Offer Document
Dated February 28, 2026
Book Built Issue

RAAJMARG INFRA INVESTMENT TRUST

The Trust has been registered in the Republic of India as an irrevocable trust set up under the Indian Trusts Act, 1882, on November 24, 2025, and registered as an infrastructure investment trust under the Securities and Exchange Board of India (Infrastructure Investment Trusts) Regulations, 2014, on December 22, 2025, having registration number IN/InvIT/25-26/0034.

Principal Place of Business: G - 5 & 6, Sector 10, Dwarka, New Delhi – 110 075
Telephone: +91 11 2507 4100/200-3211; **Compliance Officer**: Gunjan Rajpal
E-mail: compliance@riimpl.in; **Website**: www.raajmarginfratrust.in

SPONSOR	INVESTMENT MANAGER	TRUSTEE
NATIONAL HIGHWAYS AUTHORITY OF INDIA	RAAJMARG INFRA INVESTMENT MANAGERS PRIVATE LIMITED	IDBI TRUSTEESHIP SERVICES LIMITED

INITIAL PUBLIC OFFERING OF UP TO [●] UNITS OF RAAJMARG INFRA INVESTMENT TRUST ("TRUST") FOR CASH AT A PRICE OF ₹ [●] PER UNIT TOGETHER WITH SPONSOR CONTRIBUTION (AS DEFINED HERINAFTER) AGGREGATING UP TO ₹ 60,000.00 MILLION ("ISSUE"). THE ISSUE IS AN INITIAL PUBLIC OFFER IN RELIANCE UPON REGULATION 14(4) OF THE SECURITIES AND EXCHANGE BOARD OF INDIA (INFRASTRUCTURE INVESTMENT TRUSTS) REGULATIONS, 2014, AS AMENDED ("INVIT REGULATIONS").

Pursuant to the Commitment Letter, the Sponsor will subscribe to [●] Units of the Trust for a cash consideration of ₹[●] million to ensure that the aggregate unitholding of the Sponsor amounts to at least 15.00% of the total post-Issue unit capital of the Trust in order to comply with the sponsor and sponsor group lock-in requirements under Regulations 12(3) and 12(3A) of the InvIT Regulations ("**Sponsor Contribution**"). Upon Sponsor Contribution, the Issue Size will be reduced to the extent of such Sponsor Contribution (the Issue less Sponsor Contribution is hereinafter referred to as "**Net Issue**"). The Net Issue will constitute at least [●]% of the outstanding Units on a post-Issue basis.

This Issue is being made through the Book Building Process and in compliance with the InvIT Regulations and the SEBI InvIT Master Circular, wherein not more than 75.00% of the Net Issue (excluding the Strategic Investor Portion) shall be available for allocation on a proportionate basis to Institutional Investors, provided that the Investment Manager may, in consultation with the Book Running Lead Managers, allocate up to 60.00% of the Institutional Investor Portion to Anchor Investors on a discretionary basis in accordance with the InvIT Regulations and the SEBI InvIT Master Circular. Further, not less than 25.00% of the Net Issue (excluding the Strategic Investor Portion) shall be available for allocation on a proportionate basis to Non-Institutional Investors, in accordance with the InvIT Regulations and the SEBI InvIT Master Circlar, subject to valid Bids being received at or above the Issue Price. The Issue will also include participation by Strategic Investors, wherein not less than 5.00% of the Net Issue and not more than 25.00% of the Net Issue shall be allocated to the Strategic Investors in accordance with the InvIT Regulations and the SEBI InvIT Master Circular. All Bidders, other than Anchor Investors and Strategic Investors, are required to utilise the Application Supported by Blocked Amount ("**ASBA**") process by providing details of their respective ASBA accounts and UPI ID (in case of individual Non-Institutional Investors using the UPI Mechanism Bidding with a Bid Amount of ₹ 0.50 million or less), in which case the corresponding Bid Amounts will be blocked by the Self Certified Syndicate Banks ("**SCSBs**") or under the UPI Mechanism, as applicable, to participate in this Issue. Anchor Investors are not permitted to participate in the Anchor Investor Portion of the Issue through the ASBA process. For details, please see the section entitled "*Issue Information*" on page 271.

The Units have not been and will not be registered under the United States Securities Act of 1933, as amended ("**Securities Act**") and may not be offered or sold within the United States except pursuant to an exemption from, or in a transaction not subject to, the registration requirements of the Securities Act and applicable U.S. state securities laws. Accordingly, the Units are only being offered and sold outside the United States in "offshore transactions" as defined in and in reliance on Regulation S under the Securities Act ("**Regulation S**") and the applicable laws of the jurisdictions where such offers and sales are made.

The Price Band and the Minimum Bid Size (as determined by the Investment Manager in consultation with the Book Running Lead Managers) will be announced on the websites of the Trust, the Sponsor, the Investment Manager and the Stock Exchanges, as well as advertised in all editions of Economic Times (a widely circulated English national daily newspaper) and in all editions of Jansatta (a widely circulated Hindi national daily newspaper, Hindi also being the regional language of Delhi, where the registered office of the Investment Manager is located) at least two Working Days prior to the Bid/Issue Opening Date. For further information, please see the section entitled "*Basis of Issue Price*" on page 83. In case of any revision to the Price Band, the Bid/Issue Period will be extended by at least one Working Day, subject to the total Bid/ Issue Period not exceeding 30 days, provided that there shall not be more than two revisions to the Price Band during the Bid/ Issue Period. Any revision to the Price Band and the revised Bid/ Issue Period, if applicable, will be widely disseminated by notification to the Stock Exchanges during the Bid/ Issue Period and by indicating the change on the websites of the Trust, the Sponsor, the Investment Manager and Stock Exchanges. In case of force majeure, banking strike or similar circumstances, the Bid/ Issue Period may, for reasons to be recorded in writing, be extended by a minimum period of three Working Days, subject to the total Bid/ Issue Period not exceeding 30 days.

RISKS IN RELATION TO THE ISSUE

This being the first issue of the Units of the Trust, there has been no formal market for the Units of the Trust. The Issue Price, Floor Price and Cap Price determined by the Investment Manager in consultation with the Book Running Lead Managers, on the basis of assessment of market demand for the Units by way of the Book Building Process, as stated under "*Basis of Issue Price*" on page 83, should not be considered to be indicative of the market price of the Units after the Units are listed. No assurance can be given regarding an active or sustained trading in the Units or regarding the price at which the Units will be traded after listing.

GENERAL RISKS

Investments in Units involve a degree of risk and Bidders should not invest any funds in this Issue unless they can afford to take the risk of losing their entire investment. For taking an investment decision, Bidders must rely on their own examination of the Trust, the Units and this Issue. Bidders are advised to carefully read the section entitled "*Risk Factors*" on page 42 before making an investment decision relating to this Issue. Each Bidder is advised to consult its own advisors in respect of the consequences of an investment in the Units being issued pursuant to this Offer Document. This Offer Document has been prepared by the Trust solely for providing information in connection with this Issue. The Securities and Exchange Board of India ("**SEBI**") and the Stock Exchanges assume no responsibility for or guarantee the correctness or accuracy or adequacy of any statements made, opinions expressed or reports contained herein. Admission of the Units to be issued pursuant to this Issue for trading on the Stock exchanges should not be taken as an indication of the merits of the Trust or of the Units.

INVESTMENT MANAGER'S AND SPONSOR'S ABSOLUTE RESPONSIBILITY

Each of the Investment Manager and Sponsor, severally and not jointly, having made all reasonable inquiries, accept responsibility for, and confirm that this Offer Document contains all information with regard to the Trust and this Issue, which is material in the context of this Issue in accordance with the InvIT Regulations and the SEBI InvIT Master Circular and the information contained in this Offer Document is true and correct in all material respects and is not misleading in any material respect, and the opinions and intentions expressed herein are honestly held and that there are no other facts, the omission of which makes this Offer Document as a whole or any of such information or the expression of any such opinions or intentions misleading in any material respect.

LISTING

The Units to be offered pursuant to this Offer Document are proposed to be listed on the National Stock Exchange of India Limited (the "**NSE**") and BSE Limited (the "**BSE**", together with NSE, the "**Stock Exchanges**"). We have received in-principle approvals for listing of the Units from BSE and NSE pursuant to letters, each dated February 13, 2026. For the purposes of the Issue, NSE is the Designated Stock Exchange.

BOOK RUNNING LEAD MANAGERS				REGISTRAR TO THE ISSUE
SBI CAPITAL MARKETS LIMITED 1501, 15th Floor, A & B Wing Parinee Crescenzo Building, G Block, Bandra Kurla Complex, Bandra (East), Mumbai 400 051 Maharashtra, India **Tel:** +91 22 4196 8300 **E-mail:** raajmarg.ipo@sbicaps.com **Investor grievance e-mail:** investor.relations@sbicaps.com **Contact person:** Sanjay Sethia **Website:** www.sbicaps.com **SEBI registration number:** INM000003531	**AXIS CAPITAL LIMITED** 1st Floor, Axis House Pandurang Budhkar Marg, Worli Mumbai 400 025 Maharashtra, India **Tel**: +91 22 4325 2183 **E-mail**: raajmarg.ipo@axiscap.in **Investor grievance e-mail**: compliants@axiscap.com **Contact person**: Harish Patel/ Mayuri Arya **Website**: www.axiscapital.co.in **SEBI registration number**: INM000012029	**ICICI SECURITIES LIMITED** ICICI Venture House, Appasaheb Marathe Marg, Prabhadevi, Mumbai 400 025, Maharashtra, India **Tel**: +91 22 6807 7100 **E-mail**: raajmarg.ipo@icicisecurities.com **Investor grievance e-mail**: customercare@icicisecurities.com **Contact person**: Shri Subramanyam / Sumit Singh **Website**: www.icicisecurities.com **SEBI registration number**: INM000011179	**MOTILAL OSWAL INVESTMENT ADVISORS LIMITED** Motilal Oswal Tower, Rahimtullah Sayani Road, Opposite Parel ST Depot, Prabhadevi, Mumbai – 400 025, Maharashtra, India **Telephone:** +91 22 7193 4380 **E-mail:** riit.ipo@motilaloswal.com **Investor grievance e-mail:** moiaplredressal@motilaloswal.com **Contact person:** Shashank Pisat / Sankita Ajinkya **Website:** www.motilaloswalgroup.com **SEBI registration number.:** INM000011005	**KFIN TECHNOLOGIES LIMITED** Selenium, Tower B, Plot No-31 and 32, Financial District, Nanakramguda, Serilingampally, Hyderabad, Rangareddy - 500 032, Telangana, India **Tel.**: +91 1800 309 4001 / +91 40 6716 2222 **E-mail**: riimpl.invit@kfintech.com **Investor grievance e-mail**: einward.ris@kfintech.com **Website**: www.kfintech.com **Contact person**: M. Murali Krishna **SEBI registration number**: INR000000221

BID ISSUE/PROGRAM					
ANCHOR INVESTOR BIDDING DATE	**Tuesday, March 10, 2026***	**BID/ISSUE OPENS ON****	**Wednesday, March 11, 2026**	**BID/ISSUE CLOSES ON**	**Friday, March 13, 2026**

**The Investment Manager may, in consultation with the Book Running Lead Managers, consider participation by Anchor Investors in accordance with the InvIT Regulations. The Anchor Investor Bidding Date shall be one Working Day prior to the Bid/Issue Opening Date i.e. March 10, 2026.*

***The Issue also includes participation by Strategic Investors in accordance with the InvIT Regulations read with SEBI InvIT Master Circular. The Strategic Investor Allocation Price shall be paid at least one Working Day prior to the Bid/Issue Opening Date.*

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NOTICE TO INVESTORS

The statements contained in this Offer Document relating to the Trust and the Units are, in all material respects, true and accurate and not misleading, to enable the investors to make an informed decision. The opinions and intentions expressed in this Offer Document with regard to the Trust and the Units are honestly held, have been reached after considering all relevant circumstances and are based on reasonable assumptions and information presently available with the Investment Manager, the Sponsor or both, the Investment Manager and the Sponsor, as applicable. There are no other facts in relation to the Trust and the Units, the omission of which would, in the context of the Issue, make any statement in this Offer Document misleading in any material respect. Further, each of the Investment Manager and the Sponsor has made all reasonable enquiries to ascertain such facts and to verify the accuracy of all such information and statements disclosed in this Offer Document in all material respects.

Bidders acknowledge that they have neither relied on the Book Running Lead Managers nor any of its shareholders, employees, counsel, officers, directors, representatives, agents or affiliates in connection with such person's investigation of the accuracy of such information or such person's investment decision, and each such person must rely on his/her own examination of the Trust and the merits and risks involved in investing in the Units. Bidders should not construe the contents of this Offer Document as legal, business, tax, accounting or investment advice. Each Bidder acknowledges that in making an investment decision, such investor has relied solely on the information contained in the Draft Offer Document, this Offer Document and the Final Offer Document and not on any other disclosure or representation by the Investment Manager, the Project Manager, the Trustee, the Sponsor, the Book Running Lead Managers or any other party. Save as expressly stated in this Offer Document, nothing contained herein is, or may be relied upon as, a promise or representation as to the future performance of the Trust.

No person is authorized to give any information or to make any representation not contained in this Offer Document and any information or representation not so contained must not be relied upon as having been authorized by or on behalf of the Trust or by or on behalf of the Sponsor, the Investment Manager or by or on behalf of the Book Running Lead Managers.

Notice to Investors in jurisdictions outside India

The distribution of the Draft Offer Document, this Offer Document and the Final Offer Document and the offer of the Units in certain jurisdictions may be restricted by law. As such, the Draft Offer Document, this Offer Document and the Final Offer Document do not constitute, and may not be used for, or in connection with, an offer or solicitation by anyone in any jurisdiction in which such offer or solicitation is not authorized or to any person to whom it is unlawful to make such offer or solicitation. In particular, no action has been taken by the Investment Manager or the Book Running Lead Managers which would permit an offer of the Units or distribution of the Draft Offer Document, this Offer Document and the Final Offer Document in any jurisdiction, other than India. Accordingly, the Units may not be offered or sold, directly or indirectly, and neither the Draft Offer Document, this Offer Document and the Final Offer Document nor any Issue materials in connection with the Units be distributed or published in or from any country or jurisdiction that would require registration of the Units in such country or jurisdiction.

Each purchaser of the Units offered by this Offer Document will be deemed to have made the representations, agreements and acknowledgments as described in this section and the "*Issue Information*" on page 271.

Certain U.S. Matters

The Units to be issued pursuant to the Issue have not been approved, disapproved or recommended by any regulatory authority in any jurisdiction, including the United States Securities and Exchange Commission, any other federal or state authorities in the United States, the securities authorities of any non-United States jurisdiction or any other United States or non-United States regulatory authority. No authority has passed on or endorsed the merits of the Issue or the accuracy or adequacy of this Draft Offer Document. Any representation to the contrary is a criminal offence in the United States and may be a criminal offence in other jurisdictions.

The Units have not been and will not be registered under the Securities Act or any other applicable state securities laws of the United States and, unless so registered, may not be offered or sold within the United States except pursuant to an exemption from, or in a transaction not subject to, the registration requirements of the Securities Act and applicable state securities laws. Accordingly, the Units are being offered and sold in "offshore transactions" as defined in and in reliance on Regulation S under the Securities Act and the applicable laws of the jurisdictions where such offers and sales are made.

Available Information

The Investment Manager agrees to comply with any undertakings given by it from time to time in connection with the Units and, without prejudice to the generality of foregoing, shall furnish to the Unitholders all such information as may be required under the InvIT Regulations.

Disclaimer

This Offer Document does not, directly or indirectly, relate to any invitation, offer or sale of any securities, instruments or loans (including listed non-convertible debentures or bonds, if any) that may be issued by the Trust after the listing of the Units. Any person or entity investing in such issue or transaction by the Trust should consult its own advisors. Neither the Book Running Lead Managers, nor their associates or affiliates have any responsibility or liability for such issue or transaction by the Trust.

DISCLAIMER CLAUSE OF SEBI

IT IS TO BE DISTINCTLY UNDERSTOOD THAT SUBMISSION OF DRAFT OFFER DOCUMENT TO SEBI SHOULD NOT IN ANY WAY BE DEEMED OR CONSTRUED THAT THE SAME HAS BEEN CLEARED OR APPROVED BY SEBI. SEBI DOES NOT TAKE ANY RESPONSIBILITY EITHER FOR THE FINANCIAL SOUNDNESS OF ANY SCHEME OR THE PROJECT FOR WHICH THE ISSUE IS PROPOSED TO BE MADE OR FOR THE CORRECTNESS OF THE STATEMENTS MADE OR OPINIONS EXPRESSED IN THE DRAFT OFFER DOCUMENT.

IT SHOULD ALSO BE CLEARLY UNDERSTOOD THAT WHILE THE INVESTMENT MANAGER AND SPONSOR OF THE INVIT ARE PRIMARILY RESPONSIBLE FOR THE CORRECTNESS, ADEQUACY AND DISCLOSURE OF ALL RELEVANT INFORMATION IN THE OFFER DOCUMENT, THE BOOK RUNNING LEAD MANAGERS ARE EXPECTED TO EXERCISE DUE DILIGENCE TO ENSURE THAT THE SPONSOR AND THE INVESTMENT MANAGER OF THE INVIT DISCHARGES ITS RESPONSIBILITY ADEQUATELY IN THIS BEHALF AND TOWARDS THIS PURPOSE. THE BOOK RUNNING LEAD MANAGERS, SBI CAPITAL MARKETS LIMITED, AXIS CAPITAL LIMITED, ICICI SECURITIES LIMITED AND MOTILAL OSWAL INVESTMENT ADVISORS LIMITED, HAVE FURNISHED TO SEBI A DUE DILIGENCE CERTIFICATE DATED JANUARY 14, 2026 IN THIS REGARD.

THE FILING OF OFFER DOCUMENT DOES NOT, HOWEVER, ABSOLVE THE INVESTMENT MANAGER AND THE SPONSOR FROM ANY LIABILITIES AS UNDER THE INVIT REGULATIONS OR FROM THE REQUIREMENT OF OBTAINING SUCH STATUTORY OR OTHER CLEARANCES AS MAY BE REQUIRED FOR THE PURPOSE OF THE PROPOSED ISSUE. SEBI FURTHER RESERVES THE RIGHT TO TAKE UP, AT ANY POINT OF TIME, WITH THE BOOK RUNNING LEAD MANAGERS ANY IRREGULARITIES OR LAPSES IN OFFER DOCUMENT.

DISCLAIMER OF STOCK EXCHANGES

Disclaimer clause of NSE

As required, a copy of the Draft Offer Document was submitted to NSE. The disclaimer clause as intimated by NSE to us, post scrutiny of the Draft Offer Document, vide its in-principle approval dated February 13, 2026, is as follows:

"*As required, a copy of this Offer Document has been submitted to National Stock Exchange of India Limited (hereinafter referred to as NSE). NSE has, vide its letter Ref.: NSE/LIST/C/2026/0106 dated February 13, 2026, given permission to the Issuer to use the Exchange's name in this Offer Document as one of the stock exchanges on which this Issuer's units are proposed to be listed. The Exchange has scrutinized this draft offer document for its limited internal purpose of deciding on the matter granting the aforesaid permission to this Issuer. It is to be distinctly understood that the aforesaid permission given by NSE should not in any way be deemed or construed that the offer document has been cleared or approved by NSE of been cleared or approved by NSE; nor does it in any manner warrant, certify or endorse the correctness or completeness of any of the contents of this offer document; nor does it warrant that this Issuer's units will be listed or will continue to be listed on the Exchange; nor does it take any granting the aforesaid permission to this Issuer. It is to be distinctly understood that the*

aforesaid permission given by NSE should not in any way be deemed or construed that the offer document has responsibility for the financial or other soundness of this InvITs, its Sponsor, its Investment Manager or any project of this InvITs.

Every person who desires to apply for or otherwise acquire any units of this InvITs may do so pursuant to independent inquiry, investigation and analysis and shall not have any claim against the Exchange whatsoever by reason of any loss which may be suffered by such person consequent to or in connection with such subscription /acquisition whether by reason of anything stated or omitted to be stated herein or any other reason whatsoever."

Disclaimer clause of BSE

As required, a copy of the Draft Offer Document was submitted to BSE. The disclaimer clause as intimated by BSE to us, post scrutiny of the Draft Offer Document, vide its in-principle approval dated February 13, 2026, is as follows:

"*BSE Limited (the "**Exchange**") has given vide its letter dated February 13, 2026, permission to this Trust to use the Exchange's name in this offer document as one of the stock exchanges on which this Units of this Trust are proposed to be listed. The Exchange has scrutinized this offer document for its limited internal purpose of deciding on the matter of granting the aforesaid permission to this Trust. The Exchange does not in any manner:*

- *warrant, certify or endorse the correctness or completeness of any of the contents of this offer document; or*
- *warrant that this Trust Units will be listed or will continue to be listed on the Exchange; or*
- *take any responsibility for the financial or other soundness of this Trust, its Investment Manager, its Sponsor(s), its Trustee or Project Manager(s);*

and it should not for any reason be deemed or construed that this offer document has been cleared or approved by the Exchange. Every person who desires to apply for or otherwise acquires the Units of this Trust may do so pursuant to independent inquiry, investigation and analysis and shall not have any claim against the Exchange whatsoever by reason of any loss which may be suffered by such person consequent to or in connection with such subscription/acquisition whether by reason of anything stated or omitted to be stated herein or for any other reason whatsoever."

IMPORTANT NOTICE

THE VALUE OF UNITS AND THE INCOME DERIVED FROM THEM MAY FALL AS WELL AS RISE. UNITS ARE NOT OBLIGATIONS OF, DEPOSITS IN, OR GUARANTEED BY, THE TRUST, THE TRUSTEE, THE SPONSOR, THE INVESTMENT MANAGER, THE BOOK RUNNING LEAD MANAGERS OR ANY OF THEIR RESPECTIVE SHAREHOLDERS, EMPLOYEES, COUNSEL, OFFICERS, DIRECTORS, REPRESENTATIVES, AGENTS, ASSOCIATES OR AFFILIATES. AN INVESTMENT IN UNITS IS SUBJECT TO INVESTMENT RISKS, INCLUDING THE POSSIBLE LOSS OF THE PRINCIPAL AMOUNT INVESTED. FURTHER, LISTING OF THE UNITS ON THE STOCK EXCHANGES DOES NOT GUARANTEE A LIQUID MARKET FOR THE UNITS. INVESTORS HAVE NO RIGHT TO REQUEST THE TRUST, THE TRUSTEE, THE SPONSOR OR THE INVESTMENT MANAGER OR ANY OF THEIR RESPECTIVE SHAREHOLDERS, EMPLOYEES, COUNSEL, OFFICERS, DIRECTORS, REPRESENTATIVES, AGENTS, ASSOCIATES OR AFFILIATES TO REDEEM THEIR UNITS WHILE THE UNITS ARE LISTED, UNLESS OTHERWISE PERMITTED BY APPLICABLE LAW. THE PERFORMANCE OF ANY OF THE LISTED UNITS OF THE TRUST IS NOT NECESSARILY INDICATIVE OF THE FUTURE PERFORMANCE OF UNITS OF THE TRUST.

DEFINITIONS AND ABBREVIATIONS

This Offer Document uses the definitions and abbreviations set forth below which you should consider when reading the information contained herein.

References to any legislation, act, regulations, rules, guidelines, circulars, notifications, clarifications or policies shall be to such legislation, act, regulations, rules, guidelines, circulars, notifications, clarifications or policies as amended, supplemented, or re-enacted from time to time and any reference to a statutory provision shall include any subordinate legislation made under that provision.

The words and expressions used in this Offer Document but not defined herein shall have the meaning ascribed to such terms under the InvIT Regulations, the SEBI Act, the Depositories Act, and the rules and regulations made thereunder.

Notwithstanding the foregoing, the terms not defined but used in the sections entitled "Audited Financial Information", "Projections of Revenue from Operations and Cash Flow from Operating Activities", "Taxation" and "Material Litigation and other Regulatory Action" on pages 315, 334, 296 and 246, respectively, shall have the meanings ascribed to such terms in those respective sections.

In this Offer Document, unless the context otherwise requires, a reference to "we", "us" and "our" refers to the Trust and the Project SPV on a consolidated basis.

Trust Related Terms

Term	Description
Asset Revenue Information	Revenue data of the InvIT Assets as has been collected through toll collection and maintenance contracts, for the period between April 1, 2022, to January 31, 2026.
Associate	Associate shall have the meaning as set forth in Regulation 2(1)(b) of the InvIT Regulations. Set forth below are the associates of the Sponsor/Sponsor Group, Investment Manager, Project Manager and the Trust (other than the Parties to the Trust): i. DME Development Limited; ii. Indian Highways Management Company Limited; iii. National Highways Logistics Management Limited; iv. Ahmedabad Vadodara Expressway Company Limited; v. Calcatta-Haldia Port Road Company Limited; vi. Mormugao Port Road Company Limited; vii. New Mangalore Port Road Company Limited; viii. Paradip Port Road Company Limited; ix. Tuticorin Port Road Company Limited; x. Vishakhapatnam Port Road Company Limited; xi. Mumbai- JNPT- Port Road Company Limited; and xii. Chennai- Ennore Port Road Company Limited Since the capital of NHAI is funded by the Central Government and the Members are appointed by the Central Government, the Regulations 2(1)(b)(ii) and 2(1)(b)(iii) of the InvIT Regulations are not applicable to NHAI. Accordingly, only such associates of NHAI in accordance with Regulation 2(1)(b)(i) of the InvIT Regulations i.e., '*any person controlled, directly or indirectly, by the said person*' have been identified as associates.
Audit Committee	The audit committee of the Investment Manager constituted in accordance with the applicable law
Audited Financial Information	The special purpose standalone audited financial information of the Trust, for the period from the date of its settlement, that is November 24, 2025, till December 31, 2025
Auditors	A.R. & Co., Chartered Accountants, statutory auditors of the Trust
Borrowing Policy	The borrowing policy of the Trust adopted by the Investment Manager pursuant to a resolution of the IM Board dated December 15, 2025
CARE Industry Report	The report titled "*Research Report on Road Sector in India*" dated January 10, 2026, prepared by CARE Analytics and Advisory Private Limited
Chennai Bypass	The six-lane section from km 0+000 to km 32+600 of NH-32 and NH-48, in the state of Tamil Nadu, having total length of 32.600 km

Term	Description
Chennai-Tada	The six-lane section from km 21+400 to km 54+400 of NH-16, in the state of Tamil Nadu, having total length of 33.000 km
Chilakaluripet -Vijayawada	The six-lane section from Chilakaluripet to Vijayawada from km 355+000 to km 357+342 and from km 372+038 to km 422+605 along with Chilakaluripet bypass section from 0+000 to km 16+499 ("**Chilakaluripet Bypass**") of NH 16, in the state of Andhra Pradesh, having total length of 69.408 km
Commitment Letter	The letter dated January 12, 2026, from Sponsor to the Investment Manager, pursuant to which the Sponsor has agreed to subscribe to such number of Units which shall be equivalent to at least 15.00% of the total post-Issue unit capital of the Trust in order to comply with the sponsor and sponsor group lock-in requirements under Regulations 12(3) and 12(3A) of the InvIT Regulations. For details, see '*Formation Transactions in relation to the Trust – Sponsor Contribution*' on page 26
Compliance Officer	The compliance officer of the Trust, namely, Gunjan Rajpal
Concession Agreements	The concession agreements to be entered into by the Project SPV and NHAI in relation to the InvIT Assets
Credit Rating Agencies	Collectively, CARE Ratings Limited and India Ratings & Research Private Limited
Distribution Policy	The distribution policy adopted by the Investment Manager pursuant to a resolution of the IM Board dated December 15, 2025
Facility Agreement	The rupee term loan agreement dated February 27, 2026, entered into between Punjab National Bank and the Trust
Gorhar-Barwa Adda	The four/six lane section from Gorhar to Barwa Adda from km 320+810 to km 400+632 (design km 401+332) of NH-19 (old NH-2), comprising km 320+810 to km 326+000 between Gorhar and Atka, being a 4 lane section; Atka to Khairatunda from km 326+000 to km 360+300 (design km 361+000) and Khairatunda to Barwa Adda from km 360+300 (design km 361+000) to km 400+632 (design km 401+332), being 6 lane sections, in the state of Jharkhand, having total length of 80.522 km
Holdco(s)	A holding company, as defined under Regulation 2(1)(sb) of the InvIT Regulations.
IM Board	The board of directors of the Investment Manager
Investment Management Agreement	Investment management agreement dated December 2, 2025, entered into between the Trustee (on behalf of the Trust) and the Investment Manager
Investment Manager or RIIMPL	Raajmarg Infra Investment Managers Private Limited
Investment Objectives	The investment objectives of the Trust, as provided under the section entitled "*Overview of the Trust*" on page 24
InvIT Assets	InvIT assets as defined in Regulation 2(1)(zb) of the InvIT Regulations, in this case being the concessions to be granted under the Concession Agreements to RPPL in respect of: (i) Chennai Bypass, (ii) Chennai-Tada, (iii) Chilakaluripet-Vijayawada, (iv) Gorhar-Barwa Adda and (v) Neelmangla-Tumkur.
InvIT Documents	(i) The Trust Deed; (ii) the Investment Management Agreement; (iii) the Project Implementation and Management Agreement; (iv) Transitional Support Agreement and (v) such other policies, documents, agreements and letters executed in connection with the Trust, as originally executed and amended, modified, supplemented or restated from time to time, together with the respective annexures, schedules and exhibits, if any
Neelmangla-Tumkur	The four/six lane section from Neelmangla to Tumkur from km 29+500 to km 74+168 of NH-48, comprising km 29+500 to km 49+900 between Neelmangla to Dobbaspet, being a 6 lane section; Dobbaspet to Tumkur from km 49+900 to km 61+520, being a 4 lane section and Tumkur Bypass from km 61+520 to km 74+168, being a 6 lane section, in the state of Karnataka, having total length of 44.668 km
Nomination and Remuneration Committee	The nomination and remuneration committee of the Investment Manager constituted in accordance with the applicable law
Parties to the Trust	The Sponsor/Sponsor Group, the Trustee, the Investment Manager and the Project Manager
Project Implementation and Management Agreement	Project implementation and management agreement dated January 6, 2026, entered into amongst the Trustee (on behalf of the Trust), the Project Manager, the Investment Manager and the Project SPV
Project Manager / NHIPMPL	National Highways InvIT Project Managers Private Limited
Project SPV / RPPL	Raajmarg 1 Projects Private Limited
Projections of Revenue from Operations and Cash Flow from Operating Activities	Projections of revenue from operations and cash flow from operating activities of the Trust (consisting of the Trust and the Project SPV) for the years ending March 31, 2026, March 31, 2027, March 31, 2028 and March 31, 2029, along with the basis of preparation and other explanatory information and significant assumptions
Related Parties	Related parties, as defined under Regulation 2(1)(zv) of the InvIT Regulations
Risk Management Committee	The risk management committee of the Investment Manager constituted in accordance with the applicable law
Risk Management Policy	The risk management policy adopted by the IM Board vide resolution dated December 15, 2025

Term	Description
Sponsor	The sponsor of the Trust, National Highways Authority of India
Sponsor Contribution	The subscription of such number of Units which shall be equivalent to at least 15.00% of the total Units of the Trust on a post-Issue basis, for a cash consideration of such amount, by the Sponsor in accordance with the terms of the Commitment Letter
Sponsor Group	National Highways Authority of India
SPV(s)	Special purpose vehicles, as defined in Regulation 2(1)(zy) of the InvIT Regulations
Stakeholders Relationship Committee	The stakeholder relationship committee of the Investment Manager constituted in accordance with the applicable law
Technical Consultant	(i) URS Scott Wilson India Private Limited in JV with Marc Technocrats Private Limited, and (ii) Chaitanya Projects Consultancy Limited in association with Shree Bhawani Consultancy Services Private Limited
Technical Reports	Technical consultant reports each dated January 2026, issued by the Technical Consultant, concerning the InvIT Assets, which forms part of this Offer Document, as set out in Annexure B
Traffic Consultants	Translink Infrastructure Consultants Private Limited in association with Infra Brainiacs Private Limited
Traffic Reports	Traffic consultant reports each dated January 9, 2026, issued by the Traffic Consultant, concerning the InvIT Assets, which forms part of this Offer Document, as set out in Annexure C
Transitional Support Agreement	The transitional support agreement dated February 27, 2026, entered into amongst the Sponsor, Project Manager and the Project SPV. For further details, please see the section entitled "*Related Party Transactions – Transitional Support Agreement*" on page 232.
Trust / InvIT	Raajmarg Infra Investment Trust
Trust Deed	Trust deed dated November 24, 2025, entered into between the Sponsor and the Trustee
Trust Group	The Trust together with the Project SPV
Trust Loan Agreements	The loan agreements, each dated February 27, 2026, entered into between the Trust (acting through the Trustee), the Investment Manager and the Project SPV
Trustee	IDBI Trusteeship Services Limited
Unexpired Cash Flow	The amount calculated by multiplying concession fee with the percentages provided in the relevant Concession Agreements
Unit	An undivided beneficial interest in the Trust, and such Units together represent the entire beneficial interest in the Trust
Unitholder(s)	Any Person who holds Units (as hereinafter defined) upon making a defined contribution as determined by the Trustee
Valuation Report	The valuation report dated January 12, 2026, issued by the Valuer, which sets out their opinion as to the fair enterprise value of the InvIT Assets as on December 31, 2025, which is set out in Annexure A to this Offer Document
Valuer	RBSA Valuation Advisors LLP

Issue Related Terms

Term	Description
Abridged Offer Document	The memorandum containing such salient features of this Offer Document in accordance with InvIT Regulations and SEBI InvIT Master Circular and as specified by SEBI in this regard
Acknowledgement Slip	The slip or document issued by the Designated Intermediary to a Bidder as proof of registration of the Bid cum Application Form
Allocated/ Allocation	Allocation of Units, following the determination of the Issue Price by the Investment Manager, in consultation with the Book Running Lead Managers, to Bidders on the basis of the Application Form submitted by the Bidder
Allot/ Allotment/ Allotted	Unless the context otherwise requires, the issue and allotment of Units pursuant to the Issue to the successful Bidders
Allotment Advice	The note or advice or intimation of Allotment sent to each of the successful Bidders who have been or are to be Allotted Units after the Basis of Allotment has been approved by the Designated Stock Exchange
Allottees	Successful bidders to whom Units are Allotted in this Issue
Anchor Investor	An Institutional Investor (including a Strategic Investor), making an application of a value of at least ₹ 100.00 million, applying under the Anchor Investor Portion in accordance with the requirements specified in the InvIT Regulations and the SEBI InvIT Master Circular, in terms of this Offer Document
Anchor Investor Allocation Price	The price at which Units will be allocated to Anchor Investors during the Anchor Investor Bidding Date in terms of this Offer Document, as decided by the Investment Manager in consultation with the Book Running Lead Managers
Anchor Investor Application Form	The application form used by an Anchor Investor to make a Bid in the Anchor Investor Portion in accordance with the requirements of the InvIT Regulations and SEBI InvIT Master Circular and

Term	Description
	which will be considered as an application for Allotment in terms of this Offer Document
Anchor Investor Bidding Date	The day being one Working Day prior to the Bid/Issue Opening Date, on which Bids by Anchor Investors are to be submitted, prior to and after which no bids will be accepted from Anchor Investors i.e. March 10, 2026
Anchor Investor Issue Price	The final price at which Units will be Allotted to Anchor Investors in terms of this Offer Document and the Final Offer Document, which price will be equal to or higher than the Issue Price but not higher than the Cap Price. The Anchor Investor Issue Price will be decided by the Investment Manager in consultation with the Book Running Lead Managers.
Anchor Investor Pay-in Date	With respect to Anchor Investor(s), the Anchor Investor Bid/ Issue Period, and in the event the Anchor Investor Allocation Price is lower than the Anchor Investor Issue Price, not later than two Working Days after the Bid/ Issue Closing Date
Anchor Investor Portion	Up to 60.00% of the Institutional Investor Portion, which may be allocated by the Investment Manager in consultation with the Book Running Lead Managers on a discretionary basis
Application Supported by Blocked Amount or ASBA	An application, whether physical or electronic, used by ASBA Bidders to make a Bid by authorizing an SCSB to block the Bid Amount in the ASBA Account and will include applications made by UPI Bidders using the UPI Mechanism where the Bid Amount will be blocked upon acceptance of UPI Mandate Request by the UPI Bidders using the UPI Mechanism
ASBA Account	A bank account maintained with an SCSB and specified in the ASBA Form for blocking the Bid Amount mentioned in the ASBA Form and includes the account of a UPI Bidder in which the Bid Amount is blocked upon acceptance of a UPI Mandate Request made by the UPI Bidders using the UPI Mechanism
ASBA Bid	A Bid made by an ASBA Bidder including all revisions and modifications thereto as permitted under the InvIT Regulations
ASBA Bidder	All Bidders other than Anchor Investors and Strategic Investors
ASBA Form	An application form, whether physical or electronic, used by ASBA Bidders which will be considered as the application for Allotment in terms of this Offer Document and the Final Offer Document
Axis	Axis Capital Limited
Banker(s) to the Issue	Collectively, the Escrow Collection Bank, the Public Issue Account Bank, the Refund Bank, the Sponsor Banks and the Sponsor Contribution Bank.
Basis of Allotment	The basis on which Units will be Allotted to successful Bidders under the Issue, as described in "*Issue Information"* on page 271
Bid	An indication to make an offer during the Bid/Issue Period by an ASBA Bidder pursuant to submission of the ASBA Form, or on the Anchor Investor Bidding Date by an Anchor Investor pursuant to submission of the Anchor Investor Application Form, to subscribe to or purchase Units of the Trust at a price within the Price Band, including all revisions and modifications thereto as permitted and including any participation by Strategic Investors under the InvIT Regulations and this Offer Document and the Bid cum Application Form. The term "Bidding" shall be construed accordingly.
Bid Amount	The highest value of optional Bids indicated in the Bid cum Application Form and payable by the Bidder or blocked in the ASBA Account of the ASBA Bidder, as the case may be, upon submission of the Bid in the Issue.
Bid cum Application Form	The Anchor Investor Application Form or the ASBA Form, as the context requires
Bid/Issue Closing Date	Except in relation to any Bids received from the Anchor Investors and Strategic Investors, the date after which the Designated Intermediaries will not accept any Bids, being March 13, 2026, which will be published in editions of Economic Times (a widely circulated English national daily newspaper) and in all editions of Jansatta (a widely circulated Hindi national daily newspaper, Hindi also being the regional language of Delhi, where the registered office of the Investment Manager is located)
Bid/Issue Opening Date	Except in relation to any Bids received from the Anchor Investors and Strategic Investors, the date on which the Designated Intermediaries shall start accepting Bids, being March 11, 2026 which will be published in all editions of Economic Times (a widely circulated English national daily newspaper) and in all editions of Jansatta (a widely circulated Hindi national daily newspaper, Hindi also being the regional language of Delhi, where the registered office of the Investment Manager is located)
Bid/Issue Period	Except in relation to Anchor Investors and Strategic Investors, the period between the Bid/Issue Opening Date and the Bid/ Issue Closing Date, inclusive of both days, during which Bidders can submit their Bids, including any revisions thereof
Bidder	Any prospective investor who makes a Bid pursuant to the terms of this Offer Document and the Bid cum Application Form and for a Strategic Investor in terms of the Unit Subscription Agreement and unless otherwise stated or implied, includes an ASBA Bidder, Anchor Investor and Strategic Investors
Bidding Centres	Centres at which the Designated Intermediaries shall accept ASBA Forms, i.e. Designated SCSB

Term	Description
	Branch for SCSBs, Specified Locations for Syndicate, Broker Centres for Registered Brokers, Designated RTA Locations for RTAs and Designated CDP Locations for CDPs
Body Corporate / Bodies Corporate	Body Corporate / Bodies corporate as defined in Regulation 2(1)(d) of the InvIT Regulations
Book Building Process	The book building process, as provided in Part A of Schedule XIII of the SEBI ICDR Regulations
Book Running Lead Managers	The book running lead managers to the Issue, namely, SBI Capital Markets Limited, Axis Capital Limited, ICICI Securities Limited and Motilal Oswal Investment Advisors Limited
Broker Centres	Broker centres notified by the Stock Exchanges where Bidders can submit the ASBA Forms to a Registered Broker. The details of such broker centres, along with the names and contact details of the Registered Brokers are available on the websites of the respective Stock Exchanges (www.bseindia.com and www.nseindia.com)
Business Day	Any day from Monday to Friday, excluding any public holiday
Cap Price	The higher end of the Price Band, being ₹ [●] per Unit, above which the Issue Price will not be finalized and above which no Bids will be accepted
Cash Escrow and Sponsor Bank Agreement	The cash escrow and sponsor bank agreement dated February 28, 2026 entered into amongst the Trust (acting through the Trustee), the Trustee, the Sponsor, the Investment Manager, the Registrar to the Issue, the Book Running Lead Managers and the Bankers to the Issue for *inter alia*, collection of the Bid Amounts from Anchor Investors and Strategic Investors, transfer of funds to the Public Issue Account and where applicable, remitting refunds of the amounts collected from Anchor Investors and Strategic Investors, on the terms and conditions thereof in accordance with the UPI circulars
Client ID	Client identification number maintained with one of the Depositories in relation to a dematerialised account
Closing Date	The date on which Allotment of Units pursuant to the Issue shall be made, i.e. on or about March 18, 2026
Collecting Depository Participant or CDP	A depository participant as defined under the Depositories Act, registered with SEBI and who is eligible to procure Bids at the Designated CDP Locations in terms of circular no. CIR/CFD/POLICYCELL/11/2015 dated November 10, 2015, issued by SEBI
Confirmation of Allocation Note / CAN	The notice or intimation of allocation of Units sent to Anchor Investors who have been allocated Units, after the Anchor Investor Bidding Date, and Strategic Investors, as applicable
Demographic Details	Details of the Bidders, including the Bidder's address, investor status, occupation and bank account details, PAN, DP ID and Client ID
Depository Participant or DP	A depository participant as defined under the Depositories Act, 1996.
Designated Date	The date on which funds are transferred from the Escrow Accounts to Public Issue Account or the Refund Account, as the case maybe and/or the instructions are issued to SCSBs (in case of UPI Bidders, instructions issued through the Sponsor Banks) for the transfer of the relevant amounts blocked by the SCSBs in the ASBA Accounts to the Public Issue Account and/ or are unblocked, as the case may be, in terms of this Offer Document and Final Offer Document, after finalization of the Basis of Allotment in consultation with the Designated Stock Exchange, following which the Units will be Allotted to successful Bidders in the Issue
Designated Intermediaries	Syndicate, sub-syndicate/agents, SCSBs, Registered Brokers, CDPs and RTAs, who are authorized to collect ASBA Forms from the ASBA Bidders, in relation to the Issue.
Designated RTA Locations	Such locations of the RTAs where Bidders can submit ASBA Forms to RTAs. The details of such Designated RTA Locations, along with names and contact details of the RTAs eligible to accept Bid cum Application Forms are available on the respective websites of the Stock Exchanges (www.bseindia.com and www.nseindia.com)
Designated SCSB Branches	Such branches of the SCSBs which shall collect the ASBA Forms, a list of which is available on the website of SEBI at https://www.sebi.gov.in/sebiweb/other/OtherAction.do?doRecognised=yes or at such other website as may be prescribed by SEBI from time to time
Designated Stock Exchange	NSE
DP ID	Depository Participant's Identification
Draft Offer Document	The draft offer document dated January 14, 2026, issued in accordance with the InvIT Regulations and SEBI InvIT Master Circular, which did not contain complete particulars of the price at which the Units will be Allotted and the size of the Issue
Escrow Accounts	The 'no-lien' and 'non-interest bearing' accounts opened with the Escrow Collection Bank and in whose favour the Bidders (excluding ASBA Bidders) will transfer money through NACH/direct credit/NEFT/RTGS in respect of the Bid Amount when submitting a Bid
Escrow Collection Bank	ICICI Bank Limited
Final Offer Document	Final offer document to be filed with SEBI and the Stock Exchanges after the Pricing Date in accordance with the InvIT Regulations containing, amongst other things, the Issue Price that is determined at the end of the Book Building Process, the size of this Issue and certain other

Term	Description
	information, including any addenda or corrigenda thereto
First Bidder	The Bidder whose name shall be mentioned first in the Bid cum Application Form or the Revision Form and in case of joint Bids, whose name shall also appear as the first holder of the beneficiary account held in joint names
Floor Price	The lower end of the Price Band, subject to any revision thereto, in this case being ₹ [●] at or above which the Issue Price, the Anchor Investor Issue Price and Strategic Investor Issue Price will be finalised and below which no Bids will be accepted
Institutional Investor Portion	Portion of the Issue (including the Anchor Investor Portion) being not more than 75.00% of the Net Issue (excluding Strategic Investor Portion), comprising not more than [●] Units which shall be available for allocation to Institutional Investors (including Anchor Investors), subject to valid Bids being received at or above the Issue Price
Institutional Investors	Institutional investor means: (i) a Qualified Institutional Buyer, or (ii) a family trust or intermediaries registered with SEBI, having a net-worth of more than ₹ 5,000.00 million as per the latest audited financial statements
I-Sec	ICICI Securities Limited
Issue	The issue of up to [●] Units (as defined below) for cash at a price of ₹ [●] per Unit aggregating up to ₹ 60,000.00 million. Pursuant to the Commitment Letter, the Sponsor will subscribe to [●] Units of the Trust for a cash consideration of ₹ [●] million to ensure that the aggregate unitholding of the Sponsor amounts to at least 15.00% of the total post-Issue unit capital of the Trust in order to comply with the sponsor and sponsor group lock-in requirements under Regulations 12(3) and 12(3A) of the InvIT Regulations. Upon Sponsor Contribution, the Issue Size will be reduced to the extent of such Sponsor Contribution.
Issue Agreement	The issue agreement dated January 14, 2026, entered into amongst the Trust (acting through the Trustee), the Investment Manager, the Trustee, the Sponsor, the Project Manager and the Book Running Lead Managers, pursuant to which certain arrangements have been agreed to in relation to the Issue, read with the amendment to the issue agreement dated February 28, 2026
Issue Price	₹ [●] per Unit, being the final price at which Units will be Allotted to successful Bidders, other than Anchor Investors and Strategic Investors in terms of this Offer Document. The Issue Price will be decided by the Investment Manager in consultation with the Book Running Lead Managers on the Pricing Date in accordance with the Book Building Process and in terms of this Offer Document and the Final Offer Document.
Issue Proceeds	The proceeds of the Issue (including the Sponsor Contribution), aggregating up to ₹ 60,000.00 million. For further details about the use of the Issue Proceeds and the Issue Expenses, please see the section entitled '*Use of Proceeds*' on page 211
Issue Size	[●] Units aggregating up to ₹60,000.00 million
Listing Agreement	Any listing agreement to be entered into with the Stock Exchanges by the Trust, in line with the format as specified under the Securities and Exchange Board of India circular number CIR/CFD/CMD/6/2015 dated October 13, 2015, on "Format of uniform Listing Agreement"
Listing Date	The date on which the Units will be listed on the Stock Exchange
Minimum Bid Size	₹ [●]
Motilal	Motilal Oswal Investment Advisors Limited
Mutual Funds	Mutual funds registered with SEBI under the Securities and Exchange Board of India (Mutual Funds) Regulations, 1996
Net Issue	The Issue less Sponsor Contribution
Net Proceeds	The gross proceeds of the Fresh Issue, less the offer expenses
Non – Institutional Investors	All Bidders, that are not Institutional Investors, who have Bid for Units in the Issue.
Non-Institutional Investor Portion	Portion of the Issue being not less than 25.00% of the Net Issue (excluding Strategic Investor Portion), comprising at least [●] Units, which shall be available for allocation on a proportionate basis to Non-Institutional Investors, subject to valid Bids being received at or above the Issue Price
Non-Resident Indian/ Non-Resident	An individual resident outside India who is a citizen or is an 'overseas citizen of India' cardholder within the meaning of Section 7A of the Citizenship Act, 1955 and includes a Non-Resident Indian, FVCIs, FIIs and FPIs
Offer Document	This Offer Document dated February 28, 2026 issued in accordance with the provisions of the InvIT Regulations, which does not have complete particulars of the Price Band and the Issue Price at which the Units will be offered and the size of this Issue including any addenda, corrigenda thereto. This Offer Document has been filed with SEBI and the Stock Exchanges and shall become the Final Offer Document which shall be filed with SEBI and the Stock Exchanges after the Pricing Date.

Term	Description
Price Band	Price band between the minimum price of ₹ [●] per Unit (Floor Price) and the maximum price of ₹ [●] per Unit (Cap Price) including any revision thereof. The Price Band will be decided by the Investment Manager, in consultation with the Book Running Lead Managers, and will be announced at least two Working Days prior to the Bid/ Issue Opening Date, on the websites of the Trust, the Sponsor and the Investment Manager, and shall be made available to the Stock Exchanges for the purpose of uploading on their respective websites.
Pricing Date	The date on which the Investment Manager in consultation with the Book Running Lead Managers, finalizes the Issue Price in accordance with the Book Building Process and in terms of this Offer Document and the Final Offer Document.
Public Issue Account	'No-lien and 'non-interest bearing' bank account opened to receive monies from the Escrow Accounts and from the ASBA Accounts as well the Sponsor Contribution on the Designated Date.
Public Issue Account Bank	HDFC Bank Limited
Qualified Institutional Buyers or QIB(s)	Qualified institutional buyers, as defined under Regulation 2(1)(ss) of the SEBI ICDR Regulations, which currently includes (i) a mutual fund, venture capital fund, alternative investment fund and foreign venture capital investor registered with SEBI, (ii) foreign portfolio investor other than individuals, corporate bodies and family offices, (iii) a public financial institution, (iv) a scheduled commercial bank, (v) a multilateral and bilateral development financial institution, (vi) a state industrial development corporation, (vii) an insurance company registered with the IRDAI, (viii) a provident fund with minimum corpus of ₹ 250 million, (ix) a pension fund with minimum corpus of ₹ 250 million registered with the Pension Fund Regulatory and Development Authority established under subsection (1) of section 3 of the Pension Fund Regulatory and Development Authority Act, 2013, (x) National Investment Fund set up by resolution no. F. No. 2/3/2005-DDII dated November 23, 2005 of the GoI published in the Gazette of India, (xi) insurance funds set up and managed by army, navy or air force of the Union of India, (xii) insurance funds set up and managed by the Department of Posts, India, (xiii) systemically important non-banking financial companies and (xiv) accredited investors as defined in clause (ab) of sub-regulation (1) of regulation 2 of the Securities and Exchange Board of India (Alternative Investment Funds) Regulations, 2012, for the limited purpose of their investment in Angel Funds registered with the Board, under the Securities and Exchange Board of India (Alternative Investment Funds) Regulations, 2012
Refund Account(s)	'No-lien' and 'non-interest bearing' account(s) opened with the Refund Bank, from which refunds, if any, of the whole or part of the Bid Amount to Anchor Investors and Strategic Investors shall be made
Refund Bank	ICICI Bank Limited
Registered Brokers	Stock brokers registered with the stock exchanges having nationwide terminals, other than Book Running Lead Managers and the Syndicate Members, eligible to procure Bids in terms of Circular No. CIR/CFD/14/2012 dated October 4, 2012, issued by SEBI
Registrar Agreement	The agreement dated January 14, 2026, entered into between the Trustee (on behalf of the Trust), the Investment Manager, and the Registrar to the Issue in relation to the responsibilities and obligations of the Registrar to the Issue pertaining to the Issue.
Registrar or Registrar to the Issue	KFin Technologies Limited
Revision Form	The form used by the Bidders to modify the quantity of Units or the Bid Amount in any of their ASBA Forms or any previous Revision Forms. Bidders are not allowed to withdraw or lower their Bids (in terms of number of Units or the Bid Amount) at any stage.
SBICAPS	SBI Capital Markets Limited
Self-Certified Syndicate Bank(s) or SCSB(s)	Banks registered with SEBI, offering services in relation to ASBA, a list of which is available on the website of SEBI at https://www.sebi.gov.in/sebiweb/other/OtherAction.do?doRecognisedFpi=yes&intmId=34 or https://www.sebi.gov.in/sebiweb/other/OtherAction.do?doRecognisedFpi=yes&intmId=35, as applicable, or such other website as updated from time to time, and updated from time to time
Specified Locations	Bidding centres where the Syndicate shall accept ASBA Forms from Bidders
Sponsor Bank(s)	Together, ICICI Bank Limited and HDFC Bank Limited
Stock Exchanges	Together, BSE and NSE
Strategic Investor(s)	A strategic investor means,(i) an institutional investor, or (ii) a foreign portfolio investor not covered under (i), or (iii) a middle layer, upper layer and top layer non-banking finance company registered with RBI or (iv) such entities as SEBI may specify from time to time, who invest, either jointly or severally, not less than five percent and not more than 25% of the Net Issue or such amount as may be specified by SEBI from time to time, subject to compliance with the applicable provisions, if any, of the FEMA and the rules regulations or guidelines made thereunder, provided that if the entity is regulated by any financial sector regulator, SEBI shall consult such financial sector regulator prior to specifying the entity as a strategic investor under Regulation 2(1)(zza)(d), in this case being: (i) CBT-EPF-05-F-DM; (ii) CBT-EPF-11-F-DM; (iii) CBT-EPF-05-E-DM; (iv)

Term	Description
	CBT-EPF-11-E-DM; and (v) SBI Life Insurance Company Limited.
Strategic Investor Allocation Price	₹ 100.00
Strategic Investor Issue Price	The final price at which Units will be Allotted to Strategic Investors in terms of this Offer Document and the Final Offer Document, which price will be equal to or higher than the Issue Price.
Strategic Investor Portion	Portion of the Net Issue being up to 126,000,000 Units aggregating up to ₹ 12,600.00 million, subject to a minimum of 5.00% of the Net Issue and a maximum of 25.00% of the Net Issue which shall be available for allocation to Strategic Investors
Unit Subscription Agreements	Unit Subscription Agreements, each dated February 26, 2026, entered into between the Trust, the Investment Manager and the respective Strategic Investors, as described in the section entitled "*The Issue*" beginning on page 21.
Sponsor Contribution Bank	Yes Bank Limited
Sub-Syndicate Members	The sub-syndicate members, if any, appointed by the Book Running Lead Managers and the Syndicate Members, to collect ASBA Forms and Revision Forms.
Syndicate Agreement	The syndicate agreement, dated February 28, 2026, entered into between the Trustee (on behalf of the Trust), the Investment Manager, the Lead Manager, the Syndicate Members and the Registrar to the Issue in relation to collection of Bid cum Application Forms by the Syndicate
Syndicate Members	Intermediaries, registered with SEBI who are permitted to accept bids, applications and place orders with respect to the issue, i.e. SBICAP Securities Limited and Motilal Oswal Financial Advisors Limited
Syndicate/ Members of the Syndicate	The Book Running Lead Managers and the Syndicate Members
UPI	Unified Payments Interface, which is an instant payment mechanism, developed by NPCI
UPI Bidder(s)	Individual Non-Institutional Investors with an application size of up to ₹ 0.50 million in the Non-Institutional Category, and Bidding under the UPI Mechanism through ASBA Form(s) submitted with Syndicate Members, Registered Brokers, Collecting Depository Participants and Registrar and Share Transfer Agents
UPI ID	ID created on the UPI for single-window mobile payment system developed by the NPCI
UPI Mandate Request	A request (intimating the UPI Bidders, by way of a notification on the UPI linked mobile application and by way of an SMS directing the UPI Bidders to such UPI linked mobile application) to the UPI Bidders using the UPI Mechanism initiated by the Sponsor Bank(s) to authorise blocking of funds equivalent to the Bid Amount in the relevant ASBA Account through the UPI linked mobile application, and the subsequent debit of funds in case of Allotment
UPI Mechanism	The Bidding mechanism that may be used by UPI Bidders to make Bids in the Issue in accordance with the InvIT Regulations
Working Day	Working day, with reference to (a) announcement of Price Band; and (b) Bid/ Issue Period, shall mean all days, excluding Saturdays, Sundays and public holidays, on which commercial banks in Mumbai are open for business; and (c) the time period between the Bid/ Issue Closing Date and the listing of the Units on the Stock Exchanges, shall mean all trading days of Stock Exchanges, excluding Sundays and bank holidays

Technical and Industry Related Terms

Term	Description
AADC	Annual Average Daily Collection
AADT	Annual Average Daily Traffic
ADT	Average Daily Traffic
AL	Axle Load
CAGR	Compound Annual Growth Rate
CBIC	Chennai – Bengaluru Industrial Corridor
CFS	Container Freight Station
CJV	Car / Jeep / Van
CP	Check Plaza
EoDB	Ease of Doing Business
EPC	Engineering, Procurement and Construction
ETC	Electronic Toll Collection
EV	Electric Vehicle
FMCG	Fast Moving Consumer Goods
FSI	Floor Space Index
FY	Financial Year
GDP	Gross Domestic Product
GI	Geographical Indication

Term	Description
Golden Quadrilateral	Golden Quadrilateral refers to the national highway network connecting Delhi, Mumbai, Chennai and Kolkata, forming a quadrilateral-shaped corridor of approximately 5,846 km, developed as part of India's National Highways Development Program.
GSDP	Gross State Domestic Product
GST	Goods and Services Tax
GVA	Gross Value Added
HAM	Hybrid Annuity Mode
HCV	Heavy Commercial Vehicle
IT	Information Technology
Km	Kilometer
LCV	Light Commercial Vehicle
MADT	Monthly Average Daily Traffic
MAV	Multi Axle Vehicle
MLFF	Multi Lane Free Flow
MoRTH	Ministry of Road Transport and Highways
MSME	Micro, Small, and Medium Enterprises
NH	National Highway
NHAI	National Highways Authority of India
NHIT	National Highways Infra Trust
NMP	National Monetisation Pipeline
NW	National Waterway
OSV	Oversized Vehicle
PCI	Per Capita Income
PCU	Passenger Car Unit
PPP	Public-Private Partnership
PSU	Public Sector Undertaking
SEZ	Special Economic Zone
TOT	Toll, Operate, Transfer
2A	2 Axle
3A	3 Axle

Abbreviations

Term	Description
AIF	Alternative Investment Fund as defined in and registered with SEBI under the SEBI AIF Regulations
BSE	BSE Limited
CCEA	Cabinet Committee on Economic Affairs
CCI	Competition Commission of India
CDSL	Central Depository Services (India) Limited
CIN	Corporate Identity Number
Companies Act/ Companies Act, 2013	Companies Act, 2013
Companies Act, 1956	Erstwhile, Companies Act, 1956
Competition Act	Competition Act, 2002
Depository	A depository registered with SEBI under the Securities and Exchange Board of India (Depositories and Participants) Regulations, 2018
Depositories Act	Depositories Act, 1996
DIN	Director Identification Number
Fee Rules	National Highways Fee (Determination of Rates and Collection) Rules, 2008 and further amendments in relation to these rules till the date of the signing of the respective concession agreements
FEMA	Foreign Exchange Management Act, 1999, read with rules and regulations thereunder
FEMA Rules	Foreign Exchange Management (Non-debt Instruments) Rules, 2019
Financial Year or Fiscal Year or Fiscal	Period of 12 months ended March 31 of that particular year, unless otherwise stated
FPI	Foreign portfolio investors
FVCI	Foreign venture capital investors, as defined under the SEBI FVCI Regulations
GAAR	General Anti-Avoidance Rules
GoI or Government	Government of India
GST	Goods and Services Tax
ICAI	Institute of Chartered Accountants of India

Term	Description
Income Tax Act or IT Act	The Income-tax Act, 1961
Ind AS	Indian Accounting Standards as defined in Rule 2(1)(a) of the Companies (Indian Accounting Standards) Rules, 2015 prescribed under Section 133 of the Companies Act, 2013, including any amendments or modifications thereto
Indian GAAP	Indian Accounting Standards as defined in Rule 2(1)(a) of the Companies (Indian Accounting Standards) Rules, 2015 prescribed under Section 133 of the Companies Act, 2013, including any amendments or modifications thereto
Indian GAAS	Generally Accepted Auditing Standards in India
InvIT Regulations / SEBI InvIT Regulations	Securities and Exchange Board of India (Infrastructure Investment Trust) Regulations, 2014, as amended
IRDAI	Insurance Regulatory and Development Authority of India
MCA	Ministry of Corporate Affairs, Government of India
MORTH	Ministry of Road Transport and Highways, Government of India
MoEF	Ministry of Environment, Forest and Climate Change
NACH	National Automated Clearing House
NEFT	National Electronic Funds Transfer
NHAI	National Highways Authority of India
NHAI Act	National Highways Authority of India Act, 1988, as amended
NSDL	National Securities Depository Limited
NSE	The National Stock Exchange of India Limited
PAN	Permanent account number
RBI	Reserve Bank of India
RoC	Registrar of Companies, Delhi and Haryana at New Delhi
Rs./Rupees/INR/₹	Indian Rupees
Regulation S	Regulation S under the Securities Act
RTGS	Real Time Gross Settlement
SCRA	Securities Contracts (Regulation) Act, 1956, as amended
SCRR	Securities Contracts (Regulation) Rules, 1957, as amended
SEBI	Securities and Exchange Board of India constituted under the SEBI Act
SEBI Act	The Securities and Exchange Board of India Act, 1992, as amended
SEBI AIF Regulations	Securities and Exchange Board of India (Alternative Investments Funds) Regulations, 2012, as amended
SEBI Debenture Trustees Regulations	Securities and Exchange Board of India (Debenture Trustees) Regulations, 1993, as amended
SEBI FPI Regulations	Securities and Exchange Board of India (Foreign Portfolio Investors) Regulations, 2019, as amended
SEBI FVCI Regulations	Securities and Exchange Board of India (Foreign Venture Capital Investors) Regulations, 2000, as amended
SEBI ICDR Regulations	Securities and Exchange Board of India (Issue of Capital and Disclosure Requirements) Regulations, 2018, as amended
SEBI InvIT Master Circular	SEBI Master Circular no. SEBI/HO/DDHS-PoD-2/P/CIR/2025/102 dated July 11, 2025, including any amendments or modifications thereto
SEBI LODR Regulations	Securities and Exchange Board of India (Listing Obligations and Disclosure Requirements) Regulations, 2015, as amended
Securities Act	United States Securities Act of 1933, as amended
Stock Exchange	BSE and NSE
U.S./U.S.A./United States	United States of America
USD/US$	United States Dollars

PRESENTATION OF FINANCIAL DATA AND OTHER INFORMATION

Certain Conventions

All references in this Offer Document to "India" are to the Republic of India.

Unless stated otherwise, all references to page numbers in this Offer Document are to the page numbers of this Offer Document.

Financial Data

The Trust was settled on November 24, 2025, and has acquired ownership of the Project SPV on January 5, 2025. The audited standalone financial information of the Trust for the period from its date of settlement, i.e. November 24, 2025, up to December 31, 2025, is included in this Offer Document.

As the Project SPV was incorporated on November 21, 2025, the summary financial information of the Project SPV for Fiscals 2025, 2024 and 2023, are not available for disclosure in this Offer Document. Further, no separate financial information, including actual revenue data for the InvIT Assets, are currently available, which could be used to clearly ascertain historical financial information including revenue and expenses in respect of each of the InvIT Assets. Accordingly, in lieu of the combined financial statements of the Trust along with the InvIT Assets and/or SPV not being available, the revenue data of the InvIT Assets that NHAI has been collecting through toll collection and maintenance contracts, has been included in the section entitled "*Asset Revenue Information*" on page 312. This revenue data has been provided from April 1, 2022, till January 31, 2026, separately for each InvIT Assets, to the extent that such data is available for such InvIT Assets. The said amounts being collected are at times intermittent on account of gaps in tolling contract periods and would not be a true reflection of the revenue that these InvIT Assets are actually generating.

Further, this Offer Document includes projections of revenue from operations and cash flow from operating activities of the Trust and the Project SPV, for the financial years ended March 31, 2026, March 31, 2027, March 31, 2028, and March 31, 2029, prepared in accordance with the basis of preparation as set out in the projections of revenue from operations and cash flow from operating activities. For further details, please see the section entitled "*Projections of Revenue from Operations and Cash Flow from Operating Activities*" on page 334.

Further, this Offer Document includes summary financial information of the Sponsor, as of and for the financial years ended March 31, 2024, March 21, 2023 and March 31, 2022, derived from the audited standalone financial statements of the Sponsor for the respective years. This Offer Document also includes the summary financial information of the Sponsor, as of and for the financial years ended March 31, 2025, derived from the limited review financial statements of the Sponsor, as of and for the year ended March 31, 2025. For further details, please see the sections entitled "*Summary Financial Information of the Sponsor*" on page 31.

Further, as highlighted in the section entitled "*Parties to the Trust*" on page 85, the Investment Manager was incorporated on August 22, 2025. Accordingly, the summary financial information of the Investment Manager for Fiscals 2025, 2024 and 2023, are not available for disclosure in this Offer Document. The audited financial information of the Investment Manager for the period from August 22, 2025 to November 30, 2025, is included in this Offer Document.

The degree to which the financial information included in this Offer Document will provide meaningful information is entirely dependent on the reader's level of familiarity with Indian accounting policies and practices, the Companies Act, Ind AS, Indian GAAP and the InvIT Regulations. Any reliance by persons not familiar with Indian accounting policies and practices on the financial disclosures presented in this Offer Document should accordingly be limited.

The financial year for the Trust and Parties to the Trust commences on April 1 and ends on March 31 of the next year; accordingly, all references to a particular financial year, unless stated otherwise, are to the 12 month period ended on March 31 of that year.

In this Offer Document, any discrepancies in any table between the total and the sums of the amounts listed are due to rounding off. All figures in decimals and all percentage figures have been rounded off to two decimal places, wherever available.

Currency and Units of Presentation

All references to:

- "Rupees" or "₹" or "INR" or "Rs." are to Indian Rupee, the official currency of the Republic of India; and
- "USD" or "US$" are to United States Dollar, the official currency of the United States.

Except otherwise specified, certain numerical information in this Offer Document have been presented in "million" units. One million represents 1,000,000 and one billion represents 1,000,000,000. One lakh represents 1,00,000 and one crore represents 1,00,00,000.

Unless the context requires otherwise, any percentage amounts, as set forth in this Offer Document, have been calculated on the basis of the Audited Financial Information, Asset Revenue Information and the summary financial statements of the Sponsor.

Exchange Rates

This Offer Document contains conversion of certain other currency amounts into Indian Rupees. These conversions should not be construed as a representation that these currency amounts could have been, or can be converted into Indian Rupees, at any particular rate.

The following table sets forth, for the dates indicated, information with respect to the exchange rate between the Rupee and the US$ (in Rupees per US$):

Currency	December 31, 2025	March 31, 2025	March 31, 2024	March 31, 2023
1 US$	89.92	85.58	83.37	82.22

Source: https://www.fbil.org.in
Note: If the RBI reference rate is not available on a particular date due to a public holiday, exchange rates of the previous working day has been disclosed. The reference rates are rounded off to two decimal places

Industry and Market Data

Unless stated otherwise, industry and market data used in this Offer Document has been obtained or derived from publicly available information, as well as from the report titled "*Research Report on Road Sector in India*" dated January 10, 2026, prepared by CARE Advisory Research and Training Limited ("**CARE Industry Report**'). The CARE Industry Report is subject to the following disclaimer:

"*This report is prepared by CARE Analytics and Advisory Private Limited (CareEdge Research). CareEdge Research has taken utmost care to ensure accuracy and objectivity while developing this report based on information available in CareEdge Research's proprietary database, and other sources considered by CareEdge Research as accurate and reliable including the information in public domain. The views and opinions expressed herein do not constitute the opinion of CareEdge Research to buy or invest in this industry, sector or companies operating in this sector or industry and is also not a recommendation to enter into any transaction in this industry or sector in any manner whatsoever. This report has to be seen in its entirety; the selective review of portions of the report may lead to inaccurate assessments. All forecasts in this report are based on assumptions considered to be reasonable by CareEdge Research; however, the actual outcome may be materially affected by changes in the industry and economic circumstances, which could be different from the projections. Nothing contained in this report is capable or intended to create any legally binding obligations on the sender or CareEdge Research which accepts no responsibility, whatsoever, for loss or damage from the use of the said information. CareEdge Research is also not responsible for any errors in transmission and specifically states that it, or its directors, employees, parent company – CARE Ratings Ltd., or its directors, employees do not have any financial liabilities whatsoever to the subscribers/users of this report. The subscriber/user assumes the entire risk of any use made of this report or data herein. This report is for the information of the authorised recipient in India only and any reproduction of the report or part of it would require explicit written prior approval of CareEdge Research. CareEdge Research shall reveal the report to the extent necessary and called for by appropriate regulatory agencies, viz., SEBI, RBI, Government authorities, etc., if it is required to do so. By accepting a copy of this Report, the recipient accepts the terms of this Disclaimer, which forms an integral part of this Report*"

Industry publications generally state that the information contained in such publications has been obtained from publicly available documents from various sources believed to be reliable but accuracy, completeness and underlying assumptions of such third-party sources are not guaranteed. Although the industry and market data

used in this Offer Document is reliable, the data used in these sources may have been re-classified by us for the purposes of presentation however, no material data in connection with the Issue has been omitted. Data from these sources may also not be comparable.

Industry sources and publications may base their information on estimates and assumptions that may prove to be incorrect. The extent to which the industry and market data presented in this Offer Document is meaningful depends upon the reader's familiarity with, and understanding of, the methodologies used in compiling such information. There are no standard data gathering methodologies in the industry in which the Trust proposed to conduct business and methodologies and assumptions may vary widely among different market and industry sources. Such information involves risks, uncertainties and numerous assumptions and is subject to change based on various factors.

Credit ratings

The credit ratings included in this Offer Document are subject to the following disclaimer:

Disclaimer from CARE Ratings Limited

"The ratings issued by CARE Ratings are opinions on the likelihood of timely payment of the obligations under the rated instrument and are not recommendations to sanction, renew, disburse, or recall the concerned bank facilities or to buy, sell, or hold any security. These ratings do not convey suitability or price for the investor and no part of the Material should be construed as an expert advice or investment advice within the meaning of any law or regulation. The rating agency does not constitute an audit on the rated entity. CARE Ratings has based its ratings/outlook based on information obtained from reliable and credible sources. CARE Ratings does not, however, guarantee the accuracy, adequacy, or completeness of any information and is not responsible for any errors or omissions and the results obtained from the use of such information."

Disclaimer from India Ratings & Research Private Limited

"India Ratings & Research Private Limited ("India Ratings") relies on information obtained from multiple sources and there may be instances where the information is not accurate/incomplete, despite efforts been taken to verify the same. Ultimately, the issuer /its advisers are responsible for the accuracy of the information they provide to India Ratings and to the market in offering documents and other reports. In issuing its rating, India Ratings relies on the work of experts, including independent auditors with respect to financial statements and attorneys with respect to legal and tax matters. Further, ratings are inherently forward-looking and embody assumptions and predictions about future events that by their nature cannot be verified as facts. As a result, despite any verification of current facts, ratings can be affected by future events or conditions that may not have been anticipated at the time a rating was issued or affirmed.

It needs to be noted that ratings are not a recommendation or suggestion, directly or indirectly, to you or any other person, to buy, sell, make or hold any investment, loan or security or to undertake any investment strategy with respect to any investment, loan or security of any issuer. Credit Ratings do not comment on the adequacy of market price, the suitability of any investment, loan or security for a particular investor (including without limitation, any accounting and/or regulatory treatment), or the tax-exempt nature or taxability of payments made in respect of any investment, loan or security. The Rating Agency shall neither construed to be nor acting under the capacity or nature of an 'expert' as defined under Section 2(38) of the Companies Act, 2013. India Ratings does not provide any financial, legal, auditing, accounting, appraisal, valuation or actuarial services in any manner. A rating should not be viewed as a replacement for such advice or services. Investors may find our ratings to be important information, and India Ratings notes that you are responsible for communicating the contents of this letter, and any changes with respect to the rating, to investors."

FORWARD-LOOKING STATEMENTS

Certain statements contained in this Offer Document that are not statements of historical fact constitute "forward-looking statements". Bidders can generally identify forward-looking statements by terminology such as "aim", "anticipate", "believe", "continue", "can", "could", "estimate", "expect", "intend", "may", "objective", "plan", "potential", "project", "pursue", "seek to", "shall", "should", "will", "would", or other words or phrases of similar import. Similarly, statements that describe the strategies, objectives, plans or goals of the Trust and the Projections of Revenue from Operations and Cash Flow from Operating Activities and the Traffic Reports are also forward-looking statements. However, these are not the exclusive means of identifying forward-looking statements.

All statements regarding the Trust's expected financial conditions, results of operations and cash flows, business plans and prospects including the Projections of Revenue from Operations and Cash Flow from Operating Activities are forward-looking statements. These forward-looking statements include statements as to the Trust's business strategy, planned projects, revenue and profitability (including, without limitation, any financial or operating projections or forecasts), new business and other matters discussed in this Offer Document that are not historical facts. These forward-looking statements and any other projections contained in this Offer Document (whether made by the Trustee, Investment Manager or any third party), are predictions and involve known and unknown risks, uncertainties, assumptions and other factors that may cause the Trust's actual results, performance or achievements to be materially different from any future results, performance or achievements expressed or implied by such forward-looking statements or other projections. Further, please note that the Projections of Revenue from Operations and Cash Flow from Operating Activities included in this Offer Document are based on a number of assumptions. For further details, please see the section entitled "*Projections of Revenue from Operations and Cash Flow from Operating Activities*" on page 334.

The Valuation Report included in this Offer Document, is based on certain projections and accordingly, should be read together with assumptions and notes thereto. For further details, please see the "*Valuation Report*" attached as Annexure A. The Traffic Reports and the Technical Reports include projections and estimates in relation to traffic growth and operation and maintenance expenses, respectively, and accordingly, should be read in conjunction with the relevant notes and assumptions thereto.

Actual results may differ materially from those suggested by the forward-looking statements or financial projections due to certain known or unknown risks or uncertainties associated with the Investment Manager's expectations with respect to, but not limited to, the actual growth in the infrastructure sector, the Investment Manager's ability to successfully implement the strategy, growth and expansion plans, cash flow projections, exposure to market risks, the outcome of any legal or regulatory proceedings, the future impact of new accounting standards, regulatory changes pertaining to the infrastructure sector in India and our ability to respond to them, general economic and political conditions in India which have an impact on our business activities or investments, changes in competition, and the Project Manager's ability to operate and maintain the Project SPV and successfully implement any technological changes. By their nature, certain of the market risk disclosures are only estimates and could be materially different from what actually occurs in the future. As a result, actual future gains, losses or impact on net interest income and net income could materially differ from those that have been estimated.

Factors that could cause actual results, performance or achievements of the Trust to differ materially include, but are not limited to, those discussed in the sections entitled "*Risk Factors*", "*Industry Overview*", "*Business*" and "*Discussion and Analysis by the Directors of the Investment Manager of the Financial Condition, Results of Operations and Cash Flows of the Project SPV of the Trust*", on pages 42, 121, 160 and 221, respectively. Some of the factors that could cause the Trust's actual results, performance or achievements to differ materially from those in the forward-looking statements and financial information include, but are not limited to, the following:

- The Trust is a newly settled trust with no operating history and limited historical financial information and, as a result, investors may not be able to assess its prospects on the basis of past records and the financial information disclosed in this Offer Document.
- The Project SPV has not executed the concession agreements for InvIT Assets with the concessioning authority.
- We have sought exemptions from the strict application of certain requirements under the InvIT Regulations including in relation to the preparation of the combined financial statements of the Trust, Project SPV and the InvIT Assets.
- We must maintain certain investment ratios, which may present additional risks to us.
- The ability of the Trust to make or maintain consistency in distributions to Unitholders depends on the financial performance of the Project SPV and their profitability.

Forward-looking statements and Projections of Revenue from Operations and Cash Flow from Operating Activities, Valuation Report and Technical Reports reflect current views as of the date of this Offer Document and are not a guarantee of future performance or returns to Bidders. These statements and projections are based on certain beliefs and assumptions, which in turn are based on currently available information. Although each of the Investment Manager and the Sponsor believes that the expectations and the assumptions upon which such forward-looking statements are based are reasonable at this time, neither the Investment Manager nor the Sponsor can assure Bidders that such expectations will prove to be correct or accurate. In accordance with the InvIT Regulations, the assumptions underlying the Projections of Revenue from Operations and Cash Flow from Operating Activities have been examined by the Auditors. The Projections of Revenue from Operations and Cash Flow from Operating Activities have been prepared for inclusion in this Offer Document for the purposes of this Issue, using a set of assumptions that include hypothetical assumptions about future events and management's actions that are not necessarily expected to occur, and have been approved by the IM Board. Consequently, Bidders are cautioned that the Projections of Revenue from Operations and Cash Flow from Operating Activities may not be appropriate for purposes other than that described above. Given these uncertainties, Bidders are cautioned not to place undue reliance on such forward-looking statements and Projections of Revenue from Operations and Cash Flow from Operating Activities. In any event, these statements speak only as of the date of this Offer Document or the respective dates indicated in this Offer Document, and the Trust, the Investment Manager and the Book Running Lead Managers or any of their affiliates or advisors, undertake no obligation to update or revise any of the statements reflecting circumstances arising after the date hereof or to reflect the occurrence of underlying events, whether as a result of new information, future events or otherwise after the date of this Offer Document. If any of these risks and uncertainties materialize, or if any of the Investment Manager's underlying assumptions prove to be incorrect, the actual results of operations or financial condition or cash flow of the Trust could differ materially from that described herein as anticipated, believed, estimated or expected. All subsequent forward-looking statements attributable to the Trust are expressly qualified in their entirety by reference to these cautionary statements.

THE ISSUE

The following is a general summary of the terms of this Issue. This summary should be read in conjunction with, and is qualified in its entirety by, the detailed information appearing elsewhere in this Offer Document:

Issue	The initial offer of up to [●] Units for cash at a price of ₹ [●] per Unit aggregating up to ₹ 60,000.00 million.
Less	
Sponsor Contribution	Up to [●] Units for a cash consideration of ₹ [●] million
Accordingly	
Net Issue	Up to [●] Units aggregating up to ₹ [●] million
Of which	
Strategic Investor Portion[#]	Up to 126,000,000 Units aggregating up to ₹12,600.00 million, subject to a minimum of 5.00% of the Net Issue and a maximum of 25.00% of the Net Issue.
Institutional Investor Portion (not more than 75.00% of the Net Issue, excluding the Strategic Investor Portion)*	Not more than [●] Units
Non-Institutional Investor Portion (not less than 25.00% of the Net Issue, excluding the Strategic Investor Portion)	Not less than [●] Units
Floor Price	₹ [●] per Unit
Cap Price	₹ [●] per Unit
Issue Price	₹ [●] per Unit
Minimum Bid Size	Minimum [●] and in multiples of [●] thereafter by Bidders (other than Anchor Investors and Strategic Investors)
Bid/Issue Opening Date**	March 11, 2026
Bid/Issue Closing Date***	March 13, 2026
Sponsor	National Highways Authority of India
Trustee	IDBI Trusteeship Services Limited
Investment Manager	Raajmarg Infra Investment Managers Private Limited
Project Manager	National Highways InvIT Project Managers Private Limited
Authority for this Issue	This Issue was authorised and approved by the IM Board on January 12, 2026 read with its resolution dated February 20, 2026
Tenure of the Trust	The Trust shall remain in force perpetually until it is dissolved or terminated in accordance with the Trust Deed. For details, please see the section entitled "*Parties to the Trust*" on page 85
Units issued and outstanding as of the date of this Offer Document	As of the date of this Offer Document, there are no issued and outstanding Units.
Units issued and outstanding immediately after this Issue	Up to [●] Units
Sponsor and Sponsor Group(s) Units	Up to [●] Units Pursuant to the Commitment Letter, the Sponsor will subscribe to [●] Units of the Trust for a cash consideration of ₹ [●] million to ensure that the aggregate unitholding of the Sponsor amounts to at least 15% of the total post-issue unit capital of the Trust in order to comply with the sponsor and sponsor group lock-in requirements under Regulations 12(3) and 12(3A) of the InvIT Regulations. For details, see '*Formation Transactions in relation to the Trust – Sponsor Contribution*' on page 26. The Units held by the Sponsor and Sponsor Group shall rank *pari passu* with and have the same rights as the Units to be Allotted pursuant to this Issue. The Units to be held by the Sponsor and the Sponsor Group have been allotted to the Sponsor and Sponsor Group pursuant to the resolution of the IM Board dated [●]
Distribution	Please see the section titled "*Distribution*" on page 226
Indian Taxation	Please see the section titled "*Taxation"* on page 296
Use of Proceeds	Please see the section titled *"Use of Proceeds*" on page 211
Listing	Prior to this Issue, there has been no market for the Units. The Units are proposed to be listed on the Stock Exchanges. In-principle approval for listing of the Units has been received from BSE Limited and National Stock Exchange of India

	Limited pursuant to letters, each dated February 13, 2026. The Investment Manager shall apply to the Stock Exchanges for the final listing and trading approval, after the Allotment and the credit of the Units to the demat accounts of the Allottees
Designated Stock Exchange	NSE
Closing Date	The date on which Allotment of the Units pursuant to this Issue shall be made, i.e. on or about March 18, 2026
Ranking	The Units being issued shall rank *pari passu* in all respects, including rights in respect of distribution. Please see the section entitled *"Rights of Unitholders"* on page 263
Lock-in and Rights of Unitholders	For details, please see the sections entitled "*Information Concerning the Units*" and "*Rights of Unitholders*" on pages 209 and 263, respectively
Risk Factors	Prior to making an investment decision, Bidders should consider carefully the matters discussed in the section entitled *"Risk Factors*" on page 42
Date of Unit Subscription Agreements	February 26, 2026
Strategic Investor Allocation Price[##]	₹ 100.00 per Unit
Commitment received from Strategic Investors	See "*Commitment received from Strategic Investors*" below

* *The Investment Manager may, in consultation with the Book Running Lead Managers, consider participation by Anchor Investors in this Issue for up to 60.00% of the Institutional Investor Portion in accordance with the InvIT Regulations.*

** *The Anchor Investor Bidding Date shall be one Working Day prior to the Bid/Issue Opening Date.*

*** *The Investment Manager may in consultation with the Book Running Lead Managers, consider closing the Bid/ Issue Period for QIBs one Working Day prior to the Bid/ Issue Closing Date, in accordance with the InvIT Regulations.*

[#] *The Issue also includes participation by Strategic Investors in accordance with the InvIT Regulations read with SEBI InvIT Master Circular. Each Strategic Investor proposing to invest in the Issue has entered into the Unit Subscription Agreement. In the event that the Strategic Investor Allocation Price is lower than the Issue Price, the Strategic Investors have agreed to deposit the difference between the Strategic Investor Allocation Price and the Issue Price into the Escrow Account within two Working Days of the Pricing Date.*

Commitment received from the Strategic Investors

Set forth below are the details of the commitments received from the Strategic Investors in relation to the Issue:

Strategic Investor	Number of Units proposed to be subscribed	Subscription Amount* (in ₹ million)
CBT-EPF-05-F-DM	31,500,000	3,150.00
CBT-EPF-11-F-DM	13,500,000	1,350.00
CBT-EPF-05-E-DM	38,500,000	3,850.00
CBT-EPF-11-E-DM	16,500,000	1,650.00
SBI Life Insurance Company Limited	26,000,000	2,600.00
Total	**126,000,000**	**12,600.00**

**In the event that the Strategic Investor Allocation Price is lower than the Issue Price, the Strategic Investors have agreed to deposit the difference between the Strategic Investor Allocation Price and the Issue Price into the Escrow Account within two Working Days of the Pricing Date.*

Allocation in all categories except the Anchor Investor Portion and the Strategic Investor Portion, if any, shall be made on a proportionate basis. In case of under-subscription in any category, the unsubscribed portion in either category may be allotted to investors in the other category at the discretion of the Investment Manager, in consultation with the Book Running Lead Managers and the Designated Stock Exchange.

The Issue is being made through the Book Building Process, wherein not more than 75.00% of the Net Issue (excluding Strategic Investor Portion) shall be available for allocation to Institutional Investors on a proportionate basis, provided that the Investment Manager, in consultation with the Book Running Lead Managers, may allocate up to 60.00% of the Institutional Investor Portion to Anchor Investors on a discretionary basis in accordance with the InvIT Regulations and the SEBI InvIT Master Circular. Further, not less than 25.00% of the Net Issue (excluding Strategic Investor Portion) shall be available for allocation on a proportionate basis to Non-Institutional Investors, subject to valid Bids being received at or above the Issue Price. In case of under-subscription in any category, the unsubscribed portion in either category may be Allotted to Bidders in the other category at the discretion of the Investment Manager, in consultation with the Book Running Lead Managers and the Designated Stock Exchange.

The Units, on Allotment, shall be traded only in the dematerialized segment of the Stock Exchanges.

In accordance with the InvIT Regulations, the Investment Manager undertakes that at any given time, there shall only be one denomination for the Units, and no Unitholder shall enjoy superior voting or any other rights over another Unitholder, except as per Regulation 4(2)(i), pursuant to which the unitholder(s) holding not less than ten percent of the total outstanding units of the Trust, either individually or collectively, shall be entitled to nominate one director on the board of directors of the Investment Manager. Further, there shall not be multiple classes of Units.

In case the Trust receives oversubscription of the Issue, then the Investment Manager, in consultation with the Book Running Lead Managers, reserves the right to retain oversubscription of not more than 25.00% of the Issue in accordance with the InvIT Regulations. The Investment Manager, in consultation with the Book Running Lead Managers, will decide whether or not to retain any oversubscription in the Issue only after the Bid/Issue Closing Date. The maximum subscription from any investor, other than the Sponsor, its related parties and its associates, taken together with Units held by them and persons acting in concert with them in the Trust, shall not be more than 25.00% of the total post-Issue unit capital of the Trust.

For further details in relation to this Issue, including the method of application, please see the section entitled "*Issue Information*" on page 271.

OVERVIEW OF THE TRUST

The following overview is qualified in its entirety by, and is subject to, the more detailed information contained in or referred to elsewhere in this Offer Document. Statements contained in this summary that are not historical facts may be forward-looking statements. Such statements are based on certain assumptions and are subject to certain risks, uncertainties and assumptions that could cause actual results of the Trust to differ materially from those forecasted or projected in this Offer Document. Under no circumstances should the inclusion of such information herein be regarded as a representation, warranty or prediction of the accuracy of the underlying assumptions by the Trust, the Parties to the Trust or the Book Running Lead Managers or any other person or that these results will be achieved or are likely to be achieved. Investment in Units involves risks. Bidders are advised not to rely solely on this overview, and, should read this Offer Document in its entirety and, in particular, the sections entitled "Risk Factors" and "Forward Looking Statements" on pages 42 and 19, respectively.

Structure and description of the Trust

The Sponsor settled the Trust on November 24, 2025, as a contributory irrevocable trust, pursuant to the Trust Deed, under the provisions of the Indian Trusts Act, 1882 and was duly registered in India under the provisions of the Registration Act, 1908 on December 1, 2025. The Trust was registered with SEBI on December 22, 2025, as an infrastructure investment trust under Regulation 3(1) of the InvIT Regulations having registration number IN/InvIT/25-26/0034. The Sponsor has settled the Trust for an initial sum of ₹10,000.

For details of the registered office and contact person of the Sponsor, please see the section entitled "*General Information*" on page 75. For the contact details of the Trust, please see the cover page.

Further, Raajmarg Infra Investment Managers Private Limited has been appointed as the investment manager, and National Highways InvIT Project Managers Private Limited has been appointed as the project manager to the Trust. For further details please see the section entitled "*Parties to the Trust*" on page 85.

Investment objectives

The Investment objectives of the Trust shall be to carry on the activities of and to make investments as an infrastructure investment trust as permissible in terms of the InvIT Regulations. The investment of the Trust shall be in any manner permissible under, and in accordance with, the InvIT Regulations and applicable law, including in such holding companies and/or SPVs and/or infrastructure projects and/or securities in India as permitted under the InvIT Regulations. The Trustee shall ensure that the capital contribution and other InvIT Assets shall be utilized solely for the purposes of making investments as stated above, in accordance with the InvIT Regulations and applicable law. Whilst making such investments, the Trust shall adhere to the investment strategy as set out in the section entitled "*Business*" on page 160. The investment by the Trust shall be in compliance with the provisions of the InvIT Regulations.

As on the date of this Offer Document, the Trust is not permitted to carry out any other principal activity unless specifically provided under applicable law. Further, the Trustee shall through the Investment Manager ensure that the Trust complies with any additional conditions as may be specified by SEBI or applicable law.

Fee and expenses

Annual expenses

The expenses in relation to the Trust, other than such expenses incurred in relation to operations of Project SPV, would broadly include fees and expenses payable to (i) Trustee; (ii) Investment Manager; (iii) Project Manager; (iv) Auditor; (v) Valuer; and (vi) other intermediaries and consultants.

The estimated recurring expenses on an annual basis, including but not limited to, are as follows:

(*in ₹ million*)

Payable by the Trust	Estimated Expenses
Fee payable to Trustee	0.45
Fee payable to the Investment Manager	110.00
Fee payable to the Project Manager	2.50
Fee payable to the Auditors	0.05
Fee payable to the Valuer	1.89
Fee payable to the Registrar	0.36

Payable by the Trust	Estimated Expenses
Fee payable to the Stock Exchanges and Depositories	Stock Exchange: [●] Depositories (NSDL and CDSL): [●]
Fee payable to Credit Rating Agency	0.43

Note: The amounts are exclusive of GST.

Issue expenses

The total expenses of this Issue are estimated to be up to ₹ [●] million which will be incurred by the Trust. For details in relation to the expenses for this Issue, please see the section titled "*Use of Proceeds*" on page 211.

Set-up expenses

The expenses in relation to the setting up the Trust of approximately ₹ 1.30 million, have been borne by the Sponsor, on behalf of the Trust.

Details of credit ratings

The Trust has obtained the following credit ratings:

(i) (a) Provisional CARE AAA; Stable from CARE Ratings Limited for the proposed bank loan facilities aggregating to ₹ 40,000.00 million to be availed by the Trust; and (b) Provisional CARE AAA; Stable, from CARE Ratings Limited as issuer rating. The ratings are available at https://www.careratings.com/upload/CompanyFiles/PR/202602120222_Raajmarg_Infra_Investment_Trust.pdf; and

(ii) (a) Provisional Ind AAA/Stable from India Ratings & Research Private Limited for the proposed bank loan facilities aggregating to ₹ 40,000.00 million to be availed by the Trust; and (b) Provisional Ind AAA/Stable as issuer rating from India Ratings & Research Private Limited. The ratings are available at www.indiaratings.co.in/pressrelease/81375.

FORMATION TRANSACTIONS IN RELATION TO THE TRUST

Details of arrangement pertaining to the Trust

The Trust's portfolio comprises the Project SPV namely, Raajmarg 1 Projects Private Limited. The details of the Project SPV are as provided below:

Raajmarg 1 Projects Private Limited ("RPPL")

RPPL is a private limited company incorporated on November 21, 2025, at New Delhi, under the Companies Act, 2013, having obtained a certificate of incorporation, from the Registrar of Companies, Central Registration Centre on November 21, 2025. The CIN of the Project SPV is U42101DL2025PTC459067.

Capital structure

Set forth below, is authorised, issued, subscribed and paid-up share capital of RPPL, as on the date of this Offer Document:

Particulars	Number of equity shares of ₹ 10 each
Authorised equity share capital	2,000,000,000
Issue, subscribed and paid-up share capital	2

The shareholding pattern of RPPL as on the date of this Offer Document is provided below:

S. No.	Name of the shareholder	No. of equity shares of ₹ 10 each	Percentage Shareholding (%)
1.	Raajmarg Infra Investment Trust	1	100.00
2.	Mridul Dubey*	1	-
Total		**2**	**100.00**

**Nominee of the Trust*

The InvIT Assets will constitute tolling rights and will not possess any ownerships rights of the underlying land. Accordingly, no land diligence has been undertaken with respect to the InvIT Assets.

For further details in relation to the Project SPV, please see the section entitled "*Business*" on page 160.

Utilisation of Net Proceeds

Further, upon the listing of the Units, the Trust shall utilize the Net Proceeds for: (i) infusion of debt and equity into the Project SPV, which shall be utilized by the Project SPV for the payment of concession value of the InvIT Assets to NHAI; and (ii) general purposes. For further details, please see the section entitled "*Use of Proceeds*" on page 211.

Borrowings of the Trust

For details of the Borrowings of the Trust, please see the section "*Financial Indebtedness and Deferred Payments"* on page 215.

Sponsor Contribution

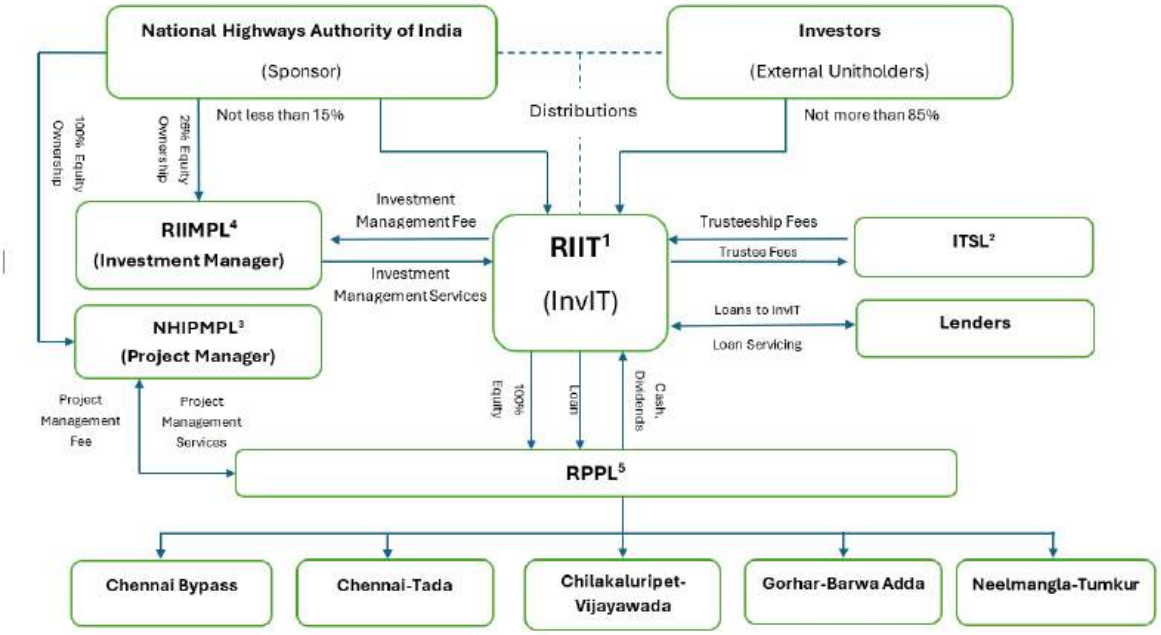
Pursuant to the letter dated January 12, 2026 ("**Commitment Letter**"), the Sponsor has agreed to contribute such amount towards subscription of such number of Units, which shall be equivalent to at least 15.00% of the total Units of the Trust on a post-Issue basis, to comply with the requirement under Regulations 12(3) and 12(3A) of the InvIT Regulations ("**Sponsor Contribution**").

While the Sponsor shall subscribe to the Units prior to the Bid/ Issue Closing Date, such Units shall be allotted to the Sponsor on the date of Allotment. Subsequently, the Investment Manager (on behalf of the Trust) shall utilize the Sponsor Contribution towards the objects of the Issue specified in the section titled "*Use of Proceeds*" on page 211.

Proposed post-listing structure

For details of the pre-Issue and post-Issue unitholding structure of the Trust, please see the section entitled "*Information Concerning the Units"* on page 209.

The following structure illustrates the relationship between the Trust, the Trustee, the Sponsor, the Investment Manager, the Project Manager and the Unitholders as at the Listing Date:



[1] RIIT - Raajmarg Infra Investment Trust
[2] ITSL - IDBI Trusteeship Services Limited
[3] NHIPMPL - National Highways InvIT Project Managers Private Limited.
[4] RIIMPL - Raajmarg Infra Investment Managers Private Limited
[5] RPPL – Raajmarg 1 Projects Private Limited

SUMMARY SPECIAL PURPOSE FINANCIAL STATEMENTS OF THE TRUST

The following tables set forth the summary standalone financial statements of the Trust derived from the Audited Financial Information of the Trust prepared in accordance with Ind AS and other relevant provisions of the InvIT Regulations, as of and for the period from the date of settlement of the Trust i.e. November 24, 2025, to December 31, 2025. The degree to which the summary financial information included herein below will provide meaningful information is entirely dependent on the reader's level of familiarity with Indian accounting practices, Ind AS, the Companies Act and the InvIT Regulations. Accordingly, any reliance by persons not familiar with Indian accounting practices, Ind AS, the Companies Act and the InvIT Regulations on the summary financial information presented below should be limited.

Summary special purpose standalone balance sheet of the Trust

(*in ₹ million*)

Particulars	As at December 31, 2025
Assets	
Non-current assets	
(a) Financial assets	-
(i) Investments	-
(ii) Loans	-
(iii) Other financial assets	-
(b) Other non-current assets	-
Total Non-Current Assets	**-**
Current assets	
(a) Financial assets	
(i) Cash and cash equivalents	-
(ii) Other financial assets	-
(b) Current tax assets (Net)	-
(c) Other Current assets	0.01
Total Current Assets	**0.01**
Total Assets	**0.01**
Equity and liabilities	
Equity	
(a) Unit Capital	-
(b) Initial settlement amount	0.01
(b) Other equity	-
Total Equity	**0.01**
Liabilities	
Non-current liabilities	
(a) Financial liabilities	
(i) Borrowings	-
Total Non-Current Liabilities	**-**
Current liabilities	
(A) Financial liabilities	
(i) Borrowings	-
(ii) Trade payables	
(a) Total outstanding dues of micro enterprises and small enterprises	-
(b) Total outstanding dues of creditors other than micro and small enterprises	-
(iii) Other financial liabilities	-
(B) Current tax liabilities (net)	-
(C) Other current liabilities	-
Total Current Liabilities	**-**
Total Liabilities	**-**
Total Equity and Liabilities	**0.01**

Summary special purpose standalone statement of Profit and Loss

(*in ₹ million*)

Particulars	For the period from November 24, 2025 to December 31, 2025
Income and Gains	
(a) Interest income on loan given to subsidiaries	-
(b) Interest income on fixed deposits	-
(c) Profit on sale of investments	-
(d) Other income	-
Total income (I)	**-**
Expenses	
(a) Investment Manager Fees	-
(b) Trustee Fees	-
(c) Valuation expenses	-
(d) Annual listing fees	-
(e) Rating fees	-
(f)Audit fees	
- Statutory audit fees	-
- Other audit services (including certification)	-
(g) Custodian Fees	-
(h) Finance Cost	-
(i) Other Expenses	-
Total expenses (II)	**-**
Profit before tax (III)= (I-II)	**-**
Tax expense:	
(a) Current tax	-
(b) Current tax – earlier years	-
(c) Deferred tax expense/(credit)	-
Total tax expenses (IV)	**-**
Net profit for the period/year (V)= (III-IV)	-
Other comprehensive income (OCI) (VI)	
(A) (i) Items that will not be reclassified to profit or loss	**-**
(ii) Income tax relating to items that will not be reclassified to profit or loss	-
(B) (i) Items that will be reclassified to profit or loss	**-**
(ii) Income tax relating to items that will not be reclassified to profit or loss	-
Total Comprehensive Income, net of tax (VII)=(V+VI)	**-**
Earnings per Unit	
Basic	-
Diluted	-

Summary Special Purpose standalone Statement of Cash Flows

(*in ₹ million*)

Particulars	For the period from November 24, 2025 to December 31, 2025
Cash flows from operating activities	
Net profit/(loss) before tax	**-**
Adjustments:	
Finance cost (net)	-
Interest income on bank FDR	-
Interest income on long term loan given to SPVs	-
Profit on redemption of Mutual Funds	-
Operating cash flows before Working Capital changes	**-**
Movements in Working Capital	
Decrease / (Increase) in Other Financial Assets	-
Decrease / (Increase) in Other Current/ Non-Current Assets	-
Increase / (Decrease) in Trade & Other Payables	-
Increase / (Decrease) in Other Financial Liabilities	-
Increase / (Decrease) in Other Current Liabilities	-
Increase / (Decrease) in Current Tax Liabilities	-
Cash used in operating activities	**-**
Income tax paid	-
Net cash flows from/(used in) operating activities – (A)	**-**
Cash Flows from Investing Activities	
Long term loans given	-
Purchase of non-current investments	-
Investment in FDR	-
Profit on redemption of Mutual Funds	-
Interest received on long term loan given	-
Interest received from bank	-
Net cash flows used in investing activities – (B)	**-**
Cash flows from financing activities	
Proceeds from Issue of unit capital	-
Expense incurred towards initial public debt offering	-
Expense incurred towards institutional unit allotment	-
Processing fee paid	-
Proceeds from long term borrowings	-
Distribution paid to unit holders	-
Repayment of long term borrowings	-
Finance costs paid	-
Net cash flows from/(used in) financing activities (C)	**-**
Net Increase / (Decrease) in cash and cash equivalents (A+B+C)	**-**
Cash and cash equivalents at the beginning of the period / year	-
Cash and cash equivalents at the end of the period / year	**-**

SUMMARY FINANCIAL INFORMATION OF THE SPONSOR

The following tables set forth the summary financial information derived from the audited standalone financial statements of the Sponsor, which was prepared in accordance with Section 23 of the National Highways Authority of India Act, 1988 (NHAI Act, 1988) and Rule 6 (5) of National Highways Authority of India (Budget, Accounts, Audit, Investment of Funds and Powers to Enter Premises) Rules, 1990 as amended from time to time, as of and for the financial years ended March 31, 2024, March 31, 2023 and March 31, 2022. The degree to which the summary standalone financial information included herein below will provide meaningful information is entirely dependent on the reader's level of familiarity with Indian accounting practices, NHAI Act and the InvIT Regulations. Accordingly, any reliance by persons not familiar with Indian accounting practices, NHAI Act and the InvIT Regulations on the summary standalone financial information presented below should be limited.

Summary Balance Sheet of the Sponsor as on March 31, 2024, March 31, 2023 and March 31, 2022

(*in ₹ million*)

S. No.	Particulars	As on March 31, 2024	As on March 31, 2023	As on March 31, 2022
I.	**Sources of Funds**			
1.	**Shareholders' Fund**			
	a) Capital	7,081,775.78	4,953,213.20	3,365,958.77
	b) Reserves & Surplus	-	-	-
2.	**Grants**			
	a) Capital	159,073.83	152,821.03	150,821.03
3.	**Borrowings**			
	a) Secured Loans	1,989,310.50	2,049,785.21	2,066,286.65
	b) Unsecured Loans	1,364,421.47	1,381,357.14	1,422,785.71
	Total	**10,594,581.58**	**8,537,176.59**	**7,005,852.16**
II.	**Application of Funds**			
1.	**Fixed Assets**			
	a) Gross Block	4,480.04	4,240.94	4,098.39
	b) Less:- Assets Created Out of Grant	75.81	75.81	75.81
	c) Assets out of own fund	4,404.23	4,165.13	4,022.58
	d) Less:- Depreciation	2,029.60	1,786.29	1,465.62
	e) Net Block	2,374.63	2,378.85	2,556.96
	Assets held on behalf of GOI (completed & ongoing)			
	a) Completed	4,477,824.47	3,834,188.92	3,005,155.75
	b) Ongoing	5,597,504.72	4,637,242.72	3,947,721.39
	Total	10,075,329.19	8,471,431.63	6,952,877.14
2.	**Investment**	**83,299.05**	**65,728.02**	**50,981.33**
3.	**Current Assets, Loans and Advances**			
	a) Inventories	-	-	-
	b) Deposits, Loans & Advances	564,912.33	516,550.35	474,854.92
	c) Interest accrued but not due on deposits	-	4,250.89	6,327.32
	d) Interest accrued and due on CALA Deposits	-	459.44	453.28
	e) Cash & Bank Balances	363,370.12	37,570.59	39,712.70
	f) Inter unit account	-	-	-
	Sub total	**928,282.45**	**558,831.26**	**521,348.22**
	Less:- Current Liabilities and Provisions			
	a) Liabilities	493,273.11	559,920.36	520,860.46
	b) Reserves & Provisions	1,430.62	1,272.80	1,051.03
	Sub Total	494,703.73	561,193.16	521,911.49
	Net Current Assets	433,578.72	(2,361.90)	(563.28)
4	**Misc. Expenditure**	-	-	-
	(to the extent not written off)			
5	**Profit & Loss Account**	-	-	-
	(Debit Balance, if any)			
	Total	**10,594,581.58**	**8,537,176.59**	**7,005,852.16**

Summary Statement of Profit and Loss of the Sponsor for the years ended March 31, 2024, March 31, 2023 and March 31, 2022

(*in ₹ million*)

S. No.	Particulars	For the year ended on March 31, 2024	For the year ended on March 31, 2023	For the year ended on March 31, 2022
I.	**Income**			
	a) Value of Work Done	**-**	**-**	**-**
	b) Other Income	267.85	322.77	341.31
	c) Interest (Gross)	0.26	0.60	0.02
	d) Net Increase/ Decrease in work in progress	-	-	-
	Total Income	268.11	323.37	341.33
II.	**Expenditure**			
	a) Construction Stores/Material Consumed			
	Other stores, spares & tools etc. consumed	-	-	-
	Work Expenses	-	-	-
	Personnel & Administrative Expenses	8,043.03	7,236.21	6,010.30
	Finance Charges	1.88	11.18	4.43
	Depreciation	258.68	232.74	202.62
	Assets of Small Value Charged off	2.20	2.72	2.77
	Exceptional Item			
	Loss on winding up of MTRCL	-	-	1,270.96
	Less:- transferred to Capital (Sch-1)	-	-	(1,270.96)
	Gain on swapping of shares with units	-	-	(1,014.20)
	Less:- transferred to Capital (Sch-1)	41.25	-	1,014.20
	Less:- Provision transferred to capital	-	-	-
	Loss: Transfer of shares of various SPVs	2,930.01	-	-
	Loss: Conversion of recoverable accrued interest of various SPVs into shares	12,406.89	-	-
	Net loss transferred to Capital (Sch-1)	(15,336.90)	-	-
	Gain: Recovery of loss from SPVs (MTRCL)	(41.25)	-	-
	Total Expenditure	**8,305.79**	**7,482.85**	**6,220.11**
I	Profit/ (Loss) for the period	(8,037.68)	(7,159.48)	(5,878.79)
	Add:- Prior Period Items net (+/-)	(29.76)	536.80	377.75
	Transfer of Net Establishment Expenses for the year	**(8,007.92)**	**(7,696.27)**	**(6,256.54)**
	Less/Add : Provision for Taxation	-	-	-
	Net Profit	-	-	-
	Less:- Transfer to Capital Reserve	-	-	-
	Less:- Transfer to other specific Reserve/fund	-	-	-
	Less/Add:- Transfer to/ Transfer from General Reserve (+/-)	-	-	-
	Less/Add:- Surplus brought forward from previous year	-	-	-

Summary Cash flow Statement of the Sponsor for the years ended March 31, 2024, March 31, 2023 and March 31, 2022

(*in ₹ million*)

S. No.	Particulars	For the year ended on March 31, 2024	For the year ended on March 31, 2023)	For the year ended on March 31, 2022
A.	**Cash Flow from Operating Activities:-**			
	Net Profit before tax	(8,037.68)	(7,159.47)	(5,878.79)
	Adjustments for:-			
	Depreciation	258.68	232.74	202.62
	Profit/Loss on Sale of assets	(0.63)	(0.52)	(0.43)
	Interest Income	(0.26)	(0.60)	(0.02)
	Operating profit before working capital changes	**(7,779.88)**	**(6,927.85)**	**(5,676.62)**
	Adjustments for			
	(Increase)/Decrease in Deposits, Loans & Advances	(47,769.80)	(41,695.43)	(9,456.43)
	Increase/(Decrease) in liabilities	(66,647.25)	39,059.90	98,009.64
	(Increase)/Decrease in Provision for gratuity and Leave encashment	157.82	221.77	179.71
	Cash flow before extraordinary Item & prior period items	**(122,039.12)**	**(9,341.61)**	**83,056.30**
	Loss due to conversion of receivable accrued interest into shares	(12,406.89)	-	-
	Prior period item	29.76	(536.80)	(377.75)
	Net Cash generated from operating activities	**(134,416.25)**	**(9,878.41)**	**82,678.55**
B.	**Cash Flow from Investing Activities**			
	Purchase of fixed assets	(255.49)	(55.77)	(1,642.31)
	Realisation from sale of assets	1.65	1.66	0.74
	(Increase)/Decrease in Capital Work in Progress	(1,380,339.65)	(1,294,048.86)	(1,062,485.83)
	(Increase)/Decrease in Investment	(17,571.03)	(14,746.68)	(30,521.60)
	Interest Income	45,643.77	25,577.25	15,200.33
	Capital Reserve (Receipts)	1,927.98	15,501.31	42,019.14
	Net Loss from transfer of shares of various SPVs	(2,930.01)	-	-
	Recovery of loss-Winding up of MTRCL	41.25	-	-
	Loss from investing activities	-	-	(256.76)
	Net cash used in Investing activities	**(1,353,481.53)**	**(1,267,771.08)**	**(1,037,686.29)**
C.	**Cash Flow from financing Activities**			
	Capital base	0.00	0.00	0.00
	Cess funds received from Govt of India	1,277,274.18	1,106,739.21	362,100.00
	Capital additional budgetary receipts	405,358.70	197,858.35	161,421.80
	Proceeds from InvIT Projects	156,998.82	28,496.67	73,504.00
	EAP Grant utilized towards Revenue Expenditure	6,252.80	2,000.00	10,000.00
	Adjusted plough back of Toll Remittance, etc.	304,226.53	254,160.21	158,054.41
	Net decrease in loan from ADB due to Exchange Loss after Adjustment of Repayments	(1,125.57)	(727.23)	(740.24)
	Proceeds from issue of 54EC Capital Gains Tax-Free Bonds	-	7,975.79	50,284.58
	Proceeds/ Repayment from issue of taxable bonds	-	(23,750.00)	80,757.00
	Proceeds/Repayment From NSSF Loan & Term Loan	(16,935.67)	(11,428.57)	354,285.71
	Redemption of 54EC Capital Gains Tax-Free Bonds	(47,063.46)	-	-

S. No.	Particulars	For the year ended on March 31, 2024	For the year ended on March 31, 2023)	For the year ended on March 31, 2022
	Redemption of Tax Free Secured Non-Convertible Bonds (10Yr) 11-12	(12,285.69)	-	(67,140.81)
	Redemption of Masala Bonds	-	(30,000.00)	-
	Interest and Other expenditure on Bond	(259,003.33)	(255,817.05)	(240,153.34)
	Net cash generated from financing activities	**1,813,697.31**	**1,275,507.38**	**942,373.11**
	Net increase(decrease) in cash and cash equivalents (A+B+C)	**325,799.54**	**(2,142.12)**	**(12,634.63)**
	Operating cash and cash equivalents	37,570.59	39,712.70	52,347.33
	Closing cash and cash equivalents	**363,370.12**	**37,570.59**	**39,712.70**
	Notes:			
	Cash and cash equivalents Include:			
	Cash and cheques in hand/ in transit	0.09	0.27	0.23
	Balance with banks-Current Account	196,560.15	27,347.94	24,628.87
	Balance with banks-Saving Bank Account	161,414.74	6,950.86	11,574.04
	Balance with banks-Fixed Deposit Account	5,395.15	3,271.52	3,509.56
	Balance as per books of account	**363,370.12**	**37,570.59**	**39,712.70**

The following tables set forth the summary financial information derived from the unaudited standalone financial statements of the Sponsor, which was prepared in accordance with Section 23 of the National Highways Authority of India Act, 1988 (NHAI Act, 1988) and Rule 6 (5) of National Highways Authority of India (Budget, Accounts, Audit, Investment of Funds and Powers to Enter Premises) Rules, 1990 as amended from time to time, as of and for the financial year ended March 31, 2025. The degree to which the summary standalone financial information included herein below will provide meaningful information is entirely dependent on the reader's level of familiarity with Indian accounting practices, NHAI Act and the InvIT Regulations. Accordingly, any reliance by persons not familiar with Indian accounting practices, NHAI Act and the InvIT Regulations on the summary standalone financial information presented below should be limited.

Summary balance sheet of the Sponsor as on March 31, 2025

(*in ₹ million*)

S. No.	Particulars	As on March 31, 2025 (Unaudited)
I.	**Sources of Funds**	
1.	**Shareholders' Fund**	
	a) Capital	9,577,791.30
	b) Reserves & Surplus	-
2.	**Borrowings**	
	a) Secured Loans	1,943,492.67
	b) Unsecured Loans	502,547.99
	Total	**12,023,831.95**
II.	**Application of Funds**	
1.	**Fixed Assets**	
	a) Gross Block	4,539.50
	b) Less: Depreciation	2,276.40
	c) Net Block (a-b)	2,263.11
	Capital Word on Road Assets Entrusted to NHAI	
	a) Completed	5,215,137.03
	b) Work in progress	6,317,673.74
	Total	**11,535,073.88**
2.	**Investment**	**97,721.76**
3.	**Current Assets, Loans and Advances**	
	a) Inventories	-
	b) Sundry Debtors	-
	c) Deposits, Loans & Advances	444,568.95
	d) Interest accrued on Investments	-
	e) Cash & Bank Balances	457,547.27
	Sub total	**902,116.22**
	Less:- Current Liabilities and Provisions	
	a) Liabilities	507,883.58
	b) Reserves & Provisions	3,196.33
	Sub Total	511,079.91
	Net Current Assets	**391,036.31**
4	**Misc. Expenditure**	-
	(to the extent not written off)	
5	**Profit & Loss Account**	-
	(Debit Balance, if any)	
	Total	**12,023,831.95**

Summary Statement of Profit and Loss of the Sponsor for the year ended March 31, 2025

(*in ₹ million*)

S. No.	Particulars	For the year ended on March 31, 2025 (Unaudited)
I.	**Income**	
	a) Value of Work Done	**-**
	b) Other Income	249.20
	c) Interest (Gross)	7.26
	d) Net Increase/ Decrease in work in progress	-
	Total Income	**256.46**
II.	**Expenditure**	
	a) Construction Stores/Material Consumed	
	Other stores, spares & tools etc. consumed	
	Work Expenses	-
	Personnel & Administrative Expenses	8,396.21
	Finance Charges	5.97
	Depreciation	266.11
	Assets of Small Value Charged off	2.17
	Exceptional Item	
	Loss: Transfer of shares of various SPVs	-
	Loss: Conversion of recoverable accrued interest of various SPVs into shares	-
	Net loss transferred to Capital (Sch-1)	-
	Gain: Recovery of loss from SPVs (MTRCL)	-
	Less: Transferred to Capital (Sch-1)	-
	Total Expenditure	**8,670.46**
I	Profit/ (Loss) for the period	(8,414.00)
	Prior Period Items net (Expenses)/ Income	(404.30)
	Transfer of Net Establishment Expenses for the year to Sch-5	**(8,818.29)**

Summary Cash flow Statement of the Sponsor for the year ended March 31, 2025

(*in ₹ million*)

S. No.	Particulars	For the year ended on March 31, 2025 (Unaudited)
A.	**Cash Flow from Operating Activities:**	
	Net Profit before tax	(8,414.00)
	Adjustments for:	
	Depreciation	266.11
	Profit/Loss on Sale of assets	(0.87)
	Interest Income	(7.26)
	Operating profit before working capital changes	**(8,156.01)**
	Adjustments for	
	(Increase)/Decrease in Deposits, Loans & Advances	119,884.75
	Increase/(Decrease) in liabilities	16,504.08
	(Increase)/Decrease in Provision for gratuity and Leave encashment	(127.90)
	Cash flow before extraordinary Item & prior period items	**128,104.92**
	Prior period items	(404.30)
	Loss due to conversion of receivable accrued interest into shares	
	Net Cash generated from operating activities	**127,700.62**
B.	**Cash Flow from Investing Activities**	
	Purchase of fixed assets	(157.39)
	(Increase)/ Decrease in Capital Work on Road Assets Entrusted to NHAI	(1,240,915.18)
	Realisation from sale of assets	3.66
	(Increase)/Decrease in Investment	(14,422.72)
	Interest Income	30,144.37
	Capital Reserve (Receipts)	(3,023.45)
	Net Loss from transfer of shares of various SPVs	-
	Recovery of loss-Winding up of MTRCL	-
	Net cash used in Investing activities	**(1,228,370.71)**
C.	**Cash Flow from financing Activities**	
	Cess funds received from Govt of India	1,179,500.00
	Capital additional budgetary receipts	561,032.45
	Proceeds from InvIT Projects	177,379.45
	EAP Grant Received & utilized towards Revenue Expenditure	17,841.90
	Adjusted plough back of Toll Remittance, etc.	401,187.87
	Repayment of ADB Loan (including exchange fluctuations)	(1,308.33)
	Proceeds/ (Repayment) of 54EC Capital Gains Tax-Free Bonds	(44,509.50)
	Proceeds/ (Repayment) from NSSF Loan & Term Loans	(861,873.49)
	Redemption of Tax Free Secured Redeemable Non-Convertible Bonds (10Yr & 15Yr) 13-14	-
	Interest and other expenditure on Bond	(234,861.77)
	Net cash generated from financing activities	**1,194,388.60**

S. No.	Particulars	For the year ended on March 31, 2025 (Unaudited)
	Net increase/ (decrease) in cash and cash equivalents (A+B+C)	**93,718.51**
	Operating cash and cash equivalents	363,828.76
	Closing cash and cash equivalents	**457,547.27**
	Notes:	
	Cash and cash equivalents Include:	
	Cash and cheques in hand/ in transit	0.18
	Balance with banks-Current Account	210,712.19
	Balance with banks-Saving Bank Account	241,903.33
	Balance with banks-Fixed Deposit Account	4,931.57
	Balance as per books of account	**457,547.27**

SUMMARY FINANCIAL INFORMATION OF THE INVESTMENT MANAGER

The following tables set forth the summary standalone financial statements of the Investment Manager prepared in accordance with Ind AS and other relevant provisions of the InvIT Regulations, as of and for the period from the date of incorporation of the Investment Manager i.e. August 22, 2025, to November 30, 2025. The degree to which the summary financial information included herein below will provide meaningful information is entirely dependent on the reader's level of familiarity with Indian accounting practices, Ind AS, the Companies Act and the InvIT Regulations. Accordingly, any reliance by persons not familiar with Indian accounting practices, Ind AS, the Companies Act and the InvIT Regulations on the summary financial information presented below should be limited.

Summary of Balance Sheet

(in ₹ million)

Particulars	As at November 30, 2025*
Assets	
1) Non-current assets	
(a) Financial assets	-
(i) Investments	-
(ii) Loans	-
(iii) Other financial assets	-
(b) Other non-current assets	-
Total non-current assets	-
Current assets	
(a) Financial assets	
(i) Cash and cash equivalents	200.93
(ii) Other financial assets	
(b) Current tax assets (net)	
(c) Other current assets	
Total current assets	**200.93**
Total assets	**200.93**
Equity and liabilities	
Equity	
1) Share capital	200.00
2) Initial settlement amount	-
3) Other equity	(0.07)
Total equity	199.93
Liabilities	
1) Non-current liabilities	
(a) Financial liabilities	-
(i) Borrowings	-
Total non-current liabilities	-
2) Current liabilities	
(A) Financial liabilities	
(i) Borrowings	1.00
(ii) Trade payables	
(a) Total outstanding dues of micro enterprises and small enterprises	-
(b) Total outstanding dues of creditors other than micro and small enterprises	-
(iii) Other financial liabilities	-
(c) Current tax liabilities (net)	-
(d) Other current liabilities	-
Total current liabilities	1.00
Total equity and liabilities	200.93

** The Investment Manager was incorporated as a private company under Companies Act, 2013 on August 22, 2025 and accordingly, the financial statements of the Investment Manager are available only for the period from August 22, 2025 to November 30, 2025.*

Summary statement of Profit & Loss

(in ₹ million, unless otherwise stated)

Particulars	For the period from August 22, 2025 to November 30, 2025*
Income	
(a) Revenue from operation	-
(b) Other income	-
Total income (I)	**-**
Expenses	
(a)Audit fees	
- Statutory audit fees	-
- Other audit services (including certification)	-
(b) Finance Cost	-
(c) Other Expenses	0.07
Total expenses (II)	**0.07**
Profit before tax (III)= (I-II)	**(0.07)**
Tax expense:	
(a) Current tax	-
(b) Current tax – earlier years	-
(c) Deferred tax expense/(credit)	-
Total tax (IV)	**-**
Profit after tax (V)= (III-IV)	**(0.07)**
Other comprehensive income (OCI) (VI)	
(A) (i) Items that will not be reclassified to profit or loss	**-**
(ii) Income tax relating to items that will not be reclassified to profit or loss	**-**
(B) (i) Items that will be reclassified to profit or loss	**-**
(ii) Income tax relating to items that will not be reclassified to profit or loss	**-**
Total Comprehensive Income, net of tax (VII)=(V+VI)	**(0.07)**
Earnings per Unit (*in ₹*)	
Basic	(0.01)
Diluted	(0.01)

** The Investment Manager was incorporated as a private company under Companies Act, 2013 on August 22, 2025 and accordingly, the financial statements of the Investment Manager are available only for the period from August 22, 2025 to November 30, 2025.*

Summary Statement of Cash flows

(in ₹ million unless otherwise stated)

Particulars	For the period from August 22, 2025 to November 30, 2025*
A. Cash flow from operating activities	
Net Profit / (Loss) before tax	(0.07)
Adjustments:	
Finance cost (net)	-
Interest income on bank FDR	-
Interest income on long term loan given to SPVs	-
Profit on redemption of Mutual Funds	-
Operating cash flows before working capital changes	(0.07)
Movements in Working Capital	
Decrease / (Increase) in Other Financial Assets	-
Decrease / (Increase) in Other Current/ Non-Current Assets	-
Increase / (Decrease) in Trade & Other Payables	-
Increase / (Decrease) in Other Financial Liabilities	-
Increase / (Decrease) in Other Current Liabilities	-
Increase / (Decrease) in Current Tax Liabilities	-
Cash used in operating activities	(0.07)
Income tax paid	-
Net cash flows from/(used in) operating activities – (A)	(0.07)
B. Cash Flows from Investing Activities	
Long term loans given	-
Purchase of non-current investments	-
Investment in FDR	-
Profit on redemption of Mutual Funds	-
Interest received on long term loan given	-
Interest received from bank	-
Net cash flows used in investing activities – (B)	-
C. Cash flow from financing activities	
Proceeds from Issue of share capital	200.00
Expense incurred towards initial public debt offering	-
Expense incurred towards institutional unit allotment	-
Processing fee paid	-
Proceeds from long term borrowings	1.00
Distribution paid to unit holders	-
Repayment of long term borrowings	-
Finance costs paid	-
Net cash flow from / (used in) financing activities (C)	**201.00**
Net increase / (decrease) in Cash and cash equivalents (A+B+C)	**200.93**
Cash and cash equivalents as at the beginning of the period/year	**-**
Cash and cash equivalents as at the end of the period/year	**200.93**

** The Investment Manager was incorporated as a private company under Companies Act, 2013 on August 22, 2025 and accordingly, the financial statements of the Investment Manager are available only for the period from August 22, 2025 to November 30, 2025.*

RISK FACTORS

An investment in the Units involves a high degree of risk. Investors should carefully consider all the information in this Offer Document, including the risks and uncertainties described below, before making an investment in the Units. If any of the following risks actually occurs, the business, results of operations and financial condition of the Trust could suffer, the price of the Units could decline and investors may lose all or part of their investment. The risks and uncertainties described below are not the only risks that the Trust faces or may face. Additional risks and uncertainties not presently known to the Investment Manager and the Trust or that they currently believe to be immaterial may also have an adverse effect on the business, results of operations and financial condition of the Trust and as a result, the returns on investments of the Unitholders. If any of the following risks, or other risks that are not currently known or are currently considered immaterial, actually occur, our business prospects, results of operations, cash flows and financial condition could suffer, the price of the Units could decline, and Bidders may lose all or part of their investment. Unless specified or quantified in the relevant risk factors below, the Investment Manager and the Sponsor are not in a position to quantify or specify the financial or other implications of any of the risks described in this section.

In making an investment decision, Bidders must rely on their own examination of the Trust and the terms of the Issue, including the merits and risks involved. To obtain a complete understanding, this section should be read in conjunction with the sections entitled "Business" and "Discussion and Analysis by the Directors of the Investment Manager of the Financial Condition, Results of Operations and Cash Flows of the Project SPV of the Trust" on pages 160 and 221, respectively as well as the financial statements and other financial information included elsewhere in this Offer Document. Before investing in the Units, Bidders should obtain professional advice on investing in the Issue.

Investors should be aware that the price of the Units, and the income from them, may be subject to volatility. If any of the risks described below occurs, our business and prospects could be materially and adversely affected, the trading price of the Units could decrease, and investors could lose all or part of their original investment.

This Offer Document also contains forward-looking statements that involve risks and uncertainties and assumptions. The Trust's actual results could differ materially from those anticipated in these forward-looking statements as a result of certain factors, including considerations described below and in the section entitled "Forward-Looking Statements" on page 19.

In making an investment decision, Bidders must rely upon your own examination and the terms of the Issue, including the merits and the risks involved. You should consult your tax, financial and legal advisors about the particular consequences of investing in the Issue.

In this section, unless specified otherwise, a reference to "we", "us" and "our" refers to the Trust and the Project SPV on a consolidated basis.

Risks Related to the Structure of the Trust

1. *The Trust is a newly settled trust with no operating history and limited historical financial information and, as a result, investors may not be able to assess its prospects on the basis of past records and the financial information disclosed in this Offer Document.*

The Trust was set-up on November 24, 2025 under the provisions of the Indian Trust Act, 1882 and it is registered as an infrastructure investment trust with SEBI on December 22, 2025, in accordance with InvIT Regulations. The Project SPV was incorporated on November 21, 2025, for the purpose of entering into the Concession Agreements to acquire tolling rights for undertaking tolling, operation, and maintenance of national highways in India. As a newly established entity, the Trust and the Project SPV do not have any operating history or historical financial information by which their past performance may be assessed. This could make it difficult for investors to assess the likely performance of the Trust and the Project SPV. Accordingly, there can be no assurance that the Project SPV will be able to generate sufficient cash flows from the operations of the InvIT Assets to make distributions to the Unitholders or that such distributions will be as anticipated with those set out in the section entitled *"Distribution"* on page 226. Our inability to successfully operate and manage the Toll Roads or to operate and manage the Toll Roads in an efficient and cost-effective manner could have an adverse effect on our results of operations and our ability to meet our payment obligations under the Units.

2. *The Project SPV has not executed the concession agreements for InvIT Assets with the concessioning authority.*

As on the date of this Offer Document, the InvIT Assets are currently owned and managed by the NHAI. We have received the approval of NHAI for monetisation of the InvIT Assets on December 20, 2025. Subsequently, we have made an offer to NHAI to grant us concessions for each of the five InvIT Assets. NHAI vide its letter dated February 10, 2026 has accepted our offer to grant us the concessioning rights for the InvIT Assets at a base concession fee of ₹ 95,000.00 million along with an additional concession fee payable to NHAI. However, the Project SPV has not executed the concession agreements in relation to the InvIT assets. Such agreements shall be executed prior to the filing of the Final Offer Document, and the underlying transactions will be consummated or become effective, as applicable, after the filing of the Final Offer Document. Accordingly, there can be no assurance that NHAI will grant us concessions rights for any or all of the InvIT Assets.

If NHAI does not grant us the concessions for the five InvIT Assets within the stipulated timeline, we may be unable to proceed with the Issue and it could materially and adversely affect our business, prospects, financial condition, results of operations and cash flows and it may adversely impact our ability to complete the Issue within the anticipated time frame or at all.

Additionally, while we have executed agreements including the Trust Loan Agreements with respect to the proposed utilization of the Issue Proceeds, such agreements are subject to us being able to raise subsequent funds from the Issue and proposed debt to be raised by us from external lenders in terms of the Facility Agreement. For further details, see *"Use of Proceeds"* and *"Formation Transactions in relation to the Trust"* on pages 211 and 26. The underlying transactions shall be consummated or become effective, as applicable, after the Bid/Issue Closing Date and prior to the Allotment of Units pursuant to the Issue, with the consideration being paid only after the Listing Date in accordance with applicable laws. Furthermore, in the event of a shortfall of funds from the Issue Proceeds, the Trust shall be required to rely on alternative sources of funding, including, inter alia, external debt, and we cannot assure you that funds shall be available to the Trust in a timely manner, or at all.

3. *We have sought exemptions from the strict application of certain requirements under the InvIT Regulations including in relation to the preparation of the combined financial statements of the Trust, Project SPV and the InvIT Assets.*

The Sponsor has submitted a request to SEBI dated January 14, 2026 seeking exemptions under the InvIT Regulations and the SEBI InvIT Master Circular in respect of: (i) preparation and disclosure of consolidated financial statements of the Sponsor prepared on a consolidated basis in accordance with Indian Accounting Standards for financial years ended March 31, 2022, March 31, 2023 and March 31, 2024; (ii) disclosure of audited financial statements of the Sponsor for the financial year ended March 31, 2025; (iii) exemption from strict application of certain provisions of the InvIT Regulations and SEBI InvIT Master Circular in respect of disclosure of financial statements of the InvIT Assets proposed to be held by the Trust and related disclosure requirements including combined financial statements of the Trust and any other applicable disclosure requirements arising in relation to preparation and disclosure of combined financial statements under the SEBI; (iv) disclosure of material litigation and regulatory actions pending against the associates of the Trust, Sponsor, Investment Manager, and Project Manager; (v) exemption from compliance with Regulation 10(7) of the InvIT Regulations read with paragraph 6(a)(vi) of Schedule III to the InvIT Regulations with respect to the InvIT Assets being adequately insured; (vii) exemption from compliance with Regulation 2(zy)(b) of the InvIT Regulations with respect to the Project SPV holding at least 90.00% of its assets directly in infrastructure assets; and (viii) exemption from compliance with Clause 18.2 of the SEBI InvIT Master Circular with respect to dematerialisation of the securities of Project SPV. SEBI vide its letter dated February 11, 2026 has granted us an exemption in respect of: (i) preparation and disclosure of consolidated financial statements of the Sponsor prepared on a consolidated basis in accordance with Indian Accounting Standards for financial years ended March 31, 2022, March 31, 2023 and March 31, 2024; (ii) disclosure of audited financial statements of the Sponsor for the financial year ended March 31, 2025; (iii) exemption from strict application of certain provisions of the InvIT Regulations and SEBI InvIT Master Circular in respect of disclosure of financial statements of the InvIT Assets proposed to be held by the Trust and related disclosure requirements including combined financial statements of the Trust and any other applicable disclosure requirements arising in relation to preparation and disclosure of combined financial statements under the SEBI; (iv) exemption from compliance with Regulation 10(7) of the InvIT Regulations read with paragraph 6(a)(vi) of Schedule III to the InvIT Regulations with respect to the InvIT Assets being adequately insured, subject to such insurance being obtained within 30 days from the Issue Closing Date.

As a result, this Offer Document does not include historical consolidated financial statements of the Sponsor, combined financial statements of the Trust and Project SPV. Instead, it includes summary standalone financial statements of the Sponsor prepared under IGAAP for the financial years ended March 31, 2022, March 31, 2023, and March 31, 2024, and project wise revenue data of the InvIT Assets collected from tolling and maintenance contracts for the period from April 1, 2022 to January 31, 2026 in accordance with the SEBI letter dated February 11, 2026. Further, as on the date of this Offer Document, (i) the Project SPV does not have any assets; and (ii) the InvIT Assets do not have any insurance obtained by us.

4. ***We must maintain certain investment ratios, which may present additional risks to us.***

Pursuant to the InvIT Regulations, we are required to invest not less than 80.00% of the value of our assets proportionate to our holding in completed and revenue generating infrastructure projects subject to conditions specified in the InvIT Regulations. In addition, we must not invest more than 20.00% of the value of our assets in under-construction infrastructure projects and certain financial instruments such as listed or unlisted debt of companies or body corporate in infrastructure section, equity shares of companies listed on a recognized stock exchange, government securities, money market instruments, amongst others, subject to the thresholds specified in the InvIT Regulations. If these conditions are breached on account of market movements of the price of the underlying assets or securities, the Investment Manager must inform the Trustee and ensure that these conditions are satisfied within six months of such breach (or within one year with Unitholder approval in accordance with the InvIT Regulations). Additionally, under the InvIT Regulations, the aggregate consolidated borrowings and deferred payments, net of cash and cash equivalents, cannot exceed 70.00% of the value of the assets of the Trust or such threshold as may be specified under the InvIT Regulations. Failure to comply with these conditions may present additional risks to us, including divestment of some or all of our assets, delisting of units from the Stock Exchanges and other penalties, which could have a material, adverse effect on our business, financial condition and results of operations.

5. ***The ability of the Trust to make or maintain consistency in distributions to Unitholders depends on the financial performance of the Project SPV and their profitability.***

The amount of future distributions, if any, will depend upon various factors including future earnings, financial condition, cash flows, working capital requirements and capital expenditures of the Project SPV and the dividends, interest payments and repayments of indebtedness that are distributed by the Project SPV to the Trust. The income earned from the InvIT Assets depends on, among other things, the amount of income generated from annuities and the level of operating and other expenses incurred. If the Project SPV do not generate sufficient operating profit, the income of the Trust, cash flows and ability to make distributions or level of distributions made to Unitholders will be adversely affected.

The Trust will substantially rely on the receipt of interest, dividends, and principal repayments (net of applicable taxes and expenses) from the Project SPV in order to make distributions to Unitholders. The distributions to Unitholders will be in the form of dividends, interest and any other means permitted by law. There can be no assurance or guarantee that the Trust will have sufficient distributable or realised profits or surplus in any future period to make distributions every year in any amount or at all. The ability of the Project SPV to make dividend payments may be affected by a number of factors, among other things:

a. its business, operational performance and financial position;
b. insufficient cash flows received from the Project SPV;
c. restrictions under applicable laws and regulations;
d. ability of the Project SPV to borrow funds and access capital markets;
e. operating losses incurred by the Project SPV in any financial year;
f. terms and conditions, covenants or any other stipulations applicable to external commercial borrowings availed by the Trust or the Project SPV;
g. changes in accounting standards, taxation laws and regulations, corporation laws and regulations relating thereto; and
h. restrictive covenants or the terms of agreements, including the Concession Agreements or financing agreements, to which the Project SPV is, or may become, a party.

In addition, the InvIT Regulations provide that the Trust must distribute not less than 90% of net distributable cash flows of each Project SPV in proportion of its holding in each of the Project SPV subject to the applicable provisions of the Companies Act, 2013. The distributions to Unitholders must be declared not less than once every six months in every financial year and shall be made within five working days from the record date, being two

working days from the date of such declarations, excluding the date of declaration and the record date, in accordance with InvIT Regulations. There is no assurance that the Trust will be able to make distributions to the Unitholders or that such distributions will be consistent across various periods. For further details, see the section titled "*Distribution*" on page 226.

Further, the method of calculating the net distributable cash flows of a Project SPV is subject to change and any change in the applicable laws in India or elsewhere may limit the Trust's ability to pay or maintain consistency in distributions to Unitholders. There is also no assurance that the expansion of the Trust's portfolio of infrastructure assets will increase the Trust's cash flows and thereby result in an increase in the level of distributions to Unitholders over time.

6. ***We depend on the Investment Manager, the Project Manager and the Trustee to manage our business and assets, and our financial condition, results of operations and cash flows and our ability to make distributions may be harmed if the Investment Manager, Project Manager or the Trustee fail to perform satisfactorily. The rights of the Trust and the rights of the Unitholders to recover claims against the Project Manager, the Investment Manager or the Trustee may be limited***.

The success of our business and growth strategy and the operational success of our assets will depend significantly upon the managers' satisfactory performance of these services. Our recourse against the Project Manager, the Trustee and Investment Manager, is limited.

The aggregate maximum liability of the Project Manager under the Project Implementation and Management Agreement in each financial year shall be limited to the fees payable to the Project Manager in such financial year in accordance with the terms of the Project Implementation and Management Agreement provided that such maximum aggregate liability shall not be applicable in the event such liability of the Project Manager arises out of any gross negligence, wilful default, wilful misconduct or fraud on the part of the Project Manager, as determined by a court of competent jurisdiction.

If the Trustee is required by the InvIT Regulations or any applicable law to provide information regarding the Trust or the Sponsor/Sponsor Group or the Unitholders, the investments made by the Trust and income therefrom and provisions of such presents, and complies with such request in good faith, whether or not it was in fact enforceable, the Trustee shall not be liable to the Unitholders or to any other party as a result of such compliance or in connection with such compliance. The Trustee is also not liable on account of anything done or omitted to be done or suffered by the Trustee in good faith in accordance with, or in pursuance of any request or advice of the Investment Manager. Further, the Trustee is not liable for any act or omission which may result in a loss to a Unitholder (by reason of any depletion in the value of the fund of the Trust or otherwise), except in the event that such depletion is a result of fraud, gross negligence or misconduct on the part of the Trustee or results from a breach by the Trustee of the Trust Deed, as determined by a court of competent jurisdiction. The liability of the Trustee shall be limited to the extent of the fees received by it, in all circumstances whatsoever except, amongst others, in case of any negligence or misconduct or fraud on the part of the Trustee as may be determined by a court of competent jurisdiction.

The Investment Manager's liability to Trustee, its directors, employees and officers ("**Trustee Party**") for breach of its obligations under the Investment Management Agreement in each financial year is limited to the aggregate fees paid to the Investment Manager for immediately preceding one financial year under the agreement. Further, the Investment Manager shall indemnify the Trustee Party against any and all direct and actual losses, actions, claims, suits, proceedings, damages, liabilities, costs and expenses including legal fees, incurred or suffered by the Trustee Party in connection with the material breach of any of the terms specified under the Investment Management Agreement. Accordingly, the Unitholders may not be able to recover claims against the Project Manager, the Trustee or the Investment Manager.

If the management agreements were to be terminated or if their terms were to be altered, our business could be adversely affected, as the Trustee may not be able to immediately replace such services, and even if replacement services were immediately available, the terms offered or obtained with the new managers could be less favourable than the ones currently offered by the Investment Manager and the Project Manager.

7. ***Our success depends in large part upon the Investment Manager and Project Manager, the management and personnel that they employ, and their ability to attract and retain such persons.***

Our ability to make consistent distributions to our Unitholders depends on the continued service of management teams and personnel of the Investment Manager and Project Manager. Each of the Investment Manager and Project Manager may face challenges in recruiting and retaining a sufficient number of suitably skilled personnel. Generally, there is significant competition for management and other skilled personnel in our industry in India, and it may be difficult to attract and retain the skilled personnel that the Investment Manager and Project Manager need for our operations. Furthermore, the Investment Manager and Project Manager may not be able to adequately re-deploy and re-train their employees to keep pace with evolving industry standards and changing customer preferences. The loss of key personnel of either of the Investment Manager or the Project Manager, may have a material adverse effect on our business, prospects, financial condition, results of operations and cash flows of the Trust.

8. ***We are governed by the provisions of, amongst others, the InvIT Regulations and the SCRA, the implementation and interpretation of which, is evolving. The evolving regulatory framework governing infrastructure investment trusts in India may have a material adverse effect on the ability of certain categories of investors to invest in the Units, our business, financial condition and results of operations and our ability to make distributions to the Unitholders.***

The Trust has been constituted under the InvIT Regulations which were issued on September 26, 2014. The InvIT Regulations have been amended pursuant to various notifications and further supplemented with additional guidelines and circulars issued by SEBI from time to time.

As the regulatory framework governing infrastructure investment trusts in India comprises a separate set of regulations, interpretation and enforcement by regulators and courts involves uncertainties. Furthermore, regulations and processes with respect to certain aspects of infrastructure investment trusts, including, but not limited to, follow-on public offers and bonus issues, the liabilities of the Unitholders, and the procedure for dissolution of infrastructure investment trusts have not yet been issued. For example, infrastructure investment trusts are not "companies" or "bodies corporate" within the meaning of the Companies Act, 2013 and various SEBI regulations, including the Securities and Exchange Board of India (Buy-back of Securities) Regulations, 2018 and the Securities and Exchange Board of India (Substantial Acquisition of Shares and Takeovers) Regulations, 2011.

The InvIT Regulations and other corresponding changes to applicable law, are largely untested in their implementation. Uncertainty in applicability, interpretation or implementation of any amendment to, or change in, law, regulation or policy, including due to an absence, or a limited body, of administrative or judicial precedent may be time consuming and costly for us to resolve and may impact the viability of our current business or restrict our ability to grow our business in the future and consequently, our ability to make distributions to the Unitholders. Changes to our organizational structure, changes to our agreements, cost increases, fines, legal fees or business interruptions may result from changes to regulations, from new regulations, from new interpretations by courts or regulators of existing regulations or from stricter enforcement practices by regulatory authorities of existing regulations. In addition, new costs may arise from audit, certification and/or self-assessment standards required to maintain compliance with new and existing InvIT Regulations, which may render it economically unviable to continue conducting business as an infrastructure investment trust or otherwise have a material, adverse effect on our business, financial condition, results of operations and cash flows.

Further, SEBI has the right to, with or without prior notice, order inspection of the books of accounts, records and other documents pertaining to our operations, either on its own or, upon receipt of complaint. Upon review of the inspection report, SEBI is entitled to, if it so deems appropriate (in the interest of the securities markets or our investors) (a) to require us to surrender our certificate of registration; (b) to wind-up our operations; (c) to sell our assets; (d) direct us to not operate or access the capital markets for a specified period; or (e) direct us to not do such things as SEBI may deem appropriate in the interest of our investors. Any such occurrence may have a material adverse effect on our business, result of operations, financial conditions and cash flows.

Additionally, with effect from April 1, 2021, units and other instruments issued by an InvIT have been included in the definition of 'securities' under section 2(h) of the SCRA. Such amendments have come into effect on April 1, 2021, and consequently, the implementation and interpretation of these amendments is untested and evolving. Accordingly, the applicability of several regulations (including regulations relating to intermediaries, merchant bankers, takeover, insider trading and fraudulent and unfair trade practices) to the Trust is unclear and subject to the interpretation and clarifications issued by regulatory bodies such as SEBI.

There can be no assurance that the legal framework for infrastructure trusts will not impose additional regulations and policies which could impact our operations and it is difficult to forecast how any new laws, regulations or standards or future amendments to the InvIT Regulations, the SCRA and other applicable law will affect infrastructure trusts and the infrastructure sector in India. Such changes may adversely affect our business, results of operations and prospects, to the extent that we are unable to suitably respond to and comply with any such changes in applicable law and policy. We may incur increased costs and other burdens relating to compliance with such new regulations, which may also require significant time and other resources, and any failure to comply with these changes may adversely affect our business, results of operations and prospects.

Risks Relating to Our Business and the Concession Agreements

9. *Any payment by the Project SPV, including in the event of the termination of the Concession Agreements, is subject to a mandatory escrow arrangement which restricts its flexibility to utilise the available funds.*

Under the terms of the Concession Agreements, the Project SPV is required to establish escrow account prior to the appointed date. All funds received by the Project SPV, including the financial package, all fees and other revenues from or in respect of the projects (including proceeds of any rentals, deposits, capital receipts or insurance claims), and all payments by the NHAI and the relevant concessioning authorities, must be deposited into an escrow account and can only be used according to a pre-determined order set out in the relevant concession agreements and the escrow agreement. For a summary of the escrow arrangements, please see the section titled "*Summary of Concession Agreements*" on page 200.

The escrow arrangements provide for appropriation of funds towards payment of all taxes due and payable, followed by the payment of concession fee to the NHAI, payment of expenses in connection with the construction of the project, operation and maintenance expenses and other costs and expenses incurred by the Sponsor in its capacity as concessioning authority and certified as payable, provision for debt service payments, any payments and damages certified by the concessioning authority as due and payable to the concessioning authority, and balance, if any, in accordance with the instructions of the concessionaire. Further, the concessionaire cannot modify the order of payments without prior written approval of the NHAI and the lenders.

The debt financing proposed to be provided by the Trust to the Project SPV comprises of certain secured and/or unsecured interest-bearing loans (collectively, the "**Trust Financing**"). In accordance with the escrow arrangement, the amounts payable to the Trust in respect of the Trust Financing, will be subordinated to the amounts payable in respect of taxes due, concession fees, construction related expenses, operation and maintenance and other costs and expenses. Further, any reduction in the cash flows of the Project SPV and/or an unanticipated increase in any of the abovementioned payments to be made by the Project SPV from the escrow accounts may result in decreased and/or delayed payment to the Trust, materially and adversely impacting the ability of the Project SPV to meet their payment obligations to the Trust. Any inability on the part of the Project SPV to meet their payment obligations to the Trust may adversely impact the ability of the Trust to make distributions to the Unitholders in the manner described in this Offer Document or at all.

In the event of termination and withdrawal of funds from the escrow account, the escrow arrangement prioritises the payment of all taxes due and payable the concessionaire for and in respect of the projects, payment due to lenders, all payments and damages certified by the concessioning authority as due and payable, retention and payments relating to liability for defects and deficiencies, incurred or accrued operation and maintenance expenses, and any other payments required to be made under the Concession Agreements. Therefore, in case of termination, the amounts payable to the Trust in respect of the Trust Financing may be recovered in accordance with the order of priority specified under the Concession Agreements.

10. *Upon completion of the Issue, the Sponsor may be able to exercise significant influence over activities of the Trust on which Unitholders are entitled to vote. The Sponsor and Sponsor Group's interests may be different from the other Unitholders.*

Under the InvIT Regulations, upon completion of the Issue, the Sponsor and the Sponsor Group, collectively, are required, must continue to own all of their Units for one year and must own at least 15.00% of the outstanding Units for three years from the date of listing of the Units, subject to the conditions specified in the InvIT Regulations. Although the Investment Manager will have an independent board of directors, the Sponsor may nonetheless be in a position to exercise significant influence in matters which require the approval of Unitholders by virtue of its ownership of Units in the Trust. The interests of the Sponsor may conflict with the interests of our other Unitholders and the Sponsor may, for business considerations or otherwise, seek to benefit itself instead of

the Trust or the interests of the other Unitholders. The Sponsor will also exercise influence over the Investment Manager and the Project Manager, as the Sponsor holds 26.00% shareholding in the Investment Manager and 100.00% shareholding in the Project Manager (wholly owned subsidiary of the Sponsor). Accordingly, the Investment Manager and Project Manager may also be subject to conflicts of interest with respect to the Trust.

Pursuant to the Commitment Letter, while the Sponsor has undertaken to hold 15.00% of the Units of the Trust for five years and 10.00% thereafter, under the InvIT Regulations the Sponsor and Sponsor Group will be able to divest its holding in the Units at any time three years from the date of listing of Units after completion of the lock-in period prescribed under the InvIT Regulations. Given the influence that the Sponsor exerts on the Investment Manager, and consequently the operations, governance and credibility of the Trust, any material divestiture by the Sponsor in the Units, or any conflict of interest that it has compared to that of other Unitholders, could have a material adverse impact on our business, financial condition and results of operations.

11. ***The cost of implementing new technologies for collection of tolls and monitoring our projects could materially and adversely affect our business, financial condition and results of operations.***

Our future success will depend in part on our ability to respond to technological advances and emerging standards and practices in a timely and cost-effective manner. In addition, rapid and frequent technology and market-demand changes can often render existing technologies and equipment obsolete, requiring substantial new capital expenditures or write-downs of assets. For instance, we are required to implement automatic number plate recognition ("**ANPR**") camera and RFID (FASTAG) based barrier less multi lane free flow (MLFF) tolling system at the toll plaza location on the respective highway stretches. The concessioning authority may also require the Project SPV to implement and adhere to certain technologies in connection with the projects in the future and there can be no assurance that we would be able to do so in a timely manner, or at all. Any failure by us to successfully adopt such technologies in a timely and cost-effective manner could increase the cost of operating the projects. Such delays or challenges may also result in operational inefficiencies or non-compliance with concession requirements. There is no guarantee that the cost of implementing new technologies for the projects will be fully reimbursed by the concessioning authority and any such cost may therefore have an adverse effect on our business, results of operations and financial condition.

12. ***We may face limitations and risks associated with debt financing and refinancing, which may adversely affect our operations and our ability to make distributions to Unitholders.***

We are subject to regulatory restrictions in relation to our debt financing and refinancing. We may from time to time require debt financing and refinancing to carry out the Investment Manager's investment strategy and to cover maintenance costs. In the event that we undertake any additional debt financing or refinancing, post listing of the Units, we may be limited by Indian law as to the nature of financing or refinancing that we may undertake. As a trust, we may be unable to access certain debt capital available to companies.

In the event that we undertake debt financing or refinancing post listing, we may also be subject to risks associated with debt financing and refinancing, including the risk that our cash flow may be insufficient to meet required payments of principal and interest under such financing and to make distributions to Unitholders. Our ability to generate sufficient cash to satisfy our debt obligations will depend on our future operating performance, which may be affected by prevailing economic conditions and financial, business and other factors beyond our control. There is no assurance that we will be able to generate sufficient cash flow to meet all of our debt obligations. If we are unable to make payments due under our debt facilities, the lenders may be able to declare an event of default and initiate enforcement proceedings relating to any security provided in respect of the loan facilities, and/or call upon any guarantees, and this may materially and adversely affect our ability to make distributions to Unitholders. Such default may also result in the termination of the Concession Agreements by the Sponsor.

We may also be subject to certain covenants in connection with any future borrowings that may limit or otherwise adversely affect our operations and our ability to make distributions to Unitholders, such as covenants restricting our ability to acquire assets or undertake other capital expenditure, requirements to set aside funds for maintenance or repayment of security deposits or requirements to maintain certain financial ratios. For further details, see *"Financial Indebtedness and Deferred Payments"* on page 215.

Further, if prevailing interest rates or other factors at the time of financing or refinancing (including changes in market conditions and maturity term imposed by any lenders) result in higher interest rates, the interest expense may be significant and may have an adverse effect on our cash flow and the amount of distributions available to Unitholders.

13. ***We may be required to pay additional stamp duty if the Concession Agreements are subject to payment of stamp duty as a deed creating leasehold rights, or as a development agreement.***

For the purposes of stamp duty payment, concession agreements are generally considered to be agreements which are not lease deeds and stamp duty ranging between ₹ 100.00 to ₹ 500.00 is typically paid for such concession agreements. However, stamp duty authorities of certain states in India have issued notices to some concessionaires alleging inadequate stamp duty on the concession agreements executed between the concessionaires and the relevant concession authority treating the concession agreements as lease deeds. The stamp authorities allege that since concession agreements relate to the letting of tolls to the concessionaires in the form of leases, or as development agreements, such agreements were required to be stamped as lease agreements or development agreements, as applicable. The stamp duty for a lease agreement or a development agreement ranges between 1.00% and 11.00% of the annual rent or premium payable or the market value of the property. Furthermore, stamp duty authorities may impose penalties for payment of inadequate stamp duty, which could extend up to ten (10) times the amount of the stamp duty payable. Accordingly, concession agreements that have not been stamped as such could be considered to be inadequately stamped. The High Courts of Allahabad and Maharashtra have also held that a concession agreement ought to be stamped as a lease agreement and have upheld the imposition of a higher stamp duty on such agreements. Furthermore, pursuant to the judgments issued by the Supreme Court of India, a concession agreement for a toll road has been categorized as a "lease" under the Indian Stamp Act, 1899. As a result, the stamp duty provisions that apply to leases are now applicable to these agreements.

If any Concession Agreements were determined to be inadequately stamped, then such agreements would be inadmissible as evidence in any legal action, until the deficient amount of stamp duty together with penalties, if any, has been paid. Any deficiently stamped documents can also be impounded by any person having authority, by law or consent, to receive evidence or every person who is in-charge of a public office, and such impounded documents could be made subject to stamp duty and penalty. In addition, a person who signs an instrument chargeable with stamp duty will be subject to a fine if such instrument is not duly stamped. Any additional stamp duty payable in respect of the Concession Agreements, if any, shall be reimbursed by NHAI, as confirmed by them vide letter dated January 12, 2026.

While we believe we have discharged our obligation of stamp duty on each of the Concession Agreements adequately, if any demand for payment of a higher stamp duty or penalty is imposed which would increase the costs of the InvIT Assets and NHAI fails to reimburse us for the same, then to the extent such additional costs are not recoverable from the concessioning authority, such demand could adversely affect our business, results of operations and prospects.

14. ***Certain actions of the Project SPV requires the prior approval of NHAI, and no assurance can be given that NHAI will approve such actions in a timely manner or at all.***

Certain terms and conditions in the Project SPV's Concession Agreements including, financing agreements require NHAI's prior written approval to be obtained for one or more of the following actions, among others, such as:

a. amendment, modification, or replacement by the Project SPV of any project agreements (including financing agreements) relating to the operation of the road asset to which the Project SPV is a party if the amendment, modification, or replacement of such agreement increases or imposes any financial liability or obligation on the concessioning authorities;
b. assignment of the Concession Agreements to any persons, the creation of any encumbrance over, or security interest over, or transfer or disposal of rights and benefits of the Project SPV under the Concession Agreements or any project agreements;
c. the selection or replacement of any operation and maintenance contractor and execution of the operation and maintenance agreements;
d. securing refinancing;
e. abandoning, or manifesting an intention to abandon, the operation and maintenance of the InvIT Assets; and
f. any change in ownership of the Project SPV.

Furthermore, the Concession Agreements typically require the submission to NHAI, for its review and comments, all project agreements (including, financing agreements, O&M contracts) to which the Project SPV is a party prior to entry, amendment or replacement of such agreements, even if such agreements do not affect the financial liability or obligations of the concessioning authorities.

The restrictions described above may impose constraints on our flexibility to conduct our business. Further, if as a result of these restrictions, we are unable to pursue a favourable course of action or to respond to an unfavourable event, condition or circumstance, then our business, financial condition and results of operations may be materially and adversely affected. For further details on the terms of the Concession Agreements, section headed "*Summary of the Concession Agreements*" on page 200.

15. *The Project SPV's toll-road concessions may be terminated prematurely under certain circumstances, which could materially affect our business, operating results, financial condition and cash flows.*

The Toll Roads concessions of the Project SPV are our principal assets. Our ability to collect tolls or receive contractual payments from the authorities and consequently, to distribute funds to our unitholders depends on the Project SPV maintaining its concession rights from the concessioning authority, in its capacity as concessioning authority. The Project SPV will be unable to continue the operation of a particular road concession without a continuing concession right from the concessioning authority, in its capacity as concessioning authority. Concession Agreements may be terminated by the concessioning authority, in its capacity as concessioning authority for certain reasons set forth herein, including, but not limited to, one or more of the following events of default by the Project SPV:

a. any failure by the Project SPV to comply with the change of ownership requirements;
b. any failure by the Project SPV to make any payments to the concessioning authority, including concession fees, within a prescribed period;
c. any failure by the Project SPV to comply with the prescribed operation and maintenance requirements;
d. abandonment or intention to abandon construction or operation of a project by us without the prior written consent of the concessioning authority;
e. failure to comply with the provisions of the escrow agreements entered into with the concessioning authority or other regulatory authorities;
f. any occurrence of an event of default under any project agreement, including financing agreements;
g. insolvency, liquidation, dissolution, winding-up, or bankruptcy of the Project SPV or appointment of a trustee, receiver, or provisional liquidator for its assets;
h. any continuation of a force majeure event, such as an act of God, act of war, expropriation or compulsory acquisition of any project assets by the government, strikes, civil commotions, boycotts and political agitations, beyond a specified time; and
i. any failure by the Project SPV to comply with the Concession Agreements if such default causes a material adverse effect on the concessioning authority.

If the Concession Agreements are terminated by the NHAI due to a default by the Project SPV, or by the Project SPV due to a default by the NHAI, the Project SPV is entitled to termination payments or otherwise from the NHAI in accordance with the terms of the relevant Concession Agreements. If the Concession Agreements are terminated prematurely, our business, financial condition and results of operations may be materially and adversely affected. For further details on the termination of the relevant Concession Agreements, the termination payments, and the definition of "default" as contemplated under the Concession Agreements, see the section headed "*Summary of the Concession Agreements*" on page 200.

16. *Toll collections and Toll Road traffic volumes may be affected by existing or new competing roads and bridges and other modes of transportation, and any improvements to, or construction of, such roads, bridges and other modes of transportation.*

Upon commencement of the concessions, our principal source of revenue will be the collection of toll fees from users of the Toll Roads. The level of toll collections may be affected by existing or new competing routes and alternative modes of transportation, such as adjacent free roads, new or existing toll roads including national highways or state toll roads, railways or air transport. Although the Concession Agreements contain certain restrictions on the ability of the concessioning authority, to construct or cause to be constructed any competing roads within 15 kms of the Toll Roads, the concessioning authority is not prohibited from constructing such competing free or toll roads if the average traffic on the Toll Road exceeds 90.00% of its designed capacity for three consecutive years, as stipulated in the Concession Agreement. Furthermore, the concessioning authority is not restricted under the Concession Agreements from constructing alternative modes of travel which service the same areas as are serviced by the Toll Roads.

In particular, the Sponsor (in its capacity as the concessioning authority) has entrusted the Project SPV with the role of development, operation, maintenance and management of the toll roads mentioned hereinbelow.

Toll Road	Length of Toll Road (in kms)	Lanes	State
Gorhar – Barwa Adda	80.522	Four/six	Jharkhand
Chilakaluripet-Vijayawada	69.408	Six	Andhra Pradesh
Chennai – Bypass	32.600	Six	Tamil Nadu
Chennai – Tada	33.000	Six	Tamil Nadu
Neelmangla –Tumkur	44.668	Four/six	Karnataka

Additionally, given the renewed focus of the GoI, at the national, state and local levels, on the development and strengthening of the highway network across India, subject to the aforementioned restriction, there can be no assurance that there will not be any construction, widening or improvement of any free or toll roads, or construction of other modes of transportation, in the proximity of the Toll Roads or which provide an alternative or more direct routing to locations served by the Toll Roads. Any such construction, widening or improvement may divert traffic away from the Toll Roads, which may adversely affect toll collections and, therefore, our ability to meet our payment obligations under the Units.

17. ***Our business will be subject to seasonal fluctuations and business and economic cycles that may affect our cash flows.***

Our cash flows from InvIT Assets will be affected by seasonal factors, and business and economic cycles, which may materially and adversely affect traffic volumes. Traffic volumes tend to decrease during the monsoon season and conversely tend to increase during holiday seasons. The monsoon season may also restrict our ability to carry on activities related to our operation and maintenance of the Toll Roads. Further, extreme weather conditions, such as floods, incessant or torrential rain, acts of God, or any other force majeure event, could impair the safe operation of and traffic movement on the Toll Roads by causing events such as overtopping of structures on the carriageway, amongst others. This may also result in stoppage or diversion of traffic on Toll Roads or delays in periodic maintenance and may also reduce productivity. Additionally, anticipated traffic diversions could be higher for certain projects due to disruptions caused by capacity augmentation construction, as seen in past projects, thereby materially and adversely affecting our business, financial condition and results of operations. Furthermore, toll revenues are highly sensitive to traffic volume and vehicle composition. Any decline in economic activity, rise in fuel prices, changes in freight movement, or external disruptions like pandemics can lead to reduced vehicle flow on highways, directly impacting toll collections and revenue stability. Variations in these underlying economic indicators may cause deviations in traffic volumes from initial forecasts. Any significant shortfall between actual and forecast traffic volumes or toll revenues may have a material adverse effect on the Project SPV's cash flows, results of operations and financial condition.

18. ***Toll rates and collections and Toll Road traffic volumes depend on regulatory limitations and number of people using our roads, which in turn are dependent on factors beyond our control and are subject to significant fluctuations.***

Revenue from toll receipts is determined by both the base rates set by the concessioning authority under the Concession Agreements and the actual volume of traffic on our roads. The toll rate structure is laid down under National Highways Fee (Determination of Rates and Collection) Rules, 2008, as amended from time to time (the "**Fee Rules**") read with our Concession Agreements executed by the Project SPV awarded by the NHAI, typically restrict the extent to which toll rates can fluctuate and prescribe related regulations. Usually, the relevant concessioning authority establishes the applicable user fees and outlines the methods for periodic adjustments. As a result, we may not be able to increase toll rates sufficiently to offset increases in our operating, financing, or other costs. The concessioning authority may revise user fees in accordance with the changes in the tolls related policies or terms of the concession agreement and relevant laws. Consequently, our revenue from tolls depends on both traffic volume and user fees, neither of which we control.

The toll rate structure is laid down under the Fee Rules. The Fee Rules specify that the applicable toll rates specified thereunder shall be increased by three per cent each year along with an adjustment based on an increase in the wholesale price index (the "**WPI**"), which currently is set at 40% of WPI. We are not provided with any flexibility to adjust the toll rates as the rates are explicitly changed by the GOI in accordance with the Fee Rules. Additionally, NHAI issued a circular dated September 13, 2025, revising the WPI linking factor, which would have affected toll rate adjustments, however, this circular has been stayed and is currently not in effect. For further details, see "*—Toll collections are affected by applicable toll rates and revisions to such rates and the number of road users subject to such rates.*"

Traffic volumes on the Toll Roads and toll revenue we collect are directly and indirectly affected by a number of other factors beyond our control, including but not limited to:

a. the growth of the Indian economy and the economic development of the states in which the Toll Roads are located as well as neighbouring states (the "**Project Influence Area**");
b. restrictions on mining, or a decline in manufacturing or exports of commodities plying on the Toll Roads due to regulatory clampdowns, financial crises or other reasons that could distort global commodity prices;
c. the number and type of motor vehicles in operation as well as the cost of purchasing and operating motor vehicles in areas served by the toll roads, including financing costs, environmental law compliance costs, exchange rate fluctuations and fuel prices, in the Project Influence Areas;
d. adverse weather conditions, such as floods or torrential rain, acts of God, strikes or any other force majeure event, including epidemics, or political and non-political unrest that could impair the safe operation of, restrict traffic access to, or prevent use or accessibility of the toll roads;
e. traffic on the roads providing access to and from the toll roads including coming up of alternate routes, or the physical condition of such roads, the waiting time at the toll plazas and congestion at the gateways, which hampers the ability of road users to reach and depart from our toll roads;
f. construction, maintenance or widening of highways or adjacent project roads or any entry restrictions of vehicles or material closures on account of safety precautions by the local administration may adversely impact the revenue of the project;
g. the capacity of the toll roads, or any associated structures such as bridges, bypasses or tunnels, as well as maintenance and repair requirements of parts or all of the toll roads, or any structure forming part of the toll roads, which may result in restricted or no access to the toll roads for material periods of time;
h. overall security of the toll roads as managed by the relevant security contractors, including the possible threat of terrorist attacks on the toll roads or any of their free-standing structures;
i. a change in the applicable toll policies or other applicable laws which affects any category of vehicle or fuel;
j. changes to axle load norms in order to further increase the permissible axle load limits in India, which may adversely impact traffic growth along Indian national and state highways and cause accelerated deterioration of the condition of the pavement of the toll roads;
k. the reactions of the public or other national or state government institutions to toll rate increases; and
l. seasonal holidays.

In the event there is a significant decrease in traffic volume or change in toll rates on the toll roads, there may be a corresponding decrease in toll collections which could have a material adverse effect on our ability to make distribution to unitholders. Furthermore, certain regulatory and policy guidelines issued by the NHAI from time to time may adversely affect the business of certain toll-based Project SPV, results of operations, cash flows and financial condition. For instance, NHAI had in the past temporarily suspended tolling on project roads due to COVID-19 during the nationwide lockdown from March 25, 2020 to April 19, 2020. Furthermore, the implementation of an annual pass, which is a capped tolling system has reduced the average toll revenue per vehicle with effect from August 15, 2025 may also affect our toll revenue. For further details see, " – *Changes in the policies adopted by governmental entities or in the relationships of any member of the Trust with the Government or State Governments could materially and adversely affect our business, financial condition, results of operations and ability to make distribution to our Unitholders."* on page 53.

19. ***Leakage of the tolls collected on the toll roads may adversely affect toll collections.***

Toll collections are dependent on the integrity of our toll collection system. Upon commencement of the concessions, the toll roads will be operated on an "open" toll collection system with different toll rates applicable to certain classes of vehicles; each motorist using a particular class of vehicle is charged a flat rate at the point of entry to the toll road regardless of the actual distance travelled.

The level of toll collections may be reduced by leakage through toll evasion, fraudulent acts on the part of road users or our toll collection operators, theft, technical faults in our toll collection systems, or unlawful roadway entries or exits by road users to avoid paying the required toll. To the extent we become aware of any routes available to road users to bypass the toll plazas, we may face delays in obtaining approval from the concessioning authority to implement additional toll plazas to prevent such unauthorized entry or exit to the toll roads, which may adversely affect our revenue and our ability to meet our payment obligations under the Units. If toll collection is not adequately monitored, leakage may reduce toll collections. Although we expect to put in place systems and software, as well as deploy a number of toll plaza supervisors and security manpower, to minimize leakage through fraud and theft, if there is any significant failure in the efficiency or effectiveness of our collection practices or of

the installed system software or any significant failure by us or our contractors to control leakage in toll collection, there could be a material adverse effect on our toll collections.

Furthermore, there may be situations where toll collection is disrupted or stopped, for example, due to public disturbances, or strikes or work stoppages as a result of disputes with local labor unions. See " *–The results of operations of the Project SPV could be adversely affected by strikes, work stoppages or increased wage demands by the employees of the Project SPV, and independent contracts or other subcontractors*." Any such disruption or other stoppage of toll collection may interfere with our collection practices, resulting in increased leakage and reduced toll collections by us, which may adversely affect our revenue and our ability to meet our payment obligations under the Units.

20. ***The termination payment due to us upon termination of the Concession Agreements may not adequately compensate us for the actual costs and investments associated with the toll roads in a timely manner or at all and thus may not provide us with sufficient funds to repay the Units.***

The Concession Agreements may be terminated by us or the NHAI prior to their expiration for a number of reasons. In the event that the early termination of the Concession Agreements is due to a breach by us, we are entitled to receive a termination payment equal to 70.00% of the Unexpired Cash Flow, as defined in the Concession Agreements, in addition to remaining liable for costs and liabilities in relation to the Toll Roads. In the event that the early termination of the Concession Agreements is due to a breach by the NHAI, we are entitled to receive a contractually agreed termination amount equal to 105.00% of the Unexpired Cash Flow. For further details see "*Summary of the Concession Agreements.*" on page 200. As the termination payment payable to us in the event of a breach by us could be lower than what we would have otherwise been entitled to receive in the event that the Concession Agreement had not been terminated, we may not be adequately compensated for the actual costs and investments associated with our assets and, therefore, may adversely affect our ability to make distributions to the Unitholders. Furthermore, such termination payments may be subject to adjustments in relation to any outstanding amounts payable to the authority, including for example any outstanding penalties/damages imposed on our Project SPV by the relevant concessioning authority till that date.

There is no assurance that any termination payment due to us will be paid in full or part, within the timelines specified in the Concession Agreement or at all. In the event of a delay in the disbursement of a termination payment by the NHAI, in particular, if any dispute arises in respect of such payment, or in the event the NHAI fails to make the termination payment at all, we may be unable to make distributions to the Unitholders.

21. ***Toll collections are affected by applicable toll rates and revisions to such rates and the number of road users subject to such rates.***

Under the terms of the Concession Agreements, the toll rates applicable to the toll roads are determined in accordance with the Fee Rules. In accordance with the Fee Rules, the toll rates are increased annually by 3.00% (fixed) and adjustments are based on the WPI. The adjustment considers the change in WPI between the week ending on January 6, 2007, and the corresponding week of each adjustment year (the "**WPI Adjustment**"). However, the WPI Adjustment is capped at 40% of the WPI change. While a correlation exists between WPI and factors like wage and material costs, toll rate increase may not fully offset operational costs, especially in high WPI fluctuation periods. Additionally, toll collections can be influenced by exemptions granted under Concession Agreements, such as for non-commercial road users or discounted fee users. Any increase in exemptions or inability to implement revised toll rates promptly can reduce toll collections. This impact can be compounded by factors like reduced traffic volume or changes in consumer preferences.

Further, the annual toll rate revisions, typically effective from April 1, are critical to ensuring revenue growth and aligning toll collections with operational costs. However, delays in implementing these revisions can lead to significant financial and operational risks. For instance, in the last financial year, toll rates were revised from June 3, 2024, due to procedural delays. Such delays can lead to revenue losses, affecting debt servicing capabilities and financial projections. Additionally, delayed revisions can also impact investor sentiment and asset valuations, particularly when uncertainties arise around revenue forecasts. These uncertainties may influence the valuation of toll assets, potentially affecting ratings from financial institutions and agencies.

22. ***Changes in the policies adopted by governmental entities or in the relationships of any member of the Trust with the Government or State Governments could materially and adversely affect our business, financial condition, results of operations and ability to make distribution to our Unitholders.***

The Project SPV would be deriving almost all of its revenue from the Concession Agreements entered into with the NHAI and must maintain good relationships and strategic alliances with the Sponsor, the Government of India and relevant State Governments. We expect that we will continue to depend on, and benefit from, policies and decisions of the NHAI and other governmental authorities relating to the terms and administration of the concessions for its existing projects, as well as any future projects that may be awarded. Any adverse change in any existing governmental policies, incentives, allocations or resources, or deterioration of our relationship with the NHAI or governmental authorities, could materially and adversely affect our business, financial condition and results of operations.

Additionally, the toll roads may be subject to delays, extensive internal processes, changes in government policies, changes due to local, or national political pressures and variation in governmental or external budgetary allocations and insufficiency of funds. Since governmental authorities are responsible for awarding concessions and are a party to the development and operation of the awarded projects, our business will be directly and significantly dependent on their continued support. Any withdrawal of such support or any adverse changes in their policies, priorities or administrative practices of governmental authorities, even if not quantifiable monetarily, may lead to the Project SPV's agreements being restructured or renegotiated or the concession period being decreased, which could materially and adversely affect the Project SPV's financing, capital expenditure, revenues, development activities or ongoing operations.

23. ***Our revenues under the Transitional Support Agreement are dependent on successful continuation of underlying tolling contracts.***

The Sponsor, Project Manager and the Project SPV have entered into the Transitional Support Agreement for the purpose of the Sponsor providing transitional support to: (i) the Project SPV in respect of its operation and maintenance ("**O&M**") obligations and tolling obligations in relation to the Concession Agreements; and (ii) the Project Manager in respect of its obligations under the Project Implementation and Management Agreement. As a result, the Sponsor is obligated, during the term of the Transitional Support Agreement, to undertake the tolling obligations/ tolling related responsibilities under and in compliance with the Concession Agreement(s) on behalf of the Concessionaire. In furtherance of this, the Sponsor will enter into tolling contracts with certain third-party contractors in respect of the project highways under which these contractors pay the Sponsor a fixed contracted fee on a regular basis irrespective of the actual quantum of fee collected in respect of the project highway. The Sponsor shall continue to operate tolling contracts on "as is basis" during the transition period from appointed date. Further, the remittance (which would be due to the Sponsor) under such tolling contracts would be credited directly to the Project SPV upon consummation of the transaction. These tolling contracts have a defined period and have set expiry dates. However, some contracts may expire during the transaction period or upon its completion, potentially delaying the handover over of the tolling operations. Additionally, tolling contracts contain provisions for pre-mature termination in cases of default by third-party contractors. In such scenarios, the Sponsor may need to enter into new contracts or extend existing ones, with the remittance from such renewed tolling contracts possibly being lower than the currently contracted amounts, posing a risk of lower revenue. Moreover, toll contracts are periodically awarded by NHAI to various tolling contractors with the understanding that they may be terminated for various reasons including, taking over of the operations of the relevant Toll Roads by Project SPV. However, such tolling contractors may contest termination of the tolling contracts, delay in handover of the toll plazas of the Toll Roads, fail to transfer the required amounts under the tolling contracts. Such uncertainties could materially impact the expected revenue, financial condition, and overall business prospects of Project SPV.

24. ***The Valuation Report by RBSA Valuation Advisors LLP (the "Valuer"), and any underlying reports, are not opinions on the commercial merits of the Trust or the InvIT Assets, nor are they opinions, expressed or implied, as to the future trading price of the Units or the financial condition of the Trust upon listing, and the valuation contained therein may not be indicative of the true value of the InvIT assets.***

RBSA Valuation Advisors LLP has been appointed as the independent valuer (the "**Valuer**") to undertake independent appraisals of the InvIT Assets. The Valuer has issued a valuation report (the "**Valuation Report**"), included in **Annexure A** to this Offer Document, which sets out its opinion as to the fair enterprise value of the InvIT Assets as of December 31, 2025. In order to issue the Valuation Report, the Valuer has relied upon, among other factors, assumptions regarding to the traffic volumes, toll rates, operation and maintenance costs, amortization, debt repayment schedules and non-cash net working capital projections and other financial and operational parameters. These assumptions are based on information provided by and discussions with or on behalf of the Sponsor, the Investment Manager and us, and which reflects current expectations and views regarding

future events and, therefore, necessarily involves known and unknown risks and uncertainties. Please see the Valuation Report included in **Annexure A** to this Offer Document for a more detailed description of all assumptions relied upon in the preparation thereof. The Valuation Report contains forecasts, projections and other "forward-looking" statements relating to future events. Such forward-looking statements are inherently subject to uncertainties and contingencies, many of which are beyond our control. Actual results or performance may differ materially from the future results or performance projected, expressed or implied in the Valuation Report.

The Valuation Report is neither an opinion on the commercial merits and structure of the Trust or the InvIT Assets, nor is it an opinion, expressed or implied, as to the future trading price of the Units in or the financial condition of the Trust upon listing. The Valuation Report does not purport to contain all the information that may be necessary or desirable to fully evaluate the Trust or the InvIT Assets or an investment in the Trust or the Units. The Valuation Report is not based on a comprehensive review of the business, operational or financial condition of the InvIT Assets and, accordingly, makes no representation or warranty, expressed or implied, in this regard. The Valuation Report does not confer rights or remedies upon investors or any other person, and does not constitute and should not be construed as any form of assurance as to the financial condition or future performance of the Trust or as to any other forward-looking statements included therein, including those relating to certain macro-economic factors, by or on behalf of the Sponsor, the Investment Manager, the Project Manager, the Trust, the Book Running Lead Managers or any other party that any person should take any action based on the Valuation Report. Further, we cannot assure you that the valuation prepared by the Valuer reflects the true value of the net future revenues of the InvIT Assets or that other valuers would arrive at the same valuation. Accordingly, the valuation contained therein may not be indicative of the true value of the InvIT Assets. The Valuation Report has been issued on January 12, 2026 and does not take into account any subsequent developments and should not be considered as a recommendation by the Sponsor, the Investment Manager, the Project Manager, the Trust or the Book Running Lead Managers or any other party that any person should take any action based on the Valuation Report. Accordingly, investors should not completely place on reliance on the Valuation Report in making an investment decision to purchase Units in the Trust.

25. ***We have referred to the data derived from (i) Technical Consultant Report commissioned from the Technical Consultant, (ii) Traffic Reports commissioned from the Traffic Consultants and (ii) CARE Industry Report which are based on certain bases, estimates and assumptions that are subjective in nature and may not be accurate.***

We have appointed the Technical Consultants to forecast the traffic volumes and operations and maintenance expenses for the InvIT Assets and to prepare technical reports on the InvIT Assets, which are set out in **Annexure B** to this Offer Document (the "**Technical Consultant Reports**"). We have also appointed the Traffic Consultants to provide their own analysis and forecast of traffic volumes for the InvIT Assets which are set out in **Annexure C** to this Offer Document (the "**Traffic Reports**"). Furthermore, we have also commissioned a report titled "*Research Report on Road Sector in India*" dated January 2026, prepared by CARE ("**CARE Industry Report**'), which was paid for by the Investment Manager on behalf of the Trust. All of the Technical Consultant Reports, the Traffic Reports and the CARE Industry Report (together referred to as "**Industry Expert Reports**") are subject to various limitations and are based upon certain bases, estimates and assumptions that are subjective in nature and that are based, in part, on information provided by and discussions with or on behalf of us, the Sponsor and the Investment Manager. The Industry Expert Reports reflect current expectations and views regarding future events, and therefore, necessarily involve known and unknown risks and uncertainties. The Industry Expert Reports contain forecasts, projections and other "forward-looking" statements that relate to future events, which are, by their nature, subject to significant risks and uncertainties, including population growth, gross domestic product growth, vehicle ownership rates, per capita income, agricultural output and fuel consumption. The future events referred to in the Industry Expert Reports involve risks, uncertainties and other factors which may cause the actual traffic volumes to be materially different from any future traffic volumes expressed or implied by the Industry Expert Reports. There can be no assurance that the bases, estimates and assumptions adopted by the Technical Consultant, CARE or the Traffic Consultants for the purposes of preparing their respective reports will prove to be accurate. If any of these bases traffic assumptions is incorrect, future traffic volumes for the InvIT Assets could be materially different from those that are set forth in the Industry Expert Reports and this Offer Document.

26. ***Certain provisions of the standard form of Concession Agreements may be untested, and the Concession Agreements may contain certain restrictive terms and conditions which may be subject to varying interpretations.***

The Concession Agreements that we will be entering into is substantially based on a model concession agreement prescribed by NHAI. For example, the toll fees under the Concession Agreements is fixed, subject to annual adjustments to account for wholesale price index as specified in the Concession Agreements. In addition, the operation and maintenance standards and specifications require the Project SPV to incur operation and maintenance costs on a regular and periodic basis. The Concession Agreements also provide for a fixed term concession and, although our Concession Agreements provide for an extension or reduction of the concession period based on certain factors, including actual traffic volumes on specified target dates, the Concession Agreements do not provide for renewal of the Concession Agreements after the expiry of the term.

The form of the Concession Agreements has evolved within the last decade and there is limited guidance available on the interpretation of a number of terms and conditions of the Concession Agreements. In addition, certain terms of the Concession Agreements, such as those related to an augmentation in the capacity of the toll roads, substitution of the concessioning authority in any or all of the project agreements, termination payments by the concessioning authority, construction of additional competing roads by the concessioning authority, the Government of India or relevant State Governments and payment of compensation by the concessioning authority for changes in law are untested. Accordingly, the interpretation of certain terms and conditions in the Concession Agreements of the Project SPV by the concessioning authority, the courts or regulators may be different from our interpretation of such terms and conditions.

The terms and conditions of the Concession Agreements contain restrictive terms and conditions. For example, the Concession Agreements contain provisions that mandate substitution clauses in the project agreements. Such substitution clauses allow the concessioning authority to step into project agreements in place of the Project SPV in the event of suspension of the Project SPV or termination of the Concession Agreements due to a breach or default by the Project SPV. The Concession Agreements also provides that the lenders to a Project SPV may substitute the Project SPV with new entities approved by the concessioning authority in the event of a default by the Project SPV under the relevant Concession Agreements or financing agreements. The terms of the Project SPV's Concession Agreements requires the Project SPV to indemnify the concessioning authority for losses arising out of breach of the obligations of the Project SPV under the Concession Agreements.

In the event the concessioning authority or a lender invokes any restrictive term or condition in the Concession Agreements, or the concessioning authority, a court, or regulator interprets any term or condition in an adverse manner, such invocation or interpretation may materially and adversely affect our business, financial condition and results of operations.

27. ***We may be subject to increases in costs, including operation and maintenance costs, which we cannot recover by increasing toll fees under the Concession Agreements.***

The terms and conditions of the Concession Agreements are fixed and are not negotiable during the concession period. The cost of operating and maintaining the InvIT Assets may increase due to factors beyond our control, including, among other things:

a. Unexpected increase in the cost of labour, materials and insurance;
b. the Project SPV being required to install intelligent toll-collection systems at their own costs;
c. the Project SPV being required to restore their project roads in the event of any landslides, floods, road subsidence, other natural disasters, accidents or other events causing structural damage or compromising safety;
d. increase in electricity tariff rates or other fuel costs resulting in an increase in the cost of energy;
e. the introduction of a levy on the usage of water for maintenance of the roads and highways;
f. adverse weather conditions;
g. unforeseen legal, tax and accounting liabilities relating to acquired assets; and
h. other unforeseen O&M costs.

In the event that our costs increase, we may be unable to offset such increases with higher revenues by increasing toll fees due to the restrictions of the Concession Agreements. Any significant increase in O&M costs beyond the amounts budgeted for by us, or any failure to meet quality standards, may reduce our profits, could expose us to penalties imposed by the concessioning authorities and could have a material, adverse effect on our business, financial condition and results of operations. Such events may also impact the ability of the Project SPV to service the debt obtained from the Trust and our ability to make distributions to Unitholders. As such, the inability to

change the terms and conditions, including the toll fees of the concession during the concession period, may materially and adversely affect our operational and financial flexibility.

28. ***We will depend on certain directors, executive officers and key employees of the Investment Manager, the Project Manager and the Project SPV, and such entities may be unable to appoint, retain such personnel or to replace them with similarly qualified personnel, which could have a material, adverse effect on the business, financial condition, results of operations and prospects of the Trust.***

Our performance will depend, in part, upon the continued service and performance of certain directors, executive officers and key employees of the Investment Manager, the Project Manager and the Project SPV. The continued operations and growth of our business will be dependent upon the Investment Manager, the Project Manager and the Project SPV being able to attract and retain personnel who have the necessary and required experience and expertise. Competition for qualified personnel with relevant industry expertise in India is intense due to the scarcity of qualified individuals in the toll-road business, and the aforesaid entities may not be able to retain their executive officers and key employees or attract and retain fresh talent in the future. Any inability by the Investment Manager, the Project Manager and the Project SPV to retain their directors, executive officers and key employees, or the inability to replace such individuals with similarly qualified personnel, could have a material, adverse effect on the business, financial condition, results of operations and prospects of the Trust.

29. ***There can be no assurance that we will be able to successfully undertake future acquisitions of road assets or efficiently manage the infrastructure road assets we have acquired or may acquire in the future.***

Our growth strategy in the future may involve strategic acquisitions of toll roads and other road assets. We may not be able to identify or acquire appropriate road assets or viable acquisitions in a timely manner. The success of our past acquisitions and any future acquisitions will depend upon several factors, including, among other things:

- our ability to identify, finance and acquire operational toll roads and other road assets on a cost-effective basis;
- our ability to integrate acquired personnel, operations, products and technologies into our organisation effectively;
- unanticipated problems or legal liabilities of the acquired businesses; and
- tax or accounting issues relating to the acquired businesses.

There can be no assurance that we will be able to achieve the strategic purpose of such acquisitions or operational integration or an acceptable return on such investments, which may materially and adversely affect our profits, financial condition and distributions.

Furthermore, Concession Agreements for future toll-road projects may also contain terms and conditions that are more restrictive than those under the current Project SPV's Concession Agreements for the toll roads. These restrictions may restrict our flexibility in managing our business or projects and could in turn materially and adversely affect our business prospects, financial condition, results of operations and cash flows.

30. ***The Project SPV may not be able to comply with its maintenance obligations under the Concession Agreements, which may result in the termination of the Concession Agreements, the suspension of the Project SPV's rights to collect tolls or the requirement that the Project SPV pay compensation or damages to the concessioning authority.***

The Project SPV is required to undertake operation and maintenance of the Toll Roads within the timelines and in the manner specified in the respective Concession Agreements. Accordingly, Project SPV must prepare a maintenance manual and a maintenance program in consultation with an independent engineer appointed by the NHAI or other concessioning authority for each toll road, and are required to abide by the same. The Project SPV's maintenance obligations primarily relate to ensuring the safe, smooth and uninterrupted flow of traffic and the related work and maintenance that they are required to undertake in order to fulfil such obligations. Such maintenance obligations include the repair of wear and tear of roads, among other things. There can be no assurance that the Project SPV will not breach the maintenance obligations under the Concession Agreements on account of the Project Manager's failure to undertake the stipulated maintenance work in a timely manner, or at all.

If the Project SPV is in breach or default of its obligations, then the NHAI may, among other rights (a) suspend the right of the Project SPV, including the right to collect tolls and other fees, (b) claim compensation for all direct,

additional costs suffered or incurred by the concessioning authority arising out of such default, or (c) terminate the Concession Agreements.

If the Concession Agreements are terminated, the right to collect tolls is suspended or the Project SPV is required to pay compensation or damages, our business, financial condition and results of operations may be materially and adversely affected. For further details of the maintenance obligations, suspension and termination events under the Concession Agreements, see the section headed "*Summary of the Concession Agreements*" on page 200.

31. *Our InvIT Assets are presently uninsured and any loss or damage to such assets may materially and adversely affect our operations.*

Under the terms of the Concession Agreements proposed to be entered into for the collection of fee for the InvIT Assets, such rights would be granted as on and with effect from the appointed date which shall occur upon the conditions specified in the Concession Agreements which would be subsequent to the allotment of the Units pursuant to the proposed issue of Units. As of the date of this Offer Document, no insurance policies have been obtained in respect of the InvIT Assets by us. The Concession Agreements requires us to obtain insurance during the concession period and post the respective O&M handover dates. Further, pursuant to the exemption granted by SEBI vide their letter dated February 11, 2026, we are required to ensure that the InvIT Assets are adequately insured within 30 days from the Issue Closing Date. As a result, the InvIT Assets are currently uninsured or inadequately insured against certain risks, and there can be no assurance that adequate insurance coverage for the InvIT Assets will be obtained in the future, or that such coverage will be available on commercially reasonable terms. Further, even if insurance is procured, such insurance may be subject to deductibles, exclusions, conditions and limits on coverage, and may not cover all potential risks or losses, which could materially and adversely affect our operations, financial condition, results of operations and cash flows.

32. *Our InvIT Assets, the Sponsor and the Trustee are or may, from time to time, be involved in certain legal proceedings, which if determined against such parties, may have an adverse effect on the reputation, business and results of operations of the Trust.*

Our InvIT Assets, the Sponsor, and the Trustee are involved in certain legal proceedings, including in relation to criminal matters, tax matters, civil and arbitration proceedings, which are or may be pending at different levels of adjudication before various courts, tribunals and appellate authorities. There is no assurance that these legal proceedings and regulatory matters will be decided in favour of the respective entities. Decisions in any of the aforesaid proceedings adverse to the Trust's or the Project SPV's interest may have an adverse effect on our business, future financial performance and results of operations. If the courts or tribunals rule against the Sponsor or its associates or the Trustee, we or the Sponsor may face monetary and/or reputational losses and may have to make provisions in our financial statements, which could increase expenses and liabilities. For more details, please see the section titled "*Material Litigation and Regulatory Action*" on page 246.

33. *The Trust does not own the trademark "Raajmarg Infra Investment Trust" and the associated logo to be used by it for its business and its ability to use their respective trademark or logo may be impaired.*

As on the date of this Offer Document, we have made an application dated December 31, 2025 bearing trademark application number 7433079, for registration of the trademark *"RAAJMARG InvIT an InvIT sponsored by NHAI"* along with the logo of the Trust, , under class 36 of the Trade Marks Act, 1999, with the Registrar of Trade Marks at Delhi.

The registration of trademark is a time-consuming process and there can be no assurance that such registration will be obtained in a timely manner including prior to the listing of the Trust or at all. If we fail to register our logo, we would not be able to protect relevant intellectual property or may have to cease the usage of the logo. The Investment Manager and the Trust's ability to use the trademark and the associated logo may be impaired if such application is rejected. Consequently, the Trust could be required to cease using "*RAAJMARG InvIT an InvIT sponsored by NHAI*" and the associated logo, which may have an adverse effect on its operations.

34. *We will depend on NHAI to undertake certain activities in relation to the operation and maintenance of the InvIT Assets. Any delay, default or unsatisfactory performance by these third parties could materially and adversely affect our ability to effectively operate or maintain the InvIT Assets.*

The Project SPV is obligated to maintain the Projects according to standards specified in the concession agreements. In this regard, we have entered into the Transitional Support Agreement with NHAI. Under the Transitional Support Agreement, NHAI are required to provide support pertaining to the operation and maintenance and tolling obligations of the InvIT Assets. We will depend on the availability and skills of NHAI and its employee pertaining to the operation and maintenance of the InvIT Assets. The Project SPV may have limited control over the timing or quality of services, equipment or supplies provided by the NHAI. Further, any delay or failure by NHAI to undertake corrective measures or remedial actions as required under the Transitional Support Agreement could result in non-compliance with the Concession Agreements, exposing the Project SPV to contractual penalties and reputational risks. Inefficiencies or operational failures on the part of the Project SPV or the NHAI, as a result of defects in design, quality of construction or maintenance, could result in the Project SPV incurring increased costs, loss of revenue and penalties, thereby causing adverse impact on the financial position of the Project SPV. When the Transitional Support Agreement expires, we will need to appoint third-party entities to undertake operations and maintenance and tolling, and the terms of these future contracts may not be favourable to us. We can also make no assurance that the services of such third parties will continue to be available at reasonable rates in the areas in which we conduct our operations. We may also be exposed to risks relating to the ability of such third parties to obtain requisite approvals for the operation and maintenance activities, as well as the quality of their services, equipment and supplies. In particular, failure to ensure the reliability and sustainability of toll collectors who are required to man the toll booths continuously may materially and adversely affect our overall level of net revenue. We may also be exposed to civil and criminal liability in relation to the actions of other third parties, including our employees and contractors.

Further, if we undertake limited development, while we may sub-contract our construction work, we may still be liable for accidents on our projects due to defects in design and quality of construction of our projects during their construction and operation. In addition, we can make no assurance that such contractors or their sub- contractors will continue to hold or renew valid registrations under the relevant labour laws in India or be able to obtain the requisite approvals for undertaking such construction and operation. Any delay, default or unsatisfactory performance by these third parties could materially and adversely affect our ability to manage the operation and maintenance of the InvIT Assets under the Concession Agreements in a timely manner or at all. Any of the foregoing factors could have a material, adverse effect on our business, financial condition, reputation and results of operations.

35. ***The provisional completion certificate in respect of one of the InvIT Assets has not been granted and accordingly, alternate documents have been relied upon in relation to certain disclosures made in this Offer Document.***

The provisional completion certificate ("**PCOD**") has not been granted in respect of one of the InvIT Assets, i.e., the Chennai Bypass. We understand that the PCOD has not been issued as the contractor responsible for the project has initiated litigation, which has delayed the issuance of the completion certificate/provisional completion certificate by the concessioning authority.

As the PCOD has not been issued, we have relied on alternate documents such as toll fee notification, letter from NHAI and technical records that were made available. While the alternate documents provide information relating to the completion status of the Chennai Bypass, there can be no assurance that such information is complete, current or not subject to future challenge, particularly in light of the ongoing dispute with the contractor. Any subsequent development, including an adverse determination regarding the completion status of the Chennai Bypass or outcome of the contractor litigation, may affect the accuracy of related disclosures and could have implications under the relevant Concession Agreement. Further, certain pending disputes and litigation in relation to the Chennai Bypass are currently pending between the concessioning authority and the contractor. Any adverse outcome of such proceedings may result in further delay in the issuance of the provisional completion certificate or could materially and adversely affect the Chennai Bypass and our rights and obligations under the relevant Concession Agreement. Moreover, the completion certificate for Chennai-Tada project has not been granted as of the date of this Offer Document. For further details, see "*Material Litigation and Regulatory Action*" on page 246.

36. ***The Project SPV may be held liable for the payment of wages to the contract labourers engaged indirectly in our operations.***

The Project SPV may appoint independent contractors who, in turn, engage on-site contract labour to perform certain operations. The Project SPV will need to obtain registration as a principal employer under the Contract Labour (Regulation and Abolition) Act, 1970 ("**Contract Labour Act**") for certain locations where workmen would be employed through contractors or agencies licensed under the Contract Labour Act. Although the Project

SPV may not engage these labourers directly, in the event of default by any independent contractor, the Project SPV may be held responsible for any wage payments and other statutory benefits that must be made to such labourers. Any violation of the provisions of the Contract Labour Act by the Project SPV may result in penalties pursuant to the provisions of the Contract Labour Act. If the Project SPV is required to pay the wages of the contracted workmen and subjected to other penalties under the Contract Labour Act, the reputation, results of operations, cash flows and financial condition of the Trust could be adversely affected.

37. ***We may be unable to renew or maintain the statutory and regulatory permits and approvals required to operate the transport sector assets, including roads which may have an adverse effect on our business, results of operation, financial condition and cash flows.***

We are required to obtain and maintain certain permits, approvals, licenses, and registrations under various regulations, guidelines, circulars and statutes regulated by various regulatory and Governmental authorities for operating the transport sector assets, including roads. While the Project SPV secure the material permits required under the Concession Agreements, we must still maintain certain approvals during the operations and maintenance. If we or the Project Manager, fail to obtain the necessary permits, approvals, licenses, and registrations, or maintain them, or if there is any delay in obtaining or renewing them, or in making any payments in this respect, our business, financial condition, results of operations and cash flows could be adversely affected. These permits, approvals, licenses, registrations and permissions could also be subject to several conditions, and we or the Project Manager might not be able to meet such conditions or be able to prove compliance with such conditions to the statutory authorities. This could lead to the cancellation, revocation or suspension of relevant permits, licenses or approvals, which may result in the interruption of our operations and may adversely affect our business, prospects, financial condition, cash flows and results of operations. Furthermore, certain regulatory authorities may raise claims or issue notices in future, which may adversely affect our business, prospects, financial condition, cash flows and results of operations. Furthermore, we may not be able to recover damages or claims from the Project Manager. For further details, see "*Regulatory Approvals*" on page 244.

38. ***The results of operations of the Project SPV could be adversely affected by strikes, work stoppages or increased wage demands by the employees of the Project SPV, and independent contracts or other subcontractors.***

Under the Transitional Support Agreement, NHAI shall undertake the O&M obligations and discharge tolling obligation on behalf of the concessionaire during the term, in accordance with the Concession Agreements and the Project Implementation and Management Agreement. Accordingly, any strikes, work stoppages, or disruptions involving NHAI's employees, tolling contractors, or other subcontractors, or any inability of NHAI to retain or recruit personnel with suitable credentials, could adversely affect the ability of the Project SPV to maintain and operate the InvIT Assets in compliance with the Concession Agreements. Accordingly, any strikes, work stoppages, or disruptions involving NHAI's employees, contractors, or subcontractors, or any inability of NHAI to retain or recruit personnel with suitable credentials, could adversely affect the ability of the Project SPV to maintain and operate the InvIT Assets in compliance with the Concession Agreements. In addition, NHAI is required to take corrective measures and remedial actions to ensure that O&M and tolling obligations are fulfilled at all times, and any disruption to the services provided by them will have an adverse effect on the operations of the Project SPV. There can be no assurance that future disruptions will not be experienced due to disputes or other problems with the work force, which may adversely affect the business and results of operations of the Project SPV.

39. ***Failure to comply with and changes in, safety, health and environmental laws and regulations in India may adversely affect the business, prospects, financial condition and results of operations of the Project SPV.***

The Project SPV is required to adhere to various environmental, health and safety laws and regulations and various labour, workplace and related laws and regulations in India as per the requirements of the concession agreements. Please see the section titled "*Regulations and Policies*" on page 234. If the Project SPV fails to meet environmental, health or safety requirements, it may be subject to administrative, civil and criminal proceedings by government authorities, as well as civil proceedings by environmental groups and other individuals, which could result in substantial fines and penalties and orders that could limit or halt its operations. The Trust cannot assure investors that the Project SPV has been or will continue to be, in compliance with all environmental, health and safety and labour laws and regulations.

Further, any changes, or amendments to, these standards or laws and regulations could further regulate the operations of the projects and may require the Project SPV to incur additional, unanticipated expenses in order to comply with these changed standards. The scope and extent of any new environmental, health and safety regulations, including their effect on the operations of the projects and the cash flows of the Project SPV, cannot be predicted with certainty. The costs and management time required to comply with these requirements could be significant. The measures taken in order to comply with these new laws and regulations may not be deemed sufficient by government authorities and compliance costs may significantly exceed estimates. There can be no assurance that the Project SPV will not become involved in future litigation or other proceedings or be held responsible in any such future litigation or proceedings relating to safety, health and environmental matters in the future. Clean-up and remediation costs, as well as damages, payment of fines or other penalties, other liabilities and related litigation, could adversely affect the business, prospects, financial condition and results of operations of the Project SPV.

40. ***We have entered into material related party transactions and may continue to do so in the future, which may potentially involve conflict of interests with the Unitholders.***

The transactions resulting from the Project Implementation and Management Agreement, and the Investment Management Agreement, are related party transactions and their terms may not be deemed as favourable to us as if they had been negotiated solely amongst unaffiliated third parties. Furthermore, it is likely that we will enter into additional related party transactions in the ordinary course of our business. The terms of such transactions may not be as favourable to us as those negotiated solely amongst unaffiliated third parties and may involve conflicts of interest. Such transactions, individually or in the aggregate, could have a material adverse effect on our business, prospects, financial condition, results of operations and cash flows. For additional details, please see the sections entitled "*Related Party Transactions*", "*Formation Transactions in Relation to the Trust*" and "*Parties to the Trust*" on pages 230, 26 and 85, respectively.

41. ***Significant differences exist between Indian GAAP used to prepare the Sponsor's Audited Financial Statements and other accounting principles, such as Ind-AS and IFRS, with which investors may be more familiar.***

The Sponsor has prepared its audited financial statements in accordance with Indian GAAP in accordance with the NHAI Act and the rules thereunder. The Sponsor has not attempted to quantify the impact of Ind-AS or International Financial Reporting Standards ("**IFRS**") on the audited financial statements, nor will the Sponsor provide a reconciliation of our financial statements to those of IFRS or Ind-AS. If the Sponsor were to prepare its audited financial statements in accordance with such other accounting principles, its results of operations, financial condition and cash flows may be substantially different. Accordingly, the degree to which the Sponsor's audited financial statements will provide meaningful information is entirely dependent on your level of familiarity with Indian accounting practices under Indian GAAP. Any reliance by persons not familiar with such accounting practice on our financial disclosures presented in this Offer Document should accordingly be limited. Persons not familiar with Indian accounting practices should, accordingly, consult their own professional advisors before relying on the financial disclosures presented in this Offer Document.

42. ***We have received provisional credit ratings from credit rating agencies.***

The Trust has been given a credit rating of: (i) Provisional CARE AAA; Stable by CARE Ratings Limited; and (ii) Provisional Ind AAA/Stable by India Ratings & Research Private Limited. Further, the long term debt facilities proposed to be availed by the Trust have been given a credit rating of: (i) Provisional CARE AAA; Stable by CARE Ratings Limited for long term bank facilities aggregating to ₹ 40,000.00 million; and (ii) Provisional Ind AAA/Stable by India Ratings & Research Private Limited for proposed bank loan facilities aggregating to ₹ 40,000.00 million. The rating issued by CARE Ratings Limited is subject to transfer of the identified assets into Trust, execution of concession agreement with NHAI for the proposed assets and completion of offer and listing of the InvIT. The rating issued by India Ratings & Research Private Limited is subject to execution of certain documents and occurrence of certain steps. There is no assurance that CARE Ratings Limited and India Ratings & Research Private Limited will continue to provide a positive credit rating to the Trust or that the agencies will provide a rating without covenants. A negative or lower rating may adversely affect our ability to raise additional financing, and the interest rates and other terms at which such additional financing is available. This in turn could materially and adversely affect our business, prospects, financial condition, results of operations and cash flows.

Risks Related to the Trust's Relationships with the Sponsor and the Investment Manager

43. ***The Investment Manager has no experience in investment management activities for an InvIT and may not be able to implement its investment or corporate strategies and the fees payable to the Project Manager are dependent on various factors.***

The Investment Manager's strategies focus on three main areas:

- managing the underlying assets of the Trust;
- managing the Trust's acquisitions and disposals; and
- managing the Trust's capital structure to maximize distributions.

The Investment Manager is a newly incorporated entity and does not have any operational history of similar investment management or other activities in the infrastructure sector. There can be no assurance that the Investment Manager will be able to implement these strategies successfully or that it will be able to expand our portfolio at any specified rate or to any specified size or to maintain distributions at projected levels. The Investment Manager may not be able to make acquisitions or investments on favourable terms or within a desired time frame, and it may not be able to manage the operations of its underlying assets in a profitable manner. Factors that may affect this risk may include, but are not limited to, changes in the regulatory framework in India, competition for assets, partial award of concessions or licenses favouring local or other competitors of the Trust, changes in the Indian regulatory or legal environment or macro-economic conditions. If the Investment Manager is unable to implement these strategies successfully or expand our portfolio, we will nonetheless be required to pay the Investment Manager an annual management fee, exclusive of taxes, in accordance with the terms of appointment of the Investment Manager.

Even if the Investment Manager is able to successfully grow the operating business of the underlying assets and to acquire toll roads and other eligible infrastructure projects in India as desired, there can be no assurance that the Investment Manager will achieve its intended return on such acquisitions or capital investments. Furthermore, the Investment Manager's investment mandate involves a higher level of risk as compared to a portfolio which has a more diverse range of investments. The Investment Manager may only be removed by a resolution of Unitholders (excluding the Sponsor) such that the votes cast in favour of the resolution are not less than one-and-a-half times the votes cast against the resolution.

Accordingly, the fees payable to the Project Manager may vary each year based upon the operating and maintenance work that is actually required to be undertaken by the Project Manager with respect to the Project SPV, and accordingly, cannot be a flat rate or decided upfront for all periods. Additionally, any such payment of fees will be in the nature of a related party transaction and the approval of Unitholders will be required prior to making such a payment to the Project Manager. For further information, please see "*Overview of the Trust*" on page 24.

44. ***The Sponsor is under no obligation to provide the Trust with access to future assets, and the Trust may be unable to bid effectively for them.***

In accordance with the approval granted by the chairman of NHAI by way of letter dated December 1, 2025, the Sponsor may consider offering to us (but is under no obligation to do so) around 1,500.00 km of roads over the next three to five years to the Trust (the "**Future Assets**").

There can be no assurance that the Trust will be able to accurately or effectively assess the Future Assets on the basis of the information to it or in the time available, and its bids may provide to be uncompetitive. Furthermore, the Sponsor may accept or reject any binding offer made by the Trust, based on various factors regarding which the Trust may have no influence.

Access to future toll road assets sourced by the Sponsor or its existing or future subsidiaries will be an important source of growth in the future for the Trust, and any inability to bid competitively for Future Assets or the inability to win contracts from the Sponsor for their operation for any reason could have a material adverse effect on the Trust's operations, financial condition or prospects.

45. ***Parties to the Trust are required to maintain the eligibility conditions specified under Regulation 4 of the InvIT Regulations on an ongoing basis. The Trust may not be able to ensure such ongoing***

compliance by the Sponsor, the Investment Manager, the Project Manager and the Trustee, which could result in the cancellation of the registration of the Trust.

Each of the parties to the Trust are required to satisfy the eligibility conditions specified under Regulation 4 of the InvIT Regulations on an ongoing basis. These eligibility conditions include, among other things, that (a) the Sponsor, Investment Manager and Trustee are separate entities; (b) the Sponsor has a net worth of not less than ₹ 1,000.00 million and has a sound track record in the development of infrastructure or fund management in the infrastructure sector; (c) the Investment Manager has a net worth of not less than ₹ 100.00 million and has not less than five years' experience in fund management or advisory services or development in the infrastructure sector or the combined experience of the directors, partners and employees of the investment manager in fund management or advisory services or development in the infrastructure sector is not less than 30 years, (d) the Trustee is registered with the SEBI under Securities and Exchange Board of India (Debenture Trustees) Regulations, 1993 and is not an associate of the Sponsor or Investment Manager and (e) each of the Sponsor, Investment Manager, Project Manager and Trustee are "fit and proper persons" as defined under Schedule II of the Intermediaries Regulations on an ongoing basis. The Trust may not be able to ensure such ongoing compliance by the Sponsor, the Investment Manager, the Project Manager and the Trustee, which could result in the cancellation of the registration of the Trust.

46. ***The Investment Manager is required to comply with certain ongoing reporting and management obligations in relation to the Trust. There can be no assurance that the Investment Manager will be able to comply with such requirements.***

The Investment Manager is required to comply with certain ongoing reporting and management obligations in relation to the Trust in accordance with the InvIT Regulations. These requirements include, among other things, (a) making investment decisions with respect to the underlying assets or projects of the Trust, (b) overseeing the activities of the Project Manager, (c) investing and declaring distributions in accordance with the InvIT Regulations, (d) submitting reports to the Trustee and (e) ensuring the audit of the Trust's accounts. There can be no assurance that the Investment Manager will be able to comply with such requirements in a timely manner or at all, which could subject the Investment Manager, the other parties to the Trust, the Trust or any person involved in the activity of the Trust to applicable penalties under the InvIT Regulations, the Intermediaries Regulations and/or the SEBI Act. Any such failure to comply or the imposition of any penalty could have a material adverse effect on our business, financial condition and results of operations. Under the InvIT Regulations, the SEBI also has the right to inspect documents, accounts and records relating to the activity of the Trust, Project SPV or parties to the InvIT and may issue directions in the nature of, *inter alia*, (i) requiring the Trust to surrender its certificate of registration; (ii) requiring the Trust to wind-up; (iii) requiring the Trust to sell its assets; (iv) requiring the Trust or parties to the Trust to take such action as may be in the interest of investors; or (v) prohibiting the Trust or parties to the Trust from operating in the capital market or from accessing the capital market for a specified period.

47. ***It may be difficult for the Unitholders to remove the Trustee or the Investment Manager***.

Under the InvIT Regulations, the Trustee or the Investment Manager cannot be removed without the prior approval of Unitholders where the votes cast in favour of the resolution shall be at least 60% of the total votes cast against such resolution. Accordingly, the Unitholders may face difficulties in removing and replacing the Trustee or the Investment Manager. Further, under the InvIT Regulations, prior approval of SEBI is required for change in the Investment Manager of the Trust.

Similarly, Unitholders may remove the Trustee only if they believe that the acts of the Trustee are detrimental to the interests of the Unitholders and by way of a resolution where the votes cast in favour of the resolution must meet the required percentage as set out in the InvIT Regulations. Further, the Investment Manager and the Trustee cannot be discharged until a suitable replacement is appointed in their place, and there can be no guarantees that a suitable replacement will be appointed, or that appointment will take place in a timely manner, or at all.

48. ***Unitholders will have no vote in the election or removal of Directors in the Investment Manager***.

The Investment Manager has the responsibility of managing the Trust. Unitholders have no vote in the election or removal of Directors in the Investment Manager, except for Unitholders, holding not less than 10% of the total outstanding Units, either individually or collectively, have a right to nominate one director on the board of directors of the Investment Manager. Unitholders' recourse is the removal of the Investment Manager by way of a resolution where Unitholders holding at least 60% of the Units must vote in favour of the resolution. In comparison, the Companies Act, 2013 requires the removal of a director of a public company to be by way of an

ordinary resolution approved by a simple majority. Accordingly, as opposed to shareholders removing a director of a public company, it may not be possible for Unitholders to remove the Investment Manager or the Trustee.

49. ***We have not been able to obtain degree certificates of the educational qualification for some of our Directors and our Key Managerial Personnel and have relied on alternate documents for details of their profile included in this Offer Document.***

Some of our Directors and our Key Management Personnel have been unable to trace copies of their educational degree certificates from their respective universities. They have made attempts to retrieve copies of their degrees but have not been successful in obtaining copies of their degrees. As a result, reliance has been placed on the alternate documents such as marksheets, information available on government portals and provisional certificates to disclose details of their educational qualification in this Offer Document. We have been unable to independently verify these details prior to inclusion in this Offer Document. Further, we cannot assure you that they will be able to trace the relevant documents pertaining to their educational qualifications in future, or at all.

Risks related to India

50. ***We are exposed to risks associated with the road sector in India.***

We derive and expect to continue to derive in the foreseeable future, most of our revenues and operating profits from India. Changes in macroeconomic conditions generally impact the road industry and could negatively impact our business. Accordingly, our business is highly dependent on the state of development of the Indian economy and the macroeconomic environment prevailing in India. Since the use of our InvIT Assets, our expansion plans and future projects depend or will depend on macroeconomic factors that may negatively impact the demand the development of road infrastructure projects in India, or the timely commencement of their operations could in turn have a material adverse effect on our growth prospects, business and cash flows. In addition, access to financing may be more expensive or not available on commercially acceptable terms during economic downturns. Any of these factors and other factors beyond our control could have a material adverse effect on our business, prospects, financial condition, results of operations and cash flows.

51. ***Changing laws, rules and regulations, legal uncertainties and political situation in India may materially and adversely affect our business, financial condition and results of operations.***

Our business, financial condition and results of operations could be materially and adversely affected by any change in laws or interpretations of existing, or the promulgation of new, laws, rules and regulations applicable to us and our business. There can be no assurance that the Government or State Governments will not implement new regulations and policies which will require the Trust and Project SPV to obtain additional approvals and licenses from governmental and other regulatory bodies or impose onerous requirements and conditions on our operations. The Investment Manager cannot predict the terms of any new policy, and there can be no assurance that such policy will not be onerous.

52. ***Significant increases in the price or shortages in the supply of crude oil and products derived therefrom, including petrol and diesel fuel, could materially and adversely affect the volume of traffic at the projects operated by the Project SPV and the Indian economy in general, including the infrastructure sector.***

India imports a most of its requirements of crude oil. Crude oil prices are volatile and are subject to a number of factors, including the level of global production and political factors, such as war and other conflicts, particularly in the Middle East, where a substantial proportion of the world's oil reserves are located. Any significant increase in the price of or shortages in the supply of crude oil could materially and adversely affect the volume of traffic at the projects operated by the Project SPV and materially and adversely affect the Indian economy in general, including the infrastructure sector, which could have a material, adverse effect on our business, financial condition and results of operations.

53. ***We may be affected by competition law in India and any adverse application or interpretation of the Competition Act could materially and adversely affect our business.***

The Competition Act, 2002, as amended (the "**Competition Act**"), regulates practices having an appreciable adverse effect on competition in the relevant market in India. Under the Competition Act, any formal or informal arrangement, understanding or action in concert, which causes or is likely to cause an appreciable adverse effect on competition is considered void and results in the imposition of substantial monetary penalties. Further, any

agreement among competitors which directly or indirectly involves the determination of purchase or sale prices, limits or controls production, supply, markets, technical development, investment or provision of services, shares the market or source of production or provision of services by way of allocation of geographical area, type of goods or services or number of customers in the relevant market or directly or indirectly results in bid-rigging or collusive bidding is presumed to have an appreciable adverse effect on competition. The Competition Act also prohibits abuse of a dominant position by any enterprise.

Pursuant to the Competition (Amendment) Act, 2023 and related regulations that have been brought into force from September 10, 2024 and thereafter, the Indian merger control regime has been substantially revised. These revisions, as reflected in the Competition Act, the Competition Commission of India (Combinations) Regulations, 2024 and the CCI's updated frequently asked questions published in May 2025, provide that a combination (being an acquisition of shares, voting rights, assets or control or a merger or amalgamation) which crosses the prescribed asset-and turnover-based thresholds or the newly introduced deal value threshold must be notified to and pre-approved by the CCI prior to consummation. Under the amended regime, any transaction where the value of the transaction exceeds ₹ 20,000.00 million and the target or merged entity has substantial business operations in India, as prescribed under applicable regulations and guidance, will require a prior notification and approval by the CCI, irrespective of whether the asset or turnover thresholds are met. The amended regime also clarifies the definition of "control" for the purposes of combination assessment to include the ability to exercise material influence over the management or strategic commercial decisions of an enterprise, and provides procedural refinements, including updated timelines for CCI review and implementation of combinations.

In the event the Project SPV or the Trust enters into any agreements or transactions that have an appreciable adverse effect on competition in the relevant market in India, including combinations that may be caught by the asset-and turnover-based thresholds or the deal value threshold, the provisions of the Competition Act will be applicable, and failure to comply with such provisions or obtain necessary approvals could result in prohibition of such combinations, cessation of implementation, substantial monetary penalties or other remedial measures by the CCI. Any prohibition or substantial penalties levied under the Competition Act could materially and adversely affect our financial condition and results of operations. Any adverse impact on our financial condition or operations due to the Competition Act may have a material adverse impact on our business, financial condition, results of operations and prospects and our ability to make distributions to the Unitholders.

54. ***Social, economic and political conditions and natural disasters could have a negative effect on our business***.

The Project SPV is incorporated in India and they derive all of their revenue from India. In addition, all of our assets are located in India. Consequently, our business and the trading price of our Units may be adversely affected by the social, economic and political conditions in India and its neighbouring countries. Specific risks, such as the following could adversely influence the Indian economy, thereby having a material adverse effect on our business, financial condition, results of operations and cash flows:

- political instability, riots or other forms of civil disturbance or violence;
- war, terrorism, invasion, rebellion or revolution;
- Government interventions, including expropriation or nationalization of assets, increased protectionism and the introduction of tariffs or subsidies;
- changing regulatory regimes;
- underdeveloped industrial and economic infrastructure;
- changes in exchange rates and controls, interest rates, government policies, taxation and economic and political developments;
- changes in policies such as, the fiscal and economic policy, industrial policy, direct and indirect taxes and the export-import policy; and
- changes in state specific regulation and conditions;

Pandemics, such as the outbreak of the COVID-19, and natural disasters such as floods, earthquakes or famines, events and conditions linked to climate change have in the past had a negative impact on the Indian economy. Potential effects may include damage to infrastructure and the loss of business continuity and business information. If our facilities are affected by any of these events, our operations may be significantly interrupted, which could materially and adversely affect our business, prospects, financial condition, results of operations and cash flows.

55. ***Any adverse revision to India's sovereign credit rating may have a negative impact on our business.***

India's sovereign credit ratings remain at investment grade (Baa3 with a stable outlook by Moody's and BBB- with a stable outlook by Fitch). India's sovereign credit rating is subject to periodic review by international credit rating agencies and may be adversely revised due to factors beyond our control, including changes in tax or fiscal policy or a decline in India's foreign exchange reserves, which are outside of our control. Any adverse revision to India's credit ratings may negatively affect investor sentiment and may adversely affect our ability to raise additional financing, as well as the interest rates and other terms on which such financing is available. Such developments could materially and adversely affect our ability to obtain financing for capital expenditure, which could in turn materially and adversely affect our business, prospects, financial condition, results of operations and cash flows.

56. ***Unitholders may not be able to enforce a judgment of a foreign court against the Trust or the Investment Manager.***

The Trustee, the Investment Manager and the Sponsor are incorporated in India, and the Trust is settled and registered in India. All of our assets are located in India, and we may, from time to time, invest in toll roads in India. Where investors wish to enforce foreign judgments in India, where our assets are or will be located, they may face difficulties in enforcing such judgments. India is not a party to any international treaty in relation to the recognition or enforcement of foreign judgments. India exercises reciprocal recognition and enforcement of judgments in civil and commercial matters with a limited number of jurisdictions, including Singapore. In order to be enforceable, a judgment obtained in a jurisdiction which India recognizes as a reciprocating territory must meet certain requirements of the Code of Civil Procedure, 1908 ("**Civil Code**"). Furthermore, the Civil Code only permits enforcement of monetary decrees not being in the nature of any amounts payable in respect of taxes, or other charges of a like nature or in respect of a fine or other penalty and does not provide for the enforcement of arbitration awards even if such awards are enforceable as a decree or judgment. Judgments or decrees from jurisdictions not recognized as a reciprocating territory by India cannot be enforced or executed in India except through a fresh suit upon judgment. Even if we or a Unitholder were to obtain a judgment in such a jurisdiction, we or it would be required to institute a fresh suit upon the judgment and would not be able to enforce such judgment by proceedings in execution. In addition, the party which has obtained such judgment must institute the new proceedings within three years of obtaining the judgment. It is unlikely that an Indian court would award damages on the same basis or to the same extent as was awarded in a judgment rendered by a foreign court if the Indian court believed that the amount of damages awarded was excessive or inconsistent with public policy in India. In addition, any person seeking to enforce a foreign judgment in India is required to obtain prior approval of the RBI to repatriate outside India any amount recovered pursuant to the execution of the judgment. Consequently, it may not be possible to enforce in an Indian court any judgment obtained in a foreign court, or effect service of process outside of India, against Indian companies, their directors and executive officers, and any other parties resident in India. Additionally, a suit brought in an Indian court in relation to a foreign judgment might not be disposed of in a timely manner.

Risks Related to Ownership of the Units

57. ***The Trust may be dissolved, and the proceeds from the dissolution thereof may be less than the amount invested by the Unitholders.***

The Trust is an irrevocable trust registered under the Registration Act, 1908 and it may only be extinguished (i) if it is impossible to continue with the Trust or if the Trustee, on the advice of the Investment Manager, deems it impracticable to continue with the Trust; (ii) on the written recommendation of the Investment Manager and upon obtaining the prior written consent of such number of the Unitholders as is required under the InvIT Regulations; (iii) if the Units of the Trust are delisted from the Stock Exchanges; (iv) if the SEBI passes a direction for the winding up of the Trust or the delisting of the Units; (v) if the Trust fails to make any offer of Units by way of public issue or a private placement (as applicable) within the time period stipulated in the InvIT Regulations or any other time period as specified by SEBI, in which case the Trust shall surrender its certificate to SEBI and cease to operate as an investment infrastructure trust, unless the period is extended by SEBI; or (vi) in the event the Trust becomes illegal. Under the Trust Deed, in the event of dissolution, the net assets of the Trust, remaining after settlement of all liabilities, and the retention of any reserves which the Trustee deems to be necessary to discharge contingent or unforeseen liabilities, shall be paid to the Unitholders. Should the Trust be dissolved, depending on the circumstances and the terms upon which assets of the Trust are disposed of, there is no assurance that a Unitholder will recover all or any part of his investment.

58. ***The reporting requirements and other obligations of infrastructure investment trusts post-listing are still evolving. Accordingly, the level of ongoing disclosures made to and the protection granted to Unitholders may be more limited than those made to or available to the shareholders of a company that has listed its equity shares upon a recognized stock exchange in India.***

The InvIT Regulations, along with the guidelines and circulars issued by the SEBI from time to time, govern the affairs of infrastructure investment trusts in India. However, as compared to the statutory and regulatory framework governing companies that have listed their equity shares upon a recognized stock exchanges in India, the regulatory framework applicable to infrastructure investment trusts is relatively nascent and thus, still evolving. Pursuant to a circular dated November 29, 2016, the SEBI has prescribed certain continuous disclosure requirements that will be applicable to an InvIT after listing of its units.

Accordingly, the ongoing disclosures made to Unitholders under the InvIT Regulations may differ from those made to the shareholders of a company that has listed its equity shares upon a recognized stock exchange in India in accordance with the Securities and Exchange Board of India (Listing Obligations and Disclosure Requirements) Regulations, 2015. Further, the rights of the Unitholders may not be as extensive as the rights of the shareholders of a company that has listed its equity shares upon a recognized stock exchange in India, and accordingly, the protection available to the Unitholders may be more limited than those available to such shareholders.

59. ***The sale or possible sale of a substantial number of Units by the Sponsor or Sponsor Group (if applicable) in the public market following the end of its lock-in requirement as prescribed under the InvIT Regulations could adversely affect the price of the Units.***

Under the InvIT Regulations, the Sponsor and Sponsor Group are required to, collectively, hold a minimum of 15.00% of our Units for a minimum period of three years from the date of listing pursuant to the initial offer and the balance of their unitholding in the Trust is required to be locked in for a period of not less than one year from the date of listing of the Units. Further, in accordance with the InvIT Regulations, the Sponsor and the Sponsor Group are required to lock-in our Units as follows:

Period of unitholding	Percentage
From the beginning of 4th year after the date of listing pursuant to the initial offer and till the end of 5th year from the date of listing pursuant to the initial offer	5.00% of total Units or ₹ 5,000.00 million, whichever is lower
From the beginning of 6th year after the date of listing pursuant to the initial offer and till the end of 10th year from the date of listing pursuant to the initial offer	3.00% of total Units or ₹ 5,000.00 million, whichever is lower
From the beginning of 11th year after the date of listing pursuant to the initial offer and till the end of 20th year from the date of listing pursuant to the initial offer	2.00% of total Units or ₹ 5,000.00 million, whichever is lower
After completion of the 20th year from the date of listing pursuant to the initial offer	1.00% of total Units or ₹ 5,000.00 million, whichever is lower

The Units are proposed to be listed on the Stock Exchanges. If the Sponsor and the Sponsor Group, subsequent to the end or lapse of either of the aforesaid lock-in periods directly or indirectly sells or is perceived as intending to sell a substantial number of its Units, or if a secondary offering of the Units is undertaken, the market price for the Units could be adversely affected.

60. ***Any additional debt financing or issuance of additional Units may have a material, adverse effect on the Trust's distributions, and your ability to participate in future rights offerings may be limited.***

The Investment Manager may require additional debt financing or the issuance of additional Units in order to support the operating business or to make acquisitions and investments. If obtained, any such additional debt financing may decrease distributable income, and any issuance of additional Units may dilute existing Unitholders' entitlement to distributions. Any additional leverage or issuance of Units may reduce the cash available for distribution to existing Unitholders.

We are not required to offer pre-emptive rights to existing Unitholders when issuing new Units. Compliance with securities laws or other regulatory provisions in some jurisdictions may prevent certain investors from participating in any future rights issuances and thereby result in dilution of their existing holdings in Units.

61. ***The Trust may be unable to dispose of its non-performing assets in a timely manner.***

Due to the nature of its structure, the Trust may be unable to dispose of its non-performing assets in a timely manner, or at all. Such inability may arise due to regulatory restrictions, minimum holding requirements, or structural limitations applicable to infrastructure investment trusts. As a result, no assurance can be given that the Trust may be able to adapt to market developments, changes in asset quality, or adverse macroeconomic factors in a way comparable to, or competitive with, its competitors or more traditional corporate entities in general. Any ability to dispose of non-performing assets may in turn adversely affect the financial condition, business and prospects of the Trust, as well as distributions that the holders of the Units may receive from the Trust.

62. ***Fluctuations in the exchange rate of the Indian Rupee with respect to the U.S. Dollar or other currencies will affect the foreign currency equivalent of the value of the Units and any distributions.***

Fluctuations in the exchange rates between the Indian Rupee and other currencies will affect the foreign currency equivalent of the Indian Rupee price of the Units. Such fluctuations will also affect the amount that holders of the Units will receive in foreign currency upon conversion of any cash distributions or other distributions paid in Indian Rupees by us on the Units, and any proceeds paid in Indian Rupees from any sale of the Units in the secondary trading market.

63. ***Unitholders are unable to require the redemption of their Units.***

Unitholders will not have the right to redeem Units or request or require the redemption of Units by the Investment Manager while the Units are listed on the Stock Exchanges, although the Trust Deed provides that the Trustee may subject to applicable law, repurchase Units from the Unitholders at any time. Accordingly, liquidity for Unitholders is dependent entirely on secondary market trading or permitted buyback mechanisms.

64. ***The Units have never been publicly traded and the listing of the Units on the Stock Exchanges may not result in an active or liquid market for the Units.***

There is no public market for the Units prior to the Issue and an active public market for the Units may not develop or be sustained after the Listing Date. Listing and quotation do not guarantee that a trading market for the Units will develop or, if a market does develop, that there will be liquidity of that market for the Units. Accordingly, prospective Unitholders should view the Units as illiquid and must be prepared to hold their Units for an indefinite length of time. There is no assurance that the Trust will continue to satisfy the listing requirements for Trusts. Furthermore, it may be difficult to assess the Trust's performance against domestic benchmarks.

65. ***Investors will not be able to sell immediately on an Indian stock exchange any of the Units purchased in the Issue until the Issue receives the appropriate trading approvals.***

The Units will be listed on the Stock Exchanges. Pursuant to Indian regulations, certain actions must be completed before the Units can be listed and trading may commence. Following the Allotment of the Units, the Investment Manager will apply for final listing and trading approval from the Stock Exchange. Furthermore, allotment of Units in the issue is subject to, *inter alia*, our ability to successfully undertake and complete the transactions pursuant to which we will make an offer to NHAI to grant us concessions for each of the five InvIT Assets, which are subject to certain conditions. There is no assurance that the Units will be credited to investors' demat accounts, or that the transactions contemplated above will be completed in time, or that trading in the Units will commence, within the time periods specified above. Any delay in obtaining final listing and trading approvals would restrict your ability to dispose of units.

66. ***There is no assurance that our Units will remain listed on the Stock Exchanges.***

Although it is currently intended that the Units will remain listed on the Stock Exchanges, there is no guarantee of the continued listing of the Units. Among other factors, we may not continue to satisfy the listing requirements of the Stock Exchanges. Accordingly, Unitholders will not be able to sell their Units through trading on the Stock Exchanges if the Units are no longer listed on the Stock Exchanges. While the InvIT Regulations state that we must provide Unitholders with an exit prior to delisting, the specific mechanism of such delisting and related exit offer has not yet been finalised by the SEBI.

Furthermore, under the InvIT Regulations, we are required to maintain a minimum number of Unitholders (other than the Sponsor, its related parties and its associates) at all times after the listing of the Units pursuant to the Issue

and certain minimum public holding requirements. Failure to maintain such minimum number of Unitholders or public holding may result in action being taken against us by the SEBI and the Stock Exchanges, including the compulsory delisting of our Units.

67. ***Any future issuance of Units by us or sales of Units by the Sponsor or any of other significant Unitholders may materially and adversely affect the trading price of the Units.***

Any future issuance of Units by us could dilute investors' holdings of Units. Any such future issuance of Units may also materially and adversely affect the trading price of the Units and could impact our ability to raise capital through an offering of our securities. There can be no assurance that we will not issue further Units. In addition, any perception by investors that such issuances might occur could also affect the trading price of the Units.

Units will be tradable on the Stock Exchanges. If the Sponsor (following the lapse of its lock-up arrangements including the minimum unitholding requirements prescribed under the InvIT Regulations or pursuant to any applicable waivers), directly or indirectly, sells or is perceived as intending to sell a substantial number of its Units, or if a secondary offering of the Units is undertaken, the market price for the Units could be materially and adversely affected. These sales may also make it more difficult for us to raise capital through the issue of new units at a time and at a price we deem appropriate.

68. ***Our rights and the rights of the Unitholders to recover claims against the Investment Manager or the Trustee are limited.***

Under the Investment Management Agreement, the Investment Manager is not liable for, among other things, any action or omission, if it has carried out its duties and exercised its powers with reasonable skill and care expected of an investment manager (except in the case of fraud, negligence or wilful misconduct). Pursuant to the Trust Deed, the Trustee is not liable for anything done or omitted to be done or suffered by the Trustee in good faith. Further, the Trustee is not liable for any action or omission that results in any depletion in the value of the trust fund and consequent losses of the Unitholder, except in situations where such depletion is a result of the gross negligence or wilful default on the part of the Trustee. The Investment Management Agreement provides that the Investment Manager is entitled to be indemnified out of the Trust Fund against all taxes and other liabilities, claims, costs, losses, damages and expenses (including reasonable attorney's fees and costs) ("**Losses**") incurred in connection with the Trust, unless arising out of gross negligence, dishonest acts or commissions or omissions, wilful misfeasance, reckless disregard of duty or breach of duties under the Investment Management Agreement. As a result, the Trust's rights and the rights of the Unitholders to recover claims against the Investment Manager are limited. Furthermore, recourse to the Trustee may be limited under the Trust Deed. The Trust Deed provides for the indemnification of the Trustee and the Investment Manager for all Losses, except Losses incurred due to any gross negligence, default, breach of duty or trust, or a failure to show a requisite degree of diligence and care. Accordingly, the liability of the Investment Manager and the Trustee are limited under the terms of these agreements and the Unitholders may not be able to recover claims against the Trustee or the Investment Manager, including claims with respect to any offer documents relating to the Issue.

Further, pursuant to the Trust Deed, the Trustee is not under any obligation to institute, acknowledge the service of, appear in, prosecute or defend any action, suit, proceeding or claim, which in its opinion might involve it in expense or liability that exceeds the value of the fund. The Trust (acting through the Trustee) and the Investment Manager intend to apply the proceeds of the Issue towards the objects set out in this Offer Document. Accordingly, the Net Proceeds may not be sufficient to recover claims, including claims with respect to any offer documents in relation to the Issue.

69. ***Information and the other rights of Unitholders under Indian law may differ from such rights available to equity shareholders of an Indian company or under the laws of other jurisdictions.***

The Trust Deed and various provisions of Indian law govern our corporate affairs. Legal principles relating to these matters and the validity of corporate procedures, fiduciary duties and liabilities, and Unitholders' rights may differ from those that would apply to a company in India or a trust in another jurisdiction. Unitholders' rights and disclosure standards under Indian law may also differ from the laws of other countries or jurisdictions. See the section headed "*Rights of Unitholders*" on page 263.

70. ***No Investor are permitted to withdraw or lower their bids) in terms of quantity of Units or the bid amount) at any stage after submitting a bid.***

Pursuant to the InvIT Regulations, investors are required to pay the Bid Amount on submission of the Bid, and are not permitted to withdraw or lower their Bids (in terms of quantity of Units or the Bid Amount) at any stage after submitting a Bid, notwithstanding adverse developments in international or national monetary policy, financial, political or economic conditions, our business, cash flows, results of operations, or otherwise, at any stage after the submission of their bids. For details in relation to the Bidding process, see "*Issue Information*" on page 271.

71. ***The price of the Units may decline after the Listing Date.***

The Issue Price has been determined by the Investment Manager in consultation with the Book Running Lead Managers. The Issue Price may not be indicative of the market price of the Units upon completion of the Listing. The market price of the Units may also be highly volatile and could be subject to wide fluctuations. If the market price of the Units declines significantly, investors may be unable to resell their Units at or above their purchase price, if at all. There can be no assurance that the market price of the Units will not fluctuate or decline significantly in the future. The market price of the Units will depend on many factors, including, among others:

- the perceived prospects of our business and investments and the market for toll roads and other infrastructure projects;
- differences between our actual financial and operating results and those expected by investors and analysts;
- the perceived prospects of future toll roads and other infrastructure projects that may be added to our portfolio in accordance with our investment mandate;
- changes in research analysts' recommendations or projections;
- changes in general economic or market conditions;
- the market value of our assets;
- the perceived attractiveness of the Units against those of other business trusts, equity or debt securities;
- the balance of buyers and sellers of the Units;
- the size and liquidity of the Indian business trusts market;
- any changes to the regulatory system, including the tax system, both generally and specifically in relation to India business trusts;
- the ability of the Investment Manager to implement successfully its investment and growth strategies;
- foreign exchange rates;
- broad market fluctuations, including increases in interest rates and weakness of the equity and debt markets;
- variations in our quarterly operating results;
- difficulty in assessing our performance against either domestic or international benchmarks, as there are few listed comparables;
- publication of research reports about us, other road businesses, the road industry in general or other relevant sectors, or the failure of securities analysts to cover the Units after the Total Issue;
- additions or departures of key management personnel of the Trust and/or the Trust Group;
- changes in the amounts of our distributions, if any, and changes in the distribution payment policy or failure to execute the existing distribution policy;
- actions by Unitholders;
- changes in market valuations of similar business entities or companies;
- announcements by us or our competitors of significant contracts, acquisitions, disposals, strategic partnerships, joint ventures or capital commitments;
- speculation in the press or investment community; and
- changes or proposed changes in laws or regulations affecting the road industry and infrastructure development in India or enforcement of these laws and regulations, or announcements relating to these matters.

To the extent that we retain operating cash flow for investment purposes, working capital reserves or other purposes, these retained funds, while increasing the value of our underlying assets, may not correspondingly increase the market price of the Units. Our failure to meet market expectations with regard to future earnings and cash distributions may materially and adversely affect the market price of the Units.

Where new Units are issued at less than the market price of the Units, the value of an investment in the Units may be affected. In addition, Unitholders who do not, or are not able to, participate in the new issuance of Units may experience a dilution of their interest in the Trust. In addition, the Units are not capital-safe products and there is no guarantee that Unitholders can regain the amount invested, in full or in part. If the Trust is extinguished, it is possible that investors may lose a part or all of their investment in the Units.

Risks Related to Tax

72. ***Some of our road's assets enjoy certain benefits under Section 80-IA of the Income Tax Act and any change in these tax benefits applicable to us may materially and adversely affect our results of operations.***

Currently, surface transport infrastructure development projects, including toll-road concession projects, enjoy certain benefits under Section 80-IA of the Income Tax Act. In accordance with and subject to the condition specified in this section, the Project SPV is entitled to certain benefits for all of the operational infrastructure projects and would be entitled to a deduction of 100% of the profits derived from the development or operation and maintenance or development, operation and maintenance of the toll roads for any 10 consecutive tax assessment years out of 20 years, beginning from the year in which the Project SPV develops and begins to operate the infrastructure facility. The incentives for Section 80-IA of the Income Tax Act are available for a period of 10 consecutive tax years out of a block of 20 years from the year of commencement of operations. However, the Project SPV would be liable to pay tax on their respective book profits under the MAT Provisions at the rate of 18.5% (plus applicable surcharge and cess). When the tax incentives expire or terminate, our tax liability may increase, thereby impacting our profitability. Further, the India tax authorities may disallow the deduction availed if the conditions specified are not complied with or the computation of the profits and gains of the eligible business is not in accordance with the manner prescribed and there is no assurance that such projects will continue to enjoy the tax benefits. This may affect the overall tax liabilities of the Project SPV and result in significant additional taxes becoming payable thereby resulting in a material, adverse effect on our business, financial condition, cash flows and results of operations and consequently may have a material, adverse impact on our distributions.

73. ***Change in ownership of Project SPV may result in the inability to carry forward and set off accumulated losses and unabsorbed depreciation, which could adversely affect cash flows and distributions to Unitholders***.

Under the Income Tax Act, 1961, a company's ability to carry forward and set off accumulated losses from prior years is subject to shareholding continuity requirements. Where there is a change in shareholding, losses can only be carried forward if shares carrying not less than 51% of the voting power continue to be beneficially held by the same persons who held such shares on the last day of the year in which the loss was incurred.

In the event, tax authorities take a view that the Formation Transactions, or any subsequent restructuring or reorganization involving a Project SPV, amounts to a change in beneficial ownership of such Project SPV, it could result in the affected Project SPV losing its ability to carry forward and set off accumulated losses against future taxable income. There can be no assurance that the Project SPV will be able to retain the benefit of past period losses. Any loss of such tax benefits could materially and adversely affect the financial condition, results of operations and cash flows of the affected Project SPV and, consequently, the Trust's ability to make distributions to Unitholders.

74. ***Entities operating in India are subject to a variety of Government and state government tax regimes and surcharges and changes in legislation or the rules relating to such tax regimes and surcharges could materially and adversely affect our business, prospects, cash flows and results of operations.***

There have been two recent major reforms in Indian tax laws, namely the introduction of the GST and provisions relating to general anti-avoidance rules ("**GAAR**").

The GST regime came into effect on July 1, 2017, combining taxes and levies by the Government and state governments into a unified rate structure. Given the limited availability of information in the public domain concerning the GST, we cannot assure you as to the tax regime following implementation of the GST. Additionally, there is limited clarity on the availability of input tax credit, and any unfavourable orders, including in respect of grants or annuity from relevant concessioning authorities in this regard may have an adverse effect on our financial position and cash flows. Furthermore, any application of existing law or future amendments may affect our overall tax efficiency and may result in significant additional taxes becoming payable. The GAAR regime came into effect on April 1, 2017. The tax consequences of the GAAR provisions being applied to an arrangement could result in denial of tax benefit, amongst other consequences, including on the interest paid by the Project SPV on the debt from the Trust. In the absence of any precedents on the subject, the application of these provisions is uncertain. If the GAAR provisions are made applicable to any member of the Trust, it may have an adverse effect on the Trust.

Furthermore, by way of the Finance Act, 2021, the Government, amongst others, amended the SCRA to recognize pooled investment vehicles and recognize the Units, debentures, other marketable securities and other instruments issued by infrastructure investment trusts as "securities". The Finance Act, 2021 exempted the payment of tax deducted at source on dividends paid by the Project SPV to infrastructure investment trusts. For further details, see "*Risk Factors – Investors may be subject to Indian taxes arising out of capital gains on the sale of Units and on any dividend or interest component of any returns from the Units*" on page 73.

By way of the Finance Act, 2022, the applicability of section 94(7) of the IT Act has been extended to the units of business trust (with effect from Financial Year 2022-23), which provides that certain situation, loss, if any, arising from the sale and purchase of securities and units, to the extent of dividend or income received or receivable on such securities or unit, shall be ignored for computing income chargeable to tax. The Finance Act, 2022 extended the applicability of section 94(8) of the IT Act (commonly known as bonus stripping) to the units of business trusts (with effect from Financial Year 2022-23), which provides certain other situations where loss, if any, arising from the sale and purchase of all or any of the units shall be ignored for computing income chargeable to tax and notwithstanding anything contained in any other provision of the IT Act, the amount of loss so ignored shall be deemed to be the cost of purchase or acquisition of additional/ bonus units as are held on the date of such sale or transfer.

The Finance Act 2023 provides for tax on the unitholders for such portion of distribution received by them that is not covered under section 10(23FC) or 10(23FCA) of the IT Act and that which is not chargeable to tax under section 115UA(2) of the IT Act. Any distribution not covered under the aforementioned clauses will be taxed in the hands of the unitholders as 'income' under section 56(2)(xii) of the IT Act, provided the amount received (including similar distributions in earlier years to the same unitholder or any other unitholder) is in excess of the amount at which units were issued by the Trust, as reduced by the amount which would have been charged to tax earlier under this provision. The aforementioned amounts received by a unitholder being a specified person covered under section 10(23FE) of the IT Act shall not be subject to taxes upon the fulfilment of certain conditions set out in the IT Act. Further, any such distribution received by a unitholder to the extent not chargeable to tax under section 56(2)(xii) and 115UA(2) and not covered under sections 10(23FC), or 10(23FCA) shall be reduced from the cost of units. We cannot assure you that there will be no adverse impact on the tax incidence to the unitholders pursuant to the Finance Act 2023. For details, see "*Taxation*" on page 296.

Furthermore, pursuant to the Finance Act, 2024, the capital gains tax regime was amended, and the definitions of long-term capital assets, short term capital assets and their applicable tax rates were changed. The Finance Act, 2025, also introduced an amendment to section 115UA of the IT Act to provide that capital gains income, chargeable under section 112A of the IT Act will be taxed under the rates specified in section 112A of the IT Act, rather than the maximum marginal rate.

Tax laws and regulations are subject to differing interpretations by tax authorities. Differing interpretations of tax and other fiscal laws and regulations may exist within governmental ministries, including tax administrations and appellate authorities, thus creating uncertainty and potential unexpected results. The degree of uncertainty in tax laws and regulations, combined with significant penalties for default and a risk of aggressive action, including by retrospective legislation, by the governmental or tax authorities, may result in tax risks in the jurisdictions in which we operate being significantly higher than expected. These events may result in an adverse effect on our business, financial condition, cash flows, results of operations and prospects. Tax authorities in India may also introduce additional or new regulations applicable to our business which could adversely affect our business and profitability.

The Investment Manager has not determined the impact of such existing or proposed legislation on our business. Uncertainty in the applicability, interpretation or implementation of any amendment to, or change in, governing law, regulation or policy, including by reason of an absence, or a limited body, of administrative or judicial precedent, may be time consuming as well as costly for us to resolve and may impact the viability of our current business or restrict our ability to grow our business in the future. The Investment Manager intends to take measures to ensure that it is in compliance with all relevant tax laws. However, the tax authorities might take a position that differs from the position taken by us with regard to our tax treatment of various items.

75. ***Tax laws are subject to changes and differing interpretations, which may materially and adversely affect our operations.***

We are subject to a number of taxes and other levies imposed by the central and state governments in India, particularly GST, as well as certain other taxes, duties or surcharges introduced on a permanent or temporary basis. The central and state tax scheme in India is extensive and subject to change from time to time. Any adverse changes in any of the taxes levied by the central or state governments in India may adversely affect our business, financial condition, results of operations and cash flows.

The current tax laws and regulations in India provide certain exemptions to certain distributions received by business trusts from a SPV as a result of which the business trust and subsequently the Unitholders would be subject to relatively lower tax liabilities. These exemptions could be modified or removed at any time or clarified in a manner adverse to the Unitholders, which could adversely affect our profitability and the amount available for distribution to the Unitholders.

Tax laws and regulations are subject to differing interpretations by tax authorities. Differing interpretations of tax and other fiscal laws and regulations may exist within governmental ministries, including tax administrations and appellate authorities, thus creating uncertainty and potential unexpected results. The degree of uncertainty in tax laws and regulations, combined with significant penalties for default and a risk of aggressive action, including by retrospective legislation, by the governmental or tax authorities, may result in tax risks in the jurisdictions in which we operate being significantly higher than expected. For example, while our Investment Manager intends to take measures to ensure that it is in compliance with all relevant tax laws, we cannot assure you that the tax authorities will not take a position that differs from the position taken by our Investment Manager with regard to tax treatment of various items. Any of the above events may result in an adverse effect on our business, financial condition, results of operations and/or prospects and ability to make distributions to the Unitholders. Tax authorities in India may also introduce additional or new regulations applicable to our business, which could adversely affect our business and profitability.

We may incur increased costs relating to compliance with any new requirements, which may also require management time and other resources, and any failure to comply may adversely affect our business, results of operations and prospects. Uncertainty in the applicability, interpretation or implementation of any amendment to, or change in, governing law, regulation or policy, including by reason of an absence, or a limited body, of administrative or judicial precedent may be time consuming as well as costly for us to resolve and may affect the viability of the current business or restrict our ability to grow our business in the future.

76. ***Investors may be subject to Indian taxes arising out of capital gains on the sale of Units and on any dividend or interest component of any returns from the Units.***

Under current Indian tax laws, units of a business trust held for more than 12 months are considered as long term capital assets. In case of sale of such units through a recognised stock exchange in India, any gain exceeding ₹0.125 million realized on the sale of Units held for more than 12 months will be subject to capital gains tax in India at 12.5% (plus applicable surcharge and cess) without indexation benefits if STT has been paid on the transaction. Further, gains realized on the sale of Units held for 12 months or less will be subject to capital gains tax in India at 20% (plus applicable surcharge and cess) if STT is paid on the transaction. STT will be levied on and collected by a domestic stock exchange on which the Units are sold. Any gain realized on the sale of the Units held for more than 24 months to an Indian resident, on which no STT has been paid, will be subject to long-term capital gains tax in India at 12.5% (plus applicable surcharge and cess) without indexation benefits. Further, any gain realized on the sale of Units held for a period of 24 months or less and on which STT is not paid will be subject to short-term capital gains tax in India at normal rates at which the unitholder would be subject to tax on his other incomes. Capital gains arising from the sale of the Units will be exempt from taxation in India in cases where the exemption from taxation in India is provided under a treaty between India and the country of which the seller is resident. The above statements are based on the current tax laws and subject to change as a result of the introduction of new laws or amendments to existing laws.

More recently, the Government of India announced the Union Budget for Fiscal 2027, following which the Finance Bill, 2026 ("**Finance Bill**") was introduced in the Lok Sabha. Subsequently, the Finance Bill was passed by the Lok Sabha and is pending for assent from the President of India, post which it may come into effect from April 1, 2026 ("**Finance Act**"). Potential investors are advised to consult their own tax advisors and to carefully consider the potential tax consequences of owning Units. There is no certainty on the impact that the Finance Act may have on our business and operations or on the industry in which we operate. Uncertainty in the applicability, interpretation or implementation of any amendment to, or change in, governing law, regulation or policy, including by reason of an absence, or a limited body, of administrative or judicial precedent may be time

consuming as well as costly for us to resolve and may affect the viability of our current business or restrict our ability to grow our business in the future.

GENERAL INFORMATION

Raajmarg Infra Investment Trust

Raajmarg Infra Investment Trust ("**Trust**") was settled on November 24, 2025, in New Delhi pursuant to the Trust Deed as a contributory irrevocable trust in accordance with the Indian Trusts Act, 1882 and registered in India pursuant to the provisions of the Registration Act, 1908. The Trust was registered with SEBI on December 22, 2025, under Regulation 3(1) of the InvIT Regulations and has obtained a certificate of registration from SEBI bearing number IN/InvIT/25-26/0034. The principal place of business of the Trust is situated at G - 5 & 6, Sector 10, Dwarka, New Delhi – 110 075.

The Trust is an infrastructure investment trust established for making investments in special purpose vehicles as defined under Regulation 2(1)(zy) of the InvIT Regulations, or infrastructure projects or securities of Indian companies engaged in the infrastructure sector, as may be permitted in terms of Regulation 18(5) of the InvIT Regulations. For information on the background of the Trust and the description of the InvIT Assets, please see the sections entitled "*Overview of the Trust*" and "*Business*" on pages 24 and 260, respectively.

Compliance Officer of the Trust

The Compliance Officer is Gunjan Rajpal. Her contact details are as follows:

Gunjan Rajpal
G - 5 & 6, Sector 10, Dwarka,
New Delhi – 110 075
Telephone: +91 11 2507 4100/200-3211
E-mail: compliance@riimpl.in

Bidders can contact the Compliance Officer or the Registrar to the Issue in case of any pre-Issue or post-Issue related problems such as non-receipt of Allotment Advice/letter of Allotment, non-credit of Allotted Units in the respective beneficiary account, non-receipt of refund orders and non-receipt of funds by electronic mode.

The Sponsor – National Highways Authority of India

Head office and address for correspondence*:*

National Highways Authority of India
G-5 & 6, Sector – 10, Dwarka,
New Delhi – 110 075

Contact Person of the Sponsor

Soumya Mukhopadhyay, Deputy General Manager (Finance and Accounts) is the contact person of the Sponsor. His contact details are as follows:

Soumya Mukhopadhyay
G-5 & 6, Sector – 10, Dwarka,
New Delhi – 110 075
Telephone: +91 11 25074100/200 Extn: 1109
E-mail: s.mukhopadhyay@nhai.org

The Investment Manager - Raajmarg Infra Investment Managers Private Limited

Registered office and address for correspondence*:*

Raajmarg Infra Investment Managers Private Limited
G - 5 & 6, Sector 10, Dwarka,
New Delhi – 110075, India
Telephone: +91 92356 13818
E-mail: mriduldubey@nhai.org
Contact person: Mridul Dubey

The Project Manager – National Highways InvIT Project Managers Private Limited

Registered office and address for correspondence

National Highways InvIT Project Managers Private Limited
G - 5 & 6, Sector 10,
Dwarka, New Delhi – 110075
Telephone: +91 11 4039 5336 Extn:11
Contact person: Akhil Khare

The Trustee – IDBI Trusteeship Services Limited

Registered Office and correspondence address

IDBI Trusteeship Services Limited
Ground Floor, Universal Insurance Building,
Sir Phirozshah Mehta Road, Fort,
Mumbai – 400 001, Maharashtra, India
Telephone: +91 11 4513 8885
E-mail: itsl@idbitrustee.com/ delhiitsl@idbitrustee.com
Contact person : Deepak Kumar and Mahendra Singh Chouhan
Website: www.idbitrustee.com

Other Parties involved in the Trust

Auditors

A.R. & Co., Chartered Accountants
A-403, Gayatri Apartment,
Airlines Group Housing Society,
Plot No-27, Sector-10,
Dwarka, New Delhi – 110075
Telephone: +91 9810195084, +91 9810444051
E-mail: ar_co1981@yahoo.co.in , pawankgoel1@gmail.com
Contact person: Mohd. Azam Ansari
Firm registration no: 002744C
Peer review no: 023024

Valuer

RBSA Valuation Advisors LLP
Unit 1081 & 1082, 8th Floor,
Building No. 10, Solitaire Corporate Park,
Guru Hargovindji Road, Chakala,
Andheri East, Mumbai – 400093
Telephone: +91 22 6130 6093
E-mail: ravishu.shah@rbsa.in
Website: www.rbsa.in
Firm registration no: IBBI/RV-E/05/2019/110
Contact person: Ravishu Vinod Shah

Technical Consultants

URS Scott Wilson India Private Limited in JV with Marc Technocrats Private Limited
3rd Floor, Tower 8 A, DLF Cyber City,
DLF Phase 2, Gurgaon – 122002
Telephone: +91 124 4871400
E-mail: shankar.lohani@aecom.com
Website: www.aecom.com
Contact person: Shankar Raj Lohani

Chaitanya Projects Consultancy Limited in association with Shree Bhawani Consultancy Services Private Limited
C-5, 2nd Floor, R. K. Tower,
Sector-4, Vaishali,
Ghaziabad 201012
Telephone: 01204110472
E-mail: chaitanya.projects@gmail.com
Contact person: Deepika Shukla

Traffic Consultant

Translink Infrastructure Consultants Private Limited in association with Infra Brainiac Private Limited
1103 , I Square Corporate Park,
Near Shukan Mall Cross Road,
Science City Road,
Sola, Ahmedabad, Gujarat – 380 060
Telephone: +91 79297 06769
E-mail: tejas@translinkinfra.com
Contact person: Tejas Patel

Book Running Lead Managers to this Issue

SBI Capital Markets Limited
1501, 15th Floor, A & B Wing
Parinee Crescenzo Building, G Block,
Bandra Kurla Complex,
Bandra (East), Mumbai 400 051
Maharashtra, India
Telephone: +91 22 4196 8300
E-mail: raajmarg.ipo@sbicaps.com
Website: www.sbicaps.com
Investor grievance e-mail:investor.relations@sbicaps.com
Contact person: Sanjay Sethia
SEBI registration number: INM000003531

Axis Capital Limited
1st Floor, Axis House
Pandurang Budhkar Marg, Worli
Mumbai 400 025
Maharashtra, India
Telephone: +91 22 4325 2183
E-mail: raajmarg.ipo@axiscap.in
Investor grievance e-mail: compliants@axiscap.com
Contact person: Harish Patel/ Mayuri Arya
Website: www.axiscapital.co.in
SEBI registration number: INM000012029

ICICI Securities Limited
ICICI Venture House,
Appasaheb Marathe Marg,
Prabhadevi, Mumbai 400 025,
Maharashtra, India
Telephone: +91 22 6807 7100
E-mail: raajmarg.ipo@icicisecurities.com
Investor grievance e-mail: customercare@icicisecurities.com
Contact person: Shri Subramanyam / Sumit Singh
Website: www.icicisecurities.com
SEBI registration number: INM000011179

Motilal Oswal Investment Advisors Limited
Motilal Oswal Tower,
Rahimtullah Sayani Road,
Opposite Parel ST Depot,
Prabhadevi, Mumbai – 400 025,
Maharashtra, India
Telephone: +91 22 7193 4380
E-mail: riit.ipo@motilaloswal.com
Investor grievance e-mail: moiaplredressal@motilaloswal.com
Contact person: Shashank Pisat/ Sankita Ajinkya
Website: www.motilaloswalgroup.com
SEBI registration number: INM000011005

Inter-se allocation of responsibilities

The following table sets forth the inter-se allocation of responsibilities for various activities amongst the Book Running Lead Managers for this Issue:

Sr. No.	Activity	Responsibility	Co-ordination
1.	Assist the Investment Manager in selecting the initial portfolio of the InvIT, capital structuring, with the relative components and formalities such as type of instruments, etc.	Book Running Lead Managers	SBICAPS
2.	Due diligence of the InvIT's operations/management/ business plans/ legal, etc., Sponsor's / Investment Manager's / Project Manager's experience, the proposed formation transactions, the proposed and future assets arrangements, any other related party transactions (including any name licensing or other arrangements), drafting and design of offer documents and drafting of Statutory Advertisements. The Book Running Lead Managers shall ensure compliance with stipulated requirements and completion of prescribed formalities with the Stock Exchanges and the SEBI.	Book Running Lead Managers	SBICAPS
3.	Assisting with the appointment of all intermediaries including registrar to the issue, escrow banks, printers, advertising agency, credit rating agencies, bankers to the issue, industry report provider and any other intermediaries	Book Running Lead Managers	SBICAPS
4.	Coordination with the auditor deliverables and co-ordination with lawyers for legal opinion	Book Running Lead Managers	SBICAPS
5.	Coordination for drafting of agreements like trust deed, investment management agreement, project implementation and management agreement and concession agreements	Book Running Lead Managers	SBICAPS
6.	Coordination for drafting of various agreements like issue agreement, cash escrow and sponsor bank agreement, registrar agreement, transitional support agreement, syndicate agreement, ad agency agreement, etc.	Book Running Lead Managers	Axis
7.	Finalisation of traffic and technical reports	Book Running Lead Managers	SBICAPS
8.	Drafting and approval of all publicity material like corporate advertisement, brochure, hoardings etc. (other than statutory advertisement as mentioned above)	Book Running Lead Managers	Axis
9.	Finalising road show marketing presentation	Book Running Lead Managers	I-Sec
10.	Finalising FAQs	Book Running Lead Managers	I-Sec
11.	Institutional Marketing of the Issue which will cover, inter alia: • Formulating overall institutional marketing strategy; • Finalising the list and division of investors for one-on-one meetings, institutional allocation; and • Finalizing road show schedule and investor meeting schedules	Book Running Lead Managers	SBICAPS
12.	Non-institutional marketing of the Issue	Book Running Lead Managers	Axis
13.	Coordination with stock exchanges for book building software and submitting deposit	Book Running Lead Managers	I-Sec
14.	Finalising of pricing and allocation in consultation with the Investment Manager	Book Running Lead Managers	SBICAPS

Sr. No.	Activity	Responsibility	Co-ordination
15.	Assisting the investment manager in ensuring the completion of the formation transactions and the allotment of Units in consideration thereof	Book Running Lead Managers	SBICAPS
16.	Post bidding activities including management of escrow account, coordinate non-institutional and institutional allocation, coordination with registrar and banks, intimation of allocation and dispatch of refund to bidders, etc. The post Issue activities of the Issue will involve essential follow up steps, which include finalization of basis of allotment, dispatch of certificates and demat delivery of Units, with the various agencies connected with the work such as Registrar to the Issue, Bankers to the Issue and the bank handling refund business. Any other activities related to post issue including redressal of investor grievances and listing/trading of Units.	Book Running Lead Managers	Motilal

Escrow Collection Bank, Refund Bank and Sponsor Bank

ICICI Bank Limited
Capital Market Division, 163, 5th Floor,
H.T. Parekh Marg, Backbay Reclamation,
Churchgate, Mumbai – 400 020
Telephone: +91 22-68052182
E-mail: ipocmg@icici.bank.in
Contact person: Varun Badai
Website: www.icici.bank.in
SEBI registration number: INBI00000004

Public Issue Account Bank and Sponsor Bank

HDFC Bank Limited
HDFC Bank Limited, FIG-OPS Department,
Lodha IThink Techno Campus, O-3 Level,
Next to Kajurmarg Railway Station,
Kanjurmarg (East),Mumbai – 400 042
Telephone: +91 022-30752914/28/29
E-mail: btiscsb@hdfcbank.com
Contact person: Tushar Gavankar
Website: www.hdfcbank.com
SEBI registration number: INBI00000063

Sponsor Contribution Bank

Yes Bank Limited
YES Bank, Plot #444,
Udyog Vihar V
Gurugram – 122 001
Telephone: +91 99584 75025
E-mail: dlggnbtiservices@yes.bank.in
Contact person: Ashish Moses
Website: www.yesbank.in
SEBI registration number: INBI00000935

Syndicate Members

SBICAP Securities Limited
Marathon Futurex, B Wing,
Unit no 1201, 12th Floor,
N M Joshi Marg, Lower Parel,
Mumbai – 400 013
Telephone: +91 22-69316411
E-mail: archana.dedhia@sbicapsec.com
Contact person: Archana Dedhia

Website: www.sbisecurities.in
SEBI registration number: INZ000200032

Motilal Oswal Financial Services Limited
Motilal Oswal Tower,
Rahimtullah Sayani Road,
Opposite Parel ST Depot,
Prabhadevi, Mumbai – 400 025,
Maharashtra, India
Telephone: +91 22-71934200/ +91 22-7193 4236
E-mail: ipo@motilaloswal.com/santosh.patil@motilaloswal.com
Contact person: Santosh Patil
Website: www.motilaloswalgroup.com
SEBI registration number: INZ000158836

Legal counsel to the Sponsor, Investment Manager and the Trust as to Indian law

JSA
One Lodha Place, 27th Floor,
Senapati Bapat Marg, Lower Parel,
Mumbai – 400 013
Maharashtra, India

Legal counsel to the Book Running Lead Managers as to Indian law

Shardul Amarchand Mangaldas & Co
24th Floor, Express Towers
Nariman Point, Mumbai – 400021
Maharashtra, India

Registrar to the Issue

KFin Technologies Limited
Selenium, Tower B, Plot No-31 and 32,
Financial District, Nanakramguda,
Serilingampally, Hyderabad,
Rangareddy – 500 032
Telangana, India
Telephone: +91 1800 309 4001 / +91 40 6716 2222
E-mail: riimpl.invit@kfintech.com
Investor grievance e-mail: einward.ris@kfintech.com
Website: www.kfintech.com
Contact person: M. Murali Krishna
SEBI registration number: INR000000221

Credit Rating Agencies

Care Ratings Limited
32, Titanium,
Prahaladanagar Corporate Road,
Satellite, Ahmedabad – 380015
Telephone: +91 79 40265656 / 91-85111 90079
E-mail: maulesh desai@careedge.in
Contact person: Maulesh Desai

India Ratings & Research Private Limited
Wockhardt Towers, 4th Floor,
West Wing, Bandra Kurla Complex,
Bandra (E) Mumbai – 400 051
Telephone: +91 22 40001700

E-mail: infogrp@indiaratings.co.in
Contact person: Suryanarayanan S

Self-Certified Syndicate Banks

The list of SCSBs notified by SEBI for the ASBA process is available at http://www.sebi.gov.in/sebiweb/other/OtherAction.do?doRecognised=yes, or at such other website as may be prescribed by SEBI from time to time. For a list of the SCSB branches named by the respective SCSBs to receive ASBA Forms from the Designated Intermediary, please refer to the above-mentioned link.

Registered Brokers

The list of the Registered Brokers, including details such as postal address, telephone number and e-mail address, is provided on the websites of the Stock Exchanges at https://www.bseindia.com/ and https://www.nseindia.com, as updated from time to time.

Registrar and Unit Transfer Agents

The list of the RTAs eligible to accept ASBA Forms at the Designated RTA Locations, including details such as address, telephone number and e-mail address, is provided on the websites of BSE at https://www.bseindia.com/Static/PublicIssues/RtaDp.aspx and NSE at http://www.nseindia.com/products/content/equities/ipos/asba_procedures.htm, respectively, as updated from time to time.

Collecting Depository Participants

The list of the CDPs eligible to accept ASBA Forms at the Designated CDP Locations, including details such as name and contact details, is provided on the websites of BSE at https://www.bseindia.com/Static/PublicIssues/RtaDp.aspx and NSE at http://www.nseindia.com/products/content/equities/ipos/asba_procedures.htm, respectively, as updated from time to time.

Investor Grievances

Investors can contact our Compliance Officer, the Book Running Lead Managers or the Registrar to the Issue in case of any pre-Issue or post- Issue related problems, redressals of complaints, such as non-receipt of letters of Allotment, non-credit of Allotted Units in the respective beneficiary account, non-receipt of refund orders or non-receipt of funds by electronic mode.

All Issue related grievances, other than that of Anchor Investors, may be addressed to the Registrar to the Issue with a copy to the relevant Designated Intermediary to whom the Bid cum Application Form was submitted. The Bidder should give full details such as name of the first or sole Bidder, Bid cum Application Form number, Bidder's DP ID, Client ID, UPI ID, PAN, date of submission of the Bid cum Application Form, address of the Bidder, number of Units applied for, the name and address of the Designated Intermediary where the Bid cum Application Form was submitted by the first or sole Bidder and ASBA Account number (for Bidders other than UPI Bidders using the UPI Mechanism) in which the amount equivalent to the Bid Amount was blocked or the UPI ID in case of UPI Bidders.

Further, the first or sole Bidder shall also enclose a copy of the Acknowledgment Slip or provide the acknowledgement number received from the Designated Intermediaries in addition to the information mentioned hereinabove. All grievances relating to Bids submitted through Registered Brokers may be addressed to the Stock Exchanges with a copy to the Registrar to the Issue. The Registrar to the Issue shall obtain the required information from the SCSBs for addressing any clarifications or grievances of ASBA Bidders.

All Issue -related grievances of the Anchor Investors may be addressed to the Registrar, giving full details such as the name of the sole or First Bidder, Anchor Investor Application Form number, Bidders' DP ID, Client ID, PAN, date of the Anchor Investor Application Form, address of the Bidder, number of Units applied for, Bid Amount paid on submission of the Anchor Investor Application Form and the name and address of the Book Running Lead Managers where the Anchor Investor Application Form was submitted by the Anchor Investor.

Book Building Process

Book building process, in the context of the Issue, refers to the process of collection of Bids from investors on the basis of this Offer Document, the Bid cum Application Forms and the Revision Forms within the Price Band. The Price Band, and minimum Bid Lot size will be decided by the Investment Manager in consultation with the Book Running Lead Managers and published in all editions of Economic Times (a widely circulated English national daily newspaper) and in all editions of Jansatta (a widely circulated Hindi national daily newspaper, Hindi also being the regional language of Delhi, where the registered office of the Investment Manager is located), at least two Working Days prior to the Bid/ Issue Opening Date and shall be made available to the Stock Exchanges for the purpose of uploading on their respective websites. The Issue Price shall be determined by the Investment Manager in consultation with the Book Running Lead Managers after the Bid/ Issue Closing Date. For further details, see "*Issue Information*" on page 271.

All Bidders, other than Anchor Investors and Strategic Investors, shall participate in the Issue mandatorily through the ASBA process by providing the details of their respective ASBA Accounts in which the corresponding Bid Amount will be blocked by the SCSBs and Sponsor Banks, as the case may be. Anchor Investors are not permitted to participate in the Issue through the ASBA process. UPI Bidders may participate through the ASBA process by either (a) providing the details of their respective ASBA Account in which the corresponding Bid Amount will be blocked by the SCSBs or, (b) through the UPI Mechanism.

Each Bidder will be deemed to have acknowledged the above restrictions and the terms of the Issue, by submitting their Bid in the Issue.

The process of Book Building and the Bidding Process are subject to change from time to time and the investors are advised to make their own judgment about investment through this process prior to submitting a Bid in the Issue. The Book Building Process is in accordance with guidelines, rules, regulations prescribed by SEBI. Bidders are advised to make their own judgment about an investment through this process prior to submitting a Bid.

Bidders should note the Issue is also subject to obtaining the final listing and trading approvals of the Stock Exchanges, which the Investment Manager shall apply for after Allotment.

BASIS OF ISSUE PRICE

The Issue Price will be determined by the Investment Manager, in consultation with the Book Running Lead Managers, on the basis of the assessment of market demand for the Units offered through the Book Building Process and on the basis of quantitative and qualitative factors as described below.

Bidders are requested to also refer to the sections entitled "*Risk Factors"* and "*Business*" on pages 42 and 260, respectively, to make an informed investment decision.

The Price Band is ₹ [●] to ₹ [●].

Based on the evaluation of the qualitative and quantitative factors listed below, the enterprise value and equity value at the Floor Price and the Cap Price and the Issue Price is as follows:

Particulars	At Floor Price	At Cap Price	At Issue Price
Equity Value (Post Issue) (in ₹ million)	[●]	[●]	[●]
Total Units Post Issue	[●]	[●]	[●]

Qualitative Factors

We believe that some of the qualitative factors which form the basis for computing the Issue Price are as follows:

- Attractive industry sector with strong underlying fundamentals and favourable government policies
- Experienced Sponsor with consistent track record in operating and maintaining projects in the roads and highways sector in India
- Sizeable portfolio of diversified long-term revenue generating Toll Road assets
- Portfolio of strategically located assets catering to key economic corridors of the country
- Significant growth visibility through a defined pipeline of future assets
- Concession Agreements terms with low counterparty risk
- Long term transitional support from NHAI ensuring operational continuity

For further details, please see the section entitled "*Business*" on page 160.

Quantitative Factors

Some of the quantitative factors which may form the basis for computing the Issue Price are as follows:

1. **Valuation provided by the Valuer**

The Valuer has used the discounted cash flows method to determine the value of the InvIT Assets as on December 31, 2025. The assumptions on which the value of the InvIT Assets is based have been disclosed in the section entitled "*Valuation Report*" attached as Annexure A. For further details, please refer to the "*Valuation Report*" attached as Annexure A.

2. **Enterprise Value / Cash flows from operations ratio in relation to Issue Price:**

(in ₹ million)

Particulars	Amount	EV/Cash flow from operations		
		At Floor Price	At Cap Price	At Issue Price
Projected cash flows from operations for the financial year ended March 31, 2026	Nil	[●]	[●]	[●]
Projected cash flows from operations for the financial year ended March 31, 2027	8,621.50	[●]	[●]	[●]
Projected cash flows from operations for the financial year ended March 31, 2028	10,605.20	[●]	[●]	[●]
Projected cash flows from	10,955.53	[●]	[●]	[●]

Particulars	Amount	EV/Cash flow from operations		
		At Floor Price	At Cap Price	At Issue Price
operations for the financial year ended March 31, 2029				

***In accordance with the Projections of Revenue from Operations and Cash Flow from Operating Activities prepared by the Investment Manager. For details of the projections and notes thereto, please see the section entitled "Projections of Revenue from Operations and Cash Flow from Operating Activities" on page 335. Also see the section entitled "Risk Factors" on page 42.*

3. **Price / Net Asset Value per Unit ratio in relation to Issue Price:**

Particulars	Amount (₹)	Price / Net Asset Value per Unit		
		At Floor Price	At Cap Price	At Issue Price
Net Asset Value per Unit as of [●] [(1)]	[●]	[●]	[●]	[●]

[(1)] The number of Units that the Trust will issue is not presently ascertainable. Hence, the disclosures in respect of number of Units and Net Asset Value per Unit have not been provided as on date of this Offer Document.

For further details, refer to "*Audited Financial Information*" on page 315.

4. **Earnings Per Units**

Year/Period ended	Earnings per Unit (₹)*
[●]	[●]

Note: The number of Units that the Trust will issue is not presently ascertainable. Hence, the disclosures in respect of Earnings Per Unit have not been provided as on date of this Offer Document.

5. **Comparison with Industry Peers**

Particulars	Net Asset Value per Unit ("NAV") (₹)	Premium / (Discount) to NAV%***
Cube Highways Trust	142.70*	(1.89)
Vertis Infrastructure Trust	103.35*	5.47
Interise Trust	104.18**	5.35
National Highways Infra Trust	145.80*	6.31
IRB Invit Fund	79.50*	(22.19)

** NAV as of December 31, 2025.*
*** NAV as of March 31, 2025.*
**** Premium / (Discount) to NAV% has been calculated as Unit Price, divided by Net Asset Value per unit minus one, based on the latest available price on the stock exchanges of the peers till February 27, 2026. The respective price available is as follows:*

(i) Cube Highways Trust - ₹140.00 on NSE as on February 27, 2026.
(ii) Vertis Infrastructure Trust - ₹109.00 on NSE as on February 27, 2026.
(iii) Interise Trust - ₹109.75 on NSE as on September 16, 2025.
(iv) National Highways Infrastructure Trust - ₹155.00 on NSE as on February 26, 2026.
(v) IRB InvIT Fund - ₹61.86 on NSE as on February 27, 2026.

PARTIES TO THE TRUST

A. The Sponsor and Sponsor Group– National Highways Authority of India

History and Certain Corporate Matters

NHAI is an autonomous body under MoRTH, and was established on June 15, 1989, by the NHAI Act, as a body corporate, having a perpetual succession and common seal. It was made operational in February, 1995, with the appointment of the Chairman and other Members. NHAI is responsible for the development, maintenance and management of the national highways in India entrusted to it by the Central Government.

NHAI has all India presence through its different offices (regional offices/project implementation units/corridor management units) in different cities. The functioning of NHAI is governed by NHAI Act, and the rules and regulations framed thereunder.

Background of the Sponsor

NHAI is an autonomous body under Ministry of Road, Transport and Highways. It is established and governed by the NHAI Act. NHAI is not a company in terms of the Companies Act, 2013 (or in terms of the Companies Act, 1956), and accordingly, does not have a share capital. Pursuant to Section 17 of the NHAI Act, NHAI may receive additional capital and grants from the Central Government to discharge its functions. Additionally, NHAI has not issued any shares against such capital or grants invested by the Central Government.

As per Section 3(3) of the NHAI Act, NHAI shall consist of: (i) a chairman; (ii) not more than six full-time members; and (iii) not more than six part-time members, and each of the above shall be appointed by the Central Government by notification in the official gazette.

In accordance with the eligibility criteria specified under the InvIT Regulations, NHAI has a shareholders' fund (net worth) of not less than ₹ 1,000.00 million as on December 31, 2025.

Neither the Sponsor nor any of the members of the Sponsor are: (i) debarred from accessing the securities market by SEBI; (ii) promoters, directors or persons in control of any other company or a sponsor, investment manager or trustee of any other infrastructure investment trust or an infrastructure investment trust which is debarred from accessing the capital market under any order or direction made by SEBI; or (iii) in the list of wilful defaulters published by the RBI.

Details of the holding or the proposed holding by Sponsor in the Trust

Pursuant to the Commitment Letter, the Sponsor has agreed contribute such amount towards subscription of such number of Units, which shall be equivalent to at least 15.00% of the total Units of the Trust on a post-Issue basis, to comply with the requirement under Regulations 12(3) and 12(3A) of the InvIT Regulations. Further, the Units held by the Sponsor will be subject to lock-in requirements in accordance with the InvIT Regulations. For further details, see '*Formation Transactions in relation to the Trust – Sponsor Contribution*' on page 26.

Sponsor Group

In accordance with Regulation 2(zxc) of the InvIT Regulations, sponsor group" includes (i) the sponsor(s); (ii) entities or person(s) which are controlled by such sponsor; (iii) entities or person(s) who control such body corporate; (iv) entities or person(s) which are controlled by entities or person(s) specified in clause (iii). Further, Regulation 4(2)(d) of the InvIT Regulations clarifies that of the entities categorized as sponsor group as per (ii), (iii) and (iv) above, only the following entities may be considered: a) a person or entity who is directly or indirectly holding an interest or shareholding in any of the assets or SPVs or holdco(s) proposed to be transferred to the InvIT; b) a person or entity who is directly or indirectly holding units of the InvIT on post- issue basis; c) a person or entity whose experience is being utilized by the sponsor for meeting with the eligibility conditions required under sub-clause (iii) of clause of sub-regulation (2) of regulation 4 of the InvIT Regulations.

Accordingly, National Highways Authority of India has been identified as the Sponsor Group of the Trust.

B. The Trustee – IDBI Trusteeship Services Limited

History and Certain Corporate Matters

IDBI Trusteeship Services Limited is the Trustee of the Trust. The Trustee is a registered intermediary with SEBI under the Securities and Exchange Board of India (Debenture Trustees) Regulations, 1993, as a debenture trustee. The Trustee has obtained a certificate of registration dated February 14, 2017 (having registration code IND000000460), which is valid until suspended or cancelled by SEBI. The Trustee was incorporated in India under the Companies Act, 1956 with corporate identity number U65991MH2001GOI131154. The Trustee was originally incorporated on March 8, 2001 at Mumbai, Maharashtra. The Trustee's registered office is situated at Ground Floor, Universal Insurance Building, Sir Phirozshah Mehta Road, Fort, Mumbai, Maharashtra, India, 400001. The Trustee is jointly promoted by IDBI Bank Limited, Life Insurance Corporation and General Insurance Corporation for providing corporate and other trusteeship services.

Background of the Trustee

The Trustee is permitted to engage in the following activities: (a) to act as (i) a debenture or bond trustee; (ii) a security trustee or facility agent; (iii) a securitization trustee; (iv) a share pledge trustee or share monitoring agent; (v) an escrow agent; (vi) a venture capital fund trustees, trustee of an infrastructure investment trust or a trustee to an AIF; and (b) providing services including (i) safe keeping or locker services; (ii) management of private trusts or execution of wills; and (iii) special corporate services.

The Trustee confirms that it has maintained, and undertakes to ensure that it will at all times maintain, adequate infrastructure personnel and resources to perform its functions, duties and responsibilities with respect to the Trust, in accordance with the Trust Deed, the InvIT Regulations and other applicable law.

The Trustee is not an Associate of the Sponsor or the Investment Manager. Further, neither the Trustee nor any of the promoters or directors of the Trustee are: (i) debarred from accessing the securities market by SEBI; (ii) promoters, directors or persons in control of any other company or a sponsor, investment manager or trustee of any other infrastructure investment trust or an infrastructure investment trust which is debarred from accessing the capital market under any order or direction made by SEBI; or (iii) in the list of wilful defaulters published by the RBI.

Board of directors of the Trustee

The board of directors of the Trustee is entrusted with the responsibility for the overall management of the Trustee. Please see below the details in relation of the board of directors of the Trustee:

Sr. No.	Name	DIN
1.	Jayakumar S Pillai	10041362
2.	Pradeep Kumar Malhotra	09817764
3.	Balkrishna Variar	10661169
4.	Arun Kumar Agarwal	00063359
5.	Hare Krushna Dandapani Panda	00479786
6.	Soma Nandan Satpathy	10899299
7.	Lohit Kumar Neel	06504417

Brief profiles of the Directors of the Trustee

1. Jayakumar S Pillai is the deputy managing director on the board of directors of the IDBI Trusteeship Services Limited.

2. Pradeep Kumar Malhotra is the managing director and chief executive officer on the board of directors of the IDBI Trusteeship Services Limited.

3. Balkrishna Variar is a non-executive director on the board of directors of the IDBI Trusteeship Services Limited.

4. Arun Kumar Agarwal is an independent director on the board of directors of the IDBI Trusteeship Services Limited.

5. Hare Krushna Panda is an independent director on the board of directors of the IDBI Trusteeship Services Limited.

6. Soma Nandan Satpathy is a director on the board of directors of the IDBI Trusteeship Services Limited.

7. Lohit Kumar Neel is an executive director on the board of directors of the IDBI Trusteeship Services Limited.

Key Terms of the Trust Deed

The Trustee has entered into the Trust Deed, in terms of the InvIT Regulations, the key terms of which, are provided below:

1. *Powers and Duties of the Trustee*

Without prejudice to the powers conferred upon the Trustee under the Indian Trusts Act, 1882, under the Trust Deed, the Trustee shall, in relation to the InvIT, have all powers that a Person competent to contract and acting as a legal and beneficial owner of such property would have. Such powers shall not be limited by any rule of construction and shall be interpreted with the widest generality, notwithstanding that certain powers are specifically set out herein:

(i) The Trustee shall have the power to appoint the Investment Manager as the investment manager of the InvIT and may delegate to it such powers of the Trustee, as permitted under the Trust Deed. The Trustee may execute the Investment Management Agreement, the Project Implementation and Management Agreement, and any other agreement with the Investment Manager or its nominees;

(ii) The Trustee shall determine, in accordance with the Investment Management Agreement and the Investment Objectives, distributions to Unitholders and other rights attached to Units, in compliance with the InvIT Regulations;

(iii) The Trustee shall oversee voting by Unitholders in accordance with the InvIT Regulations;

(iv) The Trustee shall have the power (which may be delegated to the Investment Manager) to:

(a) cause the offering of Units through any Offer Document;
(b) cause any Offer Documents to investors;
(c) issue and allot Units;
(d) summon and conduct meetings of Unitholders in accordance with the InvIT Documents and InvIT Regulations; and
(e) approve transfers of Units, subject to the InvIT Documents and InvIT Regulations.

(v) The Trustee shall, through the Investment Manager, invest and hold the InvIT Assets in the name of the InvIT in accordance with the InvIT Regulations, the Trust Deed and the Investment Objectives;

(vi) The Trustee may make investment decisions only to the extent delegated to and exercised exclusively by the Investment Manager. These powers include the ability to:

a. acquire, hold, trade, or dispose of securities of all kinds issued by SPVs or infrastructure projects;
b. deposit InvIT capital and monies with banks or institutions;
c. accept contributions;
d. receive income, dividends, return of capital and other proceeds;
e. invest in securities or mutual fund units permitted;
f. invest in money market instruments;
g. provide financial assistance to SPVs in the form of debt or equity instruments;

h. invest , acquire, purchase, hold, divest, sale, hypothecate, pledge or othrewise transfer immovable property and related rights.

(vii) The Trustee may, in consultation with the Investment Manager, create reserves out of income or capital as deemed appropriate, in compliance with the InvIT Regulations;

(viii) The Trustee may employ agents in any jurisdiction (including attorneys, solicitors, brokers, banks, trust companies, and others) and pay them from InvIT funds and shall not be liable for an agent's default if appointed in good faith;

(ix) The Trustee shall appoint the Investment Manager on behalf of the InvIT by executing the Investment Management Agreement within a reasonable time from the execution of the Trust Deed;

(x) The Trustee shall oversee the Investment Manager's activities, ensure compliance with InvIT Regulations and other applicable law, including in relation to Unitholder Nominee Directors, and obtain compliance certificates as prescribed by SEBI;

(xi) The Trustee shall appoint the Project Manager on behalf of the InvIT by executing the Project Implementation and Management Agreement;

(xii) The Trustee shall oversee the Project Manager's activities and obtain compliance certificates as prescribed by SEBI;

(xiii) The Trustee (through the Investment Manager) may appoint custodians and deposit InvIT property with them as permitted;

(xiv) The Trustee may pay taxes, duties, fees, penalties or interest payable in any jurisdiction in respect of the InvIT and may create reserves for future liabilities. No Unitholder shall be required to contribute capital other than the value paid for Units;

(xv) The Trustee may pay InvIT Expenses out of InvIT funds, subject to the advice of the Investment Manager;

(xvi) The Trustee may obtain legal or tax advice and pay related fees from InvIT funds;

(xvii) The Trustee may enter into transactions with trustees of other trusts or executors, including where the Trustee is the same Person, provided such power is delegated to and exercised exclusively by the Investment Manager and conflicts of interest are avoided;

(xviii) The Trustee may, subject to Investment Manager's advice, cause the InvIT to borrow funds and provide security over InvIT Assets, subject to Unitholder approvals and the InvIT Regulations;

(xix) The Trustee may retain and reinvest proceeds received from InvIT Assets;

(xx) The Trustee may, in consultation with the Investment Manager, make rules for implementing the Investment Objectives, including:

(a) maintaining records of Unitholders;
(b) investment norms;
(c) custodial procedures;
(d) administrative matters;
(e) procedures for Unitholder voting;
(f) procedures for convening Unitholder meetings.

The Trustee may delegate this rule-making power to the Investment Manager.

(xxi) The Trustee shall cause the Depository to maintain the Depository Register;

(xxii) The Trustee shall advise the Investment Manager regarding appointment of intermediaries such as valuer, auditors, merchant bankers, custodian, registrar, etc.;

(xxiii) The Trustee shall review reports submitted by the Investment Manager and, after follow-up, intimate SEBI of any delays;

(xxiv) The Trustee may open, operate, and manage one or more bank accounts for the InvIT;

(xxv) The Trustee may take up with SEBI or stock exchanges any matter approved by Unitholders requiring such action;

(xxvi) The Trustee may:

(a) initiate or defend legal proceedings involving the InvIT;
(b) issue receipts and releases;
(c) negotiate and execute contracts for the InvIT;
(d) execute deeds and documents;
(e) execute InvIT Documents and amendments thereto;
(f) take custody of InvIT assets;
(g) exercise all powers required under applicable law.

(xxvii) The Trustee may delegate powers for administrative convenience, subject to retaining liability except for powers delegated to the Investment Manager, Project Manager, or third-party experts as permitted.

2. *Rights of the Trustee*

The Trustee shall have the following rights:

(i) The Trustee may, in the discharge of its duties, act upon any written advice obtained from any bankers, accountants, brokers, lawyers, professionals, consultants or other experts acting as advisers to the Trustee.

(ii) No Unitholder shall be entitled to inspect or examine the InvIT's premises or properties (including those of any Holding Company or SPV) without the prior permission of the Trustee, who shall grant such permission, if necessary, in consultation with the Investment Manager. Further, no Unitholder shall be entitled to seek discovery of any information relating to the InvIT's activities or conduct of business, where in the opinion of the Trustee and the Investment Manager such disclosure may adversely affect the interests of the Unitholder(s).

(iii) Without prejudice to any other provision of the Trust Deed (save as otherwise provided in any InvIT Document), the Trustee shall be entitled to reimburse itself and to charge the InvIT, and shall be indemnified from the InvIT and from any distributions made to Unitholders, for all expenses, outgoings, taxes, levies and liabilities (including any indemnity obligations of the InvIT) as set out in Schedule I.

(iv) The Trustee may accept as sufficient evidence of the value, cost price, sale price or any other fact within its competence, a certificate issued by a Valuer or any other professional appointed by the Investment Manager.

3. *Liabilities of the Trustee*

The liabilities of the Trustee in terms of the Trust Deed are as follows:

(i). The Trustee shall be chargeable only for such monies, stocks, funds and securities as it has actually received and shall not be liable for any banker, broker, custodian or other Person with whom such assets are deposited, nor for any deficiency or depreciation in the value of the InvIT's investments, nor for any involuntary loss. Any receipt signed by the Trustee for any monies, stocks, funds, shares, securities, investments or property paid, delivered or transferred to the Trustee shall discharge the Trustee and the Person making such payment or transfer,

provided the Trustee and such Person acted in good faith, without negligence, and used best efforts in connection with such dealings.

(ii). The Trustee shall not be liable for anything done, omitted or suffered in good faith in accordance with, or pursuant to, any request or advice of the Investment Manager.

(iii). The Trustee shall not be obliged to institute, acknowledge service of, appear in, prosecute or defend any action, suit, proceeding or claim relating to the InvIT or the InvIT Assets if such action may involve expense or liability, unless the Investment Manager so requests in writing and the Trustee is satisfied that the value of the investment is sufficient to provide adequate indemnity. All costs incurred by the Trustee in connection with such actions (whether undertaken upon request or otherwise) shall be borne by the InvIT.

(iv). The Trustee shall not be liable for any action taken or damage suffered in reliance on any notice, resolution, direction, consent, certificate, affidavit, statement, stock certificate, plan of reorganization or other document believed to be genuine and duly passed, sealed or signed by the appropriate authority.

(v). The Trustee shall not be liable to Unitholders for performing or failing to perform any act required by any present or future law, regulation, decree, order, judgment, or any request or action of any governmental authority. If it becomes impossible or impracticable to carry out any provision of the Trust Deed, the Trustee shall not incur liability on that account.

(vi). The Trustee shall not be responsible for the authenticity of signatures affixed to any document, nor liable for acting upon any forged or unauthorized signature. The Trustee may, but is not obliged to, require verification of any Unitholder's signature to its reasonable satisfaction.

(vii). Nothing in the Trust Deed prevents the Trustee from acting as trustee for other trusts, AIFs, VCFs, PE funds, REITs, InvITs or any other fiduciary arrangements, and retaining for its own benefit all remuneration, profits and advantages derived therefrom, as permitted under any other applicable law.

(viii). Where the Trustee is required under the InvIT Regulations or any other applicable law to provide information regarding the InvIT, the Sponsor, the Unitholders or the investments of the InvIT, and complies with such request in good faith (whether or not enforceable), the Trustee shall not be liable to the Unitholders or any other Person for such compliance.

(ix). The Trustee shall not be liable for any loss to a Unitholder (including loss arising from depletion in the value of the InvIT Assets), except where such loss results directly from fraud, gross negligence or wilful default of the Trustee, or from a breach of the Trust Deed, as finally determined by a court of competent jurisdiction.

(x). If the Trustee engages external advisers or experts (as permitted under the Trust Deed) or undertakes additional work (in consultation with the Investment Manager and in the interest of Unitholders) beyond the scope of its obligations under the Trust Deed or any other applicable law, it shall be entitled to recover such costs and expenses from the InvIT funds. The Trustee shall not be required to utilize funds held for any other trust administered by IDBI Trusteeship Services Limited for meeting its obligations under the Trust Deed.

(xi). Nothing in the Trust Deed exempts or indemnifies the Trustee from liability for:

(a) breach of trust under the Indian Trusts Act, 1882;
(b) fraud, misconduct or gross negligence, as conclusively determined by a court of competent jurisdiction;
(c) violation of any applicable law by the Trustee that materially affects the InvIT or the Unitholders; or
(d) failure to exercise the degree of care and diligence required of a trustee under the Indian Trusts Act, 1882, as finally determined by a court of competent jurisdiction.

(xii). The Trustee shall promptly inform the Sponsor upon the occurrence of any cancellation, revocation, suspension, non-renewal, or breach of the terms of its trustee registration that materially impairs its ability to perform its obligations under the Trust Deed.

(xiii). The Trustee shall ensure that the InvIT, the Investment Manager, the Project Manager, the Holding Companies and the SPVs adopt, prior to filing of the relevant Offer Document for the initial offer, appropriate policies including corporate governance policies, asset acquisition policies, related party transaction policies, auditor and valuer appointment policies, Net Distributable Cash Flow policies, and leverage policies (together, **"Policies"**). The requirements and manner of Unitholder approval, applicability, amendment and termination of each Policy shall be set out within the respective Policy.

4. *Provisions relating to Unitholders*

(i) Notwithstanding anything to the contrary contained in any InvIT Document, the aggregate liability of each Unitholder (including any taxes, duties, fines, levies, liabilities, costs or expenses) shall be limited to making the Capital Contribution payable by it in respect of the Units subscribed by it. For the avoidance of doubt, no Unitholder shall be responsible or liable, directly or indirectly, for any act, omission or commission of the Trustee, the Investment Manager, the Sponsor or any other Person, whether or not such act, omission or commission has been approved by the Unitholders in accordance with the InvIT Regulations. Further, the Sponsors shall not be responsible or liable, directly or indirectly, for any act, omission or commission of the Trustee, the Investment Manager or any other Person, irrespective of whether such act, omission or commission has been approved by the Unitholders in accordance with the InvIT Regulation;

(ii) Each Unit allotted to the Unitholders shall carry one vote in respect of decisions requiring a vote of Unitholders and shall carry such other rights as provided under the InvIT Regulations;

(iii) No Unitholder shall enjoy preferential voting or any other rights over another Unitholder;

(iv) In no event shall the Trustee or the Investment Manager be obliged to make any payment to any Unitholder except out of funds held for that purpose under the Trust Deed;

(v) A Unitholder whose name and account details appear in the Depository Register shall be the sole Person entitled to be recognized by the Trustee as having any right, title or interest in the Units registered in his name. The Trustee shall treat such holder as the absolute owner thereof and shall not be bound by any notice to the contrary, nor required to take notice of, or ensure the execution of, any trust (express or implied), except where expressly provided or required by an order of a court of competent jurisdiction;

(vi) The Unitholders (acting in their capacity as unitholders) shall not give any directions to the Trustee or the Investment Manager (whether at a meeting or otherwise) if such directions would require the Trustee or the Investment Manager to:

(a) act or refrain from acting in a manner that results in the InvIT, the Trustee or the Investment Manager ceasing to comply with any other applicable law; or
(b) interfere with the exercise of any discretion expressly conferred on the Trustee under the Trust Deed or on the Investment Manager under the Investment Management Agreement, or determine any matter requiring the agreement of the Trustee or the Investment Manager.

(vii) The Depository Register shall, save in case of manifest error, be conclusive evidence of the number of Units held by each Depositor. In case of any discrepancy between the Depository Register and any statement issued by the Depository, the Depository Register shall prevail unless the Depositor proves to the satisfaction of the Trustee and the Depository that the Depository Register is incorrect;

(viii) Unitholders shall have the right to call for certain matters to be placed for their consent, to the extent required under the InvIT Regulations and any other applicable law;

(ix) Eligible Unitholders shall have the right to appoint Unitholder Nominee Directors on the board of the Investment Manager ("IM Board"), in the manner prescribed under the InvIT Regulations. The Trustee shall supervise and ensure that the Investment Manager undertakes all actions and compliances required under the InvIT Regulations in relation to such appointment rights;

(x) Unitholders may, in accordance with the InvIT Documents and any other applicable law, transfer any Units to an investor who accepts all rights and obligations of the transferor. The Trustee and the Investment Manager shall give effect to such transfer;

(xi) Unitholders shall be entitled to receive Distributions made by the InvIT in proportion to their respective Beneficial Interests. The Beneficial Interest of each Unitholder shall be equal and correspond to the proportion of the Units held by such Unitholder relative to the total number of Units issued by the InvIT on the relevant date;

(xii) After the initial offer, no Person (other than the Sponsor, its related parties and associates) ("Investor") shall acquire or receive Units which, together with Units held by the investor and persons acting in concert with it, exceed the threshold prescribed under the InvIT Regulations without prior approval of the Unitholders. If such approval is not obtained, the Investor shall provide an exit option to dissenting Unitholders in accordance with the InvIT Regulations and as specified by SEBI;

(xiii) The Trustee shall, and shall ensure that the Investment Manager shall, obtain Unitholder consent for all matters prescribed under the InvIT Regulations, in the manner and to the extent required under the InvIT Regulations.

5. *Indemnity*

In addition to the fees, distributions and expense reimbursements herein described, the InvIT Assets shall be utilized to indemnify and hold harmless the Trustee, the Sponsor and any of their respective officers, directors, shareholders, sponsors, partners, members, employees, advisors and agents ("**Indemnified Parties**") from and against any claims, losses, costs, damages, liabilities and expenses, including legal fees ("**Losses**") suffered or incurred by them by reason of their activities on behalf of the Trust, unless such Losses resulted from fraud, gross negligence, wilful default or wilful misconduct or breach of any obligations or duties under applicable law by the relevant Indemnified Party, as determined by a court of competent jurisdiction.

6. *Termination*

The InvIT is subject to dissolution and termination in accordance with and subject to the InvIT Regulations and applicable law:

(i). if the Trust fails to make any offer of Units by way of public issue or a private placement, within the time period stipulated in the InvIT Regulations or any other time period as specified by SEBI, the Trust shall surrender its certificate to SEBI and cease to operate as an investment infrastructure trust, unless the period is extended by SEBI;

(ii). upon the liquidation of InvIT Assets;

(iii). if there are no projects remaining under the Trust and the Trust does not invest in any project for six months thereafter;

(iv). delisting of the Units in accordance with the InvIT Regulations; or

(v). illegality of the InvIT under applicable law.

C. The Investment Manager – Raajmarg Infra Investment Managers Private Limited

History and Certain Corporate Matters

Raajmarg Infra Investment Managers Private Limited was incorporated as a private limited company on August 22, 2025, under the Companies Act, 2013. The CIN of the Investment Manager is U66309DL2025PTC453624.

The principal business of the Investment Manager in terms of its memorandum of association is, *inter alia*:

(a) to carry on the business of acting as investment manager investment adviser, trustee, settler, sponsor, promoter, portfolio manager, manager, administrator, attorney, agent, consultant, representative or nominee of or for any collective investment schemes, trusts, special purpose vehicles, infrastructure investment trusts, real estate investment trusts, properties and/or assets of any kind, including any fund set up, formed or established in India or in any other country by the Company or by any other person including bodies corporate, limited liability partnerships, partnerships, trusts, societies, associations of persons or by government, state or local authority (whether incorporated or not) of any other agency or organisation with respect to any class of assets, and to thereby settle, administer, manage, deploy funds, acquire, take up, manage, invest, hold, sell, deal or dispose of all or any property, investments, securities or other assets of any kind whatsoever, acting in such capacity;

(b) to carry out the business of acting as investment manager investment adviser to Raajmarg Infra Investment Trust and to work for meeting out the targets set out by the Government of India for Raajmarg Infra Investment Trust. Alteration of this clause may require to be passed by special resolution as per provisions of Companies Act 2013;

(c) to negotiate and obtain concessions from the appropriate Government/ s for the rights to build, operate and own or transfer highways, interchangers, viaducts and bridges and any other structures, buildings and services that are ancillary thereto in India and upon such terms for such benefits as may be set forth in the concessions or negotiated from time to time and generally to carry on the business of owners, operators or toll collectors or concessionaires of highways, bridges, tunnels, railways, ports, airports, public utilities, telecommunication facilities and any other rights, properties, utilities and services wherever situated; and

(d) to carry on the business of builders and contractors for the construction, upgradation, maintenance and repairs of roads, highways, bridges, viaducts, buildings, interchangers, tunnels, railways, ports, airports, public utilities, telecommunication and other related works and generally to carry on the business of engineers, contractors, consultants, advisors, managers and administrators in all its branches, mechanical, electrical and telecommunication, engineering and incidental thereto, to provide financing or act as guarantors for project financing to owner where to required.

Background of the Investment Manager

RIIMPL has been appointed as the investment manager of the Trust, pursuant to the investment management agreement dated December 2, 2025, based on the recommendation of the Sponsor.

The Investment Manager confirms that it has, and undertakes to ensure that it will at all times maintain, adequate infrastructure, personnel and resources to perform its functions, duties and responsibilities with respect to the management of the Trust, in accordance with the InvIT Regulations, the Investment Management Agreement and applicable law.

In accordance with the eligibility criteria specified under the InvIT Regulations, the Investment Manager has a consolidated net worth of not less than ₹ 100.00 million as on November 30, 2025.

Neither the Investment Manager nor any of the promoters or directors of the Investment Manager are: (i) debarred from accessing the securities market by SEBI; (ii) promoters, directors or persons in control of any other company or a sponsor, investment manager or trustee of any other infrastructure investment trust or an infrastructure investment trust which is debarred from accessing the capital market under any order or direction made by SEBI; or (iii) in the list of wilful defaulters published by the RBI.

Shareholding Pattern

The shareholding pattern of the IM as on the date of this Offer Document is provided below:

S. No.	Name of the shareholder	No. of equity shares of ₹ 10 each	Percentage Shareholding (%)
1.	National Highways Infra Trust	5,200,000	26.00
2.	National Bank for Financing Infrastructure and Development	1,600,000	8.00

3.	State Bank of India	1,490,000	7.45
4.	Punjab National Bank	1,490,000	7.45
5.	IDBI Bank Limited	1,460,000	7.30
6.	ICICI Bank Limited	1,460,000	7.30
7.	HDFC Bank Limited	1,460,000	7.30
8.	Yes Bank Limited	1,460,000	7.30
9.	IndusInd Bank Limited	1,460,000	7.30
10.	Axis Bank Limited	1,460,000	7.30
11.	Bajaj Finserv Ventures Limited	1,460,000	7.30
Total		**20,000,000**	**100.00**

The IM Board

The IM Board is entrusted with the responsibility for the overall management of the Investment Manager. Pursuant to the share subscription and shareholder's agreement dated October 18, 2025 entered into between NHAI, the Investment Manager, National Bank for Financing Infrastructure and Development, State Bank of India, Punjab National Bank, Axis Bank Limited, Bajaj Finserv Ventures Limited, HDFC Bank Limited, ICICI Bank Limited, IDBI Bank Limited, IndusInd Bank Limited and Yes Bank Limited, (i) NHAI shall have the right, but not the obligation to appoint one director on the IM Board; (ii) National Bank for Financing Infrastructure and Development shall, as long as it holds at least 5.00% of the equity share capital in Investment Manager, shall have the right but not the obligation to appoint one Director on the IM Board; (iii) other shareholders of the Investment Manager (exclusive of NHAI and National Bank for Financing Infrastructure and Development), shall, as long as they individually or together with their affiliates hold at least 5.00% of the equity share capital in Investment Manager, shall collectively have the right but not the obligation to appoint one director on the IM Board. The right to appoint directors on the IM Board shall be based on alphabetical order of the name of the other shareholders of the IM and the tenor of such director shall be one year. Further, IDBI Bank Limited does not have significant influence on the Investment Manager.

Set forth below are the details of the IM Board:

Sr. No.	Name	DIN
1.	Ashish Kumar Singh	09841587
2.	NRVVMK Rajendra kumar	09494456
3.	Giridhar Aramane	00483130
4.	Annie George Mathew	11422154
5.	Dip Kishore Sen	03554707
6.	Himanshu Gulliani	11422736

Brief Biography of the Directors of the Investment Manager

Please see below a brief biography of the directors of the Investment Manager:

Ashish Kumar Singh, is a non-independent director on the board of the Investment Manager. He has a bachelor's degree in arts from the Lucknow University and a post graduate diploma in development studies from Institute of Developing Economics Advanced School-JETRO, Japan. He has also completed career training program on public financial management for the Indian Civil Accounts Service (2002 Batch) from Duke University, USA. and as part of mid-career training program, he has obtained a certificate in public financial management from National Institute of Financial Management, Faridabad. At present he is in the rank of Senior Administrative Grade in Government of India and currently serving as the Chief General Manager (Finance) in NHAI and has over 23 years of experience including finance, taxation and infrastructure development sector.

Neti Ravi Vijay Venkat Murali Krishna Rajendrakumar is a non-independent director on the board of the Investment Manager. He has a master's degree in public management from Harvard Kennedy School and Lee Kuan Yew School of Public Policy. He also holds a doctorate in economics from University of Hyderabad. He is also a nominee director on behalf of NHAI on the board of National Highways Infra Investment Managers Private Limited since 2022 and was a nominee director on the board of NHIT Western Projects Private Limited from April 2022 to November 2025. He has over 29 years of experience in the financial management and asset management sectors.

Giridhar Aramane, is an independent director on the board of the Investment Manager. He has a bachelor's degree in technology (civil engineering) from Jawaharlal Nehru Technological University, Hyderabad, a master's degree in technology (civil engineering) from Indian Institute of Technology, Madras and a master's degree in economics from Kakatiya University, Warangal. He is a retired officer of the Indian Administrative Services and has served as the defence secretary at the Ministry of Defence, and the secretary of the Ministry of Road Transport and Highways. He has over 34 years of experience in administrative and public services.

Annie George Mathew, is an independent director on the board of the Investment Manager. She has a bachelor's degree in science (botany) and a master's degree in science (botany). She is a retired officer of Indian Audit and Accounts Service and has last served as the special secretary, Department of Expenditure. She was also Government of India's nominee, on the board of Indian Overseas Bank. She has over 33 years of experience in the public finance and financial management sectors.

Dip Kishore Sen, is an independent director on the board of the Investment Manager. He has a bachelor's degree in civil engineering from Indian Institute of Technology Kharagpur and a post graduate diploma in business management from XLRI Jamshedpur. He was previously associated with Larsen and Toubro Limited and last served as whole-time directors, and senior executive vice president (development projects). He has over 33 years of experience in the infrastructure development sector.

Himanshu Gulliani, is a non-independent director on the board of the Investment Manager. He has been appointed by NaBFID as its nominee director on the board of the Investment Manager. He has a bachelor's degree in arts (business economics) from the University of Delhi, a post graduate diploma from Fore School of Management, New Delhi and has completed post graduate programme in management from the Indian School of Business, Hyderabad. He currently serves as the executive vice president (corporate strategy and partnerships and ecosystem development) at the National Bank for Financing Infrastructure and Development. He was previously associated with IndusInd Bank Limited, ICICI Bank Limited, Macquarie Bank Limited, Axis Bank Limited and SOCIÉTÉ GÉNÉRALÉ. He has over 22 years of experience in the banking and finance sector across India, the UAE and Australia, spanning across investment banking, project/infrastructure finance, money markets, corporate banking, international banking, environmental, social and governance sustainability, environmental, social and governance sustainability risk management, corporate strategy and credit advisory. He has evaluated, financed and managed assets across sectors including power, roads, ports, airports, city gas distribution, transmission, mining, renewable energy, railways and metros, water and wastewater management, smart cities and defence. He is a Chartered Alternative Investment Analyst charter holder since 2009 and currently serves as the India chapter head for the Chartered Alternative Investment Analyst Institute.

Brief profiles of the key personnel of the Investment Manager

Set out below are the details of the key personnel of the Investment Manager:

Mridul Dubey, is chief financial officer of the Investment Manager. He has a bachelor's degree in science from Lucknow University, and bachelor's degree in law from Lucknow University and is a qualified chartered accountant. He was previously associated with THDC India Limited He has over 27 years of experience in the accounting and finance sector.

Gunjan Rajpal, is the Company Secretary and Compliance Officer of the Investment Manager. She is an fellow member of the Institute of Company Secretaries of India. She has a bachelor's degree in law from Chaudhury Charan Singh University, Meerut. She was previously associated with Prayag Polytech Private Limited, Mumbai-JNPT Port Road Company Limited and National Highways Logistics Management Limited. She has over 14 years of experience in legal compliance.

Alok Kumar, is a Senior Technical Officer of the Investment Manager. He has a bachelor's degree in engineering (civil) from Bangalore University. He has also obtained a certificate from the Indian School of Business for completing the advanced management programme for infrastructure. He has been associated with NHAI since 2008 and currently serves as the chief general manager (InvIT/toll operate transfer). He was previously associated with the road construction department of the government of Bihar as an assistant engineer. He has over 28 years of experience in infrastructure development and the highways sector.

Rajesh Balajirao Pekam, is Technical Officer of the Investment Manager. He holds a Diploma in Civil Engineering from the Board of Technical Examinations. He is a graduate AMIE degree holder from the Institute of Engineers (India) certifying him as a graduate. He also holds a Master's Degree in Technology (Environmental)

from Visvesvaraya National Institute of Technology, Nagpur. He has been associated with NHAI since the year 2011 and currently serve as the General Manager (Technical) of the InvIT division. He has over 14 years of experience in the infrastructure development and road and highways sector.

Key Terms of the Investment Management Agreement

The Investment Manager has entered into the Investment Management Agreement, in terms of the InvIT Regulations, the key terms of which, are provided below.

1. *Powers of the Investment Manager*

The Investment Manager has been provided with various powers under the Investment Management Agreement in accordance with the InvIT Regulations, including but not limited to:

(i) The Investment Manager shall take all decisions relating to the management and administration of the InvIT Assets and the investments of the InvIT, as may be incidental or necessary for advancing or fulfilling the Investment Objectives of the InvIT, in accordance with the InvIT Regulations and any other applicable law.

(ii) Subject to such approvals as may be required from the Unitholders, the Investment Manager shall make all investment decisions relating to the underlying assets or projects of the InvIT and the InvIT Assets, including further investments or divestments, in accordance with the InvIT Regulations and the offer document. In this regard, the Investment Manager is empowered to perform, on behalf of the InvIT, the following acts:

(a) Acquire, subscribe, hold, manage, trade, transfer, dispose of, hypothecate, pledge or create encumbrances on all forms of securities of any Holding Company, SPV or infrastructure project.
(b) Avail loans and create encumbrances on InvIT Assets as collateral,
(c) Keep the capital and monies of the InvIT, Holding Companies and SPVs in deposits with banks, mutual funds or other institutions.
(d) Accept contributions as permitted.
(e) Collect and receive all income, including profits, interest, dividends, repayment of principal and returns of capital.
(f) Invest in securities/mutual funds in accordance with the InvIT Regulations.
(g) Invest in money market instruments, including government securities and commercial paper.
(h) Undertake lending to SPVs and other persons permitted.
(i) Enter into strategic investment/ pooling/ co-investment arrangements.
(j) Provide guarantees/security in connection with financings undertaken by the InvIT or its subsidiaries.
(k) Appoint advisors and service providers.
(l) Provide financial assistance to Holding Companies or SPVs in the form of equity, debt or convertibles.
(m) Deal with movable or immovable property of Holding Companies and SPVs, including acquiring, divesting, hypothecating, pledging or transferring the same.

(iii) Along with the Trustee, appoint a Project Manager within a reasonable time for operation and management of the InvIT Assets, through a Project Implementation and Management Agreement;

(iv) Oversee compliance of the Project Manager with InvIT Regulations and the Project Implementation and Management Agreement, and obtain quarterly (or as prescribed) compliance certificates;

(v) Carry out all acts necessary or incidental to fulfil the Investment Objectives of the InvIT as set out in the offer document;

(vi) Issue, allot and list Units; accept subscription monies; refund monies and pay interest where applicable; and undertake all activities relating thereto under any other applicable law. After the

initial offer, no Investor (other than the Sponsor and its related parties/associates) may acquire Units exceeding 25.00% of outstanding Units without Unitholder approval. If such approval is not obtained, an exit option must be provided to dissenting Unitholders in accordance with InvIT Regulations;

(vii) Exercise all rights of the InvIT in the project SPVs and holding companies, including voting and appointment of directors. Ensure voting is exercised in all general meetings and appoint majority directors where required under any other applicable law;

(viii) Appoint advisors/consultants for administrative, accounting, due diligence, HR, tax, IT or other services. Advisors shall be accountable to the IM and not directly to the InvIT or its subsidiaries;

(ix) Cause the InvIT to repay, prepay or redeem debt or debt securities raised or issued by the InvIT, and the terms of such instruments;

(x) In consultation with the Trustee, appoint nominees to the governing boards of SPVs proportionate to the InvIT's holding;

(xi) Employ agents (attorneys, brokers, banks, etc.) to transact business or raise funds, without being responsible for defaults committed in good faith;

(xii) Appoint a Custodian and permit InvIT property to be held by such custodian in India or elsewhere;

(xiii) Appoint and determine remuneration for auditors, valuers, registrars, merchant bankers, rating agencies, custodians, and other intermediaries;

(xiv) Auditor appointment shall follow SEBI-specified selection procedures, tenure and Unitholder approval requirements;

(xv) Pay or provide for taxes, duties, stamp duties, penalties, fees and related liabilities of the InvIT. File income tax returns on behalf of the InvIT and maintain appropriate reserves for tax matters;

(xvi) Pay InvIT Expenses from InvIT funds or assets, and seek reimbursement of expenses duly incurred;

(xvii) Seek opinions from legal or tax counsel, with fees to be paid out of InvIT funds;

(xviii) Retain proceeds received from SPVs or infrastructure projects, subject to InvIT Documents;

(xix) Appear before governmental/regulatory authorities, submit information, seek clarifications and file applications or documents for approvals/permissions;

(xx) Restrict Unitholder inspection of properties or records where such information may adversely affect other Unitholders;

(xxi) Buyback Units from Unitholders at the end of the InvIT term or otherwise;

(xxii) Advise the Trustee regarding extension of loans or subscription to debt/quasi-debt issued by Holding Companies or SPVs.

2. *Duties of the Investment Manager*

The Investment Manager shall perform its duties as required under the Investment Management Agreement in accordance with the InvIT Regulations, including but not limited to:

(i). The Investment Manager shall use best endeavours to carry on and conduct its business in a proper and efficient manner in the best interest of the Unitholders. Further, it shall at all times exercise due diligence in carrying out its duties and protecting the interest of the Unitholders.

(ii). The Investment Manager shall coordinate with the Trustee, as may be necessary, with respect to the operations and activities of the InvIT.

(iii). The Investment Manager shall appoint eligible Valuer(s) and ensure that valuation of the InvIT Assets is conducted in accordance with the InvIT Regulations at the prescribed frequency. It shall submit the Valuation Reports to the Trustee and, where required, to the stock exchange(s), within the timelines stipulated under the InvIT Regulations.

(iv). The Investment Manager shall arrange for adequate insurance coverage for the InvIT Assets in accordance with the InvIT Regulations and shall ensure that the InvIT Assets held by the holding companies or the SPVs are adequately insured.

(v). The Investment Manager shall maintain proper books of accounts, documents and records with respect to the Trust, to give a true, fair and accurate account of the investments, expenses, earnings, profits etc. of the Trust. The Investment Manager shall ensure that audit of the accounts of the Trust by the auditors is undertaken in accordance with the InvIT Regulations and such report is submitted to the stock exchange(s) within the time stipulated by the stock exchange(s), if any, and in accordance with the InvIT Regulations.

(vi). The Investment Manager shall declare distributions to Unitholders in accordance with the InvIT Regulations. Subject to applicable law, such percentage of the net distributable cash flows of the SPVs shall be distributed to the Trust in terms of the InvIT Regulations. Such declared distributions shall be made within the time period prescribed by the InvIT Regulations.

(vii). The Investment Manager shall convene meetings of the Unitholders and maintain records pertaining to the meetings in accordance with the InvIT Regulations and other applicable law.

(viii). The Investment Manager shall declare and ensure distributions to Unitholders in accordance with the InvIT Regulations, the Deed and the distribution policy. It shall ensure that the required percentage of Net Distributable Cash Flows is distributed upstream from the Holding Companies/SPVs to the InvIT, and shall maintain required records of all distributions made.

(ix). The Investment Manager shall convene meetings of the Unitholders and maintain records of such meetings in accordance with the InvIT Regulations.

(x). The Investment Manager shall notify the Trustee prior to any change in its control to enable the Trustee to obtain Unitholder approval and, where applicable, SEBI approval. No change in control shall take effect until such approvals are obtained or a new investment manager is appointed.

(xi). The Investment Manager shall manage the InvIT in accordance with the Investment Objectives, the InvIT Documents. Investments shall comply with the investment conditions set out in the InvIT Regulations.

(xii). The Investment Manager may review and amend the Investment Objectives in accordance with the InvIT Documents;

(xiii). The Investment Manager shall adopt (and ensure adoption by the InvIT, the Project Manager, and the SPVs) all policies required under the InvIT Regulations; including governance, related party transactions, acquisition of assets, auditor/valuer appointment, NDCF policy, leverage, anti-corruption, AML, EHS and other relevant policies prior to filing the Draft Offer Document. Each Policy shall specify its applicability, approval requirements, amendment process and termination terms.

(xiv). The Investment Manager shall review transactions between the Project Manager and its Associates. Where the Project Manager identifies a potential conflict of interest, the Investment Manager shall obtain confirmation from an independent practising chartered accountant or Valuer, as applicable, that the transaction is on an arm's-length basis.

(xv). The Investment Manager shall ensure adequate and timely redressal of all Unitholders' grievances pertaining to the activities of the InvIT in accordance with the InvIT Regulations.

(xvi). The Investment Manager shall submit to the Trustee:

(a) quarterly reports on the activities of the Trust including receipts for all funds received by it and for all payments made, status of compliance with the InvIT Regulations, performance report, status of development of under-construction projects, within the time period specified under the InvIT Regulations;

(b) valuation reports as required under the InvIT Regulations within the time period specified under the InvIT Regulations;

(c) proposal/decision to acquire, sell or develop, or bid for any asset or project or expand existing completed assets or projects along with rationale for the same;

(d) details of any action which requires approval from the Unitholders as may be stipulated under the InvIT Regulations;

(e) details of transactions it enters into with its associates;

(f) details of any other material fact including change in its directors, change in its shareholding, any legal proceedings that may have a significant bearing on the activity of the Trust, within such period as stipulated under applicable law;

(g) such information, document and records as pertaining to the activities of the Trust as may be reasonably necessary for, and sought by, the Trustee with respect to its responsibilities under the Trust Deed, the InvIT Regulations and applicable law; and

(h) such other information, document and records as pertaining to its activities, obligations, duties and responsibilities under the Investment Management Agreement, the InvIT Regulations and applicable law, as may be reasonably necessary for, and sought by, the Trustee.

(xvii). The Investment Manager shall be responsible for all activities pertaining to any issue and listing of the Units of the InvIT in accordance with applicable law, including:

(a) filing the offer document with SEBI and/or the stock exchange(s) within the prescribed time period;

(b) dealing with all matters up to the allotment of Units to the Unitholders;

(c) obtaining in-principle approval and final listing and trading approvals from the designated stock exchange; and

(d) dealing with all matters relating to the issue and listing of the Units.

It shall ensure correctness, adequacy and fairness of all disclosures in the offer document and compliance with minimum public holding and unitholder requirements (where applicable).

(xviii). The Investment Manager shall make half-yearly filings and provide all information required under the InvIT Regulations to the stock exchange(s), including price-sensitive information and information having a bearing on the operation or performance of the InvIT

(xix). The Investment Manager will also have the following duties and obligations:

(a) ensure that computation and declaration of Net Asset Value of the Trust is based on the valuation done by the valuer in accordance with the InvIT Regulations and applicable law;

(b) maintain regular interaction with the Trustee regarding performance of the Trust and providing the Trustee with any information in relation to the operations of the Trust as maybe required under applicable law;

(c) conducting its affairs and the affairs of the Trust in such a manner that no Unitholder will have any personal liability (except to the extent of their Unitholding, where such Unit is partly paid) with respect to any liability or obligation of the Trust;

(d) keeping the Unitholders of the Trust informed and updated on investment activities of the Trust in accordance with the terms of the InvIT Documents;

(e) collecting all dividends, fees, property and other payments due and receivable by the Trust declaring distribution to the Unitholders in the manner set out in the Deed and in terms of the InvIT Regulations and applicable law;

(f) to ensure that no commission or rebate or any other remuneration, by whatever name called, arising out of transactions pertaining to the Trust is collected by it or its associates for the purpose of the issue of the Units;

(g) to ensure that the InvIT Assets including the holding companies and the SPVs, have proper legal titles, to the extent applicable, and that all the material contracts entered into on behalf of the Trust or the InvIT Assets are legal, valid, binding and enforceable by and on behalf of the Trust or the InvIT assets, as applicable;

(h) to ensure that all the activities of the intermediaries or agents or service providers appointed by it are in accordance with the InvIT Regulations or any guidelines or circulars issued thereunder;

(i) to ensure that any possible conflict of interest involving its role as Investment Manager is reported to the Trustee;

(j) to ensure that disclosures or reporting to Unitholders, SEBI, the Trustee and the designated stock exchange(s) are in accordance with the InvIT Regulations and applicable law;

(k) provide SEBI, the designated stock exchange(s) and Trustee, where applicable, such information as may be sought by SEBI or by the designated stock exchange(s) or Trustee pertaining to the activity of the Trust;

(l) submit a compliance certificate to the Trustee, in the form and at such intervals as may be specified under the InvIT Regulations and applicable law;

(m) to inform the Trustee in writing about any change in the representations and warranties provided under the Investment Management Agreement; and

(n) take any other actions reasonably incidental to any of the foregoing, or necessary or convenient in order to fully effect or evidence any action or transaction contemplated under the Investment Management Agreement.

(xx). Related Party Transactions: The Investment Manager shall provide such assistance to ensure that all related party transactions shall be on an arms-length basis in accordance with relevant accounting standards, in the best interest of the Unitholders, consistent with the strategy and investment objectives of the InvIT and in accordance with the InvIT Regulations.

(xxi). The Investment Manager shall provide to the Trustee such assistance as may be required by the Trustee in fulfilling its obligation towards the Trust under applicable law or as may be required by any regulatory authority with respect to the Trust.

(xxii). The Investment Manager shall rectify any delay or discrepancy or non-compliance of reporting

or disclosures requirements under the InvIT Regulations and applicable law on an urgent basis.

(xxiii). Disclose to the Trustee any pending business transactions, contracts under negotiation and other arrangements with the valuer and any other factors that may interfere with the valuer's ability to give an independent and professional valuation of the assets.

3. *Liabilities of the Investment Manager*

The liabilities of the Investment Manager in terms of the Investment Management Agreement are as follows:

(i). The Investment Manager shall not be liable in respect of any action taken or damage suffered by it on reliance upon any notice, resolution, direction, consent, certificate, affidavit, statement, certificate of stock, plan of reorganization or, without being limited in any way by the foregoing, other paper or document believed to be genuine and to have been passed, sealed or signed by appropriate authorities or entities.

(ii). The Investment Manager shall not be liable to the Unitholders for doing or failing to do any act or thing which by reason of any provision of any present or future law or regulation made pursuant thereto, or of any decree, order or judgment of any court, or by reason of any request, announcement or similar action, whether of binding legal effect or not, which may be taken or made by any person or body acting with or purporting to exercise the authority of any government (legally or otherwise) it shall be directed or requested to do or perform or to forbear from doing or performing. If for any reason it becomes impossible or impracticable to carry out any of the provisions of the Investment Management Agreement, the Investment Manager shall not be under any liability.

(iii). The Investment Manager shall not be liable to the Unitholder or any of them or to any other party as a result of such compliance or in connection with such compliance if the Investment Manager is required by the InvIT Regulations or applicable law to provide information regarding the Trust or the Unitholders, the Trust investments and income therefrom and provisions of these presents and complies with such request in good faith, whether or not it was in fact enforceable. If permitted under applicable law and if reasonably practicable, the Investment Manager shall provide prior written notice to the Trustee and the relevant Unitholders of such disclosure requirement.

(iv). The Investment Manager shall not be liable to incur any act or omission which may result in a loss to a Unitholder by reason of any depletion in the value of the InvIT Assets or otherwise, except in the event that such loss is a result of fraud or gross negligence or wilful default on the part of the Investment Manager or where the Investment Manager fails to exercise due care in relation to its obligations under this Agreement.

(v). The Investment Manager shall be liable to pay interest to the Unitholders at the rate as may be prescribed in the InvIT Regulations until the distribution is made, and such interest shall not be recovered in the form of fees or any other form payable to the Investment Manager by the Trust.

(vi). The Investment Manager shall continue to be liable for all of its acts of omission and commission with respect to the activities of the InvIT, notwithstanding surrender of registration of the InvIT to SEBI.

(vii). The Investment Manager shall not be obligated to initiate, accept service of, appear in, prosecute, or defend any action, suit, proceeding or claim (including tax proceedings) relating to the agreement, the InvIT Documents, the Investments or any part thereof, or any corporate or shareholder action, if in its opinion such action may involve expense or liability, unless it is satisfied that the value of the Investments provides adequate indemnity against all potential costs, claims, damages, expenses, or demands that the Investment Manager may incur in its capacity as Investment Manager.

4. *Indemnity*

In addition to the fees, distributions and expense reimbursements described herein, the Trustee shall, from the InvIT Assets, indemnify and hold harmless the Investment Manager and its respective officers, directors, shareholders, partners, members, employees, advisors and agents ("**Indemnified Parties**") from and against any claims, losses, costs, damages, liabilities, suits, proceedings and expenses, including legal fees (collectively, "**Losses**"), incurred or suffered by them by reason of their activities undertaken on behalf of the InvIT; unless such Losses have resulted from fraud, gross negligence, wilful default, wilful misconduct or a material breach of any obligations or duties under applicable law by the relevant Indemnified Party, as determined by a court of competent jurisdiction.

The Trustee, its directors, employees and officers ("**Trustee Party**") shall be indemnified by the Investment Manager against all direct and actual losses, actions, claims, suits, proceedings, damages, liabilities, costs and expenses, including legal fees, incurred or suffered by a Trustee Party, arising from:

(a) a material breach by the Investment Manager of any terms of the agreement;

(b) failure to furnish information required by SEBI or any other regulatory authority with respect to the InvIT; or

(c) the furnishing of incorrect information by the Investment Manager under the InvIT Regulations or in any Offer Document,

In each case to the extent arising out of fraud, gross negligence, wilful default or misconduct by the Investment Manager in the performance of its obligations under the agreement, the Trust Deed, other InvIT Documents, any information memorandum, Offer Document or applicable law.

The Trustee acknowledges and agrees that the aggregate maximum liability of the Investment Manager for any financial year shall be limited to the aggregate fees paid to the Investment Manager for the immediately preceding financial year.

5. *Termination*

The Investment Management Agreement shall be effective from the date of execution of the Investment Management Agreement and shall terminate in accordance with the terms of the Investment Management Agreement. The appointment of the Investment Manager may be terminated by the Trustee or the Unitholders in accordance with the procedure specified under the InvIT Regulations.

(i). The Unitholders, other than any party related to the transactions and its associates holding not less than such percentage by value as specified under the InvIT Regulations, may apply in writing to the Trustee for removal of the Investment Manager.

(ii). Subject to the approval of Unitholders (if required) and compliance with other requirements under applicable law, the Investment Management Agreement may be terminated:

(a) by the Investment Manager by delivery of a written notice to the Trustee at any time, subject to appointment of new Investment Manager in accordance with the Investment Management Agreement and the InvIT Regulations;

(b) by the Trustee by delivery of a written notice to the Investment Manager at any time, upon breach of any of the terms, covenants, conditions or provisions of the Investment Management Agreement by the Investment Manager and a failure of the Investment Manager to cure the said breach within a period that is earlier of: (a) the period stipulated under applicable law, or (b) 90 business days; or such other period as may be mutually agreed to cure such breach;

(c) by the InvIT (acting through the Trustee) pursuant to a resolution of Unitholders; or

(d) by any Party by delivery of a written notice to the other Party upon the bankruptcy of such other Party, or if winding up or liquidation proceedings are commenced against such other Party, and such proceedings persist for a period of more than three months.

(iii). After approval from the Unitholders in accordance with the InvIT Regulations, the Trustee shall appoint a new investment manager and execute a new investment management agreement within three months from the termination of the previous investment management agreement in accordance with applicable law. The Trustee shall also ensure that the new investment manager

stands substituted as a party in all documents to which the Investment Manager was a party, in relation to the Trust in its capacity as the Investment Manager. The Investment Manager shall remain in office until the appointment of a new investment manager. The Investment Manager shall continue to be liable for all of its acts, omissions and commissions during its tenure as Investment Manager, notwithstanding the termination of the Investment Management Agreement.

(iv). Upon removal or replacement of the Investment Manager, the Investment Manager shall, within a period of 30 (thirty) business days, transfer custody of the Trust to the Trustee and give the Trustee all books of accounts, correspondence, documents and records relating to the InvIT which the Investment Manager has in its possession. In the event of removal or resignation of the Investment Manager, the Investment Manager shall be entitled to receive Management Fees only up to the date of such removal or resignation.

(v). Notwithstanding anything contained hereinabove, (i) in the event that the offer of Units does not occur within the time period stipulated in the InvIT Regulations or such other date as may be mutually agreed to between the Investment Manager and the Trustee, or (ii) in the event of cancellation of registration of the Trust by SEBI, or (iii) winding up of the Trust, then the Investment Management Agreement shall automatically terminate without any liability on any party.

D. The Project Manager – National Highways InvIT Project Managers Private Limited

History and Certain Corporate Matters

National Highways InvIT Project Managers Private Limited was incorporated as a private limited company on March 9, 2021, under the Companies Act, 2013. The CIN of the Project Manager is U45201DL2021GOI378178.

Background of the Project Manager

The Project Manager is a wholly-owned subsidiary of NHAI.

The Project Manager shall (directly through the appointment of appropriate agents) undertake operations and management of the Trust, including making arrangements for the maintenance of assets held under the Trust. The Project Manager has been appointed as per the terms of the Project Implementation and Management Agreement.

Neither the Project Manager nor any of the promoters or directors of the Project Manager are: (i) debarred from accessing the securities market by SEBI; (ii) promoters, directors or persons in control of any other company or a sponsor, investment manager or trustee of any other infrastructure investment trust or an infrastructure investment trust which is debarred from accessing the capital market under any order or direction made by SEBI; or (iii) in the list of wilful defaulters published by the RBI.

Key terms of the Project Implementation and Management Agreement

The Project Manager has entered into the Project Implementation and Management Agreement, in terms of the InvIT Regulations, the key terms of which, are provided below.

1. *Scope of Services*

The scope of services of the Project Manager are as follows:

i. Whilst the primary obligation under the Concession Agreements remains with the SPV in the manner contemplated therein, the Project Manager shall ensure that the InvIT Assets are operated, maintained and managed as per the terms and conditions of the Concession Agreements, respective O&M Agreements and the InvIT Regulations, either directly or through the appointment and supervision of appropriate agents or contractors or consultants by the SPV or by the Project Manager, and perform obligations as stipulated therein. The Project Manager shall provide and/cause to procure and ensure procurement of all such services as are required to enable the SPV to perform its operation and maintenance related obligations under and in compliance with the Concession Agreements. The responsibilities and the scope of services of the Project Manager include, but not limited to, those specifically provided under the Project Implementation and Management Agreement, which may be modified from time to time.

ii. Costs and expenses to be paid to any third party (engaged by the SPV or Project Manager, on behalf of the Project SPV, with the consent of the Investment Manager) shall be borne by the SPV in accordance with the terms and conditions of the contract entered into between the SPV and such third party.

2. *Duties of the Project Manager*

The duties of the Project Manager in terms of the Project Implementation and Management Agreement and the InvIT Regulations are as follows:

i. The Project Manager shall undertake implementation, development, maintenance, operation and management of the InvIT Assets including making arrangements for the appropriate maintenance, either directly or through the appointment and supervision of agents or consultants, if any, as may be necessary for discharge of its duties under the terms of the Project Implementation and Management Agreement, the O&M Agreements and under the InvIT Regulations.

ii. The Project Manager shall facilitate and ensure, either directly or through appropriate agents or consultants engaged either by them or through the SPV, the progress of development, approval status and other aspects of the InvIT Assets that may be under development or, of any new projects, until its completion in accordance with any agreement that may be entered into in this regard, including the supervision of agents or consultants appointed for such purpose.

iii. The Project Manager shall discharge all obligations in respect of achieving timely completion of the infrastructure projects, wherever applicable, implementation, development, operation, maintenance and management of the infrastructure projects in terms of the O&M Agreements, the Project Implementation and Management Agreement and the InvIT Regulations.

iv. The Project Manager acknowledges that the Trustee and the Investment Manager will be overseeing the activities of the Project Manager in accordance with the InvIT Regulations and accordingly, the Project Manager shall extend complete coordination to enable the Trustee and the Investment Manager to perform such obligations in accordance with the InvIT Regulations. Further, the Project Manager shall provide relevant documents in connection with the Projects, including reports and compliance certificate(s), as may be specified, to the Investment Manager and the Trustee in accordance with the InvIT Regulations, in the form prescribed by SEBI or the Investment Manager, if any.

v. The Project Manager shall provide the Investment Manager with details of transactions carried out between itself and its associates in relation to the Trust, and disclose any conflict of interest in such cases to the Investment Manager, in accordance with the InvIT Regulations.

vi. The Project Manager shall intimate the Trustee prior to any Change in Control of the Project Manager to enable the Trustee to seek approval from the relevant authority in accordance with the Concession Agreements or other project documents pertaining to the InvIT Assets, if applicable.

vii. The Project Manager shall provide to the Trustee and Investment Manager, or to such other person as the Trustee and/or the Investment Manager may authorise and direct, all information that may be necessary for each of them to maintain the records of the InvIT and as may be required for making submissions to SEBI or any other Governmental Authority, including documents with respect to relevant approvals, consents and other documents required in relation to the Projects and the reporting requirements under the InvIT Regulations, in a proper and timely manner, and in the format prescribed (if any), as required by the Trustee and /or Investment Manager.

viii. The Project Manager shall appoint one of its qualified employees acceptable to the Investment Manager and the SPV with adequate and appropriate experience as a principal contact for the board of directors of the SPV, the Trustee and the Investment Manager in relation to the Projects and the Services. The Project Manager shall receive directions and instructions from the Investment Manager, which directions or instructions shall have been issued by the Investment Manager on its own or on behalf of the Project SPV, and to take actions in relation to and ensure compliance with such directions and instructions and report back to the Trustee and the Investment Manager.

ix. The Project Manager shall at all times ensure that the transactions or arrangements entered into by the

Project Manager with a related party are on an arm's length basis.

x. The Project Manager shall promptly inform the Parties in writing of any act, occurrence or event, which the Project Manager believes is reasonably likely to increase the cost of or the time for implementation taken in relation to any InvIT Asset, or materially to change the financial viability, quality or function of any InvIT Asset.

xi. If any defects are identified in the maintenance, materials and workmanship of the Services provided under the Project Implementation and Management Agreement by the Project Manager and/or by the PM Agents, the Project Manager shall promptly, in consultation and agreement with the other Parties, regarding appropriate remedying of the defects, and at its own cost, repair, replace or otherwise make good (as any SPV shall, at its discretion, determine) such defects as well as any damage caused by such defect.

xii. The Project Manager shall be liable to the other Parties for any direct loss or damage attributable to the non-performance or breach of the obligations of the Project Manager including those of the PM Agents, under the Project Implementation and Management Agreement The Trustee and the Investment Manager acknowledge and agree that the aggregate maximum liability of the Project Manager shall be limited to the fees payable to the Project Manager in accordance with the terms of the Project Implementation and Management Agreement.

xiii. The duties of Project Manager shall also include the following:

a. providing the necessary certification as may be required under applicable laws and the InvIT Regulations;

b. facilitate and ensure execution and completion of activities in relation to any InvIT Assets under development in accordance with and in the manner contemplated in any agreement entered into by any or all the InvIT Assets;

c. exercising diligence and vigilance in carrying out its duties directly or through its agents/ contractors of the SPV and protecting the InvIT Assets;

d. keeping the Investment Manager informed on all matters which have a material bearing on the operations of the InvIT Assets, and attending meetings with the Investment Manager and/or the SPV, as may be required;

e. liaising with Governmental Authorities in respect of its obligations under the Project Implementation and Management Agreement and the O&M Agreements;

f. taking appropriate measures to mitigate the risks which may be encountered by the InvIT in respect of the InvIT Assets, including creation of risk registers and periodic risk auditors either directly or through its agents;

g. keeping proper records for actions taken in respect of the InvIT Assets; and

h. complying with the instructions of the Investment Manager and the Trustee and the provisions of the InvIT Regulations.

xiv. The Parties may, from time to time, agree to the provision of certain additional services to be rendered by the Project Manager. If, in the assessment of the Project Manager, such additional services are required for the purposes of carrying out its duties and obligations under the Project Implementation and Management Agreement, the O&M Agreements, and applicable law, the Project Manager shall notify the Parties in writing of such requirement, including the fee payable and the terms and conditions for such additional services, and obtain prior written approval of the Parties in this regard.

xv. In case of any inconsistency or discrepancy between the Project Implementation and Management Agreement and the O&M Agreements, the Project Manager shall bring the same into the notice of the Investment Manager. The Investment Manager shall issue instructions (in writing) for resolving the inconsistency, to the Project Manager. The Project Manager shall be bound to comply with the

instructions of the Investment Manager.

xvi. Notwithstanding anything to the contrary contained in the Project Implementation and Management Agreement, nothing contained in the Project Implementation and Management Agreement shall be construed to limit or restrict the performance of any duties or obligations of the Project Manager, Investment Manager or the Trustee contained in the InvIT Regulations and other applicable law.

xvii. During the term of the Project Implementation and Management Agreement, in the event the representations provided by the Project Manager under the Project Implementation and Management Agreement, become untrue or incorrect or incomplete in any respect, the Project Manager shall, within a reasonable time, inform the Trustee and Investment Manager of such event.

xviii. The Project Manager shall promptly and periodically notify the Investment Manager regarding any deficiency in the services of the SPV Team or any third party contractor or service provider engaged either directly by the Project Manager or through the SPV, along with an assessment report covering, amongst others, the details of deficiency in service, remedial measures and financial impact on the Project SPV. Any such deficiency shall be remedied in the manner provided in the Project Implementation and Management Agreement.

xix. Other than on account of any non-compliance or deficiency, the Project Manager shall promptly notify the Investment Manager regarding any proposed change in the SPV Team along with an assessment report covering, amongst other things, rationale for the change and its assessment of the same and professional competence of the persons proposed to be appointed to the SPV Team. The Project Manager shall not grant consent for any change in the SPV Team without prior consultation with, and approval of, the Investment Manager, in accordance with the Project Implementation and Management Agreement.

3. *Indemnity*

The Trust, the Investment Manager, the Project SPV and their respective directors, employees, officers and the InvIT ("**Indemnified Parties**") shall be indemnified by the Project Manager against any claims, suits, proceedings, losses, costs, damages, liabilities and expenses, including legal fee from and incurred or suffered by the Indemnified Parties in connection with the breach of any of the terms of the Project Implementation and Management Agreement by the Project Manager, or failure in furnishing information required by SEBI or any regulatory authority with respect to the InvIT, or furnishing wrong information by the Project Manager under the InvIT Regulations or related to InvIT including in any offer documents, or arising out of gross negligence, wilful default, wilful misconduct or fraud on part of the Project Manager, in carrying out its obligations under the Project Implementation and Management Agreement, the other InvIT Documents and applicable law. The Trustee and the Investment Manager acknowledge and agree that the aggregate maximum liability of the Project Manager in each financial year shall be limited to the fees payable to the Project Manager in such financial year in accordance with the terms of the Project Implementation and Management Agreement, provided that such maximum aggregate liability shall not be applicable in the event such liability of the Project Manager arises out of any gross negligence, wilful default, wilful misconduct or fraud on the part of the Project Manager, as determined by a court of competent jurisdiction.

4. *Termination*

(i). The Project Implementation and Management Agreement shall remain effective, unless terminated by the parties in accordance with the provisions hereto or extended by mutual consent expressed in writing by the parties, for the period that the concession agreement is in force or such other period as may be mutually agreed between the Parties ("**Validity Period**").

(ii). Prior to the expiry of its Validity Period, the Project Implementation and Management Agreement, may be terminated:

(a) by the Investment Manager after consultation with the Trustee by delivery of a written notice of 30 (thirty) business days, specifying the reasons for such termination, to the Project Manager at any time, subject to appointment of new project manager in accordance with the Project Implementation and Management Agreement and the InvIT Regulations; or

(b) by the Investment Manager after consultation with the Trustee by delivery of a written notice to the Project Manager at any time, upon breach of any of the terms, covenants, conditions or provisions of the Project Implementation and Management Agreement by the Project Manager and a failure of the Project Manager to remedy the said breach within a period of 60 Business Days or such other period as may be mutually agreed by the parties; or

(c) by any party by delivery of a written notice to the other party upon the bankruptcy of such other party or if insolvency resolution process, winding up or liquidation proceedings, whether voluntary or involuntary, are commenced against such other party (and such proceedings persist for a period of more than three months).

(iii). Notwithstanding anything contained hereinabove, the Trustee in consultation with the Investment Manager shall appoint a new project manager and execute a new project implementation and management agreement within three months from the termination of the earlier project implementation and management agreement in accordance with applicable law. The Trustee and Investment Manager shall also ensure that the new project manager stands substituted as a party in all documents to which the Project Manager was a party. The Project Manager shall remain in office until the appointment of a new project manager. The Project Manager shall continue to be liable for all its acts and omissions and commissions notwithstanding its termination until the appointment of a new project manager.

(iv). The termination of the Project Implementation and Management Agreement shall not affect the rights and obligations of the parties accrued prior to such termination.

(v). In case of early termination prior to the expiry of the Validity Period, the Project Manager shall be entitled to and the Trustee shall be liable to pay (from the funds of the InvIT) to the Project Manager the reimbursement of all out of pocket expenses incurred by the Project Manager while performing services in terms of the Project Implementation and Management Agreement up to that date. The fees shall be paid to the Project Manager within a period of 60 business days from the date of receipt of demand in this regard from the Project Manager failing which the fees, or any part thereof, which remains outstanding shall attract interest at the rate of 10% per annum on the outstanding amount.

(vi). Notwithstanding anything contained hereinabove, the termination of any of the O&M Agreements, as the case may be, will not result in the termination of Project Implementation and Management Agreement, and the Project Implementation and Management Agreement shall continue to be in force in respect of the other O&M Agreements that are not terminated and the InvIT Assets.

(vii). Notwithstanding anything herein contained, in the event of:

(a) any amendment or supplement or restatement of any of the O&M agreements or execution of a new O&M agreement;

the same shall be deemed to have been incorporated in the Project Implementation and Management Agreement and the Agreement shall stand modified to such extent.

(viii). Notwithstanding anything contained hereinabove, the Project Implementation and Management Agreement shall automatically terminate: (i) in the event the offer of the Units does not occur within the time period stipulated in the InvIT Regulations, or such other date as may be mutually agreed to between the parties; (ii) in the event of cancellation of the registration of the Trust by SEBI; or (iii) upon winding up of the Trust, in accordance with the InvIT Regulations.

CORPORATE GOVERNANCE

The section below is a summary of the corporate governance framework in relation to the Trust, adopted by the Investment Manager and the Project SPV, as applicable and as specified in this section.

1. Investment Manager

Raajmarg Infra Investment Managers Private Limited is the investment manager of the Trust. For further details on the background of the Investment Manager, please see the section entitled "*Parties to the Trust – The Investment Manager – Raajmarg Infra Investment Mangers Private Limited"* on page 92.

1.1. Board of directors

Composition of the IM Board

In addition to applicable provisions of the InvIT Regulations, Companies Act, 2013, and the SEBI LODR Regulations, the board of directors should adhere to the following:

(a) The IM Board shall comprise not less than six directors and have not less than one woman independent director;

(b) Not less than 50% of the board of directors shall comprise independent directors, who are not directors or members of the governing board of the investment manager of another infrastructure investment trust registered under the InvIT Regulations;

(c) the independence of directors shall be determined in accordance with the InvIT Regulations and other applicable law; and

(d) collective experience of directors should cover a broad range of commercial experience, particularly experience in infrastructure sector (including the applicable sub-sector), investment management or advisory and financial matters.

Quorum

The quorum shall be 1/3rd of total strength or three directors whichever is higher including at least 1(one) independent director.

Frequency of meetings

The IM Board should meet at least four times in a financial year, with a maximum gap of 120 days between any two successive meetings. Additionally, the board of directors should meet prior to any meeting of the unitholders and approve the agenda for unitholders' meetings.

For details of the current composition of the board of directors, please see the section entitled "*Parties to the Trust – The Investment Manager – Raajmarg Infra Investment Managers Private Limited– The IM Board*" on page 94.

1.2. Remuneration of directors

Remuneration including sitting fees of the directors will be decided by the IM Board, from time to time.

1.3. Committees of the IM Board

Name of the committee	Composition	Present Members	Quorum	Frequency of meetings
Audit Committee	The audit committee shall consist of at least three directors. At least two-thirds of the members of audit committee shall be independent directors. The chairperson of the	Annie George Mathew (chairperson); Giridhar Aramane	The quorum shall either be two members or one third of the members of the	The audit committee should meet at least four times every financial year, with

Name of the committee	Composition	Present Members	Quorum	Frequency of meetings
	audit committee should be an independent director. All members of the audit committee should be financially literate and at least one member should have accounting or related financial management expertise, in accordance with the SEBI LODR Regulations. The company secretary shall act as the secretary to the audit committee. The audit committee at its discretion shall invite the finance director or head of the finance function, head of internal audit and a representative of the statutory auditor and any other such executives to be present at the meetings of the committee. Provided that occasionally the Audit Committee may meet without the presence of any executives	(member); Dip Kishore Sen (member); NRVVMK Rajendra Kumar (member)	audit committee, whichever is greater, including at least two independent directors in attendance.	a maximum gap of 120 days between any two meetings.
Nomination and Remuneration Committee	The Nomination and Remuneration Committee should comprise at least three directors. All the directors of the committee shall be non-executive directors. At least two-thirds of the members of this committee shall be independent directors. The chairperson of this committee shall be an independent director. Provided that the chairperson of the Board, may be appointed as a member of the Nomination and Remuneration Committee and shall not chair such committee.	Dip Kishore Sen (chairperson); Annie George Mathew (member); Himanshu Gulliani (member)	The quorum shall be either two members or one third of the members of the committee, whichever is greater, including at least one independent director in attendance.	The Nomination and Remuneration Committee shall meet at least once in a financial year or as necessary.
Stakeholders Relationship Committee	The stakeholders' relationship committee should comprise at least three members. At least one member of the committee shall be an independent director. The chairperson of this committee shall be an independent director.	Giridhar Aramane (chairperson); Annie George Mathew (member); Dip Kishore Sen (member); Himanshu Gulliani (member)	The quorum shall be at least one-third of the members of the stakeholders' relationship committee or two members, whichever is higher.	The stakeholders relationship committee shall meet at least once in a financial year.
Risk Management Committee	The risk management committee should comprise at least three members with majority of them being members of the board of directors, including at least one independent director. The chairperson of this committee shall be a member of the board of	Giridhar Aramane (chairperson); Dip Kishore Sen (member); NRVVMK Rajendra	The quorum shall either be two members or one third of the members of the committee, whichever is greater,	The risk management committee should meet at least twice in a financial year. The meetings of the risk management committee shall be

Name of the committee	Composition	Present Members	Quorum	Frequency of meetings
	directors and senior executives may be member of committee.	Kumar (member); Himanshu Gulliani (member)	including at least one members of the board in attendance.	conducted in such a manner that on a continuous basis not more than two hundred and ten days shall elapse between any two consecutive meetings.

(a). *Audit Committee*

The IM Board has constituted the Audit Committee pursuant to a resolution dated December 29, 2025.

Scope of the Audit Committee

The terms of reference of the Audit Committee include amongst others, the following:

(i). recommending to the board of directors the appointment, re-appointment and replacement, remuneration and terms of appointment of the statutory auditor of the Trust and the audit fee, subject to the approval of the unitholders;

(ii). approving the payment to statutory auditors for any other services rendered by the statutory auditors;

(iii). discussion with statutory auditors before the audit commences, about the nature and scope of audit as well as post-audit discussion to ascertain any area of concern;

(iv). evaluation of internal financial controls and risk management systems;

(v). reviewing and monitoring with the management, the independence and performance of statutory and internal auditors of the Trust, and adequacy and effectiveness of the audit process and internal control systems, as necessary;

(vi). reviewing the adequacy of internal audit function, if any, including the structure of the internal audit department, staffing and seniority of the official heading the department, reporting structure coverage and frequency of internal audit;

(vii). reviewing management letters/letters of internal control weaknesses issued by the statutory auditors and the findings of any internal investigations in relation to the Trust, into matters where there is suspected fraud or irregularity or a failure of internal control systems of a material nature, discussing such findings with internal and statutory auditors and follow ups thereon and reporting the matter to the board of directors;

(viii). oversight of the Trust's financial reporting process and the disclosure of its financial information to ensure that the financial statement is correct, sufficient and credible;

(ix). reviewing the annual financial statements and auditor's report thereon of the Trust and the Investment Manager, before submission to the board of directors for approval, with particular reference to:

- matters required to be included in the director's responsibility statement to be included in the board's report of the Investment Manager in terms of clause (c) of sub-section (3) of Section 134 of the Companies Act, 2013;

- changes, if any, in accounting policies and practices and reasons for such change;

- major accounting entries involving estimates based on the exercise of judgment by management;
- significant adjustments made in the financial statements arising out of audit findings;
- compliance with listing and other legal requirements relating to financial statements;
- disclosure of any related party transactions; and
- modified opinions or qualifications in the draft audit report;

(x). reviewing, with the management, the Trust's financial disclosure and reporting process and all periodic financial statements, including but not limited to quarterly, half-yearly and annual financial statements of the Trust, whether standalone or consolidated or in any other form as may be required under applicable law, before submission to the board of directors for approval;

(xi). reviewing the management's discussion and analysis of financial condition and results of operations;

(xii). reviewing and evaluating the adequacy of financial controls, risk management systems and internal audit function if any of the Trust, including the structure of the internal audit department, staffing and seniority of the official heading the department, reporting structure coverage and frequency of internal audit;

(xiii). reviewing, with the management, the statement of uses/application of funds raised through an issue of units by the Trust (including but not limited to public issue, rights issue, preferential issue, private placements, etc.) and any issue of debt securities, and the statement of funds utilised for purposes other than those stated in the offer documents/ notice, and making appropriate recommendations to the board of directors for follow-up action;

(xiv). (a) reviewing the procedures put in place by the Investment Manager for reviewing related party transactions, the indemnification of expenses or liabilities incurred by the Investment Manager, and the setting of fees or charges payable out of the Trust's assets, (b) reviewing the statement of significant related party transactions, submitted by the management; and (c) approving or any subsequently modifying transactions of the Trust with related parties, and recommending such transactions to the board of directors or the unitholders, as may be required, in terms of the InvIT Regulations;

(xv). scrutiny of inter-corporate loans and investments of the Trust, including (a) reviewing the investment decisions with respect to the underlying assets or projects of the Trust from the Sponsor including any further investments or divestments and (b) approving any proposal in relation to acquisition of assets, further issue of units including in relation to acquisition or assets; and undertaking other functions to ensure protection of the interest of unitholders;

(xvi). reviewing the utilization of loans and/ or advances from/investment by the Trust in the SPVs exceeding rupees 1000 million or 10% of the asset size of the SPVs, whichever is lower including existing loans / advances / investments;

(xvii). valuation of undertakings or assets of the Trust, wherever it is necessary

(xviii). giving recommendations to the board of directors regarding appointment, re-appointment and replacement, remuneration and terms of appointment of the valuer of the Trust; as well as reviewing and monitoring the independence and performance of the valuer of the Trust;

(xix). providing recommendations to the board of directors regarding any proposed distributions, and evaluating any defaults or delay in payment of distributions to the unitholders or dividends by the Project SPV to the Trust and payments to any creditors or debenture holders of the Trust or the Project SPV, and recommending remedial measures; and

(xx). to review the functioning of the whistle blower mechanism;

(xxi). approval of appointment of chief financial officer after assessing the qualifications, experience and background, etc. of the candidate;

(xxii). consider and comment on rationale, cost-benefits and impact of schemes involving merger, demerger, amalgamation etc., on the Trust and its unitholders or Investment Manager and its shareholders.

(xxiii). formulating any policy for the Investment Manager as necessary, in relation to its functions, as specified above.

(b). *Nomination and Remuneration Committee*

The IM Board has constituted the Nomination and Remuneration Committee pursuant to a resolution dated December 29, 2025.

Scope of the Nomination and Remuneration Committee

The terms of reference of the nomination and remuneration committee include amongst others, the following:

(i) ensuring compliance with the requirements of the Companies Act, 2013;

(ii) making all decisions in relation to appointment or replacement or removal of (a) independent directors; (b) any key managerial personnel; and (c) directors on the board of directors of the Project SPV; and

(iii) formulating the following policies:

(a) the policy for appointment of independent directors (including the qualification and experience requirements, compensation model, performance parameters, process for appointment and removal);

(b) the policy for nomination of directors on the board of directors of the Project SPV (including qualification and experience requirements, compensation model, performance parameters, process for appointment and removal); and

(c) the human resources policy (in relation to employment terms including remuneration for the key managerial personnel.

(iv) for every appointment of an independent director, evaluation of the balance of skills, knowledge and experience on the board of directors and on the basis of such evaluation, prepare a description of the role and capabilities required of an independent director. The person recommended to the board of directors as an independent director shall have the capabilities identified in such description. For the purpose of identifying suitable candidates the Nomination and Remuneration Committee may
(a) use the services of an external agencies, if required;
(b) consider candidates from a wide range of backgrounds, having due regard to diversity; and
(c) consider the time commitments of the candidates.

(v) formulation of criteria for evaluation of performance of independent directors and the IM Board;

(vi) devising a policy on diversity of the IM Board;

(vii) identifying persons who are qualified to become Directors and who may be appointed in senior management in accordance with the criteria laid down and recommend to the Board their appointment and removal.

(viii) recommend to the Board, all remuneration, in whatever form, payable to senior management.

(c). *Stakeholders' Relationship Committee*

The IM Board has constituted the Stakeholders' Relationship Committee pursuant to a resolution dated

December 29, 2025.

Scope of the Stakeholders' Relationship Committee

The terms of reference of the stakeholders' relationship committee include amongst others, the following:

(i) consider and resolve grievances of the unitholders or debenture holders, including complaints related to the transfer/transmission of units, non-receipt of annual report, non-receipt of declared distributions and non-receipt of interest or principal repayment on debentures, general meetings;

(ii) review of measures taken for effective exercise of voting rights by shareholders;

(iii) review of any litigation related to unitholders' grievances;

(iv) review of adherence to the service standards adopted by the listed entity in respect of various services being rendered by the registrar transfer agent;

(v) review of the various measures and initiatives taken by the Trust or Investment Manager for reducing the quantum of unclaimed distributions and ensuring timely receipt of distribution warrants/annual reports/statutory notices by the unitholders of the Trust;

(vi) update unitholders on acquisition / sale of assets by the Trust and any change in the capital structure of the Project SPV;

(vii) reporting specific material litigation related to unitholders' grievances to the board of directors;

(viii) approve report on investor grievances to be submitted to the Trustee;

(ix) undertaking all functions in relation to resolution of any conflicts of interest;

(x) review of measures taken for effective exercise of voting rights by Unitholders; and

(xi) provide the unitholders with regular updates and information on the operation or performance of the Trust.

(d) *Risk Management Committee*

The IM Board has constituted the Risk Management Committee pursuant to a resolution dated December 29, 2025.

Scope of the Risk Management Committee

The terms of reference of the risk management committee include amongst others, the following:

(i) to formulate a detailed risk management policy which shall include:

  (a) a framework for identification of internal and external risks specifically faced by the listed entity, in particular including financial, operational, sectoral, sustainability (particularly, ESG related risks), information, cyber security risks or any other risk as may be determined by the Committee.

  (b) measures for risk mitigation including systems and processes for internal control of identified risks.

  (c) business continuity plan.

(ii) to ensure that appropriate methodology, processes and systems are in place to monitor and evaluate risks associated with the business;

(iii) to monitor and oversee implementation of the risk management policy, including evaluating the adequacy of risk management systems;

(iv) to periodically review the risk management policy, at least once in two years, including by considering the changing industry dynamics and evolving complexity;

(v) to keep the board of directors informed about the nature and content of its discussions, recommendations and actions to be taken;

(vi) the appointment, removal and terms of remuneration of the chief risk officer (if any) will be done as per the extant human resource policies of the Investment Manager by managing director and chief executive officer in consultation with the Risk Management Committee.

1.4. Articles of association of the Investment Manager

The articles of association do not include any affirmative rights for the Sponsor.

1.5. Policies adopted by the IM Board

The IM Board will adopt policies for corporate governance as may be required from time to time in accordance with applicable law and the InvIT Regulations. The Investment Manager has adopted the following policies, in relation to management of the Trust:

Code of conduct of the Trust ("***Code***")

The IM Board has adopted the Code pursuant to a resolution dated December 15, 2025, in relation to the Trust and conduct of the Trust and the Parties to the Trust. The policy provides for principles and procedures for the Sponsor, the Investment Manager, the Project Manager, the Trustee and their respective employees, as may be applicable, for ensuring interest of the Unitholders and proper conduct and carrying out of the business and affairs of the Trust in accordance with applicable law. The key principles of the Code are set out below:

1. the Trust and the Parties to the Trust shall conduct all affairs of the Trust in the interest of all the Unitholders;

2. the Trust and the Parties to the Trust shall make adequate, accurate, explicit and timely disclosure of relevant material information to all Unitholders, the stock exchanges and the SEBI in accordance with the InvIT Regulations and as may be specified by the stock exchanges from time to time;

3. the Trust and the Parties to the Trust shall try to avoid conflicts of interest, as far as possible, in managing the affairs of the Trust and keep the interest of all Unitholders paramount in all matters. In case such events cannot be avoided, it shall be ensured that appropriate disclosures are made to the Unitholders as required under the InvIT Regulations and they are fairly treated;

4. the Trust and the Parties to the Trust shall ensure that fees charged by them with respect to activities of the Trust shall be fair and reasonable;

5. the Investment Manager shall carry out the business of the Trust and invest in accordance with the investment objectives (as disclosed in the draft offer document and the offer document) and take investment decisions solely in the interest of Unitholders Each investment decision shall be supported by a documented evaluation of the proposed investment, a comprehensive risk assessment, and verification of compliance with applicable laws, regulations, and internal policies. Such decisions shall adhere to the internal approval frameworks established by the Trust;

6. the Trust, the Parties to the Trust and any third party appointed by the Investment Manager shall not use any unethical means to sell, market or induce any person to buy units of the Trust and where a third party appointed by the Investment Manager fails to comply with this condition, the Investment Manager shall be held liable for the same;

7. the Trust and the Parties to the Trust shall maintain high standards of integrity and fairness in all their dealings and in the conduct of their business;

8. the employees of the Trust and the Parties to the Trust shall not accept or offer gifts to past, current or prospective Unitholders of the Trust unless in accordance with the policies adopted by the Investment Manager, on behalf of the Trust;

9. the Compliance Officer shall ensure compliance in relation to anti-bribery and anti-corruption laws at all times. Further, the Compliance Officer shall not personally engage in or ignore any instance of someone paying or receiving any bribe or facilitate payment on behalf of any of the Parties of the Trust. Additionally, any instance of potential bribery or corruption shall be immediately reported to the Compliance Officer;

10. the Trust and the Parties to the Trust shall render at all times high standards of service, exercise due diligence, ensure proper care and exercise independent professional judgment;

11. the Trust and the Parties to the Trust shall not make any exaggerated statement, whether oral or written, either about their qualifications or capabilities or experience;

12. the employees of the Parties to the Trust shall avoid any action or behaviour that could be viewed as harassment. In case of any complain of sexual harassment, the relevant Party to the Trust shall put in place a process to appropriately, sensitively and expeditiously deal with it. Strict disciplinary action will be taken against any employee found guilty of any kind of sexual harassment;

13. the employees of the Parties to the Trust shall respect the intellectual property rights of others and never infringe them. Further, the employees should be cautious while preparing advertising and promotional materials using the name or logo of any of the Parties to the Trust. The employees shall ensure that only licensed software should be used on Trust's and Parties to the Trust's electronic devices. Any breach of these obligations shall attract penal consequences under applicable law and internal disciplinary policies as applicable. The relevant departmental head or such other designated Key Managerial Personnel shall be responsible for ensuring compliance and conducting periodic checks; and

14. The employees of the Parties to the Trust shall not disclose any confidential/ privileged information of the Trust and should direct any media queries or approaches to the appropriate spokesperson within the Trust.

*Policy on unpublished price-sensitive information and dealing in units by the Parties to the Trust ("**UPSI Policy**")*

The IM Board has adopted the UPSI Policy, pursuant to a resolution dated December 15, 2025, to outline the process and procedures for dissemination of information and disclosures in relation to the Trust on the website of the Trust, to the stock exchanges and to all stakeholders at large. The purpose of the UPSI is also to ensure that the Trust and the Investment Manager comply with applicable law, including the InvIT Regulations along with any guidelines, circulars, notifications and clarifications framed or issued thereunder, or such other Indian laws, regulations, rules or guidelines prohibiting insider trading and governing disclosure of material, unpublished price sensitive information.

Acquisition policy

The IM Board has adopted the acquisition policy pursuant to a resolution dated December 15, 2025. The acquisition policy provides for a framework for acquisition of assets in future. The Investment Manager shall ensure that all investment decisions in relation to the Trust are in accordance with applicable law, including the InvIT Regulations and the investment strategy of the Trust as specified under the Trust Deed and the acquisition policy.

Policy in relation to related party transactions

The IM Board has adopted the policy in relation to related party transactions pursuant to a resolution dated December 15, 2025, in relation to the Trust. The policy in relation to related party transactions to ensure proper approval, supervision and reporting of the transactions between the Trust and its related parties. For details of the policy, see "*Related Party Transactions*" on page 230.

Policy on appointment of auditor and valuer

The IM Board has adopted the distribution policy pursuant to a resolution dated December 15, 2025, in relation to the Trust. The policy provides a framework for ensuring compliance by the Trust in the appointment of its auditor, and the auditing standards to be followed, and the appointment of its valuer, in accordance with the InvIT Regulations and applicable law. For details of the policy, see "*Other Parties Involved in the Trust*" on page 117.

Borrowing policy

The IM Board has adopted the distribution policy pursuant to a resolution dated December 15, 2025, in relation to the Trust. The purpose of the borrowing policy provides a framework to ensure that all funds borrowed in relation to the Trust are in compliance with the InvIT Regulations. For details of the policy, see "*Financial Indebtedness and Deferred Payments*" on page 215.

Distribution policy

The IM Board has adopted the distribution policy pursuant to a resolution dated December 15, 2025, in relation to the Trust. The distribution policy provides a structure for distribution of the net distributable cash flows of the Project SPV to the Trust and the Trust to the Unitholders. For details of the policy, see "*Distribution*" on page 226.

Further, in accordance with the SEBI LODR Regulations, InvIT Regulations, and other applicable law the IM Board has also adopted the following policies vide resolution dated December 15, 2025:

(i). Code of conduct for the IM Board and senior management of the Investment Manager
(ii). Risk Management Policy
(iii). Policy for determining materiality of information for periodic disclosures of the Trust
(iv). Document archival policy
(v). Vigil mechanism and whistleblower policy
(vi). Policy for familiarisation programmes for independent directors of the Investment Managers
(vii). Nomination and remuneration policy
(viii). Policy for evaluation of the performance of the board of directors of the Investment Manager
(ix). Policy on succession planning for the IM Board and senior management of the Investment Manager
(x). Policy to promote diversity on the IM Board
(xi). Policy on appointment of unitholders' nominee directors
(xii). Investor grievance redressal policy

2. Project SPV

Board of directors of Project SPV

The Investment Manager, in consultation with the Trustee, has appointed the board of directors of the Project SPV, in accordance with the InvIT Regulations.

OTHER PARTIES INVOLVED IN THE TRUST

The Auditor

Background and terms of appointment

The Investment Manager, in consultation with the Trustee, has appointed A.R. & Co., Chartered Accountants (Firm Registration No. 002744C) as the statutory auditors of the Trust, for the financial year 2025-2026, until the first annual general meeting of the Unitholders. The Auditors have audited the Audited Financial Information and have examined the Projections of Revenue from Operations and Cash Flow from Operating Activities, and their reports in relation to such Audited Financial Information and Projections of Revenue from Operations and Cash Flow from Operating Activities, each dated January 12, 2026, have been included in this Offer Document.

Functions, Duties and Responsibilities of the Auditor

The functions, duties and responsibilities of the Auditor will be in accordance with the InvIT Regulations. Presently, in terms of the InvIT Regulations, the Auditor is required to comply with the following conditions at all times:

- the Auditor shall conduct audit of the accounts of the Trust and draft the audit report based on the accounts examined and after taking into account the relevant accounting and auditing standards, as may be specified by SEBI;
- the Auditor shall, to the best of his information and knowledge, ensure that the accounts and financial statements give a true and fair view of the state of the affairs of the Trust, including profit or loss and cash flow for the period and such other matters as may be specified;
- the Auditor shall have a right of access at all times to the books of accounts and vouchers pertaining to activities of the Trust; and
- the Auditor shall have a right to require such information and explanation pertaining to activities of the Trust as he may consider necessary for the performance of his duties as auditor from the employees of the Trust or holding company or Parties to the Trust or holding company or the special purpose vehicles or any other person in possession of such information.
- undertake a limited review of the audit of all the entities or companies whose accounts are to be consolidated with the accounts of the Trust as per the applicable Indian Accounting Standards and any addendum thereto as defined in Rule 2(1)(a) of the Companies (Indian Accounting Standards) Rules, 2015, in such manner as may be specified by SEBI.

The Valuer

Background and terms of appointment

The Investment Manager, in consultation with the Trustee, has appointed RBSA Valuation Advisors LLP, as the valuers of the Trust for the financial year 2025-2026. In accordance with the InvIT Regulations, the Valuers have undertaken a full valuation of the InvIT Assets which is proposed to be acquired by the Trust, and their report in relation to such valuation as on December 31, 2025, has been included in this Offer Document.

Functions of the Valuer

The functions, duties and responsibilities of the Valuer will be in accordance with the InvIT Regulations in the manner and withing timelines as specified under the InvIT Regulations and other applicable law. Presently, in terms of the InvIT Regulations, the Valuer is required to comply with the following conditions at all times:

- the Valuer shall ensure that the valuation of the project SPVs is impartial, true and fair and is in accordance with Regulation 21 of the InvIT Regulations;
- the Valuer shall ensure adequate and robust internal controls to ensure the integrity of its valuation reports;
- the Valuer shall ensure that it has sufficient key personnel with adequate experience and qualification to perform valuations;
- the Valuer shall ensure that it has sufficient financial resources to enable it to conduct its business effectively and meet its liabilities;

- the Valuer and any of its employees involved in valuing of the assets of the Trust, shall not, (i) invest in Units of the Trust or in the assets being valued; and (ii) sell the assets or Units of Trust held prior to being appointed as the Valuer, till the time such person is designated as Valuer of the Trust and not less than six months after ceasing to be valuer of the Trust;
- the Valuer shall conduct valuation of the project SPVs with transparency and fairness and shall render, at all times, high standards of service, exercise due diligence, ensure proper care and exercise independent professional judgment;
- the Valuer shall act with independence, objectivity and impartiality in performing the valuation;
- the Valuer shall discharge its duties towards the Trust in an efficient and competent manner, utilising its knowledge, skills and experience in best possible way to complete given assignment;
- the Valuer shall not accept remuneration, in any form, for performing a valuation of the project SPVs from any person other than the Trust or its authorised representative;
- the Valuer shall before accepting any assignment, from any related party of the Trust, disclose to the Trust any direct or indirect consideration which the Valuer may have in respect of such assignment;
- the Valuer shall disclose to the Trust any pending business transactions, contracts under negotiation and other arrangements with the Investment Manager or any other party whom the Trust is contracting with and any other factors that may interfere with the Valuer's ability to give an independent and professional valuation of the assets;
- the Valuer shall not make false, misleading or exaggerated claims in order to secure assignments;
- the Valuer shall not provide misleading valuation, either by providing incorrect information or by withholding relevant information;
- the Valuer shall not accept an assignment which interferes with its ability to do fair valuation; and
- the Valuer shall, prior to performing a valuation, acquaint itself with all laws or regulations relevant to such valuation.

Policy on appointment of auditor and valuer

The Investment Manager has adopted a policy on the appointment of auditor and valuer of the Trust, vide a resolution passed by the IM Board dated December 15, 2025, which will stand amended, to the extent of any amendment to the InvIT Regulations or applicable law, details of which are provided below:

Appointment and role of Auditor of the Trust

(i). The Investment Manager, in consultation with the Trustee, shall appoint the auditor of the Trust (the "**Auditor**"), in a timely manner and in accordance with the InvIT Regulations.

(ii). The Investment Manager shall ensure that the appointment of the Auditor and the fees payable to the Auditor is approved by the Unitholders in accordance with the InvIT Regulations.

(iii). The Investment Manager shall ensure that if the removal of the Auditor and appointment of another auditor to the Trust is taken up at a meeting of the Unitholders at the request of the Unitholders, such removal of the Auditor shall be approved by the Unitholders in accordance with the InvIT Regulations.

(iv). The Investment Manager shall appoint an individual or a firm as the Auditor, who shall hold office from the date of conclusion of the annual meeting in which the Auditor has been appointed till the date of conclusion of the sixth annual meeting of the Unitholders in accordance with the procedure for selection of auditors, in accordance with the InvIT Regulations.

(v). The Investment Manager shall not appoint or re-appoint

(a) an individual as the Auditor for more than one term of five consecutive years, provided that such individual, upon completion of one term of five consecutive years, shall not be eligible for re-appointment as the auditor in the Trust for a period of five years from the date of completion of the term; and

(b) an audit firm as the Auditor for more than two terms of five consecutive years, provided that, upon completion of two terms of five consecutive years, such audit firm shall not be eligible for re-appointment as the auditor in the Trust for a period of five years from the date of completion of its term.

(vi). The Investment Manager shall ensure that the audit of accounts of the Trust by the Auditor is done not less than once in a year and such report is submitted to the stock exchanges within the timelines prescribed under the InvIT Regulations.

(vii). The Auditor shall conduct the audit of the accounts of the Trust and draft the audit report based on the accounts examined by it after taking into account the relevant accounting and auditing standards under applicable law, including the InvIT Regulations and any guidelines, circulars, notifications and clarifications framed or issued by the SEBI, as may be specified from time to time.

(viii). The Auditor shall undertake a limited review of the audit of all the entities or companies whose accounts are to be consolidated with the accounts of the Trust as per the relevant auditing standards under applicable law and in accordance with the InvIT Regulations.

(ix). The Auditor shall comply with the conditions prescribed under the InvIT Regulations at all times, including the following:

(a). the accounts of the Trust shall be subjected to audit by the Auditors and shall be accompanied by a report of the Auditors in such manner and at such intervals as may be prescribed under applicable law, including the InvIT Regulations;
(b). the Auditor shall, to the best of his information and knowledge, ensure that the accounts and financial statements give a true and fair view of the state of the affairs of the Trust, including profit or loss and cash flow for the period and such other matters as may be specified by SEBI;
(c). the Auditor shall have a right of access at all times to the books of accounts and vouchers pertaining to activities of the Trust;
(d). the Auditor shall have a right to obtain such information and explanation pertaining to activities of the Trust as he may consider necessary for the performance of his duties as auditor from the employees of Trust or any holding company or parties to the Trust or any holding company or the special purpose vehicle(s) or any other person in possession of such information; and
(e). The auditor shall undertake a limited review of the audit of all the entities or companies whose accounts are to be consolidated with the accounts of the InvIT as per the applicable Indian Accounting Standards (Ind AS) and any addendum thereto as defined in Rule 2 (1) (a) of the Companies (Indian Accounting Standards) Rules, 2015, in such manner as may be specified by the Board.

(x). The Investment Manager, in consultation with the Trustee, shall have the right to take all necessary steps to remove the Auditor who ceases to comply with the eligibility criteria required under the InvIT Regulations and applicable law. In case of removal of the auditor and appointment of another auditor to the Trust, approval from the Unitholders shall be required in accordance with the InvIT Regulations.

Appointment and role of Valuer of the Trust

(i). The Investment Manager, in consultation with Trustee, shall appoint the valuer of the Trust ("**Valuer**"), in a timely manner and shall determine the remuneration of such Valuer, in accordance with the InvIT Regulations. A 'Valuer' shall have the meaning provided under the InvIT Regulations.

(ii). The remuneration of the Valuer shall not be linked to or based on the value of the assets being valued.

(iii). The Valuer shall not be an associate of any of the Sponsors or the Investment Manager or Trustee. The Valuer shall have the minimum number of years of experience in valuation of infrastructure assets as may be required under the InvIT Regulations.

(iv). The Valuer shall be eligible to act as a valuer in accordance with the InvIT Regulations or any clarifications, guidelines, notifications or exemptions issued by SEBI.

(v). A Valuer shall not undertake valuation of the same project for more than four years consecutively, provided that the Valuer may be reappointed after a period of not less than two years from the date it ceases to be the Valuer of the Trust.

(vi). The Valuer shall not undertake valuation of any assets in which it has either been involved with the acquisition or disposal within the last twelve months other than such cases where the Valuer was engaged by the Trust for such acquisition or disposal.

(vii). The Valuer shall comply with the following conditions at all times:

(a) the Valuer shall ensure that the valuation of the Trust assets is impartial, true and fair and is in accordance with the Regulation 21 of InvIT Regulations;

(b) the Valuer shall ensure adequate and robust internal controls to ensure the integrity of its valuation reports;

(c) the Valuer shall ensure that it has sufficient key personnel with adequate experience and qualification to perform valuations;

(d) the Valuer shall ensure that it has sufficient financial resources to enable it to conduct its business effectively and meet its liabilities;

(e) the Valuer and any of its employees involved in valuing of the assets of the Trust, shall not:

- invest in units of the Trust or in the assets being valued; and
- sell the assets or units of the Trust held prior to being appointed as the Valuer,

until the time such person is designated as Valuer of the Trust and not less than six months after ceasing to be Valuer of the Trust;

(f) the Valuer shall conduct valuation of the Trust assets with transparency and fairness and shall render, at all times, high standards of service, exercise due diligence, ensure proper care and exercise independent professional judgment;

(g) the Valuer shall act with independence, objectivity and impartiality in performing the valuation;

(h) the Valuer shall discharge its duties towards the Trust in an efficient and competent manner, utilizing its knowledge, skills and experience in best possible way to complete given assignment;

(i) the Valuer shall not accept remuneration, in any form, for performing a valuation of the Trust assets from any person other than the Trust or its authorized representative;

(j) the Valuer shall before accepting any assignment, from any related party of the Trust, disclose to the Trust, by disclosing to the Investment Manager or the Trustee, any direct or indirect consideration which the Valuer may have in respect of such assignment;

(k) the Valuer shall disclose to the Trust, through the Investment Manager, any pending business transactions, contracts under negotiation and other arrangements with the Investment Manager or any other party whom the Trust is contracting with and any other factors that may interfere with the Valuer's ability to give an independent and professional valuation of the assets, and other necessary disclosures required under the InvIT Regulations;

(l) the Valuer shall not make false, misleading or exaggerated claims in order to secure assignments;

(m) the Valuer shall not provide misleading valuation, either by providing incorrect information or by withholding relevant information;

(n) the Valuer shall not accept an assignment which interferes with its ability to do fair valuation; and

(o) the Valuer shall, prior to performing a valuation, acquaint itself with all laws or regulations relevant to such valuation.

(viii). The Investment Manager in consultation with the Trustee shall have the right to take all necessary steps to remove the Valuer who ceases to comply with the eligibility criteria required under the InvIT Regulations and applicable law. If the removal of the Valuer and appointment of another valuer to the Trust is taken up at a meeting of the Unitholders at the request of the Unitholders, such removal of the Valuer shall be approved by the Unitholders in accordance with the InvIT Regulations.

INDUSTRY OVERVIEW

*The information in this section is extracted from an industry report titled "Research Report on Road Sector in India" dated January 10, 2026, prepared and released by CARE Analytics and Advisory Private Limited ("**CARE Industry Report**"). Industry sources and publications generally state that the information contained therein has been obtained from sources generally believed to be reliable, but that their accuracy, completeness and underlying assumptions are not guaranteed, and their reliability cannot be assured. Industry publications are also prepared based on information available as of specific dates and may no longer be current or reflect current trends. Accordingly, investment decisions should take these limitations into account. All references to years refer to calendar years except as otherwise stated. References to Indian financial years ("**FY**" or "**Fiscal**") are to the one-year period ending March 31 of the named year.*

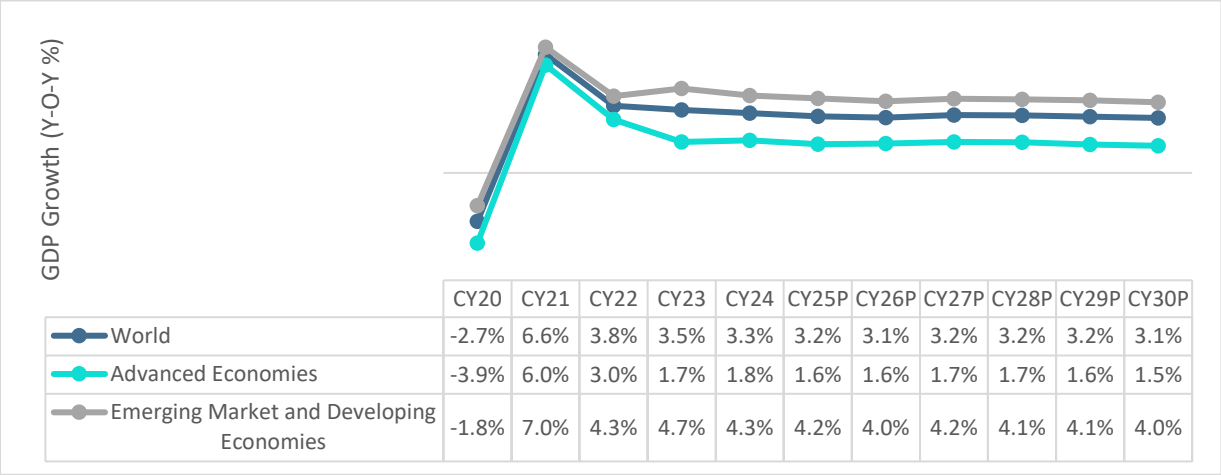
Economic Outlook

Global Economy

Global economic growth expected to sustain at ~3% in near term

Global growth, which reached 3.5% in CY23, stabilized at 3.3% for CY24 and projected to decrease at 3.2% for CY25. Global trade is expected to be disrupted by new US tariffs and countermeasures from trading partners, leading to historically high tariff rates and negatively impacting economic growth projections. The global landscape is expected to change as countries rethink their priorities and policies in response to these new developments. Central banks priority will be to adjust policies, while smart fiscal planning and reforms are key to handling debt and reducing global inequalities.

Chart 1: Global Growth Outlook Projections (Real GDP, Y-o-Y change in %)



	CY20	CY21	CY22	CY23	CY24	CY25P	CY26P	CY27P	CY28P	CY29P	CY30P
World	-2.7%	6.6%	3.8%	3.5%	3.3%	3.2%	3.1%	3.2%	3.2%	3.2%	3.1%
Advanced Economies	-3.9%	6.0%	3.0%	1.7%	1.8%	1.6%	1.6%	1.7%	1.7%	1.6%	1.5%
Emerging Market and Developing Economies	-1.8%	7.0%	4.3%	4.7%	4.3%	4.2%	4.0%	4.2%	4.1%	4.1%	4.0%

Source: IMF – World Economic Outlook, October 2025; Note: P-Projection

Table 1: GDP growth trend comparison - India v/s Other Economies (Real GDP, Y-o-Y change in %)

	Real GDP (Y-o-Y change in %)										
	CY20	CY21	CY22	CY23	CY24	CY25P	CY26P	CY27P	CY28P	CY29P	CY30P
India	-5.8	9.7	7.6	9.2	6.5	6.6	6.2	6.4	6.5	6.5	6.5
China	2.3	8.6	3.1	5.4	5.0	4.8	4.2	4.2	4.0	3.7	3.4
Indonesia	-2.1	3.7	5.3	5.0	5.0	4.9	4.9	5.0	5.0	5.1	5.1
Saudi Arabia	-3.8	6.5	12.0	0.5	2.0	4.0	4.0	3.3	3.3	3.3	3.3
Middle East	-2.3	4.7	6.4	2.6	2.6	3.5	3.8	3.8	3.7	3.7	3.7
Latin America	-6.9	7.4	4.3	2.4	2.4	2.4	2.3	2.6	2.7	2.8	2.6
Brazil	-3.3	4.8	3.0	3.2	3.4	2.4	1.9	2.2	2.3	2.4	2.5
Euro Area	-6.0	6.4	3.6	0.4	0.9	1.2	1.1	1.4	1.3	1.2	1.1
United States	-2.1	6.2	2.5	2.9	2.8	2.0	2.1	2.1	2.1	1.9	1.8

Source: IMF- World Economic Outlook Database (October 2025); Note: P- Projections, India's fiscal year (FY) aligns with the IMF's calendar year (CY). For instance, FY24 corresponds to CY23.

Indian Economic Outlook

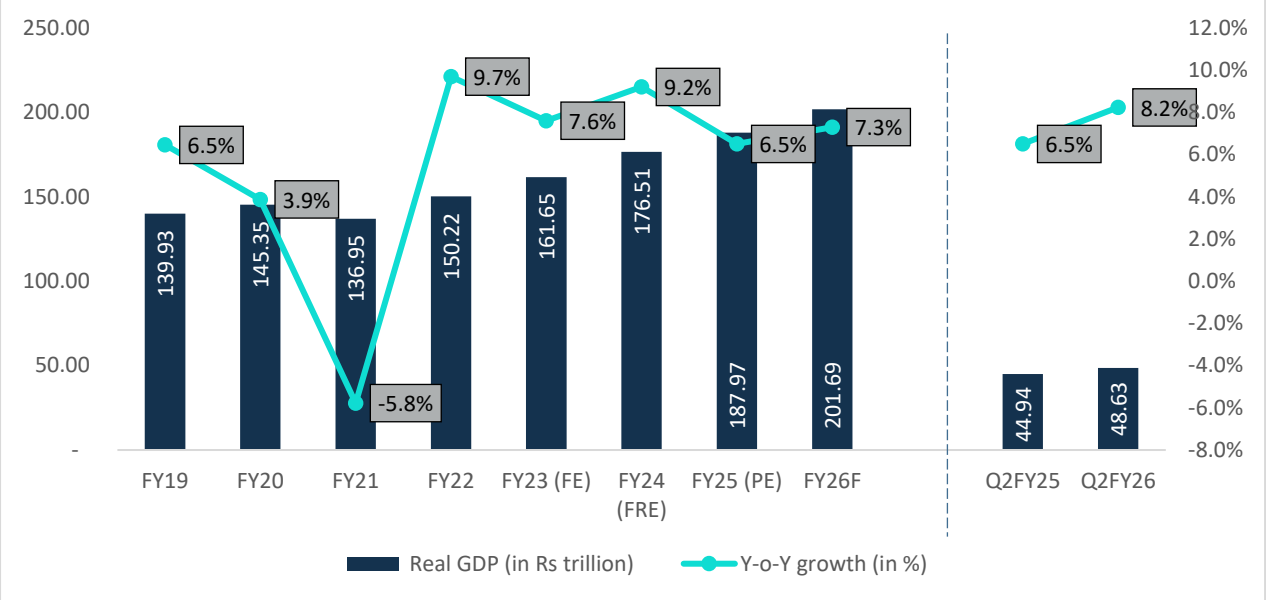
GDP Growth and Outlook

Resilience to External Shocks remains Critical for Near-Term Outlook

India's economy continues to show rapid growth. In the second quarter of FY26, the country's GDP grew by 8.2% compared to the same period last year, which saw a 6.5% increase. For the full year FY26, GDP is expected to grow by 7.3%, supported by rising rural demand, better job opportunities, and active business conditions.

In FY25, provisional estimates show a growth of 6.5% (Rs 187.97 trillion), led by robust performance in manufacturing, construction, and financial services. Consumer spending rose by 7.6%, and government spending increased by 3.8%, both contributing to the overall growth. In FY24, India's GDP grew by 9.2% (Rs 176.5 trillion), the highest in over a decade (excluding the pandemic year).

Chart 2: Trend in Real Indian GDP growth rate



Source: MOSPI, Reserve Bank of India; Note: FE – Final Estimates, FRE- First Revised Estimates, PE – Provisional Estimates, F - Forecasted

GDP Growth Outlook (December 2025)

FY26 GDP Outlook: The RBI projects real GDP growth at 7.3% for 2025–26, driven by industrial and services sectors. The upward trajectory of growth is also due to income tax and goods and services tax (GST) rationalisation, softer crude oil prices, increase of government capital expenditure, and facilitative monetary and financial conditions lower inflation rates.

However, risks from prolonged geopolitical tensions, global trade disruptions, and weather-related uncertainties remain. Taking these into account, the RBI has reaffirmed its growth projections.

Table 2: RBI's GDP Growth Outlook (Y-o-Y %)

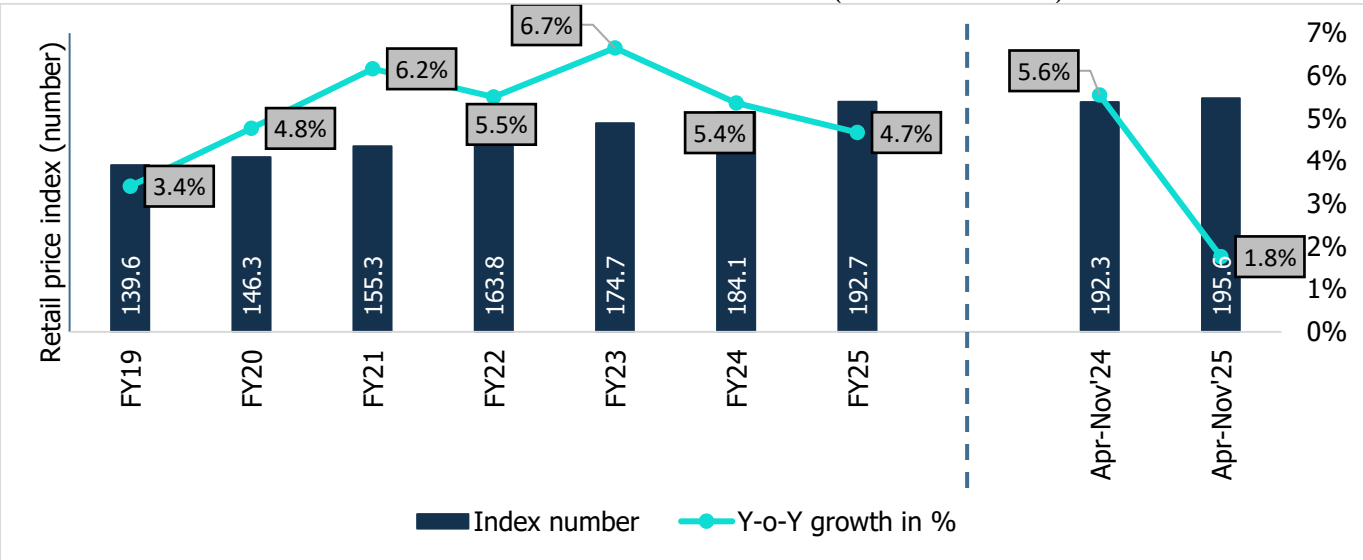
FY26P (complete year)	Q3FY26P	Q4FY26P	Q1FY27P	Q2FY27P
7.3%	7.0%	6.5%	6.7%	6.8%

Source: Reserve Bank of India; Note: P-Projected

Performance of key macro-economic indicators

The Consumer Price Index (CPI) for the April–November 2025 recorded a combined inflation rate of 1.8%, there was an increase of 46 basis points in November, 2025 from October, 2025. The increase in inflation in November 2025 was driven by increase in inflation of Vegetables, Egg, Meat and fish, Spices and Fuel and light.

Chart 3: Retail Price Inflation in terms of index and Y-o-Y Growth in % (Base: 2011-12=100)

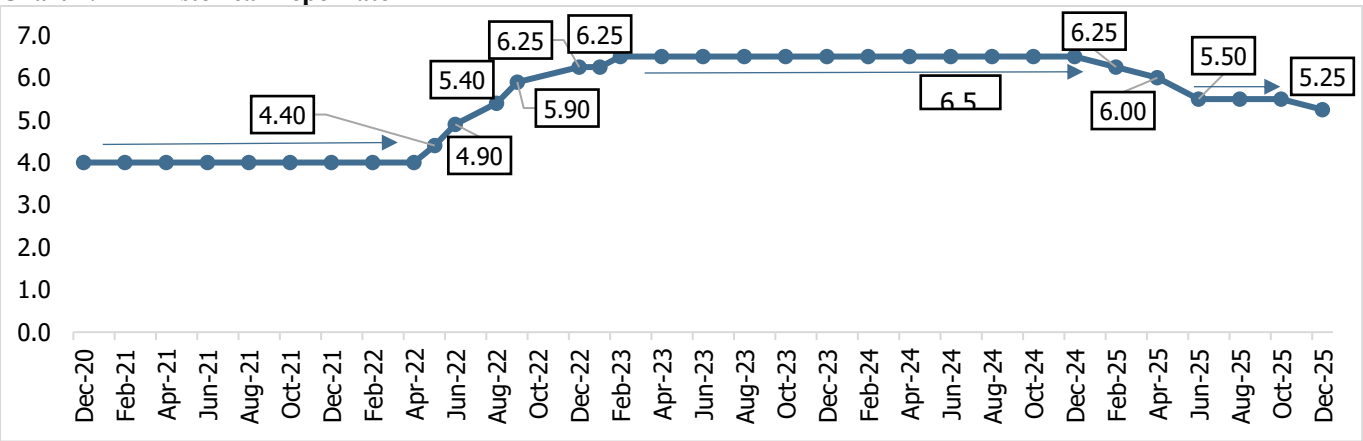


Source: MOSPI

The CPI is primarily factored in by RBI while preparing their bi-monthly monetary policy. At the bi-monthly meeting held in December 2025, RBI projected inflation at 2.0% for FY26 with inflation during Q3FY26 at 0.6% and Q4FY26 at 2.9%, Q1FY27 at 3.9% and Q2FY27 at 4.0%.

Considering the current inflation situation, RBI has reduced the repo rate by 25 basis points to 5.25% in the December 2025 meeting of the Monetary Policy Committee.

Chart 4: RBI historical Repo Rate



Source: RBI

The RBI maintained a 'neutral' monetary policy stance, continuing to signal confidence that India's economic growth would remain resilient, underpinned by robust private consumption and sustained expansion in fixed capital formation, while also emphasising persistent external risks. The domestic demand conditions remain supportive even as global uncertainties prevail. On trade policy, the temporary pause on US tariff increases concluded in August 2025, and higher duties on certain Indian exports have since taken effect, although bilateral trade talks continue to manage tariff-related tensions.

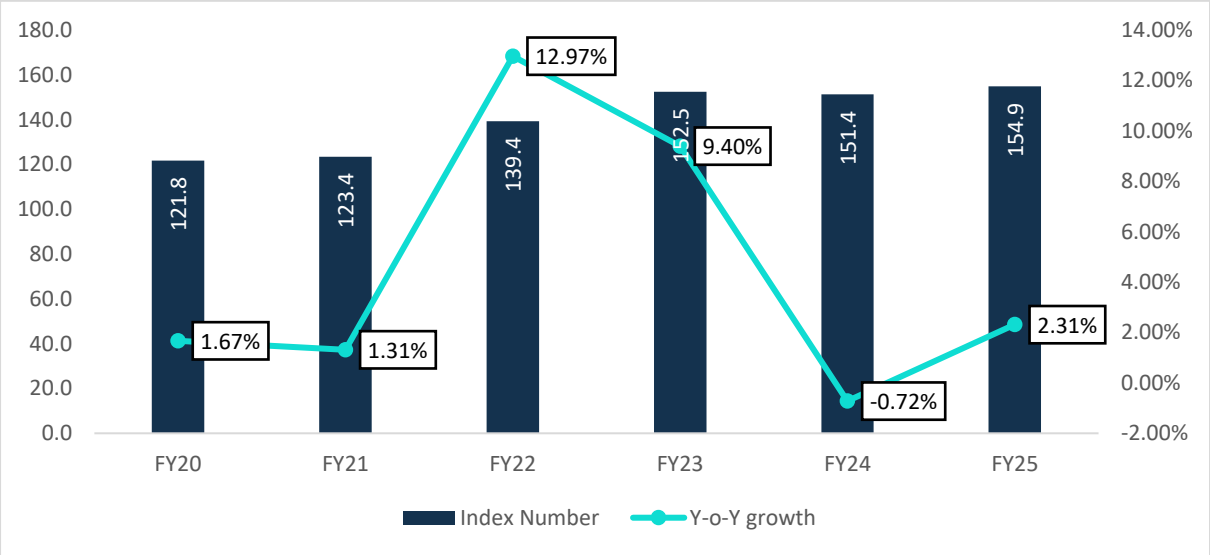
The RBI has adopted for a non-inflationary growth with the foundations of strong demand and supply with a good macroeconomic balance. The domestic growth and inflation curve require the policies to be supportive with the volatile trade conditions.

Wholesale Price Index

Wholesale Price Index (WPI) is an index number that measures the average movement in prices of a defined basket of goods at the wholesale level in the domestic market, broadly capturing prices at the first point of bulk sale.

From FY23 to FY25, WPI index stayed high and broadly flat, easing slightly from 152.5 (FY23) to 151.4 (FY24) before rising to 154.9 (FY25). This pattern is consistent with easing and re-firming in wholesale input costs, this can be attributed to the geopolitical tensions and sanctions contributed to supply disruptions and higher global prices.

Chart 5: Wholesale Price Index



Source: Office of Economic Advisor

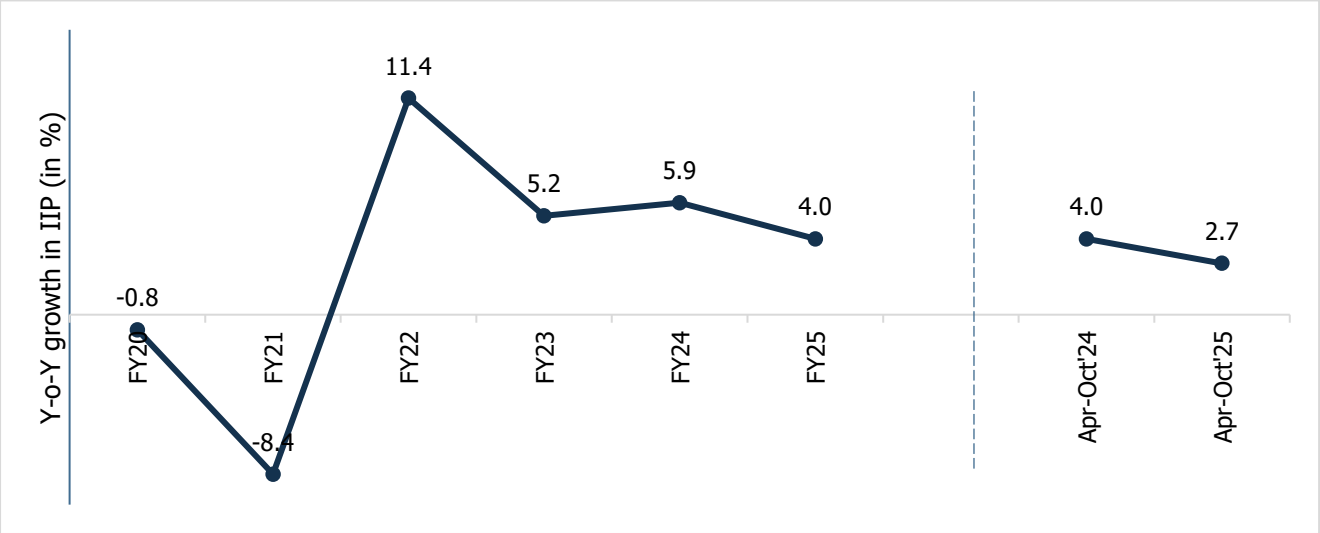
Index of Industrial Production

The Quick Estimates of the Index of Industrial Production (IIP) for October 2025 show a growth of 0.4%, a decline from 4.0% from October 2024. The year-on-year decline in IIP reflects weakness across major segments, primarily due to contractions in electricity, mining, and consumer non-durables.

In October 2025, industrial growth weakened due to less number of working days because of a number of festivals in the month. Within manufacturing, notable growth was recorded in basic metals, petroleum products, motor vehicles, trailers and semi-trailers.

Use-based indices reflected mixed trends, with strong growth in Infrastructure/Construction goods, Intermediate and Capital goods. Manufacturing contributed significantly to overall industrial growth. This was primarily driven by strong performance in segments such as pharmaceuticals, motor vehicles, beverages, and electrical equipment.

Chart 6: Y-o-Y growth in IIP (in %)



Source: MOSPI

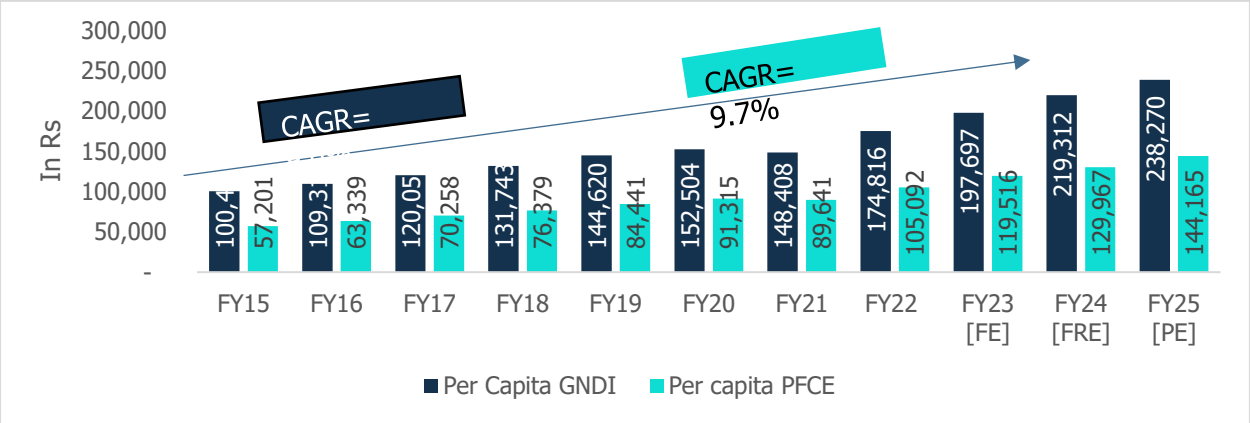
Per capita income trends of the economy

Increasing Disposable Income and Consumer Spending

Gross National Disposable Income (GNDI) is a measure of the income available to the nation for final consumption and gross savings. Between the period FY15 to FY25, per capita GNDI at current prices registered a CAGR of 9.0%. More disposable income drives more consumption, thereby driving economic growth.

With increase in disposable income, there has been a gradual change in consumer spending behaviour as well. Per capita Private Final Consumption Expenditure (PFCE) which is measure of consumer spending has also showcased significant growth from FY15 to FY25 at a CAGR of 9.7%.

Chart 7: Trend of Per Capita GNDI and Per Capita PFCE (Current Price)



Source: MOSPI; Note: FRE – First Revised Estimates, FE – Final Estimates, PE- Provisional Estimates

Gross Value Added (GVA) Trend

Gross Value Added (GVA) is the measure of the value of goods and services produced in an economy. GVA gives a picture of the supply side whereas GDP represents consumption. India's recovery in FY25 was powered by a broad-based rebound across sectors. The gap between GDP and GVA growth stood at 0.1 percentage point in FY25, with GDP growing at 6.5% and GVA at 6.4%, as per MoSPI's provisional estimates released in August 2025.

The agriculture and allied sector grew by 4.6% in FY25 (up from 2.7% in FY24), supported by a good monsoon, better crop output, and strong allied activities. The industrial sector grew by 5.9% in FY25, down from 10.8% in FY24 due to weaker manufacturing, with FY24 growth driven by strong manufacturing sales, construction (9.4%), utilities, and supportive policies. The services sector grew by 7.2% in FY25, down from 9.0% in FY24, supported by public administration (8.9%), financial services (7.2%), and trade and transport (6.1%), contributing Rs 94.4 trillion to the economy.

From H1FY25 to H1FY26, the overall GVA at basic price had a Y-o-Y growth from 5.8% to 8.1%, indicating a stronger economic performance. Most sectors showed growth, with Services sector growing significantly from 7.2% to 9.2%, and Industrial sector had a growth from 3.8% to 7.7% in H1FY26. However, Mining & Quarrying declined sharply from -0.4% to -0.04%, and Electricity, Gas & Water supply increased considerably from 3.0% to 4.2%.

Table 3: Sectoral Growth (Y-o-Y % Growth) - at Constant Prices

At constant Prices	FY19	FY20	FY21	FY22	FY23 (FE)	FY24 (FRE)	FY25 (PE)	H1FY25	H1FY26
Agriculture, Forestry & Fishing	**2.1**	**6.2**	**4.1**	**4.6**	**5.1**	**2.7**	**4.6**	**4.1**	**3.5**
Industry	**5.3**	**-1.4**	**-0.9**	**12.2**	**2.0**	**10.8**	**5.9**	**3.8**	**7.7**
Mining & Quarrying	-0.9	-3.0	-8.6	6.3	2.8	3.2	2.7	-0.4	-0.04
Manufacturing	5.4	-3.0	2.9	10.0	-3.0	12.3	4.5	2.2	9.1
Electricity, Gas, Water Supply & Other Utility Services	7.9	2.3	-4.3	10.3	11.5	8.6	5.9	3.0	4.4
Construction	6.5	1.6	-5.7	19.9	10.0	10.4	9.4	8.4	7.2
Services	**7.2**	**6.4**	**-8.2**	**9.2**	**11.3**	**9.0**	**7.2**	**7.2**	**9.2**

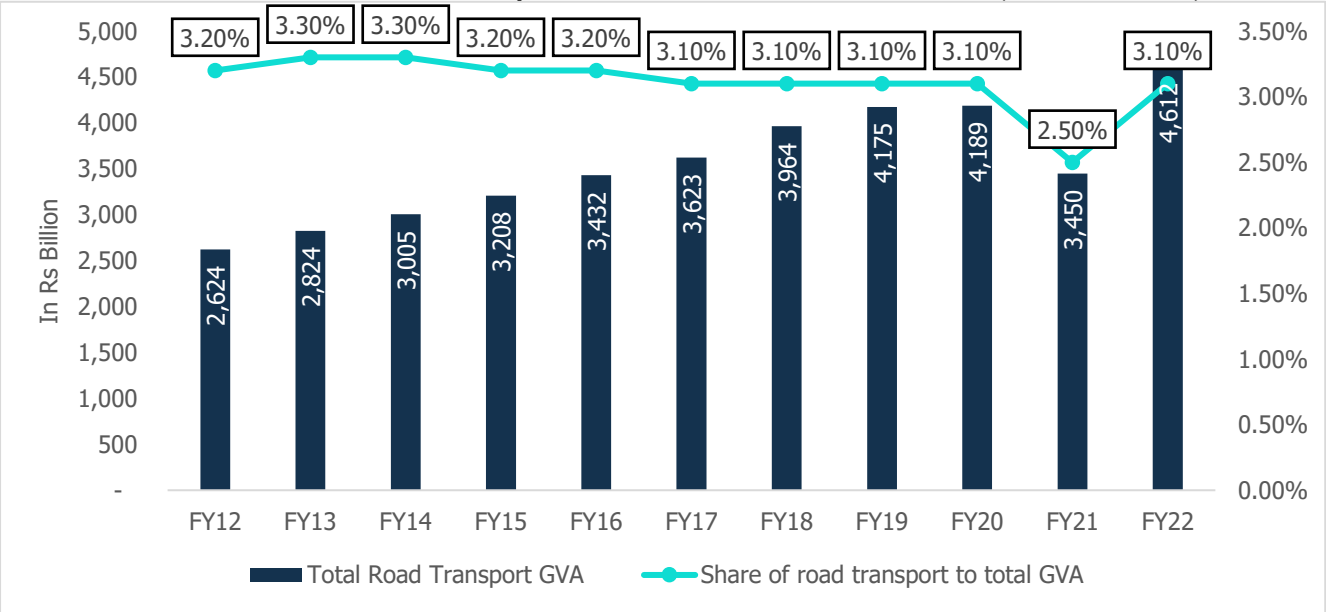
Trade, Hotels, Transport, Communication & Broadcasting	7.2	6.0	-19.7	15.2	14.4	7.5	6.1	6.1	7.4
Financial, Real Estate & Professional Services	7.0	6.8	2.1	5.7	10.7	10.3	7.2	7.2	10.2
Public Administration, Defence and Other Services	7.5	6.6	-7.6	7.5	8.2	8.8	8.9	8.9	9.7
GVA at Basic Price	**5.8**	**3.9**	**-4.2**	**9.4**	**7.2**	**8.6**	**6.4**	**5.8**	**8.1**

Source: MOSPI; Note: FRE – First Revised Estimates, FE- Final Estimates, PE – Provisional Estimates

Contribution of Road Transport to Total Gross Value Added (GVA)

Road transport has been a preferred mode of domestic transport for any passengers and goods movement vis-à-vis other modes of transport due to ease of first and last mile connectivity and significant development of the road network across the country over the past two decades. The road sector generated highest gross value addition of Rs. 4.61 trillion in FY22 at current prices and contributed ~78% to overall GVA added by the transportation sector. Wherein, the other mode of transports like railways contributed ~15%, while water contributed ~3% and air 1%. From FY12 to FY22, factors like growing urbanization and population led to growth of road transport segment at a CAGR of 6.5%.

Chart 8: Contribution of Road Transport to total Gross Value Added (Current Prices)

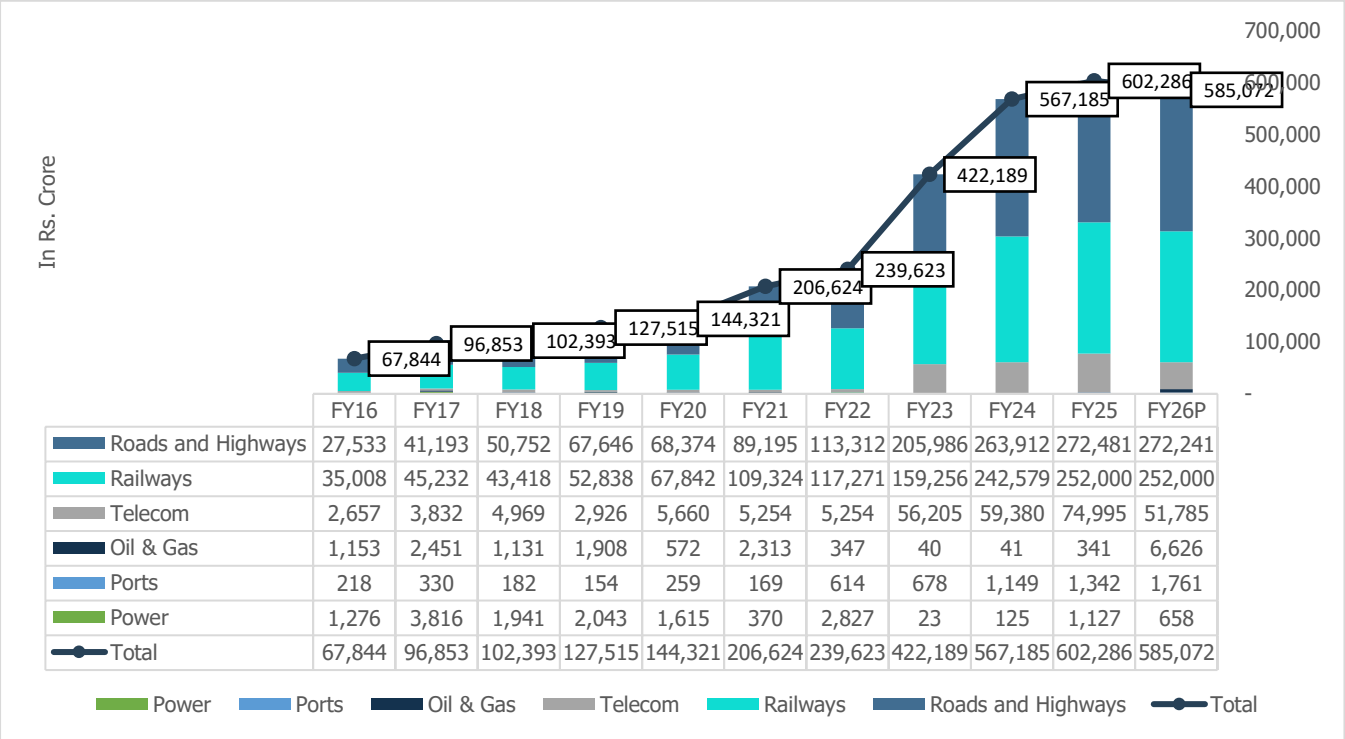


Source: MOSPI

Budget Outlay towards Infrastructure

With the growing population, the long-term need for robust infrastructure is necessary for economic development. This generates the need for massive investments in the development and modernization of infrastructure facilities, which will not only cater to the growing demand but will also ensure competitiveness in the global market.

Chart 9: Budgetary outlay towards infrastructure



	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26P
Roads and Highways	27,533	41,193	50,752	67,646	68,374	89,195	113,312	205,986	263,912	272,481	272,241
Railways	35,008	45,232	43,418	52,838	67,842	109,324	117,271	159,256	242,579	252,000	252,000
Telecom	2,657	3,832	4,969	2,926	5,660	5,254	5,254	56,205	59,380	74,995	51,785
Oil & Gas	1,153	2,451	1,131	1,908	572	2,313	347	40	41	341	6,626
Ports	218	330	182	154	259	169	614	678	1,149	1,342	1,761
Power	1,276	3,816	1,941	2,043	1,615	370	2,827	23	125	1,127	658
Total	67,844	96,853	102,393	127,515	144,321	206,624	239,623	422,189	567,185	602,286	585,072

Source: Union Budget FY26 document

Some of the key government infrastructure schemes include:

- The government has announced plans for the National Monetization Pipeline (NMP) and Development Finance Institution (DFI) to improve the financing of infrastructure projects
- The government has helped the growth of urbanization through a number of schemes and projects, including the **Smart Cities Mission,** the **Atal Mission for Rejuvenation and Urban Transformation (AMRUT),** and the **Pradhan Mantri Awas Yojana (Urban).**

Concluding Remarks

Global economic growth faces headwinds from geopolitical tensions, volatile commodity prices, high interest rates, inflation, financial market volatility, climate change, and rising public debt. However, India's economy remains relatively strong, with an IMF forecast of 6.6% GDP growth in CY25 (FY26 according to the fiscal year), compared to the global projection of 3.2%. Key drivers include strong domestic demand, government capital expenditure and moderating inflation.

Public investment is expected to exhibit healthy growth as the government has allocated a strong capital expenditure of about Rs. 11.21 lakh crores for FY26. The private sector's intent to invest is also showing improvement as per the data announced on new project investments and resilience shown by the import of capital goods. Additionally, improvement in rural demand owing to healthy sowing, improving reservoir levels, and progress in south-west monsoon along with government's thrust on capex and other policy support will aid the investment cycle in gaining further traction.

The recent 56th meeting of the Goods and Services Tax (GST) Council announced some major changes in the existing GST structure. The focus is majorly on simplifying it to a two-tiered GST tax structure of 5% and 18%, phasing out the currently existing 12% and 28% slabs. There is also a de-merit tax rate for luxury and 'sin' goods at a 40% tax slab. These changes are typically aimed at increasing the disposable income and in turn boosting consumption, as well as promoting the ease of doing business. The GST rationalization is expected to be a positive step towards economic growth, stimulating private consumption and ease inflationary pressures. The recent revisions in income tax rates, coupled with the reduction in GST, are expected to result in savings of over Rs 2.5 lakh crore, which is likely to further boost the consumption.

The impact of U.S. tariffs on India's export trade is anticipated to be minimal. The engineering goods sector will have a potential U.S. tariff impact, whereas steel industry is affected by the 50% tariffs although the impact is expected to be minimal given the volume of goods exported is less.

On February 13th, 2025, India and US discussed enhancing the U.S.-India trade relationship, with a target to increase bilateral trade from USD 200 billion to USD 500 billion by 2030. As of September 2025, India and the U.S discussions seem "positive and forward looking"

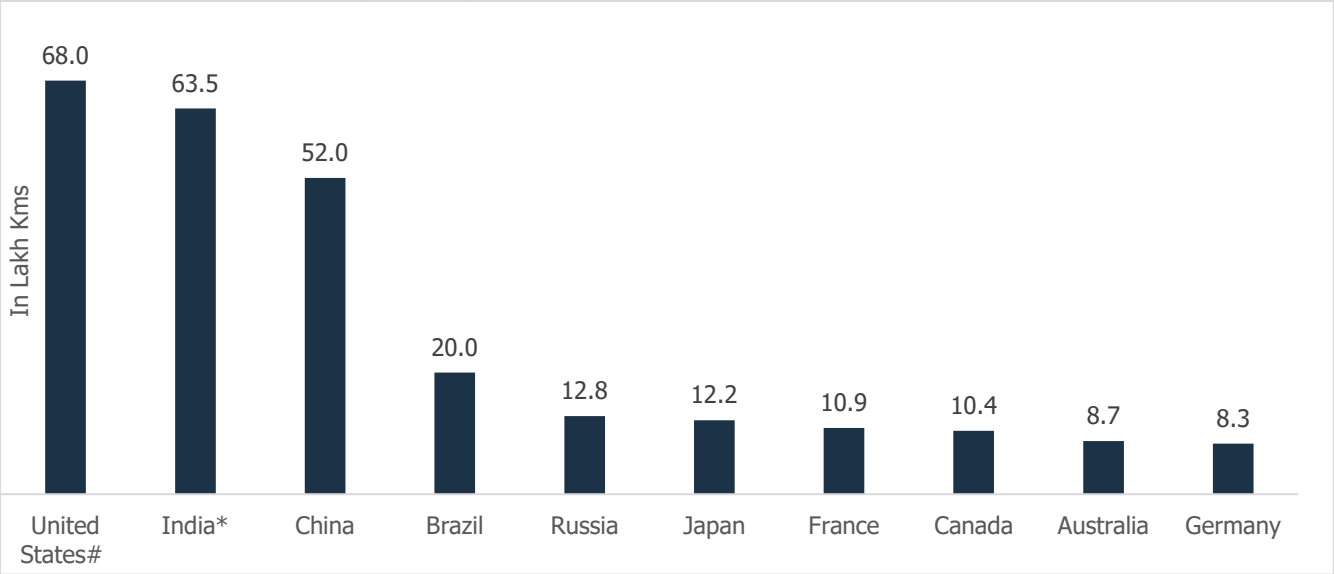
Thus, while U.S. tariffs may have a limited impact on India's exports, ongoing trade negotiations and India's competitive manufacturing advantage position it well for continued growth in global trade.

Road Sector in India

Global Road Network

The number and spread of roads in a country is a vital factor in a country's development and economic potential. However, there are some incredibly significant differences in road network size around the world.

Chart 10: Road Network Size by Country



Source: World Population Review, Industry Sources, CareEdge Research, Data as of 2024
Note 1: *Data for India is taken from Ministry of Road Transport and Highways of India, while
Note 2: #United States data is from Media reports

The United States leads the world with the most extensive road network, encompassing nearly 4.2 million miles (6.8 million kilometres) of roads. This network is not limited to the famous interstate highways, which are integral for long-distance travel and transportation, but also includes a wide range of state, county, and local roads that connect even the most remote areas. The vastness of the U.S. Road system is a result of its large geographic area, its high population, and the country's historical investment in transportation infrastructure, which supports not only domestic travel but also international trade and logistics.

India ranks second globally with over 4 million miles (6.6 million kilometres) of roadways, despite having a smaller land area than the U.S. Its road network is vital for the movement of over a billion people across a densely populated country. The extensive system includes highways, urban roads, and rural paths, addressing challenges posed by diverse topography, rapid urbanization, and population growth. Many roads connect rural areas to urban centres, supporting economic activities and providing access to essential services.

These figures are constantly changing as countries build new roads and, in some cases, as existing roads deteriorate.

Overview and Investment Trend in Infrastructure

Infrastructure Overview

India's infrastructure sector is witnessing robust growth, fuelled by significant government investments and strategic initiatives aimed at strengthening the nation's economic framework. For the fiscal year 2025–26, the

government allocated a record Rs. 11.21 trillion, underscoring its dedication to infrastructure development as a cornerstone of economic progress and employment generation.

Transport and logistics remain key focus areas, particularly roads, with over 45,000 kilometres, including 5,000 kilometres of specialised structures such as elevated roads, tunnels, and bridges, under consideration for awards. The National Highways Authority of India (NHAI) plans to award approximately 5,000 kilometres annually through Build-Operate-Transfer (BOT) and Engineering, Procurement, and Construction (EPC) models. This approach presents significant opportunities for infrastructure construction companies. Furthermore, ongoing bidding for third-party operations and maintenance (O&M) projects, with Rs. 77,210 million worth of projects in the pipeline, provides additional growth avenues. The government has also announced plans to expand the national highway network to 2,00,000 kilometres by FY37 which is 1,46,204 kilometres as of FY25.

Urban mobility is another priority, as of November 2025, India has around 1,028 kilometres of operational metro rail across 23 cities. Additionally, approximately 861 kilometres of metro projects, including the remaining portion of the Delhi-Meerut RRTS, are under construction in various cities such as Delhi, Bangalore, Kolkata, Chennai, Kochi, Mumbai, Nagpur, Ahmedabad, Gandhinagar, Pune, Kanpur, Agra, Bhopal, Indore, Patna, Surat, and Meerut. Investments in this segment are expected to grow at a CAGR of 5-10% from FY24 to FY28. Similarly, investments in the Water Supply and Sanitation (WSS) sector are projected to grow at a CAGR of 10-12% from FY24 to FY28.

In the airport sector, 159 operational airports currently manage approximately 327 million passengers annually. Opportunities for EPC players are expected to expand with plans to increase operational airports to 220 and add an additional 200 over the next two decades.

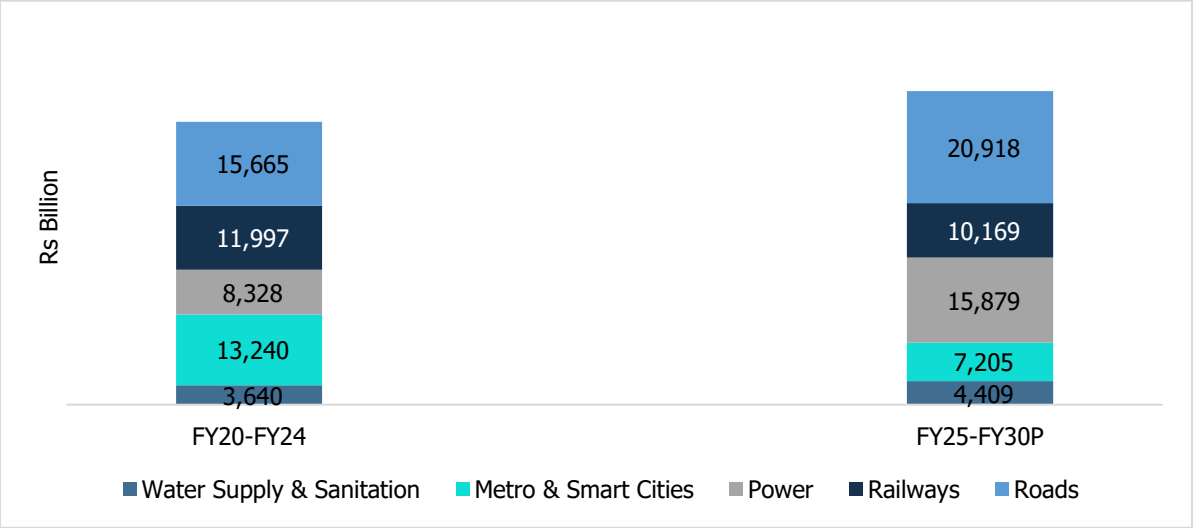
The government is also prioritising multi-modal logistics parks under its PM Gati Shakti National Master Plan. This initiative integrates key projects such as Bharatmala, Sagarmala, and UDAN, ensuring streamlined infrastructure planning and monitoring. Public-Private Partnerships (PPPs) are being emphasised as critical to achieving India's goal of becoming a USD 5 trillion economy, particularly in the development of airports, ports, highways, and logistics parks. Overall, the infrastructure sector is expected to grow at a CAGR of approximately 8% from CY24 to CY30, driven by investments across roads and highways, railways, metros, and the water supply and sanitation sectors. These ambitious initiatives collectively position India's infrastructure sector as a pivotal driver in its aspiration to achieve developed nation status by 2047.

Investment Trend Towards Infrastructure

Further, infrastructure projects are often expensive and have a long gestation period. To address this issue, fundraising and generating returns, the government is continuously striving to create a favourable operating environment for its players. Accordingly, national, and state-level agencies like the National Highways Authority of India (NHAI), state-level bodies, and private sector companies (both domestic and international), are actively participating in infrastructure development.

With the growing population, the long-term need for robust infrastructure is necessary for economic development. This generates the need for massive investments in the development and modernization of infrastructure facilities, which will not only cater to the growing demand but will also ensure competitiveness in the global market.

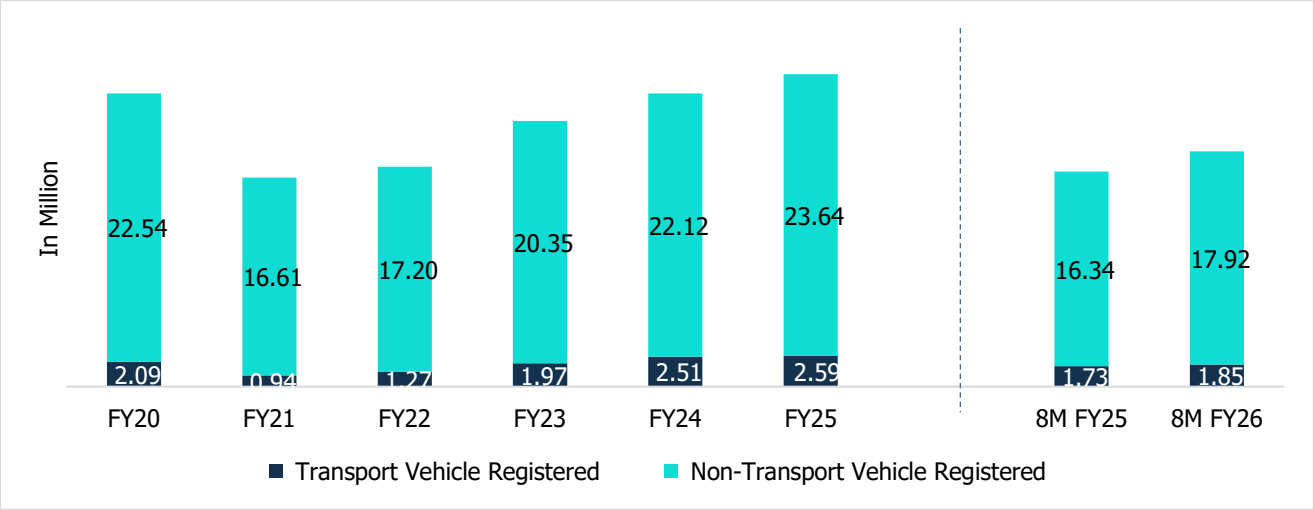
Chart 11: Continued High Investment Momentum in Indian Key Infrastructure Sectors



Source: CareEdge Research, NITI Aayog, NIP
Note: The projections are based on our estimations for multiple sectors which have been derived from respective government department sources.

Registered Motor Vehicles

Chart 12: Motor Vehicle Registered in India



Source: CMIE, CareEdge Research

Vehicle registrations in India have shown a steady recovery post Covid-19, where total registrations dropped to 17.55 million amid disruptions, down from 24.63 million in FY20. Since then, there has been consistent growth, reaching 26.23 million in FY25. Transport vehicle registrations increased from 0.91 million in FY21 to 2.58 million in FY25, indicating rising commercial demand. Similarly, non-transport vehicle registrations also grew from 16.64 million in FY21 to 23.66 million in FY25, reflecting improved consumer sentiment and personal mobility uptake.

Current Scenario of Road Sector

Road Network in India

India has the second-largest road network in the world, with about 63,45,463 km as of FY25. This comprises national highways, expressways, state highways, major district roads, other district roads, and village roads. To accelerate the country's growth, the development of national highways has been the key focus area. On the other hand, state highways, district and rural roads continue to be a large part of the overall road network.

Table 4: Road Network of Past 6 Years (In Km)

Particulars	FY20	FY21	FY22	FY23	FY24	FY25
National Highways	1,32,500	1,36,440	1,40,995	1,44,955	1,46,145	1,46,204
State Highways	1,56,694	1,76,818	1,71,039	1,67,079	1,79,535	1,79,535
Other Roads	56,08,477	59,02,539	60,59,813	60,19,757	60,19,757	60,19,723
Total	**58,97,671**	**62,15,797**	**63,71,847**	**63,31,791**	**63,45,437**	**63,45,462**

Source: Ministry of Road Transport and Highways of India Annual Reports, CareEdge Research

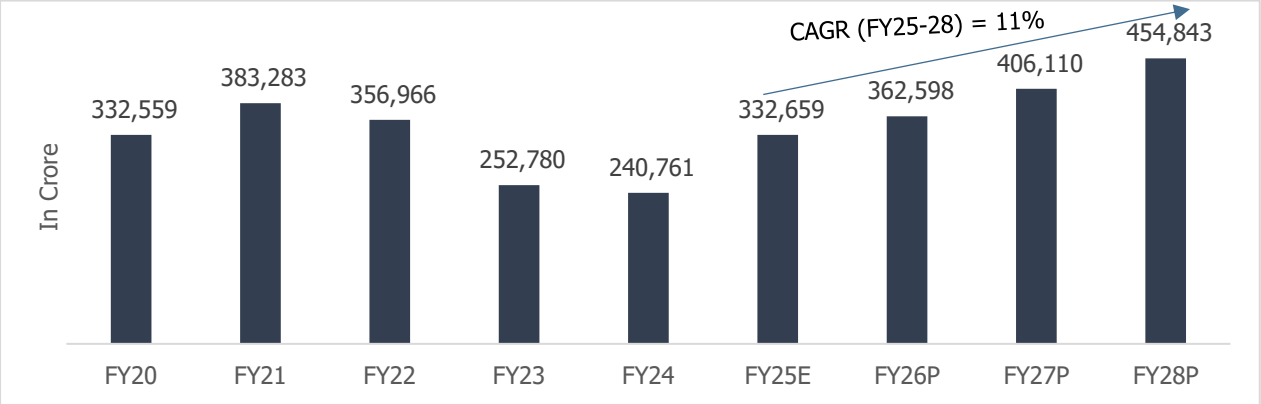
Road transportation, the most common mode of transportation in India, accounts for about 87% of passenger traffic. Despite having a network of 1,46,145 km, Indian national highways account for ~2% of total road network and ~ 40% of total road traffic. State highways and major district roads make up the country's secondary road transportation system, accounting for 60% of traffic and 98% of road length.

As of FY25, the road sector budget contributes ~1.53% of total India's GDP, highlighting its crucial role in driving economic growth through infrastructure development, creating employment, facilitating trade and logistics, and enhancing connectivity across regions, which in turn stimulates various industries and supports overall national productivity

Investment in Road Sector in India

CareEdge research anticipates Rs. 15,50,000 crores of investments from FY25-28 which will be invested in national highways with expected CAGR of around 11% in the same period.

Chart 13: Investments in Roads sector

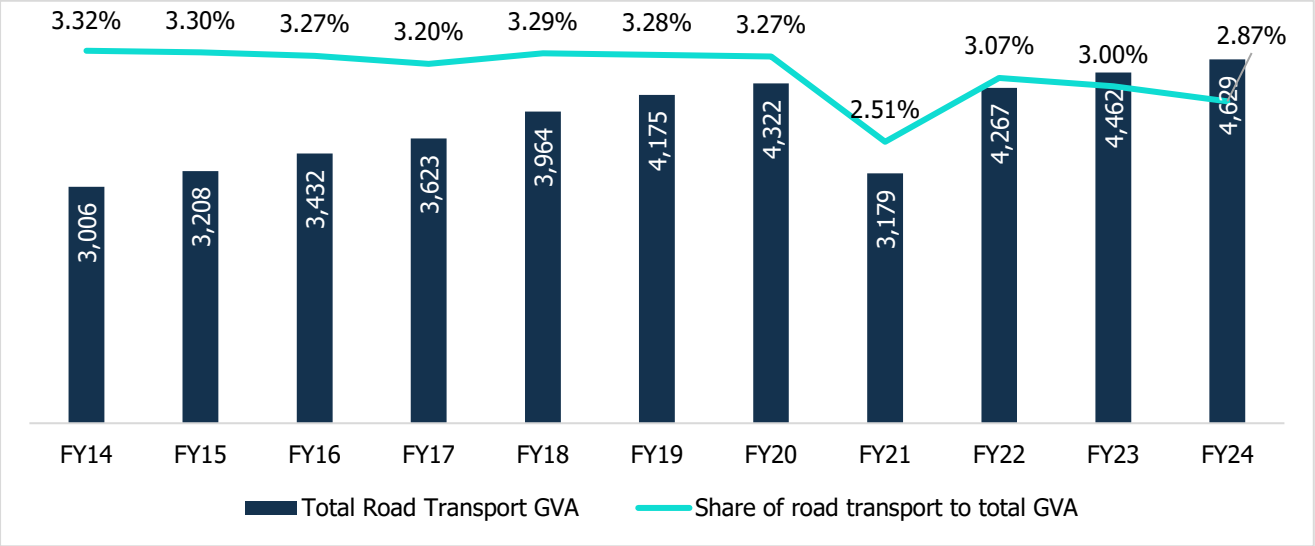


Source: NITI Aayog report on National Infrastructure Pipeline, CareEdge Research

Contribution of Road to Total GVA

Road transport has been a preferred mode of domestic transport for any passengers and goods movement vis-à-vis other modes of transport due to ease of first and last mile connectivity and significant development of the road network across the country over the past two decades. The road sector generated highest gross value addition of Rs. 4.63 trillion in FY24 at current prices and contributed ~78% to overall GVA added by the transportation sector. Wherein, the other mode of transports like railways contributed ~15%, while water contributed ~3% and air 1%. From FY14 to FY24, factors like growing urbanization and population led to growth of road transport segment at a CAGR of 4.4%.

Chart 14: Contribution of Road Transport to total Gross Value Added (Current Prices)



Source: MOSPI

Outlook on Toll Collection

The Government mandated the use of FASTag from February 2021 onwards. In addition, the convenience of using digital payment modes has resulted in considerable growth in toll payments through the NETC platform. There has been an upside in toll collection after increase in Toll Operate Transfer (TOT) models and Monetization of assets by Government of India. Under this model, NHAI has monetised four TOT Bundle 11,12,13 and 14 and realised Rs. 15,968 crores during the FY24 and TOT Bundle 16 with realization of 6,681 crores, totalling Rs. 48,995 crores so far.

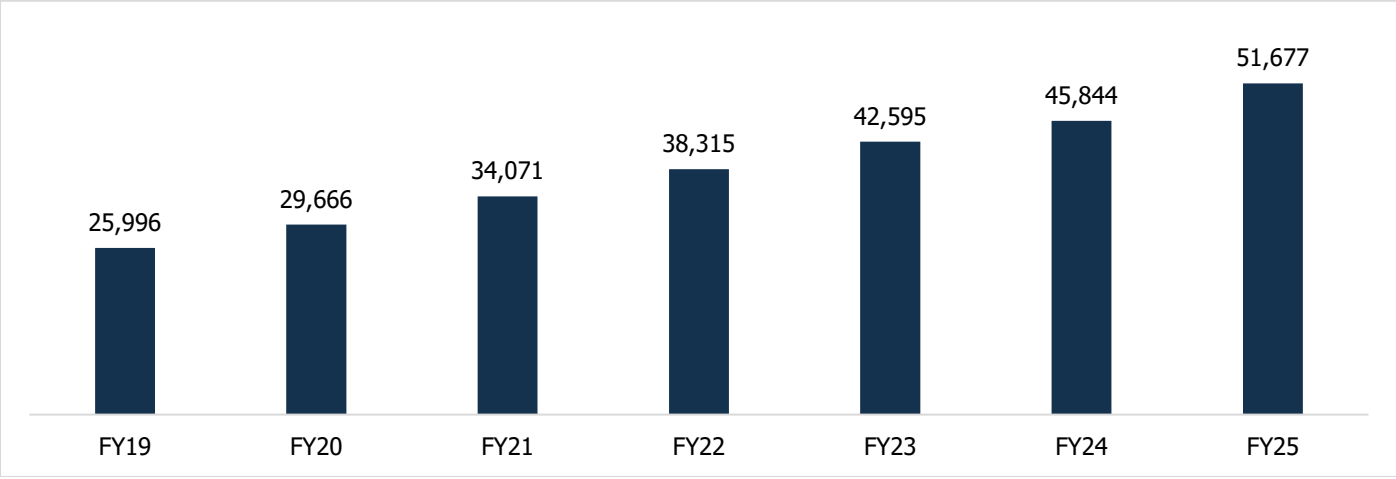
Table 5: User Fee Collection Revenue (Rs. Crore)

Financial Year	Total Amount
FY19	25,154.8
FY20	27,637.6
FY21	27,923.8
FY22	33,907.7
FY23	48,028.2
FY24	64,809.9
FY25	72,931.0

Source: PIB, CareEdge Research

The tolling length has also increased on yearly basis. It has grown by 98.8% when compared with FY19 implying government shifts towards increasing toll plaza and efficient toll collection with Fastag collection system. As of March 2025, the toll length stands at around 51,677 Km.

Total Tolling Length (In Km)



Source: PIB, CareEdge Research

Total Tolling Length is expected to grow in future with increasing toll revenue for the government. The government's upcoming NHAI projects focused on connectivity and increasing expressways which will help increase in cargo and passenger vehicle movement. The investments made in projects will be recovered through toll collection for a period of 15-20 years, this will eventually lead to increase in toll collection in future for NHAI.

Recent Road Projects Announcements

Table 6: Below table depicts Major Projects Announced

Project Name	Project Announcement Date	Cost (Rs. Crore)	Km	State
Elevated Highway Corridor (Nallamala Hills) Project	12-05-2025	7,700	63.0	Andhra Pradesh, Telangana
Expressway (Nashik-Vadhavan Port) Project	26-03-2025	18,000	103.0	Maharashtra
Expressway (Somnath-Dwarka) Project	18-03-2025	57,120	680.0	Gujarat
Namo Shakti Expressway (Deesa-Pipavav) Project	18-03-2025	39,120	430.0	Gujarat
Expressway (Jewar Airport-Ganga Expressway) Project	03-03-2025	4,415	83.0	Uttar Pradesh
Underground Tunnel (Yerawada-Katraj) Project	21-02-2025	7,500	20.0	Maharashtra
Greenfield Expressway (Sri Ganganagar-Kotputli) Project (Package-8)	19-02-2025	7,015	290.0	Rajasthan
High Speed Corridor (Shillong-Silchar) Project	06-02-2025	25,000	167.0	Assam, Meghalaya
Elevated Corridor (Kilambakkam Terminus-Mahindra City) Project	06-02-2025	3,500	18.4	Tamil Nadu
Greenfield Expressway (Jaipur-Pachpadra) Project	23-07-2025	11,492	350.0	Rajasthan
High Speed Corridor (Lakhnadon-Raipur) Project	28-08-2025	10,000	220.0	Madhya Pradesh, Chhattisgarh
High Speed Access Controlled Corridor (Ayodhya-Varanasi) Project	16-09-2025	9,200	200.0	Uttar Pradesh
New Outer Ring Road (Nagpur) Project	15-09-2025	8,948	148.0	Maharashtra
Tunnel (Seshadri Road-Silk Board) Project (Package 2)	19-08-2025	8,928	8.0	Karnataka

Tunnel (Hebbal Esteem Mall-Silk Board KSRP) Project (Package 1)	19-08-2025	8,770	8.7	Karnataka

Source: Projects Today

Freight Traffic Scenario

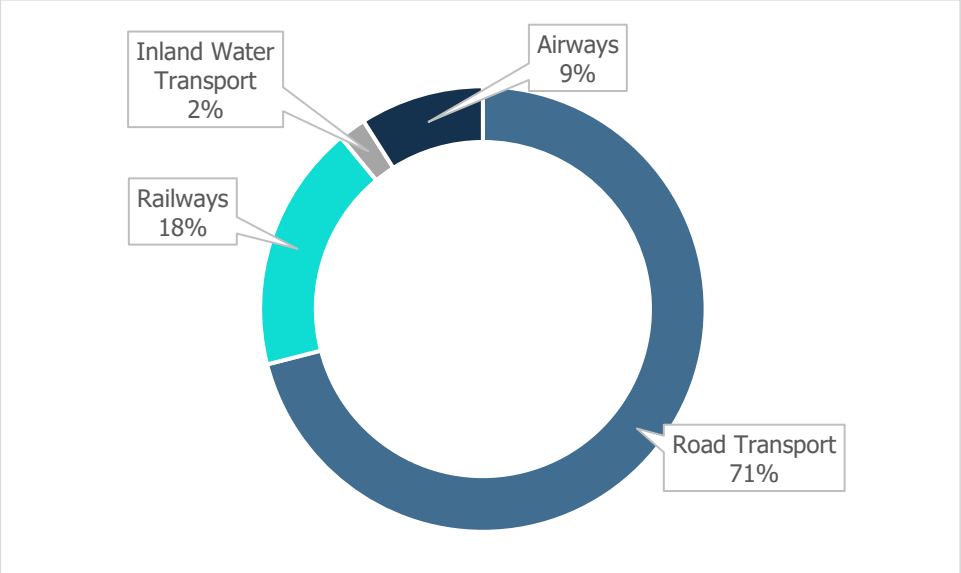
India handles more than 4.6 billion tonnes of goods each year, amounting to a total annual cost of USD 1.2 Trillion. These goods represent a variety of domestic industries and products – 22% are agricultural goods, 39% are mining products and 39% are manufacturing-related commodities. Trucks and other vehicles handle most of the movement of these goods. Railways, coastal and inland waterways, pipelines, and airways account for the rest.

The freight traffic (rail, air and port) is an indicator of the movement of goods by any means of transportation. Major domestic freight as at FY25 is still transported by road which accounts for 71% (25% globally) followed by rail – 18% (60% globally), Inland Water Transport- 2% and Airways- 9%.

Freight movement in India is dominated by road transport, which carries nearly 71 percent of the country's total freight volumes. Over the past decade, road freight traffic has expanded steadily in line with industrial output, consumer demand, and the growth of organized logistics. The increase has been supported by multiple drivers. Expansion in core industries such as steel, cement, automobiles, and FMCG has added significant freight volumes, while the rapid penetration of e-commerce platforms has boosted demand for last-mile and regional distribution services. Infrastructure development, including new highways under Bharatmala and the widening of existing corridors, has reduced transit times and improved efficiency.

Going forward, Railways are expected to gain share owing to the Dedicated Freight Corridors (DFCs) and comparatively higher road freight rates. DFCs are aimed at decongesting India's railway network. It will help carry freight at higher speed with increased load-carrying capacity.

Chart 15: Share of Major Domestic Freight Traffic (FY25)



Source: PIB

Key Demand Drivers and Emerging Trends

Category	Details
Population Growth and Economic Development	India's increasing population and economic growth necessitate enhanced transport infrastructure. Investments in roads, railways, aviation, shipping, and inland waterways are vital.
Recent Initiatives	• **September 2025**: GOI announced Rs 11 trillion investment to build 17,000 km of high speed, access-controlled expressways by 2033. • India plans to upgrade 25,000 km of two-lane highways to four-lanes at Rs 10 trillion and 16,000 km of four-lane highways to six-lanes for Rs 6 trillion. The work is expected to start by 2027.
National Infrastructure Pipeline (NIP)	Projects worth Rs. 54.3 trillion is at various stages of implementation, demonstrating the government's commitment to infrastructure development.
Infrastructure Development in Roads and Highways	The pace of construction for NH projects has relatively increased from 15km/day in FY19 to 29KM/day in FY25.

Public-Private Partnerships (PPPs) and Investment Opportunities	Models like the Hybrid Annuity Model (HAM) and toll-operate-transfer (ToT) have encouraged private sector participation. India allows 100% FDI in roads and highways under the automatic route, offering lucrative opportunities.
Innovation and Efficiency	The adoption of digital platforms and artificial intelligence in project management enhances efficiency and transparency, showcasing India's potential for innovative infrastructure projects.

Emerging Trend

- **Technology integration** in road infrastructure for traffic control, real-time monitoring, and intelligent mobility solutions is known as "smart infrastructure."
- **Sustainable Practices:** Using renewable energy sources, green building methods, and environmentally friendly materials in road constructions.
- **Multimodal connection**: For seamless connection, there is a focus on combining road networks with other forms of transportation like railroads, waterways, and air travel.
- **Public-Private Partnerships (PPPs):** Using PPP models to generate finances and skills, the private sector is becoming more involved in road development projects.
- **Electric Vehicles:** As more people use electric more improvements and innovations in the road infrastructure are required to accommodate these innovative technologies.

National Highways in India

Overview of National Highways

India's national highways constitute the core of the country's road infrastructure, serving as the primary corridors for freight and passenger movement. The network has expanded steadily over the past five years, increasing from 1,32,500 km in FY20 to 1,46,204 km in FY25 at CAGR of 2%. The most significant addition was recorded between FY22 and FY23, when nearly 3,960 km were added, underscoring accelerated execution under government programs such as Bharatmala Pariyojana and the National Infrastructure Pipeline. Despite accounting for only about 2 percent of India's total road length, national highways carry more than 40 percent of road traffic, highlighting their critical role in economic activity and logistics efficiency. Going forward, policy emphasis is expected to move towards widening existing stretches, improving safety standards, and integrating technology solutions such as digital tolling and smart asset monitoring, thereby positioning the sector for efficiency-driven growth rather than sheer expansion.

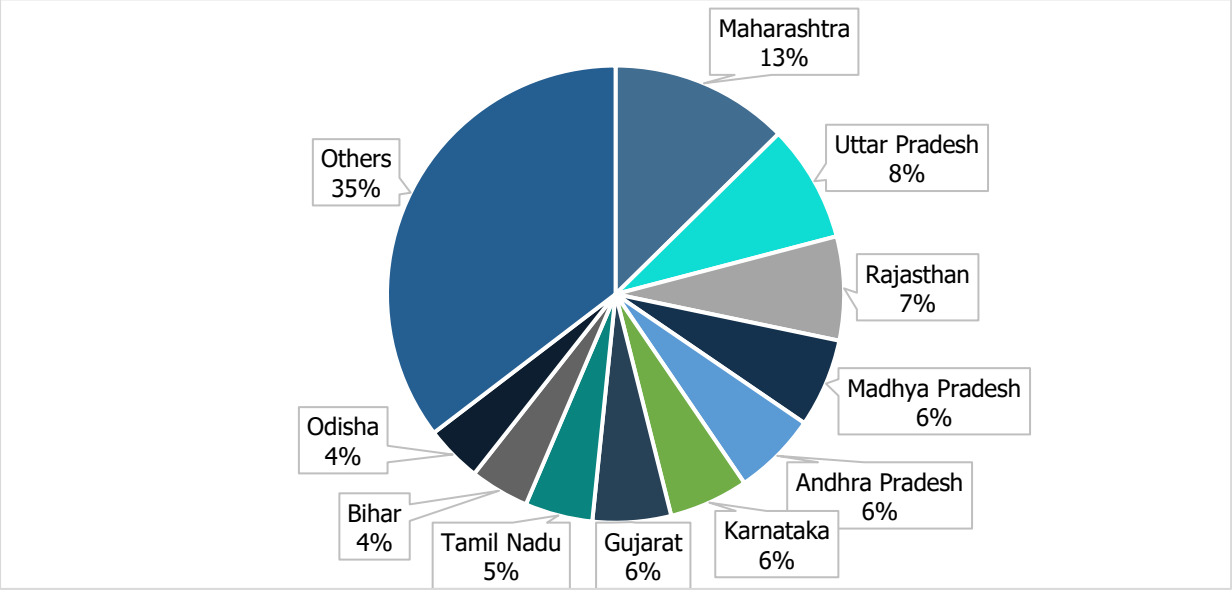
Table 7: State-wise Length of National Highways

States	Total NH length as on 30/09/2019	Total NH length as on 31/12/2024
Andhra Pradesh	6,914	8,683
Arunachal Pradesh	2,537	4,367
Assam	3,909	4,077
Bihar	5,358	6,132
Chandigarh	15	15
Chhattisgarh	3,606	3,620
Delhi	157	157
Goa	293	299
Gujarat	6,635	8,111
Haryana	3,166	3,347
Himachal Pradesh	2,607	2,607
Jammu & Kashmir and Ladakh	2423.2	2741
Jharkhand	3,367	3,633
Karnataka	7,335	8,191
Kerala	1,782	1,858

Madhya Pradesh	8,772	9,160
Maharashtra	17,757	18,462
Manipur	1,750	1,840
Meghalaya	1,156	1,156
Mizoram	1,423	1,499
Nagaland	1,548	1,670
Odisha	5,762	5,867
Puducherry	27	64
Punjab	3,274	4,264
Rajasthan	10,342	10,733
Sikkim	463	709
Tamil Nadu	6,742	7,000
Telangana	3,796	4,926
Tripura	854	889
Uttar Pradesh	11,737	12,123
Uttarakhand	2,949	3,664
West Bengal	3,665	3,910
Andaman and Nicobar Island	331	331
Dadra and Nagar Haveli	31	37
Daman and Diu	22	22

Source: MORTH Annual Report, NHAI website, CareEdge Research

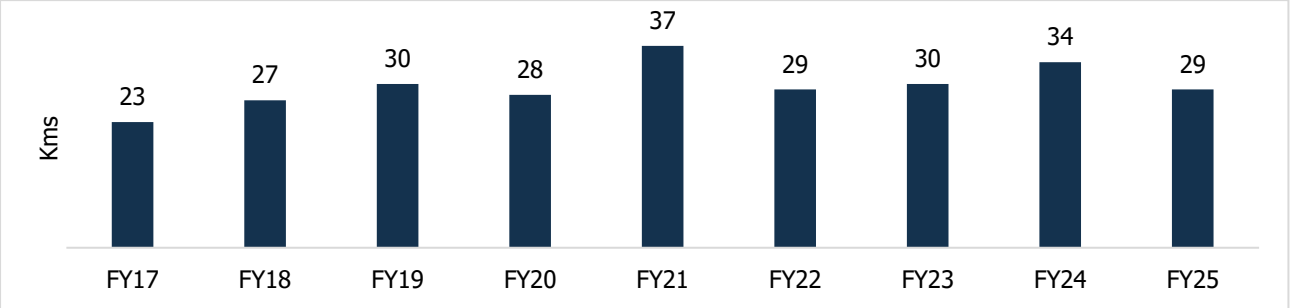
Chart 16: Share of Top 10 states as on 31st December 2024



Source: NHAI website, CareEdge Research

Rate of Highway Construction per day

Chart 17: Pace of Construction (Km/Day)

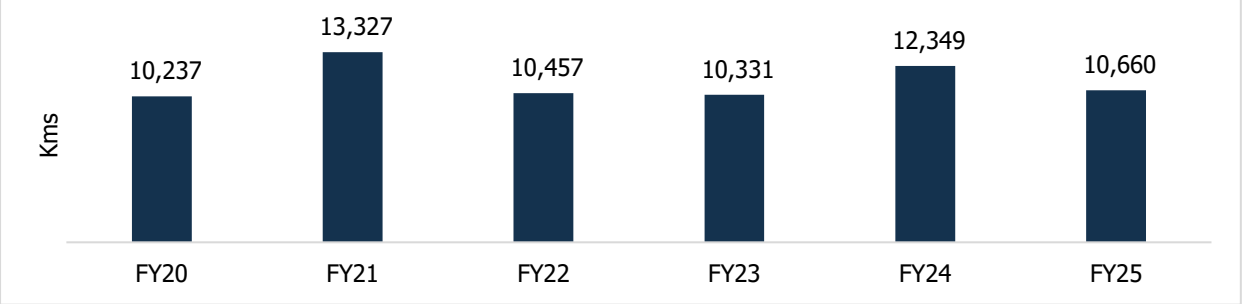


Source: Ministry of Road Transport and Highways of India Annual Reports & CareEdge Research

Highway construction activity has shown notable fluctuations over the years, with the highest pace recorded in FY21 at 37 km per day, driven by government stimulus and increased infrastructure spending during the COVID-19 period. In the subsequent years, construction remained steady, averaging 30 km per day in FY23 and rising to 34 km per day in FY24, reflecting consistent execution momentum. As of FY25, the pace has moderated to 29 km per day, mainly due to the slowdown typically seen during general election periods, which tends to delay project approvals, fund disbursements and construction activity.

Construction of National Highway

Chart 18: Year-wise Construction of National Highway

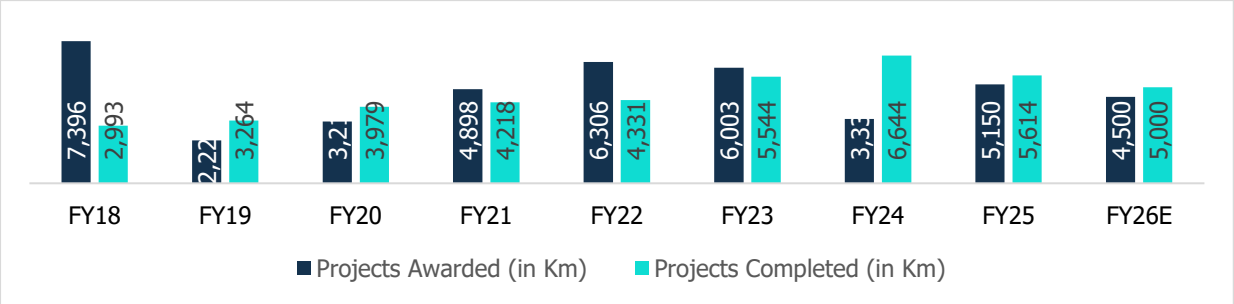


Source: MORTH FY24-25, CareEdge Research

Highway construction peaked in FY21, primarily due to aggressive government capital expenditure aimed at reviving the economy post-COVID. This period saw a record 13,327 km of construction, supported by faster clearances, liquidity support, and strong policy thrust. In the years that followed, construction moderated, reflecting a normalization of activity. However, FY24 saw renewed momentum with 12,349 km of highways built one of the highest in recent years. In FY25, highway construction declined to 10,660 km, primarily due to delays in state-level clearances during the extended election period and a shift in focus towards the development of high-speed corridors and expressways.

National Highway Projects Awarded and Completed

Chart 19: Projects Awarded by NHAI



Source: NHAI Annual Reports, Industry Resources, CareEdge Research

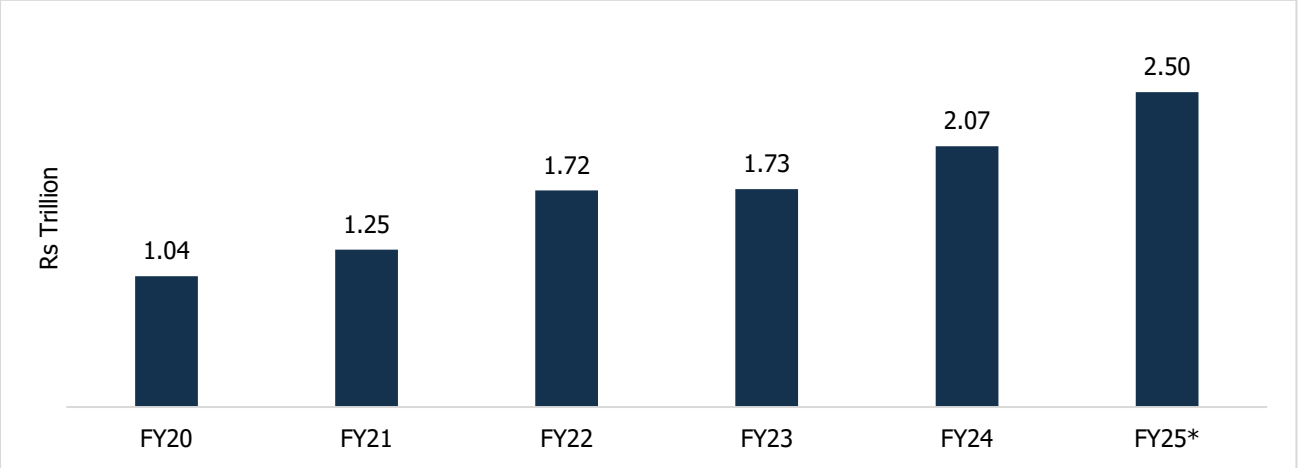
For FY26, NHAI is expected to award 4,500 km and complete 5,000 km of highway projects. In FY25, the National Highways Authority of India (NHAI) awarded 5,150 km of highway projects and completed 5,614 km

of construction, continuing the strong execution momentum seen in recent years. While project awards have reduced from the peak of 6,003 km in FY23 and 6,306 km in FY22, primarily due to a halt in projects under the Bharatmala Pariyojana pending revised cost approvals, the general elections and associated Model Code of Conduct, and new tighter bidding norms aimed at curbing aggressive bidding.

On the execution side, FY24 recorded the highest completion to date at 6,644 km, driven by improved coordination, efficiency, and policy push under initiatives such as Gati Shakti, Bharatmala Pariyojana, the National Infrastructure Pipeline, and the revised Hybrid Annuity Model (HAM) framework. FY25 sustained this performance with 5,614 km completed, indicating that the groundwork laid in prior years is translating into consistent delivery.

Budgetary Outlay for NHAI

Chart 20: Capital Expenditure by NHAI



Source: PIB, CareEdge Research

An amount of about Rs 2.40 trillion has been allocated and released to NHAI during FY25 through budgetary resources. NHAI has incurred actual expenditure of Rs 2.50 trillion during FY25. Additionally, expenditure of Rs 19,245 crore through private investment has also been incurred during FY25.

In last 6 years, NHAI has constructed 29,664 km of National Highways (NHs) with estimated 45 Crore man days of direct employment, 57 Crore man days of indirect employment and 532 Crore man days of induced employment. This substantial job creation highlights the socio-economic benefits of infrastructure development. Furthermore, Expressways and 22 Access Controlled Highways, having total length of 9,860 km with approved / estimated project cost of Rs. 4,19,130 crores have been taken up by NHAI as greenfield corridors.

National Highway Development Project (NHDP)

The primary objective of the NHDP is to build International standard roads with facilities for uninterrupted traffic flow with:

- Enhanced Safety Features
- Better Riding Surface
- Better Road Geometry
- Better Traffic Management and Noticeable Signage
- Divided Carriageways and Service Roads Grade Separators
- Over Bridges and Underpasses
- Bypasses
- Wayside Amenities

The project is being carried out by NHAI in association with various state public works departments.

Over time, as the scale and ambition of India's highway development expanded, the NHDP framework was gradually integrated into the broader Bharatmala Pariyojana, which now serves as the umbrella program for national highway expansion and modernization. While NHDP laid the foundation for systematic highway development and corridor-based planning, Bharatmala has taken forward this vision with a more comprehensive

approach, focusing on economic corridors, border and coastal connectivity, and efficiency-driven logistics integration.

Vision 2047 – Bharatmala

The Bharatmala Pariyojana represents the Government of India's flagship program for national highway expansion and modernization, subsuming earlier initiatives such as the NHDP. While Phase I of Bharatmala, covering 34,800 km at an estimated cost of Rs 5.35 trillion, has faced delays and is now expected to be completed by FY27–28, the program continues to anchor India's long-term infrastructure vision.

Table 8: Status of Bharatmala as on 31st December, 2024

Component	Length (in Km)	Total Length Completed (in km)
Economic Corridors	8,737	5,986
Inter Corridors Roads	2,889	2,108
Feeder Roads	973	540
National Corridors	1,777	1,394
National Corridor Efficiency Improvement	824	732
Expressways	2,422	1,791
Border Roads & International Connectivity Roads	1,619	1,400
Coastal Roads	77	72
Port Connectivity Roads	348	120
Balance Road Works under NHDP	6,758	5,058
Total - Bharatmala	**26,425**	**19,201**

Source: MORTH Annual Report 2024-25, CareEdge Research

Aligned with the Ministry of Road Transport and Highways' Vision 2047, Bharatmala is envisaged as a transformative framework to deliver high-speed corridors within 100–150 km of all citizens, ensuring seamless freight and passenger movement across the country. The vision emphasizes not only network expansion but also efficiency-driven development, including economic corridors, border and coastal connectivity, logistics integration, and adoption of advanced contracting and asset monetization models.

By 2047, the program aims to:

- Establish 50 national corridors, expanding beyond the six legacy corridors under NHDP.
- Connect over 550 districts with highway infrastructure, compared to ~300 today.
- Shift freight movement share on highways from ~40% to 70–80%, reducing logistics costs and improving India's competitiveness.
- Integrate highways with logistics parks, multimodal hubs, and smart monitoring systems, ensuring resilience and sustainability

Annual Toll Collections

NETC FASTag statistics

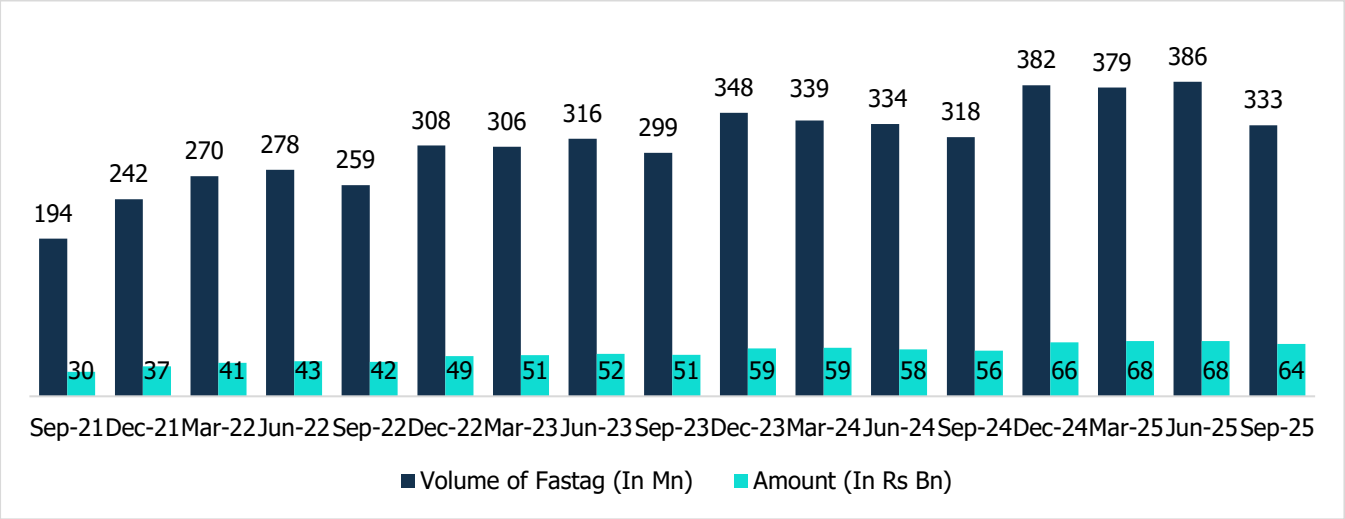
Over the past few years, the Indian roadways infrastructure has been constantly upgraded due to the increasing vehicle density. At the same time, digital transactions in the country have steadily grown. The National Electronic Toll Collection (NETC) programme using FASTags on vehicles has played a crucial role in the growth of digital transactions across the country. It has moved many vehicles to the payments ecosystem and reduced the use of cash for toll payments on roads and highways.

Though the national highways constitute just 2% of the overall road network in the country, around 40%of the total traffic is concentrated on these highways. Any congestion at these highways or at toll plazas results in wastage of fuel, money and time and has significant environmental impacts. Another critical factor is the revenue leakage from toll plazas due to irregularities in reporting the actual toll money collected in cash and non-standardised vehicle classification. To provide the public with convenient, easy, and cashless modes of payments at toll plazas across the country, the Indian Highways Management Company Limited (IHMCL) and National

Highways Authority of India (NHAI) introduced FASTag. FASTag is a toll collection mechanism that uses radio frequency identification (RFID) tags and is placed on vehicles. The National Payments Corporation of India (NPCI) is running it.

The programme has seen 11.9% growth on y-o-y basis as of Mar-25, with a collection of Rs 68 billion in FY25 and as of Sep-25 stands at Rs 64 billion. In terms of volume and the amount collected Jun-25 has been the highest q-o-q sales.

Chart 21: NETC FAStag Statistics

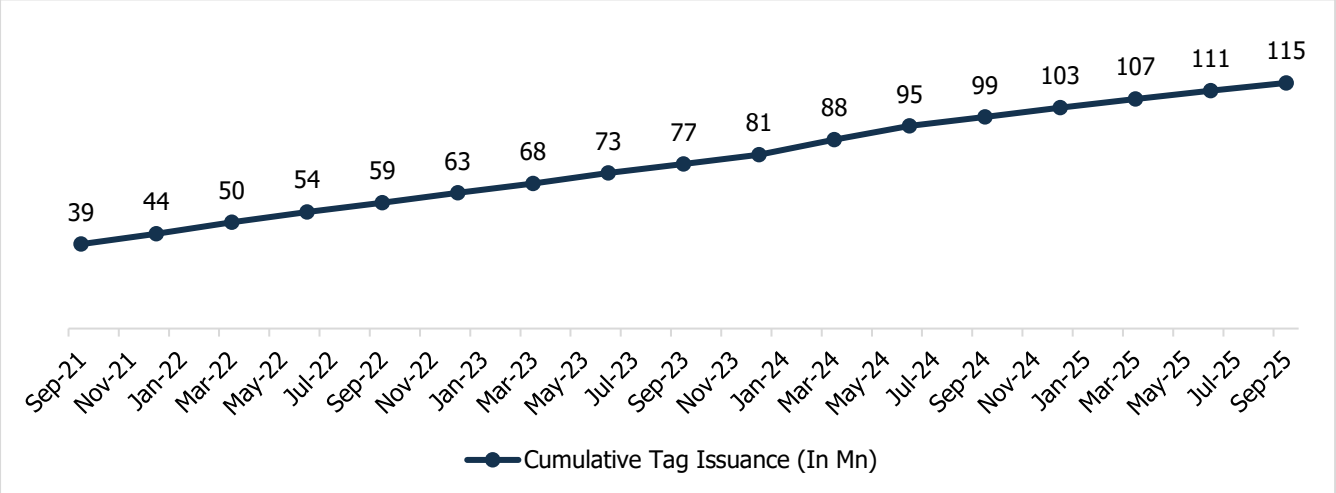


Source: NPCI, CareEdge Research

Cumulative Tag Issuance

The landscape of toll collection in India is evolving, with a growing emphasis on improving road infrastructure and traffic management. As tolling becomes an integral part of the nation's road development strategy, the willingness of people to pay tolls is emerging as a significant factor in the growth of toll collection systems. The openness of the Indian populace to toll payments is shaped by a variety of elements, from infrastructure quality to economic and social perceptions, which directly impact the sustainability and scalability of toll-based financing models for road development.

Chart 22: Cumulative Tag Issuance



Source: NPCI, CareEdge Research

Overview of the Government Policies and Regulatory Framework in the industry

Overview of the Government Policies

Policy Framework at the central level

Road construction is a critical sub-segment for infrastructure development, economic growth, and employment creation. The government has placed significant emphasis on infrastructure development. For example, in the Union Budget 2025–26, the government allocated an outlay of Rs 2,870 billion for road construction, surpassing the estimated expenditure of Rs 2,803 billion for 2024-25.

Moreover, Rs. 111 trillion of investments had been projected in infrastructure projects for FY20-FY25 by the Task Force on National Infrastructure Pipeline (NIP), with ~18% of the targeted investment expected to be made in the road sector in India. As of now, overall projects worth Rs 37.3 trillion have been completed, accounting for 31% of the revised target. While the original horizon was set for FY2020–2025, the program will continue beyond FY25, aligning with India's long-term infrastructure and economic growth objectives.

Also, under the recently announced Asset Monetization Pipeline, around Rs. 1,600 billion are to be raised through the monetisation of roads.

Table 9: Authority and Responsibility

Authority	Responsibility
The **Ministry of Road Transport and Highways (MoRTH)**, a central government apex body, formulates and implements policies for road transport, national highways, and transport research. It collaborates with other central ministries, state governments, union territories, organisations, and individuals to enhance the mobility and efficiency of the road transport system across the country.	The **National Highways Authority of India (NHAI)** is responsible for the development and maintenance of national highways. The **National Academy of Highway Engineers** (formerly National Institute of Training for Highway Engineers) is responsible for sharing of knowledge and pooling of experience on the entire range of subjects dealing with the construction and maintenance of roads, bridges, tunnels, and road transportation including technology, equipment, research, planning, finance, taxation, organization, and all connected policy issues. A wholly owned company of MoRTH, **National Highways and Infrastructure Development Corporation (NHIDCL)**, is responsible for promoting, surveying, establishing, designing, building, operating, maintaining, and upgradation of national highways and strategic roads including interconnecting roads in parts of the country which share international boundaries with neighbouring countries.

- **Financial Incentives for Road Developers**

To encourage private sector participation and investment in road development, the government has introduced several financial incentives and mechanisms:

a) Public Private Participation: Traditionally, the road projects were fully financed and controlled/ supervised by the Government. The implementation of road projects was purely dependent on the availability/allocation of funds out of the budget of the Government. The Government has announced several incentives to attract private sector participation and foreign direct investment, which include the following.

- Government to bear the cost of-
    - Project Feasibility Study

- Land for the right of way and way side amenities
- Shifting of utilities
- Environment clearance, cutting of trees, etc.

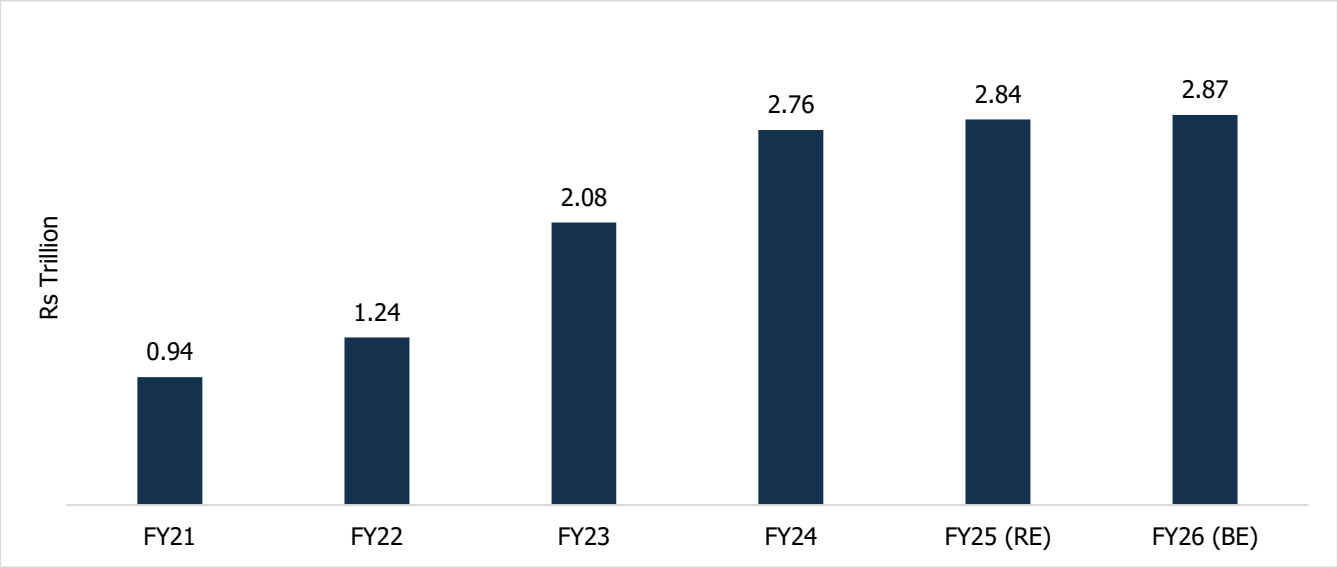
- Foreign Direct Investment up to 100 % in road sector.
- Provision of subsidy up to 40% of project cost to make projects viable. The quantum of subsidy to be decided on a case-to-case basis.
- 100% tax exemption in any consecutive 10 years out of 20 years after commissioning of the project.
- Duty free import of high capacity and modern road construction equipment's.
- Declaration of the road sector as an industry (Infrastructure as defined in section 18(1) (12) of the Infrastructure Act includes Roads).
- Easier external commercial borrowing norms.
- Right to retain Toll rates are indexed to the wholesale price index.

Make in India: The Make in India initiative promotes indigenous manufacturing, reducing reliance on imports and boosting the economy, with significant benefits for the road sector. It encourages the local production of essential materials like asphalt, bitumen, cement, and steel for road construction and maintenance. Additionally, the initiative has driven the local manufacturing of road construction equipment, machinery, and technology, lowered costs and enhancing self-sufficiency. Furthermore, the government's focus on creating a favourable business environment has attracted foreign direct investment (FDI), leading to collaborations between international and domestic firms, fostering a more competitive road development sector.

Budgetary Outlay for the Road Sector

Road construction plays a vital role in developing infrastructure, boosting the economy, and creating jobs. The government is putting a lot of emphasis on infrastructure. Overall, though, MoRTH's budget increased to Rs 2.9 trillion in the 2025-26 budget estimate, up from Rs 2.8 trillion in the revised estimate for 2024-25. However, the capital expenditure for the Ministry of Road Transport and Highways (MoRTH) remained flat at Rs 2.7 trillion in 2025-26, as compared to the revised estimate for 2024-25. It is expected that the centre is focusing on asset monetisation along with increasing the share of BOT-Toll projects to boost Capex in the sector.

Chart 23: Budgetary Outlay for Road Sector



Source: Union Budget 2025-26 Analysis, CareEdge Research

Regulatory Framework

Overview of PPP framework and models in operation

Connectivity has been a key priority for the government, with roads recognised as the most effective and economical means of enhancing last-mile connectivity. Constructing roads across every corner of the country solely through government agencies poses challenges, as it would significantly increase both time and cost. To address this, the government partnered with private players through Public-Private Partnerships (PPPs) to achieve comprehensive road connectivity. Initially, PPP road projects were categorised broadly into toll-based and annuity-based models.

Private sector participation, however, began to decline after 2012 due to several issues, including aggressive bidding, over-leveraged balance sheets of developers, deficiencies in project preparation, and challenges with land acquisition. To reinvigorate private sector involvement in the road sector, the government introduced the Hybrid Annuity Model (HAM), which prioritises the equitable allocation of risks between stakeholders.

In recent years, the operational asset monetisation model has gained traction, particularly with the introduction of the Toll-Operate-Transfer (TOT) framework. Additionally, alternative asset monetisation mechanisms, such as Infrastructure Investment Trusts (InvITs) and the securitisation of toll revenue, have been implemented to further attract investment and enhance efficiency in the sector.

Table 10: Key Features

Type of Project	Development Risk	Financing Risk	Traffic Risk and accrual of toll fee collection	Award Criteria	Concession Period	Cash Outflow for Government	Revenue for Private Party
BOT-HAM	Concessionaire	Concessionaire	Authority	Lowest project and O&M cost	15-20 years	40% of project cost paid by authority during construction, and 60% in semi-annuity along with interest.	Construction grants, annuity payments, interest on annuity.
EPC	Concessionaire	Authority	Authority	Lowest contract price	No concession	100% of project cost borne by authority	Limited to contract payments
OMT	No to minimal development risk	Concessionaire	Concessionaire	Highest % of toll revenue share or highest premium per year	5-9 years	Nil	Toll revenues accrue to concessionaire, subject to revenue share/premium
Tolling	No development risk	Concessionaire	Concessionaire	Highest revenue sharing bid	1-3 years	Nil	Toll revenues accrue to concessionaire, shared with authority
TOT	Authority in case of lane upgradation in the concession period	Concessionaire	Concessionaire	Highest upfront payment	15-30 years	Nil	Toll revenues accrue to concessionaire for concession period

Source: MORTH

PPP models

To boost private participation, the government has produced various models including the PPP model.

Build Operate and Transfer (BOT) Toll Model

This is a simple and conventional PPP model where the private partner is responsible for designing, building, operating (during the concession period), and transferring back the facility to the public sector. The role of the private sector partner is to bring the finance for the project and take the responsibility to construct and maintain it. In return, the public sector will allow it to collect revenue from the users by way of tolls. To increase the viability of projects, a capital grants up to a maximum of 40% is provided by NHAI.

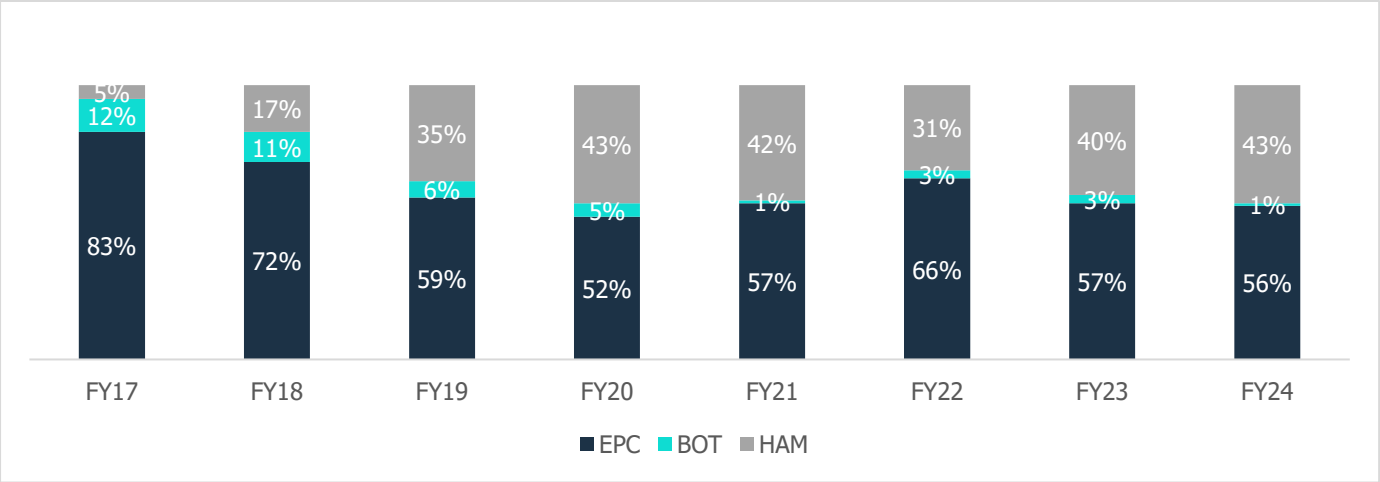
BOT (Annuity) Model

In the BOT (Annuity) mode, the private partner is responsible for building, operating, and transferring the road at the end of the agreement period to the public sector. The toll collection is however undertaken by the government agency and the payment is made on a semi-annual basis to the private players.

Hybrid Annuity Model (HAM)

The Hybrid Annuity Model (HAM), introduced in January 2016, is a type of Public-Private Partnership (PPP) model used for the construction and development of roads in India, ensuring better risk allocation between the government and private developers. The National Highways Authority of India (NHAI) has widely employed this model to develop national highways across the country, which has attracted private capital, accelerated road infrastructure development, and improved road quality. Under the HAM, the government funds 40% of bid the project cost, paid to the private developer in ten equal instalments, while the remaining cost is arranged by the developer. Upon project completion, although NHAI collects tolls, and the private developer is repaid through annuity payments. Traffic risk is borne by the government, with developers receiving fixed annuities. Additionally, all payments are inflation-indexed using a Price Multiple Index, a 70:30 weighted average of the Wholesale Price Index (WPI) and Consumer Price Index (CPI), which helps mitigate inflation risk for the developer.

Chart 24: Breakup of Capital Expenditure Mix of NHAI



Source: NHAI Annual Reports, Projects Today, CareEdge Research

The trend shows that government is now focusing on Hybrid Annuity Model (HAM) because the responsibility of maintenance of roads lies with the contractor, and he must pay the price.

In a bid to address the key issues faced by the stakeholders under existing concession agreement and to enhance the bidding appetite for Hybrid Annuity Model (HAM) based road projects, Ministry of Road Transport and Highways (MoRTH), on November 10, 2020, issued revised model concession agreement for new HAM-based road projects.

Some of the Amendments to HAM after Model Concession Agreement (2020) are as follows:

1. Interest annuities for upcoming HAM projects are now linked to average of one-year MCLR of top five scheduled commercial banks as against bank rate linked interest annuities payable under existing agreement.
2. Release of construction annuity in ten tranches as against five tranches of existing concession agreement.
3. Increase in effective interest rate on mobilization advances from authority

4. Allowing 100% change of ownership post six months from commercial operations date (COD) as against current lock in a period of two years from COD

Engineering, Procurement and Construction (EPC)

In the EPC mode, the cost is completely borne by the public sector (government). The public sector invites bids for engineering knowledge from the private players. Procurement of raw materials and construction costs are met by the public player. The private sector's participation is limited to the provision of engineering expertise.

Service contract

In this approach, the private promoter performs a particular operational or maintenance function for a fee over a specified period. In addition, there are modes such as TOT and Operate-Maintain-Transfer (OMT) for monetizing future toll earnings of completed projects.

Toll Collection

In 2009, the concept of Toll collection emerged as a distinct business model like outsourcing. In this arrangement, the authority invites the private parties to collect tolls on highways built under EPC and BOT-annuity contracts. It is often used for projects which last less than a year.

The project is given to the private player with the highest bid and the contracting authority determines the user fee. During the concession time, the private player has the power to collect user fees.

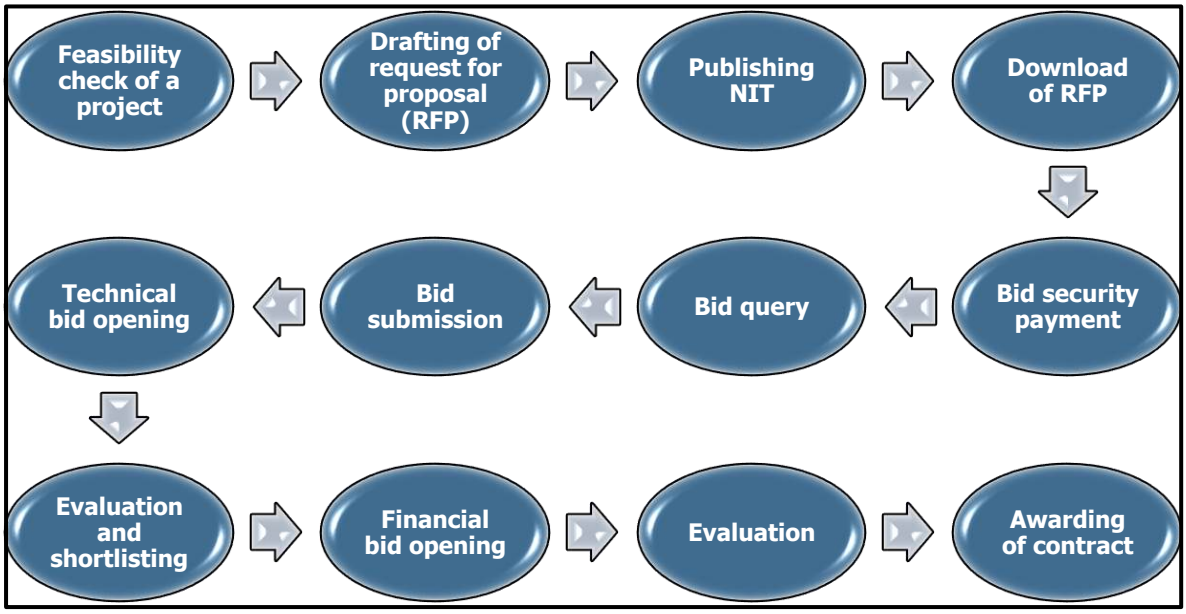
OMT

Under the OMT model, the private party is responsible for maintenance for a set period. The concept of OMT was established to ensure optimum quality and safety for road travellers. An OMT project includes a contract for the right to collect tolls as well as a contract for the stretch's management and maintenance.

TOT

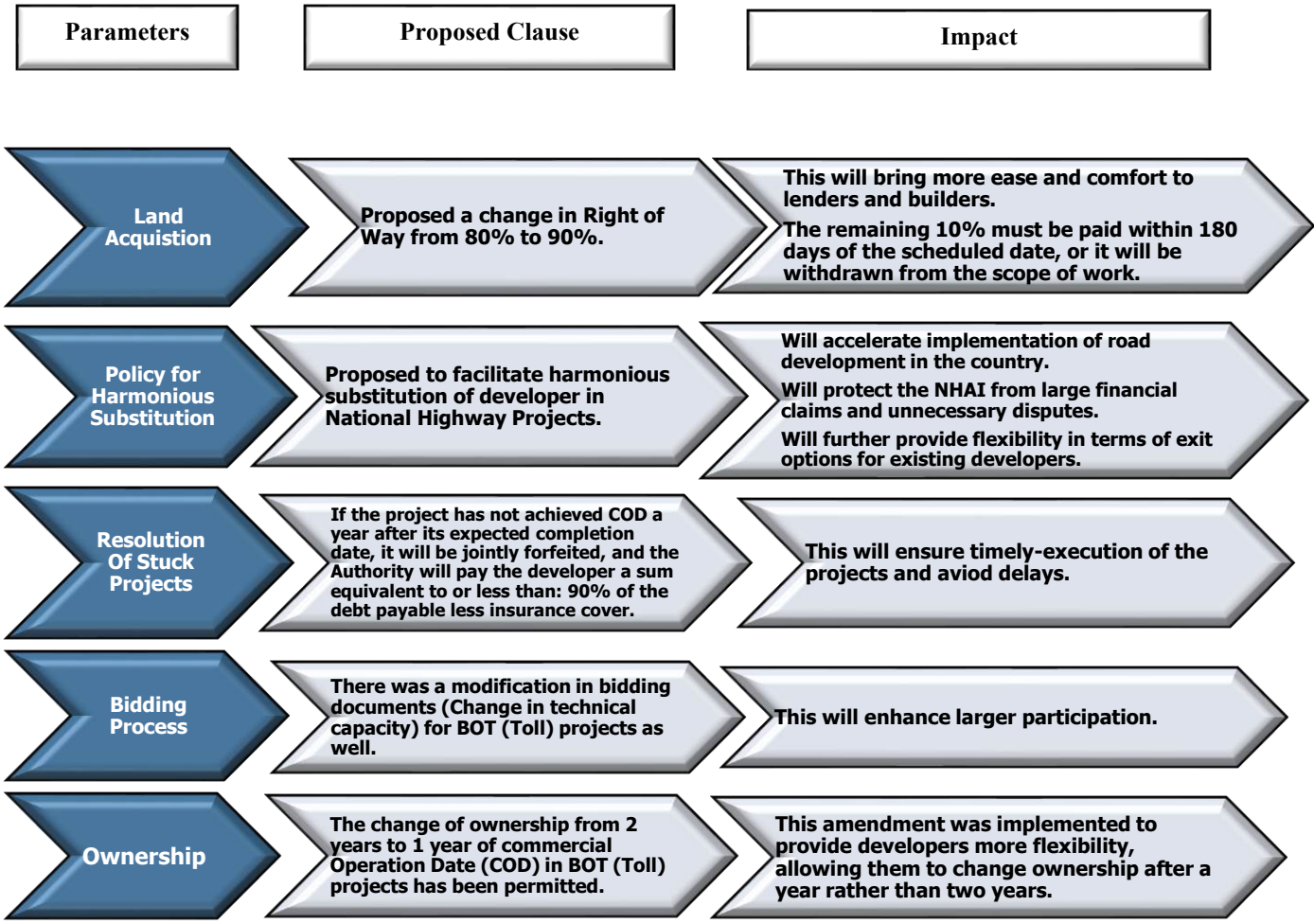
Under the TOT model, the right of collection and appropriation of fees for selected operational NH projects constructed with public funds shall be assigned to developers for a pre-determined concession period in exchange for an upfront payment to NHAI. Such rights assignment shall be based on the toll income potential of the identified NH projects. The developer will be responsible for the operation and maintenance (O&M) of such projects until the concession period expires.

Bidding Process of a Construction Project



Key Parameters of Existing BOT MCA and Bidding Process

Key Challenges Addressed in BOT MCA Model by the Ministry in order to Promote Private Participation



The total budget for the roads sector in FY26 increased marginally to Rs 2,873.33 billion from Rs 2,780 billion in FY25, supported by a rise in revenue expenditure. The rise in revenue expenditure indicates increased maintenance needs and possible higher operational costs.

The 2025-26 budget by the Government highlights the impetus for growth by focusing on big public investments for modern infrastructure, which shall be guided by PM Gati Shakti and benefited from the synergy of a multi-modal approach.

- In FY26 budget, Centre has launched Asset Monetization Plan 2025-30 with an aim to raise Rs 10 trillion by monetizing brownfield assets, including highways with NHAI identifying 24 road projects for monetization in FY26.
- The budgetary outlay of Rs 2.50 trillion towards the NHAI for FY26 has increased by 21% as compared to FY25.
- In FY26 budget, the NHAI aims to increase project awards by modifying the build-operate-transfer (BOT) model with fast-tracked clearance, as its share has decreased in recent years.

Qualitative views on asset monetisation of HAM projects by EPC players to aid in deleveraging balance sheet

Roads sector to hold significant potential for asset monetisation in the medium term

The potential is expected to be realized through an expanded portfolio of NHAI HAM assets, as well as through EPC projects.

CareEdge projects a substantial monetisation potential for HAM projects, with Business Project Cost ranging from Rs. 1.75 trillion to Rs. 2.2 trillion during FY24-FY28. Additionally, NHAI is expected to commission EPC-roads length of 4,000- 4,500 km each year, which could potentially be transferred to either InvIT or TOT.

Notwithstanding the large pipeline of operational highways, CareEdge opines quality of roads construction, robustness of Operations and Maintenance assumptions and movement in bank rates shall be key determinants for fructification of asset monetization deals.

Asset monetization of HAM projects by EPC players to aid in deleveraging their balance sheets is a strategy that involves selling ownership stakes in operational Highway Asset Management projects to external investors. This can help EPC players achieve several key benefits:

Key Point	Details
Reduce Developer's Debt Levels	The upfront capital from asset sales provides significant cash flow for EPC players, enabling them to bid for new projects and deleverage their balance sheets.
Free Up Capital for New Projects	Reduced debt obligations allow EPC players to redeploy capital into new infrastructure projects, expand operations, and accelerate overall infrastructure development.
Improve Cash Flow	HAM projects provide periodic payments, but asset monetization offers immediate cash flow, improving liquidity, cash flow predictability, and operational expense management.
Attract New Investors	Monetization diversifies the funding base and attracts long-term institutional investors seeking stable returns from infrastructure assets.

Overall, asset monetization of HAM projects creates a win-win situation for both EPC players and the government. EPC players improve their financial health and gain resources for further growth, while the government benefits from increased efficiency in project execution and access to diverse funding sources.

Change in the Model Concession Agreement (MCA) of the Hybrid Annuity Model (HAM) of road project implementation

The introduction of HAM in India provides private developers with valuable opportunities in annuity-based infrastructure projects. The Model Concession Agreement (MCA) for Hybrid Annuity Model (HAM) road projects has seen several updates to improve the efficiency and attractiveness of these projects. Here are some of the key changes:

Bidding Process: Bids will be evaluated on the basis of the lowest Bid Project Cost. The Concession Period is pre- determined. The Bid Project Cost shall constitute the sole criteria for evaluation of bids. In this, the term "Lowest Bidder" shall mean the Bidder who's Bid Project Cost is the lowest.

O&M Payments: The O&M payments are now more structured, with specific amounts payable for maintenance adjusted for price index variations. This provides more clarity and predictability for concessionaires.

a) For flexible perpetual pavement including structures, no maintenance charges shall be paid for the first year; it will be 0.40% of the Bid Project Cost each for the second, third and fourth year, and 0.60% of the Bid Project Cost each for the subsequent years till laying of the renewal layer or end of concession period, whichever is earlier.
b) For rigid pavement with 10 years Maintenance Period including structures: no maintenance charges shall be paid for the first year; 0.20% of the Bid Project Cost each for the second, third & fourth year, 0.40% of the Bid Project Cost each for fifth, sixth, seventh & eighth year, and 0.60% of the Bid Project Cost each till the end of concession period.
c) For stand-alone Bridge/ Tunnel works, the concessionaire shall be paid no maintenance charges for the first year; 0.20% of the Bid Project Cost each for the next five years, and 0.40% of the Bid Project Cost each for the remaining years till the end of concession period.

Overview of TOT projects and its advantages to the government

In 2016, the TOT model was introduced by Cabinet Committee on Economic Affairs (CCEA). CCEA authorized NHAI to monetize publicly funded NH projects in 2016. In TOT model, developers are chosen through a fair and competitive bid process, assuring fairness and transparency in the selection.

The NHAI had begun an asset recycling project using the TOT concept. Through the TOT model, NHAI has been authorized to monetize publicly funded NH Projects that have been operational and collected tolls for at least one year.

The TOT model is a new idea for asset recycling that envisions long-term investment opportunities in the highway sector for Indian developers, as well as a platform built by Pension and Foreign Infrastructure and Pension Funds.

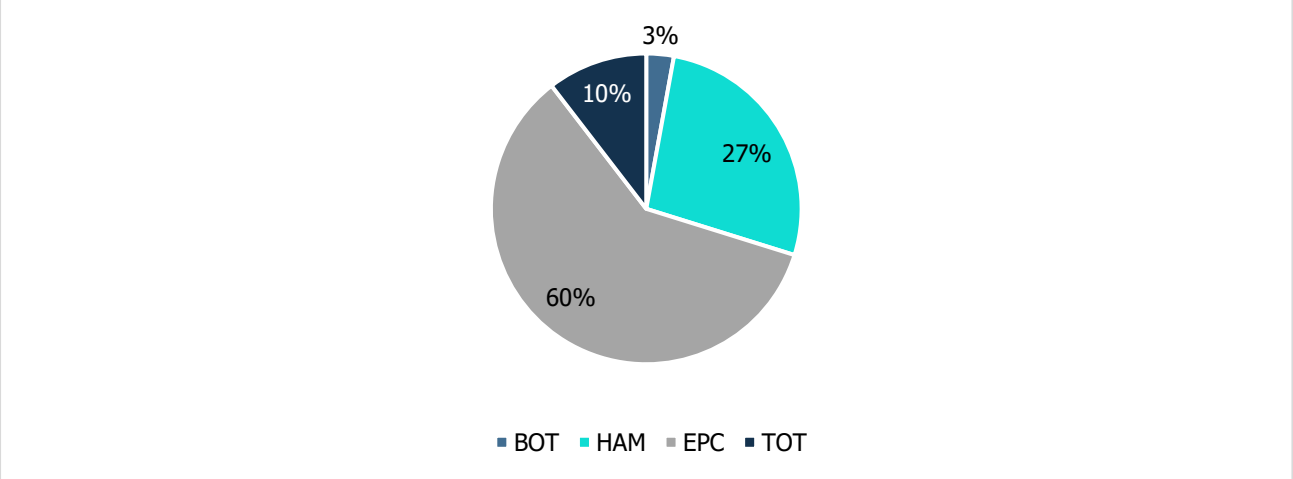
Benefits to the government

- The developer's upfront payments in the TOT model provide the government with immediate revenues, serving as a vital financial source for highway expansion and maintenance in future.
- The TOT model encourages private participation by allowing private enterprises to invest in highway construction. The model attracts private investment which supplements government resources allowing for greater and efficient development. This also helps in reducing the load on the government's budget and enables them to grant funds to other critical sectors.
- Private enterprises are responsible for the development and operation of toll roads under the TOT concept. These firms usually have the skills, expertise and resources necessary for effective project execution which can result in faster project completion, minimizing the time and expense associated with road construction.
- The model will also assist the government in utilizing the corpus (produced from the proceeds of project monetization) to satisfy financing requirements for future development and O&M of roads in the country.

Success of BOT, HAM and TOT projects in terms of bid interest

A total of ongoing projects worth Rs 4,694.6 billion are being executed under various contract models, with different percentages of shares. Among these, the Engineering, Procurement, and Construction (EPC) contracts account for the largest portion, making up 60% of the total, highlighting a preference for this model due to its comprehensive approach encompassing design, procurement, and execution within a single contract. The Hybrid Annuity Model (HAM) projects come next, with a share of 27%. Toll-Operate-Transfer (TOT) projects represent 10% of the total, while Build-Operate-Transfer (BOT) projects have the smallest share, contributing just 3%.

Chart 25: Share between PPP models



Source: Projects Today

HAM Projects

The HAM model has seen considerable success thanks to its balanced approach to risk-sharing, financial sustainability, and strong government backing.

Additionally, the Indian government's preference for HAM, which facilitates quicker project execution and effective risk-sharing, has resulted in a notable increase in projects being developed under this model. With milestone-based payments fostering financial discipline and lowering capital exposure for private entities, HAM is especially advantageous for projects with unpredictable toll revenues but significant public benefits, such as national highways and rural connectivity efforts. However, according to NHAI, HAM projects are proving to be expensive for the government as they involve both upfront grants and repayment with interest to concessionaires. Despite this, HAM remains attractive due to assured returns and reduced private sector risk, leading to higher participation.

Table 11: Details of Top 25 Ongoing projects under HAM model

Project Name	Project Cost (Rs. billion)	Location	State
Outer Ring Road (Mangalapuram-Thekkada-Vizhinjam) (Southern Ring)	48.71	Mangalapuram-Thekkada-Vizhinjam	Kerala
Satellite Town Ring Road (Kunigal-S Mudugadapali) Project (Phase-II)	27.79	Kunigal-S Mudugadapali	Karnataka
Satellite Town Ring Road (Obalapura-Kunigal) Project (Phase-I)	26.42	Obalapura-Kunigal	Karnataka
Raipur-Dhanbad Economic Corridor (Turua Ama-Putrichoura) Project (Pkg-7)	23.82	Turua Ama-Putrichoura	Chhattisgarh
Access-Controlled Coastal Highway (Kakatpur-Erasama) Project (Package-III)	22.01	Kakatpur-Erasama	Odisha
Outer Ring Road (Navaikulam-Thekkada) (Northern Ring)	20.95	Navaikulam-Thekkada	Kerala
Access Controlled Greenfield Highway (Kereya-Latra) Project (Package-II)	20.51	Latra, Kereya	Jharkhand
Highway (Chehedi Khurdh-Khandalwadi) Project (Package-V)	17.29	Chehedi Khurdh-Khandalwadi	Maharashtra
Capital Region Ring Road (Rameswar-Gobindpur) Project (Package-I)	17.15	Rameswar-Gobindpur	Odisha
Greenfield Highway (Surat-Nashik-Ahmadnagar-Solapur) Project (Package-VIIA)	16.96	Manjarsumba, Mominakhada	Maharashtra
Greenfield Highway (Ambegaon-Chehedi Khurdh) Project (Package-IV)	16.71	Ambegaon-Chehedi Khurdh	Maharashtra
Highway (AP/KN Border-KN/TS Border) Project	16.33	AP/KN Border-KN/TS Border	Karnataka
Access Controlled Greenfield Highway (Latra-Sithiyo) Project (Package-III)	16.13	Latra, Sithiyo	Jharkhand
Greenfield Highway (Surat-Nashik-Ahmadnagar-Solapur) Project (Package-VIII)	15.82	Shiral, Sarola Baddi	Maharashtra
Tharad Ahmedabad Expressway (Khimana-Diodarda) Project (Package-II)	15.25	Khimana-Diodarda	Gujarat
Greenfield Highway (Surat-Nashik-Ahmadnagar-Solapur) Project (Package-X)	15.16	Nagobachiwadi, Chinchpur Budruk	Maharashtra
Greenfield Highway (Surat-Nashik-Ahmadnagar-Solapur) Project (Package-VI)	15.13	Chincholigurav-Mominakhada	Maharashtra
Kharagpur-Moregram Highway (ChandrakonaGhatal-Bowaichandi) Project (Pkg-II)	15.03	Chandrakona-Ghatal Road Crossing-Bowaichandi	West Bengal
Varanasi-Kolkata Highway (Malpura-Lerua) Project (Package-5)	14.71	Malpura-Lerua	Bihar
Coastal Road (Rameshwar-Puri) Project (Package-I)	14.36	Rameshwar-Puri	Odisha
Patna-Arrah-Sasaram Greenfield Highway (Garhani-Patar) Project (Pkg-2)	13.98	Patna-Arrah-sasaram Corridor	Bihar
AP/KN-Raichur-KN/TS Border Access Controlled Highway Project	13.81	Deosugur	Karnataka
Capital Region Ring Road (Rameswar-Gobindpur) Project (Package-II)	13.74	Rameswar-Gobindpur	Odisha

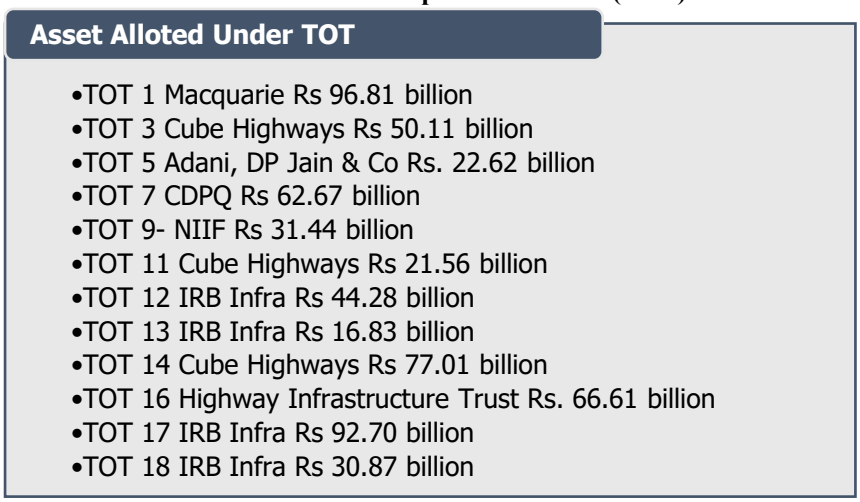
Project Name	Project Cost (Rs. billion)	Location	State
Access Controlled Highway (Sirhind-Sehna) Project (Package-II)	13.66	Sirhind-Sehna	Punjab
Chambal Expressway (Sada ka Pada-Chhavar) Project (Atal Progressway PKG-3)	13.59	Sada ka Pada-Chhavar	Madhya Pradesh

Source: Projects Today

TOT Projects

The Toll-Operate-Transfer (TOT) model has seen significant success in attracting bid interest due to its low-risk profile and the maturity of the assets involved. It allows private developers to operate and maintain existing toll roads for a fixed period in exchange for an upfront lump sum payment, providing investors with predictable revenue streams and minimal financial uncertainty compared to models like BOT and HAM. The model has gained traction among institutional investors such as pension funds, sovereign wealth funds, and private equity firms, which favor its stable returns and lower operational risks. The recent success of TOT Bundle 16, awarded for Rs. 66.61 billion, highlights the model's effectiveness in securing investor interest. Moreover, NHAI's achievement of raising Rs. 159.68 billion in FY24, surpassing the Rs. 100 billion targets, underscores the strong demand for TOT assets. With the National Monetization Pipeline driving further asset sales, NHAI has crossed Rs. 1 Trillion in total monetization which includes Rs. 489.95 billion through TOT, indicating sustained investor confidence and a promising future for the TOT model.

Chart 26: Investments under Toll-Operate-Transfer (TOT) model



Source: CareEdge Research

BOT Projects

In recent years, the Build-Operate-Transfer (BOT) model has witnessed a decline in bid interest due to inherent financial risks, substantial upfront capital requirements, and revenue uncertainties. Key challenges include inaccurate traffic projections, extended payback periods, and past project failures, which have led to diminished investor confidence and reluctance from financial institutions to extend funding. These issues have prompted the government to pivot towards alternative models such as the Hybrid Annuity Model (HAM) and Toll-Operate-Transfer (TOT), which offer improved risk-sharing frameworks and reduced financial exposure, thereby attracting greater private sector participation.

However, recent policy efforts indicate a renewed push to revive BOT projects. The National Highways Authority of India (NHAI) has targeted awarding BOT projects worth Rs 621.3 billion in FY26, covering approximately 1,250 km of highways, as part of its broader pipeline. This is a significant scale-up compared to earlier plans of 15 projects worth Rs 440 billion, underlining the government's intent to re-establish BOT as a viable model within the sector. Developers, however, continue to seek an overhaul of BOT terms, including longer concession periods, improved traffic risk-sharing, and enhanced viability gap funding, to make projects financially sustainable.

NHAI has introduced measures such as extending tolling periods, offering construction support, and monetizing assets worth USD 2.4 billion through InvITs. These initiatives are expected to attract fresh participation and drive renewed interest in BOT projects.

Updates on recent regulatory changes

Revision of WPI-linked toll escalation	•The National Highways Authority of India (NHAI) revised the Wholesale Price Index (WPI) linking factor used for toll rate escalation, reducing it from 1.641 to 1.561. This adjustment lowered toll charges by about 3–5 percent across national highways. While commuters benefit from reduced travel costs, concessionaires face slightly lower equity returns. The move reflects the government's intent to balance affordability with investor sustainability, supported by alternative monetization mechanisms like InvITs and TOT.
Introduction of FASTag Annual Pass	•In August 2025, NHAI launched a nationwide annual pass priced at Rs 3,000, valid for either 200 toll trips or one year. Linked directly to existing FASTags, the pass simplifies travel for frequent highway users by reducing congestion and eliminating the need for repeated recharges. Adoption was immediate, with over 1.4 lakh users activating the pass on launch day. For operators, this reform enhances predictability of toll revenues and demonstrates the government's push toward digital convenience.
Refinancing flexibility for HAM projects	•New guidelines allow concessionaires under the Hybrid Annuity Model (HAM) to refinance debt more efficiently. This provides developers with greater flexibility in managing long-term financing costs, improving project viability and encouraging wider participation. The change is particularly relevant given the capital-intensive nature of HAM projects, where annuity payments are spread over extended durations.
Updated qualification criteria for HAM and EPC projects	•NHAI revised Request for Proposal (RFP) norms to ensure only bidders with proven execution capacity and authentic bid securities participate. This addresses the issue of aggressive bidding that often led to delays and cost overruns. By tightening eligibility, the government aims to improve project delivery standards and reduce execution risks.
Performance security norms adjustment	•The Ministry of Road Transport and Highways (MoRTH) reduced the threshold for Additional Performance Security (APS) from bids 20 percent below authority cost to 10 percent, while removing the earlier cap of 3 percent of project cost. This discourages abnormally low bids and strengthens contractual discipline, ensuring that projects are awarded to financially capable developers.
National Road Safety Policy 2025	•MoRTH advanced a comprehensive safety framework focusing on behavioral change, enforcement, and technology adoption. This policy sets the roadmap for reducing accident rates and improving compliance over the next decade.

InvITs in India

Overview

In India, infrastructure has limited funding options, and traditionally, financing has been met through bank finance with a tenure of 10 to 15 years. In this backdrop, Union Budget in February 2014 introduced Infrastructure Investment Trusts (InvITs) in India, and subsequently in September 2014, SEBI had notified InvIT regulations. InvITs provide long-term capital and unlock the developer's capital, which can be deployed for further growth.

InvITs utilise the pooled capital of investors to buy and manage income-generating infrastructure assets, such as roads, transmission towers, wind power, solar power, seaports, airports, telecom, etc. InvITs are permitted to issue units (equivalent to equity) that are listed and traded on the bourses. Public InvITs invest not less than 80% of the value of InvIT assets in revenue-generating infrastructure assets. InvITs must distribute not less than 90% of the net distributable cash flows to the unit holders. The aggregate consolidated borrowings and deferred payments of the InvIT, net of cash and cash equivalents, is restricted to 70% of the value of the InvIT assets. According to the Bharat InvITs Association, as of January 2025, 26 SEBI-registered InvITs have collectively raised over Rs 1.2 trillion in equity since 2019 and currently, manage assets over Rs 5.0 trillion.

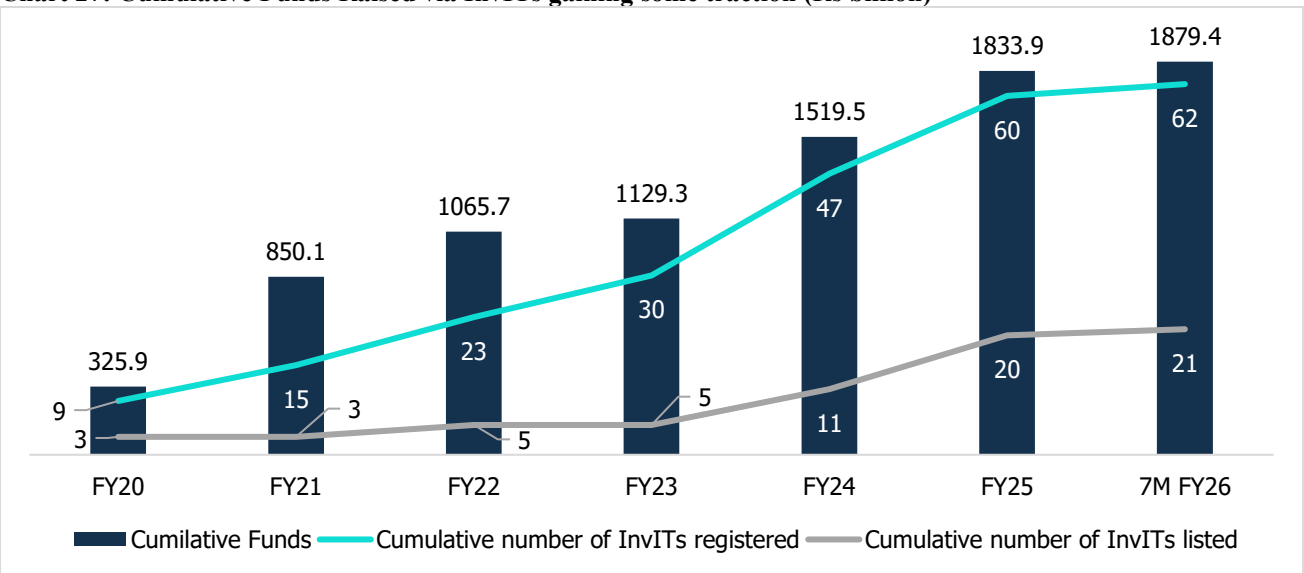
InvIT by NHAI

The National Highways Authority of India (NHAI) established the National Highways Infra Trust (NHIT) in 2020 as part of the Government of India's asset monetization program. The InvIT structure allows NHAI to pool completed highway assets and monetize them by offering units to institutional and retail investors, thereby recycling capital for new infrastructure projects. NHIT was created to provide a transparent, regulated platform for monetizing operational highway assets. By channelling funds from long-term investors such as pension funds, sovereign wealth funds, and insurance companies, NHIT reduces reliance on budgetary allocations and debt financing. NHIT has attracted participation from leading domestic institutions (LIC, SBI, HDFC Bank) and global investors (CPP Investments, OTPP, GIC), reflecting strong confidence in India's highway assets. By FY25, NHIT has raised over Rs 46,000 crore, making it the largest monetization platform in India's road sector.

In FY26 Budget, the Government announced NMP-2, setting a monetisation target of Rs 10 trillion, with NHAI's share estimated at around Rs 3.6 trillion. To support this scale of monetisation, NHAI has proposed sponsoring and launching an additional public InvIT. Unlike privately placed InvITs, a public InvIT enables participation from retail investors, with a substantially lower minimum investment of about Rs 10,000–15,000. While private InvITs raise funds through private placement among a select group of investors, in view of large target, NHAI intends to establish one more InvIT which will also do retail public issue as well. Through Public InvIT, domestic and retail investor will get the opportunity to contribute in the growth of national infrastructure.

Growth of InvITs in India

Chart 27: Cumulative Funds Raised via InvITs gaining some traction (Rs billion)

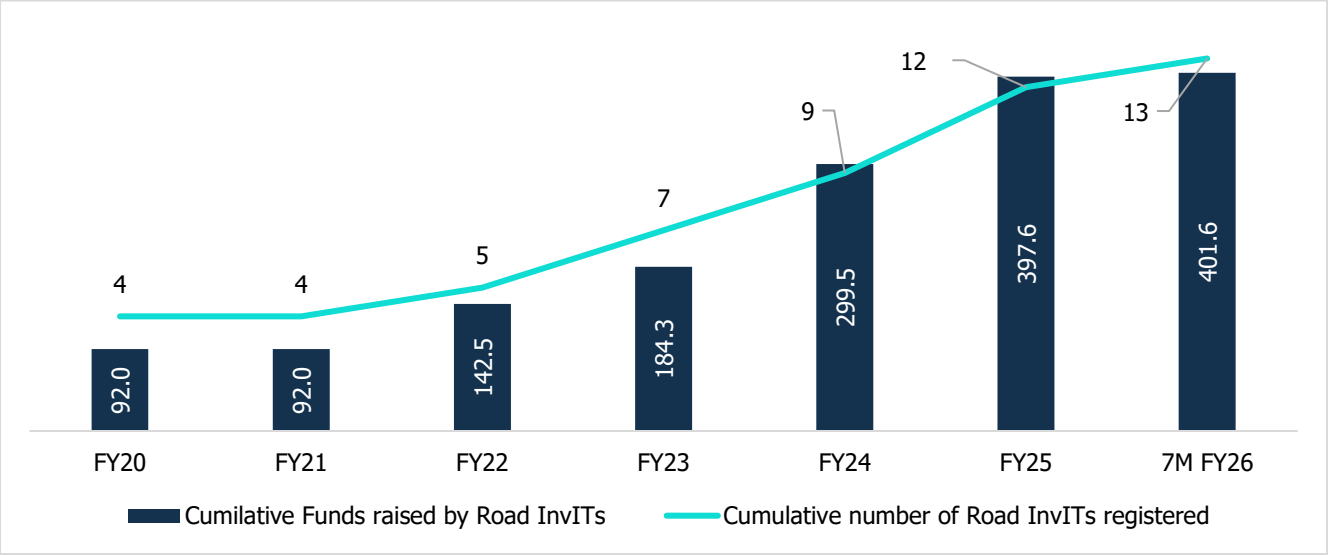


Source: SEBI, CareEdge Research; Note: Cumulative funds raised across years; includes funds raised through public issue, private placement, preferential issue, institutional placement, rights issue

Cumulative funds raised via InvITs have increased substantially from Rs 325.9 billion in FY20 to Rs 1,879.4 billion in 7MFY26, reflecting the growing acceptance of InvITs as a preferred infrastructure financing vehicle. The sharp rise in recent years highlights strengthening investor confidence, supportive regulatory framework, and a deepening market for alternative funding sources in the infrastructure sector.

As of November 2025, the number of InvITs in India stood at 62, of which 21 are public issue and rest are private placement.

Chart 28: Cumulative Funds Raised via Road InvITs (Rs billion)



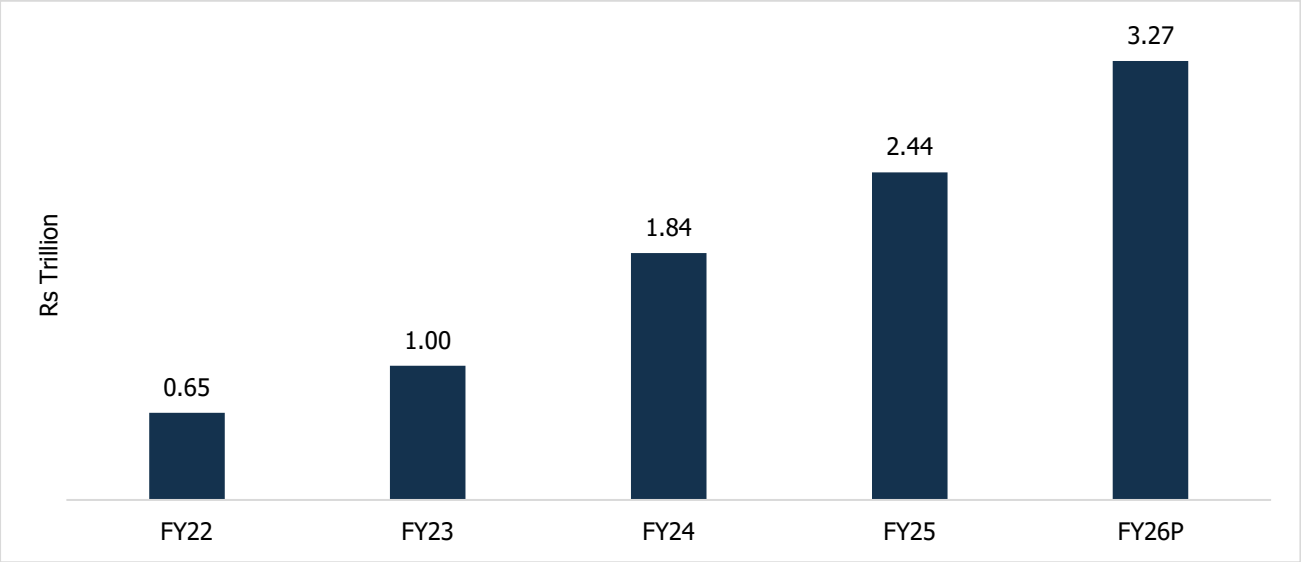
Source: SEBI, CareEdge Research; Note: Cumulative funds raised across years; includes funds raised through public issue, private placement, preferential issue, institutional placement, rights issue

Cumulative funds raised via Road InvITs have increased substantially from Rs 92.0 billion in FY20 to Rs 401.6 billion in 7MFY26. Further, the number of Road InvITs in India as of 7MFY26 stood at 13, of which 4 are public issue and rest are private placement. The growth is driven by rise in number of InvITs from 3 in FY20 to 12 till date which have contributed through private placement and public issues, policy emphasis on asset monetization under the National Monetization Pipeline, regulatory clarity under SEBI's InvIT framework, and the ability of InvITs to support debt reduction and capital recycling for new highway projects.

Growth in AUM of Road InvIT

The monetisation of road assets through InvITs is reflected in the growth in AUM over the years. The AUM of Road InvITs have grown from Rs 0.65 trillion in FY22 to Rs 2.44 trillion in FY25, at a CAGR of 55% for the same period. It is estimated to reach Rs 3.27 trillion by FY26, indicating a potential y-o-y growth of 34%. The strong asset monetisation pipeline of 1,472 kms by NHAI, the gaining monetisation popularity of NH-HAM projects and, the transfer of mature operational toll roads will continue to drive this growth.

Chart 29: Growth in Road AUM



Source: CareEdge Research

Salient Features of Listed InvITs

Table 12: Salient Features of Listed InvITs

Particulars	Description
Entity style	Trust under Indian Trusts Act 1882
Underlying asset type	Majority operational
Lock-in period for sponsors and strategic investors	Three years for minimum of 15% stake and 1 year for holding exceeding 15%. One-year lock-in for strategic investor
Shareholding by the sponsors	15% collectively as sponsors on a post issue basis for not less than three years
Aggregate consolidated borrowings and deferred payments net of cash and cash equivalents	Cap at 49% of the asset's valuation. Cap at 70% of the assets valuation (AAA rated entities and track record of six distributions on a continuous basis).
Distribution	At least 90% of the net distributable cash flow.
Frequency of dividend distribution	At least once every half-year for public InvITs, and at least once a year for privately placed InvITs.
Investments	Listed/unlisted debt of companies in the infrastructure sector, government securities, money market instruments, liquid mutual funds, equity share of companies, which derive not less than 80% of their operating income from infrastructure sector
Requirement of credit rating	Consolidated borrowings and deferred payments net of cash exceed 25% of the assets value.

Advantages of InvITs

Particulars	Description
Capital Recycling	Allows sponsors to monetise operational road assets and redeploy capital into new EPC/HAM projects, enabling higher bidding capacity and faster business growth.
Stable and Predictable Cash Flows	Operational toll/annuity road assets provide steady long-term revenues, making InvITs attractive for pension funds, sovereign funds and institutional investors seeking yield stability.
Diversification of Funding Sources	Offers an alternate financing platform beyond bank loans; InvITs can raise equity and debt at the trust level, reducing funding concentration risk for the sector.
Lower Cost of Capital	Strong asset pools and predictable revenues help InvITs secure financing at competitive rates, improving net distributable cash flows and enhancing investor returns.

Particulars	Description
Deleveraging and Balance Sheet Strengthening	Asset transfer to InvITs reduces developer leverage, improves debt metrics and strengthens credit profile, enabling participation in future projects.
Attractive Long-Term Yield Instrument	InvITs provide regular cash distributions (often semi-annual/quarterly), offering investors a stable, long-duration, inflation-linked income stream.
Support to Government Monetisation Programme	Key tool under NMP; enables NHAI and private sponsors to unlock value through TOT concessions and InvIT listings, attracting large-scale private capital.
Better Asset Management and O&M Efficiency	Professional InvIT managers prioritise tolling efficiency, traffic analytics and lifecycle O&M practices, improving asset performance and durability.

Asset Monetization through InvITs and TOTs by NHAI

The government launched the National Monetization Pipeline (NMP-1) with a target of Rs 6 trillion for FY22–25. Out of this, a target of Rs 1.6 trillion was assigned to the NHAI. NHAI achieved 72% of its target, mobilizing Rs 1.15 trillion through TOT, InvITs and SPV model.

NHAI has monetized operational highway assets through InvITs and TOTs, monetizing a cumulative Rs 779 billion between FY22 and FY25. These mechanisms are part of the National Monetization Pipeline and have been used to recycle capital from completed projects and reduce reliance on budgetary support.

InvITs Model

Table 13: Year-wise details of the amount realised so far through monetisation of NHs by InvIT

Year	InvIT (Amt Rs in Billion)
FY22	73.5
FY23	28.5
FY24	157.0
FY25	177.4
Total	436.4

Source: Asset Monetization Strategy by NHAI, CareEdge Research

InvITs have mobilized a cumulative Rs 436.4 billion over FY22–FY25. The FY25 round was the largest, raising Rs 177.4 billion at an enterprise value of Rs 183.8 billion, with participation from marquee investors such as CPP Investments, OTPP, GIC, LIC, SBI, and HDFC Bank. Further, NHAI is expected to launch InvIT Bundle-5 for 9 Stretches in 550 km length (expected fund raising of Rs 125 billion), covering Maharashtra, Odisha, Andhra Pradesh and West Bengal. The proceeds from InvITs are earmarked for repayment of borrowings and funding of new highway construction, ensuring liquidity for upcoming EPC and HAM awards.

TOTs Model

Table 14: Year-wise details of the amount realised so far through monetisation of NHs by TOTs

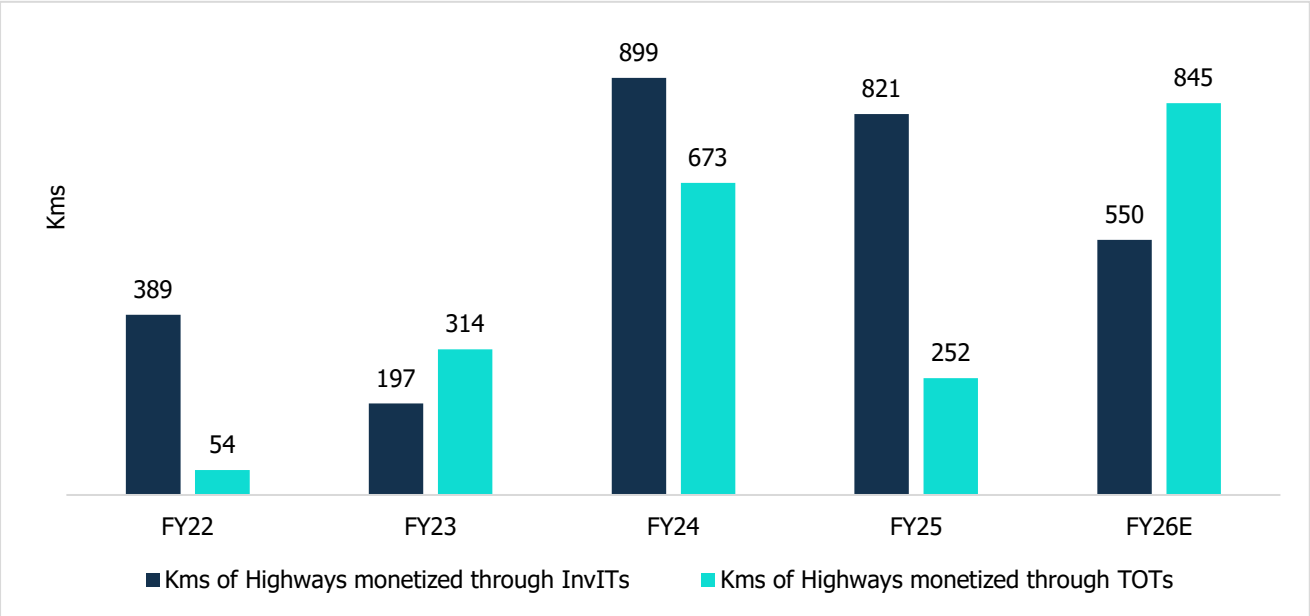
Year	TOT (Amt Rs in billion)
FY22	10.1
FY23	106.2
FY24	159.7
FY25	66.6
Total	**342.6**

Source: Asset Monetization Strategy by NHAI, CareEdge Research

TOT bundles have raised a cumulative Rs 343 billion over FY22–FY25. The FY24 recorded the highest monetization, while FY25 saw lower realizations as concession terms were revised. The recently awarded 17th TOT bundle to IRB Infrastructure for Rs 93 billion for 333 kms highway network, reflects continued activity. Other than TOT-Bundle 17, bidding for another five bundles of highways, i.e. ToT Bundle 18, 19, 20, 21 and 22 are open. In FY26, monetisation of some of them are expected to be completed. The total length of highways on

offer on these five bundles are of 845 km. This proceeds from TOT transactions are directed toward financing new highway projects and strengthening NHAI's balance sheet, reducing reliance on budgetary allocations.

Chart 30: Length of Highways monetized



Source: Asset Monetization Strategy by NHAI, CareEdge Research

For FY26, NHAI had targeted Rs 300 billion for monetization of highway assets, which has been enhanced to Rs 400 billion. Out of the total target, Rs 150 billion has been targeted for monetization via TOTs and InvITs and remaining from project-based financing. Additionally, NHAI has identified 24 assets spanning 1,472 km for monetisation through TOT and InvIT.

Key Threats and Challenges

- **Traffic Risk**: Toll revenues are highly sensitive to traffic volume and vehicle composition. Any decline in economic activity, rise in fuel prices, changes in freight movement, or external disruptions like pandemics can lead to reduced vehicle flow on highways, directly impacting toll collections and revenue stability.

- **Regulatory and Policy Risk**: Infrastructure investment trusts operate within a regulatory environment influenced by government policies and sectoral norms. Any changes in tolling regulations, concession agreements, taxation rules, or InvIT specific frameworks may alter the expected cash flows, reduce investor confidence, or delay new acquisitions.

- **Refinancing and Interest Rate Risk**: Since asset acquisitions are often funded through a mix of debt and equity, rising interest rates can lead to higher borrowing costs and tighter refinancing conditions. This can erode returns for unitholders, reduce the attractiveness of the trust's distributions, and increase financial stress if not managed prudently.

- **Limited Asset Pipeline**: The number of mature revenue-generating road assets suitable for monetization is finite. As competition intensifies from private equity investors, infrastructure funds, and other bidders, acquisition prices may rise, making it challenging to maintain targeted return thresholds and scale operations sustainably.

- **Market Liquidity and Investor Sentiment**: InvITs are still a developing investment product in the broader market. Their ability to raise capital and maintain healthy unit valuations depends on overall investor sentiment, macroeconomic conditions, and awareness. Any dip in confidence or liquidity constraints can affect fundraising and secondary market performance.

- **Environmental and Social Risks**: Infrastructure assets, particularly those involving land and public access, are vulnerable to environmental scrutiny and social resistance. Issues such as land acquisition disputes, community opposition, or noncompliance with environmental norms can result in operational delay.

- **Dependence on Government Ecosystem:** The entire lifecycle from asset identification and transfer to regulatory clearances relies heavily on coordination with government authorities. Delays in approvals, shifts in political priorities, or changes in the monetization policy framework can disrupt expansion plans and reduce visibility on future opportunities.

Company Profile

About the company

Raajmarg Infra Investment Managers Private Limited (RIIMPL) was incorporated on 22 August 2025, as a non-government private company. It has been established as the Investment Manager for the proposed Raajmarg Infra Investment Trust (RIIT), a Public InvIT sponsored by NHAI. RIIMPL's mandate is to manage the assets and investments of RIIT in accordance with SEBI (Infrastructure Investment Trusts) Regulations, 2014, and the Investment Management Agreement. RIIMPL has a paid-up capital of Rs 200 million with 51.1% shareholding with private and 48.9% with public out of which NHAI holds 26%. Private shareholders includes equity participation from leading banks and financial institutions including State Bank of India, Punjab National Bank, NaBFID, Axis Bank, Bajaj Finserv Ventures Ltd., HDFC Bank, ICICI Bank, IDBI Bank, IndusInd Bank, and Yes Bank.

Assets proposed for monetization

Table 15: Assets Proposed for monetization

Sr No.	Section Name	Mode of Execution	Length (Kms)	State
1	Gorhar-Barwa Adda	HAM	80.5	Jharkhand
2	Chilkaluripeta-Vijayawada	0.2 km in EPC,16.50 km in HAM & remaining under PBMC(O&M)	69.4	Andhra Pradesh
3	Chennai Bypass	EPC	32.6	Tamil Nadu
4	Chennai-Tada	EPC	33.0	Tamil Nadu
5	Neelmangla-Tumkur	20.4 km in EPC & 11.62 km in O&M	44.7	Karnataka

Source: Company Disclosures

Competitive Landscaping

Peer Company Profile

Name of the Company	Business Overview
National Highways Infra Trust (NHIT)	NHIT was established in 2020 by NHAI as a contributory irrevocable trust under the Indian Trusts Act, 1882. It is registered with SEBI as an Infrastructure Investment Trust. NHIT holds a portfolio of 26 operating toll roads with an aggregate length of 2,345 km across 12 states. The trust has raised over Rs 46,000 crore across four rounds of monetization. The investment manager is National Highways Infra Investment Managers Pvt. Ltd and investors include CPP Investments, OTPP, GIC, LIC, SBI, and HDFC Bank.
Interise Trust	Interise Trust was listed in May 2018 on NSE and BSE through private placement. It manages 17 road projects aggregating 7,300 lane km across 8 states, with ~450,000 vehicles traversing daily. The trust focuses on operations and maintenance of highways, with investor participation from global and domestic institutions.
Oriental Infra Trust	Oriental Infra Trust was registered with SEBI in March 2019 as an InvIT sponsored by Oriental Structural Engineers Pvt. Ltd. and Oriental Tollways Pvt. Ltd. The trust holds six operating road assets totalling 769 km, including 5 toll roads and 1 annuity project. The investment manager is OIT Infrastructure Management Limited.

Vertis Infrastructure Trust	Vertis Infrastructure Trust is an InvIT platform backed by KKR India Infrastructure. It manages a portfolio of toll road assets acquired from GVK and other developers, with a focus on long-term operations and monetization. The trust has raised capital from global infrastructure investors and has been used as a vehicle for institutional participation in India's road sector. The trust's portfolio includes 14 HAM assets, 2 Annuity assets and 12 Toll assets with an aggregate length of 8,300 lane km across 11 states.
IRB InvIT Fund	IRB InvIT Fund was India's first listed InvIT, sponsored by IRB Infrastructure Developers Ltd. It holds portfolio of 8 BOT assets and 1 HAM assets across Maharashtra, Gujarat, Rajasthan, Karnataka, Tamil Nadu, and Punjab. The investment manager is IRB Infrastructure Pvt. Ltd.
Cube Highways Trust	Cube Highways Trust is a privately managed InvITs, sponsored by Cube Highways and Infrastructure III Pte Ltd. It manages a portfolio of 18 - Toll Assets, 6 - HAM Assets, 3 - Annuity Assets across India, covering 8,819 lane km and operating 27 toll plazas. The trust is backed by global investors including I Squared Capital, ADIA, IFC, and Japanese infrastructure funds.

Operational Benchmarking

Table 16: Operational Parameters

Particulars	RIIT	NHIT	Interise Trust	Oriental Infra Trust	Vertis Infrastructure Trust	IRB InvIT Fund	Cube Highway Trust
No. of Assets (Toll, HAM, Annuity)	5 – Toll Assets	26 – Toll	17 - BOT / Annuity Road	5 - Toll, 1 - annuity	14 - HAM Assets 2 - Annuity Assets 12- Toll Assets	8 - BOT assets 1 - HAM assets	18 - Toll Assets 6 - HAM Assets 3 - Annuity Assets
No. of States	4	11	8	4	11	6	13
Kilometres	260.2 Km	2,345 Km	7,300 - Lane KM	769 Km	8,300 - Lane Km	NA	8,819 Lane Km
Sponsor Stake (%)	100%	11%	60.83%	59.20%	57.80%	16%	41%

BUSINESS

Some of the information in this section, including information with respect to our plans, strengths, and strategies, contain forward-looking statements that involve risks and uncertainties. You should read "Forward-Looking Statements" on page 19 for a discussion on the risks and uncertainties related to those statements and also "Risk Factors", and "Discussion and Analysis by the Directors of the Investment Manager of the Financial Condition, Results of Operations and Cash Flows of the Project SPV of the Trust" on pages 42 and 221 respectively, and the "Projections of Revenue From Operations and Cash Flow from Operating Activities" on page 334, for a discussion of certain factors that may affect our business, financial condition, or results of operations.

Our actual results may differ materially from those expressed in or implied by these forward-looking statements. Unless otherwise stated or the context requires otherwise, references in this section to "we", "our", or "us" are to the Trust along with the Project SPV.

We have included various operational and financial performance indicators in this section. The manner in which such operational and financial indicators are calculated and presented, and the assumptions and estimates used in such calculations, may vary from that used by other entities in the business similar to ours. Investors are accordingly cautioned against placing undue reliance on such information in making an investment decision.

Unless otherwise indicated, the industry, macro-economic and market data and all other industry related statements in this section have been derived or extracted from the CARE Industry Report. For further details in relation to the CARE Industry Report, please see the section entitled "Industry Overview" on page 121. Additionally, for further details and risks in relation to CARE Industry Report, please see the section entitled "Risk Factors" on page 42.

Overview

Raajmarg Infra Investment Trust ("**Trust**") is an infrastructure investment trust which is registered with SEBI under the InvIT Regulations on December 22, 2025, under Regulation 3(1) of the InvIT Regulations. The Trust intends to acquire, operate and maintain the InvIT Assets pursuant to the terms of the Concession Agreements. The Trust is sponsored by NHAI, an autonomous authority of the GoI under the MoRTH constituted on June 15, 1989 under the NHAI Act. NHAI was operationalised in February 1995 with the appointment of a full-time chairman and other members of the board. The functioning of NHAI is governed by the NHAI Act and the rules, and regulations framed thereunder. We are managed by qualified personnel of the Investment Manager with majority of the personnel who have management and operational experience in the roads and highways sector for over two decades. For further details, see the sections headed "*Parties to the Trust – The Investment Manager – Raajmarg Infra Investment Managers Private Limited*" on page 92.

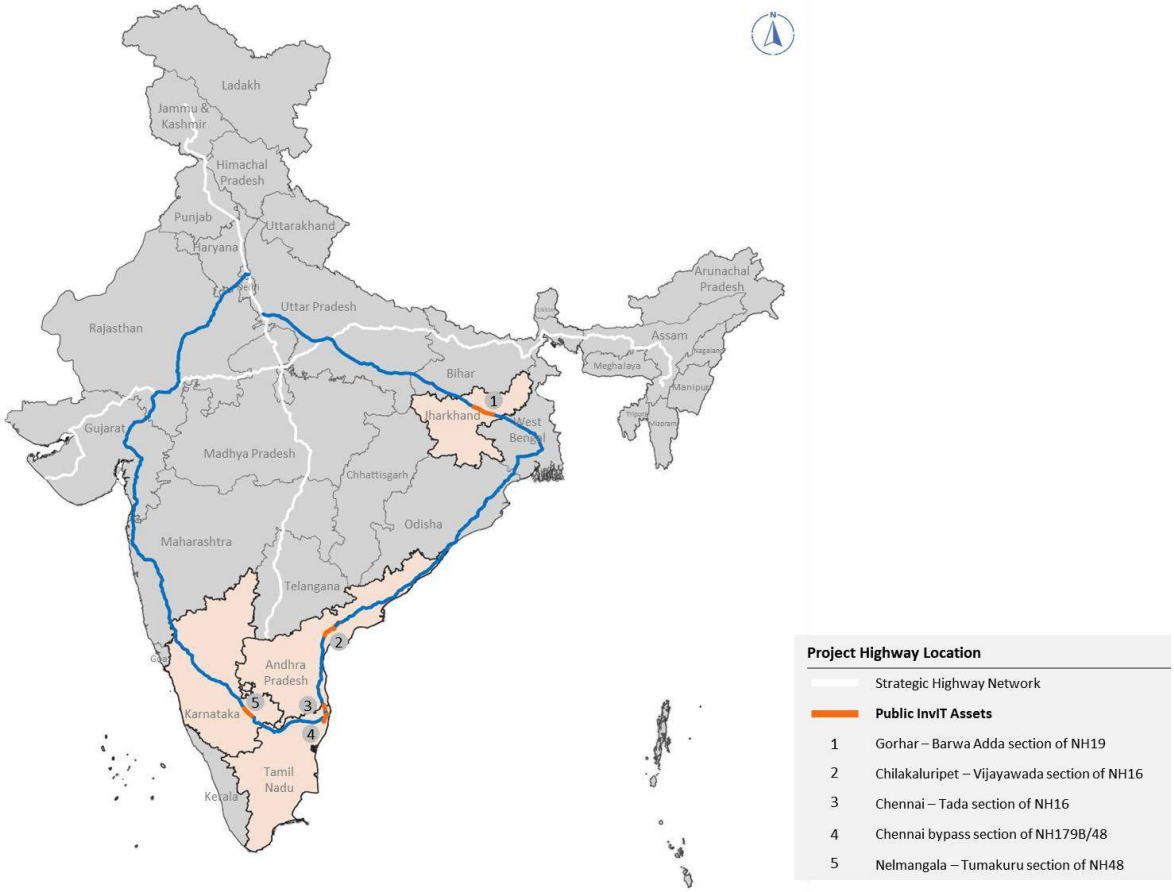
The Trust proposes to have an initial portfolio of five Toll Roads in the Indian states of Jharkhand, Andhra Pradesh, Tamil Nadu and Karnataka under the Toll Operate Transfer ("**TOT**") model conceived by NHAI. These Toll Roads will be operated and maintained pursuant to concessions granted by the NHAI to the Project SPV. The Toll Roads comprise five toll roads spanning a total length of 260.198 kms and forms part of the Golden Quadrilateral project. The Project SPV proposes to have an exclusive right, license and authority to demand, collect and appropriate fee, operate, manage and maintain the Toll Roads. We expect to satisfy all conditions precedent and commence our concessions in accordance with the terms of the Concession Agreements. For further details, see "*Summary of the Concession Agreements*", "*Discussion and Analysis by the Directors of the Investment Manager of the Financial Condition, Results of Operations and Cash Flows of the Project SPV of the Trust*" and "*Use of Proceeds*" on pages 200, 221 and 211, respectively.

The Concession Agreements, once executed between the Project SPV and NHAI (as concessioning authority) will provide the Project SPV, the exclusive right, license and authority to demand, collect and appropriate fee, operate, manage and maintain the initial portfolio assets for a period of 15 years from users of each Toll Road and perform and fulfil all of the concessionaire's obligations under and in accordance with respective Concession Agreements. The responsibility for the supervision of the operation and maintenance of the Toll Roads from the O&M handover date will also vest with us. In return, the Project SPV is required to pay the concession fee to the NHAI prior to the commencement of the concession, as set out in the respective Concession Agreements. For further information on the provisions of the Concession Agreements, see "*Summary of the Concession Agreements"* on page 200.

From the appointed date (i.e., the date on which all conditions precedent have been satisfied in accordance with Concession Agreement, hereinafter, "**Appointed Date**"), the Project SPV will acquire, operate and maintain the following toll road assets ("**Toll Roads**"):

S No.	Asset	Details
1.	Gorhar to Barwa Adda	The four/six lane section from Gorhar to Barwa Adda from km 320+810 to km 400+632 (design km 401+332) of NH-19 (old NH-2), comprising km 320+810 to km 326+000 between Gorhar and Atka, being a four lane section; Atka to Khairatunda from km 326+000 to km 360+300 (design km 361+000) and Khairatunda to Barwa Adda from km 360+300 (design km 361+000) to km 400+632 (design km 401+332), being six lane sections, in the state of Jharkhand, having total length of 80.522 km.
2.	Chilakaluripet-Vijayawada	The six lane section from Chilakaluripet to Vijayawada from km 355+000 to km 357+342 and from km 372+038 to km 422+605 along with Chilakaluripet bypass section from 0+000 to km 16+499 ("**Chilakaluripet Bypass**") of NH 16, in the state of Andhra Pradesh, having total length of 69.408 km.
3.	Chennai Bypass	The six lane section from km 0+000 to km 32+600 of NH-32 and NH-48, in the state of Tamil Nadu, having total length of 32.600 km.
4.	Chennai -Tada	The six lane section from km 21+400 to km 54+400 of NH-16, in the state of Tamil Nadu, having total length of 33.000 km.
5.	Neelmangla Tumkur	The four/six lane section from Neelmangla to Tumkur from km 29+500 to km 74+168 of NH-48, comprising km 29+500 to km 49+900 between Neelmangla to Dobbaspet being a six lane section; Dobbaspet to Tumkur from km 49+900 to km 61+520, being a four lane section and Tumkur Bypass from km 61+520 to km 74+168 being a 6 lane section, in the state of Karnataka, having total length of 44.668 km.

The following map depicts the location of the InvIT Assets:



Map not to scale

Strengths of the Trust

Attractive industry sector with strong underlying fundamentals and favourable government policies

India's infrastructure sector is witnessing robust growth, fuelled by significant government investments and strategic initiatives aimed at strengthening the nation's economic framework. For the fiscal year 2025–26, the government allocated a record ₹ 11.21 trillion, underscoring its dedication to infrastructure development as a

cornerstone of economic progress and employment generation. *(Source: CARE Industry Report)*

Transport and logistics remain key focus areas, particularly roads, with over 45,000 kilometres, including 5,000 kilometres of specialised structures such as elevated roads, tunnels, and bridges, under consideration for awards. The National Highways Authority of India (NHAI) plans to award approximately 5,000 kilometres annually through Build-Operate-Transfer (BOT) and Engineering, Procurement, and Construction (EPC) models. This approach presents significant opportunities for infrastructure construction companies. Furthermore, ongoing bidding for third-party operations and maintenance (O&M) projects, with ₹ 77,210 million worth of projects in the pipeline, provides additional growth avenues. The government has also announced plans to expand the national highway network to 2,00,000 kilometres by FY37 which is 1,46,204 kilometres as of FY25. *(Source: CARE Industry Report)*

India has the second-largest road network in the world, with about 63,45,463 km as of FY25. This comprises national highways, expressways, state highways, major district roads, other district roads, and village roads. To accelerate the country's growth, the development of national highways has been the key focus area. On the other hand, state highways, district and rural roads continue to be a large part of the overall road network. *(Source: CARE Industry Report)*

With the growing population, the long-term need for robust infrastructure is necessary for economic development. This generates the need for massive investments in the development and modernization of infrastructure facilities, which will not only cater to the growing demand but will also ensure competitiveness in the global market. The tolling length has also increased on yearly basis. It has grown by 98.8% when compared with FY19 implying government shifts towards increasing toll plaza and efficient toll collection with Fastag collection system. As of March 2025, the toll length stands at around 51,677 Km. (*Source: CARE Industry Report*).

The total tolling length is expected to grow in future with increasing toll revenue for the government. The government's upcoming NHAI projects focused on connectivity and increasing expressways which will help increase in cargo and passenger vehicle movement. The investments made in projects will be recovered through toll collection for a period of 15-20 years, this will eventually lead to increase in toll collection in future for NHAI. (*Source: CARE Industry Report*).

The government launched the National Monetization Pipeline (NMP-1) with a target of Rs 6 trillion for FY22–25. Out of this, a target of Rs 1.6 trillion was assigned to the NHAI. NHAI achieved 72% of its target, mobilizing Rs 1.15 trillion through TOT, InvITs and SPV model. NHAI has monetized operational highway assets through InvITs and TOTs, monetizing a cumulative Rs 779 billion between FY22 and FY25. These mechanisms are part of the National Monetization Pipeline and have been used to recycle capital from completed projects and reduce reliance on budgetary support. (*Source: CARE Industry Report*)

For further details on the market opportunity for the road infrastructure industry in India, please see the section entitled *"Industry Overview"* on page 121.

Experienced Sponsor with consistent track record in operating and maintaining projects in the roads and highways sector in India

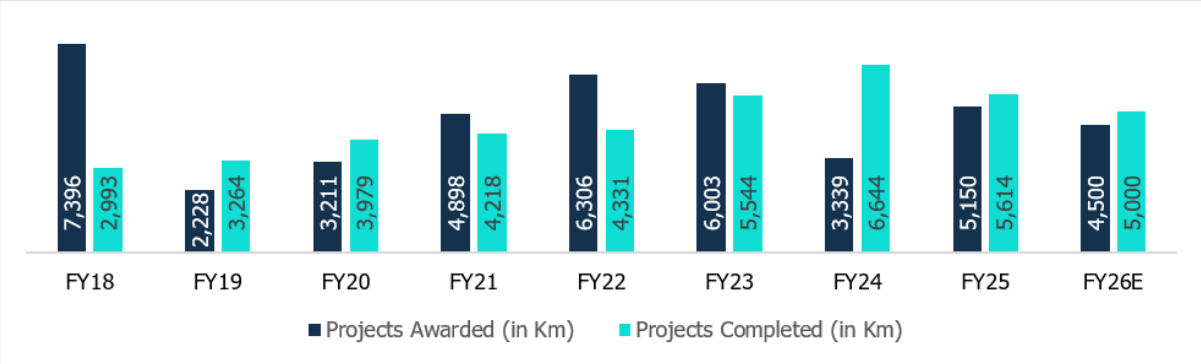
Our Sponsor, NHAI is India's national agency responsible for the development, maintenance and management of India's national highways network. Our Sponsor has a consistent track record of growth and operational performance. Our Sponsor manages the development of National Highways Development Project ("**NHDP**") under the mandate of MoRTH, Government of India, which along with other minor projects, has vested in national highways for development, maintenance and management. As part of the NHDP, our Sponsor infuses funds into immediate areas of development and enables private sector participation bringing about a healthy participatory economy.

India's national highways constitute the core of the country's road infrastructure, serving as the primary corridors for freight and passenger movement. The network has expanded steadily over the past five years, increasing from 1,32,500 km in FY20 to 1,46,204 km in FY25 at CAGR of 2%. The most significant addition was recorded between FY22 and FY23, when nearly 3,960 km were added, underscoring accelerated execution under government programs such as Bharatmala Pariyojana and the National Infrastructure Pipeline. *(Source: CARE Industry Report)*

Aligned with the Ministry of Road Transport and Highways' Vision 2047, Bharatmala is envisaged as a transformative framework to deliver high-speed corridors within 100–150 km of all citizens, ensuring seamless

freight and passenger movement across the country. The vision emphasizes not only network expansion but also efficiency-driven development, including economic corridors, border and coastal connectivity, logistics integration, and adoption of advanced contracting and asset monetization models. *(Source: CARE Industry Report)*

The following growth sets forth our Sponsor's performance and growth in terms of kilometres of roads awarded and constructed for the financial years indicated:



Source: CARE Industry Report

Backed by NHAI as our Sponsor, we believe we are well positioned to drive new initiatives in the road sector in India. For more details about our Sponsor and the projects, please see *"Industry Overview"* on page 121.

Sizeable portfolio of diversified long-term revenue generating Toll Road assets

Upon signing of the Concession Agreements, the Project SPV will acquire, operate and maintain five toll-road projects in India with a concession period of 15 years, forming part of the Golden Quadrilateral project. We believe the Toll Roads currently have a healthy mix of passenger and commercial traffic which will drive the revenue generation/cash inflows post completion of the formation transactions. For further details in relation to toll segmentation please see – *"Description of our toll roads"* on page 169. The Concession Agreements will provide the Project SPV the right to collect toll for a period of 15 years. For details of the project traffic for each of the Toll Roads, please see "*Traffic Reports*" at Annexure C.

We also believe that the Toll Roads possess a good mix of captive short distance traffic and long-distance traffic. In addition, the range of commodities transported by commercial traffic across the Toll Roads varies from agricultural products and other perishable goods to steel, cement, coal, containers and multiple industrial products, representing a broad cross-section of the Indian economy. For further details in relation to strategic locations of the InvIT Assets and key growth drivers please see – *"Description of our toll roads"* on page 169. Each Toll Road has a distinct set of users based on its local economy, which results in significant independence of traffic across the Toll Roads. As a result, we expect the geographical diversification of the Toll Roads to reduce our reliance on the local economy of any single state or district. The diversified composition of traffic along the Toll Roads is expected to provide us with stable cash flows.

The table below provides the revenue projections for each of the InvIT Assets for the following years basis the Traffic Reports:

Toll Plaza	Unit	FY27	FY28	FY29	FY30	FY31	FY36	FY41
Gorhar Barwa Adda								
Kulgo	₹ *(in million)*	1,551	1,773	1,901	2,056	2,220	2,562	3,856
	PCU	33,383	34,599	35,951	37,516	39,023	38,103	48,033
Chilakaluripet Vijayawada								
Kaza	₹ *(in million)*	2,257	2,480	2,697	2,995	3,275	3,351	5,054
	PCU	62,377	63,234	66,596	71,224	75,337	65,233	81,752
Chennai Bypass								
Vanagram / Tiruneermalai	₹ *(in million)*	966	1,184	1,362	1,514	1,694	3,112	4,034
	PCU	65,092	71,566	78,317	85,036	93,147	1,39,066	1,51,494
Surapattu	₹ *(in million)*	1,089	1,347	1,331	1,328	1,469	2,530	4,163
	PCU	49,943	53,908	52,696	51,349	55,780	80,663	1,12,496
Chennai - Tada								

Toll Plaza	Unit	FY27	FY28	FY29	FY30	FY31	FY36	FY41
Nallur / Durainallur	₹ *(in million)*	1,475	865(H1), 768 (H2)	1,694	1,866	2,008	3,110	4,745
	PCU	78,689	83,664(H 1) 68,410 (H2)	72,944	77,472	80,515	1,03,294	1,30,545
Neelmangla Tumkur								
Kulumepalya*	₹ *(in million)*	899	-	-	-	-	-	-
	PCU	92,939	-	-	-	-	-	-
Chokkenhalli*	₹ *(in million)*	1,017	1,205	654	-	-	-	-
	PCU	85,035	89,960	95,316	-	-	-	-
Bharathipura and Honnenahalli Check Plaza	₹ *(in million)*	-	303	307	317	336	431	591
	PCU	-	26,485 (H1) 26,485(H 2)	26,241 (H1) 26,241 (H2)	25,909	26,404	28,812	32,822
Halenijagal and Dobbaspet Check Plaza	₹ *(in million)*	-	-	238	675	752	1,133	1,461
	PCU	-	-	30,019 (H1) 30,019 (H2)	40,398	43,243	53,893	58,179
Halenijagal**	₹ *(in million)*	-	1,356	1,623	1,781	1,866	2,612	3,483
	PCU	-	99,485 (H1) 99,485 (H2)	96,090 (H1) 71,101 (H2)	65,440	66,845	77,307	85,126

**According to Traffic Report, these are the existing toll plazas which will be dismantled on completion of four to six lane widening.*

*** According to Traffic Report, this will be a new single mainline plaza, instead of two mainline plazas.*

We believe that the Toll Roads have revenue growth potential due to expected growth in traffic volumes as a result of regional growth and expected increases in toll fees as a result of inflation adjustments.

Portfolio of strategically located assets catering to key economic corridors of the country

The Trust proposes to have an initial portfolio of five Toll Roads in the Indian states of Jharkhand, Andhra Pradesh, Tamil Nadu and Karnataka forming part of the Golden Quadrilateral project under the Toll Operate Transfer ("**TOT**") model conceived by NHAI. Four Toll Roads are located in southern India while the remaining one Toll Road is located in eastern India. According to the Traffic Report, these corridors have witnessed high traffic growth rates in the past few years due to offering enhanced connectivity and economic opportunities offered and are expected to experience a steady rise in traffic. The project highways are strategically located in the states with high economic activities. For further details on major economic activities in the influence region of project highways please see *"- Description of Our Toll Roads"* on page 169.

We believe that future development of highways along the Toll Roads and the increased government initiatives such as *Bharatmala Pariyojana* to improve efficiency across roads in India, will provide an impetus to the growth in traffic on the Toll Roads. Furthermore, each of the Toll Roads lie upon inter-city connection routes within the states of Jharkhand, Andhra Pradesh, Tamil Nadu and Karnataka, with passenger and commercial traffic.

Significant growth visibility through a defined pipeline of future assets

Through our relationship with the Sponsor, and in accordance with the approval granted by the chairman of NHAI *vide* letter dated December 01, 2025, our Sponsor will offer around 1,500.00 km of completed and operational national highways to the Trust over the next three to five years for monetization ("**Future Assets**"). We believe this structured access to the Sponsor's future portfolio provides a distinct competitive advantage and a structured roadmap for scaling the Trust.

To ensure disciplined growth, the Investment Manager has established a defined framework for identifying and selecting assets to be transferred to the Trust. This framework is designed to streamline the evaluation process with clear visibility on future scaling opportunities. The selection and acquisition of these Future Assets are governed by the Trust's rigorous investment criteria, which include assessments of yield accretion, traffic

diversity, residual concession periods, and geographic distribution. For a detailed description of these criteria and our acquisition framework, please see *"Our Strategy—Acquisition of toll road projects"* on page 166.

We believe that this access to future toll road assets of the Sponsor or its existing or future subsidiaries will be an important source of growth in the future

Concession Agreement terms with low counterparty risk

We believe that the Concession Agreements proposed to be entered into by the Project SPV have terms with low counterparty risk due to the creditworthiness of our Sponsor, being NHAI, a statutory body. We believe this, along with the following factors, provide for excellent prospects for our business:

- *Long concession life with the possibility for an extension:* Our Concession Agreements will be for a period of 15 years from the relevant Appointed Date, subject to the provisions of extension mentioned in the respective Concession Agreement. We believe this is a sufficiently long period that provides us with ample opportunity to refinance the assets on a fully amortized basis.

- *Termination payments:* Furthermore, our Concession Agreements provide for termination payments under various default scenarios such as NHAI events of default or *force majeure* events or concessionaire event of default. Under the Concession Agreements, NHAI is obligated to make termination payments in case of an event of default. NHAI's strong track record of meeting its obligations when they become due gives us confidence that any termination payments will be made in a timely manner. Such termination payments may be used to compensate our creditors.

- *Minimal price risk:* The toll rates for all Toll Roads are determined with reference to published base toll rates and are adjusted annually at the beginning of each fiscal year equal to 40% of the movement in the wholesale price index measured in December of the preceding year plus a fixed 3% as per NHAI Fee Rules. Given India's long track record of inflation rates as well as the 3% fixed portion of the increase, we anticipate an increase in toll rates over the life of the concession. We expect that this formula will minimize any risk of increasing operating costs over time.

- *Prohibition against additional tollways:* Subject to certain exemptions, NHAI is prohibited from constructing, or permitting the construction of, any competing expressway or other toll road ("**Additional Tollway**") between specified stretches of each Toll Road at any time during the relevant concession period. We will be compensated in line with the terms of the Concession Agreement if our toll collection activities are impacted by the Additional Tollway. NHAI is also obligated to use its best efforts to ensure that the tolls to be levied on vehicles using the Additional Tollway are at least 25.00% higher than the toll rates of the impacted Toll Road.

- *Prohibition against competing roads:* Subject to certain exemptions, NHAI is prohibited from constructing a Competing Road (as such term is defined in the Concession Agreements) of each of the Toll Roads during the respective concession periods.

- *Installation of additional check plazas:* Under the Concession Agreements, subject to certain restrictions we are permitted to install temporary or permanent fee collection booths to prevent fee evasion by users of the Toll Roads. We believe the installation of these check plazas will significantly decrease leakage in the Toll Roads, increasing cash collections and performance.

For details, see "*Summary of the Concession Agreements*" on page 200.

Experienced management team with industry experience

We will be managed by qualified personnel of the Investment Manager with majority of the personnel who have management and operational experience in the roads and highways sector for over two decades. In addition, qualified personnel of the Project Manager will manage our projects. For further details, in relation to the qualified personnel of the Investment Manager, see the section headed "*Parties to the Trust – The Investment Manager – Raajmarg Infra Investment Managers Private Limited*" on page 92. We believe that the experience and leadership of these teams will contribute to our growth and success and will position the Toll Road assets to be operated and managed in an efficient manner.

Long term transitional support from NHAI ensuring operational continuity

We will also benefit from a comprehensive and long-term Transitional Support Agreement entered into among the Sponsor, Project Manager, and the Project SPV. This agreement will ensure a seamless transition of the Toll Roads from NHAI-appointed contractors to our Project SPV by leveraging the Sponsor's expertise in managing O&M and tolling obligations. By providing support for a period of thirty months from the appointed date, the Transitional Support Agreement proposes to minimize execution risk and ensures that road service levels and tolling operations remain uninterrupted. The operational framework is designed to provide immediate revenue stability through fixed-fee tolling contracts with third-party contractors. Under these arrangements, the Sponsor will receive a fixed contracted fee on a regular basis from the third party contractors, which is independent of the actual quantum of toll collected by such third party contractors, thereby mitigating traffic volume volatility during the toll contracting period. Upon the consummation of the transaction, these remittances will be credited directly to the Project SPV, ensuring immediate cash flow accrual. This arrangement, combined with the Sponsor's obligation to operate tolling contracts on an "as is basis" from the appointed date, provides a highly visible and de-risked revenue stream for the Trust.

Strategies of our Trust

Organic growth through proactive management

Our principal investment strategy is to proactively manage the Toll Road assets to support growth. In particular, the Investment Manager will seek to maintain or improve the Project SPV's net incomes by, among other initiatives, curbing leakages, conducting proper due diligence, formulating and adopting policies and procedures and structuring investments to address tax or regulatory considerations. The Project Manager will assist the Investment Manager by carrying out the operations, management and maintenance of the project in accordance with the Concession Agreement and the Project Implementation and Management Agreement and by procuring, operating and maintaining the project's toll management systems, including but not limited to, employing staff for toll collection, monitoring toll collection and providing security arrangements at toll plazas.

The Investment Manager will also focus on minimizing project operating expenses. The roads and highways sector are a highly competitive sector that is capital intensive and requires significant expenditure. Our ability to efficiently manage the costs associated with the Toll Road assets is critical to maintaining the Project SPV's profit margins. The Investment Manager also intends to focus on increasing the margins of the Project SPV by strengthening internal processes and systems so as to improve utilization of resources and reduce costs. As part of our operations and maintenance systems and processes, the Investment Manager intends to work closely with the Project Manager to promote best practices, to minimize downtime or defects with respect to the Toll Road assets and to monitor performance of toll booth operators and maintenance contractors. The Investment Manager also intends to work with the Project Manager and the Project SPV to upgrade technology as needed, to manage any leakages in toll collections and to streamline collection, route and maintenance operations. With this focus on proactive asset management and operating expense minimization, the Investment Manager hopes to increase our profit margins and achieve long-term growth.

Acquisition of toll road projects

The Investment Manager intends to expand our initial portfolio by identifying and selectively acquiring additional toll road projects that meet our investment criteria described below. The Investment Manager intends to capitalize on opportunities to acquire road projects in India that provide attractive cash flows and yields. While evaluating acquisition opportunities, the Investment Manager intends to focus on, among other things, the following investment criteria in order to make asset selections:

- *Traffic characteristics*. The Investment Manager will seek to acquire assets with potential for traffic growth;
- *Residual concession period*. The Investment Manager will actively seek projects with residual concession periods of sufficient duration to meet the investment objectives of the Trust to generate stable returns and ensure long-term growth;
- *Geographic diversity*. The Investment Manager will seek projects in a variety of geographical locations in India to mitigate concentration risk and to take advantage of regional growth;
- *Traffic Diversity*: The current portfolio of InvIT Assets demonstrates a diversified traffic profile with a balanced mix of passenger and commercial vehicles, ensuring revenue is not overly reliant on any single vehicle class. This multi-modal traffic stream mitigates the risks of sectoral cyclicity and concentration,

providing high revenue resilience against localized economic shifts in specific industries or tourism. For further details please see – *"Description of our toll roads "* on page 169; and

- *Other*. In addition, the Investment Manager will also take into account factors such as estimated maintenance costs based on technical assessments of projects under evaluation, the impact of acquisitions on our expected distributions, and the requirements under the InvIT Regulations to propel our portfolio of completed and revenue generating projects.

Optimization of capital structure

The Investment Manager seeks to employ appropriate financing policies and diversify its sources of financing with the objective of minimizing the overall cost of capital, while maintaining a sustainable capital structure. Such financing and capital allocation decisions are undertaken within the framework of the Risk Management Policy adopted by the board of directors of the Investment Manager pursuant to the investment management agreement, which provides a structured and disciplined approach to the identification, assessment, monitoring and mitigation of risks associated with the Trust's business.

The Investment Manager operates within the borrowing limits prescribed under the InvIT Regulations, pursuant to which the maximum level of external debt of the Trust Group will not exceed 70.00% (or such other percentage as may be prescribed from time to time) of the value of the Trust's assets, and may adopt more conservative internal thresholds where considered appropriate to manage financial risk and protect Unitholder interests.

If it is in the interests of the Unitholders, the Investment Manager may also pursue growth opportunities that require raising additional capital through the issuance of new Units following an evaluation of the associated financial and risk implications in accordance with the Risk Management Policy.

Seamlessly transition all aspects of the Toll Roads upon acquisition

Each of the Toll Roads are publicly funded toll roads which have been operated, pursuant to annual toll contracts, by contractors or sub-contractors appointed by NHAI. Upon acquisition of the Toll Roads pursuant to the respective Concession Agreements, the operation and maintenance of each of the Toll Roads will be undertaken by the Project SPV, either directly or through third-party operation and maintenance contractors appointed by the Project SPV, from the concession commencement date or within such timelines as may be prescribed under the applicable Concession Agreements or Transitional Support Agreement. We expect to seamlessly transition the O&M of each of the Toll Roads in a timely and efficient manner to ensure continuity of operations and to minimize any disruption to toll collection, road usage or service levels.

Furthermore, we will also enter into a Transitional Support Agreement for the purpose of the Sponsor providing the transitional support to (i) the Project Manager in respect of its obligations under the Project Implementation and Management Agreement, and (ii) the Project SPV in respect of its O&M obligations and tolling obligations (*as provided under the Concession Agreements*). The terms and conditions of the Transitional Support Agreement shall, in respect of each Concession Agreement and the Project Implementation and Management Agreement, be effective and binding on the Parties for a period of thirty months from the appointed date, unless terminated earlier by mutual consent.

Improve toll collection efficiencies across the Toll Roads

We intend to transition from the existing hybrid ETC toll collection methods currently employed at the Toll Roads to automated toll collection system which we expect will improve efficiency, reduce leakage and decongest toll plazas. The adoption of automated toll collection system involves, among other things, the upgradation of toll management software to record vehicles crossing toll plazas, the usage of robust two-fold toll monitoring (including an automated traffic counter and vehicle classifiers to be installed at each toll lane and a remote video monitoring center to be established at our head office) and strict implementation of ETC at the toll lanes. This strategy is in line with the Government of India's initiatives to increase digitization, including the adoption of FASTags for all toll collections across India. Hitherto, the Toll Roads have seen an increasing share of ETC/FASTag-based toll collection, and according to the Traffic Report, this share is expected to grow further post the Government of India's initiative in the year 2021 mandating electronic toll payments.

Additionally, pursuant to the terms of the respective Concession Agreements, we propose to implement a barrier-less Multi-Lane Free Flow ("**MLFF**") tolling system at the proposed toll plaza location on each project highway stretch. The MLFF system will be based on Automatic Number Plate Recognition ("**ANPR**") cameras and RFID

technology, enabling electronic toll collection without physical barriers. The system is intended to facilitate seamless traffic movement, reduce congestion and improve tolling efficiency. The MLFF infrastructure will be integrated with the Central Clearing House and other authority-mandated platforms in accordance with applicable guidelines. The implementation and operation of the MLFF system will be undertaken in compliance with the specifications and performance standards prescribed by the authority under the Concession Agreements.

Summary of our toll roads

Particulars	Gorhar-Barwa Adda	Chilakaluripet - Vijayawada	Chennai Bypass	Chennai - Tada	Neelmangla Tumkur
Highway	NH 19	NH16	NH 32 and NH 48	NH 16	NH 48
State	Jharkhand	Andhra Pradesh	Tamil Nadu	Tamil Nadu	Karnataka
PCOD	October 16, 2021 and October 9, 2021 and October 5, 2010 (taking over certificate)	July 20, 2015 and October 29, 2024	May 14, 2013*	February 9, 2022	November 1, 2011
Length (km)	80.522	69.408	32.600	33.000	44.668
Length (lane km)	472.752	416.448	195.600	198.000	244.768
Number of lanes	four/six	six	six	six	four/six
Km chainage (km)	Gorhar to Barwa Adda from km 320+810 to km 400+632 (design km 401+332) of NH-19 (old NH-2)	Chilakaluripet to Vijayawada from km 355+000 to km 357+342 and from km 372+038 to km 422+605 along with Chilakaluripet bypass section from 0+000 to km 16+499 of NH 16	km 0+000 to km 32+600 of NH-32 and NH-48	km 21+400 to km 54+400 of NH-16	Neelmangla to Tumkur from km 29+500 to km 74+168 of NH-48
Toll plaza location ***(Kilometric point location)***	Kulgo (km 352+100)	Kaza (km 420+500)	Vanagram (km 16+500) / Tiruneermalai (km 6+500) Surapattu (km 28+600)	Nallur (km 21+625) / Durainallur (km 34+180)	Kulumepalya (km 30+000) Chokkenahalli (km 61+500), or Halenijagal (km 53+100) Bharathipura (km 46+375) Honnenahalli CP (km 47+425) Halenijagal (km 53+100) Dobbaspet (km 49+900)
Pavement type	Flexible/ Rigid at toll plaza	Flexible/ Rigid at toll plaza	Flexible/ Rigid at toll plaza	Flexible/ Rigid at toll plaza	Flexible/ Rigid at toll plaza
• **% of flexible**	98%	99.14%	99.56%	98.59%	98.21%
• **% of rigid**	2%	0.86%	0.44%	1.41%	1.79%
Other concession end	HAM-1: October	HAM: October	EPC: May 30,	EPC (six laning): February 09,	EPC and EPC (six laning):

Particulars	Gorhar-Barwa Adda	Chilakaluripet - Vijayawada	Chennai Bypass	Chennai - Tada	Neelmangla Tumkur
dates	15, 2036 HAM-2: October 8, 2036	28, 2039	2028	2026	March 31, 2032
Current concessionaire	HAM- 1DBL Gorhar Khairatunda Highways Private Limited HAM-2: Ashoka Khairatunda Barwa Adda Road Limited	HAM: Chilakaluripet Bypass Private Limited	EPC: Babuji Civil construction Private Limited	EPC: SPL Infrastructure Private Limited	EPC: H G Infra Engineering Limited
Tolling handover date	April 1, 2026				
Concession agreement end date	March 31, 2041				
Concession Period	15 years				
O&M handover date	Stretch-1: April 1, 2026; Stretch-2: October 15, 2036 Stretch-3: October 8, 2036	Stretch 1 and 3: March 24, 2032 Stretch 2: October 28, 2039	April 1, 2026	April 1, 2026	Stretch 1 and 3: March 31, 2032; Stretch-2: June 5, 2029
Capacity augmentation	Please see note 4 below	NA	NA	NA	Please see note 5 below

**date of toll notification*

Notes:

(1) Maintenance for project stretches to continue under scope of existing concessionaire until end of current concession.

(2) Appointed date as per the relevant Concession Agreements. Transitional Support Agreement entered into between NHAI and the Trust to manage tolling and O&M for the first 30 months from the Appointed Date.

(3) The PCOD dates mentioned herein are for the respective stretches for which the PCOD certificates were granted for such InvIT Assets

(4) DPR for Stretch 1 in progress. NHAI to decide on capacity augmentation post DPR acceptance.

(5) The EPC contract for six laning of Stretch 1 and 3 awarded to H G Infra Engineering Limited with expected PCOD of March 31, 2027. The bids for preparation of DPR for six laning for Stretch 2 has been invited. NHAI to decide on capacity augmentation post DPR acceptance.

Description of our Toll Roads

- ***Gorhar to Barwa Adda***

Project overview

The asset comprise the four/six lane section from Gorhar to Barwa Adda from km 320+810 to km 400+632 (design km 401+332) of NH-19 (old NH-2), comprising km 320+810 to km 326+000 between Gorhar and Atka, being a four lane section; Atka to Khairatunda from km 326+000 to km 360+300 (design km 361+000) and Khairatunda to Barwa Adda from km 360+300 (design km 361+000) to km 400+632 (design km 401+332), being six lane sections, in the state of Jharkhand, having total length of 80.522 km. According to Traffic Report, the project

highway is an integral part of golden quadrilateral along NH19, a strategic long-distance transport corridor linking Delhi/Agra and Kolkata.

The map below illustrates the location of the project and the corridor it covers

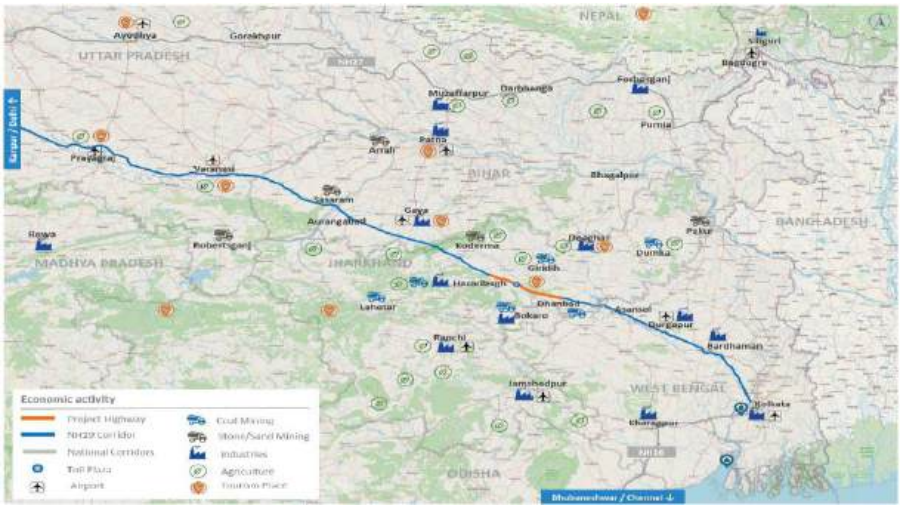
Source: Traffic Report.

Salient growth features and traffic generators

The project highway serves as critical inter-state traffic, ensuring all-weather connectivity among Uttar Pradesh, Bihar, Jharkhand and West Bengal and supporting efficient regional freight and passenger movement. In addition to providing national connectivity, the project highway also provides regional and local linkages across eastern India. It facilitates medium-distance movement between key urban and industrial centres in Bihar, Uttar Pradesh, Jharkhand, West Bengal and Odisha, supporting the transport of manufacturing goods, construction materials and petroleum products. The corridor additionally serves short-distance commuter and commercial traffic between regional nodes such as Gaya, Ranchi, Dhanbad, Barhi, Chouparan, and Hazaribagh, ensuring year-round connectivity. Notably, it enables the movement of coal from Dhanbad, the mining capital of Jharkhand, to industrial centres in West Bengal, reinforcing its importance to regional supply chains. *(Source: Traffic Report)*

The project highway is strategically located in Jharkhand which consists of about 40% of the country's mineral wealth which includes coal, iron ore, copper ore, etc. The Jharkhand's industries enjoy location advantage within eastern India being close to the in the region, raw material and access to ports of Kolkata, Haldia and Paradip. *(Source: Traffic Report)*

The map below illustrates the major economic activities in the influence region:



Source: Traffic Report.

Traffic volume and composite of vehicles

Historical traffic data

Gorhar to Barwa Adda demonstrates a growth trajectory with a projected total CAGR of 6.3% (3.5% in PCU terms) from Fiscal 2023 to Fiscal 2026 till October 2025. The following table shows the vehicle category-wise traffic growth from Fiscal 2023 to Fiscal 2026 till October 2025:

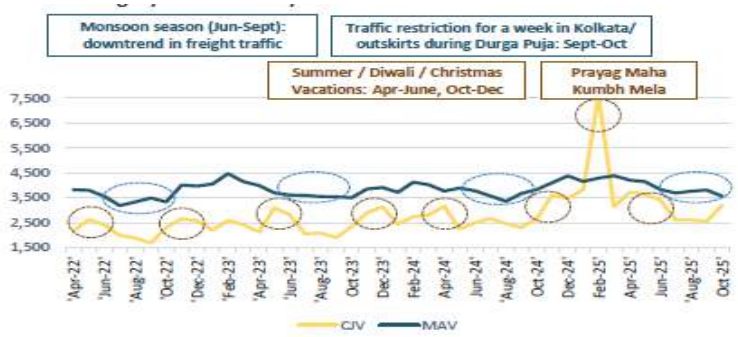
Vehicle category-wise traffic growth trend - ETC

Vehicle Category	CJV	Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	Total	PCU
Annual Average Daily Traffic (AADT)									
FY23	2,287	561	251	283	938	901	3,762	8,983	26,518
FY24	2,533	552	300	301	1,022	876	3,759	9,343	27,047
FY25	3,273	608	345	343	1,162	890	3,931	10,553	29,274
FY26 till Oct'25	3,106	746	387	316	1,208	847	3,859	10,470	28,913
Growth trends									
FY24 vs FY23	10.8%	(1.6%)	19.3%	6.6%	8.9%	(2.8%)	(0.1%)	4.0%	2.0%
FY25 vs FY24	29.2%	10.2%	15.1%	13.7%	13.7%	1.6%	4.6%	13.0%	8.2%
FY26* vs FY25	(5.1%)	22.6%	12.1%	(7.9%)	3.9%	(4.8%)	(1.8%)	(0.8%)	(1.2%)
CAGR (FY23 – FY26 YTD)	13.0%	12.1%	18.9%	4.5%	10.6%	(2.4%)	1.0%	6.3%	3.5%

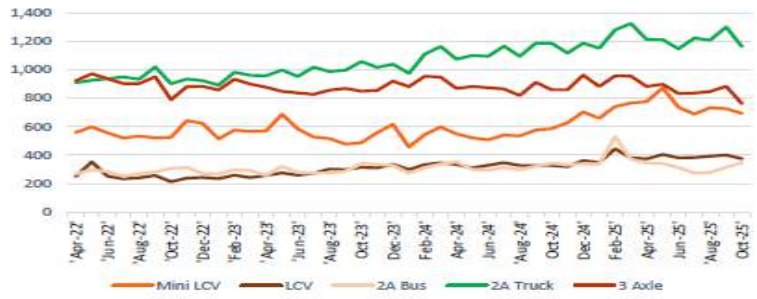
Source: Traffic Report.
** Against Fiscal 2025 for 7 months i.e., April-October, 2025*

Monthly Average Daily Traffic

The chart below presents data available on a monthly basis starting April 2022 up to October 2025 for the Kulgo toll plaza on Gorhar to Barwa Adda.



Source: Traffic Report



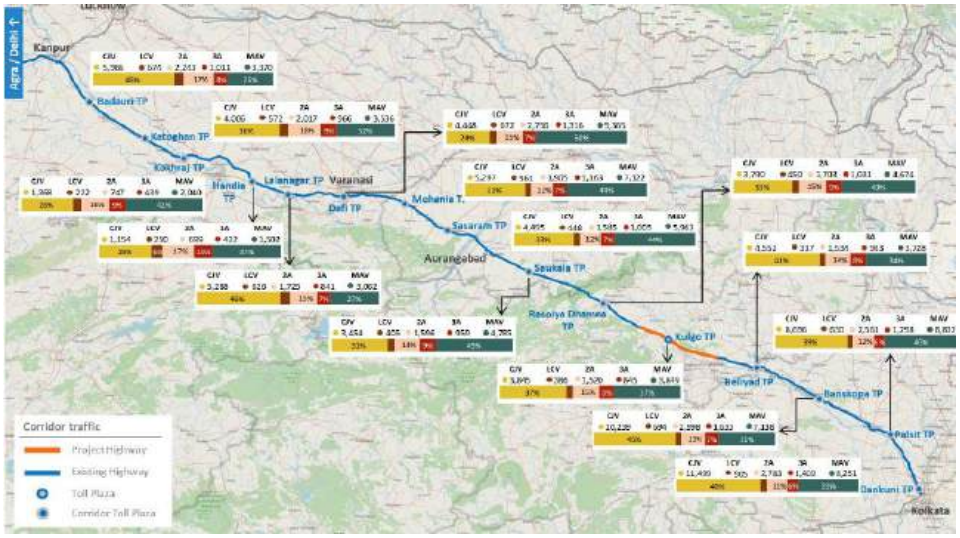
Source: Traffic Report

Monthly reported traffic on the surrounding assets/connecting roads

The Gorha -Barwa Adda project highway serves as a critical link within the Kanpur - Kolkata Corridor of NH19, with the Kulgo toll plaza. According to the Traffic Report, this asset's traffic profile is benchmarked against

proximal upstream and downstream plazas, such as Rasoiya Dhamna (~34,000 PCU) and Beliyad (~30,000 PCU). Additionally, the project highway section of Gorhar to Barwa Adda demonstrates a stable medium-term growth trajectory with a projected total CAGR of ~5% (~3.5% in PCU terms), closely aligning with the ~5% (~6% in PCU terms) CAGR observed in the neighbouring Barachatti - Gorhar section.

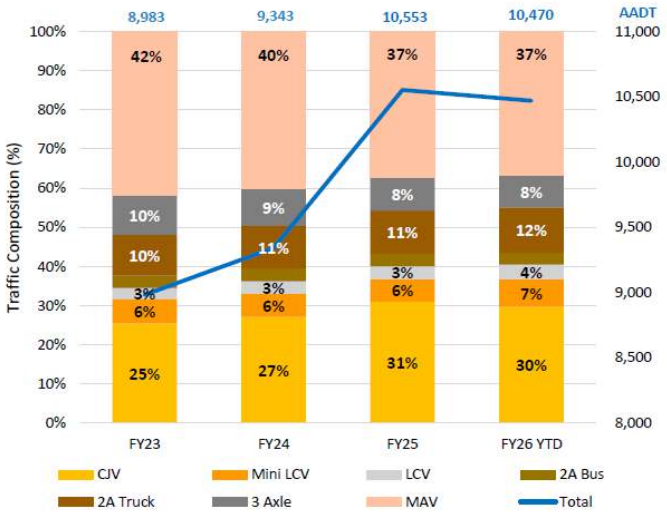
Growth projections for the section are tied to regional industrial outputs, specifically the production of finished steel and coal from the influence regions of Jharkhand and West Bengal. High-capacity freight, including MAVs and 3A Trucks, represents a significant portion of the corridor's AADT, reflecting the specialized commodity movement of the region. Consequently, the traffic composition and elasticity values are aligned with the weighted average GSDP of the surrounding four-state influence zone. Hence, according to the Traffic Report it is reasonable to believe that the traffic profile on this asset will mirror the profile of surrounding assets/connecting roads. The chart below indicates the traffic profile on the surrounding assets/connecting roads of Kulgo toll plaza for 7 months ADT of Fiscal 2026 till October 2025.



Source: Traffic Report

Toll Segmentation

The chart below presents the estimated segmentation based on traffic data from Fiscal 2023, Fiscal 2024 and Fiscal 2025 and from April 2025 to October 2025 for Kulgo toll plaza. For further details in this regard, please refer to Annexure C:



Source: Traffic Report

Base year Annual Average Daily Traffic

The table below shows Fiscal 2026 Annual Average Daily Traffic ("**AADT**") estimated using the counts and the variance factors:

Particulars	Kulgo toll plaza
Car / Jeep/ Van	4,617
Mini LCV	909
Minibus/LCV	391
Buses	342
2A Truck	1,228
3A Truck	876
MAV	4,135
OSV	3
AADT	12,500
PCU	32,069

Source: Traffic Report

Elasticity recommendations

As per the Traffic Report, travel demand elasticity for the project highway is driven by a combination of macro-economic trends and regional industry-specific factors. For passenger and light commercial vehicles, elasticity is primarily benchmarked against the weighted average GSDP of Jharkhand, West Bengal, Bihar, and Uttar Pradesh. For heavy commercial vehicle demand, particularly for 2A Trucks, 3A Trucks is influenced by industrial output, including the production of finished steel within the primary influence regions of Jharkhand, West Bengal, and Odisha. For multi-axle vehicle, elasticity is primarily benchmarked against influence region by industrial output, including the production of finished steel and coal within the primary influence regions of Jharkhand, West Bengal, and Odisha and production of coal from Jharkhand and West Bengal. Consequently, adopted elasticity values ranging from 0.85 - 1.00 for MAV to 0.75 - 1.10 for light commercial vehicles reflecting the diverse socio-economic conditions of the corridor. These estimates sourced from the Traffic Report rely on historical traffic data and benchmark references from proximal toll plazas to align growth projections with regional economic activity.

Projected Traffic Data: Growth in Passenger Car Unit (PCU)

The Traffic Report also projects that there will be growth in PCU of Gorhar to Barwa Adda across all vehicle types from Fiscal 2026 till Fiscal 2041. For detailed analysis on the traffic growth rates, please refer to Annexure C.

Operation and maintenance

Two stretches Gorhar to Barwa Adda Toll Road is currently operated under the HAM model, whereby the HAM concessionaire is responsible for construction, operation and maintenance of the toll road while the relevant authority collects tolls and makes annuity payments to the HAM concessionaire. The current concessionaires are DBL Gorhar Khairatunda Highway Private Limited and Ashoka Khairatunda Barwa Adda Road Limited with October 15, 2036 and October 8, 2036 being the O&M handover date. We expect the current concessionaire /contractor to operate and maintain the respective works/stretches up to the DLP/maintenance period as per the provisions of the respective concession agreements. After end of DLP/maintenance period, the works/stretches shall be handed over to the InvIT -Concessionaire for operation and maintenance as per scope of the Concession Agreement.

Tollable Length and Toll Rates

In terms of tollable length, the Gorhar to Barwa Adda Toll Road comprises 87.231 km of roads. In India, toll rates are as per notification by the Ministry of Road Transport and Highways in the Gazette of India. The present toll rates are determined with reference to the published base toll rates and are adjusted annually at the beginning of each fiscal year equal to 40% of the movement in the wholesale price index in December of the preceding year plus a fixed 3%.

According to the NHAI's revision of user fee letter dated September 30, 2025, the toll rates at the Kulgo toll plaza for the Gorhar to Barwa Adda Toll Road are as follows:

Vehicle Type	**Single Journey**	**Multiple Journey**	**Monthly Pass (50 single-journeys in a month)**	**Fee for Commercial Vehicle Registered within the district of the toll plaza**
				(Rs.)
Car/Jeep/Van or LMV	130	195	4,285	65
LCV, LGV or Minibus	210	310	6,925	105
Bus/Truck (2 Axle)	435	655	14,505	220
3 Axle Commercial Vehicles	475	710	15,825	235
HCM/EME or MAV (4 to 6)	680	1,025	22,750	340
Oversized vehicles (7 or more axles)	830	1,245	27,695	415

The rate of monthly pass applicable for local non-commercial residing within a distance of 20km from the toll plaza for the year 2025-2026 shall be ₹ 340

- ***Chilakaluripet-Vijayawada:***

Project overview

The project comprises the six lane section from Chilakaluripet to Vijayawada from km 355+000 to km 357+342 and from km 372+038 to km 422+605 along with Chilakaluripet Bypass section from 0+000 to km 16+499 of NH 16, in the state of Andhra Pradesh, having total length of 69.408 km. This project is a part of NH16 which is a major Indian highway running along the country's, to eastern coast, connecting Kolkata, West Bengal and Chennai, Tamil Nadu. It forms part of the Golden Quadrilateral project/east coast corridor and connects key urban cities such as Bhubaneswar, Visakhapatnam and Vijayawada.

Source: Traffic Report.

Salient growth features and traffic generators

According to the Traffic Report, the project highway is strategically located at the central region of Andhra Pradesh and, hence, acts as the spinal cord for the state by extending connectivity to different parts of the country, namely West Bengal and Odisha in the north and Karnataka and Tamil Nadu in the south. The NH16 corridor has evolved over the past few years and has witnessed an increase in traffic volumes along with an improvement in the level of service across the corridor. Its improved connectivity boosts economic activities, supports agriculture and manufacturing hubs, and strengthens links to major ports and markets along the east coast.

According to the Traffic Report, the project highway is strategically located in Andhra Pradesh which is the 8th largest state in country and contributes approximately 4.9% of India's GDP. The presence of 15 operational ports along the coastline helps in uplifting the industry landscape. Andhra Pradesh is among the top five exporting States in India.

The map below illustrates the major economic activities in the influence region:

Source: Traffic Report.

Traffic volume and composite of vehicles

Historical traffic data

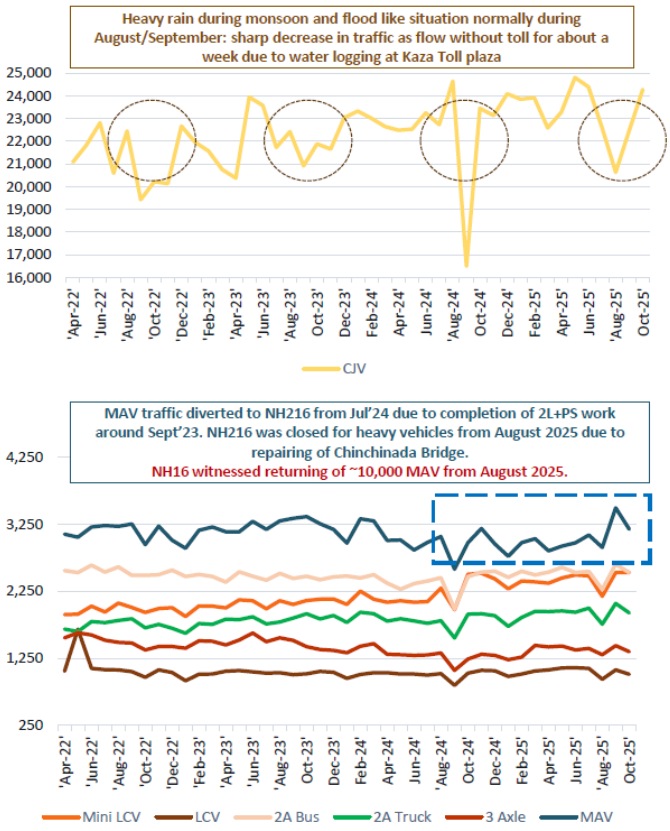
Chilakaluripet - Vijayawada demonstrates a growth trajectory with a projected total CAGR of 2.8% (1.6% in PCU terms) from Fiscal 2023 to Fiscal 2026 till October 2025. The following table shows the vehicle category-wise traffic growth from Fiscal 2023 to Fiscal 2026 till October 2025:

Vehicle Category	CJV	Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	Total	PCU
Annual Average Daily Traffic (AADT)									
FY23	21,295	1,976	1,091	2,528	1,739	1,492	3,125	**33,246**	**56,246**
FY24	22,385	2,099	1,030	2,462	1,850	1,494	3,229	**34,518**	**57,886**
FY25	22,774	2,264	1,013	2,407	1,819	1,283	2,951	**34,512**	**56,367**
FY26 till Oct'25	23,207	2,431	1,060	2,523	1,941	1,387	3,058	**35,609**	**58,546**
Growth trends									
FY24 vs FY23	5.1%	6.2%	(5.6%)	(2.6%)	6.4%	(1.9%)	3.3%	**3.8%**	**2.9%**
FY25 vs FY24	1.7%	7.9%	(1.6%)	(2.2%)	(1.6%)	(12.4%)	(8.6%)	**0.0%**	**(2.6%)**
FY26* vs FY25	4.3%	12.3%	6.5%	8.2%	8.7%	9.7%	4.4%	**5.6%**	**6.0%**
CAGR (FY23 - FY26 YTD)	3.5%	8.6%	(1.1%)	(0.1%)	4.5%	(2.9%)	(0.9%)	**2.8%**	**1.6%**

Source: Traffic Report.
** Against Fiscal 2025 for 7 months i.e., April-October.*

Monthly Average Daily Traffic

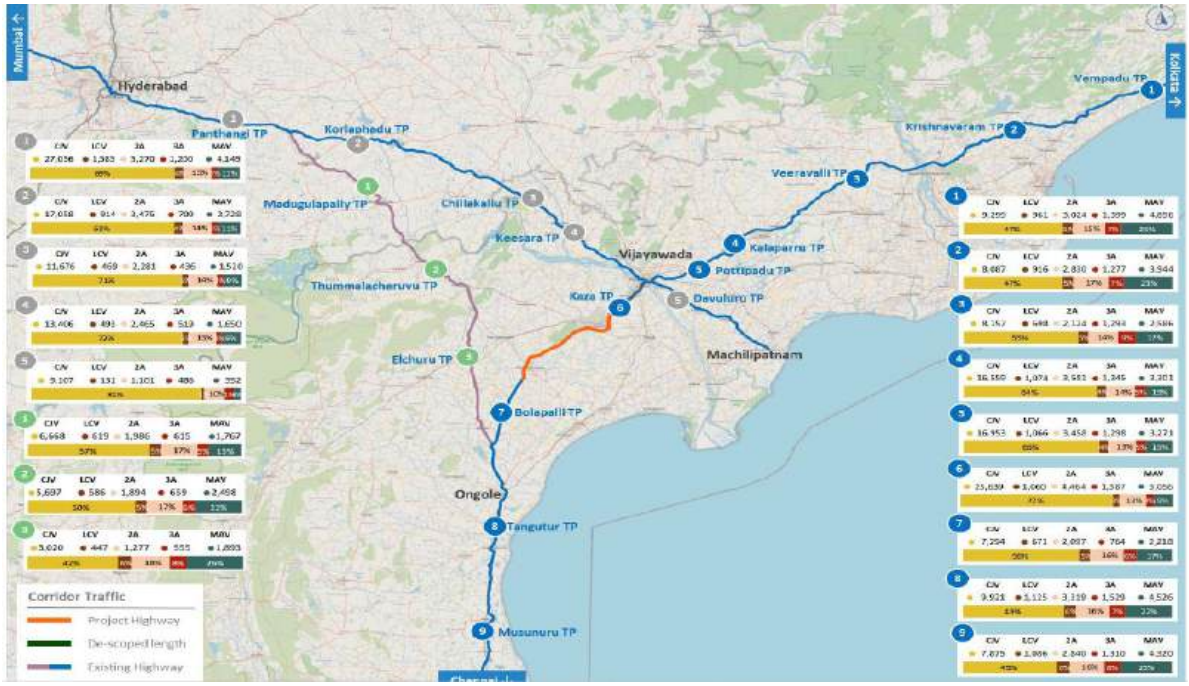
The chart below presents data available on a monthly basis starting April 2022 up to October 2025 for the Kaza toll plaza on Chilakaluripet - Vijayawada.



Source: Traffic Report.

Monthly reported traffic on the surrounding assets/connecting roads

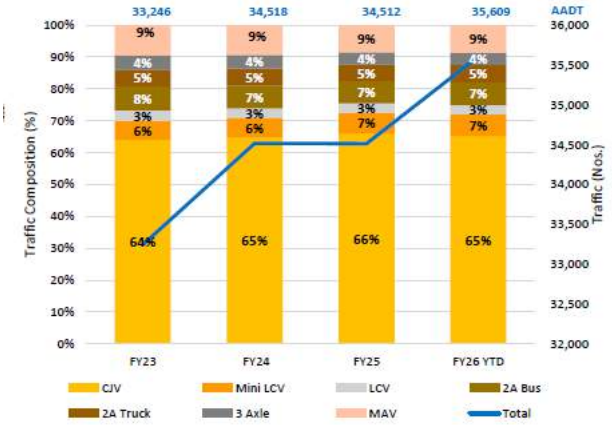
Chilakaluripet - Vijayawada project highway is integral part of strategic NH16. The traffic growth was witnessed at healthy and sustainable pace every year till Fiscal 2020. According to the Traffic Report, only immediate tollable section in south of the project highway can act as benchmark for determining long term growth rate. The neighbouring highway section (Pottipadu TP) on north of the project highway (Kaza TP) witness traffic of Hyderabad and till Vijayawada and hence, traffic characteristics are different. The corridor has witnessed a CAGR of 6.7% (5% in PCU terms) over the period of fiscal 2015 to fiscal 2019 and a CAGR of 5% (3% in PCU terms) over the period of fiscal 2019 to fiscal 2024. The chart below indicates the traffic profile on the surrounding assets/connecting roads at the Kaza toll plaza for 7 months ADT of Fiscal 2026 till October 2025:



Source: Traffic Report

Toll Segmentation

The chart below presents the estimated segmentation based on traffic data from Fiscal 2023, Fiscal 2024 and Fiscal 2025 and from April 2025 to October 2025 for Kaza toll plaza. For further details in this regard, please refer to Annexure C:



Source: Traffic Report

Base year Annual Average Daily Traffic

The table below shows Fiscal 2026 AADTs estimated using the counts and the variance factors:

Asset	Kaza toll plaza
Car/Jeep/Van	25,073
Mini LCV	2,482
Mini Bus/LCV	1,089
Buses	2,525
2A Truck	2,000
3A Truck	1,388
MAV	3,164
OSV	3
Total AADT	**37,725**
Total PCU	**61,180**

Source: Traffic Report

Elasticity recommendations

As per the Traffic Report, travel demand elasticity for the project highway is driven by a combination of macro-economic trends and regional industry-specific factors. For passenger vehicles and buses, elasticity is primarily benchmarked against the GSDP of Andhra Pradesh, while for Mini LCVs, 2A Trucks and 3A Trucks, it is influenced by the weighted average of GDP and the GSDP of Andhra Pradesh and Tamil Nadu. The adopted elasticity values reflect the corridor's role in industrial and agricultural trade across the eastern coastal influence zone. These estimates, sourced from the Traffic Report, rely on historical traffic data and benchmark references from proximal toll plazas to align growth projections with regional economic activity.

Projected Traffic Data: Growth in Passenger Car Unit (PCU)

The Traffic Report also projects that there will be growth in PCU of Chilakaluripet - Vijayawada across all vehicle types from Fiscal 2026 till Fiscal 2041. For detailed analysis on the traffic growth rates, please refer to Annexure C .

Operation and maintenance

The Project Highway Vijayawada- Chilakaluripet section is under performance based maintenance contract ("**PBMC**") from Km 355+000 to Km 357+342 & from Km 372+038 to Km 422+605 and under HAM from Km 0+000 to Km 16+499. In the HAM concession, the HAM concessionaire is responsible for construction, operation and maintenance of the toll road while the relevant authority collects tolls and makes annuity payments to the concessionaire. The current PBMC contractor is Shiva Build Tech Private Limited and the current HAM concessionaire is Chilakaluripet Bypass Private Limited. We expect the current concessionaire/contractor to

operate and maintain the project up to the O&M Handover Date pursuant to and in accordance with the existing concession/contract agreements. The O&M Handover Date for the Chilakaluripet-Vijayawada Toll Road on March 24, 2032 from Shiva Build Tech Private Limited for PBMC and on October 28, 2039 from Chilakaluripet Bypass Private Limited for HAM.

Tollable Length and Toll Rates

In terms of tollable length, the Chilakaluripet-Vijayawada Toll Road comprises 80.802 km of roads. In India, toll rates are as per notification by the Ministry of Road Transport and Highways in the Gazette of India. The present toll rates are determined with reference to the published base toll rates and are adjusted annually at the beginning of each fiscal year equal to 40% of the movement in the wholesale price index in December of the preceding year plus a fixed 3%.

According to the NHAI's letter dated September 30, 2025, the toll rates at the Kaza toll plaza for the Chilakaluripet-Vijayawada Toll Road are as follows:

Vehicle Type	Single Journey	Multiple Journey	Monthly Pass (50 single-journeys in a month)	Fee for Commercial Vehicle Registered within the district of the toll plaza
		(Rs.)		
Car/Jeep/Van or LMV	170	255	5,620	85
LCV, LGV or Minibus	270	410	9,080	135
Bus/Truck (2 Axles)	570	855	19,020	285
3 Axle Commercial Vehicles	625	935	20,750	310
HCM/EME or MAV (4 to 6 Axles)	895	1,340	29,830	445
Oversized vehicles (7 or more axles)	1,090	1,635	36,315	545

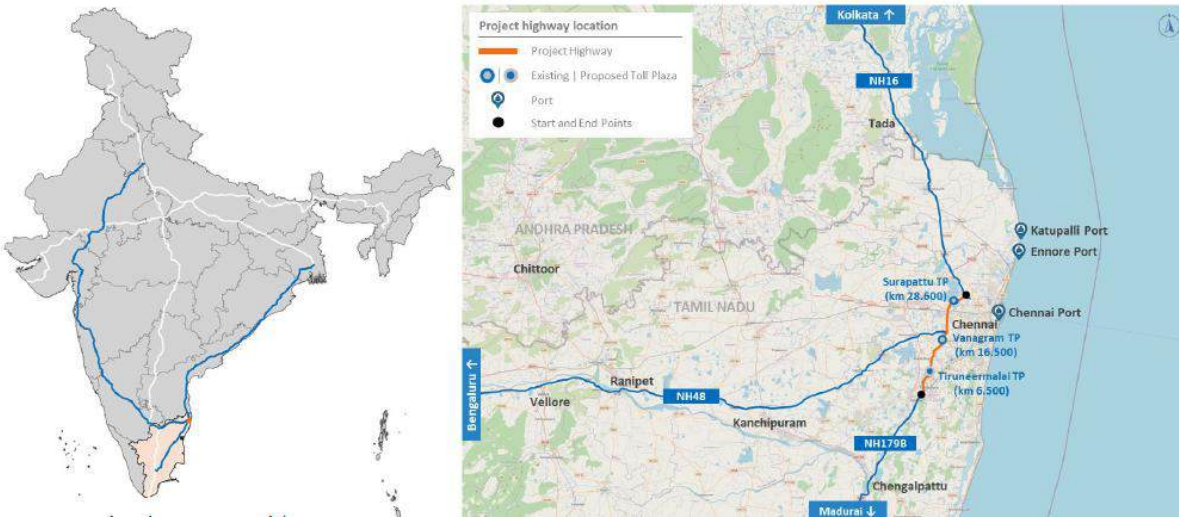
The rate of monthly pass applicable for local non-commercial residing within a distance of 20km from the toll plaza for the year 2025-2026 shall be ₹ 340.

- ***Chennai Bypass***

Project overview

Chennai Bypass is a six lane section from km 0+000 to km 32+600 of NH-32 and NH-48, in the state of Tamil Nadu, having total length of 32.600 km, connecting Chennai to south Tamil Nadu.

Project highway plays a significant role in reducing congestion within Chennai city and streamlining traffic flow along the north-south corridor in the state and upwards journey towards Andhra Pradesh when conceptualized. It caters to substantial intra-city and port-related traffic, including movements between Bengaluru/western and Chennai maritime cluster covering ports of Chennai, Ennore and Kattupalli.



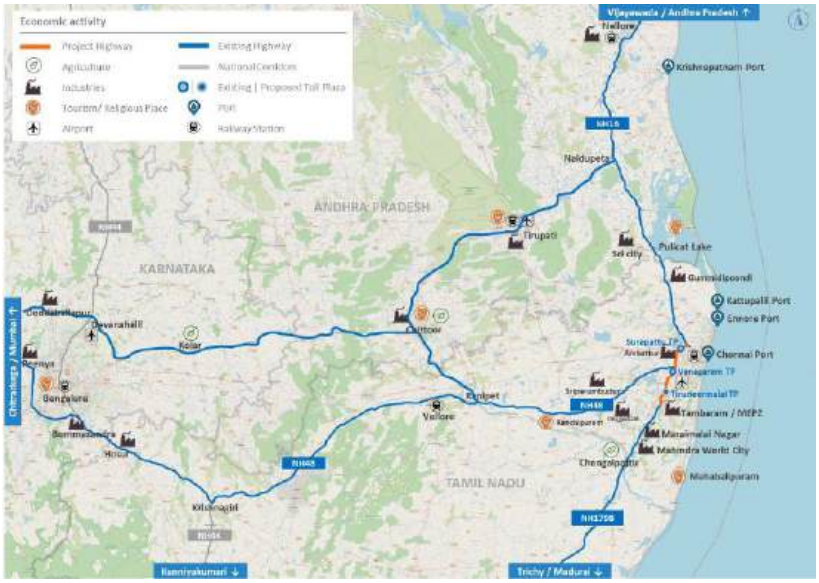
Source: Traffic Report.

Note:
Present toll plaza at Vanagram location is to be shifted to Tiruneermalai due to identified black spot near toll plaza and proposed construction of Vehicular Underpass (VUP) at km 16.890

Salient growth features and traffic generators

According to the Traffic Report, Tamil Nadu is one of India's most industrialized state, with a diversified economy driven by manufacturing, services and agriculture. Tamil Nadu's strategic coastal location along the Bay of Bengal supports strong maritime trade through Chennai, Ennore, Kattupalli and Thoothukudi ports. Due to the rapid urbanization of Chennai, the bypass now functions as an integral part of the city's internal road network, handling substantial intra-city and suburban traffic. It supports the daily movement of commuters, goods vehicles, and port related transport between industrial clusters, residential zones, and logistics parks. Additionally, it provides last-mile connectivity to city distribution centers and container yards, contributing to the efficient functioning of the urban freight ecosystem within the Chennai region.

The map below illustrates the major economic activities in the influence region:



Source: Traffic Report.

Traffic volume and composite of vehicles

Historical traffic data

Surapattu toll plaza of Chennai Bypass demonstrates a growth trajectory with a projected total CAGR of 9.7% (4.1% in PCU terms) from Fiscal 2023 to Fiscal 2026 till October 2025. The following table shows the vehicle category-wise traffic growth from Fiscal 2023 to Fiscal 2026 till October 2025:

Vehicle category-wise traffic growth trend

Vehicle Category	CJV	Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	Total	PCU
Annual Average Daily Traffic (AADT)									
FY23	8,139	2,282	2,365	168	1,333	1,417	3,836	**19,538**	**39,980**
FY24	9,558	2,706	2,491	193	1,297	1,185	3,633	**21,064**	**40,377**
FY25	10,652	3,057	2,542	220	1,231	1,021	3,686	**22,409**	**41,526**
FY26 till Oct'25	12,197	3,464	2,737	208	1,283	990	3,765	**24,645**	**44,154**
Growth trends									
FY24 vs FY23	17.4%	18.6%	5.3%	15.1%	(2.7%)	(16.4%)	(5.4%)	**7.8%**	**1.0%**
FY25 vs FY24	11.4%	13.0%	2.0%	14.0%	(5.1%)	(13.8%)	1.5%	**6.4%**	**2.8%**
FY26* vs FY25	15.9%	16.5%	5.0%	(7.3%)	0.5%	(9.3%)	(3.3%)	**9.1%**	**3.3%**
CAGR (FY23 – FY26 YTD)	17.6%	18.2%	6.0%	8.9%	(1.5%)	(13.4%)	(0.7%)	**9.7%**	**4.1%**

Source: Traffic Report.
** Against Fiscal 2025 for 7 months i.e., April-October.*

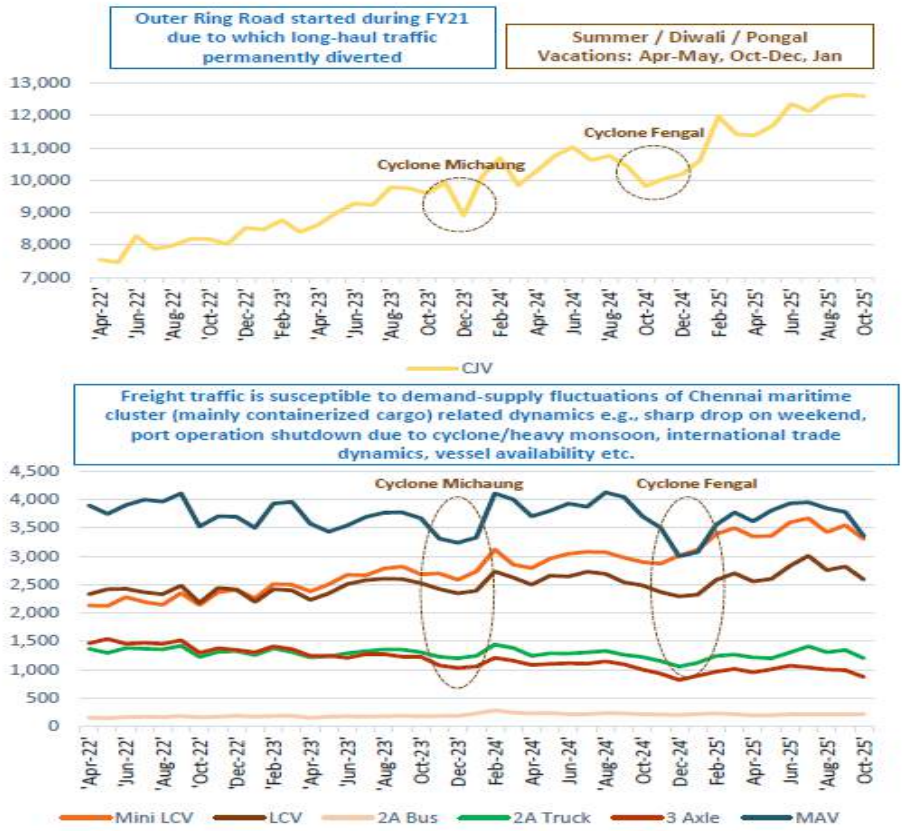
Vanagram toll plaza of Chennai Bypass demonstrates a growth trajectory with a projected total CAGR of 16.0% (12.3% in PCU terms) from Fiscal 2023 to Fiscal 2026 till October 2025. The following table shows the vehicle category-wise traffic growth from Fiscal 2023 to Fiscal 2026 till October 2025:

Vehicle Category	CJV	Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	Total	PCU
Annual Average Daily Traffic (AADT)									
FY23	17,566	2,772	1,970	890	1,100	788	1,781	**26,867**	**39,641**
FY24	19,468	2,927	1,826	998	990	653	1,866	**28,728**	**41,454**
FY25	23,197	3,549	1,874	1,328	887	560	1,869	**33,264**	**46,293**
FY26 till Oct'25	27,725	4,166	2,034	1,505	934	565	2,007	**38,936**	**52,985**
Growth trends									
FY24 vs FY23	10.8%	5.6%	(7.3%)	12.2%	(10.0%)	(17.1%)	4.5%	**6.9%**	**4.6%**
FY25 vs FY24	19.2%	21.2%	2.6%	33.0%	(10.4%)	(14.3%)	0.4%	**15.8%**	**11.7%**
FY26* vs FY25	23.7%	22.7%	3.3%	16.8%	(3.9%)	(9.9%)	(2.3%)	**19.0%**	**13.5%**
CAGR (FY23 – FY26 YTD)	20.0%	17.7%	1.3%	23.4%	(6.3%)	(12.5%)	4.9%	**16.0%**	**12.3%**

Source: Traffic Report.
** Against Fiscal 2025 for 7 months i.e., April-October.*

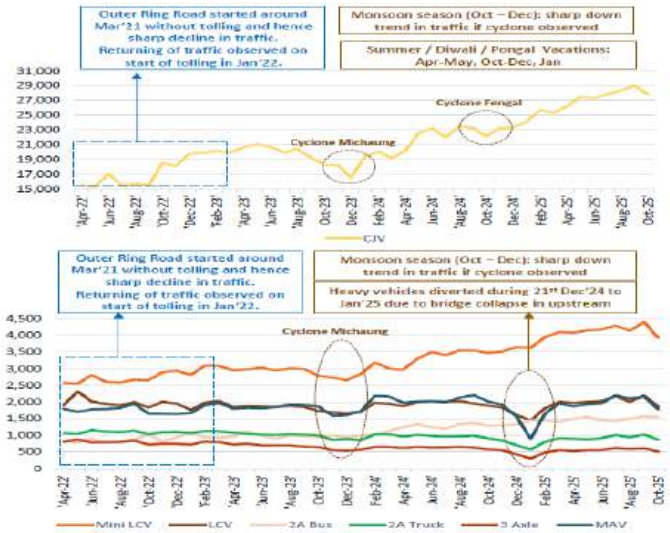
Monthly Average Daily Traffic

The chart below presents the reported traffic volume for Surapattu toll plaza on Chennai Bypass, in terms of monthly traffic trend from April 2022 to October 2025.



Source: Traffic Report

The chart below presents the reported traffic volume for Vanagram toll plaza on Chennai Bypass, in terms of monthly traffic trend from April 2022 to October 2025.



Source: Traffic Report

Monthly reported traffic on the surrounding assets/connecting roads

Chennai Bypass serves as a vital arterial link connecting NH16 and NH45, with the Vanagram and Surapattu toll plazas. According to the Traffic Report, this asset's traffic profile is benchmarked against proximal plazas such as Nallur and Paranur, which demonstrate consistent heavy urban and port-bound flow patterns.

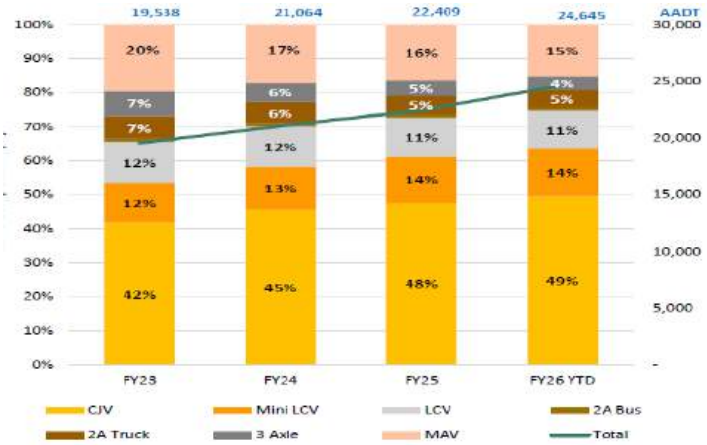
Growth projections for the section are tied to regional economic drivers, including the rapid urbanization of the Chennai Metropolitan Area and industrial output from the surrounding automotive and manufacturing districts.

Additionally, the project corridor demonstrates a robust demand profile, driven significantly by heavy freight and high-frequency urban passenger traffic. Hence, it is reasonable to believe that the traffic profile on Chennai Bypass will mirror the profile of immediate tollable sections north and south of the project highway. The chart below indicates the traffic profile on the surrounding assets/connecting roads at the Chennai Bypass toll plaza for 7 months ADT of Fiscal 2026 till October 2025.

Source: Traffic Report

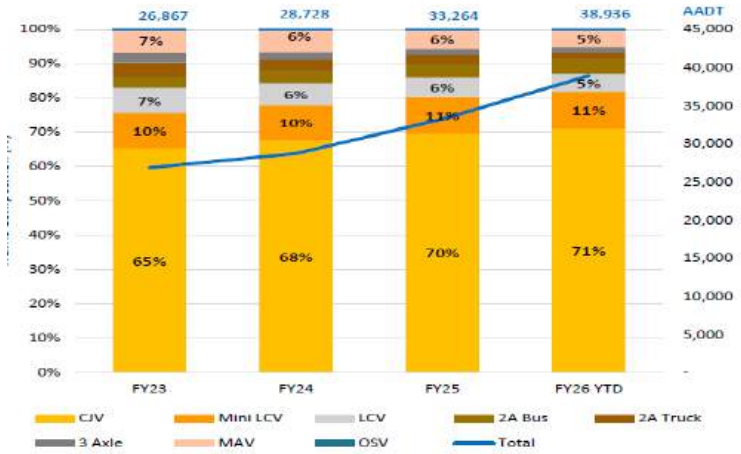
Toll Segmentation

The chart below presents the estimated segmentation based on traffic data from Fiscal 2023, Fiscal 2024 and Fiscal 2025 and from April 2025 to October 2025 for Surapattu toll plaza:



Source: Traffic Report

The chart below presents the estimated segmentation based on traffic data from Fiscal 2023, Fiscal 2024 and Fiscal 2025 and from April 2025 to October 2025 for Vanagram toll plaza:



Source: Traffic Report

For further details in this regard, please refer to Annexure C.

Base year Annual Average Daily Traffic

The below shows Fiscal 2026 ADTs estimated using the counts and the variance factors:

Asset	**Surapattu TP**	**Vanagram TP**
Car/Jeep/Van	14,081	29,235
Mini LCV	3,579	4,546
Mini Bus/LCV	2,791	2,049
Bus	265	2,945
2A Trucks	1,332	1,060
3A Trucks	1,007	551
MAV	3,765	2,008
OSV	13	7
Total AADT	**26,833**	**42,400**
PCU	**46,659**	**59,587**

Source: Traffic Report

Elasticity recommendations

As per the Traffic Report, travel demand elasticity for the project highway is driven by a combination of macro-economic trends and specific regional urban drivers. For passenger vehicles, mini LCVs, and LCVs, elasticity is primarily benchmarked against the weighted average GSDP of Tamil Nadu and the Gross District Domestic Product of the Chennai, Kancheepuram, Chengalpattu, and Thiruvallur districts. For heavy commercial vehicles, particularly 2A Trucks, 3A Trucks and MAVs, demand is further influenced by Chennai port cluster container traffic in addition to regional economic metrics. These estimates, sourced from the Traffic Report, rely on historical traffic data and benchmark references from proximal toll plazas to align growth projections with regional economic activity.

Projected Traffic Data: Growth in Passenger Car Unit (PCU)

The Traffic Report also projects that there will be growth in PCU of Chennai Bypass across all vehicle types from Fiscal 2026 till Fiscal 2041. For detailed analysis on the traffic growth rates, please refer to Annexure C.

Operation and maintenance

The Chennai Bypasss section is under O&M (Annual Maintenance) from km 0+000 to Km 32+600 and under EPC (major maintenance) from Km 0+000 to Km 32+600. The existing concessionaire/ contractor shall operate

and maintain the project up to O&M handover date pursuant to and in accordance with the existing concession/contract agreements. The current O&M contractor is Arjunvaishanvi Infrastructure & Developers Private Limited and the current EPC concessionaire for major maintenance is Babuji Civil construction. We expect the current concessionaire to operate and maintain the project up to Handover date pursuant to and in accordance with the existing concession/contract agreements. Our O&M Handover Date for the Chennai Bypass Toll Road is with effect from April 1, 2026 and May 30, 2028 in respect of major maintenance.

Tollable Length and Toll Rates

In terms of tollable length, the Chennai Bypass Toll Road comprises 85.408 km of roads. In India, toll rates are as per notification by the Ministry of Road Transport and Highways in the Gazette of India. The present toll rates are determined with reference to the published base toll rates and are adjusted annually at the beginning of each fiscal year equal to 40% of the movement in the wholesale price index in December of the preceding year plus a fixed 3%.

According to the NHAI's letter dated September 29, 2025, the toll rates at the Vanagram toll plaza are as follows:

Vehicle Type	Single Journey	Multiple Journey	Monthly Pass (50 single-journeys in a month)	Fee for Commercial Vehicle Registered within the district of the Vanagram toll plaza
		(Rs.)		
Car/Jeep/Passenger Van	55	80	1,760	25
LCV	85	130	2,840	45
Bus/Truck	180	270	5,955	90
3 Axle commercial vehicle	195	290	6,495	95
HCM or EME or MAV (4 to 6 Axle)	280	420	9,340	140
Oversized (7 or more axles)	340	510	11,370	170

The rate of monthly pass applicable for local non-commercial residing within a distance of 20km from the toll plaza for the year 2025-2026 shall be ₹ 340

The toll rates at the Surapattu toll plaza of the Maharashtra Border - Belgaum Toll Road are as follows:

Vehicle Type	Single Journey	Multiple Journey	Monthly Pass (50 single-journeys in a month)	Fee for Commercial Vehicle Registered within the district of the Surapattu toll plaza
		(Rs.)		
Car/Jeep/Passenger Van	75	110	2,445	35
LCV	120	180	3,945	60
Bus/Truck	250	370	8,270	125
3 Axle commercial vehicle	270	405	9,020	135
HCM or EME or MAV (4 to 6 Axle)	390	585	12,965	195
Oversized (7 or more axles)	475	710	15,785	235

The rate of monthly pass applicable for local non-commercial residing within a distance of 20km from the toll plaza for the year 2025-2026 shall be ₹ 340

- ***Chennai - Tada***

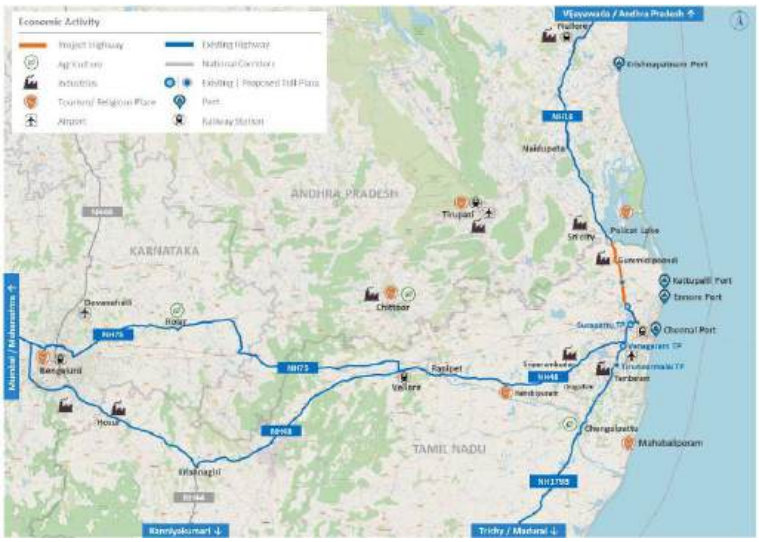
Project overview

It is a six lane section from km 21+400 to km 54+400 of NH-16, in the state of Tamil Nadu, having total length of 33.000 km in the state of Tamil Nadu. The total length of Project Stretch is 33.00 km. Chennai – Tada comprises end section of NH16 corridor with high contribution of traffic originated/destined at Chennai Port Cluster. It forms the southern terminal stretch of NH16 under the Golden Quadrilateral, providing east coast connectivity between Chennai, Andhra Pradesh, Odisha and West Bengal and further towards eastern and north-eastern India.

Source: Traffic Report.

Salient growth features and traffic generators

According to the Traffic Report, Tamil Nadu is one of India's most industrialized state, with a diversified economy driven by manufacturing, services and agriculture. Chennai, Coimbatore, Tiruppur, Hosur, Salem, and Madurai are major industrial and commercial hubs, hosting automobile, textile, leather, and electronic clusters. Tamil Nadu's strategic coastal location along the Bay of Bengal supports strong maritime trade through Chennai, Ennore, Kattupalli and Thoothukudi ports.



Source: Traffic Report.
Note:

Nallur toll plaza will be shifted to Durainallur at km 34.180 from 1st October 2027 (H2 Fiscal 2028) in context of development of Chennai Peripheral Ring Road

Traffic volume and composite of vehicles

Historical traffic data

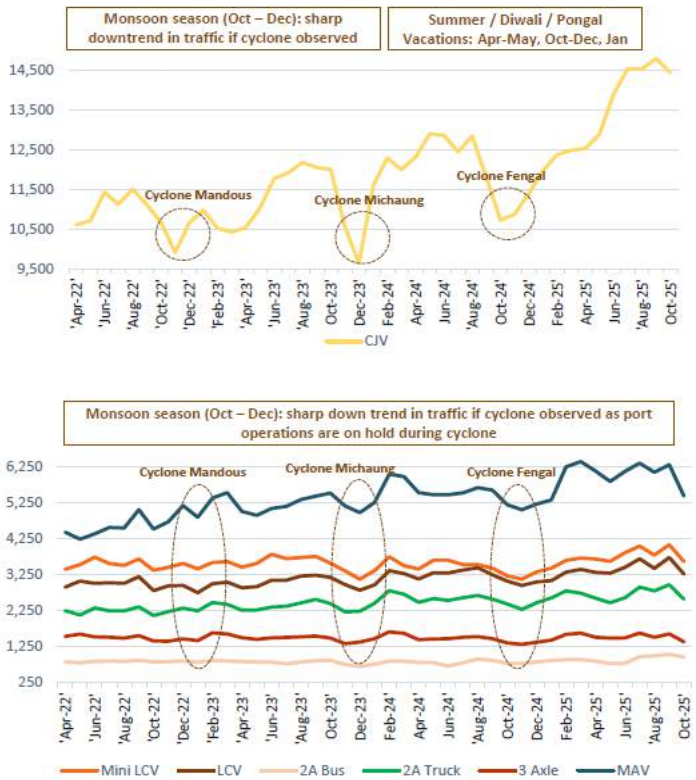
Chennai – Tada demonstrates a growth trajectory with a projected total CAGR of 8.0% (7.9% in PCU terms) from Fiscal 2023 to Fiscal 2026 till October 2025. The following table shows the vehicle category-wise traffic growth from Fiscal 2023 to Fiscal 2026 till October 2025:

Vehicle Category	CJV	Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	Total	PCU
Annual Average Daily Traffic (AADT)									
FY23	10,803	3,546	2,984	846	2,287	1,518	4,810	26,794	54,424
FY24	11,461	3,566	3,094	816	2,437	1,504	5,352	28,231	58,025
FY25	12,079	3,481	3,233	835	2,574	1,471	5,589	29,262	60,201
FY26 till Oct'25	13,953	3,826	3,464	919	2,713	1,526	6,070	32,471	65,764
Growth trends									
FY24 vs FY23	6.1%	0.6%	3.7%	(3.5%)	6.6%	(0.9%)	11.3%	5.4%	6.6%
FY25 vs FY24	5.4%	(2.4%)	4.5%	2.3%	5.6%	(2.2%)	4.4%	3.7%	3.7%
FY26* vs FY25	13.7%	9.4%	5.7%	12.2%	5.7%	3.7%	9.8%	10.4%	9.4%
CAGR (FY23 – FY26 YTD)	10.8%	3.1%	6.1%	3.4%	7.1%	0.2%	9.8%	8.0%	7.9%

Source: Traffic Report.
** Against Fiscal 2025 for 7 months i.e., April-October.*

Monthly Average Daily Traffic

The chart below presents data available on a monthly basis starting April 2022 up to October 2025 for the Nallur toll plaza on Chennai - Tada.

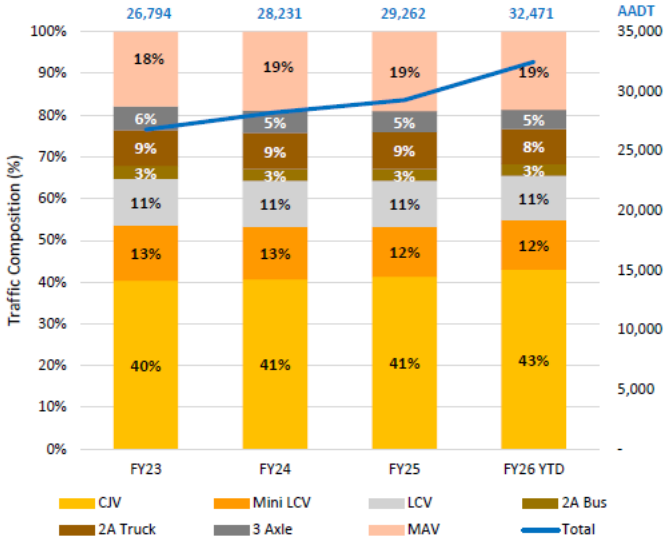


Source: Traffic Report

Monthly reported traffic on the surrounding assets/connecting roads

Toll Segmentation

The chart below presents the estimated segmentation based on traffic data from Fiscal 2023, Fiscal 2024 and Fiscal 2025 and from April 2025 to October 2025 for Nallur toll plaza. For further details in this regard, please refer to Annexure C:



Source: Traffic Report

Base year Annual Average Daily Traffic

The table below shows Fiscal 2026 AADTs estimated using the counts and the variance factors:

Asset	Nallur toll plaza	Durainallur toll plaza
Car/Jeep/Van	17,704	10,246
LCV	4,216	2,526
Mini Bus / LCV	3,648	3,359
Buses	1,850	1,048
2A Truck	2,809	2,638
3A Truck	1,545	1,394
MAV	6,195	6,099
OSV	25	18
Total AADT	**37,992**	**27,329**
PCU	**73,994**	**60,578**

Source: Traffic Report

Elasticity recommendations

As per the Traffic Report, travel demand elasticity for the project highway is driven by a combination of macro-economic trends and regional industry-specific factors. For passenger vehicles, Mini LCVs, Buses, and LCVs, elasticity is primarily benchmarked against the weighted average GSDP of Tamil Nadu and Andhra Pradesh. For heavy commercial vehicles, particularly 2A Trucks, 3A Trucks and MAVs, demand is influenced by the Weighted average of GDP, GSDP of Tamil Nadu, Andhra Pradesh and Chennai port cluster – container and general traffic. The adopted elasticity values reflects the corridor's strategic role in industrial and port-related trade within the

southern coastal influence zone. These estimates, sourced from the Traffic Report, rely on historical traffic data and benchmark references from proximal toll plazas to align growth projections with regional economic activity.

Projected Traffic Data: Growth in Passenger Car Unit (PCU)

The Traffic Report projects that Chennai - Tada will undergo a period of traffic stabilization till Fiscal 2030 following an initial contraction in H2 of Fiscal 2028 and eventually transitioning into a steady growth trajectory from Fiscal 2030 through Fiscal 2041. For detailed analysis on the traffic growth rates, please refer to Annexure C.

Operation and maintenance

The operation and maintenance of the Chennai -Tada Toll Road will be the responsibility of the Project SPV with effect from April 1, 2026. As per the transition support agreement, NHAI will be handling the O&M for a period of 30 months from the appointed date.

Tollable Length and Toll Rates

In terms of tollable length, the Chennai-Tada Toll Road comprises 43.278 km of roads. In India, toll rates are as per notification by the Ministry of Road Transport and Highways in the Gazette of India. The present toll rates are determined with reference to the published base toll rates and are adjusted annually at the beginning of each fiscal year equal to 40% of the movement in the wholesale price index in December of the preceding year plus a fixed 3%.

According to NHAI's letter dated September 29, 2025, the toll rates at the Nallur toll plaza are as follows:

Vehicle Type	**Single Journey**	**Multiple Journey**	**Monthly Pass (50 single-journeys in a month)**	**Fee for Commercial Vehicle Registered within the district of the Nallur toll plaza**
		(Rs.)		
Car/Jeep/Passenger Van	80	120	2,640	40
LCV	130	190	4,260	65
Bus/Truck	270	400	8,925	135
3 Axle commercial vehicle	290	440	9,740	145
HCM or EME or MAV (4 to 6 Axle)	420	630	14,000	210
Oversized (7 or more axles)	510	765	17,040	255

The rate of monthly pass applicable for local non-commercial residing within a distance of 20km from the toll plaza for the year 2025-2026 shall be ₹ 340

- ***Neelmangla Tumkur:***

Project overview

It is a four/six lane section from Neelmangla to Tumkur from km 29+500 to km 74+168 of NH-48, comprising km 29+500 to km 49+900 between Neelmangla to Dobbaspet being a six lane section; Dobbaspet to Tumkur from km 49+900 to km 61+520, being a four lane section and Tumkur Bypass from km 61+520 to km 74+168 being a 6 lane section, in the state of Karnataka, having total length of 44.668 km.

Currently, toll is collected at Kulumepalya (Ch. 30+000) and Chokkenahalli (Ch. 61+500). Upon completion of six-laning of the respective stretch, toll collection will be shifted to the new toll plazas at MCW (Ch. 53+100), Ramp RHS (Ch. 53+100), Ramp RHS (Ch. 46+375), LHS Ramp (Ch.49+900) and Ramp LHS (Ch. 47+425), and the existing toll plazas at Kulumepalya and Chokkenahalli will be demolished.

Neelmangla Tumkur part of the Golden Quadrilateral (NH48: Delhi–Mumbai–Bengaluru–Chennai corridor), serving as link for long-distance freight traffic towards Bengaluru and western India. With rapid industrialization and urban sprawl around Bengaluru, Neelmangla, and Tumkur, the section has transitioned from a pure intercity corridor to a mixed-use urban-industrial route, accommodating substantial commuter, logistics, and regional goods traffic.

Source: Traffic Report.

Salient growth features and traffic generators

According to the Traffic Report, the project highway provides strong local connectivity between Bengaluru's western outskirts, Neelmangla, Dobbaspet, and Tumkur, acting as a major conduit for goods from local industries to larger markets as well as passenger and employee commute along the Bengaluru–Tumkur growth corridor. The project highway connects key industrial and logistics hubs, such as including the Dobbaspet Industrial Area and the Tumkur Industrial Node (under the Chennai–Bengaluru Industrial Corridor), boosting regional manufacturing and export activity. The project highway, being a part of NH48, acts as a spinal cord for Karnataka which includes Belagavi, Dharwad, Haveri, Davangere, Chitradurga, Tumkur, Bengaluru Urban and Rural district. It also facilitates the movement of goods and raw materials between Bengaluru, Hubballi, Belagavi, and Pune, supporting strengthening industrial supply chains and distribution networks across Karnataka.

The map below illustrates the major economic activities in the influence region:

Source: Traffic Report.

Traffic volume and composite of vehicles

Historical traffic data

Kulumepalya toll plaza of Neelmangla Tumkur demonstrates a growth trajectory with a projected total CAGR of 4.6% (4.8% in PCU terms) from Fiscal 2023 to Fiscal 2026 till October 2025.The following table shows the vehicle category-wise traffic growth from Fiscal 2023 to Fiscal 2026 till October 2025:

Vehicle category-wise traffic growth trend

Vehicle Category	CJV	Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	Total	PCU
Annual Average Daily Traffic (AADT)									
FY23	17,117	2,349	4,276	2,549	2,787	1,865	4,227	35,170	66,506
FY24	19,685	2,752	4,566	3,139	3,217	1,807	4,536	39,702	74,187
FY25	17,780	2,944	4,264	3,371	3,206	1,743	4,459	37,767	72,145
FY26 till Oct'25	18,382	3,462	4,329	3,688	3,257	1,723	4,525	39,367	74,707
Growth trends									
FY24 vs FY23	15.0%	17.2%	6.8%	23.1%	15.5%	(3.1%)	7.2%	12.9%	11.5%
FY25 vs FY24	(9.7%)	6.9%	(6.6%)	7.4%	(0.3%)	(3.5%)	(1.6%)	(4.9%)	(2.8%)
FY26* vs FY25	3.6%	25.1%	1.7%	10.1%	2.7%	0.2%	5.0%	5.5%	5.2%
CAGR (FY23 – FY26 YTD)	2.9%	16.8%	0.5%	15.9%	6.4%	(3.1%)	2.8%	4.6%	4.8%

Source: Traffic Report.
** Against Fiscal 2025 for 7 months i.e., April-October.*

Chokkenahalli toll plaza of Neelmangla Tumkur demonstrates a growth trajectory with a projected total CAGR of 9.0% (9.2% in PCU terms) from Fiscal 2023 to Fiscal 2026 till October 2025. The following table shows the vehicle category-wise traffic growth from Fiscal 2023 to Fiscal 2026 till October 2025:

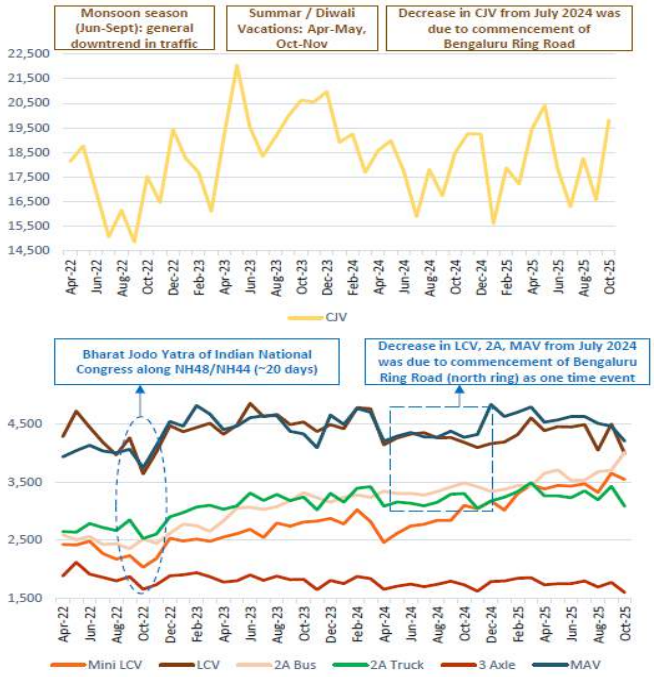
Vehicle category-wise traffic growth trend

Vehicle Category	CJV	Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	Total	PCU
Annual Average Daily Traffic (AADT)									
FY23	13,492	1,483	2,590	2,278	2,321	1,654	4,240	**28,059**	**56,701**
FY24	15,262	1,769	2,868	2,801	2,814	1,696	4,604	**31,813**	**63,981**
FY25	15,393	2,181	3,157	3,226	3,128	1,689	4,956	**33,730**	**68,739**
FY26 till Oct'25	15,538	2,613	3,253	3,458	3,246	1,696	4,974	**34,778**	**70,612**
Growth trends									
FY24 vs FY23	13.1%	19.3%	10.7%	23.0%	21.2%	2.6%	8.4%	**13.4%**	**12.8%**
FY25 vs FY24	0.9%	23.3%	10.1%	15.2%	11.2%	(0.4%)	7.8%	**6.0%**	**7.4%**
FY26* vs FY25	1.1%	28.3%	4.7%	8.1%	5.4%	1.6%	4.4%	**4.7%**	**4.9%**
CAGR (FY23 – FY26 YTD)	5.8%	25.4%	9.5%	18.2%	14.4%	1.0%	6.6%	**9.0%**	**9.2%**

Source: Traffic Report.
** Against Fiscal 2025 for 7 months i.e., April-October.*

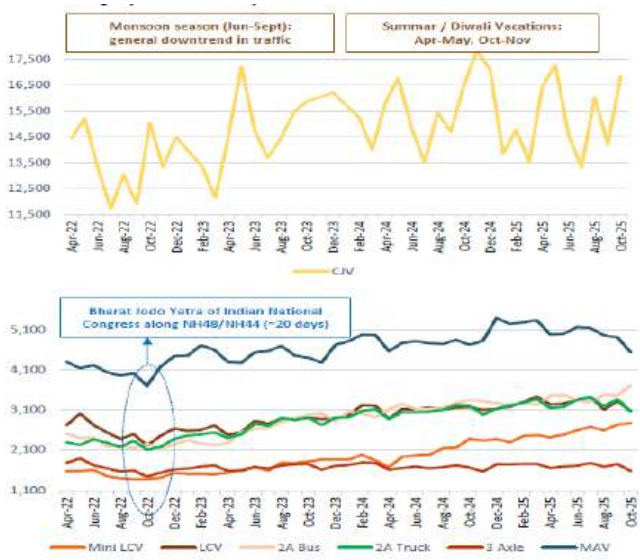
Monthly Average Daily Traffic

The chart below presents the reported traffic volume for Kulumepalya toll plaza on Neelmangla Tumkur, in terms of monthly traffic trend from April 2022 to October 2025.



Source: Traffic Report

The chart below presents the reported traffic volume for Chokkenahalli toll plaza on Neelmangla Tumkur, in terms of monthly traffic trend from April 2022 to October 2025.

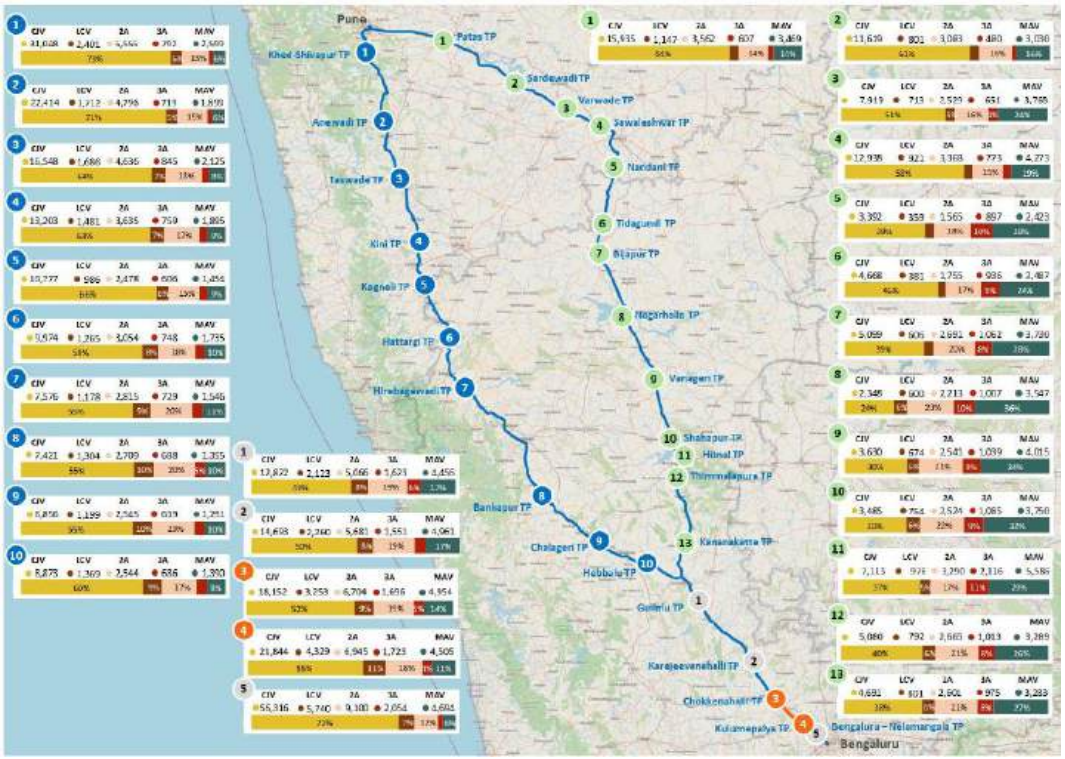


Source: Traffic Report

Monthly reported traffic on the surrounding assets/connecting roads

Neelmangla Tumkur serves as a vital link within the NH48 corridor. According to the Traffic Report, this asset's traffic profile is benchmarked against proximal plazas such as Karjeevanhalli toll plaza, which demonstrate consistent heavy urban flow patterns. Growth projections for the section are tied to regional economic drivers, including the rapid urbanization of the Bengaluru metropolitan area and large-scale industrialization. Hence, according to the Traffic Report, it is reasonable to believe that the traffic profile on Neelmangla Tumkur will mirror the profile of surrounding assets and connecting roads.

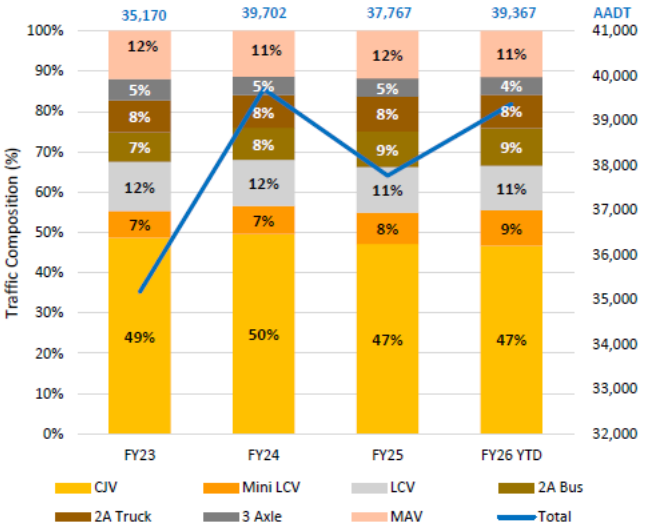
The chart below indicates the traffic profile and historical trends observed at the Neelmangla Tumkur toll plazas for 7 months ADT of Fiscal 2026 till October 2025.



Source: Traffic Report

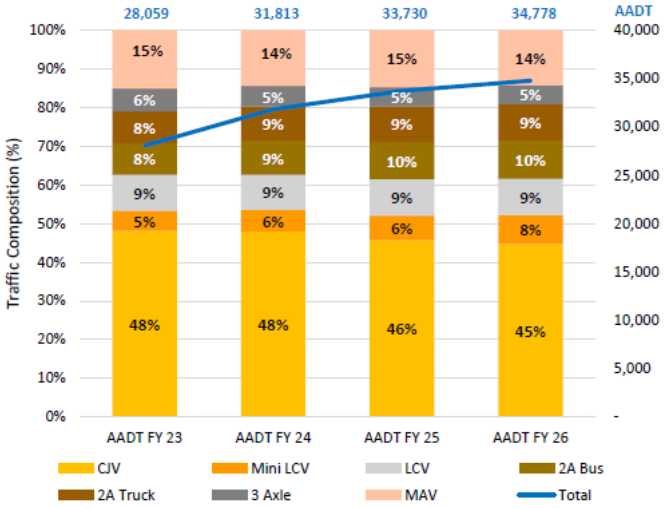
Toll Segmentation

The chart below presents the estimated segmentation based on traffic data from Fiscal 2023, Fiscal 2024 and Fiscal 2025 and from April 2025 to October 2025 for Kulumepalya toll plaza:



Source: Traffic Report

The chart below presents the estimated segmentation based on traffic data from Fiscal 2023, Fiscal 2024 and Fiscal 2025 and from April 2025 to October 2025 for Chokkenahalli toll plaza:



Source: Traffic Report

For further details in this regard, please refer to Annexure C.

Base year Annual Average Daily Traffic

The table below shows Fiscal 2026 AADTs estimated using the counts and the variance factors:

Asset	Kulumepalya toll plaza	Chokkenahalli toll plaza
Car/Jeep/Van	26,217	20,078
Mini LCV	3,990	2,966
Mini Bus/LCV	4,725	3,811
Buses	3,850	3,610
2A Truck	3,664	3,642

Asset	Kulumepalya toll plaza	Chokkenahalli toll plaza
3A Truck	1,874	1,859
MAV	4,940	5,389
OSV	25	23
Total AADT	**49,312**	**41,378**
Total PCU	**87,839**	**80,448**

Source: Traffic Report.

Elasticity recommendations

As per the Traffic Report, travel demand elasticity for the project highway is driven by a combination of macro-economic trends and regional industry-specific factors. For passenger vehicles, Mini LCV and buses, elasticity is primarily benchmarked against the GSDP of Karnataka, while for Mini Bus/ LCV, 2A Truck , 3A Truck, and MAVs, it is influenced by the weighted average of GDP and GSDP of Karnataka and Tamil Nadu. The adopted elasticity values reflects the corridor's strategic role as gateway to Bengaluru handling high volume of freight traffic, supporting inter-state trade movement. These estimates, sourced from the Traffic Report, rely on historical traffic data and benchmark references from proximal toll plazas.

Projected Traffic Data: Growth in Passenger Car Unit (PCU)

According to the Traffic Reports, the existing toll plazas (Kulumepalya and Chokkenhalli) will be dismantled on completion of four to six lane widening. Additionally, new single mainline plaza will be constructed instead of the existing two mainline plazas. The Traffic Report projects that the toll plazas will undergo growth in PCU of Neelmangla Tumkur for Bharathipura and Honnenahalli Check Plaza, Halenijagal and Dobbaspet Check Plaza and, Halenijagal across all vehicle types until Fiscal 2041. For detailed analysis on the traffic growth rates, please refer to Annexure C.

Operation and maintenance

The Project Highway Neelmangla- Tumkur section is under EPC (Six Laning) from Km 29+500 to Km 49+900, from Km 61+520 to 74+168 is under EPC. The existing concessionaire/ contractor shall operate and maintain the project up to the O&M handover date pursuant to and in accordance with the existing concession/contract agreements. The current EPC concessionaire (including six laning) is H G Infra Engineering Limited and the O&M contractor is Sri Chowdeshwari Concrete India Private Limited. The O&M Handover Date for the Neelmangla Tumkur Toll Road from H G Infra Engineering Limited is expected to be March 31, 2032 and is expected to be on June 5, 2029 from Sri Chowdeshwari concrete India Private Limited.

Tollable Length and Toll Rates

In terms of tollable length, the Neelmangla Tumkur Toll Road comprises 48.646 km which will increase to 52.516 km post completion of six laning of the roads. In India, toll rates are as per notification by the Ministry of Road Transport and Highways in the Gazette of India. The present toll rates are determined with reference to the published base toll rates and are adjusted annually at the beginning of each fiscal year equal to 40% of the movement in the wholesale price index in December of the preceding year plus a fixed 3%.

The toll rates at the Chokkenahalli toll plaza with effect from October 1, 2025 are as follows:

Vehicle Type	Single Journey	Multiple Journey	Monthly Pass (50 single-journeys in a month)	Fee for Commercial Vehicle Registered within the district of the Chokkenahalli toll plaza
		(Rs.)		
Car/Jeep/Van/LMV	20	30	655	10

Vehicle Type	Single Journey	Multiple Journey	Monthly Pass (50 single-journeys in a month)	Fee for Commercial Vehicle Registered within the district of the Chokkenahalli toll plaza
LCV/LGV/Mini Bus	30	50	1,060	15
Truck/ Bus (2 axle)	65	100	2,220	35
3 axle commercial vehicles	75	110	2,420	35
HCM/EME/MAV (4 to 6 Axles)	105	155	3,480	50
Oversized vehicles (7 or more axles)	125	190	4,240	65

The rate of monthly pass applicable for local non-commercial residing within a distance of 20km from the toll plaza for the year 2025-2026 shall be ₹ 340.

The toll rates at the Kulumepalya toll plaza with effect from October 1, 2025 are as follows:

Vehicle Type	Single Journey	Multiple Journey	Monthly Pass (50 single-journeys in a month)	Fee for Commercial Vehicle Registered within the district of the Kulumepalya toll plaza
		(Rs.)		
Car/Jeep/Van/LMV	25	35	825	10
LCV/LGV/Mini Bus	40	60	1,335	20
Truck/ Bus (2 axle)	85	125	2,800	40
3 axle commercial vehicles	90	135	3,055	45
HCM/EME/MAV (4 to 6 Axles)	130	200	4,390	65
Oversized vehicles (7 or more axles)	160	240	5,345	80

The rate of monthly pass applicable for local non-commercial residing within a distance of 20 km from the toll plaza for the year 2025-2026 shall be ₹ 340

Operation and Maintenance Services

One of our key business activities will be the operation and maintenance of the InvIT Assets pursuant to, and in accordance with, the provisions of the Concession Agreements and other road project related agreements (as applicable). The Project SPV is required to operate and maintain the InvIT Assets in accordance with the Concession Agreement, including by modifying, repairing or otherwise making improvements to the roads. In particular, the Concession Agreement requires the Project SPV to maintain the Toll Roads to certain standards during the concession period. NHAI has used, and will likely continue to use, independent engineers to carry out periodic tests to assess the quality of the roads or bridges and their related maintenance.

The Project Manager, together with the Project SPV, will be responsible for managing the critical day-to-day operation and maintenance of the Toll Road assets. The Project Manager, through the Project Management and Implementation Agreement, will provide project and contract management support, such as liaising with and supervising sub-contractors, managing design, planning and the obtaining of necessary licenses and approvals for the projects.

A project SPV is generally responsible for carrying out operation and maintenance activities at its toll road during its concession period. The scope of a project SPV's operation and maintenance activities is usually defined in the relevant concession agreement. Within the scope of such operation and maintenance obligations, the project SPV may be required to undertake routine and periodic maintenance of project roads, maintain and comply with safety standards to ensure smooth and safe traffic movement, deploy adequate human resources for incident management, maintain proper medical and sanitary arrangements for personnel deployed at the site and prevent any unauthorized entry to and exit from the project as may be required.

A maintenance management system is used to ensure that all maintenance is systematically and correctly scheduled, carried out and recorded. In addition, it is used to assure planning, control and monitoring of each maintenance activity. Maintenance methodologies and system performance are regularly reviewed and examined for optimisation of resource deployment.

Operations

Toll collection system

Toll is collected for each journey through each of the toll plazas. Signs setting out the toll rates for the Toll Road assets are displayed at the toll booths and tolls can be paid or tendered by the driver of any vehicle in the following manners:

Cash

Tolls paid by means of cash are collected by toll collectors at the manual toll booths.

Electronic toll collection

In 2014, an electronic toll collection ("**ETC**") system based on radio-frequency identification ("**RFID**") technology was introduced. The RFID technology based FASTags required vehicles to affix FASTags on windscreens to enable toll plazas to auto-debit toll fees from a linked account, without requiring vehicles to stop for transactions. This ETC based on RFID did not pick up until a transport ministry directive in July 2019 called for equipping all toll lanes across national highways in India to mandate the same. The authority has made FASTag (cashless payment mechanism) at toll plazas mandatory. The National Electronic Toll Collection programme using FASTags on vehicles has played a crucial role in the growth of digital transactions across the country. It has moved many vehicles to the payments ecosystem and reduced the use of cash for toll payments on roads and highways. This programme has seen 11.9% growth on y-o-y basis as of Mar-25, with a collection of Rs 68 billion in FY25 and as of Sep-25 stands at Rs 64 billion. (*Source: CARE Industry Report)*.

Additionally, pursuant to the terms of the respective Concession Agreements, the Project SPV will be required to implement a barrier-less MLFF tolling system at the proposed toll plaza location on each project highway stretch. The MLFF system will be based on ANPR cameras and RFID (FASTag) technology, enabling electronic toll collection without physical barriers.

Monitoring

Toll collection

Payments at the toll plazas, both electronic as well as cash payments, are processed through a semi-automated or a fully automated toll collection system, depending on complexity of the project. Both these systems collect and store traffic and payment data, thereby reducing the need for manual operation. A semi-automated system consists of a revenue collection software desktop, a barrier gate, smart cards and monitoring cameras and a fully automated system includes equipment such as vehicle counting classifier, vehicle audit system, communication channels and traffic control equipment in addition to all the components of a semi-automated system.

For the purpose of identifying categories of vehicles and to charge an appropriate toll rate, the automatic vehicle identification based in-road/infrared sensors are also used. The Project SPV would use weigh-in-motion technology for projects where weight-based toll collection is mandated. The weight based tolling systems are integrated with the fully automatic toll collection system for enhanced revenue controls.

There are cameras installed particularly for capturing and recording any toll evasion incidents by vehicles. There is also a back-up power supply system to ensure that there is no interruption to power supply at the toll plazas in order to maintain a stable power supply for the sub-systems and equipment. Servers used in the toll collection systems at the toll plazas are capable of real time uploading of transaction data from toll lane equipment and performing an automatic daily backup to prevent any toll data loss and to enable quick system recovery, which would allow the Project SPV to collect variable amounts of tolls depending on the class of motor vehicles and serves as a traffic information system.

Only certain authorised persons have access to the toll collection systems and the activities are recorded for security purposes. The Project SPV is responsible for operating the toll collection system at its toll plaza and taking regular preventive and corrective measures to maintain such systems at the highest levels of security and reliability.

Traffic control

There are helpline numbers displayed along the national highways for communication between the road users and the control room in case of any emergency. This provides a reliable communication channel for the road users in cases of an exigency where they need to communicate with staff at the Control Room. The Project SPV would take regular preventive and corrective measures to maintain the emergency telephone system at the highest levels of reliability and safety. The Project SPV is required to carry out regular patrolling and regulate and maintain traffic order within the projects. Emergency telephone systems and emergency helpline numbers are provided at all projects where such systems and numbers are required by the Concession Agreement. There are also patrol vehicles that continuously move on the section of the project that it is assigned to, which will intervene to regulate traffic and carry out surveillance activities.

Traffic and motorway assistance services

Traffic assistance

The Project SPV would provide emergency assistance to motorists using the toll roads. They station patrol/light recovery vehicles on each toll road, which are deployed to patrol the toll roads on a continuous basis.

In the case of a vehicle breakdown or traffic accident, the Control Room will announce the occurrence via mobile phones or handsets to instruct a mobile supervisor and a recovery supervisor to proceed to the scene immediately, and file relevant reports with the police if personal injury is involved. At the scene of a traffic accident or vehicle breakdown, the mobile supervisor will report to the Control Room on the situation of the incident, ensure safety of the scene and apply first aid to injured persons, if any. The recovery supervisor will determine whether the vehicle can be recovered on site or deploy recovery vehicles for towing. The traffic officer will stop the traffic, close the affected lane where necessary and direct trapped vehicles away to other unaffected lanes.

Safety Measures

Under the Concession Agreement, the concessionaire is obligated to abide by certain safety requirements, which include measures such as road signs, pavement marking, traffic control devices, roadside furniture, highway design elements, enforcement and emergency response. The concessionaire must abide by among others, applicable laws and applicable permits, the Manual for Safety in Road Design as issued by the Ministry of Road Transport and Highways, relevant standards and guidelines of the Indian Roads Congress and good industry practice. NHAI also carries out safety audits of the projects by appointing a safety consultant employing a team comprising of, among others, one road safety expert and one traffic planner. These safety requirements apply to all phases of construction, operation and maintenance with emphasis on identification of factors associated with accidents and implementation of appropriate remedial measures.

Management

We will be managed, upon the listing of the Units on the Stock Exchanges, by qualified personnel of the Investment Manager, with members who will have management and operational experience in the roads and highways sector. For further details about the Investment Manager, please see the sections headed "*Parties to the Trust – The Investment Manager – Raajmarg Infra Investment Managers Private Limited*" on page 92.

Consequent to the completion of the formation transactions, the Investment Manager, in consultation with the Trustee, will appoint a majority of the directors on the board of the Project SPV in accordance with the InvIT Regulations, and such directors would form part of the quorum. The Project SPV's board of directors will also thereafter form committees, if required, under the Companies Act, 2013 and rules made thereunder.

Seasonality

Traffic volume tends to decrease during the monsoon season and conversely tends to increase during holiday seasons. While the northern parts of India experience monsoon rains during the period from June or July until September or October every year, the southern parts of India, especially coastal parts of Andhra Pradesh, experience monsoon rains even during the months of October to December. The monsoon season may also restrict the Trust's ability to carry on activities related to its operation and maintenance of toll roads. For further details on risk associated with seasonality, please see the section headed "*Risk Factors – Risks Relating to Our Business and the Concession Agreements –Our business will be subject to seasonal fluctuations and business and economic cycles that may affect our cash flows.*" on page 51. Conversely, traffic volume tends to increase during holiday seasons.

Property

The Investment Manager's registered and corporate office are located within the premises of NHAI in New Delhi from which all its administrative and reporting activities are conducted.

Insurance

The Trust's operations are subject to hazards that are inherent in providing operation and maintenance services, such as risk of equipment failure, work accidents, fire, earthquake, flood and other force majeure events. This includes hazards that may cause injury and loss of life, damage and destruction of property, equipment and environmental damage. We undertake that the InvIT Assets will be adequately insured within 30 days from the Bid/Issue Closing Date.

SUMMARY OF THE CONCESSION AGREEMENTS

The following is a brief summary of the Concession Agreements proposed to be entered into by the Project SPV and NHAI in relation to the InvIT Assets. The descriptions and summary of the Concession Agreements below are not, nor do they purport to be complete descriptions or summaries of all terms of such Concession Agreements. The actual terms of the Concession Agreements, once executed may differ from the summaries provided below. Certain terms used in this section have the meaning assigned to them in the respective concession agreements. Copies of the concession agreements will also be made available for inspection at the registered office of the Investment Manager, once executed. For details, refer to "Material Contracts and Documents for Inspection" on page 350.

1. *Certain Definitions*

"Accounting Year" means the financial year commencing from the first day of April of any calendar year and ending on the thirty-first day of March of the next calendar year.

"Change in Ownership" means a transfer of the direct and/or indirect legal or beneficial ownership of any shares, or securities convertible into shares, that causes the aggregate holding of the InvIT, together with its Associates, in the total equity share capital of the Concessionaire to decline below 51% (fifty one percent) of the subscribed and issued share capital of the Concessionaire during the first 2 (two years) of the Concession Period.

"Encumbrances" means, in relation to the Project Highway, any encumbrances such as mortgage, charge, pledge, lien, hypothecation, security interest, assignment, privilege or priority of any kind having the effect of security or other such obligations, and shall include any designation of loss payees or beneficiaries or any similar arrangement under any insurance policy pertaining to the Project Highway, where applicable herein but excluding utilities referred to as existing utilities and roads in the Concession Agreement and charge on Project receivables only for purposes of securing debt repayment and for no other purpose.

"Good Industry Practice" means the practices, methods, techniques, designs, standards, skills, diligence, efficiency, reliability and prudence which are generally and reasonably expected from a reasonably skilled and experienced operator engaged in the same type of undertaking as envisaged under this Agreement and which would be expected to result in the performance of its obligations by the Concessionaire in accordance with this Agreement, Applicable Laws and Applicable Permits in reliable, safe, economical and efficient manner

"**Independent Engineer**" means the consulting engineering firm appointed by NHAI from a panel of 10 (ten) firms or bodies corporate, constituted by NHAI substantially in accordance with the selection criteria set forth in Schedule-L, to be the independent consultant under the Concession Agreement.

"O&M Contractor" means the person, if any, with whom the Concessionaire has entered into an O&M Contract for discharging O&M obligations for and on behalf of the Concessionaire.

"**O&M Handover Date**" shall mean the dates as set out in the respective Concession Agreements:

"**Project**" means the operation and maintenance of the Project Highway in accordance with the provisions of this Agreement and includes all works, services and equipment relating to or in respect of the Scope of the Project.

"**Project Assets**" means all physical and other assets relating to and forming part of the Site including (a) rights over the Site in the form of licence, Right of Way or otherwise; (b) tangible assets such as civil works and equipment including foundations, embankments, pavements, road surface, interchanges, bridges, culverts, road overbridges, drainage works, traffic signals, sign boards, kilometre- stones, toll plazas, electrical systems, communication systems, rest areas, relief centers, maintenance depots and administrative offices; (d) all rights of the Concessionaire under the Project Agreements; (security deposits (e) insurance proceeds; and (g) Applicable Permits and authorisations relating to or in respect of the Project Highway, but does not include Additional Facilities

"Project Agreements" means this Agreement, O&M Contract, Tolling Contract, and any other material

agreements or contracts that may be entered into by the Concessionaire with any person in connection with matters relating to, arising out of or incidental to the Project, or any agreement for procurement of goods and services involving a consideration of upto ₹ 5 crore;

"**Safety Requirements**" means the safety requirements set forth in Schedule-H of the Concession Agreement

"**Scope of Project**" means the scope of the Project as defined in Schedule A and Schedule B hereto, shall mean and include, during the Concession Period:

(a) Tolling, operation, management, maintenance and transfer of the Project Highway subject to and in accordance with the provisions of this Agreement; and

(b) performance and fulfilment of all other obligations of the Concessionaire in accordance with the provisions of this Agreement and matters incidental thereto or necessary for the performance of any or all of the obligations of the Concessionaire under this Agreement.

"Specifications and Standards" means the specifications and standards relating to the quality, quantity, capacity and other requirements for the Project Highway as set forth in Schedule-C of the Concession Agreement and any modifications thereof, or additions thereto as included in the operations, maintenance and other related obligations of the Concessionaire under this Agreement;

"Transfer Date" means the date on which this Agreement and the Concession hereunder expires pursuant to the provisions of this Agreement or is terminated by a Termination Notice.

"Termination" means the expiry or termination of this Agreement and the Concession hereunder;

"Termination Notice" means the communication issued in accordance with this Agreement by one Party to the other Party terminating this Agreement;

2. *Concession Fee*

In consideration of the grant of Concession, the Concessionaire shall pay to NHAI, in accordance with the terms of the Concession Agreement and prior to the Appointed Date, the lump sum upfront concession fee of an amount as specified in the Concession Agreement. As consideration for the grant of the concession for the InvIT Assets, the Project SPV is required to pay a base concession fee to NHAI equivalent to ₹ 95,000.00 million ("**Base Concession Fee**") together with Additional Concession Fees, within 120 days of the date of execution of the Concession Agreements or any extended date as agreed by NHAI, but in any case prior to the Appointed Date as a condition precedent. Further as communicated by NHAI by way of a letter dated February 10, 2026, any amount raised from the proceeds of the Issue and the Facility Agreement in excess of the Base Concession Fee (net of estimated issue expenses, estimated general corporate purposes and initial improvements costs, if any) shall be paid to NHAI ("**Additional Concession Fees**").

3. *Change of Scope*

Under the Concession Agreement, NHAI may require the Concessionaire to make alterations or modifications to the Scope of the Project ("**Change of Scope**") by issuing a notice specifying the proposed works ("**Change of Scope Notice**"). Upon agreement between the Concessionaire and NHAI, with the assistance of the Independent Engineer, on the time and cost for implementation, NHAI shall issue an order requiring the Concessionaire to carry out such works ("**Change of Scope Order**"). The Concessionaire may also propose a Change of Scope by issuing a written request ("**Change of Scope Request**"), which NHAI may accept (with or without modifications) ("**Change of Scope Acceptance**") or reject without any liability. NHAI shall make an advance payment equal to 20% (twenty per cent) of the cost of the Change of Scope (or, in the event of a Dispute, 20% of the cost assessed by the Independent Engineer), with the balance payable against certified bills. If the cumulative cost of all Change of Scope Orders exceeds 5% (five per cent) of the Concession Fee in any continuous period of 3 (three) years or exceeds 25.00% (twenty five per cent) of the Concession Fee at any time during the Concession Period, the Concessionaire shall have the option to match the first-ranked bid in the relevant bidding process, subject to participation, eligibility and payment of 2% (two per cent) of the bid amount to NHAI. Where such thresholds are not exceeded, the Concessionaire may accept or reject any Change of Scope Order at its discretion. If the Concessionaire or the entity appointed by the Concessionaire shall have failed to

complete any construction works on account of Force Majeure or for reasons solely attributable to NHAI, NHAI may, in its discretion, require the Concessionaire to pay 80% (eighty percent) of the sum saved therefrom, and upon such payment to NHAI, the obligations of the Concessionaire in respect of such works shall be deemed to have been fulfilled.

4. *O&M*

With effect from O&M Handover Date and thereafter during the remaining Concession Period, the Concessionaire shall operate and maintain the Project Highway in accordance with the Concession Agreement either by itself, or through the O&M Contractor and if required, modify, repair or otherwise make improvements to the Project Highway to comply with the provisions of the Concession Agreement, and conform to Specifications and Standards and Good Industry Practice. The obligations of the Concessionaire hereunder shall include:

RPPL shall operate and maintain the Project, in accordance with the Concession Agreement either by itself, or through the O&M contractor, and if required, modify, repair or otherwise make improvements to the Project to comply with provisions of the Concession Agreement applicable laws, applicable permits and conform to Specifications, Standards and Good Industry Practice. The obligations of RPPL, among other things, shall include:

(a) permitting safe, smooth and uninterrupted flow of traffic on the Project Highway during normal operating conditions;
(b) collecting and appropriating the Fee;
(c) minimising disruption to traffic in the event of accidents or other incidents affecting the safety and use of the Project Highway by providing a rapid and effective response and maintaining liaison with emergency services of the State;
(d) carrying out periodic preventive maintenance of the Project Highway;
(e) undertaking routine maintenance including prompt repairs of potholes, cracks, joints, drains, embankments, structures, pavement markings, lighting, road signs and other traffic control devices;
(f) undertaking major maintenance such as resurfacing of pavements, repairs to structures, and repairs and refurbishment of tolling system and other equipment;
(g) preventing, with the assistance of concerned law enforcement agencies, any unauthorised use of the Project Highway;
(h) preventing, with the assistance of the concerned law enforcement agencies, any encroachments on the Project Highway;
(i) protection of the environment and provision of equipment and materials therefore;
(j) operation and maintenance of all communication, control and administrative systems necessary for the efficient operation of the Project Highway;
(k) maintaining a public relations unit to interface with and attend to suggestions from the Users, government agencies, media and other agencies; and
(l) complying with Safety Requirements in accordance with the relevant provisions of the Concession Agreement.

5. *Maintenance Requirements*

The Concessionaire shall procure that at all times during the Concession Period, the Project Highway conforms to the maintenance requirements set forth in Schedule-F of the Concession Agreement (**"Maintenance Requirements"**).

6. *Maintenance manual*

No later than 90 (ninety) days prior to O&M Handover Date, the Concessionaire shall, in consultation with the Independent Engineer, evolve a repair and maintenance manual (**"Maintenance Manual"**) for the regular and preventive maintenance of the Project Highway in conformity with the Specifications and Standards, Maintenance Requirements, Safety Requirements and Good Industry Practice. The Maintenance Manual shall be revised and updated once every three years.

7. *Maintenance programme*

On or before O&M Handover Date and no later than 45 (forty five) days prior to the beginning of each Accounting Year during the Concession Period, as the case may be, the Concessionaire shall provide to NHAI and the Independent Engineer, its proposed annual programme of preventive, urgent and other scheduled maintenance (the **"Maintenance Programme"**) to comply with the Maintenance Requirements, Maintenance Manual and Safety Requirements. Such Maintenance Programme shall include:

(a) preventive maintenance schedule;
(b) arrangements and procedures for carrying out urgent repairs;
(c) criteria to be adopted for deciding maintenance needs;
(d) intervals and procedures for carrying out inspection of all elements of the Project Highway;
(e) intervals at which the Concessionaire shall carry out periodic maintenance;
(f) arrangements and procedures for carrying out safety related measures; and
(g) intervals for major maintenance works and the scope thereof.

Within 15 (fifteen) days of receipt of the Maintenance Programme, the Independent Engineer shall review the same and convey its comments to the Concessionaire with particular reference to its conformity with the Maintenance Requirements, Maintenance Manual and Safety Requirements. The Concessionaire may modify the Maintenance Programme as may be reasonable in the circumstances, and the procedure specified in the relevant provisions of the Concession Agreement shall apply *mutatis mutandis* to such modifications.

8. *Obligations relating to change in ownership*

The Concessionaire shall not undertake or permit any Change in Ownership, except with the prior approval of NHAI. The obligations relating to change in ownership as provided in the Concession Agreement shall apply to the Concessionaire in the event the aggregate shareholding of the InvIT together with its Associates, in the issued and paid-up equity share capital of the Concessionaire declines below 51% (fifty one percent) thereof during the first 2 (two) years of the Concession Period. Notwithstanding anything to the contrary contained in this Agreement, the Concessionaire agrees and acknowledges that:

(i) all acquisitions of equity by an acquirer, either by himself or with any person acting in concert, directly or indirectly, including by transfer of the direct or indirect legal or beneficial ownership or control of any equity, in aggregate of not less than 25.00% (twenty five per cent) of the total equity of the Concessionaire, or
(ii) acquisition of any control directly or indirectly of the Board of Directors of the Concessionaire by any person either by himself or together with any person or persons acting in concert with him,

shall constitute a change in ownership requiring prior approval of NHAI from national security and public interest perspective, the decision of NHAI in this behalf being final, conclusive and binding on the Concessionaire, and undertakes that the Concessionaire shall not give effect to any such acquisition of equity or control of the board of directors of the Concessionaire without such prior approval of NHAI. It has been expressly agreed that approval of NHAI hereunder shall be limited to national security and public interest perspective, and NHAI shall endeavour to convey its decision within a period of 60 days from the date of receipt of such request. It has also been agreed that NHAI shall not be liable in any manner on account of grant or otherwise of such approval and that such approval or denial thereof shall not in any manner absolve the Concessionaire from any liability or obligation under the Concession Agreement. It has also been agreed that merger of the Concessionaire with its parent company and/or the Selected Bidder and/or any of the constituents thereof shall also constitute Change in Ownership.

9. *Indemnities*

The Concessionaire will indemnify, defend, save and hold harmless NHAI and its officers, servants, agents, Government Instrumentalities and Government owned and/or controlled entities/enterprises, (the **"NHAI Indemnified Persons"**) against any and all suits, proceedings, actions, demands and claims from third parties for any loss, damage, cost and expense of whatever kind and nature, whether arising out of any breach by the Concessionaire of any of its obligations under this Agreement or any related agreement or on account of any defect or deficiency in the provision of services by the Concessionaire to any User or from any negligence of the Concessionaire under contract or tort or on any other ground whatsoever,

except to the extent that any such suits, proceedings, actions, demands and claims have arisen due to any negligent act or omission, breach or default of this Agreement on the part of the NHAI Indemnified Persons.

The Concessionaire shall fully indemnify, hold harmless and defend NHAI and the NHAI Indemnified Persons from and against any and all loss and/or damages arising out of or with respect to:

(a) failure of the Concessionaire to comply with Applicable Laws and Applicable Permits;
(b) payment of Taxes required to be made by the Concessionaire in respect of the income or other Taxes of the Concessionaire's Contractors, suppliers and representatives; or
(c) non-payment of amounts due as a result of materials or services furnished to the Concessionaire or any of its Contractors which are payable by the Concessionaire or any of its Contractors.

The Concessionaire shall fully indemnify, hold harmless and defend the NHAI Indemnified Persons from and against any and all suits, proceedings, actions, claims, demands, liabilities and damages which the NHAI Indemnified Persons may hereafter suffer, or pay by reason of any demands, claims, suits or proceedings arising out of claims of infringement of any domestic or foreign patent rights, copyrights or other Intellectual Property, proprietary or confidentiality rights with respect to any materials, information, design or process used by the Concessionaire or by the Concessionaire's Contractors in performing the Concessionaire's obligations or in any way incorporated in or related to the Project. If in any such suit, action, claim or proceedings, a temporary restraint order or preliminary injunction is granted, the Concessionaire shall make every reasonable effort, by giving a satisfactory bond or otherwise, to secure the revocation or suspension of the injunction or restraint order. If, in any such suit, action, claim or proceedings, the Project Highway, or any part thereof or comprised therein, is held to constitute an infringement and its use is permanently enjoined, the Concessionaire shall promptly make every reasonable effort to secure for NHAI a license, at no cost to NHAI, authorising continued use of the infringing work. If the Concessionaire is unable to secure such license within a reasonable time, the Concessionaire shall, at its own expense, and without impairing the Specifications and Standards, either replace the affected work, or part, or process thereof with non-infringing work or part or process, or modify the same so that it becomes non-infringing.

NHAI will indemnify, defend, save and hold harmless the Concessionaire against any and all suits, proceedings, actions, demands and claims from third parties for any loss, damage, cost and expense of whatever kind and nature arising out of (i) defect in title and/or the rights of NHAI in the land comprised in the Site, and/or (ii) breach by NHAI of any of its obligations under this Agreement or any related agreement, which materially and adversely affect the performance by the Concessionaire of its obligations under this Agreement save and except that where any such claim, suit, proceeding, action, and/or demand has arisen due to a negligent act or omission, or breach of any of its obligations under and/or any provision of this Agreement or any related agreement and/or breach of its statutory duty on the part of the Concessionaire, its subsidiaries, affiliates, contractors, servants or agents, the same shall be the liability of the Concessionaire.

10. *Suspension of the Concessionaire's rights*

Upon occurrence of a concessionaire default (as defined in the Concession Agreement), ("**Concessionaire Default**"), NHAI shall be entitled, without prejudice to its other rights and remedies under the Concession Agreement including its rights of Termination, thereunder, to (i) suspend all rights of the Concessionaire under this Agreement including the Concessionaire's right to collect Fee, and other revenues pursuant hereto, and (ii) exercise such rights itself and perform the obligations hereunder or authorise any other person to exercise or perform the same on its behalf during such suspension (the **"Suspension"**). Suspension hereunder shall be effective forthwith upon issue of notice by NHAI to the Concessionaire and may extend up to a period not exceeding 120 (one hundred and twenty) days from the date of issue of such notice; provided that upon written request from the Concessionaire and the Lenders, NHAI shall extend the aforesaid period of 120 (one hundred and twenty) days by a further period not exceeding 90 (ninety) days. At any time during the period of Suspension, the Lenders', shall be entitled to substitute RPPL under and in accordance with the substitution agreement, as defined in the Chenai Bypass Concession Agreement ("**Substitution Agreement**"), and upon receipt of notice thereunder from the Lenders', NHAI shall withhold Termination for a period not exceeding 120 days from the date of Suspension, and any extension thereof, for enabling the Lenders' to exercise its rights

of substitution.

11. *Effect of force majeure event on the Concession*

Upon the occurrence of any force majeure event (as defined in the Concession Agreement) ("**Force Majeure Event**") prior to the Appointed Date, the period for achieving the Appointed Date shall be extended by a period equal in length to the duration of the Force Majeure Event.

If any Force Majeure Event occurs after the Appointed Date, whereupon the Concessionaire is unable to collect Fee despite making best efforts or it is directed by NHAI to suspend the collection thereof during the subsistence of such Force Majeure Event, the Concession Period shall be extended by a period, equal in length to the period during which the Concessionaire was prevented from collection of Fee on account thereof; provided that in the event of partial collection of Fee where the daily collection is less than 90% (ninety per cent) of the Average Daily Fee, NHAI shall extend the Concession Period in proportion to the loss of Fee on a daily basis. For the avoidance of doubt, loss of 25.00% (twenty five per cent) in collection of Fee as compared to the Average Daily Fee for four days shall entitle the Concessionaire to extension of 1 (one) day in the Concession Period.

12. *Allocation of costs arising out of Force Majeure*

Upon occurrence of any Force Majeure Event prior to the Appointed Date, the parties to the Concession Agreement shall bear their respective costs and no party shall be required to pay to the other party any costs thereof.

Upon occurrence of a Force Majeure Event after the Appointed Date, the costs incurred and attributable to such event and directly relating to the Project ("**Force Majeure Costs**") shall be allocated and paid as follows:

(a) upon occurrence of a non-political event as defined in the Concession Agreement ("**Non-Political Event**"), the Parties shall bear their respective Force Majeure Costs and neither Party shall be required to pay to the other Party any costs thereof; or
(b) upon occurrence of an indirect political event as defined in the Concession Agreement ("**Indirect Political Event**"), all Force Majeure Costs attributable to such Indirect Political Event and not exceeding insurance cover for such Indirect Political Event, shall be borne by Concessionaire, and to the extent Force Majeure Costs exceeds such insurance cover one half of such costs shall be reimbursed by NHAI to the Concessionaire.
(c) upon occurrence of a political event as defined in the Concession Agreement ("**Political Event**"), all Force Majeure Costs attributable to such Political Event shall be reimbursed by NHAI to the Concessionaire.

Force Majeure Costs may include interest payments on debt, O&M expenses, and all other costs directly attributable to the Force Majeure Event, but shall not include loss of Fee revenues or debt repayment obligations, and for determining such costs in respect of debt, information contained in the copy of financing agreement and financial package, as defined in the Concession Agreement ("**Financial Package**"), furnished by the Concessionaire may be relied upon to the extent that such information is relevant.

Neither Party shall be liable in any manner whatsoever to the other Party in respect of any loss, damage, cost, expense, claims, demands and proceedings relating to or arising out of occurrence or existence of any Force Majeure Event or exercise of any right pursuant hereto.

13. *Divestment Requirements*

Upon Termination, the Concessionaire shall comply with and conform to the following requirements:

(a) notify to NHAI forthwith the location and particulars of all Project Assets;
(b) deliver forthwith the actual or constructive possession of the Project Highway free and clear of all Encumbrances;
(c) cure all Project Assets, including the road, bridges, structures and equipment, of all defects and deficiencies so that the Project Highway is compliant with the Maintenance Requirements;

(d) deliver and transfer relevant records, reports, intellectual property and other licences pertaining to the Project Highway and its, operation and maintenance, including all programmes and manuals pertaining thereto, and complete 'as built' drawings in respect of maintenance works, if applicable, as on the Transfer Date. For the avoidance of doubt, the Concessionaire represents and warrants that the intellectual property delivered hereunder shall be adequate and complete for the operation and maintenance of the Project Highway and shall be assigned to the Government free of any Encumbrance;

(e) transfer and/ or deliver all applicable permits to the extent permissible under applicable laws;

(f) execute such deeds of conveyance, documents and other writings as NHAI may reasonably require for conveying, divesting and assigning all the rights, title and interest of the Concessionaire in the Project Highway, including manufacturers' warranties in respect of any plant or equipment and the right to receive outstanding insurance claims to the extent due and payable to NHAI, absolutely unto NHAI or its nominee; and

(g) comply with all other requirements as may be prescribed or required under applicable laws for completing the divestment and assignment of all rights, title and interest of the Concessionaire in the Project Highway, free from all Encumbrances, absolutely unto NHAI or to its nominee.

Subject to the exercise by NHAI of its rights under the Concession Agreement or under any of the Project Agreements to perform or procure the performance by a third party of any of the obligations of the Concessionaire, the parties to the Concession Agreement shall continue to perform their obligations under the Concession Agreement, notwithstanding the giving of any Termination Notice, until the Termination of the Concession Agreement becomes effective in accordance with its terms.

14. *Termination for Concessionaire Default*

Save as otherwise provided in this Agreement, in the event that any of the defaults specified below shall have occurred, and the Concessionaire fails to cure the default within the Cure Period set forth below, or where no Cure Period is specified within a Cure Period of 60 (sixty) days, the Concessionaire shall be deemed to be in default of this Agreement (the **"Concessionaire Default"**) unless the default has occurred solely as a result of any breach of this Agreement by NHAI or due to Force Majeure. The defaults referred to herein shall include the following:

(a) the Performance Security as defined under the Concession Agreement ("**Performance Security**") has been encashed and appropriated in accordance with the Concession Agreement and the Concessionaire fails to replenish or provide fresh performance security within a cure period of 15 (fifteen) days;

(b) subsequent to the replenishment or furnishing of fresh Performance Security in accordance with the Concession Agreement, the Concessionaire fails to cure, within a cure period of 60 (sixty) days, the Concessionaire Default for which whole or part of the Performance Security was appropriated;

(c) the Concessionaire abandons or manifests intention to abandon the operation and maintenance of the Project Highway without the prior written consent of NHAI;

(d) the Concessionaire fails to roll over, renew and furnish new bank guarantee towards Performance Security subject to and in accordance with terms of the Concession Agreement, at least three months prior to expiry of subsisting bank guarantee;

(e) the Concessionaire is in breach of the Maintenance Requirements or the Safety Requirements, as the case may be;

(f) the Concessionaire has failed to make any payment to NHAI within the period specified in this Agreement;

(g) upon occurrence of a financial default as defined under the Concession Agreement ("**Financial Default**"), the lenders' representative has by notice required NHAI to undertake Suspension or Termination, as the case may be, in accordance with the Substitution Agreement and the Concessionaire fails to cure the default within the cure period specified hereinabove;

(h) a breach of any of the Project Agreements by the Concessionaire has caused a material adverse effect as defined under the Concession Agreement ("**Material Adverse Effect**");

(i) the Concessionaire creates any Encumbrance in breach of the Concession Agreement;

(j) the Concessionaire repudiates this Agreement or otherwise takes any action or evidences or conveys an intention not to be bound by the Concession Agreement;

(k) a Change in Ownership has occurred in breach of the provisions of the Concession Agreement;

(l) there is a transfer, pursuant to law either of (i) the rights and/or obligations of the Concessionaire

under any of the Project Agreements, or of (ii) all or part of the assets or undertaking of the Concessionaire, and such transfer causes a Material Adverse Effect;

(m) an execution levied on any of the assets of the Concessionaire has caused a Material Adverse Effect;

(n) the Concessionaire is adjudged bankrupt or insolvent, or if a trustee or receiver is appointed for the Concessionaire or for the whole or material part of its assets that has a material bearing on the Project;

(o) the Concessionaire has been, or is in the process of being liquidated, dissolved, wound-up, amalgamated or reconstituted in a manner that would cause, in the reasonable opinion of NHAI, a Material Adverse Effect;

(p) a resolution for winding up of the Concessionaire is passed or any petition for winding up of the Concessionaire is admitted by a court of competent jurisdiction and a provisional liquidator or receiver is appointed and such order has not been set aside within 90 (ninety) days of the date thereof or the Concessionaire is ordered to be wound up by Court except for the purpose of amalgamation or reconstruction; provided that, as part of such amalgamation or reconstruction, the entire property, assets and undertaking of the Concessionaire are transferred to the amalgamated or reconstructed entity and that the amalgamated or reconstructed entity has unconditionally assumed the obligations of the Concessionaire under the Concession Agreement and the Project Agreements; and provided that:

  (i) the amalgamated or reconstructed entity has the capability and operating experience necessary for the performance of its obligations under this Agreement and the Project Agreements;

  (ii) the amalgamated or reconstructed entity has the financial standing to perform its obligations under this Agreement and the Project Agreements and has a credit worthiness at least as good as that of the Concessionaire as at Appointed Date; and

  (iii) each of the Project Agreements remains in full force and effect;

(q) any representation or warranty of the Concessionaire herein contained which is, as of the date hereof, found to be materially false, incorrect or misleading;

(r) the Concessionaire submits to NHAI any statement, notice or other document, in written or electronic form, which has a material effect on NHAI's rights, obligations or interests and which is false in material particulars;

(s) the Concessionaire has failed to fulfil any obligation, for which failure Termination has been specified in this Agreement;

(t) the Concessionaire commits a default in complying with any other provision of this Agreement if such default causes a Material Adverse Effect on NHAI;

(u) an escrow default as defined under the Concession Agreement ("**Escrow Default**") has occurred and the Concessionaire fails to cure the default within a cure period of 15 (fifteen) days;

15. *Termination for NHAI Default*

In the event that any of the defaults specified below shall have occurred, and NHAI fails to cure such default within a Cure Period of 90 (ninety) days or such longer period as has been expressly provided in the Concession Agreement, NHAI shall be deemed to be in default of this Agreement (the "**NHAI Default**") unless the default has occurred as a result of any breach of this Agreement by the Concessionaire or due to Force Majeure. The defaults referred to herein shall include the following:

(a) NHAI commits a material default in complying with any of the provisions of the Concession Agreement and such default has a Material Adverse Effect on the Concessionaire;

(b) NHAI repudiates the Concession Agreement or otherwise takes any action that amounts to or manifests an irrevocable intention not to be bound by the Concession Agreement; or

(c) the state commits a material default in complying with the provisions of the state support agreement as defined under the Concession Agreement ("**State Support Agreements**") if such default has a Material Adverse Effect on the Concessionaire and the breach continues for a period of 90 (ninety) days from the date of notice given in this behalf by the Concessionaire to NHAI.

Without prejudice to any other right or remedy which the Concessionaire may have under the Concession Agreement, upon occurrence of an NHAI Default, the Concessionaire shall, be entitled to terminate the Concession Agreement by issuing a Termination Notice to NHAI; provided that before issuing the Termination Notice, the Concessionaire shall by a notice inform NHAI of its intention to issue the

Termination Notice and grant 15 (fifteen) days to NHAI to make a representation, and may after the expiry of such 15 (fifteen) days, whether or not it is in receipt of such representation, issue the Termination Notice.

16. *Defects liability after termination*

The Concessionaire shall be responsible for all defects and deficiencies in the Project Highway for a period of 60 (sixty) days after Termination, and it shall have the obligation to repair or rectify, at its own cost, all defects and deficiencies observed by the Independent Engineer in the Project Highway during the aforesaid period (the "**Defects Liability Period**"). In the event that the Concessionaire fails to repair or rectify such defect or deficiency within a period of 15 (fifteen) days from the date of notice issued by NHAI in this behalf, NHAI shall be entitled to get the same repaired or rectified at the Concessionaire's risk and cost so as to make the Project Highway conform to the Maintenance Requirements. All costs incurred by NHAI hereunder shall be reimbursed by the Concessionaire to NHAI within 15 (fifteen) days of receipt of demand thereof, and in the event of default in reimbursing such costs, NHAI shall be entitled to recover the same from the escrow account as defined under the Concession Agreement ("**Escrow Account**"). A sum equal to the Performance Security shall be retained in the Escrow Account for a period of 90 (ninety) days after Termination for meeting the liabilities, if any, arising out of or in connection with the provisions of the Concession Agreement.

17. *Modification of Concession period due to variation in Target Fee*

In the event Actual Fee shall have fallen short of the Estimated Toll Collection at Target Point ("**Target Fee**") by more than 5% (Five percent), then for every 1% (one percent) shortfall as compared to the Target Fee , the remaining Concession Period, subject to fulfilment of terms of this Agreement, shall be increased by 1% (one percent) respectively thereof.
In the event Actual Fee shall have exceeded the Estimated Toll Collection at Target Point ("**Target Fee**") by more than 5% (Five percent), then for every 1% (one percent) increase as compared to the Target Fee, the remaining Concession Period, subject to fulfilment of terms of this Agreement, shall be decreased by 1% (one percent) thereof.
Provided that such increase or decrease in Concession Period shall not in any case exceed the limits specified in concession Agreement.
Concession Period shall not be reduced by more than 5 (five) years, or shall not be increased by more than 10 (ten) years on any account or for any reason whatsoever.

INFORMATION CONCERNING THE UNITS

Unit holding of the Trust

Particulars	Number of Units
Units issued and outstanding prior to this Issue	Nil
Units issued and outstanding after this Issue	Up to [●]*

** To be determined upon finalisation of the Issue Price and updated in the Final Offer Document prior to filing with SEBI and the Stock Exchange.*

Unitholders holding more than 5% of the Units

Sr. No.	Name of Unitholders*	Pre-Issue*		Post-Issue**	
		Number of Units	Percentage of holding (%)	Number of Units	Percentage of holding (%)
1.	Sponsor	Nil	Not Applicable	Up to [●]	[●]
2.	[●]	Nil	Not Applicable	[●]	[●]

** To be determined upon finalisation of the Issue Price and updated in the Final Offer Document prior to filing with SEBI and the Stock Exchange.*

Unitholding of the Sponsor, Sponsor Group, Investment Manager, Project Manager and Trustee

The Sponsor has agreed contribute such amount towards subscription of such number of Units which shall be equivalent to at least 15.00% of the total Units of the InvIT on a post-Issue basis, to comply with the requirement under Regulations 12(3) and 12(3A) of the InvIT Regulations. For details, see "*Formation Transactions in relation to the Trust – Sponsor Contribution"* on page 26.

Further, the Sponsor has undertaken to hold 15.00% of the total Units of the InvIT for a period of five years from the date of Allotment and 10.00% of the total Units of the InvIT thereafter.

The Trustee, Project Manager and the Investment Manager do not hold any Units and shall not acquire any Units in this Issue.

Unitholding of the directors of the Investment Manager

As on the date of this Offer Document, none of the directors of the Investment Manager hold any Units or propose to hold any Units.

Sponsor and Sponsor Group lock-in

Under the InvIT Regulations, the Sponsor and Sponsor Group are required to, collectively, hold a minimum of 15.00% of our Units on a post- Issue basis for a minimum period of three years from the date of listing pursuant to the initial offer and the balance of their unitholding in the Trust is required to be locked in for a period of not less than one year from the date of listing of the Units.

Further, in accordance with the InvIT Regulations, the Sponsor and the Sponsor Group are required to lock-in our Units as follows:

From the beginning of 4th year after the date of listing pursuant to the initial offer and till the end of 5th year from the date of listing pursuant to the initial offer	5% of total Units on a post-Issue basis or ₹ 5,000.00 million, whichever is lower*
From the beginning of 6th year after the date of listing pursuant to the initial offer and till the end of 10th year from the date of listing pursuant to the initial offer	3% of total Units on a post-Issue basis or ₹ 5,000.00 million, whichever is lower*
From the beginning of 11th year after the date of listing pursuant to the initial offer and till the end of 20th year from the date of listing pursuant to the initial offer	2% of total Units on a post- Issue basis or ₹ 5,000.00 million, whichever is lower*

After completion of the 20th year from the date of listing pursuant to the initial offer	1% of total Units on a post- Issue basis or ₹ 5,000.00 million, whichever is lower*

** Provided that the maximum value of Units to be held by the Sponsor and Sponsor Group for compliance with the above shall not exceed ₹ 5,000.00 million or such other value as may be decided by SEBI from time to time wherein such valuation shall be based on the latest available asset value of the Trust.*

In terms of the InvIT Regulations, the Sponsor and Sponsor Group shall, collectively, hold not less than 15.00% of Units on a post-Issue basis, aggregating up to [●] Units (being, [●] % of the unitholding). 15.00% of the Sponsor's and Sponsor Group's unitholding, collectively, shall be locked-in for a period of three years from the date of listing of the Units. Further, the Sponsor and Sponsor Group, undertake and agree to lock-in its unitholding in the manner specified above for the period subsequent to the three years after Listing, in the manner as may be mutually agreed.

Additionally, any unitholding held by the Sponsor and Sponsor Group exceeding the 15.00% of Units on a post-Issue basis set out above, shall be locked in for a period of not less than one year from the date of listing of the Units. Any person other than the Sponsor holding units of the Trust prior to the initial offer shall hold the units for a period of not less than one year from the date of listing of the Units.

In terms of the InvIT Regulations, the locked-in units held by the Sponsor or its Sponsor Group entities may be transferred only amongst such Sponsor or its Sponsor Group entities subject to the condition that lock-in on such units shall continue for the remaining period with the transferee and such transferee shall not be eligible to transfer such units till the lock-in period has expired. In case of an InvIT with multiple sponsors, the locked in units held by a sponsor or its sponsor group entities can be transferred only amongst such sponsor or its own sponsor group entities and shall not be transferred to any other sponsor or their sponsor group entities. Provided further that in case of change in sponsor, locked-in units held by the outgoing sponsor or its sponsor group entities may be transferred to the incoming sponsor or its sponsor group entities subject to the condition that the incoming sponsor or its group entities shall meet the minimum unitholding requirements after the transfer. Provided also that in case of conversion to self-sponsored investment manager, locked-in units held by the outgoing sponsor or its sponsor group entities may be transferred to the self-sponsored investment manager or its shareholders or group entities of self-sponsored investment manager subject to the condition that the self-sponsored investment manager or its shareholders or group entities of self-sponsored investment manager shall meet the minimum unitholding requirements after the transfer.

Anchor Investor lock-in

Any Units Allotted to Anchor Investors in the Issue shall be locked-in for a period of 30 days from the date of Allotment.

Strategic Investor lock-in

The Units Allotted to Strategic Investors in the Issue shall be locked-in for a period of 180 days from the date of listing of Units.

Other Lock-In Requirements

Any pre-Issue unitholding in the Trust held by any Unitholders other than the Sponsor and Sponsor Group will be locked in for a period of one year in accordance with the InvIT Regulations.

USE OF PROCEEDS

The Fresh Issue

The gross proceeds of the Fresh Issue (including the Sponsor Contribution) will be up to ₹ 60,000.00 million and the Net Proceeds will be ₹ [●] million. The Net Proceeds will be utilised towards the following objects:

- Infusion of debt and equity into the Project SPV, which shall be utilized by the Project SPV for the payment of concession value of the InvIT Assets to NHAI; and
- General purposes.

The details of the Net Proceeds, which shall include the Sponsor Contribution, are set forth in the following table:

Particulars	Estimated Amount*(in ₹ million)*
Gross proceeds of the Fresh Issue (including the Sponsor Contribution)	Up to 60,000.00
Less: Issue related expenses and other expenses to be borne by the Trust	([●])*
Net Proceeds (including the Sponsor Contribution)	[●]

* *To be updated in the Final Offer Document to be filed with SEBI and the Stock Exchange.*

Requirements of Funds

The Net Proceeds are proposed to be used in accordance with the details provided in the following table:

Sr. No.	Particulars	Amount**(in ₹ million)*
1.	Infusion of debt and equity into the Project SPV, which shall be utilized by the Project SPV for the payment of concession value of the InvIT Assets to NHAI	58,500.00
2.	General purposes	[●]
Total		[●]

** To be updated in the Final Offer Document to be filed with SEBI and the Stock Exchange. The amount to be utilised for general purposes shall not exceed 10.00% of the Gross Proceeds.*

We believe that the infusion of the funds into the Project SPV, in order to meet its obligations under the Concession Agreements, will enable the Project SPV to acquire the necessary rights under the Concession Agreements. Accordingly, we believe that the proposed infusion of funds will be beneficial to the Trust and the Unitholders.

The fund requirements mentioned above and the proposed deployment are based on the estimates of the Investment Manager and have not been appraised by any bank, financial institution or any other external agency. The fund requirements may vary due to factors beyond the Investment Manager's control, such as market conditions and competitive environment. Consequently, the fund requirements are subject to revisions in the future at the discretion of the Investment Manager. In the event of any shortfall of funds for the activities proposed to be financed out of the Net Proceeds as stated above, the Investment Manager may re-allocate the Net Proceeds to the activities where such shortfall has arisen, subject to compliance with applicable law.

Proposed schedule of implementation and deployment of Net Proceeds

We propose to deploy the Net Proceeds towards the Objects in accordance with the estimated schedule of implementation and deployment of funds as set forth in the table below:

(in ₹ million)

S. No.	Particulars	Estimated amount proposed to be funded from the Net Proceeds	Estimated utilisation of the Net Proceeds	
			Fiscal 2026	Fiscal 2027
1.	Infusion of debt and equity into the Project SPV, which shall be utilized by the Project SPV for the payment of concession value of the InvIT Assets to NHAI	58,500.00	58,500.00	Nil
2.	General purposes[(1)]	[●]	[●]	[●]
	Total	[●]	[●]	[●]

[(1)] *The amount to be utilised for general purposes shall not exceed 10.00% of the Gross Proceeds.*

We intend to deploy the Net Proceeds towards the Issue as disclosed in the table above. However, the actual deployment of funds will depend on a number of factors, including the timing of completion of the Issue and we may have to revise our funding requirements and deployment on account of a variety of factors such as our financial conditions, market conditions, signing of the Concession Agreements, raising of debt and other external factors such as changes in the business environment or regulatory climate, which may not be within our control. This may entail rescheduling the proposed utilization of the Net Proceeds and changing the allocation of funds from its planned allocation at our discretion, subject to compliance with applicable law. Further, in the event, the Net Proceeds are not utilized (in full or in part) for the objects of the Issue during the period stated above due to any reason, including (i) the timing of completion of the Issue; (ii) market conditions outside our control; and (iii) any other economic, business and commercial considerations, the remaining Net Proceeds shall be utilized in subsequent periods as may be determined by the Investment Manager, in accordance with applicable laws.

Details of Utilisation of Net Proceeds

The details of utilisation of the Net Proceeds are set forth herein below:

Infusion of debt and equity into the Project SPV, which shall be utilized by the Project SPV for the payment of concession value of the InvIT Assets to NHAI

Pursuant to the Issue, the Project SPV will be entering into the Concession Agreements with NHAI, in its capacity as the concessioning authority to acquire, operate and maintain the InvIT Assets and shall be required to pay the relevant concession fee to NHAI in terms of the Concession Agreements. As consideration for the grant of the concession for the InvIT Assets, the Project SPV is required to pay a base concession fee to NHAI equivalent to ₹ 95,000.00 million ("**Base Concession Fees**") together with Additional Concession Fees, within 120 days of the date of execution of the Concession Agreements or any extended date as agreed by NHAI, but in any case prior to the Appointed Date as a condition precedent. Further as communicated by NHAI by way of a letter dated February 10, 2026, an amount raised from the proceeds of the Issue and the Facility Agreement in excess of the Base Concession Fee (net of estimated Issue Expenses, estimated general corporate purposes and initial improvement costs, if any) shall be paid to NHAI ("**Additional Concession Fees**"). The Trust proposes to utilise an amount of up to ₹ 58,500.00 million from the Net Proceeds to infuse debt and equity into the Project SPV to enable the Project SPV to pay the concession value of the InvIT Assets. The debt will be infused in accordance with the terms of the Trust Loan Agreements. Further, the Trust will also infuse capital by way of equity into the Project SPV.

The Project SPV will utilize the funds raised through the Trust Loan Agreements and the equity infused by the Trust towards payment of concession value to NHAI, in terms of the Concession Agreements. For details of the Concession Agreements, please see the section entitled "*Summary of the Concession Agreements*" on page 200.

For details in relation to the funds proposed to be raised by the Trust through Facility Agreement and the funds proposed to be infused in the Project SPV by the Trust , please see the section entitled "*Financial Indebtedness and Deferred Payments*" on page 215.

General Purposes

In terms of the InvIT Regulations, the Investment Manager shall, at its discretion, deploy the balance Net Proceeds aggregating to ₹ [●] million towards general expenses for the operation of the Trust, subject to such utilization not exceeding 10.00% of the Gross Proceeds, in compliance with the InvIT Regulations. The general purposes for which the Trust proposes to utilize Issue Proceeds include meeting exigencies and expenses incurred, by way of the Trust in the ordinary course of business, cost of debt financing to be incurred and any other expenses. Further, the Trust may also utilise it towards funding the DSRA required to be maintained by the Trust. In addition, the Trust may utilize the Issue Proceeds towards other expenditure (in the ordinary course of business) considered expedient and as approved by the Investment Manager or the Trustee, as the case may be, subject to compliance with applicable law. In case of a shortfall in Net Proceeds, the Investment Manager may, in compliance with the InvIT Regulations, have the flexibility to meet such shortfall including, by utilising the Trust's internal accruals or availing facilities from lenders. The Investment Manager will have flexibility in utilizing the proceeds earmarked for general purposes. The Investment Manager, in accordance with the investment objectives of the Trust, policies of its board of directors and the InvIT Regulations, will have flexibility in utilising any surplus amounts.

Issue Expenses

The total expenses of this Issue are estimated to be approximately ₹ [●] million. The Issue expenses consist of fee and commissions payable to the Book Running Lead Managers, fee payable to legal counsels, fee payable to Escrow Collection Banks and Registrar to the Issue, printing and stationery expenses, and all other incidental and miscellaneous expenses for listing the Units on the Stock Exchange. For ease of operations, if required, the expenses of in relation to the Issue as stated above, at the outset, may be borne by the Sponsor on behalf of the Trust, and the Investment Manager (on behalf of the Trust) agrees that it will reimburse the Sponsor for all such expenses as may be incurred by the Sponsor. The break-up for the Issue expenses is as follows:

(in ₹ million)

Activity	Estimated expenses*	As a % of the total estimated Issue expenses*	As a % of the total Issue size*
Fee and commission payable to the Book Running Lead Managers (including brokerage and selling commission)	[●]	[●]	[●]
Selling commission payable to SCSBs for Bids directly procured by them and processing fees payable to SCSBs for Bids (other than Bids submitted by UPI Bidders using the UPI Mechanism) procured by the members of the Syndicate, the Registered Brokers, CRTAs or CDPs and submitted to SCSBs for blocking, Bankers to the Offer, fees payable to the Sponsor Bank for Bids made by RIBs	[●]	[●]	[●]
Processing fees payable to the Sponsor Bank	[●]	[●]	[●]
Fees payable to Registrar to the Issue	[●]	[●]	[●]
Printing and stationery expenses	[●]	[●]	[●]
Listing fees, SEBI fees, BSE and NSE processing fees, book-building software fees, and other regulatory expenses	[●]	[●]	[●]
Fee payable to other advisors and any other fees and expenses	[●]	[●]	[●]
Total estimated Issue expenses	[●]	[●]	[●]

* *To be determined upon finalisation of the Issue Price and updated in the Final Offer Document prior to filing with SEBI and the Stock Exchanges.*

Selling Commissions

Selling commission payable to the SCSBs on the portion for Non-Institutional Bidders which are directly procured and uploaded by the SCSBs, would be as follows:

Portion for Non-Institutional Bidders	*0.20% of the amount Allotted* (plus applicable tax) on application by Individuals or HUFs below ₹ 0.2 million* *0.05% of the amount Allotted* (plus applicable tax) on application of other than above*

**Amount Allotted is the product of the number of Units Allotted and the Offer Price. Selling commission payable to the SCSBs will be determined on the basis of the bidding terminal ID as captured in the Bid Book of BSE or NSE. No processing fees shall be payable by to the SCSBs on the applications directly procured by them.*

- *Processing fees payable to the SCSBs on the portion for Bidders (excluding UPI Bids) which are procured by the members of the Syndicate/sub-Syndicate/Registered Broker/RTAs/ CDPs and submitted to SCSB for blocking, would be as follows:*

Portion for Bidders *₹ 10/- per valid Application (plus applicable taxes)*

- *Selling commission payable on the portion for Non-Institutional Bidders which are procured by members of the Syndicate (including their sub-Syndicate Members), RTAs and CDPs or including by using UPI Mechanism or using 3-in-1 type accounts-linked online trading, demat & bank account provided by some of the brokers which are members of Syndicate (including their sub-Syndicate Members) would be as follows:*

Portion for Non-Institutional Bidders	*0.20% of the amount Allotted* (plus applicable tax) on application by Individuals or HUFs below ₹ 0.2 million* *0.05% of the amount Allotted* (plus applicable tax) on application of other than above*

**Amount Allotted is the product of the number of Units Allotted and the Offer Price.*

The selling commission payable to the Syndicate / sub-Syndicate Members will be determined on the basis of the *application form number / series, provided that the application is also bid by the respective Syndicate / sub-Syndicate Member. For clarification, if a Syndicate ASBA application on the application form number / series of a Syndicate / sub-Syndicate Member,*

is bid by an SCSB, the selling commission will be payable to the SCSB and not the Syndicate / Sub-Syndicate Member.

- *Uploading Charges payable to Members of the Syndicate (including their sub-Syndicate Members), RTAs and CDPs on the applications made by Bidders using 3-in-1 accounts/ Syndicate ASBA mechanism which are procured by them and submitted to SCSB for blocking would be ₹ 10 plus applicable taxes, per valid application bid by the Syndicate (including their sub-Syndicate embers), RTAs and CDPs.*

The selling commission and bidding charges payable to Registered Brokers, the RTAs and CDPs will be determined on the basis of the bidding terminal ID as captured in the bid book of BSE or NSE.

Selling commission / uploading charges payable to the Registered Brokers on the portion for Non-Institutional Bidders which are directly procured by the Registered Brokers and submitted to SCSBs for processing, would be as follows:

Portion for Non-Institutional Bidders	*₹ 10 per valid Application (plus applicable taxes)*

Uploading charges/ processing fees for applications made by individual Non-Institutional Bidders Bidding for a Bid Amount of ₹0.50 million or less using the UPI Mechanism would be as under:

Members of the Syndicate / RTAs / CDPs /Registered Brokers (uploading charges)	*₹ 10 per valid application (plus applicable taxes)*
Sponsor Bank	*₹ Nil per valid Application Form (plus applicable taxes)* *The Sponsor Bank shall be responsible for making payments to the third parties such as remitter bank, NPCI and such other parties as required in connection with the performance of its duties under the SEBI circulars, the Syndicate Agreement and other applicable laws.*

The total uploading charges / processing fees payable to members of the Syndicate, RTAs, CDPs, Registered Brokers will be subject to a maximum cap of ₹0.50 million (plus applicable taxes). In case the total uploading charges/processing fees payable exceeds ₹0.50 million, then the amount payable to members of the Syndicate, RTAs, CDPs, Registered Brokers would be proportionately distributed based on the number of valid applications such that the total uploading charges / processing fees payable does not exceed ₹0.50 million.

In the event the actual Issue expenses differ from the estimated Issue expenses, the Investment Manager will have the flexibility to utilize such a difference, subject to applicable law.

Interim use of Net Proceeds

The Net Proceeds shall be retained in the Public Issue Account until receipt of the listing and trading approvals from the Stock Exchanges by the Investment Manager. Pending utilization of the Net Proceeds for the purposes described above, the Investment Manager may deposit the Net Proceeds only in one or more scheduled commercial banks included in the Second Schedule of the Reserve Bank of India Act, 1934, as may be approved by the IM Board.

Retention of oversubscription in the Issue, if any

The Investment Manager, in consultation with the Book Running Lead Managers, reserves the right to retain oversubscription of up to 25.00% of the Issue Size in accordance with the InvIT Regulations. In the event that the Investment Manager, in consultation with the Book Running Lead Managers, exercises the aforesaid right, the proceeds from the Allotment pursuant to such oversubscription shall be utilized in a manner that is proportional to the proposed utilisation of the Issue Proceeds and towards the same objects. However, in compliance with the InvIT Regulations, proceeds from the Allotment pursuant to such oversubscription shall not be utilized towards general purposes.

FINANCIAL INDEBTEDNESS AND DEFERRED PAYMENTS

The Trust or the Project SPV do not have any outstanding borrowings as of the date of this Offer Document. The Trust proposes to raise an amount of up to ₹ 40,670.00 million pursuant to the Facility Agreement.

Principal terms of borrowings to be availed by the Trust from Punjab National Bank pursuant to the Facility Agreement

The Investment Manager is proposing to avail debt facilities by the Trust pursuant to the loan agreement dated February 27, 2026. The principal terms of the Facility Agreement are as follows:

Parameter	Description
Borrower	Raajmarg Infra Investment Trust
Lender	Punjab National Bank Limited
Facility amount	Rupee Term Loan (RTL) : ₹ 40,670.00 million Capex LC (as sub-limit of RTL): ₹ 1,000.00 million PBG (as sub-limit of RTL): ₹ 250.00 million
Prepayment charges	The Borrower shall have the right to prepay the Lender, in part of in full, the outstanding amounts under the facility amount without any prepayment charges subject to notice period of 30 days.
Purpose	1. Granting loans and advances to the Project SPV 2. Payment of concession fees to the Authority 3. Towards initial improvement / capital expenditure of assets 4. Towards major maintenance reserve, DSRA and other expenses of the Project SPV 5. Towards meeting transaction expenses 6. Performance Bank Guarantee (PBG) for regulatory requirements or as per concession agreements and LCs for equipment purchase like toll equipment, advance payment to contractors etc. of Project SPV and the Trust
Interest Rates	Linked to repo rate plus applicable spread
Door to Door Tenor	Door to Door period of up to 13 years
Security	Customary to the facility of this nature including but not limited to the obligations of the Borrower being secured, amongst the lenders by a first ranking *pari passu* security interest to the following: A. First *pari passu* charge on all immovable assets (if any) and movable assets and the receivables of the Trust including but not limited to: i. the interest and principal repayments of the loans advanced by the Trust to its SPVs. ii. The dividends to be paid by SPVs. B. First pari-passu security interest on InvIT escrow account and all sub-accounts there under. C. Assignment of loans advanced by InvIT to SPVs and securities created by InvIT, including the assignment of right of substitution and termination and invocation of provisions of escrow agreement in case of default. D. Negative lien on the immovable and movable assets (including current assets and cash flows) of the projects under SPVs, subject to sale of obsolete items or cars / ambulances, old toll equipment etc under normal business practice, subject to a maximum cumulative value of ₹ 2.00 crore per project in any financial year. E. Pledge of 100% shares in dematerialized form of the SPVs held by the RIIT in favour of the Lenders.
Mandatory prepayments	The Lender shall reserve the right to seep cash flows received towards prepayment of Term Loan facilities out of surplus funds available as per the waterfall under the concession agreement for the following scenarios: 1. Any proceeds of any material asset sale of Project SPV as per provision of financing agreement (other than the proceeds to the extent of ₹ 50.00 crore cumulatively for Project SPV in a year). 2. Insurance proceeds received to the extent not applied for repair, renovate,

Parameter	Description
	reinstating / replacing assets of Project SPVs (other than the proceeds to the extent of ₹ 50.00 crore cumulatively for Project SPV in a year) 3. Any proceeds resulting from the expropriation or other takeover event by any Government Authority of the project assets of the Borrower or Project SPV(s) in excess of ₹ 50.00 crore cumulatively for Project SPVs in a year. 4. Any proceeds resulting from an arbitral or judicial award in connection with any of the Project Documents to the extent not applied for repair, renovate, reinstating/ replacing the Project Assets in excess of ₹ 50.00 crore cumulatively for Project SPVs in a year. 5. Release of cash in case of replacement of cash DSRA by BG, in case the DSR originally funded by Lenders. Except point (5), the Lenders shall be provided with an option for prepayment, in the ratio of Rupee Term Loans to Total Capital (debt plus unit capital by the unit holders) in the borrower's book.
DSRA	The Trust shall create DSRA covering an amount equivalent to principal, interest, fees and all other obligations due and payable in respect of the facility during the subsequent quarter in the form of Permitted Investments or Bank Guarantees, to be created within 4 months from the date of disbursement.
Cash Trap Mechanism	Cash trap mechanism will be invoked when the actual Gross DSCR (as per annual audited figures) falls below the minimum Gross DSCR of 1.10x. In case of invocation, the surplus in the escrow account after meeting all statutory expenses and debt servicing will be retained and not released to the borrower till the achievement of the minimum stipulated DSCR. The amount retained could at the option of the Borrower be used to reduce Debt. The Cash trap would be released if the Minimum DSCR breach is cured, as evidenced by a certificate from the Statutory Auditor.
Restricted Payment Conditions	Upon occurrence any one or more of the following events, the Trust shall not declare any distribution including dividend/interest income pass through to the unit holders or any other form of cash flow on its share capital / shareholders units / inter corporate deposits from Sponsor/ InvIT unit holders, associate companies, and/or strategic investors (Restricted Payments): 1. If the Trust fails to meet its obligations to pay interest and/or installments or other charges to the external lenders which shall have become due and as long as it is in such default; or 2. If the Trust fails to demonstrate availability of liquidity equivalent for major maintenance funding requirements across all SPVs either in the form of earmarked cash or availability on credit facilities for the said amount as mandated in cash/ permitted investments; or 3. If the DSRA or the debt servicing amount as required on ensuing debt servicing or any other reserves (MM/ O&M etc.) has not been replenished as per stipulated timelines for the InvIT and as long as it is in such default; or 4. If an Event of Default has occurred and is continuing in respect of the Trust; or 5. If there is any Material Adverse Effect on the SPV which has not been cured; or 6. If there is a breach in any financial covenant; or 7. If the Restricted Payments are not permitted under Applicable Laws.
Cash Sweep	Lenders shall reserve the right to sweep cash flows received towards payment of InvIT loans under the following scenarios: 1. If the rating falls below AA by any Rating Agency; or 2. If the Term Loan does not have a valid credit rating from any credit rating agencies; or 3. Admission into corporate insolvency resolution or bankruptcy or dissolution or liquidation or winding up against the SPVs, under the Insolvency & Bankruptcy Code, 2016 or any other such prevailing applicable law; or

Parameter	Description
	4. Termination of any Concession Agreement of any SPV (to the extent of the termination payment received); or 5. Breach of any financial covenant
Negative Covenants	The following shall constitute the negative covenants, whereby the Borrower shall not, without the prior written permission of the Lender, shall not take any action in relation to the items set out as under: a) Change of business: Change the general nature of its business unless as mandated by applicable law and regulatory guidelines; b) Constitutional documents: Unless as mandated by the applicable law and regulatory guidelines, change its Trust Deed in any material way which would prejudicially affect the interest of the Lender; c) Change in control of the Project SPV; d) Winding up, liquidation or dissolution of its affairs or take any action towards the same; and e) Material change in the project documents other than mandated by applicable law, regulatory guidelines or concessioning authority;
Events of Defaults	The Facility Agreement contain events of default as may be required by the Lender, including but not limited to: a) Any instalment of principal amount or interest on the facility remaining unpaid when due except in case of any delay on account of technical issues in which case the default may be cured within 3 working days of the due date; b) The Borrower committing any breach or default in the performance or observance of the material covenants excluding financial covenants of the facility agreement and the same is not cured within thirty (30) days; c) A material representation, warranty or statement made in connection with any financing agreements or in any document delivered by or on behalf of the Borrower is found to be substantially incorrect, provided however any nondeliberate misrepresentation or statement may not be an event of default if cured within 30 days of such misrepresentation/ statement being made; d) Execution or distress being enforced or levied against whole or substantial part of the Borrower's assets and any order obtained in relation thereto is not discharged, vacated or stayed within 30 (thirty) days from the date of such enforcement or levy; e) The occurrence of any material event or circumstance that is prejudicial to or materially imperils or materially depreciates or jeopardizes the Security created or to be created in favour of the Lenders and if such event is not remedied within 30 (thirty) days from the occurrence of such event; f) Seizing/Change of material activities/ projects of SPVs which materially impact the obligation of the borrower under financing documents; g) Abandonment of the material activities/project by SPVs which materially impact the obligation of the borrower under financing documents; h) The occurrence of any event or circumstance that may lead to a material adverse effect and the same is not cured within a period of thirty (30) days from such determination; and i) If the final external credit rating of entire debt including the proposed debt is not obtained within a period of 6 months from the date of first disbursement.
Consequences of Event of Default	Upon the occurrence of an Event of Default and the same not getting cured by the Borrower in the cure period as provided in financing documents, the Lender may exercise any one or more of the following rights: a) Right to reset the spread, in addition to the right available to reset the spread on the relevant reset date under the terms of the Trust Loan Agreements; b) Accelerate the repayment of the facility amount; c) Enforcement of Security

Parameter	Description
	d) cancel the commitments (in part or in full) and accelerate all or a part of the payment obligations of the Borrower under the Facility Agreement; e) Exercise any or all of its rights, remedies, powers or discretions that the Lender under the Trust Loan Agreements and security documents or under India Law; f) Exercising option as per RBI stipulation; g) In case of default on the loan extended by the Trust to any SPV which results in an event of default, the Lender will have the right to instruct the Trust to enforce the security under the SPV loan agreement and the Trust shall follow these instruction. h) Cross default: Default by individual project loan shall not be construed as event of default at Trust level. The Trust level event of default shall be governed as per the terms of the Facility Agreement.
Governing Laws and Jurisdiction	Laws of India

Principal terms of borrowings to be availed by the Project SPV pursuant to the Trust Loan Agreement

The Project SPV will be availing debt facilities from the Trust pursuant to the loan agreements, each dated February 27, 2026. The principal terms of the Trust Loan Agreements are as follows:

Parameter	Description
Borrower	Raajmarg1 Projects Private Limited
Lender	Raajmarg Infra Investment Trust
Facility amount	• Rupee Term Loan (RTL) : ₹ 83,000.00 million • Capex LC (as sub-limit of RTL): ₹ 670.00 million • Performance Bank Guarantee of ₹250 million to be available either from InvIT Lender or InvIT
Purpose	a) Payment of initial estimated concession value / additional concession fee of the InvIT Assets to NHAI b) payment of improvement costs; c) payment of major maintenance costs / other capex related expenses; d) payment of upfront fees to various agencies in relation to the projects, as applicable; e) creation and maintenance of debt service reserve account, if any; f) creation and maintenance of major maintenance reserve, if any; and/or g) any other purpose as may be agreed between the Senior Lender and the Borrower and as permitted under Law, in each case, as specified in the relevant Disbursement request submitted by the Borrower. h) Performance Bank Guarantee (PBG) for regulatory requirements or as per concession agreements and LCs for equipment purchase like toll equipment, advance payment to contractors etc. of Project SPV and the Trust.
Interest Rates	13.00% or such other rate of interest as may be notified by the Senior Lender to the Borrower
Door to Door Tenor	Door to Door period of up to 15 years
Security	Secured
Repayment	The facility shall be repayable in accordance with the repayment schedule subject to the availability of the cash flows of the Borrower and/or written request from the Lender
Events of Defaults	The Facility Agreement contain events of default as may be required by the Lender, including but not limited to: a) Any instalment of principal amount or interest on the facility remaining unpaid upon (a) demand being made by the Lender and (b) when due except in case of any insufficiency of amounts available in connection with the Project, as set out

Parameter	Description
	in the facility agreement; b) Any amount due and payable under the facility agreement and which default has not been cured within a period of 30 days. c) Non-creation of security d) The Borrower committing any breach or default in the performance or observance of any condition or obligation under the facility agreement and the same is not cured within thirty (30) days; e) A material representation, warranty or statement made in connection with any financing agreements or in any document delivered by or on behalf of the Borrower is found to be substantially incorrect and the same is not cured within 30 days of such occurrence; f) Admission of an application in relation to the corporate insolvency resolution process or liquidation process of the Borrower. g) The Concession Agreement is repudiated or terminated by the Borrower or NHAI or is declared to be illegal, unenforceable, or invalid. h) If any of the Financing Documents in relation to the facility becomes ineffective, unenforceable, or invalid for reasons attributable to the Borrower and any other person. i) It is or becomes unlawful for the Borrower or any person to perform any of its material obligations under this Agreement or any Financing Document in relation to the facility; j) Any material obligation under any Financing Document in relation to the facility is not or ceases to be a valid and binding obligation of any Person party to it or becomes void, illegal, unenforceable or is repudiated by such person;; and k) Any of the Financing Documents in relation to the facility or any provision thereof is required to be materially amended, waived or repudiated under any Applicable Laws.
Consequences of Event of Default	Upon the occurrence of an Event of Default the Lender may exercise any one or more of the following rights: a) Accelerate the repayment of the facility amount; b) Enforcement of Security c) cancel the commitments (in part or in full) d) Exercise any or all of its rights, remedies, powers or discretions that the Lender under the Applicable Law and financing document; e) Instruct the Escrow Bank to transfer the surplus funds from the Escrow Account to the escrow account of the Lender
Governing Laws and Jurisdiction	Laws of India

Status of lender consents

As on date of this Offer Document, neither the Trust nor the Project SPV have availed any borrowings. Accordingly, there are no consents required to be obtained from the lenders in relation to the Issue.

Borrowing Policy

The Investment Manager shall ensure that all funds borrowed in relation to the Trust are in compliance with the InvIT Regulations. Accordingly, the Investment Manager has formulated the Borrowing Policy to outline the process for borrowing monies in relation to the Trust. The key terms of the Borrowing Policy include the following:

1. The Trust may raise debt and avail borrowings and deferred payments from time to time, including through (i) issuance of debt securities, commercial paper or loans from banks and financial institutions, in the manner specified by the SEBI, and in accordance with applicable law, and (ii) availing loans from banks and financial institutions in accordance with applicable law (including the InvIT Regulations). The Trust shall, in all cases, comply with the borrowing limits and approval requirements prescribed under Regulation 20 of the InvIT Regulations. Transaction-specific covenants, shall be documented in the respective offer or financing agreements. The Trust shall be permitted to borrow monies through any

permitted means, by any instrument, in Indian or foreign currency, as permitted by applicable law, including as prescribed by the Reserve Bank of India, from time to time.

2. The Investment Manager and the Trustee (on behalf of the Trust) shall be permitted to borrow monies in relation to the Trust, subject to the approval of its board of directors or such other committee of the board of directors of the Investment Manager as may be constituted in this regard. The Investment Manager may engage such intermediaries (include any other group companies of the Investment Manager) as may be necessary to facilitate the borrowings in relation to the Trust, holding companies or SPVs at such remuneration as may be reasonable and at arm's length, as permitted by applicable law.
3. In the event the aggregate consolidated borrowings and deferred payments (net of cash and cash equivalents) of the Trust, holding companies and the SPVs, exceed any thresholds prescribed under the Regulation 20 of the InvIT Regulations in this regard or any other applicable law, any further borrowings by the Trust shall be availed in accordance with the requirements prescribed under the InvIT Regulations, including any approval from Unitholders under Regulation 22 of the InvIT Regulations.
4. The Investment Manager shall ensure that if the value of funds borrowed from related parties in a financial year, exceeds 5% of the total consolidated borrowings of the Trust, any holding company and the SPVs or any other thresholds prescribed under the InvIT Regulations, approval from the Unitholders shall be obtained prior to entering into any such subsequent transaction with any related party, in accordance with Regulation 22 of the InvIT Regulations.
5. The Trust also has the power to create mortgage or secure any of its assets or provide guarantees in order to borrow funds. However, the Investment Manager shall not be allowed to create any obligation which would allow the liabilities to extend beyond the assets held by the Trust or making such liabilities unlimited except with obtaining the necessary approvals as may be required under the applicable law including the InvIT Regulations.
6. Except with prior approval of the Unitholders and obtaining any other approvals required under applicable law (including the InvIT Regulations), any such obligation will not allow the Investment Manager to make the liabilities of the Trust or its Unitholders unlimited.
7. In addition to the above, any borrowing by the Holding Companies or the SPVs, incorporated under the Companies Act, 1956 or the Companies Act, 2013, will be in accordance with the conditions prescribed therein.

DISCUSSION AND ANALYSIS BY THE DIRECTORS OF THE INVESTMENT MANAGER OF THE FINANCIAL CONDITION, RESULTS OF OPERATIONS AND CASH FLOWS OF THE PROJECT SPV OF THE TRUST

Due to the nature of the Project SPV and the InvIT Assets, there is limited financial information available in respect of us which can be presented in this Offer Document. No separate financial information, including actual revenue data for the InvIT Assets, are currently available, which could be used to clearly assess financial information, including revenue and expenses, in respect of each of the InvIT Assets. Accordingly, in lieu of combined financial statements of the Trust, the InvIT Assets and/or Project SPV, the revenue data that NHAI has collected through toll collection and maintenance contracts has been included in the section entitled "Asset Revenue Information" on page 312.

Furthermore, this limited historical revenue data available in respect of the InvIT Assets may not reflect their operation in the future and are not indicative of our expected future financial condition, results of operations or cash flows. Investors are cautioned that the lack of financial information in this Offer Document may make it difficult to assess our financial position or future prospects or results of operations.

The following discussion is intended to convey management's perspective on our expected financial condition and results of operations.

This discussion contains forward-looking statements that involve risks and uncertainties. Actual results may differ materially from those discussed in or implied by any of the forward-looking statements as a result of various factors, including those listed under "Risk Factors" and "Forward-Looking Statements" on pages 42 and 19.

Overview

Raajmarg Infra Investment Trust ("**Trust**") is an infrastructure investment trust which is registered with SEBI under the InvIT Regulations on December 22, 2025, under Regulation 3(1) of the InvIT Regulations. The Trust intends to acquire, operate and maintain the InvIT Assets pursuant to the terms of the Concession Agreements. The Trust is sponsored by NHAI, an autonomous authority of the GoI under the MoRTH constituted on June 15, 1989 under the NHAI Act. NHAI was operationalised in February 1995 with the appointment of a full-time chairman and other members of the board. The functioning of NHAI is governed by the NHAI Act and the rules, and regulations framed thereunder. We are managed by qualified personnel of the Investment Manager with majority of the personnel who have management and operational experience in the roads and highways sector for over two decades. For further details, see the sections headed "*Parties to the Trust – The Investment Manager – Raajmarg Infra Investment Managers Private Limited*" on page 92.

The Trust proposes to have an initial portfolio of five Toll Roads in the Indian states of Jharkhand, Andhra Pradesh, Tamil Nadu and Karnataka under the Toll Operate Transfer ("**TOT**") model conceived by NHAI. These Toll Roads will be operated and maintained pursuant to concessions granted by the NHAI to the Project SPV. The Toll Roads comprise five toll roads spanning a total length of 260.198 kms and forms part of the Golden Quadrilateral project. The Project SPV proposes to have an exclusive right, license and authority to demand, collect and appropriate fee, operate, manage and maintain the Toll Roads. We expect to satisfy all conditions precedent and commence our concessions in accordance with the terms of the Concession Agreements. For further details, see "*Summary of the Concession Agreements*" and "*Use of Proceeds*" on pages 200 and 211, respectively.

The Concession Agreements, once executed between the Project SPV and NHAI (as concessioning authority) will provide the Project SPV, the exclusive right, license and authority to demand, collect and appropriate fee, operate, manage and maintain the initial portfolio assets for a period of 15 years from users of each Toll Road and perform and fulfil all of the concessionaire's obligations under and in accordance with respective Concession Agreements. The responsibility for the supervision of the operation and maintenance of the Toll Roads from the O&M handover date will also vest with us. In return, the Project SPV is required to pay the concession fee to the NHAI prior to the commencement of the concession, as set out in the respective Concession Agreements. For further information on the provisions of the Concession Agreements, see "*Summary of the Concession Agreements"* on page 200.

From the appointed date (i.e., the date on which all conditions precedent have been satisfied in accordance with Concession Agreement, hereinafter, "**Appointed Date**"), the Project SPV will acquire, operate and maintain the following toll road assets ("**Toll Roads**"):

S No.	Asset	Details
1.	Gorhar to Barwa Adda	The four/six lane section from Gorhar to Barwa Adda from km 320+810 to km 400+632 (design km 401+332) of NH-19 (old NH-2), comprising km 320+810 to km 326+000 between Gorhar and Atka, being a four lane section; Atka to Khairatunda from km 326+000 to km 360+300 (design km 361+000) and Khairatunda to Barwa Adda from km 360+300 (design km 361+000) to km 400+632 (design km 401+332), being six lane sections, in the state of Jharkhand, having total length of 80.522 km.
2.	Chilakaluripet-Vijayawada	The six lane section from Chilakaluripet to Vijayawada from km 355+000 to km 357+342 and from km 372+038 to km 422+605 along with Chilakaluripet bypass section from 0+000 to km 16+499 ("**Chilakaluripet Bypass**") of NH 16, in the state of Andhra Pradesh, having total length of 69.408 km.
3.	Chennai Bypass	The six lane section from km 0+000 to km 32+600 of NH-32 and NH-48, in the state of Tamil Nadu, having total length of 32.600 km.
4.	Chennai -Tada	The six lane section from km 21+400 to km 54+400 of NH-16, in the state of Tamil Nadu, having total length of 33.000 km.
5.	Neelmangla Tumkur	The four/six lane section from Neelmangla to Tumkur from km 29+500 to km 74+168 of NH-48, comprising km 29+500 to km 49+900 between Neelmangla to Dobbaspet being a six lane section; Dobbaspet to Tumkur from km 49+900 to km 61+520, being a four lane section and Tumkur Bypass from km 61+520 to km 74+168 being a 6 lane section, in the state of Karnataka, having total length of 44.668 km.

The Investment Manager has confirmed that the Trust shall have the ability to meet its working capital requirements for at least 12 months from the date of listing of the Units.

SEBI Exemptions

The Sponsor has submitted a request to SEBI dated January 14, 2026 seeking exemptions under the InvIT Regulations and the SEBI InvIT Master Circular in respect of: (i) preparation and disclosure of consolidated financial statements of the Sponsor prepared on a consolidated basis in accordance with Indian Accounting Standards for financial years ended March 31, 2022, March 31, 2023 and March 31, 2024; (ii) disclosure of audited financial statements of the Sponsor for the financial year ended March 31, 2025; (iii) exemption from strict application of certain provisions of the InvIT Regulations and SEBI InvIT Master Circular in respect of disclosure of financial statements of the InvIT Assets proposed to be held by the Trust and related disclosure requirements including combined financial statements of the Trust and any other applicable disclosure requirements arising in relation to preparation and disclosure of combined financial statements under the SEBI; (iv) disclosure of material litigation and regulatory actions pending against the associates of the Trust, Sponsor, Investment Manager, and Project Manager; (v) exemption from compliance with Regulation 10(7) of the InvIT Regulations read with paragraph 6(a)(vi) of Schedule III to the InvIT Regulations with respect to the InvIT Assets being adequately insured; (vii) exemption from compliance with Regulation 2(zy)(b) of the InvIT Regulations with respect to the Project SPV holding at least 90.00% of its assets directly in infrastructure assets; and (viii) exemption from compliance with Clause 18.2 of the SEBI InvIT Master Circular with respect to dematerialisation of the securities of Project SPV. SEBI vide its letter dated February 11, 2026 has granted us an exemption in respect of: (i) preparation and disclosure of consolidated financial statements of the Sponsor prepared on a consolidated basis in accordance with Indian Accounting Standards for financial years ended March 31, 2022, March 31, 2023 and March 31, 2024; (ii) disclosure of audited financial statements of the Sponsor for the financial year ended March 31, 2025; (iii) exemption from strict application of certain provisions of the InvIT Regulations and SEBI InvIT Master Circular in respect of disclosure of financial statements of the InvIT Assets proposed to be held by the Trust and related disclosure requirements including combined financial statements of the Trust and any other applicable disclosure requirements arising in relation to preparation and disclosure of combined financial statements under the SEBI; (iv) exemption from compliance with Regulation 10(7) of the InvIT Regulations read with paragraph 6(a)(vi) of Schedule III to the InvIT Regulations with respect to the InvIT Assets being adequately insured, subject to such insurance being obtained within 30 days from the Issue Closing Date.

Accordingly, only the following financial information is presented in this Offer Document:

- The audited standalone financial information of the Trust for the period from its date of settlement, i.e. November 24, 2025, till December 31, 2025;
- Projections of Revenue from Operations and Cash Flow from Operating Activities on page 334;
- Summary financial information of the Sponsor, as of and for the financial years ended March 31, 2024, March 21, 2023, and March 31, 2022, derived from the audited standalone financial statements of the Sponsor for the respective years and summary financial information of the Sponsor, as of and for the

financial years ended March 31, 2025 derived from the limited review standalone financial statements of the Sponsor for the year ended March 31, 2025. For further details, please see the sections entitled *"Summary Financial Information of the Sponsor"* on page 31;

- Summary financial information of the Investment Manager from the date of its incorporation i.e. August 22, 2025, to November 30, 2025;
- In lieu of the combined financial statements, of the Trust along with the InvIT Assets and/or SPV, the revenue data that NHAI has been collecting through toll collection and maintenance contracts, has been included in the section entitled "*Asset Revenue Information*" on page 312. This revenue data has been provided from April 1, 2022 till January 31, 2026, separately for each InvIT Asset, to the extent that such data is available for such InvIT Asset. The said amounts being collected are at times intermittent on account of gaps in tolling contract periods and would not be a true reflection of the revenue that these InvIT Assets are actually generating. Please refer to "*Risk Factors – The Trust is a newly settled trust with no operating history and limited historical financial information and, as a result, investors may not be able to assess its prospects on the basis of past records and the financial information disclosed in this Offer Document* ." on page 42 in this regard.

The absence of meaningful historical operating data or financial statements may make it difficult for investors to evaluate our ability to operate, manage and maintain the Toll Roads and assess our financial position or future prospects or results of operations.

Significant factors affecting our results of operations

We expect our results of operations, financial condition and liquidity to be influence by the following events, facts, developments and market characteristics.

Toll revenues

The operation of toll roads principally involves collection of tolls and maintenance. Revenues from the Toll Roads will substantially comprise receipts collected at toll plazas from vehicles passing through the Toll Roads. Toll revenues generated by each of the Toll Roads will be subject to a number of factors, including traffic volume by vehicle categories, weight of the vehicle, applicable toll rates and distance travelled. The volume can vary with the location of the asset and the period of operation, as well as seasonal effects. Meanwhile, toll rates are ultimately determined by the Indian government in accordance with certain national laws and regulations. We anticipate a continuing increase in toll rates for the Toll Roads given the annual inflation-linked adjustment.

Operation and maintenance costs

We will be responsible for the operation and maintenance of the Toll Roads upon commencement of the respective concession. We expect to take over the operation and maintenance of the InvIT Assets post 30 months from the appointed date. Pursuant to each of the Concession Agreements, we will be required to ensure that the relevant Toll Road conforms to the maintenance requirements set forth in the Concession Agreements. For each Toll Road, we will be required to prepare an annual program of preventive, urgent and other scheduled maintenance to comply with the standards and requirements set out in the Concession Agreements.

Local state economies

We expect our financial results from the Toll Road to be dependent upon growth in the local state economies in which they are operated, namely Jharkhand, Andhra Pradesh, Tamil Nadu and Karnataka. We expect trends in the economic development and population growth of each of these states to have a direct impact on the traffic utilizing the Toll Road.

Access to and cost of financing

Our ability to obtain financing, as well as the cost of such financing, affects our business. Our ability to access such additional financing is subject to a variety of factors, including interest rates and other funding costs and market conditions. Any lack of access or higher costs in relation to additional financing that may be required by us could negatively impact our results of operations.

Arrangement with respect to future assets

In accordance with the approval granted by the Chairman of NHAI, by way of communication dated December 01, 2025, our Sponsor will offer around 1,500.00 km of completed and operational national highways to the Trust over the next three to five years for monetization ("**Future Assets**"). The process of identification of Future Assets, offer of Future Assets to Trust and completion of transfer of Future Assets to the Trust including valuation mechanism may be refined and/or modified in line with the internal policies of NHAI.

Liquidity and Capital Resources

Pursuant to the Concession Agreement, we are required to pay certain concession fees and make certain improvement works to each of the Toll Road relating to overlay activities and construction of additional toll lanes, among other things. We expect to finance our operations for the next 12 months primarily from cash flow from the operation of the Toll Roads. We may also from time to time seek other sources of funding, which may include debt or equity financings, depending on our financing needs and market conditions.

Qualitative Disclosures About Market Risk

Market risk is the risk of loss arising from adverse changes in market rates and prices, such as foreign currency exchange rates and commodity prices. We do not hold or issue financial instruments for trading purposes and does not enter into derivative transactions that would be considered speculative positions. We intend to minimize our exposure to currency risk by minimizing our non-Rupee borrowings.

Interest Rate Risk

We expect the bulk of our borrowings to be at fixed rates of interest. Our borrowings are exposed to market risk relating to changes in interest rates upon any refinancing or additional financing.

Liquidity Risk

We may not have sufficient cash flows to meet our operation and maintenance expense requirements and our financing obligations when they come due. We manage liquidity risks by forecasting projected cash flows. Management closely monitors our future and contingent obligations and set up required cash reserves as necessary in accordance with internal requirements.

CAPITALIZATION STATEMENT

The following table sets forth the Trust's capitalization, on a standalone basis, as at December 31, 2025, on the basis of amounts derived from the Audited Financial Information and as adjusted for the Issue.

(in ₹ million, other than ratio)

Particulars	Pre-Issue as at December 31, 2025	As adjusted for Issue*
Financial liabilities		
Non current borrowings	Nil	[●]
Current borrowings	Nil	[●]
Total borrowings (A)	Nil	[●]
Equity		
Initial contribution to the Trust	0.01	[●]
Unit capital	Nil	[●]
Other Equity	Nil	[●]
Total Equity (B)	0.01	[●]
Total Borrowings / Total Equity Ratio (A/B) times	0	[●]

** Corresponding details post Issue are not available, hence the required disclosures in respect of the same have not been provided in the above table.*

DISTRIBUTION

Statements contained in this section entitled "Distribution" that are not historical facts are forward-looking statements. Such statements are subject to certain risks and uncertainties that could cause actual results to differ materially from those that may be projected. Under no circumstances should the inclusion of such information herein be regarded as a representation, warranty or prediction with respect to the accuracy of the underlying assumptions by the Trust, the Trustee, the Sponsor, the Investment Manager, the Book Running Lead Managers or any other person. Bidders are cautioned not to place undue reliance on these forward-looking statements that are stated only as at the date of this Offer Document. For details, please see the section entitled "Forward-Looking Statements" on page 19. For details on the risks relating to distribution, please see the section entitled "Risk Factors" on page 42.

The distribution policy (the "**Distribution Policy**") aims to outline the process and procedure for the distribution to be undertaken by Trust, subject to the provisions of the InvIT Regulations.

The net distributable cash flows of the Trust (the "**Distributable Income**") shall be based on the cash flows generated from the underlying operations undertaken by the SPV and/or any HoldCo held by the Trust. For details of the business and operations presently undertaken by the InvIT Assets, please see "*Business*" on page 160. Presently, cash flows receivable by the Trust may be in the form of dividend, interest income or principal repayment received from the Trust Assets in relation to any debt sanctioned by the Trust, or a combination of both. The computation of the Distributable Income will at all times be compliant with the prevailing provisions of the InvIT Regulations. Distributions may be made from the monies received by the Trust, in accordance with the provisions of the documents executed in relation to the InvIT and applicable law.

In terms of the InvIT Regulations and SEBI InvIT Master Circular, each SPV shall distribute not less than 90% of its net distributable cash flows ("**NDCF**") to its respective HoldCo or the Trust, as applicable, in the proportion of its holding in the SPV, subject to applicable provisions of the Companies Act, 2013, as amended or Limited Liability Partnership Act, 2008, as amended, as applicable. In terms of the InvIT Regulations, with regard to distribution of NDCF by the Holdco, if any, to the Trust, 100% of cash flows received by the Holdco from underlying SPVs shall be distributed to the Trust (net of any expenses and applicable taxes including withholding taxes and adjustment for negative cash flows of the Holdco as permitted under InvIT Regulations) and with respect to the cash flows generated by a Holdco on its own, not less than 90% of such NDCF shall be distributed by the Holdco to the Trust.

In terms of the InvIT Regulations, the Trust shall distribute at least 90% of the Distributable Income to the Unitholders in proportion to their respective unit holdings. The distributions shall be made in accordance with the timelines as prescribed under the InvIT Regulations. The Trust shall ensure that such distribution of available Distributable Income is made at least once in every quarter during the financial year. All distributions shall be effected within the prescribed timelines from the record date, as stipulated under the InvIT Regulations. The first distribution (whether monthly/quarterly/half-yearly, etc.) out of the NDCF computed for a financial year (or period thereof) should be as mandated in the InvIT Regulations. Thereafter, minimum distribution requirement should be met on a cumulative basis for the subsequent distributions out of the NDCF for such financial year.

In the event any infrastructure asset is sold by the Trust or any Holdco or SPV, or if the equity shares or interest in any Holdco or SPV is sold by the Trust, then in accordance with the InvIT Regulations and the Distribution Policy:

- if the Trust proposes to re-invest the sales proceeds into any other infrastructure asset, it shall not be required to distribute any sales proceeds to the Unitholders or the Trust; and
- if the Trust proposes not to invest the sales proceeds into any other infrastructure asset within a period of one year, it shall be required to distribute the same in accordance with the InvIT Regulations.

All distributions to the Unitholders shall be made in compliance with the InvIT Regulations, Income-tax Act, 2025 ("**IT Act**"), and other applicable law.

For the purposes of the IT Act, any income distributed by the Trust to the Unitholders shall be deemed to be of the same nature and in the same proportion in the hands of the Unitholder as if it had been received by, or accrued to, the Trust. Accordingly, the Trust may follow either the receipt approach or the accrual approach subject to the provisions of the IT Act and applicable accounting standards, however, the same shall be followed on a consistent basis.

The Distributable Income and the NDCF of any SPV shall be calculated in accordance with the InvIT Regulations. The indicative method of calculating NDCF for the SPV and the Trust is provided below:

a. Calculation of net distributable cash flows at the HoldCo / SPV level:

Particulars
Cash flow from operating activities as per Cash Flow Statement of HoldCo/ SPV
(+) Cash Flows received from SPV's which represent distributions of NDCF computed as per relevant framework **(refer note 1 and 8 below)** ***(relevant in case of HoldCos)***
(+) Treasury income / income from investing activities (interest income received from FD, tax refund, any other income in the nature of interest, profit on sale of Mutual funds, investments, assets etc., dividend income etc., excluding any Ind AS adjustments. Further clarified that these amounts will be considered on a cash receipt basis)
(+) Proceeds from sale of infrastructure investments, infrastructure assets or shares of SPVs or Investment Entity adjusted for the following • Applicable capital gains and other taxes • Related debts settled or due to be settled from sale proceeds • Directly attributable transaction costs • Proceeds reinvested or planned to be reinvested as per Regulation 18(7) of InvIT Regulations or any other relevant provisions of the InvIT Regulations
(+) Proceeds from sale of infrastructure investments, infrastructure assets or sale of shares of SPVs or Investment Entity not distributed pursuant to an earlier plan to reinvest as per Regulation 18(7) of InvIT Regulations or any other relevant provisions of the InvIT Regulations, if such proceeds are not intended to be invested subsequently
(-)Finance cost on Borrowings as per Profit and Loss Account excluding finance cost on any shareholder debt/loan from trust. The amortization of any transaction costs can be excluded provided such transaction costs have already been deducted while computing NDCF of previous period when such transaction costs were paid
(-) Debt repayment (to include principal repayments as per scheduled EMI's except if refinanced through new debt including overdraft facilities and to exclude any debt repayments / debt refinanced through new debt, in any form or equity raise as well as repayment of any shareholder debt / loan from Trust)
(-) any reserve required to be created under the terms of, or pursuant to the obligations arising in accordance with, any: (i). loan agreement entered with banks / financial institution from whom the Trust or any of its SPVs/ HoldCos have availed debt, or (ii). terms and conditions, covenants or any other stipulations applicable to debt securities issued by the Trust or any of its SPVs/ HoldCos, or (iii). terms and conditions, covenants or any other stipulations applicable to external commercial borrowings availed by the Trust or any of its SPVs/ HoldCos, or (iv). agreement pursuant to which the SPV/ HoldCo operates or owns the infrastructure asset, or generates revenue or cashflows from such asset (such as, concession agreement, transmission services agreement, power purchase agreement, lease agreement, and any other agreement of a like nature, by whatever name called); or (v). statutory, judicial, regulatory, or governmental stipulations; or – (**refer note 2 below**)
(-) any capital expenditure on existing assets owned / leased by the SPV or HoldCo, to the extent not funded by debt / equity or from reserves created in the earlier years (**refer note 9 below**)
NDCF for HoldCo/SPVs

b. Calculation of net distributable cash flows at the Trust level:

Particulars
Cashflows from operating activities of the Trust
(+) Cash flows received from SPV's / Investment entities which represent distributions of NDCF computed as per relevant framework **(refer note 1 and 8 below)**
(+) Treasury income / income from investing activities of the Trust (interest income received from FD, any investment entities as defined in Regulation 18(5), tax refund, any other income in the nature of interest, profit on sale of Mutual funds, investments, assets etc., dividend income etc., excluding any Ind AS adjustments. Further clarified that these amounts will be considered on a cash receipt basis)
(+) Proceeds from sale of infrastructure investments, infrastructure assets or shares of SPVs/HoldCos or Investment Entity adjusted for the following • Applicable capital gains and other taxes • Related debts settled or due to be settled from sale proceeds • Directly attributable transaction costs • Proceeds reinvested or planned to be reinvested as per Regulation 18(7) of InvIT Regulations or any other relevant provisions of the InvIT Regulations
(+) Proceeds from sale of infrastructure investments, infrastructure assets or sale of shares of SPVs/ HoldCos or Investment Entity not distributed pursuant to an earlier plan to re-invest as per Regulation 18(7) of InvIT Regulations or any other relevant provisions of the InvIT Regulations, if such proceeds are not intended to be invested subsequently

(-)Finance cost on Borrowings as per Profit and Loss Account. However, amortization of any transaction costs can be excluded provided such transaction costs have already been deducted while computing NDCF of previous period when such transaction costs were paid
(-) Debt repayment at Trust level (to include principal repayments as per scheduled EMI's except if refinanced through new debt including overdraft facilities and to exclude any debt repayments / debt refinanced through new debt in any form or funds raised through issuance of units)
(-) any reserve required to be created under the terms of, or pursuant to the obligations arising in accordance with, any: (i). loan agreement entered with financial institution, or (ii). terms and conditions, covenants or any other stipulations applicable to debt securities issued by the Trust or any of its SPVs/ HoldCos, or (iii). terms and conditions, covenants or any other stipulations applicable to external commercial borrowings availed by the Trust or any of its SPVs/ HoldCos, or (iv). agreement pursuant to which the Trust operates or owns the infrastructure asset, or generates revenue or cashflows from such asset (such as, concession agreement, transmission services agreement, power purchase agreement, lease agreement, and any other agreement of a like nature, by whatever name called); or (v). statutory, judicial, regulatory, or governmental stipulations; or – (**refer note 2 below**)
(-) any capital expenditure on existing assets owned / leased by the InvIT, to the extent not funded by debt / equity or from contractual reserves created in the earlier years (**refer note 9 below**)
NDCF at Trust Level

Notes / other rules:

1. *NDCF computed at SPV level for a particular period to be added under this line item, even if the actual cashflows from SPV to the Trust has taken place post that particular period, but before finalization and adoption of accounts of the Trust.*
2. *The Trust retains the option to distribute any surplus amounts, unless such surplus is required to create reserves for any subsequent period. However, any reserve created out of debt funds at the time of availing debt as per the terms of the financing documents shall not be reduced.*
3. *The option to retain 10% distribution under Regulation 18(6) of the InvIT Regulations needs to be computed by taking together the retention done at SPV level and Trust level.*
4. *Surplus cash available in Trust/ Holdco/SPVs due to:*
   - i. *10% of NDCF withheld in line with the InvIT Regulations in any earlier year or half year or;*
   - ii. *Such surplus being available in a new Holdco/SPV on acquisition of such Holdco/SPV by the Trust; or*
   - iii. *Any other reason, excluding if such surplus cash is available due to any debt raise;*

   could be considered for distribution by the Holdco/SPV to the Trust/ Holdco, or by the Trust to its Unitholders in part or in full. Also, such distribution of surplus funds shall be separately disclosed after the NDCF computation for the respective period.

   Provided that with regard to the point 4 (ii) above, if an acquisition of such SPV was funded by external debt, then surplus cash available with such SPV should first be used to repay such external debt. After such debt repayment, remaining surplus, if any, can be used for distribution.
5. *Similarly, any restricted cash (disclosed as such) should not be considered for NDCF computation by the SPV/ Holdco or Trust (e.g. unspent CSR balance for any year deposited in a separate account as per Companies Act, 2013 which will be utilized in subsequent years, DSRA reserve, major maintenance reserve etc.)*
6. *Further, it is expressly provided that no Trust or Holdco/SPV can distribute any cashflows by obtaining external debt, except to the extent clarified in note 2 and 7 (this will exclude any working capital / OD facilities obtained by Trust / SPVs as part of Treasury management / working capital purposes as long as they are squared off within the quarter).*
7. *Further, it is also clarified that proceeds from sale of infrastructure investments, infrastructure assets or shares of SPVs or Investment Entity adjusted for transaction costs or repayment of debt taken for such assets or other items as mentioned above which is intended to be reinvested or planned to be reinvested as per Regulation 18(7) of the InvIT Regulations, could be temporarily parked in Overdraft accounts or used to repay any additional / unrelated debt. Further if such proceeds are not intended to be reinvested as per the timeline provided in the InvIT Regulations and such net proceeds are to be distributed back to Unitholders, then redrawing such temporarily parked funds to distribute such net proceeds will not be considered as a contravention of note 6 above.*
8. *Cash flows received from Holdco/SPV's / Investment entities which represent distributions of NDCF computed as per relevant framework at the Trust and/or Holdco level for further distribution to Unitholders shall exclude any such cash flows used by the Trust and/or Holdco for onward lending to any other Holdco/SPVs / Investment entities to meet operational / interest expenses or debt servicing of entities.*
9. *Capital expenditure include amounts incurred and paid towards asset enhancement and are capitalized to asset value in the financial statements including lease payments. It is further clarified that Existing Assets as referred to in this line item includes any new structure / building / other infrastructure constructed on an existing infrastructure asset which is already a part of the Trust.*
10. *Debt repayment at Trust level will not be reduced from NDCF to the extent such debt is refinanced at the Holdco/SPV level and such proceeds from refinancing have been transferred by the Holdco/SPV to the Trust for such debt repayment. Similarly, debt repayment at Holdco/SPV level will not be reduced from NDCF to the extent such debt is refinanced at the Trust level and such proceeds from refinancing have been transferred by the Trust to the Holdco/SPV for such debt repayment.*

In terms of the InvIT Regulations, if the distribution is not made in accordance with the prescribed timeline under the InvIT Regulations, the Investment Manager shall be liable to pay interest to the Unitholders at the rate of 15.00% per annum or such other rate as may be specified under applicable law, whichever is lower, until the distribution is made. Such interest shall not be recovered in the form of fees or any other form payable to the Investment Manager by the Trust.

In accordance with the InvIT Regulations, in the event any amount remains unclaimed or unpaid out of the Distributions declared by the Trust, such amount shall be transferred to the "Investor Protection and Education Fund" constituted by SEBI in terms of Section 11 of the Securities and Exchange Board of India Act, 1992 in a manner as may be specified by SEBI, provided such amount transferred shall not bear any interest.

For risks in relation to distribution, please see "*Risk Factors*" on page 42.

RELATED PARTY TRANSACTIONS

In terms of Regulation 2(1)(zv) of the InvIT Regulations, related party shall be as defined as under the Companies Act, 2013 or under the applicable accounting standards and shall also include: (i) Parties to the Trust; and (ii) promoters, directors, and partners of the Parties to the Trust. Further, related parties also include such persons and entities as defined in terms of the applicable accounting standards, being Ind AS 24 on "*Related Party Disclosures*" ("**Related Parties**") in relation to related party transactions. The Parties to the Trust, may, from time to time, enter into related party transactions, in accordance with applicable law.

Procedure for dealing with Related Party Transactions

The IM Board has adopted the policy on related party transactions ("**RPT**") of the Trust (the "**RPT Policy**") pursuant to its resolution dated December 15, 2025.

The key terms of the RPT Policy are provided below:

(i). In accordance with the InvIT Regulations, the Investment Manager will ensure that all future RPTs shall be:
- (a). on an arm's length basis;
- (b). in accordance with the relevant accounting standards;
- (c). in the best interest of the Unitholders;
- (d). consistent with the strategy and investment objectives of the Trust; and
- (e). compliant with applicable law, including the InvIT Regulations.

(ii). Review and approval of RPT:

(a). Each transaction which is identified as a RPT shall be pre-approved by the Audit Committee prior to entering into such transaction.

(b). The Audit Committee may grant omnibus approval for RPT. Each such omnibus approval shall be valid for a period not exceeding one year from the date of such approval, and RPTs undertaken after the expiry of such period shall require fresh approval of the Audit Committee. The Audit Committee shall review, on a periodic basis, the details of RPTs entered into by the Trust pursuant to the omnibus approval.

(iii). Information for approval - For considering approval of RPTs, the Audit Committee will be provided with all relevant material information, including but not limited to:

i. Type, material terms, and particulars of the proposed transaction.

ii. Name of the related party and its relationship with the Trust including nature of its concern or interest (financial or otherwise).

iii. Tenure of the proposed transaction (particular tenure shall be specified).

iv. Value of the proposed transaction.

v. The percentage of the annual consolidated turnover of the Trust or value of Trust's asset, as applicable, as on immediately preceding financial year, that is represented by the value of the proposed transaction;

vi. If the transaction relates to any loans, inter-corporate deposits, advances or investments made or given by the Trust :
- details of the source of funds in connection with the proposed transaction
- where any financial indebtedness is incurred to make or give loans, interoperate deposits, advances or investments,
  - nature of indebtedness;
  - cost of funds; and
  - tenure
- applicable terms, including covenants, tenure, interest rate and repayment schedule, whether secured or unsecured; if secured, the nature of security; and
- the purpose for which the funds will be utilized by the ultimate beneficiary of such funds pursuant to the RPT.

vii. Justification as to why the RPT is in the interest of the Trust

viii. A copy of the valuation or other external party report, if any such report has been relied upon

ix. Percentage of the counter-party's annual consolidated turnover that is represented by the value of the proposed RPT (on a voluntary basis);

x. Any other information that may be relevant

(iv). The Investment Manager will establish an internal control system so as to ensure that all future RPTs are compliant with the InvIT Regulations and applicable accounting standards. Further, the Investment Manager shall comply with the InvIT Regulations in relation to RPTs. The Investment Manager shall also ensure compliance with any additional guidelines issued in this regard by Securities and Exchange Board of India and other relevant regulatory, statutory or governmental authorities from time to time.

(v). In addition to any other requirement that may be prescribed in terms of the InvIT Regulations or other applicable laws, all RPTs to be entered into in the future will be decided by the Board after the examination of the nature of the transaction and its supporting documents or such other data as may be deemed necessary by the Board.

(vi). The Investment Manager will ensure that if with respect to RPTs entered into after the initial offer of Units, the total value of all the RPTs in a financial year pertaining to acquisition or sale of assets, whether directly or through a holding company or SPV, or investments into securities, exceeds 5% of the value of the assets of the Trust or any other threshold prescribed by the InvIT Regulations, approval from the Unitholders shall be obtained prior to entering into any such subsequent transaction with any Related Party, in accordance with Regulation 22 of the InvIT Regulations.

(vii). The Investment Manager will ensure that if with respect to RPTs entered into after the initial offer of Units, the value of the funds borrowed from related parties in a financial year exceeds 5% of the total consolidated borrowings of the Trust, any holding company and the SPVs, or any other threshold prescribed by the InvIT Regulations, approval from the Unitholders shall be obtained prior to entering into any such subsequent transaction with any related party, in accordance with Regulation 22 of the InvIT Regulations.

(viii). As a general rule, the Investment Manager must demonstrate to the Board that future RPTs satisfy the criteria set out in (i) above at the time of recommending the same for the approval of the Board.

(ix). The Investment Manager will also incorporate into its internal audit plan a review of all material RPTs entered into by the Trust during each financial year, including a review of the implementation of the agreements, including any right of first offer or right of first refusal arrangements, to acquire assets from the Sponsor, Sponsor Group and its associates.

(x). The Investment Manager shall ensure that the profits from RPTs have arisen from legitimate business transactions.

(xi). While considering a RPT, any director on the Board who has a potential interest in any Related Party Transaction will recuse himself or herself and abstain from discussion, review and voting on the RPT in terms of the InvIT Regulations and applicable law. Further, while considering voting on a RPT which requires approval of the Unitholders, voting by any person who is a related party of the Trust in such transaction as well as associate of such person(s) shall not be considered on the specific issue.

(xii). In connection with any review of related party transaction, the Audit Committee/Unitholders has authority to modify or waive any procedural requirements of the RPT Policy in the best interest of the Trust.

Potential conflict of interest

(i). Subject to applicable law and the RPT Policy, all resolutions in writing of the IM Board in relation to matters concerning RPTs of the Trust must be approved by a majority of the directors of the Investment Manager.

(ii). Where matters concerning the Trust relate to transactions entered into or to be entered into by the Investment Manager for and on behalf of Trust with a related party, the IM Board is required to consider the terms of the transactions to satisfy itself that the transactions are conducted in accordance with the parameters set out in the RPT Policy.

(iii). As part of its review of the internal audit reports, the IM Board will review the internal audit reports of the implementation of the agreements to acquire assets from the Sponsor to ensure compliance. The review will include an examination of supporting documents and such other data deemed necessary to the IM Board.

Present and On-going Related Party Transactions

Related party transactions of the Trust in relation to the setting up of the Trust and this Issue

A number of present and on-going transactions with certain related parties have been, or will be, entered into in relation to the setting up of the Trust. The Trustee and the Investment Manager confirm that the following related party transactions have been, or shall be, entered into, on an arm's length basis in accordance with the relevant accounting standards, in the best interest of the Unitholders, consistent with:

(A) Trust Deed

Please see the section entitled "*Parties to the Trust – Key Terms of the Trust Deed*" on page 87 for a description of the terms of the Trust Deed.

(B) Investment Management Agreement

Please see the section entitled "*Parties to the Trust – Key Terms of the Investment Management Agreement*" on page 96 for a description of the terms of the Investment Management Agreement.

(C) Project Implementation and Management Agreement

Please see the section entitled "*Parties to the Trust – Key terms of the Project Implementation and Management Agreement*" on page 103 for a description of the terms of the Project Implementation and Management Agreement.

(D) Concession Agreements

Please see the section entitled "*Summary of the Concession Agreements*" on page 200 for a description of the terms of the Concession Agreements.

(E) Transitional Support Agreement

The Sponsor, Project Manager and the Project SPV have entered into a transitional support agreement dated February 27, 2026 for the purpose of the Sponsor providing the transitional support to (i) the Project Manager in respect of its obligations under the Project Implementation and Management Agreement, and (ii) the Project SPV in respect of its O&M obligations and tolling obligations (as provided under the Concession Agreements). The terms and conditions of the Transitional Support Agreement shall, in respect of each Concession Agreement and the Project Implementation and Management Agreement, be effective and binding on the Parties for a period of thirty (30) months commencing from the appointed date of the respective Concession Agreements, unless terminated earlier by mutual consent. The Sponsor's fee for the services provided under the Transitional Support Agreement shall be such amount as may be mutually agreed amongst Sponsor, Project Manager and the Project SPV.

(F) Sponsor Contribution

Pursuant to the Commitment Letter, the Sponsor has agreed to contribute such amount towards subscription of such number of Units which shall be equivalent to at least 15.00% of the total Units of the Trust on a post-Issue basis, to comply with the requirement under Regulations 12(3) and 12(3A) of the InvIT Regulations. For details, see "*Formation Transactions in relation to the Trust – Sponsor Contribution*" on page 26.

(G) Trade-mark License Agreement

The Sponsor and the Trust, acting through the Trustee have entered into a trade-mark license agreement dated February 25, 2026 to grant to the Trust: (i) non-exclusive, non-transferable, royalty-free and non-assignable license for the use in the Republic of India and the rest of the world of the trade name "NHAI" as part of the trade name and/or logo of the Trust of the Trust and (ii) a non-exclusive, non-transferable, royalty-free and non-assignable license for the use in the Republic of India and the rest of the world of the NHAI trademark in relation to the business of the Trust, whether singly or in combination with other marks, including for the purpose of, amongst others, (a) affixing of the trademarks as included in the trade-mark license agreement ("**Trademarks**"), to the items/equipment in connection to the business of the Trust, and (b) providing services using the property affixed with the Trademarks and offered for the use of persons receiving that service. The Trademarks may also be used by the Trust in connection with its business through visual browsers by electromagnetic means (including electronic means, magnetic means, and other means imperceptible to humans).

Arrangement with respect to future assets

In accordance with the approval granted by the Chairman of NHAI, by way of communication dated December 01, 2025, our Sponsor will offer around 1,500.00 km of completed and operational national highways to the Trust over the next three to five years for monetization ("**Future Assets**"). The process of identification of Future Assets, offer of Future Assets to Trust and completion of transfer of Future Assets to the Trust including valuation mechanism may be refined and/or modified in line with the internal policies of NHAI.

Borrowings from Related Parties

As on date of this Offer Document, no borrowings have been availed by the Trust or Project SPV.

Potential Conflicts of Interest

The Investment Manager has established certain procedures to deal with conflict-of-interest issues. For further details on management of potential conflicts of interest, please see the section entitled "– *Procedure for dealing with Related Party Transactions*" on page 230.

Conflicts of the Investment Manager and the Sponsor

Certain related party transactions may be entered into by the Investment Manager and the Sponsor in the future which will be undertaken in compliance with applicable law.

Related Party under Regulation 19(4) and 19(6) of the InvIT Regulations

In accordance with Regulation 19(4) of the InvIT Regulation, National Highways Infra Trust is a related party of the Trust.

The Trust intends to acquire only such assets which are exclusively offered to it by NHAI. Accordingly, the Trust does not have an interest in a business which competes or is likely to compete, either directly or indirectly, with activities of National Highways Infra Trust. Further, the Trust does not intend to acquire any assets from National Highways Infra Trust. Accordingly, the disclosures under Regulation 19(6) of the InvIT Regulations are not applicable to this Issue.

REGULATIONS AND POLICIES

The following description is a summary of certain sector specific laws currently in force in India, which are applicable to the Trust. The information detailed in this chapter has been obtained from publications available in the public domain. The description of the regulations set out below may not be exhaustive, and is only intended to provide general information to Bidders, and is neither designed as, nor intended to substitute, professional legal advice. Judicial and administrative interpretations are subject to modification or clarification by subsequent legislative, judicial or administrative decisions.

Provided below are certain significant legislations, regulations and policies that generally govern the road infrastructure sector in which the Project SPV operates.

Laws Relating to the Business and Operations of the Trust and the Project SPV

The regulatory framework in India in the highways sector, implemented on a public-private partnership ("**PPP**") basis, mainly derives its source from the primary legislations of National Highways Authority of India Act, 1988 (the "**NHAI Act**") and the National Highways Act, 1956 (the "**NH Act**") enacted by the Indian parliament, each as amended or supplemented. The Indian government, through the NHAI and the MoRTH, is actively promoting the digitalization of highway management by using artificial intelligence for traffic monitoring and geographic information system mapping for asset management.

The National Highways Act, 1956

The policy of the MoRTH, in implementing the NH Act, is to vest the MoRTH with the power to declare a national highway and for acquisition of land for this purpose. The GoI, by notification, can declare the intention to acquire any land for a 'public purpose' as envisaged by the law and such land can be used for the purposes of building, maintenance and operation of the declared national highways throughout the country. The NH Act prescribes the procedure for such land acquisition. The procedure includes, amongst others, a declaration of an intention to acquire, entering and inspecting such land, hearing of objections, a declaration of the acquisition and the power to take possession. The NH Act also provides for payment of compensation to owners and any other person whose right of enjoyment or ownership in the land has been affected. The NH Act vests MoRTH with the power to appoint a competent authority for the effective implementation of the NH Act and its policies. The said appointed authority retains the right and power to (a) survey, make any inspection, valuation or enquiry; (b) take levels; (c) dig or bore into sub-soil; (d) set out boundaries and intended lines of work; (e) mark such levels, boundaries and lines placing marks and cutting trenches; or (f) do such other acts or things as may be laid down by rules made in this behalf by that government. All the notified national highways shall vest in the name of the Union and for the purposes, shall include all lands appurtenant thereto and all the bridges, culverts, tunnels and other enlisted constructions under the said NH Act. The Central Government shall assume the responsibility of maintaining and construction of national highways in proper condition in accordance to the law. The Central Government also retains the right to levy fee over the services and benefits rendered in relation to the use of such national highways.

The GoI is responsible for the development and maintenance of national highways. However, it may direct that such functions may also be exercised by the government of a state in which the highway is located or by any officer or authority subordinate to the GoI or to the state government. Further, the GoI has the power to enter into an agreement with any person for the development and maintenance of a part or whole of the highway. Such person would have the right to collect and retain fees at such rates as may be notified by the GoI and will also have the powers to regulate and control the traffic, for proper management of the highway, in accordance with the provisions of the Motor Vehicles Act, 1988, as amended. The GoI also has the power to make rules for carrying out the purposes of the NH Act.

The National Highways (Amendment) Act, 2017, entails the competent authority to issue reports to the Central Government in respect of any land (either acquired or proposed to be acquired) which is, either under incorrect revenue record or which is not required due to change in geometry or alignment of the construction, to issue order for the de-notification of such land from the acquisition for development and maintenance of the national highway. In pursuance of the foregoing amendment to the statute, the National Highways Rules, 1957, have been amended to ensure the exercise of the power under the NH Act. These rules provide for periodic regulatory compliance and reporting standards to be followed by the competent authority in reporting to the Central Government.

The National Highways Authority of India Act, 1988

The NHAI Act was enacted in pursuance of the powers of the Central Government for appointing a competent

authority under the NH Act and provides for the constitution of an authority for the development, maintenance and management of national highways and for matters connected therewith or incidental thereto. In accordance with the NHAI Act, the GoI carries out development and maintenance of the national highways through NHAI. Subject to the provisions of the NHAI Act, the NHAI has the power to enter into and perform any contract necessary for the discharge of its functions. The NHAI has the power to acquire any land to discharge its functions, and such acquired land will be deemed to be land needed for a 'public purpose'. The NHAI Act prescribes a limit in relation to the value of the contracts that may be entered into by NHAI. However, the NHAI may enter into contracts exceeding the specified value, on obtaining prior approval of the GoI. The NHAI Act provides that the contracts for acquisition, sale, or lease of immovable property on behalf of the NHAI cannot exceed a term of 30 years unless previously approved by the GoI. NHAI's objective is to ensure that all contract awards and procurements conform to the best industry practices with regard to transparency of process, adoption of bid criteria to ensure healthy competition in award of contracts. In accordance with the NHAI Act, the NHAI shall consist of a full-time chairman, not more than six full time members and not more than six part time members who are being appointed by the Central Government. Additionally, various project implementation units headed by project director have been set at various sites to oversee timely completion of the projects.

In view of the challenging task of construction, development, and management of national highways being undertaken by NHAI, the Committee on Public Undertakings selected the subject "National Highways Authority of India (NHAI)" for comprehensive examination and report. The National Highways Authority of India (Amendment) Act, 2013, received the assent of the President of India on September 10, 2013, and aimed at increasing the institutional capacity of NHAI to help execute the powers delegated to it. National Highways Development Project ("**NHDP**") was launched in 1998 with the objective of developing roads of international standards which facilitate smooth flow of traffic. The NHDP envisages creation of roads with enhanced safety features, better riding surface, grade separator and other salient features.

As per the NHAI Works Manual, 2006, NHAI's mandate is the time and cost bound implementation of the NHDP. The sources of finance available to the NHAI include fund assistance from external funding agencies like the International Bank of Reconstruction and Development and the Asian Development Bank. NHAI's role encompasses involving the private sector in provision, maintenance, and operation of the national highways.

Financing of the NHDP

Under the Central Road and Infrastructure Fund Act, 2000, the Government of India established the Central Road Fund, which was later renamed as the Central Road and Infrastructure Fund pursuant to the Finance Act, 2018. The Fund is mandated to be utilized for the development and maintenance of national highways and other specified infrastructure projects. Section 18 of the NHAI Act also provides for the creation of a separate NHAI Fund. Any capital grant or aid received, loan taken, borrowing made, or any other sum received by the NHAI is credited to the NHAI Fund. Certain sources for financing of the NHDP are through dedicated accruals under the Central Road and Infrastructure Fund by levy of cess on fuel as well as involving the private sector and encouraging public private partnerships. The NHDP is also financed through long-term external loans from the International Bank of Reconstruction and Development, the Asian Development Bank and the Japan Bank for International Cooperation as well as through tolling of roads for different projects undertaken by the NHAI.

Private Participation in NHDP

In an effort to attract private sector participation in the NHDP, the NHAI has issued model concession agreements ("**MCAs**") which have been formulated by Planning Commission of India or NITI Aayog and other departments of Central Government where a private entity, being the concessionaire, is, through an international competitive bidding process, awarded a concession (in form of a license) to build, own, operate and collect toll on a highway for a specified period of time, which is usually up to 30 years. The concession to develop highway projects is given by the NHAI or other governmental authorities under various models of PPP like:

(i) Build, Operate, Transfer (BOT)/ Design, Build, Finance, Operate and Transfer (DBFOT) – In this model, the entire designing, financing and construction is undertaken by the concessionaire at its own cost. The concessionaire is entitled to collect toll or receive annuity payments from the NHAI, as the case may be, during the concession period after the construction of the highway project. The bid for the project may either be selected basis the lowest grant wanted by the private developer from the NHAI or the highest premium the private developer is willing to pay to NHAI, in the form of additional concession fee. The concessionaire at the end of the concession period transfers the highway project to the NHAI (free of charge and clear of all encumbrances). The concessionaire's investment in the highway project is recovered directly through user fees collected by way of tolls. Under the BOT model, the projects which

are generally not viable based on toll revenue alone, the NHAI or the relevant governmental authority provides concessionaire with a capital grant up to certain percentage of the project cost to increase the viability of projects and the quantum of such grant is determined on a case-to-case basis. For certain projects with high traffic volumes, concessionaire also offers a negative grant (i.e., premium) to the NHAI.

(ii) Hybrid Annuity Model (HAM) – In this model, the NHAI or the relevant governmental authority invests 40% (forty percent) of the construction cost of the project in (five) equal instalments and the balance amount is infused by the private developer. The private developer recovers his investment in the form of annuity payments received by it over a period of 15 (fifteen) years. Additionally, there is no revenue risk for the private developer under HAM model because the toll is collected by the NHAI or relevant governmental authorities unlike the BOT model where the private developer collects it.

(iii) Toll, Operate and Transfer (TOT) – In this model, the road projects which are in operational phase are awarded by the NHAI or relevant governmental authorities to the concessionaire. The NHAI passes on the toll collection rights and operation and maintenance obligations to the concessionaire against payment of upfront concession fees quoted by the concessionaire as a part of the bidding process.

The bidding for the projects takes place in two stages as per the process provided below:

1. in the qualification (RFQ) stage, the NHAI selects certain applicants on the basis of technical and financial expertise, prior experience in implementing similar projects and previous track record; and

2. in the proposal (RFP) stage, the NHAI invites financial bids from the applicants qualified at the RFQ stage on the basis of which the concession is awarded to the successful bidder by the NHAI for implementation of the project.

In accordance with the MCAs for projects above ₹1,000 million, the concessionaire meets the upfront cost and expenditure on annual maintenance and recovers the entire cost along with the interest from toll collections during the concession period. As per the 'Guidelines for Investment in Road Sector' issued by MORTH in 2009, in order to increase the viability of projects, a capital grant of up to 40% of the project cost is provided by the NHAI or the GoI. The quantum of grant is determined on a case-to-case basis and typically constitutes the bid parameter in BOT projects which are generally not viable based on toll revenue alone. For certain projects with high traffic volumes, concessionaire also offers a negative grant (i.e., premium) to the NHAI. The concessionaire at the end of the concession period transfers the road back to the Government (free of charge and clear of all encumbrances). The concessionaire's investment in the road is recovered directly through user fees collected by way of tolls. As per the MCAs for annuity-based projects, the concessionaire is required to meet the entire upfront cost (no grant is paid by the NHAI or the GoI) and the expenditure on annual maintenance for annuity-based projects. The concessionaire recovers the entire investment through pre- determined annuity payments to be made by the NHAI or the GoI.

Exit Policy

The CCEA in May 2015 approved a comprehensive exit policy framework with the objective to mobilize funds in the market. In pursuance thereto, NHAI, vide Circular No. NHAI/1103/CGM(FA)/4/2015 dated June 9, 2015 permitted divestment of 100% equity by concessionaires/developers after two years of completion of construction of all BOT projects to facilitate unlocking of funds for new infrastructure projects. The equity divested is required to be invested by promoters in their new projects. This comprehensive exit policy framework is expected to harmonize certain conditions across all concessions signed prior to 2009 with the policy framework for post 2009 contracts which permit divestment of equity up to 100%, two years after completion of construction. In line with the spirit of quoted circular, the NHAI issued another circular dated September 9, 2015 followed by the circular dated November 19, 2015, on the same subject, allowing the promoter to use the proceeds from the sale of divested equity of the concessionaire in one or more of the following:

(i) to reinvest in incomplete NHAI projects;

(ii) to reinvest any other highway projects;

(iii) to reinvest in any other power sector projects; or

(iv) to retire their debt to financial institutions in any other infrastructure projects.

Relaxation in the 'change in ownership' clause in Hybrid Annuity Model (HAM) projects

The MoRTH, *vide* circular dated November 10, 2020 and November 27, 2020, read along with the NHAI circular dated December 31, 2020, amended the MCAs in respect of project implemented under the HAM model, and permitted the selected bidder/consortium members, for the new as well as subsisting national highways project under the HAM-model, to dilute their equity six months after COD is achieved for the respective project.

Rationalized Compensation

The CCEA in November 2015 approved a policy for rationalized compensation to concessionaires for languishing national highway projects in BOT mode for delays that are not attributable to the concessionaires. Under the policy, the NHAI is authorized to allow an extension of the concession period for BOT (Toll) projects while the tenure for the operations period as envisaged originally in the concession agreement may remain unchanged which would result in a corresponding increase in concession period. The NHAI has also been authorised to pay compensatory annuities to the concessionaire corresponding to the actual period of delay that is not attributable to the concessionaire upon successful completion of the project.

One Time Fund Infusion Scheme

The CCEA in October 2015 gave its approval to the NHAI for a one-time infusion of funds with the purpose of reviving and physically completing stalled projects in the advanced stages of completion. As per the policy, the amount of funds required in each case shall be approved by NHAI on a case-to-case basis.

Bidder Information

MoRTH has developed the Bidder Information Management System ("**BIMS**") to streamline the process of pre-qualification of bidders for EPC mode of contracts for all national highway works, with enhanced transparency and objectivity. BIMS works as a data base of bidder information that covers basic details, civil works experience, cash accruals and network, and annual turnover so that bidders' pre-qualification can be assessed based on evaluation parameters like threshold capacity and bid capacity from already stored data and the technical evaluation can be carried out in a faster manner.

Land Acquisition

While land is acquired for national highway projects under the NH Act, the Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013 (the "**Land Acquisition Act**") must also be complied with. MoRTH has issued comprehensive guidelines on land acquisition for national highways taking into account the applicability of the Land Acquisition Act.

Arbitral Awards

CCEA on August 31, 2016 approved various measures to revive the construction sector. An office memorandum dated September 5, 2016 was issued by the National Institute for Transforming India with certain proposals. On November 20, 2019, the CCEA approved certain proposals in relation to the arbitrations by or against government entities, for the effective implementation of the CCEA's decision on August 31, 2016 on its initiatives to revive the construction sector. Initially, the CCEA had approved the proposal that government agencies will be required to pay 75.00% of the arbitral award to the concessionaire against a bank guarantee, in cases where the award already announced is challenged. However, pursuant to a press release dated November 20, 2019, the CCEA approved, inter-alia, that where a government entity has challenged an arbitral award, resultant of which the amount of the arbitral award has not been paid, 75.00% of such award will be paid by the government entity to the contractor or the concessionaire against a bank guarantee only for the said 75.00% and not for its interest component. In relation to interest payable to the government entity, if a subsequent court order required the refund of 75.00% of the amount, the payment of such amounts will be required to be made as per the court orders.

The NHAI through policy circulars dated April 9, 2021 and May 26, 2021 and MoRTH through letter dated December 18, 2019 provide for expedited mechanism for settlement of claims arising out of projects via establishment of Conciliation of Independent Experts. The Department of Expenditure, Ministry of Finance has also launched a scheme detailing a one-time settlement initiative for resolving pending contractual disputes involving the Government of India or its related entities. Disputes where the award by court/ arbitral tribunal is only for monetary value were eligible for settlement under this scheme.

Applicable Rules

As per the NH Act and the NHAI Act, the Central Government is empowered to make rules in order to further the objects of NH Act and NHAI Act. In exercise of such power, the Central Government has framed certain rules which are as follows:

- The National Highways Rules, 1957, as amended;
- National Highways Authority of India (Budget, Accounts Audit, Investment of Funds and Powers to enter Premises) Rules, 1990, as amended;
- The National Highways (Manner of Depositing the Amount by the Central Government with Competent Authority for Acquisition of Land) Rules, 1998;
- The National Highways Tribunal (Procedure for Appointment as Presiding Officer of the Tribunal) Rules, 2003, as amended;
- The Central Road Fund (State Roads) Rules, 2014, as amended;
- The National Highways Tribunal (Procedure) Rules 2003;
- National Highways Authority of India (The Term of Office and Other Conditions of Service of Members) Rules, 2003, as amended;
- The National Highways Tribunal (Financial and Administrative Powers) Rules, 2004;
- The National Highways Tribunal (Procedure for Investigation of Misbehaviour or Incapacity of Presiding Officer) Rules, 2003;
- The National Highways Fee (Determination of Rates and Collection) Rules, 2008, as amended;
- The Highway Administration Rules, 2004;
- The National Highways (Collection of Fees by any person for the use of Section of National Highways/Permanent Bridges/Temporary bridge on National Highways) Rules, 1997;
- The National Highways (Fee for the use of National Highways and Permanent Bridge public Funded Project) Rules, 1997;
- The National Highways (Rate of Fee) Rules, 1997.
- The Building and other Construction Workers (Regulation of Employment and Conditions of Services) Act, 1996 and Central Rules, 1998
- Central Electricity Authority (Measures Relating to Safety and Electric Supply) Regulations, 2023
- Indian Electricity Rules, 1956; and
- The Central Motor Vehicle Rules 1989.

Other legislations relevant to the road sector

In addition to the above, there are also certain other legislations that are relevant to the road sector which include the Road Transport Corporation Act, 1950, Central Road and Infrastructure Act, 2000, etc.

Environmental Compliances and Regulations

Infrastructure projects must also ensure compliance with environmental legislations such as the Water (Prevention and Control of Pollution) Act, 1974 ("**Water Pollution Act**"), the Air (Prevention and Control of Pollution) Act, 1981 ("**Air Pollution Act**") and the Environment Protection Act, 1986 ("**Environment Act**", together with the Water Pollution Act and the Air Pollution Act, the "**Environment Protection Acts**"). The Water Pollution Act aims to prevent and control water pollution. This legislation provides for the constitution of a central pollution control board ("**Central Pollution Control Board**" or "**CPCB**") at the Central level and state pollution control boards ("**State Pollution Control Boards**" or "**SPCBs**", together with the Central Pollution Control Board, the

"**PCBs**") at the State levels. The functions of the CPCB includes, among other things, coordination of activities of the SPCBs, collecting data relating to water pollution and the measures devised for the prevention and control of water pollution and prescription of standards for streams or wells. The SPCBs are responsible for, among other things, the planning for programmes for prevention and control of pollution of streams and wells, collecting and disseminating information relating to water pollution and its prevention and control, inspection of sewage or trade effluents, works and plants for their treatment and to review the specifications and data relating to plants set up for treatment and purification of water, laying down or annulling the effluent standards for trade effluents and for the quality of the receiving waters, and laying down standards for treatment of trade effluents to be discharged. These authorities issue consent to establish and consent to operate which are to be required to be renewed periodically. These authorities also have the power of search, seizure and investigation if the authorities are aware of or suspect violation of such regulations. This legislation prohibits any person from establishing any industry, operation or process or any treatment and disposal system, which is likely to discharge trade effluent into a stream, well or sewer, or bring into use any new or altered outlet for discharge of sewage, or begin to make any new discharge of sewage without taking prior consent of the SPCBs.

In context of the environmental compliances and regulations, the National Green Tribunal Act, 2010 (the "**NGT Act**") is an important legislation which provides for the establishment of a National Green Tribunal ("**NGT**") for the effective and expeditious disposal of cases relating to environmental protection and conservation of forests and other natural resources including enforcement of any legal right relating to environment and giving relief and compensation for damages to persons and property and for matters connected therewith or incidental thereto. In accordance with the Forest (Conservation) Act, 1980 as amended by the Forest (Conservation) Amendment Act, 2023, state governments are not permitted to make any order directing the use of forest land for a non-forest purpose, or assignment of any forest land through lease or otherwise to any private person or corporation without the approval of the GoI. The Ministry of Environment, Forest and Climate Change ("**MoEF**") mandates the Environment Impact Assessment ("**EIA**") must be conducted for specified projects. In the process, the MoEF receives proposals or the setting up of projects and assesses their impact on the environment before granting clearances to the projects. The EIA Notification S.O. 1533, issued on September 14, 2006 (the "**EIA Notification**") and amended from time to time, under the provisions of the Environment Protection Act, prescribes that new construction of specified projects require prior environmental clearance from the MoEF. The environment clearance must be obtained from MoEF according to the procedure specified in the EIA Notification. No construction work or preparation of land by the project management except for securing the land, relating to the setting up of a specified project can be undertaken until such clearance is obtained. Under the EIA Notification, the environmental clearance process for new projects consists of four stages – screening, scoping, public consultation and appraisal. After completion of public consultation, the applicant is required to make appropriate changes in the draft 'EIA Report' and the 'Environment Management Plan.' The final EIA Report has to be submitted to the concerned regulatory authority for appraisal. The regulatory authority is required to give its decision within 105 days of the receipt of the final EIA Report. The EIA Guidance Manual for Highways, 2010 explains the four stages of the environmental clearance process and the contents of the EIA Report required to be submitted by highway projects.

Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 (as amended)

The Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016, impose an obligation and duty on the owners and operators of any facility or industry with a capability to create hazardous materials to safely dispose of such material in transport and other means of collecting and storing. Each occupier and operator of any facility generating hazardous waste is required to obtain an approval from the relevant state pollution control board for collecting, storing and treating the hazardous waste.

Green Highways (Plantation, Transplantation, Beautification and Maintenance) Policy, 2015

In September 2015, MoRTH has launched Green Highways (Plantation, Transplantation, Beautification and Maintenance) Policy, 2015, which will require road developers to earmark 1% of a project's total cost for planting of trees and shrubs along the national highways. Under this policy, the maintenance of such plantations will be outsourced through a bidding process to plantation agencies. MoRTH/NHAI will appoint the authorized agency for empanelment of such plantation agencies.

Public Liability Insurance Act, 1991

The Public Liability Insurance Act, 1991 (the "**Public Liability Act**"), imposes liability on the owner or controller of hazardous substances for any damage arising out of an accident involving such hazardous substances. A list of 'hazardous substances' covered by the legislation has been enumerated by the GoI by way of a notification. The

owner or handler is also required to take out an insurance policy insuring against liability under the legislation. The rules made under the Public Liability Act mandate that the employer has to contribute towards the Environment Relief Fund, a sum equal to the premium paid on the insurance policies. This amount is payable to the insurer.

Other applicable law

The Motor Vehicles Act, 1988

The development, maintenance and management as well as control of the National Highways are regulated by the NH Act and the NHAI Act. Under the Motor Vehicles Act, 1988, some powers have been delegated to the Transport Authority of the State Governments. Section 138 of the Motor Vehicles Act, 1988 further empowers the State Governments to make rules for the control of traffic, including for the purpose of the removal and the safe custody of vehicles including their loads which have broken down or which have been left standing or have been abandoned on roads; the installation and use of weighing devices; the maintenance and management of wayside amenities complexes; the exemption from all or any of the provisions of relating to fire brigade vehicles, ambulances and other special classes or descriptions of vehicle, subject to such conditions as may be prescribed; the maintenance and management of parking places and stands and the fee, if any, which may be charged for their use; prohibiting the taking hold of or mounting of a motor vehicle in motion; prohibiting the use of foot-paths or pavements by motor vehicles, generally, the prevention of danger, injury or annoyance to the public or any person, or of danger or injury to property or of obstruction to traffic. The Motor Vehicles (Amendment) Act, 2019 is targeted towards bringing changes in the transport sector to encourage safer driving practices among Indian motor vehicle drivers and imposing strict fines on the violators of traffic rules. The Act proposes to create a National Road Safety Board, which was notified by Ministry of Road Transport & Highways in 2021. The Board will advise the Central and State governments on all aspects of road safety and traffic management.

Indian Trusts Act, 1882

The Indian Trusts Act, 1882 ("**Trusts Act**"), as amended, governs all private trusts in India. The Trusts Act sets out the purpose for which private trusts can be established, the manner in which they may be created, executed and extinguished. The person creating a trust under the Trusts Act is the author of such trust, the person to whom the author grants the power and authority to regulate the trust is the trustee and the persons for whose benefit such trust has been created are the beneficiaries of such trust. The Trust Act sets out the rights, duties, liabilities and powers of the trustees and the beneficiaries *vis-a-vis* the trust. The Trust has been settled in accordance with the provisions of the Trusts Act.

Control of National Highways (Land and Traffic) Act, 2002

The Control of National Highways (Land and Traffic) Act, 2002 (the "**Control of NH Act**") provides for control of land within national highways, right of way and traffic moving on national highways and also for removal of unauthorised occupation thereon.

In accordance with the provisions of the Control of NH Act, the Central Government has established Highway Administrations. Under the Control of NH Act, all land that forms part of a highway which vests in the Central Government, or that which does not already vest in the Central Government but has been acquired for the purpose of highways shall be deemed to be the property of the Central Government. The Control of NH Act prohibits any person from occupying any highway land or discharging any material through on such land without the permission of the Highway Administration or any officer authorised by such administration. The Control of NH Act permits the grant of lease and license for use of highway land for temporary use.

Indian Tolls Act, 1851

In accordance with the Indian Tolls Act, 1851, as amended (the "**Tolls Act**"), the state governments have been vested with the power to levy tolls at such rates as they deem fit, to be levied upon any road or bridge, made or repaired at the expense of the Central or any state government. The tolls levied under the Tolls Act, are deemed to be 'public revenue' and the collection of tolls can be placed under any person the State governments' deem fit. Such persons are enjoined with the same responsibilities as if they were employed in the collection of land revenue. Further, all police officers are bound to assist the toll collectors when required in the implementation of the Tolls Act. The Tolls Act further gives power for recovery of toll and exempts certain category of people from payment of toll.

National Highways Fee (Determination of Rates and Collection) Rules, 2008

The National Highways Fee (Determination of Rates and Collection) Rules, 2008 (the "**NH Fee Rules**"), as amended, regulates the collection of fee for the use of national highways. In accordance with the NH Fee Rules, the GoI may, by a notification, levy fee for use of any section of a national highway, permanent bridge, bypass or tunnel forming part of a national highway, as the case may be. However, the GoI may, by notification, exempt any section of a national highway, permanent bridge, bypass or tunnel constructed through a public funded project from levy of such fee. The NH Fee Rules supersede the National Highways (Temporary Bridges) Rules, 1964, the National Highways (Collection of Fees by any Person for the Use of Section of National Highways/ Permanent Bridge/ Temporary Bridge on National Highways) Rules, 1997, the National Highways (Fees for the use of National Highways Section and Permanent Bridges Public Funded Project) Rules, 1997 and the National Highways (Rate of Fees) Rules, 1997 other than in respect of things done or omitted to be done under such rules prior to supersession. The NH Fee Rules do not apply to agreements and contracts executed or bids invited prior to the publication of such rules i.e. prior to December 5, 2008. The collection of fee in case of a public funded project shall commence within 45 days from the date of completion of the project. The NH Fee Rules further provide for the base rate of fee applicable for the use of a section of the national highway for different categories of vehicles and the fees collected by the executing authority shall be remitted to the GoI. However, the GoI may, by notification, allow any or all of the executing authorities to appropriate the whole, or part of such fees for purposes as may be specified.

FASTag lanes on fee plazas is an initiative of the GoI in which there is an exclusive lane in the fee plaza for movement of vehicles fitted with FASTag. The FASTag is a device which is fitted on the front windscreen of vehicles to indicate online toll payment. The amended NH Fee Rules impose a penalty equivalent to two times the fee applicable if a vehicle not fitted with FASTag enters the exclusive FASTag lane. However, in case a user is unable to pay, due to malfunctioning electronic toll collection infrastructure, the user will be permitted to pass the fee plaza without payment. GNSS-based tolling introduced distance-based charges using GNSS-OBU devices, with zero toll for trips up to 20 km and double toll for vehicles without GNSS in exclusive lanes. Beyond 20 km, toll is calculated based on actual distance travelled. The NH Fee rules were also amended to provide that the driver or owner of a mechanical vehicle which is loaded in excess of permissible load specified for its category, (i) shall be liable to pay fee at such rate which is applicable for the next higher category of mechanical vehicles, and (ii) Payment of such fee shall not entitle the driver or owner, to use the national highway until the excess load has been remove from such mechanical vehicle. However, in case no weighbridge has been installed at the toll plaza, no fee for overloading shall be levied.

The National Highways Rules, 1957 (the "NH Rules")

The NH Rules provide that in situations where the estimate cost of the execution of any original work on a national highway exceeds ₹ 5,000,000, a detailed estimated of the cost is to be forwarded to the GoI. An application for allotment of funds for meeting expenditure on an original work on a national highway must also be made to the GoI. The executing agency of the highway is required to furnish monthly progress reports and a completion report on the conclusion of the work. The NH Rules also give the consulting engineer of the GoI the right to inspect the work while it is in progress or after completion.

Provisions under the Constitution of India and other legislations in relation to collection of toll

Entry 59, List II of Schedule VII read with Article 246 of the Constitution of India vests state governments with the power to levy tolls. Further, in accordance with the Tolls Act, state governments have been vested with the power to levy tolls at such rates as they deem fit.

National Monetisation Pipeline (NMP)

NITI Aayog has developed the pipeline, in consultation with infrastructure line ministries, based on the mandate for 'Asset Monetisation' for roads and highways, amongst others, under Union Budget 2021-22. The framework for monetisation of core asset monetisation has three key imperatives: (i) monetization of 'rights' not 'ownership' i.e. assets will be handed back to the government at the end of transaction life; (ii) brownfield de-risked assets and stable revenue streams; and (iii) structured partnerships under defined contractual frameworks with strict performance standards. This shall include selection of de-risked and brownfield assets with stable revenue generation profile with the overall transaction structured around revenue rights. The primary ownership of the assets under these structures shall be with the government.

Foreign Investment Regulations

Foreign investment in Indian securities is governed by the provisions of the FEMA, read with the applicable

FEMA Rules, the FEMA (Mode of payment and Reporting of Non-Debt Instruments) Regulations, 2019 and the consolidated FDI Policy issued by the Department for Promotion of Industry and Internal Trade, Ministry of Commerce and Industry, Government. Foreign investment is permitted (except in the prohibited sectors) either through the automatic route or the approval route, depending upon the sector in which foreign investment is sought to be made. Under the FEMA Rules and the current consolidated FDI Policy, effective from October 15, 2020, an infrastructure investment trust registered and regulated by the SEBI under the InvIT Regulations, being an 'investment vehicle', is permitted to receive foreign investment from a person resident outside India (subject to Press Note 3 (2020 series)), including an FPI or an NRI subject to the terms and conditions specified in the FEMA Rules.

Downstream investment by an infrastructure investment trust shall be regarded as indirect foreign investment if neither the sponsor nor the investment manager of such an infrastructure investment trust is Indian 'owned and controlled' as defined in FEMA Rules.

Downstream investment by an 'investment vehicle' shall have to conform to the sectoral caps and conditions/restrictions, if any, as applicable to the company in which the downstream investment is made as per the FDI Policy. Foreign investment of up to 100% through the automatic route is permitted in the infrastructure sector in India. An infrastructure investment trust that receives foreign investment shall be required to make such report and in such format to the RBI or to the SEBI as may be prescribed by them from time to time.

The payment for the units of an infrastructure investment trust acquired by a person resident or registered/ incorporated outside India shall be made by an inward remittance from abroad through banking channels or by way of swap of shares of an SPV, or out of funds held in a Non-resident External ("**NRE**") or Foreign Currency Non-resident Bank ("**FCNR(B)"**) account maintained in accordance with the Foreign Exchange Management (Deposit) Regulations, 2016.

Further, any person who is a non-resident and holds units of an infrastructure investment trust in accordance with the FEMA Rules may pledge such units (i) in favour of a bank in India to secure the credit facilities being extended to the Indian company for bona fide purposes; (ii) in favour of an overseas bank to secure the credit facilities being extended to the person, or a person resident outside India who is the promoter of the Indian company or the overseas group company of the Indian company; (iii) in favour of a Non-Banking Financial Company registered with the RBI to secure credit facilities being extended to the Indian company for bona fide purposes; and (iv) subject to the authorized dealer bank satisfying itself of the compliance of the conditions stipulated by the RBI in this regard.

Provisions under the Constitution of India and other legislations in relation to collection of toll

Entry 59, List II of Schedule VII read with Article 246 of the Constitution of India vests state governments with the power to levy tolls. Further, in accordance with the Tolls Act, state governments have been vested with the power to levy tolls at such rates as they deem fit.

Labour laws and regulations

In order to rationalize and reform the existing labour laws in India, the Government of India has framed four labour codes, namely the (i) Occupational Safety, Health and Working Conditions Code, 2020, (ii) Industrial Relations Code, 2020, (iii) Code on Wages, 2019, and (iv) the Code on Social Security, 2020 (collectively the "**Labour Codes**"). The Labour Codes were notified by the Central Government on November 21, 2025, subsuming the existing labour laws.

*(i) **The Occupational Safety, Health and Working Conditions Code, 2020***

The Occupational Safety, Health and Working Conditions Code, 2020 ("**OSHWC Code**") subsumes certain existing legislations, including the Factories Act, 1948, the Contract Labour (Regulation and Abolition) Act, 1970, The Mines Act, 1952, and the Inter-State Migrant Workmen (Regulation of Employment and Conditions of Service) Act, 1979. This code provides for, among other things, standards for health, safety and working conditions for employees of establishments. The OSHWC Code broadly applies to an establishment where 10 or more workers are employed and include a place where any industry, trade, business, manufacturing or occupation is carried out, places undertaking motor transport, a newspaper establishment, an audio-video production, building and other construction work or plantations and applies to all establishments involving hazardous processes regardless of the threshold of workers. It also defines a "factory" to cover any premises which employees or had employed 20 or more workers on any day of the preceding twelve months, and in which a manufacturing process

is carried on with the aid of power or, 40 or more workers on any day of the preceding twelve months, and in which a manufacturing process is carried on without the aid of power. The OSHWC Code also ensures that contract labour falls under safety and welfare protections provided by the establishment, and introduces the concept of core activity, restricting the scope of outsourcing of an establishment's primary function while allowing contract labour for non-core services such as housekeeping or maintenance. It expands protection for inter-state migrant workers, covering those recruited directly or through contractors, and introduces entitlements such as journey allowances. The OSHWC Code also defines hazardous processes based on activities involving dangerous substances and mandates higher safety standards for such operations. The OSHWC Code also subsumes the Mines Act, 1952, consolidating all safety, health and welfare provisions relating to mining operations into a single unified framework, ensuring comprehensive coverage for mine workers.

Prior to the enactment of OSHWC Code, the Company was operating in accordance with the Mines Act, 1952, the Mine Rules, 1955 and Mine Rescue Rules, 1985. These rules shall remain in-effect till the time the Government of India and state governments enact further rules under the OSHWC Code.

(ii) ***The Industrial Relations Code, 2020***

The Industrial Relations Code, 2020 ("**IR Code**") subsumes three existing legislations, namely, the Industrial Disputes Act, 1947, the Trade Unions Act, 1926 and the Industrial Employment (Standing Orders) Act, 1946 and provides a unified framework governing trade unions, conditions of employment, layoffs, retrenchment, and dispute resolution mechanisms. The IR Code introduces certain uniform definitions such as 'worker' which has been expanded to include sales promotion employees, working journalists, and supervisory employees earning up to ₹18,000/- per month, thereby extending statutory labour protections to a wider segment of workers, 'employee' which includes managerial and supervisory personnel and employer which includes any person or authority with control over an establishment, including those employing through contractors. The IR Code establishes that an industrial establishment, employing 300 or more workers, shall require prior permission from the appropriate government authority, for lay-off, retrenchment, or closing down its industrial establishment, with flexibility for States to enhance this limit further. It also introduces fixed-term employment, granting such employees benefits similar to permanent workers including gratuity on a pro-rata basis.

(iii) ***The Code on Wages, 2019***

The Code on Wages, 2019 ("**COW**") subsumes four separate legislations, namely, the Payment of Wages Act, 1936, the Minimum Wages Act, 1948, the Payment of Bonus Act, 1965 and the Equal Remuneration Act, 1976. It provides a framework governing wage regulation, minimum wages, payment timelines, and bonus entitlements across sectors. The provisions related to wages apply to all employees in both organised as well as unorganised sectors, irrespective of wage threshold. The COW also introduces floor wages, which will be fixed by the Central Government on the basis of minimum living standards of an employee which will be revised at regular intervals. It also directs the State governments to ensure that the minimum wages in their respective regions are not lower than the prescribed floor wage.

(iv) ***The Code on Social Security, 2020***

The Code on Social Security, 2020 ("**CSS**") subsumes several separate legislations including the Employee's Compensation Act, 1923, the Employees' State Insurance Act, 1948, the Employees' Provident Funds and Miscellaneous Provisions Act, 1952, the Employment Exchanges (Compulsory Notification of Vacancies) Act, 1959, the Maternity Benefit Act, 1961, and the Payment of Gratuity Act, 1972. It provides a framework for social security of employees. CSS provides coverage of schemes such as employee provident fund, employee state insurance, maternity benefits, gratuity, employee compensation, and social-security funds to fixed-term employees, contract workers, inter-state migrant workers, and gig and platform workers through dedicated welfare funds. CSS also enables portability of benefits through Aadhaar-based registration and provides a framework for state and central governments to roll out social-security schemes for unorganised, gig, and platform workers.

Other Laws and Regulations

In addition to the above, compliance with the provisions of various tax-related legislations, intellectual-property related legislations, Shops and Establishment Act, Companies Act, 2013, Competition Act, 2002, Property Laws and other applicable laws for our day-to-day operations are also required.

REGULATORY APPROVALS

The Trust and the Project SPV are required to obtain consents, licenses, registrations, permissions and approvals for carrying out their present business activities which include, approvals for registration as an infrastructure investment trust and for carrying out its present business, as applicable. Other than as stated in this section, the Trust and the Project SPV have obtained necessary consents, licenses, permissions, registrations and approvals from various governmental, statutory and regulatory authorities, required for the registration as an infrastructure investment trust and for carrying out its present business, as applicable.

Unless otherwise stated, these approvals are all valid as on date of this Offer Document. For details in connection with the regulatory and legal framework within which we operate, please refer to the section entitled "Regulations and Policies" on page 234.

I. Material approvals in relation to the Issue

1. In-principle approval from the NSE dated February 13, 2026.
2. In-principle approval from the BSE dated February 13, 2026.
3. Resolution dated January 12, 2026 and February 20, 2026, passed by the IM Board in relation to the Issue and other incidental matters.

II. Material approvals in relation to the Trust

1. Certificate of registration bearing number IN/InvIT/25-26/0034 dated December 22, 2025, with SEBI as an infrastructure investment trust.
2. The permanent account number issued by the Income Tax Department, Government of India, under the Income-tax Act, 1961 is AAFTR8639H.
3. The tax deduction account number issued by the Income Tax Department under the Income-tax Act, 1961 is DELR54168C.
4. The goods and services tax registration certificate issued by the relevant authority having GST identification number 07AAFTR8639H1Z0.

III. Material approval in relation to the Project SPV

1. Certificate of incorporation dated November 21, 2025 issued by the Registrar of Companies with CIN U42101DL2025PTC459067.
2. The permanent account number issued by the Income Tax Department, Government of India, under the Income-tax Act, 1961 is AAPCR2760N.
3. The tax deduction account number issued by the Income Tax Department under the Income-tax Act, 1961 is DELR53937C.
4. The goods and services tax registration certificate issued by the relevant authority having GST identification number 07AAPCR2760N1ZQ.

IV. Material Approvals received in respect of the InvIT Assets

Gorhar- Barwa Adda

(i) Completion certificates dated March 31, 2022 and April 21, 2022.
(ii) Provisional completion certificates dated October 5, 2010 (taking over certificate), October 9, 2021 and October 16, 2021.

Chilakaluripet - Vijayawada

(i) Completion certificates dated June 30, 2025 and May 03, 2016.
(ii) Provisional completion certificate dated July 20, 2015 and October 29, 2024.

Chennai- Tada

(i) Provisional completion certificate dated February 9, 2022.

Chennai Bypass (Tamil Nadu)

(i) Toll fee notification with effect from May 14, 2013

Neelmangla Tumkur

(i) Provisional completion certificate dated November 1, 2011

V. Material approvals applied for but not yet received

As on the date of this Offer Document, except as stated below, there are no material approvals required to be obtained by the Trust and the Project SPV, for which applications have been made but approvals have not been received:

(i) Application dated December 31, 2025, bearing trademark application number 7433079, for registration of the trademark *"RAAJMARG InvIT an InvIT sponsored by NHAI"* along with the logo of the Trust, under class 36 of the Trade Marks Act, 1999, with the Registrar of Trade Marks at Delhi.

VI. Material approvals for which applications are yet to be made

As on the date of this Offer Document, there are no material approvals required to be obtained by Trust and the Project SPV, for which applications are yet to be made.

MATERIAL LITIGATION AND REGULATORY ACTION

Except as stated in this section, there are no outstanding material litigations and actions by regulatory authorities involving the Project SPV or the InvIT Assets as on the date of this Offer Document. Further, except as stated in this section, there are no outstanding material litigations and actions by regulatory authorities against the Trust, the Investment Manager, the Project Manager, the Sponsor/Sponsor Group or their respective associates and the Trustee as on the date of this Offer Document.

For the purpose of this section, details of all outstanding regulatory actions and criminal matters: (i) involving the Project SPV or the InvIT Assets, or (ii) against the Trust, the Investment Manager, the Project Manager, the Sponsor/Sponsor Group or their respective associates or the Trustee have been disclosed.

Further, any outstanding civil matter involving an amount equivalent to or more than the amount as disclosed below: (i) involving the Project SPV or the InvIT Assets, or (ii) against the Trust, the Investment Manager, the Project Manager, the Sponsor/Sponsor Group or their respective associates have been disclosed. Further, in relation to the Trustee, all the outstanding civil matters against the Trustee have been disclosed.

In respect of the Sponsor/Sponsor Group and its associates (including the common associates of the Trust, the Investment Manager or the Project Manager), all outstanding civil matters against the Sponsor/Sponsor Group and its associates (including the common associates of the Trust, the Investment Manager or the Project Manager) which involve an amount exceeding ₹5,000.00 million, have been considered material. Further, all outstanding civil matters against the Sponsor/Sponsor Group and its associates (including the common associates of the Trust, the Investment Manager or the Project Manager), where the amount is not ascertainable but considered material, have been disclosed.

In respect of the Trust, Investment Manager, the Project Manager or their respective associates, all outstanding civil matters against the Trust, Investment Manager, the Project Manager or their respective associates, which involve an amount exceeding ₹1.00 million, have been considered material. Further, all outstanding civil matters against the Trust, Investment Manager, the Project Manager or their respective associates where the amount is not ascertainable, but considered material, have been disclosed.

In respect of the Project SPV and the InvIT Assets, all outstanding civil matters involving the Project SPV or the InvIT Assets which involve an amount exceeding ₹1.00 million, have been considered material. Further, all outstanding civil matters involving the Project SPV or the InvIT Assets where the amount is not ascertainable, but considered material, have been disclosed.

Further, in cases where the outcome of one matter impacts one or more other matters, which individually are below the amounts mentioned above, but collectively above, such cases have also been disclosed.

It is clarified that notices received by: (i) the Project SPV, the InvIT Assets, (ii) the Trust, the Investment Manager, the Project Manager, the Sponsor/Sponsor Group or their respective associates, or (iii) the Trustee from third parties (excluding notices from regulatory or tax authorities or notices threatening criminal action) shall not be evaluated for materiality until they have been impleaded as defendants in proceedings before any judicial forum.

Further, taxation proceedings against (i) the Project SPV, the InvIT Assets, (ii) the Trust, the Investment Manager, the Project Manager, the Sponsor/Sponsor Group or their respective associates, or (iii) the Trustee have been disclosed in a consolidated manner.

I. Litigation involving the InvIT Assets

Chennai Bypass

1. NHAI, in its capacity as the concessioning authority, has filed a petition dated August 24, 2012 before the High Court of Delhi (challenging the award of the arbitral tribunal passed on March 21, 2012) against Hindustan Construction Company in relation to the contract agreement dated February 26, 2005 for construction of Chennai Bypass Phase-II connecting NH-4 & NH-5 and widening of Chennai Bypass Phase-I connecting NH-45 & NH-4 in the State of Tamil Nadu. The claims challenged are determination of additional costs incurred for piling works due to change in the sequence of piling, and reimbursement of additional costs incurred on account of change in norms for bonus payment to workers and introduction/increase of service tax due to subsequent legislation. The amount challenged before the High Court of Delhi is ₹217.30 million. The matter is currently

pending.

2. NHAI, in its capacity as the concessioning authority has filed a petition dated April 27, 2022 before the High Court of Delhi (challenging the award of the arbitral tribunal passed on June 05, 2013) against Hindustan Construction Company in relation to the contract agreement dated February 26, 2005 for construction of Chennai Bypass Phase-II connecting NH-4 & NH-5 and widening of Chennai Bypass Phase-I connecting NH-45 & NH-4 in the State of Tamil Nadu. The claims challenged include determination of rates for a new item of 40 mm thick bituminous concrete (treated as variation) and reimbursement of additional costs incurred during the extended contract period due to delays not attributable to the contractor, covering overheads, equipment charges, labour costs, financing charges, loss of profit, and uncovered escalation on materials and fuel. The amount challenged before the High Court of Delhi is ₹1,505.34 million. The matter is currently pending.

3. NHAI, in its capacity as the concessioning authority has filed a petition dated November 13, 2024, before the High Court of Delhi (challenging the award of the arbitral tribunal passed on August 12, 2024) against MEP Chennai Bypass Toll Road Private Limited in relation to the concession agreement for operation and maintenance of Chennai Bypass (Km 0.00 to Km 32.600) on operate, maintain and transfer basis in the State of Tamil Nadu. The claims challenged relate to non-remittance of concession fee, non-completion of project facilities, non-compliance with maintenance obligations, interest amount, and costs. The amount challenged before the High Court of Delhi is ₹2,776.22 million. The matter is currently pending.

4. MEP Chennai Bypass Toll Road Private Limited has filed a petition dated January 1, 2025 before the High Court of Delhi (challenging the arbitral award passed on August 14, 2024) against NHAI in relation to the concession agreement for operation and maintenance of Chennai Bypass (Km 0.00 to Km 32.600) on operate, maintain and transfer basis in the State of Tamil Nadu. The claims relate to compensation for losses due to failure to notify correct user fee and exclusion of Maduravoyal Junction Structure in fee notification, losses due to toll evasion through illegal/unplanned entry and exit points, loss of future business, reimbursement of costs for maintaining collaterals in the form of bank guarantees, interest for pre-award and post-award periods, and costs incurred in the proceedings. The amount involved is ₹301.55 million. The matter is currently pending.

Gorhar-Barwa Adda

DBL Gorhar Khairatunda Highways Private Limited. has initiated arbitration proceedings against NHAI under Society for Affordable Redressal of Disputes ("**SAROD**") in relation to six-laning of Gorhar to Khairatunda section of NH-2 (Km 320.810 to Km 360.300) in the State of Jharkhand. The claims relate to compensation for delayed and withheld payments including milestone and change of scope works, reimbursement of expenses for extension of performance bank guarantee, compensation for additional costs due to change in law (royalty rates and fuel taxes), release of withheld annuity and O&M payments due to incorrect CPI index application, and interest on delayed payments. The amount involved is ₹ 1,558.21 million. The matter is currently pending.

Neelmangla-Tumkur

Mushtafa Khan, Jinesh Kumar Jain, K. Anjan Kumar, Doddahanumaiah, Sri Siddalingaswamigalu and 147 other landowners have initiated arbitration proceedings against NHAI in relation to Neelmangla to Tumkur section of NH – 48 (Km 30.00 to Km 75.00) in the state of Karnataka. NHAI had acquired land and fixed compensation as per the right to fair compensation and transparency in Land Acquisition and Rehabilitation and Resettlement Act, 2013. The claims in the arbitration proceedings relate to enhancement of compensation for the acquired land. The matters are currently pending.

II. Litigation against the Trust

There are no pending criminal, regulatory or other material litigations against the Trust as on the date of this Offer Document.

III. Litigation against the Project SPV

There are no pending criminal, regulatory or other material litigations against the Project SPV as on the date of this Offer Document.

IV. Litigations against the Investment Manager

There are no pending criminal, regulatory or other material litigations against the Investment Manager as on the date of this Offer Document.

V. Litigations against the Project Manager

There are no pending criminal, regulatory or other material litigations against the Project Manager as on the date of this Offer Document.

VI. Litigations against the Sponsor/Sponsor Group

Criminal matters

There are no pending criminal litigations against the Sponsor/Sponsor Group as on the date of this Offer Document.

Regulatory matters

1. An application was filed by Amresh Singh against Union of India and others including NHAI before the National Green Tribunal alleging the rampant dumping of soil by NHAI contractors directly in the river Chenab and Tawi without prior environmental clearance. After considering all the documents placed on record, while referring the report of monitoring committee, the Tribunal was not satisfied with the actions taken by NHAI, and accepted the recommendations of the monitoring committee and directed the Jammu and Kashmir Pollution Control Board to take appropriate actions in consultation with CPCB against the names mentioned in the report of the monitoring committee. The Bench also directed NHAI to take strict actions against the non- compliant contractors and sub-contractors at the HQ level. The matter is currently pending.

2. An application was filed before the National Green Tribunal Principal Bench, New Delhi regarding the Ghazipur Dump Site and the environmental problems that are caused due to the unsegregated, un-recycled large mountain of dump. The Sponsor was not a party to these proceedings till 2017 and East Delhi Municipal Corporation had been exploring the implementation of a project to undertake the removal and processing of the municipal solid waste dumped at the site. In view of the same, the East Delhi Municipal Corporation held discussions with the Sponsor for use of solid waste for construction of embankments in the expansion of NH-24 or other National Highway projects undertaken by the Sponsor. In view of our role, we were impleaded in the case in 2017. The matter is currently pending.

Material civil matters

The following material civil cases are initiated by contractors/concessionaires against the Sponsor in relation to various projects across India:

1. Madhucon Projects Limited (Barasat Krishnagar Expressway Limited) has initiated arbitration proceedings against the Sponsor in relation to Barasat-Krishnagar Section BOT (Annuity) in West Bengal. The claims have been filed for loss due to interest on debt, loss due to interest on equity infused into the project, losses due to idling/underutilisation of machinery and equipment, losses due to idling/underutilisation of manpower, losses due to miscellaneous expenditure incurred at site, compensation due to delay in handing over of site, losses due to price escalation on the works already executed, losses due to expenses incurred on the works executed, loss of overheads and profit and total termination payment. The claimant has raised a claim for ₹ 19,001.40 million. The Sponsor has also filed counter claims for ₹ 10,606.80 million. The matter is currently pending.

2. GVK Deoli Kota Expressway Private Limited has initiated arbitration proceedings against the Sponsor in relation to design, construction, development, finance, operation and maintenance of four laning of Deoli- Kota Section of NH-12 from km 165.000 to Junction of NH-76 on Kota Bypass (approx. length 83.04 km) in Rajasthan on BOT(Toll) project on DBFOT pattern under NHDP phase–II. The claims filed

by the claimant for claim on account of prolongation costs and extended stay at the site, loss suffered on account of additional overhead and loss of profit, loss of toll revenue, claim on account of increase in cost of the project due additional works done by the claimant owing to the change of scope, claim on account of additional expenses incurred by the claimant towards tunnel work, claim on account of excessive repair and prolonged maintenance duration of existing road, claim on account of the Sponsor in making the termination payment and claim on account of future loss to claimant. The claimant has raised a claim for ₹ 60,130.00 million. The Sponsor has also filed counter claims against the claimant for ₹ 7,495.00 million. The matter is currently pending.

3. Bareilly Highways Project Limited has initiated arbitration proceedings against the Sponsor in relation to four laning of Bareilly-Sitapur section of NH-24 from km 262.000 to km 413.200 (approx. 151.200km) in Uttar Pradesh under NHDP Phase-III of DBFOT basis on BOT basis. The claims filed by the claimant were in relation to claim for additional interest on debt beyond SPCD (i.e. between August 23, 2013 to January 31, 2019), interest for additional interest on debt beyond SPCD, claim for interest due on additional promoters contribution infused in the project, claim for interest due on delay release of grant, claim for expenses incurred by SPV company beyond SPCD, claim for interest for cost of land compensation, claim for net revenue loss from SPCD till January 31, 2019, interest for net revenue loss from SPCD till January 31, 2019, claim for interest on excess 50.00% independent engineering cost debit by the Sponsor, claim for reimbursement of GST on regular EPC invoices-change of law, claim for interest on claim of GST on change of scope & utility shifting, claim for direct expenses incurred by EPC contractor beyond SPCD, claim for plant and machinery rental/rehandling for extended period, claim for interest for plant and machinery/rental/rehandling for extended period, claim for price escalation during the extended period, claim for interest for price escalation during the extended period, claim for expenses incurred on change of scope/variation items, claim for interest for change of scope/variation items, claim for additional transportation cost due to ban in local mining at sites, claim for interest for additional transportation cost due to ban in local mining at sites. The claimant has raised a claim for ₹ 5,450.00 million. The Sponsor has also filed counter claims against the claimant for ₹ 12,594.30 million. The matter is currently pending.

4. Lucknow-Sitapur Expressways Limited has initiated arbitration proceedings against the Sponsor in relation to improvement, operation and maintenance including strengthening and widening of existing two-lane road to four lane dual carriageway from km 488.270 – km. 413.200 of NH -24 (Lucknow Sitapur Section) in Uttar Pradesh on BOT basis. The claims filed by the claimant for revenue loss, revenue loss due to delay in COD, revenue loss from start of toll collection, EPC escalation, EPC additional overhead, EPC overstay of plant and equipment, additional maintenance cost of EPC, loss of profit earning capacity, extra cost IDC, revenue loss due to overloading and claims for underpasses. The claimant has raised a claim for ₹ 7,470.00 million. The Sponsor has also filed counter claims against the claimant for ₹ 3,270.00 million. The matter is currently pending.

5. Tantia Raxaul Private Limited has initiated arbitration proceedings against the Sponsor in relation to two laning with paved shoulder of Pioprakothi to Raxaul Section of NH-28A from km 0.600 to km 62.064 in the state of Bihar. The claims filed by the claimant were in relation to claim for termination payment for default of respondent , claim for non-finalisation of location and correct notification for toll plaza (along with interest at the rate of 18%), claim for delay in handover for land/ right of way/ site (along with interest at the rate of 18%), claim for additional interest during construction on account of extended construction period, claim for increased distance/lead for stone aggregate, claim for inflation/ price escalation (along with interest at the rate of 18%), claim for additional cost of maintenance, claim for increased overheads of concessionaire (along with interest at the rate of 18%), claim for increased overheads of EPC contractor (along with interest at the rate of 18%), claim for idling/underutilisation of plant, machinery and equipment, and claim for loss of profits of EPC contractor. The claimant has raised a claim for ₹ 9,861.70 million. The Sponsor has also filed counter claims against the claimant for ₹ 2,873.60 million. The matter is currently pending.

6. Haridwar Highways Project Limited has initiated arbitration proceedings against the Sponsor in relation to the four laning of Muzaffarnagar-Haridwar Section from km 131.00 to km 211.000 of NH-28 in the state of UP and Uttarakhand under NHDP Phase-II as BOT (Toll) on DBFOT pattern. The claims filed by the claimant were in relation to financial expenses incurred by the claimant beyond the scheduled commercial operation date till February 2019, interest payable on compensation for delay in handing over of the land form from appointed date till February, 2019, interest due on delay towards release of grant from February 7, 2013, up to February, 2019, claim for reimbursement of GST on regular

bills/invoices of the claimant from July, 2016, claims for expenses incurred by the claimant on rentals of plants and machinery beyond SCOD, claims for expenses incurred by the claimant on rentals of plants and machinery beyond SCOD till February 2019, claim for expenses incurred by the claimant due to price escalation beyond the SCOD up to February 2019, additional transportation cost due to ban on mining at sites, claim for direct expenses incurred beyond SCOD up to February 2019, expenses incurred on existing road maintenance beyond SCOD and claim on account of amount recovered for Dehradun Highway Project Limited. The claimant has raised a claim for ₹ 32,692.10 million. The Sponsor has also filed counter claims against the claimant for ₹ 27,019.89 million. The matter is currently pending.

7. Madhucon (Madurai-Tuticorin Expressways Limited) has initiated arbitration proceedings against the Sponsor in relation to the "Design, Engineering, Finance, Construction, Operation and Maintenance of Madurai- Tuticorn Section from km 138.800 to km 264.50 of NH-45B Ref.1 in the State of Tamil Nadu under NHDP Phase IIIA". The claims relate to compensation payable due to prolongation of the project, refund of liquidated damages, change of scope of work, loss of business opportunity, loss on account of shortfall in revenue from the project and amount payable on account of price escalation during the extended period of construction. The claim raised by claimant amounts to ₹ 81,993.10 million. The Sponsor has also filed counter claims against the claimant for ₹ 2,902.60 million. The said matter is currently pending.

8. Ranchi Expressway Limited has initiated arbitration proceedings against the Sponsor in relation to the four laning of Ranchi- Rargaon-Jamshedpur Section from km 114.00 to km 277.500 of NH-33 in the State of Jharkhand on BOT(Annuity) basis under NHDP Phase-II. The claims filed by the claimant were in relation to payment towards value of work done, amount payable towards maintenance of existing road, refund of amount expended on interest during construction, compensation payable due to delay in handling over of land, extra expenditure due to escalation of cost of work done, loss incurred due to idling of machinery due to prolongation of project, loss of overheads due to prolongation of project, loss of overheads and profits on value of work done due to illegal termination and claim for amount of revenue loss (loss of annuity). The claimant has raised a claim for ₹ 89,402.50 million. The Sponsor has also filed counter claims against the claimant for ₹ 26,471.10 million. The matter is currently pending.

9. Millennium City Expressways Private Limited has initiated arbitration proceedings against the Sponsor in relation to the 8/6 lane highway from km.14.300 to km. 42.000 at Delhi-Gurgaon section of NH-8 on BOT basis. The claims filed by the claimant were in relation to the Loss of profit on account of closure of the km. 24 Toll Plaza (such amount calculated until June 24, 2021), Loss of profit on account of commissioning of the competing/alternate road facilities alternatively, extend Concession Period by a period of ninety four (94) months, Loss of profit suffered due to failure to provide requisite security at the Main Toll Plaza, thereby resulted in loss of toll revenue from the residents of nearby 31 villages, various works carried out by the claimant as change of scope, which were over and above the project agreements, payment for which remains pending despite the claimant having already completed such additional works, compensation/extension due to Demonetization, Compensation/extension due to Pandemic/Covid, On account of additional compliance with the Joint Action Plan that was over and above the Project Agreements. The claimant has raised a claim for ₹ 36,099.70 million. The Sponsor has also filed counter claims against the claimant for ₹ 10,200.00 million. The matter is currently pending.

10. AE Tollway Limited. has initiate arbitration proceedings against the Sponsor in relation to the 6-laning of Agra-Etawah Bypass Section of NH-2 from km. 199.660 to km, 323.525 under NHDP Phase-V in the State of UP on BOT (Toll) basis. The claims filed by the claimant were in relation to the Additional cost incurred towards Interest during Construction (IDC) for the delayed Period, Additional direct cost incurred during the delayed period, Fixed Overhead (FOH) payable to EPC Contractor, Escalation cost. The claimant has raised a claim for ₹ 13,179.80 million. The Sponsor has filed a counter claim of ₹ 11,875.10 million against the claimant. The matter is currently pending before the arbitral tribunal.

11. Pink City Expressway Private Limited has initiate arbitration proceedings against the Sponsor in relation to the 6 laning of Gurgaon-Kotputli-Jaipur Section of NH-8 from km 42.700 to km 273.00 (Length 225.60 km.) in the State of Haryana & Rajasthan to be executed as BOT (Toll) on DBFOT pattern under NHDP PH-V. (Ref-III). The claims filed by the claimant were in relation to the delay in handing over of ROW, idle of resources deployed in the way of man power, towards machineries, plant and equipment beyond the date of completion. The claimant has raised a claim for ₹ 66,320.00 million. The Sponsor has filed the counter claims of ₹ 149,310.00 million against the claimant. The matter is currently pending before

the arbitral tribunal.

12. KM Toll Road Private Limited has initiated arbitration proceedings against the Sponsor in relation to the Construction, operation and maintenance of National Highway No. 8A extension including section from km to km 71.40 (approximately 71.40 km) on the Gandhidham (Kandla) – Mundra Port section of National Highway No. 8A Extension in the state of Gujarat by Four-Laning and subsequent Six-Laning thereof on design, build, finance, operate and transfer ("DBFOT") basis. The claims filed by the claimant for declaration for valid termination of the concession agreement by the claimant, termination payment, refund to the claimant of sum wrongfully deducted purportedly towards non-compliance of punch list items, pay towards Change in Law etc. The claimant has raised a claim for ₹ 18,730.00 million. The Sponsor has filed the Counter- claims of ₹ 1,572.40 million against the claimant. The matter is currently pending before the arbitral tribunal.

13. Gorakhpur Infrastructure Co. Private Limited has initiated arbitration proceedings against the Sponsor in relation to Design construction Finance Operation and Maintenance of km.0.000 to km. 32.270 of Gorakhpur Bypass on NH-28 (existing km. 255.700 to km. 279.800) in Uttar Pradesh on BOT (Annuity) basis. The claimant has raised a claim for ₹ 12,373.00 million. The Sponsor is yet to file the counter claim against the claimant. The matter is currently pending before the arbitral tribunal.

14. Raebareilly Allahabad Highway Private Limited has initiated arbitration proceedings against the Sponsor in relation to Two Laning with Paved shoulder of Raebareli to Allahabad section of NH-24B from km 82.000 to km 188.600 in Uttar Pradesh through public private partnership on design, build, finance, operate and transfer on the toll basis under NHDP-IVA. The claimant has raised a claim for ₹ 6,842.40 million. The Sponsor has filed a counter claim of ₹ 315,340.00 million against the claimant. The matter is currently pending before the arbitral tribunal.

15. Solapur Tollways Private Limited has initiated arbitration proceedings against the four laning of Solapur-Mah/Knt border Section of NH-9 from km. 249+000 to km.348.800 in the State of Maharashtra is being executed on DBFOT basis. The claimant has raised a claim for ₹ 8,260.60 million. The Sponsor has filed the counter claim of ₹ 8,100.00 million against the claimant. The matter is currently pending before the arbitral tribunal.

16. Solapur Yedeshi Tollway Limited has initiated arbitration proceedings against the Four laning of Solapur- Yedeshi section of NH-21 from km.0.000 to km 100.000 (Design Length -98.717 km) in the state of Maharashtra to be executed for BOT (Toll) on DBFOT pattern under NHDP Phase IV. The claimant has raised a claim for ₹ 7,900.00 million. The Sponsor has filed the counter claim of ₹ 1,400.00 million against the claimant. The matter is currently pending before the arbitral tribunal.

17. Kishangarh Gulabpura Tollway Limited has initiated arbitration proceedings against the Six Lanning of Kishangarh to Gulabpura Section of NH 79A and NH 79 in the State of Rajasthan (Length 90.000 KM) on DBFOT. The claimant has raised a claim for ₹ 8,689.60 million. The Sponsor has filed the counter claim of ₹ 3,560.00 million against the claimant. The matter is currently pending before the arbitral tribunal.

18. Transstroy Dindigul-Theni-Kumli Tollways Private Limited has initiated arbitration proceedings against Two laning with paved shoulder of Dindigul-Theni Section from km 2.750 to km 73.400 of NH-45 (Extn.) and Theni- Kumli section of NH-220 from km 215.500 to km 273.600 in the State of Tamil Nadu under DBFOT Annuity basis. The claimant has raised a claim for ₹ 7,481.00 million. The Sponsor has filed the counter claim for ₹7,657.00 against the claimant. The matter is currently pending before the arbitral tribunal.

19. JR Toll Road Private Limited has initiated arbitration proceedings against the Sponsor in relation to the Design, Engeneering, Construction, Development, Finance, Operation and Maintainance of Jaipur to Reengus Section of NH-11 (KM 246.300 to km 298.075) in the state of Rajasthan under NHDP Phase-III on Design, Build, Finance, Operate and Transfer (DBFOT) Basis. The claims raised by the claimant amount to ₹ 8,440.00 million. The Sponsor has also filed counter claim for ₹ 8,210.00 million. The matter is currently pending.

20. Dilip Buildcon Limited. has initiated arbitration proceedings against the Sponsor in relation to the Six

Laning of Gorhar to Khairtunda Section of NH-2 from km. 320.810 to km. 360.300 section on HAM in the State of Jharkhand under NHDP phase V. The claims raised by the claimant amount to ₹ 155.00 million. The Sponsor has filed the counter claim of ₹ 9,795.20 against the claimant. The matter is currently pending before the arbitral tribunal.

21. Simplex Infrastructures Limited initiated arbitration proceedings against the Sponsor in relation to the rehabilitation and up-gradation to 4-laning of NH-31D from km 113+200 to km 154+854 (Pkg-2A) Falakata- Salsalabari Section in West Bengal on EPC basis. The claims raised by the claimant amount to ₹9,000.00 million. The Sponsor has filed the counter claim of ₹8,434.50 million. The matter is currently pending before the arbitral tribunal.

22. PNC Infratech Limited initiated arbitration proceedings against the Sponsor in relation to rehabilitation and upgradation of Barabanki - Jarwal road junction in Uttar Pradesh. The claims raised by the claimant amount to ₹1,627.00 million. The Sponsor has filed the counter claim of ₹ 5,244.00 million. The matter is currently pending before the arbitral tribunal.

23. Dilip Buildcon Limited- Mahagaon Yavatmal Highways Private Limited initiated arbitration proceedings against the Sponsor in relation to the four laning of Mahagaon to Yavatmal section of NH- 361 from km 320.580 to km 400.575 in the state of Maharashtra under the NHDP Phase IV on Hvbrid Annuity Mode. The claims raised by the claimant amount to ₹ 1,434.00 million. The Sponsor has filed the counter claim of ₹ 5,451.00 million. The matter is currently pending before the arbitral tribunal.

24. Shamlaji Expressway Private Limited initiated arbitration proceedings against the Sponsor in relation to the six laning of Shamlaji to Motachiloda from km 401.200 to 494.410 section of NH-8 in Gujarat under NHDP Phase-V (Package -VI) on HAM. The claims raised by the claimant amount to ₹ 11,863.40 million. The Sponsor has filed counter claim of ₹39,748.40 million. The matter is currently pending before the arbitral tribunal.

25. NK Toll Road Limited initiated arbitration proceedings against the Sponsor in relation to the design, construction, development, finance, operation and maintenance of km 258.645 (end of Namakkal Bypass) to km 292.6 (start of Karur Bypass) and improvement of operation, maintenance of km 248.625 (start of proposed flyover on Namakkal Bypass) to km 258.645 (end of Namakkal Bypass) on NH- 7 in the State of Tamil Nadu on BOT basis. The claims raised by the claimant amount to ₹ 5,521.40 million. The Sponsor has filed counter claim of ₹884.30 million. The matter is currently pending before the arbitral tribunal.

26. IL&LFS Engineering & Construction Company Limited has filed a petition before the High Court of Delhi against the sponsor in relation to Balance work of Patna-Gaya-Dobhi Section of NH-83 from km.83.000 to km.127.217 (Pkg-III) on EPC (Item Rate) in the State of Bihar executed under JICA ODA Loan Assistance. The claims raised by the claimant ₹ 6,000.00 million. The Sponsor has filed the counter claim of ₹ 22,780.00 million against the claimant. The matter is currently pending before the arbitral tribunal.

27. Appollo Enterprises, JLI and D S Construction Limited (JV) has filed a petition before the High Court of Delhi against the sponsor in relation to Improvement, Operation, Maintenance and Strengthening of existing 2- lane road and widening to 4-lane divided highway from km 239.000 to km 281.000 of NH-6 (Raipur- Aurung Section) in the state of Chhattisgarh on BOT basis. (Ref-1) ICA Case No.2145. The claims raised by the claimant ₹ 10,121.00 million. The Sponsor has filed the counter claim of ₹ 4,232.00 million against the claimant. The matter is currently pending before the arbitral tribunal.

28. Bilaspur Pathrapali Road Private Limited has filed a petition before the High Court of Delhi against the sponsor in relation to 4-lane with paved shoulder configuration of Bilaspur-Pathrapali (km. 0+000 to km. 53+300) section of NH-111 (New NH-130) in the State of Chhattisgarh under Bharatmala on Hybrid Annuity. The claims raised by the claimant ₹7,432.10 million. The Sponsor has not filed the counter claim yet. The matter is now reserved for pronouncement of order on the Application for amendment. No next date has been notified.

29. VK1 Expressway Private Limited has filed a petition before the High Court of Delhi against the sponsor in relation to Construction of Eight Lane Vadodara Kim Expressway from 355+000 km to 378+740 km

(Padra to Vadodara section of Vadodara Mumbai Expressway) in the State of Gujarat under NHDP Phase-VI on HAM mode (Phase - IA- Package-I). The claims raised by the claimant ₹ 7,425.40 million. The Sponsor has filed the counter claim of ₹ 7,911.00 million against the claimant. The matter is currently pending before the arbitral tribunal.

30. Panipat Jalandhar NH-1 Tollway Private Limited has filed a petition before the High Court of Delhi against the sponsor in relation to Six laning of Panipat-Jalandhar Section of NH-1 from km. 96.000 to km. 387.100 in the State of Haryana and Punjab on BOT (Toll) basis on DBFOT pattern under NHDP Phase-V 9 (Ref-II). The claims raised by the claimant ₹54,436.50 million. The Sponsor has filed the counter claim of ₹ 13,037.8 million against the claimant. The matter is currently pending before the arbitral tribunal.

31. West Haryana Highways Projects Private Limited (WHHPPL) has filed a petition before the High Court of Delhi against the sponsor in relation to 4/6 Laning of Delhi/Haryana Border to Rohtak section of NH-10 from km. 29.700 to km. 93.140 including Bahadurgarh and Rohtak bye-passes in the State of Haryana under NHDP Phase IIIA on Build, Operate and Transfer (BOT) basis (Ref-III). The claim raised by the claimant is ₹ 56,846.60 million and no counter claim yet. The matter is currently pending before the arbitral tribunal.

32. Srinagar Banihal Expressway Ltd has filed a petition before the High Court of Delhi against the sponsor in relation to Rehabilitation, Strengthening and Four laning of Srinagar to Banihal Section from km220.700 to km286.110 of NH-44 (old NH 1A) in the UT of Jammu and Kashmir on BOT (Annuity) Basis. The claims raised by the claimant ₹42,372.40 million. The Sponsor has filed the counter claim of ₹ 2,763.8 million. The matter is currently pending before the arbitral tribunal.

33. IRB Tumkur - Chitradurga Tollways Private Limited has filed a petition before the High Court of Delhi against the sponsor in relation to 6-laning of Tumkur-Chitradurga (excluding Tumkur & Chitradurga bypass) Section from km 75.00 to km 189.00 of NH-4 (Approx. 114.00 km) in the State of Karnataka to be executed as BOT (Toll) Project on DBFOT pattern under NHDP. The claims raised by the claimant ₹949.80 million. The Sponsor has filed the counter claim of ₹ 7,804.00 million against the claimant. The matter is currently reserved for award.

34. Hampi Expressways Private Limited has filed a petition before the High Court of Delhi against the sponsor in relation to Four Laning of Hospet - Chitradurga section of NH 13 (New NH-50) from km 299+000 to km 418 + 750 in the state of Karnataka under National Highways Development Project (NHDP) Phase III on DBFOT (Toll) basis. The claims raised by the claimant is of ₹8,776.00 million. The Sponsor has filed the counter claim of ₹ 2,254.30 million against the claimant. The matter is currently pending before the arbitral tribunal.

35. IRB West Coast Tollway Private Limited has filed a petition before the High Court of Delhi against the sponsor in relation to Four laning of Goa-Karnataka Border to Kundapur section of NH-66 (formerly NH-17) from km. 93.700 to km. 283.300 in the State of Karnataka to be executed as BOT Project on DBFOT Pattern under NHDP-IV. The claims raised by the claimant ₹ 31,080.00 million. The Sponsor has not filed the counter claim yet. The matter is currently pending before the arbitral tribunal.

36. Guruvayorr Infrastructure Private Limited has filed a petition before the High Court of Delhi against the sponsor in relation to Design, Construction, Development, Finance, Operation and Maintenance of (i) KM 270.000 (Trissur) to km 316.700 (Angamali) and (ii) Improvement, Operation and Maintenance of km 316.700 (Angamali) to km 342.000(Edapally) of NH-47 in the State of Kerala on BOT basis. The claims raised by the claimant ₹15,260.00 million. The Sponsor has filed the counter claim of ₹ 3,735.00 million against the claimant. The matter is currently pending before the arbitral tribunal.

37. Gwalior Jhansi Expressway Limited has filed a petition before the High Court of Delhi against the sponsor in relation to Design, Construction, Development, Finance, Operation and maintenance of the work of rehabilitation and upgradation of four lane from km. 16.00 to km. 96.127 on NH-75 in the state of U.P and M.P under North-South Corridor (NHDP Phase-II) on BOT (Annuity). The claims raised by the claimant ₹ 20,915.20 million. The Sponsor has filed the counter claim of ₹ 13,980.00 million against the claimant. The matter is currently pending before the arbitral tribunal.

38. Indore Dewas Tollways Limited has filed a petition before the High Court of Delhi against the sponsor

in relation to 6-laning of Indore-Dewas Section of Nh-3 from km 577.550 to km 610.000 and km 0.000 to km 12.600 (approx length 45.05km) in the State of Madhya Pradesh under NHDP Phase-V to be executed as BOT(Toll) project on DBFOT pattern. The claims raised by the claimant ₹10,709.60 million. The Sponsor has filed the counter claim of ₹ 535.3 million against the claimant. The matter is currently pending before the arbitral tribunal.

39. Biaora-Dewas Highway Private Limited has filed a petition before the High Court of Delhi against the sponsor in relation to 4-laning of Biaora - Dewas section from km 426.100 to km 566.450 of NH-3 (Package- III) in the State of Madhya Pradesh to be executed on BOT (Toll) on DBFOT pattern under NHDP Phase-IV. The claims raised by the claimant ₹7,487.30 million. The Sponsor has filed the counter claim of ₹ 23,520 million against the claimant. The matter is currently pending before the arbitral tribunal.

40. Supreme Panvel Indapur Tollway Pvt Ltd has filed a petition before the High Court of Delhi against the sponsor in relation to Four laning of Panvel-Indapur Section of NH-17 from km 0.00 to km 84.00 under NHDP Phase III on BOT Basis on design, build, finance, operate and transfer (DBFOT) pattern in the State of Maharashtra. The claims raised by the claimant ₹75,050.00 million. The Sponsor has filed the counter claim of ₹ 17,330.00 million against the claimant. The matter is currently pending before the arbitral tribunal.

41. Udaipur Tollway Limited has filed a petition before the High Court of Delhi against the sponsor in relation to Six Lanning of from KM. 287.400 to KM 401.200 Section of NH-8 in the States of Rajasthan and Gujarat on DBFOT (Toll)) IRB-ARBITRATION Ref NO.1. The claims raised by the claimant ₹ 9,060.00 million. The Sponsor has filed the counter claim of ₹ 2,150.00 million against the claimant. The matter is currently pending before the arbitral tribunal.

42. CG Tollways Limited has filed a petition before the High Court of Delhi against the sponsor in relation to Six Lanning of Kishangarh Udaipur Ahmedabad Section from KM 90.000(near Gulabpura) to KM 214.870 (end of Chittorgarh Bypass) of NH 79 in the State of Rajasthan on BOT(Toll) mode) IRB-arbitration Ref NO.2. The claims raised by the claimant ₹ 5,021.20 million. The Sponsor has filed the counter claim of ₹ 3,040 million against the claimant. The matter is currently pending before the arbitral tribunal.

43. Trichy Thanjavur Expressways Limited has filed a petition before the High Court of Delhi against the sponsor in relation to Design, engineering, finance construction, operation and maintenance of 4 laning of Thanjavur – Trichy section from km 80.000 to km.135.750 of NH -67 in the State of Tamil Nadu under NHDP- IIIA on BOT basis. The claims raised by the claimant ₹13,494.20 million. The Sponsor has filed the counter claim of ₹ 4,918.00 million against the claimant. The matter is currently pending before the arbitral tribunal.

44. TN (DK) Expressways Limited has filed a petition before the High Court of Delhi against the sponsor in relation to Design, Construction, Development, Finance, Operation and Maintenance of km.305.600 (End of Karur Bypass) to km 373.725 (Dindigul) and Improvement, Operation and Maintenance of km 292.600 (Start of Karur Bypass) to km 305.600 (End of Karur Bypass) on NH-7 in the State of Tamil Nadu under North- South Corridor (NHDP-Phase-II) on Build, Operate and Transfer (BOT) Basis (Contract Package No. NS 2/BOT/TN-4). The claims raised by the claimant ₹ 10,589.5 million. The Sponsor has filed the counter claim of ₹ 2,741.00 million against the claimant. The matter is currently pending before the arbitral tribunal.

45. HK Toll Road Private Limited has filed a petition before the High Court of Delhi against the sponsor in relation to Six laning of Hosur to Krishnagiri section of NH-44(Old NH-7) from km. 33/130 to km.93/000 in the state of Tamil Nadu under NHDP Phase V on BOT (toll) basis under DBFOT pattern. The claims raised by the claimant ₹11,980.90 million. The Sponsor has filed the counter claim of ₹6,428.30 million against the claimant. The matter is currently pending before the arbitral tribunal.

46. DS Toll Road Limited has filed a petition before the High Court of Delhi against the sponsor in relation to Design Construction, Development, Finance, Operation and Maintenance of km 373+726 (Start of Proposed Fly Over at Dindigul Bypass) to km 426+775 (Samayanallur) (Actual Chainage km 368+147 to km 421+196) of NH-7 (TN05) on BOT Mode in the state of TN. The claims raised by the claimant ₹ 6,360.80 million. The Sponsor has filed the counter claim of ₹ 6,402.00 million against the claimant. The matter is currently pending before the arbitral tribunal.

47. SU Toll Road Private Limited has filed a petition before the High Court of Delhi against the sponsor in relation to Design, Engineering, Finance, Construction Operation and Maintenance of Four laning of Salem to Ulundurpet section from km.0/313 to km. 136.670 of NH-68-Package no. NHDP /BOT-I/TN/06 on BOT basis. The claims raised by the claimant ₹ 8,412.00 million. The Sponsor has filed the counter claim of ₹ 2,004.00 million against the claimant. The matter is currently pending before the arbitral tribunal.

48. Oriental Structural Engineers Private Limited KMC Construction Limited (Jv) OSE KMC-JV has filed a petition before the High Court of Delhi against the sponsor in relation to Rehabilitation and upgradation of Barabanki - Jarwal road Junction section (km 0.000 to km 43.000) of NH-28C (new NH no. 972) in the State of Uttar Pradesh. The claims raised by the claimant is ₹2,305.20 million and the Sponsor has not filed the counter claim yet against the claimant. The matter is currently pending before the arbitral tribunal.

49. Appollo Enterprises, JLI and D S Construction Limited (JV) initiated arbitration proceedings against the sponsor in relation to Improvement, Operation & Maintenance, Rehabilitation and Strengthening of existing 2-lane road and widening to 4-lane divided carriageway from km. 239.000 km. to 281.000 of NH-6 (Raipur-Aurang Section) on Build, Operate and Transfer (BOT) basis (Ref-2) AC-2384 on EPC Basis. The claims raised by the claimant ₹ 9,090.00 million. The Sponsor has not filed the counter claim yet against the claimant. The matter is currently pending before the arbitral tribunal.

50. IRB Ahmedabad Vadodra Super Express initiated arbitration proceedings against the sponsor in relation to Construction of Eight Lane access-controlled Expressways from km. 154.000 to km. 190.500 of Vadodra Mumbai Expressways (gandeva to Jujuwa) in the State of Gujarat on HAM mode under Bharatmal Pariyojna (Phase IB-Package IX) on HAM Basis. The claims raised by the claimant ₹ 2,858.00 million. The Sponsor has filed the counter claim of ₹6,352.00 million against the claimant. The matter is currently pending before the arbitral tribunal.

51. Panipat Jalandhar NH-1 Tollway Private Limited initiated arbitration proceedings against the sponsor in relation to Six laning of Panipat-Jalandhar Section of NH-1 from km. 96.000 to km. 387.100 in the State of Haryana and Punjab on BOT (Toll) basis on DBFOT pattern under NHDP Phase-V 9 (Ref-III) on BOT basis. The claims raised by the claimant ₹ 29,320.00 million. The Sponsor has filed the counter claim of ₹15,850.00 million against the claimant. The matter is currently pending before the arbitral tribunal.

52. Rohtak-Hisar Tollway Private Limited initiated arbitration proceedings against the sponsor in relation to Four Laning of Rohtak to Hisar section of NH-10 (from km. 87+000 to km. 170+000) including connecting link from km. 87+000 (NH-10) to km 348+000 (NH-71) to be executed as BOT (Toll) Project on DBFOT Pattern under NHDP Phase III in the State of Haryana on BOT basis. The claims raised by the claimant ₹19,290.00 million. The Sponsor has filed the counter claim of ₹3,666.00 million against the claimant. The matter is currently pending before the arbitral tribunal.

53. West HaryanaHighways Projects Private Limited (WHHPPL) has filed a petition before the High Court of Delhi against the sponsor in relation to 4/6 Laning of Delhi/Haryana Border to Rohtak section of NH-10 from km. 29.700 to km. 93.140 including Bahadurgarh and Rohtak bye-passes in the State of Haryana under NHDP Phase IIIA on Build, Operate and Transfer (BOT) basis (Ref-II). The claims raised by the claimant ₹9,640.00 million. The Sponsor has not filed the counter claim yet against the claimant. The matter is currently pending before the arbitral tribunal.

54. Viva Highways Limited initiated arbitration proceedings against the sponsor in relation to "Reconstruction, Strengthening, Widening and Rehabilitation of a section on State Highway-27 connecting Indore Sanawad Khandwa Burhanpur from km 0.00 to km 203.00 Edlabad Road (2001 to 2015) on SH-27 Indore – Edlabad stretch on design build, finance operate and transfer basis"on BOT Basis. The claims raised by the claimant ₹9,636.10 million. The Sponsor has not filed the counter claim yet against the claimant. The matter is currently pending before the arbitral tribunal.

55. PS Toll Road Private Limited initiated arbitration proceedings against the sponsor in relation to "Six laning of Pune-satara section of NH-4 from km.725.00 to km 865.35 (Length-km 140.35) in the state of Maharashtra to executed as BOT (TOLL) on DBFOT pattern under NHDP Phase-V on BOT Basis. The

claims raised by the claimant ₹25,810.00 million. The Sponsor has filed the counter claim of ₹29,720.00 million against the claimant. The matter is currently pending before the arbitral tribunal.

56. Dilip Buildcon Limited initiated arbitration proceedings against the sponsor in relation to Four Lanes with paved shoulders of End of Sangrur Bypass to Tapa Section of NH-64(New NH No. 7) from Existing km 116.170 to km 138.030 and Existing km 142.950 to km168.000 in the State of Punjab on EPC Mode. The claims raised by the claimant ₹625.50 million. The Sponsor has filed the counter claim of ₹29,720.00 million against the claimant. The matter is currently pending before the arbitral tribunal.

57. Ceigall India Limited—Krishna Constructions (JV) initiated arbitration proceedings against the sponsor in relation to Construction of four lane Greenfield Amritsar conncectivity for Connection of Amritsar with Delhi- Amritsar-Katra Expressway from MDR Junction at ch. 40+900 Dhunda Village to Junction with NH3 and Taran Bypass near Mannawalla village chainage 70+950(km 40+ 900 to km 70+950 of Amritsar Connectivity) on EPC mode under Bharatmala Pariyojna in the State of Punjab on EPC Mode. The claims raised by the claimant ₹2,115.40 million. The Sponsor has not filed the counter claim yet against the claimant. The matter is currently pending before the arbitral tribunal.

58. Roadway Solutions India Infra Limited (RSIIL) initiated arbitration proceedings against the sponsor in relation to Strengthening/ overlaying on Six lane Gurgaon- Kotputli Jaipur section of NH-48 (Old NH-8) from km.107.100 to 273.000 in the state of Rajasthan at the Risk & Cost of Concessionaire on item rate (Percentage) Basis. The claims raised by the claimant is ₹4,280.00 million. The Sponsor has filed the counter claim of ₹5,188.50 million against the claimant. The matter is currently pending before the arbitral tribunal.

59. IRCON PB Tollway Limited initiated arbitration proceedings against the sponsor in relation to Widening & strengthening of existing Bikaner – Phalodi section to four lanes from km 4.200 to km 55.250 and two lanes with paved shoulder from km 55.250 to km 163.500 of NH-15 on BOT (Toll) basis in the state of Rajasthan, (Ref-II). The claims raised by the claimant is ₹ 13,837.60 million. The Sponsor has filed the counter claim of ₹ 4249.40 million against the claimant. The matter is currently pending before the arbitral tribunal.

60. Madurai Tuticorin Expressway Limited initiated arbitration proceedings against the sponsor in relation to Madurai- Tuticorin Section NH-38 (Old NH-45B) From km138.800 to km.264.500 (Madurai Tuticorin Section BOT (Toll) (Ref-2) on BOT basis. The claims raised by the claimant is ₹42,320.00 million. The Sponsor has filed the counter claim of ₹11,810.00 million against the claimant. The matter is currently pending before the arbitral tribunal.

61. Bareilly Highways Project Limited has initiated arbitration proceedings against the Sponsor in relation to Four laning of Bareilly-Sitapur section of NH-24 from km 262.000 to km 413.200 (approx. 151.200km) in the State of UP under NHDP Phase-III of DBFOT basis (Ref-1) on BOT basis. The claims filed by the claimant were in relation to claim for additional interest on debt beyond SPCD (i.e. between August 23, 2013 to January 31, 2019), interest for additional interest on debt beyond SPCD, claim for interest due on additional promoters contribution infused in the project, claim for interest due on delay release of grant, claim for expenses incurred by SPV company beyond SPCD, claim for interest for cost of land compensation, claim for net revenue loss from SPCD till January 31, 2019, interest for net revenue loss from SPCD till January 31, 2019, claim for interest on excess 50% independent engineering cost debit by the Sponsor, claim for reimbursement of GST on regular EPC invoices-change of law, claim for interest on claim of GST on change of scope & utility shifting, claim for direct expenses incurred by EPC contractor beyond SPCD, claim for plant and machinery rental/rehandling for extended period, claim for interest for plant and machinery/rental/rehandling for extended period, claim for price escalation during the extended period, claim for interest for price escalation during the extended period, claim for expenses incurred on change of scope/variation items, claim for interest for change of scope/variation items, claim for additional transportation cost due to ban in local mining at sites, claim for interest for additional transportation cost due to ban in local mining at sites. The claimant has raised a claim for ₹ 31,767.60 million. The Sponsor has also filed counter claims against the claimant for ₹ 17,049.90 million. The matter is currently pending.

Other material litigation

Considering the business and purpose of the Sponsor, it is imperative for the Sponsor to have an effective

mechanism for the acquisition of land for building roads. Taking this need of the Sponsor into account, the parliament has enacted the NH Act, a special enactment which overrides the Land Acquisition Act, 1894 in cases where the land is acquired for the purposes of building National Highways. The Parliament has enacted the Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013, which is applicable to land acquisitions under NH Act with effect from January 1, 2015 (i.e. one year from the date of commencement of the Act, subject to notification by Central Government). The process of acquiring land is a very cumbersome process and it leads to a large number of disputes. At present there are approximately 72,000 land acquisition cases pending before various Courts/Tribunals/Competent Authorities for adjudication.

VII. Litigations against the associates of the Sponsor/Sponsor Group, Investment Manager, Project Manager or the Trust

There are no pending criminal, regulatory or other material litigations against the associates of (i) the Sponsor/Sponsor Group, (ii) the Investment Manager, (iii) the Project Manager or (iv) the Trust as on the date of this Offer Document.

VIII. Litigations against the Trustee

As per the details provided by the Trustee, the Trustee, in its capacity as trustee for its clients, has been party to the following show cause notices, advisory letters, administrative warnings, adjudication orders, and other such letter from the Securities Exchange Board of India and the Securities Appellate Tribunal:

1. SBI Cap Trustee (the "Plaintiff") had filed a suit before the City Civil Court, Bangalore against the Trustee and others (the "Defendants") requiring sale of pledged shares for a particular price by SREI Fund/Investors, for whom the Trustee was acting as the share pledge trustee. India Competitive Global Fund ("ICGC") acting through the SREI Investment Manager had a first and exclusive charge over the pledged shares. At the instructions of the ICGC and SREI Investment Manager, the Trustee had transferred the pledged shares to their demat account as they has first and exclusive right over the shares. The Trustee as the share pledge trustee has acted on the instructions of the Lenders/Investors. ICGC/SREI sold the shares and appropriated the amounts towards their dues and transferred the surplus amount to the Plaintiff. The Trustee has filed its written statement on August 12, 2022 and application for deletion of its name from array of the parties. The matter is currently pending.

2. The Competition Commission of India vide its order dated the March 14, 2024 rejected the application dated March 21, 2023 and held that director general may continue its investigation for alleged cartelization. Additional Director General, CCI vide his letter dated the March 15 2024 addressed to the Trustee, directed to provide the requisite information/documents as sought by CCI vide notice dated February 18, 2022 latest by March 26, 2024. We have submitted the required information on April 11, 2024 and April 15, 2024. The director general filed its report dated October 10, 2024. The matter is currently pending.

3. Authum Investments and Infrastructure Limited ("AIIL") has filed a petition against the R.K. Mohata Family Trust and others, at the Supreme Court of India. The Supreme Court of India vide their order dated the March 3, 2023 allowed the resolution plan filed by AIIL and directed AIIL to make the payments prior to March 31, 2023. AIIL has made the payment. Formal closure of the suit is awaited.

4. Certain investors have filed a suit ("**Suit**")seeking compensation and damages of USD 103, 699, 976 for the loss of their investments in Dynamic India Fund III against Dynamic India Fund III, International Financial Services, ICICI Venture Funds Management Company Limited, ICICI Bank and the Trustee. All the defendants including ICICI Venture Funds Management Company Limited have raised preliminary jurisdiction objections to the Suit. At the hearing held on 17th July,2025 we have opposed suit on the ground that the Trustee being a government company is an instrumentality of the State under Article 12 of the Constitution of India unlike the erstwhile trustee, Western India Trustee & Executors Co, the Trustee cannot become a party to these proceedings. The matter is currently pending.

5. Pawan Kapoor and Amri Resorts Private Limited, the debenture holders (together the "**Petitioners**") have filed a writ petition before Delhi High Court, inter alia against the Trustee alleging various non-compliances by the Trustee and for not initiating action against Karvy Data Management Services Limited for defaults in payment of interest and principal. The Trustee has filed a reply. The Delhi High Court had enquired from the counsel for SEBI as to what steps SEBI has taken in the present matter, to

which they apprised the Delhi High Court that on the receipt of the complaints from the Petitioners, SEBI has considered the same and since the matter pertains to unlisted NCDs issued on private placement basis, it has been forwarded to Ministry of Corporate Affairs for its necessary action. MCA has filed its status report. The matter is currently pending.

6. The suit is for declaration of deed of mortgage dated June 15, 2021 executed by defendant no. 2 to no.7 in favour of the Trustee as defendant no. 1 as void, illegal, invalid, non-est, not binding on the plaintiffs together with relief for permanent injunction from entering into the suit property, selling in auction and/or agreeing to sale in auction the suit property under the garb or colour whatsoever. The issuer company has mortgaged different property and disputed property has been released. The Trustee has filed an application for deletion of their name from array of the parties. The matter is currently pending.

7. In the case of Spenta Suncity Private Limited., Monivedda Consultant LLP, one of the stakeholder has filed a civil appeal and contempt petition against the Trustee and MD P.K. Malhotra for alleged violations of order dated December 16, 2022 passed by the Supreme Court of India. The order was to not make further allotment of debentures and create further liabilities on the assets. The Trustee has filed counter replies in both civil appeal and contempt petition before Supreme Court of India. The Trustee was directed to file affidavit/undertaking confirming that it is not carrying out any constructions nor it has authorised anyone to carry out constructions including Spenta Suncity Private Limited. The required affidavit/undertaking was filed in stipulated time. Spenta filed an injunction application for urgent listing. The Supreme Court of India allowed the injunction application and directed the matter to be listed. The matter is currently pending.

8. Credit Opportunities III PTE. Limited ("**Claimant**") has initiated arbitration proceedings against IIFL management Services Limited, IIFL Finance Limited, 360 One Investment Advisors and Trustee Services Limited and the Trustee under the arbitration rules of the Singapore Arbitration Centre ("SIAC"). IDBI Trusteeship Services Limited was appointed as the trustee on November 7, 2023. Under SIAC Rules one an arbitrator was appointed and arguments were held, wherein the arbitrator directed the parties to file written submissions (including submissions on costs) of not more than 25 pages by July 9, 2025. Further. the arbitrator asked parties to file additional written submissions on whether the correct approach would be to apply Singapore law (which is the seat of arbitration) or Indian law (which governs contribution agreement) in the context of the pre-conditions to the arbitration. The arbitrator has asked for filing of the additional submissions on the aforementioned issues by August 8, 2025 and the same has been filed. The arbitrator vide a jurisdiction award dated December 14, 2025 has held that the online dispute resolution mechanism is applicable and terminated the arbitration against respondent No. 1 (IIFL Management Services Limited.); and held that the law governing the arbitration agreement and contribution agreement is Indian Law with the seat of arbitration at Singapore and has directed respondent nos. 2, 3, 5, 6 and 8 to jointly and severally pay costs of USD 86,550.83 to the Claimant. The matter is currently pending.

9. Francis Cassian Mendis has filed a suit against Heida Aloysious Gomes and nine others including the Trustee, challenging the conveyance deed dated May 18, 1981 including all other conveyances executed thereafter and mortgage dated September 9, 2021 created in favour of the Trustee by Spenta Suncity Private Limited, and the permanent order and injunction restraining the defendants from carrying out any constructions/development activity on the suit property i.e., land bearing CTS No.336, Survey No.23, Hissa No.13/7 admeasuring 1622.8 sq. mtrs., village Mogra, Taluka Andheri, Mumbai. The matter is currently pending.

10. The Trustee has received a summons from the court of district and sessions judge, Rohini Commercial Court, North West Delhi on July 11, 2024 for the alleged unpaid amount of ₹ 8,035,732 towards construction contracts executed by them. The Trustee has filed an application for deletion of their name from array of the parties for filing with the court of district and sessions judge, Rohini Commercial Court, North West Delhi. The matter is currently pending

11. Spanhaus Traders LLP ("**Plaintiff**") has filed a suit against Spenta Suncity Private Limited ("**Spenta**"), the Trustee and Rajat Jhunjhunwala, which pertains to a loan allegedly advanced by Spanhaus Traders LLP to JLS Realty Private Limited ("**JLS**"). The Plaintiff's contention is that the sale of the disputed land by JLS to Spenta was carried out fraudulently, illegally, and with the intent to defeat and frustrate the Plaintiff's claims. The Plaintiff has sought that the deed of conveyance dated September 8, 2021 executed by JLS in favour of Spenta, the indenture of mortgage dated September 9, 2021 by Spenta in

favour of the Trustee be declared is invalid, illegal, non-est, void and not binding on the Plaintiff and ordered to be cancelled same and JLS, Spenta and the Trustee jointly and severally be directed to make payment of sum of ₹ 1,181,680,355 as on April 23, 2021, along with interest. The matter is currently pending.

12. Pawan Kappor and others ("**Petitioners**") who were the debenture holders of Karvy Data Management Services Limited ("Karvy") have filed a criminal revision petition for reinstating the investigation in Karvy which was previously rejected at the Tis Hazari Court, New Delhi, alleging the following: (i) there has been breach of trust by the Trustee as a Debenture Trustee; (ii) alleged collusion between the Trustee and Karvy; (iii) the Trustee has not taken any action against Karvy after the default in payment of dues to debenture holders. The Trustee has filed its reply. The court directed Petitioner to file note of arguments with advance copy to the respondents. The matter is currently pending.

13. In the matter of Narayanamma versus Thammaiah and others, the Trustee has been impleaded as a proposed respondent in summons without suit papers being received, in relation to non-release of a property. The Trustee has filed an interlocutory application stating that the said property has been released. The matter is currently pending.

14. In the matter of Sulochana versus India Cement Limited and other before the Principal District Court, Ariyalur, Chennai, the Trustee has been impleaded as a respondent. The Trustee has written to the Registrar, District Court, Ariyalur, Chennai for suit papers. The matter is currently pending and the next date of hearing is January 9, 2026.

15. In the matter of Madhu Prasad versus Punniyama and others before Principal Subordinate Court, Krishnagiri, Tamil Nadu, the Trustee has been made a party to the suit which pertains to partition of properties, however, the Trustee has released the charge on the disputed properties and executed a release deed and has accordingly filed its reply in the matter. The matter is currently pending.

16. Gyanchand Mootha ("**Plaintiff**") has filed a suit against the Industrial Development Bank of India ("**IDBI**") and the Trustee for declaration and recovery of 1160 debentures having face value of ₹ 40,600 along with interest accrued thereon amounting to ₹ 38,512, with further interest at12.5% till realisation and for relief that the resolution dated March 31, 1998 be declared as void and illegal. The trial court vide order dated July 31, 2006, ("**Order**") has granted decree on the ground that the IDBI as a lender was responsible for payment to the Plaintiff, which is a mistake apparent on the face of the record when it has mixed role of IDBI as a "lender" and as "trustee". The role of IDBI as a lender is distinctive which could not have been mixed for the purposes of awarding decree against the defendant No.1 and therefore, the trial court committed a jurisdictional error. IDBI has filed a civil suit before High Court of Rajasthan at Jaipur for quashing/setting aside of the Order. The IDBI and the Trustee have filed an application for early listing and hearing of the case with the High Court of Rajasthan. The matter is currently pending.

17. Faisal Rashid ("**Plaintiff**") has filed a civil suit against Lokhandwala Kataria Constructions Private Limited ("**LKCPL**"), the Trustee and others (collectively the "**Defendants**"). before the Bombay High Court, seeking inter alia direction to the Defendants for cancellation/rectification of mortgages attempted to be created on Flat No. 7001 and Flat No.7101 ("**Flats**") by LKCPL in favour of the Trustee and defendant no. 3, respectively. It is submitted by the Plaintiff that the Flats have been sold by Defendant No. 1 to the him by the registered agreements of sale dated February 11, 2019 prior to the said attempted mortgages. Shapoorji Pallonji the sole debenture holder has taken up the matter with LKCPL for release of the flat from security and amendment to the documents. The matter is currently pending.

IX. Taxation Proceedings

The details of direct tax and indirect tax against the Trust, Project SPV, InvIT Assets, Investment Manager, Project Manager, Sponsor/Sponsor Group and the Trustee, as of the date of this Offer Document is as follows:

Sr. No.	Nature of Case	Number of cases	Amount involved (to the extent quantifiable) (in ₹ million)
Trust			
1.	Direct Tax	Nil	Not applicable
2.	Indirect Tax	Nil	Not applicable
Investment Manager			

Sr. No.	Nature of Case	Number of cases	Amount involved (to the extent quantifiable) (in ₹ million)
1.	Direct Tax	Nil	Not applicable
2.	Indirect Tax	Nil	Not applicable
Project Manager			
1.	Direct Tax	Nil	Not applicable
2.	Indirect Tax	Nil	Not applicable
Sponsor /Sponsor Group			
1.	Direct Tax	3	0.11
2.	Indirect Tax	7	55,213.71
Project SPV			
1.	Direct Tax	Nil	Not applicable
2.	Indirect Tax	Nil	Not applicable
InvIT Assets			
1.	Direct Tax	Nil	Not applicable
2.	Indirect Tax	Nil	Not applicable
Trustee			
1.	Direct Tax	2	2.35
2.	Indirect Tax	Nil	Not applicable
Associates			
1.	Direct Tax	13	1,095.03
2.	Indirect Tax	2	992.84

SECURITIES MARKET IN INDIA

The information in this section has been extracted from documents available on the website of SEBI and the Stock Exchanges and has not been prepared or independently verified by the Parties to the Trust or the Book Running Lead Managers or any of their respective affiliates or advisors. The information below is given for the benefit of investors in the Issue. Investors are advised to make their independent investigations and ensure that they are eligible to subscribe to, purchase or otherwise acquire the Units they Bid for under Indian laws or regulations.

The Indian Securities Market

India has a long history of organized securities trading. In 1875, the first stock exchange was established in Mumbai. The BSE and the NSE, together hold a dominant position among the stock exchanges in terms of the number of listed companies, market capitalisation and trading activity.

Stock Exchange Regulation

Indian stock exchanges are regulated primarily by SEBI, as well as by the Government acting through the Ministry of Finance, Capital Markets Division, under the Securities Contracts (Regulation) Act, 1956 ("**SCRA**") and the Securities Contracts (Regulation) Rules, 1957 ("**SCRR**"). SEBI, in exercise of its powers under the SCRA and the SEBI Act, notified the SCR (SECC) Regulations, which regulate *inter alia* the recognition, ownership and internal governance of stock exchanges and clearing corporations in India together with providing for minimum capitalisation requirements for stock exchanges. The SCRA, the SCRR and the SCR (SECC) Regulations along with various rules, bye-laws and regulations of the respective stock exchanges, regulate the recognition of stock exchanges, the qualifications for membership thereof and the manner, in which contracts are entered into, settled and enforced between members of the stock exchanges.

The SEBI Act empowers SEBI to regulate the Indian securities markets, including stock exchanges and intermediaries in the capital markets, promote and monitor self-regulatory organisations and prohibit fraudulent and unfair trade practices. Regulations concerning minimum disclosure requirements by public companies, rules and regulations concerning investor protection, insider trading, substantial acquisitions of shares and takeover of companies, buy-backs of securities, employee stock option schemes, stockbrokers, merchant bankers, underwriters, mutual funds, foreign portfolio investors, credit rating agencies and other capital market participants have been notified by the relevant regulatory authority.

Listing and Delisting of Units

The InvIT Regulations provide for listing and delisting of units of infrastructure investment trusts on the stock exchanges.

BSE

Established in 1875, it is the oldest stock exchange in India. In 1957, it became the first stock exchange in India to obtain permanent recognition from the Government under the SCRA. It has evolved over the years into its present status as one of the premier stock exchanges of India. The BSE provides a market for trading in equity. Currencies, debt instruments, derivatives and mutual funds. Pursuant to the BSE (Corporatization and Demutualization) Scheme 2005 of SEBI, with effect from August 19, 2005, BSE was incorporated as a company under the Companies Act, 1956. The equity shares of BSE were listed on NSE on February 3, 2017.

NSE

NSE was established by financial institutions and banks to provide nationwide online, satellite-linked, screen-based trading facilities with market-makers and electronic clearing and settlement for securities including government securities, debentures, public sector bonds and units. It has evolved over the years into its present status as one of the premier stock exchanges of India. NSE was recognised as a stock exchange under the SCRA in April 1993 and commenced operations in the wholesale debt market segment in June 1994. The capital market (equities) segment commenced operations in November 1994 and operations in the derivatives segment commenced in June 2000. Presently, the products on the exchange are organized into three assets classes for trading, namely (i) equity and equity-linked products such as stocks, IDRs, ETFs and units of closed ended mutual fund schemes, (ii) derivates and (iii) fixed income securities and debt products, including corporate bonds, sovereign gold bonds and other debt securities.

Internet-based Securities Trading and Services

Internet trading takes place through order routing systems, which route client orders to exchange trading systems for execution. Stockbrokers interested in providing this service are required to apply for permission to the relevant stock exchange and also have to comply with certain minimum conditions stipulated by SEBI. The NSE became the first exchange to grant approval to its members for providing internet-based trading services. Internet trading is possible on both the "equities" as well as the "derivatives" segments of the NSE.

Trading Hours

Trading on both NSE and BSE occurs from Monday to Friday, between 9:15 a.m. and 3:30 p.m. 1ST (excluding the 15 minutes pre-open session from 9:00 a.m. to 9:15 a.m. that has been introduced recently). BSE and NSE are closed on public holidays. The recognised stock exchanges have been permitted to set their own trading hours (in the cash and derivatives segments) subject to the condition that (i) the trading hours are between 9.00 a.m. and 5.00 p.m. and (ii) the stock exchange has in place a risk management system and infrastructure commensurate to the trading hours.

Trading Procedure

This totally automated screen based trading in securities was put into practice nationwide. This has enhanced transparency in dealings and has assisted considerably in smoothening settlement cycles and improving efficiency in back-office work. In the year 2004, BSE introduced its new generation trading platform, BOLT Plus.

NSE has introduced a fully automated trading system called National Exchange for Automated Trading ("**NEAT**"), which operates on strict time/price priority besides enabling efficient trade. NEAT has provided depth in the market by enabling large number of members all over India to trade simultaneously, narrowing the spreads.

Depositories

The Depositories Act provides a legal framework for the establishment of depositories to record ownership details and effect transfer in book-entry form. Further, SEBI framed regulations in relation to the registration of such depositories, the registration of participants as well as the rights and obligations of the depositories, participants, companies and beneficial owners. The depository system has significantly improved the operation of the Indian securities markets.

RIGHTS OF UNITHOLDERS

The rights and interests of Unitholders are included in this Offer Document and the InvIT Regulations. Under the Trust Deed and the Investment Management Agreement, these rights and interests are safeguarded by the Trustee and the Investment Manager, respectively. Any rights and interests of Unitholders as specified in this Offer Document would stand qualified by and deemed to be amended to the extent of any amendment to the InvIT Regulations.

Beneficial Interest

Each Unit represents an undivided beneficial interest in the Trust. The beneficial interest of each Unitholder shall be equal and limited to the proportion of the number of Units held by the Unitholder to the total number of Units. A Unitholder has no equitable or proprietary interest in the InvIT Assets and is not entitled to transfer of the InvIT Assets (or any part thereof) or any interest in the InvIT Assets (or any part thereof) of the Trust. A Unitholder's right is limited to the right to require due administration of the Trust in accordance with the provisions of the Trust Deed and the Investment Management Agreement.

Ranking

No Unitholder of the Trust shall enjoy superior voting or any other rights over another Unitholder. Further, the Units shall not have multiple classes, except for any subordinate Units that may be issued only to the Sponsor, where such subordinate units carry only inferior voting or any other rights compared to other Units in the future in accordance with Regulation 4(2)(h) and Chapter IV A of the InvIT Regulations.

Redressal of grievances

The Investment Manager shall ensure adequate and timely redressal of all Unitholders' grievances pertaining to the activities of the Trust, and the Trustee shall periodically review the status of Unitholders' complaints and their redressal undertaken by the Investment Manager. The Stakeholders' Relationship Committee of the Investment Manager shall monitor the status of complaints and their redressal, and maintain records of grievances and actions taken for the same. For details, please see the section entitled "*Corporate Governance*" on page 108.

Distribution

The Unitholders shall have the right to receive distributions in accordance with the InvIT Regulations, Distribution Policy, and in the manner provided in this Offer Document. For details, please see the section titled "*Distribution*" on page 226.

Nominee Directors

Unitholder(s), holding not less than 10% of the total outstanding Units, either individually or collectively, shall be entitled to nominate one director on the board of directors of the Investment Manager. In this regard, we shall undertake the relevant actions in due course in accordance with the SEBI InvIT Master Circular and the InvIT Regulations.

Meeting of Unitholders

Meetings of Unitholders will be conducted in accordance with the InvIT Regulations.

Passing of resolutions

1. With respect to any matter requiring approval of the Unitholders:

    (i). a resolution shall be considered as passed when the votes cast by Unitholders, so entitled and voting, in favour of the resolution exceed a certain percentage as specified in the InvIT Regulations, of total votes cast;

    (ii). the voting threshold specified under the InvIT Regulations shall be calculated on the basis of unit holders present and voting;

    (iii). the voting may be done by postal ballot or electronic mode;

(iv). a notice of not less than 21 (twenty one) days shall be provided to the Unitholders: Provided that a meeting of unit holders may be called after giving shorter notice than that specified in this clause if consent, in writing or by electronic mode, is accorded thereto: (a) in case of an annual meeting, by not less than ninety-five percent of the unit holders entitled to vote thereat; and (b) in case of any other meeting, by majority of the unitholders in number entitled to vote thereat and who represent not less than ninety-five percent of such part of the units by value as gives a right to vote at the meeting;

(v). voting by any person who is a related party in such transaction, as well as associates of such person(s) shall not be considered on the specific issue;

(vi). the Investment Manager shall be responsible for all the activities pertaining to conducting of meeting of the Unitholder, subject to oversight by the Trustee. However, for issues pertaining to the Investment Manager, including a change in Investment Manager, removal of Investment Manager or change in control of Investment Manager; the Trustee shall convene and handle all activities pertaining to conduct of the meetings. Additionally, for issues pertaining to the Trustee, including change in Trustee, the Trustee shall not be involved in any manner in the conduct of the meeting; and

(vii). for all unit holder meetings, the Investment Manager shall provide an option to the Unitholders to attend the meeting through video conferencing or other audio visual means and the option of remote electronic voting in the manner as may be specified by SEBI.

2. For the Trust:

(i). an annual meeting of all Unitholders shall be held not less than once a year within 120 days from the end of each financial year and the time between two meetings shall not exceed 15 months;

(ii). with respect to the annual meeting of Unitholders,

(a). any information that is required to be disclosed to the Unitholders and any issue that, in the ordinary course of business, may require approval of the Unitholders may be taken up in the meeting including:

- latest annual accounts and performance of the Trust;
- approval of auditors and fee of such auditors, as may be required;
- latest valuation reports;
- appointment of valuer, as may be required; and
- any other issue;

(b). for any issue taken up in such meetings which require approval from the Unitholders, votes cast in favour of the resolution shall be more than fifty per cent of the total votes cast for the resolution unless otherwise specified under the InvIT Regulations.

3. In case of the following, approval from the Unitholders shall be required where the votes cast in favour of the resolution shall be more than the fifty per cent of the total votes cast for the resolution:

(i). any approval from the Unitholders required in terms of Regulation 18 (*Investment conditions and dividend policy)*, Regulation 19 (*Related Party Transactions*) and Regulation 21 *(Valuation of assets*) of the InvIT Regulations;

(ii). any transaction, other than any borrowing, the value of which is equal to or greater than 25.00% (twenty five per cent) of the InvIT Assets;

(iii). any borrowings, in terms of the limits specified under Regulation 20(3)(a) of the InvIT Regulations;

(iv). any issue of units after initial public offer by an InvIT, in whatever form, other than any issue of units which may be considered by SEBI under Regulation 22(5);

(v). increasing period for compliance with investment conditions to one year in accordance with Regulation 18(5)(c) of the InvIT Regulations;

(vi). any issue, in the ordinary course of business, which in the opinion of the Sponsors or the Trustee or the Investment Manager, is material and requires approval of the Unitholders, if any; and

(vii). any issue for which SEBI or the stock exchanges requires approval;

4. In case of the following, approval from the Unitholders shall be required where the votes cast in favour of the resolution shall be at least sixty per cent of total votes cast for the resolution:

(i). any change in Investment Manager including removal of the Investment Manager or change in control of the Investment Manager;

(ii). any material change in investment strategy or any change in the management fees of the Trust;

(iii). the Trustee and Investment Manager proposing to seek delisting of units of the Trust under clause (e) of sub-regulation (1) of regulation 17 of the InvIT Regulations;

(iv). any issue, not in the ordinary course of business, which in the opinion of the Sponsor or Investment Manager or Trustee requires approval of the Unitholders;

(v). any issue for which SEBI or the designated stock exchanges require approval;

(vi). any issue taken up on request of the Unitholders including:

(a). removal of the Investment Manager and appointment of another investment manager to the Trust;

(b). removal of the Statutory Auditor and appointment of another auditor to the Trust;

(c). removal of the Valuer and appointment of another valuer to the Trust;

(d). any issue which the Unitholders have sufficient reason to believe that is detrimental to the interest of the Unitholders;

(e). change in the Trustee, if Unitholders have sufficient reason to believe that acts of the Trustee are detrimental to the interest of Unitholders;

(f). delisting of the Trust, if the Unitholders have sufficient reason to believe that such delisting would act in the interest of the Unitholders;

(g). introduction of unit based employee benefit scheme after an initial offer;

(h). unit based employee benefit scheme proposed at the time of initial offer;

(i). acquisition of units by the employee benefit trust as specified in regulation 17I(3) of the InvIT Regulations;

(j). issuance of units to the employee benefit trust as specified in regulation 17I(1)(a) of the InvIT Regulations;

(k). transfer of units to the employee benefit trust as specified in regulation 17I(1) (b) and 17I(1)(c) of the InvIT Regulations;

(l). a separate resolution that shall be required for grant of options to identified employees, during any one year, equal to or exceeding one per cent of the unit capital of the Trust at the time of grant of options; and

(m). variation of the terms of the unit based employee benefit scheme including repricing of the options

With respect to the rights of the Unitholders under clause 4(vi) above:

(i). not less than 25.00% of the Unitholders by value, other than any party related to the transactions and its associates, shall apply, in writing, to the Trustee for the purpose;

(ii). on receipt of such application, the Trustee shall require, with the Investment Manager to place the issue for voting in the manner as specified in the InvIT Regulations;

(iii). with respect to clause 4(iv)(e) above, not less than 60% of the Unitholders by value shall apply, in writing, to the Trustee for the purpose.

5. In case of the following, approval from 75.00% of Unitholders by value excluding the value of units held by parties related to the transaction shall be:

(i) In case of any borrowing by the Trust in terms of limit specified in clause (b) of sub-regulation 3 of Regulation 20 of the InvIT Regulations;

(ii) In case that any person other than the Sponsor, its related parties and its associates, acquires Units of the Trust, which taken together with Units held by such person and by persons acting in concert with such persons in the Trust, exceeds 25.00% of the value of the outstanding Units of the Trust (value of Units held by parties related to the transaction shall not be considered for this specific purpose);

Provided that if the required approval is not received, the person acquiring the Units shall provide an exit option to the dissenting Unitholders to the extent and in the manner as may be specified by SEBI;

(iii) Prior to any change in Sponsor or inducted sponsor or change in control of Sponsor or inducted sponsor or conversion to Self-Sponsored Investment Manager (value of Units held by parties related to the transaction shall not be considered for this specific purpose).

If the required approval is not received:

a. in case of change in Sponsor or inducted sponsor, the proposed inducted sponsor shall provide the dissenting Unitholders an option to exit by buying their units in the manner specified by SEBI;

b. in case of change in control of the Sponsor or inducted sponsor, the said Sponsor or inducted sponsor shall provide the dissenting Unitholders an option to exit by buying their Units in the manner specified by SEBI; and

c. in case of conversion to Self-Sponsored Investment Manager, the Investment Manager shall provide the dissenting unit holders an option to exit by buying their units in the manner specified by the Board

Information rights

The Investment Manager, on behalf of the Trust, shall also submit such information to Stock Exchange and the Unitholders, on a periodical basis as may be required under the InvIT Regulations and the Listing Agreement to be entered into with Stock Exchange. The Investment Manager (on behalf of the Trust) shall disclose to Stock Exchange, the Unitholders and SEBI, all such information and in such manner as specified under the InvIT Regulations and such other requirements as may be specified by SEBI. The Investment Manager, on behalf of the Trust, shall also provide disclosures or reports specific to the sector or sub-sector in which the Trust has invested or proposes to invest, in the manner as may be specified by SEBI.

Nomination rights

Unitholder(s), holding not less than 10% of the total outstanding Units, either individually or collectively, shall be entitled to nominate one director on the board of directors of the Investment Manager in accordance with the InvIT Regulations and Trust Deed, and in the manner specified by SEBI.

Buyback of Units

Any buyback of Units shall be in accordance with the Trust Deed and the InvIT Regulations.

De-listing of Units

Any delisting of Units shall be in accordance with the Trust Deed and the InvIT Regulations.

ISSUE STRUCTURE

Initial public offer of up to [●] Units by the Trust for cash at price of ₹ [●] per Unit aggregating up to ₹ 60,000.00 million. This Issue is being made through the Book Building Process. This Issue shall constitute at least 10% of the total outstanding Units on a post-Issue basis.

Particulars	Strategic Investors	Institutional Investors[(1)]	Non-Institutional Investors
Number of Units available for Allotment/Allocation [(2)]	Not more than 126,000,000 Units	Not more than [●] Units	Not less than [●] Units
Percentage of Issue Size available for Allotment/Allocation	Not less than 5.00% of the Net Issue and not more than 25.00% of the Net Issue, either jointly or severally	Not more than 75.00% of the Net Issue (excluding the Strategic Investor Portion)[(1)]	Not less than 25.00% of the Net Issue (excluding the Strategic Investor Portion)
Basis of Allotment/ Allocation if respective category is oversubscribed	Discretionary	Proportionate[(1)]	Proportionate
Minimum Bid	Such number of Units (in multiples of [●] Units) not less than 5.00% of the Net Issue	Such number of Units that the Bid Amount exceeds ₹ [●] and in multiples of [●] Units thereafter	Such number of Units that the Bid Amount exceeds ₹[●] and in multiples of [●] Units thereafter
Maximum Bid	Such number of Units (in multiples of [●] Units) not exceeding 25.00% of the Net Issue	Such number of Units (in multiples of [●] Units) not exceeding the size of the Issue, subject to applicable limits	Such number of Units (in multiples of [●] Units) not exceeding the size of the Issue, subject to applicable limits
Mode of Allotment	Compulsorily in dematerialised form		
Bid Lot	Not applicable	[●] Units and in multiples of [●] Units thereafter	[●] Units and in multiples of [●] Units thereafter
Allotment Lot	[●] Units and in multiples of [●] Units thereafter	[●] Units and in multiples of [●] Units thereafter	[●] Units and in multiples of [●] Units thereafter
Trading Lot	One Unit	One Unit	One Unit
Who can apply[(3)]	(i) an institutional investor; (ii) a foreign portfolio investor not covered under (i); (iii) a middle layer, upper layer and top layer non-banking finance company registered with RBI; or (iv) such entities as SEBI may specify from time to time who invest, either jointly or severally, not less than five percent and not more than 25% of the total Issue Size (excluding the Sponsor Contribution) or such amount as may be specified by SEBI from time to time, subject to compliance with the applicable provisions, if any, of the FEMA and the rules regulations or guidelines made thereunder, provided that if the entity is regulated by any financial sector regulator, SEBI shall consult such financial sector regulator prior to specifying the entity as a strategic investor under Regulation 2(1)(zza)(d) of the InvIT Regulations	(i) QIBs; or (ii)family trusts or intermediaries registered with SEBI, with net-worth of more than ₹ 5,000 million, as per their last audited financial statements (*Please also see note 1 below*)	Bidders other than Institutional Investors, eligible to apply in this Issue
Terms of Payment	Subscription price per Unit, payable by the Strategic Investors is set out in the Unit Subscription Agreement and the	Full Bid Amount shall be blocked by the SCSBs in the bank account of the ASBA	For individual Non-Institutional Investors Bidding with a Bid Amount of up to ₹ 0.50 million or

Particulars	Strategic Investors	Institutional Investors[(1)]	Non-Institutional Investors
	entire subscription price shall be deposited in a special escrow account prior to opening of the Issue. See "*Issue Information*" on 271	Bidder that is specified in the Bid cum Application Form. In case of case of Anchor Investors, full Bid Amount shall be payable by the Anchor Investors at the time of submission of their Bids [(4)]	less and Bidding through the UPI Mechanism: Full Bid Amount shall be blocked by the Sponsor Bank in the bank account of the Non-Institutional Investor that is specified in the Bid cum Application Form; Full Bid Amount shall be blocked by the SCSBs in the bank account of the ASBA Bidder that is specified in the Bid cum Application Form

(1) The Investment Manager in consultation with the Book Running Lead Managers may allocate up to 60.00% of the Institutional Investor Portion to Anchor Investors on a discretionary basis.

(2) Subject to valid Bids being received at or above the Issue Price. This Issue will be made through the Book Building Process wherein not more than 75.00% of the Net Issue will be available for allocation on a proportionate basis to Institutional Investors, provided that the Investment Manager, in consultation with the Book Running Lead Managers may allocate up to 60.00% of the Institutional Investor Portion to Anchor Investors on a discretionary basis.

(3) In case of joint Bids, the Bid cum Application Form should contain only the name of the First Bidder whose name should also appear as the first holder of the beneficiary account held in joint names. The signature of only the First Bidder would be required in the Bid cum Application Form and such First Bidder would be deemed to have signed on behalf of the joint holders. Bidders are advised to consult their own advisors with respect to any restrictions or limitations that may be applicable to them, including any restrictions or limitations in relation to their ability to invest in the Units. By making a Bid (including any revision thereof), the Bidder will be deemed to have represented to the Investment Manager, the Trustee, the Book Running Lead Managers and the Syndicate Members that it is eligible to participate in the Issue and be Allotted Units under applicable law.

(4) Full Bid Amount shall be payable by the Anchor Investors at the time of submission of the Anchor Investor Application Forms, provided that any difference between the price at which Units are allocated to the Anchor Investors and the Anchor Investor Issue Price, shall be payable by the Anchor Investor Pay-in Date as mentioned in the CAN.

(5) Each Strategic Investor proposing to invest in the Issue has entered into a Unit Subscription Agreement with the Investment Manager and the Trust (acting through the Trustee) prior to filing of this Offer Document with the SEBI and the Stock Exchanges. The price at which the Strategic Investors agree to purchase the Units shall not be less than the Issue Price. In case the Issue Price is higher than the Strategic Investor Allocation Price, each Strategic Investor shall bring in the additional amount within two Working Days of the Pricing Date.

In case of under-subscription in any investor category, the unsubscribed portion in either the Institutional Investor Portion or the Non-Institutional Investor Portion may be Allotted to Applicants in the other category at the discretion of the Investment Manager, in consultation with the Book Running Lead Managers and the Designated Stock Exchange.

Indicative Issue Timeline

Event	Indicative Date
Bid/ Issue Opening Date	Wednesday, March 11, 2026[(1)]
Bid/ Issue Closing Date	Friday, March 13, 2026
Finalisation of the Basis of Allotment	On or about Wednesday, March 18, 2026
Closing Date[(2)]	On or about Wednesday, March 18, 2026
Designated Date	On or about Friday, March 20, 2026
Initiation of refunds	On or about Friday, March 20, 2026
Listing Date	On or about Tuesday, March 24, 2026

(1) The Investment Manager may, in consultation with the Book Running Lead Managers, consider participation by Anchor Investors in accordance with the InvIT Regulations. The Anchor Investor Bidding Date shall be one Working Day prior to the Bid/ Issue Opening Date i.e. Tuesday, March 10, 2026. The Issue also includes participation by Strategic Investors in accordance with the InvIT Regulations read with SEBI InvIT Master Circular. The Strategic Investor Allocation Price shall be paid at least one Working Day prior to the Bid/Issue Opening Date.

(2) The date on which Allotment of Units pursuant to the Issue shall be made.

The above timetable is indicative and does not constitute any obligation or liability on the Trust, the Investment Manager, the Sponsor, the Trustee or the Book Running Lead Managers. While the Investment Manager shall ensure that all steps for the completion of the necessary formalities for the listing and the commencement of trading of the Units on the Stock Exchanges are taken within 6 Working Days of the Bid/ Issue Closing Date, the timetable may change due to various factors, including any extension of the Bid/

Issue Period by the Investment Manager due to any revision(s) of the Price Band or any delay in receiving the final listing and trading approval from the Stock Exchanges. The commencement of trading of the Units will be entirely at the discretion of the Stock Exchanges and in accordance with the applicable laws.

Except in relation to the Bids received from the Anchor Investors and Strategic Investors, Bids and any revision in Bids shall be accepted only between 10.00 a.m. and 5.00 p.m. (Indian Standard Time) during the Bid/ Issue Period (except the Bid/ Issue Closing Date) at the Bidding Centres and the Designated Branches mentioned on the Bid cum Application Form. Investors are not allowed to withdraw or lower their Bid (in terms of number of Units or the Bid Amount) at any stage. Bidders can make upward revisions in their Bids, subject to applicable law. It is clarified that Bids not uploaded on the electronic bidding system would be rejected. Due to limitation of the time available for uploading the Bids on the Bid/ Issue Closing Date, Investors are advised to submit their Bids one day prior to the Bid/ Issue Closing Date and, in any case, no later than 1.00 p.m. IST on the Bid/ Issue Closing Date. Any time mentioned in this Offer Document is IST. Investors are cautioned that, in the event a large number of Bids are received on the Bid/ Issue Closing Date, some Bids may not get uploaded due to lack of sufficient time. Such Bids that cannot be uploaded will not be considered for allocation under the Issue. Bids will be accepted only on Business Days i.e. Monday to Friday (excluding any public holiday). None among the Trust, the Investment Manager, the Trustee or any member of the Syndicate is liable for any failure in uploading the Bids due to faults in any software/hardware system or otherwise.

In case of any discrepancy in the data entered in the electronic book *vis-à-vis* the data contained in the physical Bid cum Application Form, for a particular Investor, the details as per the Bid file received from the Stock Exchanges may be taken as the final data for the purpose of Allotment.

The Investment Manager, in consultation with the Book Running Lead Managers, reserves the right to revise the Price Band during the Bid/ Issue Period. In case the Price Band is revised, the Issue Period shall be extended for a minimum period of one Working Day, subject to the total Bid/ Issue Period not exceeding 30 days. The revised Price Band and Issue Period will be widely disseminated by notification to the SCSBs and Stock Exchanges, and also by indicating the change on the websites of the Trust, the Book Running Lead Managers, the Sponsor, the Investment Manager and the Stock Exchanges and at the terminals of the members of the Syndicate. In accordance with the InvIT Regulations, the Price Band cannot be revised more than two times during the Bid/ Issue Period.

ISSUE INFORMATION

Below is a summary, intended to provide a general outline of the procedures for the bidding, application, payment, Allocation and Allotment.

Bidders are advised to inform themselves of any restrictions or limitations that may be applicable to them and are required to consult their respective advisers in this regard. Bidders that apply in the Issue will be required to confirm and will be deemed to have represented to the Trustee, the Investment Manager, the Book Running Lead Managers and their respective directors, officers, agents, affiliates and representatives that they are eligible under all applicable laws, rules, regulations, guidelines and approvals to acquire the Units. Bidders are also advised to make their independent investigations submitted in accordance with applicable laws and do not exceed the investment limits or maximum number of Units that can be held by them under applicable law or as specified herein. The Investment Manager, the Trustee, the Book Running Lead Managers, the Syndicate Member(s) and their respective directors, officers, agents, affiliates and representatives accept no responsibility or liability for advising any Bidder on whether such Bidder is eligible to acquire the Units. The Investment Manager, the Trustee, the Book Running Lead Managers and Syndicate Member(s)do not accept any responsibility for the completeness and accuracy of the information stated in this chapter and are not liable for any amendment, modification or change in the applicable law which may occur after the date hereof.

Authority for the Issue

The Trust is making this Issue in accordance with Regulation 14(4) of the InvIT Regulations. The Issue was authorised and approved by the IM Board on January 12, 2026 read with its resolution dated February 20, 2026.

The Trust has received the in-principle approval of Stock Exchanges for the listing of the Units pursuant the letters, each dated February 13, 2026.

The Investment Manager has filed a copy of the Draft Offer Document and this Offer Document, and will file a copy of the Final Offer Document, with SEBI and the Stock Exchanges.

The Units have not been and will not be registered, listed or otherwise qualified in any jurisdiction outside India and may not be offered or sold, and Bids may not be made by persons in any such jurisdiction, except in compliance with the applicable law of such jurisdiction. The Units shall not be offered or sold where such offer or sale would require registration, qualification or listing.

Bidders should note that Allotment to successful Bidders will only be in the dematerialized form. Application forms which do not have the details of the Bidders' demat accounts including DP ID, PAN and Client ID will be treated as incomplete and rejected. Bidders will not have the option of receiving Allotment in physical form. On Allotment, the Units will be traded only on the dematerialized segment of BSE and NSE.

Issue procedure

This section applies to all Bidders. All Bidders other than Anchor Investors and Strategic Investors shall mandatorily participate in the Issue through the ASBA process. Bidders applying in this Issue should carefully read the provisions applicable to them before submitting a Bid through the ASBA process. All Bidders are required to pay the full Bid Amount at the time of Bidding, by way of instructing the relevant SCSB to block the full Bid Amount at the time of Bidding, or in the case of Anchor Investors, by making payment by electronic methods or in accordance with the Unit Subscription Agreements.

By making a Bid (including any revision thereof), the Bidder will be deemed to have represented to the Investment Manager, the Trustee, the Book Running Lead Managers and the Syndicate Members that it is eligible to participate in the Issue and be Allotted Units under applicable law. Bidders are also advised to make their independent investigations and ensure that their Bids are submitted in accordance with applicable laws and do not exceed the investment limits or maximum number of Units that can be held by them under applicable law or as specified herein.

Book Building Procedure

This Issue is being made through the Book Building Process, wherein not more than 75.00% of the Net Issue (excluding the Strategic Investor Portion) shall be available for allocation to Institutional Investors on a

proportionate basis, provided that the Investment Manager may, in consultation with the Book Running Lead Managers, allocate up to 60.00% of the Institutional Investor Portion to Anchor Investors on a discretionary basis, in accordance with the InvIT Regulations. Further, not less than 25.00% of the Net Issue (excluding the Strategic Investor Portion) shall be available for allocation on a proportionate basis to Non-Institutional Investors, subject to valid Bids being received at or above the Issue Price. In case of under-subscription in any category, the unsubscribed portion in any category may be Allotted to Bidders in the other category at the discretion of the Investment Manager in consultation with the Book Running Lead Managers and the Designated Stock Exchange.

The Issue also includes participation by Strategic Investors in accordance with the InvIT Regulations and the SEBI InvIT Master Circular. The Net Issue will be adjusted to the extent of participation by Strategic Investors.

Bidders do not have the right to withdraw or lower their Bid (in terms of number of Units or the Bid Amount) at any stage. Bidders can only make upward revisions in their Bids, subject to applicable law.

Bidders should note that Allotment to successful Bidders will be only in the dematerialized form. Bid cum Application Forms which do not have the details of the Bidders' depository accounts including DP ID, PAN ID, UPI ID (for Non-Institutional Investors Bidding for a Bid Amount of ₹0.50 million or less using the UPI Mechanism) and Client ID will be treated as incomplete and rejected. Bidders will not have the option of receiving Allotment in physical form. On Allotment, the Units will be traded only on the dematerialized segment of the Stock Exchanges.

Bid cum Application Form

Copies of the Bid cum Application Form and the Abridged Offer Document will be available at the offices of the Book Running Lead Managers, the Syndicate Members, if any, the principal place of business of the Trust and the Designated Intermediaries at the Bidding Centres. An electronic copy of the Bid cum Application Form will also be available on the websites of the SCSBs, NSE (www.nseindia.com) and BSE (www.bseindia.com). The Anchor Investor Application Forms will be made available at the principal place of business of the Trust and the registered office of the Investment Manager and the Book Running Lead Managers.

Bidders should use only the specified Bid cum Application Form bearing the stamp of a Designated Intermediary submitted at Bidding Centres (except in case of electronic Bid cum Application Forms), for the purpose of making a Bid in terms of this Offer Document. Bid cum Application Forms not being such specified stamp are liable to be rejected. Before being issued to Bidders, the Bid cum Application Form will be serially numbered. All Bidders other than Anchor Investors and Strategic Investors shall mandatorily participate in the Issue only through the ASBA process. Anchor Investors and Strategic Investors are not permitted to participate in the Issue through the ASBA process. All Bidders (other than Anchor Investors and Strategic Investors) must provide bank account details and authorization to block funds in the relevant space provided in the Bid cum Application Form and Bid cum Application Forms that do not contain such details will be rejected.

UPI Bidders using the UPI Mechanism must provide the UPI ID in the relevant space provided in the ASBA Form. ASBA Forms for such UPI Bidders, that do not contain the UPI ID are liable to be rejected. UPI Bidders using the UPI Mechanism may also apply through the SCSBs and mobile applications using the UPI handles as provided on the website of SEBI. UPI Bidders using the UPI Mechanism may submit the Bid cum Application with SCSBs, Syndicate Members, Registered Stock Brokers, RTAs and Depository Participants along with details of their bank account for blocking of funds. The relevant intermediary is required to the upload the Bid on the Stock Exchange bidding platform and forward the Bid cum application Form to an SCSB for blocking of funds. The Bid cum Application form will contain information about the Bidder and the price and number of Units that the Bidder wishes to Bid for. Bidders will have the option to make a maximum of three Bids in the Bid cum Application Form and such options will not be considered multiple Bids.

On filing of the Final Offer Document with SEBI and the Stock Exchanges, the Bid cum Application Form will be treated as a valid application form for Allotment of the Units. On submission of the completed Bid cum Application Form to a Designated Intermediary or participation pursuant to the Unit Subscription Agreement or the Book Running Lead Managers (in case of Anchor Investors), the Bidder (including any Strategic Investor) is deemed to have authorized the Investment Manager to make the necessary changes in this Offer Document as may be required under the InvIT Regulations, and other applicable laws, for filing the Final Offer Document with SEBI and the Stock Exchanges without prior or subsequent notice of such changes to the Bidder.

The prescribed colour of the Bid cum Application Forms for various categories is as follows:

Category	Colour of Bid cum Application Form including Bid cum Application Form*
Resident Indians	White
Non-Residents including Eligible NRIs and FPIs and multilateral and bilateral development financial institutions, excluding Anchor Investors and Strategic Investors	Blue
Anchor Investors*	White

* *Bid cum Application Forms for Anchor Investors will be made available at the principal place of business of the Trust and the registered office of the Investment Manager and the Book Running Lead Managers.*

Designated Intermediaries shall submit/deliver the Bid cum Application Forms of Bidders (other than Anchor Investors and Strategic Investors) to the respective SCSBs where the Bidder has a bank account and shall not submit it to any non-SCSB Bank or Escrow Collection Bank (unless such Escrow Collection Bank is also an SCSB). For UPI Bidders using the UPI Mechanism, the Stock Exchanges shall share the Bid details (including UPI ID) with the Sponsor Bank(s) on a continuous basis to enable the Sponsor Bank(s) to initiate a UPI Mandate Request to such UPI Bidders for blocking of funds. Designated Intermediaries (other than SCSBs) shall not accept any ASBA Form from a UPI Bidder who is not Bidding using the UPI Mechanism.

Stock Exchanges shall validate the electronic bids with the records of the depository for DP ID/Client ID and PAN, on a real time basis through API integration and bring inconsistencies to the notice of the relevant Designated Intermediaries, for rectification and re-submission within the time specified by Stock Exchanges. Stock Exchanges shall allow modification of either DP ID/Client ID or PAN ID (but not both), bank code and location code in the Bid details already uploaded. For UPI Bidders using UPI Mechanism, the Stock Exchanges shall share the Bid details (including UPI ID) with the Sponsor Bank(s) on a continuous basis through API integration to enable the Sponsor Bank(s) to initiate UPI Mandate Request to UPI Bidders for blocking of funds. The Sponsor Bank(s) shall initiate request for blocking of funds through NPCI to UPI Bidders, who shall accept the UPI Mandate Request for blocking of funds on their respective mobile applications associated with UPI ID linked bank account. The Sponsor Bank(s) will undertake a reconciliation of Bid responses received from Stock Exchanges and sent to NPCI and will also ensure that all the responses received from NPCI are sent to the Stock Exchanges platform with detailed error code and description, if any.

Sponsor Contribution

Pursuant to the Commitment Letter, the Sponsor has agreed contribute such amount towards subscription of such number of Units which shall be equivalent to at least 15.00% of the total Units of the Trust on a post-Issue basis, to comply with the requirement under Regulations 12(3) and 12(3A) of the InvIT Regulations ("**Sponsor Contribution**"). Upon Sponsor Contribution, the Issue Size will be reduced to the extent of such Sponsor Contribution.

While the Sponsor shall subscribe to the Units prior to the Bid/ Issue Closing Date, such Units shall be allotted to the Sponsor on the date of Allotment. Subsequently, the Investment Manager (on behalf of the InvIT) may utilize the Sponsor Contribution towards the objects of the Issue specified in the section titled "*Use of Proceeds*" on page 211.

Who can Bid?

Each Bidder should check if it is eligible to Bid under applicable law. Furthermore, certain categories of Bidders may not be permitted to Bid in the Issue or hold Units in excess of the limits specified under applicable law. Each Bidder (other than Anchor Investor and Strategic Investors) is required to Bid for a Minimum Bid Size in the range of ₹10,000 and ₹15,000.

The Unitholders shall be required to be qualified to invest or hold interest in highways projects of NHAI in India under applicable laws, including Foreign Exchange Management Act, 1999, read with rules and regulations thereunder, the foreign direct investment policy of India, as amended, InvIT Regulations. Further, acquisition of control, directly or indirectly, of the board of directors of the Project SPV require prior approval from NHAI from national security and public interest perspective under the respective Concession Agreements entered into by the Project SPV with NHAI.

The maximum subscription in the Issue from any investor other than the Sponsor, its related parties and its associates shall not exceed 25.00% of the total post-Issue outstanding Units.

The Units have not been and will not be registered under the Securities Act or any state securities laws in the United States and may not be offered or sold within the United States, except pursuant to an exemption from, or in a transaction not subject to, the registration requirements of the Securities Act and applicable state securities laws. Accordingly, the Units are only being offered and sold outside the United States in "offshore transactions" as defined in and in reliance on Regulation S under the Securities Act and the applicable laws of the jurisdiction where such offers and sales are made.

The Units have not been and will not be registered, listed or otherwise qualified in any other jurisdiction outside India and may not be offered or sold, and Bids may not be made by persons in any such jurisdiction, except in compliance with the applicable laws of such jurisdiction.

Units Issued and Sold in this Offer

Each purchaser that acquires the Units offered pursuant to this Offer, by its acceptance of this Offer Document and of the Units offered pursuant to this Offer, will be deemed to have acknowledged, represented to and agreed with the Trust and the Lead Managers that it has received a copy of this Offer Document and such other information as it deems necessary to make an informed investment decision and that:

(1) the purchaser is authorized to consummate the purchase of the Units offered pursuant to this Offer in compliance with all applicable laws and regulations;

(2) the purchaser acknowledges that the Units offered pursuant to this Offer have not been and will not be registered under the Securities Act or with any securities regulatory authority of any state of the United States and accordingly may not be offered or sold within the United States except pursuant to an exemption from, or in a transaction not subject to, the registration requirements of the Securities Act;

(3) the purchaser is purchasing the Units offered pursuant to this Offer in an "offshore transaction" meeting the requirements of Rule 903 of Regulation S under the Securities Act;

(4) the purchaser and the person, if any, for whose account or benefit the purchaser is acquiring the Units offered pursuant to this Offer, was located outside the United States at the time (i) the offer was made to it and (ii) when the buy order for such Units was originated and continues to be located outside the United States and has not purchased such Units for the account or benefit of any person in the United Sates or entered into any arrangement for the transfer of such Units or any economic interest therein to any person in the United States;

(5) the purchaser is not an affiliate of the Trust or a person acting on behalf of an affiliate;

(6) if, in the future, the purchaser decides to offer, resell, pledge or otherwise transfer such Units, or any economic interest therein, such Units or any economic interest therein may be offered, sold, pledged or otherwise transferred only in an "offshore transaction" complying with Rule 903 or Rule 904 of Regulation S under the Securities Act and (B) in accordance with all applicable laws. The purchaser understands that the transfer restrictions will remain in effect until the Trust determines, in its sole discretion, to remove them;

(7) the purchaser agrees that neither the purchaser, nor any of its affiliates, nor any person acting on behalf of the purchaser or any of its affiliates, will make any "directed selling efforts" as defined in Regulation S under the Securities Act in the United States with respect to the Units;

(8) the purchaser understands that such Units (to the extent they are in certificated form), unless the Trust determines otherwise in accordance with applicable law, will bear a legend substantially to the following effect:

THE UNITS REPRESENTED HEREBY HAVE NOT BEEN AND WILL NOT BE REGISTERED UNDER THE SECURITIES ACT OR WITH ANY SECURITIES REGULATORY AUTHORITY OF ANY STATE OR OTHER JURISDICTION OF THE UNITED STATES AND MAY NOT BE OFFERED, SOLD, PLEDGED OR OTHERWISE TRANSFERRED EXCEPT IN AN OFFSHORE TRANSACTION COMPLYING WITH RULE 903 OR RULE 904 OF REGULATION S UNDER THE SECURITIES ACT, IN EACH CASE IN ACCORDANCE WITH ANY APPLICABLE SECURITIES LAWS OF ANY STATE OF THE UNITED STATES.

(9) The Trust will not recognize any offer, sale, pledge or other transfer of such Units made other than in compliance with the above-stated restrictions; and

(10) the purchaser acknowledges that the Trust, the Lead Managers, their respective affiliates and others will rely upon the truth and accuracy of the foregoing acknowledgements, representations and agreements and agrees that, if any of such acknowledgements, representations and agreements deemed to have been made by virtue of its purchase of such Units are no longer accurate, it will promptly notify the Trust, and if it is acquiring any of such Units as a fiduciary or agent for one or more accounts, it represents that it

has sole investment discretion with respect to each such account and that it has full power to make the foregoing acknowledgements, representations and agreements on behalf of such account.

In relation to each EEA State that has implemented the Prospectus Directive (each, a "**Relevant Member State**"), an offer to the public of any Units may be made at any time under the following exemptions under the Prospectus Directive, if they have been implemented in that Relevant Member State:

(a) to any legal entity which is a qualified investor as defined under the Prospectus Directive;
(b) to fewer than 150 natural or legal persons (other than qualified investors), subject to obtaining the prior consent of the Lead Managers; or
(c) in any other circumstances falling within Article 3(2) of the Prospectus Directive,

provided that no such offer of Units shall result in a requirement for the Trust or any Lead Manager to publish a prospectus pursuant to Article 3 of the Prospectus Directive or supplement a prospectus pursuant to Article 16 of the Prospectus Directive and each person who receives any communication in respect of, or who acquires any Units under, the offers contemplated in this Draft Offer Document will be deemed to have represented, warranted and agreed to with the Lead Managers and the Trust that it is a qualified investor within the meaning of the law in that Relevant Member State implementing Article 2(1)(e) of the Prospectus Directive.

For the purposes of this provision, the expression an "offer of to the public" in relation to any of the Units in any Relevant Member States means the communication in any form and by any means of sufficient information on the terms of the offer and the Units to be offered so as to enable an investor to decide to purchase or subscribe for the Units, as the same may be varied in that Relevant Member State by any measure implementing the Prospectus Directive in that Relevant Member State.

In the case of any Units acquired by it as a financial intermediary, as that term is used in Article 3(2) of the Prospectus Directive, each such financial intermediary will be deemed to have represented, acknowledged and agreed that the Units acquired by it in the Offer have not been acquired on a non-discretionary basis on behalf of, nor have they been acquired with a view to their offer or resale to, persons in circumstances which may give rise to an offer of any Units to the public in a Relevant Member State prior to the publication of a prospectus in relation to the Units which has been approved by the competent authority in that relevant member state or, where appropriate, approved in another Relevant Member State and notified to the competent authority in the Relevant Member State, all in accordance with the Prospectus Directive, other than their offer or resale to qualified investors or in circumstances in which the prior consent of the Lead Managers has been obtained to each such proposed offer or resale.

The Trust, the Lead Managers and their affiliates, and others will rely upon the truth and accuracy of the foregoing representation, acknowledgement and agreement.

The Parties to the Trust, and the Book Running Lead Managers are not liable for any amendment or modification or change to applicable laws, which may occur after the date of this Offer Document. Investors are advised to make independent investigations and satisfy themselves that they are eligible to apply. Bidders are advised to ensure that any single application from them does not exceed the investment limits or maximum number of Units that can be held by them under applicable law. The Trustee, the Valuer and the employees of the Valuer who were involved in the valuation of the InvIT Assets are not permitted to Bid in this Issue.

Participation by Associates and affiliates of the Book Running Lead Managers and Syndicate Members

The Book Running Lead Managers and the Syndicate Members are not entitled to Bid for Units in this Issue in any manner. However, associates and affiliates of the Book Running Lead Managers and Syndicate Members may Bid for Units in the Issue, either in the Institutional Investor Portion (excluding the Anchor Investor Portion) or in the Non- Institutional Investor Portion, where allocation will be on a proportionate basis, either on their own account or on behalf of their clients. All categories of investors, including associates or affiliates of the Book Running Lead Managers shall be treated equally for the purpose of allocation to be made on a proportionate basis. Neither the Book Running Lead Managers nor any associate of the Book Running Lead Managers, other than mutual funds sponsored by entities which are associate of the Book Running Lead Managers or insurance companies promoted by entities which are associate of the Book Running Lead Managers or pension funds of entities which are associate of the Book Running Lead Managers or Alternate Investment Funds (AIFs) sponsored by the entities which are associate of the Book Running Lead Managers or FPIs other than Category III sponsored by the entities which are associate of the Book Running Lead Managers can apply in the Issue under the Anchor Investor Portion.

Bids by Anchor Investors

The Investment Manager, in consultation with the Book Running Lead Managers may allocate up to 60.00% of the Institutional Investor Portion on a discretionary basis to the Anchor Investors, in accordance with the InvIT Regulations. The Institutional Investor Portion will be reduced in proportion to the allocation under the Anchor Investor Portion. Strategic Investors may apply under the Anchor Investor Portion. Only Institutional Investors and Strategic Investors are eligible to invest in the Anchor Investor Portion. In the event of under-subscription in the Anchor Investor Portion, the balance Units will be added to the Institutional Investor Portion. In accordance with the InvIT Regulations, the key terms for participation in the Anchor Investor Portion are provided below.

(i) Anchor Investors are not permitted to participate in the Issue through the ASBA process. Anchor Investor Application Forms will be made available for the Anchor Investor Portion at the principal place of business of the Trust, and the registered offices of the Investment Manager and the Book Running Lead Managers.

(ii) A Bid by an Anchor Investor must be for a minimum of such number of Units so that the Bid Amount is at least ₹100.00 million. A Bid cannot be submitted for more than 60.00% of the Institutional Investor Portion.

(iii) The Bidding for Anchor Investors will open one Working Day before the Bid/ Issue Opening Date and Allocation to Anchor Investors will be completed on the same day.

(iv) The Investment Manager, in consultation with the Book Running Lead Managers, will finalize allocation to the Anchor Investors on a discretionary basis, provided that the minimum number of Allottees in the Anchor Investor Portion will not be less than:

- two, where the allocation under Anchor Investor Portion is up to ₹2,500.00 million; and
- five, where the allocation under Anchor Investor Portion is over ₹2,500.00 million.

(v) Allocation to Anchor Investors will be completed on the Anchor Investor Bidding Date. The number of Units allocated to Anchor Investors and the Anchor Investor Allocation Price, will be made available on the websites of the Stock Exchanges, the Sponsor, the Investment Manager and the Book Running Lead Managers, prior to the Bid/Issue Opening Date.

(vi) If the Issue Price is higher than the Anchor Investor Allocation Price, the additional amount being the difference between the Issue Price and the Anchor Investor Allocation Price will be payable by the Anchor Investors by the Anchor Investor Pay-in Date. If the Issue Price is lower than the Anchor Investor Allocation Price, Allotment to successful Anchor Investors will be at the higher price, i.e., the Anchor Investor Allocation Price and the amount in excess of the Issue Price paid by Anchor Investors will not be refunded to them.

(vii) The Units Allotted in the Anchor Investor Portion will be locked in for a period of 30 days from the date of Allotment.

(viii) However, the Units Allotted to the Strategic Investors will be locked in for a period of 180 days from the date of listing of Units.

(ix) Bids made by Institutional Investors and Strategic Investors (where such Strategic Investors are Institutional Investors) Bidding under both the Anchor Investor Portion and the Institutional Investor Portion will not be considered as multiple Bids.

(x) The Investment Manager, in consultation with the Book Running Lead Managers, reserves the right to reject any Bid received from Anchor Investors without assigning any reasons.

(xi) Neither the Book Running Lead Managers nor any their associates, other than mutual funds sponsored by entities which are associates of the Book Running Lead Managers, insurance companies promoted by entities which are associates of the Book Running Lead Managers or pension funds of entities which are associates of the Book Running Lead Managers or AIFs sponsored by the entities which are associates of the Book Running Lead Managers or FPIs other than category III sponsored by the entities which are associates of the Book Running Lead Managers, shall apply under the Anchor Investors Portion.

All Non-Resident Investors including Eligible NRIs and FPIs should note that refunds, dividends and other distributions, if any, will be payable in Indian Rupees only and net of bank charges and / or commission. **There is no reservation for NRIs, FPIs and FVCIs and all Bidders will be treated on the same basis with other categories for the purpose of allocation.**

Anchor Investors cannot withdraw or lower the size of their Bids (in terms of number of Units or the Bid Amount) at any stage after submission of the Bid.

Method of Allocation for Anchor Investors

The Investment Manager shall determine the Allocation in consultation with the Book Running Lead Managers on a discretionary basis in accordance with the allocation methodology approved by the IM Board ("**Allocation Methodology**") and in compliance with InvIT Regulations and SEBI InvIT Master Circular.

The Allocation Methodology proposed to be followed by the Investment Manager and the Book Running Lead Managers for Anchor Portion is provided below:

1. If the number of Units bid in the Anchor Portion of the Issue does not exceed the number of Units allocated for Anchor Investors, each Anchor Investor will be allocated the respective number of Units bid by them.

2. If the number of Units bid in the Anchor Portion of the Issue exceeds the number of Units allocated for Anchor Investors, the Allotment of Units to the Anchor Investors would be undertaken in accordance with the parameters set out below:

   Step 1 – Tiering the Anchor Investors

   a. Tier 1 – Domestic Provident Funds and Domestic Pension Funds falling under Anchor Investors

   b. Tier 2 – An insurance company registered with IRDAI, insurance funds set up and managed by army, navy or air force of the Union of India and Department of Posts, India

   c. Tier 3 – Mutual Funds registered with SEBI (AIFs are excluded)

   d. Tier 4 – other Anchor Investors.

   Step 2 – Allocation approach within each Tier as specified above:

   a. The number of Units to be allocated and minimum allocation to Anchor Investors for each tier would be decided by the IM Board.

   b. Within each tier, allocation should be ascertained basis following:

      - Bid quantum;
      - openness to participate in future rounds; and
      - Eligible Investor repute (AUM, long term capital commitment, early expression of interest etc.)

   c. In case of a tie, discretion shall be used by the Investment Manager

   d. The shortfall in any Tier would be first allocated to Tier 1 and then to Tier 2 and so on.

   e. Allocation of Units shall be subject to compliance with InvIT Regulations and applicable laws.

THE DECISION OF THE INVESTMENT MANAGER IN CONSULTATION WITH THE BOOK RUNNING LEAD MANAGERS IN RESPECT OF ALLOCATION TO ANCHOR INVESTORS SHALL BE FINAL AND BINDING ON ALL ANCHOR INVESTORS. ANCHOR INVESTORS MAY NOTE THAT ALLOCATION OF UNITS IS AT THE SOLE AND ABSOLUTE DISCRETION OF THE INVESTMENT MANAGER IN CONSULTATION WITH THE BOOK RUNNING LEAD MANAGERS AND ANCHOR INVESTORS MAY NOT RECEIVE ANY ALLOCATION EVEN IF THEY HAVE SUBMITTED VALID APPLICATION FORMS AND PAID THE ENTIRE APPLICATION AMOUNT

AT OR ABOVE THE ISSUE PRICE. NEITHER THE INVESTMENT MANAGER NOR THE BOOK RUNNING LEAD MANAGERS ARE OBLIGED TO ASSIGN ANY REASON FOR ANY NON-ALLOCATION.

Bids by Strategic Investors

In accordance with the InvIT Regulations, the key terms for participation by Strategic Investors are provided below:

(i) The Strategic Investor(s) shall, either jointly or severally, invest not less than 5.00% and not more than 25.00% of the Net Issue.

(ii) The Investment Manager on behalf of the Trust, shall enter into a binding unit subscription agreement with the Strategic Investor(s) which propose(s) to invest in the Issue prior to the filing of this Offer Document.

(iii) Subscription price per Unit, payable by the Strategic Investor(s) shall be set out in the Unit Subscription Agreement and the entire subscription price shall be deposited in a special escrow account prior to opening of Issue in accordance with the terms of the unit subscription agreement.

(iv) The Strategic Investor Issue Price shall not be less than the Issue Price. In the event that the Issue Price is higher than the Strategic Investor Allocation Price, the Strategic Investor(s) shall bring in the additional amount within two Working Days of the determination of the Issue Price.

(v) If the Issue Price is lower than the Strategic Investor Allocation Price, the excess amount shall not be refunded to the Strategic Investor and the Strategic Investor shall take Allotment at the price at which allocation was agreed to be made to it in the unit subscription agreement.

(vi) The commitment received from Strategic Investors and details of the unit subscription agreement, including the name of each Strategic Investor, the number of Units proposed to be subscribed by it or the investment amount, proposed subscription price per Unit shall be disclosed in this Offer Document.

(vii) The unit subscription agreement shall not be terminated except in the event the Issue fails to collect minimum subscription.

(viii) The Investment Manager, in consultation with the Lead Managers, in their absolute discretion, will decide the list of Strategic Investors to whom the provisional CAN or CAN will be sent pursuant to which the details of the Units allocated to them in their respective names will be notified to such Strategic Investors. The payment instruments for payment into the Escrow Account(s) should be drawn in favour of "RAAJMARG INFRA INVESTMENT TRUST- STRATEGIC PORTION".

(ix) In accordance with the InvIT Regulations, the Units Allotted to Strategic Investors will be locked-in for a period of 180 days from the date of listing of Units.

(x) Bids made by Strategic Investors (where such Strategic Investors are Institutional Investors) under both the Anchor Investor Portion and the Institutional Investor Portion will not be considered as multiple Bids; and

(xi) Bids by Strategic Investors (where such Strategic Investors are Non -Institutional Investors) under both the Anchor Investor Portion and Non-Institutional Investor Portion will not be considered as multiple Bids, subject to applicable limits.

Bids by SEBI registered VCFs and AIFs

The SEBI VCF Regulations prescribe, amongst others, the investment restrictions on VCFs registered with SEBI under the said regulations. Further, the SEBI AIF Regulations prescribe, amongst others, the investment restrictions on AIFs. Further, VCFs which have not re-registered as an AIF under the SEBI AIF Regulations shall continue to be regulated by the SEBI VCF Regulations until the existing fund or scheme managed by the fund is wound up and such funds shall not launch any new scheme after the notification of the SEBI AIF Regulations. Additionally, VCFs and AIFs are subject to certain investment restrictions, including with respect to the percentage of investible funds held in each investee entity. Under the SEBI AIF Regulations, Category I and II AIFs are permitted to invest not more than 25.00% of the investable funds in one "investee company" (which includes the Trust) and Category III AIFs are permitted to invest not more than 10% of the investable funds in one "Investee company". Allotments made to VCFs and AIFs in the Issue are subject to the rules and regulations that are applicable to each of them respectively.

Bids by Banking Companies

Bids may be made by banks as permitted by the RBI and are subject to conditions specified in the Prudential Guidelines – Banks' investment in units of REITs and InvITs dated April 18, 2017. In case of Bids made by banking companies registered with the RBI, certified copies of (i) the certificate of registration issued by the RBI,

and (ii) the approval of such banking company's investment committee are required to be attached to the Application Form. Banks may participate in public issuances by Trusts within the overall ceiling of 20% of their net worth permitted for direct investments in shares, convertible bonds/ debentures, units of equity-oriented mutual funds and exposures to VCFs, subject to the following conditions: (i) Banks should put in place a board approved policy on exposures to the Trust which lays down an internal limit on such investments within the overall exposure limits in respect of the real estate sector and infrastructure sector; (ii) Banks shall not invest more than 10% of the unit capital of the Trust; (iii) Banks should ensure adherence to the prudential guidelines issued by RBI from time to time on Equity investments by Banks, Classification and Valuation of Investment Portfolio, Basel III Capital requirements for Commercial Real Estate Exposures and Large Exposure Framework, as applicable. Failing this, the Investment Manager, in consultation with the Book Running Lead Managers, reserves the right to reject the Bid.

Bids by LLPs

In case of Bids made by limited liability partnerships registered under the Limited Liability Partnership Act, 2008, a certified copy of certificate of registration issued under the Limited Liability Partnership Act, 2008, must be attached to the Bid cum Application Form. Failing this, the Bid(s) may be rejected.

Bids by Provident Funds/Pension Funds

On March 2, 2015, the Ministry of Finance issued a notification allowing investments by non-government provident funds, superannuation funds and gratuity funds up to 5% in infrastructure investment trusts, as specified. On May 29, 2015, the Ministry of Labour and Employment issued a notification allowing investments by provident funds up to 5% in infrastructure investment trusts, as specified. The Pension Fund Regulatory and Development Authority issued circulars dated June 3, 2015 and September 2, 2015, respectively, allowing investments by national pension funds up to 5% in infrastructure investment trusts, as specified. However, such investments by provident funds and pension funds will be subject to, amongst others, the sponsor having a minimum of AA or equivalent rating from at least two credit rating agencies registered with SEBI. In case of Bids made by provident funds/ pension funds (registered with the Pension Fund Regulatory and Development Authority established under section 3(1) of the Pension Fund Regulatory and Development Authority Act, 2013), subject to applicable laws, with minimum corpus of ₹ 250 million, a certified copy of certificate from a chartered accountant certifying the corpus of the provident fund/pension fund must be attached to the Bid cum Application Form. Failing this, the Bid(s) may be rejected.

Bids by NPS Schemes

The Pension Fund Regulatory and Development Authority issued circulars dated June 3, 2015 and September 2, 2015, respectively, allowing investments by national pension fund schemes ("**NPS Schemes**") up to 5% in infrastructure investment trusts, as specified. However, in accordance with the circular dated May 4, 2017 (effective from May 8, 2017), as amended by the circular dated May 8, 2018, issued by PFRDA, such investments by NPS Schemes will be subject to, amongst others, such securities having a minimum of AA or equivalent rating in the applicable rating scale from at least two credit rating agencies registered with SEBI. In case of Bids made by NPS Schemes, subject to applicable laws, with minimum corpus of ₹250 million, a certified copy of certificate from a chartered accountant certifying the corpus of the provident fund/pension fund must be attached to the Bid cum Application Form. Failing this, the Investment Manager, in consultation with the Book Running Lead Managers, reserves the right to reject the Bid.

Bids by Insurance Companies

Bids may be made by insurance companies as permitted by the Insurance Regulatory and Development Authority of India in terms of the Master Circular – Investments, 2016 and the circular issued by the IRDAI titled 'Investment in Units of Real Estate Investment Trusts (REIT) & Infrastructure Investment Trusts (InvIT)' and dated March 14, 2017. In case of Bids made by insurance companies registered with the IRDAI, a certified copy of the certificate of registration issued by IRDAI must be attached to the Bid cum Application Form. Failing this, the Investment Manager, in consultation with the Book Running Lead Managers, reserves the right to reject the Bid. An insurer can invest not more than 3% of respective fund size of the insurer or not more than 5% of the units issued by a single InvIT, whichever is lower.

Bids by Mutual Funds

Bids may be made by mutual funds under all its schemes, existing and future, subject to the investment conditions and other restrictions prescribed under the Securities and Exchange Board of India (Mutual Funds) Regulations,

1996 (including, the circular on mutual funds dated July 27, 2024 and any other circulars, notifications and guidelines issued thereunder). A mutual fund may invest in the Units subject to the following:

(a) No mutual fund under all its schemes shall own more than 10% of the units; and

(b) A mutual fund scheme shall not invest:

(i) more than 10% of its net asset value in the units issued by InvIT; and

(ii) More than 5% of its net asset value in the units,

provided that the limits mentioned in sub-clauses (i) and (ii) above shall not be applicable for investments in case of index fund or sector or industry specific scheme pertaining to Trusts.

Bids by Eligible NRIs

In accordance with Schedule IV of the FEMA Rules, Eligible NRIs, including companies, trusts and partnership firms incorporated outside India which are owned and controlled by NRIs, are permitted to purchase units issued by an 'investment vehicle' without any limit, either on the stock exchange or outside it. The FEMA Rules define an 'investment vehicle' to mean an entity registered and regulated under the regulations framed by the SEBI or any other authority designated for that purpose, including an InvIT governed by the SEBI.

Investments by Eligible NRIs in the Units shall be on a non-repatriation basis and shall be deemed to be domestic investment at par with investments made by residents of India.

Only Bids accompanied by payment in freely convertible foreign exchange will be considered for Allotment. Eligible NRIs bidding on a repatriation basis by using the Bid cum Application Form for Non-Residents should authorize their respective SCSB (if they are Bidding directly through the SCSB) or confirm or accept the UPI Mandate Request (in case of Bidding through the UPI Mechanism) to block their Non-Resident External ("**NRE**") accounts, or Foreign Currency Non-Resident ("**FCNR**") accounts, and eligible NRIs bidding on a non-repatriation basis by using the Bid cum Application Form for residents should authorize their respective SCSB (if they are Bidding directly through SCSB) or confirm or accept the UPI Mandate Request (in case of Bidding through the UPI Mechanism) to block their Non-Resident Ordinary ("**NRO**") accounts for the full Bid Amount, at the time of the submission of the Bid cum Application Form.

Bids by FPIs

Foreign Portfolio Investors (other than individuals, corporate bodies and family offices) are permitted to participate in the Issue subject to compliance with Schedule VIII of FEMA Rules. In case of Bids by FPIs the payment should be paid as inward remittance from abroad through banking channels or out of funds held in NRE, SNRR or FCNR(B) account maintained in accordance with the Foreign Exchange Management (Deposit) Regulations, 2016, along with documentary evidence in support of the remittance. In case of Bids made by FPIs, a verified true copy of the certificate of registration issued by the designated depository participant under the SEBI FPI Regulations is required to be attached along with the Application Form, failing which the Investment Manager, in consultation with the Book Running Lead Managers, reserves the right to reject the Bid.

It is hereby clarified that bids received from FPIs bearing the same PAN shall be treated as multiple Bids and are liable to be rejected, except for Bids from FPIs that utilize the multiple investment manager structure in accordance with the operational guidelines for FPIs and designated Depository Participants issued to facilitate implementation of SEBI FPI Regulations (such structure referred to as "**MIM Structure**"), provided such Bids have been made with different beneficiary account numbers, Client IDs and DP IDs. Accordingly, it should be noted that multiple Bids received from FPIs, who do not utilize the MIM Structure, and bear the same PAN, are liable to be rejected. In order to ensure valid Bids, FPIs making multiple Bids using the same PAN, and with different beneficiary account numbers, Client IDs and DP IDs, are required to provide a confirmation in the Bid cum Application Forms that the relevant FPIs making multiple Bids utilize the MIM Structure. In the absence of such confirmation from the relevant FPIs, such multiple Bids shall be rejected.

Please note that, the maximum Bid by any Bidder including a QIB Bidder should not exceed the investment limits prescribed for them under applicable laws. Further, multiple Bids by a FPI Bidder utilising the MIM Structure shall be aggregated for determining the permissible maximum Bid. Further, please note that, Bid cum Application Forms are liable to be rejected in the event that the Bid in the Bid cum Application Form "exceeds the Issue size and/or investment limit or maximum number of Units that can be held under applicable laws or regulations or maximum amount permissible under applicable laws or regulations, or under the terms of this Offer Document".

Bids by SCSBs

SCSBs participating in the Issue are required to comply with the terms of the SEBI circulars dated September 13, 2012 (CIR/CFD/DIL/12/2012) and January 2, 2013 (CIR/CFD/DIL/1/2013). Such SCSBs are required to ensure that for making applications on their own account using ASBA, they should have a separate account in their own name with any other SCSBs. Further, such account shall be used solely for the purpose of making application in public issues and clear demarcated funds should be available in such account for such applications.

Bids under Power of Attorney

In case of Bids made pursuant to a power of attorney by Institutional Investors or bodies corporate, registered societies, etc. a certified copy of the power of attorney or the relevant resolution or authority, as the case may be, along with a certified copy of the memorandum of association and articles of association and/or bye laws must be submitted along with the Bid cum Application Form. Failing this, the Bid is liable to be rejected.

The Investment Manager, in consultation with the Book Running Lead Managers, in its absolute discretion, reserves the right to relax the above condition of simultaneous lodging of the power of attorney along with the Bid cum Application Form.

Allotments, if any, made to FVCIs in the Issue are subject to the respective rules and regulations that are applicable to each of them.

The above information is given for the benefit of the Bidders. Each Bidder should check whether it is eligible to apply under applicable law and ensure that any prospective Allotment to it in the Issue is in compliance with the investment restrictions under applicable law. Certain categories of Bidders may not be allowed to Bid in the Issue or hold Units exceeding certain limits specified under applicable law.

The Parties to the Trust, and the Book Running Lead Managers are not liable for any amendments or modification or changes in applicable laws or regulations, which may occur after the date of this Offer Document. Bidders are advised to make their independent investigations and ensure that any single Bid from them does not exceed the applicable investment limits or maximum number of the Units that can be held by them under applicable law or regulation or as specified herein.

Maximum and Minimum Bid Size

Each Bidder (other than an Anchor Investor and a Strategic Investor) is required to Bid for a Minimum Bid Size in the range of ₹10,000 and ₹15,000 and in multiples of [●] thereafter.

(i) No Bidder shall Bid for such number of Units which exceeds the Issue Size.

(ii) The maximum Bid by any Bidder including Institutional Investors should not exceed the investment limits prescribed for them under the applicable law.

The price and quantity options submitted by a Bidder in the Bid cum Application Form may be treated as optional bids from the Bidder and may not be cumulated. After determination of the Issue Price, the highest number of Units Bid for by a Bidder at or above the Issue Price may be considered for Allotment and the rest of the Bid(s), irrespective of the Bid Amount may automatically become invalid.

Information for the Bidders:

(i) This Offer Document has been filed by the Investment Manager with SEBI and the Stock Exchanges at least five Working Days before the Bid/Issue Opening Date.

(ii) After the filing of this Offer Document with SEBI and the Stock Exchanges, the Book Running Lead Managers/ Investment Manager shall make a Pre-Issue advertisement on the websites of the Trust, the Sponsor, the Investment Manager and the Stock Exchanges. Further, such Pre-Issue advertisement will also be published in all editions of Economic Times (a widely circulated English national daily newspaper) and in all editions of Jansatta (a widely circulated Hindi national daily newspaper, Hindi also being the regional language of Delhi, where the registered office of the Investment Manager is located).

(iii) Any Bidder (who is eligible to invest in the Units) may obtain the Bid cum Application Form or both from the principal place of business of the Trust, the registered office of the Investment Manager or from

any Designated Intermediary at the Bidding Centres. Anchor Investor Application Forms will be made available at the principal place of business of the Trust and the registered office of the Investment Manager and the Book Running Lead Managers.

(iv) The Bid/Issue Period shall be for a minimum of three Working Days. In case the Price Band is revised, the Bid/Issue Period shall be extended for a minimum period of one Working Day, subject to the total Bid/Issue Period not exceeding 30 Working Days. In case of *force majeure*, banking strike or similar circumstances, the Bid/Issue Period may be extended for a minimum period of three Working Days, subject to the total Bid/Issue Period not exceeding 30 Working Days. The revised Price Band and Bid/Issue Period will be widely disseminated by notification to the SCSBs and Stock Exchanges, and also by indicating the change on the websites of the Trust, the Book Running Lead Managers, the Sponsor, the Investment Manager and the Stock Exchanges and at the terminals of the members of the Syndicate. In accordance with the InvIT Regulations, the Price Band cannot be revised more than two times.

(v) The Designated Intermediaries will accept Bids during the Bid/Issue Period in accordance with the terms of this Offer Document, provided that the Book Running Lead Managers will accept the Bids from Anchor Investors only on the Anchor Investor Bidding Date.

(vi) The Bids should be submitted on the prescribed Bid cum Application Form only. Bids by ASBA Bidders will be accepted by the Designated Intermediaries at the Bidding Centres in accordance with applicable law and any circulars issued by SEBI in this regard. Bid cum Application Forms should bear the stamp of a Designated Intermediary. Bid cum Application Forms (except electronic Bid cum Application Forms) which do not bear the stamp of a Designated Intermediary are liable to be rejected.

(vii) The Bidding Centres will acknowledge the receipt of the Bid cum Application Forms by stamping and returning to the Bidder the Acknowledgement Slip. This Acknowledgement Slip will serve as the duplicate of the Bid cum Application Form for the records of the Bidder.

Instructions for completing the Bid Cum Application Form

Bidders may note that Bid cum Application Forms not filled completely or correctly as per instructions provided in this Offer Document and the Bid cum Application Form are liable to be rejected.

Bids must be:

(i) made only in the prescribed Bid cum Application Form or Revision Form, as applicable;

(ii) completed in full, in BLOCK LETTERS in ENGLISH and in accordance with the instructions contained here and in the Bid cum Application Form. Incomplete Bid cum Application Forms or Revision Forms are liable to be rejected. Bidders must provide details of valid and active DP ID, Client ID and PAN clearly and without error. Invalid accounts, suspended accounts or where such account is classified as invalid or suspended shall not be considered for Allotment. Bidders should note that the members of the Syndicate and/or the SCSBs (as appropriate) will not be liable for errors in data entry due to incomplete or illegible Bid cum Application Forms; and

(iii) in a single name or in joint names (not more than three, and in the same order as their Depository Participant details).

Bidders should also note that:

(i) information provided by Bidders will be uploaded in the online system by the Designated Intermediaries and the electronic data will be used to make allocation/Allotment. Bidders are advised to ensure that the details are correct and legible;

(ii) only the First Bidder is required to sign the Bid cum Application Form. Bidders should ensure that thumb impressions and signatures other than in the languages specified in the Eighth Schedule to the Constitution of India are attested by a Magistrate or a Notary Public or a Special Executive Magistrate under official seal; and

(iii) if the ASBA Account holder is different from the ASBA Bidder, the Bid cum Application Form should also be signed by the account holder as provided in the Bid cum Application Form.

General Instructions

Dos:

(i) Check if you are eligible to apply as per the terms of this Offer Document and under applicable laws and approvals;

(ii) Ensure that you have Bid within the Price Band;

(iii) Read all the instructions carefully and complete the relevant Bid cum Application Form;

(iv) Ensure that the details about the PAN, DP ID, Client ID and UPI ID (where applicable) are correct, and the Beneficiary Account is activated, as Allotment will be in dematerialized form only;

(v) Ensure that the Bids are submitted at the Bidding Centres only on the Bid cum Application Forms bearing the stamp of a Designated Intermediary;

(vi) Ensure that if you are the Bidder you have mentioned the correct ASBA Account number (for all Bidders other than UPI Bidders using the UPI Mechanism) in the Bid cum Application Form (with a maximum length of 45 characters) and such ASBA account belongs to you and no one else. Further, UPI Bidders using the UPI Mechanism must also mention their UPI ID and shall use only his/her own bank account which is linked to his/her UPI ID;

(vii) UPI Bidders using the UPI Mechanism through the SCSBs and mobile applications shall ensure that the name of the bank appears in the list of SCSBs which are live on UPI, as displayed on the SEBI website. UPI Bidders shall ensure that the name of the app and the UPI handle which is used for making the application appears on the list displayed on the SEBI website. An application made using incorrect UPI handle or using a bank account of an SCSB or bank which is not mentioned on the SEBI website is liable to be rejected;

(viii) Ensure that your Bid is submitted at a Bidding Centre of a Designated Intermediary. Further, ensure that the Bid cum Application Form is signed by the ASBA Account holder if the Bidder is not the ASBA Account holder;

(ix) Ensure that the full Bid Amount is paid for Bids submitted by Anchor Investors and Strategic Investors and funds equivalent to the Bid Amount are blocked by the SCSBs in case of Bids submitted through the ASBA process;

(x) Ensure that you have correctly checked the authorization/undertaking box in the Bid cum Application Form, or have otherwise provided an authorization to the SCSB via the electronic mode for the Designated Branch to block funds in the ASBA Account equivalent to the Bid Amount mentioned in the Bid cum Application Form at the time of submission of the Bid;

(xi) Instruct your respective banks to not release the funds other than in relation to the Issue, blocked in the ASBA Accounts;

(xii) Ensure that you request for and have received an Acknowledgement Slip for all your Bid options;

(xiii) Ensure that you receive an Acknowledgement Slip from the Designated Intermediary for the submission of your Bid cum Application Form;

(xiv) Submit revised Bids at the same Bidding Centre of a Designated Intermediary, through which the original Bid was placed and obtain a revised Acknowledgement Slip, as the case may be;

(xv) Except for Bids (i) on behalf of the Central or State Governments and the officials appointed by the courts, who, in terms of the SEBI circular dated June 30, 2008, may be exempt from specifying their PAN for transacting in the securities market, and (ii) Bids by persons resident in Sikkim, who, in terms of a SEBI circular dated July 20, 2006, may be exempted from specifying their PAN for transacting in the securities market, all Bidders should mention their PAN allotted under the IT Act. The exemption for the Central or the State Government and officials appointed by the courts and for Bidders residing in Sikkim is subject to (a) the Demographic Details received from the respective depositories confirming the exemption granted to the beneficiary owner by a suitable description in the PAN field and the beneficiary account remaining in "active status"; and (b) in the case of residents of Sikkim, the address

as per the Demographic Details evidencing the same. All other applications in which the PAN is not mentioned will be rejected;

(xvi) In cases where the PAN is same, such Bids will be treated as multiple applications. Bidders should not submit the GIR number instead of the PAN as the Bid is liable to be rejected on this ground. With effect from August 16, 2010, the demat accounts of Bidders for whom PAN details have not been verified shall be "suspended for credit" and no credit of Units pursuant to the Issue will be made into the accounts of such Bidders;

(xvii) Ensure that your PAN is linked with Aadhaar and are in compliance with Central Board of Direct Taxes notification dated February 13, 2020 and press release dated June 25, 2021;

(xviii) Ensure that the Demographic Details (as defined below) are updated, true and correct in all respects;

(xix) In case of joint Bids, the Bid cum Application Form should contain the name of only the First Bidder whose name should also appear as the first holder of the beneficiary account held in joint names. Ensure that the signature of the First Bidder in case of joint Bids, is included in the Bid cum Application Forms;

(xx) Ensure that the name(s) given in the Bid cum Application Form is exactly the same as the name(s) in which the beneficiary account is held with the Depository Participant;

(xxi) Ensure that the category and the Bidder status is indicated;

(xxii) Bidders (except UPI Bidders using the UPI Mechanism) should instruct their respective banks to release the funds blocked in the ASBA Account under the ASBA process. UPI Bidders using the UPI Mechanism, should ensure that they approve the UPI Mandate Request generated by the Sponsor Bank(s) to authorise blocking of funds equivalent to Bid Amount and subsequent debit of funds in case of Allotment, in a timely manner;

(xxiii) Ensure that in case of Bids under power of attorney or by limited companies, corporates, trusts, etc., relevant documents are submitted;

(xxiv) UPI Bidders using the UPI Mechanism shall ensure that details of the Bid are reviewed and verified by opening the attachment in the UPI Mandate Request and then proceed to authorize the UPI Mandate Request using his/her UPI PIN. Upon the authorization of the mandate using his/her UPI PIN, the UPI Bidders may be deemed to have verified the attachment containing the application details of the UPI Bidders using the UPI Mechanism in the UPI Mandate Request and have agreed to block the entire Bid Amount and authorized the Sponsor Bank(s) to offer a request to block the Bid Amount mentioned in the ASBA Form in his/her ASBA Account;

(xxv) UPI Bidders using the UPI Mechanism should mention valid UPI ID of only the Bidder (in case of single account) and of the first Bidder (in case of joint account) in the ASBA Form;

(xxvi) UPI Bidders using the UPI Mechanism, who have revised their Bids subsequent to making the initial Bid, should also approve the revised UPI Mandate Request generated by the Sponsor Bank(s) to authorise blocking of funds equivalent to the revised Bid Amount in their account and subsequent debit of funds in case of allotment in a timely manner;

(xxvii) Ensure that Bids submitted by any person outside India are in compliance with applicable foreign and Indian laws; and

(xxviii) With respect to Bids by SCSBs, ensure that you have a separate account in your own name with any other SCSB having clear demarcated funds for applying under the ASBA process and that such separate account (with any other SCSB) is used as the ASBA Account with respect to your Bid.

The Bid cum Application Form is liable to be rejected if the above instructions, as applicable, are not complied with.

Don'ts*:*

(i) Do not Bid for lower than the Minimum Bid Size;

(ii) Do not submit a Bid without payment of the entire Bid Amount;

(iii) Do not Bid less than the Floor Price or higher than the Cap Price;

(iv) Do not Bid on another Bid cum Application Form after you have submitted a Bid;

(v) Do not pay the Bid Amount in cash, by money order or postal order and in relation to ABSA Bidders, in any other

(vi) mode other than blocked amounts in the ASBA Accounts;

(vii) Do not send Bid cum Application Forms by post and only submit the same to a Designated Intermediary at a Bidding Centre;

(viii) Do not fill up the Bid cum Application Form such that the Units Bid for exceed, the Issue Size or investment limits, or the maximum number of Units that can be held or the maximum amount permissible under applicable laws or under the terms of this Offer Document;

(ix) Do not submit more than five Bid cum Application Forms per ASBA Account;

(x) Do not submit the GIR number instead of the PAN as the Bid is liable to be rejected on this ground;

(xi) Do not submit incorrect details of DP ID, Client ID and PAN or give details for which demat account is suspended or for which such details cannot be verified by the Registrar;

(xii) Do not instruct your respective banks to release the funds blocked in the ASBA Account under the ASBA process, other than in relation to the Issue;

(xiii) Do not submit the Bid for an amount more than funds available in your ASBA Account;

(xiv) Do not submit Bids on plain paper or on incomplete or illegible Bid cum Application Forms or on Bid cum Application Forms in a colour prescribed for another category of Bidders;

(xv) Do not submit a Bid in case you are not eligible to acquire Units under applicable law or your relevant constitutional documents or otherwise;

(xvi) Do not Bid if you are not competent to contract under the Indian Contract Act, 1872 (other than minors having valid depository accounts as per demographic details provided by the Depository);

(xvii) Anchor Investors and Strategic Investors should not Bid through the ASBA process; and

(xviii) Do not withdraw your Bid or lower the size of your Bid (in terms of quantity of the Units or the Bid Amount) at any stage.

Method and Process of Bidding

(i) The Investment Manager and the Book Running Lead Managers have declared the Bid/Issue Opening Date and Bid/Issue Closing Date at the time of filing this Offer Document with SEBI and the Stock Exchanges.

(ii) Post filing of this Offer Document with SEBI and the Stock Exchanges, the Book Running Lead Managers/ Investment Manager shall make a Pre-Issue advertisement on the websites of the Sponsor, the Investment Manager and the Stock Exchanges. Further, such Pre-Issue will also be published in all editions of Economic Times (a widely circulated English national daily newspaper) and in all editions of Jansatta (a widely circulated Hindi national daily newspaper, Hindi also being the regional language of Delhi, where the registered office of the Investment Manager is located).

(iii) The Price Band will be decided by the Investment Manager in consultation with the Book Running Lead Managers and shall be disclosed at least two Working Days prior to the Bid/Issue Opening Date on the websites of the Trust, the Sponsor, the Investment Managers and the Stock Exchanges and in the newspapers where the Pre-Issue advertisement was published.

(iv) The Book Running Lead Managers will accept Bids from the Anchor Investors on the Anchor Investor Bidding Date, *i.e.* one Working Day prior to the Bid/Issue Opening Date. Bidders, except Anchor Investors, who are interested in subscribing to the Units should approach any of the Designated Intermediaries at Bidding Centres to register their Bids during the Bid/Issue Period. The Designated Intermediaries will accept Bids from all Bidders and will have the right to vet the Bids during the Bid/Issue Period in accordance with the terms of the Syndicate Agreement and/or this Offer Document. The Bid/Issue Period will be for at least three Working Days and not exceeding 30 Working Days (*including* the days for which the Issue is open in case of revision in Price Band). If the Price Band is revised, the revised Price Band and the Bid/Issue Period will disclosed on the websites of the Trust, the

Sponsor, the Investment Managers, Book Running Lead Managers, Syndicate Members, SCSBs and the Stock Exchanges and in the newspapers where the Pre-Issue advertisement will be published.

(v) UPI Bidders may submit the Bid cum Application form with the Designated Intermediaries and use their bank account linked with UPI ID for the purpose of blocking funds. The Designated Intermediaries shall upload the Bid on the Stock Exchange bidding platform and the application amount would be blocked through the UPI Mechanism.

(vi) Each Bid cum Application Form will give the Bidder the choice to Bid for up to three optional prices within the Price Band and specify the demand (*i.e.*, the number of Units Bid for) in each option. The price and demand options submitted by the Bidder in the Bid cum Application Form will be treated as optional demands from the Bidder and will not be cumulated. In case of an upward revision in the Price Band, in the event the Bidder does not either revise the Bid or make additional payment and the Issue Price is higher than the Cap Price prior to revision, the number of Units Bid for will be adjusted downwards for the purpose of Allotment, such that no additional payment will be required from the Bidder and the Bidder shall be deemed to have approved such revised Bid. The Bidder can Bid at any price within the Price Band. The Bidder has to Bid for the desired number of Units at a specific price.

(vii) No Bidder shall either withdraw or lower its Bid at any stage.

(viii) After determination of the Issue Price, the maximum number of Units Bid for by a Bidder at or above the Issue Price will be considered for allocation/Allotment and the rest of the Bid(s), irrespective of the Bid Amount, will become automatically invalid.

(ix) Except in relation to the Bids received from the Anchor Investors and Strategic Investors, the Designated Intermediary will enter each Bid option into the electronic bidding system as a separate Bid and generate an Acknowledgement Slip, and SCSBs will generate an Acknowledgement Slip for each price and demand option and will, on demand, give the same to the Bidder. Therefore, a Bidder can receive up to three Acknowledgement Slips for each Bid cum Application Form.

(x) On receipt of the Bid cum Application Form (whether in physical or electronic mode) the Designated Branch of the SCSB will verify if sufficient funds equal to the Bid Amount are available in the ASBA Account, as mentioned in the ASBA Bid cum Application Form, prior to uploading such Bids with the Stock Exchanges. If sufficient funds are not available in the ASBA Account, the Designated Branch of the SCSB will reject such Bids and will not upload such Bids with the Stock Exchanges. If sufficient funds are available in the ASBA Account, the SCSB will block an amount equivalent to the Bid Amount mentioned in the ASBA Bid cum Application Form and will enter each Bid option into the electronic bidding system as a separate Bid.

(xi) Along with the Bid cum Application Form, all Bidders will make payment in the manner described under the paragraph titled "– *Payment Instructions*" in this section.

Bidders' Depository Account and Bank Account Details

Bidders should note that on the basis of Bidders' PAN, DP ID and Client ID provided by them in the Bid cum Application Form and as entered into the electronic bidding system of the Stock Exchanges by the Members of the Syndicate and the SCSBs as the case may be, the Registrar will obtain from the Depository the demographic details including the Bidders' address, occupation and bank account details (including the nine-digit Magnetic Ink Character Recognition ("**MICR**") code as appearing on a cheque leaf (the "**Demographic Details**")), from the Depository. The Demographic Details will be used for giving refunds and allocation advice (including through physical refund warrants, direct credit, NACH, NEFT and RTGS) to Anchor Investors and Strategic Investors. Hence, Bidders are advised to immediately update their bank account details, PAN and Demographic Details as appearing on the records of the Depository Participant and ensure that they are true and correct. Accordingly, Bidders should carefully fill in their depository account details in the Bid cum Application Form.

By signing the Bid cum Application Form, the Bidder is deemed to have authorized the Depositories to provide to the Registrar, on request, the required Demographic Details as available in their records.

Bids with no corresponding record available with the Depositories matching the three parameters (namely, PAN (in case of joint Bids, PAN of First Bidder), the DP ID and Client ID), are liable to be rejected.

Payment mechanism for ASBA Bidders

The ASBA Bidders will specify the ASBA Account in the Bid cum Application Form and the SCSB will block an amount equivalent to the Bid Amount in the ASBA Account so specified. The SCSB will keep the Bid Amount in the relevant ASBA Account blocked until finalization of the Basis of Allotment and consequent transfer of the Bid Amount to the Public Issue Account, or until withdrawal/failure of the Issue or until rejection of the Bid, as the case may be.

In the event of rejection of the Bid cum Application Form, failure of the Issue or for unsuccessful Bid cum Application Forms, the Registrar will give instructions to the SCSB to unblock the Bid Amount in the relevant ASBA Account and the SCSBs will unblock the Bid Amount on receipt of such instruction.

Payment Instructions

The Investment Manager and the Syndicate will open Escrow Accounts with one or more Escrow Collection Bank(s) in whose favour Anchor Investors and Strategic Investors will offer payment instruments. The payment instruments for payment into the Escrow Accounts should be drawn in favour of:

In case of resident Anchor Investors: "RAAJMARG INFRA INVESTMENT TRUST-ANCHOR R"

In case of non-resident Anchor Investors: "RAAJMARG INFRA INVESTMENT TRUST-ANCHOR NR"

In case of Strategic Investors: "RAAJMARG INFRA INVESTMENT TRUST-STRATEGIC PORTION"

The Bidders should note that the escrow mechanism is not prescribed by SEBI and has been established as an arrangement amongst the Investment Manager, the Trustee (acting on behalf of the Trust), the Syndicate, the Escrow Collection Banks and the Registrar to facilitate collections from Bidders.

The Escrow Collection Banks will act in terms of this Offer Document and the Escrow Agreement. The monies deposited in the Escrow Accounts will be held for the benefit of the Anchor Investors until the Designated Date. On the Designated Date, the Escrow Collection Banks will transfer the funds from the Escrow Accounts as per the terms of the Escrow Agreement into the Public Issue Account with the Escrow Collection Banks and the Refund Account. The Escrow Collection Banks will not exercise any lien whatsoever over the monies deposited therein and will hold the monies therein in trust for the Anchor Investors. The balance amount after transfer to the Public Issue Account will be transferred to the Refund Account. Payments of refund to the Anchor Investors will be made from the Refund Account as per the terms of the Escrow Agreement and this Offer Document. Payments should be made by Anchor Investors only in electronic mode through direct credit/NEFT/NACH/RTGS. Cheques or bank drafts, cash, money orders or postal orders will not be accepted and is liable to be rejected.

Payment Mechanism for UPI Bidders

In relation to UPI Bidders, the Sponsor Bank shall initiate a UPI Mandate Request on the UPI Bidder, i.e., request the UPI Bidder to authorize blocking of funds equivalent to application amount and subsequent debit of funds in case of Allotment. The request raised by the Sponsor Bank would be electronically received by the UPI Bidder as an SMS / intimation on their mobile number / mobile application associated with the UPI ID linked bank account. The UPI Bidder shall be able to view the details of the request in their UPI application and authorize the transaction. In UPI, the SCSBs / UPI applications eligible for public issues shall send SMS alerts to UPI Bidders for all ASBA applications and may also provide invoices in the inbox as an additional feature to verify the UPI mandate details. After reviewing the details properly, the UPI Bidder shall be required to authorize the mandate, which shall be a one-time mandate for each application in the Issue. The payment accompanied with any upward revision of the Bid shall be adjusted against the payment made at the time of the original Bid or previously revised Bid.

Other Instructions

Joint Bids in case of Individuals

Bids may be made in single or joint names (not more than three). In the case of joint Bids, all payments will be made out in favour of the Bidder whose name appears first in the Bid cum Application Form or Revision Form. All communications will be addressed to the First Bidder and will be dispatched to his or her address as per the Demographic Details received from the Depository.

Multiple Bids

A Bidder should submit only one Bid for the total number of the Units required. Two or more Bids will be deemed to be multiple Bids if the sole or First Bidder is the same. However, a Bidder can revise the Bid through the Revision Form.

In case of a mutual fund, subject to investment conditions as per applicable law, a separate Bid can be made in respect of each scheme of the mutual fund registered with SEBI and such Bids in respect of more than one scheme of the mutual fund will not be treated as multiple Bids, provided that the Bids clearly indicate the scheme

concerned for which the Bid is made. Bids by Strategic Investors and QIBs under the Anchor Investor Portion and Institutional Investor Portion (excluding Anchor Investor Portion) will not be considered as multiple Bids.

After Bidding on an ASBA Form either in physical or electronic mode, where such ASBA Bid is submitted to the Designated Intermediaries and uploaded with the Stock Exchanges, an ASBA Bidder cannot Bid, either in physical or electronic mode, on another ASBA Form or a non-ASBA Form. Submission of a second Bid cum Application Form, whether an ASBA Form, to either the same or to another Designated Intermediary, or a non-ASBA Form, will be treated as multiple Bids and will be liable to be rejected either before entering the Bid into the electronic bidding system, or at any point of time prior to the allocation or Allotment of Units in this Issue. However, the ASBA Bidder can revise the Bid through the Revision Form.

More than one ASBA Bidder may Bid for Units using the same ASBA Account, provided that the SCSBs will not accept a total of more than five Bid cum Application Forms from ASBA Bidders with respect to any single ASBA Account.

The Investment Manager, in consultation with the Book Running Lead Managers, reserves the right to reject, in its absolute discretion, all or any multiple Bids in any or all categories. A check will be carried out for the same PAN. In cases where the PAN is same, such Bids will be treated as multiple applications.

Right to Reject Bids

In case of QIBs Bidding in the Institutional Investor Portion and Anchor Investors, the members of the Syndicate may reject Bids provided that such rejection will be made at the time of acceptance of the Bid and the reasons for rejecting such Bids will be provided to such Bidder in writing. The Members of the Syndicate may also reject Bids if all information required is not provided and the Bid cum Application Form is incomplete in any respect.

Grounds for Technical Rejections

Bidders are advised that incomplete or illegible Bid cum Application Forms will be rejected by Designated Intermediaries. Bidders are advised to note that Bids are liable to be rejected on technical grounds including the following:

(i) The amounts mentioned in the Bid cum Application Form does not tally with the amount payable for the value of the Units Bid for;
(ii) Application on plain paper;
(iii) In case of partnership firms, Units may be registered in the names of the individual partners and no firm as such will be entitled to apply;
(iv) Bid by persons not competent to contract under the Indian Contract Act, 1872, as amended, including minors;
(v) PAN not stated (except for Bids on behalf of the Central or State Government, residents of Sikkim and the officials appointed by the courts);
(vi) GIR number furnished instead of PAN;
(vii) Where PAN details are not verified by demat accounts, i.e. where the demat account is "suspended for credit";
(viii) Bids for lower value of Units than specified for that category of Bidders;
(ix) Bids at a price less than the Floor Price;
(x) Bids at a price over the Cap Price;
(xi) Submission of more than five Bid cum Application Forms per ASBA Account;
(xii) Bids for a value of less than ₹0.01 million and Bids by UPI Bidders for a value of more than ₹ 0.50 million;
(xiii) Individual Non-Institutional Investors Bidding for a Bid Amount of ₹ 0.50 million or less using the UPI Mechanism have not provided the valid UPI ID in the relevant space provided in the Bid cum Application Form;
(xiv) Bidder category not specified;
(xv) Multiple Bids as described in this Offer Document;
(xvi) In case of Bids under power of attorney or by limited companies, corporate, trust etc., relevant documents not being submitted;
(xvii) Bids accompanied by cash, stock invest, money order or postal order;
(xviii) Signature of sole and/or the First Bidder (in case of joint Bids) is missing;
(xix) The Bid cum Application form not being signed by the ASBA Account holder, if the ASBA Account holder is different from the Bidder;

(xx) Bid cum Application Form does not have the stamp of a Designated Intermediary (except for electronic ASBA Bids), as the case may be;
(xxi) Bid cum Application Forms are not submitted within the time prescribed as per the Bid cum Application Form, Bid/Issue Opening Date advertisement and this Offer Document and as per the instructions in this Offer Document and the Bid cum Application Forms;
(xxii) Inadequate funds in the ASBA Account to block the Bid Amount specified in the Bid cum Application Form at the time of blocking such Bid Amount in the ASBA Account;
(xxiii) Authorisation for blocking funds in the ASBA Account not provided;
(xxiv) Bids for amounts greater than the maximum permissible amounts prescribed by applicable law;
(xxv) Bids by OCBs;
(xxvi) Bank account details for the refund not given, as applicable;
(xxvii) Bids by persons in United States;
(xxviii) Bids by persons prohibited from buying, selling or dealing in the Units directly or indirectly by SEBI or any other regulatory authority;
(xxix) Bids by persons who are not eligible to acquire Units under applicable law or their relevant constitutional documents or otherwise; and
(xxx) Bids that do not comply with the securities laws of their respective jurisdictions.

IN CASE THE DP ID, CLIENT ID, PAN AND UPI ID (WHERE APPLICABLE) MENTIONED IN THE BID CUM APPLICATION FORM AND ENTERED INTO THE ELECTRONIC BIDDING SYSTEM OF THE STOCK EXCHANGES BY THE LEAD MANAGER/THE DESIGNATED INTERMEDIARIES DO NOT MATCH WITH THE DP ID, CLIENT ID, UPI ID (FOR INDIVIDUAL NON-INSTITUTIONAL INVESTORS BIDDING FOR A BID AMOUNT OF ₹0.50 MILLION OR LESS USING THE UPI MECHANISM) AND PAN AVAILABLE IN THE RECORDS WITH THE DEPOSITORIES THE APPLICATION IS LIABLE TO BE REJECTED.

Electronic Registration of Bids

(i) The Designated Intermediaries will register the Bids received, except Bids received from Anchor Bidders, using the online facilities of the Stock Exchanges. Details of Bids in the Strategic Investor Portion and Anchor Investor Portion will not be registered on the online facilities of the Stock Exchanges. The Book Running Lead Managers, the Investment Manager and the Registrar are not responsible for any acts, mistakes or errors or omission and commissions in relation to (i) the Bids accepted by Designated Intermediaries, (ii) the Bids uploaded by Designated Intermediaries, (iii) the Bids accepted but not uploaded by the Designated Intermediaries or (iv) Bids accepted and uploaded without blocking funds in the ASBA Accounts. It will be presumed that for the Bids uploaded by the SCSBs, the Bid Amount has been blocked in the relevant ASBA Account.
(ii) The Stock Exchanges will offer a screen-based facility for registering such Bids for the Issue. This facility will be available on the terminals of the Designated Intermediaries during the Bid/Issue Period. The Designated Intermediaries can also set up facilities for offline electronic registration of Bids subject to the condition that it will upload the offline data file into the on-line facilities for book building on a regular basis.
(iii) On the Bid/Issue Closing Date, the Designated Intermediaries will upload the Bids until such time as may be permitted by the Stock Exchanges. This information will be available with the Book Running Lead Managers on a regular basis. In order to ensure that the data uploaded is accurate, the Syndicate may be permitted one Working Day after the Bid/Issue Closing Date to amend some of the data fields (currently DP ID, Client ID and PAN) entered by them in the electronic bidding system, after which the Registrar will proceed with the Allotment of the Units. Bidders are cautioned that a high inflow of Bids is typically experienced on the last Working Day of the Bidding, which may lead to some Bids received on the last Working Day not being uploaded due to lack of sufficient uploading time. Such Bids that could not uploaded will not be considered for allocation. Bids will only be accepted on Working Days (excluding any public holiday).
(iv) Based on the aggregate demand and price for Bids registered on the electronic facilities of the Stock Exchanges a graphical representation of consolidated demand and price will be made available at the Bidding Centres and on the websites of each of the Stock Exchanges during the Bid/Issue Period.
(v) At the time of registering each Bid, the Designated Intermediaries will enter the following details of the Bidder in the electronic system:
- Name of the infrastructure investment trust;
- Bid cum Application Form number;
- Bidder Category – QIB, Eligible NRI, FPI, etc.;
- PAN of the first applicant;

- DP ID;
- UPI ID (for UPI Bidders);
- Client ID;
- Number of Units Bid for; and
- Price option.

(vi) A system generated Acknowledgement Slip will be given to the Bidder (only on demand) as a proof of the registration of each of the Bidding options. It is the Bidders' responsibility to obtain the Acknowledgement Slip from Designated Intermediaries. The registration of the Bid by Designated Intermediaries does not guarantee that the Units will be allocated/Allotted. Such Acknowledgement Slip will be non-negotiable and by itself will not create any obligation of any kind.

(vii) In relation to Bids by UPI Bidders, once the Bid details are entered on the Stock Exchange platform, the Stock Exchange shall validate the PAN and demat account combination details of the Bidder with the Depository. The Depository shall validate the PAN and demat account details on a near real time basis and send responses to the Stock Exchanges which would be shared by the Stock Exchanges with the Designated Intermediaries through its platforms for corrections, if any. Once Bid details are uploaded on the platforms of the Stock Exchanges, the Stock Exchanges shall send an SMS to the UPI Bidder on their mobile number associated with demat account regarding submission of their Bid cum Application Form at the end of the day during the Bidding period. For the last day of Bidding, the SMS may be sent the next Working Day.

(viii) The permission given by the Stock Exchanges to use their network and software of the online IPO system should not in any way be deemed or construed to mean that the compliance with various statutory and other requirements by the Investment Manager and/or the Book Running Lead Managers are cleared or approved by the Stock Exchanges; nor does it in any manner warrant, certify or endorse the correctness or completeness of any of the compliance with the statutory and other requirements nor does it take any responsibility for the financial or other soundness of the Trust, the management of the Investment Manager or the Trustee or any project of the Trust nor does it in any manner warrant, certify or endorse the correctness or completeness of any of the contents of this Offer Document; nor does it warrant that the Units will be listed or will continue to be listed on the Stock Exchanges.

Build-up of the book and revision of Bids

(i) Bids received from various Bidders through the Designated Intermediaries will be electronically uploaded to the Stock Exchanges mainframe on a regular basis.

(ii) The book gets built up at various price levels. This information will be available with the Book Running Lead Managers at the end of the Bid/Issue Period.

(iii) During the Bid/Issue Period, any Bidder who has registered his or her interest in the Units at a particular price level is free to revise the Bid upwards within the Price Band using the printed Revision Form, which is a part of the Bid cum Application Form.

(iv) Upward revisions can be made in both the desired number of Units and the Bid Amount by using the Revision Form. Apart from mentioning the revised options in the Revision Form, the Bidder must also mention the details of all the options in his or her Bid cum Application Form or its previous Revision Form. For example, if a Bidder has Bid for three options in the Bid cum Application Form and such Bidder is changing only one of the options in the Revision Form, he must still fill the details of the other two options that are not being revised, in the Revision Form. The Members of the Syndicate and the Designated Branches will not accept incomplete or inaccurate Revision Forms.

(v) The Bidder can make this upward revision any number of times during the Bid/Issue Period. However, for any revision(s) in the Bid, the Bidders will have to use the services of the same Designated Intermediary through which such Bidder had placed the original Bid. Bidders are advised to retain copies of the blank Revision Form and the revised Bid must be made only in such Revision Form or copies thereof.

(vi) If revision of the Bids results in an incremental amount, the relevant SCSB will block the additional Bid Amount. The Registrar will reconcile the Bid data and consider the revised Bid data for preparing the Basis of Allotment.

(vii) When a Bidder revises his or her Bid, he or she will surrender the earlier Acknowledgement Slip and will, on demand, receive a revised Acknowledgement Slip from the Designated Intermediary. It is the responsibility of the Bidder to request for and obtain the revised Acknowledgement Slip, which will act as proof of his or her having revised the previous Bid.

Price Discovery and Allocation

(i) Based on the Bids received and demand generated at various price levels, the Investment Manager, in consultation with the Book Running Lead Managers, will finalize the Issue Price and the Anchor Investor Issue Price.

(ii) Allocation to Anchor Investors will be at the discretion of the Investment Manager in consultation with the Book Running Lead Managers and in accordance with the Allocation Methodology, subject to compliance with the InvIT Regulations, and other applicable laws. In the event of under-subscription in the Anchor Investor Portion, the balance Units will be added to the Institutional Investor Portion. The number of Units allocated to Anchor Investors and the Anchor Investor Allocation Price, will be made available in public domain by the Book Running Lead Managers before the Bid/Issue Opening Date.

(iii) Allocation to Strategic Investors will be in accordance with the Unit Subscription Agreement and at the discretion of the Investment Manager, subject to compliance with the InvIT Regulations, and other applicable law.

(iv) In case of under-subscription in any category, the unsubscribed portion in either the Institutional Investor category or the Non-Institutional Investor Portion may be allotted to applicants in the other categories.

(v) Allocation to Non-Residents, including Eligible NRIs and FPIs will be subject to applicable law.

(vi) The Investment Manager in consultation with the Book Running Lead Managers reserves the right to withdraw the Issue any time after the Bid/Issue Opening Date but before the Allotment, without assigning any reasons whatsoever.

(vii) No Bidders can withdraw or lower their Bids at any time.

Advertisement regarding Issue Price

The Investment Manager will offer an advertisement after the filing of the Final Offer Document with SEBI and the Stock Exchanges. This advertisement will indicate the Issue Price.

Issuance of Allotment Advice

(i) Upon approval of the Basis of Allotment by the Designated Stock Exchange, the Registrar shall send to the Syndicate a list of the Bidders who have been Allotted Units in the Issue.

(ii) The Registrar will then dispatch an Allotment Advice to the Bidders who have been Allotted Units in the Issue. The dispatch of an Allotment Advice shall be deemed a valid, binding and irrevocable contract for the Bidder.

(iii) The issuance of Allotment Advice is subject to "Notice to Anchor Investors and Strategic Investors: Allotment Reconciliation and Confirmation of Allocation Note" below.

Notice to Anchor Investors and Strategic Investors: Allotment Reconciliation and Confirmation of Allocation Note ("CAN")

(i) A physical book will be prepared by the Registrar on the basis of the Bid cum Application Forms received from Anchor Investors. Based on the physical book and at the discretion of the Investment Manager in consultation with the Book Running Lead Managers, selected Anchor Investors will be sent a CAN or, if required, the revised CAN.

(ii) ***In the event that the Issue Price is higher than the Strategic Investor Allocation Price or Anchor Investor Allocation Price:*** Strategic Investors and Anchor Investors will be sent a revised CAN within one day of the Pricing Date indicating the number of Units allocated to such Anchor Investor or Strategic Investor and the pay-in date for payment of the balance amount. Anchor Investors and Strategic Investors are then required to pay any additional amounts, being the difference between the Issue Price and the Anchor Investor Allocation Price or Strategic Investor Allocation Price, as indicated in the revised CAN within the pay-in date referred to in the revised CAN. Thereafter, the Allotment Advice will be issued to such Anchor Investors and Strategic Investors.

(iii) ***In the event the Issue Price is lower than the Anchor Investor Allocation Price and Strategic Investor Allocation Price*****:** Anchor Investors and Strategic Investors and who have been Allotted Units will directly receive Allotment Advice and will not receive a refund for the difference between the Issue Price and the Anchor Investor Allocation Price or Strategic Investor Allocation Price, as applicable.

Designated Date and Allotment

On the Designated Date, the Registrar to the Issue shall instruct the SCSBs to transfer funds represented by allocation of Units from ASBA Accounts into Public Issue Account. The balance amount after transfer to the Public Issue Account shall be unblocked by the relevant SCSB. Whilst the Investment Manager shall ensure all steps for the completion of the necessary formalities for the listing and the commencement of trading of the Units

on the Stock Exchanges are completed within 6 Working Days of the Bid/Issue Closing Date, the timetable may be extended due to various factors, such as extension of the Bid/Issue Period by the Investment Manager, revision of the Price Band or any delay in receiving the final listing and trading approval from the Stock Exchanges. The commencement of trading of the Units will be entirely at the discretion of the Stock Exchanges and in accordance with the applicable laws.

Bidders are advised to instruct their Depository Participant to accept the Units that may be Allotted to them in this Issue.

Basis of Allotment

For other than Anchor Investors and Strategic Investors

(i) The Allotment to Bidders other than Anchor Investors and Strategic Investors shall be on proportionate basis within the specified investor categories and the number of Units Allotted shall be rounded off to the nearest integer, subject to minimum Allotment per successful Bidder in case of oversubscription as per the InvIT Regulations.

(ii) In case of under-subscription in any investor category, the unsubscribed portion in either the Institutional Investor category or the Non-Institutional Investor category may be allotted to applicants in the other category.

(iii) The aggregate allocation to Institutional Investors will not be more than 75.00% of the Net Issue.

(iv) The aggregate allocation to Non-Institutional Investors shall not be less than 25.00% of the Net Issue.

(v) The identity of Institutional Investors other than Strategic Investors shall not be made public.

(vi) In relation to UPI Bidders, the RTA shall prepare the basis of Allotment based on information of Bidding and blocking received from the Stock Exchange and after undertaking reconciliation of the Bid data and block confirmations corresponding to the Bids by all Investor category applications (with and without the use if UPI). Upon approval of the basis of Allotment, the RTA shall share the 'debit' file with the Sponsor Bank and SCSBs, as applicable, for credit of funds in the Public Issue Account and unblocking of excess funds in the UPI Bidder's account. The Sponsor Bank, based on the mandate approved by the Bidder at the time of blocking of funds, shall raise the debit / collect request from the Bidder's bank account, whereupon funds will be transferred from investor's account to the public offer account and remaining funds, if any, will be unblocked without any manual intervention by investor or their bank.

For Anchor Investor Portion

Allocation to Anchor Investors at the Anchor Investor Allocation Price will be at the discretion of the Investment Manager, in consultation with the Book Running Lead Managers, subject to compliance with the following requirements:

- not more than 60% of the Institutional Investor Portion will be available for allocation to Anchor Investors;

- allocation to Anchor Investors will be on a discretionary basis and in terms of the Allocation Methodology, subject to a minimum number of two Anchor Investors for allocation up to ₹ 2,500 million and minimum number of five Anchor Investors for allocation more than ₹ 2,500 million. The identity of the Anchor Investors shall be made public.

The number of Units Allocated to Anchor Investors and the Anchor Investor Allocation Price will be made available on the websites of the Stock Exchanges, the Sponsor, the Investment Manager and the Book Running Lead Managers, prior to the Bid/Issue Opening Date.

For Strategic Investor Portion

Allocation to Strategic Investors at the Strategic Investor Allocation Price will be at the discretion of the Investment Manager, in consultation with the Lead Managers, subject to compliance with the following requirements:

(i) Strategic Investor(s) shall, jointly or severally, invest not less than 5% and not more than 25% of the Net Issue;
(ii) allocation to Strategic Investors will be on a discretionary basis, as per applicable law.

The details of Allocation to Strategic Investors will be made available on the websites of the Stock Exchanges, the Sponsor, the Investment Manager and the Lead Managers, prior to the Bid/ Issue Opening Date, subject to applicable law.

Method of Proportionate Basis of Allotment in the Issue

Except in relation to Anchor Investors and Strategic Investors, in the event of the Issue being over-subscribed, the Investment Manager and the Book Running Lead Managers will finalize the Basis of Allotment in consultation with the Designated Stock Exchange. The Designated Stock Exchange along with the Book Running Lead Managers and the Registrar will be responsible for ensuring that the Basis of Allotment is finalized in a fair and proper manner.

Except in relation to Anchor Investors and Strategic Investors, the Allotment will be made on a proportionate basis as explained below, subject to minimum Allotment per successful Bidder in case of oversubscription in accordance with the InvIT Regulations:
(i) Bidders will be categorized according to the number of Units applied for.
(ii) The total number of Units to be allotted to each category as a whole will be arrived at on a proportionate basis, which is the total number of Units applied for in that category (number of Investors in the category multiplied by the number of Units applied for) multiplied by the inverse of the over-subscription ratio.

Number of Units to be allotted to the successful Bidders will be arrived at on a proportionate basis, which is total number of Units applied for by each Bidder in that category multiplied by the inverse of the over-subscription ratio.

Units in Dematerialized Form with NSDL or CDSL

As per the InvIT Regulations, the Allotment will be only in dematerialized form. In this context, two agreements have been signed amongst the Trustee (on behalf of the Trust), the respective Depositories and the Registrar:

(i) Agreement dated January 2, 2026, between NSDL, the Trust (acting through Investment Manager) and the Registrar.
(ii) Agreement dated January 6, 2026, between CDSL, the Trust (acting through Investment Manager) and the Registrar.
(iii) Bids from any Bidder without relevant details of his or her depository account are liable to be rejected.
(iv) A Bidder applying for Units must have at least one valid beneficiary account with either of the Depository Participants of either NSDL or CDSL prior to making the Bid.
(v) Allotment to a successful Bidder will be credited in electronic form directly to the beneficiary account (with the Depository Participant) of the Bidder.
(vi) Bid cum Application Forms or Revision Forms containing incomplete or incorrect details under the heading "Bidder's Depository Account Details" are liable to be rejected.
(vii) Units in electronic form can be traded only on the stock exchanges having electronic connectivity with NSDL and CDSL. The Stock Exchanges where the Units are proposed to be listed have electronic connectivity with CDSL and NSDL.

Communications

All future communications in connection with Bids made in this Issue should be addressed to the Registrar quoting the full name of the sole or First Bidder, Bid cum Application Form number, PAN, Bidders depository account details, number of Units applied for, date of Bid cum Application Form, name and address of the member of the Syndicate where the Bid was submitted and cheque or draft number and issuing bank thereof or with respect to ASBA Bids, the bank account number in which an amount equivalent to the Bid Amount was blocked.

Bidders can contact the Compliance Officer or the Registrar in case of any pre-Issue or post-Issue related problems such as non-receipt of letters of allotment, credit of allotted Units in the respective beneficiary accounts, refund orders etc. In case of ASBA Bids submitted with the Designated Intermediaries, Bidders can contact the relevant Designated Intermediary. We estimate that the average time required by the Registrar to the Issue, the SCSBs or us for redressal of routine investor grievances shall be 10 Working Days from the date of receipt of the complaint.

In case of non-routine complaints and complaints where external agencies are involved, we will seek to redress complaints as expeditiously as possible. The Trust has registered on SCORES in compliance with the SEBI circular (CIR/OIAE/1/2014) dated December 18, 2014, (SEBI/HO/OIAE/IGRD/P/CIR/202) dated November 7, 2022, (SEBI/HO/OIAE/IGRD/CIR/P/2023/156) dated September 20, 2023 and (SEBI/HO/OIAE/IGRD/CIR/P/2023/183) dated December 1, 2023 in relation to redressal of investor grievances through SCORES.

Payment of Refunds

Payment of refunds will be made in the manner described below.

Mode of Refunds

For Anchor Investors and Strategic Investors

For Anchor Investors and Strategic Investors, any payment of refund will be made electronically through NACH, Direct Credit, RTGS or NEFT. For all other Anchor Investors, including those who have not updated their bank particulars with the MICR code, refund orders through speed or registered post for refund orders of ₹ 1,500 and above. Such refunds will be made by cheques, pay orders or demand drafts drawn on the Refund Bank and payable at par at places where Bids are received. Any bank charges for cashing such cheques, pay orders or demand drafts at other centres will be payable by the respective Investors. Please note that refunds through the abovementioned modes shall be credited only to the bank account from which the Bid Amount was remitted.

Refunds for ASBA Bidders

In the case of ASBA Bidders, the Registrar will instruct the relevant SCSBs to unblock the funds in the relevant ASBA Accounts to the extent of the Bid Amounts specified in the Bid cum Application Forms for withdrawn, rejected or unsuccessful or partially successful ASBA Bids, within 6 Working Days of the Bid/Issue Closing Date.

Refunds for UPI Bidders

For UPI Bidders, Units would be credited to the Bidder's account after confirmation of receipt of funds in the Public Issue Account. The Bidder will be notified for full / partial Allotment. For partial Allotment, the remaining funds shall be unblocked. For no Allotment, the UPI mandate would be revoked and application amount would be unblocked for the Bidder. The Registrar shall ensure refund of application amount or excess application amount in the bank account of the Bidder as stated in its demat account.

Disposal of Applications and Application Moneys

With respect to Bidders other than ASBA Bidders, the Investment Manager will ensure dispatch of Allotment Advice, refund orders (except for Anchor Investors who receive refunds through electronic transfer of funds) and give benefit to the beneficiary account with Depository Participants and submit the documents pertaining to the Allotment to the Stock Exchanges after the Allotment.

In case of Anchor Investors who receive refunds through NACH, NEFT, direct credit or RTGS, the refund instructions will be given to the clearing system within 6 Working Days from the Bid/Issue Closing Date. A suitable communication will be sent to the Anchor Investors receiving refunds through this mode within 6 Working Days from the Bid/Issue Closing Date, giving details of the bank where refunds will be credited along with amount and expected date of electronic credit of refund.

Refund Orders or instructions to the SCSBs

With respect to Anchor Investors and Strategic Investors, the Investment Manager will ensure dispatch of Allotment Advice and refund orders (except for Anchor Investors and Strategic Investors who receive refunds through electronic transfer of funds), give benefit to the beneficiary account with the Depository Participants and submit documents pertaining to the Allotment to the Stock Exchanges after the Allotment.

In the case of ASBA Bidders, the Registrar will instruct the relevant SCSBs to unblock the funds in the relevant ASBA Accounts to the extent of the Bid Amounts specified in the Bid cum Application Forms for withdrawn, rejected or unsuccessful or partially successful ASBA Bids, within 6 Working Days of the Bid Closing Date.

Interest in case of delay in dispatch of Allotment Letters or Refund Orders/instruction to SCSB by the Registrar

Allotment, including the credit of Allotted Units to the beneficiary accounts of the Depository Participants, will be made not later than 6 Working Days of the Bid/Issue Closing Date. If Allotment letters/refund orders have not been dispatched to the Bidders or if, in a case where the refund or portion thereof is made in electronic manner through direct credit, NEFT, RTGS or NACH, or unblocking of ASBA Accounts or the refund instructions have not been issued to the clearing system in the disclosed manner and/or demat credits are not made to Bidders within 6 Working Days from the Bid/ Issue Closing Date, the Investment Manager will be liable to pay interest at 15% per annum, as prescribed under the InvIT Regulations and other applicable law.

The Trust, and the Investment Manager shall not have recourse to the Issue Proceeds until the final approval for listing and trading of the Units from all the Stock Exchanges where listing is sought has been received.

Withdrawal of the Issue

The Investment Manager in consultation with the Trustee and the Book Running Lead Managers, reserves the right not to proceed with the Issue at any time after the Bid/Issue Opening Date but before Allotment. If the Investment Manager, in consultation with the Book Running Lead Managers, withdraw the Issue, they will offer a public notice within two days or such other time as may be prescribed by SEBI in this regard, providing reasons for not proceeding with the Issue. The Book Running Lead Managers, through the Registrar, will notify the SCSBs to unblock the ASBA Accounts within one Working Day or such other time as may be prescribed by SEBI, from the day of receipt of such notification. The notice of withdrawal will be made available on the websites of the Stock Exchanges, the Trust, the Sponsor, the Investment Manager and will also be issued in the same newspapers where the Pre-Issue advertisements have appeared.

If the Investment Manager withdraws the Issue after the Bid/Issue Closing Date and thereafter determine that they will proceed with a further public offering of Units, they will file a fresh draft offer document with SEBI or the Stock Exchanges, as the case may be.

Notwithstanding the foregoing, the Issue is also subject to obtaining (i) the final listing and trading approvals of the Stock Exchanges, which the Investment Manager will apply for only after Allotment; and (ii) the final approval of the Final Offer Document after it is filed with SEBI and the Stock Exchanges.

In the event the Trust does not receive listing permission from the Stock Exchanges or in the event of withdrawal of the observation letter issued by SEBI, the Units shall not be eligible for listing and the Trust shall be liable to refund the subscription monies, if any, to the respective Bidders immediately, along with interest at the rate of 15.00% per annum, from the date of Allotment.

Minimum Subscription and Minimum Allotment

In case the Trust does not receive (i) the minimum subscription of at least 90.00% of the Issue; or (ii) subscription for at least 10.00% of the total outstanding Units by public Unitholders, on a post-Issue basis or in accordance with InvIT Regulation; or (iii) if the number of prospective Allottees (other than the Sponsor, its related parties and Associates) is less than 20, the entire subscription money shall be refunded.

Undertakings of Investment Manager

The Investment Manager hereby undertakes on behalf of the Trust that at any given time, there shall be only one denomination for the Units and that it shall comply with such disclosure and accounting norms specified by the SEBI from time to time. The Investment Manager further undertakes that no person connected with this Issue, including a person connected with the distribution of this Issue, shall offer any incentive, whether direct or indirect, in any manner, whether in cash or kind or services or otherwise to any person for making an application for allotment of Units, except for any fees or commission for services rendered in relation to this Issue.

TAXATION

STATEMENT OF POSSIBLE TAX BENEFITS AVAILABLE TO THE RAAJMARG INFRA INVESTMENT TRUST AND ITS UNITHOLDERS UNDER THE APPLICABLE LAWS IN INDIA

To
Raajmarg Infra Investment Trust
G-5 & 6, Sector – 10,
Dwarka,
New Delhi 110 075

Raajmarg Infra Investment Managers Private Limited
G-5 & 6, Sector – 10 Dwarka
New Delhi 110 075

IDBI Trusteeship Services Limited
1009, 10th Floor,
Ansal Bhawan, KG Marg,
New Delhi – 110 001

Sub: Statement of possible tax benefits available to Raajmarg Infra Investment Trust and its Unitholders

Dear Sirs,

We refer to the proposed initial offer public offer of units of Raajmarg Infra Investment Trust ("**Trust**"). With reference to the captioned subject, given below is a statement and the Annexure herewith, of the applicable sections of the Income-tax Act, 1961, as amended ("**Income Tax Act**") relating to possible tax benefits available to the Trust and its Unitholders. These benefits are typically dependent on Trust or its unitholders fulfilling the conditions prescribed under the relevant provisions of the Income Tax Act.

The benefits discussed in the enclosed Annexure are not exhaustive but illustrative. The information contained in the Annexure is only intended to provide general information to the investors and hence is neither designed nor intended to be a substitute for professional tax advice. In view of the individual tax consequences and the changing tax laws, it is advisable to consult a tax consultant with respect to the specific tax implications arising out of the participation in the issue.

Our confirmation is based on the information, explanations and representations obtained from the Investment Manager and on the basis of our understanding of the business activities and operations of the Trust.

We do not express an opinion or provide any assurance as to whether:

Trust or its Unitholders will continue to obtain these benefits in future.

The conditions prescribed for availing the benefits, where applicable have been/would be met with.

The revenue authorities/courts will concur with the views expressed herein.

Limitations

Our views expressed in the statement and as enclosed in the Annexure are based on the facts and assumptions indicated above. No assurance is given that the revenue authorities/ courts will concur with the views expressed herein. Our views are based on the existing provisions of law and its interpretation, which are subject to change from time to time. We do not assume responsibility to update the views consequent to such changes.

We have considered the provisions of the Income-tax Act, 1961 as amended by the Finance Act, 2025, to the extent notified and applicable as on the date of this statement. Any amendments proposed but not yet notified, or effective for future assessment years, have not been considered. We have not considered the impact of Finance Bill, 2026 and the proposed Direct Tax Code 2025; as the said law shall be effective from April 01, 2026.

We hereby give our consent to include this statement and the Annexure attached herewith, regarding possible tax

benefits available to the Trust and to its Unitholders in the offer document and final offer document in connection with the initial public offer of units of the Trust which is proposed to be filed with Securities and Exchange Board of India, relevant stock exchanges and any regulatory authority, as may be required under applicable law.

The Annexure has been prepared solely in connection with the initial public offer of units of the Trust under the prescribed regulations.

Reliance on the Annexure is on the express understanding that we do not assume responsibility towards the investors who may or may not invest in the initial public offer of units of the Trust relying on the Annexure.

For A.R. & Co.,
Chartered
Accountants
FRN – 002744C

CA. Mohd. Azam Ansari
Partner
MRN – 511623
UDIN: 26511623MBCYAV7865
Date: February 27, 2026
Place: New Delhi

ANNEXURE TO STATEMENT OF POSSIBLE TAX BENEFITS AVAILABLE TO RAAJMARG INFRA INVESTMENT TRUST AND ITS UNITHOLDERS UNDER THE APPLICABLE LAWS IN INDIA

The information provided below sets out the possible tax benefits available to the Unitholders in a summary manner only and is not a complete analysis or listing of all potential tax consequences of purchase, ownership and disposal of equity shares or units, under the tax laws presently in force in India. It is not exhaustive or comprehensive analysis and is not intended to be a substitute for professional tax advice.

The Income-tax Act, 1961 as amended ("**Act**") has set-out a special regime for taxation of income arising to the Trust and its unitholders under Chapter XII FA of the Act.

We have summarised below relevant income-tax provisions as applicable to the Trust and its unitholders, under the Act. The income tax provisions listed below are available to the Trust and its unitholders subject to compliance with the applicable provisions and/or the conditions laid out in the Act and the regulations as prescribed under the Securities and Exchange Board of India (Infrastructure Investment Trusts) Regulations, 2014, made under the Securities and Exchange Board of India Act, 1992 (15 of 1992) ('InvIT Regulations').

Tax provisions applicable to the Trust

1. Definition of business trust under the Act

A 'business trust' is defined under section 2(13A) of the Act to mean a trust registered as an infrastructure investment trust (InvIT) under the SEBI InvIT Regulations or a real estate investment trust (REIT) under the SEBI REIT Regulations.

2. Taxability of the Trust

2.1.1. Income received from the Special Purpose Vehicle(s) ('SPVs')

a. Interest

Interest received or receivable by the Trust from the Project SPV (being domestic companies) shall be exempt from tax, subject to satisfaction of conditions given in section 10(23FC) of the Act.

In this regard, please note that as per the explanation to section 10(23FC) of the Act, the expression "special purpose vehicle" means an Indian company in which the business trust holds controlling interest and any specific percentage of shareholding or interest, as may be required by the regulations under which such trust is granted registration.

As per provisions of section 14A of the Act, any expenditure incurred in relation to earning the exempt income as provided above, whether accrued, arisen or received or not, should not be tax deductible. In case the tax authorities are not satisfied by the disallowance considered by the Trust, the quantum of disallowance shall be computed in accordance with the provisions of section 14A read with Rule 8D of the Rules.

As per section 193(ix) and section 194A(3)(xi) of the Act, any income by way of interest received/receivable by the Trust from SPV is not subject to withholding of taxes.

b. Dividend (other than dividend in the nature of the buy-back proceeds from Project SPV)

Dividend received or receivable by the Trust from the Project SPV (being domestic companies) shall be exempt from tax, subject to satisfaction of conditions given in section 10(23FC) of the Act.

In this regard, please note that as per the explanation to section 10(23FC) of the Act, the expression "special purpose vehicle" means an Indian company in which the business trust holds controlling interest and any specific percentage of shareholding or interest, as may be required by the regulations under which such trust is granted registration.

As per provisions of section 14A of the Act, any expenditure incurred in relation to earning the exempt income as provided above, whether accrued, arisen or received or not, should not be tax deductible. In case the tax authorities are not satisfied by the disallowance considered by the Trust, the quantum of disallowance shall be computed in accordance with the provisions of section 14A read with Rule 8D of the Rules.

Further, second proviso to section 194 of the Act provides that no TDS is required to be deducted by a SPV in respect of dividend paid to the Trust.

c. Dividend in the nature of the buy-back proceeds from Project SPV

As per amendments made *vide* Finance (No. 2) Act, 2024, proceeds from buy-back of shares shall be taxable as deemed dividend in the hands of shareholders as per provisions of newly inserted clause (f) under section 2(22) of the Act.

Further, with respect to shares bought back which are deemed as dividend under section 2(22)(f) of the Act, no deduction should be allowed while computing the dividend income as per second proviso to section 57 of the Act.

Additionally, as per proviso to section 46A of the Act, sales consideration in respect of shares bought back shall be considered as Nil for the purposes of computation of capital gains. Accordingly, cost of acquisition of such shares should be regarded as capital loss in the hands of shareholders in the year of such buy back.

It must be noted that such loss shall be considered as short-term capital loss where shares are held for a period of 24 months or less, and where shares are held for a period of more than 24 months, such losses shall be classified as long-term capital loss.

Section 70 read with section 74 of the Act allows short-term capital loss arising during a financial year to be set off against income, if any, from capital gains (short-term or long-term), arising in the same financial year. However, long-term capital loss arising during a financial year is allowed to be set-off only against long-term capital gains. Balance loss, if any, is allowed to be carried forward and set-off against income from capital gains, arising during subsequent eight assessment years, as follows: (i) balance short-term capital loss can be carried forward and set-off against capital gains (short-term or long-term); and (ii) balance long-term capital loss can be carried forward and set-off only against long-term capital gains.

Further, as per Section 71 of the Act, short term/ long term capital loss for the year cannot be set-off against income under any other head other than capital gains for the same year.

In absence of any clarity by the CBDT with respect to treatment of such deemed dividend in case of Trust, taxability of such deemed dividend in the hands of Trust should be in a similar manner, as in the case of normal dividend as discussed in Point 'b' above. Trust will incur a capital loss (to the extent of cost of acquisition of shares) in the year of buy back which will be eligible for carry forward and set off against future capital gains in accordance with provisions of section 70 read with section 74 of the Act, as discussed above.

2.1.2. Income other than the income distributed by the SPVs

a. Income by way of dividend/ interest/ any other income (such as treasury income)

Dividend/interest income received by the Trust from listed securities, liquid funds, etc. or treasury income etc. shall be subject to tax at the maximum marginal rate in force ('MMR') as per section 115UA of the Act. MMR is defined under the provisions of the Act to mean the rate of income-tax (including surcharge on income-tax, if any) applicable in relation to the highest slab of income as per the relevant Finance Act as increased by cess.

As per first proviso to section 57 of the Act, no deduction shall be allowable against dividend income other than deduction on account of interest expense and such interest expense shall not exceed 20% of

the gross dividend income included in the total income for that year, without deduction under section 57 of the Act.

b. Income by way of capital gains

In terms of section 115UA(2) of the Act, the total taxable income of the Trust shall be chargeable to tax at Maximum Marginal Rate (MMR) except for income arising on transfer of short-term capital assets[1] taxable under Section 111A and long-term capital assets taxable under Section 112 and Section 112A of the Act.

As per the provisions of section 111A of the Act, any income arising from transfer of short-term capital asset being an equity share in a company or a unit of an equity-oriented fund or a unit of a business trust, transacted through a recognized stock exchange and subject to STT, should be taxable at a rate of 20%[++2]. However, the condition of subject to STT is not applicable if the transaction is undertaken on a recognized stock exchange located in any International Financial Services Centre ('IFSC') and where the consideration for such transaction is received or receivable in foreign currency.

Short-term capital gains arising from transfer of short-term capital asset other than the shares and securities covered under section 111A of the Act, will be taxed at MMR.

As per the provisions of section 112 of the Act, gains arising on the transfer of long-term capital assets shall be chargeable to tax in the hands of the Trust at the rate of 12.5%[++].

Section 48 of the Act prescribes the mode of computation of capital gains and provides for deduction of cost of acquisition/ improvement and expenses incurred in connection with the transfer of a capital asset, from the sale consideration to arrive at the amount of capital gains. In respect of long-term capital gains taxable under section 112 of the Act, section 48 of the Act provided for substitution of cost of acquisition/improvement with indexed cost of acquisition/improvement, which adjusts the cost of acquisition/improvement by a cost inflation index as prescribed from time to time. However, such adjustment of cost of acquisition/improvement by a cost inflation index has been removed *vide* Finance (No. 2) Act, 2024 and this position continues under the Finance Act, 2025.

Further, as per provisions of section 112A of the Act, capital gains exceeding one lakh and twenty five thousand rupees arising on the transfer of long term capital asset, being an equity share in a company or a unit of an equity oriented fund or a unit of a business trust, transacted through a recognized stock exchange and subject to STT, shall be chargeable to tax in the hands of the business trust at the rate of 12.50% (plus applicable surcharge and cess) without applying the benefit under the first proviso to section 48 of the Act. Pursuant to the amendment introduced by the Finance Act, 2025, Section 112A has been expressly included within the scope of Section 115UA(2) of the Act, and accordingly, such long-term capital gains shall not be taxable at the maximum marginal rate in the hands of the business trust.

As per section 50CA of the Act, where the consideration on transfer of unquoted shares of a company, is less than the fair market value of such share determined in such manner as may be prescribed, the value so determined shall for the purpose of section 48 of the Act, be deemed to the full value of consideration.

Section 70 read with section 74 of the Act allows short-term capital loss arising during a financial year to be set off against income, if any, from capital gains (short-term or long-term), arising in the same financial year. However, long-term capital loss arising during a financial year is allowed to be set-off only against long-term capital gains. Balance loss, if any, is allowed to be carried forward and set-off against income from capital gains, arising during subsequent eight assessment years, as follows: (i) balance short-term capital loss can be carried forward and set-off against capital gains (short-term or

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[1] *As per section 2(42A), a short-term capital asset means: (i) for unlisted shares – period of holding is less than or equal to 24 months; (ii) for unlisted bonds/debentures - always deemed to be short-term capital asset; (iii) Immovable property being land and/or building - period of holding is less than or equal to 24 months; (iv) listed equity shares or debentures or units of an equity-oriented fund or units of business trust– period of holding less than or equal to 12 months. As per section 2(29A), a capital asset which is not a short-term capital asset is regarded as a long-term capital asset.*

[2] *excluding applicable surcharge and cess*

long-term); and (ii) balance long-term capital loss can be carried forward and set-off only against long-term capital gains.

Further, as per Section 71 of the Act, short term/ long term capital loss for the year cannot be set-off against income under any other head other than capital gains for the same year.

3. Taxability of unitholders

3.3 Income by way of interest and dividend (including upstreaming of dividend in the nature of the buy-back proceeds from Project SPV)

a. As per the provisions of section 115UA(1) of the Act, the income distributed by the Trust is taxable in the hands of the unitholders in the same manner and in the same proportion as the underlying income received by or accrued to the Trust.
b. As per the provisions of section 10(23FD), any income referred to in section 115UA(1) of the Act and distributed by the Trust shall not be included in the total income of the unitholders, except for the following income:
   - Interest income from SPV (referred to in section 10(23FC)(a));
   - Dividend Income from SPV (referred to in section 10(23FC)(b)), i.e., if the SPV has opted for concessional tax regime under section 115BAA;

   The above income would be taxable in the hands of the unitholders under section 115UA(3) of the Act at the rates applicable to the respective unitholders.
c. As per section 115A(1)(iiac) of the Act read with section 194LBA of the Act, income in the nature of interest referred to in section 10(23FC)(a) shall be taxable at the rate of 5%++ in the hands of a non-resident unitholders. Such interest would be taxable in the hands of resident unitholders at the applicable tax rates.
d. Taxability of dividend income distributed by the Trust to unitholders is dependent on the taxation regime adopted by the SPV(s), which distributes the dividend to the Trust. If the SPV(s) has not opted for a concessional corporate tax rate under section 115BAA of the Act ('Qualifying SPV'), dividend distributed by such Qualifying SPV ('Qualified Dividend') and distributed by the Trust is exempt in the hands of the unitholders. Any dividend other than Qualified Dividend distributed by the Trust ('Unqualified Dividend') is taxable in the hands of the unitholders. Such Unqualified Dividend shall be taxable in the hands of non-resident unitholders at the rate of 20%++ as per section 115A of the Act and shall be taxable in the hands of resident unitholders at the applicable tax rates.
e. Further, where the dividend, interest, or any other income received by the Trust is chargeable to tax in the hands of the Trust, such income shall be exempt in the hands of the unitholders on distribution by the Trust under section 10(23FD) of the Act. Further, any expenditure incurred for earning such exempt income shall not be deductible in the hands of the unitholders under the provisions of section 14A of the Act.
f. <u>Deductions from income in the hands of unitholders</u>
   A domestic company is allowed deduction of dividend income received by it from another domestic company or the Trust subject to certain conditions. Therefore, if the unitholder is a domestic company, it should be able to claim the deduction under section 80M where the prescribed conditions mentioned under section 80M have been complied with.
   Further, as per proviso to section 57 of the Act, no deduction shall be allowable against the dividend income other than deduction on account of interest expense and such interest expense shall not exceed 20% of the gross dividend income for that year, without deduction under section 57 of the Act. Furthermore, where dividend income is in the nature of the shares bought back, no expense shall be allowed as deduction against such dividend income.

3.2 <u>Distribution of specified sum</u>

a. The Finance Act, 2023 has amended section 56(2) of the Act to add a new clause (xii) which provides the taxability of any specified sum received by unitholders from the Trust in respect of units held by him at any time during the year.

b. Computation of "specified sum" shall be the result of 'A-B-C' where:

   'A' = Cumulative distribution made by trust till date excluding the amount distributed in the nature of dividend, interest or rental income or any amount taxed/taxable in the hands of InvIT
   'B' = Issue price of such units
   'C' = Amount charged to tax under this provision in earlier years

Specified sum shall be deemed to be zero if 'A-B-C' results in negative value.

3.3 Other income (income other than interest or dividend income or income chargeable to tax under section 56(2)(xii) of the Act) received from Trust

a. Other income (income other than interest or dividend income or income chargeable to tax under section 56(2)(xii) of the Act) such as treasury income earned by Trust and distributed to unitholder shall be exempt in hands of unitholders as the same shall be taxable in the hands of Trust. Further, there shall be no withholding on distribution of such other income by the Trust to the unitholders.

3.4 Income by way of capital gains

3.1.1. For resident unitholder

a. For the purpose of computation of capital gains on sale of units of Trust, consideration received on sale of units of Trust shall be reduced by cost of acquisition of such units and expenditure incurred wholly and exclusively in connection with such sale.

b. As per the amendments made by Finance Act, 2023, the amount of distribution to the extent not chargeable to tax u/s 56(2)(xii) of the Act and not covered u/s 10(23FC), 10(23FCA) or 115UA(2) of the Act, shall be reduced from the cost of units, for the purpose of computation of capital gains.

c. Investors are advised to consult their tax advisor for computation of capital gains including cost of acquisition of units as per Indian tax laws in each case.

d. Where the gains arising on the transfer of units of the Trust by the unitholder are included in the business income of an assessee assessable under the head 'Profits and Gains from Business or Profession' and on which STT has been charged, such STT shall be a deductible expense from business income as per the provisions of section 36(1)(xv) of the Act. The characterization of gains/ losses, arising from sale of units, as capital gains or business income would depend on the nature of holding in the hands of the unitholder and various other factors.

e. Where the gains on transfer of the units of the Trust are characterized as capital gains, and if such units are long-term capital assets and such transaction is chargeable to STT, income arising on transfer of units of the Trust (over and above INR 0.125 million) will be taxable at a tax rate of 12.50%$^{++}$ subject to conditions as per section 112A. However, the condition of transaction being chargeable to STT is not required if the transaction is undertaken on a recognised stock exchange located in IFSC and where the consideration for such transaction is received or receivable in foreign currency. Further, in case of long-term capital gain on transfer of units of the Trust, which are not subject to STT, shall be taxable in the hands of the unitholders at the tax rate of 12.50%$^{++}$ under section 112 of the Act.

f. Short-term capital gains arising on transfer of the units of the Trust will be chargeable to tax at the rate of 20%$^{++}$ as per the provisions of section 111A of the Act, provided such transaction is subject to STT. The condition of STT is not required to be followed if the transaction is undertaken on a recognised stock exchange located in IFSC and where the consideration for such transaction is received or receivable in foreign currency.

g. In case of a unitholder being an individual or HUF, where the total taxable income as reduced by short-term capital gains is below the basic exemption limit, the short-term capital gains will be reduced to the extent of the shortfall and only the balance short-term capital gains will be subjected to such tax in accordance with the proviso to sub-section (1) of section 111A of the Act. Short-term capital gains on transfer of units of the business trust, not transacted through a recognized stock exchange and not subject to STT shall be taxable at the applicable rate of tax for respective unitholders.

h. In case of a unitholder being a resident individual or HUF, where the total taxable income as reduced by long-term capital gains taxable is below the basic exemption limit, such long-term capital gains will be reduced to the extent of the shortfall and only the balance long-term capital gains will be subjected to such tax in accordance with the proviso to sub-section (1) of section 112 and proviso to sub-section (2) of section 112A of the Act.

i. In case of determining the period of holding for units allotted pursuant to exchange of shares of special purpose vehicle, as per clause (hc) of explanation 1 to section 2(42A), the period of holding for the units shall include the period for which the shares were held by the promoter in the SPV

j. In case of unitholder, being a domestic company that are liable to pay MAT under provisions of section 115JB of the Act, the gains arising, if any, on sale of units of the Trust are to be included as part of book profits for the purposes of computing MAT lability. MAT paid by such companies should be available as credit for set off against future tax liability, provided such companies do not opt to be governed by the concessional tax rate under section 115BAA of the Act.

k. In case of unitholders, other than companies, that are liable to Alternate Minimum Tax (AMT) under provisions of Section 115JC of the Act, the gains arising, if any, on sale of units of Trust are to be included as part of adjusted total income for the purpose of computing AMT liability. AMT paid by such unitholders should be available as credit for set-off against future tax liability, provided they do not opt to be governed by the concessional tax rates u/s 115BAC or 115BAD of the Act.

3.1.2. <u>For non-resident unitholder (other than Foreign Portfolio Investors ('FPIs'):</u>

a. For the purpose of computation of capital gains on sale of units of Trust, consideration received on sale of units of Trust shall be reduced by cost of acquisition of such units and expenditure incurred wholly and exclusively in connection with such sale.

b. As per the amendments made by Finance Act, 2023, the amount of distribution to the extent not chargeable to tax u/s 56(2)(xii) of the Act and not covered u/s 10(23FC), 10(23FCA) or 115UA(2) of the Act, shall be reduced from the cost of units, for the purpose of computation of capital gains.

c. Investors are advised to consult their tax advisor for computation of capital gains including cost of acquisition of units as per Indian tax laws in each case.

d. Where the gains arising on the transfer of shares of the unitholder are included in the business income of an assessee assessable under the head 'Profits and Gains from Business or Profession' and on which STT has been charged, such STT shall be a deductible expense from business income as per the provisions of section 36(1)(xv) of the Act. Such business income should not be taxable in India unless the non-resident has a taxable presence in India.

e. Where the gains on transfer of the units are characterized as capital gains, if such units are long-term capital assets and such transaction is chargeable to STT, income arising on transfer of units of the Trust (over and above INR 0.125 million) will be taxable at a tax rate of 12.50%++ subject to conditions as per Section 112A. However, the condition of STT is not required to be followed if the transaction is undertaken on a recognised stock exchange located in IFSC and where the consideration for such transaction is received or receivable in foreign currency. Further, in case of long-term capital gain on transfer of units of the Trust, which are not subject to STT, shall be taxable in the hands of the unitholders at the tax rate of 12.50%++ under section 112 of the Act.

f. Short-term capital gains arising on transfer of the units of the Trust will be chargeable to tax at the rate of 20%++ as per the provisions of section 111A of the Act if such transaction is chargeable to STT. However, the condition of STT is not required to be followed if the transaction is undertaken on a recognised stock exchange located in IFSC and where the consideration for such transaction is received or receivable in foreign currency.

g. Short-term capital gains on transfer of units of the business trust, not transacted through a recognized stock exchange and not subject to STT shall be taxable at the applicable rate of tax for respective unitholders.

h. As per section 47 of the Act read with Notification no. 16/2020, any capital gain arising on transfer of capital asset being unit of a business trust listed on a recognised stock exchange located in any IFSC where the consideration is received or receivable in foreign currency, would not be regarded as a transfer and therefore, would not be subject to any capital gain tax implications.

i. In case of unitholders, other than companies, that are liable to AMT under provisions of Section 115JC of the Act, the gains arising, if any, on sale of units of Trust are to be included as part of adjusted total income for the purpose of computing AMT liability. AMT paid by such unitholders should be available as credit for set-off against future tax liability, provided they do not opt to be governed by the concessional tax rates u/s 115BAC or 115BAD of the Act.

j. As per explanation 4 to section 115JB(2), the provisions of section 115JB shall not be applicable to a foreign company if the foreign company is a resident of a country having DTAA with India and such foreign company does not have a permanent establishment within the definition of the term in the relevant DTAA, or the foreign company is a resident of a country which does not have a DTAA with India and such foreign company is not required to seek registration under the legislation covering companies in India.

3.1.3. <u>For non-resident unitholders who are FPIs:</u>

a. As per section 2(14) of the Act, any securities held by an FPI, which were invested in accordance with the regulations made under the Securities and Exchange Board of India Act, 1992 shall be deemed to be capital assets. Hence the income from the transfer of such securities shall be deemed to be treated as capital gains.

b. If units of the Trust are long-term capital assets and such transaction is chargeable to STT, income arising on their transfer (over and above INR 0.125 million) will be taxable at a tax rate of 12.50%$^{++}$ subject to conditions as per section 112A read with section 115AD. Further, in case of long-term capital gain on transfer of units of the Trust, which are not subject to STT, shall be taxable in the hands of the unitholders at the tax rate of 10%$^{++}$, as per section 115AD.

c. Short-term capital gains arising on transfer of the units of the Trust will be chargeable to tax at the rate of 20%$^{++}$ as per the provisions of section 111A of the Act read with section 115AD, if such transaction is chargeable to STT. Short-term capital gains on transfer of units of the Trust, not transacted through a recognized stock exchange and not subject to STT shall be taxable at 30%$^{++}$ under section 115AD of the Act. The condition of payment of STT is not required to be followed if the transaction is undertaken on a recognised stock exchange located in IFSC and where the consideration for such transaction is received or receivable in foreign currency.

d. Investors are advised to consult their tax advisor for computation of capital gains including cost of acquisition of units as per Indian tax laws in each case.

e. As per the Explanation 4 to section 115JB, provisions of Minimum Alternate Tax shall not be applicable to any foreign company if:

- Such foreign company is a resident of country with which India has a DTAA and such foreign company does not have a permanent establishment in India; or

- Such foreign company is a resident of country with which India does not have a DTAA and such foreign company is not required to seek registration under any law for the time being in force relating to companies.

Accordingly, provisions of MAT shall not apply to FPIs/ FIIs in case the above conditions hold true.

3.1.4. <u>For unitholders who are notified Sovereign Wealth Fund and notified Pension Funds:</u>

a. As per section 10(23FE) of the Act, any income by way of dividend, interest, any sum referred to in section 56(2)(xii), or long-term capital gain arising from investment made in units of the Trust on or after 1 April 2020 and before 31 March 2030 and held for at least three years shall be exempt for notified Sovereign Wealth Fund, wholly owned subsidiary of Abu Dhabi Investment Authority (ADIA) and notified Pension Funds, subject to satisfaction of stipulated conditions.

b. Investors are advised to consult their tax advisor for computation of capital gains including cost of acquisition of units as per Indian tax laws in each case.

c. In this regard, please note that there as per provisions of the Act, no exemption is being provided from withholding of taxes on above mentioned income accruing to the specified persons as defined under section 10(23FE) of the Act.

3.1.5. Special tax benefits/ provisions applicable to Alternative Investment Fund (Category I and II)

a. Under section 10(23FBA) of the Act, any income of an investment fund other than the income chargeable under the head "Profits and gains of business or profession" is exempt from income tax.

b. Further, income of the investment fund chargeable under the head 'Profits and gains of business or profession' is taxable as follows (section 115UB(4) of the Act)

- at the rate or rates as specified in the Finance Act of the relevant year, where such fund is a company or a firm; or
- at maximum marginal rate in any other case

c. The losses incurred by AIF shall be treated in accordance with the provisions of section 115UB(2) and 115UB(2A) of the Act.

3.1.6. For unitholders who are mutual funds:

a. Under section 10(23D) of the Act, any income earned by a Mutual Fund registered under the Securities and Exchange Board of India Act, 1992, or a Mutual Fund set up by a public sector bank or a public financial institution, or a Mutual Fund authorised by the Reserve Bank of India would be exempt from income-tax, subject to such conditions as the Central Government may by notification in the Official Gazette specify in this behalf.

b. In light with the provisions of section 196 of the Act, no deduction of tax shall be made on any sum payable to a Mutual Fund specified under clause (23D) of section 10. Accordingly, the Trust is not required to withhold tax on any sum payable to Mutual Fund set up under section 10(23D) of the Act.

3.1.7. For Venture Capital Companies/Funds:

For VCF/VCC registered prior to 21 May 2012:

a. Under Section 10(23FB) of the Act, any income of Venture Capital Company to whom the certificate of registration is granted before 21/05/2012 under SEBI (Venture Capital Funds) Regulations, 1996 or as a subcategory I Alternative Investment Fund as is regulated under SEBI (Alternative Investment Funds Regulations) under the SEBI Act, 1992, would be exempt from income tax, subject to conditions specified therein.

b. As per Section 115U of the Act, any income derived by a person from his investment in Venture Capital Company/Venture Capital Fund would be taxable in the hands of the person making an investment in the same manner as if it were the income accruing or arising to or received by such person had the investments been made directly in the venture capital undertaking.

For VCF/VCC registered post 21 May 2012:

c. VCF/VCC registered post 21 May 2012 shall be classified as a Category 1 Alternate Investment Fund which shall be governed by the SEBI (AIF) Regulations 2012 or as referred to in sub-regulation (2) of regulation 18of the International Financial Services Centres Authority (Fund Management) Regulations, 2022 made under the International Financial Services Centres Authority Act, 2019. For such funds benefit of section 10(23FB) and section 115U shall not be applicable and shall be governed by section 115UB read with section 10(23FBA) and 10(23FBB) which states that business income earned by such fund shall be taxable in the hands of the Fund and exempt in the hands of the unit holders, and other income earned viz. capital gains, income from other sources shall be exempt in the hands of the fund and taxable in the hands of unit holder.

3.1.8. Benefits under Double taxation avoidance agreement (DTAA)

a. As per section 2(30) of the Act, non-resident is defined to mean a person who is not a "resident". A non-resident unit holder should be subject to taxation in India only if:

- it is regarded a tax resident of India; or
- being a non-resident in India, it derives: (a) if any income is received / deemed to be received in India; or (b) if any income has accrued or arisen / deemed to have accrued or arisen in India in terms of the provisions of the Act.

b. Section 6 of the Act provides that a foreign company should be treated as a tax resident in India if its place of effective management (POEM) is in India in that year. POEM has been defined to mean a place where key managerial and commercial decisions that are necessary for the conduct of the business of an entity as a whole are, in substance made.

c. Under the provisions of section 90(2) of the Act, a non-resident will be governed by the provisions of the DTAA between India and the country of tax residence of the non-resident and the provisions of the Act apply to the extent they are more beneficial to the assessee.

d. However, the non-resident investor will have to furnish a certificate of his being a tax resident in a country outside India and a suitable declaration stating that such non-resident does not have a fixed base/ permanent establishment in India, to obtain the benefit of the applicable DTAA and such other document as may be prescribed as per the provision of section 90(4) of Act. Further, as per Notification No. 3/2022 dated 16th July 2022, Form 10F is required to be furnished electronically for submitting information as required under Rule 21AB, where tax residence certificate does not contain all the prescribed requisite information.

e. As per the provisions of section 90(2) of the Act, the provisions of the Act would prevail over the provisions of the DTAA to the extent they are more beneficial to the non-resident.

3.1.9. Treatment of loss:

a. Section 70 read with section 74 of the Act allows short-term capital loss arising during a financial year to be set off against income, if any, from capital gains (short-term or long-term), arising in the same financial year. However, long-term capital loss arising during a financial year is allowed to be set-off only against long-term capital gains. Balance loss, if any, is allowed to be carried forward and set-off against income from capital gains, arising during subsequent eight assessment years, as follows: (i) balance short-term capital loss can be carried forward and set-off against capital gains (short-term or long-term); and (ii) balance long-term capital loss can be carried forward and set-off only against long-term capital gains.

b. Further, as per Section 71 of the Act, short term/ long term capital loss for the year cannot be set-off against income under any other head other than capital gains for the same year.

3.3 Tax deduction at source by the Trust

a. Section 194LBA – Certain income from units of the Trust: As per section 194LBA of the Act, taxes shall be required to be deducted at source at the time of payment/ credit (whichever is earlier) from following income distributions by the Trust to its unitholders:

Class of unitholders	Nature of income	Applicable tax rates
• Resident unitholders*	Interest income - Section 194LBA(1)	10%
	Unqualified Dividend income - Section 194LBA(1)	10%
	Qualified Dividend income - Section 194LBA(2A)	Not subject to withholding tax
	Specified sum – Section 56(2)(xii)	Not subject to withholding tax

• Non-resident unitholders*#^	Interest income – Section 194LBA(2) Unqualified Dividend income^ - Section 194LBA(2) Qualified Dividend income – Section 194LBA(2A) Specified sum – Section 56(2)(xii)	5%++ 10%++ Not subject to withholding tax Tax rates as may be applicable++
• Category I & II Alternative Investment Funds • Mutual Funds	Any distribution	Not subject to withholding tax

**The unitholders may provide NIL/Lower withholding certificate issues under section 197 of the Act with respect to income as specified u/s 194LBA of the Act.*

^ If the Act provides withholding tax rate for any specific category of non-resident unitholders, then the same needs to be considered.

 # Non-resident unitholders may seek to avail any beneficial provisions under applicable DTAA that India may have entered into with its country of residence. Rate of TDS for FPI/FII may be governed in accordance with section 196D of the Act.

b. Applicability of other provisions:

No income tax is deductible at source from income in the nature of capital gains arising to a resident unitholder under the provisions of the Act.

However, as per the provisions of Section 195 read with section 90 of the Act, any income on transfer of units of the Trust by non-residents may be subject to withholding of tax at the rate under the domestic tax laws or under the DTAA, whichever is more beneficial to the Assessee (other than FPIs/ FIIs who are subject to provisions of section 196D(2) of the Act)

Further, section 196D of the Act provide that in case of a payee, being FPIs/ FIIs of country with which India has entered into DTAA, tax shall be deducted at the rate of 20% or the DTAA rates (for the incomes referred in section 115AD(1), other than capital gains and interest income subject to TDS u/s 194LD of the Act), whichever is lower, subject to the FPI/ FII furnishing a Tax Residency Certificate (referred to in Section 90(4) of the Act) and a suitable declaration for not having a fixed base/ permanent establishment in India, to the payer.

Further, as per sub-section (2) of section 196D of the Act, no tax is to be deducted from any income, in the nature of capital gains arising to a FPI or FII from the transfer of units, subject to the FPI/ FII furnishing a Tax Residency Certificate (referred to in Section 90(4) of the Act) and a suitable declaration for not having a fixed base/ permanent establishment in India, to the payer.

Buyer and seller of unlisted shares/securities also need to check the applicability of TDS u/s 194Q of the Act read with provision of Tax Collection at Source (TCS) u/s 206C(1H) of the Act. As per the clarification issued by CBDT, the transaction in shares not taken place through recognized stock exchange/ recognised clearing corporations may also fall under the ambit of section 194Q/206C(1H) of the Act since CBDT has clarified that the said provisions of section 194Q/206C(1H) of the Act are not applicable to transactions in securities and commodities transacted through recognised stock exchanges/ recognised clearing corporations, including those located in International Financial Service Centre.

c. Provisions of section 206AA of the Act

As per section 206AA of the Act, where a tax payer does not possess a Permanent Account Number ('PAN'), taxes have to be withheld on payment of income to the tax payer (where chargeable to tax) at higher of the following:

- at the rate specified in the Act; or
- at the rate or rates in force; or
- at the rate of twenty per cent

The Finance Act, 2016 amended the aforementioned provision to provide an exemption to non-residents, subject to compliance of such conditions as may be prescribed by the CBDT. In furtherance

of the amended provision, the CBDT issued a notification prescribing the rules (Rule 37BC of the Rules) for relaxation from withholding of tax at higher rates in the absence of PAN in the case of non-resident deductee and laid down the information and alternative documents required to claim such relaxation.

d. Provisions of section 206AB of the Act

Finance Act 2021 has inserted section 206AB which *inter alia* stipulates that where tax is required to be withheld by a person on payment or credit to a *specified person*[3], the tax shall be deducted at the higher of the following rates:

- at twice the rate specified in the relevant provision of the Act; or
- at twice the rate or rates in force; or
- at the rate of five per cent.

If the provisions of section 206AA is applicable to a specified person, in addition to the provision of section 206AB, the tax shall be deducted at higher of the two rates provided in section 206AB and in section 206AA.

e. Applicability of other provisions:

Section 94(7) of the Act (commonly known as dividend stripping)

Vide Finance Act, 2022, applicability of section 94(7) of the Act (commonly known as dividend stripping) has been extended to the units of Trust as well (that with effect from Financial Year 2022-23) which provides that where:

a) any person buys or acquires any securities or unit within a period of three months prior to the record date[4];
b) such person sells or transfers such securities within three months after such record date or such units within a period of nine months after such record date;
c) the dividend or income on such securities or unit received or receivable by such person is exempt

then, the loss, if any, arising from the sale and purchase of securities and units, to the extent of dividend or income received or receivable on such securities or unit, shall be ignored for computing income chargeable to tax.

Section 94(8) of the Act (commonly known as bonus stripping)

Vide Finance Act, 2022, applicability of section 94(8) of the Act (commonly known as bonus stripping) has been extended to the units of Trust as well (that with effect from Financial Year 2022-23) which provides that where:

a) any person buys or acquires any units within a period of three months prior to the record date;
b) such person is allotted additional units without any payment on the basis of holding of such units on such record date;
c) such person sells or transfers all or any of the units within a period of nine months after the record date, while continuing to hold all or any of the additional units referred above

then, the loss, if any, arising from the sale and purchase of all or any of the units shall be ignored for computing income chargeable to tax and notwithstanding anything contained in any other provision of

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[3] *As per the provisions of section 206AB of the Act, 'Specified person' means a person who:*
(i) has not furnished the return of income for the previous year immediately preceding the previous year in which the tax is required to be deducted, for which time-limit of furnishing the return of income u/s 139(1) has expired; and
(ii) the aggregate of tax deducted at source and tax collected at source is INR 50,000 or more in the said previous year

[4] *Record date means a date fixed to entitles the holder of such securities or units to receive dividend, income, or additional securities or unit without consideration, as the case may be*

the Act, the amount of loss so ignored shall be deemed to be the cost of purchase or acquisition of such additional units referred above as are held on the date of such sale or transfer.

f. Transaction not regarded as transfer under section 47(xvii) of the Act:

According to section 47(xvii) of the Act, any transfer of a capital asset, being share of a special purpose vehicle to a business trust in exchange of units allotted by that trust to the transferor shall not be regarded as transfer and accordingly not be liable to capital gains tax.

Further, as per section 49(2AC) of the Act, the cost of units of Trust allotted to the transferor in exchange of shares in SPV shall be deemed to be the cost of acquisition of shares in SPV.

Furthermore, as per clause (hc) of Explanation 1 to section 2(42A) of the Act, for ascertaining the period of holding of such units, the period of holding of shares in SPV shall also be included.

Any notional gain or loss arising on transfer of shares of SPV to business trust in exchange of units allotted by the trust as referred under section 47(xvii) are to be excluded while calculating book profits for the purpose of MAT under section 115JB. Similarly, any notional gain or loss arising upon change in carrying amount of the units held by Unitholder are to be excluded in calculating book profits for the levy of MAT under section 115JB (clause (iie)/(fc) to explanation 1 to section 115JB).

Further, actual gain or loss on disposal of units held by the Unitholder as referred to in section 47 (xvii) are considered for the purpose of normal provisions of the Act and MAT under section 115JB by taking into account the cost of the shares exchanged with units referred to in the said clause or the carrying amount of the shares at the time of exchange where such shares are carried at a value other than the cost through statement of profit and loss, as the case may be (clause (iif)/(k) to explanation 1 to section 115JB).

However, if the Unitholder opts for concessional tax regime under section 115BAA / 115BAB then provisions of MAT under section 115JB shall not be applicable for the Unitholder and it shall forego its entire MAT credit available, if any, at the time of exercising concessional tax-regime.

3. General tax rates and provisions

3.1. The characterization of gains/ losses, arising from sale / transfer of units, as capital gains or business income would depend on the nature of holding in the hands of the unit holder and various other factors.

3.2. Where the gains arising on the transfer of the units of the Trust are included in the business income of an assessee assessable under the head "Profits and Gains from Business or Profession" and on which securities transaction tax has been charged, such securities transaction tax shall be a deductible expense from business income as per the provisions of section 36(1)(xv) of the Act. However, securities transaction tax is not eligible to be deducted as cost on transfer of the units of the Trust in case where the gains arising from such transfer is assessable under the head “Capital Gains”.

3.3. The income-tax rates specified in this note are as applicable for the financial year 2025-26 (relevant to assessment year 2026-27), and are exclusive of surcharge and cess, if any. Rate of surcharge and cess are provided below:

Surcharge:

Domestic companies (other than companies who have opted for concessional tax regime under section 115BAA and 115BAB of the Act):

a) If the total income does not exceed INR 10 million – Nil
b) If the total income exceeds INR 10 million but does not exceed INR 100 million - 7 %
c) If the total income exceeds INR 100 million - 12 %

Domestic companies (for companies who have opted for concessional tax regime under section 115BAA and 115BAB of the Act):

a) At the rate of 10% on total income

Foreign companies:

a) If the total income does not exceed INR 10 million - Nil
b) If the total income exceeds INR 10 million but does not exceed INR 100 million – 2%
c) If the total income exceeds INR 100 million – 5%

Firms:

a) If the total income does not exceed INR 10 million - Nil
b) If the total income exceeds INR 10 million – 12%

For individuals, HUF, AOP and BOI (including non-resident) who have not opted for the New Regime:

a) If the total income does not exceed INR 5 million – Nil
b) If the total income exceeds INR 5 million but does not exceed INR 10 million – 10%
c) If the total income exceeds INR 10 million but does not exceed INR 20 million – 15%
d) If the total income (excluding dividend income or income under the provision of section 111A, section 112 and section 112A of the Act) exceeds INR 20 million but does not exceed INR 50 million – 25%
e) If the total income (excluding dividend income or income under the provision of section 111A, section 112 and section 112A of the Act) exceeds INR 50 million – 37%
f) If total income is above 20 million (including dividend income or income under the provision of section 111A, section 112 and section 112A of the Act) but is not covered under (d) and (e) above – 15%.

However, the applicable surcharge does not exceed 15% in case of dividend income or income under the provision of section 111A and section 112A of the Act included in such total income. Also, in case of an association of persons consisting of only companies as its members, the rate of surcharge on the amount of Income-tax shall not exceed 15%. The above surcharge is subject to marginal tax benefit as per the Act. As per the Finance (No. 2) Act, 2024, in case of the Individual/HUF/AOP (other than co-operative)/ BOI/ Artificial Juridical Person ('AJP') taxable under the New Regime prescribed under the Act, the surcharge on the amount of income-tax shall not exceed 25% where taxable income exceeds INR 20 million. As per the Finance (No. 2) Act, 2024, in the case of an AOP being a non-resident, and consisting of only companies as its members, surcharge shall be calculated at the rate of 10%, where the aggregate income exceeds INR 5 million but does not exceed INR 10 million; at the rate of 15%, where the aggregate income exceeds INR 10 million.

Health and education cess:

In all cases, health and education cess will be levied at the rate of 4% of income-tax and surcharge.

4. Disclaimer

4.1. The stated benefits will be available only to the sole/ first named holder in case the units are held by joint holders.

4.2. Please note that the TDS rates mentioned in the given document may be subject to any concessions introduced/ allowed by the Government under any policy, press release, etc. Also, the same may also be subject to lower/ nil withholding tax certificates which may be furnished by the unit holders.

4.3. In respect of non-residents, the tax rates and the consequent taxation mentioned above shall be further subject to any benefits available under the applicable DTAA, if any, between India and the country in which the non-resident has fiscal domicile. Further, it is pertinent to meet the terms and condition viz. Principal purpose test, beneficial ownership test etc. as enacted in DTAAs entered into by India with various countries based on Multilateral Convention to implement tax treaty related measures to prevent Base Erosion and Profit Shifting ('MLI').

4.4. The tax implications/ benefits stated in this document are subject to General Anti Avoidance Rules (GAAR) provisions under the Act. GAAR may be invoked by the Indian income-tax authorities in case arrangements are found to be impermissible avoidance arrangements. Further, in case GAAR provisions are invoked, the onus to prove that the main purpose of an arrangement was not to obtain any tax benefit

is on the taxpayer. Also, any resident or non-resident may approach the Authority for Advance Rulings to determine whether an arrangement can be regarded as an impermissible avoidance arrangement.

4.5. This statement is intended only to provide general information to the investors and is neither designed nor intended to be substituted for professional tax advice. In view of the individual nature of tax consequences, each investor is advised to consult his/her own tax advisor with respect to specific tax consequences of his/her participation in the scheme.

4.6. No assurance is given that the revenue authorities/courts will concur with the views expressed herein. Our views are based on the existing provisions of law and its interpretation, which are subject to changes from time to time. We do not assume responsibility to update the views consequent to such changes. We shall not be liable to any claims, liabilities or expenses relating to this assignment, except to the extent of fees relating to this assignment, as finally judicially determined to have resulted primarily from bad faith or intentional misconduct. We will not be liable to any other person in respect of this statement.

4.7. This statement of possible direct tax benefits enumerated above is as per the Act as amended by the Finance Act, 2025 applicable for financial year ending 31 March 2026 relevant to the assessment year 2026-27. The above statement of possible Direct-tax Benefits sets out the possible tax benefits available to the Trust and its unitholders under the current tax laws presently in force in India. Several of these benefits available are dependent on the Trust or its unitholders fulfilling the conditions prescribed under the relevant tax laws.

4.8. Please note that the tax rates provided in this statement are exclusive of applicable surcharge and cess. The rates prescribed in sub-section (1A) of section 115BAC of the Act ("New Tax Regime") are the default rates applicable to all individuals, HUFs, AOPs (other than co-operative societies), BOIs and Artificial Juridical Persons ("AJPs"). Accordingly, tax rates and surcharge prevailing under the New Tax Regime will be considered for the purpose of withholding, unless the payee has exercised a valid option otherwise in accordance with the Act.

4.9. The information provided above sets out the possible tax benefits available to the unit holders in a summary manner only and is not a complete analysis or listing of all potential tax consequences of the purchase, ownership and disposal of equity shares and units, under the current tax laws presently in force in India. It is not exhaustive or comprehensive and is not intended to be a substitute for professional advice. Investors are advised to consult their own tax advisor with respect to the tax implications arising on account of any investment in equity shares or units (including tax implications on account of any distributions by/ receipts from the Trust), particularly in view of the fact that certain recently enacted legislation may not have a direct legal precedent or may have a different interpretation impacting the benefits, which an investor can avail.

4.10. This statement does not discuss any tax consequences in the country outside India of an investment in the units of trust. The unit holders / investors in the country outside India are advised to consult their own professional advisors regarding possible Income tax consequences that apply to them.

4.11. The statement is prepared on the basis of information available with the Trust and there is no assurance that:

- the Trust or its unitholders will continue to obtain these benefits in future;
- the conditions prescribed for availing the benefits have been/ would be met with; and
- the revenue authorities/courts will concur with the view expressed herein.

The above views are based on the provisions of law that exist on this day and its interpretation, which are subject to change from time to time.

ASSET REVENUE INFORMATION

In relation to the Issue, we are proposing to transfer tolling rights of the InvIT Assets, to RPPL. Since NHAI is not required to prepare or maintain project-wise financials for the InvIT Assets, it would not be feasible to present the combined financial statements of the Trust in relation to the InvIT Assets proposed to be held by the Trust as required under the Chapter 3 of the SEBI InvIT Master Circular. Accordingly, we have filed an exemption letter dated January 14, 2026 and subsequently on February 9, 2026 ("**Exemption Letters**") with the SEBI for exemption from strict application of certain provisions of the InvIT Regulations and SEBI InvIT Master Circular in respect of disclosure of financial statements of the InvIT Assets proposed to be held by the Trust and related disclosure requirements including combined financial statements of the Trust. SEBI vide its letter dated February 11, 2026 has granted us an exemption for the same. For further details, please see the section titled "*Discussion and Analysis by the Directors of the Investment Manager of the Financial Condition, Results of Operations and Cash Flows of the Project SPV of the Trust – SEBI Exemptions*" on page 222.

In accordance with the Exemption Letter, the revenue data for each of the InvIT Assets for the period from April 1, 2022 till January 31, 2026 is disclosed below:

(in ₹ million)

S. No.	Asset Name	Plaza Name	April 2022	May 2022	June 2022	July 2022	August 2022	September 2022
01	Neelmangla-Tumkur	Kulumapalya toll plaza	41.78	44.12	41.87	46.81	46.53	44.94
		Chokkenahalli toll plaza	36.74	37.88	35.58	38.95	38.58	37.08
02	Gorhar-Barwa adda	Ghanghri Toll Plaza	103.48	112.70	102.93	96.68	99.63	100.29
03	Vijayawada	Kaza Toll Plaza Mangaliri	146.96	154.98	153.37	153.58	157.97	162.35
04	Chennai Tada	Nallur Toll Plaza	109.67	110.93	112.07	115.53	116.42	118.37
05	Chennai Bypass	Vanagram Toll Plaza	54.16	55.57	57.28	55.50	56.47	56.14
		Surapattu Toll Plaza	80.64	81.38	82.49	84.89	84.52	85.01

(in ₹ million)

S. No.	Asset Name	Plaza Name	October 2022	November 2022	December 2022	January 2023	February 2023	March 2023
01	Neelmangla-Tumkur	Kulumapalya toll plaza	45.72	46.44	53.45	52.83	48.40	51.46
		Chokkenahalli toll plaza	38.75	39.14	42.69	42.66	38.65	41.90
02	Gorhar-Barwa adda	Ghanghri Toll Plaza	99.10	111.76	113.89	112.94	112.63	116.90
03	Vijayawada	Kaza Toll Plaza Mangaliri	161.34	165.79	170.19	163.18	155.16	168.99
04	Chennai Tada	Nallur Toll Plaza	111.33	109.79	121.08	116.41	112.91	125.62
05	Chennai Bypass	Vanagram Toll Plaza	58.65	56.03	61.18	61.41	57.81	63.47
		Surapattu Toll Plaza	78.23	78.85	82.80	78.93	77.60	84.36

(in ₹ million)

S. No.	Asset Name	Plaza Name	April 2023	May 2023	June 2023	July 2023	August 2023	September 2023
01	Neelmangla-Tumkur	Kulumapalya toll plaza	51.93	56.79	55.08	55.55	57.26	54.94
		Chokkenahalli toll plaza	40.98	45.76	44.82	45.50	48.00	46.87
02	Gorhar-Barwa adda	Ghanghri Toll Plaza	114.09	116.52	108.53	109.97	108.29	104.37
03	Vijayawada	Kaza Toll Plaza Mangaliri	161.06	178.59	174.86	169.84	175.89	182.88

04	Chennai Tada	Nallur Toll Plaza	120.07	123.53	124.72	129.64	133.48	130.53
05	Chennai Bypass	Vanagram Toll Plaza	61.71	65.43	61.89	62.61	64.78	60.84
		Surapattu Toll Plaza	79.41	82.70	82.91	86.93	89.45	86.34

(in ₹ million)

S. No.	Asset Name	Plaza Name	October 2023	November 2023	December 2023	January 2024	February 2024	March 2024
01	Neelmangla-Tumkur	Kulumapalya toll plaza	57.61	53.68	58.34	55.81	54.82	56.04
		Chokkenahalli toll plaza	49.05	46.54	49.61	50.16	47.82	49.00
02	Gorhar-Barwa adda	Ghanghri Toll Plaza	109.64	114.42	121.41	112.55	116.88	124.34
03	Vijayawada	Kaza Toll Plaza Mangaliri	191.98	179.92	190.30	185.86	180.34	192.67
04	Chennai Tada	Nallur Toll Plaza	134.34	119.34	119.80	129.42	135.91	142.67
05	Chennai Bypass	Vanagram Toll Plaza	60.33	54.90	54.59	59.69	61.66	65.03
		Surapattu Toll Plaza	87.20	79.58	79.45	83.31	90.07	92.22

(in ₹ million)

S. No.	Asset Name	Plaza Name	April 2024	May 2024	June 2024	July 2024	August 2024	September 2024
01	Neelmangla-Tumkur	Kulumapalya toll plaza	51.06	53.97	51.94	51.60	53.35	51.71
		Chokkenahalli toll plaza	46.45	50.83	47.62	48.09	49.77	48.73
02	Gorhar-Barwa adda	Ghanghri Toll Plaza	114.44	116.74	114.40	116.88	110.10	115.22
03	Vijayawada	Kaza Toll Plaza Mangaliri	176.88	185.53	176.98	181.82	189.86	144.35
04	Chennai Tada	Nallur Toll Plaza	130.46	137.11	136.78	143.27	146.41	136.70
05	Chennai Bypass	Vanagram Toll Plaza	63.11	70.56	72.24	71.82	76.17	73.59
		Surapattu Toll Plaza	85.64	91.22	93.13	95.02	98.10	92.38

(in ₹ million)

S. No.	Asset Name	Plaza Name	October 2024	November 2024	December 2024	January 2025	February 2025	March 2025
01	Neelmangla-Tumkur	Kulumapalya toll plaza	54.42	51.87	55.74	52.76	50.21	56.17
		Chokkenahalli toll plaza	51.40	49.98	53.18	50.53	46.93	51.26
02	Gorhar-Barwa adda	Ghanghri Toll Plaza	122.50	126.74	137.80	134.07	143.57	140.23
03	Vijayawada	Kaza Toll Plaza Mangaliri	195.37	232.75	247.62	248.43	232.48	256.58
04	Chennai Tada	Nallur Toll Plaza	131.70	124.21	135.09	138.40	137.63	154.08
05	Chennai Bypass	Vanagram Toll Plaza	71.72	69.63	68.83	64.70	67.29	76.85
		Surapattu Toll Plaza	89.57	83.28	80.67	79.69	82.77	94.20

(in ₹ million)

S. No.	Asset Name	Plaza Name	April 2025	May 2025	June 2025	July 2025	August 2025	September 2025
01	Neelmangla-Tumkur	Kulumapalya toll plaza	54.53	58.24	55.37	58.46	58.12	55.26
		Chokkenahalli toll plaza	50.38	53.68	52.05	54.78	53.26	43.92
02	Gorhar-Barwa adda	Ghanghri Toll Plaza	136.01	139.02	124.66	124.09	125.78	123.98
03	Vijayawada	Kaza Toll Plaza Mangaliri	262.06	281.46	273.49	275.87	243.42	249.80
04	Chennai Tada	Nallur Toll Plaza	148.75	149.63	151.78	165.52	159.04	157.16
05	Chennai Bypass	Vanagram Toll Plaza	76.48	82.45	79.33	85.15	83.65	79.81
		Surapattu Toll Plaza	91.68	97.92	97.37	103.24	100.95	96.18

(in ₹ million)

S. No.	Asset Name	Plaza Name	October 2025	November 2025	December 2025	January 2026
01	Neelmangla-Tumkur	Kulumapalya toll plaza	55.02	54.68	62.07	55.72
		Chokkenahalli toll plaza	43.28	42.86	49.78	44.93
02	Gorhar-Barwa adda	Ghanghri Toll Plaza	117.38	139.27	141.65	139.91
03	Vijayawada	Kaza Toll Plaza Mangaliri	239.61	246.20	250.13	237.39
04	Chennai Tada	Nallur Toll Plaza	140.16	146.17	155.05	150.72
05	Chennai Bypass	Vanagram Toll Plaza	73.13	71.84	76.77	72.83
		Surapattu Toll Plaza	86.12	89.71	93.07	88.32

AUDITED FINANCIAL INFORMATION

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A. R. & Co.
Chartered Accountants

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pawankgoel1@gmail.com

INDEPENDENT AUDITORS' REPORT

To,
The Board of Directors
Raajmarg Infra Investment Managers Private Limited
(Investment Manager of Raajmarg Infra Investment Trust)
G-5 & 6, Sector-10,
Dwarka, Delhi-110075

Opinion

We have audited the special purpose standalone financial statements of Raajmarg Infra Investment Trust ("the Trust"), which comprise the special purpose standalone balance sheet as at 31st December, 2025, the special purpose standalone statement of profit and loss (including other comprehensive income) for the period from 24th November 2025 to 31st December 2025, and the special purpose standalone statement of cash flows for the period from 24th November, 2025 to 31st December, 2025, the special purpose Statement of Net Assets at fair value for the period from 24th November, 2025 to 31st December, 2025, the special purpose Statement of Total Returns at fair value and the special purpose Statement of Net Distributable Cash Flows ("NDCFs") for the period from 24th November, 2025 to 31st December, 2025 and notes to the special purpose standalone financial statements, including a summary of the material accounting policies ("the special purpose standalone financial statements") and other explanatory information, as required by Indian Accounting Standard 34, "Interim Financial Reporting" ("Ind AS 34") and other accounting principles generally accepted in India.

In our opinion and to the best of our information and according to the explanations given to us, the aforesaid special purpose standalone financial statements give the information required by the Securities and Exchange Board of India (Infrastructure Investment Trusts) Regulations, 2014 as amended from time to time including any guidelines and circulars issued thereunder (together referred to as the "SEBI InvIT Regulations") in the manner so required and give a true and fair view in conformity with Ind AS 34 and other accounting principles generally accepted in India, to the extent not inconsistent with SEBI InvIT Regulations, of the state of affairs of the Trust, as at 31st December, 2025, Profit and other comprehensive income for the period from 24th November, 2025 to 31st December, 2025, its cash flows for the period from 24th November, 2025 to 31st December, 2025, its statement of changes in Unitholder's equity for the period from 24th November, 2025 to 31st December, 2025, its net assets at fair value as at 31st December, 2025, its total returns at fair value and the net distributable cash flows of the Trust for the period from 24th November, 2025 to 31st December, 2025.

A. R. & Co.
Chartered Accountants

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Basis for Opinion

We conducted our audit in accordance with the Standards on Auditing ("SAs") issued by the Institute of Chartered Accountants of India. Our responsibilities under those SAs are further described in the Auditor's Responsibilities for the Audit of the Special purpose standalone financial statements section of our report. We are independent of the Trust in accordance with the Code of Ethics issued by the Institute of Chartered Accountants of India together with the ethical requirements that are relevant to our audit of the special purpose standalone financial statements under the provisions of the SEBI InvIT Regulations, and we have fulfilled our other ethical responsibilities in accordance with these requirements and the Code of Ethics. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

RESPONSIBILITIES OF THE BOARD OF DIRECTORS OF INVESTMENT MANAGER FOR THE SPECIAL PURPOSE STANDALONE FINANCIAL STATEMENTS

The Board of Directors of Raajmarg Infra Investment Managers Private Limited (Investment Manager) is/are responsible for the preparation of these special purpose standalone financial statements that give a true and fair view of the state of affairs, profit and other comprehensive income , cash flows and the movement of the Unitholder's equity for the period from 24th November, 2025 to 31st December, 2025, the net assets at fair value as at 31st December, 2025, the total returns at fair value and the net distributable cash flows of the Trust in accordance with the requirements of the SEBI InvIT Regulations, Indian Accounting Standards as defined in Rule 2(1)(a) of Companies (Indian Accounting Standards) Rules, 2015, as amended and other accounting principles generally accepted in India, to the extent not inconsistent with SEBI InvIT Regulations.
This responsibility also includes maintenance of adequate accounting records in accordance with the provisions of the SEBI Invit Regulations for safeguarding of the assets of the Trust and for preventing and detecting frauds and other irregularities; selection and application of appropriate accounting policies; making judgments and estimates that are reasonable and prudent; and design, implementation and maintenance of adequate internal financial controls that were operating effectively for ensuring accuracy and completeness of the accounting records, relevant to the preparation and presentation of the special purpose standalone financial statements that give a true and fair view and are free from material misstatement, whether due to fraud or error.

In preparing the special purpose standalone financial statements, the Board of Directors of Investment Manager are responsible for assessing the Trust's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless the management either intends to liquidate the Trust or to cease operations, or has no realistic alternative but to do so.

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The Board of Directors of Investment Manager are also responsible for overseeing the Trust's financial reporting process.

Auditor's Responsibilities for the Audit of the Special purpose standalone financial statements

Our objectives are to obtain reasonable assurance about whether the special purpose standalone financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditors' report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with SAs will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these special purpose standalone financial statements.

As part of an audit in accordance with SAs, we exercise professional judgment and maintain professional skepticism throughout the audit. We also:

- Identify and assess the risks of material misstatement of the special purpose standalone financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.

- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Trust's internal control.

- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by management.

- Conclude on the appropriateness of management's use of the going concern basis of accounting and based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Trust's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditors' report to the related disclosures in the special purpose standalone financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence

A. R. & Co.
Chartered Accountants

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obtained up to the date of our auditors' report. However, future events or conditions may cause the Trust to cease to continue as a going concern.

- Evaluate the overall presentation, structure and content of the special purpose standalone financial statements, including the disclosures, and whether the special purpose standalone financial statements represent the underlying transactions and events in a manner that achieves fair presentation.

We communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.

We also provide those charged with governance with a statement that we have complied with relevant ethical requirements regarding independence and communicate with them all relationships and other matters that may reasonably be thought to bear on our independence, and where applicable, related safeguards.

For A. R. & Co.
Chartered Accountants
FRN. 002744C

CA Mohd. Azam Ansari
Partner
Membership No: 511623
UDIN: 26511623UACYIH3626
Place: New Delhi
Date: 12.01.2026

RAAJMARG INFRA INVESTMENT TRUST
SEBI Registration Number :- IN/InvIT/25-26/0034
SPECIAL PURPOSE STANDALONE BALANCE SHEET AS AT 31 DECEMBER, 2025

(All amounts are in ₹ millions unless otherwise stated)

Particulars	Notes	As at 31 December, 2025
Assets		
1) Non - Current Assets		
(a) Financial Assets		
(i) Investments		-
(ii) Loans		-
(iii) Other Financial Assets		-
(b) Other Non-Current Assets		-
Total non current assets		**-**
2) Current Assets		
(a) Financial Assets		
(i) Cash and Cash Equivalents		-
(ii) Other Financial Assets		-
(b) Current Tax Assets (Net)		-
(c) Other Current Assets	4	0.01
Total current assets		**0.01**
Total Assets		**0.01**
Equity and Liabilities		
Equity		
1) Unit Capital	5	-
2) Initial Settlement Amount		0.01
3) Other Equity		-
Total Equity		**0.01**
Liabilities		
1) Non-Current Liabilities		
(a) Financial Liabilities		
(i) Borrowings		-
Total Non-Current Liabilities		**-**
2) Current Liabilities		
(a) Financial Liabilities		
(i) Borrowings		-
(ii) Trade Payables		
(a) Total Outstanding, dues of micro and small enterprises		-
(b) Total outstanding, dues of creditors other than micro and small enterprises		-
(iii) Other Financial Liabilities		-
(b) Current Tax Liabilities (Net)		-
(c) Other Current Liabilities		-
Total Current Liabilities		**-**
Total Equity and Liabilities		**0.01**

The accompanying notes form an integral part of these financial statements
This is the Balance Sheet referred to in our report of even date.

For A.R. & Co.
Chartered Accountants
FRN - 002744C

For and on behalf of Board of Directors of the
Raajmarg Infra Investment Managers Private Ltd.
(acting as Investment Manager of Raajmarg Infra Investment Trust)

CA Mohd. Azam Ansari
Partner
MRN - 511623

NRVVMK Rajendra Kumar
Director
DIN: 09494456

Ashish Kumar Singh
Director
DIN: 09841587

Date : 12.01.2026
Place : New Delhi

Mridul Dubey
CFO

Gunjan Rajpal
Compliance Officer

RAAJMARG INFRA INVESTMENT TRUST

SEBI Registration Number :- IN/InvIT/25-26/0034

SPECIAL PURPOSE STANDALONE STATEMENT OF PROFIT AND LOSS

FOR THE PERIOD ENDED 31 DECEMBER, 2025

(All amounts are in ₹ millions unless otherwise stated)

Particulars	Notes	For the Period ended 31 December, 2025
Income and Gains		
Interest income on loan given to subsidiaries		-
Interest Income on fixed deposits		-
Profit on sale of investments		-
Other income		-
Total Income		**-**
Expenses		
Investment Manager Fees		-
Trustee Fees		-
Valuation expenses		-
Annual listing fees		-
Rating fees		-
Audit Fees		
- Statutory audit fees		-
- Other audit services (including certification)		-
Custodian Fees		-
Finance Cost		-
Other Expenses		-
Total Expenses		**-**
Profit before Tax		**-**
Tax Expenses		
Current Tax		-
Current tax - earlier years		
Deferred Tax expense/(credit)		
Total Tax		-
Profit after Tax		-
Other Comprehensive Income		
A (i) Items that will not be reclassified to Profit or Loss		-
(ii) Income tax relating to items that will not be reclassified to profit or loss		-
B (i) Items that will be reclassified to Profit or Loss		-
(ii) Income tax relating to items that will not be reclassified to profit or loss		-
		-
Total Comprehensive Income for the period/year		**-**
Earnings per Unit		
Basic		-
Diluted		-

The accompanying notes form an integral part of these financial statements.
This is the Statement of Profit and Loss referred to in our report of even date.

For A.R. & Co.
Chartered Accountants
FRN - 002744C

For and on behalf of Board of Directors of the
Raajmarg Infra Investment Managers Private Ltd.
(acting as Investment Manager of Raajmarg Infra Investment Trust)

CA Mohd. Azam Ansari
Partner
MRN - 511623

NRVVMK Rajendra Kumar
Director
DIN: 09494456

Ashish Kumar Singh
Director
DIN: 09841587

Date : 12.01.2026
Place : New Delhi

Mridul Dubey
CFO

Gunjan Rajpal
Compliance Officer

RAAJMARG INFRA INVESTMENT TRUST
SEBI Registration Number :- IN/InvIT/25-26/0034
SPECIAL PURPOSE STANDALONE STATEMENT OF CASH FLOWS
FOR THE PERIOD ENDED 31 DECEMBER, 2025

(All amounts are in ₹ millions unless otherwise stated)

	Particulars	For the Period ended 31 December, 2025
A.	**Cash flows from operating activities**	
	Net Profit/(Loss) Before Tax	-
	Adjustments:	
	Finance Cost (net)	-
	Interest Income on Bank FDR	-
	Interest Income on Long Term Loan given to SPVs'	-
	Profit on redemption of Mutual Funds	-
	Operating cash flows before Working Capital Changes	-
	Movements in Working Capital	
	Decrease / (Increase) in Other Financial Assets	-
	Decrease / (Increase) in Other Current/ Non-Current Assets	-
	Increase / (Decrease) in Trade & Other Payables	-
	Increase / (Decrease) in Other Financial Liabilities	-
	Increase / (Decrease) in Other Current Liabilities	-
	Increase / (Decrease) in Current Tax Liabilities	-
	Cash used in operating activities	**-**
	Income Tax paid	-
	Net Cash Flows from/(used in) operating activities -A	**-**
B.	**Cash flows from investing activities**	
	Long Term Loans given	-
	Purchase of Non Current Investments	-
	Investment in FDR	-
	Profit on redemption of Mutual Funds	-
	Interest received on Long Term Loan given	-
	Interest Received from Bank	-
	Net Cash Flows used in investing activities - B	-
C.	**Cash flows from financing activities**	
	Proceeds from Issue of unit capital	-
	Expense incurred towards initial public debt offering	-
	Expense incurred towards institutional unit allotment	-
	Processing Fee paid	-
	Proceeds from Long Term Borrowings	-
	Distribution paid to unit holders	-
	Repayment of Long Term Borrowings	-
	Finance Costs Paid	-
	Net Cash Flows from/(Used in) financing activities -C	-
	Net Increase/Decrease in Cash and Cash equivalents (A+B+C)	-
	Cash and Cash Equivalents at the Beginning of the Period/Year	-
	Cash and Cash Equivalents at the end of the Period/Year (Refer Note 8)	**-**

Reconciliation of liabilities arising from Financing Activities pursuant to Ind AS 7- Statement of Cash Flows.
Net Debt Recognition

(All amounts are in ₹ millions unless otherwise stated)

Particulars	For the Period ended 31 December, 2025
a) Carrying amount of debt at the beginning of the period/year	-
b) Additional borrowings during the period/year	-
c) Repayments during the period/year	-
d) Other adjustments/settlements during the period/year	-
e) Transaction Cost adjustment	-
f) Carrying amount of debt at the end of the period/year	**-**

Note:
(i) The above Statement of Cash Flows has been prepared under the indirect method as set out in "Ind AS 7 Statement of Cash Flows".
(ii) Amount in bracket represent outflows.
This is the Cash Flow Statement referred to in our report of even date.

For A.R. & Co.
Chartered Accountants
FRN - 002744C

For and on behalf of Board of Directors of the
Raajmarg Infra Investment Managers Private Ltd.
(acting as Investment Manager of Raajmarg Infra Investment Trust)

CA Mohd. Azam Ansari
Partner
MRN - 511623

NRVVMK Rajendra Kumar
Director
DIN: 09494456

Ashish Kumar Singh
Director
DIN: 09841587

Date : 12.01.2026
Place : New Delhi

Mridul Dubey
CFO

Gunjan Rajpal
Compliance Officer

RAAJMARG INFRA INVESTMENT TRUST
SEBI Registration Number :- IN/InvIT/25-26/0034
SPECIAL PURPOSE STANDALONE STATEMENT OF CHANGES IN UNIT HOLDERS EQUITY
FOR THE PERIOD ENDED 31 DECEMBER, 2025

A. Initial Settlement Amount

(All amounts are in ₹ millions unless otherwise stated)

Particulars	Amount
Opening Balance	**-**
Changes during the period	0.01
Balance as at 31 December, 2025	**0.01**

B. Unit Capital

(All amounts are in ₹ millions unless otherwise stated)

Particulars	Number of unit	Amount
Opening Balance	**-**	**-**
Changes in unit capital	**-**	**-**
One time issue expenses	**-**	**-**
Balance as at 31 December, 2025	**-**	**-**

C. Other Equity

(All amounts are in ₹ millions unless otherwise stated)

Particulars	Reserves and Surplus	Items of Other Comprehensive Income	Total
		Items that will not be reclassified to profit or loss	
	Retained Earnings	Remeasurement of Defined Benefit Obligation/ Plan	
Opening Balance	**-**	**-**	**-**
Profit for the period	**-**	**-**	**-**
Less:			
Distribution to unit holders			
Interest	**-**	**-**	**-**
Other Income	**-**	**-**	**-**
Balance as at 31 December, 2025	**-**	**-**	**-**

For A.R. & Co.
Chartered Accountants
FRN - 002744C

For and on behalf of Board of Directors of the
Raajmarg Infra Investment Managers Private Ltd.
(acting as Investment Manager of Raajmarg Infra Investment Trust)

CA Mohd. Azam Ansari
Partner
MRN - 511623

NRVVMK Rajendra Kumar
Director
DIN: 09494456

Ashish Kumar Singh
Director
DIN: 09841587

Date : 12.01.2026
Place : New Delhi

Mridul Dubey
CFO

Gunjan Rajpal
Compliance Officer

RAAJMARG INFRA INVESTMENT TRUST
SEBI Registration Number :- IN/InvIT/25-26/0034
Notes to Special Purpose Standalone Financial Statements for the period ended 31 December, 2025
Disclosures pursuant to SEBI circulars (as required by paragraph 6 of chapter 4 to the SEBI Master Circular No.SEBI/HO/DDHS-PoD-2/P/CIR/2024/44 dated May 15, 2024)

Standalone Statement of Net Assets at Fair Value

(All amounts are in ₹ millions unless otherwise stated)

Particulars	As at 31 December, 2025	
	Book value	Fair value^
A. Assets	-	-
B. Liabilities (at book value)	-	-
C. Net assets (A-B)	**-**	**-**
D. No of units	-	-
E. NAV (C/D)	**-**	**-**

Standalone Statement of Total Return at Fair Value:

(All amounts are in ₹ millions unless otherwise stated)

Particulars	As at 31 December, 2025
Total comprehensive income for the period/year (As per the Special Purpose Standalone Statement of Profit and Loss)	-
Add: Other changes in fair value for the	-
Total return	**-**

The accompanying notes form an integral part of the Special Purpose Standalone Financial Statements.

This is the Standalone Statement of Net Assets at Fair Value and Standalone Statement of Total Return at Fair Value referred to in our report of even date.

For A.R. & Co.
Chartered Accountants
FRN - 002744C

CA Mohd. Azam Ansari
Partner
MRN - 511623

Date : 12.01.2026
Place : New Delhi

For and on behalf of Board of Directors of the Raajmarg Infra Investment Managers Private Ltd. (acting as Investment Manager of Raajmarg Infra Investment Trust)

NRVVMK Rajendra Kumar
Director
DIN: 09494456

Ashish Kumar Singh
Director
DIN: 09841587

Mridul Dubey
CFO

Gunjan Rajpal
Compliance Officer

RAAJMARG INFRA INVESTMENT TRUST
SEBI Registration Number :- IN/InvIT/25-26/0034
Special Purpose Statement of Net Distributable Cash Flow for the Period ended 31 December, 2025

Additional disclosures as required by paragraph 6 of chapter 4 to the SEBI Master Circular No.SEBI/HO/DDHS-PoD-2/P/CIR/2024/44 dated May 15, 2024

(All amounts are in ₹ lakh unless otherwise stated)

S. No.	Particulars	Amount
1	**Cashflows from operating activities of the Trust**	0.00
2	(+) Cash flows received from SPV's / Investment entities which represent distributions of NDCF computed as per relevant framework (Refer Notes Below)	0.00
3	(+) Treasury income / income from investing activities of the Trust (interest income received from FD, any investment entities as defined in Regulation 18(5), tax refund, any other income in the nature of interest, profit on sale of Mutual funds, investments, assets etc., dividend income etc., excluding any Ind AS adjustments)	0.00
4	(+) Proceeds from sale of infrastructure / real estate investments, infrastructure / real estate assets or shares of SPVs/Holdcos or Investment Entity adjusted for the following	0.00
	• Applicable capital gains and other taxes	0.00
	• Related debts settled or due to be settled from sale proceeds	0.00
	• Directly attributable transaction costs	0.00
	• Proceeds reinvested or planned to be reinvested as per Regulation 18(16)(d) of REIT Regulations or Regulation 18(7) of InvIT Regulations or any other relevant provisions of the REIT/InvIT Regulations	0.00
5	(+) Proceeds from sale of infrastructure / real estate investments, infrastructure / real estate assets or sale of shares of SPVs/ Hold cos or Investment Entity not distributed pursuant to an earlier plan to re-invest as per Regulation 18(16)(d) of REIT Regulations or Regulation 18(7) of InvIT Regulations or any other relevant provisions of the REIT/InvIT Regulations, if such proceeds are not intended to be invested subsequently	0.00
6	(-) Finance cost on Borrowings, excluding amortisation of any transaction costs, recognized in Profit and Loss account of the Trust	0.00
7	(-) Debt repayment at Trust level (to include principal repayments as per scheduled EMI's except if refinanced through new debt including overdraft facilities and to exclude any debt repayments / debt refinanced through new debt in any form or equity raise)	0.00
8	(-) any reserve required to be created under the terms of, or pursuant to the obligations arising in accordance with, any: (i). loan agreement entered with lenders, or (ii). agreement pursuant to which the Trust operates or owns the infrastructure or real estate asset, or generates revenue or cashflows from such asset (such as, concession agreement, transmission services agreement, power purchase agreement, lease agreement, and any other agreement of a like nature, by whatever name called); or (iii). statutory, judicial, regulatory, or governmental stipulations; or (iv). such mandatory terms or conditions, which if breached (or not complied with) would result in the Trust losing the right to own or operate the relevant infrastructure asset or real estate asset	0.00
9	(-) any capital expenditure to the extent not funded by debt / equity or from reserves created in the earlier years	0.00
10	**NDCF at Trust level as at the beginning**	**0.00**
	NDCF Distributed during the period	**0.00**
	Balance NDCF for December 2025	**0.00**

Notes:

1 In accordance with the SEBI circular no. SEBI/HO/DDHS-PoD-2/P/CIR/2024/44 dated May 15, 2024, the framework for computation of Net Distributable cash flows ("NDCF") is revised with effect from April 01, 2024. Accordingly, NDCF for the period ended 31 December, 2025, has been calculated and presented in accordance with the revised framework.

RAAJMARG INFRA INVESTMENT TRUST

SEBI Registration Number :- IN/InvIT/25-26/0034

Notes to Special Purpose Standalone Financial Statements for the period ended 31 December, 2025

1 TRUST INFORMATION AND NATURE OF OPERATIONS

Raajmarg Infra Investment Trust ("Trust" or "InvIT") is an irrevocable Trust with Trust Deed executed on 24 November 2025 and registered with Sub Registrar IX Distt. South West Delhi having registration number 2025/16/IV/4177, in Book No : IV, Volume No. 3262, under the provisions of the Indian Trusts Act, 1882 on 01 December 2025.

It is registered under the Securities and Exchange Board of India (Infrastructure Investment Trust) Regulations, 2014 on 22 December 2025 having registration number IN/InvIT/25-26/0034.

The Trust was setup by National Highways Authority of India ("NHAI" or the "Sponsor"). The Trustee to the Trust is IDBI Trusteeship Services Limited (the "Trustee") and Investment Manager for the Trust is Raajmarg Infra Investment Managers Private Limited ("Investment Manager").

The Trust has been formed to invest in infrastructure assets primarily being in the road sector in India. The Trust's road projects will be implemented and held through special purpose vehicles ("Project SPVs"/ "Subsidiaries").

The registered office of Investment Manager is G-5 & 6, Sector-10, Dwarka, New Delhi - 110075.

2 Basis of Preparation

The financials comprises of the Balance Sheet, Statement of Profit and Loss, Cash Flow Statement, Statement of Changes in Equity and explanatory notes thereon of Raajmarg Infra Investment Trust, for the period ended 31st December 2025. The Special Purpose financial Information has been prepared in accordance with recognition and measurement principles laid down in Indian Accounting Standard 34- Interim Financial Reporting (Ind AS 34), as presribed in Rule 2(1)(a) of the Companies (Indian Accounting Standards) Rules, 2015 (as amended) and other accounting principles generally accepted in India, to the extent not inconsistent with the Securities and Exchange Board of India (Infrastructure Investment Trusts) Regulations, 2014, as amended, the additional disclosures as required in Chapter 4 of SEBI Master Circular No. SEBI/HO/DDHS-PoD 2/P/CIR/2023/115 dated 06th July 2023 as amended including any guidelines and circulars issued thereunder ("SEBI Circulars/InvIT Regulations")

The financial statements were authorised for issue in accordance with resolution passed by the board of directors of the Investment Manager on 12.01.2026.

The audit of these Special Purpose Standalone Financial statements for the period ended 31 December, 2025 of RIIT has been carried out by the Statutory Auditors of RIIT.

3 Material accounting policies and key sources of estimation uncertainities and critical judgements

A Material accounting policies

The accounting policies adopted in preparation of these financial statements are consistent with those followed in preparation of the Trust's latest Annual Financial Statements.

B Key sources of estimation uncertainities and critical judgements

The preparation of the financial statements requires use of certain critical accounting estimates and judgements. It also requires the management to exercise judgement in the process of applying the Trust's accounting policies. The areas where judgements and estimates are significant to the financial statements or areas involving a higher degree of judgement or complexity are the same as those applied to the Trust's latest Annual Standalone Financial Statements.

4 Other Current Assets

(All amounts are in ₹ millions unless otherwise stated)

Particulars	As at 31 December, 2025
Balance with Trustee (IDBI Trusteeship Services Ltd.)	0.01
Total	**0.01**

As per the executed Trust Deed on 24.11.2025, the Trustee i.e. IDBI Trusteeship Services Limited holds an amount of Rs. 10,000/- towards the initial settlement of the InvIT Trust on behalf of the Trust. The said amount of Rs. 10,000/- were transferred to Trustee by the Sponsor i.e. NHAI on 31.10.2025 i.e. before the execution of the Trust Deed. This initial corpus shall be applied and governed by the Terms and Conditions of the Trust Deed.

5 Unit Capital

(All amounts are in ₹ millions unless otherwise stated)

Particulars	As at 31 December, 2025	
	No of Units	Amount
Unit Capital		
Opening balance	-	-
Add: Units issued during the year	-	-
Less: Issue expenses (refer note below)	-	-
Balance as at year end	-	-

Rights/ preferences and restrictions attached to Unit Capital

Subject to the provisions of the InvIT Regulations, the indenture of funds, and applicable rules, regulations and guidelines, the rights of the unit holders include:

a) The beneficial interest of each unitholder shall be equal and limited to the proportion of the number of the units held by that unitholder to the total number of units.

b) Right to receive income or distributions with respect to the units held.
c) Right to attend the annual general meeting and other meetings of unit holders of the Trust.
d) Right to vote upon any matters/resolutions proposed in relation to the Trust.
e) Right to receive periodic information having a bearing on the operation or performance of the Trust in accordance with the InvIT Regulations.
f) Right to apply to the Trust to take up certain issues at meetings for unit holders approval.
g) Right to receive additional information, if any, in accordance with InvIT documents filed with Placement Memorandum.

In accordance with the InvIT Regulations, no unit holders shall enjoy superior voting or any other rights over any other unit holders, and there shall not be multiple classes of units. There shall be only one denomination of units. Not withstanding the above, subordinate units may be issued only to the Sponsor and its Associates, where such subordinate units shall carry only inferior voting or any other rights compare to the other units.

Under the provisions of the InvIT Regulations, not less than 90% of the net distributable cash flows of the Trust is required to be distributed to the unitholders, and in accordance with such statutory obligation the Trust has formulated a distribution policy to declare and distribute the distributable cash flows to its unitholders atleast once every financial year as approved by the Board of Directors of the Investment Manager. The distributions made by Trust to its unitholders are based on the Net Distributable Cash Flows (NDCF) of the Trust under the InvIT Regulations. The distribution in proportion to the number of units held by the unitholders. The Trust declares and pays in distributions in Indian rupees.

Limitation to the Liability of the unit holders
The liability of each unit holders towards the payment of any amount (that may arise in relation to the Trust including any taxes, duties, fines, levies, liabilities, costs or expenses) shall be limited only to the extent of the capital contribution of such unit holders and after such capital contribution shall have been paid in full by the unit holders, the unit holders shall not be obligated to make any further payments.
The unit holders shall not have any personal liability or obligation with respect to the Trust.

Classification of Unit Holders' Funds

Under the provisions of the InvIT Regulations, RIIT is required to distribute to Unitholders not less than ninety percent of the net distributable cash flows of RIITfor each financial year. Accordingly, a portion of the unitholders' funds contains a contractual obligation of the Trust to pay to its Unitholders cash distributions. The Unitholders' funds could therefore have been classified as compound financial instrument which contain both equity and liability components in accordance with Ind AS 32 - Financial Instruments: Presentation. However, in accordance with SEBI Circulars (No. CIR/IMD/DF/114/2016 dated 20-Oct-2016 and No. CIR/IMD/DF/127/2016 dated 29-Nov-2016) issued under the InvIT Regulations, the unitholders' funds have been classified as equity in order to comply with the mandatory requirements of Section H of Annexure A to the SEBI Circular dated 20-Oct-2016 dealing with the minimum disclosures for key financial statements. In line with the above, the distribution payable to unit holders is recognised as liability when the same is approved by the Investment Manager.

Details Of Unitholders Holding More Than 5% Units In The Trust

Name Of Unitholders	As at 31 December, 2025	
	No. of Units	%

As per records of the Trust, including its register of unitholders and other declaration received from unitholders regarding beneficial interest, the above unitholding represent both legal and beneficial ownership of units.

The Trust has not allotted any fully paid-up units by way of bonus units nor has it bought back any class of units from the date of incorporation till the balance sheet date. Further the Trust has not issued any units for consideration other than cash during the period/year.

Reconciliation of Number of Units Outstanding is set out below*:

Particulars	As at 31 December, 2025	
	No of Units	Amount (amounts in ₹ millions) *
Number of Units at the beginning of the period/year		
Units issued during the period/year		
Number of Units at the end of the period/year		

* Amount related to issue expenses are not deducted in the reconciliation of number of unit capital outstanding.

6 Statement of Related Parties

A. List of Related Parties as per requirement of IND AS 24 – "Related Party Disclosures"

Enterprises where Control / significant influence exists	

B. List of additional related parties as per Regulation 2(1)(zv) of the SEBI InvIT Regulations

Parties to the Trust

Raajmarg Infra Investment Managers Private Limited (RIIMPL) - Investment Manager (IM) of the Trust
IDBI Trusteeship Services Limited (ITSL) - Trustee of the Trust
National Highways Authority of India (NHAI)- Sponsor
National Highways InvIT Project Managers Private Limited (NHIPMPL)- Project Manager

Promoters of the Parties to the Trust specified above

Government of India (acting through Ministry of Road, Transport & Highways (MORTH)) - Promoter of RIIMPL
IDBI Bank Limited (IDBI Bank) - Promoter of ITSL
Government of India (acting through Ministry of Road, Transport & Highways (MORTH)) - Promoter of NHAI
National Highways Authority of India (NHAI)- Promoter of NHIPMPL

Directors of the parties to the Trust specified above

Directors of RIIMPL

Mr. NRVVMK Rajendra Kumar
Mr. Ashish Kumar Singh
Ms. Annie George Mathew
Mr. Giridhar Aramane
Mr. Himanshu Gulliani
Mr. DIP Kishore

Directors of ITSL

Ms. Jayakumar Subramonia Pillai
Mr. Pradeep Kumar Malhotra
Mr. Balkrishna Variar
Mr. Arun Kumar Agarwal
Mr. Hare Krushna Dandapani Panda
Mr. Soma Nandan Satpathy
Mr. Kumar Neel Lohit

Directors of NHIPMPL

Mr. Akhil Khare
Mr. Ashish Kumar Singh

C. Transactions with Related Parties

(All amounts are in ₹ millions unless otherwise stated)

Particulars	Period ended 31 December, 2025
Raajmarg 1 Projects (P) Ltd.	
National Highways Infra Investment Managers Private Limited (NHIIMPL)	
National Highways Authority of India (NHAI)	
Initial Settlement Amount	0.01
IDBI Trusteeship Services Limited (ITSL)	
IDBI Bank Limited	

D. Closing Balances with Related Parties

(All amounts are in ₹ millions unless otherwise stated)

Particulars	As at 31 December, 2025
Raajmarg 1 Projects (P) Ltd.	
National Highways Infra Investment Managers Private Limited (NHIIMPL)	
National Highways Authority of India (NHAI)	
Initial Settlement Amount	0.01
IDBI Trusteeship Services Limited (ITSL)	
IDBI Bank Limited	

7 Statement of Contingent Liabilities/Contingent Assets

There are no contingent liabilities as at 31 December, 2025

8 Distribution made

(All amounts are in ₹ millions unless otherwise stated)

Particulars	Period ended 31 December, 2025
Interest	-
Return of capital	
Dividend	
Other income of the Trust	-
Total	**-**

9 Disclosure of segment information pursuant to IND AS 108 "Operating Segments"

The activities of the Trust mainly include investing in infrastructure assets primarily in the SPVs operating in the road sector to generate cash flows for distribution to unit holders. Based on the guiding principles given in Ind AS - 108 “Operating Segments”, this activity falls within a single operating segment. Further, the entire operations of the Trust are only in India and hence, disclosure of secondary / geographical segment information does not arise. Accordingly, requirement of providing disclosures under Ind AS 108 does not arise.

10 Investment Management Fees

i) The Investment Manager's Management Fee has been agreed at Rs.11.0 Crores from the Financial Year 2026-27 onwards.

ii) The management fee set out in paragraph (i) above shall be subject to escalation on an annual basis at the rate of 10% of the management fee for each previous year.

iii) Any applicable taxes, cess or charges, as the case may be, shall be in addition to the management fee and shall be payable by Raajmarg Infra Investment Trust (RIIT) to the Investment Manager (RIIMPL).

iv) Management fee payment frequency: Payment of management fee shall be made by Raajmarg Infra Investment Trust (RIIT) to the Investment Manager (RIIMPL) in advance on a quarterly basis at the beginning of each quarter of the financial year.

11 Key sources of estimation

The preparation of financial statements in conformity with Ind AS requires the Trust makes estimates and assumptions that affect the reported amounts of income and expenses of the period, the reported balances of assets and liabilities and the disclosures relating to contingent liabilities as of the date of the financial statements. The estimates and underlying assumptions are reviewed on an ongoing basis. Revisions to accounting estimates include allowance for doubtful loans /other receivables, fair value measurement etc. Difference, if any, between the actual results and estimates is recognised in the period in which the results are known.

12 Disclosure pursuant to Ind AS 23 "Borrowing Costs"
Borrowing cost capitalised during the period ended 31 December, 2025 Rs. Nil

13 Default and breaches
There are no defaults during the year with respect to repayment of principal and payment of interest and no breaches of the terms and conditions of the borrowings. There are no breaches during the year which permitted lender to demand accelerated payment.

14 The financial statements of the Trust are the first financial statements prepared under Ind AS, comparative information for the previous period has not been presented. Accordingly, the figures for the current period are not comparable with those of any prior period.

For A.R. & Co.
Chartered Accountants
FRN - 002744C

CA Mohd. Azam Ansari
Partner
MRN - 511623

Date : 12.01.2026
Place : New Delhi

For and on behalf of Board of Directors of the Raajmarg Infra Investment Managers Private Ltd. (acting as Investment Manager of Raajmarg Infra Investment Trust)

NRVVMK Rajendra Kumar
Director
DIN: 09494456

Ashish Kumar Singh
Director
DIN: 09841587

Mridul Dubey
CFO

Gunjan Rajpal
Compliance Officer

PROJECTIONS OF REVENUE FROM OPERATIONS AND CASH FLOW FROM OPERATING ACTIVITIES

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A. R. & Co.
Chartered Accountants

A-403, Gayatri Apartments
Plot No-27, Sector-10, Dwarka,
New Delhi-110075
Cell No.9810195084, 9810444051
E-mail: ar_co1981@yahoo.co.in
pawankgoel1@gmail.com

Independent Auditor's Report on financial projections of revenue from operations and cash flow from operating activities and underlying assumptions

To,
The Board of Directors of
Raajmarg Infra Investment Managers Private Limited
("RIIMPL" or "Investment Manager")
in its capacity as the **Investment Manager** of
Raajmarg Infra Investment Trust
("InvIT" or "RIIT" or "Trust")

G – 5 & 6, Sector - 10, Dwarka,
New Delhi – 110 075

1. We have examined the accompanying Statement of financial projections of revenue from operations and cash flow from operating activities and the underlying assumptions of the Raajmarg Infra Investment Trust **(the "Trust")**, Raajmarg 1 Projects Private Limited (referred to as the **"Project SPV"**) (the Trust and Project SPVs together referred to as 'Trust Group'), for the years ending March 31, 2026, March 31, 2027, March 31, 2028 and March 31, 2029 along with basis of preparation and the significant assumptions (Statement of financial projections along with the related assumptions for the Trust Group are hereinafter referred to as the "Financial Projection Information") , annexed to this report for the purpose of inclusion in the Offer Document and Final Offer Document (collectively, the "Offer Documents") prepared by Raajmarg Infra Investment Managers Private Limited (the **"Investment Manager")** in connection with the proposed Initial Public Offering of Units of the Trust (the **"Offering").** The Project SPV is owned by the Trust and the Project Assets are proposed to be transferred from the Sponsor to the Project SPV.

2. The preparation and presentation of the Financial Projection Information, including the underlying assumptions, as set out in Note 3 to Financial Projection Information, is the responsibility of the Investment Manager and has been approved by Board of Directors of the Investment Manager in its meeting held on 12.01.2026. Our report on the financial projection information is based on the Final Valuation Report obtained by the management from Registered Valuers i.e. RBSA Valuation Advisors LLP who have submitted their final signed valuation report to the management on 12.01.2026. Our responsibility is to examine the evidence supporting the assumptions (excluding hypothetical assumptions) and other information to the Projection Information. Our responsibility does not include verification of projections. Therefore, we do not vouch for the accuracy of the same.

3. The Projection Information has been prepared by the Investment Manager in accordance with the requirements of the Securities and Exchange Board of India (Infrastructure Investment Trusts) Regulations, 2014 issued by the Securities and Exchange Board of India

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Plot No-27, Sector-10, Dwarka,
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pawankgoel1@gmail.com

("SEBI"), as amended from time to time and any circulars issued thereunder (the "lnvlT Regulations") for inclusion in the Offer Documents using a set of assumptions that include hypothetical assumptions about future events and management's actions that are not necessarily expected to occur, as set out in Note 3 to the Projection Information and has been approved by the Board of Directors of the Investment Manager. Consequently, users are cautioned that the Projection Information may not be appropriate for purposes other than that described above.

4. We have examined the evidence supporting the assumptions and other information in the Projection Information on a test basis taking into consideration:
   (a) the terms of our engagement agreed with you vide our engagement letter dated 19.12.2025 requesting us to carry out work on the Projection Information, proposed to be included in the Offer Documents; and
   (b) Standard on Assurance Engagement 3400, "The Examination of Prospective Financial Information", issued by the Institute of Chartered Accountants of India.

5. Based on our examination of the evidence supporting the assumptions (excluding the hypothetical assumptions mentioned in Note 3 to the Projection Information), read with para 7 below, nothing has come to our attention which causes us to believe that such assumptions do not provide a reasonable basis for the Projection Information.

6. Further, nothing has come to our attention that causes us to believe, that the Projection Information, read with the Basis of Preparation and notes therein, has not been properly prepared on the basis of the assumptions as set out in Note 3 to the Projection Information and on a consistent basis, to the extent applicable, with the accounting policies and the basis of preparation of the historical Special Purpose Combined Financial Statements of the Trust Group as required by the lnvlT Regulations, prepared in accordance with Indian Accounting Standards as defined in Rule 2(1)(a) of the Companies (Indian Accounting Standards) Rules, 2015 prescribed under Section 133 of the Companies Act, 2013. Our report on such historical Special Purpose Combined Financial Statements expressed unmodified opinion.

7. We draw attention to Note 3 to the Projection Information, the management of Investment Manager has assumed hypothetical assumptions in preparation of Projection Information. Our conclusion is not modified in respect of this matter.

8. Events and circumstances frequently do not occur as expected. Even if the events anticipated under the hypothetical assumptions described above occur, actual results are still likely to be different from the Projection Information since other anticipated events frequently do not occur as expected and the variation may be material. The actual results may therefore differ materially from those forecasted and projected. For the reasons set out above, we do not express any opinion as to the possibility of achievement of the Projection Information.

A. R. & Co.
Chartered Accountants

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9. lnvlT Regulations require the independent auditor to issue a report on the Projection Information and this report is issued for the sole purpose of the Offering in accordance with Indian lnvlT Regulations. Our work has not been carried out in accordance with auditing or other standards and practices generally accepted in jurisdictions outside India, including in the United States of America, and accordingly should not be relied upon as if it had been carried out in accordance with those standards and practices. US securities regulations do not require profit forecasts to be reported on by a third party. This report should not be relied upon by prospective investors in the United States of America, including persons who are Qualified Institutional Buyers as defined under Rule 144A under the United States Securities Act of 1933 participating in the Offering. We accept no responsibility and deny any liability to any person who seeks to rely on this report and who may seek to make a claim in connection with any offering of securities on the basis that they had acted in reliance on such information under the protections afforded by United States of America law and regulation.

10. We have no responsibility to update our report for events and circumstances occurring after the date of the report.

11. This report is intended solely for inclusion in the Offer Documents in connection with the Offering. It should not be used by any other person or for any other purpose. Accordingly, we do not accept or assume any liability or any duty of care for any other purpose or to any other person to whom this report is shown or into whose hands it may come.

For A.R. & Co.
Chartered Accountants
FRN: 002744C

CA. Mohd. Azam Ansari
Partner
MRN: 511623
UDIN: 26511623TYJEYN8172
Place: Delhi
Date: January 12, 2026

RAAJMARG INFRA INVESTMENT TRUST
Statement of Projections of Revenue from Operations
And
Cash Flow from Operating Activities

₹ Millions

Year Start	**1-Jan-26**	**1-Apr-26**	**1-Apr-27**	**1-Apr-28**
Year End	**31-Mar-26**	**31-Mar-27**	**31-Mar-28**	**31-Mar-29**
Trust				
Revenue from Operations	0.00	10,463.83	10,709.19	10,701.73
Cash Flow from Operating Activities	0.00	8,572.75	10,607.70	10,958.03
Project SPV				
Revenue from Operations	0.00	9,258.00	11,280.35	11,806.52
Cash Flow from Operating Activities	0.00	8,766.30	10,764.10	11,129.92
Combined (Trust & Project SPV)				
Revenue from Operations	0.00	9,258.00	11,280.35	11,806.52
Cash Flow from Operating Activities	0.00	8,621.50	10,605.20	10,955.53

** Cashflow from operating activities are reported before taxes (Refer note 3 of Significant assumptions for the Projections).*

For and on behalf of the Board of Directors of
Raajmarg Infra Investment Managers Private Limited
(as Investment Manager of Raajmarg Infra Investment Trust)

Ashish Kumar Singh
Director
DIN: 09841587
Place: Delhi
Date: January 12, 2026

Raajmarg Infra Investment Trust
Notes to the Statement of projections of
Revenue from Operations
And
Cash Flow from Operating Activities

1. General Information:

Raajmarg Infra Investment Trust **("RIIT" or the "Trust")** was setup as an irrevocable trust under the Indian Trust Act, 1882 registered as an Infrastructure Investment Trust ("InvlT") with Securities Exchange Board of India ("SEBI") under the SEBI (Infrastructure Investment Trust) Regulations, 2014 vide Certificate of Registration (IN/lnvlT/25-26/0034) dated December 22, 2025

National Highways Authority of India **("NHAI" or the "Sponsor")** is the sponsor of the Trust. The Trustee to the Trust is IDBI Trusteeship Services Limited **(the "Trustee")**. Investment Manager for the Trust is Raajmarg Infra Investment Managers Limited **("RIIMPL" or the "Investment Manager")** and the Project Manager for the Trust is National Highways Infra Project Managers Private Limited **("NHIPMPL" the "Project Manager")**.

The object and purpose of the Trust, as described in the Trust Deed, is to carry on the activity of an infrastructure investment trust as permissible under SEBI (Infrastructure Investment Trusts) Regulations, 2014 as amended from time to time including circulars, notifications, clarifications and guidelines issued thereunder (the "InvIT Regulations") to raise funds through the Trust, to make investments in accordance with the InvIT Regulations and the investment strategy and to carry on the activities as may be required for operating the Trust, including incidental and ancillary matters thereto.

Raajmarg 1 Projects (P) Ltd. is the Project SPV which is owned by Trust **(the "Project SPV")**. While preparing financial projections of the Project SPV, following assets have been considered which are proposed to be transferred to the Project SPV:

S. No.	Corridor Code	Corridor Name	Asset Code	Toll plaza Name	State	Number of Plazas
1	GBA	Gorhar Barwa Adda	Ku	Kulgo	Jharkhand	1
2	VC	Vijayawada Chilakaluripet	Ka	Kaza	Andhra Pradesh	1
3	CB	Chennai Bypass	Va	Vanagram*	Tamil Nadu	2
			Su	Surapattu	Tamil Nadu	
4	CT	Chennai Tada	Na	Nallur*	Tamil Nadu	1
5	NT	Nelamangala Tumakuru	Kul	Kulumepalya	Karnataka	2
			Ch	Chokkenahalli	Karnataka	

** As per Traffic Due Diligence report of December 2025, toll plaza at Vanagaram is proposed to be relocated to Tiruneermalai and toll plaza at Nallur Is proposed to be relocated to Durainallur*

2. Basis of preparation of projections of revenue from operations and cash flow from operating activities

The projection of revenue from operations and cash flows from operating activities ("Projections") of Project SPV and the Trust (collectively referred to as "Trust Group") for the financials years ending March 31, 2026, March 31, 2027, March 31, 2028 and March 31 2029 ("Projections period") along with the basis of preparation and other explanatory information and the significant assumptions (the "Statement of Projections") have been compiled by Investment Manager to the Trust and has been approved by the Board of Directors of the Investment Manager to the Trust solely for inclusion in the draft offer document/ offer document/ final offer document in connection with the listing. Therefore, the use of these Statement of Projections is not appropriate and should not be used or relied upon for any purpose other than described above.

The Statement of Projections have been prepared based on the accounting policies for recognition and measurement used for preparation of the Special Purpose Combined Financial Statements of the Trust Group in accordance with Indian Accounting Standards ("Ind AS") as defined in Rule 2(l)(a) of the Companies (Indian Accounting Standards) Rules, 2015, prescribed under Section 133 of the Companies Act, 2013 read with InvIT Regulations and the Guidance Note on Combined and Carved Out Financial Statements issued by the Institute of Chartered Accountants of India.

Though the aforesaid Projections are prepared using the principles of the Ind AS framework, they do not provide for all the detailed disclosures as required under Ind AS. Projected Operational cash flows of the SPVs and Trust have been calculated using the direct method under Ind AS 7- Statement of Cash Flows and is computed by deducting the projected operating expenses from the projected revenue from operations and non-cash expenses (if any). Projected cash flow from operations does not include any items pertaining to financing or investing nature. Cash flows from operating activities are reported before taxes.

The Statement of Projections are presented in Indian Rupees (INR/ ₹) which is also the functional currency of the Trust Group. All values are rounded to the nearest millions, unless otherwise indicated.

The Projections include the following information:

1. Projections of revenue from operations and operating cash flows for each of the SPV for the financial years ending March 31, 2026, March 31, 2027, March 31, 2028 and March 31, 2029.

2. Projections of revenue from operations and operating cash flows for the Trust Group for the financial years ending March 31, 2026, March 31, 2027, March 31, 2028 and March 31, 2029.

3. Summary of significant assumptions and other explanatory information. The Trust Group follows March 31 as its accounting year end.

It is clarified that the Statement of Projections have been prepared on the basis of a mixture of best-estimates (i.e., assumptions as to future events which are expected to take place and the actions expected to take place as of the date the information is prepared) and hypothetical assumptions (about future events and actions which may or may not necessarily take place).

3. Significant assumptions:

The Statement of Projections has been prepared based on the significant assumptions including hypothetical assumptions summarized below.

The Investment Manager has obtained the Traffic reports from the third-party traffic consultants ("Traffic Consultants") for its Project SPV and the Technical reports from third-party technical consultants ("Technical Consultants") in assessment of the assumptions, market fundamentals, industry drivers and outlook amongst other things for the preparations of the Statement of Projections. The names of the appointed consultants are as below:

S. No.	Name of Consulatant	Job	Stretch
1	Chaitanya Projects Consultancy (P) Ltd. & Shree Bhawani Consultancy Services (P) Ltd.	Technical Due Diligence	Vijayawada-Chilakaluripet, Andhra Pradesh Chennai Bypass, Tamil Nadu Chennai - Tada, Tamil Nadi Bangalore - Neelmangla - Tumkur, Karnataka
2	URS Scott Wilson India (P) Ltd. & Marc Technocrats (P) Ltd.	Technical Due Diligence	Barachatti - Gorhar, Jharkhand Gorhar - Barwa Adda, Bihar/Jharkhand
3	Translink Infrastructure Consultant (P) Ltd. & Infra Brainiacs (P) Ltd.	Traffic Due Diligence	Barachatti - Gorhar, Jharkhand Gorhar - Barwa Adda, Bihar/Jharkhand Vijayawada-Chilakaluripet, Andhra Pradesh Chennai Bypass, Tamil Nadu Chennai - Tada, Tamil Nadi Bangalor - Neelmangla - Tumkur, Karnataka

The proposed assets to be acquired by Project SPVs are exclusively toll based projects as far as income of the Project SPV and Trust is considered. However, it is given to understand by the management that NHAI i.e. the Sponsor of the Trust has entered into certain contracts inter-alia for EPC, HAM, and Maintenance in respect of certain sections of the Proposed Specified Projects.

In respect of these projects management has represented expenses which are detailed hereinafter.

Revenue of the toll-based projects is based on and subject to various estimates, forecast and assumptions that are subjective in nature. The Traffic Reports and Statement of Projections consider current expectations and views on future influencing events and contain forecasts, projections and other forward-looking statements that relate to future events. The future traffic growth considered in the Statement of Projections are taking into consideration the factors like country's GDP growth, economic survey inputs, current and future growth of traffic in

the specific corridor of the project, traffic mix in the relevant geographical section of the project, development of alternative traffic options, both as competitive roads or as an alternative transport mode availability, demographic/industrial development in the vicinity of the project, fuel prices, local government policies on natural resources extraction, etc., as per the Report of the Traffic Consultant.

The Technical Reports and Statement of Projections consider current status of the maintenance requirement of the projects and future period expectation depending on the pattern of the traffic. It also considers the forecasted major maintenance need of the project based on the life expectancy of the structure of the road and its effectiveness in meeting the requisite quality expectations as per the Report of the Technical Consultant.

The Statement of Projections contains forecasts and projections that relate to future events including hypothetical assumptions, which by nature, are subject to significant risks and uncertainties. Events and circumstances may not occur as expected. Even if the events anticipated under the hypothetical assumptions that are considered in the Statement of Projects occur, actual outcomes could be different from those stated in the Statement of Projections.

However, the Investment Manager does not expect that actual traffic volumes to differ materially from the future traffic volumes expressed or implied in the Traffic Reports and reflected in these Statements of Projections. The Investment Manager considers these projections to be fair and reasonable as of the report date.

The assumptions used in the Projections by the Investment Manager are in line with the information and assumptions as per analysis of the industry experts.

The projections of the Trust Group have been prepared by combining the projections of revenue from operations and cash flows from operating activities of the Trust and Project SPV, eliminating transactions (vis., interest on loan) between the Trust and Project SPV and after considering following assumptions:

A. Revenue from Operations: For Project SPV

Revenue from operations of the Project SPV consists of revenue from toll collection, and interest income. Revenue projections do not include any other income (operating or otherwise) as these have material in the Projections period.

i. Revenue from Toll Collection

Revenue from toll collection is projected based on Traffic report obtained from the Traffic Consultant (the "Traffic Report"). The projections of revenue from operations is based on base case scenario who has based its report considering the actual traffic data for the period upto December 2025 and toll tariff rates for the financial year ending March 31, 2026. The key variables for toll income growth, tollable traffic growth, future traffic mix and the Wholesale Price Index ("WPI") are based on the Traffic Report.

NHAI has entered into toll collection arrangement with certain third parties for the specified projects which is expected to be extended by the Trust up to 31.03.2027.

The summary of the existing toll collections agreements is as under:

S. No.	Corridor Name	Toll plaza Name	Toll Collection Contract Period	
			From	To
1	Gorhar Barwa Adda	Kulgo	30.01.2025	30.01.2026
2	Vijayawada Chilakaluripet	Kaza	23.01.2025	23.01.2026
3	Chennai Bypass	Vanagram	15.04.2025	15.04.2026
		Surapattu	13.09.2025	13.09.2026
4	Chennai Tada	Nallur	09.05.2025	09.05.2026
5	Nelamangala Tumakuru	Kulumepalya	14.11.2025	14.11.2026
		Chokkenahalli	14.11.2025	14.11.2026

Toll revenue for FY2027 comprises:

a) Assured remittance from NHAI as per existing toll collection arrangement with third parties; and
b) Estimated revenue from the extension of Toll collection arrangement till 31.03.2027 is summarized below:

S. No.	Corridor Name	FY 2027 ₹ in Millions
1	Gorhar Barwa Adda	1,551
2	Vijayawada Chilakaluripet	2,257
3	Chennai Bypass	2,055
4	Chennai Tada	1,475
5	Nelamangala Tumakuru	1,920
	Total:	**9,258**

Tollable Traffic Growth Projected

S. No.	Corridor Name	Tollable Traffic Growth (FY2027 to FY2041)
1	Gorhar Barwa Adda	2.6%
2	Vijayawada Chilakaluripet	2.0%
3	Chennai Bypass	6.1%
4	Chennai Tada	3.7%
5	Nelamangala Tumakuru	1.7%

The management has considered long-term forecast of WPI annual growth rate of 3.24% based on circular related macro-economic assumptions considered by NHAI while deciding an initial estimated concession value (IECV) i.e. average of past WPI growth trend for last 10 calendar years for – for 2024, available on the web portal of NHAI

S. No.	Corridor Name	WPI Inflation Factor FY26-27	Estimated WPI Inflation Factor for FY27-28 and subsequent years
1	Gorhar Barwa Adda	0.25%	3.24%
2	Vijayawada Chilakaluripet	0.25%	3.24%
3	Chennai Bypass	0.25%	3.24%
4	Chennai Tada	0.25%	3.24%
5	Nelamangala Tumakuru	0.25%	3.24%

Projected Toll Revenue

Toll revenue growth for FY2027 and FY 2041 (inter-alia based on tollable traffic projected by the traffic consultants and toll rates based on WPI inflation estimate) is summarized below:

S. No.	Corridor Name	Tollable Revenue Growth (base year FY2027)
1	Gorhar Barwa Adda	6.7%
2	Vijayawada Chilakaluripet	5.9%
3	Chennai Bypass	10.4%
4	Chennai Tada	8.7%
5	Nelamangala Tumakuru	7.9%

Further, the assumptions for the Traffic mix for the toll-based Project SPV considered by the Traffic Consultant as on the date of the report and by Board of Directors of the Investment Manager are tabulated in Annexure I to these notes.

B. Operating Expenses: (For Project SPV)

i. **Operation and maintenance expenses (Major Maintenance Expenses – MMR)**

Management has informed that NHAI has entered into certain contracts inter-alia for EPC, HAM, Maintenance in respect of certain sections of the specified projects. As per the aforementioned, management has represented that:

a) O&M expenses and MMR expenses during the tenor of the aforementioned contracts shall be borne by NHAI/ respective contractor.
b) EPC expenses/ Capital expenditure for six laning as per the aforementioned contracts shall be borne by NHAI;
c) Subsequent to the completion of the tenor of the aforementioned contracts, SPV shall be responsible for maintenance (O&M/MMR) for the Specified Projects and the same has been considered in Technical Study Reports accordingly.

ii. **Operation and Maintenance Expenses (Routine Maintenance):**

O&M Expenses for the Specified Projects for the Projected Period have been estimated

by the Management basis the Technical Study conducted by the Technical Consultants appointed by Trust. Further, SPV proposes to enter into a transitional support agreement with NHAI and National Highways Invit Project Managers Private Limited wherein NHAI will provide the Concessionaire and the Project Manager a transitional support in respect of its O&M obligations and Tolling Obligations and obligations under the Project Implementation and Management Agreement for a period of 30 months commencing from the Appointed Date. In consideration of the services to be rendered by NHAI, the Project SPV and the Project Manager will pay fees to NHAL, as per the transitional support agreement.

iii. **Major Maintenance & Repair Expenses (MMR/ Periodic maintenance):**

Periodic maintenance expenses are costs that are incurred to bring the road assets back to an earlier condition or to keep the road asset operating at its present condition. MMR Expenses have been estimated by the Management for the Projected Period basis the Technical Due Diligence Reports of the Technical Consultants.

iv. **Project Management (PM) Expenses:**

PM expenses shall be paid to the Project Manager for management of all the toll road projects. These expenses have been estimated by the Management considering the draft terms of the Project management agreement proposed to be entered into with the Project Manager.

v. **Insurance and Other Office Expenses:**

Like O&M Expenses, Insurance and Other Expenses have been estimated by the Management for the Projected Period basis the Technical Due Diligence Reports of the Technical Consultants.

As further understood from the Management that during the transition period of 30 months commencing from 1st April 2026, ATMS expenses, in relation to toll management systems and software, to the extent of 40% will be borne by the SPV and remaining 60% related to manpower and other costs will be borne by NHAI. As represented by the Management, the ATMS costs 40% of the overall toll collection costs are related to toll management systems and software. The same has been considered to arrive cash flows during the transition period for the valuation exercise.

Post transition period, these expenses for the Projected Period have been estimated by the Management basis the Technical Study conducted by the Technical Consultants appointed by Trust.

vi. **IM Expenses and Trust Expenses**

IM Expenses and Trust Expenses shall be paid by RIIT to the Investment Manager and Trust, respectively. These expenses have been estimated by the Management considering the draft terms of the proposed agreements to be entered into with the Investment Manager and the Trust.

vii. **Depreciation and Amortization**

One time lumpsum consideration for Service Concession to be paid to NHAI and future capital expenditure have been amortized over the period of concession (15 years) on the basis of projected revenues.

viii. **Taxes**

Income Taxes have been estimated considering, as appropriate, tax depreciation/ amortization policy to be followed by the SPV and the corporate income tax rate of 25.17%.

ix. **Capital Expenditure**

The Management has projected that major capital expenditure aggregating ₹ 669 millions shall be incurred by the SPV during FY2027 (₹ 528 millions) and FY2028 (₹ 141 millions) for the Specified Projects, basis the Technical Study conducted by the Technical Consultants appointed by Trust.

S. No.	Corridor Name	Capital Expenditure ₹ in Millions
1	Gorhar Barwa Adda	231
2	Vijayawada Chilakaluripet	156
3	Chennai Bypass	118
4	Chennai Tada	164
5	Nelamangala Tumakuru	-
	Total:	**669**

x. **Working Capital**

Considering the nature of the business of operating toll road projects, the working capital requirement for the Projected Period has been estimated as NIL/ Not Material.

Annexure I
Average Annual Daily Traffic ("AADT")

Gorhar to Barwa Adda, Bihar/Jharkhand – Kulgo Toll Plaza				
Total Traffic (AADT)	**FY26**	**FY27**	**FY28**	**FY29**
Cars + Mini LCV	4,617	5,012	5,384	5,750
Buses	342	351	361	369
Mini LCV	909	954	997	1,047
LGV/LCV	391	428	457	480
2 Axle Truck	1,228	1,303	1,368	1,431
3 Axle Trucks	876	884	881	874
MAV/ OSV	4,138	4,258	4,379	4,536
AADT	**12,500**	**13,190**	**13,826**	**14,487**
PCU	**32,069**	**33,383**	**34,599**	**35,951**

Vijayawada-Chilakaluripet, Andhra Pradesh – Kaza Toll Plaza				
Total Traffic (AADT)	**FY26**	**FY27**	**FY28**	**FY29**
Cars + Mini LCV	25,073	26,314	27,714	29,555
Buses	2,525	2,583	2,643	2,702
Mini LCV	2,482	2,590	2,709	2,826
LGV/LCV	1,089	1,141	1,198	1,258
2 Axle Truck	2,000	2,081	2,166	2,294
3 Axle Trucks	1,388	1,372	1,344	1,358
MAV/ OSV	3,167	3,034	2,790	2,948
AADT	**37,725**	**39,115**	**40,564**	**42,941**
PCU	**61,180**	**62,377**	**63,234**	**66,596**

Chennai-Bypass, Tamil Nadu – Vanagram Toll Plaza				
Total Traffic (AADT)	**FY26**	**FY27**	**FY28**	**FY29**
Cars + Mini LCV	29,235	33,399	38,005	43,297
Buses	2,945	3,030	3,118	3,210
Mini LCV	4,546	5,142	5,871	6,653
LGV/LCV	2,049	2,101	2,159	2,215
2 Axle Truck	1,060	1,110	1,185	1,215
3 Axle Trucks	551	555	573	577
MAV/ OSV	2,015	2,070	2,183	2,231
AADT	**42,400**	**47,407**	**53,094**	**59,398**
PCU	**59,587**	**65,092**	**71,566**	**78,317**

Chennai-Bypass, Tamil Nadu – Surapattu Toll Plaza				
Total Traffic (AADT)	**FY26**	**FY27**	**FY28**	**FY29**
Cars + Mini LCV	14,081	16,058	18,235	20,723
Buses	265	273	281	289
Mini LCV	3,579	4,036	4,608	5,207
LGV/LCV	2,791	2,922	3,066	2,725
2 Axle Truck	1,332	1,376	1,432	1,214
3 Axle Trucks	1,007	1,015	1,031	875
MAV/ OSV	3,778	3,883	4,053	3,454
AADT	**26,833**	**29,564**	**32,705**	**34,487**
PCU	**46,659**	**49,943**	**53,908**	**52,696**

Chennai-Tada, Tamil Nadu – Nallur Toll Plaza					
Total Traffic (AADT)	**FY26**	**FY27**	**H1 FY28**	**H2 FY28**	**FY29**
Cars + Mini LCV	17,704	19,130	20,618	11,870	12,778
Buses	1,850	1,905	1,961	1,111	1,145

Mini LCV	4,216	4,433	4,661	2,758	2,884
LGV/LCV	3,648	3,819	3,991	3,675	3,845
2 Axle Truck	2,809	2,985	3,172	2,979	3,171
3 Axle Trucks	1,545	1,577	1,607	1,450	1,477
MAV/ OSV	6,220	6,667	7,150	7,033	7,585
AADT	**37,992**	**40,514**	**43,161**	**30,876**	**32,886**
PCU	**73,994**	**78,689**	**83,664**	**68,410**	**72,944**

Nelamangla-Tumakuru, Karnataka – Kulumepalya Toll Plaza				
Total Traffic (AADT)	**FY26**	**FY27**	**FY28**	**FY29**
Cars + Mini LCV	26217	28100	-	-
Buses	3850	3986	-	-
Mini LCV	3990	4237	-	-
LGV/LCV	4752	4935	-	-
2 Axle Truck	3664	3898	-	-
3 Axle Trucks	1874	1887	-	-
MAV/ OSV	4,964	5,308	-	-
AADT	**49312**	**52351**	**-**	**-**
PCU	**87839**	**92939**	**-**	**-**

Nelamangla-Tumakuru, Karnataka – Chokkenahalli Toll Plaza				
Total Traffic (AADT)	**FY26**	**FY27**	**FY28**	**FY29**
Cars + Mini LCV	20078	21449	22947	24706
Buses	3610	3737	3868	3989
Mini LCV	2966	3123	3286	3458
LGV/LCV	3811	4023	4246	4482
2 Axle Truck	3642	3879	4126	4389
3 Axle Trucks	1859	1874	1908	1943
MAV/ OSV	5,412	5,768	6,145	6,547
AADT	**41378**	**43853**	**46526**	**49515**
PCU	**80,448**	**85,035**	**89,960**	**95,316**

Nelamangla-Tumakuru, Karnataka – Halenijagal Toll Plaza						
Total Traffic (AADT)	**FY26**	**FY27**	**FY28 H1**	**FY28 H2**	**FY29 H1**	**FY29 H2**
Cars + Mini LCV	-	-	28,060	28,060	29,513	22,264
Buses	-	-	3,973	3,973	4,098	3,825
Mini LCV	-	-	5,157	5,157	5,309	4,080
LGV/LCV	-	-	4,701	4,701	4,548	3,236
2 Axle Truck	-	-	4,777	4,777	4,601	3,098
3 Axle Trucks	-	-	1,962	1,962	1,680	1,201
MAV/ OSV	-	-	6,018	6,018	5,180	3,452
AADT	-	-	**54,648**	**54,648**	**54,929**	**41,155**
PCU	-	-	**99,485**	**99,485**	**96,090**	**71,101**

Nelamangla-Tumakuru, Karnataka – Bhartipura & Honnenahalli Toll Plaza						
Total Traffic (AADT)	**FY26**	**FY27**	**FY28 H1**	**FY28 H2**	**FY29 H1**	**FY29 H2**
Cars + Mini LCV	-	-	8,731	8,731	8,799	8,799
Buses	-	-	643	643	650	650
Mini LCV	-	-	2,095	2,095	2,168	2,168
LGV/LCV	-	-	1,631	1,631	1,671	1,671
2 Axle Truck	-	-	1,219	1,219	1,194	1,194
3 Axle Trucks	-	-	792	792	769	769
MAV/ OSV	-	-	1,167	1,167	1,096	1,096
AADT	-	-	**16,278**	**16,278**	**16,346**	**16,346**

PCU	-	-	**26,485**	**26,485**	**26,241**	**26,241**

Nelamangla-Tumakuru, Karnataka – Dobbaspet & Halenijagal Toll Plaza						
Total Traffic (AADT)	**FY26**	**FY27**	**FY28 H1**	**FY28 H2**	**FY29 H1**	**FY29 H2**
Cars + Mini LCV	-	-	-	-	6,287	6,287
Buses	-	-	-	-	221	221
Mini LCV	-	-	-	-	911	911
LGV/LCV	-	-	-	-	1,172	1,172
2 Axle Truck	-	-	-	-	1,863	1,863
3 Axle Trucks	-	-	-	-	760	760
MAV/ OSV	-	-	-	-	2,785	2,785
AADT	-	-	-	-	**13,998**	**13,998**
PCU	-	-	-	-	**30,019**	**30,019**

MATERIAL CONTRACTS AND DOCUMENTS FOR INSPECTION

The following contracts, which are or may be deemed material have been entered or are to be entered into in due course. These contracts and also the documents for inspection referred to hereunder, may be inspected at the principal place of business of the Trust, from 10:00 A.M. to 5:00 P.M., on all Working Days from the date of filing this Offer Document until the Bid/Issue Closing Date. Any of the contracts or documents mentioned in this Offer Document may be amended or modified at any time if so required in the interest of the Trust or if required by the other parties, without reference to the Unitholder, subject to compliance with applicable law and InvIT Documents.

1. Trust deed dated November 24, 2025, entered between the Sponsor and the Trustee.
2. SEBI registration certificate for the Trust bearing number IN/InvIT/25-26/0034 dated December 22, 2025, to act as an infrastructure investment trust.
3. Investment management agreement dated December 2, 2025, entered between the Trustee and the Investment Manager.
4. Project implementation and management agreement dated January 6, 2026, entered amongst the Trustee, the Investment Manager, the Project Manager and Project SPV.
5. The Board resolution of the Investment Manager dated January 12, 2026, read with the resolution dated February 20, 2026, authorizing this Issue.
6. Issue agreement dated January 14, 2026, entered into amongst the Trust (acting through the Trustee), the Investment Manager, the Sponsor, the Project Manager and the Book Running Lead Managers read with the amendment to the issue agreement dated February 28, 2026.
7. Cash escrow and sponsor bank agreement dated February 28, 2026 entered into amongst the Trust (acting through the Trustee), the Investment Manager, the Sponsor, the Escrow Collection Banks, the Refund Banks, the Registrar to the Issue and the Book Running Lead Managers.
8. Syndicate agreement dated February 28, 2026 entered into among the Book Running Lead Managers, the Syndicate Members, the Trustee (on behalf of the InvIT), the Investment Manager, and the Registrar to the Issue.
9. The concession agreements, each dated [●], entered into by the Project SPV with NHAI.
10. Agreement dated January 2, 2026, between NSDL, the Trust (acting through the Investment Manager and its constituted attorneys) and the Registrar to the Issue.
11. Agreement dated January 6, 2026, between CDSL, the Trust (acting through the Investment Manager and its constituted attorneys) and the Registrar to the Issue.
12. Registrar agreement dated January 14, 2026, entered into among the Trustee (on behalf of the Trust), Investment Manager, and the Registrar to the Issue.
13. Unit Subscription Agreements, each dated February 26, 2026, entered into amongst the Trust (acting through the Trustee), the Investment Manager and the respective Strategic Investors.
14. Trust Loan Agreements, each dated February 27, 2026, entered into amongst the Trust (acting through the Trustee), the Investment Manager and the Project SPV.
15. Transitional support agreement dated February 27, 2026 entered into amongst the Sponsor, the Project SPV and the Project Manager.
16. Trade mark license agreement dated February 25, 2026, entered into amongst the Sponsor, the Investment Manager and the Trust.
17. Approval of NHAI dated January 12, 2026, in relation to the Issue.
18. Commitment letter dated January 12, 2026, from the Sponsor.
19. Letter from NHAI dated December 1, 2025, bearing reference number FINDIV-16012(16)/13/2025-O/o DGM (Fin-I). to the Investment Manager.
20. Certified copies of the updated Memorandum and Articles of Association of the Investment Manager as amended from time to time.
21. The consents from: (i) Book Running Lead Managers to the Issue; (ii) Legal counsel to the InvIT, the Investment Manager and the Sponsor as to Indian law; (iii) Legal counsel as to the Book Running Lead Managers as to Indian law; (v) Valuer; (vi) Registrar to the Issue; (vii) Escrow Collection Bank; (viii) Refund Bank; (ix) Public Issue Account Bank; (x) Sponsor Contribution Bank; (xi) the Compliance Officer; (xii) Traffic Consultant; (xiii) Technical Consultants; and (xiv) Syndicate Members, as referred to in their respective capacities.
22. Audited standalone financial statements of the Trust, for the period from the date of its settlement, that is November 24, 2025, till December 31, 2025.
23. The Projections of Revenue from Operations and Cash Flow from Operating Activities and the report dated January 12, 2026, thereon.
24. Audited financial statements of the Sponsor for financial years ended March 31, 2022, March 31, 2023,

and March 31, 2024.

25. The report on statement of possible tax benefits dated February 27, 2026, from the Statutory Auditors.
26. In-principle listing approvals, each dated February 13, 2026, issued by the Stock Exchanges.
27. Corporate governance policies adopted by the Investment Manager.
28. Letter dated February 11, 2026, bearing reference number HO/17/33/17(1)2026-DDHS-RAC I/4713/2026 from SEBI granting us an exemption in terms of the InvIT Regulations and the SEBI InvIT Master Circular.
29. Due diligence certificate dated January 14, 2026, addressed to SEBI from the Book Running Lead Managers.
30. SEBI observation letter bearing number HO/17/22/11 (2)2026-DDHS-RAC 1/5191/2026 dated February 17, 2026.

DECLARATION

The Investment Manager hereby declares and certifies that all relevant provisions of the InvIT Regulations, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be) have been complied with and no statement made in this Offer Document is contrary to the applicable provisions of the InvIT Regulations, the SCRA, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be). The Investment Manager further certifies that all the statements and disclosures in this Offer Document are material, true, correct, not misleading and adequate in order to enable the Bidders to make an informed decision.

For Raajmarg Infra Investment Managers Private Limited

NRVVMK Rajendra Kumar
Non-independent Director

Place: New Delhi
Date: February 28, 2026

DECLARATION

The Investment Manager hereby declares and certifies that all relevant provisions of the InvIT Regulations, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be) have been complied with and no statement made in this Offer Document is contrary to the applicable provisions of the InvIT Regulations, the SCRA, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be). The Investment Manager further certifies that all the statements and disclosures in this Offer Document are material, true, correct, not misleading and adequate in order to enable the Bidders to make an informed decision.

For Raajmarg Infra Investment Managers Private Limited

Ashish Kumar Singh
Non-independent Director

Place: New Delhi
Date: February 28, 2026

DECLARATION

The Investment Manager hereby declares and certifies that all relevant provisions of the InvIT Regulations, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be) have been complied with and no statement made in this Offer Document is contrary to the applicable provisions of the InvIT Regulations, the SCRA, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be). The Investment Manager further certifies that all the statements and disclosures in this Offer Document are material, true, correct, not misleading and adequate in order to enable the Bidders to make an informed decision.

For Raajmarg Infra Investment Managers Private Limited

Giridhar Aramane
Independent Director

Place: Hyderabad
Date: February 28, 2026

DECLARATION

The Investment Manager hereby declares and certifies that all relevant provisions of the InvIT Regulations, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be) have been complied with and no statement made in this Offer Document is contrary to the applicable provisions of the InvIT Regulations, the SCRA, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be). The Investment Manager further certifies that all the statements and disclosures in this Offer Document are material, true, correct, not misleading and adequate in order to enable the Bidders to make an informed decision.

For Raajmarg Infra Investment Managers Private Limited

Annie George Mathew
Independent Director

Place: New Delhi
Date: February 28, 2026

DECLARATION

The Investment Manager hereby declares and certifies that all relevant provisions of the InvIT Regulations, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be) have been complied with and no statement made in this Offer Document is contrary to the applicable provisions of the InvIT Regulations, the SCRA, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be). The Investment Manager further certifies that all the statements and disclosures in this Offer Document are material, true, correct, not misleading and adequate in order to enable the Bidders to make an informed decision.

For Raajmarg Infra Investment Managers Private Limited

Dip Kishore Sen
Independent Director

Place: Mumbai
Date: February 28, 2026

DECLARATION

The Investment Manager hereby declares and certifies that all relevant provisions of the InvIT Regulations, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be) have been complied with and no statement made in this Offer Document is contrary to the applicable provisions of the InvIT Regulations, the SCRA, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be). The Investment Manager further certifies that all the statements and disclosures in this Offer Document are material, true, correct, not misleading and adequate in order to enable the Bidders to make an informed decision.

For Raajmarg Infra Investment Managers Private Limited

Himanshu Gulliani
Non- Independent Director

Place: Mumbai
Date: February 28, 2026

DECLARATION

The Sponsor hereby declares and certifies that all relevant provisions of the InvIT Regulations, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be) have been complied with and no statement made in this Offer Document is contrary to the applicable provisions of the InvIT Regulations, the SCRA, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be). The Sponsor further certifies that all the statements and disclosures in this Offer Document are material, true, correct, not misleading and adequate in order to enable the Bidders to make an informed decision.

FOR NATIONAL HIGHWAYS AUTHORITY OF INDIA

Santosh Kumar Yadav, IAS
Chairman

Place: New Delhi
Date: February 28, 2026

DECLARATION

The Sponsor hereby declares and certifies that all relevant provisions of the InvIT Regulations, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be) have been complied with and no statement made in this Offer Document is contrary to the applicable provisions of the InvIT Regulations, the SCRA, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be). The Sponsor further certifies that all the statements and disclosures in this Offer Document are material, true, correct, not misleading and adequate in order to enable the Bidders to make an informed decision.

FOR NATIONAL HIGHWAYS AUTHORITY OF INDIA

Vishal Chauhan, IAS
Member (Admin)

Place: New Delhi
Date: February 28, 2026

DECLARATION

The Sponsor hereby declares and certifies that all relevant provisions of the InvIT Regulations, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be) have been complied with and no statement made in this Offer Document is contrary to the applicable provisions of the InvIT Regulations, the SCRA, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be). The Sponsor further certifies that all the statements and disclosures in this Offer Document are material, true, correct, not misleading and adequate in order to enable the Bidders to make an informed decision.

FOR NATIONAL HIGHWAYS AUTHORITY OF INDIA

Anil Choudhary
Member (Projects)

Place: New Delhi
Date: February 28, 2026

DECLARATION

The Sponsor hereby declares and certifies that all relevant provisions of the InvIT Regulations, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be) have been complied with and no statement made in this Offer Document is contrary to the applicable provisions of the InvIT Regulations, the SCRA, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be). The Sponsor further certifies that all the statements and disclosures in this Offer Document are material, true, correct, not misleading and adequate in order to enable the Bidders to make an informed decision.

FOR NATIONAL HIGHWAYS AUTHORITY OF INDIA

NRVVMK Rajendra Kumar
Member (Finance)

Place: New Delhi
Date: February 28, 2026

DECLARATION

The Sponsor hereby declares and certifies that all relevant provisions of the InvIT Regulations, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be) have been complied with and no statement made in this Offer Document is contrary to the applicable provisions of the InvIT Regulations, the SCRA, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be). The Sponsor further certifies that all the statements and disclosures in this Offer Document are material, true, correct, not misleading and adequate in order to enable the Bidders to make an informed decision.

FOR NATIONAL HIGHWAYS AUTHORITY OF INDIA

K Venkata Ramana
Member (PPP)

Place: New Delhi
Date: February 28, 2026

DECLARATION

The Sponsor hereby declares and certifies that all relevant provisions of the InvIT Regulations, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be) have been complied with and no statement made in this Offer Document is contrary to the applicable provisions of the InvIT Regulations, the SCRA, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be). The Sponsor further certifies that all the statements and disclosures in this Offer Document are material, true, correct, not misleading and adequate in order to enable the Bidders to make an informed decision.

FOR NATIONAL HIGHWAYS AUTHORITY OF INDIA

Alok Deepankar,
Member (Technical)

Place: New Delhi
Date: February 28, 2026

DECLARATION

The Sponsor hereby declares and certifies that all relevant provisions of the InvIT Regulations, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be) have been complied with and no statement made in this Offer Document is contrary to the applicable provisions of the InvIT Regulations, the SCRA, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be). The Sponsor further certifies that all the statements and disclosures in this Offer Document are material, true, correct, not misleading and adequate in order to enable the Bidders to make an informed decision.

FOR NATIONAL HIGHWAYS AUTHORITY OF INDIA

Vipnesh Sharma
Member (Projects)

Place: New Delhi
Date: February 28, 2026

DECLARATION

The Sponsor hereby declares and certifies that all relevant provisions of the InvIT Regulations, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be) have been complied with and no statement made in this Offer Document is contrary to the applicable provisions of the InvIT Regulations, the SCRA, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be). The Sponsor further certifies that all the statements and disclosures in this Offer Document are material, true, correct, not misleading and adequate in order to enable the Bidders to make an informed decision.

FOR NATIONAL HIGHWAYS AUTHORITY OF INDIA

V Umashankar
Secretary, Ministry of Road Transport and Highways

Place: New Delhi
Date: February 28, 2026

DECLARATION

The Sponsor hereby declares and certifies that all relevant provisions of the InvIT Regulations, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be) have been complied with and no statement made in this Offer Document is contrary to the applicable provisions of the InvIT Regulations, the SCRA, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be). The Sponsor further certifies that all the statements and disclosures in this Offer Document are material, true, correct, not misleading and adequate in order to enable the Bidders to make an informed decision.

FOR NATIONAL HIGHWAYS AUTHORITY OF INDIA

V. K. Rajawat
DG (Road Development) & Special Secretary, Ministry of Road Transport and Highways

Place: New Delhi
Date: February 28, 2026

DECLARATION

The Sponsor hereby declares and certifies that all relevant provisions of the InvIT Regulations, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be) have been complied with and no statement made in this Offer Document is contrary to the applicable provisions of the InvIT Regulations, the SCRA, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be). The Sponsor further certifies that all the statements and disclosures in this Offer Document are material, true, correct, not misleading and adequate in order to enable the Bidders to make an informed decision.

FOR NATIONAL HIGHWAYS AUTHORITY OF INDIA

Vumlunmang Vualnam
Secretary, Department of Expenditure

Place: New Delhi
Date: February 28, 2026

DECLARATION

The Sponsor hereby declares and certifies that all relevant provisions of the InvIT Regulations, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be) have been complied with and no statement made in this Offer Document is contrary to the applicable provisions of the InvIT Regulations, the SCRA, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be). The Sponsor further certifies that all the statements and disclosures in this Offer Document are material, true, correct, not misleading and adequate in order to enable the Bidders to make an informed decision.

FOR NATIONAL HIGHWAYS AUTHORITY OF INDIA

Prof. Manoj Kumar Tiwari
Director, IIM, Mumbai

Place: New Delhi
Date: February 28, 2026

DECLARATION

The Sponsor hereby declares and certifies that all relevant provisions of the InvIT Regulations, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be) have been complied with and no statement made in this Offer Document is contrary to the applicable provisions of the InvIT Regulations, the SCRA, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be). The Sponsor further certifies that all the statements and disclosures in this Offer Document are material, true, correct, not misleading and adequate in order to enable the Bidders to make an informed decision.

FOR NATIONAL HIGHWAYS AUTHORITY OF INDIA

Rajnish Kumar
Former Chairman, State Bank of India

Place: New Delhi
Date: February 28, 2026

ANNEXURE A

VALUATION REPORT

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Report on the Enterprise Valuation of the Specified Road Projects proposed to be acquired by Raajmarg 1 Projects Private Limited ("R1PPL") as of 31 December 2025

Private and Confidential

Report Reference No.: RVA2526AMDRRN064 12/01/2026

Raajmarg Infra Investment Managers Private Limited
G5 & 6, Sector-10, Dwarka,
New Delhi - 110075

Sub: Enterprise Valuation of the Specified Projects (as defined below), pursuant to the SEBI (Infrastructure Investment Trusts) Regulations, 2014, in connection with the Proposed Transaction

Dear Sir,

We refer to your letter of award dated 14 November 2025 wherein RBSA Valuation Advisors LLP ("RBSA"), a registered valuer entity under the Section 247 of the Companies Act, 2013, was appointed by Raajmarg Infra Investment Managers Private Limited ("RIIMPL"/ the "Investment Manager"), as an independent valuer, as per Regulation 2(zzf) of the SEBI (Infrastructure Investment Trust) Regulations, 2014 ("SEBI InvIT Regulations").

Raajmarg Infra Investment Trust ("RIIT" or the "Trust" or "InvIT") is registered with the Securities and Exchange Board of India ("SEBI") as an infrastructure investment trust under the SEBI InvIT Regulations. Raajmarg 1 Projects Private Limited ("R1PPL" or the "SPV") is a wholly owned subsidiary of RIIT and is incorporated as a special purpose vehicle to operate and maintain the road projects. RIIMPL is acting as the Investment Manager to the Trust, National Highways Authority of India ("NHAI") is acting as the Sponsor to the Trust and IDBI Trusteeship Services Limited ("Trustee") is acting as Trustee to the Trust, within the meaning of the SEBI InvIT Regulations.

NHAI aims to monetize the following five road projects (together referred to as the Specified Projects through the InvIT (Infrastructure Investment Trust) route:

Section No.	Name of Section	NH	Total Length (Kms)	Toll Plaza	Start Kms	End Kms
1	Chilakaluripet-Vijayawada	NH-16	69.408 Km	Kaza	355+000	357+342
	Chilakaluripet Bypass				0+000	16+499
	Chilakaluripet-Vijayawada				372+038	422+605
2	Chennai Bypass	NH-32 and NH-48	32.600 Km	Vanagaram /Tiruneermalai* and Surapattu	000+000	32+600
3	Chennai- Tada	NH-16	33.000 Km	Nallur*	21+400	54+400
4	Neelmangala- Tumakuru	NH-48	44.668 Km	Kulumepalya and Chokkenahalli	29+500	61+520
	Tumakuru Bypass				61+520	74+168
5	Gorhar-Barwa Adda	NH-19 (old NH-2)	80.522 Km	Kulgo	320+810	401+332

** As per Traffic Due Diligence report of December 2025, toll plaza at Vanagaram is proposed to be relocated to Tiruneermalai and toll plaza at Nallur Is proposed to be relocated to Durainallur*

Source: Information provided by the Management

We understand from you that:

- R1PPL is evaluating acquisition of the Specified Projects and enter into concession agreements with NHAI to operate, maintain and transfer the Specified Projects under the Toll, Operate and Transfer ("TOT") model ("Proposed Transaction");
- The Proposed Transaction is expected to be effective from 1 April 2026.

In this context, RIIMPL has requested RBSA for carrying out fair enterprise valuation ("Enterprise Valuation") of the Specified Projects as at 31 December 2025 ("Valuation Date"), pursuant to the SEBI InvIT Regulations, in connection with the Proposed Transaction. While the valuation date for the purpose of this Report has been considered as 31 December 2025, the economic benefits in the form of cash flows are expected to accrue to the Trust only from the Appointed Date, i.e., 1 April 2026. Considering this, the discounting of projected cash flows has been undertaken from the Appointed Date.

In the event of any material change in the proposed key terms of the Concession agreement and Transitional Support agreement for the Specified Projects and the actual terms or Management's estimate of interest rate and actual interest rate, the valuation will need to be updated. Our valuation of the SPV is subject to this premise.

We have analyzed the information provided by/ on behalf of the Investment Manager through broad inquiry, analysis and review but have not carried out due diligence or audit of such information. We have relied on the explanations and information provided by/ on behalf of the Investment Manager. We have no present or planned future interest in the Sponsors, R1PPL or the Investment Manager except to the extent of our appointment as an independent valuer. Our professional fees for the valuation are not contingent upon the values reported herein. Our valuation analysis should not be construed as investment advice specifically, we do not express any opinion on the suitability or otherwise of entering into any financial or other transaction with R1PPL or the Trust.

Our valuation analysis must be considered as a whole. Selecting portions of our analysis or the factors we considered, without considering all factors and analysis together could create a misleading view of the process underlying the valuation conclusions. Valuation is a complex process and is not necessarily susceptible to partial analysis or summary description. Any attempt to do so could lead to undue emphasis on any particular factor or analysis.

We enclose our valuation report (the "Report") providing our opinion on the Enterprise Valuation of the Specified Projects as of 31 December 2025, on a 'going concern value' premise. The attached Report details the valuation approach and methodologies, calculations, and conclusions with respect to this valuation and complies with the SEBI InvIT Regulations and guidelines, circulars or notifications issued by SEBI there under.

Please note that the Report must be read in conjunction with the Assumptions and Limiting Conditions, which are contained in Section 5 of this Report. This letter, the Report and the summary of valuation included herein may be provided to the Trust's advisors, the Securities and Exchange Board of India and other regulatory and supervisory authority, as may be required under the applicable regulations in connection with the Proposed Transaction and can be reproduced and included in the draft offer document/ offer document/ final offer document proposed to be filed in connection with offering of the units of the Trust.

This letter should be read in conjunction with the attached Report.

For **RBSA Valuation Advisors LLP,**
(RVE No.: IBBI/RV-E/05/2019/110)

Name: Ravishu Vinod Shah
Designation: Partner
Asset Class: Securities or Financial Assets (RV No.: IBBI/RV/06/2020/12728)

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1. Executive Summary

National Highways Authority of India ("NHAI") was set up by an act of the Indian Parliament, NHAI Act, 1988. NHAI was set up with the primary objective of facilitating development, maintenance and Management of national highways in India. NHAI has been entrusted with National Highways Development Project, along with other minor projects.

Raajmarg Infra Investment Trust ("RIIT" or the "Trust" or "InvIT") is registered with the Securities and Exchange Board of India ("SEBI") as an infrastructure investment trust under the SEBI InvIT Regulations. Raajmarg 1 Projects Private Limited ("R1PPL" or the "SPV") is a wholly owned subsidiary of RIIT and is incorporated as a special purpose vehicle to operate and maintain the road projects. Raajmarg Infra Investment Managers Private Limited ("RIIMPL" or the "Investment Manager") is acting as Investment Manager to the Trust, National Highways Authority of India ("NHAI" or "Sponsor") is acting as Sponsor to the Trust and IDBI Trusteeship Services Limited ("Trustee") is acting as the Trustee to the Trust, within the meaning of the SEBI (Infrastructure Investment Trust) Regulations, 2014 ("SEBI InvIT Regulations").

NHAI aims to monetize the following five road projects (together referred to as the Specified Projects through the InvIT (Infrastructure Investment Trust) route:

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3	Chennai- Tada	NH-16	33.000 Km	Nallur*	21+400	54+400
4	Neelmangala- Tumakuru	NH-48	44.668 Km	Kulumepalya and Chokkenahalli	29+500	61+520
	Tumakuru Bypass				61+520	74+168
5	Gorhar-Barwa Adda	NH-19 (old NH-2)	80.522 Km	Kulgo	320+810	401+332

** As per Traffic Due Diligence report of December 2025, toll plaza at Vanagaram is proposed to be relocated to Tiruneermalai and toll plaza at Nallur Is proposed to be relocated to Durainallur*
Source: Information provided by the Management

We understand from you that:

- R1PPL is evaluating acquisition of the Specified Projects and enter into concession agreements with NHAI to operate, maintain and transfer the Specified Projects under the Toll, Operate and Transfer ("TOT") model ("Proposed Transaction")
- The Proposed Transaction is expected to be effective from 1 April 2026,

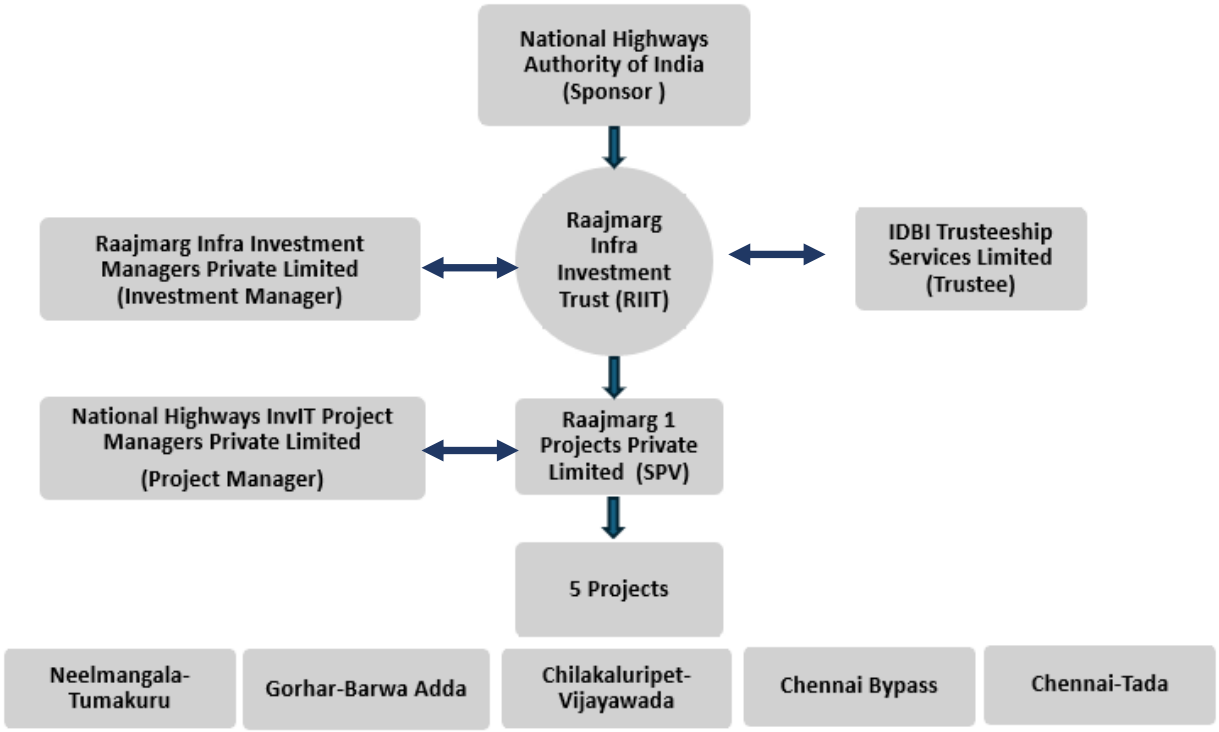
RBSA VALUATION ADVISORS LLP

Head Office: 912, Venus Atlantis Corporate Park, Anandnagar Main Road, Prahaladnagar, Ahmedabad – 380015 Tel: +91 79 4050 6000
Corporate Office: 1081 and 1081, Solitaire Corporate Park, Chakala, Andheri Kurla Road, Andheri (E) - 400 093 Tel: +91 22 6130 6000
Website: www.rbsa.in Email: contact@rbsa.in LLP IN: AAA-0842

RBSA Valuation Advisors LLP, a registered valuer entity under the Section 247 of the Companies Act, 2013, has been appointed by Raajmarg Infra Investment Managers Private Limited ("RIIMPL"/ the "Investment Manager"), as an independent valuer, as per Regulation 2(zzf) of the SEBI InvIT Regulations.

In this context, RIIMPL has requested RBSA for carrying out fair enterprise valuation ("Enterprise Valuation") of the Specified Projects as at 31 December 2025 ("Valuation Date") pursuant to the SEBI InvIT Regulations in connection with the Proposed Transaction. Although the valuation date is 31 December 2025, the projected cash flows have been discounted from the Appointed Date of 1 April 2026, being the date from which the Trust is expected to start receiving economic benefits.

Raajmarg Infra Investment Trust Structure



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Website: www.rbsa.in Email: contact@rbsa.in LLP IN: AAA-0842

2. Disclosure about the Valuer

- RBSA Valuation Advisors LLP ("RBSA") is a registered valuer entity under the Section 247 of the Companies Act, 2013 registered with the Insolvency and Bankruptcy Board of India having Registered Valuer Entity No. IBBI/RV-E/05/2019/110.

- RBSA Group operates across 9 offices in India, Middle East and Singapore, offering a comprehensive suite of services, including Valuation services, Investment Banking, Restructuring services, Transaction Services, Risk Consulting, Dispute & Litigation Support, etc.

- Ravishu Vinod Shah, the signatory to this Report, is a partner with RBSA Valuation Advisors LLP. He is a registered valuer for the Securities or Financial Assets asset class, with IBBI, holding RV No. IBBI/RV/06/2020/12728. He has been associated with RBSA for over 6 years. With over 28 years of experience, he carries extensive expertise in valuation and financial advisory services.
  Contact details: +91 22 6130 6093
  Email ID: ravishu@rbsa.in

- RBSA, Ravishu Vinod Shah and the team working on the valuation of Specified Projects do not have any financial interest in the Trust, the SPV, Investment Manager or the Sponsor, except to the extent of our appointment as independent valuer. We do not have any conflict of interest in carrying out this valuation. Sufficient time and information was provided to us to carry out the valuation. Further, the information provided by the Management have been appropriately reviewed in carrying out the valuation.

- We declare that:
  i. We are competent to undertake the financial valuation in terms of the SEBI InvIT Regulations;
  ii. We are an independent registered valuer entity and have prepared the Report on a fair and unbiased basis;
  iii. We have at least two partners/ directors having experience of 5 years each in the valuation of infrastructure assets; and

- We have carried out additional scope of work as per Schedule V of SEBI InvIT Regulations (Refer para 9.2 for further details).

- This Report covers all the disclosures required as per the SEBI InvIT Regulations and the Valuation of the Specified Projects is impartial, true and fair and in compliance with the SEBI InvIT Regulations.

3. Valuation Analysis

- The Discounted Cash Flow ("DCF") method under the Income Approach has been adopted for carrying out the Enterprise Valuation of the Specified Projects. Free Cash Flow to Firm ("FCFF") method under DCF has been applied based on the projected financial statements of the Specified Projects provided by the management of RIIMPL (the "Management").

- The Enterprise Value of the Specified Projects has been estimated, on a 'going concern value' premise. The Proposed Transaction is expected to be effective from 1 April 2026. We understand from the Management that the consideration for the acquisition of concession rights for the Specified Projects is expected to be paid prior to the commencement of their concession period. Accordingly, the Enterprise Value has been computed by discounting the projected FCFF of the Specified Projects beginning from 1 April 2026 until the end of the concession period of 15 years, using an appropriate Weighted Average Cost of Capital ("WACC"). The Enterprise Value of the Specified Projects has been computed by discounting the projected Free Cash Flows to Firm from the Appointed Date, i.e., 1 April 2026, with reference to the valuation date of 31 December 2025.

- It may be noted that in the event of any material change in the proposed key terms of the Concession agreement and Transitional Support agreement for the Specified Projects and the actual terms or Management's estimate of interest rate and actual interest rate, the valuation will need to be updated. Our valuation of the SPV is subject to this premise.

- The Investment Manager had appointed Traffic and Technical Consultants to carry out Traffic study for estimation of toll revenue and Technical study for estimation of operating and maintenance expenses and major maintenance expenses respectively, for each of the Specified Road Projects over the respective concession period of 15 years ending 31 March 2041. We have relied upon the Traffic Due Diligence Reports provided by the Traffic Consultant and Technical Due Diligence Reports provided by the Technical Consultants, on the Specified Projects for the Enterprise Valuation.

- Valuation of a company/ business is not a precise science and the conclusions arrived at in many cases will be subjective and dependent on the exercise of individual judgment. There is, therefore, no indisputable single value and we normally express our opinion on the value as falling within a likely range. However, considering the nature of the engagement, we have provided a single point value estimate. While we have provided our opinion on the enterprise value of the Specified Projects based on the information made available to us and within the scope and constraints of our engagement, others may have a different opinion. Accordingly, we expressly disclaim all liability for any loss or damage of whatever kind which may arise from any person acting on any information and estimates contained in this Report which are contrary to the stated purpose.

RBSA VALUATION ADVISORS LLP RM

- While our work has involved an analysis of financial and other information provided by/ on behalf of the Management, our engagement does not include an audit in accordance with generally accepted auditing standards of Specified Projects' existing business records. We have not carried out any independent technical evaluation or appraisal or due diligence of the assets or liabilities of Specified Projects. Accordingly, we assume no responsibility and make no representations with respect to the accuracy or completeness of any information provided by/ on behalf of the Management. Our Report is subject to the scope, assumptions and limitations detailed hereinafter. As such the Report is to be read in totality, and not in parts, in conjunction with the relevant documents referred to herein and in the context of the purpose for which it is made.

- Enterprise Valuation of the Specified Projects as of 31 December 2025 has been carried out considering inter-alia Traffic Due Diligence Reports of Traffic Consultants and Technical Due Diligence Reports of Technical Consultants, Business plan/ Projected financial statements of the Specified Projects and other information provided by/ on behalf of the Management, industry analysis and other relevant factors.

- The Valuation Date considered for the Enterprise Valuation of the Specified Projects is 31 December 2025. For details relating to the valuation date and the commencement of discounting of projected cash flows, reference may be made to the Valuation Analysis section of this Report.

- Valuation analysis and results are specific to the Valuation Date. A valuation of this nature involves consideration of various factors including the financial position of the Specified Projects as at the Valuation Date, trends in the equity stock market and fixed income security market, macro-economic and industry trends, etc.

- The Valuation summary of the Specified Projects as of 31 December 2025 is as follows:

Particulars	WACC	Enterprise Value (INR Cr)
Enterprise Value of Specified Projects	10.1%	9,298.7

- This Report covers the disclosures required as per the SEBI InvIT Regulations and the valuation of the Specified Projects is impartial, true and fair and in compliance with the SEBI InvIT Regulations.

4. Assumptions and Limiting Conditions

4.1. This Report, its contents and the results herein are specific to (i) the purpose of valuation agreed as per the terms of our engagement; (ii) the date of this Report; (iii) Traffic Due Diligence Reports and Technical Due Diligence Reports for the Specified Road Projects by the Traffic and Technical Consultants respectively, (iv) Business plan/ Projected financial statements of the Specified Projects, and (v) other information provided by/ on behalf of the Management and information obtained from public domain/ subscribed databases till 31 December 2025.

4.2. While our work has involved an analysis of financial and other information provided by/ on behalf of the Management, our engagement does not include an audit of the existing business records of the Specified Projects, in accordance with generally accepted auditing standards. We have not carried out any independent technical evaluation or appraisal or due diligence of the assets or liabilities of the Specified Projects. Accordingly, we assume no responsibility and make no representations with respect to the accuracy or completeness of any information provided by/ on behalf of the Management. Our Report is subject to the Scope, Assumptions and Limitations detailed hereinafter. As such the Report is to be read in totality, and not in parts, in conjunction with the relevant documents referred to herein and in the context of the purpose for which it is made.

4.3. The valuation of companies and businesses is not a precise science and the conclusions arrived at in many cases will be subjective and dependent on the exercise of individual judgment. There is, therefore, no indisputable single value and we normally express our opinion on the value as falling within a likely range. However, considering the purpose and requirement of this engagement, we have provided a single point value estimate. While we have provided our opinion on the fair enterprise value of the Specified Projects based on the information made available to us and within the scope and constraints of our engagement, others may have a different opinion.

4.4. A valuation of this nature is necessarily based on stock market, financial, economic and other conditions in general and industry trends in particular prevailing as on the Valuation date and the information made available to us as of the date hereof. Events occurring after the Valuation date may affect this Report and the assumptions used in preparing it, and we do not assume any obligation to update, revise or reaffirm this Report.

4.5. In the course of valuation, we were provided with both written and verbal information as mentioned in Section 5. We have analysed the information provided to us by/ on behalf of the Management through broad inquiry, analysis and review but have not carried out a due diligence or audit of the information provided for the purpose of this engagement. We have assumed that no information has been withheld that could have influenced the purpose of our Report.

4.6. Valuation may be based on estimates of future financial performance or opinions that represent reasonable expectations at a particular point in time. However, we do not provide assurance on the achievability of the results projected by the Management as events and circumstances do not occur as expected and differences between actual and expected results may be material. We express no opinion as to how closely the actual results will correspond to those projected as the achievement of

the projected results is inter-alia dependent on actions, plans and assumptions of the Management and macro-economic and other external factors which are beyond the control of the Management.

4.7. Our valuation is primarily from a business perspective and does not consider various legal and other corporate structures beyond the limited information provided to us by the Management. The value conclusion is not intended to represent the value at any time other than the Valuation Date that is specifically stated in the Report.

4.8. We have also relied on the data from external sources to conclude the valuation. These sources are believed to be reliable and therefore, we assume no liability for the truth or accuracy of any data, opinions or estimates furnished by others that have been used in this analysis. Where we have relied on data, opinions or estimates from external sources, reasonable care has been taken to ensure that such data has been correctly extracted from those sources and/ or reproduced in its proper form and context.

4.9. The actual price achieved in case of a transaction may be higher or lower than our estimate of value depending upon the circumstances and timing of the transaction, the nature of the business and other relevant factors. The knowledge, negotiating ability and motivation of the buyers and sellers and the applicability of a discount or premium for control will also affect actual market price achieved. Accordingly, our valuation conclusion will not necessarily be the price at which any agreement proceeds. The final transaction price is something on which the parties themselves have to agree considering *inter-alia* their own assessment of the transaction and inputs from other advisors.

4.10. This Report has been prepared for sole use by the Investment Manager/ Trust/ Sponsor in connection with the purpose stated herein. It is inappropriate to use this Report for any purpose other than the purpose mentioned herein. This restriction does not preclude the Investment Manager from providing a copy of the Report to its third-party advisors whose review would be consistent with the intended use. Our Report may be disclosed in connection with any statutory and regulatory filing in accordance with the provision of SEBI InvIT Regulations. We shall not assume any responsibility to any third party to whom the Report is disclosed or otherwise made available.

4.11. The Report assumes that the Specified Projects comply fully with relevant laws and regulations applicable in their area of operations and usage unless otherwise stated, and that they will be managed in a competent and responsible manner. Further, unless specifically stated to the contrary, this Report has given no consideration to matters of a legal nature, including issues of legal title and compliance with local laws, and litigations and other contingent liabilities that are not recorded/ reflected in the financial statements provided to us.

4.12. It is clarified that this Report is not a fairness opinion under any of the stock exchange/ listing regulations. In case of any third-party having access to this Report, it should be noted that the Report is not a substitute for the third party's own due diligence/ appraisal/ enquiries/ independent advice that the third party should undertake for his purpose.

4.13. In the particular circumstances of this case, our liability (in contract or under statute or otherwise) for any economic loss or damage arising out of or in connection with this engagement, irrespective of the quantum of loss or damage caused, shall be limited to the amount of fees actually received by us from the Trust, as laid out in the engagement letter, for such valuation work.

4.14. In rendering this Report, we have not provided any legal, regulatory, tax, accounting or actuarial advice and accordingly we do not assume any responsibility or liability in respect thereof.

4.15. This Report does not look into the business/ commercial reasons behind the acquisition of the Specified Projects by the Trust nor the likely benefits arising out of the same. Similarly, it does not address the relative merits of investing in an infrastructure trust as compared with any other alternative business transaction, or other alternatives, or whether or not such alternatives could be achieved or are available.

4.16. We are not advisors with respect to legal, tax and regulatory matters for the Specified Projects or the Trust. No investigation of the Specified Projects' claim to title of assets has been made for the purpose of this Report and the Specified SPVs' claim to such rights have been assumed to be valid. No consideration has been given to liens or encumbrances against the assets, beyond the loans disclosed in the accounts. Therefore, no responsibility is assumed for matters of a legal nature.

4.17. The scope of work has been limited both in terms of the areas of the business and operations which have been reviewed. There may be matters, other than those noted in this report, which might be relevant in the context of the transaction and whose wider scope might uncover.

4.18. RBSA is not aware of any contingent, commitment or material issue, besides the information disclosed in the audited/ provisional financial statements and additionally provided by the Investment Manager / Management which has been presented in this Report, which could materially affect the Specified Projects economic environment and future performance and therefore, the fair value of their businesses.

4.19. We have no present or planned future interest in the Trustee, Investment Manager, the Sponsor, the Trust or the SPV except to the extent of our appointment as an independent valuer. The fee for this Report is not contingent upon the values reported herein. Our valuation analysis should not be construed as investment advice; specifically, we do not express any opinion on the suitability or otherwise of entering into any financial or other transaction.

4.20. We have relied upon the representations of the Management in respect of the information provided by them. We shall not be liable for any loss, damages, cost or expenses arising from fraudulent acts, misrepresentations, or willful default on part of the Investment Manager, the SPV, their directors, employees or agents.

- **Limitation of Liabilities**
  - It is agreed that, having regard to RBSA's interest in limiting the personal liability and exposure to litigation of its personnel, the Investment Manager, the Sponsor, the SPV, the Trust or the Trustee will not bring any claim in respect of any damage against any of RBSA's personnel.
  - In no circumstances, RBSA shall be responsible for any consequential, special, direct, indirect, punitive or incidental loss, damages or expenses (including loss of profits, data, business, opportunity cost, goodwill or indemnification) in connection with the performance of the Services whether such damages are based on breach of contract, tort, strict liability, breach of warranty, negligence, or otherwise) even if the Trust had contemplated and communicated to RBSA the likelihood of such damages. Any decision to act upon the Report is to be made by the Trust and no communication by RBSA should be treated as an invitation or inducement to engage the Trust to act upon the Report.
  - In the particular circumstances of this case, our liability (in contract or under statute or otherwise) for any loss or damage caused, shall be limited to the amount of fees actually received by us, as laid out in the engagement letter, for this valuation report.
  - It is clarified that the Sponsor and the Trust will be solely responsible for any delays, additional costs, or other liabilities caused by or associated with any deficiencies in their responsibilities, misrepresentations, incorrect and incomplete information including information provided to determine the assumptions.
  - RBSA will not be liable if any loss arises due to the provision of false, misleading or incomplete information or documentation by the Investment Manager, the Sponsor, the SPV, the Trust or the Trustee.

5. Sources of Information

For the purpose of undertaking this valuation exercise, we have relied on the following sources of information provided by/ on behalf of the Management:

- Discussions with the Management to *inter-alia* understand expected future performance of the Specified Projects, key value drivers and other key factors affecting the business of the Specified Projects;
- Projected financial statements of the Specified Projects for the concession period from 1st April 2026 to 31 March 2041 (FY2026 – FY2041) which the Management expects to be their best estimate of the expected performance of the Specified Projects ("Management Projections");
- Reports of Translink Infrastructure Consultants Pvt. Ltd. in association with Infra Brainiacs Private Limited ("Traffic Consultants") appointed by the Investment Manager for Traffic Study and estimation of toll revenue for the duration of the concession period for each of the Specified Projects ("Traffic Due Diligence Reports");
- Reports of URS Scott Wilson India Private Limited in joint venture with MARC Technocrats Private Limited and Chaitanya Project Consultancy Limited ("Technical Consultants") appointed by the Investment Manager for Technical Study for estimation of operating and maintenance expenses and major maintenance expenses for the duration of the concession period for Gorhar - Barwa Adda (December 2025) and each of the remaining Specified Projects (January 2026) ("Technical Due Diligence Reports");
- Draft Concession Agreements and Draft Transitional Support Agreement for the Specified Projects between the SPV and NHAI for the Specified Projects;
- Information provided by the Management for mandatory disclosures required by SEBI; and
- S&P Capital IQ's database of publicly traded companies.

We have also obtained the explanations, information and representations, which we believed were reasonably necessary and relevant for our exercise from the Management. Besides above, there may be other information provided by the Management which we may not have perused in detail, if not considered relevant for the defined scope.

6. Procedures

We have carried out the Enterprise Valuation of the Specified Projects, to the extent applicable, in accordance with ICAI Valuation Standards, 2018 ("ICAI VS") issued by the Institute of Chartered Accountants of India.

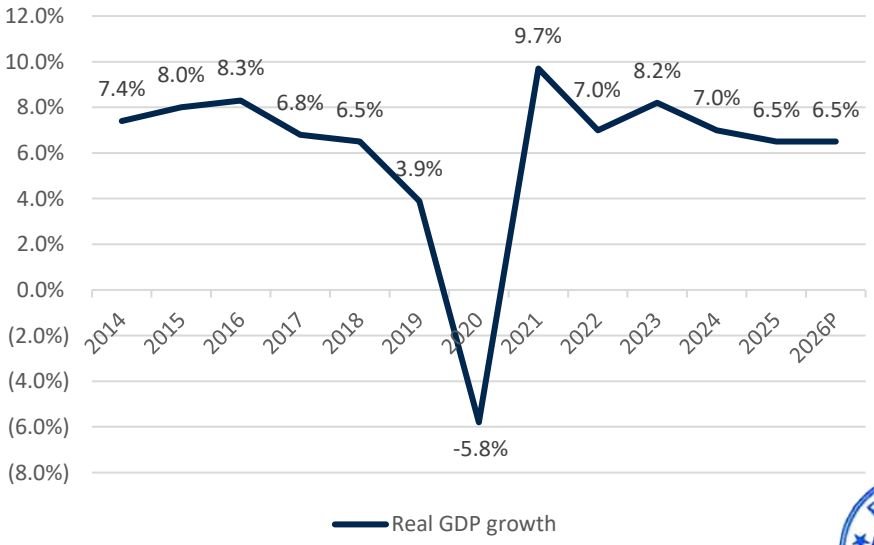
We have adopted the following procedures for carrying out the valuation analysis:

- Discussions with the Management to *inter-alia* understand expected future performance of the Specified Projects, key value drivers and other factors affecting the business of the Specified Projects;
- Analysis of the Management Projections;
- Considered the Traffic Due Diligence Reports and Technical Due Diligence Reports;
- Considered the key terms of Draft Concession Agreements and Draft Transitional Support Agreement;
- Analysis of the information available in public domain/ subscribed databases in respect of the comparable companies/ comparable transactions, as considered relevant by us;
- Selection of valuation approach and valuation methodology/(ies), in accordance with ICAI VS, as considered appropriate and relevant by us;
- Analysis of other publicly available information, as considered relevant by us; and
- Determination of Enterprise Value of the Specified Projects as on Valuation Date.

7. Industry Overview

Indian Economy

- India is one of the fastest-growing major economies in the world, underpinned by strong domestic demand, young population and structural economic reforms. As of FY 2024–25, the Indian economy has demonstrated resilience amid global headwinds, with GDP growth of ~6.5% according to the Reserve Bank of India and international financial institutions. The services and manufacturing sectors continue to be primary growth drivers, supported by government initiatives like 'Make in India', 'Digital India', and the Production-Linked Incentive (PLI) scheme. Additionally, public infrastructure investment and a rebound in private consumption have further bolstered growth momentum. While external uncertainties persist, India's stable macroeconomic fundamentals, expanding middle class, and digital transformation position it well for sustained medium to long-term growth.
- India, ranked as the fourth largest economy, has been amongst the fastest growing economies in the world over the past few years.For FY2026, GDP is projected at ~INR 197 trillion, a growth of around 6.5%, consistent with consensus estimates from MOSPI, the Reserve Bank of India, and global institutions. This trajectory is supported by ongoing capex expansion, infrastructure development, stronger formalization of the economy, and improving macroeconomic stability. Reforms such as GST 2.0, focused on rate rationalization and simplification are also expected to boost infrastructure and construction activity, further supporting medium-term growth.



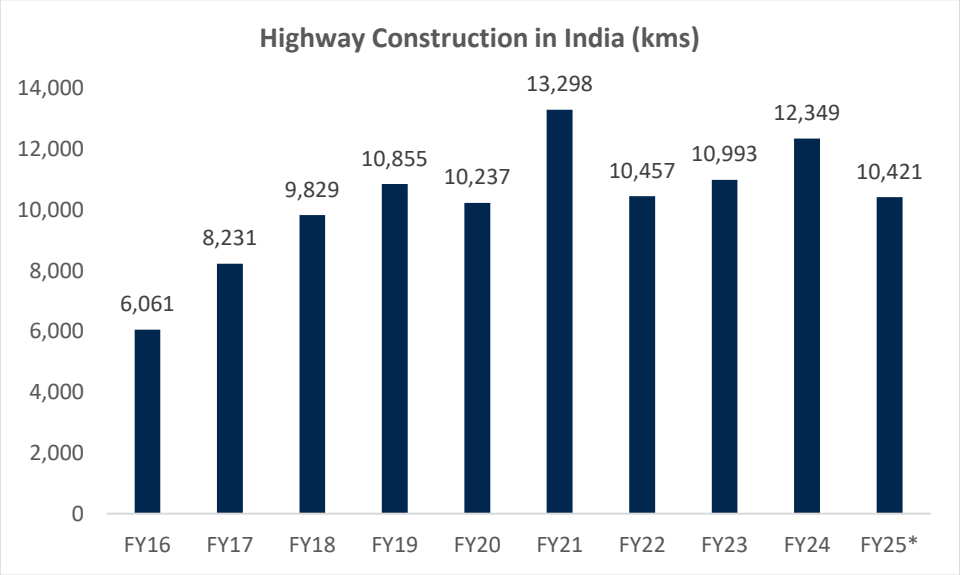
Road Infrastructure in India

- The road sector in India plays a pivotal role in the nation's infrastructure development and economic growth, contributing significantly to GDP and employment. India has the second-largest road network in the world, spanning over ~6.7 million kilometers, which includes national highways, state highways, and rural roads. The government, through agencies like the National Highways Authority of India, continues to prioritize road development under flagship programs such as Bharatmala Pariyojana and PM Gati Shakti. The sector has witnessed robust investment from both public and private players, with increasing emphasis on hybrid annuity and BOT (Build-Operate-Transfer) models to enhance efficiency and risk-sharing. Despite challenges such as land acquisition delays, regulatory hurdles, and funding constraints, the road sector remains a key focus area for infrastructure-led economic transformation in India. The road network transports ~64.5% of all goods in the country and ~90% of India's total passenger traffic uses road network to commute.

Particulars	In Km	% Share
National Highways	1,46,195	2%
State Highways	1,79,535	3%
Other Roads	6,345,403	95%
Total	**6,671,133**	

Source: IBEF Roads Industry Report August 2025

Highway Construction in India (Kms)



**Provisional Target*
Source: IBEF Roads Industry Report August 2025

Strong momentum in expansion of roadways

- The government has established a provisional target of constructing 10,421 km of national highways in FY25, reflecting a 15% decrease from last year's achievement due to delays in project clearances. In FY24, ~12,349 km of national highways were constructed.
- National Highways increased from 91,287 km in 2013-14 to 1,46,195 km in 2024-25, and the pace of construction has improved from 12.1 km a day in 2014-15 to 33.8 km in 2023-24.
- From 2014 to 2024, the length of four-lane and above national highways in India has expanded significantly, increasing by approximately 2.5 times. The total length of these highways grew from 18,371 kilometers in 2014 to 45,947 kilometers in 2024. This expansion reflects the government's sustained focus on improving highway capacity, enhancing road safety, and boosting connectivity for freight and passenger movement under initiatives such as Bharatmala Pariyojana. The development of high-capacity corridors has also been instrumental in reducing travel time and logistics costs, thereby contributing to the overall economic efficiency and competitiveness of the country
- The length of operational High-Speed Corridors of NHs network has increased from 93 km in 2014 to about 2,474 km in 2024.
- As of December 2025, the Pradhan Mantri Gram Sadak Yojana (PMGSY) has constructed over 7.88 lakh kilometers of rural roads since its inception, aiming to provide all-weather road connectivity to unconnected villages across India.
- Bharatmala Pariyojana, a flagship government program, aims to develop about 34,800 kilometers of highways for improving connectivity across India. As on 31.08.2025, projects covering a total length of ~26,425 km have been awarded and out of this, ~20,378 km have already been constructed
- Summary of Phase 1 Components and approved outlay of for the same are as follows: -

Sr. No.	Components	Length (Km)	Outlay (INR Crore)
1	Economic corridors development	9,000	120,000
2	Inter- corridors & feeder roads	6,000	80,000
3	National Corridors Efficiency Improvement	5,000	100,000
4	Border and International Connectivity Roads	2,000	25,000
5	Coastal and port connectivity roads	2,000	20,000
6	Expressways	800	40,000
7	Balance Road works under NHDP	10,000	1,50,000
	Total	**34,800**	**5,35,000**

Source: MoRTH Website

- Highway construction in India increased at a CAGR of 9.3% between FY16-FY24 and the Indian road infrastructure market is projected to witness a CAGR of 9.5% during the forecast period FY2025–FY2032, growing from ~USD 270.50 trillion in FY2024 to ~USD 559.09 trillion in FY2032.
- In March 2025, The National Highways Authority of India (NHAI) has achieved a significant milestone by raising INR 18,380 crore through its Infrastructure Investment Trust (InvIT), marking the largest monetization transaction in the history of India's road sector. The fourth round of fund raising adds up the total amount raised via InvIT to over INR 46,000 crore since its inception in 2020.

Growth Drivers

- Government Initiatives: In the Union Budget 2025-26, ~INR 287,333 Crore has been allocated to MorTH reflecting a increase of 2.4% compared to FY25. Of this, allocation to NHAI is ~ INR 170,266 crore earmarked for the development and maintenance of national highways, including projects under the Bharatmala Pariyojana, Roads and Bridges – INR 116,292 crore, for the construction and maintenance of roads and bridges and Other Expenditures – INR 775 crore, covering administrative costs and road safety initiatives.
- Policy Changes: The following are the recent policy changes that the MoRTH and NHAI have undertaken to improve private participation in the sector and increase competition. (i) Technical and financial bidder eligibility criteria reduced for HAM and EPC projects, which would promote the entry of smaller players (ii) Changes in the hybrid-annuity model (HAM) concession agreement aimed at protecting developers' returns and easing their cash flows during the construction period (iii) Changes in the Build-Operate-Toll (BOT) concession agreement to reinstate developer interest in the model.
- Rising Vehicular Demand: The expansion of domestic trade has driven an increase in commercial vehicle production and freight movement across the country. This upward trend in commercial and freight transport is expected to enhance inter-state trade and tourism, resulting in higher traffic volumes and improved toll revenues.
- FÀSTag: To streamline toll collection and enhance transparency, the Ministry of Road Transport and Highways launched the National Electronic Toll Collection (NETC) program—implemented nationwide—as a key initiative to modernize tolling systems. Under this system, vehicles are fitted with FASTags, RFID-enabled prepaid tags linked to vehicle registration and user accounts. As of March 2025, the FASTag program in India has continued its robust growth. The total FASTags issued were ~10.72 crore reflecting a significant increase from the 8.81 crore tags issued by 39 banks as of March 2024. The monthly toll collection in March 2025 was ~INR 6,800 crore in toll collections through 379.1 million electronic toll transactions.

Future Prospects:

The Indian roads sector is experiencing steady growth, propelled by rapid urbanization, a rising population, and the growing need for reliable and efficient transport infrastructure. Increasing domestic trade activity has also contributed to a rise in commercial vehicle usage and freight movement, further strengthening the outlook for the sector.

- A surge in private investments is projected in the highway sector from INR 20,000 Cr to almost INR 1 trillion in 6-7 years.
- Cumulative FDI Inflows in construction development stood at US$ 35.24 billion between April 2000-September 2024.
- Under “Parvatmala Pariyojana”, the Government of India plans to develop 250+ projects with a Ropeway length of 1,200+ km over five years.

- As of March 2025, the National Highways Authority of India (NHAI) has significantly advanced its Wayside Amenities (WSAs) initiative. A total of 501 sites have been awarded for development along national highways and expressways. Out of these, 94 WSAs are currently operational, providing facilities such as fuel stations, electric vehicle charging points, food courts, restrooms, and medical clinics. The Ministry of Road Transport and Highways aims to develop approximately 1,000 WSAs over the next five years, positioning one every 50 kilometers along national highways.
- The Government of India is actively advancing the integration of innovative toll collection technologies, including the Global Navigation Satellite System (GNSS), to facilitate barrier-less tolling. This system will utilize On-Board Units (OBUs) installed in vehicles to track distance travelled, enabling precise, distance-based toll charges without the need for physical toll booths.

Road InvITs

The road sector has been one of the most prominent segments for InvITs in India and emerged as the largest contributor to the InvIT landscape, with approximately 39% share of AUM as of March 2025.

As of fiscal 2025, there are 26 InvITs registered with SEBI, of which 15 are road InvITs. The AUM for road InvITs increased to Rs 2.46 lakh crore in March 2025, clocking a CAGR of ~42% from Rs 0.60 lakh crore in fiscal 2021.The number of road InvITs have grown 3 times from fiscal 2021 to fiscal 2025 and more than doubled in the past three fiscal years.

With numerous infrastructure initiatives underway, the outlook for India's road sector remains strong, well-positioned to support the country's expanding economy and growing population.

8. Valuation Approach and Methodology

VALUATION APPROACHES		
INCOME APPROACH	**MARKET APPROACH**	**ASSET APPROACH**
Estimates value based on the present value of future earnings of cash	Estimates value based on the multiples of comparable companies and precedent comparable transactions	Estimates value based on the fair value of the business' assets less the fair value of its liabilities
Applied	Not applied	Not Applied

Basis and Methodology of Valuation

- **Basis of Valuation**

  It means the indication of the type of value being used in an engagement. Fair Value as per ICAI VS is defined as under:

  "Fair value is the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the valuation date."

  Fair value basis has been adopted for enterprise valuation of the Specified SPVs.

- **Valuation Date**

  Valuation Date is the specific date at which the value of the assets to be valued gets estimated or measured. Valuation is time specific and can change with the passage of time *inter-alia* due to changes in the condition of the asset to be valued and market parameters. Accordingly, valuation of an asset as at a particular date can be different from other date(s).

  The Valuation Date considered for the fair enterprise valuation of the Specified Projects is 31 December 2025.

  It may be noted that in the event of any material change in the proposed key terms of the Concession agreement and Transitional Support agreement for the Specified Projects and the actual terms or Management's estimate of interest rate and actual interest rate, the valuation will need to be updated. Our valuation of the SPV is subject to this premise.

- **Premise of Value**

  Premise of Value refers to the conditions and circumstances how an asset is deployed. In the present case, we have determined the fair enterprise value of the Specified Projects on a Going Concern Value defined as, *"Going concern value is the value of a business enterprise that is expected to continue to operate in the future. The intangible elements of going concern value result from factors such as having a trained work force, an operational plant, the necessary licenses, systems, and procedures in place, etc."*

Approach & Method	Applied/Not Applied	Description	Rationale
Income Approach Discounted Cash Flow Method (DCF)	Applied	▪ In the DCF method under the Income approach, forecast cash flows are discounted back to the Valuation date, estimating a net present value of the cash flow stream of the business. A terminal value at the end of the explicit forecast period is then determined and that value is also discounted back to the Valuation date to give an overall value for the business. ▪ A discounted cash flow methodology typically requires the forecast period to be of such a length to enable the business to achieve a stabilized level of earnings, or to be reflective of an entire operation cycle for more cyclical industries. ▪ The rate at which the future cash flows are discounted (the "discount rate") should reflect not only the time value of money, but also the risk associated with the business' future operations. The discount rate most generally employed is Weighted Average Cost of Capital ("WACC") or Cost of Equity (Ke), reflecting an optimal as opposed to actual financing structure.	• Management has provided financial projections of the Specified Projects, which represents their best estimate of the expected performance of the Specified Projects for the balance tenor of their respective Concession period. Considering the aforementioned, the DCF method has been adopted to estimate the enterprise value of the Specified Projects.
Market Approach • Market Price Method	Not Applied	▪ Under this method, the value of a company is arrived at considering its market price over an appropriate period.	▪ As the Specified Projects are not listed, this method is not applied
Market Approach • Comparable Companies Multiples ("CCM") Method	Not Applied	▪ Under Comparable Companies Method, the value of shares / business of a company is determined based on market multiples of publicly traded comparable companies. Although no two companies are entirely alike, the companies selected as comparable companies should be engaged in the same or a similar line	▪ The Specified Projects are operational and does not have project implementation risk. Further, the projected income and cash flows of the Specified Projects primarily depend on the key terms of the respective concession agreements, residual tenor project-specific

Approach & Method	Applied/Not Applied	Description	Rationale
		of business as the subject company. ▪ The appropriate multiple is generally based on the performance of listed companies with similar business models and size.	characteristics/ factors, etc. which may differ from the other projects. Accordingly, this method is not adopted.
Market Approach • Comparable Transaction Multiples ("CTM") Method	Not Applied	▪ Under Comparable Transaction Multiples Method, the value of shares /business of a company is determined based on market multiples of publicly disclosed transactions in the similar space as that of the subject company. ▪ Multiples are generally based on data from recent transactions in a comparable sector, but with appropriate adjustment after consideration is given to the specific characteristics of the business being valued.	▪ The projected income and cash flows of the Specified Projects primarily depend on the key terms of the respective concession agreements, residual tenor, project-specific characteristics/ factors, etc. which may differ from the other projects. We have not adopted this methodology due to unavailability of information in public domain involving recent transactions in similar projects

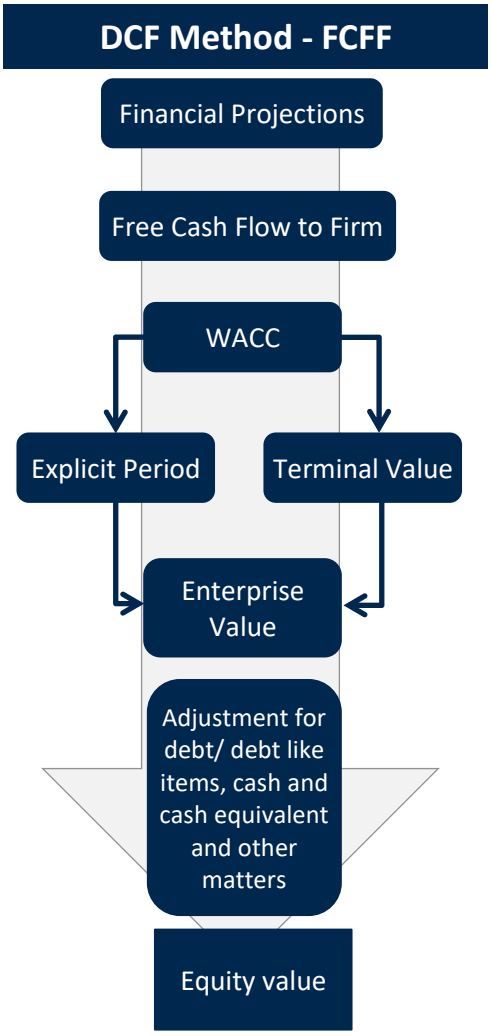
Asset based Approach.
• Adjusted Net Asset Value Method
	Not Applied	▪ Under the Adjusted Net Asset Value Method, a Valuation of a 'going concern' business is computed by adjusting the assets and liabilities to the fair market value as of the date of the Valuation.
		▪ A net asset value methodology is typically most appropriate when:
		  ▪ Valuing a holding company or a capital-intensive company.
		  ▪ Losses are continually generated by the business; or
		  ▪ Valuation methodologies based on a company's net income or cash flow levels indicate a value lower than its adjusted net asset value.
			▪ The Specified Projects has entered into concession agreements and are expected to make the operating profits. The valuation of the Specified Projects is carried out on a 'going concern value' premise. In such a scenario, the fair worth of the business is reflected in its future earning capacity rather than the historical cost of the project. Since the Net Asset value does not capture the future earning potential of the businesses, we have not adopted the Asset approach for the valuation of the Specified Projects.

Income Approach

The Income Approach is widely used for valuation under "Going Concern Value" premise. It focuses on the income generated by a company in the past as well as its future earning capability.

Discounted Cash Flow ("DCF") Method

- Under the DCF method, the business is valued by discounting its free cash flows for the explicit forecast period and the perpetuity value thereafter.
- Free Cash Flows to Firm ("FCFF") under the DCF method has been applied for estimating the enterprise value of the Specified Projects.
- FCFF represent the cash available for distribution to both, the owners and creditors of the business. FCFF for the explicit period and perpetuity value is discounted by the Weighted Average Cost of Capital ("WACC") to derive the net present value. The WACC is an appropriate rate of discount to calculate the present value of the future cash flows as it considers equity–debt risk by incorporating debt–equity ratio of the firm.
- Enterprise Value ("EV") is derived by aggregating the present value of FCFF for the balance tenor of the Concession Agreement ("Explicit period") and Terminal value at the end of the Explicit period.
- Terminal value is estimated based on the business' potential for further growth beyond the Explicit period. Considering *inter-alia* estimated economic life of the projects and terms of the Concession Agreement, Terminal value has been estimated considering release of net working capital, at the end of the Explicit period.
- The Enterprise Value of the Specified Companies have been determined as an aggregate of the present value of FCFF for the Explicit period and Terminal value.



Weighted Average Cost of Capital (WACC)

WACC has been estimated as under:

Particulars	Definition/Formula
WACC	Ke * (E/ (D + E)) + Kd * (1-T) * (D/(D + E))
Where:	
Ke	cost of equity
E	market value of equity
Kd	cost of debt
D	market value of debt
T	effective tax rate

The cost of equity is derived using the Capital Asset Pricing Model ("CAPM") as follows:

Particulars	Definition/Formula
Ke	Rf + ß * (Rm – Rf) + α
Where:	
Rf	the return on risk-free assets
Rm	the expected average return of the market
(Rm – Rf)	the average risk premium above the risk – free rate that a "market" portfolio of assets is earning
ß	the beta factor, being the measure of the systematic risk of a particular asset relative to the risk of a portfolio of all risky assets
α	Company specific risk factor (alpha) if any

A summary of WACC for the Specified Road Projects is appended as per **Appendix 1**.

9. Valuation of the Specified Projects

9.1. Key assumptions underlying Management Projections:

We have carried out the Enterprise Valuation of the Specified Projects as of 31 December 2025, considering *inter-alia* the Traffic Due Diligence Reports and Technical Due Diligence Reports of the Traffic and Technical Consultants respectively dated December 2025, Business plan/ Projected financial statements of the Specified Projects and other information provided by/ on behalf of the Management, industry analysis and other relevant factors.

Operating Revenue:

Operating revenue for the Specified Road Projects for the forecast period from 1st April 2026 to 31 March 2041 (the "Projected Period") have been estimated by the Management considering *inter-alia* projected Tollable traffic for the Specified Projects as per the Traffic Due Diligence Reports dated December 2025 of the Traffic Consultants appointed by the Trust.

We understand from the Management that, as on the Valuation Date, toll collection for the Specified Projects are currently being carried out by NHAI through certain third-party arrangements, the details of which are set out in the table below:

Particulars	Toll Plaza	Toll Collection Contract Period	
		From	To
Chilakaluripet - Vijayawada	Kaza Toll	23 January 2025	23 January 2026
Chennai Bypass	Vanagram	15 April 2025	15 April 2026
	Surapattu	13 September 2025	13 September 2026
Chennai- Tada	Nallur	9 May 2025	9 May 2026
Neelmangala- Tumakuru	Kulumepalya	14 November 2025	14 November 2026
	Chokkenahalli	14 November 2025	14 November 2026
Gorhar-Barwa Adda	Kulgo	30 January 2025	30 January 2026

Source: Information provided by the Management

Toll revenue for FY2027 comprising a) assured remittance from NHAI as per existing toll collection arrangement with third parties and b) estimated revenue from the extension of toll collection arrangement till 31 March 2027 is summarised below:

Particulars	FY2027 (INR Cr)
Chilakaluripet- Vijayawada	225.7
Chennai Bypass	205.5
Chennai- Tada	147.5
Neelmangala- Tumakuru	192.0
Gorhar-Barwa Adda	155.1
Total	**925.8**

Source: Information provided by the Management

Tollable Traffic Growth Projected

Tollable Traffic has been projected by the Traffic Consultants considering *inter-alia* the analysis of historical traffic data, GDP growth, road network development in the region, potential traffic drivers and other relevant factors.

Tollable Traffic Growth projected by the Traffic Consultants is summarised below in terms of the Compound Annual Growth Rate (CAGR) for the period from FY2027 to the last full financial year before the concession end date. For further details, refer Traffic Due Diligence Reports.

Particulars	Tollable Traffic Growth (FY2027- FY2041)
Chilakaluripet - Vijayawada	2.0%
Chennai Bypass	6.1%
Chennai- Tada	3.7%
Neelmangala- Tumakuru	1.7%
Gorhar-Barwa Adda	2.6%

Source: Traffic Due Diligence Report; RBSA Analysis

Toll Rates

Toll rates have been estimated for the forecast years as per the National Highway Fee (Determination of Rates and Collection) Rules, 2008 and amendment thereto and the following Wholesale Price Index (WPI) Inflation factor mentioned in the below table. The WPI inflation factors for FY26-27 have been considered based on the Management estimate.

The Management has considered a long- term forecast of WPI annual growth rate of 3.24% based on circular related macro-economic assumptions considered by NHAI while deciding an Initial Estimated Concession Value (IECV) i.e. average of past WPI growth trend for last 10 calendar years – for 2024, available on the web portal of NHAI

Particulars	WPI Inflation Factor for FY26-27	Estimated WPI Inflation Factor for FY27-28 and subsequent years
Chilakaluripet - Vijayawada	0.25%	3.24%
Chennai Bypass	0.25%	3.24%
Chennai- Tada	0.25%	3.24%
Neelmangala- Tumakuru	0.25%	3.24%
Gorhar-Barwa Adda	0.25%	3.24%

Source: Information provided by the Management

Projected Toll Revenue

Toll Revenue growth for FY2027 and FY2041 (inter-alia based on Tollable Traffic projected by the Traffic Consultants and Toll rates based on WPI inflation estimate) is summarised below.

Particulars	Toll Revenue Growth (base year FY2027)
Chilakaluripet - Vijayawada	5.9%
Chennai Bypass	10.4%
Chennai- Tada	8.7%
Neelmangala- Tumakuru	7.9%
Gorhar-Barwa Adda	6.7%

Source: Management Projection; Traffic Due Diligence Report and RBSA Analysis

For Project-wise, year-wise details of toll revenue for FY2027 to FY2041, refer Appendix 2

Capacity Augmentation

The draft concession agreement provides that during capacity augmentation, any monetary loss to the Concessionaire due to lane closures or traffic diversion will be assessed by the Authority using prescribed traffic measurement methods. The Authority shall only be obliged to pay compensation, in case it is determined by the Authority that the monetary loss suffered by the Concessionaire in the event of such lane closure/ traffic diversion on account of Capacity Augmentation is greater the threshold specified in the concession agreement. However, during or after capacity augmentation, any revenue impact arising from changes in the Equivalent Tollable Length shall be settled quarterly. Any increase in revenue due to an increase in Equivalent Tollable Length shall be remitted by the Concessionaire to the Authority, while any revenue loss resulting solely from a decrease in Equivalent Tollable Length shall be compensated by the Authority to the Concessionaire.

Effect of Variation of Toll Collection

In the event, the actual fee shall have fallen short/ exceeded of the target fee by more than 5% thereof, then for every 1% shortfall/ excess as compared to the target fee, the remaining Concession Period shall be increased/ decreased by 1% thereof, subject to fulfilment of terms of the Draft Concession Agreement; provided that the Concession Period shall not be reduced by more than 5 years, or shall not be increased by more than 10 years. It is further clarified that the subsequent target fee shall also be changed by the same percentage. Target fees shall not be revised in the event the Authority undertakes capacity augmentation.

Existing arrangement for Operation and Maintenance ("O&M") Expenses, Major Maintenance & Repair Expenses ("MMR"), Hybrid Annuity Model ("HAM") and capacity augmentation

We understand from the Management that NHAI has entered into certain contracts inter-alia for EPC, HAM, maintenance in respect of certain section of the Specified Projects, which are summarised below:

Chilakaluripet-Vijayawada

Particulars	Mode of Contract	Chainage (Km)		Length	COD/ PCOD	O&M Handover Date
		From	To	(Km)		
M/s Shiva Build Tech Private Limited	PBMC #	355+000	357+342	2.342	-	24 March 2032
M/s Chilakaluripet Bypass Private Limited	HAM	0+000	16+499	16.499	29 October 2024	28 October 2039
M/s Shiva Build Tech Private Limited	PBMC	372+038	422+605	50.567	-	24 March 2032

Performance Based Maintenance Contract

Chennai Bypass

Particulars	Mode of Contract	Chainage (Km)		Length	COD/ PCOD	O&M Handover Date
		From	To	(Km)		
M/s Arjunvaishanvi Infrastructure & Developers Pvt. Ltd	O&M (Annual Maintenance)	0+000	32+600	32.6	-	30 March 2026
M/s Babuji Civil Construction	EPC (Major Maintenance)				-	30 May 2028

Chennai- Tada

Particulars	Mode of Contract	Chainage (Km)		Length	COD/ PCOD	O&M Handover Date
		From	To	(Km)		
M/s SPL Infrastructure Private Limited	EPC (Six laning)	21+400	54+400	33	9 February 2022	9 February 2026

Neelmangala Tumakuru

Particulars	Mode of Contract	Chainage (Km)		Length	COD/ PCOD	O&M Handover Date
		From	To	(Km)		
M/s HG Infra Engineering Limited	EPC (Six laning)	29+500	49+900	20.4	31 March 2027	31 March 2032
	EPC	61+520	74+168	12.648	31 March 2027	31 March 2032
Sri Chowdeshwari Concrete India Private Limited	O&M	49+900	61+520	11.62	-	5 June 2029
DPR invited (Six laning)		49+900	61+520	11.62	30 September 2028	30 September 2033

Gorhar- Barwa Adda

Particulars	Mode of Contract	Chainage (Km)		Length	COD/ PCOD	O&M Handover Date
		From	To	(Km)		
Progressive Construction Ltd & Sunway Construction Berhad, Malaysia	Item Rate	320+810	326+000	5.19	Not Applicable	
DBL Gorhar Khairatunda Highway Private Limited	HAM	326+000	360+300 (Design 361+000)	35	16 October 2021/ 31 March 2022	15 October 2036
M/s Ashoka Khairatunda Barwa Adda Road Limited	HAM	360+300 (Design 361+000)	400+632 (Design 401+332)	40.332	09 October 2021/ 21 April 2022	08 October 2036

Source: Information provided by the Management; Technical Due Diligence Reports

Management represented that:

- O&M expenses and MMR expenses during the tenor of the aforementioned contracts shall be borne by NHAI/ respective contractor;
- EPC expenses/ Capital expenditure for six laning as per the aforementioned contracts shall be borne by NHAI;
- Subsequent to the completion of the tenor of the aforementioned contracts, SPV shall be responsible for maintenance (O&M/ MMR) for the Specified Projects and the same has been considered in Technical Study Reports accordingly.

- **Operation and Maintenance Expenses (Routine Maintenance):** O&M Expenses for the Specified Projects for the Projected Period have been estimated by the Management basis the Technical Study conducted by the Technical Consultants appointed by Trust. Further, R1PPL proposes to enter into a transitional support agreement with NHAI and National Highways Invit Project Managers Private Limited wherein NHAI will provide the Concessionaire and the Project Manager a transitional support in respect of its O&M obligations and Tolling Obligations and obligations under the Project Implementation and Management Agreement for a period of 30 months commencing from the Appointed Date. In consideration of the services to be rendered by NHAI, the Project SPV and the Project Manager will pay fees to NHAI, as per the transitional support agreement.

- **Major Maintenance & Repair Expenses (MMR / Periodic maintenance)**: Periodic maintenance expenses are costs that are incurred to bring the road asset back to an earlier condition or to keep the road asset operating at its present condition. MMR Expenses have been estimated by the Management for the Projected Period basis the Technical Due Diligence Reports of the Technical Consultants.
- **Project Management (PM) Expenses**: PM expenses shall be paid to the Project Manager for management of all the toll road projects. These expenses have been estimated by the Management

considering the draft terms of the Project management agreement proposed to be entered into with the Project Manager.

- **Insurance and Other Office Expenses**: Like O&M Expenses, Insurance and Other Expenses have been estimated by the Management for the Projected Period basis the Technical Due Diligence Reports of the Technical Consultants.

  As further understood from the Management that during the transition period of 30 months commencing from 1st April 2026, ATMS expenses, in relation to toll management systems and software, to the extent of 40% will be borne by the SPV and remaining 60% related to manpower and other costs will be borne by NHAI. As represented by the Management, the ATMS costs ~ 40% of the overall toll collection costs are related to toll management systems and software. The same has been considered to arrive cash flows during the transition period for this valuation exercise.

  Post transition period, these expenses for the Projected Period have been estimated by the Management basis the Technical Study conducted by the Technical Consultants appointed by Trust.

- **IM Expenses and Trust Expenses:** IM Expenses and Trust Expenses shall be borne by RIIT. These expenses have been estimated by the Management considering the draft terms of the proposed agreements to be entered into with the Investment Manager and the Trust.

- **Depreciation and Amortization**: One-time lumpsum consideration for Service Concession to be paid to NHAI and future capital expenditure have been amortized over the period of concession (15 years) on the basis of projected revenues.

- **Taxes:** Income taxes have been estimated considering, as appropriate, tax depreciation/ amortisation policy to be followed by the SPV and the corporate income tax rate of 25.17%.

- **Capital Expenditure**: The Management has projected that major capital expenditure aggregating ~INR 66.9 crores shall be incurred by the SPV during FY2027 (~INR 52.8 crores) and FY2028 (~INR 14.1 crores) for the Specified Projects, basis the Technical Due Diligence Reports.

Particulars	Capex (INR Cr)
Chilakaluripet- Vijayawada	15.6
Chennai Bypass	11.8
Chennai- Tada	16.4
Neelmangala- Tumakuru	-
Gorhar-Barwa Adda	23.1
Total Capex	**66.9**

Source Management Projection

- **Working Capital**: Considering the nature of the business of operating toll road projects, the working capital requirement for the Projected Period has been estimated as NIL/ not material.

9.2. Specified Road Projects of R1PPL

9.2.1. Chilakaluripet-Vijayawada Project

9.2.1.1. Project Overview

Parameters	Details
Project Name	Chilakaluripet- Vijayawada (NH-16)
Length of the project	69+408 Km (post de-scope due to development of Vijayawada Bypass) 2.342 Km from Chilakaluripet (355+000) to Vijayawada (357+342) 16.499 Km Chilakaluripet Bypass (0+000 - (16+499) 50.567 Km from Chilakaluripet (372+038) to Vijayawada (422+065)
Toll Plaza Location	Kaza at Km 420+500

Source: Information provided by the Management

9.2.1.2. Project Location

Source: Information provided by the Management

The project highway forms a vital part of Golder Quadrilateral (GQ) / East Coast Corridor which connects Kolkata and Chennai. The project highway strategically located at central region of Andhra Pradesh and hence as acts as spinal cord for the state by extending the connectivity to different parts of the country i.e., West Bengal/Odisha in north and Karnataka/Tamil Nadu in south. Additionally, the corridor plays a vital role in supporting port-led industrial development, logistics parks, and regional economic hubs along the eastern coast, strengthening Andhra Pradesh's integration with national and international supply chains.

9.2.1.3. Key proposed infrastructure developments which may affect Traffic

We understand from the Traffic Study Report that traffic has been projected after considering inter-alia the impact of following proposed infrastructure developments:

- **Amaravati Outer Ring Road**

  Amaravati Outer Ring Road (ORR) is a major proposed infrastructure project designed to circle the new capital city of Amaravati in Andhra Pradesh. Proposed outer ring road will be around 189 km long, six-lane, access-controlled greenfield road being developed by National Highways Authority of India. Alignment is finialled and DPR work is in advance stage. Proposed ring road is planned to connect Guntur, Tenali, Vuyyuru and Amaravati to support the region's growth as outlined in Master Plan 2050 by Andhra Pradesh Capital Region Development Authority.

  A part of the project highway including the existing Kaza TP will be within the boundary to be established by proposed ring road which will encircle Vijayawada, Amaravati and Guntur. Consequently, a significant portion of traffic is expected to divert to the ring road, as vehicles will prefer to bypass the city to avoid congestion, leading to a significant reduction in through traffic.

- **Ramayapatnam Port**

  Ramayapatnam port is a greenfield development by the state government in Prakasam district and implemented by Andhra Pradesh Maritime Board through Ramayapatnam Port Development Corporation Limited. Construction of Phase-1 commenced in July 2022 and expected to be operational by end of FY27. Phase-1 development includes four multipurpose berths, breakwaters and dredging works with cargo handling capacity of 30 MTPA extended to 19 berths with 138 MTPA capacity in future.

  This port-led economic development will strengthen trade and growth of the region. This development is likely to attract additional traffic to the project road, leading to a developmental traffic.

- **Amaravati Capital City**

  Development related to Amaravati Capital City and nearby region is expected to generate significant developmental and induced traffic at the project highway.

  As major phases of the capital city's infrastructure such as government administrative complexes, educational institutions, housing townships and commercial centers become operational, travel demand within the region is expected to rise. This growth will lead to increased daily commuting between Amaravati/Vijayawada and Guntur, as well as heightened movement of goods and services supporting the expanding urban ecosystem.

In the long term, the enhanced connectivity and economic opportunities offered by the Amaravati Capital City and nearby region will act as strong promoter for traffic growth through the project highway. The induced traffic will primarily consist of passenger vehicles, public transport and logistics movement associated with residential and business development.

- **Chennai Hyderabad high-speed rail**

  Chennai–Hyderabad High Speed Rail Corridor is a proposed 778 km high-speed rail link connecting Chennai Central, Minjur (on Chennai Ring Road), Tirupati, Amaravati/ Vijayawada, and Hyderabad across Tamil Nadu, Andhra Pradesh and Telangana. Upon completion, it is expected to reduce the current Chennai–Hyderabad travel time from approximately 12 hours to about ~3 hours. Consequently, a portion of traffic is expected to reduce, as people will prefer to take rail to avoid congestion. This will reduce traffic movement of Car/Jeep/Van and bus from/ to Hyderabad, Vijayawada and Chennai.

9.2.1.4. Additional Procedures to be complied with in accordance with InvIT regulations:

A. List of one-time sanctions/approvals which are obtained or pending:

As represented by the Management, the list of sanctions/ approvals obtained till 31 December 2025 is provided in Appendix 3(a).

B. List of up to date/ overdue periodic clearances:

As represented by the Management, all other material permits, registrations, licenses, approvals, consents and other authorizations (collectively referred as "Governmental Licenses") shall be obtained by R1PPL as per individual project requirements once the rights and obligations are assumed by the SPV. The Project SPV (R1PPL) would be in due course and as required under applicable law procure all the Governmental Licenses issued by, and shall make all material declarations and filings with, the applicable Government Authority to own, lease, license, operate and use its properties and assets and to conduct the business by the Project SPV, as will be described in the placement documents. No notice of proceedings has been received relating to the revocation or modification of any Governmental Licenses, except as would not result in a Material Adverse Change. The general list of relevant Governmental Licenses as provided by the Management is enclosed in Appendix 3(b).

C. Estimates of already carried out as well as proposed major repairs and improvements along with estimated time of completion:

Historical Major Maintenance Expenses: We understand from the Management that the details of historical major maintenance expenses are not available with the Investment Manager.

Projected Major Maintenance Expenses as per the Technical Due Diligence Report by Technical Consultants is provided in Appendix 3(c).

D. On-going material litigations including tax disputes and claims in relation to the assets, if any;
As represented by the Management, the list of on-going material litigations including tax disputes and claims till 31 December 2025 is provided in Appendix 3(d).

The Management represented that impact, if any, of the litigation in respect of the Specified Projects pertaining to the period prior to the Effective date shall be borne by NHAI (the Sponsor).

E. Revenue pendencies including local authority taxes associated with InvIT asset and compounding charges, if any:
As represented by the Management, there are no revenue pendencies including local authority taxes associated with the Chilakaluripet-Vijayawada Project and compounding charges as at 31 December 2025.

F. Vulnerability to natural or induced hazards that may not have been covered in town planning building control:
As represented by the Management, there are no vulnerability to natural or induced hazards that may not have been covered in town planning/ building control.

G. Physical inspection
We carried out the physical inspection on 5 January 2026. We observed during the physical inspection that the Toll was being collected at Kaza toll plaza. Please refer to Appendix 3(e) for the latest pictures of the project.

H. Statement of Assets:
As represented by the Management, RIIMPL is envisaging to acquire the Specified Projects. Hence, there is no asset of the Project as at the Valuation Date.

9.2.2. Chennai Bypass Project

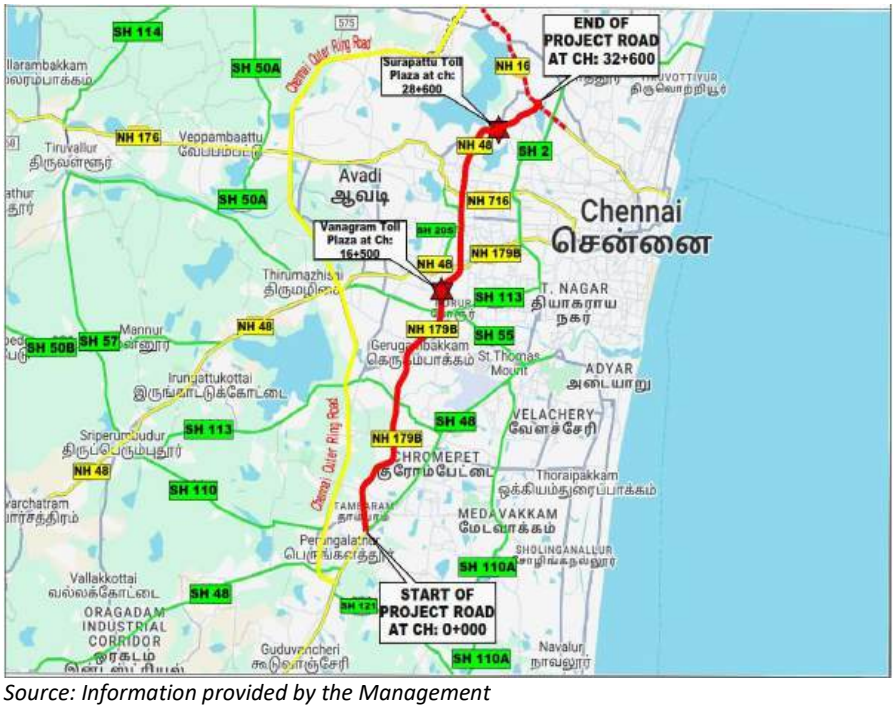
9.2.2.1. Project Overview

Parameters	Details
Project Name	Chennai Bypass (NH-32 & NH-48)
Length of the project	32.600 kms from Tambaram (0+000) to Madhavaram (32+600)
Toll Plaza Location	Vanagaram at Km 16+500 / Tiruneermalai* at Km 6+500 and Surapattu at Km 28+600

*Present toll plaza at Vanagaram location is to be shifted to Tiruneermalai due to identified black spot near toll plaza and proposed construction of Vehicular Underpass (VUP) at Km 016+890

Source: Information provided by the Management

9.2.2.2. Project Location



Source: Information provided by the Management

The project highway is a 32 km bypass section of Chennai city, part of two national highways i.e., Golden Quadrilateral (Mumbai – Bengaluru – Chennai corridor NH48) and NH179B (old NH32/NH45) connecting Chennai to south Tamil Nadu. It starts Irumbuliyur junction near Tambaram in southern Chennai) and extends to Madhavaram junction on NH16 on east of the city. It caters to substantial intra-city and port-related traffic, including movements between Bengaluru/western and Chennai maritime cluster covering ports of Chennai, Ennore and Kattupalli.

9.2.2.3. Key proposed infrastructure developments which may affect Traffic

We understand from the Traffic Study Report that traffic has been projected after considering inter-alia the impact of following proposed infrastructure developments:

- **Bengaluru – Chittor – Thatchoor corridor and CPRR link**
  Chennai – Bengaluru Industrial Corridor (CBIC) proposes high impact / market driven nodes at Ponneri in Tamil Nadu (NH48), Tumakuru in Karnataka (NH48) and Krishnapatnam/ Nellore in Andhra Pradesh (NH16).

  Bengaluru – Chittor – Thatchoor corridor in association with northern end of Chennai Peripheral Ring Road (CPRR) will be backbone to this mega industrial corridor. Bengaluru Chennai Expressway (NE7) and Chittoor Thatchur section of NH716B will link both states to Chennai Maritime Cluster covering ports of Chennai, Ennore and Kattupalli. Both will be access-controlled development. As a result, a portion of traffic is expected to reduce for Surapattu toll plaza.

- **Chennai Port Maduravoyal elevated corridor**
  NHAI is developing elevated corridor exclusively for Chennai Port (Maduravoyal to Chennai Port Gate No. 10) to strengthen external evacuation infrastructure. Further, Chennai Port is implementing strengthening program of internal roads for ease on movement between Gate No. 1 to 10 followed by internal elevated corridor as long-term solution to ease out internal congestion. This project is under implementation with expected completion by mid FY29.

  Integrated logistics facility at Chennai (Mappedu) Multimodal Logistics Park ("MMLP") – This acts as dry port for Chennai Maritime Cluster. Traffic which is associated to Chennai Port without using logistics facility (CFS/Yard) at Manali area, elevated corridor will act as natural choice for such traffic i.e., factory stuffing/sealed container to/ from manufacturing facility. Traffic which is associated to Chennai Port using logistics facility (CFS/ Yard) at Manali area partly will use Mappedu MMLP as dry port followed by elevated corridor as seamless connectivity.

  Sriperumbudur to Maduravoyal Elevated Corridor (long-term)- DPR of 'Construction of 6 lane Elevated Corridor from Sriperumbudur to Maduravoyal' for future connectivity is under process by Chennai Metro Rail Limited in close coordination with NHAI as plan is to integrate metro connectivity with the elevated corridor. This will further enhance seamless connectivity for Chennai port bound traffic.

  Considering the above developments, it could have a significant negative impact on traffic associated with Surapattu toll plaza.

- **Additional entry/exit at Ch km 5.200**
  As Chennai Bypass is access-controlled with limited entry-exit, the present route via ORR require a long detour, causing delays in the movement of export and import goods. Therefore, MEPZ has requested NHAI to develop a dedicated entry and exit ramp at Ch km 5.200 on Chennai Bypass. Also industrial area at Thirumudivakkam and Tambaram originated/destined traffic could use the proposed Facility hence will be positive impact for the both the toll plazas.

9.2.2.4. Additional Procedures to be complied with in accordance with InvIT regulations:

A. List of one-time sanctions/approvals which are obtained or pending

As represented by the Management, the list of sanctions/ approvals obtained till 31 December 2025 is provided in Appendix 3(a).

B. List of up to date/ overdue periodic clearances:

As represented by the Management, all other material permits, registrations, licenses, approvals, consents and other authorizations (collectively referred as "Governmental Licenses") shall be obtained by R1PPL as per individual project requirements once the rights and obligations are assumed by the SPV. The Project SPV (R1PPL) would be in due course and as required under applicable law procure all the Governmental Licenses issued by, and shall make all material declarations and filings with, the applicable Government Authority to own, lease, license, operate and use its properties and assets and to conduct the business by the Project SPV, as will be described in the placement documents. No notice of proceedings has been received relating to the revocation or modification of any Governmental Licenses, except as would not result in a Material Adverse Change. The general list of relevant Governmental Licenses as provided by the Management is enclosed in Appendix 3(b)**.**

C. Estimates of already carried out as well as proposed major repairs and improvements along with estimated time of completion:

Historical Major Maintenance Expenses: We understand from the Management that the details of historical major maintenance expenses are not available with the Investment Manager.

As further represented by the Management, forecasted Major Maintenance Expenses (INR in Crs) is provided in Appendix 3(c).

D. On-going material litigations including tax disputes and claims in relation to the assets, if any;

As represented by the Management, the list of on-going material litigations including tax disputes and claims till 31 December 2025 is provided in Appendix 3(d).

The Management represented that impact, if any, of the litigation in respect of the Specified Projects pertaining to the period prior to the Effective date shall be borne by NHAI (the Sponsor).

E. Revenue pendencies including local authority taxes associated with InvIT asset and compounding charges, if any:

As represented by the Management, there are no revenue pendencies including local authority taxes associated with InvIT Asset and compounding charges as at 31 December 2025.

F. Vulnerability to natural or induced hazards that may not have been covered in town planning building control:

As represented by the Management, there are no vulnerability to natural or induced hazards that may not have been covered in town planning/ building control.

G. Physical inspection

We carried out the physical inspection of Chennai Bypass Project on 5 January 2026. We observed during the physical inspection that the Toll was being collected at Vanagaram and Surapattu toll plazas. Please refer to Appendix 3(e) for the latest pictures of the project.

H. Statement of Assets:

As represented by the Management, RIIT is envisaging to acquire stake in the SPV. Hence, there is no asset of the Project as at the Valuation Date.

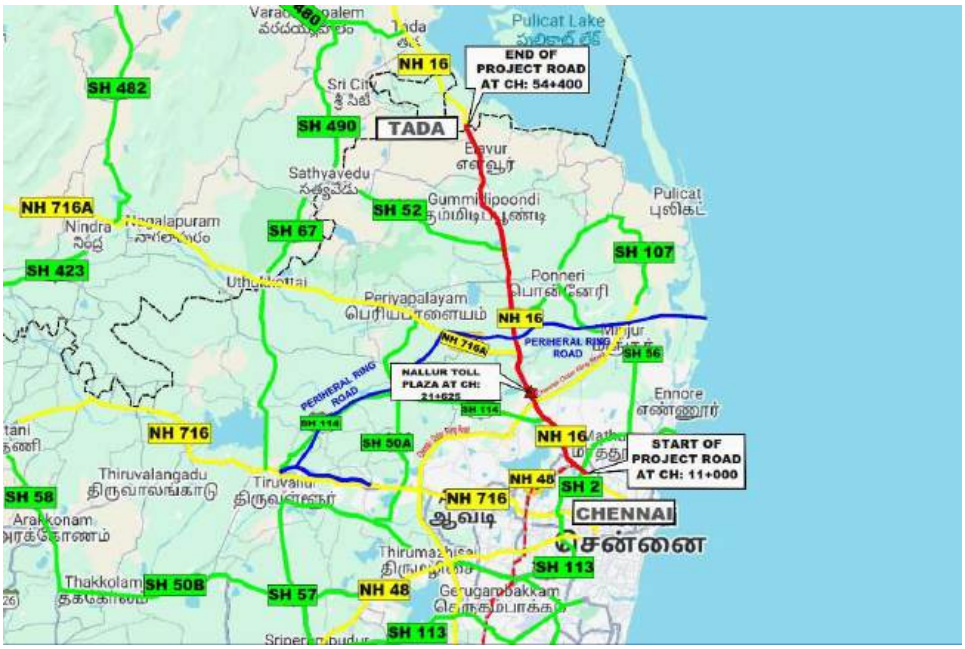
9.2.3. Chennai Tada Project

9.2.3.1. Project Overview

Parameters	Details
Project Name	Chennai Tada (NH-16)
Length of the project	Revised Length: 33.000 Kms for asset monetization proposal* From NH16 interaction with Chennai Outer Ring Road (21+400 Km) to TN/AP Border (54+400)
Toll Plaza Location	Nallur at Km 21+625 Nallur toll plaza will be shifted to Durainallur at Km 34+180 from 1st October 2027 in context of development of Chennai Peripheral Ring Road

**Initial section of Km 11+000 to Km 21+400 (10.400 Km length) is to be de-notified and handed over to the state government in near future considering 4 lane configuration and urbanization along the section. Hence, this 10.400 Km length to be excluded for asset monetization proposal.*
Source: Information provided by the Management

9.2.3.2. Project Location



Source: Information provided by the Management

Located at the southern end of the country's ~1,500 km east–coast corridor (NH16), this point serves as gateway to Chennai maritime and industrial clusters and observes traffic from states on eastern coast, northern and western part of the country. Chennai maritime cluster includes Chennai, Ennore (Kamarajar) and Kattupalli ports which contributes ~20% in container traffic of India, being second largest container traffic cluster western India.

9.2.3.3. Key proposed infrastructure developments which may affect Traffic

We understand from the Traffic Study Report that traffic has been projected after considering inter-alia the impact of following proposed infrastructure developments:

- **Surat – Nasik – Chennai Expressway**

  Surat Nasik Chennai Expressway is ~1,200 km long 6-lane, partially access-controlled highway being developed by NHAI through HAM. The project is part of two major economic corridors i.e., ~513 km Surat – Nashik – Ahmednagar – Solapur corridor and ~707 km. Solapur– Kurnool – Chennai corridor integrating both greenfield and brownfield stretches.

  Recently, MoRTH cancelled Surat – Nasik section of proposed development due to persistent challenges in securing environmental clearances. To address the intended connectivity objective, Maharashtra State Road Development Corporation ("MSRDC") will develop greenfield expressway connecting Bharvir Khurd on Smruddhi Marg to Tawa village on NH48. This development will negatively impact traffic movement between Solapur/ west and Chennai/ south and between Hyderabad/ north and Chennai/ south

- **Chennai Hyderabad high-speed rail**

  Chennai–Hyderabad High Speed Rail Corridor is a proposed 778 km high-speed rail link connecting Chennai Central, Minjur (on Chennai Ring Road), Tirupati, Amaravati/ Vijayawada and Hyderabad across Tamil Nadu, Andhra Pradesh and Telangana. it is expected to reduce the current Chennai–Hyderabad travel time from approximately 12 hours to about ~3 hours. As a result, there will be a negative movement in Traffic from/ to Hyderabad, Vijayawada and Chennai.

- **National Waterway 4**

  National Waterway 4 (NW4) is a major plan to use rivers and canals as a large transportation route in South India. It connects the states of Andhra Pradesh, Tamil Nadu, Telangana, and the territory of Puducherry. Alignment follows several important waterways, including parts of the Godavari and Krishna rivers, as well as several man-made canals. In total, the planned route is nearly 2,900 kilometers long. Inland Waterways Authority of India (IWAI), is currently working on the first sections, making rivers deeper and building docks for loading and unloading goods. The aim is to create a cheaper and more environmentally friendly way to move heavy cargo like coal, cement, and food, reducing traffic from roads and railways. This will reduce the traffic of 3A trucks and MAV.

9.2.3.4. Additional Procedures to be complied with in accordance with InvIT regulations:

A. List of one-time sanctions/approvals which are obtained or pending:
As represented by the Management, the list of sanctions/ approvals obtained till 31 December 2025 is provided in Appendix 3(a).

B. List of up to date/ overdue periodic clearances:

As represented by the Management, all other material permits, registrations, licenses, approvals, consents and other authorizations (collectively referred as "Governmental Licenses") shall be obtained by R1PPL as per individual project requirements once the rights and obligations are assumed by the SPV. The Project SPV (R1PPL) would be in due course and as required under applicable law procure all the Governmental Licenses issued by, and shall make all material declarations and filings with, the applicable Government Authority to own, lease, license, operate and use its properties and assets and to conduct the business by the Project SPV, as will be described in the placement documents. No notice of proceedings has been received relating to the revocation or modification of any Governmental Licenses, except as would not result in a Material Adverse Change. The general list of relevant Governmental Licenses as provided by the Management is enclosed in Appendix 3(b).

C. Estimates of already carried out as well as proposed major repairs and improvements along with estimated time of completion:

Historical Major Maintenance Expenses: We understand from the Management that the details of historical major maintenance expenses are not available with the Investment Manager.

As further represented by the Management, forecasted Major Maintenance Expenses (INR in Crs) is provided in Appendix 3(c).

D. On-going material litigations including tax disputes and claims in relation to the assets, if any;
As represented by the Management, the list of on-going material litigations including tax disputes and claims till 31 December 2025 is provided in Appendix 3(d).

The Management represented that impact, if any, of the litigation in respect of the Specified Projects pertaining to the period prior to the Effective date shall be borne by NHAI (the Sponsor).

E. Revenue pendencies including local authority taxes associated with InvIT asset and compounding charges, if any:
As represented by the Management, there are no revenue pendencies including local authority taxes associated with InvIT Asset and compounding charges as at 31 December 2025.

F. Vulnerability to natural or induced hazards that may not have been covered in town planning building control:

As represented by the Management, there are no vulnerability to natural or induced hazards that may not have been covered in town planning/ building control.

G. Physical inspection

We carried out the physical inspection of Chennai Tada Project on 5 January 2026. We observed during the physical inspection that the Toll was being collected at Nallur toll plaza. Please refer to Appendix 3(e) for the latest pictures of the project.

H. Statement of Assets:

As represented by the Management, RIIT is envisaging to acquire stake in the SPV. Hence, there is no asset of the Project as at the Valuation Date.

9.2.4. Neelmangla- Tumakuur Project

9.2.4.1. Project Overview

Parameters	Details
Project Name	Neelmangla-Tumakuru (NH-48)
Length of the project	44.668 kms for asset monetization proposal* 32.02 Kms from Neelmangla (29+500) to Tumakuru (61+520) 12.648 Kms for Tumakuru Bypass from 61+520 to 74+168
Toll Plaza Location	Kulumepalya at Km 30+000, Chokkenahalli at Km 61+500

** Tolling of Tumakuru Bypass (km 62.000 to km 74.168, length 12.168 km) is currently being exercised at adjacent Karjeevanahalli toll plaza (under BOT concession) and reimbursed to NHAI by BOT concessionaire. This section will be added for this monetization bundle. Hence, this 12.168 km length to be added for asset monetization proposal.*

Timeline of commencement/ closure of mentioned toll plazas/ check plazas are as follows:

Toll/Check Plaza	Details
Kulumepalya (km 30.000)	will be terminated on 31 March 2027 (FY27) on completion of 4 to 6 laning of Nelmangala toDobbaspet section
Halenijagal (km 53.100)	will be operational from 1 April 2027 (FY28)
Bharathipura Entry CP (km 46.375) and Honnenahalli Exit CP (km 47.425)	will be operational from 1 April 2027 (FY28) along with Halenijagal TP for Nelamangala to Dobbaspet section
Chokkenahalli (km 61.500)	will be terminated on 30 September 2028 (H1 FY29) on completion of 4 to 6 laning of Dobbaspet to Tumakuru and entire project highway length will be charged at Halenijagal TP
Dobbaspet Entry CP (km 49.900) and Halenijagal Exit CP (km 53.100)	will be operational from 1 October 2028 (H2 FY29)

9.2.4.2. Project Location

Source: Information provided by the Management

Located at the southern end of golden quadrilateral's ~1,000 km Mumbai – Bengaluru corridor (NH48), this point serves as gateway to Bengaluru and handles high volume of freight traffic moving towards western and northern India and neighbouring state of Tamil Nadu, supporting inter-state trade movement.

9.2.4.3. Key proposed infrastructure developments which may affect Traffic

We understand from the Traffic Study Report that traffic has been projected after considering inter-alia the impact of following proposed infrastructure developments:

Upgradation of NH66

NH66 upgradation aims to decongest the corridor, enhance inter-state connectivity, and support economic growth, logistics, and tourism along the western coast. The project has faced prolonged construction challenges and is targeted for completion by March 2027, with phased openings continuing into early 2028, particularly in Kerala. The Mumbai–Goa section is nearing completion and is expected to significantly reduce travel time, while diverted hazardous cargo traffic is likely to return to NH66 once all sections become operational. This will be expected to have a negative diversion on traffic movement between Kagal/north and Kochi / south for hazardous cargo traffic and other chemical and petroleum products traffic using NH48 as safety precautions.

Satellite Town Ring Road (STRR)

STRR officially designated as NH948A and partly as NH648, is a greenfield expressway project being developed by NHAI. Planned as a 4–6 lane, access-controlled corridor, the STRR is envisioned as an orbital road around Bengaluru, to ease the pressure on the city's congested road network. Its primary objective is to create a regional transportation framework by connecting 12 satellite towns surrounding Bengaluru, while allowing through traffic to bypass the congested core city area. It is also expected to stimulate economic development, encourage industrial growth in peripheral areas, and support more balanced urban expansion.

It is being implemented in multiple phases with the northeastern arc from Dobbaspet to Hoskote via Doddaballapur and Devanahalli is completed. The partially operational northern ring is also known as the Bengaluru Ring Road. Southwestern arc of the STRR is also being built in phases, with the overall project expected to be completed by the end of 2030. Once this section becomes operational, it will provide a smoother bypass around Bengaluru for vehicles coming from Mysuru and the northern districts of Kerala, reducing travel time and congestion on existing highways.

Development of North Ring of STRR / Bengaluru Ring Road will have a negative impact on traffic movement between Dobbaspet/north-west and Hosur/south-east. However, South Ring of STRR will be expected to have positive impact on traffic movement between Dobbaspet/north-west and Hosur/south-east and Dobbaspet/north and Mysuru/north Kerala and negative impact on Traffic movement between Dobbaspet/north and Mysuru/north Kerala.

Surat – Nasik – Chennai Expressway

Surat Nasik Chennai Expressway is ~1200 km long 6-lane, partially access-controlled highway being developed by NHAI through HAM. The project is part of two major economic corridors i.e

513 km Surat – Nashik – Ahmednagar – Solapur corridor and 707 km. Solapur– Kurnool – Chennai corridor integrating both greenfield and brownfield stretches. Recently, MoRTH cancelled Surat – Nasik section of proposed development due to persistent challenges in securing environmental clearances. To address the intended connectivity objective, Maharashtra State Road Development Corporation (MSRDC) will develop greenfield expressway connecting Bharvir Khurd on Smruddhi Marg to Tawa village on NH48. This development will negatively impact Traffic movement between Solapur/west and Chennai/south and between Hyderabad/north and Chennai/south

Bengaluru Tumakuru Metro line

The proposed extension of the Namma Metro along the north-western corridor aims to connect Bengaluru with Tumakuru marking Karnataka's first inter-city metro corridor and a major step towards Bengaluru – Tumakuru twin city planning. Corridor is planned to span approximately 59.6 km, extending from Madavara (terminal station of the Green Line) to Tumakuru, thereby linking the Bengaluru metropolitan area with an important industrial and educational hub of the state via Dobbaspet. The plan also includes two metro depots, one proposed near Nelamangala to serve the suburban and industrial belt, and another near Tumakuru to support terminal operations and maintenance requirements. This will have a negative diversion on the traffic movement of bus and Car/ Jeep/ Van between Bengaluru and Tumakuru.

Service Road on implementation of access-controlled

Proposed access-controlled modality will be implemented on completion of 4 to 6 lane widening of entire stretch i.e. start of H2 FY29. This will have a negative diversion of local traffic movement between Dobbaspet and Tumakuru.

Dobbaspet and Halenijagal (Check Plaza) traffic

Dobbaspet and Halenijagal (Check Plaza) will be implemented in mid FY29 and because of which traffic movement between Tumakuru/north and Dobbaspet/further towards north-east ring and south-west ring of Bengaluru / Satellite Town Ring Road will use proposed check plazas as Entry/Exit. Hence, the same will be eliminated from the main carriage way.

9.2.4.4. Additional Procedures to be complied with in accordance with InvIT regulations:

A. List of one-time sanctions/approvals which are obtained or pending:

As represented by the Management, the list of sanctions/ approvals obtained till 31 December 2025 is provided in Appendix 3(a).

B. List of up to date/ overdue periodic clearances:

As represented by the Management, all other material permits, registrations, licenses, approvals, consents and other authorizations (collectively referred as "Governmental Licenses") shall be obtained by R1PPL as per individual project requirements once the rights and obligations are assumed by the SPV. The Project SPV (R1PPL) would be in due course and as required under applicable law procure all the Governmental Licenses issued by, and shall make all material declarations and filings with, the applicable Government Authority to own, lease, license, operate

and use its properties and assets and to conduct the business by the Project SPV, as will be described in the placement documents. No notice of proceedings has been received relating to the revocation or modification of any Governmental Licenses, except as would not result in a Material Adverse Change. The general list of relevant Governmental Licenses as provided by the Management is enclosed in Appendix 3(b)**.**

C. Estimates of already carried out as well as proposed major repairs and improvements along with estimated time of completion:

Historical Major Maintenance Expenses: We understand from the Management that the details of historical major maintenance expenses are not available with the Investment Manager.

As further represented by the Management, forecasted Major Maintenance Expenses (INR in Crs) is provided in Appendix 3(c).

D. On-going material litigations including tax disputes and claims in relation to the assets, if any;
As represented by the Management, the list of on-going material litigations including tax disputes and claims till 31 December 2025 is provided in Appendix 3(d).

The Management represented that impact, if any, of the litigation in respect of the Specified Projects pertaining to the period prior to the Effective date shall be borne by NHAI (the Sponsor).

E. Revenue pendencies including local authority taxes associated with InvIT asset and compounding charges, if any:
As represented by the Management, there are no revenue pendencies including local authority taxes associated with InvIT Asset and compounding charges as at 31 December 2025.

F. Vulnerability to natural or induced hazards that may not have been covered in town planning building control:
As represented by the Management, there are no vulnerability to natural or induced hazards that may not have been covered in town planning/ building control.

G. Physical inspection
We carried out the physical inspection of Neelmangla Tumakuru Project on 5 January 2026. We observed during the physical inspection that the Toll was being collected at Kulumepalya and Chokkenahalli toll plaza. Please refer to Appendix 3(e) for the latest pictures of the project.

H. Statement of Assets:
As represented by the Management, RIIT is envisaging to acquire stake in the SPV. Hence, there is no asset of the Project as at the Valuation Date.

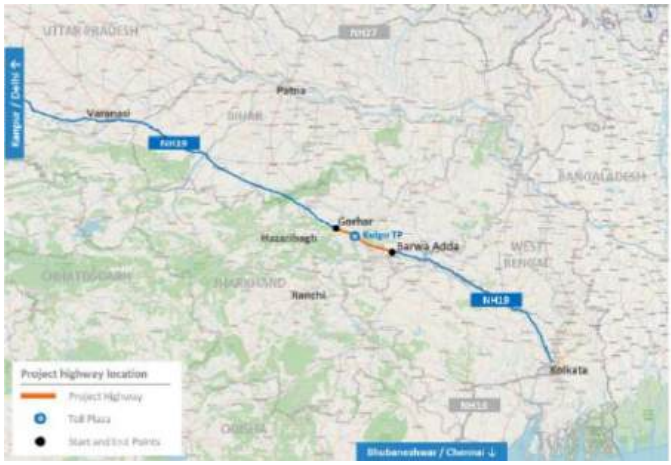
9.2.5. Gorhar-Barwa Adda Project

9.2.5.1. Project Overview

Parameters	Details
Project Name	Gorhar-Barwa Adda (NH-19)
Length of the project	80.522 kms from Gorhar (320+810) to Barwa Adda (401+332)
Toll Plaza Location	Kulgo at Km 352+100 (known as Ghanghri toll plaza in local region)

Source: Information provided by the Management

9.2.5.2. Project Location



Source: Information provided by the Management

The project highway is an integral part of golden quadrilateral along NH19, a strategic long-distance transport corridor linking Delhi/Agra and Kolkata. It serves as a critical inter-state traffic, ensuring all-weather connectivity among Uttar Pradesh, Bihar, Jharkhand and West Bengal and supporting efficient regional freight and passenger movement.

9.2.5.3. Key proposed infrastructure developments which may affect Traffic

We understand from the Traffic Study Report that traffic has been projected after considering inter-alia the impact of following proposed infrastructure developments:

Varanasi Ranchi Kolkata highspeed corridor

Greenfield 6 lane access controlled highspeed corridor under Bharatmala Pariyojana to be developed as National Highway passing through Uttar Pradesh, Bihar, Jharkhand, West Bengal and will be part of Vision 2047. This will expect to reduce current travel time from 12-14 hours to 7-9 hours. Consequently, this will have a negative movement in traffic between Varanasi/west and Hazaribagh/Bokaro/south from FY31 onwards; between Varanasi/west and Kolkata/Kharagpur/Haldia from Q4 FY33 onwards and between Dobhi/north and Hazaribagh/south from Q4 FY33 onwards.

Raxual Haldia Economic Corridor

This project is a planned 695 km, 6 lane, access-controlled greenfield highway development that will connect Raxaul on the India-Nepal border in Bihar to Haldia Port in West Bengal. Passing through parts of Bihar, Jharkhand, and West Bengal, the expressway is aimed at improving regional connectivity, reducing travel time, and facilitating smoother movement of goods and passengers across eastern India. By offering a faster and more efficient link between Nepal and an important maritime hub, it will play a key role in boosting cross-border trade and regional development. Development of this expressway will attract traffic between Nepal, Bihar, Jharkhand and southern West Bengal impacting negatively to project highway.

Eastern Dedicated Freight Corridor

Sonnagar - Dankuni section is the eastern extension of the Eastern Dedicated Freight Corridor (EDFC), designed to connect the existing freight corridor from Sonnagar in Bihar to Dankuni near Kolkata in West Bengal. Project is being implemented by the Dedicated Freight Corridor Corporation of India Limited (DFCCIL), with the objective of enhancing freight capacity, reducing congestion on existing railway lines, and improving transport efficiency for industries located in Bihar, Jharkhand, and West Bengal. Sonnagar - Dankuni link is expected to significantly decongest the existing Howrah - Delhi main line, improve supply chain efficiency and will negatively impact the traffic movement of Gorhar-Barwa Adda project.

Kandla Gorakhpur LPG Pipeline

Kandla - Gorakhpur LPG Pipeline is a 2,805 km long project world's longest LPG pipeline being developed by IHB Limited, a joint venture of Indian Oil, BPCL, and HPCL. Authorized by the Petroleum & Natural Gas Regulatory Board (PNGRB) under the Common Carrier category, the pipeline traverses Gujarat, Madhya Pradesh, and Uttar Pradesh. The pipeline will transport LPG sourced from import terminals at Kandla, Dahej, and Pipavav, and refineries at Koyali and Bina. It will directly supply 22 LPG bottling plants 3 in Gujarat, 6 in Madhya Pradesh, and 13 in Uttar Pradesh ensuring reliable and efficient LPG distribution across western and northern India. Development of this pipeline is expected to impact LPG transportation from Haldia Port (via Durgapur Bottling Plant to Purvanchal region, Bihar, Jharkhand), as Kandla serves as a major hub for handling petroleum, oil, and lubricants (POL) and will cater to a significant share of LPG movement through the new network.

Varanasi Howrah Vande Bharat Express

Varanasi - Howrah Vande Bharat Express is a semi-high-speed train covering about 760 km between Varanasi and Howrah in around 7.5 to 8 hours, offering faster and more comfortable travel. It enhances connectivity across major cities like Patna, Gaya, and Asansol, boosting regional mobility and tourism in eastern India. Consequently, a portion of traffic is expected to shift to the rail transport leading to a reduction in traffic.

National Waterway 1

National Waterway 1 (NW1), also known as the Allahabad–Haldia Inland Waterway, is one of India's longest and most significant inland navigation corridors, spanning 1,620 km along the Ganga River. It connects Haldia in West Bengal to Prayagraj (Allahabad) in Uttar Pradesh, passing through the states of West Bengal, Jharkhand, Bihar, and Uttar Pradesh. It is expected to reduce trucks and MAV traffic movement between Varanasi and Kolkata

9.2.5.4. Additional Procedures to be complied with in accordance with InvIT regulations:

A. List of one-time sanctions/approvals which are obtained or pending:

As represented by the Management, the list of sanctions/ approvals obtained till 31 December 2025 is provided in Appendix 3(a).

B. List of up to date/ overdue periodic clearances:

As represented by the Management, all other material permits, registrations, licenses, approvals, consents and other authorizations (collectively referred as "Governmental Licenses") shall be obtained by R1PPL as per individual project requirements once the rights and obligations are assumed by the SPV. The Project SPV (R1PPL) would be in due course and as required under applicable law procure all the Governmental Licenses issued by, and shall make all material declarations and filings with, the applicable Government Authority to own, lease, license, operate and use its properties and assets and to conduct the business by the Project SPV, as will be described in the placement documents. No notice of proceedings has been received relating to the revocation or modification of any Governmental Licenses, except as would not result in a Material Adverse Change. The general list of relevant Governmental Licenses as provided by the Management is enclosed in Appendix 3(b).

C. Estimates of already carried out as well as proposed major repairs and improvements along with estimated time of completion:

Historical Major Maintenance Expenses: We understand from the Management that the details of historical major maintenance expenses are not available with the Investment Manager.

As further represented by the Management, forecasted Major Maintenance Expenses is provided in Appendix 3(c).

D. On-going material litigations including tax disputes and claims in relation to the assets, if any;

As represented by the Management, the list of on-going material litigations including tax disputes and claims 31 December 2025 is provided in Appendix 3(d).

The Management represented that impact, if any, of the litigation in respect of the Specified Projects pertaining to the period prior to the Effective date shall be borne by NHAI (the Sponsor).

E. Revenue pendencies including local authority taxes associated with InvIT asset and compounding charges, if any:

As represented by the Management, there are no revenue pendencies including local authority taxes associated with InvIT Asset and compounding charges as at 31 December 2025.

F. Vulnerability to natural or induced hazards that may not have been covered in town planning building control:

As represented by the Management, there are no vulnerability to natural or induced hazards that may not have been covered in town planning/ building control.

G. Physical inspection

We carried out the physical inspection of Gorwa Barwa Adda Project on 5 January 2026. We observed during the physical inspection that the Toll was being collected at Kulgo toll plaza. Please refer to Appendix 3(e) for the latest pictures of the project.

H. Statement of Assets:

As represented by the Management, RIIT is envisaging to acquire stake in the SPV. Hence, there is no asset of the Project as at the Valuation Date.

10. Valuation Conclusion

We have carried out the Enterprise Valuation of the Specified Projects as of 31 December 2025, considering *inter-alia* Traffic Due Diligence Reports and Technical Due Diligence Reports of Traffic and Technical Consultants respectively, Business plan/ Projected financial statements of the Specified SPVs and other information provided by/ on behalf of Management, industry analysis and other relevant factors.

The Valuation summary of Specified Projects as of 31 December 2025[1] is as follows:

Particulars	WACC	Enterprise Value (INR Cr)
Enterprise Value of Specified Projects	10.1%	9,298.7

[1] While the valuation date for the purpose of this Report is 31 December 2025, the cash flows are expected to accrue to the Trust only from the Appointed Date, i.e., 1 April 2026. Considering this, the discounting of projected cash flows has been undertaken from the Appointed Date.

Appendices

Appendix 1 - WACC:

Toll Projects	SPV	Remarks
Debt-to-equity Ratio	~ 1.00	Specified Projects are yet to be acquired by the SPV. Considering *inter-alia* the typical funding pattern and long-term debt-equity ratio for road infrastructure projects, permissible leverage under the SEBI InvIT Regulations, discussions with the Management regarding planned long-term debt-equity ratio and other relevant factors, debt to equity ratio has been considered as 1:1.
Unlevered Beta – Industry	~ 0.51	Beta is a measure of the risk of the shares of a company. ß is the co-variance between the return on sample stock and the return on the market. In order to determine the appropriate beta factor for the Company, consideration must be given either to the market beta of the Company or betas of comparable quoted companies. Following comparable companies have been selected considering inter-alia the nature of the business operations, segmental analysis, size, historical performance, trading frequency and trading volume and other relevant factors. • Ashoka Buildcon Limited • IRB Infrastructure Developers Limited • PNC Infratech Limited Further, two additional comparable companies, namely, Bharat Road Network Limited and IRB InvIT Fund were also analysed for computation of industry beta. However, their unlevered beta was significantly lower (less than 0.10) and they were considered as outliers. Unlevered beta of the selected comparable companies have been estimated based on their 5-year monthly levered beta, using: Unlevered beta = Relevered beta/ [1 + (D/E)] For further details, refer note 1 below (Calculation of Beta on page no. 52). (Source: Capital IQ and RBSA analysis)
Cost of Equity (Ke)		
Risk Free Rate (Rfr)	~6.80%	Based on 10-year zero coupon yield curve ("ZCYC") for GoI securities as at 31 December 2025 (Source: The Clearing Corporation of India Limited).
Equity Market Risk Premium	~7.00%	Equity Market equity risk premium is the additional return that investors expect over a risk-free asset and is estimated considering inter-alia historical equity market returns over a risk-free rate and forward-looking equity market risk premium estimates. Data sources reviewed[2] generated a range of equity risk premium indications. However, a 7% equity market risk premium was considered reasonable representative of the equity risk premium for India.
Relevered Beta	~ 1.03	Considering inter-alia the unlevered beta of the selected comparable companies and the debt-to-equity ratio of 1.00 (as mentioned above). The relevered beta has been computed using: Relevered beta = Unlevered beta * [1 + (D/E)]
Cost of Equity (Ke)	**~13.98%**	

[2] RBSA internal study for long term historical equity market returns of BSE Sensex over 1990 – 2024 (on a 'systematic investment plan' basis), Risk-free rate for the long term GoI securities (Source: CCIL), etc.

Toll Projects	SPV	Remarks
Cost of Debt (Kd)		
Pre-Tax Cost of Debt (Kd)	~7.60%	Management estimate considering *inter-alia* ongoing discussions/ negotiations with the potential lenders
Effective tax rate	~19.23%	Estimated considering *inter-alia* tax depreciation/ amortization policy followed by the SPV and corporate income tax rate
Post-Tax Cost of Debt (Kd)	**~ 6.14%**	
WACC (Rounded off)	**10.10%**	

Note 1: Calculation of Beta

Name of Comparable Company	5-year monthly levered beta	6-month VWAP Market Capitalization (INR in Cr)	Total Debt as of the latest available financials for Valuation date (INR in Cr)	Debt-equity ratio based on 5 years average	Unlevered Beta based on 5-year debt-equity#
Ashoka Buildcon Limited	1.55	5,228.6	1,988,9	1.55	0.47
IRB Infrastructure Developers Limited	1.63	26,662.2	20,851.6	1.63	0.49
PNC Infratech Limited	0.83	7,662.1	5,068.8	0.83	0.58
Mean					**0.51**

 # Unlevered Beta= [Levered Beta/(1+Debt-equity ratio)]
Source: Capital IQ and RBSA analysis

Following comparable companies have been selected considering inter-alia the nature of the business operations, segmental analysis, size, historical performance, trading frequency and trading volume and other relevant factors:

A. Ashoka Buildcon Limited engages in the infrastructure development business in India. The company operates through Construction & Contract Related Activity; Built, Operate and Transfer (BOT); and Sale of Goods segments. It engages in the construction of infrastructure facilities on engineering, procurement, and construction basis, as well as BOT basis. In addition, the company undertakes various projects, such as highways, bridges, power projects, buildings, city gas distribution projects, water projects, and railways. Further, it sells ready mix concrete and real estate properties.

B. IRB Infrastructure Developers Limited engages in the infrastructure development business in India. It operates in two segments, Built, Operate and Transfer/Toll Operate and Transfer; and Construction. The company develops roads and operates and maintains roadways. It also provides real estate, hospitality, and airport development services, as well as operates as an investment manager. The company was incorporated in 1998 and is based in Mumbai, India.

C. PNC Infratech Limited, operates as an infrastructure investment, development, construction, operation, and management company in India. The company undertakes various infrastructure projects, including roads, highways, bridges, flyovers, power transmission lines, airport runways and pavements, rural drinking water supply, irrigation, industrial area development, rail freight corridors, and other infrastructure projects. It also provides end-to-end infrastructure implementation solutions, such as EPC services and executes and implements projects on a design-build-finance-operate-transfer, operate-maintain-transfer, hybrid annuity model, and other public-private partnership formats. PNC Infratech Limited was founded in 1989 and is headquartered in Agra, India.

Appendix 2 – Discounted Cash Flow (DCF): Enterprise Valuation of the Specified Projects

Note: Discounting of projected cash flows commences from 1 April 2026, being the Appointed Date.

INR Cr

Finanical Year	FY2027	FY2028	FY2029	FY2030	FY2031	FY2032	FY2033	FY2034	FY2035	FY2036	FY2037	FY2038	FY2039	FY2040	FY2041
Months	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Revenue	925.8	1,128.0	1,180.7	1,253.1	1,362.1	1,489.6	1,609.1	1,652.0	1,710.4	1,884.1	2,046.4	2,198.2	2,361.8	2,544.3	2,738.7
EBITDA before MMR Provisions and CSR Expense	876.6	1,076.4	1,113.0	1,158.8	1,263.0	1,385.6	1,461.8	1,496.2	1,535.4	1,704.7	1,806.9	1,972.8	2,149.3	2,271.1	2,442.1
Add: Interest income on MM Reserve	-	-	-	-	-	-	-	-	-	-	-	-	2.3	3.2	0.9
Add/(Less): (Increase)/Decrease in MM Reserve	-	-	-	-	-	-	-	-	-	-	-	-	(93.4)	58.4	35.0
Less: CSR Expense	-	-	-	-	-	-	-	-	-	-	-	(1.5)	(5.8)	(10.8)	(17.1)
Less: IM Expenses	(13.0)	(14.3)	(15.7)	(17.3)	(19.0)	(20.9)	(23.0)	(25.3)	(27.8)	(30.6)	(33.7)	(37.0)	(40.7)	(44.8)	(49.3)
Less: Trust Expenses	(1.5)	(1.6)	(1.7)	(1.9)	(2.0)	(2.2)	(2.3)	(2.5)	(2.7)	(2.9)	(3.1)	(3.3)	(3.6)	(3.8)	(4.1)
Less: Income Tax	-	-	-	-	-	-	(33.0)	(262.6)	(327.2)	(370.7)	(421.3)	(426.7)	(375.1)	(510.4)	(586.3)
Less: MM Expenses	-	-	-	-	-	-	(102.6)	(139.4)	-	(54.8)	-	(177.4)	(583.9)	(186.8)	(70.0)
Less: Capital Expenditure	(52.8)	(14.1)	-	-	-	-	-	-	-	-	-	-	-	-	-
Add/(Less): (Increase)/ Decrease in Working Capital	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Free Cashflows to Firm ("FCFF")	**809.3**	**1,046.4**	**1,095.6**	**1,139.7**	**1,242.0**	**1,362.5**	**1,300.9**	**1,066.5**	**1,177.8**	**1,245.7**	**1,348.9**	**1,326.9**	**1,049.1**	**1,576.1**	**1,751.1**
Time to Midpoint	0.5	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5
Discount Rate	0.953	0.865	0.786	0.714	0.648	0.589	0.535	0.486	0.441	0.401	0.364	0.330	0.300	0.273	0.248
PV of FCFF	**771.3**	**905.7**	**861.1**	**813.6**	**805.3**	**802.3**	**695.7**	**518.0**	**519.6**	**499.1**	**490.7**	**438.5**	**314.9**	**429.6**	**433.4**
Enterprise Value	**9,298.7**														

Projected Cash EBITDA for Specified Projects:

INR Cr

Financial Year	FY2027	FY2028	FY2029	FY2030	FY2031	FY2032	FY2033	FY2034	FY2035	FY2036	FY2037	FY2038	FY2039	FY2040	FY2041
Months	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Vijayawada- Chilakaluripet	225.7	248.0	269.7	299.5	327.5	360.5	395.4	353.8	299.9	335.1	364.4	390.6	420.8	458.4	505.4
Chennai Bypass	205.5	253.1	269.4	284.2	316.4	359.7	400.3	447.1	508.1	564.2	618.4	662.0	712.9	761.8	819.6
Chennai- Tada	147.5	163.3	169.4	186.6	200.8	218.5	237.0	258.5	284.1	311.1	339.1	370.0	399.4	437.1	474.5
Neelmangala- Tumakuru	192.0	286.3	282.1	277.3	295.4	310.3	327.0	355.7	384.0	417.6	447.2	473.5	501.2	530.0	553.5
Gorhar-Barwa Adda	155.1	177.3	190.1	205.6	222.0	240.4	249.3	237.0	234.3	256.2	277.2	302.0	327.5	357.1	385.6
Revenue	**925.8**	**1,128.0**	**1,180.7**	**1,253.1**	**1,362.1**	**1,489.6**	**1,609.1**	**1,652.0**	**1,710.4**	**1,884.1**	**2,046.4**	**2,198.2**	**2,361.8**	**2,544.3**	**2,738.7**
Other Office expenses	13.9	14.6	15.4	23.2	24.3	25.6	35.0	36.7	38.6	40.5	52.4	55.1	57.8	60.7	63.7
Routine Maintenance	14.2	14.9	15.9	18.1	19.0	20.0	38.6	41.2	54.7	53.1	84.1	62.2	41.2	89.1	103.3
Electricity	2.3	2.4	2.5	3.1	3.2	3.4	7.4	7.7	8.1	8.5	14.9	15.6	16.4	18.2	19.2
Toll Plaza & ATMS O & M	16.0	16.8	30.8	46.2	48.6	51.0	54.7	57.9	60.8	63.8	67.0	70.4	73.9	78.4	82.3
PM Expenses	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5
Insurance Expenses	2.5	2.6	2.7	3.3	3.5	3.7	11.2	11.7	12.3	12.9	20.5	21.6	22.6	26.2	27.5
Performance BG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Total Expenses	**49.2**	**51.6**	**67.7**	**94.3**	**99.1**	**104.0**	**147.3**	**155.8**	**175.0**	**179.4**	**239.5**	**225.4**	**212.6**	**273.2**	**296.6**
EBITDA before MMR Provisions and CSR Expense	**876.6**	**1,076.4**	**1,113.0**	**1,158.8**	**1,263.0**	**1,385.6**	**1,461.8**	**1,496.2**	**1,535.4**	**1,704.7**	**1,806.9**	**1,972.8**	**2,149.3**	**2,271.1**	**2,442.1**

Sensitivity Analysis: Enterprise Value

INR Cr

WACC	9.60%	9.85%	10.10%	10.35%	10.60%
Enterprise Value	9,571.0	9,433.3	9,298.7	9,167.1	9,038.5

Appendix 3 – Additional Disclosure for the Specified Projects

Appendix 3(a) - List of one-time sanctions / approvals as of 31 December 2025, as provided by the Management

Gorhar- Barwa Adda (Jharkhand)

Gorhar to Khairatunda

- Environmental Clearance Approval dated June 23, 2014 issued by Ministry of Environment and Forests for widening and rehabilitation of the existing 4 lane to 6 lane of Aurangabad to Barwa Adda (km 180.000 to km 400.057) Section of NH-2 in the state of Bihar and Jharkhand.

Khairatunda to Barwa Adda

- Environmental Clearance Approval from Forest Division Officer, Girdih East Forest Division, Forest Department, Jharkhand for six laning of Khairatunda- Barwa Adda of NH-2 from 360.000 km to 400.132 section.

Chilakaluripet-Vijayawada (Andhra Pradesh)

- Environmental Clearance Exemption Certificate dated March 8, 2013 issued by Louis Berger Group Inc., acting as Independent Engineer, confirming that obtaining environmental clearance for the project was not required.

Appendix 3(b) – List of up to date / overdue periodic clearances

Gorhar- Barwa Adda (Jharkhand)

Gorhar to Khairatunda

- Licence obtained pursuant to CLRA Act issued by Office of the Licensing Officer, Assistant Labour Commissioner, Dhanbad, GoI dated November 2, 2023.

Khairatunda to Barwa Adda

- Licence obtained pursuant to CLRA Act issued by Office of the Licensing Officer, Assistant Labour Commissioner, Dhanbad, GoI dated February 24, 2023.
- Registration under the Employees' Provident Fund and Miscellaneous Provisions Act, 1952, issued by the Employees' Provident Fund Organisation.

Chilakaluripet-Vijayawada (Andhra Pradesh)

- Licence obtained pursuant to CLRA Act issued by Office of the Licensing Officer, Assistant Labour Commissioner, Vijayawada, GoI dated August 5, 2025;
- Registration under the Employees' Provident Fund and Miscellaneous Provisions Act, 1952, issued by the Employees' Provident Fund Organisation.
- Certificate of registration under the Employees' State Insurance Act, 1948, issued by the Employees' State Insurance Corporation.

Chennai- Tada (Tamil Nadu)

- Renewal of CTO obtained pursuant to Water Act and Air Act issued by Tamil Nadu Pollution Board in relation to, amongst others, for operating the facility for manufacture of products/ byproducts, discharge of sewage/trade effluent for hot bituminous mix dated October 1, 2020.
- Licence obtained pursuant to CLRA Act issued by Office of the Licensing Officer, Assistant Labour Commissioner, Chennai, GoI dated October 29, 2025.
- Registration under the Employees' Provident Fund and Miscellaneous Provisions Act, 1952, issued by the Employees' Provident Fund Organisation.
- Certificate of registration under the Employees' State Insurance Act, 1948, issued by the Employees' State Insurance Corporation.

Chennai Bypass (Tamil Nadu)

- Licence obtained pursuant to CLRA Act issued by Office of the Licensing Officer, Assistant Labour Commissioner, Chennai, GoI
- Registration under the Employees' Provident Fund and Miscellaneous Provisions Act, 1952, issued by the Employees' Provident Fund
- Certificate of registration under the Employees' State Insurance Act, 1948, issued by the Employees' State Insurance Corporation

Neelmangla Tumakuru (Karnataka)

- CTE obtained pursuant to Water Act and Air Act issued by Karnataka State Pollution Control Board in relation to, amongst others, for setting up of manufacturing unit for ready mix concrete, wet mix dated October 19, 2022.
- CTO obtained pursuant to Water Act and Air Act issued by Karnataka State Pollution Control Board in relation to, amongst others, for discharge of sewage/trade effluents and emission for ready mix concrete, wet mix dated January 13, 2023.
- CTO obtained pursuant to Water Act and Air Act issued by Karnataka State Pollution Control Board in relation to, amongst others, for discharge of sewage/trade effluents and emission for ready mix concrete, hot mix dated February 9, 2023.
- Licence obtained pursuant to CLRA Act issued by Office of the Licensing Officer, Assistant Labour Commissioner, Bangalore, GoI dated August 16, 2022.
- Registration under the Employees' Provident Fund and Miscellaneous Provisions Act, 1952, issued by the Employees' Provident Fund Organisation.
- Registration Certificate of Establishment pursuant to Karnataka Shops and Commercial Establishments Act, 1961, issued by Department of Labour, Government of Karnataka for road construction dated May 4, 2022.
- Certificate of registration for principal employer obtained pursuant to BOCW Act issued by Office of the registering officer, assistant labour commissioner, Bangalore, GoI dated November 4, 2025

Appendix 3(c) - Estimates of proposed major repairs and improvements

INR Cr

Financial Year	FY2027	FY2028	FY2029	FY2030	FY2031	FY2032	FY2033	FY2034	FY2035	FY2036	FY2037	FY2038	FY2039	FY2040	FY2041
Months	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Gorhar-Barwa Adda	-	-	-	-	-	-	-	-	-	-	-	177.4	-	-	-
Chilakaluripet-Vijayawada	-	-	-	-	-	-	-	-	-	-	-	-	270.7	-	-
Chennai Bypass	-	-	-	-	-	-	102.6	-	-	-	-	-	137.5	-	-
Chennai-Tada	-	-	-	-	-	-	-	139.4	-	-	-	-	-	186.8	-
Neelmangala- Tumakuru	-	-	-	-	-	-	-	-	-	54.8	-	-	175.8	-	70.0
Major Repair and improvements	**-**	**-**	**-**	**-**	**-**	**-**	**102.6**	**139.4**	**-**	**54.8**	**-**	**177.4**	**583.9**	**186.8**	**70.0**

Source : Information provided by the Management

Excludes expenses which are to be borne by NHAI/ contractors based on existing contracts between NHAI and respective contractors (for details, refer Section 9)

Appendix 3(d) - On-going material litigation including tax disputes and claims in relation to the assets as of 31 December 2025

Chennai Bypass

1. NHAI, in its capacity as the concessioning authority, has filed a petition before the High Court of Delhi (challenging the award of the arbitral tribunal passed on March 21, 2012) against M/s. Hindustan Construction Company in relation to the construction of Chennai Bypass Phase-II connecting NH-4 & NH-5 and widening of Chennai Bypass Phase-I connecting NH-45 & NH-4 in the State of Tamil Nadu. The claims challenged are determination of additional costs incurred for piling works due to change in the sequence of piling, and reimbursement of additional costs incurred on account of change in norms for bonus payment to workers and introduction/increase of service tax due to subsequent legislation. The amount challenged before the High Court of Delhi is INR 21.70 crore. The matter is currently pending.

2. NHAI, in its capacity as the concessioning authority has filed a petition before the High Court of Delhi (challenging the award of the arbitral tribunal passed on June 05, 2013) against M/s. Hindustan Construction Company in relation to the Contract Agreement dated February 26, 2005 for construction of Chennai Bypass Phase-II connecting NH-4 & NH-5 and widening of Chennai Bypass Phase-I connecting NH-45 & NH-4 in the State of Tamil Nadu. The claims challenged include determination of rates for a new item of 40 mm thick bituminous concrete (treated as variation) and reimbursement of additional costs incurred during the extended contract period due to delays not attributable to the contractor, covering overheads, equipment charges, labour costs, financing charges, loss of profit, and uncovered escalation on materials and fuel. The amount challenged before the High Court of Delhi is INR 150.5 crore. The matter is currently pending.

3. NHAI, in its capacity as the concessioning authority has filed a petition before the High Court of Delhi (challenging the award of the arbitral tribunal passed on August 12, 2024) against M/s. MEP Chennai Bypass Toll Road Private Limited in relation to the concession agreement for operation and maintenance of Chennai Bypass (Km 0.00 to Km 32.600) on operate, maintain and transfer basis in the State of Tamil Nadu. The claims challenged relate to non-remittance of concession fee, non-completion of project facilities, non-compliance with maintenance obligations, interest amount, and costs. The amount challenged before the High Court of Delhi is INR 277.6 crore. The matter is currently pending.

4. M/s. MEP Chennai Bypass Toll Road Private Limited has filed a petition before the High Court of Delhi (challenging the arbitral award passed on August 14, 2024) against NHAI in relation to the concession agreement for operation and maintenance of Chennai Bypass (Km 0.00 to Km 32.600) on operate, maintain and transfer basis in the State of Tamil Nadu. The claims relate to compensation for losses due to failure to

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notify correct user fee and exclusion of Maduravoyal Junction Structure in fee notification, losses due to toll evasion through illegal/unplanned entry and exit points, loss of future business, reimbursement of costs for maintaining collaterals in the form of bank guarantees, interest for pre-award and post-award periods, and costs incurred in the proceedings. The amount involved is INR 30.2 crore. The matter is currently pending.

Gorhar-Barwa Adda

1. M/s DBL Gorhar Khairatunda Highways Private Limited. has initiated arbitration proceedings against NHAI under Society for Affordable Redressal of Disputes ("SAROD") in relation to six-laning of Gorhar to Khairatunda section of NH-2 (Km 320.810 to Km 360.300) in the State of Jharkhand. The claims relate to compensation for delayed and withheld payments including milestone and change of scope works, reimbursement of expenses for extension of performance bank guarantee, compensation for additional costs due to change in law (royalty rates and fuel taxes), release of withheld annuity and O&M payments due to incorrect CPI index application, and interest on delayed payments. The amount involved is INR 155.8 crore. The matter is currently pending.

Neelmangla-Tumakuru

1. Mushtafa Khan, Jinesh Kumar Jain, K. Anjan Kumar, Doddahanumaiah, Sri Siddalingaswamigalu and 147 other landowners have initiated arbitration proceedings against NHAI in relation to Neelmangla to Tumakuru section of NH – 48 (Km 30.00 to Km 75.00) in the state of Karnataka. NHAI had acquired land and fixed compensation as per the right to fair compensation and transparency in Land Acquisition and Rehabilitation and Resettlement Act, 2013. The claims in the arbitration proceedings relate to enhancement of compensation for the acquired land. The amount involved in all such case is not quantifiable. The matters are currently pending.

Note: The Management has represented that impact, if any, of the litigation in respect of the Specified Projects pertaining to the period prior to the effective date shall be borne by NHAI (the Sponsor).

Source: Information Provided by the Management

Appendix 3(e)- Site Visit Photographs

Chilakaluripet- Vijayawada

Site Visit Photos- OHHPL

Chennai Bypass

Chennai Tada

Neelmangala Tumakru

Gorhar- Barwa Adda

ANNEXURE B

TECHNICAL CONSULTANT REPORTS

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URS MARC Technocrats Pvt. Ltd.

Preparation of Technical Due Diligence Report of the National Highway Stretches under Consideration for award on Asset Monetization

Technical Due Diligence Report

Gorhar to Barwa Adda

(Km 320+810 to Km 401+332)

January 26

भारतीय राष्ट्रीय राजमार्ग प्राधिकरण
National Highways Authority of India

Prepare For:

National Highways Authority of India

Quality Information

Prepared by	Checked by	Verified by	Approved by
YR	AD	SG	SRL

Revision History

Revision	Revision date	Details	Authorized	Name	Position
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LIST OF ABBREVIATIONS

AMC	Annual Maintenance Contract	DGPS	Differential Global Positioning System
ATCC	Automatic Traffic Counter and Classifier	DCA	Draft Concession Agreement
ATMS	Advanced Traffic Management System	DIS	Digital Imaging system
AADT	Annual Average Daily Traffic	DG	Diesel Generator
AVCC	Automatic Vehicle Count and classifier	DLC	Dry Lean Concrete
ARRB	Australian Road Research Board	DLP	Digital Laser Profiler
BC	Bituminous Concrete	DPR	Detailed Project Report
BHS	Both Hand Side	ECB	Emergency Call Box
BI	Bump Integrator	EPC	Engineering, Procurement, and Construction
BOQ	Bill of Quantity	ESAL	Equivalent Standard Axle Load
BT	Bituminous Top	ETC	Electronic Toll Collection
CA	Concession Agreement	EW	East West
CBR	California Bearing Ratio	FY	Financial Year
CAL	Client Access License	FOB	Foot Over Bridge
CAPEX	Capital Expenditures	FWD	Falling Weight Deflectometer
CC	Control Centre	GAD	General Arrangement Drawing
CMO	Chief Medical Officer	GOI	Government of India
CCEA	Cabinet Committee on Economic Affairs	GPRS	General Packet Radio Service
CCTV	Closed Circuit Television Systems	GSB	Granular Sub-base
CUP	Cattle Underpass	GNSS	Global Navigation Satellite System
DBM	Dense Bituminous Macadam	GPS	Global Positioning System

GSM	Global System for Mobile
GST	Goods and Services Tax
HAM	Hybrid Annuity Model
HSYD	High Yielding Strength Deformed
IMU	Inertial Measurement Unit
INR	Indian Rupees
INViT	Infrastructure Investment Trust
IRC	Indian Road Congress
IE	Independent Engineer
ITM	Integrated Traffic Management
ITS	Intelligent Transport System
KVA	Kilo-Volt-Ampere
LCV	Light Commercial Vehicle
LiDAR	Light Detecting and Ranging
LED	Light Emitting Diode
LHS	Left Hand Side
LIU	Light Interface Units
LOA	Level of Service
LVUP	Light Vehicular Underpass
LL	Liquid Limit
MAV	Multi Axle Vehicle
MBIU	Mobile Bridge Inspection Unit
MCA	Model Concession Agreement
MCW	Main Carriageway
MDS	Metrological Data System
MDD	Maximum Dry Density
MET	Metrological
MIS	Management Information System
MJB	Major Bridge
MNB	Minor Bridge
MOP	Management of Means of Payment
MoRTH	Ministry of Road Transport and Highways
MSA	Million Standard Axles
MSWIM	Medium Setting Weighing Motion
MT	Metric Ton
NH	National Highway
NHAI	National Highways Authority of India
NMS	Network Management System
NSV	Network survey Vehicle
NVR	Network Video Recorder
O&M	Operation & Maintenance
OMC	Optimum Moisture content
OFC	Optical Fiber Cable
OPEX	Operational Expenditure

OSV	Other Sized Vehicle
PCC	Plain Cement Concrete
PCOD	Provisional Commercial Operation Date
PCI	Pavement Condition Index
PCR	Pavement Condition Rating
PCU	Passenger Car Unit
PQC	Pavement Quality Concrete
PR	Project Road
PSC	Pre-Stressed Concrete
PTZ	Pan–Tilt–Zoom
PUP	Pedestrian Underpass
PWIM	Portable Weigh in Motion
RCC	Reinforced Cement Concrete
RFID	Radio Frequency Identification
RFP	Reference for Proposal
RHS	Right Hand Side
RMS	Radio Mobile System
ROB	Rail/Road Over Bridge
ROW	Right of Way
RUB	Rail/Road Under Bridge
SAN	Storage Area Network
SOR	Schedule of Rates
SPV	Special Purpose Vehicle
SWB	Static Weigh Bridge
SR	Service Road
SC	Scheduled Caste
ST	Scheduled Tribe
TMS	Toll Management System
TOT	Toll, Operate and Transfer
TTES	Travel Time Estimation System
UI	Unevenness Index
UPS	Uninterruptible Power Supply
VASD	Vehicle Actuated Speed Display
VDF	Vehicle Damage Factor
VIDS	Video Incident Detection System
VMS	Variable Message Signs
VUP	Vehicular Underpass
WIM	Weigh in Motion
WMM	Wet Mix Macadam

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Executive Summary

EXECUTIVE SUMMARY

1. INTRODUCTION

The National Highways Authority of India (NHAI), constituted by an act of Parliament, is engaged in development, maintenance and management of National Highways networks in India entrusted to it by Ministry of Road Transport and Highways (MoRT&H), Government of India (GoI).

To fulfill the requirement of the growing industrialization and development of the country, Government has made ambitious plans to expand network of national highways across the length and width of the country at a rapid pace. The various programs which have been taken by Govt. through NHAI are

The various programs which have been taken by Govt. through NHAI are:

1. **Phase I**: Golden Quadrilateral (GQ): connecting four metro cities (Delhi, Mumbai, Chennai and Kolkata) by upgrading existing road with four / six lanning having length of 5846 km
2. **Phase II**: North-South and East-West Corridors (NSEW) comprising 4/6-laning of National Highways connecting Srinagar to Kanyakumari and Silchar to Porbandar. The total length of NSEW corridor is 7300 km.
3. **Phase III**: Four-laning of 12,109 km of high-density national highways connecting state capitals and places of economic, commercial and tourist importance.
4. **Phase IV**: Upgradation of 20,000 km of single-lane roads to two-lane standards with paved shoulders.
5. **Phase V**: Six-laning of 6,500 km of four-laned highways.
6. **Phase VI**: Construction of 1,000 km of expressways connecting major commercial and industrial townships.
7. **Phase VII**: Construction of ring roads, bypasses, underpasses, flyovers, etc. comprising 700 km of road network.

Bharatmala Pariyojana is a new umbrella program launched by GOI for the highways sector that focuses on optimizing efficiency of freight and passenger movement across the country by bridging critical infrastructure gaps through effective interventions like development of Economic Corridors, Inter Corridors and Feeder Routes, National Corridor Efficiency Improvement, Border and International connectivity roads, Coastal and Port connectivity roads and Green-field expressways.

To achieve this accelerated pace of development, high funding is required in the short term. For this purpose, MoRTH has proposed to leverage Asset Recycling in the highway sector and is expected to generate additional resources for construction of future highways. Accordingly, the Model for monetization of public funded operational NH projects has been developed, which is called Toll, Operate and Transfer (TOT). Under the TOT model, right of collection of user fee of selected operational NH projects is proposed to be assigned for a specific time period, to developers or investors (Concessionaire) against upfront payment of a lump-sum amount to NHAI. Further, during the tenure of the contract, the O&M responsibility would also remain with the assigned Concessionaire.

In August 2016, the Cabinet Committee on Economic Affairs (CCEA) authorized the NHAI to monetize public funded NH projects which are operational and generating toll revenues

for at least two years after the Commercial Operations Date (COD) through the TOT model.

The National Highways Authority of India (NHAI) has initiated the process of setting up an infrastructure investment trust (InvIT) to monetize its road assets. In order to implement this model, NHAI requires the preparation of a detailed report on inventory & physical condition of the road to be conducted through selected consultant.

M/s. URS Scott Wilson India Pvt. Ltd. in JV with MARC Technocrats (P) Ltd submitted proposal and selected as empaneled consultant for carrying out Technical Due Diligence. LOA issued by NHAI vide ref No: NHAI / AM/2023-24/ Empanelment-2/ Tech. RFP/e-203713/254 dated 10.09.2024 for carrying out Tech Due Diligence of following road stretches.

List of Allotted Stretches

S.No.	Name of Stretch	Name of Toll Plaza	State	Length of Project	No. of Lanes
1	Gorhar to Barwa Adda	Kulgo	Jharkhand	80.522	4L/ 6L
Total Length				**80.522 Km**	

Accordingly, detailed reports on inventory & physical condition have been carried out for all stretches including a study of improvement proposals. This executive summary presents details of Project **Gorhar to Barwa Adda** Section from Km 320+810 to Km 401+332 having length of 80.522 km.

2. STUDY OBJETIVE

The main objective of this assignment is to assess the physical condition of all existing features of the **Gorhar to Barwa Adda** stretch and preparation of Technical Due Diligence Report (TDDR), technical and maintenance schedules. Physical condition survey of Project Stretch includes data collection and analysis of highway geometric design parameters, pavement condition, condition of structures, road safety features, condition of existing facilities like toll plazas, truck lay byes etc.

Based on physical condition of stretches, options are worked out for improvements of safety aspects of existing highway features, repair and rehabilitation of pavement and structures. Cost associated with all improvement proposals are also estimated as part of this study.

NHAI has appointed **M/s Translink Infrastructure Consultants (P) Ltd.** for carrying out Traffic Due Diligence and data provided by Traffic Consultant through NHAI is adopted for analysis of pavement design and periodic overlay.

3. PROJECT STRETCH

The project stretch start from Gorhar Km 320+810 to Barwa Adda Km 401+332 (Existing 400+632) of NH 19 in the State of Jharkhand. The total length of the project road is 80.522 km.

The project road passes through the Gorhar, Atka, Bagodar, Kulgo, Dumri, Jamtara, Ishri, Topchanchi, Rajganj, and Barwa Adda the State of Jharkhand.

The existing Four/six Lane project road was constructed under Item Rate by the HAM Concessionaire package wise from as shown details below in table:

Name of Agency	Mode of Contract	Chainage (Km)		Length (Km)	PCOD / COD	O&M Handover Date*
		From	To			
Progressive Construction Limited & Sunway Construction Berhad, Malaysia	Item Rate	320+810	326+000	5.19	Not Applicable	
M/s DBL Gorhar Khairatunda Highways Pvt. Ltd.	HAM	326+000	360+300 (Design 361+000)	35.000	16.10.2021/ 31.03.2022	15.10.2036
M/s Ashoka Khairatunda Barwa Adda Road Limited (AKBARL)	HAM	360+300 (Design 361+000)	400+632 (Design 401+332)	40.332	09.10.2021/ 21.04.2022	08.10.2036
Total Length				**80.522**		

The project road was known as NH-2 which starts from Km 320+810 at Gorhar and ends at Km 401+332 at Barwa Adda. The project road is renumbered as New NH-19. Available project documents are as per NH-19 therefore this report is also prepared based on changing system of New NH 19.

Ongoing Status of Project Section

From Km 320+810 to Km 326+000 (Gorhar to Atka)

The stretch from Km 320+810 to Km 326+000, between Gorhar and Atka, is a 4-lane retained portion with a length of 5.190 kilometers.

From Km 320+810 to Km 360+300 (Design 361+000) (Atka to Khairatunda)

The stretch from Km 320+810 to Km 360+300 (Design Km 361+000), from Gorhar was awarded to M/s DBL Gorhar Khairatunda Highways Pvt. Ltd (HAM Concessionaire) under the Hybrid Annuity Model (HAM) for six lanning works, with the Concession Agreement signed on 27th April 2018. The section from Km 320+810 to Km 326+000 was descope from M/s DBL Gorhar Khairatunda Highways Pvt. Ltd therefore revised scope of M/s DBL is from Km 326+000 to Km 360+300 (Design 361+000) having length of 35 km. Six lanning is now completed with PCOD on 16.10.2021 and COD achieved on 31.03.2022. As per the HAM Concession Agreement, this stretch shall be under Operation and Maintenance for 15 years from PCOD i.e. till 15.10.2036.

From Km 360+300 to 400+632 (Design 401+332) (Khairatunda to Barwa Adda)

The stretch from Km 360+300 to Km 400+632, spanning a length of 40.332 km between Khairatunda to Barwa Adda is awarded to M/s Ashoka Khairat under Barwa Adda Road Limited (AKBARL) under the Hybrid Annuity Model (HAM) for six lanning works. The Concession Agreement for this section was signed on 17th April 2018. Six lanning is now completed with PCOD on 09.10.2021 and COD achieved on 21.04.2022. As per the HAM Concession Agreement, this stretch shall be under Operation and Maintenance for 15 years from PCOD i.e. till 08.10.2036.

The index map depicting the project road is presented in **Fig.0.1.**

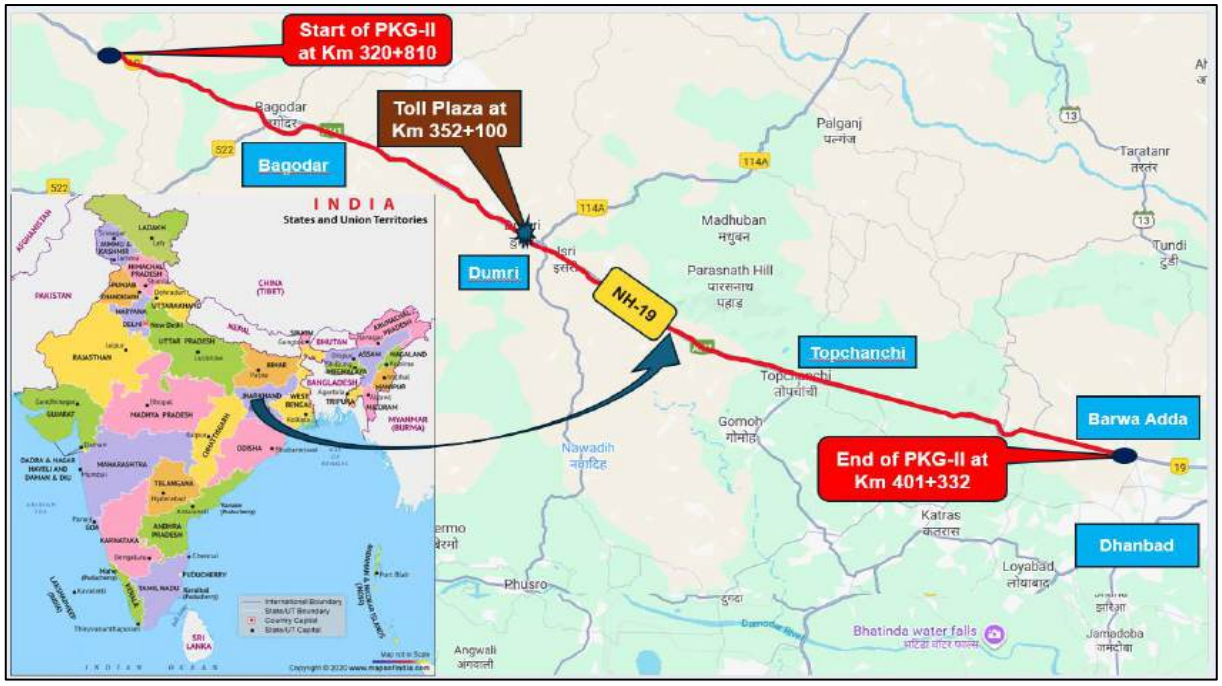


Fig 0.1: Project Location Map

4. Survey and Investigation

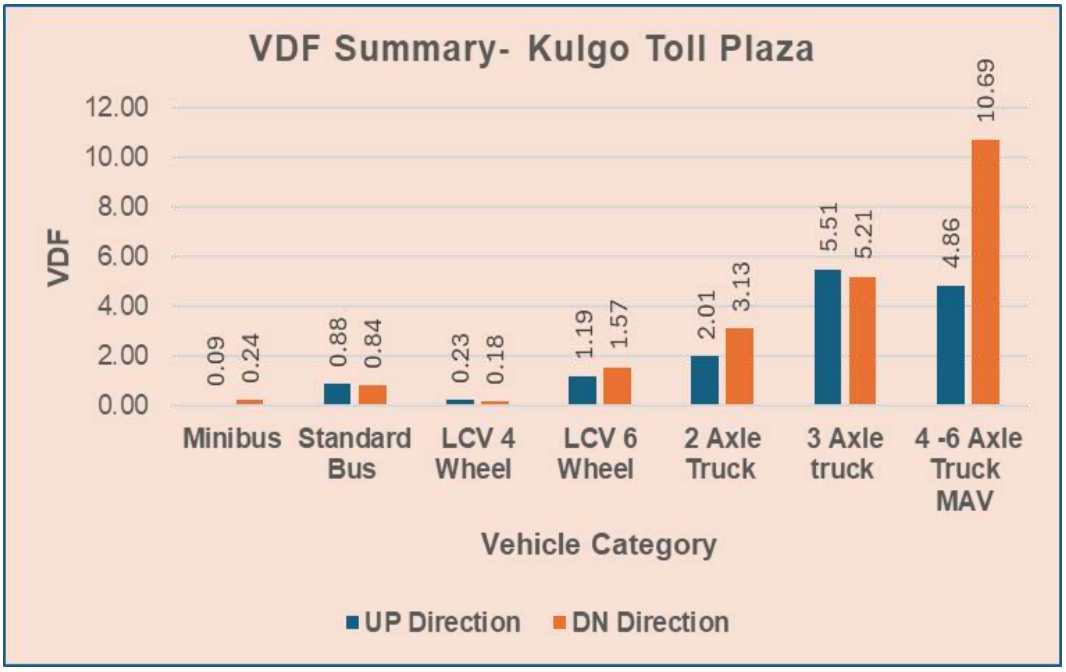
Existing KM stone of NH-19 is being referred to in this report. Various investigations were carried out to assess the physical condition of the Project Stretch. List of all investigations and its schedule is presented in table below:

Sl. No	Type of Survey	Location	Survey Schedule
Survey & Investigation Schedule			
1	Traffic Surveys	**Carried out by M/s TransLink Infra**	
2	Topographical Survey through LiDAR	Entire Stretch	Aug / Sep 2025
3	Aerial Videography by Drone	Entire Stretch	Aug / Sep 2025
4	Network Survey Vehicle	Entire Stretch	Aug / Sep 2025
5	(a) FWD	Entire Stretch	Aug / Sep 2025
	(b)Test Pits		Aug / Sep 2025
	© Core Cutting		Aug / Sep 2025
6	Material Testing	Entire Stretch	Aug / Sep 2025
7	Structural Investigation	Entire Stretch	Aug / Sep 2025
	i. Inventory		Aug / Sep 2025
	Ii MBIU	Entire Stretch	Aug / Sep 2025
8	Road Safety Audit	Entire Stretch	Aug / Sep 2025
9	Toll Plaza Audit	Main Plaza 1 nos	Aug / Sep 2025
10	Road Inventory (Manual)	Entire Stretch	Aug / Sep 2025
11	Retroreflection of Road Signs	Entire Stretch	Aug / Sep 2025

5. TRAFFIC SURVEY, ANALYSIS & TRAVEL DEMAND ESTIMATION

Traffic Survey has been carried out by the traffic consultant appointed by M/s **Translink Infrastructure Consultants Pvt. Ltd.**

a) **Axle Load Survey**: Vehicle Damage Factor (VDF) has calculated based on Axle Load Survey is presented as below:

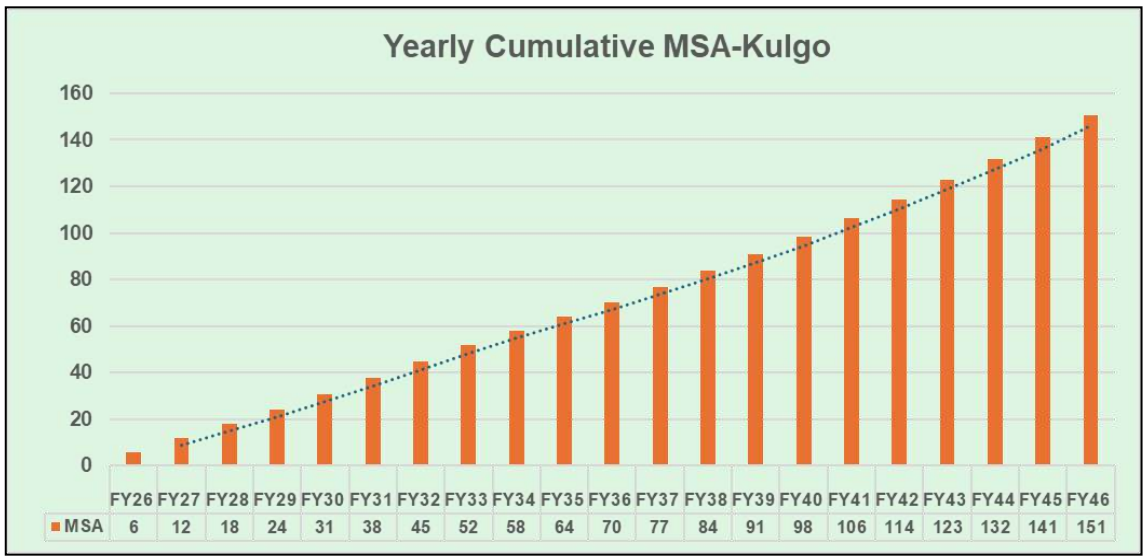


b) Yearly Design Traffic in terms of MSA

Financial Year	Minibus	Standard Bus	LCV-4	LCV-6	2A	3A	4 -6 Axle Truck MAV	OSV	Yearly Design ESA	MSA	Design Period
VDF	***0.24***	***0.88***	***0.23***	***1.57***	***3.13***	***5.51***	***10.69***	***0.00***			
FY26	26	342	364	684	544	876	4135	3	5,779,734	**6**	***0***
FY27	29	351	399	726	577	884	4255	3	5,947,335	**12**	***1***
FY28	31	361	426	762	606	881	4376	3	6,122,831	**18**	***2***
FY29	32	369	448	797	633	874	4533	3	6,305,056	**24**	***3***
FY30	34	374	466	837	665	873	4728	3	6,554,336	**31**	***4***
FY31	35	384	483	877	697	872	4914	4	6,793,580	**38**	***5***
FY32	36	393	501	920	731	871	5113	4	7,068,386	**45**	***6***
FY33	36	404	503	907	720	812	5132	4	7,029,897	**52**	***7***
FY34	35	414	479	788	626	653	4682	4	6,348,046	**58**	***8***
FY35	34	424	469	722	574	557	4450	4	5,985,698	**64**	***9***
FY36	36	432	491	758	602	559	4665	5	6,276,878	**70**	***10***
FY37	37	437	508	796	633	562	4897	5	6,553,916	**77**	***11***
FY38	38	447	525	837	664	566	5136	5	6,858,330	**84**	***12***
FY39	39	456	546	877	696	569	5383	5	7,172,498	**91**	***13***
FY40	41	467	564	919	730	573	5649	6	7,530,802	**98**	***14***
FY41	42	477	584	962	764	576	5906	6	7,837,468	**106**	***15***
FY42	44	487	607	1008	800	580	6182	6	8,188,159	**114**	***16***
FY43	45	495	625	1052	836	583	6456	6	8,535,741	**123**	***17***
FY44	47	500	644	1100	874	587	6749	7	8,931,511	**132**	***18***
FY45	48	510	663	1149	913	590	7052	7	9,292,363	**141**	***19***
FY46	49	520	683	1202	955	595	7374	7	9,700,619	**151**	***20***

End of HAM Concessionaire (Km 326 to Km 3 Operation and Maintenance in Year 2036.

Graphical Presentation of Yearly MSA



6. Detailed Road Inventory

Detailed inventory of Project Stretch is captured through NSV, LiDAR and field reconnaissance. Salient features like built-up settlements, carriageway dimensions, surface type, junctions, service roads, road furniture etc. are recorded for entire Project Stretch. Overview of summarized road inventory is presented in table below.

S. No.	Description		Details
1	Project Stretch		Project Road Start from Gorhar Km 320+810 to Barwa Adda Km 401+332 (Existing 400+632) NH 19 (Old NH 2) Gorhar – Barwa Adda section in the state of Jharkhand.
2	Length of Project Stretch (km)		80.522 Km
3	Road Type (km)	Flexible & Rigid	Km 320+810 to Km 401+332 (Existing 400+632) (excluding Toll Plaza)
4	Length of Urban Section (km)		33.900 Km
5	Length of Slip/Service Road (km)	LHS	41.640 Km
		RHS	41.191 Km
6	No. of Bypasses		02 Nos. (Bagodar, Rajgunj)
7	No. of Major Junctions		11 Nos. (2 At grade, 9 Grade Separated)
8	No. of Minor Junctions		154 Nos. (146 At grade, 8 Grade Separated)
9	No. of Median Openings		30 Nos.
10	No. of Toll Plazas		1 Nos.
11	No. of Bus Bays / Shelter		25 Nos.
12	No. of Truck Lay Byes		05 Nos.
14	No. of Rest Area		Nil.
15	Drain (km)	RCC Cover Drain	52.087 Km (at MCW)
		RCC Open Drain	0.115 Km (at MCW),
		Line Drain	0.055 Km (at MCW), 1.78 Km (at Median)
		Open V Drain	0.705 Km (at MCW), 3.355 Km (at Median)
16	Streetlight (Nos.)		2811 Nos.
17	High Mast Lights (Nos.)		08 Nos.
18	Solar Blinkers (Nos.)		44 Nos.
19	Length of Safety Barrier (Km)		

S. No.	Description	Details
	W-Beam Safety Barrier (Km)	28.280 Km
	RCC Crash Barrier (Km)	25.781 Km
	New Jersey crash barriers (Km)	0.460 Km
	Wire rope	38.670 Km
20	Length of Pedestrian Guard Rails (in km)	15.980 Km

7. INVENTORY, REPAIR AND REHABILITATION FOR STRUCTURES

One of the objectives of this assignment was to carry out inventory of all the existing structures, condition surveys for all the highway structures and to analyze their condition and to propose defects repairs or rehabilitation if required. There are a total 212 nos of structures along the project stretch, number of structure based on type of structures is summarized below:

S. No.	Type of Structure	Unit	Structures
1.	Major bridges (Length > 60m)	No	03
2.	Minor bridges (Length < 60m & > 6m)	No	33
3.	Fly over	No	0
4.	ROB	No	01
5.	VUP	No	16
6.	VUP Grade II	No	01
7.	PUP / CUP	No	04
8.	FOB	No	10
9.	VOP	No	0
10.	Culvert (Pipe and Box)	No	144
Total		**No**	**212**

Visual inspections and condition surveys were carried out as per provisions of IRC: SP: 35 on all bridges and structures in the Project Stretch. For all non-accessible structures, Mobile Bridge Inspection Unit (MBIU) was used during inventory and condition surveys.

As per Condition Survey findings it is evident that structures are generally in good to fair condition. Protection works and expansion joints, etc. are minimally distressed. It is noted that some minor defects like vegetation growth, damaged or filled expansion joints, missing drainage spouts, settlement in approach slab, minor distresses in substructures and superstructures. These defects are to be rectified by the existing HAM Concessionaire in case of structure falling between Km 326.000 to 401.332 and structures coming in between Km 320.810 to Km 326 shall be rectified during six lanning of work.

8. PAVEMENT CONDITION ASSESSMENT

The project road has Flexible Pavement along entire Main Carriageway and Rigid Pavement at toll plaza location and Rigid Pavement along existing Service Road. The construction of project completed as shown in the table below:

The Consultant has carried out various surveys and investigations along the project and findings of test report is summarized as below:

A. Pavement Material Investigation

Pavement material investigations were carried out to know the properties of the existing sub-grade, Granular Subbase (GSB) Wet Mix Macadam (WMM) / Dry Lean Concrete (DLC) and Bituminous / Concrete layers. Field investigations such field dry density and field moisture content were also carried out on existing subgrade by excavating test pit to evaluate the in-situ characteristics of exiting subgrade. Visual inspection of the existing pavement conditions as well as surrounding area along project road was carried out prior to commencement of material investigation work.

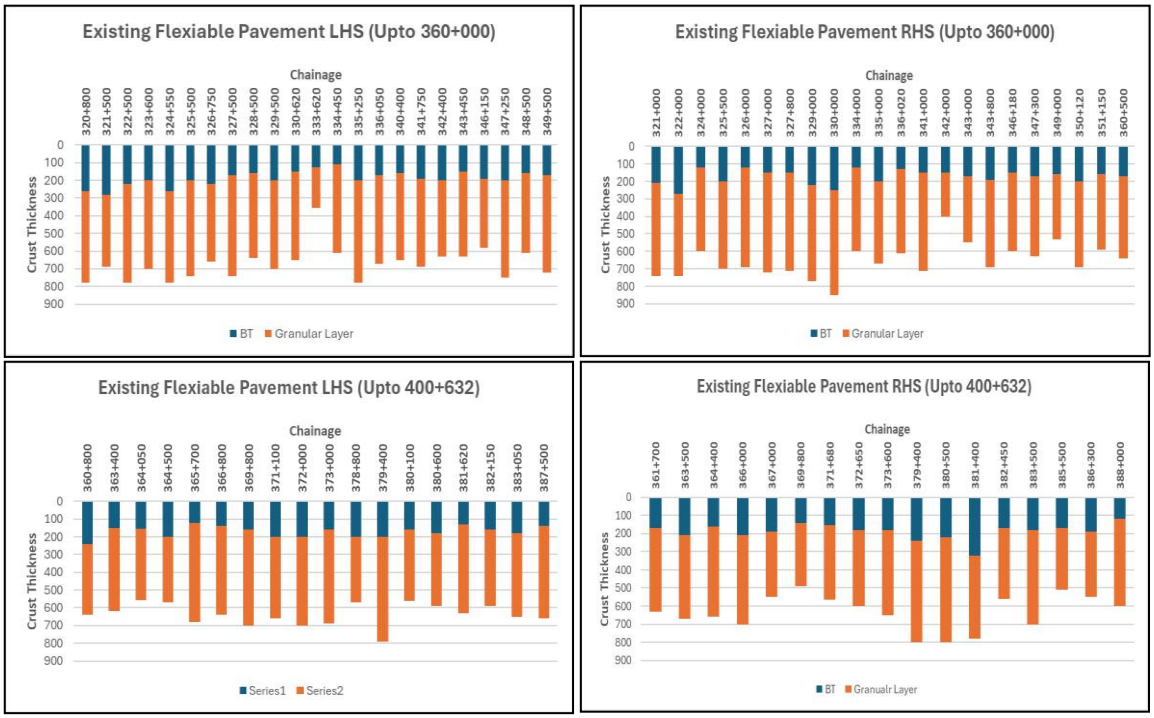
a. Existing Subgrade Soil

The existing subgrade soil is Along the project road section, the existing subgrade soil is predominately comprising of Sand 45.88 %, Silt & Clay 28.06 % and 26.07 % Gravel along the project road.

4-days Soaked CBR (at 97% Compaction) vary in the range of 12.5 % and 17.5%.

b. Crust Composition

Pavements are layered structures comprising various types of materials. These materials, their associated properties, and their interactions determine properties of the resultant pavement. Therefore, a good understanding of the underlayer will help to understand how they are characterized, and how they perform for better understanding of pavement behavior and deterioration. The existing crust thickness of Flexible and Rigid is present below:



Crust Composition of Existing Pavement

B. Analysis of Pavement Condition by using FWD Survey

The Structural Condition of the Pavement has evaluated using Falling Weight

Deflectometer (FWD). The FWD is a non-destructive pavement testing device which provides accurate data on the response of the pavement to dynamic loads by simulating actual wheel loads in both response and duration. Structural evaluation was carried out by using data obtained from test and further analysis is carried out based on IRC 115- 2014 for Flexible Pavement and IRC 117-2015 for Rigid Pavement. The direction wise Project Stretch lengths are summarized in the table below.

Homogeneous Section wise Remaining Life

Sl No	Chainage		Length (Km)	IIT Pave Result		Rutting Life	Fatigue Life	Remaining life
	From	To		Tensile Strain at Bottom BT	Vertical Strain at top of Subgrade			
LHS								
Section-1 (4 Lane)								
1	320+000	321+000	1.00	2.36E-04	2.31E-04	434.58	15.88	15.88
2	321+000	322+000	1.00	2.33E-04	2.38E-04	374.48	16.07	16.07
3	322+000	324+000	2.00	2.14E-04	2.08E-04	696.57	23.67	23.67
4	324+000	325+000	1.00	2.46E-04	2.20E-04	536.77	13.83	13.83
5	325+000	326+000	1.00	2.24E-04	2.16E-04	591.93	16.76	16.76
Section-2 (Six Lane)								
1	326+000	328+000	2.00	3.56E-04	2.89E-04	156.72	5.09	5.09
2	328+000	330+000	2.00	2.90E-04	2.50E-04	303.01	9.14	9.14
3	330+000	333+000	3.00	3.29E-04	2.78E-04	186.57	5.94	5.94
4	333+000	336+000	3.00	3.47E-04	2.70E-04	212.98	6.03	6.03
5	336+000	338+000	2.00	2.67E-04	2.53E-04	287.04	11.96	11.96
6	338+000	342+000	4.00	3.01E-04	2.49E-04	307.45	8.23	8.23
7	342+000	346+000	4.00	2.80E-04	2.44E-04	339.58	9.91	9.91
8	346+000	348+000	2.00	3.36E-04	2.68E-04	220.66	5.56	5.56
9	348+000	351+000	3.00	2.57E-04	2.33E-04	417.90	12.97	12.97
10	351+000	353+000	2.00	2.87E-04	2.44E-04	340.21	11.00	11.00
11	353+000	355+000	2.00	2.71E-04	2.46E-04	325.41	12.14	12.14
12	355+000	356+000	1.00	3.04E-04	2.70E-04	214.78	7.95	7.95
13	356+000	360+000	4.00	2.71E-04	2.41E-04	357.85	11.33	11.33
Section-3 (Six Lane)								
1	360+000	367+000	7.00	2.90E-04	2.63E-04	241.16	8.87	8.87
2	367+000	370+000	3.00	2.87E-04	2.67E-04	222.53	10.94	10.94
3	370+000	375+000	5.00	2.46E-04	2.44E-04	337.06	15.63	15.63
4	375+000	379+000	4.00	2.96E-04	2.61E-04	248.37	9.69	9.69
5	379+000	382+000	3.00	2.75E-04	2.50E-04	301.91	11.46	11.46
6	382+000	387+000	5.00	3.12E-04	2.64E-04	234.62	7.46	7.46
7	387+000	395+000	8.00	2.70E-04	2.44E-04	336.44	11.36	11.36
8	395+000	396+000	1.00	2.96E-04	2.72E-04	207.35	8.55	8.55
9	396+000	398+000	2.00	2.31E-04	2.16E-04	586.97	18.65	18.65
10	398+000	401+000	3.00	2.42E-04	2.41E-04	359.88	14.49	14.49

Sl No	Chainage		Length (Km)	IIT Pave Result		Rutting Life	Fatigue Life	Remaining life
	From	To		Tensile Strain at Bottom BT	Vertical Strain at top of Subgrade			
RHS								
Section-1								
1	320+000	321+000	1	2.53E-04	2.33E-04	417.09	15.16	15.16
2	321+000	324+000	3	3.94E-04	2.97E-04	137.41	3.76	3.76
3	324+000	326+000	2	2.79E-04	2.48E-04	310.83	9.85	9.85
Section-2								
1	326+000	328+000	2	3.18E-04	2.71E-04	208.4	7.37	7.37
2	328+000	330+000	2	3.60E-04	2.78E-04	188.1	4.78	4.78
3	330+000	336+000	6	2.48E-04	2.29E-04	452.98	13.64	13.64
4	336+000	339+000	3	3.15E-04	2.66E-04	227.12	6.59	6.59
5	339+000	343+000	4	2.56E-04	2.35E-04	398.14	13.45	13.45
6	343+000	345+000	2	3.05E-04	2.52E-04	292.78	9.04	9.04
7	345+000	348+000	3	2.34E-04	2.17E-04	579.63	17.59	17.59
8	348+000	354+000	6	2.76E-04	2.53E-04	284.99	10.35	10.35
9	354+000	358+000	4	2.70E-04	2.54E-04	278.95	11.09	11.09
10	358+000	360+000	2	2.44E-04	2.24E-04	493.7	17.11	17.11
Section-3								
1	360+000	364+000	4	2.71E-04	2.43E-04	344.68	12.38	12.38
2	364+000	370+000	6	3.44E-04	2.68E-04	220.28	5.57	5.57
3	370+000	375+000	5	2.66E-04	2.46E-04	322.43	11.34	11.34
4	375+000	378+000	3	3.07E-04	2.66E-04	229.06	7.35	7.35
5	378+000	383+000	5	2.93E-04	2.66E-04	227.12	9.89	9.89
6	383+000	388+000	5	3.25E-04	2.79E-04	182.67	6.57	6.57
7	388+000	393+000	5	2.89E-04	2.58E-04	263.58	9.23	9.23
8	393+000	394+000	1	2.64E-04	2.52E-04	292.78	12.15	12.15
9	394+000	401+000	7	2.84E-04	2.44E-04	335.81	10.06	10.06

Overlay required to increase life of pavement is up to Year 2036 is the responsibility of HAM Concessionaire.

C. Analysis of Pavement Condition Data

Field Survey for Surface Distress and Riding Quality was carried out using Network Survey Vehicle (NSV). NSV is a highly specialized survey Vehicle designed and developed by Australian Road Research Board (ARRB) Group. NSV is equipped with a fully integrated Hawkeye 2000 data collection system. The NSV consists of a Multi-Laser Profiler, Digital Imaging System whose outputs are all linked via a highly accurate distance measuring instrument.

i) Evaluation of Roughness and Rutting

Roughness and rutting of pavement are being measured using a Digital Laser Profiler (DLP), Integrated into the NSV. DLP has eleven lasers to enhance the accuracy of measurements. The profiler is capable of measuring:

- Pavement Roughness (one laser in each wheel path and center)
- Rutting (full transverse pavement measurement) in case of Flexible Pavement

Roughness and Rutting are two most important quality parameters of pavement describing its riding quality and durability and are very significant in gaining negative or positive feedback from road users. The summary of result is summarized as below:

Pavement condition based on Roughness

Sl. No.	Pavement	Section	Chainage		Length* (Km)	Range	Condition	
			From	To			LHS	RHS
1	Flexible Pavement	Section-1	320+810	326+000	5.19	<1800	0	0
						1800 - 2400	3.19	4.94
						>2400	2	0.25
2	Flexible Pavement	Section-2	326+000	360+300 (Design 361+000)	34.3	<1800	15	16.3
						1800 - 2400	19	17
						>2400	0.3	1
3	Flexible Pavement	Section-3	360+300 (Design 361+000)	400+632 (Design 401+332)	40.33	<1800	27	27
						1800 - 2400	13.33	13.33
						>2400	0	0

Pavement Condition based on Rutting

Sl. No.	Pavement	Section	Chainage		Length* (Km)	Range	Condition					
			From	To			L-1	L-2	L-3	R-1	R-2	R-3
1	Flexible Pavement	Section-1	320+810	326+000	5.19	<5	3.35	4.82	0.00	2.41	4.68	0.00
						5 to 10	1.61	0.36	0.00	2.52	0.49	0.00
						>10	0.23	0.01	0.00	0.26	0.02	0.00
2	Flexible Pavement	Section-2	326+000	360+300 (Design 361+000)	34.30	<5	2.30	11.30	0.10	3.50	12.80	22.75
						5 to 10	21.90	17.70	0.00	19.85	18.20	0.00
						>10	10.10	5.30	0.00	10.95	3.30	0.70
3	Flexible Pavement	Section-3	360+300 (Design 361+000)	400+632 (Design 401+332)	40.33	<5	5.90	19.40	0.10	5.70	22.45	36.05
						5 to 10	28.33	18.43	0.00	25.63	15.88	0.00
						>10	6.10	2.50	0.00	9.00	2.00	0.00

- Length excluding Toll Plaza and Structure.

The section under HAM Concession shall be maintained by existing HAM Concessionaire up to O & M Handover Date.

ii) Evaluation of Pavement Condition Index (PCI)

The Hawkeye 2000 Series Asset View Digital Imaging System (DIS) is a video acquisition system for visually assessment of pavement conditions. Analysis of condition measurement (cracks, potholes, patching, etc.) is undertaken to determine Pavement Condition Index (PCI) of the Project Stretches.

PCI provides a numerical rating for the condition of road segments within the road network, where 0 is the poor possible condition and 100 is the best possible condition.

The Roughness condition summary is presented in table below:

Pavement condition Summary based on PCI Values (Flexible)

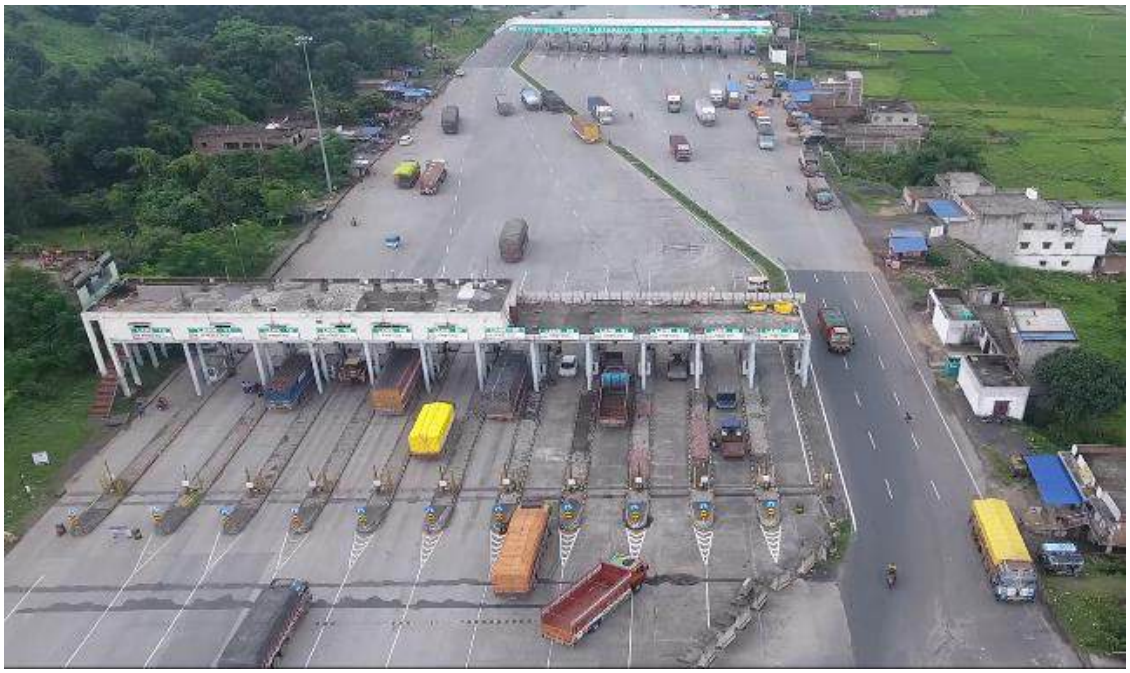
Condition	PCI Rating	LHS		RHS	
		Length	Percentage	Length	Percentage
Excellent	**100-90**	22.19	27.67%	25.00	31.18%
Good	**90-80**	14.00	17.46%	16.00	19.95%
Satisfactory	**80-60**	43.00	53.62%	37.19	46.38%
Fair	**60-40**	1.00	1.25%	2.00	2.49%
Poor	**40-20**	0.00	0.00%	0.00	0.00%
Fail	**20-0**	0.00	0.00%	0.00	0.00%

9. TOLL PLAZAS

Toll on this Project stretch is currently being collected through open tolling system at following toll plazas:

- Toll Plaza at Km 352+100 (Kulgo)

The photograph showing existing Toll Plazas is appended as below:



Toll Plaza at Km 352+100 (Kulgo)

It is proposed to retain the existing toll plaza as the numbers of lanes are sufficient for the 20-year Concession period. The existing toll plaza is having following facilities:

- Rigid Pavement is provided on both plazas.
- Existing Administrative building is required to be furnished e.g., Furniture, AC, and Fitting of Windows etc. as per the requirements.
- Parking area, paving, lighting, plantation etc.as per IRC: SP:84-2019/IRC:87-2019 in the existing Administrative Building premise.

- Traffic Aid Post and Medical Aid Post within the Area/ boundary of Toll Complex.
- Toilet Blocks on both sides of Toll Plaza.
- High Mast has provided both Toll Plaza Lighting and Approach Lighting on both sides of Toll Plaza.

10. MATERIAL INVESTIGATION

The construction material survey and investigations include Identification of borrow area locations and laboratory testing on borrow soil samples, Identification and laboratory testing of Quarry materials and identification and laboratory testing of locally available industrial waste.

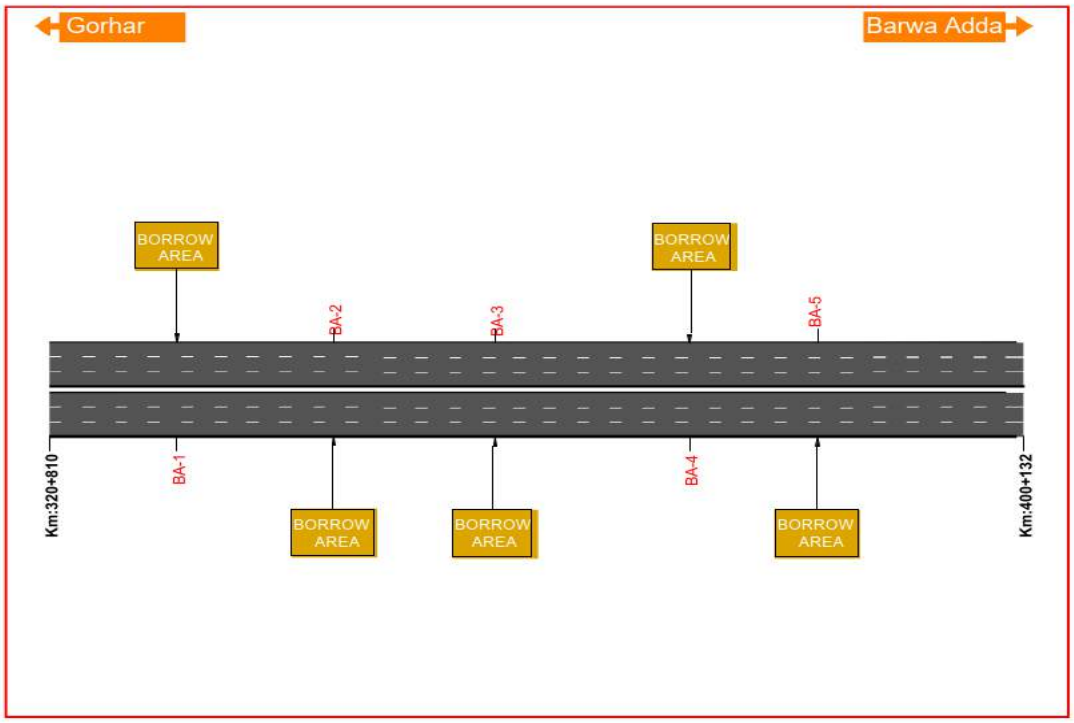
Borrow Area Investigation and Testing

A total of Ten (5) borrow soil sources, have been identified, visited, inspected, and sampled. From the inspection of borrow area locations and test results of borrow area soil, it has been observed that the lead of the borrow area location is within 5 Km. The liquid limit of the borrowed soil varies in the range of 24.6 to 35.9 and the soil PI found in the range of 3.1 to 30.2. The MDD of the soil is found to be in the range of 1.93 gm/cc to 9.80 gm/cc with OMC varying from 7.2% to 11.6%. The soaked CBR (97% compaction) of the borrow soil sample is found to be in the range of 14.0% to 19.2% with 80% of soil samples have CBR at 97% compaction greater than 10%.

Borrow Locations

The locations of most of the currently known sources of quarry materials and natural sand in the vicinity of the project have been thoroughly examined. Samples collected from these sources were tested and found to be suitable for road construction. The Barakar River serves as a natural source of sand, while two aggregate sources near the project highway have been identified as Ekta Engineering Works and Vikas Crusher.

Photographs of Aggregate source at Km 400+132



Description of Aggregate Source and Stone Dust

Source ID	Existing Chainage/ Side	Location	Lead from nearest point of project Road (Km)	Quantity
AQ1	400+132 L/S	Vikash Crusher	39.2	Plenty

Description of Natural Sand Source

Source ID	Location	Lead from the nearest point of project Road (Km)	Approx. Quantity (m3)	River
SQ1	Chirkunda	62.80	Huge	Barakar River

Source of Construction Water

The primary source of water for concrete works could be natural streams, springs and ground water. The latter can be obtained from deep bore wells. Potable water is generally

acceptable for concrete works

11. Pond Ash & Fly Ash

One number of coals fired thermal power plants has been identified within 57 km of project road vicinity as source of pond ash. Representative samples of pond ash had been collected from this source. The location and the approximate distance from power plant to the nearest point on the project road are given in the table mentioned below.

S. No	Plant	Details	Lead (km)
1	Koderma Thermal Power station	Chandwara, Jharkhand	72.4

12. ROAD SEFTY ASSESSMENT AND IDENTIFICATION OF IMPROVEMENT PROPOSALS

Road Safety Audit (RSA) of the Project Stretch was carried out to:

- Identify issues related to Road Safety along Project Stretch.
- Propose Improvement Proposals for the identified issues/locations along the Project Stretch.

Based on the Road Safety Audit conducted at site the following is recommended:

S. No	Safety Issue	Description of Safety Issue	Proposed Safety Improvements
1	Non-standard Entry & Exit	Entry & Exit from MCW to Service Road and vice-versa are not having proper acceleration and deceleration lane.	Provide properly designed acceleration & deceleration lanes, ensuring smooth speed transitions between service roads and highways
2	Improper junction design	Improperly designed junctions without central islands	All junctions are to be developed with left-in/left-out as per Fig 3.7 of IRC: SP:87-2019
3	Junctions are directly connected to MCW	Junctions are connected to MCW with direct access without acceleration and deceleration lane without proper radius for turning	All junctions are to be developed with left-in/left-out as per Fig 3.7 of IRC: SP:87-2019
4	Unauthorized Median Opening	There are unauthorized median openings along the project.	All median openings are to be closed immediately.
5	Existing Median Opening	Median openings have been provided without shelters lanes. These median openings are being used for U Turn Provision only. Road furniture is found to be inadequate.	All median openings are to be provided with sign boards, road markings, road studs and blinkers.

S. No	Safety Issue	Description of Safety Issue	Proposed Safety Improvements
6	Sign Boards	Missing place name in Informatory sign Informatory sign with Blue background for National Highway, incorrect placement/positioning of signs on the service road which are intended for traffic traveling on MCW, Non-uniform spacing of Chevron signs, etc.	Provide all road signs as per IRC:67-2022 & latest circular ensuring correct placement.
7	Road Markings	Incorrect/missing road markings observed at many locations	Provide road markings as per IRC:35-2015 & ensure periodic maintenance.
8	Traffic Calming	Absence of active traffic calming measures on side road & MCW at junction locations	Active traffic calming measures like Transverse Bar Markers are proposed to be provided as per IRC:99-2018
9	VUP	Unsafe crossing of vehicles due to absence of VUP at few locations.	VUP are proposed at major junctions for ensuring safety of all road users
10	ATMS	ATMS as provided are not in accordance with NHAI / Policy Guidelines / Standard Documents 2023, Policy Circular No. 11.53/2023 dated 10th October 2023.	It is recommended to provide ATMS as per NHAI latest Circular.

The existing HAM Concessionaire is responsible for providing deficiencies in terms of road safety and same being provided. ATMS is proposed to be under Public InvIT Scope.

13. COST ESTIMATE

The summary of cost estimate proposed to be provided under Public InvIT is as follows:

A. CAPEX

Sl. No.	Item Description	Quantity		Amount (Rs in Cr.)
		Unit	Qty.	
1	Advanced Traffic Management System (ATMS)	Km	80.522	14.570
2	Providing Multi Lane Free Flow (MLFF) at Toll Plaza	Nos	1	5.00
Total Amount (excl GST)				**19.570**

B. Operation & Maintenance Cost (OPEX) as of 2025/26

Year	Routine Maintenance	Toll Plaza & ATMS Operation and Maintenance	Electricity & Patrolling expenses	Other office expenses	Insurance	Total Maintenance Amount incl GST (excluding Periodic Maintenance)	Total Periodic Maintenance Amount incl GST
2026-2027	-	2.13	0.14	0.30	0.19	3.25	-
2027-2028	-	2.13	0.14	0.30	0.19	3.25	-
2028-2029	0.19	3.72	0.14	0.30	0.19	5.35	-
2029-2030	0.38	5.32	0.14	0.30	0.19	7.46	-

Year	Routine Maintenance	Toll Plaza & ATMS Operation and Maintenance	Electricity & Patrolling expenses	Other office expenses	Insurance	Total Maintenance Amount incl GST (excluding Periodic Maintenance)	Total Periodic Maintenance Amount incl GST
2030-2031	0.38	5.32	0.14	0.30	0.19	7.46	-
2031-2032	0.38	5.32	0.14	0.30	0.19	7.46	-
2032-2033	0.57	5.32	0.21	0.30	0.28	7.88	-
2033-2034	0.57	5.32	0.21	0.30	0.28	7.88	-
2034-2035	0.57	5.32	0.21	0.30	0.28	7.88	-
2035-2036	0.57	5.32	0.21	0.30	0.28	7.88	-
2036-2037	12.92	5.32	3.30	5.46	3.90	36.45	-
2037-2038	-	5.32	3.30	5.46	3.90	21.21	103.70
2038-2039	12.92	5.32	3.30	5.46	3.90	36.45	-
2039-2040	12.92	5.32	3.30	5.46	3.90	36.45	-
2040-2041	12.92	5.32	3.30	5.46	3.90	36.45	-
2041-2042	12.92	5.32	3.30	5.46	3.90	36.45	-
2042-2043	12.92	5.32	3.30	5.46	3.90	36.45	-
2043-2044	-	5.32	3.30	5.46	3.90	21.21	103.70
2044-2045	12.92	5.32	3.30	5.46	3.90	36.45	-
2045-2046	12.92	5.32	3.30	5.46	3.90	36.45	-
2046-2047	12.92	5.32	3.30	5.46	3.90	36.45	-
2047-2048	12.92	5.32	3.30	5.46	3.90	36.45	-
2048-2049	12.92	5.32	3.30	5.46	3.90	36.45	-
2049-2050	-	5.32	3.30	5.46	3.90	21.21	103.70
Total	**145.73**	**119.67**	**47.83**	**79.40**	**56.84**	**530.36**	**311.11**

Chapter 1. Introduction

CHAPTER 1. INTRODUCTION

1.1 INTRODUCTION

The National Highways Authority of India (NHAI) constituted by an act of Parliament, "the National Highways Authority of India Act, 1988". It is responsible for the development, maintenance and management of National Highways entrusted to it and for matters connected or incidental thereto. The Authority is in operation since February 1995 with the appointment of full time Chairman and other Members. Additional information about NHAI activities and other details can be found on www.nhai.org. The source of information provided in this report is taken from NHAI website.
National Highways Authority of India (NHAI) is mandated to implement National Highways Development Project (NHDP) which is

- India 's Largest ever highways project
- World class roads with uninterrupted traffic flow

The National Highways have a total length of 140,000 + km to serve as the arterial network of the country. The Government of India has launched major initiatives to upgrade and strengthen National Highways through various phases of National Highways Development project (NHDP), which are briefly as under:

- NHDP Phase I: NHDP Phase I was approved by Cabinet Committee on Economic Affairs (CCEA) in December 2000 at an estimated cost of Rs.30,000 crore comprises mostly of GQ (5,846 km) and NS-EW Corridor (981km), port connectivity (356 km) and others (315 km).
- NHDP Phase II: NHDP Phase II was approved by CCEA in December 2003 at an estimated cost of Rs.34,339 crores (2002 prices) comprise mostly NS-EW Corridor (6,161 km) and other National Highways of 486 km length, the total length being 6,647 km. The total length of Phase II is 6,647 km.
- NHDP Phase-III: Government approved on 5.3.2005 up gradation and 4 laning of 4,035 km of National Highways on BOT basis at an estimated cost of Rs. 22,207 crores (2004 prices). Government approved in April 2007 up gradation and 4 laning at 8074 km at an estimated cost of Rs. 54,339 crores.
- NHDP Phase V: CCEA has approved on 5.10.2006 six laning of 6,500 km of existing 4 lane highways under NHDP Phase V (on DBFO basis). Six laning of 6,500 km includes 5,700 km of GQ and other stretches.
- NHDP Phase VI: CCEA has approved on November 2006 for 1000 km of expressways at an estimated cost of Rs. 16680 crores.
- NHDP Phase VII: CCEA has approved on December 2007 for 700 km of Ring Roads, Bypasses and flyovers and selected stretches at an estimated cost of Rs. 16680 crores.

To accelerate development of National Highways, MoRTH proposed to leverage asset monetization of existing operational roads and it is expected to generate additional resources. Accordingly, NHAI has awarded / being awarded under Toll Operate Transfer and through InVIT.

For implementation of ToT / InVIT, NHAI requires the preparation of a detailed report on inventory & physical condition of the road along with estimation of immediate requirement in order to improve safety of project road, Operation & Maintenance cost (OPEX) and periodic overlay requirement for proposed concession period.

M/s. URS Scott Wilson India Pvt. Ltd. in JV with MARC Technocrats (P) Ltd submitted proposal and selected as empaneled consultant for carrying out Technical Due Diligence. LOA issued by NHAI vide ref No: NHAI / AM/2023-24/ Empanelment-2/ Tech. RFP/e-203713/254 dated 10.09.2024 for carrying out Tech Due Diligence of following road stretches.

S.No.	Name of Stretch	Name of Toll Plaza	State	Length of Project	No. of Lanes
1	Gorhar to Barwa Adda	Kulgo	Jharkhand	80.522	4L/ 6L
Total Length				**80.522 Km**	

The consultant has carried out detailed investigations and prepared detail reports on inventory and physical conditions for the above roads.

This report presents details for section of **Gorhar to Barwa Adda Section from** Km 320+810 to Km 401+332 having length of 80.522 km.

1.2 OBJECTIVE OF STUDY AND SCOPE OF WORKS

The main objective of this assignment is to assess the physical condition of all existing features of the **Gorhar to Barwa Adda** stretch and preparation of Detailed Project Report (DPR), technical and maintenance schedules for bidding process. Physical condition survey of Project Stretch includes data collection and analysis of highway geometric design parameters, pavement condition, condition of structures, road safety features, condition of existing facilities like toll plazas, truck lay byes etc.

Based on physical condition of stretches, options are worked out for improvements of safety aspects of existing highway features, repair and rehabilitation of pavement and structures. Cost associated with all improvement proposals are also estimated as part of this study.

NHAI has appointed **M/s Translink Infrastructure Consultants (P) Ltd.** for carrying out Traffic Due Diligence and data provided by Traffic Consultant through NHAI is adopted for analysis of pavement design and periodic overlay.

The general scope of services of the Consultant are as follows:

- Undertake topographic surveys using LiDAR along existing Right of Way (ROW) covering sufficient width beyond main carriageway and extraction of existing physical features from the captured data
- Investigation for accessing condition of pavement including shoulder, embankment, drainage etc. using visual means, advanced laser profilometer and image processing software and Falling Weight Deflectometer.
- Investigation for perception of existing pavement composition
- Conducting road safety audit for evaluating geometry of road, adequacy and condition of existing of safety features etc.
- Inventory of all structures along Project Stretches like bridges, culverts, ROBs, underpasses, flyovers etc. covering physical and hydraulic parameters. Investigations shall be carried out for accessing structural conditions using Mobile Bridge Inspection Unit (MBIU) as per IRC: SP:35. For the bridges identified to be in a distressed condition based upon the visual condition survey, supplementary testing shall be carried out as per IRC:

SP:35 and IRC: SP:40. Selection of tests may be made based on the specific requirement of the structure.

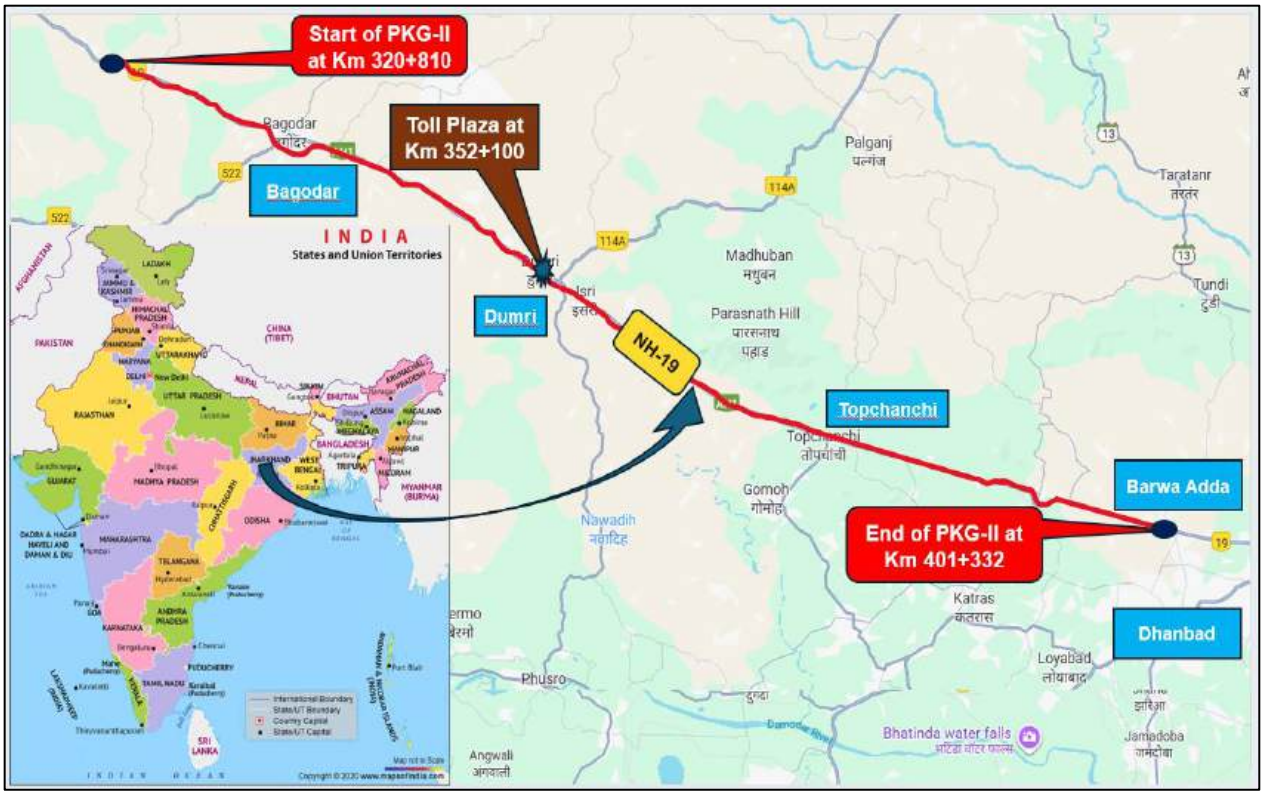
- Identification of source of construction materials quarry sites, sand source and borrow areas and assessment of quality of various construction materials
- Preparation of improvement strategy for strengthening of pavement and structures, rehabilitation and design for road safety features, road furniture etc.
- Condition and Inventory of Toll Plaza
- Preparation of suitable proposals for improvement of the existing road and strengthening of pavement, as required at the appropriate time to maintain the level of service over the design period.
- Estimation of detailed cost based on improvement proposal
- Preparation and submission of following items:
    a) Strip Plan
    b) Drawing for Improvement Proposal
    c) Topographic Survey Plan and Profile
    d) Signage Plan (existing and additional signs)

1.3 PROJECT STRETCH

The project stretch start from Gorhar Km 320+810 to Barwa Adda Km 401+332 (Existing 400+632) of NH 19 in the State of Jharkhand. The total length of the project road is 80.522 km.

The are one toll plaza and toll being collected at following locations:

- Toll Plaza at Km 352+100 (Kulgo)



Project Location Map

The salient features of the project are as below:

A) Project Salient Features - Highway

S. No.	Description		Details
1	Project Stretch		Project Road Start from Gorhar Km 320+810 to Barwa Adda Km 401+332 (Existing 400+632) NH 19 (Old NH 2) Gorhar – Barwa Adda section in the state of Jharkhand.
2	Length of Project Stretch (km)		80.522 Km
3	Road Type (km)	Flexible & Rigid	Km 320+810 to Km 400+632 (Design 401+332) (excluding Toll Plaza)
4	Length of Urban Section (km)		33.900 Km
5	Length of Slip/Service Road (km)	LHS	41.640 Km
		RHS	41.191 Km
6	No. of Bypasses		02 Nos. (Bagodar, Rajgunj)
7	No. of Major Junctions		11 Nos. (2 At grade, 9 Grade Separated)
8	No. of Minor Junctions		154 Nos. (146 At grade, 8 Grade Separated)
9	No. of Median Openings		30 Nos.
10	No. of Toll Plazas		1 Nos.
11	No. of Bus Bays / Shelter		25 Nos.
12	No. of Truck Lay Byes		05 Nos.
14	No. of Rest Area		Nil.
15	Drain (km)	RCC Cover Drain	52.087 Km (at MCW)
		RCC Open Drain	0.115 Km (at MCW),
		Line Drain	0.055 Km (at MCW), 1.78 Km (at Median)
		Open V Drain	0.705 Km (at MCW), 3.355 Km (at Median)
16	Streetlight (Nos.)		2811 Nos.
17	High Mast Lights (Nos.)		08 Nos.
18	Solar Blinkers (Nos.)		44 Nos.
19	Length of Safety Barrier (Km)		
	W-Beam Safety Barrier (Km)		28.280 Km
	RCC Crash Barrier (Km)		25.781 Km
	New Jersey crash barriers (Km)		0.460 Km
	Wire rope		38.670 Km
20	Length of Pedestrian Guard Rails (in km)		15.980 Km

B) Project Salient Features – Structure

S. No	Type of Structures	Unit	Quantity
1	Major Bridges	No	03
2	Minor Bridges	No	33
3	Flyover	No	-
4	ROB	No	01
5	RUB	No	-
6	VOP	No	-
7	VUP	No	16
8	VUP Grade II	No	01
8	PUP	No	04
9	EUP/CUP/AOP	No	-
12	FOB	No	10
13	Culverts (Pipe and Box)	No	144

Chapter 2. Project Description with Highway Inventory

2. PROJECT ROAD DESCRIPTION

2.1 GENERAL

The project stretch start from Gorhar at Km 320+810 to Barwa Adda at Km 401+332 (Existing Km 400+632) of NH 19 in the State of Jharkhand. The total length of the project road is 80.522 Km.

The project road stretch passes through Gorhar, Atka, Bagodar, Kulgo, Dumri, Jamtara, Ishri, Topchanchi, Rajganj and Barwa Adda (Dhanbad) in the State of Jharkhand.

Project Highway has been divided in Three (3) sections and the details of the section as given in **Table 2.1.**

Table 2.1: Project Site Details

Section No.	Section Name		Chainage (Km)		Length (Km)	Coordinates			
						From		To	
	From	To	From	To		Easting	Northing	Easting	Northing
Sec-1	Gorhar	Atka	320+810	326+000	5.190	369385.18	2667956.34	374188.59	2666059.24
Sec-2	Atka	Khairatunda	326+000	360+300 (Design 361+000)	35.000	374188.59	2666059.25	404117.48	2650761.09
Sec-3	Khairatunda	Barwa Adda	360+300	400+632 (Design 401+332)	40.332	404117.48	2650761.09	441794.72	2637925.95
Total Length					**80.522**				

All above Three (3) sections of Project Highway are under HAM as per provisions of the existing Concession. Existing Concessionaire shall operate and maintain the project up to Handover date pursuant to and in accordance with the existing HAM Concession Agreement. The details of agency, section and COD/PCOD date as given in **Table 2.2.**

Table 2.2: Project Details

Name of Agency	Mode of Contract	Chainage (Km)		Length (Km)	PCOD /COD	O&M Handover Date
		From	To			
M/s DBL Gorhar Khairatunda Highways Pvt. Ltd.	HAM	326+000	360+300 (Design 361+000)	35.000	16.10.2021/ 31.03.2022	15.10.2036
M/s Ashoka Khairatunda Barwa Adda Road Limited (AKBARL)	HAM	360+300 (Design 361+000)	400+632 (Design 401+332)	40.332	09.10.2021/ 21.04.2022	08.10.2036

These works pertain to the de-scoped 6-lane sections, which have been retained as 4-lane configurations. Details for these projects section are provided in the table below:

Table 2.3: Project Details of DPR Under Progress

Sl. No	Chainage (Km)		Length (Km)	Remarks
	From	To		
1	320+810	326+000	5.190	6-Lane DPR Under Progress

The O&M Handover Date is tentative and may vary based on the actual completion date of the project. There will be no financial implication for the same.

The project stretches will be handed over to the TOT/InvIT Concessionaire for Toll Collection and Operation of TMS and works mentioned in Schedule-B

After completion of the concession period of existing HAM concessionaire, subject section from Km 320+810 to Km 401+332 (Existing 400+632) of NH-19 shall be handed over the InvIT Concessionaire to operate and maintain the Project Highway i.e., the date of end of concession period of existing concessionaire shall be O&M Handover date

Fee is being collected at 1 (One) number of Toll Plazas, at Km. 352+100 near at Kulgo, for the Project length of 80.522 Km.

Location Maps of Project Highway is Presented Below

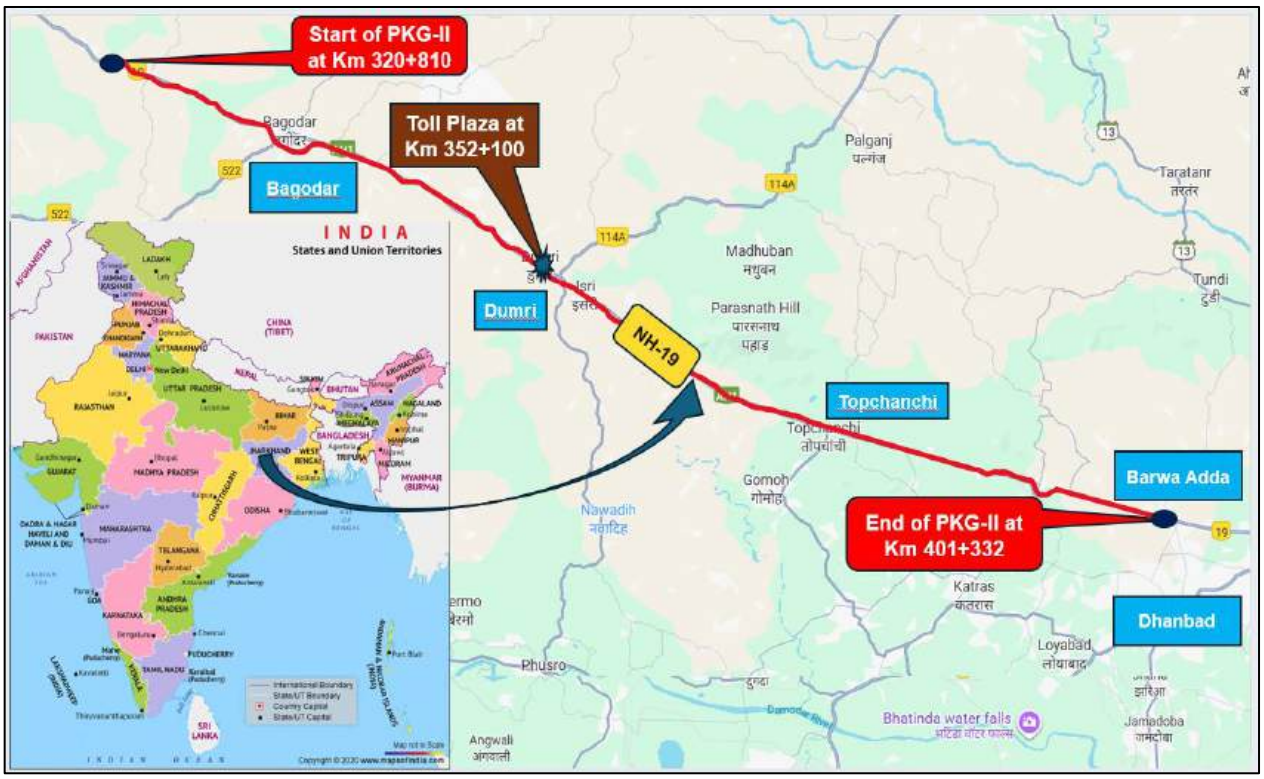


Fig 2.1: Index Map showing Project Road

2.2 START AND END POINT

The project road starts at Km 320+810 (Gorhar) and end at Km 400+632 (Design 401+332) (Barwa Adda) as given below table.

Table 2.4: New NH 19 (Old NH 02) Start & End Points LHS & RHS

Kilometer (Km) as per NH-19 LHS		Kilometer (Km) as per NH-19 RHS		Length (Km)	Description of Road
From	To	From	To		
320+810	400+632 (Design 401+332)	400+632 (Design 401+332)	320+810	80.522	Gorhar – Barwa Adda

Project Road Start at Km 320+810

Project Road End at Km 400+632

2.3 SUMMARY OF INVENTORY

While inventory is captured chainage-wise with their existing physical condition, an overview of all inventories is presented in **Table 2.5**.

Table 2.5: Summary of Inventory on Project Stretch

S. No.	Description		Details
1	Project Stretch		Project Road Start from Gorhar Km 320+810 to Barwa Adda Km 401+332 (Existing Km 400+632) NH 19 (Old NH 2) Gorhar –Barwa Adda section in the state of Jharkhand. *
2	Length of Project Stretch (km)		80.522 Km
3	Road Type (km)	Flexible & Rigid	Km 320+810 to Km 401+332 (Existing Km 400+632) (excluding Toll Plaza)
4	Length of Urban Section (km)		33.900 Km
5	Length of Service /SlipRoad (km)	LHS	41.640 Km
		RHS	41.191 Km
6	No. of Bypasses		02 Nos. (Bagodar, Rajgunj)
7	No. of Major Junctions		11 Nos. (2 At grade, 9 Grade Separated)
8	No. of Minor Junctions		154 Nos. (146 At grade, 8 Grade Separated)
9	No. of Median Openings		30 Nos.
10	No. of Toll Plazas		1 Nos.
11	No. of Bus Bays / Shelter		25 Nos.
12	No. of Truck Lay Byes		05 Nos.
14	No. of Rest Area		Nil.
15	Drain (km)	RCC Cover Drain	52.087 Km (at MCW)
		RCC Open Drain	0.115 Km (at MCW),
		Line Drain	0.055 Km (at MCW), 1.78 Km (at Median)
		Open V Drain	0.705 Km (at MCW), 3.355 Km (at Median)
16	Streetlight (Nos.)		2811 Nos.
17	High Mast Lights (Nos.)		08 Nos.

S. No.	Description	Details
18	Solar Blinkers (Nos.)	44 Nos.
19	Length of Safety Barrier (Km)	
	W-Beam Safety Barrier (Km)	28.280 Km
	RCC Crash Barrier (Km)	25.781 Km
	New Jersey crash barriers (Km)	0.460 Km
	Wire rope	38.670 Km
20	Length of Pedestrian Guard Rails (in km)	15.980 Km

* Note: that there is overlap between Section 2 which ends at Km 361+000 and Sec 3 starts from 360+300 thus there is chainage overlap of 700 m. Therefore, end of Chainage of the project becomes Km 401+332. For this chainage variation also has been observed between M/s DBL and M/s ABL Section. End point of DBL Section is Km 361+000 and same location is referred to as Km 360+300 while design by M/ ABL. Therefore, there is two KM Stone of Km 361 at spacing of 700 m length.

2.4 HIGHWAY INVENTORY

Details of Highway Inventory with respect to existing Kilometer as per NH-19 are presented in below sections.

2.4.1 Built-up Settlements

The following are the details of the built-up section:

S. No.	Chainage Km		Length (m)	Side	Name of Settlement
	From	To		(LHS/RHS)	
Section-1 from Km 320+810 to Km 326+000 (Retained 4 Lane)					
1	322+300	325+750	3450	BHS	Atka Village
Section-2 from Km 326+000 to Km 361+000 (Ex. Km 360+300) (6 Lane)					
2	330+200	330+900	700	BHS	Sonturpi Village
3	336+600	337+250	650	BHS	Banpura
4	337+900	338+250	350	LHS	Ghaghra
5	338+850	339+220	370	LHS	Hesla
6	339+220	340+350	1130	BHS	Hesla
7	343+150	343+700	550	BHS	Aura
8	343+900	344+400	500	BHS	Aura
9	344+550	344+900	350	BHS	Aura
10	346+050	346+600	550	LHS	Beko
11	346+900	347+200	300	BHS	Beko
12	347+500	347+900	400	BHS	Beko
13	349+800	350+150	350	LHS	Beko
14	350+300	351+200	900	BHS	Kulgo
15	352+650	353+700	1050	BHS	Kulgo
16	354+150	355+900	1750	LHS	Jamtara
17	355+200	355+900	700	RHS	Jamtara
18	356+500	357+800	1300	LHS	Ishri
19	357+250	357+900	650	RHS	Ishri
20	359+100	359+950	850	BHS	Dumri
Section-6 from Km 360+300 to Km 400+632 (Ex. Km 400+132) (6 Lane)					
21	360+700	361+300	600	BHS	Nimiyaghat

S. No.	Chainage Km		Length (m)	Side (LHS/RHS)	Name of Settlement
	From	To			
22	361+400	362+100	700	BHS	Nimiyaghat
23	362+350	362+900	550	BHS	Nimiyaghat
24	364+000	364+450	450	BHS	Uparnagar Village
25	366+900	367+300	400	RHS	Sankardih Village
26	368+800	370+000	1200	BHS	Sankardih Village
27	370+700	371+100	400	LHS	Satkira Village
28	371+950	372+450	500	LHS	Pabapur Village
29	372+100	372+600	500	RHS	Pabapur Village
30	375+300	377+000	1700	BHS	Topchanchi
31	377+500	377+800	300	LHS	Topchanchi
32	380+200	380+500	300	LHS	Madaidih Village
33	380+700	381+600	900	BHS	Ledatanr Village
34	382+200	382+600	400	BHS	Kabirdih
35	382+850	383+200	350	BHS	Kamata
36	384+300	384+800	500	BHS	Kotaldih
37	385+900	387+000	1100	BHS	Dayabanspahar
38	387+800	389+700	1900	BHS	Maheshpur
39	389+900	390+600	700	LHS	Dalludih
40	392+650	393+000	350	BHS	Rajabhita
41	393+300	394+200	900	LHS	Domanpur
42	397+100	397+500	400	RHS	Udaypur
43	397+500	398+150	650	BHS	Udaypur
44	398+400	399+100	700	RHS	Udaypur
45	399+800	400+400	600	BHS	Barwaadda
Total			**33900**		

2.4.2 Kilometer & Hectometer Stone

The number of existing kilometer and hectometer stone along the Project Stretch are obtained from NSV and LiDAR survey and presented in **Table 2.6**.

Table 2.6: Availability of Kilometer Stones

S. No.	Existing Km	Topo / Design KM
1	321+000	321+000
2	322+000	322+000
3	323+000	323+000
4	324+000	324+000
5	325+000	325+000
6	326+000	325+992
7	327+000	326+990
8	328+000	327+990
9	329+000	328+995
10	330+000	329+982
11	331+000	330+983
12	332+000	331+983
13	333+000	332+983
14	334+000	333+988
15	335+000	334+982

S. No.	Existing Km	Topo / Design KM
16	336+000	335+982
17	337+000	336+980
18	338+000	337+981
19	339+000	338+980
20	340+000	339+981
21	341+000	340+980
22	342+000	341+981
23	343+000	342+982
24	344+000	343+981
25	345+000	344+980
26	346+000	345+981
27	347+000	346+982
28	348+000	347+979
29	349+000	348+964
30	350+000	349+965

S. No.	Existing Km	Topo / Design KM
31	351+000	350+976
32	352+000	351+978
33	353+000	352+977
34	354+000	353+978
35	355+000	354+978
36	356+000	355+976
37	357+000	356+981
38	358+000	357+980
39	359+000	358+990
40	360+000	359+976
41	361+000 A	361+000
42	361+000 B	361+700
43	362+000	362+718
44	363+000	363+718
45	364+000	364+717
46	365+000	365+722
47	366+000	366+716
48	367+000	367+716
49	368+000	368+716
50	369+000	369+716
51	370+000	370+726
52	371+000	371+716
53	372+000	372+715
54	373+000	373+714
55	374+000	374+713
56	375+000	375+714

S. No.	Existing Km	Topo / Design KM
57	376+000	376+722
58	377+000	377+714
59	378+000	378+713
60	379+000	379+713
61	380+000	380+712
62	381+000	381+712
63	382+000	382+713
64	383+000	383+713
65	384+000	384+712
66	385+000	385+712
67	386+000	386+712
68	387+000	387+703
69	388+000	388+711
70	389+000	389+711
71	390+000	390+714
72	391+000	391+712
73	392+000	392+710
74	393+000	393+710
75	394+000	394+707
76	395+000	395+722
77	396+000	396+708
78	397+000	397+708
79	398+000	398+707
80	399+000	399+707
81	400+000	400+707
82	400+632	401+332

Existing Kilometer Stone at Site

2.4.3 Right of Way

Existing Right of Way (Row) on Project Stretch is given in this section. There is no Row demarcation at site in most of the sections of Project Stretch. Consultant has obtained the Row from PIU and presented it in **Table 2.7**.

Table 2.7: Existing Row

S. No.	Chainage Km		Length (m)	Total width of RoW	ROW width from median centerline (m)	
	From	To			LHS	RHS
Section-1 from Km 320+810 to Km 326+000 (Retained 4 Lane) 6 lane DPR in under process						
1	320+810	321+140	330	40.00	16.00	24.00
2	321+140	321+351	211	40.00	16.00	24.00
3	321+351	321+641	290	40.00	16.00	24.00
4	321+641	321+875	234	40.00	16.00	24.00
5	321+875	321+951	76	39.00	20.00	19.00
6	321+951	322+391	440	39.00	21.00	18.00
7	322+391	322+741	350	33.00	22.00	11.00
8	322+741	323+126	385	36.00	19.00	17.00
9	323+126	323+419	293	36.00	15.00	21.00
10	323+419	323+495	76	36.00	15.00	21.00
11	323+495	323+960	465	38.00	17.00	21.00
12	323+960	324+185	225	38.00	18.00	20.00
13	324+185	324+204	19	33.00	17.00	16.00
14	324+204	324+298	94	33.00	17.00	16.00
15	324+298	325+356	1058	36.00	19.00	17.00
16	325+356	325+556	200	36.00	19.00	17.00
17	325+556	325+798	242	36.00	19.00	17.00
18	325+798	326+000	202	43.00	27.00	16.00
Section-2 from Km 326+000 to 361+000 (Ex. Km 360+300) (6 Lane)						
19	326+000	326+060	60	67.90	37.80	30.10
20	326+060	326+110	50	67.90	38.30	29.60
21	326+110	326+160	50	67.90	38.80	29.10
22	326+160	326+210	50	59.90	28.90	31.00
23	326+210	326+260	50	59.90	29.00	30.90
24	326+260	326+310	50	59.90	30.00	29.90
25	326+310	326+360	50	59.90	30.70	29.20
26	326+360	326+410	50	59.90	31.10	28.80

S. No.	Chainage Km		Length (m)	Total width of RoW	ROW width from median centerline (m)	
	From	To			LHS	RHS
27	326+410	326+460	50	59.90	30.90	29.00
28	326+460	326+510	50	59.90	30.00	29.90
29	326+510	326+560	50	59.90	29.00	30.90
30	326+560	326+610	50	59.90	28.90	31.00
31	326+610	326+660	50	59.90	28.90	31.00
32	326+660	326+710	50	59.90	28.90	31.00
33	326+710	326+760	50	59.90	28.90	31.00
34	326+760	326+810	50	59.90	28.90	31.00
35	326+810	326+860	50	59.90	29.00	30.90
36	326+860	326+910	50	59.90	29.00	30.90
37	326+910	326+960	50	59.90	28.90	31.00
38	326+960	327+010	50	59.90	28.30	31.60
39	327+010	327+060	50	60.00	28.20	31.80
40	327+060	327+110	50	59.90	26.70	33.20
41	327+110	327+160	50	59.90	27.00	32.90
42	327+160	327+210	50	60.00	26.60	33.40
43	327+210	327+260	50	59.90	27.80	32.10
44	327+260	327+310	50	59.90	26.20	33.70
45	327+310	327+360	50	59.90	25.40	34.50
46	327+360	327+410	50	59.90	25.30	34.60
47	327+410	327+460	50	59.90	23.80	36.10
48	327+460	327+510	50	60.10	22.80	37.30
49	327+510	327+560	50	59.90	24.80	35.10
50	327+560	327+610	50	60.40	24.70	35.70
51	327+610	327+660	50	60.00	29.30	30.70
52	327+660	327+710	50	59.90	30.30	29.60
53	327+710	327+810	100	60.00	30.70	29.30
54	327+810	327+860	50	59.80	28.90	30.90
55	327+860	327+910	50	59.90	29.00	30.90
56	327+910	327+960	50	59.90	28.90	31.00
57	327+960	328+010	50	59.90	28.00	31.90
58	328+010	328+060	50	60.00	28.60	31.40
59	328+060	328+110	50	60.00	27.60	32.40
60	328+110	328+160	50	60.10	30.20	29.90
61	328+160	328+210	50	59.90	28.30	31.60
62	328+210	328+260	50	60.00	29.80	30.20
63	328+260	328+310	50	59.90	28.50	31.40
64	328+310	328+360	50	59.90	30.10	29.80
65	328+360	328+410	50	59.90	29.70	30.20
66	328+410	328+460	50	59.90	29.80	30.10
67	328+460	328+510	50	59.90	29.90	30.00
68	328+510	328+560	50	59.90	29.90	30.00
69	328+560	328+610	50	59.90	29.70	30.20
70	328+610	328+660	50	59.90	29.50	30.40
71	328+660	328+710	50	59.90	29.90	30.00
72	328+710	328+760	50	59.90	30.30	29.60
73	328+760	328+810	50	59.90	30.30	29.60

S. No.	Chainage Km		Length (m)	Total width of RoW	ROW width from median centerline (m)	
	From	To			LHS	RHS
74	328+810	328+860	50	59.90	30.60	29.30
75	328+860	328+910	50	59.90	30.90	29.00
76	328+910	328+960	50	59.90	30.50	29.40
77	328+960	329+010	50	60.00	31.20	28.80
78	329+010	329+060	50	60.00	30.10	29.90
79	329+060	329+110	50	59.90	30.80	29.10
80	329+110	329+160	50	59.90	29.90	30.00
81	329+160	329+210	50	59.90	30.00	29.90
82	329+210	329+260	50	59.90	30.00	29.90
83	329+260	329+310	50	59.90	30.00	29.90
84	329+310	329+360	50	59.90	29.90	30.00
85	329+360	329+410	50	59.90	29.90	30.00
86	329+410	329+460	50	59.90	29.90	30.00
87	329+460	329+510	50	59.90	30.10	29.80
88	329+510	329+560	50	59.90	30.10	29.80
89	329+560	329+610	50	59.90	29.90	30.00
90	329+610	329+660	50	59.90	29.80	30.10
91	329+660	329+710	50	59.90	29.80	30.10
92	329+710	329+760	50	59.90	29.80	30.10
93	329+760	329+810	50	59.90	29.70	30.20
94	329+810	329+860	50	59.90	29.50	30.40
95	329+860	329+910	50	59.90	29.40	30.50
96	329+910	329+960	50	59.90	29.70	30.20
97	329+960	330+010	50	59.90	29.30	30.60
98	330+010	330+060	50	60.00	30.40	29.60
99	330+060	330+110	50	60.00	32.80	27.20
100	330+110	330+160	50	61.60	37.10	24.50
101	330+160	330+210	50	59.90	43.20	16.70
102	330+210	330+260	50	60.40	41.20	19.20
103	330+260	330+310	50	59.90	43.40	16.50
104	330+310	330+360	50	59.90	43.00	16.90
105	330+360	330+410	50	60.20	40.10	20.10
106	330+410	330+460	50	60.10	35.90	24.20
107	330+460	330+510	50	59.90	33.60	26.30
108	330+510	330+560	50	59.90	33.60	26.30
109	330+560	330+610	50	59.90	33.50	26.40
110	330+610	330+660	50	59.90	33.40	26.50
111	330+660	330+710	50	59.90	33.30	26.60
112	330+710	330+760	50	59.90	33.10	26.80
113	330+760	330+810	50	59.90	33.20	26.70
114	330+810	330+860	50	59.90	33.40	26.50
115	330+860	330+910	50	59.90	33.20	26.70
116	330+910	330+960	50	59.90	32.60	27.30
117	330+960	331+010	50	59.90	31.50	28.40
118	331+010	331+060	50	59.90	30.50	29.40
119	331+060	331+110	50	59.90	30.00	29.90
120	331+110	331+160	50	59.90	30.00	29.90

S. No.	Chainage Km		Length (m)	Total width of RoW	ROW width from median centerline (m)	
	From	To			LHS	RHS
121	331+160	331+210	50	59.90	30.20	29.70
122	331+210	331+260	50	59.90	30.60	29.30
123	331+260	331+310	50	59.90	30.50	29.40
124	331+310	331+360	50	59.90	30.20	29.70
125	331+360	331+410	50	59.90	30.10	29.80
126	331+410	331+460	50	59.90	30.30	29.60
127	331+460	331+510	50	59.90	30.20	29.70
128	331+510	331+560	50	59.90	30.00	29.90
129	331+560	331+610	50	59.90	30.30	29.60
130	331+610	331+660	50	59.90	30.40	29.50
131	331+660	331+710	50	59.90	30.60	29.30
132	331+710	331+760	50	59.90	30.70	29.20
133	331+760	331+810	50	59.90	30.50	29.40
134	331+810	331+860	50	59.90	29.90	30.00
135	331+860	331+910	50	60.00	28.80	31.20
136	331+910	331+960	50	59.90	27.10	32.80
137	331+960	332+010	50	59.90	27.60	32.30
138	332+010	332+060	50	60.20	27.70	32.50
139	332+060	332+110	50	59.90	25.60	34.30
140	332+110	332+160	50	60.20	26.60	33.60
141	332+160	332+210	50	60.70	30.40	30.30
142	332+210	332+260	50	60.10	33.10	27.00
143	332+260	332+310	50	60.40	29.80	30.60
144	332+310	332+360	50	59.90	25.60	34.30
145	332+360	332+410	50	59.90	25.70	34.20
146	332+410	332+460	50	60.00	26.90	33.10
147	332+460	332+510	50	59.90	28.10	31.80
148	332+510	332+560	50	59.90	27.50	32.40
149	332+560	332+610	50	60.10	26.00	34.10
150	332+610	332+660	50	60.00	29.70	30.30
151	332+660	332+710	50	60.00	30.60	29.40
152	332+710	332+760	50	59.90	30.10	29.80
153	332+760	332+810	50	59.80	28.70	31.10
154	332+810	332+860	50	59.50	26.00	33.50
155	332+860	332+910	50	59.75	25.85	33.90
156	332+910	332+960	50	59.70	26.50	33.20
157	332+960	333+010	50	60.00	31.40	28.60
158	333+010	333+060	50	59.90	32.30	27.60
159	333+060	333+110	50	59.90	32.60	27.30
160	333+110	333+160	50	60.00	31.30	28.70
161	333+160	333+210	50	60.00	29.20	30.80
162	333+210	333+260	50	59.90	27.10	32.80
163	333+260	333+310	50	59.90	27.00	32.90
164	333+310	333+360	50	59.90	27.10	32.80
165	333+360	333+410	50	59.90	27.20	32.70
166	333+410	333+460	50	59.90	27.50	32.40
167	333+460	333+510	50	59.90	27.80	32.10

S. No.	Chainage Km		Length (m)	Total width of RoW	ROW width from median centerline (m)	
	From	To			LHS	RHS
168	333+510	333+560	50	59.90	26.70	33.20
169	333+560	333+610	50	60.10	26.80	33.30
170	333+610	333+660	50	59.90	29.60	30.30
171	333+660	333+710	50	60.00	31.60	28.40
172	333+710	333+760	50	59.90	34.00	25.90
173	333+760	333+810	50	59.90	35.90	24.00
174	333+810	333+860	50	60.00	35.60	24.40
175	333+860	333+910	50	60.00	32.80	27.20
176	333+910	333+960	50	60.00	31.30	28.70
177	333+960	334+010	50	59.90	30.10	29.80
178	334+010	334+060	50	59.90	29.30	30.60
179	334+060	334+110	50	59.90	28.90	31.00
180	334+110	334+160	50	60.00	29.50	30.50
181	334+160	334+210	50	59.90	29.90	30.00
182	334+210	334+260	50	59.90	29.40	30.50
183	334+260	334+310	50	59.90	29.60	30.30
184	334+310	334+360	50	59.90	30.60	29.30
185	334+360	334+410	50	59.90	32.90	27.00
186	334+410	334+460	50	59.90	32.90	27.00
187	334+460	334+510	50	59.90	32.60	27.30
188	334+510	334+560	50	59.90	31.80	28.10
189	334+560	334+610	50	60.00	30.30	29.70
190	334+610	334+660	50	59.90	27.90	32.00
191	334+660	334+710	50	59.90	28.00	31.90
192	334+710	334+760	50	59.90	28.90	31.00
193	334+760	334+810	50	59.90	29.60	30.30
194	334+810	334+860	50	59.90	29.90	30.00
195	334+860	334+910	50	59.90	29.90	30.00
196	334+910	334+960	50	59.90	29.50	30.40
197	334+960	335+010	50	59.90	29.10	30.80
198	335+010	335+060	50	59.90	28.50	31.40
199	335+060	335+110	50	59.90	30.10	29.80
200	335+110	335+160	50	59.80	31.00	28.80
201	335+160	335+210	50	59.90	31.20	28.70
202	335+210	335+260	50	60.00	30.30	29.70
203	335+260	335+310	50	59.90	29.80	30.10
204	335+310	335+360	50	59.90	30.00	29.90
205	335+360	335+410	50	59.90	30.30	29.60
206	335+410	335+460	50	59.90	30.50	29.40
207	335+460	335+510	50	59.90	30.80	29.10
208	335+510	335+560	50	59.90	31.00	28.90
209	335+560	335+610	50	59.90	31.20	28.70
210	335+610	335+660	50	59.90	31.50	28.40
211	335+660	335+710	50	59.90	31.70	28.20
212	335+710	335+760	50	59.90	32.00	27.90
213	335+760	335+810	50	59.90	32.20	27.70
214	335+810	335+860	50	60.00	32.50	27.50

S. No.	Chainage Km		Length (m)	Total width of RoW	ROW width from median centerline (m)	
	From	To			LHS	RHS
215	335+860	335+910	50	59.90	32.70	27.20
216	335+910	335+960	50	59.90	32.90	27.00
217	335+960	336+010	50	59.90	33.20	26.70
218	336+010	336+060	50	59.90	33.20	26.70
219	336+060	336+110	50	60.10	30.90	29.20
220	336+110	336+160	50	60.00	26.50	33.50
221	336+160	336+210	50	60.00	25.20	34.80
222	336+210	336+260	50	60.00	25.60	34.40
223	336+260	336+310	50	60.00	28.60	31.40
224	336+310	336+360	50	59.90	28.50	31.40
225	336+360	336+410	50	59.90	28.70	31.20
226	336+410	336+460	50	60.00	31.80	28.20
227	336+460	336+510	50	60.00	34.50	25.50
228	336+510	336+560	50	59.90	33.50	26.40
229	336+560	336+610	50	59.90	32.90	27.00
230	336+610	336+660	50	60.00	30.20	29.80
231	336+660	336+710	50	59.90	28.60	31.30
232	336+710	336+760	50	59.90	28.90	31.00
233	336+760	336+810	50	59.90	29.70	30.20
234	336+810	336+860	50	59.90	30.00	29.90
235	336+860	336+910	50	59.90	30.10	29.80
236	336+910	336+960	50	59.90	30.10	29.80
237	336+960	337+010	50	59.90	30.10	29.80
238	337+010	337+060	50	59.90	30.40	29.50
239	337+060	337+110	50	59.90	31.00	28.90
240	337+110	337+160	50	59.90	30.80	29.10
241	337+160	337+210	50	59.90	30.10	29.80
242	337+210	337+260	50	59.90	29.40	30.50
243	337+260	337+310	50	59.90	28.70	31.20
244	337+310	337+360	50	59.90	28.50	31.40
245	337+360	337+410	50	59.90	30.30	29.60
246	337+410	337+460	50	59.90	31.80	28.10
247	337+460	337+510	50	59.90	31.60	28.30
248	337+510	337+560	50	59.90	31.30	28.60
249	337+560	337+610	50	59.90	30.90	29.00
250	337+610	337+660	50	59.90	30.50	29.40
251	337+660	337+710	50	59.90	30.50	29.40
252	337+710	337+760	50	59.90	30.40	29.50
253	337+760	337+810	50	59.90	30.30	29.60
254	337+810	337+860	50	59.90	30.60	29.30
255	337+860	337+910	50	59.90	30.00	29.90
256	337+910	337+960	50	59.90	30.00	29.90
257	337+960	338+010	50	59.90	30.20	29.70
258	338+010	338+060	50	59.90	29.70	30.20
259	338+060	338+110	50	59.90	30.20	29.70
260	338+110	338+160	50	59.90	29.80	30.10
261	338+160	338+210	50	59.90	29.30	30.60

S. No.	Chainage Km		Length (m)	Total width of RoW	ROW width from median centerline (m)	
	From	To			LHS	RHS
262	338+210	338+260	50	60.00	28.80	31.20
263	338+260	338+310	50	59.90	28.30	31.60
264	338+310	338+360	50	59.90	29.30	30.60
265	338+360	338+410	50	59.90	29.30	30.60
266	338+410	338+460	50	59.90	29.60	30.30
267	338+460	338+510	50	60.00	29.10	30.90
268	338+510	338+560	50	59.90	29.90	30.00
269	338+560	338+610	50	59.90	29.20	30.70
270	338+610	338+660	50	59.90	30.00	29.90
271	338+660	338+710	50	59.90	29.80	30.10
272	338+710	338+760	50	59.90	30.10	29.80
273	338+760	338+810	50	59.90	30.00	29.90
274	338+810	338+860	50	59.90	29.80	30.10
275	338+860	338+910	50	59.90	29.40	30.50
276	338+910	338+960	50	59.90	29.20	30.70
277	338+960	339+010	50	59.90	29.50	30.40
278	339+010	339+060	50	59.90	29.90	30.00
279	339+060	339+110	50	59.90	30.30	29.60
280	339+110	339+160	50	59.90	30.70	29.20
281	339+160	339+210	50	59.90	31.00	28.90
282	339+210	339+260	50	60.43	31.18	29.25
283	339+260	339+310	50	56.33	29.40	26.93
284	339+310	339+360	50	55.15	29.50	25.65
285	339+360	339+410	50	54.35	28.72	25.63
286	339+410	339+460	50	54.57	27.75	26.82
287	339+460	339+510	50	54.33	29.50	24.83
288	339+510	339+560	50	54.12	29.90	24.22
289	339+560	339+610	50	52.95	29.05	23.90
290	339+610	339+660	50	53.99	29.95	24.04
291	339+660	339+710	50	51.97	27.57	24.40
292	339+710	339+760	50	52.02	27.22	24.80
293	339+760	339+810	50	52.22	26.40	25.82
294	339+810	339+860	50	53.21	25.55	27.66
295	339+860	339+910	50	53.51	24.70	28.81
296	339+910	339+960	50	52.70	23.70	29.00
297	339+960	340+010	50	60.00	25.20	34.80
298	340+010	340+060	50	59.90	26.60	33.30
299	340+060	340+110	50	59.90	27.60	32.30
300	340+110	340+160	50	59.90	28.40	31.50
301	340+160	340+210	50	59.90	28.40	31.50
302	340+210	340+260	50	59.90	28.70	31.20
303	340+260	340+310	50	59.90	29.50	30.40
304	340+310	340+360	50	60.10	29.80	30.30
305	340+360	340+410	50	59.90	32.30	27.60
306	340+410	340+460	50	60.00	32.90	27.10
307	340+460	340+510	50	59.90	33.90	26.00
308	340+510	340+560	50	59.90	33.20	26.70

S. No.	Chainage Km		Length (m)	Total width of RoW	ROW width from median centerline (m)	
	From	To			LHS	RHS
309	340+560	340+610	50	59.90	32.10	27.80
310	340+610	340+660	50	59.90	31.40	28.50
311	340+660	340+710	50	60.00	31.80	28.20
312	340+710	340+760	50	60.00	31.40	28.60
313	340+760	340+810	50	59.90	29.70	30.20
314	340+810	340+860	50	59.90	30.20	29.70
315	340+860	340+910	50	59.90	30.70	29.20
316	340+910	340+960	50	59.90	31.00	28.90
317	340+960	341+010	50	59.90	31.10	28.80
318	341+010	341+060	50	59.90	31.10	28.80
319	341+060	341+110	50	59.90	31.00	28.90
320	341+110	341+160	50	59.90	30.80	29.10
321	341+160	341+210	50	59.90	30.50	29.40
322	341+210	341+310	100	59.90	30.30	29.60
323	341+310	341+360	50	59.90	30.20	29.70
324	341+360	341+410	50	59.90	30.00	29.90
325	341+410	341+460	50	59.90	29.80	30.10
326	341+460	341+510	50	59.90	29.90	30.00
327	341+510	341+560	50	59.90	29.90	30.00
328	341+560	341+610	50	59.90	29.90	30.00
329	341+610	341+660	50	59.90	29.80	30.10
330	341+660	341+710	50	59.90	29.80	30.10
331	341+710	341+760	50	59.90	29.80	30.10
332	341+760	341+810	50	59.90	29.80	30.10
333	341+810	341+860	50	59.90	29.70	30.20
334	341+860	341+910	50	59.90	29.80	30.10
335	341+910	341+960	50	60.00	29.70	30.30
336	341+960	342+010	50	59.90	28.70	31.20
337	342+010	342+060	50	59.90	30.20	29.70
338	342+060	342+110	50	59.90	30.00	29.90
339	342+110	342+160	50	59.90	30.90	29.00
340	342+160	342+210	50	59.90	30.30	29.60
341	342+210	342+260	50	59.90	29.90	30.00
342	342+260	342+310	50	59.90	29.90	30.00
343	342+310	342+360	50	59.90	29.90	30.00
344	342+360	342+410	50	59.90	29.80	30.10
345	342+410	342+460	50	59.90	30.80	29.10
346	342+460	342+510	50	59.90	30.00	29.90
347	342+510	342+560	50	59.90	30.00	29.90
348	342+560	342+610	50	59.90	30.90	29.00
349	342+610	342+660	50	60.00	30.70	29.30
350	342+660	342+710	50	60.00	29.10	30.90
351	342+710	342+760	50	60.00	29.70	30.30
352	342+760	342+810	50	51.50	28.50	23.00
353	342+810	342+860	50	59.90	29.70	30.20
354	342+860	342+910	50	59.90	30.50	29.40
355	342+910	342+960	50	60.20	31.40	28.80

S. No.	Chainage Km		Length (m)	Total width of RoW	ROW width from median centerline (m)	
	From	To			LHS	RHS
356	342+960	343+010	50	59.90	33.90	26.00
357	343+010	343+060	50	59.90	32.50	27.40
358	343+060	343+110	50	59.90	33.20	26.70
359	343+110	343+160	50	59.90	32.10	27.80
360	343+160	343+210	50	59.90	32.20	27.70
361	343+210	343+260	50	59.90	32.00	27.90
362	343+260	343+310	50	59.90	31.00	28.90
363	343+310	343+360	50	59.90	30.40	29.50
364	343+360	343+410	50	59.90	30.50	29.40
365	343+410	343+460	50	59.90	30.50	29.40
366	343+460	343+510	50	59.90	30.50	29.40
367	343+510	343+560	50	59.90	30.50	29.40
368	343+560	343+610	50	59.90	30.50	29.40
369	343+610	343+660	50	59.90	30.60	29.30
370	343+660	343+710	50	59.90	30.60	29.30
371	343+710	343+760	50	59.90	30.40	29.50
372	343+760	343+810	50	59.90	29.60	30.30
373	343+810	343+860	50	59.90	28.60	31.30
374	343+860	343+910	50	59.90	27.20	32.70
375	343+910	343+960	50	60.00	26.90	33.10
376	343+960	344+010	50	60.00	28.60	31.40
377	344+010	344+060	50	59.90	30.90	29.00
378	344+060	344+110	50	59.90	30.20	29.70
379	344+110	344+160	50	59.90	29.80	30.10
380	344+160	344+210	50	59.90	29.70	30.20
381	344+210	344+260	50	59.90	29.70	30.20
382	344+260	344+310	50	59.90	29.60	30.30
383	344+310	344+360	50	59.90	30.00	29.90
384	344+360	344+410	50	59.90	29.00	30.90
385	344+410	344+460	50	59.90	29.70	30.20
386	344+460	344+510	50	60.00	32.20	27.80
387	344+510	344+560	50	59.90	34.30	25.60
388	344+560	344+610	50	59.90	34.00	25.90
389	344+610	344+660	50	59.90	34.60	25.30
390	344+660	344+710	50	59.90	34.80	25.10
391	344+710	344+760	50	59.90	34.80	25.10
392	344+760	344+810	50	59.90	34.30	25.60
393	344+810	344+860	50	59.90	34.30	25.60
394	344+860	344+910	50	59.90	34.00	25.90
395	344+910	344+960	50	59.90	34.00	25.90
396	344+960	345+010	50	59.90	34.10	25.80
397	345+010	345+060	50	59.80	33.90	25.90
398	345+060	345+110	50	59.90	34.30	25.60
399	345+110	345+160	50	59.90	33.80	26.10
400	345+160	345+210	50	59.90	33.20	26.70
401	345+210	345+260	50	59.90	32.90	27.00
402	345+260	345+310	50	59.90	32.80	27.10

S. No.	Chainage Km		Length (m)	Total width of RoW	ROW width from median centerline (m)	
	From	To			LHS	RHS
403	345+310	345+360	50	59.90	31.90	28.00
404	345+360	345+410	50	60.00	31.50	28.50
405	345+410	345+460	50	59.90	30.50	29.40
406	345+460	345+510	50	59.90	30.90	29.00
407	345+510	345+560	50	59.90	30.30	29.60
408	345+560	345+610	50	59.90	30.50	29.40
409	345+610	345+660	50	58.90	29.70	29.20
410	345+660	345+710	50	55.60	29.70	25.90
411	345+710	345+760	50	54.70	29.70	25.00
412	345+760	345+810	50	57.60	28.80	28.80
413	345+810	345+860	50	59.60	30.00	29.60
414	345+860	345+910	50	59.70	29.60	30.10
415	345+910	345+960	50	59.20	29.70	29.50
416	345+960	346+010	50	57.30	29.20	28.10
417	346+010	346+060	50	56.40	28.80	27.60
418	346+060	346+110	50	58.50	28.70	29.80
419	346+110	346+160	50	59.70	27.50	32.20
420	346+160	346+210	50	58.50	24.00	34.50
421	346+210	346+260	50	57.50	23.70	33.80
422	346+260	346+310	50	56.70	26.50	30.20
423	346+310	346+360	50	55.10	29.50	25.60
424	346+360	346+410	50	53.10	30.40	22.70
425	346+410	346+460	50	51.90	31.30	20.60
426	346+460	346+510	50	51.90	31.70	20.20
427	346+510	346+560	50	52.00	31.00	21.00
428	346+560	346+610	50	52.00	31.50	20.50
429	346+610	346+660	50	51.60	30.70	20.90
430	346+660	346+710	50	50.60	30.40	20.20
431	346+710	346+760	50	51.70	30.20	21.50
432	346+760	346+810	50	56.70	30.40	26.30
433	346+810	346+860	50	58.30	30.00	28.30
434	346+860	346+910	50	53.30	28.10	25.20
435	346+910	346+960	50	49.70	26.90	22.80
436	346+960	347+010	50	49.70	25.90	23.80
437	347+010	347+060	50	49.80	25.00	24.80
438	347+060	347+110	50	49.90	25.30	24.60
439	347+110	347+160	50	51.50	24.90	26.60
440	347+160	347+210	50	56.60	24.90	31.70
441	347+210	347+260	50	59.90	24.80	35.10
442	347+260	347+310	50	59.80	24.70	35.10
443	347+310	347+360	50	59.80	25.20	34.60
444	347+360	347+410	50	59.80	26.00	33.80
445	347+410	347+460	50	59.80	26.10	33.70
446	347+460	347+510	50	59.80	25.90	33.90
447	347+510	347+560	50	59.80	25.80	34.00
448	347+560	347+610	50	59.80	27.80	32.00
449	347+610	347+660	50	59.90	29.70	30.20

S. No.	Chainage Km		Length (m)	Total width of RoW	ROW width from median centerline (m)	
	From	To			LHS	RHS
450	347+660	347+710	50	59.90	31.60	28.30
451	347+710	347+760	50	59.80	32.80	27.00
452	347+760	347+810	50	59.90	32.30	27.60
453	347+810	347+860	50	60.20	30.70	29.50
454	347+860	347+910	50	61.20	30.60	30.60
455	347+910	347+960	50	62.30	29.80	32.50
456	347+960	348+010	50	63.00	29.40	33.60
457	348+010	348+060	50	63.20	29.40	33.80
458	348+060	348+110	50	61.20	27.00	34.20
459	348+110	348+160	50	60.00	27.00	33.00
460	348+160	348+210	50	62.40	26.90	35.50
461	348+210	348+260	50	64.30	28.40	35.90
462	348+260	348+310	50	65.30	28.00	37.30
463	348+310	348+360	50	66.40	28.90	37.50
464	348+360	348+410	50	67.30	30.70	36.60
465	348+410	348+460	50	66.30	31.80	34.50
466	348+460	348+510	50	62.40	31.90	30.50
467	348+510	348+560	50	59.80	32.30	27.50
468	348+560	348+610	50	59.70	31.60	28.10
469	348+610	348+660	50	58.60	30.60	28.00
470	348+660	348+710	50	54.60	32.00	22.60
471	348+710	348+760	50	52.50	30.70	21.80
472	348+760	348+810	50	53.30	30.40	22.90
473	348+810	348+860	50	54.60	29.60	25.00
474	348+860	348+910	50	56.20	28.40	27.80
475	348+910	348+960	50	59.30	28.00	31.30
476	348+960	349+010	50	64.60	29.00	35.60
477	349+010	349+060	50	66.70	29.50	37.20
478	349+060	349+110	50	63.70	29.30	34.40
479	349+110	349+160	50	61.70	29.60	32.10
480	349+160	349+210	50	60.80	29.60	31.20
481	349+210	349+260	50	60.40	30.30	30.10
482	349+260	349+310	50	60.40	30.60	29.80
483	349+310	349+360	50	60.30	30.50	29.80
484	349+360	349+410	50	60.00	30.40	29.60
485	349+410	349+460	50	60.00	30.20	29.80
486	349+460	349+510	50	59.90	30.40	29.50
487	349+510	349+560	50	60.00	30.30	29.70
488	349+560	349+610	50	60.00	30.40	29.60
489	349+610	349+660	50	61.50	29.80	31.70
490	349+660	349+710	50	65.40	29.40	36.00
491	349+710	349+760	50	67.20	28.70	38.50
492	349+760	349+810	50	65.00	28.50	36.50
493	349+810	349+860	50	65.30	29.40	35.90
494	349+860	349+910	50	69.30	30.90	38.40
495	349+910	349+960	50	71.70	32.60	39.10
496	349+960	350+010	50	74.20	31.30	42.90

S. No.	Chainage Km		Length (m)	Total width of RoW	ROW width from median centerline (m)	
	From	To			LHS	RHS
497	350+010	350+060	50	77.40	32.50	44.90
498	350+060	350+110	50	81.70	34.10	47.60
499	350+110	350+160	50	80.80	35.70	45.10
500	350+160	350+210	50	75.00	37.50	37.50
501	350+210	350+260	50	71.00	37.40	33.60
502	350+260	350+310	50	68.90	35.10	33.80
503	350+310	350+360	50	66.10	33.80	32.30
504	350+360	350+410	50	62.20	33.60	28.60
505	350+410	350+460	50	58.20	32.70	25.50
506	350+460	350+510	50	54.40	30.20	24.20
507	350+510	350+560	50	51.90	26.90	25.00
508	350+560	350+610	50	51.90	25.50	26.40
509	350+610	350+660	50	52.40	23.80	28.60
510	350+660	350+710	50	54.00	23.80	30.20
511	350+710	350+760	50	55.00	24.00	31.00
512	350+760	350+810	50	54.90	24.50	30.40
513	350+810	350+860	50	54.30	25.30	29.00
514	350+860	350+910	50	52.70	26.10	26.60
515	350+910	350+960	50	52.30	26.90	25.40
516	350+960	351+010	50	53.30	27.40	25.90
517	351+010	351+060	50	55.20	28.10	27.10
518	351+060	351+110	50	58.20	28.60	29.60
519	351+110	351+160	50	59.90	29.10	30.80
520	351+160	351+210	50	60.00	29.40	30.60
521	351+210	351+260	50	59.90	29.60	30.30
522	351+260	351+310	50	59.80	30.10	29.70
523	351+310	351+360	50	59.90	30.30	29.60
524	351+360	351+410	50	59.80	30.10	29.70
525	351+410	351+460	50	59.80	29.90	29.90
526	351+460	351+510	50	59.70	29.90	29.80
527	351+510	351+560	50	59.80	30.40	29.40
528	351+560	351+610	50	60.00	31.95	28.05
529	351+610	351+660	50	68.08	34.57	33.51
530	351+660	351+710	50	60.15	38.14	22.01
531	351+710	351+760	50	60.09	41.27	18.82
532	351+760	351+810	50	60.00	43.53	16.47
533	351+810	351+860	50	79.80	47.84	31.96
534	351+860	351+910	50	96.43	52.93	43.50
535	351+910	351+960	50	89.99	60.82	29.17
536	351+960	352+010	50	96.34	61.18	35.16
537	352+010	352+060	50	89.97	61.48	28.49
538	352+060	352+110	50	90.00	61.85	28.15
539	352+110	352+160	50	103.43	62.22	41.21
540	352+160	352+210	50	89.98	62.53	27.45
541	352+210	352+260	50	90.01	62.57	27.44
542	352+260	352+310	50	90.01	62.16	27.85
543	352+310	352+360	50	90.01	61.22	28.79

S. No.	Chainage Km		Length (m)	Total width of RoW	ROW width from median centerline (m)	
	From	To			LHS	RHS
544	352+360	352+410	50	83.93	62.42	21.51
545	352+410	352+460	50	84.62	63.10	21.52
546	352+460	352+510	50	59.67	38.14	21.53
547	352+510	352+560	50	58.03	36.50	21.53
548	352+560	352+610	50	56.12	34.59	21.53
549	352+610	352+660	50	54.01	31.71	22.30
550	352+660	352+710	50	60.84	35.55	25.29
551	352+710	352+760	50	54.00	27.02	26.98
552	352+760	352+810	50	54.00	26.77	27.23
553	352+810	352+860	50	55.90	28.10	27.80
554	352+860	352+910	50	55.90	28.90	27.00
555	352+910	352+960	50	55.90	28.90	27.00
556	352+960	353+010	50	55.90	29.00	26.90
557	353+010	353+060	50	55.90	29.20	26.70
558	353+060	353+110	50	55.90	29.30	26.60
559	353+110	353+160	50	55.90	29.50	26.40
560	353+160	353+210	50	55.80	29.40	26.40
561	353+210	353+260	50	55.80	29.30	26.50
562	353+260	353+310	50	55.90	29.00	26.90
563	353+310	353+360	50	55.90	28.80	27.10
564	353+360	353+410	50	55.90	28.80	27.10
565	353+410	353+460	50	55.90	28.90	27.00
566	353+460	353+510	50	55.80	29.20	26.60
567	353+510	353+560	50	55.90	29.00	26.90
568	353+560	353+610	50	55.90	28.90	27.00
569	353+610	353+660	50	57.50	28.10	29.40
570	353+660	353+710	50	61.40	26.10	35.30
571	353+710	353+760	50	68.00	24.70	43.30
572	353+760	353+810	50	78.40	24.40	54.00
573	353+810	353+860	50	87.80	24.60	63.20
574	353+860	353+910	50	96.50	27.00	69.50
575	353+910	353+960	50	99.80	30.90	68.90
576	353+960	354+010	50	94.50	35.80	58.70
577	354+010	354+060	50	91.50	39.80	51.70
578	354+060	354+110	50	97.10	39.70	57.40
579	354+110	354+160	50	99.90	39.80	60.10
580	354+160	354+210	50	99.80	39.80	60.00
581	354+210	354+260	50	97.90	41.00	56.90
582	354+260	354+310	50	93.70	43.50	50.20
583	354+310	354+360	50	84.20	41.80	42.40
584	354+360	354+410	50	68.20	34.60	33.60
585	354+410	354+460	50	60.80	31.80	29.00
586	354+460	354+510	50	63.10	32.30	30.80
587	354+510	354+560	50	65.50	33.30	32.20
588	354+560	354+610	50	66.80	35.40	31.40
589	354+610	354+660	50	66.00	36.20	29.80
590	354+660	354+710	50	62.10	36.40	25.70

S. No.	Chainage Km		Length (m)	Total width of RoW	ROW width from median centerline (m)	
	From	To			LHS	RHS
591	354+710	354+760	50	59.90	34.10	25.80
592	354+760	354+810	50	59.80	31.60	28.20
593	354+810	354+860	50	59.80	29.70	30.10
594	354+860	354+910	50	59.50	29.70	29.80
595	354+910	354+960	50	59.30	29.70	29.60
596	354+960	355+010	50	59.30	29.90	29.40
597	355+010	355+060	50	58.70	29.60	29.10
598	355+060	355+110	50	56.90	28.60	28.30
599	355+110	355+160	50	55.90	28.40	27.50
600	355+160	355+210	50	55.90	29.30	26.60
601	355+210	355+260	50	55.80	29.80	26.00
602	355+260	355+310	50	55.70	29.80	25.90
603	355+310	355+360	50	55.60	29.80	25.80
604	355+360	355+410	50	55.60	29.80	25.80
605	355+410	355+460	50	59.50	29.90	29.60
606	355+460	355+510	50	69.30	29.90	39.40
607	355+510	355+560	50	76.00	31.10	44.90
608	355+560	355+610	50	76.00	34.10	41.90
609	355+610	355+660	50	75.80	35.90	39.90
610	355+660	355+710	50	75.90	36.00	39.90
611	355+710	355+760	50	75.80	36.00	39.80
612	355+760	355+810	50	75.90	36.00	39.90
613	355+810	355+860	50	75.90	35.90	40.00
614	355+860	355+910	50	75.80	35.80	40.00
615	355+910	355+960	50	75.80	35.80	40.00
616	355+960	356+010	50	75.80	36.00	39.80
617	356+010	356+060	50	75.90	36.20	39.70
618	356+060	356+110	50	75.80	36.20	39.60
619	356+110	356+160	50	75.80	36.20	39.60
620	356+160	356+210	50	75.90	36.30	39.60
621	356+210	356+260	50	72.10	34.90	37.20
622	356+260	356+310	50	62.30	32.20	30.10
623	356+310	356+360	50	56.40	30.50	25.90
624	356+360	356+410	50	58.50	30.00	28.50
625	356+410	356+460	50	59.90	30.40	29.50
626	356+460	356+510	50	59.80	30.50	29.30
627	356+510	356+560	50	59.90	30.40	29.50
628	356+560	356+610	50	59.80	30.50	29.30
629	356+610	356+660	50	59.90	30.30	29.60
630	356+660	356+710	50	59.90	30.50	29.40
631	356+710	356+760	50	59.90	30.20	29.70
632	356+760	356+810	50	59.90	30.30	29.60
633	356+810	356+860	50	59.90	29.70	30.20
634	356+860	356+910	50	59.80	28.90	30.90
635	356+910	356+960	50	59.80	28.80	31.00
636	356+960	357+010	50	59.90	28.90	31.00
637	357+010	357+060	50	59.60	29.40	30.20

S. No.	Chainage Km		Length (m)	Total width of RoW	ROW width from median centerline (m)	
	From	To			LHS	RHS
638	357+060	357+110	50	59.70	29.50	30.20
639	357+110	357+160	50	59.70	29.80	29.90
640	357+160	357+210	50	59.80	29.60	30.20
641	357+210	357+260	50	59.80	30.30	29.50
642	357+260	357+310	50	59.80	30.30	29.50
643	357+310	357+360	50	58.90	30.20	28.70
644	357+360	357+410	50	57.00	30.20	26.80
645	357+410	357+460	50	56.60	30.30	26.30
646	357+460	357+510	50	58.50	30.30	28.20
647	357+510	357+560	50	59.00	30.30	28.70
648	357+560	357+610	50	56.90	30.40	26.50
649	357+610	357+660	50	56.50	30.40	26.10
650	357+660	357+710	50	59.20	30.80	28.40
651	357+710	357+760	50	63.10	31.90	31.20
652	357+760	357+810	50	68.60	34.70	33.90
653	357+810	357+860	50	71.90	36.30	35.60
654	357+860	357+910	50	71.90	36.20	35.70
655	357+910	357+960	50	72.70	36.10	36.60
656	357+960	358+010	50	74.70	36.10	38.60
657	358+010	358+060	50	75.90	36.10	39.80
658	358+060	358+110	50	75.90	36.10	39.80
659	358+110	358+160	50	80.10	37.90	42.20
660	358+160	358+210	50	90.20	42.10	48.10
661	358+210	358+260	50	92.40	43.30	49.10
662	358+260	358+310	50	84.50	40.60	43.90
663	358+310	358+360	50	79.80	38.40	41.40
664	358+360	358+410	50	79.80	36.80	43.00
665	358+410	358+460	50	79.90	36.80	43.10
666	358+460	358+510	50	79.70	38.70	41.00
667	358+510	358+560	50	80.50	41.70	38.80
668	358+560	358+610	50	82.60	43.20	39.40
669	358+610	358+660	50	81.50	41.90	39.60
670	358+660	358+710	50	78.00	40.20	37.80
671	358+710	358+760	50	75.10	37.50	37.60
672	358+760	358+810	50	75.60	37.90	37.70
673	358+810	358+860	50	75.20	35.90	39.30
674	358+860	358+910	50	73.30	35.90	37.40
675	358+910	358+960	50	73.20	36.00	37.20
676	358+960	359+010	50	77.30	38.00	39.30
677	359+010	359+060	50	75.50	37.90	37.60
678	359+060	359+110	50	65.60	32.30	33.30
679	359+110	359+160	50	59.60	29.20	30.40
680	359+160	359+210	50	59.60	27.10	32.50
681	359+210	359+260	50	60.30	27.80	32.50
682	359+260	359+310	50	61.60	28.60	33.00
683	359+310	359+360	50	62.70	29.40	33.30
684	359+360	359+410	50	63.50	30.20	33.30

S. No.	Chainage Km		Length (m)	Total width of RoW	ROW width from median centerline (m)	
	From	To			LHS	RHS
685	359+410	359+460	50	63.10	30.60	32.50
686	359+460	359+510	50	61.00	30.60	30.40
687	359+510	359+560	50	59.90	30.60	29.30
688	359+560	359+610	50	59.80	30.60	29.20
689	359+610	359+660	50	59.90	30.70	29.20
690	359+660	359+710	50	59.80	30.80	29.00
691	359+710	359+760	50	59.90	30.90	29.00
692	359+760	359+810	50	59.90	30.60	29.30
693	359+810	359+860	50	59.80	29.90	29.90
694	359+860	359+910	50	59.80	28.90	30.90
695	359+910	359+960	50	59.00	28.30	30.70
696	359+960	360+010	50	57.10	28.30	28.80
697	360+010	360+060	50	55.90	28.20	27.70
698	360+060	360+110	50	55.90	28.00	27.90
699	360+110	360+160	50	57.00	29.00	28.00
700	360+160	360+210	50	59.50	32.10	27.40
701	360+210	360+260	50	60.30	32.50	27.80
702	360+260	360+310	50	59.90	30.00	29.90
703	360+310	360+360	50	63.30	30.00	33.30
704	360+360	360+410	50	71.50	32.10	39.40
705	360+410	360+460	50	72.70	31.90	40.80
706	360+460	360+510	50	65.80	29.20	36.60
707	360+510	360+560	50	61.40	27.10	34.30
708	360+560	360+610	50	60.40	27.10	33.30
709	360+610	360+660	50	59.80	27.80	32.00
710	360+660	360+710	50	59.90	29.20	30.70
711	360+710	360+760	50	59.70	29.90	29.80
712	360+760	360+810	50	59.40	29.80	29.60
713	360+810	360+860	50	59.40	30.00	29.40
714	360+860	360+910	50	59.70	30.20	29.50
715	360+910	360+960	50	59.90	30.00	29.90
716	360+960	361+000	40	59.80	29.80	30.00
Section-3 – 360+300 to 400+632 (Ex. Km 400+132) (6 Lane)						
717	360+300	362+300	2000	59.50	30.00	29.50
718	362+300	363+100	800	59.00	29.50	29.50
719	363+100	364+000	900	58.50	29.00	29.50
720	364+000	364+200	200	58.50	29.50	29.00
721	364+200	365+800	1600	59.00	29.50	29.50
722	365+800	365+900	100	60.00	30.50	29.50
723	365+900	366+000	100	59.00	30.50	28.50
724	366+000	366+100	100	59.50	31.00	28.50
725	366+100	366+200	100	59.00	31.00	28.00
726	366+200	366+300	100	57.00	31.00	26.00
727	366+300	366+400	100	59.35	32.85	26.50
728	366+400	366+900	500	58.00	31.00	27.00
729	366+900	367+500	600	59.60	31.30	28.30
730	367+500	368+000	500	60.00	30.00	30.00

S. No.	Chainage Km		Length (m)	Total width of RoW	ROW width from median centerline (m)	
	From	To			LHS	RHS
731	368+000	368+100	100	59.30	31.00	28.30
732	368+100	368+200	100	59.30	31.00	28.30
733	368+200	368+300	100	62.75	36.00	26.75
734	368+300	368+400	100	62.75	36.00	26.75
735	368+400	368+500	100	64.15	37.40	26.75
736	368+500	368+600	100	60.15	33.40	26.75
737	368+600	368+700	100	60.15	33.40	26.75
738	368+700	368+800	100	57.75	31.00	26.75
739	368+800	368+900	100	57.75	31.00	26.75
740	368+900	369+000	100	58.00	35.00	23.00
741	369+000	369+100	100	57.00	33.00	24.00
742	369+100	369+200	100	60.00	30.00	30.00
743	369+200	369+300	100	63.00	29.00	34.00
744	369+300	369+400	100	60.00	29.00	31.00
745	369+400	369+500	100	60.50	29.50	31.00
746	369+500	369+600	100	60.50	26.50	34.00
747	369+600	369+700	100	60.00	30.50	29.50
748	369+700	369+800	100	56.50	26.50	30.00
749	369+800	369+900	100	61.00	30.00	31.00
750	369+900	370+000	100	60.00	26.00	34.00
751	370+000	370+100	100	60.00	25.00	35.00
752	370+100	370+200	100	61.00	26.50	34.50
753	370+200	370+300	100	60.60	25.00	35.60
754	370+300	370+400	100	61.20	25.60	35.60
755	370+400	370+500	100	60.50	26.50	34.00
756	370+500	370+600	100	60.50	26.50	34.00
757	370+600	370+700	100	60.00	26.00	34.00
758	370+700	370+800	100	61.50	26.50	35.00
759	370+800	370+900	100	68.00	33.00	35.00
760	370+900	371+000	100	65.50	30.50	35.00
761	371+000	371+100	100	65.50	30.50	35.00
762	371+100	371+200	100	58.50	30.00	28.50
763	371+200	371+300	100	58.50	30.00	28.50
764	371+300	371+400	100	58.50	30.00	28.50
765	371+400	371+500	100	58.50	30.00	28.50
766	371+500	371+600	100	58.50	30.00	28.50
767	371+600	371+700	100	56.00	27.50	28.50
768	371+700	371+800	100	58.50	30.00	28.50
769	371+800	371+900	100	58.50	30.00	28.50
770	371+900	372+000	100	51.50	24.50	27.00
771	372+000	372+100	100	49.00	24.00	25.00
772	372+100	372+200	100	52.00	25.00	27.00
773	372+200	372+300	100	52.00	25.00	27.00
774	372+300	372+400	100	52.00	25.00	27.00
775	372+400	372+500	100	53.00	26.00	27.00
776	372+500	372+600	100	60.00	25.00	35.00
777	372+600	372+700	100	60.00	25.00	35.00

S. No.	Chainage Km		Length (m)	Total width of RoW	ROW width from median centerline (m)	
	From	To			LHS	RHS
778	372+700	372+800	100	59.00	24.00	35.00
779	372+800	372+900	100	62.00	24.00	38.00
780	372+900	373+000	100	63.00	25.00	38.00
781	373+000	373+100	100	62.00	24.00	38.00
782	373+100	373+200	100	63.00	25.00	38.00
783	373+200	373+300	100	62.00	24.00	38.00
784	373+300	373+400	100	68.00	26.00	42.00
785	373+400	373+500	100	69.00	27.00	42.00
786	373+500	373+600	100	68.00	27.00	41.00
787	373+600	373+700	100	71.00	34.00	37.00
788	373+700	373+800	100	70.00	30.00	40.00
789	373+800	373+900	100	70.00	36.00	34.00
790	373+900	374+000	100	64.00	28.00	36.00
791	374+000	374+100	100	63.00	27.00	36.00
792	374+100	374+200	100	60.00	27.00	33.00
793	374+200	374+300	100	52.00	25.00	27.00
794	374+300	374+400	100	52.00	24.00	28.00
795	374+400	374+500	100	53.00	25.00	28.00
796	374+500	374+600	100	52.00	24.00	28.00
797	374+600	374+700	100	53.00	25.00	28.00
798	374+700	374+800	100	62.00	24.00	38.00
799	374+800	374+900	100	61.00	24.00	37.00
800	374+900	375+000	100	52.50	25.50	27.00
801	375+000	375+100	100	52.75	25.50	27.25
802	375+100	375+200	100	52.75	25.50	27.25
803	375+200	375+300	100	52.75	25.50	27.25
804	375+300	375+400	100	52.75	25.50	27.25
805	375+400	375+500	100	55.75	28.50	27.25
806	375+500	375+600	100	54.25	27.00	27.25
807	375+600	375+700	100	52.50	25.50	27.00
808	375+700	375+800	100	51.00	24.00	27.00
809	375+800	375+900	100	50.50	24.00	26.50
810	375+900	376+000	100	45.50	23.50	22.00
811	376+000	376+100	100	52.00	30.00	22.00
812	376+100	376+200	100	51.70	30.00	21.70
813	376+200	376+300	100	56.95	29.25	27.70
814	376+300	376+400	100	51.20	29.20	22.00
815	376+400	376+500	100	52.10	29.60	22.50
816	376+500	376+600	100	52.70	29.20	23.50
817	376+600	376+700	100	47.80	24.30	23.50
818	376+700	376+800	100	50.90	27.40	23.50
819	376+800	376+900	100	55.90	27.40	28.50
820	376+900	377+000	100	55.90	27.40	28.50
821	377+000	377+100	100	83.00	28.50	54.50
822	377+100	377+200	100	81.00	27.00	54.00
823	377+200	377+300	100	54.50	27.00	27.50
824	377+300	377+400	100	54.00	27.00	27.00

S. No.	Chainage Km		Length (m)	Total width of RoW	ROW width from median centerline (m)	
	From	To			LHS	RHS
825	377+400	377+500	100	54.25	27.00	27.25
826	377+500	377+600	100	54.25	27.00	27.25
827	377+600	377+700	100	54.25	27.00	27.25
828	377+700	377+800	100	54.25	27.00	27.25
829	377+800	377+900	100	61.00	27.00	34.00
830	377+900	378+000	100	61.00	27.00	34.00
831	378+000	378+100	100	61.00	27.00	34.00
832	378+100	378+200	100	61.00	27.00	34.00
833	378+200	378+300	100	55.50	27.00	28.50
834	378+300	378+400	100	55.00	27.00	28.00
835	378+400	378+500	100	56.50	28.50	28.00
836	378+500	378+600	100	56.50	28.50	28.00
837	378+600	378+700	100	57.50	29.50	28.00
838	378+700	378+800	100	55.00	27.00	28.00
839	378+800	378+900	100	62.50	28.50	34.00
840	378+900	379+000	100	64.00	30.00	34.00
841	379+000	379+100	100	53.10	27.50	25.60
842	379+100	379+200	100	60.75	26.75	34.00
843	379+200	379+300	100	66.10	27.60	38.50
844	379+300	379+400	100	63.20	24.60	38.60
845	379+400	379+500	100	63.20	24.60	38.60
846	379+500	379+600	100	60.20	24.60	35.60
847	379+600	379+700	100	63.20	27.60	35.60
848	379+700	379+800	100	61.60	26.00	35.60
849	379+800	379+900	100	61.60	26.00	35.60
850	379+900	380+000	100	60.60	26.60	34.00
851	380+000	380+100	100	61.60	27.60	34.00
852	380+100	380+200	100	61.60	27.60	34.00
853	380+200	380+300	100	61.60	27.60	34.00
854	380+300	380+400	100	60.00	26.00	34.00
855	380+400	380+500	100	60.00	26.00	34.00
856	380+500	380+600	100	60.00	26.00	34.00
857	380+600	380+700	100	58.60	24.60	34.00
858	380+700	380+800	100	61.60	26.00	35.60
859	380+800	380+900	100	60.00	26.00	34.00
860	380+900	381+000	100	60.00	26.00	34.00
861	381+000	381+100	100	60.00	26.00	34.00
862	381+100	381+200	100	60.00	26.00	34.00
863	381+200	381+300	100	60.00	26.00	34.00
864	381+300	381+400	100	60.00	26.00	34.00
865	381+400	381+500	100	60.00	26.00	34.00
866	381+500	381+600	100	60.00	26.00	34.00
867	381+600	381+700	100	60.00	26.00	34.00
868	381+700	381+800	100	60.00	26.00	34.00
869	381+800	381+900	100	60.00	26.00	34.00
870	381+900	382+000	100	60.00	26.00	34.00
871	382+000	382+100	100	63.00	26.00	37.00

S. No.	Chainage Km		Length (m)	Total width of RoW	ROW width from median centerline (m)	
	From	To			LHS	RHS
872	382+100	382+200	100	60.00	23.00	37.00
873	382+200	382+300	100	60.00	23.00	37.00
874	382+300	382+400	100	60.00	23.00	37.00
875	382+400	382+500	100	57.00	23.00	34.00
876	382+500	382+600	100	54.50	23.00	31.50
877	382+600	382+700	100	79.60	24.60	55.00
878	382+700	382+800	100	79.60	24.60	55.00
879	382+800	382+900	100	81.00	26.00	55.00
880	382+900	383+000	100	80.00	26.00	54.00
881	383+000	383+100	100	90.00	36.00	54.00
882	383+100	383+200	100	70.80	36.80	34.00
883	383+200	383+300	100	70.80	36.80	34.00
884	383+300	383+400	100	70.80	36.80	34.00
885	383+400	383+500	100	64.70	30.70	34.00
886	383+500	383+600	100	63.25	29.25	34.00
887	383+600	383+700	100	60.00	26.00	34.00
888	383+700	383+800	100	60.00	26.00	34.00
889	383+800	383+900	100	61.60	26.00	35.60
890	383+900	384+000	100	61.00	26.00	35.00
891	384+000	384+100	100	86.10	38.30	47.80
892	384+100	384+200	100	86.10	38.30	47.80
893	384+200	384+300	100	72.43	24.63	47.80
894	384+300	384+400	100	72.40	24.60	47.80
895	384+400	384+500	100	59.60	24.60	35.00
896	384+500	384+600	100	60.20	24.60	35.60
897	384+600	384+700	100	59.60	24.00	35.60
898	384+700	384+800	100	59.60	24.00	35.60
899	384+800	384+900	100	59.60	24.00	35.60
900	384+900	385+000	100	59.60	24.00	35.60
901	385+000	385+100	100	61.60	24.60	37.00
902	385+100	385+200	100	61.60	24.60	37.00
903	385+200	385+300	100	61.60	24.60	37.00
904	385+300	385+400	100	61.60	24.60	37.00
905	385+400	385+500	100	60.20	24.60	35.60
906	385+500	385+600	100	60.20	24.60	35.60
907	385+600	385+700	100	60.20	24.60	35.60
908	385+700	385+800	100	63.20	24.60	38.60
909	385+800	385+900	100	63.20	24.60	38.60
910	385+900	386+000	100	63.20	24.60	38.60
911	386+000	386+100	100	63.20	24.60	38.60
912	386+100	386+200	100	61.60	23.00	38.60
913	386+200	386+300	100	62.60	24.00	38.60
914	386+300	386+400	100	63.20	24.60	38.60
915	386+400	386+500	100	63.20	24.60	38.60
916	386+500	386+600	100	61.60	24.60	37.00
917	386+600	386+700	100	60.20	24.60	35.60
918	386+700	386+800	100	60.20	24.60	35.60

S. No.	Chainage Km		Length (m)	Total width of RoW	ROW width from median centerline (m)	
	From	To			LHS	RHS
919	386+800	386+900	100	60.20	24.60	35.60
920	386+900	387+000	100	60.20	24.60	35.60
921	387+000	387+100	100	57.00	23.00	34.00
922	387+100	387+200	100	61.00	26.00	35.00
923	387+200	387+300	100	61.00	26.00	35.00
924	387+300	387+400	100	57.00	23.00	34.00
925	387+400	387+500	100	61.00	26.00	35.00
926	387+500	387+600	100	63.00	26.00	37.00
927	387+600	387+700	100	63.00	26.00	37.00
928	387+700	387+800	100	58.60	24.60	34.00
929	387+800	387+900	100	58.60	24.60	34.00
930	387+900	388+000	100	58.60	24.60	34.00
931	388+000	388+100	100	54.00	26.00	28.00
932	388+100	388+200	100	55.00	27.00	28.00
933	388+200	388+300	100	56.00	28.00	28.00
934	388+300	388+400	100	56.00	28.00	28.00
935	388+400	388+500	100	56.00	28.00	28.00
936	388+500	388+600	100	56.00	28.00	28.00
937	388+600	388+700	100	56.00	28.00	28.00
938	388+700	388+800	100	54.00	26.00	28.00
939	388+800	388+900	100	54.00	26.00	28.00
940	388+900	389+000	100	53.50	26.00	27.50
941	389+000	389+100	100	53.50	26.00	27.50
942	389+100	389+200	100	55.00	27.00	28.00
943	389+200	389+300	100	56.00	28.00	28.00
944	389+300	389+400	100	64.00	28.00	36.00
945	389+400	389+500	100	63.00	28.00	35.00
946	389+500	389+600	100	60.00	28.00	32.00
947	389+600	389+700	100	60.50	28.00	32.50
948	389+700	389+800	100	60.50	28.00	32.50
949	389+800	389+900	100	60.00	30.00	30.00
950	389+900	390+000	100	60.00	30.00	30.00
951	390+000	390+500	500	60.00	30.00	30.00
952	390+500	391+000	500	60.00	30.00	30.00
953	391+000	391+500	500	60.00	30.00	30.00
954	391+500	392+000	500	60.00	30.00	30.00
955	392+000	392+500	500	60.00	30.00	30.00
956	392+500	392+800	300	60.00	30.00	30.00
957	392+800	392+900	100	59.00	27.00	32.00
958	392+900	393+000	100	59.00	27.00	32.00
959	393+000	393+100	100	53.00	27.00	26.00
960	393+100	393+200	100	54.00	28.00	26.00
961	393+200	393+300	100	54.00	28.00	26.00
962	393+300	393+400	100	57.00	31.00	26.00
963	393+400	393+500	100	57.00	31.00	26.00
964	393+500	393+600	100	57.00	31.00	26.00
965	393+600	393+700	100	57.00	31.00	26.00

S. No.	Chainage Km		Length (m)	Total width of RoW	ROW width from median centerline (m)	
	From	To			LHS	RHS
966	393+700	393+800	100	57.00	31.00	26.00
967	393+800	393+900	100	57.00	31.00	26.00
968	393+900	394+000	100	57.00	31.00	26.00
969	394+000	394+100	100	57.00	31.00	26.00
970	394+100	394+200	100	57.00	31.00	26.00
971	394+200	394+300	100	57.20	31.20	26.00
972	394+300	394+400	100	58.00	32.00	26.00
973	394+400	394+500	100	58.00	32.00	26.00
974	394+500	394+600	100	57.00	31.00	26.00
975	394+600	394+700	100	57.00	31.00	26.00
976	394+700	394+800	100	56.00	30.00	26.00
977	394+800	394+900	100	57.00	30.00	27.00
978	394+900	395+000	100	59.50	33.00	26.50
979	395+000	395+100	100	58.50	32.00	26.50
980	395+100	395+200	100	58.00	32.00	26.00
981	395+200	395+300	100	58.00	32.00	26.00
982	395+300	395+400	100	67.00	31.00	36.00
983	395+400	395+500	100	67.00	31.00	36.00
984	395+500	395+600	100	67.00	31.00	36.00
985	395+600	395+700	100	57.00	31.00	26.00
986	395+700	395+800	100	56.00	30.00	26.00
987	395+800	395+900	100	56.00	30.00	26.00
988	395+900	396+000	100	56.00	30.00	26.00
989	396+000	396+100	100	55.00	29.00	26.00
990	396+100	396+200	100	56.00	30.00	26.00
991	396+200	396+300	100	56.00	30.00	26.00
992	396+300	396+400	100	53.00	27.00	26.00
993	396+400	396+500	100	52.00	26.00	26.00
994	396+500	396+600	100	52.00	26.00	26.00
995	396+600	396+700	100	54.00	28.00	26.00
996	396+700	396+800	100	53.00	26.00	27.00
997	396+800	396+900	100	56.00	29.00	27.00
998	396+900	397+000	100	53.00	26.00	27.00
999	397+000	397+100	100	55.00	27.00	28.00
1000	397+100	397+200	100	53.00	27.00	26.00
1001	397+200	397+300	100	55.00	27.00	28.00
1002	397+300	397+400	100	57.00	29.00	28.00
1003	397+400	397+500	100	55.00	28.00	27.00
1004	397+500	397+700	200	54.00	26.00	28.00
1005	397+700	397+900	200	62.00	30.00	32.00
1006	397+900	398+700	800	84.00	40.00	44.00
1007	398+700	400+632	1932	56.50	29.50	27.00
Total			**80522**			

2.4.4 Carriageway

Generally, the existing carriageway is of four lane divided standards. The carriageway width slightly varies at merging and diverging at junctions, median openings, at approaches to

structures and on structures. It may be noted that details of carriageway on structures shall be referred from Structures Inventory section of this chapter. Details of carriageway along the Project Stretch as given in **Table 2.8.**

Table 2.8: Details of Existing Carriageway

Chainage		Length	LHS		Median	RHS	
From	To		Earthen shoulder (m)	Full Carriageway width		Full Carriageway width	Earthen shoulder (m)
Section-1 from Km 320+810 to Km 326+000 (Retained 4 Lane)							
320+810	321+000	190	2.00	8.75	4.00	8.75	2.00
321+000	321+500	500	2.00	8.50	4.00 to 3.50	8.50	2.00
321+500	322+000	500	2.00	8.50	3.50 to 1.80	8.25	2.00
322+000	322+500	500	-	8.50	1.80	8.25	-
322+500	323+000	500	-	8.50	1.80 to 1.50	8.25	-
323+000	323+500	500	-	8.50	1.50	8.25	-
323+500	324+000	500	-	8.75	1.50	8.25	-
324+000	324+500	500	2.00	8.75	1.50 to 1.80	8.25	2.00
324+500	325+000	500	2.00	8.50	1.80	8.50	2.00
325+000	325+700	700	2.00	8.25	1.80 to 1.50	8.25	2.00
325+700	326+000	300	2.00	8.50	1.50 to 4.00	8.50	2.00
Section-2 from Km 326+000 to Km 361+000 (Ex. Km 360+300) (6 Lane)							
326+000	326+260	260	2.00	12.50	4.00	12.50	2.00
326+260	326+415	155	2.00	12.50	4.00	12.50 to 19.30	2.00
326+415	326+575	160	2.00	12.50	4.00 to 1.80	8.50+7.00	2.00
326+575	326+703	128	2.00	12.50	1.80 to 4.00	20.50 to 12.50	2.00
326+703	327+000	297	2.00	12.50	4.00	12.50	2.00
327+000	327+500	500	2.00	12.50	4.00	12.50	2.00
327+500	328+000	500	2.00	12.50	4.00	12.50	2.00
328+000	328+288	288	2.00	12.50	4.00	12.50	2.00
328+288	328+430	142	2.00	12.50	4.00 to 2.10	12.25 to 20.00	2.00
328+430	328+700	270	2.00	12.50	2.10 to 3.30	8.50+9.00	2.00
328+700	328+950	250	-	12.50	3.30 to 1.80	8.50+9.00	-
328+950	329+500	550	2.00	12.50	1.80 to 2.50	8.50+9.00	2.00
329+500	330+000	500	2.00	12.50	2.50 to 2.00	8.50+9.00	2.00
330+000	330+305	305	2.00	12.50	2.00 to 4.20	8.50+8.50	2.00
330+305	330+425	120	2.00	12.50	4.20 to 4.50	18.00 to 12.50	2.00
330+425	330+500	75	2.00	12.50	4.50	12.50	2.00
330+500	331+000	500	2.00	12.50	4.50	12.50	2.00
331+000	331+500	500	-	13.00	4.50	13.00	-
331+500	332+000	500	-	13.00	4.50	13.00	-
332+000	332+500	500	-	12.50	4.50	12.50	-
332+500	333+000	500	-	12.50	4.50	12.50	-
333+000	333+500	500	-	12.50	4.50	12.50	-
333+500	334+000	500	2.00	12.50	4.50	12.50	2.00
334+000	334+500	500	2.00	12.50	4.50	12.50	2.00
334+500	335+000	500	2.00	12.50	4.50	12.50	2.00
335+000	335+300	300	2.00	12.50	4.50 to 5.30	12.50	2.00
335+300	336+000	700	2.00	12.50	5.30 to 4.70	12.50	2.00
336+000	336+500	500	-	12.50	4.70 to 4.50	12.50	-
336+500	337+000	500	-	12.75	4.50	12.75	-
337+000	337+500	500	-	12.75	4.50	12.75	-
337+500	338+000	500	-	12.75	4.50	12.75	-

Chainage		Length	LHS		Median	RHS	
From	To		Earthen shoulder (m)	Full Carriageway width		Full Carriageway width	Earthen shoulder (m)
338+000	338+500	500	-	12.75	4.50 to 4.00	12.75	-
338+500	339+000	500	-	12.50	4.00	12.50	-
339+000	339+500	500	-	12.50	4.00 to 2.50	12.50	-
339+500	340+000	500	-	12.75	2.50 to 2.00	12.75	-
340+000	340+500	500	-	12.75	2.00 to 4.00	12.75	-
340+500	341+000	500	-	12.50	4.00	12.50	-
341+000	341+500	500	2.00	12.50	4.00	12.50	2.00
341+500	342+000	500	2.00	12.50	4.00	12.50	2.00
342+000	342+500	500	2.00	12.50	4.00	12.50	2.00
342+500	343+000	500	2.00	12.50	4.00	12.50	2.00
343+000	343+460	460	2.00	13.50	4.00	13.50	2.00
343+460	343+530	70	2.00	13.50 to 19.00	4.00	13.50 to 19.00	2.00
343+530	343+962	432	2.00	8.75+8.75	4.00	8.75+9.0	2.00
343+962	344+033	71	2.00	19.00 to 13.50	4.00	19.00 to 13.50	2.00
344+033	344+500	467	-	12.75	4.00 to 2.00	12.75	-
344+500	345+000	500	-	12.75	2.00 to 3.50	12.75	-
345+000	345+500	500	-	12.75	3.50 to 4.00	12.75	-
345+500	346+000	500	-	13.00	4.00	13.00	-
346+000	346+460	460	2.00	12.50	4.00 to 0.90	12.50	2.00
346+460	346+930	470	-	12.50	0.90 NJB	12.50	-
346+930	347+500	570	2.00	12.50	0.90 to 4.00	12.50	2.00
347+500	348+000	500	-	12.50	4.00	12.50	-
348+000	348+130	130	2.00	12.50	4.00	14.00	2.00
348+130	348+290	160	2.00	12.50	4.00 to 2.10	14.00 to 21.00	2.00
348+290	348+500	210	2.00	12.50	2.10 to 1.80	8.50+8.50	2.00
348+500	348+900	400	2.00	12.50	1.80	7.00+8.50	2.00
348+900	349+000	100	2.00	12.50	1.80 to 2.10	20.00 to 16.00	2.00
349+000	349+255	255	2.00	12.50	2.10 to 4.00	16.00 to 12.50	2.00
349+255	349+500	245	-	12.50	4.00	12.50	-
349+500	349+950	450	2.00	12.50	4.00	12.00 to 14.50	2.00
349+950	350+070	120	2.00	12.50	4.00 to 2.60	14.50 to 20.50	2.00
350+070	350+155	85	2.00	12.50	2.60 to 5.90	7.00+7.00	2.00
350+155	350+220	65	-	12.50	5.90	7.00+7.00	-
350+220	350+500	280	2.00	12.75	5.90 to 2.00	20.50 to 12.75	2.00
350+500	351+000	500	-	12.75	2.00 to 4.00	12.75	-
351+000	351+510	510	-	12.50	4.00 to 4.50	12.50	-
351+510	352+665	1155	TOLL Plaza				
352+665	353+000	335	-	12.50	4.00	12.50	-
353+000	353+500	500	-	12.50	4.00	12.50	-
353+500	353+775	275	-	12.50	4.00	12.50	-
353+775	353+815	40	-	12.50	4.00 to 1.30	12.50	-
353+815	353+930	115		12.50	1.30	12.50	
353+930	354+100	170	-	12.50	1.30 to 4.00	12.50	-
354+100	354+500	400	-	12.50	4.00 to 4.50	12.50	-
354+500	354+900	400	-	13.00	4.50 to 4.00	13.00	-
354+900	355+500	600	-	13.00	4.00	13.00	-
355+500	355+800	300	-	13.00	4.00 to 3.75	13.00	-
355+800	356+500	700	-	14.00	3.75	13.00	-
356+500	357+000	500	-	14.50	3.75	13.50	-

Chainage		Length	LHS		Median	RHS	
From	To		Earthen shoulder (m)	Full Carriageway width		Full Carriageway width	Earthen shoulder (m)
357+000	357+100	100	-	14.50	3.75 to 4.00	13.50	-
357+100	357+380	280	-	14.50	4.00	13.50	-
357+380	357+600	220	-	12.50	4.00 to 1.10	12.50	-
357+600	357+675	75	-	12.50	1.10	12.50	-
357+675	357+800	125	-	12.50	1.10 to 4.00	12.50	-
357+800	358+025	225	2.00	16.0 to 19.5	4.00	16.0 to 19.5	2.00
358+025	358+075	50	2.00	9.00+9.00	4.00	9.0+8.5	2.00
358+075	358+190	115	Major Bridge				
358+190	358+760	570	-	8.50+9.00	4.00 to 3.20	8.5+9.0	-
358+760	358+880	120	ROB				
358+880	358+980	100	-	8.50+9.00	3.20	8.5+9.0	-
358+980	359+080	100	-	20.50 to 12.50	3.20 to 2.00	20.50 to 12.50	-
359+080	359+500	420	-	12.50	2.00	12.50	-
359+500	360+000	500	-	12.50	2.00	12.50	-
360+000	360+280	280	-	12.50	2.00	12.50	-
360+280	360+340	60	2.00	12.50	2.00 to 4.00	12.50	2.00
360+340	360+420	80	2.00	12.50 to 20.50	4.00	12.50 to 18.80	2.00
360+420	360+860	440	2.00	9.00+7.00	4.00	8.50+8.50	2.00
360+860	360+950	90	2.00	18.50 to 12.50	4.00	18.50 to 12.50	2.00
360+950	361+000	50	2.00	12.50	4.00	12.50	2.00
Section-3 from Km 360+300 to Km 400+632 (Ex. Km 400+132) (6 Lane)							
360+300	360+500	200	2.00	12.50	4.00	12.50	2.00
360+500	361+000	500	-	13.00	4.00	13.00	-
361+000	361+500	500	-	13.00	4.00	13.00	-
361+500	362+000	500	-	13.00	4.00	13.00	-
362+000	362+500	500	-	12.50	4.00 to 4.20	12.50	-
362+500	363+000	500	-	12.50	4.20	12.50	-
363+000	363+580	580	-	12.50	4.20 to 4.00	12.50	-
363+580	363+700	120	2.00	12.50 to 17.75	4.00	12.50 to 17.75	2.00
363+700	364+080	380	2.00	8.50+8.50	4.00	8.50+8.50	2.00
364+080	364+220	140	2.00	19.00 to 12.50	4.00	17.00 to 13.00	2.00
364+220	364+500	280	2.00	13.00	4.00	13.00	2.00
364+500	365+000	500	-	12.75	4.00	12.75	-
365+000	365+500	500	-	12.50	4.00	12.50	-
365+500	366+000	500	2.00	12.50	4.00	12.50	2.00
366+000	366+270	270	2.00	12.50	4.00	13.00	2.00
366+270	366+385	115	2.00	12.50 to 18.00	4.00	13.00 to 18.00	2.00
366+385	366+750	365	2.00	8.50+8.50	4.00	8.50+7.00	2.00
366+750	366+900	150	2.00	19.50 to 12.50	4.00	19.50 to 12.50	2.00
366+900	367+000	100	2.00	12.50	4.00	12.50	2.00
367+000	367+500	500	-	13.00	4.00	13.00	-
367+500	368+000	500	-	12.75	4.00	12.75	-
368+000	368+500	500	-	12.50	4.00 to 4.20	12.50	-
368+500	369+000	500	-	12.75	4.20	12.75	-
369+000	369+230	230	-	12.50	4.20 to 3.80	12.50	2.00
369+230	369+380	150	-	12.50 to 18.00	3.80	13.00 to 18.75	2.00
369+380	369+735	355	-	8.00+8.50	3.80	8.50+8.00	2.00
369+735	369+860	125	2.00	18.50 to 13.00	3.80	18.50 to 14.00	2.00
369+860	370+100	240	-	12.50	3.80 to 4.50	12.50	-

Chainage		Length	LHS		Median	RHS	
From	To		Earthen shoulder (m)	Full Carriageway width		Full Carriageway width	Earthen shoulder (m)
370+100	370+600	500	-	12.50	4.50 to 4.00	12.50	-
370+600	371+000	400	-	12.50	4.00 to 3.80	12.50	-
371+000	371+350	350	2.00	12.50	3.80	12.50	2.00
371+350	371+450	100	2.00	12.50 to 18.00	3.80	13.00 to 19.00	2.00
371+450	371+780	330	2.00	8.00+8.50	3.80 to 4.00	8.00+8.50	2.00
371+780	371+900	120	2.00	19.00 to 12.50	4.00	19.00 to 12.50	2.00
371+900	372+010	110	2.00	12.50	4.00	12.50	2.00
372+010	372+500	490	-	13.00	4.00	13.00	-
372+500	373+000	500	2.00	12.50	4.00	12.50	2.00
373+000	373+190	190	2.00	12.50	4.00	12.50	2.00
373+190	373+450	260	2.00	12.50	4.00 to 3.00	12.50 to 20.50	2.00
373+450	373+680	230	2.00	12.50	3.00 to 7.00	8.50+8.50	2.00
373+680	373+900	220	-	13.00	7.00 to 4.50	23.00 to 13.75	-
373+900	374+000	100	-	12.75	4.50	12.75	-
374+000	374+500	500	-	12.50	4.50	12.75	-
374+500	375+000	500	-	12.50	4.50 to 4.00	12.75	-
375+000	375+500	500	-	12.75	4.00	12.75	-
375+500	375+800	300	-	12.50	4.00 to 1.30	12.50	-
375+800	376+000	200	-	12.50	1.30 to 2.50	12.50	-
376+000	376+100	100	-	12.75	2.50 to 1.80	13.00	-
376+100	376+700	600	-	12.75	1.80	13.00	-
376+700	377+000	300	-	13.00	1.80 to 4.00	12.75	-
377+000	377+590	590	-	13.00	4.00	12.75	-
377+590	377+800	210	-	12.75	4.00 to 1.30	12.75	-
377+800	378+500	700	-	13.00	1.30 to 4.00	13.00	-
378+500	379+000	500	2.00	12.50	4.00	12.50	2.00
379+000	379+420	420	2.00	12.50	4.00	12.50	2.00
379+420	379+600	180	2.00	12.50	4.00 to 4.50	12.50 to 21.00	2.00
379+600	380+100	500	2.00	12.50	4.50 to 5.50	8.75+8.75	2.00
380+100	380+500	400	2.00	12.50	5.50 to 6.00	8.75+8.75	2.00
380+500	381+000	500	2.00	12.50	6.00 to 5.00	8.50+8.75	2.00
381+000	381+500	500	2.00	12.50	5.50	8.50+8.75	2.00
381+500	381+840	340	2.00	12.50	5.50 to 5.00	8.50+8.75	2.00
381+840	382+040	200	2.00	12.50	5.00 to 4.50	19.00 to 12.50	2.00
382+040	382+400	360	2.00	12.50	4.50 to 4.00	12.50	2.00
382+400	383+000	600	-	13.00	4.00 to 3.80	13.25	-
383+000	383+400	400	2.00	12.50	3.80 to 4.50	12.50	2.00
383+400	384+000	600	-	12.50	4.50	12.50	-
384+000	384+500	500	-	12.50	4.50	12.50	-
384+500	385+000	500	-	12.50	4.50	12.50	-
385+000	385+500	500	2.00	12.50	4.50 to 4.00	12.50	2.00
385+500	385+700	200	2.00	12.50	4.00 to 3.80	12.50	2.00
385+700	386+000	300	2.00	12.50	3.80	12.50	2.00
386+000	386+500	500	-	13.00	3.80	13.25	-
386+500	387+000	500	-	13.00	3.80	13.25	-
387+000	387+500	500	2.00	12.50	3.80 to 1.50	13.00	2.00
387+500	388+000	500	2.00	12.50	1.50 to 3.80	13.00	2.00
388+000	388+500	500	-	13.00	3.80	13.25	-
388+500	389+000	500	-	13.25	3.80	13.25	-

Chainage		Length	LHS		Median	RHS	
From	To		Earthen shoulder (m)	Full Carriageway width		Full Carriageway width	Earthen shoulder (m)
389+000	389+500	500	-	13.25	3.80 to 4.00	13.25	-
389+500	390+000	500	-	12.50	4.00 to 2.50	12.50	-
390+000	390+500	500	-	12.50	2.50	12.50	-
390+500	391+000	500	-	13.00	2.50	13.00	-
391+000	391+500	500	-	12.50	2.50	12.50	-
391+500	392+000	500	-	12.50	2.50	12.50	-
392+000	392+500	500	-	13.00	2.50	13.00	-
392+500	393+000	500	-	13.00	2.50 to 4.00	13.00	-
393+000	393+500	500	-	13.00	4.00	13.00	-
393+500	394+000	500	-	13.00	4.00	13.00	-
394+000	394+500	500	-	13.25	4.00	13.25	-
394+500	395+000	500	-	13.00	4.00 to 4.50	13.00	-
395+000	395+500	500	-	12.50	4.50	12.50	-
395+500	396+000	500	-	12.50	4.50	12.50	-
396+000	396+500	500	-	12.50	4.50 to 4.00	12.50	-
396+500	397+000	500	-	13.00	4.00	13.00	-
397+000	397+500	500	-	13.00	4.00	13.00	-
397+500	397+990	490	-	13.00	4.00	13.00	-
397+990	398+140	150	-	13.00 to 20.25	4.00	13.00 to 19.00	-
398+140	398+480	340	-	8.50+8.75	4.00	8.75+8.75	-
398+480	398+640	160	-	19.75 to 13.25	4.00	19.50 to 13.00	-
398+640	399+000	360	-	13.25	4.00	13.00	-
399+000	399+500	500	-	12.75	4.00 to 4.50	13.00	-
399+500	400+000	500	-	13.00	4.50 to 2.00	13.00	-
400+000	400+632	632	-	13.00	2.00 to 4.50	13.50	-

Note: Carriageway widths and median widths varies at approaches of structure, toll plaza, median opening, junctions etc. locations.

2.4.5 Service /Slip Road

It may be noted that, there are Service Road as well as Slip Roads along the project stretch. The details of Service/Slip Roads as given in **Table 2.9.**

Table 2.9: Service / Slip Road

S. No.	New Chainage (km)		Length (m)	Side	Width (m)	Pavement Type
	From	To				
Section-1 From Km 320+810 to Km 326+000 (4 Lane Retained)						
NIL						
Section-2 from Km 326+000 to Km 361+000 (Ex. Km 360+300) (6 Lane)						
1	331+070	331+920	850	LHS	7.00	Rigid
2	331+070	331+920	850	RHS	7.00	Rigid
3	331+920	333+215	1295	LHS	5.50	Rigid
4	331+920	333+190	1270	RHS	5.50	Rigid
5	336+160	336+880	720	LHS	5.50	Rigid
6	336+400	336+880	480	RHS	5.50	Rigid
7	336+880	340+730	3850	LHS	7.00	Rigid
8	336+880	340+730	3850	RHS	7.00	Rigid

S. No.	New Chainage (km)		Length (m)	Side	Width (m)	Pavement Type
	From	To				
9	344+215	345+880	1665	LHS	7.00	Rigid
10	344+215	344+487	272	RHS	7.00	Rigid
11	344+487	344+807	320	RHS	5.50	Rigid
12	344+807	345+880	1073	RHS	7.00	Rigid
13	346+460	346+930	470	LHS	5.50	Rigid
14	346+460	346+930	470	RHS	5.50	Rigid
15	347+550	347+880	330	LHS	7.00	Rigid
16	347+550	347+880	330	RHS	7.00	Rigid
17	349+260	349+380	120	LHS	7.00	Rigid
18	349+260	349+380	120	RHS	7.00	Rigid
19	350+855	351+275	420	LHS	7.00	Rigid
20	350+855	351+275	420	RHS	7.00	Rigid
21	352+960	357+790	4830	LHS	7.00	Rigid
22	352+960	357+790	4830	RHS	7.00	Rigid
23	359+255	360+130	875	LHS	9.00	Rigid
24	359+255	360+130	875	RHS	9.00	Rigid
Section-3 from Km 360+300 to Km 400+632 (Ex. Km 400+132) (6 Lane)						
25	360+620	360+785	165	LHS	9.00	Rigid
26	360+825	362+540	1715	LHS	9.00	Rigid
27	362+540	362+690	150	LHS	5.50	Rigid
28	362+690	363+350	660	LHS	9.00	Rigid
29	360+620	361+655	1035	RHS	9.00	Rigid
30	361+730	363+350	1620	RHS	9.00	Rigid
31	364+495	365+255	760	LHS	7.00	Rigid
32	364+495	365+255	760	RHS	7.00	Rigid
33	367+330	368+795	1465	LHS	7.00	Rigid
34	368+795	368+930	135	LHS	5.50	Rigid
35	367+330	368+950	1620	RHS	7.00	Rigid
36	369+975	370+860	885	LHS	7.00	Rigid
37	369+975	370+860	885	RHS	7.00	Rigid
38	372+250	372+400	150	LHS	5.50	Rigid
39	372+250	372+400	150	RHS	7.00	Rigid
40	373+745	375+890	2145	LHS	7.00	Rigid
41	375+890	376+895	1005	LHS	5.50	Rigid
42	376+895	378+705	1810	LHS	7.00	Rigid
43	373+745	375+800	2055	RHS	7.00	Rigid
44	375+800	375+925	125	RHS	5.50	Rigid
45	375+950	376+250	300	RHS	5.50	Rigid
46	376+250	377+563	1313	RHS	7.00	Rigid
47	377+570	378+705	1135	RHS	7.00	Rigid
48	382+400	383+000	600	LHS	7.00	Rigid
49	382+400	383+000	600	RHS	7.00	Rigid
50	383+610	385+130	1520	LHS	7.00	Rigid
51	383+610	385+110	1500	RHS	7.00	Rigid
52	386+210	386+950	740	LHS	7.00	Rigid
53	386+210	386+950	740	RHS	7.00	Rigid
54	388+060	389+770	1710	LHS	7.00	Rigid
55	389+770	392+780	3010	LHS	5.50	Rigid

S. No.	New Chainage (km)		Length (m)	Side	Width (m)	Pavement Type
	From	To				
56	392+780	400+370	7590	LHS	7.00	Rigid
57	388+060	389+770	1710	RHS	7.00	Rigid
58	389+770	392+780	3010	RHS	5.50	Rigid
59	392+780	398+977	6197	RHS	7.00	Rigid
60	399+097	400+380	1283	RHS	7.00	Rigid
Total			**82838**			

2.4.6 Junctions

There is total 11 major junctions and 154 minor junctions exist along the project stretch. Details of all junctions are provided below.

Table 2.10: At Grade Major Junction Along the Project Highway

S. No.	Chainage Km	Type of Junction	Side	Access Road Leads to	
				LHS	RHS
Section-1 from Km 320+810 to Km 326+000 (Retained 4 Lane)					
NIL					
Section-2 from Km 326+000 to Km 361+000 (Ex. Km 360+300) (6 Lane)					
1	353+950	Y	LHS	Jamtara	-
Section-3 from Km 360+300 to Km 400+632 (Ex. Km 400+132) (6 Lane)					
2	375+850	T	RHS	-	Bokaro City

At Grade Junction at Ch. 353+950 LHS

At Grade Junction at Ch. 375+850 RHS

Table 2.10 (A): Grade Separated Major Junction Along the Project Highway

S.No.	Chainage Km	Type of Junction	Side	Access Road Leads to	
				LHS	RHS
Section-1 from Km 320+810 to Km 326+000 (Retained 4 Lane)					
NIL					
Section-2 from Km 326+000 to Km 361+000 (Ex. Km 360+300) (6 Lane)					
1	332+150	Y	LHS	Bagodar	-
2	333+250	+	BHS	Bagodar	Hazaribagh
3	336+420	Y	LHS	Bagodar	-
4	353+950	Y	LHS	Jamtara	-
5	355+900	+	BHS	Giridih	Bermo

S.No.	Chainage Km	Type of Junction	Side	Access Road Leads to	
				LHS	RHS
6	359+050	Y	LHS	Jamtara	-
Section-3 from Km 360+300 to Km 400+632 (Ex. Km 400+132) (6 Lane)					
7	390+180	Y	LHS	Rajganj	-
8	390+970	+	BHS	Rajganj	Jamshedpur
9	392+520	Y	LHS	Rajganj	-

At Grade Separated Junction at Ch. 355+900 BHS

At Grade Separated Junction at Ch. 390+970 BHS

Table 2.11: At Grade Minor Junction Along the Project Highway

S. No.	Chainage Km	Type of Junction	Side	Access Road Leads to		Remarks
				LHS	RHS	Junction at MCW/ Service Road / Slip Road
Section-1 from Km 320+810 to Km 326+000 (Retained 4 Lane)						
1	323+190	T	LHS	Mundro	-	MCW
2	323+210	T	RHS	-	Atka	MCW
3	323+530	T	RHS	-	Atka	MCW
4	324+050	T	LHS	School	-	MCW
5	324+140	T	RHS	-	Atka	MCW
6	324+450	T	LHS	Gram Panchayat	-	MCW
Section-2 from Km 326+000 to Km 361+000 (Ex. Km 360+300) (6 Lane)						
7	328+210	Y	LHS	Forest Department	-	MCW
8	329+010	T	RHS	-	Gainra	MCW
9	329+775	Y	LHS	Forest Department	-	MCW
10	330+030	T	LHS	Village Road	-	MCW
11	330+120	+	Both	Mahuri	Gaira	MCW
12	330+160	T	RHS	-	Dongo	MCW
13	331+300	T	LHS	Jarmune	-	Service Road
14	331+900	T	RHS	-	School	Service Road
15	331+910	T	LHS	Jarmune	-	Service Road
16	336+960	T	RHS	-	Village Road	Service Road
17	337+530	T	LHS	College	-	Service Road
18	337+780	T	LHS	Ghaghra	-	Service Road
19	338+240	X	BHS	Hesla	Village Road	Under VUP

S. No.	Chainage Km	Type of Junction	Side	Access Road Leads to		Remarks
				LHS	RHS	Junction at MCW/ Service Road / Slip Road
20	339+800	T	LHS	School	-	Service Road
21	340+120	T	LHS	Village Road	-	Service Road
22	340+200	T	LHS	Jamuniya	-	Service Road
23	340+670	T	LHS	Pathaldiha	-	Service Road
24	340+750	T	RHS	-	Tirla	Service Road
25	341+370	T	RHS	-	School	MCW
26	342+280	T	LHS	Pathaldiha	-	MCW
27	343+170	T	LHS	Pathaldiha	-	MCW
28	343+430	T	RHS	-	Tirla	MCW
29	343+650	T	LHS	Pathaldiha	-	MCW
30	344+080	Y	RHS	-	Kharkharo	MCW
31	344+280	T	LHS	Dama	-	Service Road
32	345+350	T	LHS	Ghuttibari	-	Service Road
33	346+120	+	BHS	Ghuttibari	Pochri	MCW
34	347+730	T	LHS	Ghuttibari	-	Service Road
35	348+520	T	RHS	-	Pokharia	MCW
36	349+030	T	LHS	Ghuttibari	-	MCW
37	349+540	T	RHS	-	Kenduatan	MCW
38	350+430	T	LHS	Chino	-	MCW
39	350+690	T	RHS	-	Kulgo	MCW
40	350+840	T	LHS	Chino	-	MCW
41	351+200	T	LHS	Chino	-	Service Road
42	351+820	Y	LHS	Village Road	-	MCW
43	353+250	T	RHS	-	Tambagurio	Service Road
44	353+330	T	LHS	Dumri	-	Service Road
45	353+890	+	BHS	Dumri	Village Road	Service Road
46	354+360	Y	RHS	-	Village Road	Service Road
47	359+190	T	RHS	-	Rangamati	MCW
48	359+210	Y	LHS	Baramasia	-	MCW
49	359+310	T	LHS	Baramasia	-	Service Road
50	360+010	T	LHS	Village Road	-	Service Road
51	360+510	T	LHS	Teliatura	-	MCW
Section-3 from Km 360+300 to Km 400+632 (Ex. Km 400+132) (6 Lane)						
52	360+340	T	LHS	Rangamati	-	MCW
53	360+370	T	RHS	-	Village Road	MCW
54	360+970	T	RHS	-	Village Road	Service Road
55	361+040	T	RHS	-	Village Road	Service Road
56	361+120	T	RHS	-	Police Station	Service Road
57	361+410	T	RHS	-	Village Road	Service Road
58	361+550	T	RHS	-	Village Road	Service Road
59	361+590	T	LHS	Village Road	-	Service Road
60	362+470	T	RHS	-	Balutunda road	Service Road
61	362+900	T	RHS	-	Village Road	Service Road
62	363+480	T	RHS	-	Village Road	MCW
63	363+500	T	LHS	Village Road	-	MCW
64	364+380	T	RHS	-	Village Road	MCW

S. No.	Chainage Km	Type of Junction	Side	Access Road Leads to		Remarks
				LHS	RHS	Junction at MCW/ Service Road / Slip Road
65	364+600	T	LHS	Village Road	-	Service Road
66	365+140	T	RHS	-	Village Road	Service Road
67	365+680	T	RHS	-	Village Road	MCW
68	365+860	T	RHS	-	Village Road	MCW
69	366+730	T	RHS	-	Village Road	MCW
70	366+910	T	RHS	-	Village Road	MCW
71	367+050	T	RHS	-	Village Road	MCW
72	367+620	T	RHS	-	Barwadih	Service Road
73	368+100	T	RHS	-	Thakurchak	Service Road
74	368+930	T	LHS	Village Road	-	Service Road
75	369+180	T	RHS	-	Thakurchak	MCW
76	369+500	T	LHS	Karmatanr	-	MCW
77	369+910	T	RHS	-	Singhdih	MCW
78	370+620	T	RHS	-	Korkota	Service Road
79	370+750	+	Both	Kalyanpur	Lakshmipur	Service Road
80	370+860	T	LHS	Village Road	-	Service Road
81	371+920	T	LHS	Chinpur	-	MCW
82	372+150	T	RHS	-	Village Road	MCW
83	372+550	T	RHS	-	Village Road	MCW
84	372+580	T	LHS	Village Road	-	MCW
85	373+250	T	LHS	Village Road	-	MCW
86	373+720	T	LHS	Village Road	-	MCW
87	374+770	T	RHS	-	Narkopi	Service Road
88	375+660	T	RHS	-	Village Road	Service Road
89	376+510	T	LHS	Village Road	-	Service Road
90	376+925	T	RHS	-	-	Service Road
91	377+220	T	LHS	Madhukata	-	Service Road
92	377+465	T	LHS	Village Road	-	Service Road
93	377+720	Y	RHS	-	Gopalpur	Service Road
94	377+760	T	LHS	Madhukata	-	Service Road
95	378+240	T	LHS	Village Road	-	Service Road
96	378+370	T	LHS	Village Road	-	Service Road
97	379+060	T	RHS	-	Village Road	MCW
98	379+160	T	LHS	Khamardih	-	MCW
99	380+290	T	LHS	Madaidih	-	MCW
100	380+360	T	LHS	Madaidih	-	MCW
101	381+450	X	Both	Kamta	Sirampur	MCW
102	382+330	T	RHS	-	Kabirdih	MCW
103	382+390	T	RHS	-	Village Road	MCW
104	382+520	T	RHS	-	Village Road	Service Road
105	382+940	+	Both	Lokbad road	Kandedih	Service Road
106	383+180	T	RHS	-	Kandedih	Service Road
107	383+480	T	LHS	Lokbad road	-	Service Road
108	384+620	T	RHS	-	Village Road	Service Road
109	385+520	T	LHS	Village Road	-	MCW
110	385+590	T	LHS	Lachhmanpur	-	MCW

S. No.	Chainage Km	Type of Junction	Side	Access Road Leads to		Remarks
				LHS	RHS	Junction at MCW/ Service Road / Slip Road
111	385+610	T	RHS	-	Sidhabad	MCW
112	386+280	Y	LHS	Lachhmanpur	-	MCW
113	386+830	T	RHS	-	Dayabanspahar	MCW
114	387+110	T	LHS	-	-	MCW
115	387+580	T	LHS	Village Road	-	MCW
116	387+700	Y	RHS	-	Village Road	MCW
117	387+930	+	Both	Jarmunai	Bardar	MCW
118	388+090	T	LHS	Jarmunai	-	Service Road
119	388+110	T	RHS	-	Village Road	Service Road
120	388+530	X	Both	Village Road	Maheshpur	Service Road
121	388+770	Y	LHS	Village Road	-	Service Road
122	389+310	Y	RHS	-	Village Road	Service Road
123	389+520	T	LHS	Village Road	-	Service Road
124	389+730	T	LHS	School	-	Service Road
125	389+910	T	LHS	Village Road	-	Service Road
126	390+050	T	RHS	-	Village Road	Service Road
127	391+710	T	RHS	-	Village Road	Service Road
128	392+140	T	RHS	-	Village Road	Service Road
129	392+160	T	LHS	Rajganj	-	Service Road
130	392+790	T	Both	Village Road	Village Road	Service Road
131	393+460	T	LHS	Giridih	-	Service Road
132	394+460	T	LHS	Village Road	-	Service Road
133	395+230	T	RHS	-	Village Road	Service Road
134	395+800	T	LHS	Village Road	-	Service Road
135	396+000	T	LHS	Village Road	-	Service Road
136	396+380	T	RHS	-	Village Road	Service Road
137	396+650	T	LHS	Village Road	-	Service Road
138	397+060	T	RHS	-	Village Road	Service Road
139	397+650	T	RHS	-	Udaypur	Service Road
140	398+225	T	RHS	-	Village Road	Service Road
141	398+725	T	RHS	-	Village Road	Service Road
142	398+780	T	LHS	Village Road	-	Service Road
143	399+210	T	LHS	Village Road	-	Service Road
144	399+490	T	RHS	-	Village Road	Service Road
145	399+950	T	LHS	Street road	-	Service Road
146	400+010	T	LHS	Street road	-	Service Road

At Grade Junction at Ch. 349+030 LHS

At Grade Junction at Ch. 379+160 LHS

Table 2.11 (A): Grade Separated Minor Junction Along the Project Highway

S. No.	Chainage Km	Type of Junction	Side	Access Road Leads to	
				LHS	RHS
Section-1 from Km 320+810 to Km 326+000 (Retained 4 Lane)					
NIL					
Section-2 from Km 326+000 to Km 361+000 (Ex. Km 360+300) (6 Lane)					
1	346+810	T	LHS	Ghuttibari	-
2	354+420	Y	LHS	Jamtara	-
3	359+590	T	RHS	-	Rangamati
Section-3 from Km 360+300 to Km 400+632 (Ex. Km 400+132) (6 Lane)					
4	362+710	+	Both	Sammed Shikharji	Nimiyaghat Sation
5	368+550	T	RHS	-	Village Road
6	374+300	+	Both	Topchanchi	Narkopi
7	384+430	+	Both	Kotaldih	Katrasgarh
8	395+750	X	Both	Sadhubad	Village Road

At Grade Separated Junction at Ch. 374+300 RHS

At Grade Separated Junction at Ch. 395+750 RHS

2.4.7 Median Openings

Details of median openings observed along the Project Stretch are given in **Table 2.12**.

Table 2.12: List of Median Openings

S. No.	Chainage Km		Length (m)	Storage Lane
	From	To		
Section-1 from Km 320+810 to Km 326+000 (Retained 4 Lane)				
1	321+219	321+244	25	No
2	323+185	323+210	25	No
3	324+171	324+193	22	No
4	325+801	325+817	16	No
Section-2 from Km 326+000 to Km 361+000 (Ex. Km 360+300) (6 Lane)				
5	340+628	340+653	25	No
6	344+088	344+113	25	No
7	345+378	345+403	25	No
8	347+728	347+753	25	No
9	349+028	349+053	25	No
10	350+688	350+713	25	No
11	352+318	352+343	25	No
12	353+908	353+933	25	Yes
13	355+508	355+533	25	No
14	359+080	359+120	40	No
15	360+488	360+513	25	No
Section-3 from Km 360+300 to Km 400+632 (Ex. Km 400+132) (6 Lane)				
16	361+038	361+063	25	No
17	364+338	364+363	25	No
18	365+638	365+663	25	No
19	367+608	367+633	25	No
20	371+888	371+913	25	No
21	375+825	375+875	50	Yes
22	377+688	377+713	25	Yes
23	379+088	379+113	25	No
24	381+438	381+463	25	No
25	382+938	382+963	25	No
26	386+798	386+823	25	No
27	388+438	388+463	25	No
28	393+438	393+463	25	No
29	397+638	397+663	25	No
30	399+198	399+223	25	No

Median Openings at Ch. 323+198

Median Openings at Ch. 371+901

2.4.8 Drains

Details of existing Drains on Project Stretch as given in **Table 2.13.**

Table 2.13: Drains along the Project Stretch

S. No.	Chainage Km		Length (m)	Side	Location	Drain Type
	From	To				
Section-1 from Km 320+810 to Km 326+000 (Retained 4 Lane)						
NIL						
Section-2 from Km 326+000 to Km 361+000 (Ex. Km 360+300) (6 Lane)						
1	331+070	331+830	760	BHS	S/R & MCW	RCC Cover Drain
2	331+840	333+210	1370	LHS	SR Shoulder	RCC Cover Drain
3	331+840	332+925	1085	RHS	SR Shoulder	RCC Cover Drain
4	333+000	333+200	200	RHS	SR Shoulder	RCC Cover Drain
5	336+210	336+470	260	LHS	SR Shoulder	RCC Cover Drain
6	336+400	336+880	480	RHS	SR Shoulder	RCC Cover Drain
7	336+800	336+875	75	LHS	SR Shoulder	RCC Cover Drain
8	336+875	338+875	2000	BHS	S/R & MCW	RCC Cover Drain
9	338+875	339+775	900	BHS	SR Shoulder	RCC Cover Drain
10	339+775	340+780	1005	BHS	S/R & MCW	RCC Cover Drain
11	344+210	345+880	1670	BHS	S/R & MCW	RCC Cover Drain
12	346+460	346+860	400	BHS	SR Shoulder	RCC Cover Drain
13	346+875	346+930	55	RHS	SR Shoulder	RCC Cover Drain
14	347+550	347+880	330	BHS	S/R & MCW	RCC Cover Drain
15	349+250	349+375	125	BHS	S/R & MCW	RCC Cover Drain
16	350+285	350+400	115	LHS	Shoulder	RCC Open Drain
17	350+850	351+280	430	BHS	S/R & MCW	RCC Cover Drain
18	351+975	352+130	155	LHS	Shoulder (Toll Plaza)	RCC Cover Drain
19	352+960	354+070	1110	BHS	S/R & MCW	RCC Cover Drain
20	354+070	354+850	780	BHS	SR Shoulder	RCC Cover Drain
21	354+860	355+810	950	LHS	S/R & MCW	RCC Cover Drain
22	355+000	355+840	840	RHS	S/R & MCW	RCC Cover Drain
23	355+875	356+840	965	LHS	SR Shoulder	RCC Cover Drain
24	355+890	356+170	280	RHS	SR Shoulder	RCC Cover Drain
25	356+170	357+220	1050	RHS	S/R & MCW	RCC Cover Drain
26	356+910	357+570	660	LHS	SR Shoulder	RCC Cover Drain
27	357+220	357+780	560	RHS	SR Shoulder	RCC Cover Drain
28	359+260	359+550	290	BHS	SR Shoulder	RCC Cover Drain
29	359+570	360+120	550	RHS	SR Shoulder	RCC Cover Drain
30	359+650	360+110	460	LHS	SR Shoulder	RCC Cover Drain
Section-3 from Km 360+300 to Km 400+632 (Ex. Km 400+132) (6 Lane)						
31	362+240	362+430	190	LHS	SR Shoulder	RCC Cover Drain
32	362+240	362+380	140	RHS	SR Shoulder	RCC Cover Drain
33	362+400	363+355	955	RHS	SR Shoulder	RCC Cover Drain
34	362+560	362+610	50	LHS	SR Shoulder	RCC Cover Drain
35	362+700	363+350	650	LHS	SR Shoulder	RCC Cover Drain
36	364+480	365+640	1160	LHS	Shoulder	RCC Cover Drain
37	367+240	367+740	500	LHS	SR Shoulder	RCC Cover Drain
38	367+820	368+790	970	LHS	SR Shoulder	RCC Cover Drain
39	368+180	368+970	790	RHS	SR Shoulder	RCC Cover Drain

S. No.	Chainage Km		Length (m)	Side	Location	Drain Type
	From	To				
40	369+160	369+535	375	LHS	SR Shoulder	RCC Cover Drain
41	369+985	370+180	195	LHS	SR Shoulder	RCC Cover Drain
42	370+310	371+010	700	LHS	SR Shoulder	RCC Cover Drain
43	370+410	370+700	290	RHS	SR Shoulder	RCC Cover Drain
44	372+240	372+400	160	RHS	S/R & MCW	RCC Cover Drain
45	372+400	372+550	150	LHS	SR Shoulder	RCC Cover Drain
46	373+850	375+880	2030	LHS	SR Shoulder	RCC Cover Drain
47	373+950	374+190	240	RHS	SR Shoulder	RCC Cover Drain
48	373+950	374+190	240	RHS	SR Shoulder	RCC Cover Drain
49	374+360	375+385	1025	RHS	SR Shoulder	RCC Cover Drain
50	375+410	375+910	500	RHS	SR Shoulder	RCC Cover Drain
51	375+965	376+040	75	RHS	SR Shoulder	RCC Cover Drain
52	376+120	376+300	180	RHS	SR Shoulder	RCC Cover Drain
53	376+285	376+310	25	LHS	SR Shoulder	RCC Cover Drain
54	383+635	385+190	1555	LHS	SR Shoulder	RCC Cover Drain
55	383+635	385+220	1585	RHS	SR Shoulder	RCC Cover Drain
56	389+610	389+940	330	LHS	SR Shoulder	RCC Cover Drain
57	389+620	390+285	665	RHS	SR Shoulder	RCC Cover Drain
58	390+180	390+280	100	LHS	SR Shoulder	RCC Cover Drain
59	390+345	390+915	570	BHS	SR Shoulder	RCC Cover Drain
60	390+945	391+060	115	BHS	SR Shoulder	RCC Cover Drain
61	391+110	391+120	10	LHS	SR Shoulder	RCC Cover Drain
62	391+100	391+285	185	RHS	SR Shoulder	RCC Cover Drain
63	391+455	391+825	370	LHS	S/R & MCW	Open V Drain
64	391+510	391+845	335	RHS	S/R & MCW	Open V Drain
65	392+125	392+890	765	RHS	SR Shoulder	RCC Cover Drain
66	392+135	392+490	355	LHS	SR Shoulder	RCC Cover Drain
67	392+570	392+742	172	LHS	SR Shoulder	RCC Cover Drain
68	392+755	392+900	145	LHS	SR Shoulder	RCC Cover Drain
69	394+285	394+320	35	LHS	S/R & MCW	Line drain
70	394+300	394+320	20	RHS	S/R & MCW	Line drain
71	394+945	395+700	755	LHS	SR Shoulder	RCC Cover Drain
72	394+945	396+735	1790	RHS	SR Shoulder	RCC Cover Drain
73	395+715	395+760	45	LHS	SR Shoulder	RCC Cover Drain
74	395+795	396+355	560	LHS	SR Shoulder	RCC Cover Drain
75	396+365	396+815	450	LHS	SR Shoulder	RCC Cover Drain
76	396+765	396+830	65	RHS	SR Shoulder	RCC Cover Drain

2.4.9 Retaining Wall/RE wall/Wing Wall/Toe Wall/Stone Pitching

The details of RE wall provided in the project is given in **Table 2.14.**

Table 2.14: Retaining Wall Panels

S. No	LHS			RHS		
	Chainage		Length	Chainage		Length
	From	To		From	To	
Section-1 from Km 320+810 to 326+000 (Retained 4 Lane)						
NIL						

S. No	LHS			RHS		
	Chainage		Length	Chainage		Length
	From	To		From	To	
Section-2 from Km 326+000 to 361+000 (Ex. Km 360+300) (6 Lane)						
1	331+850	333+310	1460	331+850	333+310	1460
2	336+180	336+900	720	336+430	336+900	470
3	338+890	339+800	910	338+890	339+800	910
4	346+480	346+950	470	346+480	346+950	470
5	354+090	354+890	800	354+090	354+890	800
6	355+900	357+800	1900	355+900	356+190	290
7	-	-	-	357+240	357+800	560
8	359+280	360+140	860	359+280	360+140	860
Section-3 from Km 360+300 to Km 400+632 (Ex. Km 400+132) (6 Lane)						
9	362+300	363+370	1070	362+300	363+370	1070
10	368+200	368+970	770	368+200	368+970	770
11	370+050	370+650	600	370+050	370+650	600
12	373+800	374+800	1000	373+800	374+800	1000
13	383+820	385+010	1190	383+820	385+010	1190
14	389+800	391+350	1550	389+800	391+350	1550
15	391+900	392+800	900	391+900	392+800	900
16	395+120	396+750	1630	395+120	396+750	1630
Total			**15830**	**Total**		**14530**

2.4.10 Type of Pavement

There is Flexible Pavement along the entire length of the Project Road while, Toll Plaza area having Rigid Pavement.

Table 2.15: Pavement Type

S. No.	Existing Kilometer (Km)		Pavement Type		Remarks
	From	To	LHS	RHS	
1	320+810	400+632	Flexible	Flexible	Excluding Toll Plaza at (Kulgo 352+100 km)

2.5 PROJECT FACILITIES

2.5.1 ATMS/HTMS

The details of ATMS along the project road is given below:

Table 2.16: Details of ATMS on the Project Highway

S. No.	Equipment Description	Unit	Total Quantity		
			Km 320+810 to Km 326+000	Km 326+000 to Km 360+300	Km 360+300 to Km 400+632
1	CCTV PTZ Cameras	No	DPR in Progress	11	9
2	VIDS/VIDES	No		2	8
3	ATCC	No		2	2
4	VMS	No		3	2
5	MET	No		1	-
6	Portable VMS	No		-	1
7	ECB	No		12	17

2.5.2 Details of Bus Bays/ Bus Stops

The following are the details of Bus Bays/Bus Shelters along the project road as given in **Table 2.17.**

Table 2.17: Bus Bays/Bus Shelter

S. No.	Chainage Km	Side	Location	Name of Habitation	Type
Section-1 from Km 320+810 to Km 326+000 (Retained 4 Lane)					
NIL					
Section-2 from Km 326+000 to Km 361+000 (Ex. Km 360+300) (6 Lane)					
1	326+550	LHS	MCW	-	Bus Shelter
2	331+800	LHS	SR	Jarmune	Bus Shelter
3	331+800	RHS	SR	Jarmune	Bus Shelter
4	339+100	RHS	SR	Hesla	Bus Shelter
5	340+750	LHS	SR	Hesla	Bus Shelter
6	354+120	LHS	SR	Simradih	Bus Shelter
7	354+120	RHS	SR	Simradih	Bus Shelter
Section-3 from Km 360+300 to Km 400+632 (Ex. Km 400+132) (6 Lane)					
8	364+650	LHS	SR	Haithnagar	Bus Shelter
9	364+650	RHS	SR	Haithnagar	Bus Shelter
10	370+120	LHS	SR	Singhdih	Bus Shelter
11	370+850	LHS	SR	Satkira	Bus Shelter
12	370+851	RHS	SR	Satkira	Bus Shelter
13	376+650	LHS	SR	Topchanchi	Bus Shelter
14	376+390	RHS	SR	Topchanchi	Bus Shelter
15	384+200	LHS	SR	Kotal Adda	Bus Shelter
16	386+330	LHS	MCW	Charkipahadi	Bus Bays with Shelter
17	386+330	RHS	SR	Charkipahadi	Bus Shelter
18	387+960	RHS	SR	Jarmunai	Bus Shelter
19	388+220	LHS	SR	Jarmunai	Bus Shelter
20	395+550	LHS	SR	Kharni	Bus Shelter
21	395+800	RHS	SR	Kharni	Bus Shelter
22	397+520	LHS	SR	Jodapipal	Bus Shelter
23	397+420	RHS	SR	Jodapipal	Bus Shelter
24	399+660	LHS	SR	Kalyanpur	Bus Shelter
25	399+700	RHS	SR	Kalyanpur	Bus Shelter

2.5.3 Details of Truck Lay Byes

The following are the details of Truck Lay Byes along the project road as given in **Table 2.18.**

Table 2.18: Locations of Truck Lay Byes

S. No.	Chainage Km	Side	Name of Habitation	Remarks
Section-1 from Km 320+810 to Km 326+000 (Retained 4 Lane)				
NIL				
Section-2 from Km 326+000 to Km 361+000 (Ex. Km 360+300) (6 Lane)				
1	341+770	LHS	Hesla	
2	342+780	RHS	Hesla	
Section-3 from Km 360+300 to Km 400+632 (Ex. Km 400+132) (6 Lane)				
3	371+210	RHS	Satkira	

S. No.	Chainage Km	Side	Name of Habitation	Remarks
4	385+700	LHS	Charkipahadi	
5	387+400	LHS	Jarmunai	

2.6 ROAD FURNITURES

2.6.1 Lighting

The details of existing sections having street lightings and High masts as given in **Table 2.19A & 2.19B.**

Table 2.19A: Locations of Street Lighting

S. No.	Chainage		No. of Poles	Side	Type of Pole (Single Arm / Double Arm)
	From	To			
Section-1 from Km 320+810 to Km 326+000 (Retained 4 Lane)					
NIL					
Section-2 from Km 326+000 to Km 361+000 (Ex. Km 360+300) (6 Lane)					
1	330+990	331+120	10	Both	Single Arm
2	331+150	333+380	202	Both	Double Arm
3	333+400	334+740	62	Median	Double Arm
4	334+770	334+830	6	Both	Single Arm
5	334+860	336+150	66	Median	Double Arm
6	336+180	336+410	12	LHS + Median	Double Arm
7	336+430	338+400	120	Both	Double Arm
8	338+990	340+600	98	Both	Double Arm
9	340+750	340+920	14	Both	Single Arm
10	341+750	341+940	9	LHS	Single Arm
11	342+660	342+900	9	RHS	Single Arm
12	344+120	344+220	10	Both	Single Arm
13	344+300	344+860	40	Both	Double Arm
14	350+620	350+860	18	Both	Single Arm
15	350+910	351+190	20	Both	Double Arm
16	351+210	351+370	12	Both	Single Arm
17	351+570	351+750	13	Median	Double Arm
18	351+640	351+750	7	LHS	Single Arm
19	352+450	352+770	15	RHS	Single Arm
20	352+460	352+750	20	Median	Double Arm
21	352+990	355+580	174	Both	Double Arm
22	355+600	355+870	15	Median	Double Arm
23	355+600	356+040	34	Both (SR)	Single Arm
24	355+915	356+040	12	Both (MCW)	Single Arm
25	356+060	356+190	9	Both	Double Arm
26	356+540	357+220	24	LHS	Double Arm
27	357+250	357+610	26	Both	Double Arm
28	357+640	357+800	5	LHS	Double Arm
29	357+640	357+800	5	RHS	Single Arm
30	357+820	357+940	11	Both	Single Arm
31	358+800	358+900	8	Both	Double Arm

S. No.	Chainage		No. of Poles	Side	Type of Pole (Single Arm / Double Arm)
	From	To			
32	359+130	359+270	14	Both	Single Arm
33	359+300	360+130	70	Both	Double Arm
34	360+150	360+300	14	Both	Single Arm
Section-3 from Km 360+300 to Km 400+632 (Ex. Km 400+132) (6 Lane)					
35	361+050	361+370	11	Median	Double Arm
36	361+400	363+370	134	Both	Double Arm
37	363+400	363+600	8	Median	Double Arm
38	364+320	364+530	7	Median	Double Arm
39	364+550	365+260	40	Both	Double Arm
40	365+290	365+490	8	Median	Double Arm
41	367+110	367+310	8	Median	Double Arm
42	367+340	368+970	98	Both	Double Arm
43	369+000	369+140	6	Median	Double Arm
44	369+890	369+990	4	Median	Double Arm
45	370+030	370+870	56	Both	Double Arm
46	371+100	371+400	11	RHS	Single Arm
47	372+030	372+650	21	Median	Double Arm
48	373+780	376+360	170	Both	Double Arm
49	376+820	378+730	114	Both	Double Arm
50	378+750	379+400	20	Median	Double Arm
51	382+200	382+400	8	Median	Double Arm
52	382+440	383+030	36	Both	Double Arm
53	383+430	383+640	8	Median	Double Arm
54	383+670	385+100	88	Both	Double Arm
55	385+030	385+090	3	Median	Double Arm
56	385+580	385+900	11	LHS	Single Arm
57	386+040	386+220	7	Median	Double Arm
58	386+250	386+970	44	Both	Double Arm
59	387+000	387+200	8	Median	Double Arm
60	387+340	387+400	3	LHS	Single Arm
61	387+540	387+680	5	LHS	Single Arm
62	387+880	388+080	8	Median	Double Arm
63	388+100	391+460	204	Both	Double Arm
64	391+490	391+880	14	Median	Double Arm
65	391+910	398+010	370	Both	Double Arm
66	398+580	400+130	94	Both	Double Arm
Total			**2811**		

Table 2.19B: Locations of High Mast Light

S.No.	Chainage	Nos.	Remarks
1	352+100	6	Toll Plaza (Kulgo)
2	353+950	1	Major Junction (Start of Dumri Bypass)
3	359+050	1	Major Junction (End of Dumri Bypass)
Total		**8**	

High Mast Light at 353+950

High Mast Light at Toll Plaza 352+100

2.6.2 Traffic Blinkers

The project stretch has 44 Nos. of Traffic Blinkers.

Traffic Blinkers Light at 361+038

Traffic Blinkers Light at 375+875

2.6.3 Safety Barriers

Details of existing Metallic Beam Crash Barrier as given in **Table 2.20.**

Table 2.20: W-beam Safety Barrier

S. No.	Chainage Km		Type of Crash Barrier / PGR	Total Length (m)	Side (LHS/ RHS)	Locations details (at median, beside MCW, b/w MCW & SR etc)
	From	To				
Section-1 from Km 320+810 to 326+000 (Retained 4 Lane)						
1	320+850	320+880	W-Beam	30	LHS	MCW
2	321+250	321+300	W-Beam	50	RHS	MCW
3	325+990	326+000	W-Beam	10	LHS	MCW
Section-2 from Km 326+000 to 361+000 (Ex. Km 360+300) (6 Lane)						
4	326+000	326+040	W-Beam	40	LHS	MCW
5	326+190	326+220	W-Beam	30	LHS	MCW
6	326+550	326+750	W-Beam	200	LHS	MCW
7	328+500	328+530	W-Beam	30	LHS	MCW
8	328+580	328+660	W-Beam	80	LHS	MCW

S. No.	Chainage Km		Type of Crash Barrier / PGR	Total Length (m)	Side (LHS/ RHS)	Locations details (at median, beside MCW, b/w MCW & SR etc)
	From	To				
9	328+580	328+800	W-Beam	220	RHS	MCW
10	328+650	328+950	W-Beam	600	Median	Median
11	329+300	329+700	W-Beam	400	RHS	MCW
12	329+330	329+360	W-Beam	30	LHS	MCW
13	329+430	329+480	W-Beam	50	LHS	MCW
14	329+510	330+050	W-Beam	1080	Median	Median
15	329+530	329+580	W-Beam	50	LHS	MCW
16	331+100	331+850	PGR	750	RHS	MCW
17	331+150	331+850	PGR	700	LHS	MCW
18	331+850	331+910	W-Beam	60	LHS	MCW
19	331+850	331+950	W-Beam	100	RHS	MCW
20	331+910	332+530	RCC	620	LHS	MCW
21	331+950	333+400	RCC	1450	RHS	MCW
22	332+530	332+940	W-Beam	410	LHS	MCW
23	332+940	333+280	RCC	340	LHS	MCW
24	333+380	333+400	RCC	20	LHS	MCW
25	333+400	333+580	W-Beam	180	LHS	MCW
26	333+400	333+600	W-Beam	200	RHS	MCW
27	334+010	334+070	W-Beam	60	RHS	MCW
28	334+020	334+080	W-Beam	60	LHS	MCW
29	334+330	334+350	W-Beam	20	LHS	MCW
30	334+890	334+910	W-Beam	20	RHS	MCW
31	334+900	335+020	W-Beam	120	RHS	MCW
32	335+225	335+400	W-Beam	175	LHS	MCW
33	335+380	335+400	W-Beam	20	RHS	MCW
34	336+180	336+215	W-Beam	35	LHS	MCW
35	336+215	336+730	RCC	515	LHS	MCW
36	336+220	336+390	W-Beam	170	RHS	MCW
37	336+390	336+650	RCC	260	RHS	MCW
38	336+650	336+900	W-Beam	250	RHS	MCW
39	336+730	336+790	W-Beam	60	LHS	MCW
40	336+900	338+890	PGR	1990	RHS	MCW
41	336+920	338+910	PGR	1990	LHS	MCW
42	338+890	338+960	W-Beam	70	RHS	MCW
43	338+910	338+980	W-Beam	70	LHS	MCW
44	338+960	339+690	RCC	730	RHS	MCW
45	338+980	339+650	RCC	670	LHS	MCW
46	339+650	339+750	W-Beam	100	LHS	MCW
47	339+690	339+780	W-Beam	90	RHS	MCW
48	339+750	340+750	PGR	1000	LHS	MCW
49	339+780	340+750	PGR	970	RHS	MCW
50	339+850	340+250	W-Beam	800	Median	Median
51	339+950	340+000	W-Beam	50	RHS	Service Road
52	340+400	340+550	W-Beam	150	RHS	Service Road
53	342+020	342+050	W-Beam	30	LHS	MCW
54	342+080	342+110	W-Beam	30	LHS	MCW
55	342+450	342+480	W-Beam	30	LHS	MCW

S. No.	Chainage Km		Type of Crash Barrier / PGR	Total Length (m)	Side (LHS/ RHS)	Locations details (at median, beside MCW, b/w MCW & SR etc)
	From	To				
56	342+480	342+500	RCC	20	LHS	MCW
57	342+500	342+850	W-Beam	350	LHS	MCW
58	342+750	343+100	W-Beam	350	RHS	MCW
59	343+600	343+670	W-Beam	70	LHS	MCW
60	343+720	343+750	W-Beam	30	LHS	MCW
61	344+220	345+850	PGR	1630	LHS	MCW
62	344+500	344+600	W-Beam	100	LHS	Service Road
63	344+980	345+240	W-Beam	260	LHS	Service Road
64	345+050	345+150	W-Beam	100	RHS	Service Road
65	345+220	345+900	PGR	680	RHS	MCW
66	345+400	345+900	W-Beam	500	LHS	Service Road
67	346+470	346+490	W-Beam	40	BHS	Median
68	346+490	346+560	PGR	70	LHS	MCW
69	346+490	346+560	W-Beam	70	RHS	MCW
70	346+490	346+950	NJB	460	Median	Median
71	346+560	346+880	RCC	320	LHS	MCW
72	346+560	346+880	RCC	320	RHS	MCW
73	346+880	346+950	PGR	70	LHS	MCW
74	346+880	346+950	W-Beam	70	RHS	MCW
75	346+900	346+970	W-Beam	70	LHS	Service Road
76	346+950	346+970	W-Beam	40	Median	Median
77	346+950	347+050	W-Beam	100	LHS	MCW
78	347+200	347+240	W-Beam	40	LHS	MCW
79	347+530	347+800	W-Beam	270	RHS	Service Road
80	347+580	347+920	PGR	340	RHS	MCW
81	347+600	347+920	PGR	320	LHS	MCW
82	348+420	348+420	W-Beam	0	LHS	MCW
83	348+480	348+500	W-Beam	20	LHS	MCW
84	348+540	348+570	W-Beam	30	RHS	MCW
85	349+280	349+400	PGR	120	LHS	MCW
86	349+280	349+400	PGR	120	RHS	MCW
87	349+550	349+650	W-Beam	100	RHS	MCW
88	350+155	350+170	W-Beam	15	RHS	MCW
89	350+350	350+980	W-Beam	1260	Median	Median
90	350+750	350+900	W-Beam	150	RHS	Service Road
91	350+870	351+330	PGR	460	LHS	MCW
92	350+880	351+300	PGR	420	RHS	MCW
93	351+100	351+200	W-Beam	100	RHS	Service Road
94	352+800	352+900	W-Beam	200	Median	Median
95	352+930	352+980	W-Beam	100	Median	Median
96	352+980	354+080	PGR	1100	LHS	MCW
97	352+980	353+560	PGR	580	RHS	MCW
98	353+100	353+250	W-Beam	150	LHS	Service Road
99	353+740	354+090	PGR	350	RHS	MCW
100	354+080	354+200	W-Beam	120	LHS	MCW
101	354+090	354+190	W-Beam	100	RHS	MCW
102	354+190	354+870	RCC	680	RHS	MCW

S. No.	Chainage Km		Type of Crash Barrier / PGR	Total Length (m)	Side (LHS/ RHS)	Locations details (at median, beside MCW, b/w MCW & SR etc)
	From	To				
103	354+200	354+750	RCC	550	LHS	MCW
104	354+750	354+880	W-Beam	130	LHS	MCW
105	354+850	354+870	W-Beam	20	LHS	Service Road
106	354+870	355+000	W-Beam	130	RHS	MCW
107	354+880	355+570	PGR	690	LHS	MCW
108	355+000	355+580	PGR	580	RHS	MCW
109	355+570	355+880	W-Beam	310	LHS	MCW
110	355+580	355+880	W-Beam	300	RHS	MCW
111	355+880	356+200	RCC	320	LHS	MCW
112	355+880	356+170	RCC	290	RHS	MCW
113	356+170	356+190	W-Beam	20	RHS	MCW
114	356+190	357+240	PGR	1050	RHS	MCW
115	356+200	356+545	W-Beam	345	LHS	MCW
116	356+454	357+770	RCC	1316	LHS	MCW
117	357+240	357+620	W-Beam	380	RHS	MCW
118	357+660	357+800	W-Beam	140	RHS	MCW
119	357+770	357+800	W-Beam	30	LHS	MCW
120	358+040	358+080	W-Beam	40	LHS	MCW
121	358+040	358+080	W-Beam	40	RHS	MCW
122	358+200	358+800	W-Beam	1200	BHS	2+2 Lane median
123	358+200	358+800	W-Beam	1200	BHS	2+2 Lane median
124	358+900	358+990	W-Beam	180	BHS	2+2 Lane median
125	358+900	358+990	W-Beam	180	BHS	2+2 Lane median
126	358+990	359+060	W-Beam	70	RHS	MCW
127	359+170	360+310	W-Beam	2280	Median	Median
128	359+270	359+390	W-Beam	120	LHS	MCW
129	359+280	359+400	W-Beam	120	RHS	MCW
130	359+390	360+100	RCC	710	LHS	MCW
131	359+400	360+090	RCC	690	RHS	MCW
132	359+800	359+900	W-Beam	100	RHS	MCW
133	360+090	360+140	W-Beam	50	RHS	MCW
134	360+100	360+150	W-Beam	50	LHS	MCW
Section-3 – 360+300 to 400+632 (Ex. Km 400+132) (6 Lane)						
135	360+680	362+250	Wire rope	1570	RHS	MCW
136	360+800	361+050	Wire rope	250	LHS	Service Road
137	361+550	361+800	Wire rope	250	LHS	MCW
138	361+850	361+950	W-Beam	100	LHS	Service Road
139	361+900	362+250	Wire rope	350	LHS	MCW
140	362+380	362+430	W-Beam	50	RHS	MCW
141	362+400	363+190	RCC	790	LHS	MCW
142	362+430	363+180	RCC	750	RHS	MCW
143	363+180	363+230	W-Beam	50	RHS	MCW
144	363+190	363+220	W-Beam	30	LHS	MCW
145	363+200	363+380	Wire rope	180	LHS	MCW
146	363+550	363+660	W-Beam	110	RHS	MCW
147	363+710	364+500	Wire rope	790	LHS	MCW
148	364+150	364+480	Wire rope	330	RHS	Service Road

S. No.	Chainage Km		Type of Crash Barrier / PGR	Total Length (m)	Side (LHS/ RHS)	Locations details (at median, beside MCW, b/w MCW & SR etc)
	From	To				
149	364+420	365+280	Wire rope	860	RHS	MCW
150	365+440	365+450	W-Beam	10	RHS	MCW
151	365+850	365+870	W-Beam	20	RHS	MCW
152	365+880	365+980	W-Beam	100	RHS	MCW
153	366+080	366+240	W-Beam	160	LHS	MCW
154	366+150	366+250	W-Beam	100	RHS	MCW
155	366+360	366+500	W-Beam	140	RHS	2+2 Lane median
156	366+650	366+750	Wire rope	100	LHS	2+2 Lane median
157	366+800	368+200	Wire rope	1400	RHS	MCW
158	367+250	368+200	Wire rope	950	LHS	MCW
159	368+230	368+260	W-Beam	30	LHS	MCW
160	368+260	368+930	RCC	670	LHS	MCW
161	368+280	368+880	RCC	600	RHS	MCW
162	368+300	368+430	Wire rope	130	RHS	Service Road
163	368+880	368+910	W-Beam	30	RHS	MCW
164	368+930	368+950	W-Beam	20	LHS	MCW
165	369+370	369+430	W-Beam	60	RHS	2+2 Lane median
166	369+400	369+730	Wire rope	330	LHS	MCW
167	369+460	369+750	Wire rope	290	RHS	2+2 Lane median
168	370+030	370+050	W-Beam	20	LHS	MCW
169	370+050	370+650	RCC	600	LHS	MCW
170	370+080	370+120	W-Beam	40	RHS	MCW
171	370+120	370+660	RCC	540	RHS	MCW
172	370+650	370+680	W-Beam	30	LHS	MCW
173	370+660	370+730	W-Beam	70	RHS	MCW
174	371+030	371+350	W-Beam	320	RHS	MCW
175	371+200	371+250	W-Beam	50	LHS	MCW
176	371+450	371+850	W-Beam	400	RHS	MCW
177	371+490	371+780	Wire rope	290	LHS	2+2 Lane median
178	371+500	371+850	W-Beam	350	RHS	2+2 Lane median
179	372+280	372+450	Wire rope	170	LHS	MCW
180	372+450	372+660	W-Beam	210	LHS	Service Road
181	373+120	373+180	W-Beam	60	RHS	MCW
182	373+450	373+700	Wire rope	250	LHS	MCW
183	373+580	373+600	W-Beam	20	RHS	MCW
184	373+800	374+800	RCC	1000	LHS	MCW
185	373+820	373+870	W-Beam	50	RHS	MCW
186	373+870	374+820	RCC	950	RHS	MCW
187	374+800	374+850	W-Beam	50	LHS	MCW
188	374+820	374+870	W-Beam	50	RHS	MCW
189	374+900	378+750	Wire rope	3850	LHS	MCW B/w SR
190	374+950	378+750	Wire rope	3800	RHS	MCW
191	375+820	376+800	W-Beam	1960	Median	Median
192	377+000	377+150	Wire rope	150	RHS	Service Road
193	377+400	377+500	W-Beam	100	RHS	Service Road
194	377+900	378+050	Wire rope	150	RHS	Service Road
195	378+150	378+220	W-Beam	70	LHS	Service Road

S. No.	Chainage Km		Type of Crash Barrier / PGR	Total Length (m)	Side (LHS/ RHS)	Locations details (at median, beside MCW, b/w MCW & SR etc)
	From	To				
196	379+020	379+040	W-Beam	20	LHS	MCW
197	379+100	379+180	W-Beam	80	RHS	MCW
198	379+380	379+430	W-Beam	50	LHS	MCW
199	379+400	379+550	W-Beam	150	RHS	MCW
200	379+700	379+900	W-Beam	200	RHS	MCW
201	379+750	379+780	Wire rope	30	LHS	MCW
202	380+050	380+200	W-Beam	150	RHS	MCW
203	381+600	381+800	W-Beam	200	LHS	MCW
204	382+430	383+050	Wire rope	620	LHS	MCW
205	382+500	382+980	Wire rope	480	RHS	MCW
206	382+580	382+850	Wire rope	270	LHS	Service Road
207	382+600	382+870	Wire rope	270	RHS	Service Road
208	383+200	383+480	W-Beam	280	LHS	MCW
209	383+770	383+820	W-Beam	50	RHS	MCW
210	383+780	383+820	W-Beam	40	LHS	MCW
211	383+820	385+010	RCC	1190	LHS	MCW
212	383+820	385+010	RCC	1190	RHS	MCW
213	385+010	385+030	W-Beam	20	LHS	MCW
214	385+010	385+030	W-Beam	20	RHS	MCW
215	385+450	385+600	W-Beam	150	RHS	MCW
216	385+620	385+700	W-Beam	80	RHS	MCW
217	386+000	386+030	W-Beam	30	LHS	MCW
218	386+050	386+100	W-Beam	50	RHS	MCW
219	386+250	386+980	Wire rope	730	LHS	MCW
220	386+250	386+980	Wire rope	730	RHS	MCW
221	386+350	386+450	Wire rope	100	LHS	Service Road
222	386+670	386+720	Wire rope	50	LHS	Service Road
223	387+070	387+120	W-Beam	50	RHS	MCW
224	387+270	387+620	W-Beam	700	Median	Median
225	387+740	387+850	W-Beam	110	LHS	MCW
226	388+090	389+800	Wire rope	1710	RHS	MCW
227	388+100	389+800	Wire rope	1700	LHS	MCW
228	388+500	388+750	Wire rope	250	LHS	Service Road
229	388+600	388+750	W-Beam	150	RHS	Service Road
230	389+000	389+250	W-Beam	250	RHS	Service Road
231	389+400	389+450	W-Beam	50	RHS	Service Road
232	389+500	389+680	W-Beam	180	RHS	Service Road
233	389+860	389+920	W-Beam	60	RHS	MCW
234	389+920	391+350	RCC	1430	LHS	MCW
235	389+920	391+350	RCC	1430	RHS	MCW
236	391+350	391+390	W-Beam	40	LHS	MCW
237	391+350	391+400	W-Beam	50	RHS	MCW
238	391+480	391+830	W-Beam	350	LHS	MCW
239	391+480	391+900	W-Beam	420	RHS	MCW
240	391+900	392+100	W-Beam	200	LHS	MCW
241	391+970	392+000	W-Beam	30	RHS	MCW
242	392+000	392+780	RCC	780	LHS	MCW

S. No.	Chainage Km		Type of Crash Barrier / PGR	Total Length (m)	Side (LHS/ RHS)	Locations details (at median, beside MCW, b/w MCW & SR etc)
	From	To				
243	392+000	392+780	RCC	780	RHS	MCW
244	392+780	392+810	W-Beam	30	RHS	MCW
245	392+810	392+910	W-Beam	100	LHS	MCW
246	392+900	394+520	Wire rope	1620	RHS	MCW
247	392+980	395+030	Wire rope	2050	LHS	MCW B/w SR
248	393+600	393+700	W-Beam	100	RHS	Service Road
249	394+150	394+200	W-Beam	50	LHS	Service Road
250	394+230	394+320	W-Beam	90	LHS	Service Road
251	394+580	394+950	Wire rope	370	RHS	MCW
252	394+580	394+680	Wire rope	100	LHS	Service Road
253	395+090	395+120	W-Beam	30	RHS	MCW
254	395+120	396+750	RCC	1630	LHS	MCW
255	395+120	396+750	RCC	1630	RHS	MCW
256	396+750	396+780	W-Beam	30	RHS	MCW
257	396+900	400+400	Wire rope	3500	LHS	MCW B/w SR
258	396+950	398+970	Wire rope	2020	RHS	MCW B/w SR
259	396+950	398+950	Wire rope	2000	RHS	MCW
260	397+180	397+430	Wire rope	250	LHS	Service Road
261	397+880	397+980	W-Beam	100	LHS	Service Road
262	398+180	398+500	Wire rope	320	LHS	2+2 Lane median
263	398+180	398+500	Wire rope	320	RHS	2+2 Lane median
264	398+250	398+340	W-Beam	90	LHS	Service Road
265	398+580	398+780	Wire rope	200	LHS	Service Road
266	398+870	398+930	W-Beam	60	RHS	Service Road
267	398+900	398+930	W-Beam	30	LHS	Service Road
268	399+130	400+400	Wire rope	1270	LHS	MCW
269	399+130	400+400	Wire rope	1270	RHS	MCW
Total				**109171**		

2.6.4 Sign Boards

Exhibits of Gantry is appended as given in **Table 2.21.**

Table 2.21 Details of existing Gantries

S. No.	Chainage (km)	Signboard/ gantry details	Side (LHS/ RHS)	Locations details (at median, beside MCW, b/w MCW & SR etc)
Section-1 from Km 320+810 to Km 326+000 (Retained 4 Lane)				
NIL				
Section-2 from Km 326+000 to Km 361+000 (Ex. Km 360+300) (6 Lane)				
1	330+700	Cantilever	LHS	MCW
2	331+200	Cantilever	LHS	MCW
3	336+250	Cantilever	RHS	MCW
4	336+400	Cantilever	RHS	MCW
5	337+650	Cantilever	LHS	MCW
6	339+350	Cantilever	RHS	MCW
7	349+500	Cantilever	LHS	MCW

S. No.	Chainage (km)	Signboard/ gantry details	Side	Locations details
			(LHS/ RHS)	(at median, beside MCW, b/w MCW & SR etc)
8	352+400	Cantilever	RHS	MCW
9	350+100	Cantilever	LHS	MCW
10	352+900	Cantilever	RHS	MCW
11	353+700	Cantilever	LHS	MCW
12	354+100	Cantilever	RHS	MCW
13	354+100	Cantilever	LHS	MCW
14	356+700	Cantilever	RHS	MCW
15	359+100	Cantilever	LHS	MCW
16	359+800	Cantilever	RHS	MCW
17	360+950	Overhead Gantry	BHS	MCW
Section-3 from Km 360+300 to Km 400+632 (Ex. Km 400+132) (6 Lane)				
18	360+420	Overhead Gantry	LHS	MCW
19	362+290	Cantilever (Screen)	LHS	MCW
20	363+590	Cantilever	RHS	MCW
21	370+000	Cantilever	LHS	MCW
22	371+100	Cantilever	RHS	MCW
23	373+650	Cantilever	LHS	MCW
24	379+100	Cantilever	RHS	MCW
25	383+500	Cantilever	LHS	MCW
26	385+300	Cantilever	RHS	MCW
27	387+950	Cantilever	LHS	MCW
28	392+950	Cantilever	RHS	SR
29	394+300	Cantilever	LHS	SR
30	396+700	Cantilever	RHS	MCW
31	400+620	Overhead Gantry	LHS	MCW

Sign Boards along the Project Road

Table 2.22 Details Summary of existing Road Furniture's

Sl. No.	Type of Sign	Section-1 from Km 320+810 to Km 326+000	Section-2 from Km 326+000 to Km 361+000 (Ex. Km 360+300)	Section-3 from Km 360+300 to Km 400+632 (Ex. Km 400+132)
1	Speed Breaker	DPR under Progress	0	45
2	Stop		0	42
3	Pedestrian Crossing		9	39
4	Junction Ahead		27	111
5	Hazard Markers		178	211
6	Rute Marker		0	16
7	Chevron Marking		354	99
8	Place Identification		18	38
9	Flag Type Direction		6	10
10	Advance Direction		13	18
11	U Turn Prohibited		18	26
12	Right/Left Curve		11	10
13	Gap in Median		2	14
14	Merging Traffic		26	20
15	Bus Stop		2	18
16	Filling Station		8	18
17	No Overtaking		0	9
18	School Ahead		3	9
19	Give Way		0	14
20	Reassurance Sign		2	6
21	Km Stone		70	80
22	Truck Lay- By		6	4
23	Hospital		0	3
24	HT/LT		0	8
25	Foot over bridge		6	14
26	Cross road		0	6
27	Police Station		0	1

Retroreflective Test caried out at all sign board and Road Marking.

2.6.5 Religious Structures

Religious structures are following Locations in table below:

Table 2.23 Details of Religious Structures

S. No.	Chainage	Side	Locatin	Remarks
1	339+120	RHS	Service Road	Temple
2	361+050	LHS	Service Road	Temple
3	368+935	LHS	Service Road	Temple
4	382+390	RHS	Service Road	Temple

Temple at Ch. 339+120 RHS Service Road

Temple at Ch. 361+050 LHS Service Road

Temple at Ch. 368+935 LHS Service Road

Temple at Ch. 382+390 RHS Service Road

2.6.6 Antiglare Treatment at Median

The project road has raised median.

Table 2.24 Details of Antiglare Treatment at Median

Sl. No	Chainage		Length (Km)	Remarks
	From	To		
Nil.				

Chapter 3. Structure Inventory & Condition

3. STRUCTURE INVENTORY & CONDIITON SURVEY

The present section refers to the inventory and condition survey of all the existing highway structures following the guidelines from IRC: SP-35.

The kilometric chainages that are shown in the following section correspond to the existing Kilometer stones present at site.

3.1 FIELD WORKS AND INVESTIGATIONS

Field works included the collection of data to produce an inventory of all the highway structures and the inspection to evaluate their condition for the remaining life.

The following field surveys were carried out in accordance with the provisions of IRC: SP: 35-1990.

- Inventory of existing highway bridges / structures
- Visual condition survey of existing highway bridges / structures

In addition to minor (< 60 m length) and major bridges (>60m length) other categories of structures have been considered depending on their function, such as Vehicle Underpass (VUP), Pedestrian/Cattle Underpass, Grade Separator, Elevated Structures.

All highway structures were inspected by a bridge expert and the methodology adopted for that inspection was as follows.

- Collection of data from concerned authorities regarding details of the structure and study of previous inspection reports (if any) so that condition of the defects which were noticed earlier could be checked.
- Visual inspection of foundations, abutments, wing-walls/returns, piers, columns and bearings, soffits of the deck including beams, details under the deck, condition of bridge deck surface, drainage, parapets, expansion joints, condition of approaches, condition of protective works etc.
- Inspection of bridges using MBIU and taking photographs.
- In general, and particularly in case of any important or major shortcoming structural distress is noticed leading to doubt about structural adequacy, a detailed investigation using Nondestructive Test is carried out.
- Preparation of report and proposals for repair/rehabilitation/ reconstruction of the structure as per site conditions.

3.1.1 COLLECTION OF INVENTORY DATA

Before undertaking field survey of existing structures on the project road, all concerned authorities were contacted to ascertain the availability of any past inventory and condition survey reports of existing bridges, sub-surface and geotechnical data, hydraulic data, as-built drawings, etc. Detailed field surveys, site investigation and collection of data were carried out by the Consultant's team of Engineers accordingly.

After doing a scrutiny of the afore-mentioned data regarding locations, structural details and condition of the structures, a team of Engineers visited the site in the month of August of 2025 and an inventory of all the structures and visual condition survey was carried out.

3.1.2 Inspections

Based on the visual condition survey, all the distresses were noted for each element of all structure and detailed investigations were carried out including NDT.

A Bridge Expert Inspected Minor and Major Bridges and VUP/LVUP when required, the inspection was supported by an MBIU. In this stretch total 31 nos. of structures have been inspected by MBIU. Photographs of all Major/Minor bridges, Flyovers, Elevated Structures, VUP/LVUP/PUP were taken, and present health condition of all the structures was recorded for all the elements of the bridges except foundations which are buried underground.

Some Photographs of Mobile Bridge Inspection Unit (MBIU) used for Inspection are as given below.

Figure: 3.1 Inspection using MBIU

3.1.3 Non-Destructive Test

On carrying out the Inventory and Condition Survey it was found that all the bridges and structures are newly built and in satisfactory condition except some minor defects like vegetation growth, missing drainage spouts, settlement in approach slab, minor stains on substructures and superstructures which can be set right by carrying out minor repairs and rehabilitations.

To evaluate the strength of the components of bridges/structures, the following Non-Destructive Tests (NDT) were conducted.

a) Rebound Hammer

The Rebound Hammer Method was used for:

- Assessing the likely compressive strength of concrete with the help of suitable co-rebound index and compressive strength.
- Assessing the uniformity of concrete.
- Assessing the quality of the concrete in relation to standard requirements.
- Assessing the quality of one element of concrete in relation to another.

Figure: 3.2 Rebound Hammer Test

b) Ultrasonic Pulse Velocity

The ultrasonic pulse velocity method was used to establish:

- The homogeneity of the concrete.
- The presence of cracks voids and other imperfections.
- Changes in the structure of the concrete which may occur with time.
- The quality of the concrete in relation to standard requirement.
- The quality of one element of concrete in relation to another.
- The values of dynamic elastic modulus of the concrete.

Figure: 3.3 Ultrasonic Pulse Velocity Test

3.2 INVENTORY OF THE EXISTING STRUCTURES

The inventory of all structures was carried out and structure wise inventory details. These bridges / structures comprise the following: -

S.N.	Type of Structure	Unit	Structures
1.	Major bridges (Length > 60m)	No	03
2.	Minor bridges (Length < 60m & > 6m)	No	33
3.	Fly over	No	-
4.	ROB	No	01
5.	VUP	No	16
6.	LVUP (VUP GRADE-II)	No	01
7.	PUP / CUP	No	04
8.	Elevated structure	No	-
9.	FOB	No	10
10.	VOP	No	-
11.	Pipe Culvert	No	52
12.	Box Culverts/ Slab Culverts	No	92
	Total	No	212

3.2.1 Details of Culverts

As shown in the table above, there are 144 culverts on this project road from which 92 are Box/Slab culverts and 52 are pipe culverts.

A summary of the inventory of all culverts is provided in table below:-

Box/Slab Culvert:

S. No.	Chainage Km	Type of Culvert	Span Arrangement (m)
Box Culverts			
Section-1 from Km 320+810 to Km 326+000 (Retained 4 Lane)			
1	321+428	Box Culvert	1x1.5
Section-2 from Km 326+000 to Km 361+000 (Ex. Km 360+300) (6 Lane)			
2	332+510	Box Culvert	1X3
3	334+160	Box Culvert	1X3
4	337+949	Box Culvert	1x2
5	339+061	Box Culvert	1x6
6	342+496	Box Culvert	1x3
7	344+377	Box Culvert	1x4.1
8	345+912	Box Culvert	1x5
9	346+805	Box Culvert	1X3

S. No.	Chainage Km	Type of Culvert	Span Arrangement (m)
10	346+884	Box Culvert	1x4
11	351+210	Box Culvert	1x5
12	351+573	Box Culvert	1x2
13	352+060	Box Culvert	1x2
14	352+329	Box Culvert	1x1.2
15	352+971	Box Culvert	1x4
16	353+431	Box Culvert	1x2
17	353+858	Box Culvert	1x1.5
18	353+937	Box Culvert	1x2
19	354+327	Box Culvert	1x4
20	358+980	Box Culvert	1X3
21	359+945	Box Culvert	1x2
22	360+814	Box Culvert	1x5
Section-3 from Km 360+300 to Km 400+632 (Ex. Km 400+132) (6 Lane)			
23	362+819	Box Culvert	1x3
24	362+864	Box Culvert	1x3
25	363+641	Box Culvert	1x2
26	364+181	Box Culvert	1x1
27	365+310	Box Culvert	1x1.7
28	365+754	Box Culvert	1x2
29	365+876	Box Culvert	1x2
30	366+941	Box Culvert	1x2
31	367+514	Box Culvert	1x2.4
32	367+676	Box Culvert	1x1.8
33	367+769	Box Culvert	1x2
34	368+356	Box Culvert	1x2
35	368+477	Box Culvert	1x2
36	368+715	Box Culvert	3x3
37	369+988	Box Culvert	1x1.5
38	370+206	Box Culvert	1x5
39	371+037	Box Culvert	1x2
40	373+107	Box Culvert	1x1.5
41	373+874	Box Culvert	1x3
42	373+974	Box Culvert	1x2
43	374+382	Box Culvert	1x3
44	375+438	Box Culvert	1x1.5
45	377+274	Box Culvert	1x2
46	377+438	Box Culvert	1x2.2
47	377+915	Box Culvert	1x2
48	378+223	Box Culvert	1x2
49	378+562	Box Culvert	1x2.2
50	378+953	Box Culvert	1x1.5
51	379+432	Box Culvert	1x2

S. No.	Chainage Km	Type of Culvert	Span Arrangement (m)
52	379+536	Box Culvert	1x2.3
53	379+701	Box Culvert	1x1.5
54	380+150	Box Culvert	1x1.5
55	380+887	Box Culvert	1x1
56	381+057	Box Culvert	1x2
57	381+977	Box Culvert	1x2
58	382+037	Box Culvert	1x1.5
59	382+719	Box Culvert	1x4.2
60	383+328	Box Culvert	1x1.2
61	383+455	Box Culvert	1x2
62	383+911	Box Culvert	1x1.2
63	384+839	Box Culvert	1x1.5
64	385+456	Box Culvert	1x2
65	388+424	Box Culvert	1x1.6
66	388+506	Box Culvert	1x1.6
67	388+608	Box Culvert	1x 1.1
68	389+004	Box Culvert	1x1.1
69	389+342	Box Culvert	1x2
70	389+479	Box Culvert	1x3
71	389+971	Box Culvert	1x2
72	393+102	Box Culvert	1x1.5
73	393+681	Box Culvert	1x1.5
74	393+872	Box Culvert	1x1
75	394+247	Box Culvert	1x1.6
76	394+356	Box Culvert	1x2.1
77	395+318	Box Culvert	1x3
78	395+523	Box Culvert	1x1.5
79	396+229	Box Culvert	1x3
80	396+402	Box Culvert	1x3
81	396+693	Box Culvert	1x3
82	397+015	Box Culvert	1x1.8
83	399+350	Box Culvert	1x4.4
84	332+420	Box Culvert	1x3
85	333+040	Box Culvert	1x3
86	334+990	Box Culvert	1x3
87	334+030	Box Culvert	1x3
88	334+285	Box Culvert	1x3
89	335+770	Box Culvert	1x3
90	336+330	Box Culvert	1x3
91	391+700	Box Culvert	1x3
92	392+280	Box Culvert	1x3

Pipe Culvert:

S. No.	Chainage Km	Type of Culvert	Span Arrangement (m)
Pipe Culverts			
Section-1 From 320+810 to 326+000 (4 Lane Retained)			
1	320+924	Pipe Culvert	1x1.2
2	322+649	Pipe Culvert	1x1
3	323+599	Pipe Culvert	1x1
Section-2 From Km 326+000 to 361+000 (Ex. Km 360+300) (6 Lane)			
4	326+610	Pipe Culvert	1x1.2
5	329+608	Pipe Culvert	1x1
6	331+029	Pipe Culvert	1x1
7	331+659	Pipe Culvert	1x1
8	337+373	Pipe Culvert	1x1.2
9	338+374	Pipe Culvert	3x0.9
10	339+883	Pipe Culvert	2x0.9
11	340+452	Pipe Culvert	2x1
12	340+619	Pipe Culvert	2x0.9
13	342+764	Pipe Culvert	2x1
14	344+537	Pipe Culvert	2x1
15	346+335	Pipe Culvert	2x1
16	349+779	Pipe Culvert	2x0.9
17	352+620	Pipe Culvert	1x1
18	353+087	Pipe Culvert	2x1
19	353+549	Pipe Culvert	1x1
20	355+002	Pipe Culvert	2x1
21	355+127	Pipe Culvert	2x1
22	355+207	Pipe Culvert	2x1
23	359+578	Pipe Culvert	1x1.2
Section- 3 From 361+000 (Ex. Km 360+300) to 400+632 (Ex. Km 400+132) (6 Lane)			
24	361+262	Pipe Culvert	4x1
25	362+625	Pipe Culvert	3x0.9
26	362+978	Pipe Culvert	2x0.9
27	363+128	Pipe Culvert	2x1
28	364+578	Pipe Culvert	3x1
29	364+855	Pipe Culvert	2x1
30	366+745	Pipe Culvert	2x0.9
31	367+845	Pipe Culvert	6x1
32	368+869	Pipe Culvert	1x1
33	369+009	Pipe Culvert	2x1
34	369+366	Pipe Culvert	2x1
35	370+354	Pipe Culvert	1x1
36	371+251	Pipe Culvert	4x1
37	374+702	Pipe Culvert	3x1.2
38	374+859	Pipe Culvert	3x1.2

S. No.	Chainage Km	Type of Culvert	Span Arrangement (m)
39	375+234	Pipe Culvert	3x1.2
40	378+786	Pipe Culvert	1x0.9
41	379+091	Pipe Culvert	2x1.2
42	379+887	Pipe Culvert	2x1
43	384+963	Pipe Culvert	1x0.9
44	385+705	Pipe Culvert	2x1
45	386+064	Pipe Culvert	3x1.2
46	387+792	Pipe Culvert	1x1
47	388+685	Pipe Culvert	3x1
48	389+768	Pipe Culvert	2x1.2
49	393+250	Pipe Culvert	1x1
50	395+960	Pipe Culvert	2x1
51	399+925	Pipe Culvert	2x1
52	400+581	Pipe Culvert	1x0.9

Some photographs of the above Culverts are given below: -

Box Culvert at Km 332+510

Box Culvert at Km 337+949

Box Culvert at Km 375+438

Box Culvert at Km 392+280

HPC at Km 362+625	***HPC at Km 374+702***

3.2.2 Details of Major Bridge

A summary of Inventory of existing Major Bridges is provided in Table below

S.No.	Chainage Km		Side	Span details (m)	Bridge length (m)	Deck Width (m)			Foundation	Sub Structure details	Super Structure details
	From	To				Total	Carriageway width	Footpath & Crash barrier/ railing			
Section-1 from Km 320+810 to Km 326+000 (Retained 4 Lane)											
Nil.											
Section-2 from Km 326+000 to Km 361+000 (Ex. Km 360+300) (6 Lane)											
1	333+289	333+391	LHS (NEW)	2x25 + 2x25.6	101.20	1x15.2	1x12.5	1.5	Open Foundation	RCC Wall type Abutment & Circular Pier	PSC Girder
			RHS (NEW)	2x25 + 2x25.6	101.20	1x15.2	1x12.5	1.5	Open Foundation	RCC Wall type Abutment & Circular Pier	PSC Girder
2	335+270	335+330	LHS (NEW)	3x20	60.00	1x15.2	1x12.5	1.5	Open Foundation	RCC Wall type Abutment & Circular Pier	RCC Solid Slab
			RHS (NEW)	3x20	60.00	1x15.2	1x12.5	1.5	Open Foundation	RCC Wall type Abutment & Circular Pier	RCC Solid Slab
3	358+106	358+209	LHS (OUTER) (NEW)	2x19.5 + 2x32	103.00	1x11.7	1x9.0	1.5	Open Foundation	RCC Wall type Abutment & RCC Circular Pier	PSC Girder/PSC Girder
			LHS (INNER) (OLD)	2x18.8 + 2x32	101.60	1x11.1	1x7.5	1.8	Open Foundation	Wall Type Spill through Abutment & RCC Circular Pier	PSC Girder/RCC Voided Salb

S.No.	Chainage Km		Side	Span details (m)	Bridge length (m)	Deck Width (m)			Foundation	Sub Structure details	Super Structure details
	From	To				Total	Carriageway width	Footpath & Crash barrier/ railing			
			RHS (INNER) (OLD)	2x18.8 + 2x32	101.60	1x11.1	1x7.5	1.8	Open Foundation	Wall Type Spill through Abutment & RCC Circular Pier	PSC Girder/RCC Voided Salb
			RHS (OUTER) (NEW)	2x19.5 + 2x32	103.00	1x11.7	1x9.0	1.5	Open Foundation	RCC Wall type Abutment & RCC Circular Pier	PSC Girder/PSC Girder
Section-3 from Km 360+300 to Km 400+632 (Ex. Km 400+132) (6 Lane)											
Nil.											

Note: 1. Total width is end to end incl. footpath, crash barrier etc.

Some photographs of above MJB's are given below: -

MAJOR BRIDGE AT Km 333+330

MAJOR BRIDGE AT Km 357+418

3.2.3 Details of Flyover

A summary of Inventory of existing Flyover is provided in Table below.

S. No.	Chainage Km		Side	Span details (m)	Length (m)	Deck Width (m)			Foundation (raft/ pile/ well)	Sub Structure details	Super Structure details
	From	To				Total (end to end incl. footpath, crash barrier etc)	Carriageway width	Footpath & Crash barrier/ railing			
Section-1 from Km 320+810 to Km 326+000 (Retained 4 Lane)											
Nil.											
Section-2 from Km 326+000 to Km 361+000 (Ex. Km 360+300) (6 Lane)											
Nil.											
Section-3 from Km 360+300 to Km 400+632 (Ex. Km 400+132) (6 Lane)											
Nil.											

3.2.4 Details of ROB

A summary of Inventory of existing ROB's are provided in Table below.

S. No.	Chainage Km		Side	Span details (m)	Length (m)	Deck Width m)			Foundation (raft/ pile/ well)	Sub Structure details	Super Structure details
	From	To				Total (end to end incl. footpath, crash barrier etc)	Carriageway width	Footpath & Crash barrier/ railing			
Section-1 from Km 320+810 to Km 326+000 (Retained 4 Lane)											
Nil.											
Section-2 from Km 326+000 to Km 361+000 (Ex. Km 360+300) (6 Lane)											
1	358+780	358+876	LHS (OUTER) (NEW)	2x37.28 + 1x31.28	105.84	1x10.1	1x7.5	1.5	Open Foundation	RCC Wall Type Abutment & RCC Circular Portal Pier	Composite Steel I Girder

S. No.	Chainage Km		Side	Span details (m)	Length (m)	Deck Width m)			Foundation (raft/ pile/ well)	Sub Structure details	Super Structure details
	From	To				Total (end to end incl. footpath, crash barrier etc)	Carriageway width	Footpath & Crash barrier/ railing			
			LHS (INNER) (OLD)	1x16.73+1x16.57+1x31.72 +1x16.72	81.64	1x9.6 (excluding median)	1x7.5	1.5	Open Foundation	RCC Wall Type Abutment & RCC Rectangular Portal Pier	Composite Steel I Girder
			RHS (INNER) (OLD)	1x16.73+1x16.57+1x31.72 +1x16.72	81.64	1x9.6 (excluding median)	1x7.5	1.5	Open Foundation	RCC Wall Type Abutment & RCC Rectangular Portal Pier	Composite Steel I Girder
			RHS (OUTER) (OLD)	2x37.28 + 1x31.28	105.84	1x10.1	1x7.5	1.5	Open Foundation	RCC Wall Type Abutment & RCC Circular Portal Pier	Composite Steel I Girder
Section-3 from Km 360+300 to Km 400+632 (Ex. Km 400+132) (6 Lane)											
Nil.											

Some photographs of above ROB's are given below: -

ROB AT Km 358+118

3.2.5 Details of Minor Bridges

A summary of Inventory of existing Minor Bridges is provided in Table below.

S. No.	Chainage Km		Side	Span details (m)	Bridge length (m)	Deck Width (m)			Foundation (raft/ pile/ well)	Sub Structure details	Super Structure details
	From	To				Total (end to end incl. footpath, crash barrier etc)	Carriageway width	Footpath & Crash barrier/ railing			
Section-1 from Km 320+810 to Km 326+000 (Retained 4 Lane)											
1	325+956	325+974	LHS	1x18		1X10.8	1x8	-	Not Visible	RCC Wall Type Abutment	RCC T-Girder
			(OLD)		18						
			RHS	1x18		1X9.5	1x7.5	-	Not Visible		RCC T-Girder

S. No.	Chainage Km		Side	Span details (m)	Bridge length (m)	Deck Width (m)			Foundation (raft/ pile/ well)	Sub Structure details	Super Structure details
	From	To				Total (end to end incl. footpath, crash barrier etc)	Carriageway width	Footpath & Crash barrier/ railing			
			(OLD)		18					RCC Wall Type Abutment	
Section-2 from Km 326+000 to Km 361+000 (Ex. Km 360+300) (6 Lane)											
2	326+474	326+485	LHS	1x11	11	1X15.2	1x12	1.5	Raft	RCC Box	RCC Box
			(NEW)								
			RHS INNER	1x11	11	1x10.5	1x8.8	-	Not Visible	RCC Wall Type Abutment	RCC Solid Slab
			(OLD)								
			RHS OUTER	1x11	11	1X8.5	1x7.5	-	Not Visible	RCC Wall Type Abutment	RCC Solid Slab
			(OLD)								
3	328+537	328+563	LHS	1X27.4	27.4	1X15.2	1x12	1.5	Open Foundation	RCC Wall Type Abutment	RCC T-Girder
			(NEW)								
			RHS INNER	1X26.6	26.6	1X10.8	1x9	-	Not Visible	RCC Wall Type Abutment	RCC T-Girder
			(OLD)								
			RHS OUTER	1X26.6	26.6	1X10.8	1x9	-	Not Visible	RCC Wall Type Abutment	RCC T-Girder
			(OLD)								
4	329+048	329+059	LHS	1x11.72	11.72	1x15.2	1x12	1.5	Raft	RCC Box	RCC Box
			(NEW)								
			RHS INNER	1x11.72	11.72	1x10.5	1x8.8	-	Not Visible		

S. No.	Chainage Km		Side	Span details (m)	Bridge length (m)	Deck Width (m)			Foundation (raft/ pile/ well)	Sub Structure details	Super Structure details
	From	To				Total (end to end incl. footpath, crash barrier etc)	Carriageway width	Footpath & Crash barrier/ railing			
			(OLD)							RCC Wall Type Abutment	RCC Solid Slab
			RHS OUTER	1x11.72	11.72	1x10.6	1x8.8	-	Not Visible	RCC Wall Type Abutment	RCC Solid Slab
			(OLD)								
5	329+401	329+438	LHS	1x37.2	37.2	1x15.2	1x12	1.5	Open Foundation	RCC Wall Type Abutment	PSC GIRDER
			(NEW)								
			RHS INNER	1x37.2	37.2	1x10.5	1x8	-	Not Visible	RCC Wall Type Abutment	PSC GIRDER
			(OLD)								
			RHS OUTER	1x37.2	37.2	1x10.5	1x8	-	Not Visible	RCC Wall Type Abutment	PSC GIRDER
			(OLD)								
6	330+130	330+150	LHS	1X19.33	19.33	1x15.2	1x12	1.5	Open Foundation	RCC Wall type Abutment	RCC T-Girder
			(NEW)								
			RHS INNER	1X19.33	19.33	1x10.5	1x8	-	Not Visible	RCC Wall type Abutment	RCC T-Girder
			(OLD)								
			RHS OUTER	2x9.665	19.33	1x10.5	1x8	-	Not Visible	RCC Wall type Abutment	RCC Solid slab
			(OLD)								
7	342+047	342+053	LHS	1X6.2	6.2	1x15.3	1x12.5	1.5	Raft	RCC Box	RCC Box

S. No.	Chainage Km		Side	Span details (m)	Bridge length (m)	Deck Width (m)			Foundation (raft/ pile/ well)	Sub Structure details	Super Structure details
	From	To				Total (end to end incl. footpath, crash barrier etc)	Carriageway width	Footpath & Crash barrier/ railing			
			(NEW)								
			RHS	1X6.2	6.2	1x15.3	1x12.5	1.5	Raft	RCC Box	RCC Box
			(NEW)								
8	343+735	343+759	LHS OUTER	1x24.2	24.2	1x11.8	1x9.0	1.5	Open Foundation	RCC Wall type Abutment	PSC Girder
			(NEW)								
			LHS INNER	3x8.0	24	1x9.4	1x7.5	-	Not Visible	RCC Wall type Abutment & Pier	Arch Type with Deck slab
			(OLD)								
			RHS INNER	1X24.2	24.2	1x10.9	1x9.0	-	Not Visible	RCC Wall type Abutment	PSC Girder
			(OLD)								
			RHS OUTER	1X24.2	24.2	1x11.3	1x8.5	1.5	Open Foundation	RCC Wall type Abutment	PSC Girder
			(NEW)								
9	348+400	348+420	LHS	1X19.20	19.2	1x15.2	1x12.5	1.5	Open Foundation	RCC Wall type Abutment	RCC Solid slab
			(NEW)								
			RHS INNER	1X19.20	19.2	1x10.9	1x9.0	-	Not Visible	RCC Wall type Abutment	RCC T-Girder
			(OLD)								
			RHS OUTER	2x9.6	19.2	1x10.9	1x9.0	-	Not Visible	SM Wall type	Arch Type with Deck slab
			(OLD)								

S. No.	Chainage Km		Side	Span details (m)	Bridge length (m)	Deck Width (m)			Foundation (raft/ pile/ well)	Sub Structure details	Super Structure details
	From	To				Total (end to end incl. footpath, crash barrier etc)	Carriageway width	Footpath & Crash barrier/ railing			
										Abutment & Pier	
10	348+819	348+839	LHS (NEW)	2X20.20	40.4	1x15.2	1x12.5	1.5	Open Foundation	RCC Wall type Abutment & Pier	RCC T-Girder
			RHS INNER (OLD)	4X10.1	40.4	1x9.4	1x7.5	-	Not Visible	RCC Wall type Abutment & Pier	Arch Type with Deck slab
			RHS OUTER (OLD)	2X20.20	40.4	1x9.4	1x7.5	-	Not Visible	RCC Wall type Abutment & Pier	RCC T-Girder
11	350+154	350+209	LHS (NEW)	2X27.40	54.8	1x15.3	1x12.5	1.5	Open Foundation	RCC Wall type Abutment & Pier	PSC Girder
			RHS INNER (OLD)	2X27.40	54.8	1x9.4	1x7.5	-	Not Visible	RCC Wall type Abutment & Pier	PSC Girder
			RHS OUTER (OLD)	2X27.40	54.8	1x9.4	1x7.5	-	Not Visible	RCC Wall type Abutment & Pier	PSC Girder

S. No.	Chainage Km		Side	Span details (m)	Bridge length (m)	Deck Width (m)			Foundation (raft/ pile/ well)	Sub Structure details	Super Structure details
	From	To				Total (end to end incl. footpath, crash barrier etc)	Carriageway width	Footpath & Crash barrier/ railing			
12	360+436	360+444	LHS OUTER (NEW)	1X8.85	8.85	1x11.3	1x8.5	1.5	Raft	RCC Box	RCC Box
			LHS INNER (OLD)	1X8.85	8.85	1x9.4	1x9.0	-	Raft	RCC Box	RCC Box
			RHS INNER (OLD)	1X8.85	8.85	1x9.4	1x9.0	-	Raft	RCC Box	RCC Box
			RHS OUTER (NEW)	1X8.85	8.85	1x11.3	1x8.5	1.5	Raft	RCC Box	RCC Box
13	360+628	360+671	LHS OUTER (NEW)	2X22.0	44	1x11.7	1x9.0	1.5	Open Foundation	RCC Wall type Abutment & Pier	RCC Box Girder
			LHS INNER (OLD)	2X21.4	42.8	1x10.9	1x9.0	-	Not Visible	RCC Wall type Abutment & Pier	RCC T-Girder
			RHS INNER (OLD)	2X21.4	42.8	1x10.9	1x9.0	-	Not Visible	RCC Wall type Abutment & Pier	RCC T-Girder
			RHS OUTER (NEW)	2X22.0	44	1x11.7	1x9.0	1.5	Open Foundation	RCC Wall type Abutment & Pier	RCC Box Girder
Section-3 from Km 360+300 to Km 400+632 (Ex. Km 400+132) (6 Lane)											

S. No.	Chainage Km		Side	Span details (m)	Bridge length (m)	Deck Width (m)			Foundation (raft/ pile/ well)	Sub Structure details	Super Structure details
	From	To				Total (end to end incl. footpath, crash barrier etc)	Carriageway width	Footpath & Crash barrier/ railing			
14	361+883	361+889	LHS (OUTER)	1X6.0	6	1x11.7	1x9.0	1.5	Raft	RCC Box	RCC Box
			(NEW)								
			LHS (INNER)	1X6.0	6	1x13.9	1x13.0	-	Raft	RCC Box	RCC Box
			(OLD)								
			RHS (INNER)	1X6.0	6	1x13.9	1x13.0	-	Raft	RCC Box	RCC Box
			(OLD)								
			RHS (OUTER)	1X6.0	6	1x11.7	1x9.0	1.5	Raft	RCC Box	RCC Box
			(NEW)								
15	362+250	362+256	LHS (OUTER)	1X6.0	6	1x11.7	1x9.0	1.5	Raft	RCC Box	RCC Box
			(NEW)								
			LHS (INNER)	1X6.0	6	1x13.9	1x13.0	-	Raft	RCC Box	RCC Box
			(OLD)								
			RHS (INNER)	1X6.0	6	1x13.9	1x13.0	-	Raft	RCC Box	RCC Box
			(OLD)								
			RHS (OUTER)	1X6.0	6	1x11.7	1x9.0	1.5	Raft	RCC Box	RCC Box
			(NEW)								
16	363+897	363+927	LHS (OUTER)	1X29.540	29.54	1x11.7	1x9.0	1.5	Open Foundation	RCC Wall type Abutment	PSC Girder
			(NEW)								
			LHS (INNER)	3X9.847	29.54	1x8.8	1x7.5	-	Not Visible	RCC Wall type	RCC Solid slab
			(OLD)								

S. No.	Chainage Km		Side	Span details (m)	Bridge length (m)	Deck Width (m)			Foundation (raft/ pile/ well)	Sub Structure details	Super Structure details
	From	To				Total (end to end incl. footpath, crash barrier etc)	Carriageway width	Footpath & Crash barrier/ railing			
										Abutment & Pier	
			RHS (INNER)	1X29.540	29.54	1x10.7	1x9.0	-	Not Visible	RCC Wall type Abutment	PSC Girder
			(OLD)								
			RHS (OUTER)	1X29.540	29.54	1x11.7	1x9.0	1.5	Open Foundation	RCC Wall type Abutment	PSC Girder
			(NEW)								
17	365+112	365+122	LHS (OUTER)	1X9.250	9.25	1x11.7	1x9.0	1.5	Raft	RCC Box	RCC Box
			(NEW)								
			LHS (INNER)	1X9.250	9.25	1x13.9	1x13.0	-	Raft	RCC Box	RCC Box
			(OLD)								
			RHS (INNER)	1X9.450	9.45	1x13.9	1x13.0	-	Raft	RCC Box	RCC Box
			(OLD)								
			RHS (OUTER)	1X9.450	9.45	1x11.7	1x9.0	1.5	Raft	RCC Box	RCC Box
			(NEW)								
18	366+225	366+233	LHS	1X8.5	8.5	1x15.8	1x12.5	1.5	Raft	RCC Box	RCC Box
			(OLD)								
			RHS	1X8.5	8.5	1x15.8	1x12.5	1.5	Raft	RCC Box	RCC Box
			(OLD)								
19	366+589	366+607	LHS (OUTER)	1X18.980	18.98	1x11.7	1x9.0	1.5	Open Foundation	RCC Wall type Abutment	RCC Girder
			(NEW)								

S. No.	Chainage Km		Side	Span details (m)	Bridge length (m)	Deck Width (m)			Foundation (raft/ pile/ well)	Sub Structure details	Super Structure details
	From	To				Total (end to end incl. footpath, crash barrier etc)	Carriageway width	Footpath & Crash barrier/ railing			
			LHS (INNER) (OLD)	2X9.445	18.89	1x8.8	1x7.5	-	Not Visible	RCC Wall type Abutment & Pier	RCC Solid slab
			RHS (INNER) (OLD)	1X18.980	18.98	1x10.8	1x9.0	-	Not Visible	RCC Wall type Abutment	RCC Girder
			RHS (OUTER) (NEW)	1X18.980	18.98	1x11.7	1x9.0	1.5	Open Foundation	RCC Wall type Abutment	RCC Girder
20	369+565	369+585	LHS (OUTER) (NEW)	1X20.73	20.73	1x11.7	1x9.0	1.5	Open Foundation	RCC Wall type Abutment	RCC Girder
			LHS (INNER) (OLD)	2X10.365	20.73	1x8.8	1x7.5	-	Not Visible	RCC Wall type Abutment & Pier	RCC Solid slab
			RHS (INNER) (OLD)	1X20.79	20.79	1x10.8	1x9.0	-	Not Visible	RCC Wall type Abutment	RCC Girder
			RHS (OUTER) (NEW)	1X20.79	20.79	1x11.7	1x9.0	1.5	Open Foundation	RCC Wall type Abutment	RCC Girder
21	371+631	371+657	LHS (OUTER) (NEW)	1X25.71	25.71	1x10.2	1x7.5	1.5	Open Foundation	RCC Wall type Abutment	PSC Girder

S. No.	Chainage Km		Side	Span details (m)	Bridge length (m)	Deck Width (m)			Foundation (raft/ pile/ well)	Sub Structure details	Super Structure details
	From	To				Total (end to end incl. footpath, crash barrier etc)	Carriageway width	Footpath & Crash barrier/ railing			
			LHS (INNER)	3X8.57	25.71	1x8.8	1x7.5	-	Not Visible	RCC Wall type Abutment & Pier	RCC Solid slab
			(OLD)								
			RHS (INNER)	1X25.70	25.7	1x10.8	1x8.5	-	Not Visible	RCC Wall type Abutment	PSC Girder
			(OLD)								
			RHS (OUTER)	1X25.70	25.7	1x10.2	1x7.5	1.5	Open Foundation	RCC Wall type Abutment	PSC Girder
			(NEW)								
22	372+673	372+679	LHS	1X6.0	6	1x15.2	1x12.5	1.5	Raft	RCC Box	RCC Box
			(OLD)								
			RHS	1X6.0	6	1x15.2	1x12.5	1.5	Raft	RCC Box	RCC Box
			(OLD)								
23	373+579	373+615	LHS	2X18.075	36.15	1x15.2	1x12.5	-	Open Foundation	RCC Wall type Abutment & Pier	RCC Girder
			(NEW)								
			RHS INNER	5X7	35	1x8.5	1x7.5	-	Not Visible	Stone masonry wall type Abutment & Pier	RCC Solid slab
			(OLD)								
			RHS OUTER	2X14.4 + 1x7.1	35.9	1x10.8	1x9.0	-	Not Visible		RCC Girder/

S. No.	Chainage Km		Side	Span details (m)	Bridge length (m)	Deck Width (m)			Foundation (raft/ pile/ well)	Sub Structure details	Super Structure details
	From	To				Total (end to end incl. footpath, crash barrier etc)	Carriageway width	Footpath & Crash barrier/ railing			
			(OLD)							RCC Wall type Abutment & Pier	
24	377+001	377+010	LHS (OUTER)	1X8.8	8.8	1x11.7	1x9.0	1.5	Raft	RCC Box	RCC Box
			(NEW)								
			LHS (INNER)	1X8.8	8.8	1x13.9	1x13.0	-	Raft	RCC Box	RCC Box
			RHS (INNER)	1X8.8	8.8	1x13.9	1x13.0	-	Raft	RCC Box	RCC Box
			RHS (OUTER)	1X8.8	8.8	1x11.7	1x9.0	1.5	Raft	RCC Box	RCC Box
			(NEW)								
25	379+757	379+773	LHS	1X16.700	16.7	1x15.3	1x12.5	-	Open Foundation	RCC Wall type Abutment	RCC T-Girder
			(NEW)								
			RHS INNER	2X8.350	16.7	1x8.5	1x7.5	-	Not Visible	RCC Wall type Abutment & Pier	RCC Solid slab
			(OLD)								
			RHS OUTER	1X16.700	16.7	1x10.5	1x9.0	-	Not Visible	RCC Wall type Abutment	RCC T-Girder
			(OLD)								
26	380+637	380+655	LHS	1X18.750	18.75	1x15.3	1x12.5	-	Open Foundation	RCC Wall type Abutment	RCC T-Girder
			(NEW)								
			RHS INNER	2X9.350	18.7	1x8.5	1x7.5	-	Not Visible		

S. No.	Chainage Km		Side	Span details (m)	Bridge length (m)	Deck Width (m)			Foundation (raft/ pile/ well)	Sub Structure details	Super Structure details
	From	To				Total (end to end incl. footpath, crash barrier etc)	Carriageway width	Footpath & Crash barrier/ railing			
			(OLD)							RCC Wall type Abutment & Pier	RCC Solid slab
			RHS OUTER (OLD)	1X18.750	18.75	1x10.5	1x9.0	-	Not Visible	RCC Wall type Abutment	RCC T-Girder
27	381+697	381+715	LHS (NEW)	1X17.750	17.75	1x15.2	1x12.5	-	Open Foundation	RCC Wall type Abutment	RCC T-Girder
			RHS INNER (OLD)	2X8.875	17.75	1x8.5	1x7.5	-	Not Visible	RCC Wall type Abutment & Pier	RCC Solid slab
			RHS OUTER (OLD)	1X17.750	17.75	1x10.5	1x9.0	-	Not Visible	RCC Wall type Abutment	RCC T-Girder
28	383+650	383+656	LHS (OUTER) (NEW)	1X6.0	6	1x11.7	1x9.0	1.5	Raft	RCC Box	RCC Box
			LHS (INNER)	1X6.0	6	1x13.9	1x13.0	-	Raft	RCC Box	RCC Box
			RHS (INNER)	1X6.0	6	1x13.9	1x13.0	-	Raft	RCC Box	RCC Box
			RHS (OUTER) (NEW)	1X6.0	6	1x11.7	1x9.0	1.5	Raft	RCC Box	RCC Box
29	387+267	387+275	LHS	1X8.2	8.2	1x16	1x12.5	1.5	Raft	RCC Box	RCC Box

S. No.	Chainage Km		Side	Span details (m)	Bridge length (m)	Deck Width (m)			Foundation (raft/ pile/ well)	Sub Structure details	Super Structure details
	From	To				Total (end to end incl. footpath, crash barrier etc)	Carriageway width	Footpath & Crash barrier/ railing			
			(OLD)								
			RHS	1X8.2	8.2	1x16	1x12.5	1.5	Raft	RCC Box	RCC Box
			(OLD)								
30	398+332	398+358	LHS SR (OUTER)	1X26.5	26.5	1x11.7	1x9.0	1.5	Open Foundation	RCC Wall type Abutment	PSC Girder
			(NEW)								
			LHS MCW (OUTER)	1X26.5	26.5	1x11.7	1x10.8	-	Open Foundation	RCC Wall type Abutment	PSC Girder
			(NEW)								
			LHS MCW (INNER)	3X8.86	26.58	1x8.5	1x7.5	-	Not Visible	RCC Wall type Abutment & Pier	RCC Solid slab
			(OLD)								
			RHS MCW (INNER)	1X26.5	26.5	1x10.7	1x8.8	-	Not Visible	RCC Wall type Abutment	PSC Girder
			(OLD)								
			RHS MCW (OUTER)	1X26.5	26.5	1x11.7	1x10.8	-	Open Foundation	RCC Wall type Abutment	PSC Girder
			(NEW)								
			RHS SR (OUTER)	1X26.5	26.5	1x11.7	1x9.0	1.5	Open Foundation	RCC Wall type Abutment	PSC Girder
			(NEW)								
31	399+744	399+753	LHS (OUTER)	1X8.9	8.9	1x11.7	1x9.0	1.5	Raft	RCC Box	RCC Box
			(NEW)								

S. No.	Chainage Km		Side	Span details (m)	Bridge length (m)	Deck Width (m)			Foundation (raft/ pile/ well)	Sub Structure details	Super Structure details
	From	To				Total (end to end incl. footpath, crash barrier etc)	Carriageway width	Footpath & Crash barrier/ railing			
			LHS (INNER)	1X8.9	8.9	1x13.9	1x13.0	-	Raft	RCC Box	RCC Box
			RHS (INNER)	1X8.9	8.9	1x13.9	1x13.0	-	Raft	RCC Box	RCC Box
			RHS (OUTER) (NEW)	1X8.9	8.9	1x11.7	1x9.0	1.5	Raft	RCC Box	RCC Box
32	390+317	390+370	LHS (OUTER)	4X12.5	50	1x11.7	1x9.0	1.5	Raft	RCC Box	RCC Box
			LHS (INNER)	4X12.5	50	1x13.4	1x12.5	-	Raft	RCC Box	RCC Box
			RHS (INNER)	4X12.5	50	1x13.4	1x12.5	-	Raft	RCC Box	RCC Box
			RHS (OUTER)	4X12.5	50	1x11.7	1x9.0	1.5	Raft	RCC Box	RCC Box
33	391+096	391+130	LHS (OUTER) (NEW)	4X8.0	32	1x11.7	1x9.0	1.5	Raft	RCC Box	RCC Box
			LHS (INNER) (OLD)	4X8.0	32	1x13.4	1x12.5	-	Raft	RCC Box	RCC Box
			RHS (INNER)	4X8.0	32	1x13.4	1x12.5	-	Raft	RCC Box	RCC Box
			RHS (OUTER) (NEW)	4X8.0	32	1x11.7	1x9.0	1.5	Raft	RCC Box	RCC Box

*Mentioned span for RCC BOX is Clear Span

Some photographs of above Minor Bridges are given below: -

Minor Bridge at Km 348+112

Minor Bridge at Km 360+440

Minor Bridge at Km 380+646

Minor Bridge at Km 391+113

3.2.6 Details of Light Vehicular Underpasses (LVUP)/ Vehicular underpass Grade II

A summary of Inventory of existing Light Vehicular Underpasses is provided in Table below.

S. No.	Chainage Km	Side	Span Arrangement (m)	Length(m)	Deck Width (m)	Vertical Clearance (m)	Foundation (raft/ pile/ well)	Sub Structure	Super Structure
Section-1 from Km 320+810 to Km 326+000 (Retained 4 Lane)									
Nil.									
Section-2 from Km 326+000 to Km 361+000 (Ex. Km 360+300) (6 Lane)									
1	339+223	LHS (NEW)	1x12.0	12.00	1x13.5	4.0	Raft	RCC Box	RCC Box
		RHS (NEW)	1x12.0	12.00	1x13.5	4.0	Raft	RCC Box	RCC Box
Section-3 from Km 360+300 to Km 400+632 (Ex. Km 400+132) (6 Lane)									
Nil.									

3.2.7 Details of Vehicular Underpasses VUP

A summary of Inventory of existing Vehicular Underpasses is provided in Table below.

S. No.	Chainage Km	Side	Span Arrangement (m)	Length (m)	Deck Width (m)	Vertical Clearance (m)	Foundation (raft/ pile/ well)	Sub Structure	Super Structure
Section-1 from Km 320+810 to Km 326+000 (Retained 4 Lane)									
Nil.									
Section-2 from Km 326+000 to Km 361+000 (Ex. Km 360+300) (6 Lane)									
1	332+100	LHS (NEW)	1x21.0	21.00	1x13.5	5.5	Not Visible	RCC Wall Type Abutment	RCC Solid Slab
		RHS (NEW)	1x21.0	21.00	1x13.5	5.5	Not Visible	RCC Wall Type Abutment	RCC Solid Slab
2	333+225	LHS (NEW)	2x12.000	24.00	1x13.5	5.5	Raft	RCC Box	RCC Box

S. No.	Chainage Km	Side	Span Arrangement (m)	Length (m)	Deck Width (m)	Vertical Clearance (m)	Foundation (raft/ pile/ well)	Sub Structure	Super Structure
		RHS (NEW)	2x12.000	24.00	1x13.5	5.5	Raft	RCC Box	RCC Box
3	336+390	LHS (NEW)	1x21.0	21.00	1x13.5	5.5	Not Visible	RCC Wall Type Abutment	RCC Solid Slab
		RHS (NEW)	1x21.0	21.00	1x13.5	5.5	Not Visible	RCC Wall Type Abutment	RCC Solid Slab
4	354+384	LHS (NEW)	1x21.0	21.00	1x13.5	5.5	Not Visible	RCC Wall Type Abutment	RCC Solid Slab
		RHS (NEW)	1x21.0	21.00	1x13.5	5.5	Not Visible	RCC Wall Type Abutment	RCC Solid Slab
5	355+870	LHS (NEW)	1x15.7	15.70	1x18.0	5.5	Not Visible	RCC Wall Type Abutment	RCC Solid Slab
		RHS (NEW)	1x15.7	15.70	1x18.0	5.5	Not Visible	RCC Wall Type Abutment	RCC Solid Slab
6	357+636	LHS (NEW)	1x12.31	12.31	1x13.5	5.5	Raft	RCC Box	RCC Box
		RHS (NEW)	1x12.31	12.31	1x13.5	5.5	Raft	RCC Box	RCC Box
7	359+570	LHS (NEW)	1x21.0	21.00	1x13.5	5.5	Not Visible	RCC Wall Type Abutment	RCC Solid Slab
		RHS (NEW)	1x21.0	21.00	1x13.5	5.5	Not Visible	RCC Wall Type Abutment	RCC Solid Slab
Section-3 from Km 360+300 to Km 400+632 (Ex. Km 400+132) (6 Lane)									
8	362+680	LHS (NEW)	1x22.2	22.20	1x13.5	5.5	Open Foundation	RCC Wall Type Abutment	RCC Girder
		RHS (NEW)	1x22.2	22.20	1x13.5	5.5	Open Foundation	RCC Wall Type Abutment	RCC Girder
9	368+522	LHS (NEW)	1x22.21	22.21	1x13.5	5.5	Not Visible	RCC Wall Type Abutment	RCC Girder
		RHS (NEW)	1x22.21	22.21	1x13.5	5.5	Not Visible	RCC Wall Type Abutment	RCC Girder
10	370+425	LHS	1x22.27	22.27	1x13.5	5.5	Not Visible	RCC Wall Type	RCC Girder

S. No.	Chainage Km	Side	Span Arrangement (m)	Length (m)	Deck Width (m)	Vertical Clearance (m)	Foundation (raft/ pile/ well)	Sub Structure	Super Structure
		(NEW)						Abutment	
		RHS (NEW)	1x22.27	22.27	1x13.5	5.5	Not Visible	RCC Wall Type Abutment	RCC Girder
11	374+295	LHS (NEW)	1x22.22	22.22	1x13.5	5.5	Open Foundation	RCC Wall Type Abutment	RCC Girder
		RHS (NEW)	1x22.22	22.22	1x13.5	5.5	Open Foundation	RCC Wall Type Abutment	RCC Girder
12	384+400	LHS (NEW)	1x22.29	22.29	1x13.5	5.5	Not Visible	RCC Wall Type Abutment	RCC Girder
		RHS (NEW)	1x22.29	22.29	1x13.5	5.5	Not Visible	RCC Wall Type Abutment	RCC Girder
13	390+160	LHS (NEW)	1x25.00	25.00	1x13.5	5.5	Not Visible	RCC Wall Type Abutment	PSC Girder
		RHS (NEW)	1x25.00	25.00	1x13.5	5.5	Not Visible	RCC Wall Type Abutment	PSC Girder
14	390+900	LHS (NEW)	2x12.00	24.00	1x13.5	5.5	Not Visible	RCC Wall Type Abutment	RCC BOX
		RHS (NEW)	2x12.00	24.00	1x13.5	5.5	Not Visible	RCC Wall Type Abutment	RCC BOX
15	392+532	LHS (NEW)	1x24.60	24.60	1x14.1	5.5	Open Foundation	RCC Wall Type Abutment	PSC Girder
		RHS (NEW)	1x24.60	24.60	1x14.1	5.5	Open Foundation	RCC Wall Type Abutment	PSC Girder
16	395+750	LHS (NEW)	1x22.20	22.20	1x13.5	5.5	Open Foundation	RCC Wall Type Abutment	RCC Girder
		RHS (NEW)	1x22.20	22.20	1x13.5	5.5	Open Foundation	RCC Wall Type Abutment	RCC Girder

Some photographs of above VUP are given below: -

VUP at Km 332+050

VUP at Km 384+400

3.2.8 Details of Pedestrian/Cattle Underpasses (PUP/CUP)

A summary of Inventory of existing Vehicle Underpasses is provided in Table below.

S. No.	EXISTING CHAINAGE	LHS/RHS	SPAN ARRANGEMENT (EXPANSION JOINT TO EXPANSION JOINT) (m)	LENGTH OF BRIDGE FACE TO FACE OF DIRT WALL (m)	CARRIAGEWAY WIDTH BETWEEN KERBS (m)	TOTAL OUTER WIDTH OF BRIDGE (m)	Sub Structure	Super Structure
Section-1 From 320+810 to 326+000 (4 Lane Retained)								
Nil.								
Section-2 From Km 326+000 to 361+000 (Ex. Km 360+300) (6 Lane)								
1	346+780	LHS	1x7.0	7.0	3.5	1x13.5	RCC Box	RCC Box slab
		RHS	1x7.0	7.0	3.5	1x13.5	RCC Box	RCC Box slab

PUP at Km 346+800

S. No.	EXISTING CHAINAGE	LHS/RHS	SPAN ARRANGEMENT (EXPANSION JOINT TO EXPANSION JOINT) (m)	LENGTH OF BRIDGE FACE TO FACE OF DIRT WALL (m)	CARRIAGEWAY WIDTH BETWEEN KERBS (m)	TOTAL OUTER WIDTH OF BRIDGE (m)	Sub Structure	Super Structure
Section-3 From 361+040 (Ex. Km 360+300) to 400+632 (Ex. Km 400+132) (6 Lane)								
2	384+590	LHS	1x5	5.0	3.0	1x13.5	RCC Box	RCC Box slab
		RHS	1x5	5.0	3.0	1x13.5	RCC Box	RCC Box slab
3	392+160	LHS	1x10.5	10.5	4.0	1x13.5	RCC Box	RCC Box slab
		RHS	1x10.5	10.5	4.0	1x13.5	RCC Box	RCC Box slab
4	400+870	LHS	1x7.0	7.0	3.0	1x13.5	RCC Box	RCC Box slab
		RHS	1x7.0	7.0	3.0	1x13.5	RCC Box	RCC Box slab

Some photographs of above PUP/CUP are given below: -

3.2.9 Details of Foot Over Bridge (FOB)

A summary of Inventory of existing Foot Over Bridge is provided in Table below.

S. NO.	BRIDGE NO.	EXISTING CHAINAGE	LHS/ RHS/ BHS	SPAN ARRANGEMENT (EXPANSION JOINT TO EXPANSION JOINT) (m)	LENGTH OF BRIDGE FACE TO FACE OF DIRT WALL (m)	CARRIAGEWAY WIDTH BETWEEN KERBS (m)	TOTAL OUTER WIDTH OF BRIDGE (m)	SUPERSTRUCTURE TYPE	SUB - STRUCTURE TYPE
Section-1 From 320+810 to 326+000 (4 Lane Retained)									
Nil.									
Section-2 From Km 326+000 to 361+000 (Ex. Km 360+300) (6 Lane)									
1	FOB BHS	337+345	BHS	2 X 20	40	NA	3.5	Steel	Steel column
2	FOB BHS	340+250	BHS	2 X 20	40	NA	3.5	Steel	Steel column
3	FOB BHS	350+630	BHS	2 X 20	40	NA	3.5	Steel	Steel column
Section-3 From 361+000 (Ex. Km 360+300) to 400+632 (Ex. Km 400+132) (6 Lane)									
4	FOB BHS	360+550	BHS	2 X 20	40	NA	3.5	Steel	Steel column
5	FOB BHS	366+955	BHS	2 X 20	40	NA	3.5	Steel	Steel column
6	FOB BHS	364+480	BHS	2 X 20	40	NA	3.5	Steel	Steel column
7	FOB BHS	372+440	BHS	2 X 20	40	NA	3.5	Steel	Steel column
8	FOB BHS	393+850	BHS	2 X 20	40	NA	3.5	Steel	Steel column

S. NO.	BRIDGE NO.	EXISTING CHAINAGE	LHS/ RHS/ BHS	SPAN ARRANGEMENT (EXPANSION JOINT TO EXPANSION JOINT) (m)	LENGTH OF BRIDGE FACE TO FACE OF DIRT WALL (m)	CARRIAGEWAY WIDTH BETWEEN KERBS (m)	TOTAL OUTER WIDTH OF BRIDGE (m)	SUPERSTRUCTURE TYPE	SUB - STRUCTURE TYPE
9	FOB BHS	399+380	BHS	2 X 20	40	NA	3.5	Steel	Steel column
10	FOB BHS	400+450	BHS	2 X 20	40	NA	3.5	Steel	Steel column

Some photographs of above Foot Over Bridge are given below: -

FOB at Km 364+480

3.2.10 Details of Elevated Structure

A summary of Inventory of existing Elevated Structure is provided in Table below.

S.NO.	EXISTING CHAINAGE	LHS/RHS/ BHS	SPAN ARRANGEMENT (EXPANSION JOINT TO EXPANSION JOINT) (m)	LENGTH OF BRIDGE FACE TO FACE OF DIRT WALL (m)	CARRIAGEWAY WIDTH BETWEEN KERBS (m)	TOTAL OUTER WIDTH OF BRIDGE (m)	SUPERSTRUCTURE TYPE	SUB - STRUCTURE TYPE
Section-1 From 320+810 to 326+000 (4 Lane Retained)								
Nil.								
Section-2 From Km 326+000 to 361+000 (Ex. Km 360+300) (6 Lane)								
Nil.								
Section-3 From 361+000 (Ex. Km 360+300) to 400+632 (Ex. Km 400+132) (6 Lane)								
Nil.								

3.3 HYDRAULIC PERFORMANCE OF EXISTING BRIDGES

During inventory and condition surveys not much data about hydraulic performance of existing bridges could be obtained. However, as per local enquiry and water mark of the surrounding structures, it is found that all structures are hydraulically adequate. No overtopping was observed during the monsoon season of 2025.

3.4 CONDITION SURVEY OF EXISTING BRIDGES

The visual condition survey of all the existing structures was carried out as per provisions.

3.4.1 Culverts

A summary of Condition Survey of existing Culverts is provided in Table below.

Pipe Culvert

S. No.	Chainage Km	Type of Culvert	Span Arrangement (m)	Proposed Repair & Rehabilitation
Pipe Culverts				
Section-1 From 320+810 to 326+000 (4 Lane Retained)				
1	320+924	Pipe culvert	1x1.2	Cleaning of Debris and Vegetation is Required
2	322+649	Pipe culvert	1x1	Cleaning of Debris and Vegetation is Required
3	323+599	Pipe culvert	1x1	Cleaning of Debris and Vegetation is Required
Section-2 From Km 326+000 to 361+000 (Ex. Km 360+300) (6 Lane)				
4	326+610	Pipe culvert	1x1.2	Cleaning of Debris and Vegetation is Required
5	329+608	Pipe culvert	1x1	Cleaning of Debris and Vegetation is Required
6	331+029	Pipe culvert	1x1	Cleaning of Debris and Vegetation is Required
7	331+659	Pipe culvert	1x1	Cleaning of Debris and Vegetation is Required
8	337+373	Pipe culvert	1x1.2	Cleaning of Debris and Vegetation is Required
9	338+374	Pipe culvert	3x0.9	Cleaning of Debris and Vegetation is Required
10	339+883	Pipe culvert	2x0.9	Cleaning of Debris and Vegetation is Required
11	340+452	Pipe culvert	2x1	Cleaning of Debris and Vegetation is Required
12	340+619	Pipe culvert	2x0.9	Cleaning of Debris and Vegetation is Required
13	342+764	Pipe culvert	2x1	Cleaning of Debris and Vegetation is Required
14	344+537	Pipe culvert	2x1	Cleaning of Debris and Vegetation is Required
15	346+335	Pipe culvert	2x1	Cleaning of Debris and Vegetation is Required
16	349+779	Pipe culvert	2x0.9	Cleaning of Debris and Vegetation is Required
17	352+620	Pipe culvert	1x1	Cleaning of Debris and Vegetation is Required
18	353+087	Pipe culvert	2x1	Cleaning of Debris and Vegetation is Required
19	353+549	Pipe culvert	1x1	Cleaning of Debris and Vegetation is Required
20	355+002	Pipe culvert	2x1	Cleaning of Debris and Vegetation is Required
21	355+127	Pipe culvert	2x1	Cleaning of Debris and Vegetation is Required
22	355+207	Pipe culvert	2x1	Cleaning of Debris and Vegetation is Required
23	359+578	Pipe culvert	1x1.2	Cleaning of Debris and Vegetation is Required
Section-3 From 361+000 (Ex. Km 360+300) to 400+632 (Ex. Km 400+132) (6 Lane)				
24	361+262	Pipe culvert	4x1	Cleaning of Debris and Vegetation is Required

S. No.	Chainage Km	Type of Culvert	Span Arrangement (m)	Proposed Repair & Rehabilitation
25	362+625	Pipe culvert	3x0.9	Cleaning of Debris and Vegetation is Required
26	362+978	Pipe culvert	2x0.9	Cleaning of Debris and Vegetation is Required
27	363+128	Pipe culvert	2x1	Cleaning of Debris and Vegetation is Required
28	364+578	Pipe culvert	3x1	Cleaning of Debris and Vegetation is Required
29	364+855	Pipe culvert	2x1	Cleaning of Debris and Vegetation is Required
30	366+745	Pipe culvert	2x0.9	Cleaning of Debris and Vegetation is Required
31	367+845	Pipe culvert	6x1	Cleaning of Debris and Vegetation is Required
32	368+869	Pipe culvert	1x1	Cleaning of Debris and Vegetation is Required
33	369+009	Pipe culvert	2x1	Cleaning of Debris and Vegetation is Required
34	369+366	Pipe culvert	2x1	Cleaning of Debris and Vegetation is Required
35	370+354	Pipe culvert	1x1	Cleaning of Debris and Vegetation is Required
36	371+251	Pipe culvert	4x1	Cleaning of Debris and Vegetation is Required
37	374+702	Pipe culvert	3x1.2	Cleaning of Debris and Vegetation is Required
38	374+859	Pipe culvert	3x1.2	Cleaning of Debris and Vegetation is Required
39	375+234	Pipe culvert	3x1.2	Cleaning of Debris and Vegetation is Required
40	378+786	Pipe culvert	1x0.9	Cleaning of Debris and Vegetation is Required
41	379+091	Pipe culvert	2x1.2	Cleaning of Debris and Vegetation is Required
42	379+887	Pipe culvert	2x1	Cleaning of Debris and Vegetation is Required
43	384+963	Pipe culvert	1x0.9	Cleaning of Debris and Vegetation is Required
44	385+705	Pipe culvert	2x1	Cleaning of Debris and Vegetation is Required
45	386+064	Pipe culvert	3x1.2	Cleaning of Debris and Vegetation is Required
46	387+792	Pipe culvert	1x1	Cleaning of Debris and Vegetation is Required
47	388+685	Pipe culvert	3x1	Cleaning of Debris and Vegetation is Required
48	389+768	Pipe culvert	2x1.2	Cleaning of Debris and Vegetation is Required
49	393+250	Pipe culvert	1x1	Cleaning of Debris and Vegetation is Required
50	395+960	Pipe culvert	2x1	Cleaning of Debris and Vegetation is Required
51	399+925	Pipe culvert	2x1	Cleaning of Debris and Vegetation is Required
52	400+581	Pipe culvert	1x0.9	Cleaning of Debris and Vegetation is Required

Box/Slab Culvert

S. No.	Chainage Km	Type of Culvert	Span Arrangement (m)	Proposed Repair & Rehabilitation
Box Culverts				
Section-1 From 320+810 to 326+000 (4 Lane Retained)				
1	321+428	Box Culvert	1x1.5	Cleaning of Debris and Vegetation is Required
Section-2 From Km 326+000 to 361+000 (Ex. Km 360+300) (6 Lane)				
2	332+510	Box Culvert	1X3	PUP
3	334+160	Box Culvert	1X3	PUP
4	337+949	Box Culvert	1x2	Cleaning of Debris and Vegetation is Required
5	339+061	Box Culvert	1x6	Cleaning of Debris and Vegetation is Required
6	342+496	Box Culvert	1x3	Cleaning of Debris and Vegetation is Required
7	344+377	Box Culvert	1x4.1	Cleaning of Debris and Vegetation is Required

S. No.	Chainage Km	Type of Culvert	Span Arrangement (m)	Proposed Repair & Rehabilitation
8	345+912	Box Culvert	1x5	Cleaning of Debris and Vegetation is Required
9	346+805	Box Culvert	1X3	PUP
10	346+884	Box Culvert	1x4	Cleaning of Debris and Vegetation is Required
11	351+210	Box Culvert	1x5	Cleaning of Debris and Vegetation is Required
12	351+573	Box Culvert	1x2	Cleaning of Debris and Vegetation is Required
13	352+060	Box Culvert	1x2	Cleaning of Debris and Vegetation is Required
14	352+329	Box Culvert	1x1.2	Cleaning of Debris and Vegetation is Required
15	352+971	Box Culvert	1x4	Cleaning of Debris and Vegetation is Required
16	353+431	Box Culvert	1x2	Cleaning of Debris and Vegetation is Required
17	353+858	Box Culvert	1x1.5	Cleaning of Debris and Vegetation is Required
18	353+937	Box Culvert	1x2	Cleaning of Debris and Vegetation is Required
19	354+327	Box Culvert	1x4	Cleaning of Debris and Vegetation is Required
20	358+980	Box Culvert	1X3	PUP
21	359+945	Box Culvert	1x2	Cleaning of Debris and Vegetation is Required
22	360+814	Box Culvert	1x5	Cleaning of Debris and Vegetation is Required
Section-3 From 361+000 (Ex. Km 360+300) to 400+632 (Ex. Km 400+132) (6 Lane)				
23	362+819	Box Culvert	1x3	Cleaning of Debris and Vegetation is Required
24	362+864	Box Culvert	1x3	Cleaning of Debris and Vegetation is Required
25	363+641	Box Culvert	1x2	Cleaning of Debris and Vegetation is Required
26	364+181	Box Culvert	1x1	Cleaning of Debris and Vegetation is Required
27	365+310	Box Culvert	1x1.7	Cleaning of Debris and Vegetation is Required
28	365+754	Box Culvert	1x2	Cleaning of Debris and Vegetation is Required
29	365+876	Box Culvert	1x2	Cleaning of Debris and Vegetation is Required
30	366+941	Box Culvert	1x2	Cleaning of Debris and Vegetation is Required
31	367+514	Box Culvert	1x2.4	Cleaning of Debris and Vegetation is Required
32	367+676	Box Culvert	1x1.8	Cleaning of Debris and Vegetation is Required
33	367+769	Box Culvert	1x2	Cleaning of Debris and Vegetation is Required
34	368+356	Box Culvert	1x2	Cleaning of Debris and Vegetation is Required
35	368+477	Box Culvert	1x2	Cleaning of Debris and Vegetation is Required
36	368+715	Box Culvert	3x3	Cleaning of Debris and Vegetation is Required
37	369+988	Box Culvert	1x1.5	Cleaning of Debris and Vegetation is Required
38	370+206	Box Culvert	1x5	Cleaning of Debris and Vegetation is Required
39	371+037	Box Culvert	1x2	Cleaning of Debris and Vegetation is Required
40	373+107	Box Culvert	1x1.5	Cleaning of Debris and Vegetation is Required
41	373+874	Box Culvert	1x3	Cleaning of Debris and Vegetation is Required
42	373+974	Box Culvert	1x2	Cleaning of Debris and Vegetation is Required
43	374+382	Box Culvert	1x3	Cleaning of Debris and Vegetation is Required
44	375+438	Box Culvert	1x1.5	Cleaning of Debris and Vegetation is Required
45	377+274	Box Culvert	1x2	Cleaning of Debris and Vegetation is Required
46	377+438	Box Culvert	1x2.2	Cleaning of Debris and Vegetation is Required
47	377+915	Box Culvert	1x2	Cleaning of Debris and Vegetation is Required
48	378+223	Box Culvert	1x2	Cleaning of Debris and Vegetation is Required
49	378+562	Box Culvert	1x2.2	Cleaning of Debris and Vegetation is Required
50	378+953	Box Culvert	1x1.5	Cleaning of Debris and Vegetation is Required

S. No.	Chainage Km	Type of Culvert	Span Arrangement (m)	Proposed Repair & Rehabilitation
51	379+432	Box Culvert	1x2	Cleaning of Debris and Vegetation is Required
52	379+536	Box Culvert	1x2.3	Cleaning of Debris and Vegetation is Required
53	379+701	Box Culvert	1x1.5	Cleaning of Debris and Vegetation is Required
54	380+150	Box Culvert	1x1.5	Cleaning of Debris and Vegetation is Required
55	380+887	Box Culvert	1x1	Cleaning of Debris and Vegetation is Required
56	381+057	Box Culvert	1x2	Cleaning of Debris and Vegetation is Required
57	381+977	Box Culvert	1x2	Cleaning of Debris and Vegetation is Required
58	382+037	Box Culvert	1x1.5	Cleaning of Debris and Vegetation is Required
59	382+719	Box Culvert	1x4.2	Cleaning of Debris and Vegetation is Required
60	383+328	Box Culvert	1x1.2	Cleaning of Debris and Vegetation is Required
61	383+455	Box Culvert	1x2	Cleaning of Debris and Vegetation is Required
62	383+911	Box Culvert	1x1.2	Cleaning of Debris and Vegetation is Required
63	384+839	Box Culvert	1x1.5	Cleaning of Debris and Vegetation is Required
64	385+456	Box Culvert	1x2	Cleaning of Debris and Vegetation is Required
65	388+424	Box Culvert	1x1.6	Cleaning of Debris and Vegetation is Required
66	388+506	Box Culvert	1x1.6	Cleaning of Debris and Vegetation is Required
67	388+608	Box Culvert	1x 1.1	Cleaning of Debris and Vegetation is Required
68	389+004	Box Culvert	1x1.1	Cleaning of Debris and Vegetation is Required
69	389+342	Box Culvert	1x2	Cleaning of Debris and Vegetation is Required
70	389+479	Box Culvert	1x3	Cleaning of Debris and Vegetation is Required
71	389+971	Box Culvert	1x2	Cleaning of Debris and Vegetation is Required
72	393+102	Box Culvert	1x1.5	Cleaning of Debris and Vegetation is Required
73	393+681	Box Culvert	1x1.5	Cleaning of Debris and Vegetation is Required
74	393+872	Box Culvert	1x1	Cleaning of Debris and Vegetation is Required
75	394+247	Box Culvert	1x1.6	Cleaning of Debris and Vegetation is Required
76	394+356	Box Culvert	1x2.1	Cleaning of Debris and Vegetation is Required
77	395+318	Box Culvert	1x3	Cleaning of Debris and Vegetation is Required
78	395+523	Box Culvert	1x1.5	Cleaning of Debris and Vegetation is Required
79	396+229	Box Culvert	1x3	Cleaning of Debris and Vegetation is Required
80	396+402	Box Culvert	1x3	Cleaning of Debris and Vegetation is Required
81	396+693	Box Culvert	1x3	Cleaning of Debris and Vegetation is Required
82	397+015	Box Culvert	1x1.8	Cleaning of Debris and Vegetation is Required
83	399+350	Box Culvert	1x4.4	Cleaning of Debris and Vegetation is Required
84	332+420	Box Culvert	1x3	Cleaning of Debris and Vegetation is Required
85	333+040	Box Culvert	1x3	Cleaning of Debris and Vegetation is Required
86	334+990	Box Culvert	1x3	Cleaning of Debris and Vegetation is Required
87	334+030	Box Culvert	1x3	Cleaning of Debris and Vegetation is Required
88	334+285	Box Culvert	1x3	Cleaning of Debris and Vegetation is Required
89	335+770	Box Culvert	1x3	Cleaning of Debris and Vegetation is Required
90	336+330	Box Culvert	1x3	Cleaning of Debris and Vegetation is Required
91	391+700	Box Culvert	1x3	Cleaning of Debris and Vegetation is Required
92	392+280	Box Culvert	1x3	Cleaning of Debris and Vegetation is Required

3.4.2 Major Bridge

A summary of Condition Survey of existing Major Bridges are provided in Table below.

S. No.	Existing Chainage (Km)	LHS/RHS	SPAN ARRANGEMENT (EXPANSION JOINT TO EXPANSION JOINT) (m)	OBSERVATION	RECOMMENDATION
Section-1 From 320+810 to 326+000 (4 Lane Retained)					
Nil.					
Section-2 From Km 326+000 to 361+000 (Ex. Km 360+300) (6 Lane)					
1	333+340	LHS (NEW)	2x25 + 2x25.6	1.Leaching observed on Abutments. 2. Neoprene sealing material damaged at expansion joints. 3. Honeycombing observed in Spans 1, 2, 3, 4 and Substructure (P1, P2, P3). 4. Growth of vegetation observed on side slopes. 5. Plywood sheets observed at bearing locations.	1.Seal cracks and apply waterproof coating on abutments. 2. Replace damaged neoprene sealing material in expansion joints. 3. Repair honeycombed areas with polymer-modified mortar. 4. Remove vegetation and restore slope protection. 5. Remove plywood sheets and ensure proper bearing seating.
		RHS(NEW)	2x25 + 2x25.6	1. Leaching is observed on Abutments. 2. Neoprene Sealing material is Damaged in expansion joints. 3. Honey combing is observed on superstructure and Dirt wall. 4. Growth of vegetation is observed on side slope. 5. Plywood sheets are observed at bearings position.	1.Seal cracks and apply waterproof coating on abutments. 2. Replace damaged neoprene sealing material in expansion joints. 3. Repair honeycombed areas with polymer-modified mortar. 4. Remove vegetation and restore slope protection. 5. Remove plywood sheets and ensure proper bearing seating.
2	335+300	LHS (NEW)	3x20	1. Cracks are observed on approaches 2. Neoprene Sealing material is not visible covered with debris. 3. Leaching is observed on abutments.	1.Repair cracks on approaches. 2. Clear debris and replace or expose neoprene sealing material in expansion joints. 3. Treat leaching on abutments by cleaning, repairing, and applying protective coating.
		RHS(NEW)	3x20	1. Cracks are observed on approaches 2. Neoprene Sealing material is damaged	1.Repair cracks on approaches. 2.Replace damaged neoprene sea

S. No.	Existing Chainage (Km)	LHS/RHS	SPAN ARRANGEMENT (EXPANSION JOINT TO EXPANSION JOINT) (m)	OBSERVATION	RECOMMENDATION
				3. Minor honey combing, Leaching is observed on abutments. 4. Honey combing is observed on deck slab.	l2. Replace in expansion joints. 3. Remove loose concrete, repair minor honeycombing, and treat leaching on abutments. 4. Repair honeycombed areas on the deck slab with polymer-modified cement mortar.
3	358+157	LHS (OUTER) (NEW)	2x19.5 + 2x32	1. Cracks are observed on Pavement surface. 2. Growth of vegetation is observed side slope. 3. Honey combing is observed on retaining wall. 4. Leaching is observed on Abutments and piers. 5. Minor honey combing is observed on deck slab. 6. Debris are observed around the bearings. 7. Neoprene sealing material is damaged in expansion joints and covered with debris.	1.Repair cracks on the pavement surface. 2.Remove vegetation from pitched side slopes and apply preventive treatment. 3.Remove loose concrete and repair honeycombing on retaining walls. 4.Treat leaching on abutments and piers by cleaning, repairing, and applying protective coating. 5.Repair minor honeycombing on the deck slab with polymer-modified cement mortar. 6.Remove debris around bearings and ensure proper seating. 7.Clear debris and replace damaged neoprene sealing material in expansion joints.
		LHS (INNER) (OLD)	2x18.8 + 2x32	1. Growth of vegetation is observed side slope. 2. Minor honey combing is observed on deck slab. 3. Neoprene sealing material is damaged in expansion joints. 4. Drainage spouts are partially clogged.	1.Remove vegetation from pitched side slopes and apply preventive treatment. 2. Repair minor honeycombing on the deck slab using polymer-modified cement mortar. 3. Replace damaged neoprene sealing material in expansion joints. 4. Clean partially clogged drainage spouts to ensure proper flow.

S. No.	Existing Chainage (Km)	LHS/RHS	SPAN ARRANGEMENT (EXPANSION JOINT TO EXPANSION JOINT) (m)	OBSERVATION	RECOMMENDATION
		RHS (INNER) (OLD)	2x18.8 + 2x32	1. Growth of vegetation is observed side slope .2. Minor honey combing is observed on deck slab. 3. Neoprene sealing material is damaged in expansion joints. 4. Drainage spouts are partially clogged.	1.Remove vegetation from pitched side slopes and apply preventive treatment. 2.Repair minor honeycombing on the deck slab using polymer-modified cement mortar. 3.Replace damaged neoprene sealing material in expansion joints. 4.Clean partially clogged drainage spouts to ensure proper flow.
		RHS (OUTER) (NEW)	2x19.5 + 2x32	1. Cracks are observed on Pavement surface. 2.Growth of vegetation is observed side slope. 3. Neoprene sealing material is not visible covered with debris. 4. Debris are observed around the bearings. 5. Reinforcement is exposed on deck slab. 6. Leaching is observed on Retaining wall.	1.Repair cracks on the pavement surface. 2.Remove vegetation from pitched side slopes and apply preventive treatment. 3.Clear debris and expose/replace neoprene sealing material in expansion joints. 4.Remove debris around bearings and ensure proper seating. 5.Clean, treat, and patch exposed reinforcement on the deck slab. 6.Treat leaching on retaining wall by cleaning, repairing, and applying protective coating.
Section-3 From 361+000 (Ex. Km 360+300) to 400+632 (Ex. Km 400+132) (6 Lane)					
Nil.					

3.4.3 Flyover

A summary of Condition Survey of existing Flyover's is provided in Table below.

S. No.	Existing Chainage (Km)	LHS/RHS	SPAN ARRANGEMENT (EXPANSION JOINT TO EXPANSION JOINT) (m)	OBSERVATION	RECOMMENDATION
Section-1 From 320+810 to 326+000 (4 Lane Retained)					
Nil.					
Section-2 From Km 326+000 to 361+000 (Ex. Km 360+300) (6 Lane)					
Nil.					
Section-3 From 361+000 (Ex. Km 360+300) to 400+632 (Ex. Km 400+132) (6 Lane)					
Nil.					

3.4.4 Rail Over Bridge (ROB)

A summary of Condition Survey of existing ROB's are provided in Table below.

S. No.	EXISTING CHAINAGE	LHS/RHS	SPAN ARRANGEMENT (EXPANSION JOINT TO EXPANSION JOINT) (m)	OBSERVATION	RECOMENDATION
Section-1 From 320+810 to 326+000 (4 Lane Retained)					
Nil.					
Section-2 From Km 326+000 to 361+000 (Ex. Km 360+300) (6 Lane)					
1	358+828	LHS (OUTER) (NEW)	2x37.28 + 1x31.28	1.Growth of vegetation is observed side slope. 2. Growth of vegetation is observed Retaining wall. 3. Leaching is observed on Abutments and Piers. 4. E1 Sealing material is not provided.	1.Remove vegetation from side slopes & apply preventive treatment. 2. Remove vegetation from retaining wall & apply preventive treatment. 3. Treat leaching on abutment & piers by cleaning & repairing and apply protective coating. 44. Provide sealing material in E1.
		LHS (INNER) (OLD)	1x16.73+1x16.57+1x31.72 +1x16.72	1. Cracks and Uneven surface observed on pavement surface. 2. Growth of vegetation is observed side slope. 3. Leaching and Growth of vegetation is observed Retaining wall. 4. Leaching and Growth of vegetation is observed on Abutments. 5. Cracks are observed on edge beam of the expansion joints. 6. Drainage spouts are partially clogged. 7. Growth of vegetation is observed on edge of the deck slab.	1.Repair Cracks & level Unevenness on pavement surface. 2.Remove vegetation from side slopes & apply preventive treatment. 3.Treat leaching on retaining wall by cleaning & repairing, remove vegetation and apply protective coating. 4.Treat leaching on retaining wall by cleaning & repairing, remove vegetation and apply protective coating. 5.Repair cracks at edge beam of expansion joints. 6.Clean & flush clogged drainage spouts. 7.Remove vegetation from edge of deck slab & apply preventive treatment.

S. No.	EXISTING CHAINAGE	LHS/RHS	SPAN ARRANGEMENT (EXPANSION JOINT TO EXPANSION JOINT) (m)	OBSERVATION	RECOMENDATION
		RHS (INNER) (OLD)	1x16.73+1x16.57+1x31.72 +1x16.72	1. Cracks and Uneven surface observed on pavement surface. 2. Growth of vegetation is observed side slope. 3. Leaching and Growth of vegetation is observed Retaining wall. 4. Leaching and Growth of vegetation is observed on Abutments. 5. Cracks are observed on edge beam of the expansion joints. 6. Drainage spouts are partially clogged. 7. Growth of vegetation is observed on edge of the deck slab.	1.Repair Cracks & level Unevenness on pavement surface. 2.Remove vegetation from side slopes & apply preventive treatment. 3.Treat leaching on retaining wall by cleaning & repairing, remove vegetation and apply protective coating. 4.Treat leaching on retaining wall by cleaning & repairing, remove vegetation and apply protective coating. 5.Repair cracks at edge beam of expansion joints. 6.Clean & flush clogged drainage spouts. 7.Remove vegetation from edge of deck slab & apply preventive treatment.
		RHS (OUTER) (OLD)	2x37.28 + 1x31.28	1. Growth of vegetation is observed side slope. 2. Growth of vegetation is observed Retaining wall. 3. Leaching is observed on Abutments and Piers.	1.Remove vegetation from side slopes & apply preventive treatment. 2. Remove vegetation from retaining wall & apply preventive treatment. 3. Treat leaching on abutment & piers by cleaning & repairing and apply protective coating.
Section-3 From 361+000 (Ex. Km 360+300) to 400+632 (Ex. Km 400+132) (6 Lane)					
Nil.					

3.4.5 Minor Bridges

A summary of Condition Survey of existing Minor Bridges are provided in Table below.

S. No.	Existing Chainage (Km)	LHS/RHS	SPAN ARRANGEMENT (EXPANSION JOINT TO EXPANSION JOINT) (m)	OBSERVATION	RECOMMENDATIONS
Section-1 From 320+810 to 326+000 (4 Lane Retained)					
1	325+965	LHS (OLD)	1x18	1. Cracks, Potholes and Unevenness observed on pavement surface. 2. Growth of vegetation observed on side slopes. 3. Leaching observed on Abutments. 4. Honeycombing observed on I Girders. 5. Minor Damaged observed on I Girder. 6. Expansion Joints sealing material is damaged. 7. Debris observed on Expansion joints. 8. Drainage spouts are clogged.	1.Repair cracks, potholes, and level uneven pavement surfaces. 2.Remove vegetation from side slopes and apply preventive treatment. 3.Treat leaching on abutments by cleaning, repairing, and applying protective coating. 4.Remove loose concrete and repair honeycombing on I-girders. 5.Repair minor damage on I-girders. 6.Replace damaged expansion joint sealing material. 7.Clear debris from expansion joints to ensure proper functioning. 8.Clean clogged drainage spouts to ensure proper flow.
		RHS (OLD)	1x18	1. Growth of vegetation observed on side slopes. 2. Leaching is observed on Abutments. 3. Honeycombing is observed on Girders. 4. Minor damaged edge of	1.Remove vegetation from side slopes and apply preventive treatment. 2.Treat leaching on abutments by cleaning, repairing, and applying protective coating. 3.Remove loose concrete and repair honeycombing on girders.

S. No.	Existing Chainage (Km)	LHS/RHS	SPAN ARRANGEMENT (EXPANSION JOINT TO EXPANSION JOINT) (m)	OBSERVATION	RECOMMENDATIONS
				the deck slab. 5. Leaching is observed on superstructure. 6. Expansion joints sealing material is damaged. 7. Debris observed on Expansion joints. 8. Drainage spouts are clogged. 9. Projections pipes are not provided.	4.Repair minor damaged edges of the deck slab. 5.Treat leaching on the superstructure by cleaning, repairing, and applying protective coating. 6.Replace damaged expansion joint sealing material. 7.Clear debris from expansion joints to ensure proper movement. 8.Clean clogged drainage spouts. 9.Provide projection pipes to ensure proper water discharge.
Section-2 From Km 326+000 to 361+000 (Ex. Km 360+300) (6 Lane)					
2	326+480	LHS (NEW)	1x11	1. Leaching observed on Abutments. 2. Growth of vegetation observed on side slopes. 3. Drainage Spouts clogged.	1.Treat leaching on abutments by cleaning, repairing, and applying protective coating. 2. Remove vegetation from side slopes and apply preventive treatment. 3. Clean and flush clogged drainage spouts to ensure proper flow.
		RHS INNER (OLD)	1x11	1. Growth of vegetation observed on side slopes. 2. Leaching observed on Abutments and Deck slab. 3. Drainage Spouts clogged. 4. Expansion joints sealing material is damaged.	1.Remove vegetation from side slopes and apply preventive treatment. 2. Treat leaching on abutments and deck slab by cleaning, repairing, and applying protective coating. 3. Clean and flush clogged drainage spouts. 4. Replace damaged expansion joint sealing

S. No.	Existing Chainage (Km)	LHS/RHS	SPAN ARRANGEMENT (EXPANSION JOINT TO EXPANSION JOINT) (m)	OBSERVATION	RECOMMENDATIONS
				5. Debris is observed on Expansion joints.	material. 5. Remove debris from expansion joints to ensure proper movement.
		RHS OUTER (OLD)	1x11	1. Growth of vegetation observed on side slopes. 2. Leaching observed on Abutments. 3. Drainage Spouts clogged.	1.Remove vegetation from side slopes and apply preventive treatment. 2. Treat leaching on abutments by cleaning, repairing, and applying protective coating. 3.Clean and flush clogged drainage spouts to ensure proper flow.
3	328+550	LHS (NEW)	1X27.4	1. Growth of vegetation observed on side slopes. 2. Leaching observed on Abutment. 3. Drainage Spouts are clogged. 4. Honeycombing is observed on Girders. 5. Cracks observed on Edge of the Expansion joint. 6. Debris is observed on Expansion joints.	1.Remove vegetation from side slopes and apply preventive treatment. 2.Treat leaching on abutment by cleaning, repairing, and applying protective coating. 3.Clean and flush clogged drainage spouts. 4.Remove loose concrete and repair honeycombing on girders. 5.Repair cracks at the edges of expansion joints. 6.Remove debris from expansion joints to ensure proper movement.

S. No.	Existing Chainage (Km)	LHS/RHS	SPAN ARRANGEMENT (EXPANSION JOINT TO EXPANSION JOINT) (m)	OBSERVATION	RECOMMENDATIONS
		RHS INNER (OLD)	1X26.6	1. Minor Honey combing is observed on girders. 2. Leaching is observed on abutments. 3. Cracks are observed on sealing material. 4. Drainage spouts are clogged, and projection pipes are not provided. 5. Growth of vegetation is observed on median wall. 6. Cracks are observed on handrail.	1.Repair minor honeycombing on girders with polymer-modified cement mortar. 2.Treat leaching on abutments by cleaning, repairing, and applying protective coating. 3.Replace or repair damaged sealing material in expansion joints. 4.Clean clogged drainage spouts and provide projection pipes for proper drainage. 5.Remove vegetation from the median wall and apply preventive treatment. 6.Repair cracks on the handrail.
		RHS OUTER (OLD)	1X26.6	1. Growth of vegetation is observed on side slope.	1.Remove vegetation from the retaining wall and apply preventive treatment.
4	329+054	LHS (NEW)	1x11.72	1. Growth of vegetation is observed on retaining wall. 2. Drainage Spouts partially clogged.	1.Remove vegetation from the retaining wall and apply preventive treatment. 2. Clean partially clogged drainage spouts to ensure proper flow.
		RHS INNER (OLD)	1x11.72	1. Expansion joints are filled with debris 2. Growth of vegetation on retaining wall & median wall 3. Drainage Spouts partially clogged.	1.Clear debris from expansion joints to ensure proper movement. 2. Remove vegetation from retaining and median walls and apply preventive treatment. 3. Clean partially clogged drainage

S. No.	Existing Chainage (Km)	LHS/RHS	SPAN ARRANGEMENT (EXPANSION JOINT TO EXPANSION JOINT) (m)	OBSERVATION	RECOMMENDATIONS
					spouts to restore proper flow.
		RHS OUTER (OLD)	1x11.72	1. Expansion joints are filled with debris. 2. Growth of vegetation on retaining wall. 3. Drainage Spouts partially clogged.	1.Clear debris from expansion joints to ensure proper movement. 2. Remove vegetation from retaining and median walls and apply preventive treatment. 3. Clean partially clogged drainage spouts to restore proper flow.
5	329+420	LHS (NEW)	1x37	1. Expansion joints are damaged. 2. Growth of vegetation around structure. 3. Drainage Spouts partially clogged.	1.Replace damaged expansion joints. 2. Remove vegetation around the structure and apply preventive treatment. 3. Clean partially clogged drainage spouts to ensure proper flow.
		RHS INNER (OLD)	1x37	1. Expansion joints are damaged. 2. Growth of vegetation around structure. 3. Drainage Spouts partially clogged. 4. Bearings need to be replaced	1.Replace damaged expansion joints. 2. Remove vegetation around the structure and apply preventive treatment. 3. Clean partially clogged drainage spouts to ensure proper flow. 4. Replace worn or damaged bearings.
		RHS OUTER (OLD)	1x37	1. Expansion joints are damaged. 2. Growth of vegetation around structure. 3. Drainage	1.Replace damaged expansion joints. 2. Remove vegetation around the structure and apply preventive treatment. 3. Clean partially

S. No.	Existing Chainage (Km)	LHS/RHS	SPAN ARRANGEMENT (EXPANSION JOINT TO EXPANSION JOINT) (m)	OBSERVATION	RECOMMENDATIONS
				Spouts partially clogged. 4. Bearings need to be replaced	clogged drainage spouts to ensure proper flow. 4. Replace worn or damaged bearings.
6	330+140	LHS (NEW)	1X19.33	1. Expansion joints are filled with debris. 2. Growth of vegetation around structure. 3. Drainage Spouts partially clogged.	1.Replace damaged elastomer in expansion joints. 2. Remove vegetation around the structure and apply preventive treatment. 3. Clean partially clogged drainage spouts to ensure proper flow.
		RHS INNER (OLD)	1X19.33	1. Expansion joints elastomer damage 2. Growth of vegetation around structure. 3. Drainage Spouts partially clogged. 4. Wearing Coat Damage on approaches	1.Replace damaged elastomer in expansion joints. 2. Remove vegetation around the structure and apply preventive treatment. 3. Clean partially clogged drainage spouts to ensure proper flow. 4. Repair or replace damaged wearing coat on approaches.
		RHS OUTER (OLD)	2x9.665	1. Growth of vegetation around structure.	1.Remove vegetation from the retaining wall and apply preventive treatment.
7	342+030	LHS (NEW)	1X6.2	1. Growth of vegetation around structure.	1.Remove vegetation from the retaining wall and apply preventive treatment.
		RHS (NEW)	1X6.2	1. Growth of vegetation around structure.	1.Remove vegetation from the retaining wall and apply preventive treatment.

S. No.	Existing Chainage (Km)	LHS/RHS	SPAN ARRANGEMENT (EXPANSION JOINT TO EXPANSION JOINT) (m)	OBSERVATION	RECOMMENDATIONS
8	343+747	LHS (OUTER) (NEW)	1x24.0	1. Expansion joints elastomer damage 2. Growth of vegetation around structure. 3. Drainage Spouts partially clogged.	1.Replace damaged elastomer in expansion joints. 2. Remove vegetation around the structure and apply preventive treatment. 3. Clean partially clogged drainage spouts to ensure proper flow.
		LHS (INNER) (OLD)	3x8.0	1. Growth of vegetation around structure.	1.Remove vegetation from the retaining wall and apply preventive treatment.
		RHS (INNER) (OLD)	1X24.0	1. Expansion joints elastomer damage 2. Growth of vegetation around structure. 3. Drainage Spouts partially clogged.	1.Replace damaged elastomer in expansion joints. 2. Remove vegetation around the structure and apply preventive treatment. 3. Clean partially clogged drainage spouts to ensure proper flow.
		RHS (OUTER) (OLD)	1X24.0	1. Expansion joints elastomer damage 2. Growth of vegetation around structure. 3. Drainage Spouts partially clogged.	1.Replace damaged elastomer in expansion joints. 2. Remove vegetation around the structure and apply preventive treatment. 3. Clean partially clogged drainage spouts to ensure proper flow.
9	348+410	LHS (NEW)	1X19.200	1. Expansion joints elastomer damage 2. Growth of vegetation around structure. 3. Drainage Spouts partially clogged.	1.Replace damaged elastomer in expansion joints. 2. Remove vegetation around the structure and apply preventive treatment. 3.Clean partially clogged drainage

S. No.	Existing Chainage (Km)	LHS/RHS	SPAN ARRANGEMENT (EXPANSION JOINT TO EXPANSION JOINT) (m)	OBSERVATION	RECOMMENDATIONS
					spouts to ensure proper flow.
		RHS INNER (OLD)	1X19.200	1. Expansion joints elastomer damage 2. Growth of vegetation around structure. 3. Drainage Spouts partially clogged. 4. Wearing Coat Damage on approaches	1.Replace damaged elastomer in expansion joints. 2. Remove vegetation around the structure and apply preventive treatment. 3. Clean partially clogged drainage spouts to ensure proper flow. 4.Repair or replace the damaged wearing coat on approaches.
		RHS OUTER (OLD)	2 X 9.6	1. Expansion joints elastomer damage 2. Growth of vegetation around structure. 3. Drainage Spouts partially clogged.	1.Replace damaged elastomer in expansion joints. 2. Remove vegetation around the structure and apply preventive treatment. 3. Clean partially clogged drainage spouts to ensure proper flow.
10	348+829	LHS (NEW)	2X20.200	1. Expansion joints are filled with debris 2. Growth of vegetation on retaining wall & median wall 3. Drainage Spouts partially clogged.	1.Replace damaged elastomer in expansion joints. 2. Remove vegetation around the structure and apply preventive treatment. 3. Clean partially clogged drainage spouts to ensure proper flow.

S. No.	Existing Chainage (Km)	LHS/RHS	SPAN ARRANGEMENT (EXPANSION JOINT TO EXPANSION JOINT) (m)	OBSERVATION	RECOMMENDATIONS
		RHS INNER (OLD)	4X10.1	1. Expansion joints are filled with debris 2. Growth of vegetation on retaining wall & median wall 3. Drainage Spouts partially clogged. 4. Wearing coat damage near expansion joint	1.Clear debris from expansion joints to ensure proper movement. 2. Remove vegetation from retaining and median walls and apply preventive treatment. 3. Clean partially clogged drainage spouts to restore proper flow. 4. Repair wearing coat damage near expansion joints.
		RHS OUTER (OLD)	2X20.200	1. Expansion joints are filled with debris 2. Growth of vegetation on retaining wall & median wall 3. Drainage Spouts partially clogged.	1.Clear debris from expansion joints to ensure proper movement. 2. Remove vegetation around the structure and apply preventive treatment. 3. Clean partially clogged drainage spouts to ensure proper flow.
11	350+182	LHS (NEW)	2X27.400	1. Expansion joints are filled with debris 2. Growth of vegetation on retaining wall & median wall 3. Drainage Spouts partially clogged. 4. Wearing coat damage near approaches	1.Clear debris from expansion joints to ensure proper movement. 2. Remove vegetation from retaining and median walls and apply preventive treatment. 3. Clean partially clogged drainage spouts to restore proper flow. 4. Repair wearing coat damage near approaches.
		RHS INNER (OLD)	2X27.400	1. Expansion joints are filled with debris 2. Growth of vegetation on	1.Replace damaged elastomer in expansion joints. 2. Remove vegetation around the structure

S. No.	Existing Chainage (Km)	LHS/RHS	SPAN ARRANGEMENT (EXPANSION JOINT TO EXPANSION JOINT) (m)	OBSERVATION	RECOMMENDATIONS
				retaining wall & median wall 3. Drainage Spouts partially clogged.	and apply preventive treatment. 3. Clean partially clogged drainage spouts to ensure proper flow.
		RHS OUTER (OLD)	2X27.400	1. Expansion joints are filled with debris 2. Growth of vegetation on retaining wall & median wall 3. Drainage Spouts partially clogged.	1.Replace damaged elastomer in expansion joints. 2. Remove vegetation around the structure and apply preventive treatment. 3. Clean partially clogged drainage spouts to ensure3. Clean flow.
12	360+440	LHS (OUTER) (NEW)	1X8.85	1. Growth of vegetation around structure. 2. Drainage Spouts partially clogged.	1.Remove vegetation around the structure and apply preventive treatment. 2. Clean partially clogged drainage spouts to ensure proper flow.
		LHS (INNER) (OLD)	1X8.85	1. Growth of vegetation around structure. 2. Drainage Spouts partially clogged.	1.Remove vegetation around the structure and apply preventive treatment. 2. Clean partially clogged drainage spouts to ensure proper flow.
		RHS (INNER) (OLD)	1X8.85	1. Growth of vegetation around structure. 2. Drainage Spouts partially clogged.	1.Remove vegetation around the structure and apply preventive treatment. 2. Clean partially clogged drainage spouts to ensure proper flow.
		RHS (OUTER) (NEW)	1X8.85	1. Growth of vegetation around structure. 2. Drainage Spouts partially clogged.	1.Remove vegetation around the structure and apply preventive treatment. 2. Clean partially clogged drainage

S. No.	Existing Chainage (Km)	LHS/RHS	SPAN ARRANGEMENT (EXPANSION JOINT TO EXPANSION JOINT) (m)	OBSERVATION	RECOMMENDATIONS
					spouts to ensure proper flow.
13	360+650	LHS (OUTER) (NEW)	2X22.0	1. Expansion joints are filled with debris 2. Growth of vegetation around structure 3. Drainage Spouts partially clogged.	1.Clear debris from expansion joints to ensure proper movement. 2. Remove vegetation around the structure and apply preventive treatment. 3.Clean partially clogged drainage spouts to ensure proper flow.
		LHS (INNER) (OLD)	2X21.4	1. Expansion joints are filled with debris 2. Growth of vegetation around structure 3. Drainage Spouts partially clogged.	1.Clear debris from expansion joints to ensure proper movement. 2. Remove vegetation around the structure and apply preventive treatment. 3. Clean partially clogged drainage spouts to ensure proper flow.
		RHS (INNER) (OLD)	2X21.4	1. Expansion joints are filled with debris 2. Growth of vegetation around structure 3. Drainage Spouts partially clogged.	1.Clear debris from expansion joints to ensure proper movement. 2. Remove vegetation around the structure and apply preventive treatment. 3. Clean partially clogged drainage spouts to ensure proper flow.
		RHS (OUTER) (NEW)	2X22.0	1. Expansion joints are filled with debris 2. Growth of vegetation around structure 3. Drainage	1.Clear debris from expansion joints to ensure proper movement. 2. Remove vegetation around the structure and apply preventive

S. No.	Existing Chainage (Km)	LHS/RHS	SPAN ARRANGEMENT (EXPANSION JOINT TO EXPANSION JOINT) (m)	OBSERVATION	RECOMMENDATIONS
				Spouts partially clogged.	treatment. 3. Clean partially clogged drainage spouts to ensure proper flow.
Section-3 From 361+000 (Ex. Km 360+300) to 401+332 (Ex. Km 400+632) (6 Lane)					
14	361+886	LHS (OUTER) (NEW)	1X6.0	1. Growth of vegetation around structure.	1.Remove vegetation from the retaining wall and apply preventive treatment.
		LHS (INNER) (OLD)	1X6.0	1. Growth of vegetation around structure.	1.Remove vegetation from the retaining wall and apply preventive treatment.
		RHS (INNER) (OLD)	1X6.0	1. Growth of vegetation around structure.	1.Remove vegetation from the retaining wall and apply preventive treatment.
		RHS (OUTER) (NEW)	1X6.0	1. Growth of vegetation around structure.	1.Remove vegetation from the retaining wall and apply preventive treatment.
15	362+253	LHS (OUTER) (NEW)	1X6.0	1. Growth of vegetation around structure.	1.Remove vegetation from the retaining wall and apply preventive treatment.
		LHS (INNER) (OLD)	1X6.0	1. Growth of vegetation around structure.	1.Remove vegetation from the retaining wall and apply preventive treatment.
		RHS (INNER) (OLD)	1X6.0	1. Growth of vegetation around structure.	1.Remove vegetation from the retaining wall and apply preventive treatment.
		RHS (OUTER) (NEW)	1X6.0	1. Growth of vegetation around structure.	1.Remove vegetation from the retaining wall and apply preventive treatment.
16	363+912	LHS (OUTER) (NEW)	1X29.540	1. Expansion joints are filled with debris 2. Growth of vegetation around structure	1.Clear debris from expansion joints to ensure proper movement. 2. Remove vegetation around the structure and apply preventive

S. No.	Existing Chainage (Km)	LHS/RHS	SPAN ARRANGEMENT (EXPANSION JOINT TO EXPANSION JOINT) (m)	OBSERVATION	RECOMMENDATIONS
				3. Drainage Spouts damage	treatment. 3. Clean partially clogged drainage spouts to ensure proper flow.
		LHS (INNER) (OLD)	3X9.847	1. Growth of vegetation around structure.	1.Remove vegetation from the retaining wall and apply preventive treatment.
		RHS (INNER) (OLD)	1X29.540	1. Expansion joints are filled with debris 2. Growth of vegetation around structure 3. Drainage Spouts are clogged	1.Clear debris from expansion joints to ensure proper movement. 2. Remove vegetation around the structure and apply preventive treatment. 3. Clean partially clogged drainage spouts to ensure proper flow.
		RHS (OUTER) (NEW)	1X29.540	1. Expansion joints are filled with debris 2. Growth of vegetation around structure 3. Drainage Spouts are clogged	1.Clear debris from expansion joints to ensure proper movement. 2. Remove vegetation around the structure and apply preventive treatment. 3. Clean clogged drainage spouts to ensure proper flow.
17	365+117	LHS (OUTER) (NEW)	1X9.250	1. Growth of vegetation around structure 2. Drainage Spouts damage	1.Remove vegetation around the structure and apply preventive treatment. 2. Clean partially clogged drainage spouts to ensure proper flow.
		LHS (INNER) (OLD)	1X9.250	1. Growth of vegetation around structure.	1.Remove vegetation from the retaining wall and apply preventive treatment.

S. No.	Existing Chainage (Km)	LHS/RHS	SPAN ARRANGEMENT (EXPANSION JOINT TO EXPANSION JOINT) (m)	OBSERVATION	RECOMMENDATIONS
		RHS (INNER) (OLD)	1X9.450	1. Growth of vegetation around structure.	1.Remove vegetation from the retaining wall and apply preventive treatment.
		RHS (OUTER) (NEW)	1X9.450	1. Growth of vegetation around structure 2. Drainage Spouts damage	1.Remove vegetation around the structure and apply preventive treatment. 2. Clean partially clogged drainage spouts to ensure proper flow.
18	366+229	LHS(OLD)	1X8.5	1. Growth of vegetation around structure 2. Drainage Spouts damage	1.Remove vegetation around the structure and apply preventive treatment. 2. Clean partially clogged drainage spouts to ensure proper flow.
		RHS(OLD)	1X8.5	1. Growth of vegetation around structure 2. Drainage Spouts damage	1.Remove vegetation around the structure and apply preventive treatment. 2. Clean partially clogged drainage spouts to ensure proper flow.
19	366+598	LHS (OUTER) (NEW)	1X18.980	1. Expansion joints are filled with debris 2. Growth of vegetation around structure3. Drainage Spouts are clogged	1.Clear debris from expansion joints to ensure proper movement. 2. Remove vegetation around the structure and apply preventive treatment. 3.Clean clogged drainage spouts to ensure proper flow.
		LHS (INNER) (OLD)	2X9.445	1. Wearing coat damage 2. Growth of vegetation around structure	1.Repair or replace the damaged wearing coat. 2. Remove vegetation around the structure and apply preventive treatment.

S. No.	Existing Chainage (Km)	LHS/RHS	SPAN ARRANGEMENT (EXPANSION JOINT TO EXPANSION JOINT) (m)	OBSERVATION	RECOMMENDATIONS
		RHS (INNER) (OLD)	1X18.980	1. Expansion joints are filled with debris 2. Growth of vegetation around structure	1.Clear debris from expansion joints to ensure proper movement. 2. Remove vegetation around the structure and apply preventive treatment.
		RHS (OUTER) (NEW)	1X18.980	1. Expansion joints are filled with debris 2. Growth of vegetation around structure	1.Clear debris from expansion joints to ensure proper movement. 2. Remove vegetation around the structure and apply preventive treatment.
20	369+575	LHS (OUTER) (NEW)	1X20.730	1. Honeycombing is observed on girder G2&G3 Girder. 2. Debris on expansion joints. 3. Cracks are observed on pavement surface. 4. Growth of vegetation on retaining wall.	1.Remove loose concrete and repair honeycombing on G2 and G3 girders with polymer-modified cement mortar. 2. Clear debris from expansion joints to ensure proper movement. 3. Repair cracks on the pavement surface. 4. Remove vegetation from the retaining wall and apply preventive treatment.
		LHS (INNER) (OLD)	2X10.365	1. Grouting is observed. 2. Growth of vegetation on retaining wall. 3. Drainage Spouts partially clogged.	1.Re-grout affected areas as required. 2. Remove vegetation from the retaining wall and apply preventive treatment. 3. Clean partially clogged drainage spouts3. Cleanure proper flow.

S. No.	Existing Chainage (Km)	LHS/RHS	SPAN ARRANGEMENT (EXPANSION JOINT TO EXPANSION JOINT) (m)	OBSERVATION	RECOMMENDATIONS
		RHS (INNER) (OLD)	1X20.790	1. Honeycombing is observed on girder G2&G3 Girder. 2. Debris on expansion joints. 3. Cracks are observed on pavement surface. 4. Growth of vegetation on retaining wall. 5. Patch work is observed on girders.	1.Remove loose concrete and repair honeycombing on G2 and G3 girders with polymer-modified cement mortar. 2.Clear debris from expansion joints to ensure proper movement. 3.Repair cracks on the pavement surface. 4.Remove vegetation from the retaining wall and apply preventive treatment. 5.Inspect patched areas on girders and redo or reinforce patch work if necessary.
		RHS (OUTER) (NEW)	1X20.790	1. Honeycombing is observed on girder G2&G3 Girder. 2. Debris on expansion joints. 3. Cracks are observed on pavement surface. 4. Growth of vegetation on retaining wall.	1.Remove loose concrete and repair honeycombing on G2 and G3 girders with polymer-modified cement mortar. 2. Clear debris from expansion joints to ensure proper movement. 3. Repair cracks on the pavement surface. 4. Remove vegetation from the retaining wall and apply preventive treatment.
21	371+645	LHS (OUTER) (NEW)	1X25.710	1. Expansion joints are filled with debris 2. Growth of vegetation around structure 3. Drainage Spouts are clogged	1.Clear debris from expansion joints to ensure proper movement. 2. Remove vegetation around the structure and apply preventive treatment. 3. Clean clogged drainage spouts to ensure proper flow.

S. No.	Existing Chainage (Km)	LHS/RHS	SPAN ARRANGEMENT (EXPANSION JOINT TO EXPANSION JOINT) (m)	OBSERVATION	RECOMMENDATIONS
		LHS (INNER) (OLD)	3X8.570	1. Growth of vegetation around structure 2. Drainage Spouts are clogged	1.Remove vegetation around the structure and apply preventive treatment. 2. Clean partially clogged drainage spouts to ensure proper flow.
		RHS (INNER) (OLD)	1X25.700	1. Expansion joints are filled with debris 2. Growth of vegetation around structure 3. Drainage Spouts are clogged	1.Clear debris from expansion joints to ensure proper movement. 2. Remove vegetation around the structure and apply preventive treatment. 3. Clean clogged drainage spouts to ensure proper flow.
		RHS (OUTER) (NEW)	1X25.700	1. Expansion joints are filled with debris 2. Growth of vegetation around structure 3. Drainage Spouts are clogged	1.Clear debris from expansion joints to ensure proper movement. 2. Remove vegetation around the structure and apply preventive treatment. 3. Clean clogged drainage spouts to ensure proper flow.
22	372+676	LHS(OLD)	1X6.0	1. Honey combing on slab is observed. 2. Cracks are observed on pavement surface. 3. Honey combing on abutment. 4. Growth of vegetation on retaining wall.	1.Remove loose concrete and repair honeycombing on the slab with polymer-modified cement mortar. 2. Repair cracks on the pavement surface. 3. Remove loose concrete and repair honeycombing on the abutment. 4. Remove vegetation from the retaining wall and apply preventive treatment.
		RHS (OLD)	1X6.0		

S. No.	Existing Chainage (Km)	LHS/RHS	SPAN ARRANGEMENT (EXPANSION JOINT TO EXPANSION JOINT) (m)	OBSERVATION	RECOMMENDATIONS
23	373+597	LHS (NEW)	2X18.075	1. Minor cracks on girder observed. 2. Debris are observed on expansion joint & E2 sealing damaged. 3. Drainage spouts are partially clogged. 4. Growth of vegetation retaining wall.	1.Repair minor cracks on girders using suitable crack repair method. 2. Clear debris from expansion joints and replace damaged E2 sealing material. 3.Clean partially clogged drainage spouts to restore proper flow. 4.Remove vegetation from the retaining wall and apply preventive treatment.
		RHS INNER (OLD)	5X7	1. Grouting is observed on slab & Spalling is observed on slab S-4. 2. Vegetation growth on retaining wall and pier. 3. Drainage spouts are clogged. 4. Cracks on pavement surface.	1.Re-grout affected areas and remove loose concrete, then repair spalling on slab S-4 with suitable patch material. 2. Remove vegetation from retaining walls and piers and apply preventive treatment. 3. Clean clogged drainage spouts to ensure proper flow. 4. Repair cracks on the pavement surface.
		RHS OUTER (OLD)	2X14.4 + 1x7.1	1. Honey combing is observed on slab S1,S2& G1,G2 Girder. 2. Cracks are pavement surface. 3. Growth of vegetation on pavement surface.	1.Remove loose concrete and repair honeycombing on slab S1, S2 and G1, G2 girders with polymer-modified cement mortar. 2. Repair cracks on the pavement surface. 3. Remove vegetation from the pavement surface and apply preventive treatment.

S. No.	Existing Chainage (Km)	LHS/RHS	SPAN ARRANGEMENT (EXPANSION JOINT TO EXPANSION JOINT) (m)	OBSERVATION	RECOMMENDATIONS
24	377+006	LHS (OUTER) (NEW)	1X8.8	1. Honey combing is observed on slab. 2. Leaching is observed on slab. 3. Debris on footpath. 4. Grouting is observed on LHS side.	1.Remove loose concrete and repair honeycombing on the slab with polymer-modified cement mortar. 2. Treat leaching on the slab by cleaning, repairing, and applying protective coating. 3. Remove debris from the footpath. 4. Inspect and redo grouting on the LHS side as required.
		LHS (INNER) (OLD)	1X8.8	1. Honey combing is observed on slab. 2. Leaching is observed on slab. 3. Debris on footpath. 4. Grouting is observed on LHS side.	1.Remove loose concrete and repair honeycombing on the slab with polymer-modified cement mortar. 2. Treat leaching on the slab by cleaning, repairing, and applying protective coating. 3. Remove debris from the footpath. 4. Inspect and redo grouting on the LHS side if required.
		RHS (INNER) (OLD)	1X8.8	1. Honey combing is observed on slab. 2. Leaching is observed on slab. 3. Debris on footpath. 4. Drainage spouts are clogged.	1.Remove loose concrete and repair honeycombing on the slab with polymer-modified cement mortar. 2. Treat leaching on the slab by cleaning, repairing, and applying protective coating. 3. Remove debris from the footpath. 4. Clean clogged drainage spouts to ensure proper flow.

S. No.	Existing Chainage (Km)	LHS/RHS	SPAN ARRANGEMENT (EXPANSION JOINT TO EXPANSION JOINT) (m)	OBSERVATION	RECOMMENDATIONS
		RHS (OUTER) (NEW)	1X8.8	1. Honey combing is observed on slab. 2. Leaching is observed on slab. 3. Debris on footpath. 4. Drainage spouts are clogged.	1.Remove loose concrete and repair honeycombing on the slab with polymer-modified cement mortar. 2. Treat leaching on the slab by cleaning, repairing, and applying protective coating. 3. Remove debris from the footpath. 4. Clean clogged drainage spouts to ensure proper flow.
25	379+765	LHS (NEW)	1X16.700	1. Debris on expansion joints & Footpath. 2. Minor cracks on Girder G1,G2,G3&G4. 3. Growth of vegetation on Retaining wall. 4. Drainage spouts are partially clogged.	1.Remove debris from expansion joints and footpath to ensure proper function. 2. Repair minor cracks on G1, G2, G3, and G4 girders. 3. Remove vegetation from retaining wall and apply preventive treatment. 4. Clean partially clogged drainage spouts to restore proper flow.
		RHS INNER (OLD)	2X8.350	1. Grouting is observed on slab. 2. Vegetation on retaining wall. 3. Spouts are clogged. 4. Cracks and potholes on pavement surface. 5. Growth of vegetation & Spalling is observed on pier.	1.Inspect and redo grouting on the slab as required. 2.Remove vegetation from the retaining wall and apply preventive treatment. 3.Clean clogged drainage spouts to ensure proper flow. 4.Repair cracks and potholes on the pavement surface. 5.Remove vegetation from piers, and repair spalling by treating exposed reinforcement

S. No.	Existing Chainage (Km)	LHS/RHS	SPAN ARRANGEMENT (EXPANSION JOINT TO EXPANSION JOINT) (m)	OBSERVATION	RECOMMENDATIONS
					and patching with suitable mortar.
		RHS OUTER (OLD)	1X16.700	1. Debris on expansion joints. 2. Minor cracks on Girder G1,G2,G3&G4. 3. Growth of vegetation on Retaining wall. 4. Drainage spouts are partially clogged.	1.Remove debris from expansion joints to ensure proper movement. 2. Repair minor cracks on G1, G2, G3, and G4 girders. 3. Remove vegetation from the retaining wall and apply preventive treatment. 4. Clean partially clogged drainage spouts to restore proper flow.
26	380+646	LHS (NEW)	1X18.750	1. Honeycombing is observed on abutment. 2. Minor Cracks on G1 & G2 Observed Girder. 3. Debris on expansion joint. 4. Drainage spouts are partially clogged. 5. Growth of vegetation on retaining wall.	1.Remove loose concrete and repair honeycombing on the abutment with polymer-modified cement mortar. 2. Repair minor cracks on G1 and G2 girders. 3. Clear debris from expansion joints to ensure proper movement. 4.Clean partially clogged drainage spouts to restore proper flow. 5.Remove vegetation from the retaining wall and apply preventive t5. Remove.

S. No.	Existing Chainage (Km)	LHS/RHS	SPAN ARRANGEMENT (EXPANSION JOINT TO EXPANSION JOINT) (m)	OBSERVATION	RECOMMENDATIONS
		RHS INNER (OLD)	2X9.350	1. Grouting is observed on slab. 2. Vegetation on retaining wall. 3. Spouts are clogged. 4. Cracks on pavement surface.	1.Inspect and redo grouting on the slab as required. 2. Remove vegetation from the retaining wall and apply preventive treatment. 3. Clean clogged drainage spouts to ensure proper flow. 4. Repair cracks on the pavement surface.
		RHS OUTER (OLD)	1X18.750	1. Honeycombing is observed on abutment. 2. Minor Cracks on G1 & G2 Observed Girder. 3. Debris on expansion joint. 4. Drainage spouts are partially clogged. 5. Growth of vegetation on retaining wall.	1.Remove loose concrete and repair honeycombing on the abutment with polymer-modified cement mortar. 2. Repair minor cracks on G1 and G2 girders. 3. Clear debris from expansion joints to ensure proper movement. 4. Clean partially clogged drainage spouts to restore proper flow. 5. Remove vegetation from the retaining wall and apply preventive treatment.
27	381+706	LHS (NEW)	1X17.750	1. Drainage spouts are partially clogged. 2. Debris on footpath.	1.Clean partially clogged drainage spouts to ensure proper flow. 2. Remove debris from the footpath.
		RHS INNER (OLD)	2X8.875	1. Grouting is observed on slab. 2. Vegetation on retaining wall. 3. Spouts are clogged. 4. Cracks on pavement surface.	1.Inspect and redo grouting on the slab as required. 2. Remove vegetation from the retaining wall and apply preventive treatment. 3. Clean clogged drainage spouts to

S. No.	Existing Chainage (Km)	LHS/RHS	SPAN ARRANGEMENT (EXPANSION JOINT TO EXPANSION JOINT) (m)	OBSERVATION	RECOMMENDATIONS
					ensure proper flow. 4. Repair cracks on the pavement surface.
		RHS OUTER (OLD)	1X17.750	1. Drainage spouts are partially clogged. 2. Debris on footpath. 3. Cracks are observed on pavement surface. 4. Cracks are observed on girder.	1.Clean partially clogged drainage spouts to restore proper flow. 2. Remove debris from the footpath. 3. Repair cracks on the pavement surface. 4. Repair cracks on the girder using suitable crack repair methods.
28	383+653	LHS (OUTER) (NEW)	1X6.0	1. Drainage spouts are partially clogged. 2. Debris on footpath.	1.Clean partially clogged drainage spouts to ensure proper flow. 2. Remove debris from the footpath.
		LHS (INNER) (OLD)	1X6.0		
		RHS (INNER) (OLD)	1X6.0		
		RHS (OUTER) (NEW)	1X6.0		
29	387+271	LHS(OLD)	1X8.2	1. Grouting is observed on substructure. 2. Drainage spouts are not provided. 3. Vegetation on retaining wall.	1.Inspect and redo grouting on the substructure as required. 2. Provide drainage spouts to ensure proper water discharge. 3. Remove vegetation from the retaining wall and apply preventive treatment.
		RHS(OLD)	1X8.2	1. Drainage spouts are partially clogged. 2. Vegetation on retaining wall.	1.Clean partially clogged drainage spouts to restore proper flow. 2. Remove vegetation from the retaining wall

S. No.	Existing Chainage (Km)	LHS/RHS	SPAN ARRANGEMENT (EXPANSION JOINT TO EXPANSION JOINT) (m)	OBSERVATION	RECOMMENDATIONS
					and apply preventive treatment.
30	398+345	LHS SR (OUTER) (NEW)	1X26.5	1. Expansion joints are filled with debris. 2. Drainage spouts are partially clogged. 3. Growth of vegetation on retaining wall. 4. Cracks are observed on pavement surface.	1.Clear debris from expansion joints to ensure proper movement. 2.Clean partially clogged drainage spouts to restore proper flow 3. Clean vegetation from the retaining wall and apply preventive treatment. 4. Repair cracks on the pavement surface.
		LHS MCW (OUTER) (NEW)	1X26.5	1. Grouting is observed. 2. Cracks are observed on pavement surface. 3. Growth of vegetation on retaining wall. 4. Drainage Spouts partially clogged.	1.Inspect and redo grouting as required. 2. Repair cracks on the pavement surface. 3. Remove vegetation from the retaining wall and apply preventive treatment. 4. Clean partially clogged drainage spouts to restore proper flow.
		LHS MCW (INNER) (OLD)	3X8.86	1. Drainage spouts are clogged. 2. Patch work is observed. 3. Projection needs to be provided. 4. Growth of vegetation is observed on side slopes retaining wall 5. Damage is observed on edge of the deck slab.	1.Clean clogged drainage spouts to restore proper flow. 2. Inspect and redo patch work if required. 3. Provide projection pipes for proper drainage. 4. Remove vegetation from side slopes and retaining wall and apply preventive treatment. 5. Repair damaged edges of the deck slab.

S. No.	Existing Chainage (Km)	LHS/RHS	SPAN ARRANGEMENT (EXPANSION JOINT TO EXPANSION JOINT) (m)	OBSERVATION	RECOMMENDATIONS
		RHS MCW (INNER) (OLD)	1X26.5	1. Drainage spouts are clogged. 2. Patch work is observed. 3. Projection needs to be provided. 4. Growth of vegetation is observed on side slopes retaining wall 5. Honey combing is observed on superstructure. 6. Expansion joints are filled with debris	1.Clean clogged drainage spouts to restore proper flow. 2.Inspect and redo patch work on the structure if required. 3.Provide projection pipes for proper drainage. 4.Remove vegetation from side slopes and retaining wall and apply preventive treatment. 5.Remove loose concrete and repair honeycombing on the superstructure. 6.Clear debris from expansion joints to ensure proper movement.
		RHS MCW (OUTER) (NEW)	1X26.5	1. Expansion joints are filled with debris. 2. Drainage spouts are partially clogged. 3. Growth of vegetation on retaining wall. 4. Patch work is observed on slab. 5. Cracks are observed on pavement surface.	1.Clear debris from expansion joints to ensure proper movement. 2. Clean partially clogged drainage spouts to restore proper flow. 3. Remove vegetation from the retaining wall and apply preventive treatment. 4. Inspect and redo patch work on the slab if required. 5. Repair cracks on the pavement surface.

S. No.	Existing Chainage (Km)	LHS/RHS	SPAN ARRANGEMENT (EXPANSION JOINT TO EXPANSION JOINT) (m)	OBSERVATION	RECOMMENDATIONS
		RHS SR (OUTER) (NEW)	1X26.5	1. Expansion joints are filled with debris. 2. Drainage spouts are partially clogged. 3. Growth of vegetation on retaining wall. 4. Cracks are observed on pavement surface. 5. B-3 Pedestal is minor damaged. 6. Honeycombing on Girder G1&G4.	1.Clear debris from expansion joints to ensure proper movement. 2.Clean partially clogged drainage spouts to restore proper flow. 3.Remove vegetation from the retaining wall and apply preventive treatment. 4.Repair cracks on the pavement surface. 5.Repair minor damage on B-3 pedestal. 6.Remove loose concrete and repair honeycombing on G1 and G4 girders.
31	399+749	LHS (OUTER) (NEW)	1X8.9	1. Honey combing is observed on superstructure. 2. Crash barrier is Damaged near Median. 3. Cracks are observed on Pavement surface. 4. Debris is observed on Footpath. 5. Leaching is observed on abutment. 6. Patch work is observed on abutment. 7. Vegetation on stone pitching & Retaining wall.	1.Remove loose concrete and repair honeycombing on the superstructure. 2.Repair or replace the damaged crash barrier near the median. 3.Repair cracks on the pavement surface. 4.Remove debris from the footpath. 5.Treat leaching on the abutment by cleaning, repairing, and applying protective coating. 6.Inspect and redo patch work on the abutment if required. 7.Remove vegetation from stone pitching and retaining wall and apply preventive treatment.

S. No.	Existing Chainage (Km)	LHS/RHS	SPAN ARRANGEMENT (EXPANSION JOINT TO EXPANSION JOINT) (m)	OBSERVATION	RECOMMENDATIONS
		LHS (INNER) (OLD)	1X8.9	1. Honey combing is observed on superstructure. 2. Crash barrier is Damaged near Median. 3. Cracks are observed on Pavement surface. 4. Debris is observed on Footpath. 5. Leaching is observed on abutment. 6. Patch work is observed on abutment. 7. Vegetation on stone pitching & Retaining wall.	1.Remove loose concrete and repair honeycombing on the superstructure. 2.Repair or replace the damaged crash barrier near the median. 3.Repair cracks on the pavement surface. 4.Remove debris from the footpath. 5.Treat leaching on the abutment by cleaning, repairing, and applying protective coating. 6.Inspect and redo patch work on the abutment if required. 7.Remove vegetation from stone pitching and retaining wall, and apply preventive treatment.
		RHS (INNER) (OLD)	1X8.9	1. Honey combing is observed on superstructure. 2. Cracks are observed on Pavement surface. 3. Debris is observed on Footpath. 4. Leaching is observed on abutment. 5. Patch work is observed on abutment. 6. Vegetation on stone pitching & Retaining wall. 7. Drainage spouts are Not provided	1.Remove loose concrete and repair honeycombing on the superstructure. 2.Repair cracks on the pavement surface. 3.Remove debris from the footpath. 4.Treat leaching on the abutment by cleaning, repairing, and applying protective coating. 5.Inspect and redo patch work on the abutment if required. 6.Remove vegetation from stone pitching and retaining wall, and apply preventive treatment. 7.Provide drainage spouts to ensure proper water discharge.

S. No.	Existing Chainage (Km)	LHS/RHS	SPAN ARRANGEMENT (EXPANSION JOINT TO EXPANSION JOINT) (m)	OBSERVATION	RECOMMENDATIONS
		RHS (OUTER) (NEW)	1X8.9	1. Honey combing is observed on superstructure. 2. Cracks are observed on Pavement surface. 3. Debris is observed on Footpath. 4. Leaching is observed on abutment. 5. Patch work is observed on abutment. 6. Vegetation on stone pitching & Retaining wall. 7. Drainage spouts are Not provided	1.Remove loose concrete and repair honeycombing on the superstructure. 2.Repair cracks on the pavement surface. 3.Remove debris from the footpath. 4.Treat leaching on the abutment by cleaning, repairing, and applying protective coating. 5.Inspect and redo patch work on the abutment if required. 6.Remove vegetation from stone pitching and retaining wall, and apply preventive treatment. 7.Provide drainage spouts to ensure proper water discharge.
32	390+343	LHS (OUTER) (NEW)	4X12.5	1. Honeycombing is observed on slab. 2. Vegetation on retaining wall. 3. Spouts are clogged. 4. Cracks on pavement surface.	1.Remove loose concrete and repair honeycombing on the slab with polymer-modified cement mortar. 2. Remove vegetation from the retaining wall and apply preventive treatment. 3. Clean clogged drainage spouts to restore proper flow. 4. Repair cracks on the pavement surface.
		LHS (INNER) (OLD)	4X12.5	1. Honeycombing is observed on slab. 2. Vegetation on retaining wall. 3. Spouts are clogged. 4. Cracks on	1.Remove loose concrete and repair honeycombing on the slab with polymer-modified cement mortar. 2. Remove vegetation from the retaining wall

S. No.	Existing Chainage (Km)	LHS/RHS	SPAN ARRANGEMENT (EXPANSION JOINT TO EXPANSION JOINT) (m)	OBSERVATION	RECOMMENDATIONS
				pavement surface.	and apply preventive treatment. 3. Clean clogged drainage spouts to restore proper flow. 4. Repair cracks on the pavement surface.
		RHS (INNER) (OLD)	4X12.5	1. Honeycombing is observed on slab. 2. Vegetation on retaining wall. 3. Spouts are clogged. 4. Cracks on pavement surface.	1.Remove loose concrete and repair honeycombing on the slab with polymer-modified cement mortar. 2. Remove vegetation from the retaining wall and apply preventive treatment. 3. Clean clogged drainage spouts to restore proper flow. 4. Repair cracks on the pavement surface.
		RHS (OUTER) (NEW)	4X12.5	1. Honeycombing is observed on slab. 2. Vegetation on retaining wall. 3. Spouts are clogged. 4. Cracks on pavement surface.	1.Remove loose concrete and repair honeycombing on the slab with polymer-modified cement mortar. 2. Remove vegetation from the retaining wall and apply preventive treatment. 3. Clean clogged drainage spouts to restore proper flow. 4. Repair cracks on the pavement surface.
33	391+112	LHS (OUTER) (NEW)	4X8.0	1. Honey combing is observed on Slab S1,S3&S4. 2. Honey combing on Pier P1,P2&P3. 3. Honey combing &	1.Remove loose concrete and repair honeycombing on slabs S1, S3, and S4 with polymer-modified cement mortar. 2.Remove loose concrete and repair honeycombing on piers
		LHS (INNER) (OLD)	4X8.0		
		RHS (INNER) (OLD)	4X8.0		

S. No.	Existing Chainage (Km)	LHS/RHS	SPAN ARRANGEMENT (EXPANSION JOINT TO EXPANSION JOINT) (m)	OBSERVATION	RECOMMENDATIONS
		RHS (OUTER) (NEW)	4X8.0	Vegetation on retaining wall. 4. Drainage spouts are partially clogged. 5. Missing footpath lane	P1, P2, and P3. 3.Remove honeycombing and vegetation from the retaining wall, and apply preventive treatment. 4.Clean partially clogged drainage spouts to restore proper flow. 5.Provide or reconstruct the missing footpath lane.

3.4.6 Light Vehicular Underpasses (LVUP)/ Vehicular Underpass Grade-II

A summary of Condition Survey of existing Light Vehicular Underpasses is provided in Table below.

S. No.	EXISTING CHAINAGE	LHS/RHS	SPAN ARRANGEMENT (EXPANSION JOINT TO EXPANSION JOINT) (m)	OBSERVATION	RECOMENDATION
Section-1 From 320+810 to 326+000 (4 Lane Retained)					
Nil.					
Section-2 From Km 326+000 to 361+000 (Ex. Km 360+300) (6 Lane)					
1	339+223	LHS (NEW)	1x12.0	1. Drainage spouts are not provided. 2. Vegetation on RE wall.	1.Provide drainage spouts as per specification. 2. Remove vegetation from RE wall and apply preventive treatment.
		RHS (NEW)	1x12.0		
Section-3 From 361+000 (Ex. Km 360+300) to 400+632 (Ex. Km 400+132) (6 Lane)					
Nil.					

3.4.7 Vehicular Underpasses (VUP)

A summary of Condition Survey of existing Vehicular Underpasses are provided in Table below

S. No.	EXISTING CHAINAGE	LHS/RHS	SPAN ARRANGEMENT (EXPANSION JOINT TO EXPANSION JOINT) (m)	OBSERVATION	RECOMENDATION
Section-1 From 320+810 to 326+000 (4 Lane Retained)					
Nil.					

S. No.	EXISTING CHAINAGE	LHS/RHS	SPAN ARRANGEMENT (EXPANSION JOINT TO EXPANSION JOINT) (m)	OBSERVATION	RECOMENDATION
Section-2 From Km 326+000 to 361+000 (Ex. Km 360+300) (6 Lane)					
1	332+100	LHS (NEW)	1x21.0	1. Drainage spouts are partially clogged. 2. Vegetation on RE wall.	1.Clean & flush clogged drainage spouts. 2. Remove vegetation from RE wall and apply preventive treatment.
		RHS (NEW)	1x21.0		
2	333+225	LHS (NEW)	2x12.000	1. Drainage spouts are partially clogged. 2. Vegetation on RE wall. 3. Wearing coat on cross road damage	1.Clean & flush clogged drainage spouts. 2. Remove vegetation from RE wall and apply preventive treatment. 3. Repair damaged wearing coat on cross road.
		RHS (NEW)	2x12.000		
3	336+390	LHS (NEW)	1x21.0	1. Drainage spouts are partially clogged. 2. Vegetation on RE wall. 3. Expansion Sealing is damage.	1.Clean & flush clogged drainage spouts. 2. Remove vegetation from RE wall and apply preventive treatment. 3. Repair damaged sealing of expansion.
		RHS (NEW)	1x21.0		
4	354+384	LHS (NEW)	1x21.0	1. Drainage spouts are partially clogged. 2. Vegetation on RE wall. 3. Expansion Sealing is damage	1.Clean & flush clogged drainage spouts. 2. Remove vegetation from RE wall and apply preventive treatment. 3. Repair damaged sealing of expansion.
		RHS (NEW)	1x21.0		
5	355+870	LHS (NEW)	1x15.7	1. Drainage spouts are partially clogged. 2. Vegetation on RE wall.	1.Clean & flush clogged drainage spouts. 2. Remove vegetation from RE wall and apply preventive treatment.
		RHS (NEW)	1x15.7		
6	357+636	LHS (NEW)	1x12.31	1. Drainage spouts are partially clogged. 2. Vegetation on RE wall.	1.Clean & flush clogged drainage spouts. 2. Remove vegetation from RE wall and apply preventive treatment.
		RHS (NEW)	1x12.31		
7	358+850	LHS (NEW)	1x21.0	1. Drainage spouts are partially clogged. 2. Vegetation on RE wall. 3. Expansion Joint is damage	1.Clean & flush clogged drainage spouts. 2. Remove vegetation from RE wall and apply preventive treatment. 3. Repair damaged expansion joint.
		RHS (NEW)	1x21.0		
Section-3 From 361+000 (Ex. Km 360+300) to 400+632 (Ex. Km 400+132) (6 Lane)					
8	362+705	LHS (NEW)	1x22.2	1. Drainage spouts are partially clogged. 2. Vegetation growth on structure is observed. 3. Expansion joint Sealing elastomer is damaged.	1.Clean & flush clogged drainage spouts. 2. Remove vegetation from structure and apply preventive treatment. 3. Repair damaged sealing of expansion.
		RHS (NEW)	1x22.2		

S. No.	EXISTING CHAINAGE	LHS/RHS	SPAN ARRANGEMENT (EXPANSION JOINT TO EXPANSION JOINT) (m)	OBSERVATION	RECOMENDATION
9	368+522	LHS (NEW)	1x22.21	1. Patch work is observed on slab. 2. Minor cracks on G2&G4 Girder. 3. Debris &E1 Sealing is damaged on expansion joints. 4. Drainage spouts are partially clogged. 5. Vegetation on RE wall. 6. Cracks are observed on pavement surface.	1.Inspect patched areas on slab & reinforce patch work if necessary. 2. Repair minor cracks by using suitable repairing method. 3. Remove debris & repair damaged sealing in expansion joint. 4.Clean & flush clogged drainage spouts. 5. Remove vegetation from RE wall and apply preventive treatment. 6. Repair the observed cracks & level the pavement surface.
		RHS (NEW)	1x22.21	1. Patch work is observed on slab. 2. Minor cracks on G2&G4 Girder. 3. Debris on expansion joints. 4. Drainage spouts are partially clogged. 5. Vegetation on RE wall. 6. Cracks are observed on pavement surface.	1.Inspect patched areas on slab & reinforce patch work if necessary. 2. Repair minor cracks on G2 & G4 girders by using suitable repairing method. 3. Remove debris & clean the expansion joint. 4.Clean & flush clogged drainage spouts. 5. Remove vegetation from RE wall and apply preventive treatment. 6. Repair the observed cracks & level the pavement surface.
10	370+425	LHS (NEW)	1x22.270	1. Honey combing is on slab. 2. Minor cracks on G2&G4 Girder. 3. Debris &E2 Sealing is damaged on expansion joints. 4. Drainage spouts are partially clogged. 5. Vegetation on RE wall. 6. Cracks are observed on pavement surface.	1.Remove loose concrete and repair honeycombing on slab with polymer-modified cement mortar. 2. Repair minor cracks on G2 & G4 girders by using suitable repairing method. 3. Remove debris & repair damaged sealing in expansion joint. 4.Clean & flush clogged drainage spouts. 5. Remove vegetation from RE wall and apply preventive treatment. 6. Repair the observed cracks & level the pavement surface.

S. No.	EXISTING CHAINAGE	LHS/RHS	SPAN ARRANGEMENT (EXPANSION JOINT TO EXPANSION JOINT) (m)	OBSERVATION	RECOMENDATION
		RHS (NEW)	1x22.270	1. Honey combing is on slab. 2. Minor cracks on G2&G4 Girder. 3. Debris on expansion joints. 4. Drainage spouts are partially clogged. 5. Vegetation on RE wall. 6. Cracks are observed on pavement surface.	1.Remove loose concrete and repair honeycombing on slab with polymer-modified cement mortar. 2. Repair minor cracks on G2 & G4 girders by using suitable repairing method. 3. Remove debris & repair damaged sealing in expansion joint. 4.Clean & flush clogged drainage spouts. 5. Remove vegetation from RE wall and apply preventive treatment. 6. Repair the observed cracks & level the pavement surface.
11	374+295	LHS (NEW)	1x22.220	1. Honey combing is on b/w G3-G4 & G1-G2slab. 2. Debris is observed on expansion joints. 3. Drainage spouts are partially clogged. 4. Vegetation on RE wall.	1.Remove loose concrete and repair honeycombing b/w G3-G4 & G1-G2 slab with polymer-modified cement mortar. 2. Remove debris & clean the expansion joint. 3. Clean & flush clogged drainage spouts. 4. Remove vegetation from RE wall and apply preventive treatment.
		RHS (NEW)	1x22.220		
12	384+400	LHS (NEW)	1x22.290	1. Cracks are observed on Girder G1, G2& G3. 2. E1 expansion joint damaged & E2 debris. 3. Cracks on pavement surface. 4. Drainage spouts are partially clogged. 5. Vegetation on RE wall.	1.Repair observed cracks on girders G1, G2 & G3 by using suitable repairing method. 2. Remove debris & repair the damaged expansion joint. 3.Repair the observed cracks & level the pavement. 4.Repair, Clean & flush clogged drainage spouts. .5. Remove vegetation from RE wall and apply preventive treatment.
		RHS (NEW)	1x22.290		
13	390+160	LHS (NEW)	1x25.0	1. Honey combing is observed on slab &C/S Gider. 2. Debris on expansion joints & E2 sealing and is damaged. 3. Drainage spouts are partially clogged. 4. Vegetation on RE wall.	1.Remove loose concrete and repair honeycombing on slab & C/S girder with polymer-modified cement mortar. 2. Remove debris & repair the damaged sealing of expansion joint. 3. Clean & flush clogged drainage spouts. 4. Remove vegetation from RE wall and apply preventive treatment.
		RHS (NEW)	1x25.0		
14	390+900	LHS (NEW)	2x12.000	1. Honey combing is observed on Slab. 2. Drainage spouts are partially clogged.	1.Remove loose concrete and repair honeycombing on slab with polymer-modified cement mortar.

S. No.	EXISTING CHAINAGE	LHS/RHS	SPAN ARRANGEMENT (EXPANSION JOINT TO EXPANSION JOINT) (m)	OBSERVATION	RECOMENDATION
		RHS (NEW)	2x12.000	3. Vegetation on retaining wall.	2. Clean & flush clogged drainage spouts. 3. Remove vegetation from RE wall and apply preventive treatment.
15	392+532	LHS (NEW)	1x24.600	1. Honey combing is observed on slab, Gider &C/S Gider. 2. Debris on expansion joints& E2 sealing and edge beam is damaged. 3. Spouts are partially clogged. 4. Vegetation on RE wall.	1.Remove loose concrete and repair honeycombing on slab & C/S girder with polymer-modified cement mortar. 2. Remove debris & repair the damaged sealing & edge beam of expansion joint (E2). 3. Clean & flush clogged drainage spouts. 4. Remove vegetation from RE wall and apply preventive treatment.
		RHS (NEW)	1x24.600		
16	395+750	LHS (NEW)	1x22.200	1. Minor cracks are observed on Girder G1, G2&G3. 2. Honey combing is observed on slab. 3. Cracks are observed on pavement surface. 4. E-2 sealing is partially damaged. 5. Spouts are partially clogged. 6. Vegetation on RE wall.	1.Repair observed cracks on girders G1, G2 & G3 by using suitable repairing method. 2.Remove loose concrete and repair honeycombing on slab with polymer-modified cement mortar. 3.Repair the observed cracks & level the pavement surface. 4.Repair the damaged seal of expansion joint (E2). 5.Clean & flush clogged drainage spouts. 6. Remove vegetation from RE wall and apply preventive treatment.
		RHS (NEW)	1x22.200		

3.4.8 Pedestrian/Cattle Underpasses (PUP/CUP)

A summary of Condition Survey of existing Pedestrian/Cattle Underpasses are provided in Table below.

S. No.	EXISTING CHAINAGE	LHS/RHS	SPAN ARRANGEMENT (EXPANSION JOINT TO EXPANSION JOINT) (m)	OBSERVATION	RECOMENDATION
Section-1 From 320+810 to 326+000 (4 Lane Retained)					
Nil.					
Section-2 From Km 326+000 to 361+000 (Ex. Km 360+300) (6 Lane)					
1	346+780	LHS (NEW)	1x7.0	1. Drainage spouts are not provided. 2. Vegetation growth on structure is observed.	1.Provide drainage spouts to ensure adequate water discharge. 2. Remove vegetation from structure and apply preventive treatment.
		RHS (NEW)	1x7.0		

S. No.	EXISTING CHAINAGE	LHS/RHS	SPAN ARRANGEMENT (EXPANSION JOINT TO EXPANSION JOINT) (m)	OBSERVATION	RECOMENDATION
Section-3 From 361+000 (Ex. Km 360+300) to 400+632 (Ex. Km 400+132) (6 Lane)					
2	384+590	LHS (NEW)	1x5	1. Drainage spout are not provided. 2. Honeycombing on top slab. 3. Vegetation on RE wall.	1.Provide drainage spouts as per specification. 2. Remove loose concrete and repair honeycombing on top slab with polymer-modified cement mortar. 3. Remove vegetation from RE wall and apply preventive treatment.
		RHS (NEW)	1x5		
3	392+160	LHS (NEW)	1x10.5	1. Honey combing is observed on top slab & Patch work is observed. 2. Drainage spouts are clogged. 3. Minor cracks are observed on Abutment. 4. Cracks and potholes are observed on pavement surface.	1. Remove loose concrete and repair honeycombing on top slab with polymer-modified cement mortar and inspect the patched area & reinforce patch work if necessary. 2. Clean & flush clogged drainage spouts. 3. Repair observed cracks on abutment by using suitable repairing method. 4. Repair observed cracks & fill potholes with suitable material and level pavement surface.
		RHS (NEW)	1x10.5		
4	400+870	LHS (NEW)	1x7.0	1. Honey Combing on top slab. 2. Honey combing on abutment. 3. Drainage spouts are not provided. 4. Vegetation on RE wall.	1. Remove loose concrete and repair honeycombing on top slab with polymer-modified cement mortar. 2. Remove loose concrete and repair honeycombing on abutment with polymer-modified cement mortar. 3. Provide drainage spouts as per specification. 4. Remove vegetation from RE Wall and apply preventive treatment.
		RHS (NEW)	1x7.0	1. Honey combing is observed on superstructure & Abutment. 2. Drainage spouts are not provided. 3. Vegetation on RE wall.	1. Remove loose concrete and repair honeycombing on super structure & abutment with polymer-modified cement mortar. 2. Provide drainage spouts as per specification. 3. Remove vegetation from RE Wall and apply preventive treatment.

3.4.9 Foot Over Bridge (FOB)

A summary of Condition Survey of existing Foot Over Bridge are provided in Table below

S.NO.	BRIDGE NO.	EXISTING CHAINAGE	LHS/RHS/BHS	SPAN ARRANGEMENT (EXPANSION JOINT TO EXPANSION JOINT) (m)	CONDITION OF STRUCTURE
Section-1 From 320+810 to 326+000 (4 Lane Retained)					
Nil.					
Section-2 From Km 326+000 to 361+000 (Ex. Km 360+300) (6 Lane)					
1	FOB BHS	337+345	BHS	2 X 20	Good
2	FOB BHS	340+250	BHS	2 X 20	Good
3	FOB BHS	350+630	BHS	2 X 20	Good
Section-3 From 361+000 (Ex. Km 360+300) to 400+632 (Ex. Km 400+132) (6 Lane)					
4	FOB BHS	360+550	BHS	2 X 20	Good
5	FOB BHS	366+955	BHS	2 X 20	Good
6	FOB BHS	364+480	BHS	2 X 20	Good
7	FOB BHS	372+440	BHS	2 X 20	Good
8	FOB BHS	393+850	BHS	2 X 20	Good
9	FOB BHS	399+380	BHS	2 X 20	Good
10	FOB BHS	400+450	BHS	2 X 20	Good

3.4.10 Elevated Structure

A summary of Condition Survey of existing Elevated Structure is provided in Table below

S.NO.	BRIDGE NO.	EXISTING CHAINAGE	LHS/RHS/BHS	SPAN ARRANGEMENT (EXPANSION JOINT TO EXPANSION JOINT) (m)	CONDITION OF STRUCTURE
Section-1 From 320+810 to 326+000 (4 Lane Retained)					
Nil.					
Section-2 From Km 326+000 to 361+000 (Ex. Km 360+300) (6 Lane)					
Nil.					
Section-3 From 361+000 (Ex. Km 360+300) to 400+632 (Ex. Km 400+132) (6 Lane)					
Nil.					

3.4.11 General Condition of Existing Bridges

Following distresses have generally been noticed: -

- Clogged drainage spouts or of inadequate length or missing drainage pipe
- Poor maintenance and protection work of existing bridges
- Excessive vegetation growth around the bridges and in stream bed.
- Damaged / filled up expansion joints
- Settlement of Approach Slabs
- Damage to slope pitching and bed protection.
- Scaling of concrete or atmosphere distress
- Broken / missing railing / parapet.
- Debris on piers / abutments / deck

3.4.12 Repair / Improvement Works

As per Condition Survey findings, it is evident that most of the structures are in fair condition.

Section-1 From 320+810 to 326+000: The improvement works mentioned shall be carried out by NHAI.

Section-2 From Km 326+000 to 361+000 (Ex. 360+300): Since the section is under Operation and Maintenance of HAM Concessionaire, deficiency (minor repair works) pertaining to O & M shall be carried out the HAM Concessionaire till Year 2036.

Section-3 From Km 361+000 (Ex. 360+300) to 401+332 (Ex 400+632) . Since the section is under Operation and Maintenance of HAM Concessionaire, deficiency (minor repair works) pertaining to O & M shall be carried out the HAM Concessionaire till Year 2036.

Chapter 4. Methodology

4. METHODOLOGY FOR FEASIBILITY STUDY

4.1 GENERAL

Broad methodology as outlined in the Inception Report, prepared on the basis of Scope of Work mentioned in Terms of Reference, has been generally followed, with certain modifications as felt necessary during the study. The methodology is described in detail in following sections.

4.2 SECONDARY DATA

Secondary data related to Project Stretch are collected from various authority, institution etc. and reviewed for understanding the Project Stretch. Following are the list of relevant documents collected, reviewed in this study.

- Past Detailed Project Reports
- Highway and structure inventory
- ROW details
- Past design reports
- Past traffic data
- Accident data
- Existing O&M contract agreements

4.3 SURVEYS AND INVESTIGATION

Physical condition of Project Stretch is assessed based on data captured through various surveys and investigations. Details of all these surveys and investigations are presented in next few sections.

4.3.1 Traffic Surveys

To appreciate the characteristics of traffic along the project road sections in terms of size, desire, speed, load and lead, number of surveys are carried out.

Traffic Surveys has been conducted by consultant appointed by NHAI. Data will be received from NHAI.

4.3.2 Drone Videography of Entire Stretch

Videography of entire Project Stretch is captured through Drone cameras flown at about 20 – 30 m above ground. This shall be useful for observing various features of Project Stretch from bird's eye level. Following are some of the snapshots of Drone videos.

Snapshots of Drone Video

4.3.3 Topographic Survey

Topographic survey through Light Detection and Ranging (LiDAR) technology is conducted on entire Project Stretch to identify and map existing features of highway. The purpose of this survey is to serve as base map for road. It also shows perimeter boundary lines and the lines of easements on or crossing the assets surveyed, in order for a designer to accurately show zoning and other agency required setbacks.

The following sections present brief introduction of LiDAR Technology.

4.3.3.1 Brief Introduction of Mobile Lidar Technology

Mobile LiDAR is an advanced mapping solution that incorporates the most advanced LiDAR sensors, cameras and position/ navigation /GPS receivers to collect survey grade 3D point cloud data quickly and accurately.

With greater precision and flexibility than ever before, particularly in transportation applications, Mobile LiDAR has become an effective solution for rapid data collection in recent years given advances in scanning speed and accuracy, global navigation satellite system (GNSS) receivers and inertial measurement units (IMUs).

The system provides designers with a complete picture of project with survey accurate point measurements and ability to locate features that may be inaccessible with other methods.

Mobile mapping is the process of collecting geospatial data from a mobile vehicle. Typically fitted with a LiDAR remote sensing system, such systems are composed of an integrated array of time synchronized navigation sensors (survey grade DGPS) and imaging sensors mounted on a mobile platform. Primary output after pre-processing of data include geo-referenced 3D point cloud data, digital maps, images and videos. Further, after post-processing, output in desired format like AutoCAD*.dwg or Arc GIS*.shp files are obtained.

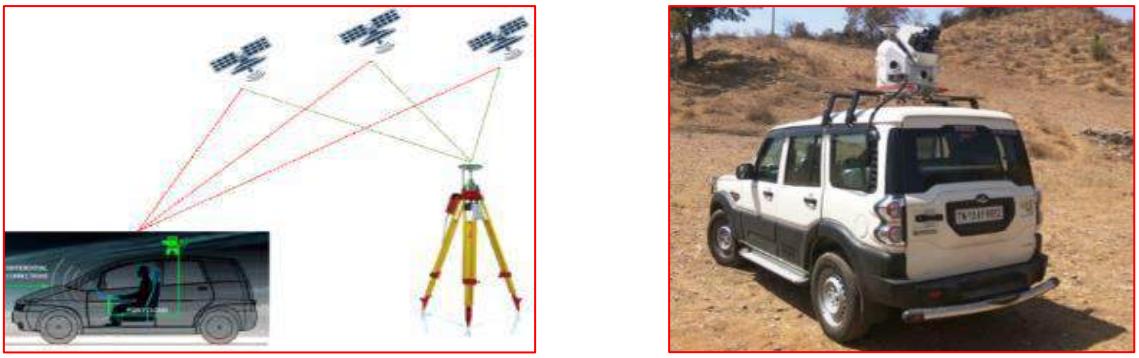
- Mobile LiDAR consists of following components.
- DGPS – Dual Antenna (Position and Heading)
- IMU (Inertial Measurement Unit) and DMI (Wheel Sensor)
- Scanner (Profiler Z+F 9012)
- 6 cameras and a sky Camera

Components of Mobile LiDAR

Methodology

Before Start of the data acquisition with Mobile LiDAR, following activities were completed at site:

- Well established network of DGPS control points at site.
- Ground control points at 250 m interval, connected with Total Station and Auto Level.



Once all the control points are marked at Ground, Mobile LiDAR are run -

- At least one DGPS - Base Station data is acquired at the time of survey.
- Single Run for each direction – i.e., two runs for each Project Stretch.
- The average length of data captured is about 80 km per day, with single run of vehicle, running at average speed of 40 km per hour.
- GPS base station observations are made using 3 numbers of survey grade DGPS receivers (Trimble R8) located about 30 km apart.
- More than 1,00,000 frames of high-resolution CCD pictures are collected with six set of Cameras covering 360 degrees of views per day.
- Generally Mobile LiDAR takes cross section at every 3 to 8 cm interval and levels at 5 mm interval. So, there are millions of data at every 10 m interval (approximately).
- During the post-processing, ground points are classified and verified. Cross-sections are extracted.

Figure 4.1: Process of Data Capture Work in field using Mobile LiDAR

Following data are generated from the system.

- Soft copy of pre-processed Raw data in Registered 3D point cloud*.hpc or LAS format.
- Soft copy showing plan of existing visible roadside features in AutoCAD*.dwg or *.shp format. L-sections & cross –sections shall as well be generated at required intervals.
- Soft copy of images captured by 6 sets of cameras in various directions, along the road, at interval of about 5 m apart.

Figure 4.2: Sample Output of Mobile Lidar

4.3.3.2 Accuracy of the Point Cloud Data

Accuracy level is as per the data sheet of Leica Pegasus one mobile mapping system along with the scanner Z+F profiler 9012 having data acquisition rate up to 1 million pixel/second and as per actual site conditions and satellites available for DGPS. The relative accuracy of the data is about +/- 5 cm, for areas with good GPS signals, Generally, we have achieved relative accuracy of point cloud data as <5cm in previous similar works.

4.3.4 PAVEMENT INVESTIGATION AND ASSET INVENTORY

To access condition of existing pavement and assets, investigations are carried out using Network Survey Vehicle (NSV). Details of these investigations are presented in following sections.

4.3.4.1 Network Survey Vehicle

Hawkeye 2000 Professional Network Survey Vehicle (NSV) is a highly specialized survey product designed and developed by Australian Road Research Board (ARRB) Group. ARRB Group was formed by state, territory and federal government road agencies in Australia, who established the organization as a means of cooperating to undertake research of national importance that they could not justify carrying out individually. ARRB has been operating for over 50 years and has built a reputation as premier automated pavement condition service and equipment providers in Australia and throughout the Asia region.

NSV is equipped with a fully integrated Hawkeye 2000 data collection system. NSV consists of a Multi-Laser Profiler, Digital Imaging System and a Gipsi-Trac unit whose outputs are all linked via a highly accurate distance measuring instrument.

Figure 4.3: Layout of Network Survey Vehicle

NSV allows all the data to be collected in a single pass, thus minimizing both the cost and the time needed to complete the survey. Since NSV is completely scalable system which suites to all different-different types of requirement of data collection and vehicle independent technology. Additionally, each data set is referenced to the road running distance, in accordance with the Council's current reference system, as well as its spatial position using GPS (WGS84). A team of trained and experienced field staff and a driver is utilized during the collection phases of projects. General methodology and modules of NSV for data collection and reporting is presented in the following section.

4.3.4.2 NSV Component - Digital Laser Profiler

Integrated into the NSV is a Digital Laser Profiler (DLP) consisting of eleven lasers. This inertial profiler is capable of measuring:

- Pavement Roughness (one laser in each wheel path and centre)
- Rutting (full transverse pavement measurement)
- Macro texture (outer wheel path and between wheel paths).

The location at which each of these parameters is measured is as shown below:

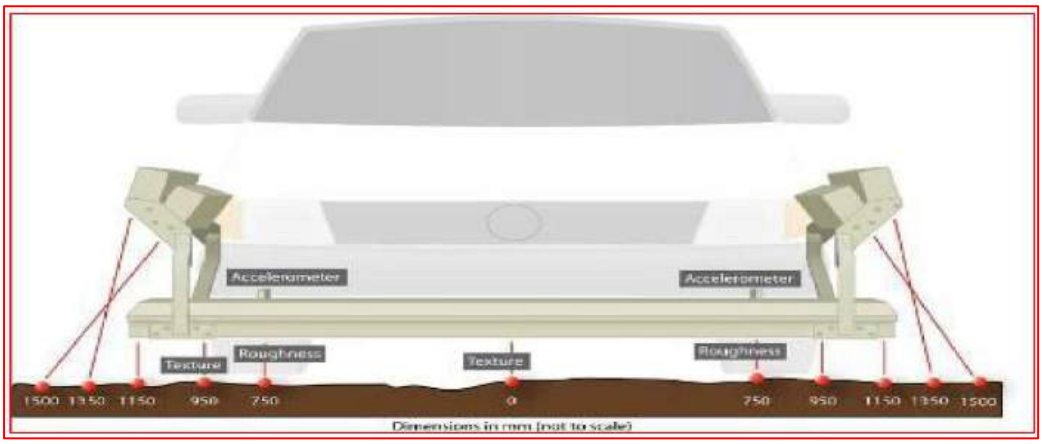


Figure 4.4: Multi Laser Profiler Spacing

Determination of Roughness

The outputs of the lasers and accelerometers located in each wheel path (750 mm either side of the centre line of the vehicle) are sampled every 25 mm of longitudinal travel and used to calculate the longitudinal profile of the road.

The profile is then passed through the Quarter Car model to calculate the International Roughness Index (IRI) lane roughness as per the methodologies specified in the Austroads Guide to Asset Management, Part 5B - Roughness.

Post Survey any 'spikes' in the roughness outputs will be excluded that may arise from cattle grids, railway crossings, bridge abutments etc. Automated checks in the data processing software are already incorporated to exclude any contribution to roughness from data collected below the minimum survey speed which is typically set at 10 -30 km/hr (user definable).

- The above mentioned Roughness Digital Laser Profile System fall under the specification defined in Circular no 11041/218/2007 - admn issued by NHAI for use of Laser Profilometer in NHAI Works.

Determination of Rutting

All data is measured and reported in accord with the recommendations contained within the Austroads Guide to Asset Management, Part 5C – Rutting.

The DLP measures a 3 metre transverse profile across the lane using a minimum of 11 lasers. A full transverse profile is measured every 50 mm of longitudinal travel and the processing software allows both lane and wheel path rutting to be measured using the string line and straight edge models.

Determination of Texture

The DLP (Digital Laser Profile) is capable of measuring both flushing and texture via Sensor Measured Texture Depth (SMTD). Texture is measured continuously along the pavement length using a non-contact laser transducer.

Macro texture can be recorded in many different ways. The most common is by using the Sensor Measured Texture Depth (SMTD). Internationally Mean Profile Depth (MPD) is more common. SMTD is more common as it can be easily correlated to a Sand Patch Texture Depth (SPTD). The DLP is able to record both types of texture to all international and national standards.

4.3.4.3 NSV Component - Digital Imaging System

The Digital Imaging System of the NSV is the digital imaging component in which four roof mounted cameras are used to record digital images; typically, images are sampled every 10m. These cameras are oriented in a certain configuration to ensure that the information of interest, such as inventory or condition, is being recorded in the camera field of view. Typically, three cameras are forward facing and another onto the pavement which are capable of recording all the pavement defects and roadside assets at 10 m interval.

Figure 4.5: Digital Image Camera

ATTRIBUTE LOCATION AND ASSESSMENT

Since the Network Survey vehicle is an integrated system, the road side inventory information can be collected from the images in conjunction with the pavement distress types. Attributes such as bridges, land use, topography, hydrological characteristics, public transport arrangements, etc. are assessed in accordance with the relevant sections including the accurate assessment of the location and condition.

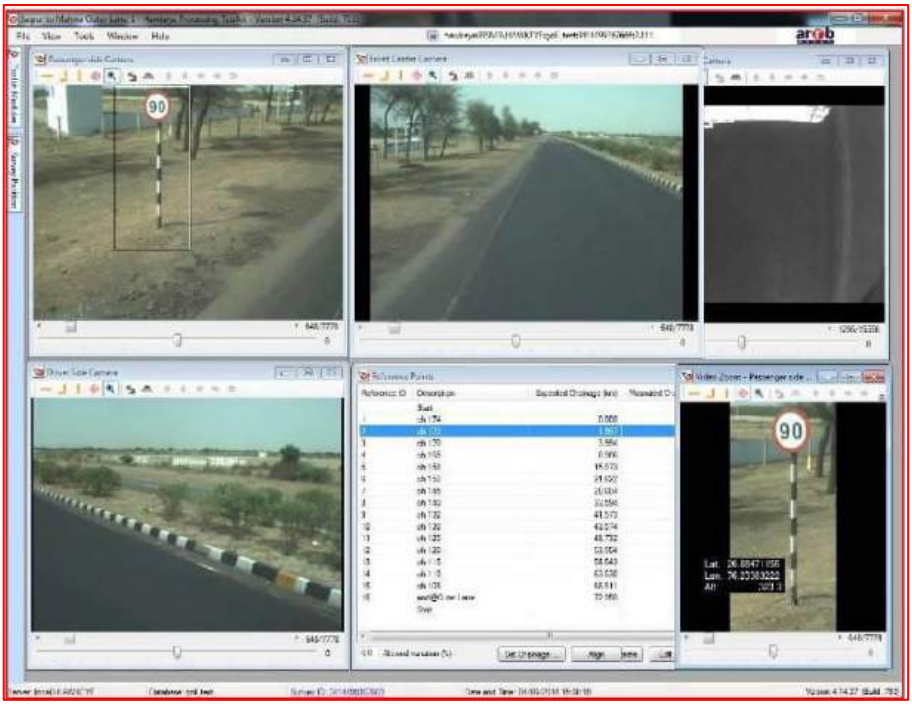


Figure 4.6: Roadside Furniture Location and Assessment

The Hawkeye 2000 Series Asset View Digital Imaging System (DIS) is a video acquisition system for visually identifying and locating roadside features accurately. The system utilizes the latest in digital camera technology and produces crisp high resolution video frames to ensure a continuous digital record of the roadway. The Hawkeye Processing Toolkit software ensures that the survey database can be reviewed, edited and processed quickly and efficiently. The data from each module can be compared against other results and exported to most common GIS and asset management systems.

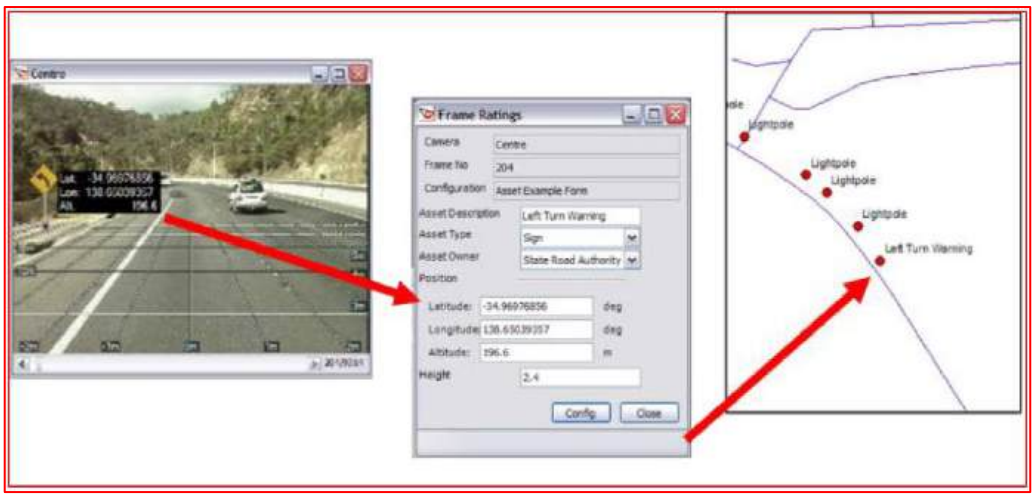


Figure 4.7: Asset Location, Image Export and Shape file Outputs

Road Dimension Confirmation

All Hawkeye Digital Image System data is calibrated prior to the commencement of the survey. Utilising special tools within the Hawkeye Processing Toolkit, Rater measures the dimensions of the road off the video. This tool is used to confirm the width of all carriageways collected. The road length is automatically collected by the vehicles distance measuring instrument.

Visual Assessment of Road Inventory Assets

From the digital images, a host of information are extracted. This information is linearly (chainage) and spatially (GPS) referenced. The information extracted is presented in the table below

Table 4.1: Information extracted from NSV

Coding Parameters	Coding Type
General Features and Utilities	
Land use pattern	Agricultural, Urban, Commercial, Forest, Rural etc.
Roadside Arboriculture	Present/Not Present
Electric pole	Present/Not Present
Telephone	Present/Not Present
Wayside amenities, Bus bays, truck lay Bye, etc...	Present/Not Present
Main Carriageway Features	
Pavement type	Bituminous, Concrete
Junction (Major / Minor & X / T/ Y) & type of road crossing / merging	Type and Geolocation
Carriageway width (lane wise)	Width
Paved shoulder (width)	Width
Earthen shoulder (width and physical condition)	Width, Condition-Good, Fair,Poor
Footpath (physical condition)	Present/Not Present, Condition
Drain width (lined & Unlined, along with general condition)	Lined/Unlined, Condition
Median (width)	Width
Kerb Height	Height
Presence of Road Studs (Lane wise) - Yes / No	Yes/No
Coding Parameters	Coding Type
Sign boards identifications (both sides of carriageway) – Type and Physical Condition	Geo Location, Condition
Gantry boards identifications (type of gantry) – Physical Condition	Geo Location, Condition
Kilometre & hectometre stones	Present/Not present
Guard rails – Physical Condition	Geo Location, Condition
Safety barriers – Type and Physical Condition	Geolocation, Type and Condition
Delineators – Physical Condition	Present/Not present
Guard / guide posts – Physical Condition	Present/Not present, Condition
Street Light and High Mast Light	Geo Location and pole condition
Location of water bodies (lakes and reservoirs), at every occurrence	Type and Geo Location
Location of Structures	Type and Geo Location
Service Road	
Pavement type	Bituminous, Concrete
Carriageway width (lane wise)	Width

Coding Parameters	Coding Type
Drain width (lined & Unlined, along with general condition)	Lined/Unlined, Condition
Sign boards identifications (both sides of carriageway) – Type and Physical Condition	Geo Location , Condition
Location of water bodies (lakes and reservoirs), at every occurrence	Type and Geo Location
Street Lights	Geo Location and pole condition

Defect Assessment

The collected images / videos are rated using the Hawkeye Processing Toolkit. The processing toolkit is fully customizable and allows rating criteria to be set to produce project specific outputs linked to its spatial (GPS) and linear (chainage) position. The Hawkeye Processing Toolkit is an integrated graphical user interface (GUI) that compiles the collected survey data and allows the user to 'virtually drive down the road' and record rating information as needed. With each frame, a customized set of rating fields are attached, where the rater records set decisions about various parameters of the road at that point. These include areas, widths, heights, text fields, lists or numerical counts. Because Hawkeye is an integrated system, this means that all ratings are automatically linked to its GPS and road-chainage position.

The images are rated using standard guidelines, the extent of which are measured using the Hawkeye processing toolkit's area and width measurement facilities. The area calculations are stored against the relevant defect field in the toolkit's data file, which is stored in the required format and referenced to the road location.

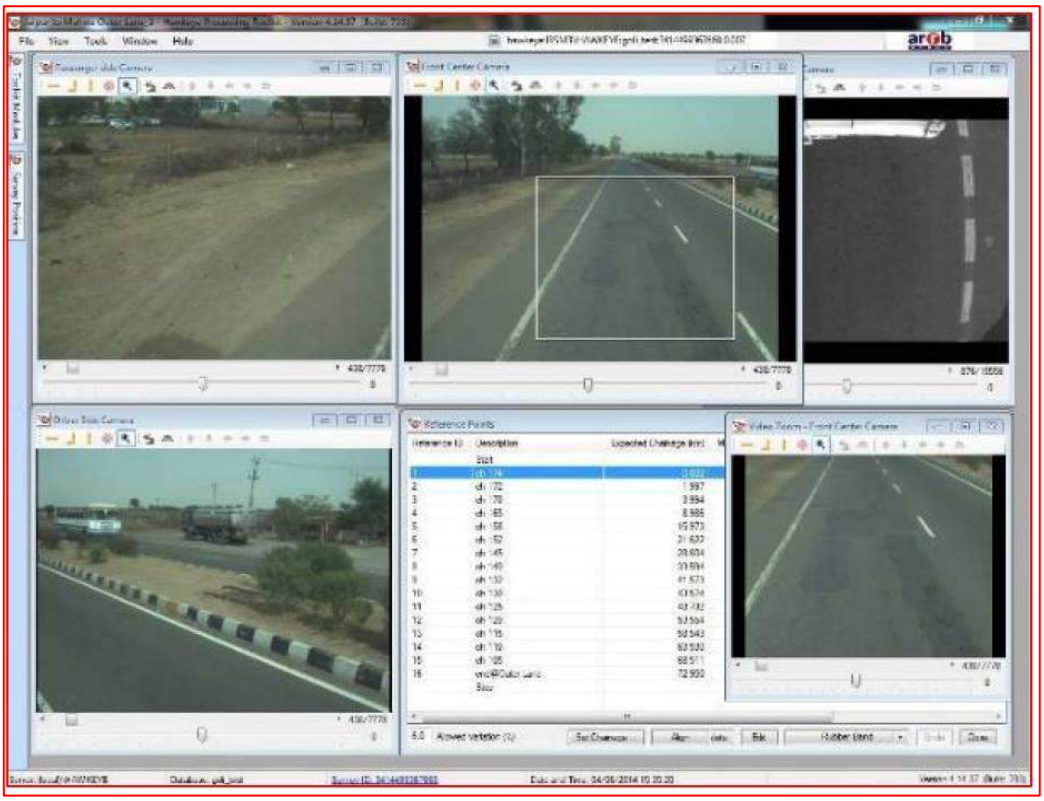


Figure 4.8: Pavement Condition rating in Hawkeye Processing Tool kit

The following pavement distress are recorded along with their severity and extent

Type of Distress	Severity Levels		Extent Levels	
Longitudinal Cracks	None	Low		None
	<5mm wide	High	1-5%	Few
	>5mm wide		6-15%	Intermittent
			16-40%	Moderate
			41-75%	Frequent
			> 75%	Extensive
Transverse Cracks	None	Low		None
	<5mm wide	High	1-5%	Few
	>5mm wide		6-15%	Intermittent
			16-40%	Moderate
			41-75%	Frequent
			> 75%	Extensive
Alligator Cracks	None	Low		None
	<5mm wide	High	1-5%	Few
	>5mm wide		6-15%	Intermittent
			16-40%	Moderate
			41-75%	Frequent
			> 75%	Extensive
Pothole	None			None
	<25mm	Low	1 no.	Few
	25-50mm	Medium	2-3 no.	Intermittent
	>50mm	High	4-6 no.	Frequent
			>6 no.	Extensive
Ravelling	None			None
	Significant Voids	Low	<3%	Few
	large patchy areas > 50% loss	Medium	3-7%	Intermittent
	loss binder stone in depth	High	8-20%	Frequent
			>20%	Extensive
Patching	None			None
	Minimal Distress	Low	<3%	Few
	Continuing Distress	Medium	3-7%	Intermittent
	Local Failure	High	8-20%	Frequent
			>20%	Extensive
Shoving	None			None
	<15mm	Low	<0.3%	Few
	15-50mm	Medium	0.3-5%	Intermittent
	>50mm	High	5-14%	Frequent
			>14	Extensive
Flushing/Bleeding	None			None
	5-10 % Bitumen	Low	1-5%	Few
	11-25% Bitumen	Medium	6-15%	Intermittent
	>25% Bitumen	High	16-40%	Moderate
			41-75%	Frequent
			>75%	Extensive

Type of Distress	Severity Levels		Extent Levels	
Depression	None			None
	<15mm	Low	<1%	Few
	15-50mm	Medium	1-15%	Intermittent
	>50mm	High	16-30%	Frequent
			>30	Extensive
Edge Break	None			None
	20-75mm	Low	<1%	Few
	76-200mm	Medium	1-15%	Intermittent
	>200mm	High	16-30%	Frequent
			>30	Extensive
Delamination	None			None
	<1m2	Low	<0.5%	Few
	>1m2	High	0.6-2%	Intermittent
			3-5%	Frequent
			>5%	Extensive
Corrugation	None			None
	<15mm	Low	<1%	Few
	15-50mm	Medium	1-15%	Intermittent
	>50mm	High	16-30%	Frequent

Distance and Speed measurement

Each road inventory and condition parameter are referenced to the road running distance via a highly accurate distance transducer attached to a rear wheel of the NSV as shown figure below. The transducer is in turn calibrated using a distance calibration site. The Distance and speed measurement performed by the distance measuring instrument which is a distance transducer and highly accurate and GPS distance and speed are also calculated.

4.3.4.4 GIPSI-Trac Geometry Data

Hawkeye 2000 Professional Network Survey Vehicle provides the ability to use the Gipsi-Trac unit. The following data can be collected using Gipsi-Trac

- Horizontal Curvature
- Vertical Gradient
- Vertical curvature
- Cross Slope

However, geometrical data for the Project Stretch is referred from LiDAR surveys.

4.3.4.5 Limitations of the Survey

As experienced operators of the survey equipment, IRSM and V R TECHNICHE are aware of the limitations of technology and the implications of the inappropriate use of technology to collect condition data, which are listed below with additional comments.

- Imaging technology requires appropriate lighting: Images are collected only when lighting conditions are conducive to recording images. Heavily wet pavements & stagnated water on pavements can mask defects and affect laser readings.
- Images do not capture extremely fine cracking: cracking less than 3mm can be difficult to observe even with high resolution images. Cracking of this severity can also be difficult to

observe from a manual footpath-based assessment and impossible from a windscreen-based assessment.

- Road conditions which affect the body roll of the vehicle such as excessive gradient, tight corners, traffic calming may affect the results of the laser profilometer.
- Inherent road attributes such as Joints on fly-over's & bridges, speed humps and service covers may represent high roughness and rutting readings on roads. These may or may not affect the accuracy of the equipment but recognizes that such issues will naturally increase the reported roughness reading.
- Due to the mechanism of data capture and rating, being from digital images instead of real environment conditions, limitations exist in the rating. Some of the possible rating limitations are:
  cannot identify cracking < 3 mm due to image resolution.

However, even taking these limitations into account, it remains possible to capture meaningful and useable data and information from the digital imaging survey, such that when applied in asset management procedures it can assist an asset manager to effectively maintain the network.

4.3.4.6 Falling Weight Deflectometer (FWD)

Structural Condition of pavement is evaluated using Falling Weight Deflectometer (FWD) and subsequent analysis is carried out to ascertain the relative performance of the pavement for all Project Stretches, in the context of evaluating residual life, overlay and other maintenance requirements.

4.3.4.7 Methodology of Falling Weight Deflectometer

Kaub Vehicle Mounted Falling Weight Deflectometer is used in this investigation. This unit is a non- destructive pavement testing device which provides accurate data on the response of the pavement (specifically the surface deflection bowl) to dynamic loads by simulating actual wheel loads in both response and duration. This allows more accurate and rapid measurement of pavement deflection under load than traditional methods.

Figure 4.9: Vehicle Mounted FWD Machine

A dynamic load is generated by the dropping of a mass from a pre-set height onto a 300 mm diameter plate. The magnitude of the load and the pavement response are measured by a load cell and six geophones. One geophone is located immediately under the load, whilst the others are located at variable offsets from the centre of the load.

The test load is varied between 7 and 80 KN to meet the requirements of the particular task and the pavement response for up to four different magnitudes of load are measured during any test sequence.

The offsets of the geophones can be set to any distance up to 1200 mm from the centre of the load and a typical sequence is completed in approximately one minute. Highly accurate deflection bowl measurements are therefore obtained, therefore it is very useful for carrying out large-scale pavement surveys.

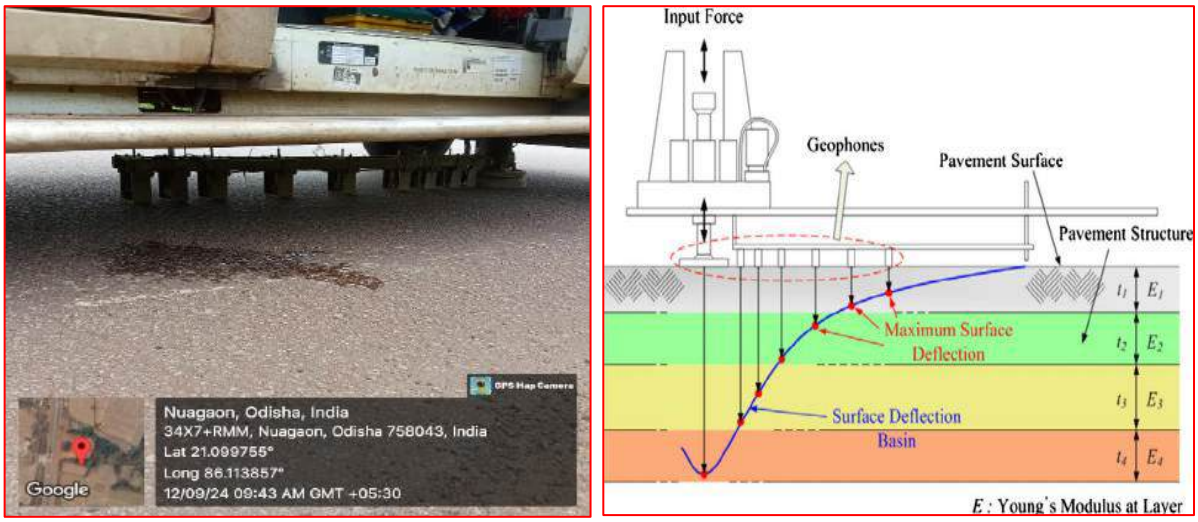


Figure 4.10: Location of Geo-Phones

This data assists in applications such as pavement overlay design, pavement condition surveys and in the development and operation of Pavement Management Systems (PMS). It is also used as input in back-calculation of Pavement Moduli packages.

The FWD is vehicle mounted. All testing is controlled by a personal computer which is located in the vehicle FWD. As a result, only one operator is required to conduct a survey on most occasions making it less labour/ equipment intensive than traditional methods.

Working Principle

- A set of weights is dropped onto a platform with springs (rubber buffers) and the impact load is transferred to the pavement through a loading plate.
- The load simulates the dynamic load from a truck.
- Normally, the load applied on road pavements is 40 kN.
- When subjected to a load, the pavement will bend and a deflection bowl is created. The deflections at various distances from the loading centre are recorded by the sensors (geophones) and stored in a data file.

Confidence limits

- Load cell accuracy 2% +/- 2 KPa (1kPa = 0.145 psi)
- Load resolution 0.03 - 0.12 KN (7 - 26 lbf), magnitude dependent
- Deflection range 2.0 mm (80 mil)
- Deflector accuracy 2% +/- 2 microns (1 micron = 0.04 mil)
- Deflector resolution 1 micron
- Deflection random error typically 1 - 2 microns (0.04 - 0.08 mil)
- Deflection systematic error +/- 2%

Data Collection

Methods of data collection using FWD is described in steps given below.

- Prepare the FWD unit for deflection testing
- Bring the FWD to a stopped position at the beginning of the test section, centred on the outside wheel path (or specific position), and take a measurement by applying load using following sequence:
- One settling drop to ensure proper contact.
- Three drops with an applied load of Specified Load
- Deflections are recorded from the sensors located at the centre of the loading plate for each drop Except the settling drop.
- Along with these deflection data, the parameter like Chainage, Temperature, Date and Time and Position of Sensors will also be recorded.
- After each measurement, drive the FWD forward to next measurement point.

4.3.4.8 Analysis Stages

Analysis methodology includes back calculation of layer moduli and remaining life analysis, presented in the Chapter 8.

4.3.4.9 Test Pits, Core Cutting and Material Investigations

As per the Scope of Work mentioned in the TOR, the following field observations are carried out

- Pavement Composition of the Project Stretches
- Subgrade Characteristics and Strength
- Material Properties of the Granular Layers
- Material Properties of the Bituminous Layers

Visual inspection of the existing pavement condition has been carried out prior to commencement of pavement investigation work to finalize the test pit and core cutting locations.

4.3.4.10 Test Pits

Field studies are carried out to assess adequacy of the pavement layers and effectiveness of existing pavement layers. Efforts are made to examine condition of existing sub-grade, GSB and WMM by taking sample test pits of 0.6mx0.6m, at the interface of paved shoulder and earthen shoulders. Pavement composition details (pavement course, material type, and thickness) are

recorded at every test pit. The various in-situ tests conducted, and laboratory tests included in the testing program on soil, GSB and WMM samples along the alignment as per the requirements are summarized below:

Field Tests on Soil Subgrade

- Field Moisture Content & Field Dry Density Determination
- Field CBR using Dynamic Cone Penetrometer at each test pit
  Laboratory Tests on Subgrade Soil Sample

- Soil Classification, Sieve Analysis, Atterberg Limits
- Laboratory Proctor Compaction Test
- 4 day soaked CBR Test
- Free swell index
  Testing on Existing Granular Materials – Granular Sub Base (GSB)

- Gradation and cross variation of the same with MoRTH
- Laboratory Proctor Compaction Test

- 4 days soaked CBR Test
  Testing on Existing Granular Materials – WMM (Wet Mix Macadam)

- Gradation and cross variation of the same with MoRTH

Figure 4.11: Test Pits

SIEVE ANALYSIS

Objective

(a) Select sieves as per IS specifications and perform sieving.
(b) Obtain percentage of soil retained on each sieve.
(c) Draw graph between log grain size of soil and % finer.

Need and Scope of Experiment

The grain size analysis is widely used in classification of soils. The data obtained from grain size distribution curves is used in the design of filters for earth dams and to determine

suitability of soil for road construction, air field etc. Information obtained from grain size analysis can be used to predict soil water movement although permeability tests are more generally used.

PLANNING AND ORGANISATION

Apparatus

1. Balance
2. I.S Sieves
3. Rubber pestle and mortar
4. Mechanical Sieve Shaker

The grain size analysis is an attempt to determine the relative proportions of different grain sizes which make up a given soil mass.

Knowledge of Equipment

1. The balance to be used must be sensitive to the extent of 0.1% of total weight of sample taken.
2. I.S 460-1962 are to used. The sieves for soil tests: 4.75 mm to 75 microns.

Procedure

1. For soil samples of soil retained on 75 micron I.S sieve
   (a) The proportion of soil sample retained on 75 micron I.S sieve is weighed, and recorded weight of soil sample is as per I.S 2720.
   (b) I.S sieves are selected and arranged in the order as shown in the table.
   (c) The soil sample is separated into various fractions by sieving through above sieves placed in the above mentioned order.
   (d) The weight of soil retained on each sieve is recorded.
   (e) The moisture content of soil if above 5% it is to be measured and recorded.

   2 Nos. particle of soil sample shall be pushed through the sieves.

Figure 4.12: Soil Grain Analysis

OBJECTIVE

To determine the California bearing ratio by conducting a load penetration test in the laboratory.

NEED AND SCOPE

The california bearing ratio test is penetration test meant for the evaluation of subgrade strength of roads and pavements. The results obtained by these tests are used with the empirical curves to determine the thickness of pavement and its component layers. This is the most widely used method for the design of flexible pavement.

This instruction sheet covers the laboratory method for the determination of C.B.R. of undisturbed and remoulded /compacted soil specimens, both in soaked as well as unsoaked state.

PLANNING AND ORGANIZATION

Equipment's and tool required.

1. Cylindrical mould with inside dia 150 mm and height 175 mm, provided with a detachable extension collar 50 mm height and a detachable perforated base plate 10 mm thick.
2. Spacer disc 148 mm in dia and 47.7 mm in height along with handle.
3. Metal rammers. Weight 2.6 kg with a drop of 310 mm (or) weight 4.89 kg a drop 450 mm.
4. Weights. One annular metal weight and several slotted weights weighing 2.5 kg each, 147 mm in dia, with a central hole 53 mm in diameter.
5. Loading **machine.** With a capacity of atleast 5000 kg and equipped with a movable head or base that travels at an uniform rate of 1.25 mm/min. Complete with load indicating device.
6. Metal penetration piston 50 mm dia and minimum of 100 mm in length.
7. Two dial gauges reading to 0.01 mm.
8. **Sieves.** 4.75 mm and 20 mm I.S. Sieves.
9. Miscellaneous apparatus, such as a mixing bowl, straight edge, scales soaking tank or pan, drying oven, filter paper and containers.

DEFINITION OF C.B.R.

It is the ratio of force per unit area required to penetrate a soil mass with standard circular piston at the rate of 1.25 mm/min. to that required for the corresponding penetration of a standard material.

C.B.R. = Test Load/Standard load 100

The following table gives the standard loads adopted for different penetrations for the standard material with a C.B.R. value of 100%.

Penetration of Plunger (mm)	Standard Load (kg)
2.5	1370
5.0	2055
7.5	2630

Penetration of Plunger (mm)	Standard Load (kg)
10.0	3180
12.5	3600

The test may be performed on undisturbed specimens and on remolded specimens which may be compacted either statically or dynamically.

PREPARATION OF TEST SPECIMEN

Undisturbed Specimen

Attach the cutting edge to the mould and push it gently into the ground. Remove the soil from the outside of the mould which is pushed in . When the mould is full of soil, remove it from weighing the soil with the mould or by any field method near the spot.

Determine the Density

Remoulded Specimen

Prepare the remoulded specimen at Proctors maximum dry density or any other density at which C.B.R> is required. Maintain the specimen at optimum moisture content or the field moisture as required. The material used should pass 20 mm I.S. sieve but it should be retained on 4.75 mm I.S. sieve. Prepare the specimen either by dynamic compaction or by static compaction.

Dynamic Compaction

Take about 4.5 to 5.5 kg of soil and mix thoroughly with the required water.

Fix the extension collar and the base plate to the mould. Insert the spacer disc over the base. Place the filter paper on the top of the spacer disc.

Compact the mix soil in the mould using either light compaction or heavy compaction. For light compaction, compact the soil in 3 equal layers, each layer being given 55 blows by the 2.6 kg rammer. For heavy compaction compact the soil in 5 layers, 56 blows to each layer by the 4.89 kg rammer.

Remove the collar and trim off soil.

Turn the mould upside down and remove the base plate and the displacer disc.

Weigh the mould with compacted soil and determine the bulk density and dry density.

Put filter paper on the top of the compacted soil (collar side) and clamp the perforated base plate on to it.

Static Compaction

Calculate the weight of the wet soil at the required water content to give the desired density when occupying the standard specimen volume in the mould from the expression.

W =desired dry density * (1+w) V

Where W = Weight of the wet soil

w = desired water content

V = volume of the specimen in the mould = 2250 cm^3 (as per the mould available in laboratory)

Take the weight W (calculated as above) of the mix soil and place it in the mould.

Place a filter paper and the displacer disc on the top of soil.

Keep the mould assembly in static loading frame and compact by pressing the displacer disc till the level of disc reaches the top of the mould.

Keep the load for some time and then release the load. Remove the displacer disc.

The test may be conducted for both soaked as well as unsoaked conditions.

If the sample is to be soaked, in both cases of compaction, put a filter paper on the top of the soil and place the adjustable stem and perforated plate on the top of filter paper.

Put annular weights to produce a surcharge equal to weight of base material and pavement expected in actual construction. Each 2.5 kg weight is equivalent to 7 cm construction. A minimum of two weights should be put.

Immerse the mould assembly and weights in a tank of water and soak it for 96 hours. Remove the mould from tank.

Note the consolidation of the specimen.

Procedure for Penetration Test

Place the mould assembly with the surcharge weights on the penetration test machine. **(Fig.4.12).**

Seat the penetration piston at the center of the specimen with the smallest possible load, but in no case in excess of 4 kg so that full contact of the piston on the sample is established.

Set the stress and strain dial gauge to read zero. Apply the load on the piston so that the penetration rate is about 1.25 mm/min.

Record the load readings at penetrations of 0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 4.0, 5.0, 7.5, 10 and 12.5 mm. Note the maximum load and corresponding penetration if it occurs for a penetration less than 12.5 mm.

Detach the mould from the loading equipment. Take about 20 to 50 g of soil from the top 3 cm layer and determine the moisture content.

Figure 4.13: Days Soaked CBR Test

LIQUID LIMIT TEST

OBJECTIVE

1. Prepare soil specimen as per specification.
2. Find the relationship between water content and number of blows.
3. Draw flow curve.
4. Find out liquid limit.

NEED AND SCOPE

Liquid limit is significant to know the stress history and general properties of the soil met with construction. From the results of liquid limit the compression index may be estimated. The compression index value will help us in settlement analysis. If the natural moisture content of soil is closer to liquid limit, the soil can be considered as soft if the moisture content is lesser than liquids limit, the soil can be considered as soft if the moisture content is lesser than liquid limit. The soil is brittle and stiffer.

THEORY

The liquid limit is the moisture content at which the groove, formed by a standard tool into the sample of soil taken in the standard cup, closes for 10 mm on being given 25 blows in a standard manner. At this limit the soil possess low shear strength.

APPARATUS REQUIRED

1. Balance 2. Liquid limit device (Casagrande's) 3. Grooving tool 4. Mixing dishes

5. Spatula 6. Electrical Oven

PROCEDURE

1. About 120 gm of air-dried soil from thoroughly mixed material passing 425 micron I.S sieve is to be obtained.

2. Distilled water is mixed to the soil thus obtained in a mixing disc to form uniform paste. The paste shall have a consistency that would require 30 to 35 drops of cup to cause closer of standard groove for sufficient length.
3. A portion of the paste is placed in the cup of LIQUID LIMIT device and spread into portion with few strokes of spatula.
4. Trim it to a depth of 1cm at the point of maximum thickness and return excess of soil to the dish.
5. The soil in the cup shall be divided by the firm strokes of the grooving tool along the diameter through the centre line of the follower so that clean sharp groove of proper dimension is formed.
6. Lift and drop the cup by turning crank at the rate of two revolutions per second until the two halves of soil cake come in contact with each other for a length of about 1 cm by flow only.
7. The number of blows required to cause the groove close for about 1 cm shall be recorded.
8. A representative portion of soil is taken from the cup for water content determination.
9. Repeat the test with different moisture contents at least three more times for blows between 15 and 35.

NEED AND SCOPE

Soil is used for making bricks , tiles , soil cement blocks in addition to its use as foundation for structures.

APPARATUS REQUIRED

1. Porcelain dish.
2. Glass plate for rolling the specimen.
3. Air tight containers to determine the moisture content.
4. Balance of capacity 200gm and sensitive to 0.01gm
5. Oven thermostatically controlled with interior of non-corroding material to maintain the temperature around 1050 and 1100C.

PROCEDURE

1. Take about 20gm of thoroughly mixed portion of the material passing through 425 micron I.S. sieve obtained in accordance with I.S. 2720 (part 1).

2. Mix it thoroughly with distilled water in the evaporating dish till the soil mass becomes plastic enough to be easily molded with fingers.

3. Allow it to season for sufficient time (for 24 hrs.) to allow water to permeate throughout the soil mass.

4. Take about 10gms of this plastic soil mass and roll it between fingers and glass plate with just sufficient pressure to roll the mass into a threaded of uniform diameter throughout its length. The rate of rolling shall be between 60 and 90 strokes per minute.

5. Continue rolling till you get a threaded of 3 mm diameter.

6. Kneed the soil together to a uniform mass and re-roll.

7. Continue the process until the thread crumbles when the diameter is 3 mm.

8. Collect the pieces of the crumbled thread in airtight container for moisture content determination.

9. Repeat the test to at least 3 times and take the average of the results calculated to the nearest whole number.

Figure 4.14: Atterberg Limits Test

FREE SWELL INDEX OF SOIL

OBJECTIVE
For determination of free swell index of soils

REFERENCE STANDARD

IS: 2720(Part 40)-1985- Methods of test for soils: Determination of free swell index of soil.

EQUIPMENT / APPARATUS

- Oven(105^0C to 110^0C, min)
- Balance (0.01g accuracy)
- Sieve [425 micron]
- Graduated glass cylinder [100ml capacity]

PREPARATION SAMPLE

The soil passing 425 micron sieve is used in this test.

PROCEDURE

1. Two no. of 10 g oven dried soil specimens passing through 425 micron IS sieve is taken.
2. Each soil specimen is poured in each of the two glass graduated cylinders of 100 ml. capacity.
3. Then one cylinder is filled with kerosene oil and the other with distilled water up to the 100 ml. mark.
4. It is to be stirred with a glass rod to remove entrapped air and allowed to settle for 24 hours.
5. After completion of 24 hours the final volume of soils in each of the cylinder is read out.

CALCULATION
The free swell index of the soil is to be calculated as follows :

Free swell index, percent = $((V_d-V_k) / V_k)*100$

Figure 4.15: Free Swell Index

4.3.4.11 Core Cutting

Detailed pavement condition survey is carried out for finalising locations of core cutting investigation based on the distresses/ pavement condition for needful further assessment.

The bituminous core samples are drilled with 100 mm standard size core cutting machine in the presence of pavement engineer, and the field observation reports of each core are prepared for needful assessment. The field observation report includes –

- Location and direction of the core cutting sample

- Off-set distance from median
- Depth of the core
- Distresses observations (crack width, depth) in each core

The following laboratory tests are carried out on the bituminous core samples –

- Density of the core
- Maximum Specific Gravity (Gmm)
- Bitumen Extraction
- Viscosity of the extracted bitumen (for 20% length)
- Gradation of Aggregates

Figure 4.16: Core Cutting

4.3.4.12 Material Investigations

The activities performed for material investigations include –

- Identification of potential sources near Project Stretch (including use of fly-ash/slag), quarry sites and borrow areas
- Collection of samples and conducting relevant laboratory tests
- Evaluation of test results and assessment of the suitability thereof for incorporation in various works and making recommendation on the use of the materials from different sources based on techno-economic principles
- Assess adequacy of quality and quantities of various construction materials available
- Preparation of mass haul diagram and quarry charts indicating the location of selected borrow areas, quarries and the respective estimated quantities

- Preparation and testing of bituminous mixes for various layers and concrete mixes of different grades using suitable materials (binders, aggregates, sand fillers etc.) as identified during material investigation to conform to latest specifications

The equipments used during investigations include hand tools like crow bars, spades, wedges etc. for collecting representative samples. The samples are packed in suitable bags, labelled and sent to laboratory for testing. Samples of stone aggregates are collected from existing crushers using the stone from the respective quarries.

a) Sample Collection

Each quarry/material source is visited by an Assistant Engineer guided by the Material Expert, and the available materials are examined. The location of the source, the approachability, ownership, any environmental and social restrictions, approximate quantum of material available for extraction, any special installation/equipment required for extraction, visual assessment about suitability, and other relevant information are recorded.

Samples (30-40 kg) are collected from each source adopting standard sampling procedures. These are packed in suitable bags, labelled and sent to the laboratory for testing.

Figure 4.17: Crusher Plant

b) Laboratory Testing of Borrow Soils and Granular Materials

The samples of materials for use in embankments, subgrade and granular sub-base are subjected to the following tests:

- Determination of water content
- Grain size analysis
- Liquid and plastic limit
- Compaction test (heavy compaction)
- Determination of CBR

c) Laboratory Testing of Quarry Sample

- Gradation
- Specifications
- Flakiness & Elongation Index
- Aggregate Impact Value
- Soundness
- Bitumen Affinity Test

TESTS ON AGGREGATES

DETERMINATION OF INDICES (FLAKINESS AND ELONGATION)

STANDARD

- IS: 2386 (Part 1) 1963.

DEFINITION

- The Flakiness Index of aggregates is the percentage by weight of particles whose least dimension (thickness) is less than 0.6 times their mean dimension.
- The Elongation Index of aggregates is the percentage by weight of particles whose greatest dimension (length) is greater than 1.8 times their mean dimension.

APPARTUS

- Standard thickness gauge.
- Standard length gauge.
- IS sieves 63mm, 50mm, 40mm, 25mm, 20mm, 16mm, 12.50mm 10mm and 6.30mm.
- Balance of capacity 15kg and sensitivity 1gram.
- Thermostatically oven controlled with capacity up to 250 ^{0}C.

PROCEDURE

- Take representative sample of aggregates from the stockpile.
- Dry the whole sample in the oven to a constant weight at a temperature of 105 to 110^{0}C and cool in room temperature.

- Sieve the whole sample through the sieves mentioned in the columns (1) and (2) of the Table 4.1.1.

FLAKINESS INDEX

- Take minimum of 200 pieces from each fraction and weigh (A).
- Separate flaky material from each fraction by gauging through the standard thickness gauge.
- Weigh the flaky material passing through the specified gauge from each fraction $c_1+c_2+c_3+c_4+c_5+\ldots\ldots\ldots= C$.

CALCULATIONS

- Flakiness index, % = (C / A) X 100

ELONGATION INDEX

- Take minimum of 200 pieces from each fraction and weigh (F).
- Separate the elongated material from each fraction by gauging through the standard length gauge.
- Weigh the elongated material passing through the specified gauge from each fraction $e_1+e_2+e_3+e_4+e_5+\ldots\ldots\ldots= E$

Figure 4.18: Elongation and Flakiness Index Test

DETERMINATION OF AGGREGATE IMPACT VALUE

STANDARD

- IS: 2386 (Part 4) 1963.

DEFINITION

- Aggregate Impact value is the ratio between the weights of the fines passing 2.36mm IS sieve and the total sample.

APPARATUS

- Standard Impact Testing machine.
- Cylindrical steel cup 6.3mm thick and having internal diameter of 102mm and depth of 50mm.
- A straight metal tamping rod of circular cross section 10mm diameter and 230mm long, rounded at one end.
- 12.5mm, 10mm and 2.36mm IS sieves.
- Balance of capacity 500gms and sensitivity 0.1gram.
- Thermostatically controlled oven with capacity up to 250 ^{o}C.

PROCEDURE

- Take representative sample of aggregates passing 12.5mm IS sieve and retained on 10mm IS sieve.
- Keep the sample in the oven for a period of four hours till the time the weight becomes constant at a temperature of 105 to 110 ^{o}C and cool to room temperature.
- Fill the cup in three equal layers, each layer being subjected to 25 strokes with the rounded end of the tamping rod.
- Struck off the surplus aggregates using tamping rod as a straight edge.
- Determine the net weight (A) of the aggregate in the cup.
- Now transfer the material into the cup of Impact machine, which is fixed firmly in position.
- Compact the material in the cup by a single tamping of 25 strokes with the tamping rod.
- Subject the test sample to a total of 15 blows by the hammer (weighing 13.50 Kg to 14Kg) of the Impact machine each being delivered at an interval of not less than one second and from a height of 380 $\pm$ 5 mm above the upper face of the aggregate as shown in Fig: 3.6.1.
- Remove the crushed aggregates from the cup and sieve the whole sample on the 2.36mm IS sieve till no further significant amount passes through the sieve in one minute and weigh (B) as shown in Fig: 3.6.2.
- Weigh the material that has passed through the sieve (C).
- If the total weight (B+C) is less than the original weight (A) by more than one gram, discard the result and conduct a fresh test.

Figure 4.19: Aggregate Impact Value Test

DETERMINATION OF SOUNDNESS OF AGGREGATES

STANDARD

- IS: 2386 (Part 5) 1963.

OBJECTIVE

- To determine the soundness of aggregates.

APPARATUS

- Sieves of size 80mm, 63mm, 50mm, 40mm, 31.50mm, 25mm, 20mm, 16mm, 12.50mm, 10mm, 8mm, 4.75mm, 4mm, 2.36mm, 1.18mm, 600microns, 300microns and 150microns with square openings conforming to IS: 460-1962.
- Containers for immersing the samples shall be perforated so as to permit free access of the solution from the sample and drainage of the solution from the sample without loss of aggregate.
- Arrangements shall also be available to ensure that the volume of the solution in which samples are to be immersed shall be at least five times the volume of the sample immersed at any one time.
- Balance of capacity 500gm sensitivity to 0.01gm
- Balance of capacity 10kg sensitivity to 1gm.
- Thermostatically controlled oven capable of being maintained at 105^0 to 110^0C.
- The rate of evaporation, at this range of temperature shall be at least 25gm/hour for four hours during which period the doors of the oven kept closed.

REAGENTS

SODIUM SULPHATE SOLUTION

- Prepare saturated solution of sodium sulphate technical grade, conforming to IS: 255 - 1950 or an equivalent grade of the salt of either the anhydrous ($Na_2 SO_4$) or the crystalline ($Na_2 SO_4 . 10 H_2O$) form in water at temperature of 25 to 30^0C.
- For making of the solution, 420gms of anhydrous salt or 1300gms of decahydrate salt per liter of water are sufficient for saturation at 28^0C.
- The mixer shall be thoroughly stirred during the addition of salt and the solution shall be stirred at frequent intervals until used.
- The solution shall be cooled to a temperature of 27 $\pm$ 2^0C and maintained at that temperature for at least 48 hours before use.
- Salt cakes if any shall be broken and specific gravity of the solution shall be determined.
- When used, the solution shall have specific gravity of 1.151 to 1.174.
- Discoloured solution shall be discarded or filtered and checked again for specific gravity.

Magnesium Sulphate Solution

- Prepare saturated solution of magnesium sulphate technical grade, conforming to IS: 257 - 1950 or an equivalent grade of the salt of either the anhydrous ($Mg SO_4$) or the crystalline ($Mg SO_4 . 7 H_2O$)(Epsom salt) form in water at a temperature of 25 to 30^0C.
- For making of the solution, 400gms of anhydrous salt or 1400gms of heptahydrate salt per liter of water are sufficient for saturation at 28^0C.
- The mixer shall be thoroughly stirred during the addition of salt and the solution shall be stirred at frequent intervals until used.
- The solution shall be cooled to a temperature of 27 $\pm$ 1^0C and maintained at that temperature for at least 48 hours before use.
- Salt cakes if any shall be broken and specific gravity of the solution shall be determined.
- When used, the solution shall have specific gravity of 1.295 to 1.308.
- Discoloured solution shall be discarded or filtered and checked again for specific gravity.

FINE AGGREGATES

- Aggregates passing 4.75mm IS Sieve shall be considered as fine aggregates.
- Sample shall be of such size that it will yield not less than 100gms of each of the sizes shown in Table.

Passing IS Sieve	Retained on IS Sieve
600microns	300microns
1.18mm	600microns
2.36mm	1.18mm
4.75mm	2.36mm

COARSE AGGREGATES

- Aggregates of size more than 4.75mm shall be considered as coarse aggregates.
- Sample shall be of such size that it will yield not less than following amounts of different sizes, mentioned in Table: 3.7.2 which shall be available in amounts of 5% or more.

ALL IN AGGREGATES

- Separate all in aggregates in to two major fractions such as smaller than 4.75 and coarser than 4.75.
- The former shall be dealt as fine aggregates and the latter as coarse aggregate

PREPARATION OF TEST SAMPLE

Fine Aggregates

- Thoroughly, wash fine aggregates on 300micron IS sieve and dry to constant weight at 105^0 to 110^0C and separate in to different sizes through the sieves mention in Table.

Coarse Aggregates

- Thoroughly wash and dry aggregates to a constant weight in an oven at a temperature of 105^0 to 110^0 C.
- Separate into desired fraction by sieving through the sieves mention in Table.
- Weigh the required size of fraction and place in to separate containers.
- In the case of fraction coarser than 20mm the number of particles shall also be counted.

10mm to 4.75mm	300gms
20mm to 10mm 12.5 to 10mm 20 to 12.5mm	1000gms 33% 67%
40mm to 20mm 25mm to 20mm 40 to 25mm	1500gms 33% 67%
63mm to 40mm 50mm to 40mm 63 to 50	3000gms 50% 50%
80mm and larger sizes by 20mm spread in sieve size, each fraction	3000gms

PROCEDURE

STORAGE OF SAMPLE IN SOLUTION

- Immerse the samples in the prepared solution of sodium sulphate for not less than 16hours nor more than 18hours in such a manner that the solution covers the sample to a depth of at least 15mm.
- Cover the containers to reduce the evaporation and to prevent accidental condition of extraneous substances.
- The temperature in the solution shall be maintained within 27 $\pm$ 1^0C through out the immersion period.

- After the immersion period remove the aggregates from the solution and permit to drain for 15 ± 5 minutes and place in the oven at a temperature of 105 to 110^{0}C until it attains a constant weight.
- During this period remove the aggregates from the oven cool to room temperature and weigh at intervals not less than 4hours nor more than 18hours.
- Constant weight may considered to have been achieved when two successive weights for any one sample shall not differ by more than 0.1gram for fine aggregates and 1gram for coarse aggregates.
- After the constant weight has been achieved remove the aggregates from the oven and cool to room temperature.
- Again immerse the aggregates in solution for next cycle and repeat the same procedure as described above.
- The number of cycles to be conducted shall be as per specifications.
- After the completion of the final cycle cool the sample and wash the sample free from sulphate.
- This may be determined when there is no more reaction of the washed water with barium chloride. (When there is no white precipitation when barium chloride is added to washed water, it can be said that there is no sulphate with washed water)
- Dry each faction of sample in an oven at a temperature of 105 to 110^{0}C to constant weight and weigh.
- Sieve the fine aggregates over the same sieve on which it was retained before the test.

  Sieve the coarse aggregates over the sieves of sizes shown in Table: 3.7.3 for appropriate size of particle.

Size of Aggregates	Sieve Size used to Determine Loss
63 to 40mm	31.50mm
40 to 20mm	16mm
20 to 10mm	8mm
10 to 4.75mm	4mm

- Examine visually each size of aggregates to see if there is any evidence of excessive splitting, crumbling or disintegration of the grains.

  Conduct a combined sieve analysis of all the material subject to the above test to note the variation from the original grain size analysis of the sample.

Laboratory Testing of Natural Sand

- Gradation and Fineness modulus
- Deleterious Constituents

Review and Verification of Test Results

- The Material Expert has reviewed all the laboratory test results for consistency and compatibility. For example, for soils and other granular materials, the quality given by classification and maximum dry density results are compared against that given by CBR. For rock samples, the specific gravity, water absorption and the aggregate impact values are checked.

4.3.5 Road Safety Audit

Methodology for identification of road safety concerns and development of improvement proposals along the Project Stretches is listed in following steps.

- Review of past data and identification of accident blackspot locations along the Project Stretches
- Field investigations to understand the current safety concerns along the Project Stretches and specifically at the identified accident prone locations
- Identification and prioritization of improvement proposals based on requirements as immediate, medium term and long term to provide safer driving conditions

The detailed methodology followed the safety enhancement along the Project Stretches is described in further sections.

4.3.5.1 Review of Past Data and Identification of Accident Blackspot Locations

Available past accident data on the Project Stretches has been collected from NHAI and analysed in detail. In addition to analysis of accident data, already identified blackspot locations by NHAI PIU are studied.

4.3.5.2 Field Investigations to understand Safety Concerns

Safe Road Environment along the highway depends upon condition of various components of the highway such as alignment, provision and placement of street furniture, intersection geometry, availability of adequate sight distance, night vision along the highway, etc. It is essential to understand all these aspects on the highway from safety point of view. For this purpose, the team of Certified Road Safety Auditor/Engineer and Transport Planner has carried out detailed site reconnaissance. Following details are recorded during the field investigations.

- Current arrangement at intersections, pedestrian crossings, adequacy of the same all along the Project Stretch
- Condition of Service Roads and their intersection with main carriageway
- Identifying reasons for accidents at the identified accident prone locations such as – improper visibility,
- inadequacy of signage and information, inappropriate geometrical design, etc.
- Identification of locations for minor and major improvements

The above details are observed and recorded along the Project Stretches during the day as well as at night. Along with manual observations, entire Project Stretch is video graphed using Vehicle Video Recorder (VVR), which has capability of storing geographical coordinates of video. Snapshot of sample output from VVR is shown below.

Figure 4.20: Snapshot-displaying Output from VVR

As can be seen in above image, Vehicle Video Recorder records following details along with video:

- Video recording with 2-cameras – One Camera records the road section at driver's eye level and the other records view inside vehicle (which is not required for road safety inspection, therefore not used in this study)
- Location of Video on the Google Map (along with coordinates of the location)
- Speed of the Recording Vehicle, in km/hour

Videos will be useful to understand driver's view along the Project Stretches.

In addition to above, current conditions of road furniture are obtained from Network Survey Vehicle.

4.3.5.3 Retro-reflectivity Test of Road Markings and Road Signs

Retro Reflect Meter (Horizontal) - for measuring road markings Retro Reflectivity - Determination of night visibility (RL) and Determination of Day visibility (Qd).

4.3.5.4 The Equipment

Road markings must be clearly visible both in day and night. Road markings have become an important aid for drivers to follow the unlit roads at night where visual cues on roadsides are absent.

Figure 4.21: Retro Reflectometer (Road Marking)

This necessitates regular performance checking which markings can be done using a retro reflectometer. The night-time visibility (RL, coefficient of retro reflected luminance) and the daytime visibility (Qd, coefficient under diffuse illumination) can be quickly and accurately measured.

4.3.5.5 Procedure

Easy lux must be positioned directly over the Pavement Marking and parallel with the Marking as shown in fig.

Day time visibility (Qd) is expressed and measured in mcd•m-2•lx-1 observed at an angle of 2.29° at a distance of 30 m and represents the value of the diffuse scattered light received by the observer.

Night-time Visibility or value expressed by the coefficient of Retro-Reflection (RL) and measured in Mcd•m-2•lx-1.

For measurement night visibility device measures Retro-Reflection luminous rays from the study area at an angle of 2.29 °, the input light angle of 1.24 ° and at a distance of
30 m with a low beam.

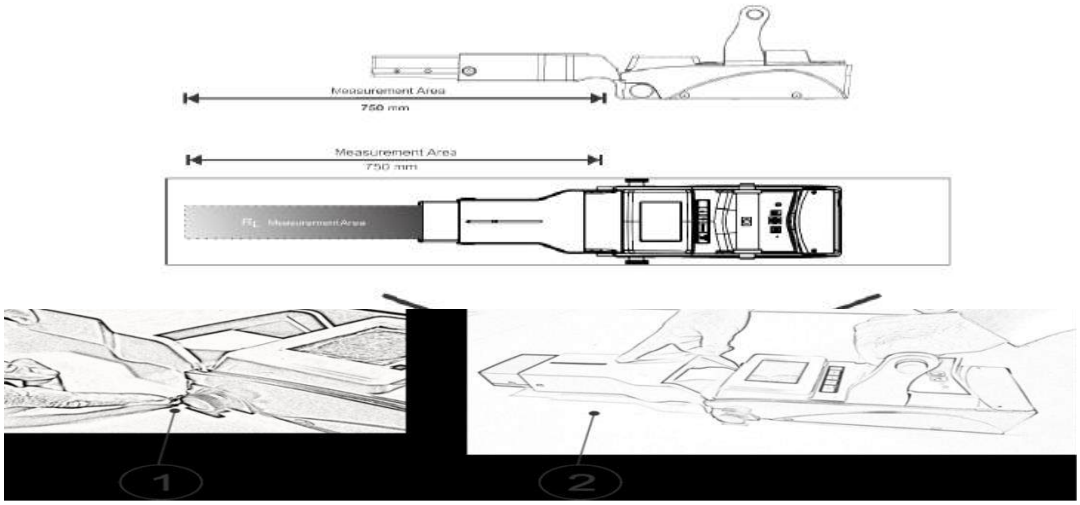


Figure 4.22: Positioning of Equipment

Figure 4.23: Retro reflectivity of Road Markings on site

4.3.5.6 Retro Reflectivity for Sign Board as per IRC 67-2012_Retro Reflectometer (vertical)

The Purpose of road sign is to promote road safety and efficiency by providing for the orderly movement of road users on all roads in both urban and non- urban are areas. Road signs notify road users of regulations and provide warning and guidance needed for safe, uniform and efficient operation.

4.3.5.7 The Equipment

The **Mini Retro Reflector (Vertical)** is a different angle retro reflectometer designed to accurately measure the retro-reflection (*RA)* of road signs, safety clothing and other materials. The innovative optical system can measure different simultaneous observation angles. The entrance angle (*β*) can be fixed (−4° / +5°) or it can be continuously adjusted by the operator. The unique quadruple Geometry enables the Mini Reflector vertical to comply with all standards.

Figure 4.24: Retro Reflectometer for Sign Board

4.3.5.8 The Principle

The Mini Retro-Reflector (Vertical) is a handheld instrument to measure the coefficient of retro-reflection (RA) of road signs and other materials. It is capable of taking simultaneous measurements of up to 4 (four) observation angles in a single unit. The entrance angle (β) can be set to -4° or +5°, or it can be continuously adjusted by the operator. The unique quadruple Geometry enables the Mini Retro-Reflector (Vertical) to comply with all standards

4.3.5.9 Procedure

Retro-reflection" means the reflection of light which is returned in directions close to the direction from which it came, and this property being maintained even over wide variations of the direction of the incident radiation.

"Observation angle (symbol α)" is the angle between the illumination axis and the observation axis as shown in Fig.

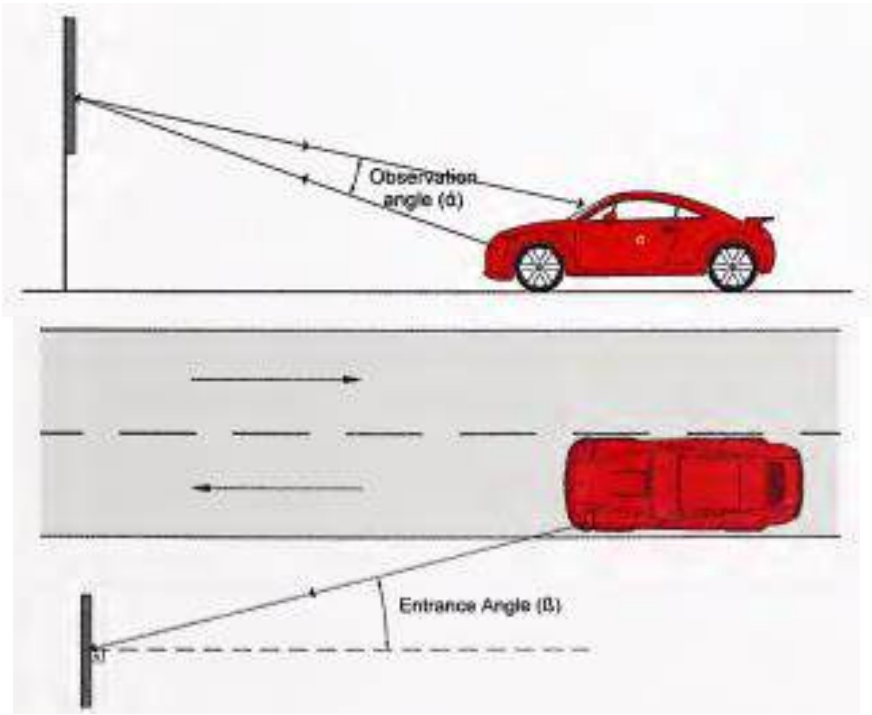


Figure 4.25: Observation Angle

"Entrance angle (symbol β)" means the angle from the illumination axis to the reference axis. The reference axis is an axis perpendicular to the retro reflective surface as shown in Fig.

4.3.5.10 Test Interpretations & Results

"Coefficient of retro-reflection R' " can be obtained from the luminous intensity (I) of the Retro-reflective area in the direction of observation and the illumination on the retro-reflective Plane at right angles to the direction of the incident light and the illuminated plane Sample surface A,

$$R' = I / E -1* A$$

The coefficient of retro-reflection R' is expressed in candle per square meter per lux (cd.m-2.lx-1).Though the sheeting as per ASTM classification are available from Type I To Type IX (as per IRC 67). a "higher" type of sheeting used in the ASTM need not necessarily imply that it is better thana "lower"-type sheeting, rather it meets different performance characteristics. Each type of

Sheeting has certain performance characteristics and the type of sheeting for a road should be selected which suits the situation encountered by road users in viewing the signs on the particular road. For example, sheeting with high coefficient of retro reflection at small observation angle will give better performance for driver's viewing the sign from long distances.

Similarly, signs with wide observation angle give good performance for drivers encountering situations to observe the signs involving wide observation angle.

Specifications of Testing

Measurement time after pressing trigger shall be less than or equal to 1 sec

- Observation angle adjustment from 0.2 degrees to 2.0 degrees
- Entrance angle adjustment from -45 degrees to +45 degrees
- Self-contained commercially available battery
- Inbuilt data storage of at least 2,000 measurements so that data transfer requirement is minimized while the survey is being conducted
- Interface for transferring data from device to Computer
- Built in GPS to capture GPS coordinates of road sign
- Range shall be at least 0-2000 cd/lx/m2

Figure 4.26: Retroreflective Test on Sign Board

Figure 4.27: Retro-Reflectivity of Road Signs

4.3.5.11 Identification and Prioritization of Improvement Proposals along the Project Stretches

As described above, details related to current situation of various road furniture and geometrical aspects are recorded during the field investigations. Along with current situations, the improvements required at various locations are also identified. Project Stretches were developed almost before a decade or more as a part of Golden Quadrilateral or East West Corridor. While suggesting the improvement measures, Provisions of latest standards and best practices are taken into consideration. IRC: SP:84-2014, Manual of Specifications and Standards for 4-laning of Highways through Public Private Partnership (First Revision) and latest specifications are followed for improvement proposals.

Identification of safety improvement proposals are classified as immediate and long-term Improvement Proposals. Some of the proposals listed as below:

- Immediate Proposals – New Service Roads, Improvements in road furniture such as Sign Boards, Pavement Markings, Safety Barriers, Pedestrian Guard Rails, Street Lights, blinkers etc.
- Long-term Proposals – Major improvement proposals such as provision of underpasses, flyovers, corridor improvements etc.

Requirement for capacity augmentation along with its timeline for all Project Stretches are worked out which is mentioned in Chapter for Travel Demand Estimation.

Above safety improvement proposals are prioritised and finalised using the following parameters:

- Urgency of need for improvement
- Ease of implementation
- Cost of improvement

4.3.6 STRUCTURAL INVESTIGATIONS

Inventory and condition survey of structures are the two most essential requirements for operation and maintenance of highway structure. These tasks are carried out as per procedure and guidelines corresponding to IRC: SP:35. As part of this activity, detailed inventory and condition survey are carried out for all the existing structures in the Project Stretch.

4.3.6.1 INVENTORY and Visual Condition Survey

Salient features for which data is collected as part of inventory survey are in accordance with IRC: SP: 35 Proforma. Main features recorded as part of inventory survey are listed below:

- Bridge number/ Name
- Location (Chainage)
- Type of structure (Major bridge, minor bridge, pipe culverts, box culverts, slab culverts, underpasses, flyovers etc.) and year of construction if available from records.
- Span Arrangement details like numbers of spans, span length, vent height from deepest stream bed level.
- Details and type of vehicle restraint systems such as safety barriers or R.C.C railing or parapet wall.
- Clear width and overall width of structure.
- Total width of structure
- Main features recorded as part of detailed condition survey are listed below.
- Condition of wearing coat such as potholes, cracks, and patches.
- Condition of expansion joints such as bump in riding, leakage in expansion joint, damaged sealing compound, silt and debris filled in expansion joint gap.
- Damaged and missing details of RCC railing/ safety barrier/ parapet wall.
- Damaged and missing details of drainage spouts and down take pipes extended below the soffit of deck slab, status of drainage spout chambers filled with debris and silt and missing or damaged gratings, covered on rainwater collection chambers.
- Spalling of concrete from super structure and sub structure elements.
- Delamination in girders, soffit of deck slab and substructure.
- Corroded reinforcement exposed anywhere in deck slab and substructure.
- Mapping of cracks in girders, deck slabs, sub structure.
- Visible voids and honey combing in concrete surfaces.
- Scouring near foundations and damage to protection works.

During the detailed inventory and conditional survey by bridge experts, Mobile Bridge Inspection Unit (MBIU) is also engaged at inaccessible bridge locations.

Figure 4.28: Mobile Bridge Inspection Unit (MBIU)

Apart from detailed visual survey to record the condition of structures, various non-destructive tests (NDT) are also conducted on elements of some of the structures whose condition looks not good such as presence of corroded steel and spalling of concrete etc. The method of testing and significance of tests are detailed below.

4.3.6.2 Non-Destructive Testing (NDT)

ND Tests are analysis techniques used in construction industry to evaluate the properties of a material, component or system without causing damage to original element of structure. Methodology and objective of each of Non-destructive tests that were used in the project as part of condition survey of highway structures are presented here.

4.3.6.3 Rebound Hammer Test

Schmidt's rebound hammer test for determining the concrete compressive strength as per (IRC: SP- 40 AND IS: 516 (part-5/sec-4):2020

The Rebound Hammer test has been used to assess concrete compressive strength at several locations.

4.3.6.4 The Equipment

Concrete Test Hammer Type N manufactured and supplied by PROCEQ, Switzerland is used as shown in Fig. A. It has impact energy of 2.207N.m (0.225 kg m), which is meant for non-destructive testing of the quality of concrete in the finished structure. When testing, the 'Rebound Number' is measured which depends on the strength of the concrete/mortar close to the surface. The rebound number is read off along a graduated scale and is designated as the rebound number.

Figure 4.29: Rebound Hammer Equipment

Correlation between Compressive Strength of Concrete and Rebound Number

A correlation (depending up on the position of rebound hammer used at work site) between Rebound Number and the likely existing compressive strength is provided by the manufacturer as shown below in Figure.

However, to have more realistic and precise assessment, a 'Site – Specific' correlation shall be developed which is based on the compressive strength of core samples taken from RCC elements of particular structure and their rebound values taken at the location of coring.

For this particular structure two correlations have been prepared as difference in original quality of concrete (used for construction of Basement level II Part 1) is observed. The correlations established are shown as Figure.

4.3.6.5 Procedure

Smooth, clean and dry surfaces are selected for testing. Rough surfaces are avoided for this purpose. Points of impact are kept away from edges. The rebound hammer is held at right angles to the surface. Concrete surface shall be rubbed clean with a grinding stone before making the impact. About six readings are taken at each point, which are then averaged to get the final value in accordance with standard procedure.

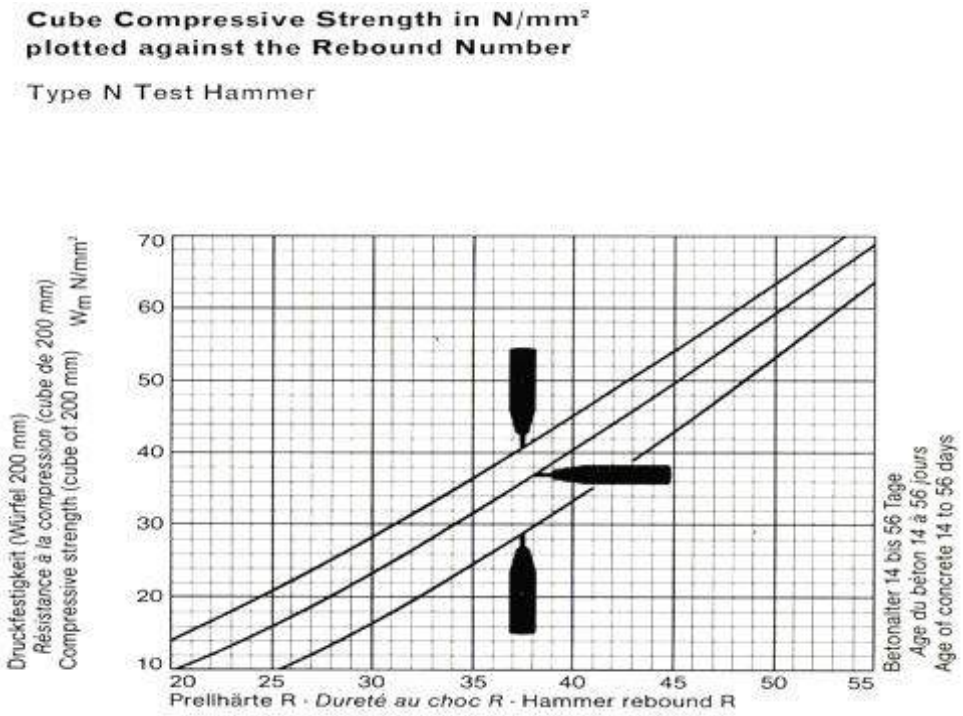


Figure 4:30: Correlation Curve Supplied by Manufacturer i.e. Proceq, Switzerland

Figure 4.31: Rebound Hammer Test at Site

4.3.6.6 Ultrasonic Pulse Velocity Test

Ultrasound pulse velocity test for establishment the quality of concrete as per (IRC: SP- 40 AND IS: 516 Part-5/sec-1:2018)

The ultrasonic pulse velocity (UPV) measurements are taken to obtain information about concrete quality i.e., voids, flaws, cracks, honeycombing etc. in terms of ultrasonic pulse velocity. The results help in identifying the areas required to be strengthened.

4.3.6.6.1 The Equipment

Ultrasonic Instrument manufactured and supplied by PROCEQ (PUNDIT LAB+), Switzerland is used for taking UPV measurements and is shown below in Fig. C. It has two standard transducers of 54 kHz natural frequency along with all the other accessories. One transducer (transmitter) sends the ultrasonic wave into the medium and other (receiver) receives it on the other face.

Figure 4.32: Ultrasonic Pulse Velocity Equipment

4.3.6.6.2 The Principle

The underlying principle of assessing the quality of concrete is that comparatively higher velocities are obtained when the quality of concrete in terms of density, homogeneity and uniformity is good. In case of poor quality, lower velocities are obtained. If there is a crack, void or flaw inside the concrete, which comes in the way of transmission of pulses, the pulse strength is attenuated and it passes around the discontinuity, thereby making the path longer. Consequently, lower velocities are obtained. The actual pulse velocity obtained depends primarily upon the materials and mix proportions of concrete. Density and modulus of elasticity of aggregate also affect the pulse velocity.

4.3.6.6.3 Procedure

The measurement points are first identified and the distance between these points is measured. Coupling paste is applied to the contact surfaces of the transducers (thinner coat to the finer concrete surface, thicker coat for the rough surface) and Measurements are taken after feeding necessary inputs in the equipment. The measurements can be taken in three manners:

a. Direct Transmission or Cross Probing: When both the probes are kept (at 180°) on opposite faces.
b. Semi-direct Transmission: Both the probes are kept (at 90°) on diagonally opposite faces.
c. Indirect Transmission or *Surface Probing: When both the probes are kept (at 180°) on the same face. All these methods have been illustrated in Figure.

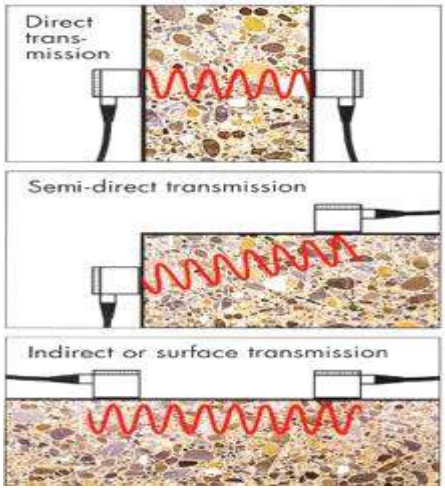


Figure 4.33: Methods of UPV Measurement

Surface probing in general gives lower pulse velocity than in case of cross probing and depending on number of parameters, the difference could be of the order of about 0.5 km/s. In view of this, it is recommended that, in surface probing method the pulse velocity may be increased by 0.5 km/s, for values > 3.0 km/s.

The quality of concrete in terms of uniformity, incidence or absence of internal flaws, cracks or segregation etc. indicative of the level of workmanship employed, can be assessed using the guidelines given in Table I below, which have been evolved for characterizing the quality of concrete in structures in terms of the ultrasonic pulse velocity.

Figure 4.34: Ultrasonic Pulse Velocity Test at Site

4.3.6.7 Carbonation Depth Test (CD)

Chemical reaction of the concrete surface to a Phenolphthalein based staining agent was recorded at varying depth at the same location. The first depth was the stain turned pink was recorded as the depth of carbonation. These tests were carried out in close proximity to the surface strength profile test locations to note the densification effect of carbonation on surface strength.

Figure 4.35: Snapshot of CD Testing

4.3.6.8 Transient Dynamic Response Test (TDR)

TDR tests are similar to UPV testing, unlike UPV the pulse is generated by blow of the hammer on the surface to be tested. This produces the transient dynamic pulses in the medium, which is tested. The wave moves in the medium and wherever there is change in density or material property the wave has a reflection. This reflection moves to the top of the surface. The geophone of the surface picks this reflection. Analysis of the reflection enables us to determine the state of the concrete and behavior under transient dynamic loading. The wave normally reflects wherever there are small cracks, voids, change of cross section, change of density etc. all these changes should be sudden to cause of reflection. The wave is either tandem or in reverse with the original wave.

The processed data are then plotted as a graph of the section mobility against frequency. The result plot is termed the frequency response or signal response curve for the concrete section.

The results are utilized to analyse the structural integrity of concrete laminae and to determine the Characteristic strength (fck) of the concrete.

Figure 4.36: Snapshot of TDR Testing

4.3.6.9 Infrared Thermography

Infrared Thermography (IRT) is a test which is used to determine the cracking and delamination in the bridge deck and in locations like piers (especially good for masonry piers) IRT provides very useful data which can be used to create historical evidence of propagation of cracks, and delamination etc. in the bridge components.

The test is conducted by capturing images of the object to be tested from different locations. One has to ensure that proper sunlight is available on the object to be tested. Multiple pictures need to be captured to provide continuous information of the tested object. Like any camera, photography, the picture has boundaries. If the object is larger than the frame of the picture captured, then overlapping images will be created.

Figure 4.37: Snapshot of IRT Testing

4.3.6.10 Half Cell Method (HCP)

This test is useful to evaluate the corrosion activity as well as actual condition of the cover layer during testing. In this test Continuity of steel is assumed / checked. Prior to testing, one rebar needs to be exposed to act as a one point. This is connected to the Copper - Copper Sulphate half-cell through a multimeter. The other point of the half-cell is directly connected at various locations on the concrete surface, which is in pre wet condition. Completion of circuit give a reading on the multimeter, which is the potential difference between the tested points. High negative difference indicates that the corrosion potential is maximum. Various readings are taken within a close grid at equal interval of 150 or 300 mm centre to centre. Contours are then drawn to indicate areas with varying corrosion potential.

Probability of Corrosion (%)

Potential Level	Probability of Corrosion(%)
Less than 200	10%
200 to 350	Uncertain
350 to 500	90%
Above 500	95%

Figure 4.38: Snapshot of HCP Testing

4.3.6.11 Vibration Monitoring (VB)

Vibration monitoring shall be carried out at all such locations where it is required to assess the effect of induced vibrations due to moving traffic and at locations, where it is essential to estimate the load capacity of the structural element. A standard vibration monitoring system shall carry out this assessment by vibration monitoring method. This equipment should be able to evaluate the parameters of vibrations. Permissible limits of vibrations shall be as defined by relevant compliance code. In India, they shall confirm to Indian Standard Codes.

The method adopted shall measure peak pulse velocity / peak acceleration / peak displacement in vertical direction for a particular frequency. Every structure has its own frequency and unless the induced vibration frequency does not match with this resonance frequency, the structure can sustain vibration safely.

Monitoring of deflections and vibrations for live load is classified based on the type of vehicle like two wheelers, four wheelers, Tempo, Truck, Multi axle and Heavier multi axle. This monitoring is done for a series of moving vehicles at restricted speeds above 10 kmph and below 30 kmph. Typically, two to three readings are taken at mid span for each live load type. Such an array of readings generates a typical load v/s deflection table and is plotted in a graph and the readings are then extrapolated to higher loadings to evaluate the maximum load at limiting deflection for the span that is tested. This method enables testing of each span without stopping the traffic and yields near accurate results.

Figure 4.39: Snapshot of VB Testing

4.3.6.12 Estimation of Remaining Life of Structures

The service life of structure or its main components such as super structure, substructure and foundations and their constituent materials is defined as the period after installation during which its essential properties exceed the minimum acceptable values, on regular routine check-up and the same if rectified immediately, no excessive expenditure is required in operation, maintenance period.

The service life is estimated considering the degradation causing factors, deterioration process and damage modes. Deterioration of reinforced cement concrete structures or its components, are mainly due to carbonation, corrosion, ingress of chloride into concrete body, apart from externally applied forces or loads such as earthquake, cyclones etc.

Some of the recommended procedures approaches to estimate Service life of any Bridge are given below.

- Based on Bridge performance rating in a scale of 1 to 9 (Very low to high, 1-9). Rating of 9 will be given for a bridge having full design life as its service life. Rating 1 denotes the bridge is not fit for use and not fit for repairs also.
- Based on depth of penetration of carbonation relative to clear cover to reinforcement.

4.3.7 Toll Plaza System Audit

Existing toll plazas including infrastructure, toll management system (TMS, if any) and operational activities are inspected thoroughly for understanding their suitability and deficiencies. A team of TMS expert and technical assistants have visited and reviewed all toll plazas. During the site visit, information related following heads are collected.

- Lane Terminals: software and database components related to lane terminals and lane operation
- Operation and health of plaza servers
- All system generated reports
- Audit procedure
- Cash-up procedure
- Point of Sale (POS)
- Incident generation and validation managements

Chapter 5. Design Standards

5. DESIGN STANDARDS, CODES AND SPECIFICATIONS

5.1 INTRODUCTION

The design standards for improvement proposals of the Project Stretch are presented here after reviewing the relevant latest Indian Roads Congress Codes (IRC), Manual of Specification & Standards for Six Laning of Highways Through Public Private Partnership (IRC:SP:87-2019) and international standards such as AASHTO etc.

The design standards have been grouped under the following.

A. Road Works

(a) Geometric Design Standards

- Terrain classification & Design Speed
- Horizontal Alignment
- Vertical Alignment
- Cross sectional Element

(b) Road drainage

B. Bridges and Cross Drainage Works

The Consultant's design methodology is based on the consideration of alignment, cross-sectional layout, geometrics, safety to cater the review of uninterrupted movement of through traffic. The consultant has also considered that the improvement proposals should be to the extent feasible within the present Right of Way (ROW) or with minimum land acquisition.

5.2 BASIC POSTULATES

The project road is recently built; existing road opened to traffic in 2016. As per the ToR, the Consultant is required to review the various elements of the project road and propose suitable rectification if required.

Before finalizing the design philosophy, the basic postulates of the Project Road is required to be kept in view which are as under:

- The uniformity of the Design Standards shall be maintained throughout the length.
- The design should thus be consistent within any area and the standards proposed for the different elements should be compatible with one another.
- The selected design should minimize the total transportation cost, including initial construction costs, costs for the maintenance of the facility and the costs borne by the road users.
- Safety should form an integral part of the design elements.
- "Ruling" standards should be followed as a matter of routine. "Minimum" standards should be followed only where serious restrictions are imposed by technical or economic considerations.
- Existing Horizontal Curves, which are found deficient in radius, layout, transition lengths or super-elevation, shall be corrected to the specified standards if possible within existing ROW.

Geometric Design Standards for the Project Road have been drafted based on the following Guidelines:

- Manual for safety in Road Design by Government of India, Ministry of Road Transport & Highways (Road Wing –September 1998)
- Manual of Specification & Standards for Six Laning of Highways Through Public Private Partnership (IRC: SP:87-2019)

- Manual on Road Safety Audit (IRC: SP:88-2019)
- NHAI circular No. 17.5.82 dated 24 May 2021.
- Other IRC Guidelines/Manuals and
- All notations, abbreviations and symbols used in the reports, documents and drawings shall be as per IRC: 71.

5.3 HIGHWAY DESIGN PARAMETERS

The following design standard shall follow minimum proposed, for the improvement proposals.

5.3.1 Terrain Classification

The terrain is classified based on the general slope of the ground across the highway alignment and is given below in **Table 1.1**.

Table 5.1: Terrain Classification for 6 Lane Highways

Sl. No.	Terrain Classification	Cross Slope of the Ground
1	Plain and Rolling	Up to 25 Percent
2	Mountainous and Steep	More than 25 Percent

The project road passes through Plain terrain.

5.3.2 Design Speed

The Design Speed to be adopted for the various terrain classifications are tabulated in **Table 5.2.**

Table 5.2: Design Speed for 6 Lane Highways

Sl. No.	Nature of Terrain	Design Speed (Km/hr)	
		Ruling	Minimum
1	Plain and Rolling	100	80
2	Mountainous and Steep	60	40

5.3.3 Extra Widening on Sharp Curve

On Horizontal curves with radius up to 300m, width of pavement and roadway in each carriageway shall be increased as given in **Table 5.3**

Table 5.3: Extra Width of Pavement and Roadway in each carriageway for 6 Lane Highways

Radius of Curve	Extra Widening
75-100 m	0.9 m
101-300	0.6 m

5.3.4 Horizontal Alignment

The essential elements of the horizontal alignment are as under:

a) Minimum Radii of the Horizontal Curve
b) Super elevation
c) Transition Length
d) Sight Distance

Radii of Horizontal Curves

The desirable minimum and absolute minimum radii of horizontal curves for various classes of terrain are given in **Table 5.4**

Table 5.4: Minimum Radii of Horizontal Curves for 6 Lane Highways

Nature of Terrain	Desirable Minimum	Absolute Minimum
Plain and Rolling	400 m	250 m
Rolling	150 m	75 m

Super Elevation

Super-elevation shall be limited to 7.0 percent, if radius of curve is less than desirable minimum radius. It shall be limited to 5.0 percent, if radius is more than desirable minimum.

Transition Curves

The minimum length of transition curve shall be determined from the following two considerations and the larger of the two values shall be adopted for design:

i) The rate of change of centrifugal acceleration should not cause discomfort to drivers. From this consideration, the length of transition curve is given by:

Ls =0.0215 V^3 /CR

Where:

Ls = Length of Transition Curve in meters

V = Speed in Km/hr

R = Radius of Circular Curve in meters

C=80/ (75+V) (Subject to a maximum of 0.80 and minimum of 0.50)

ii) The rate of change of super elevation should be such as not to cause discomfort to travellers. Further, rate of change should not be steeper than 1 in 150 for roads in Plain/Rolling Terrain, and 1 in 60 in Mountainous/Steep Terrain.

The minimum length of Transition Curve based on this consideration is given by the equation:

Ls=2.7 V^2 /R.

The minimum values of Transition lengths for different Speeds and Curve Radii are given in **Table 5.5**.

Table 5.5: Minimum Values of Transitions

Plain and Rolling Terrain							*Mountainous and Steep Terrain*						
Curve Radius	Design Speed (Km/hr)						Curve Radius	Design Speed (Km/hr)					
(m)	100	80	65	50	40	35	(m)	50	40	30	25	20	
	Transition Length in Metres							*Transition Length in Metres*					
45	-	-	-	-	NA	70	14	-	-	-	NA	30	
60	-	-	-	NA	75	55	20	-	-	-	35	20	
90	-	-	-	75	50	40	25	-	-	NA	25	20	
100	-	-	NA	70	45	35	30	-	-	30	25	15	
150	-	-	80	45	30	25	40	-	NA	25	20	15	
170	-	-	70	40	25	20	50	-	40	20	15	15	
200	-	NA	60	35	25	20	55	-	40	20	15	15	
240	-	90	50	30	20	NR	70	NA	30	15	15	15	
300	NA	75	40	25	NR	-	80	55	25	15	15	NR	
360	130	60	35	20	-	-	90	45	25	15	15		
400	115	55	30	20	-	-	100	45	20	15	15		
500	95	45	25	NR	-	-	125	35	15	15	NR		
600	80	35	20	-	-	-	150	30	15	15			
700	70	35	20	-	-	-	170	25	15	NR			
800	60	30	NR	-	-	-	200	20	15	-			
900	55	30	-	-	-	-	250	15	15	-			
1000	50	30	-	-	-	-	300	15	NR	-			
1200	40	NR	-	-	-	-	400	15	-	-			
1500	35	-	-	-	-	-	500	NR	-	-			
1800	30	-	-	-	-	-	-	-	-	-			
2000	NR	-	-	-	-	-	-	-	-	-			

Sight Distance

The safe stopping sight distance and desirable minimum sight distance for divided carriageway for various design speeds are given in **Table 5.6**. The desirable values of sight distance shall be adopted throughout. A minimum of safe stopping sight distance shall be available throughout.

Table 5.6: Sight Distances for Various Speeds for 6 Lane Highways

Speed (Km/hr)	Safe Stopping Sight Distance (m)	Desirable Minimum Sight Distance (m)
100	180	360
80	130	260
60	90	180
40	45	90

5.3.5 Vertical Alignment

There are two major elements in vertical geometry of an alignment i.e. longitudinal gradient and vertical curve.

Longitudinal Gradient

The ruling and the Limiting gradient for various class of terrain to be followed are given in **Table 5.7.**

Ruling Gradients shall be adopted as far as possible. Limiting Gradient shall be adopted in difficult situations and for short lengths.

Table 5.7: Recommended Gradients for 4 Lane and 6 Lane Highways

Nature of Terrain	Ruling Gradient	Limiting Gradient
Plain and Rolling	2.5 %	3.3 %
Mountainous	5.0 %	6.0 %
Steep	6.0 %	7.0 %

Vertical Curve

Due to changes in grade in the vertical alignment of the highway vertical curves at the interchanges and at locations where underpasses are to be inserted different grades will be provided in the design so as to smoothen the vertical profile resulting in easing off of the changes in the gradients for the fast moving vehicles. Both summit curves and valley curves will be introduced as per IRC guidelines.

Length of summit curve and valley curves (L) is guided by S, the sight distance and the deviation angle (N).

For Summit Curves:

When length of the curve is greater than sight distance $L = NS^2 / 4.4$

When length of the curve is less than sight distance $L = 2 S – 4.4 / N$

For Valley Curves:

When length of curve is greater than stopping sight distance $L = NS^2 / (1.5 + 0.035 S)$

When length of curve is less than stopping sight distance $L = 2 S – (1.5 + 0.035 S) / N$

5.3.6 Cross Sectional Elements

The details of cross-sectional elements adopted for the Project Stretch are as per 6 Laning Manual. The adopted cross-sectional elements are presented in the **Table 5.8.**

Table 5.8: Design Parameters

S. No.	Description	Adopted Standards	
1	**Design speed (Kmph) Plain and Rolling Terrain**	**Ruling**	**Minimum**
		100	80
	Mountainous and steep terrain	60	40
2	**Lane width**	3.5 m	
3	**Depressed median with Crash Barriers**	7 m including 0.6m wide Kerb Shyness	
	Raised median		
	a) Built up Sections	2.5 m including 0.5m wide Kerb Shyness	

S. No.	Description		Adopted Standards	
	b) Other sections		5.0 m including 0.5m wide Kerb Shyness	
4	**Paved Shoulder width**			
	a) Rural section		Plain Terrain	2.5 m
	b) Urban sections			2.5 m
5	**Earthen Shoulder width**			
	a) Rural section		Plain Terrain	1.5 m
	b) Urban sections			-
6	**Width of utility corridor**			
	a) Rural section			2.0m
	b) Urban sections			2.0m
7	**Width of service roads**			5.50/7.0m
8	**Minimum width of Footpath**			1.5m
9	**Minimum width of separation island between main carriage and service road**			1.5 m
10	**Cross-slopes**	Carriageway Paved shoulder and Unpaved shoulder		2.5 %
				3.0 %
11	**Maximum super elevation**	Super elevation shall be limited to 7%, if radius of curve is less than desirable minimum radius. It shall be limited to 5%, if radius is more than desirable minimum.		
12	**Minimum horizontal curve radius**	For	**Desirable Minimum**	**Absolute Minimum**
		a) Plain and Rolling Terrain	400 m	250 m
		b) Mountainous and steep Terrain	150 m	75 m
13	**Radii beyond which super elevation not required**	For		
		100 kmph	1800 m	
		80 kmph	1100 m	
		65 kmph	750 m	
14	**Super elevation runoff rate**	For Plain and Rolling	<1 in 150	
		For mountainous & steep	<1 in 60	
15	**Minimum Length of Vertical Curves / Grade change not requiring vertical curve**	**Design Speed**	**Min. curve length**	**Max. grade change for not requiring a vertical curve**
		100kmph	60m	0.50%
		80kmph	50m	0.60%
16	**Vertical curve 'K' values Crest vertical curve/Sag vertical curve**	**For design Speed**	**Crest for SSD/ISD**	**Sag**
		100kmph	74/135	42
		80kmph	33/60	26
		65kmph	19/33.8	18
		50 kmph	9/15	10
		40 kmph	5.0/8.4	6.5
17	**Vertical clearance**	Road over road	5.5 m	
		Road over railway	6.525 m	
		Electrical power lines	6.0m (Up to 650 V)	
		H.T. Electrical lines	6.5m (More than 650 V)	
		Telecommunication Lines	5.5m (Up to 110 V)	

5.3.7 Service Roads/Slip Road

a) Service Roads shall be assessed as per the requirement of the site.

b) A minimum design speed of 40 kmph shall be adopted for service roads.

c) The width of the service roads shall be minimum 5.5 m / 7.5 m for 6 Lane Highway.

d) The crust composition of service roads for 6 Lane Highways shall be for 10 msa Design Traffic.

e) Wherever service roads are provided, provisions shall be made for proper entry and exit ramps between the main highway and the service road through properly designed acceleration and deceleration lanes.

5.3.8 At Grade Junctions

- The At Grade Intersections shall be provided at crossing locations, where the traffic on the crossroads are low to moderate.
- The type of intersections to be provided shall be as under:
  - Three Leg Intersection
  - Four Leg Intersection
  - Multi Leg Intersection
- The Design of different elements of intersection shall be done as per IRC: SP: 41 and as per MOR&TH-Type Designs for Intersections on National Highways, 1992.
- Design Standards shall be as per IRC: SP: 41.
- Traffic Control Devices (such as Road Markings, Signs, Reflectors, etc.) shall be provided as per the provisions of IRC: SP: 41, IRC: 35 and also IRC: 67.

5.3.9 Traffic Control Devices and Road Safety Works

The Traffic Control Devices and Road Safety Works shall consist of the following:

a) Road Signs
b) Road Markings
c) Road Delineators
d) Reflective Pavement Markers (Road Studs)
e) Roadside and Median Safety Barriers
f) Road Boundary Stones

Road Signs

a) Three types of Road signs shall generally be provided (such as Mandatory/Regulatory, Cautionary/Warnings, and informatory signs.
b) Locations of Signs shall conform to IRC: 67, Section 800 of MOR&TH Specifications and IRC: SP:87-2019 (Manual of Specifications & Standards for Six Laning of Highways through Public Private Partnership).
c) Proper signs shall be provided for the main carriageway, service and slip roads, toll plaza and other project highway facilities. Clustering and proliferation of road signs shall be avoided for enhancing their effectiveness.

Road Markings

a) Road Markings shall be of hot applied thermoplastic materials with glass reflectorizing beads.
b) Road markings shall conform to IRC: 35 and IRC: SP:87-2019 (Manual of Specifications & Standards for Six Laning of Highways through Public Private Partnership).
c) The approach noses of the traffic islands will be marked for additional guidance of traffic by means of diagonal markings and chevrons.
d) Transverse Bar markings/ Rumble strips shall be provided before median openings, where the need for alerting the drivers for a reduction in speed is desired. Rumble

Strips are formed by a sequence of transverse strips laid across a carriageway.

Road Delineators

These are roadway indicators, hazard markers and object markers and shall conform to IRC 79.

Reflective Pavement Markers (Road Studs)

The Reflective Pavement Markers (Road Studs) shall be provided to improve the visibility in night-time and wet weather conditions. The locations and details of road studs shall conform to IRC: SP:87-2019 (Manual of Specifications & Standards for Six Laning of Highways through Public Private Partnership).

Roadside and Median Safety Barriers

a. The following types of Road Safety Barriers shall be provided on the Project Road Sections:
   i. Semi-rigid type such as “W” Beam Type Steel Barriers and Thrie beam type steel barrier.
   ii. Rigid Type such as Concrete Crash Barriers.
   iii. Flexible type such as wire rope fencing.
b. Semi-rigid type barrier at the edge of formation shall be provided at all embankments with height 3.0m or more with delineating reflectors fitted on them. These barriers shall also be provided along all curves having radii up to 450m for complete length of curves including transitions and 20m further before and after the curve.
c. Semi rigid barrier and flexible barrier shall not be installed upon a structure.
d. Steel barriers shall be provided in non-built-up sections, whereas concrete barriers shall be provided in built up sections.
e. Rigid barriers shall also be provided at the following locations: -
   i. Where embankment is retained by a retaining structure
   ii. On valley side of highway in mountainous and steep terrain.
   iii. Between main carriageway and ***footpath*** in bridges.

Kilometer / Hectometer Stones / Posts – The Kilometer and Hectometer stones are provided if missing at site. The design and placement of Highway kilometer stones, their dimensions, size, color and arrangement of letters shall be as per IRC: 8-1980. For installation and maintenance of 200-metre stones (Hectometer Stones), IRC: 26-1967 shall be applied.

Road Boundary Stones

Road Boundary stones shall be provided at the boundary on both sides of the Right of Way available under control and shall conform to IRC:25. These shall be spaced at 50m center to center interval along 6 Lane Highway.

5.3.10 Road Drainage

Adequate drainage is a primary requirement for maintaining the structural condition and functional effect of a good pavements structure including sub grade. Pavement must be protected from any ingress of water. Otherwise over a period of time it may weaken the sub grade by saturating it and cause distress in the pavement structure. The GSB layer shall extend through the full formation width and shall act as the drainage layer for effective subsurface drainage.

5.3.11 Project Facilities

Highway Lighting

Solar Street light system shall be provided at the following locations conforming to IRC: SP:87-2019 (Manual of Specifications & Standards for Six Laning of Highways through Public Private Partnership).

i. Toll Plaza Area
ii. Way Side Amenities
iii. Truck Lay byes
iv. Bus Bays and Bus Shelters
v. Grade Separated structures, Interchanges, Flyovers, Underpasses and Overpasses.
vi. Built Up Sections on the Project Highway both in the median of the main carriageway and on the service road on either side.

Solar Blinkers at Median opening

Traffic blinkers powered with solar energy required at the gaps in median openings. Adequate solar blinkers at every gap in median shall be provided.

Truck Lay Bye

Truck Lay bye shall be located near check barriers, interstate borders, places of conventional stops of the truck operators etc. The layout of the truck lay bye shall conform to IRC: SP:87-2019 (Manual of Specifications & Standards for Six Laning of Highways through Public Private Partnership).

The truck lay bye shall have the following facilities

i. Paved Parking
ii. Rest Areas with Toilets and drinking water
iii. Telephone

Bus Bays

The buses shall be allowed to stop for dropping and picking up passengers only at the bus bays, which shall be provided on both sides of the project highway near the underpass/flyovers, existing bus stop locations and near built up areas etc.

The layout of the Bus Bay shall conform to IRC: SP:87-2019 (Manual of Specifications & Standards for Six Laning of Highways through Public Private Partnership).

Way Side Amenities

The Wayside Amenities shall be provided along the project Highway at suitable locations in discussion with NHAI. The Way Side Amenities shall have the following facilities such as toilets, telephones, cafeteria, restaurant, parking for cars, buses and trucks, dormitory, rest rooms, shops for travel needs, fuel stations and garage, first aid etc. within minimum 5 acres of land (length and depth preferably in the ration of 3:2) conforming to NHAI Circular No. 11014/11/2016 HR-I dated 12.06.2017.

The layout of the Wayside Amenities shall conform to IRC: SP:87-2019 (Manual of Specifications & Standards for Six Laning of Highways through Public Private Partnership).

5.4 DESIGN STANDARDS FOR BRIDGES

This section deals with the standards to be adopted in design and as well as repair and rehabilitation of highway structures vis-à-vis Flyovers, Bridges, Underpasses, Overpasses, ROBs, RUBs and Culverts. It also provides the type of materials and their specifications that would be adopted for the above structures along with the loads and forces to be considered.

All bridges which are structurally distressed will be considered for reconstruction. However, wherever main components like superstructure, substructure and foundations

are in good condition, replacement or reconstruction is proposed for bearings, expansion joints, railings, safety barriers and wearing surface etc. if necessary. Minor structural works such as pointing, plastering, and protection works are proposed as per 7.2.2 of IRC: SP: 87-2019. All the repair and rehabilitation are proposed in accordance with IRC SP 40, MOR&TH Specifications, along with other codes mentioned in design below.

New structures will be proposed at new service roads and grade separators, wherever planned as part of project improvements. The necessary codes referred for these new structures are also listed in **Table 5.9 - IRC Codes** below.

5.4.1 Design Standards & Codes of Practice

Design standards and loading to be considered are generally based on the requirements laid down in the latest editions of IRC and IS codes of practices and standards specifications, and guidelines of MoRT&H. Additional technical references would be used wherever the provisions of IRC / IS codes are found inadequate. Following IRC/IS Codes shall be used in the design.

Table 5.9: IRC Codes Adopted in the Design

• IRC:5-2015	-	Section I, General Features of Design (7th Revision)
• IRC:6-2017	-	Section II, Loads and Stresses (Revised Edition)
• IRC:22-2015	-	Section VI, Composite construction (Limit State Design) (2nd Revision)
• IRC:24-2010	-	Steel Road Bridges (Limit State Method) (3rd Revision)
• IRC: 37 - 2018	-	Guidelines for Flexible Pavement Design
• IRC:40-2002	-	Brick, Stone and Cement Concrete Block Masonry
• IRC:78-2014	-	Section VII, Foundations and Substructure (Revised Edition)
• IRC:83 (Part I) - 2015	-	Section IX (Part I), Metallic Bearings (1st Revision)
• IRC:83 (Part II) - 2015	-	Section IX (Part II), Elastomeric Bearings
• IRC:83 (Part III)- 2002	-	Section IX (Part III), POT, Pot cum PTFE, Pin and Metallic Guide Bearings.
• IRC:83 (Part IV)- 2014		Section IX (Part IV), Bearing (Spherical and Cylindrical)
• IRC:87-2011	-	Guidelines for Formwork, Falsework and Temporary Structures (First Revision)
• IRC:112-2020		Code of Practice for Concrete Road Bridges
• IRC: 115-2014	-	Guidelines for Structural Evaluation and Strengthening of Flexible Road Pavements Using Falling Weight Deflectometer (FWD)
• IRC: 117-2015	-	Guidelines for the Structural Evaluation of Rigid Pavement Falling Weight Deflectometer

- IRC:89–1997 - Guidelines for design and construction of River Training and Control Works for Road Bridges (Ist Revision)
- IRC:123-2017 - Guidelines on Geophysical Investigation for Bridges
- IRC: SP:18-1978 - Manual for Highway Bridge Maintenance Inspection
- IRC: SP:35-1990 - Guidelines for Inspection and Maintenance of Bridges
- IRC: SP:37-2010 - Guidelines for Evaluation of Load Carrying Capacity of Bridges (First Revision)
- IRC: SP:40-1993 - Guidelines on Techniques for Strengthening and Rehabilitation of Bridges
- IRC: SP:47-1998 - Guidelines on Quality Systems for Road Bridges (Plain, Reinforced, Prestressed and Composite Concrete)
- IRC: SP:51-2015 - Guidelines for Load Testing of Bridges (First Revision)
- IRC: SP:56-2011 - Guidelines for Steel Pedestrian Bridges
- IRC: SP:64-2005 - Guidelines for Analysis and Design of cast in place voided slab superstructure
- IRC: SP:65-2005 - Guidelines for Design and Construction of Segmental Bridges
- IRC: SP:66-2005 - Guidelines for Design of Continuous Bridges
- IRC: SP:67-2005 - Guidelines for use of external and unbonded prestressing tendons in bridge structures
- IRC: SP:69-2011 - Guidelines and Specifications for Expansion Joints (First Revision)
- IRC: SP:71-2006 - Guidelines for Design and Construction of Pretensioned Girder of Bridges
- IRC: SP:73-2018 - Manual of Standards & Specifications for Two laning of Highways with Paved Shoulders.
- IRC: SP:74-2007 - Guidelines for Repair and Rehabilitation of Steel Bridges
- IRC: SP:75-2008 - Guidelines for Retrofitting of Steel Bridges by Prestressing
- IRC: SP:82-2008 - Guidelines for Design of Causeways and Submersible bridge
- IRC: SP:84-2019 - Manual for Specifications & Standards for Four laning of Highways through Public Private Partnership (Second Revision).

- IRC: SP:87-2019 - Manual for Specification and Standards for Six laning of Highways through Public Private Partnership (Second Revision).
- IRC: SP:88-2019 - Manual on Road Safety Audit
- IRC: SP:90-2010 - Manual for Grade Separators and Elevated Structures
- IRC: SP:99-2013 - Manual of Specifications and Standards for Expressways.
- IRC: SP:102-2014 - Guidelines for Design and Construction of Reinforced Soil Walls.
- IRC: SP:104-2015 - Guidelines for fabrication and erection of steel bridges
- IRC: SP:109-2015 - Guidelines for design and construction of small diameter piles for road bridges
- IRC: SP:114-2018 - Guidelines for Seismic Design of Road Bridges
- IRC: SP:116-2018 - Guidelines for Design and Installation of Gabion Structures.
- IS:2062-2011 - Hot rolled medium and high tensile structural steel.

5.4.2 Cross-sectional Elements

- **Structural width for proposed Bridges / Flyovers**

The overall width of new bridges shall be same as the roadway width of the approaches. All the new bridges shall have a footpath on left side of the traffic. The typical cross-section for new bridge with footpath should be as per IRC: 87-2014, Cl 7.3, Fig 7.2.

5.4.3 Design Loading

The new bridge shall be designed for the combination of live load specified in Table 6 under Clause 204.3 of IRC: 6-2017 depending upon carriageway width.

a) The proposed bridge with carriageway width of 8.50m with one side footpath shall be designed for 2 lanes of IRC Class A loading OR one lane of IRC Class-70R loading whichever governs.

b) IRC SV loading.

Congestion Factor

Congestion factors due to live loads shall be considered as per Table 7 in accordance with clause 204.4 of IRC:6-2017. The vehicular forces shall be multiplied with a relevant factor from Table 7. The congestion factor depends upon the span of the bridge. Horizontal forces due to braking / acceleration, centrifugal forces and temperature effects shall not be considered while applying congestion factor.

Reduction Factor

Longitudinal effects of loads shall be reduced in case of bridges having more than two lanes. The required reduction factor shall be as per table under clause 205 of IRC:6-2017. The number of lanes supported on any individual substructure and foundation shall be considered while applying the reduction factor. In case of 3 lane carriageway, the reduction factor of 10% shall be applied on longitudinal forces.

Seismic Analysis

As per the seismic map given in IRC: 6-2017, the project road passes through seismic zone–III.

Soil Parameters

Soil parameters proposed to be taken for the backfill material behind abutments and retaining walls shall generally be:

$\phi = 30^0$, $\delta = 20^0$, γ_d =20 kN/m^3, Υ_{sub} = 10 kN/m^3

For the design of foundations for the bridges, soil characteristics will be reviewed on case-to-case basis, following the results obtained from actual borings to be carried out at each bridge site.

Type of Structures

a) **Foundations**

Depending upon hydrology of the channel, and type of founding strata available, open/Raft, pile or well foundations shall be proposed.

b) **Substructure**

Abutments	:	RCC Wall type
Piers	:	RCC Wall type or circular column type depending upon the site requirement

c) **Superstructure**

Appropriate types of superstructure will be proposed for each location, bearing in mind the type and appearance of the proposed structures and easy and economical construction. In general, the proposal will be as follows: -

• Spans up to 12m length	:	Reinforced concrete solid slab.
• Spans ranging from 12m to 25m	:	RCC voided slab/RCC Precast girder with cast in situ deck slab
• Spans ranging from 25m to 30m	:	PSC voided slab
• Spans ranging from 25m to 45m	:	PSC Girder with cast-in-situ deck slab
• Spans ranging from 30m to 60m	:	PSC cast in situ Box Girder
• ROBs–Spans ranging from 18m to 36m	:	Steel plate girder with RCC deck slab composite type
• ROBs– 45 m Span	:	Bowstring type steel girder with RCC deck slab composite type

Where considered appropriate, continuous span superstructures shall be proposed.

d) **Bearings**

Bearings shall be designed depending upon the loads, forces and type of superstructure. POT-PTFE, Spherical, Elastomeric or Tar paper bearings shall be proposed.

e) **Crash Barriers and Railings**

Crash barriers and railings shall be provided over all the bridges in accordance with the provision of IRC: 5-2015.

f) **Expansion Joints**

Single Strip seal type expansion joints or filler type joints shall be proposed depending upon the anticipated expansion / contraction and shall be provided as per provision of IRC: SP-69 - 2011.

g) **Wearing Course**

65 mm thick wearing course comprising of 40mm thick asphaltic concrete overlaid with 25mm thick mastic asphalt shall be provided as per provision of MoRT&H standards.

h) **Approach Slab**

Reinforced concrete approach slabs, 3.5m long and 300mm thick, in M30 grade concrete at either end of the bridge, will be proposed, with one end supported on the reinforced concrete bracket projecting out from the dirt wall and the other end resting over the soil, in accordance with the guidelines issued by MoRT&H. A leveling course, 15 cm thick, in M 15 grade concrete will be provided under the approach slab.

i) **Drainage Spouts**

Drainage spouts will be proposed in accordance with MoRT&H standard plans.

j) **Protection Works**

Details of protection works provided for the existing bridges will be studied and new proposals framed as per provision of IRC: 89 - 1997 taking into account the behavior and performance of the existing protection works.

5.4.4 Specifications for Material

Concrete: As the minimum grade of concrete required in design of structures considering the durability aspect of the concrete, the concrete is influenced by the condition of exposure of structure. The exposure condition of bridges in project road section shall be categorised as 'Moderate' as per definition in Table 54.1 of IRC: 112-2011. The grade of concrete for various components of the bridges shall be adopted accordingly as follows:

PSC Superstructure	-	M45 / M50
RCC Superstructure	-	M30 / M35
RCC Substructure	-	M30 / M35
RCC Solid Slab	-	M30
Bored cast in situ Pile	-	M35
Open Foundations	-	M30 / M35
RCC Box	-	M30
RCC Crash Barriers	-	M40
Approach Slab	-	M30
Leveling Course under foundations	-	M10
Leveling Course under Approach slab	-	M15

Steel:

HYSD Reinforcement

Thermo Mechanical Treated (TMT) / Corrosion Resistant HYSD Grade designation Fe-500D, conforming to IS: 1786 shall be used.

Pre-stressing Steel

(a) Cables : 19T13 or 12T13cables consisting of uncoated, stress relieved, low relaxation strands, conforming to IS: 14268, will be provided. It will avoid grouping of cables and also reduce the number of cables.

(b) Pre-stressing Stages : The number of stages of pre-stressing will be kept to the minimum, preferably not more than 2

Structural Steel : Structural steel grade E250/E350 conforming to IS: 2062-2011 will be used

5.4.5 Repair and Rehabilitation

The defects found during inventory and condition shall be recommended for required corrective measures and repair works shall be carried out accordingly. Replacements of wearing coat, replacement of old non-functional bearings, replacement of railing with seach of the retained bridges.

5.5 TOLL PLAZA

The layout plan of existing toll plaza shall be reviewed based on NHAI Circular 17.5.82 dated 24th May 2021, taking into consideration the projected peak hour tollable traffic, permissible service time, adopted toll collection system and the capacity of service lanes. The number of lanes at any toll plaza would, however, be not less than four times that number of lanes for which the highway has been designed.

The design of pavement for the toll plaza shall be done taking into account the layout features and the various stresses induced by the acceleration, deceleration, braking of vehicles and the effect of possible oil spillage from stationary vehicles. The setting up, operation and administration costs for the proposed toll collection system shall be worked out.

Chapter 6. Pavement Condition Assessment

PAVEMENT CONDITION ASSESSMENT

6.1 GENERAL

Highway pavements are layered structures comprising of combination of materials to carry traffic load in given climate for a specified time interval. The pavement structure is designed in such a way that the transmitted stresses due to wheel load are sufficiently reduced, so that they will not exceed bearing capacity of the sub-grade. It should also be able to provide a surface of acceptable riding quality under all weather conditions with the highest possible degree of safety. The performance of any highway pavement is measured by two indicators, namely Functional Performance and Structural Performance. The functional performance includes aspects such as riding quality, surface distress and skid resistance. Whilst recognising these functional requirements, the pavement should also have adequate strength as a load bearing structure that is required to carry the traffic load under the prevailing environmental conditions (structural performance).

The existing pavement of the project road is Four lane divided carriageway with paved shoulder facility having flexible pavement as well as rigid pavement along the project corridor.

The existing pavement investigation includes pavement condition by Network Survey Vehicle (NSV) as well as visual means, pavement structural strength evaluation by FWD, subgrade investigation and existing pavement material investigation which includes core cutting on bituminous layers. The new pavement for main carriageway, service road and toll plaza pavement for additional lanes are also designed based on pavement and material investigation.

The data collected from the pavement investigation at site was further used for analysis. The collected data related to pavement is used for the analysis of following aspects of pavement.

- Estimation of Existing subgrade Strength by Test Pit Analysis
- Evaluation of pavement Material Properties
- Estimation of Vehicle damage factor and Design Traffic
- Analysis of Riding Quality and pavement condition in terms of Roughness and Rutting parameters
- Estimation of Pavement Condition Index (PCI) by analysing pavement distresses
- Remaining Life Analysis from FWD data
- Overlay Design of Existing Pavement and
- Future Maintenance Requirement

All these above aspects are presented in this chapter.

6.2 DESIGN METHODOLOGY

The scope of work as per Term of reference (TOR) related to pavement includes pavement investigation (pavement composition, pavement condition, pavement roughness and pavement structural strength survey by Falling Weight Deflectometer), subgrade characteristics and strength (DCP CBR, field and lab test), Existing

pavement materials investigation (granular layer and bituminous layer core cutting) and Pavement design (structural overlay design, functional overlay design and future maintenance requirements).

Traffic Survey is being carried out by **M/s Translink Infra** appointed by the NHAI.

The steps and methodology of pavement investigation and analysis is presented graphically as shown in **Figure 6.1** below.

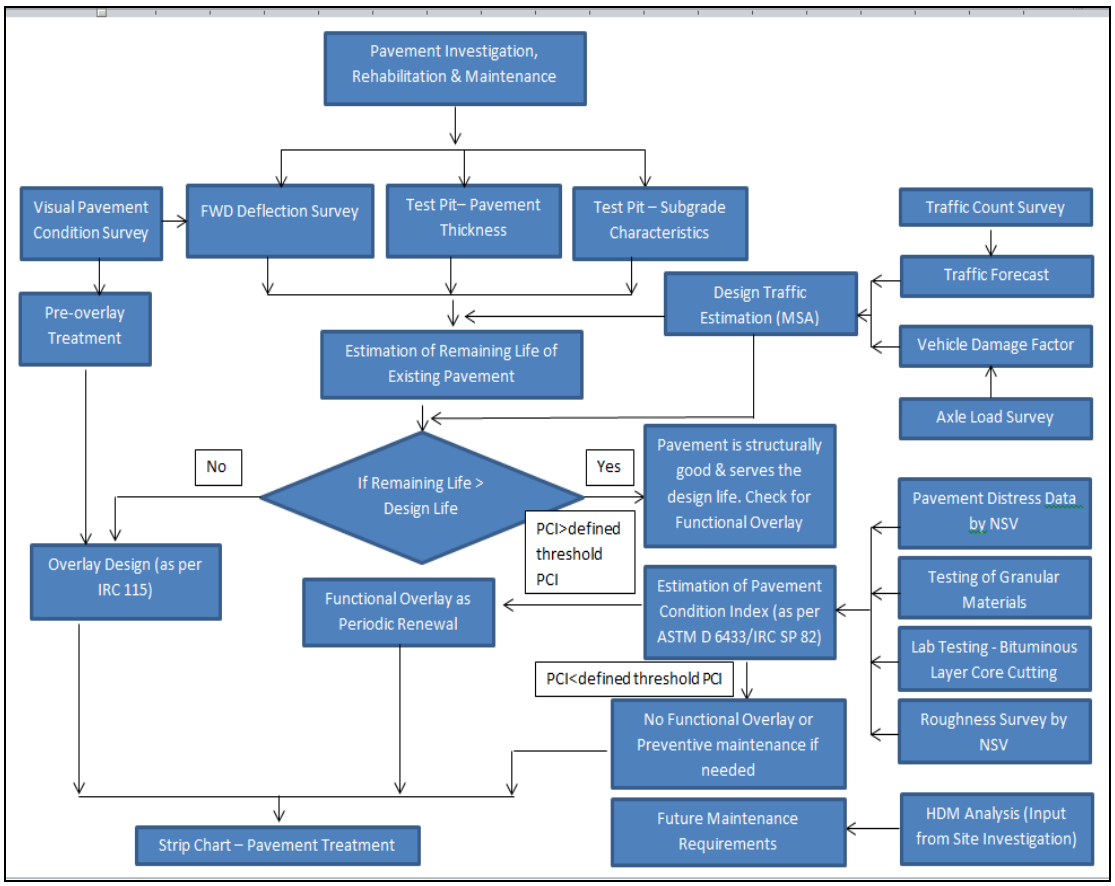


Figure 6.1: Design Methodology

6.3 ESTIMATION OF AXLE LOAD AND VEHICLE DAMAGE FACTOR

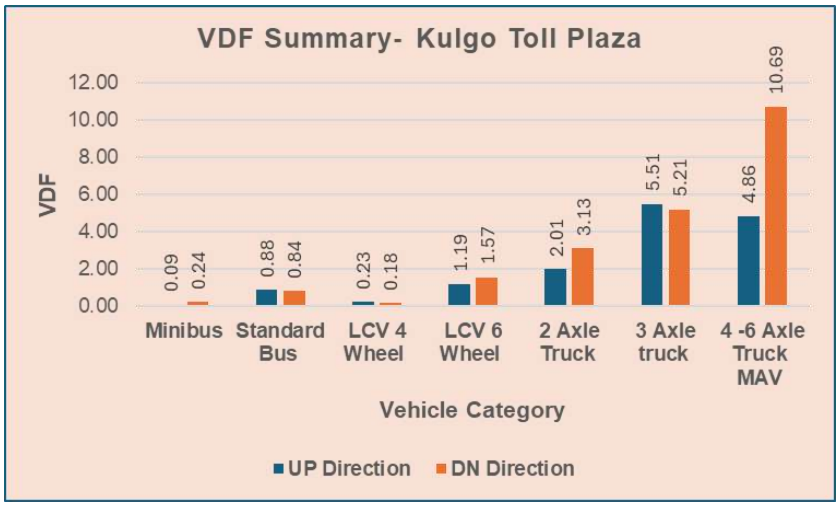
Traffic loading on highway pavements is a heterogeneous combination of different types of vehicles, carrying a wide spectrum of wheel loads. It is very much essential to convert this heterogeneous traffic to an equivalent homogenous traffic in terms of a chosen standard vehicle. One way of achieving this objective is the use of Equivalent Standard Axle Load (ESAL) factors like VDF.

The vehicle damage factor (VDF) is a multiplier to convert the number of commercial vehicles of different axle loads and axle configuration to the number of standard axle load repetitions. VDF is determined as the average value for each category of the commercial vehicle. For design purposes, the variation in axle loads is determined by converting the actual axle loads to “Equivalent Standard Axle Load (ESAL)”. An equivalency is a convenient means of indexing the wide spectrum of actual loads to one common scale or value. Axle load survey is being carried out by consultant appointed by the NHAI and VDF & MSA value given at following **Table 6.1 & table 6.2**.

VDF assumed at this stage for various categories of commercial vehicles along project road is presented below:

Table 6.1: – Vehicle Damage Factor (VDF)

At Kulgo Toll Plaza			
Vehicle	**UP Direction**	**DN Direction**	**Adopted**
Minibus	0.09	0.24	0.24
Standard Bus	0.88	0.84	0.88
LCV 4 Wheel	0.23	0.18	0.23
LCV 6 Wheel	1.19	1.57	1.57
2 Axle Truck	2.01	3.13	3.13
3 Axle truck	5.51	5.21	5.51
4 -6 Axle Truck MAV	4.86	10.69	10.69
Oversized Vehicles	0.00	0.00	0.00



6.4 DESIGN TRAFFIC ESTIMATION

The design traffic is considered in terms of the cumulative number of standard axles in both directions of the carriageway during the design life of the road. This can be computed using the following equation:

$$N = \frac{365 \times [(1+r)^n - 1]}{r} \times A \times D \times F$$

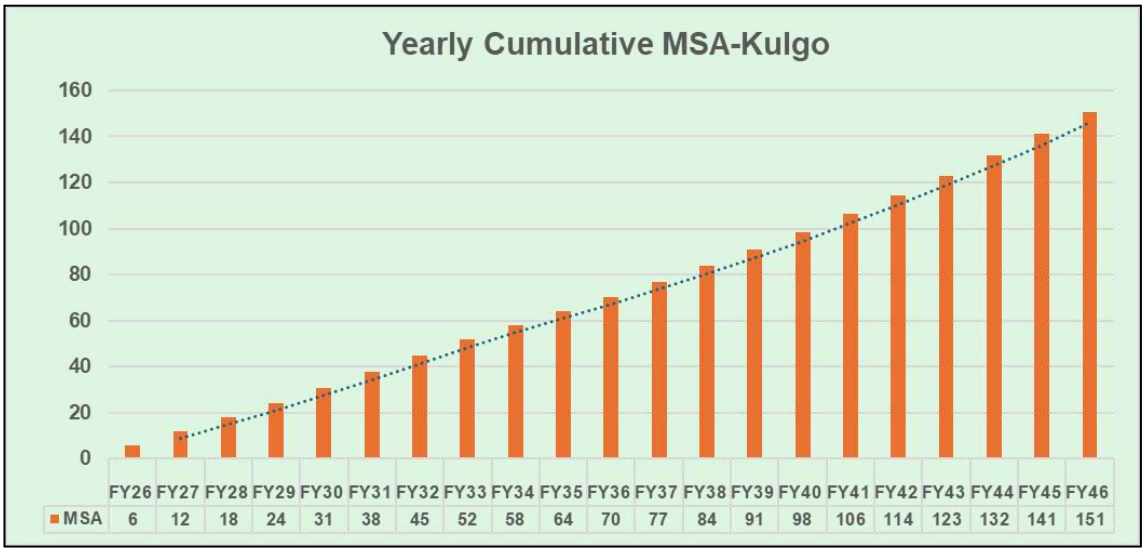
where N is the cumulative number of standard axles to be catered for the design in terms of Million Standards Axle (MSA), A is the initial traffic in terms of the number of commercial vehicles per day, D is the lane distribution factors, F is the vehicle damage factor, n is the design life in years, and r is the annual growth rate of commercial vehicles (considered minimum 5 %).

Lane distribution factor considered for calculating design traffic, is 0.60 of the commercial vehicles in each direction (dual three lane carriageway) as per IRC 37-2018.

The project road is considered as one homogeneous section based on traffic characteristics. The estimated yearly design traffic considering the traffic (Survey carried out by consultant appointed by the NHAI) and MSA is presented in Table 6.2 below:

Table 6.2: – Estimated Yearly Traffic

At Kulgo Toll Plaza											
Financial Year	**Minibus**	**Standard Bus**	**LCV-4**	**LCV-6**	**2A**	**3A**	**4 -6 Axle Truck MAV**	**OSV**	**Yearly Design ESA**	**MSA**	**Design Period**
VDF	***0.24***	***0.88***	***0.23***	***1.57***	***3.13***	***5.51***	***10.69***	***0.00***			
FY26	26	342	364	684	544	876	4135	3	5,779,734	**6**	***0***
FY27	29	351	399	726	577	884	4255	3	5,947,335	**12**	***1***
FY28	31	361	426	762	606	881	4376	3	6,122,831	**18**	***2***
FY29	32	369	448	797	633	874	4533	3	6,305,056	**24**	***3***
FY30	34	374	466	837	665	873	4728	3	6,554,336	**31**	***4***
FY31	35	384	483	877	697	872	4914	4	6,793,580	**38**	***5***
FY32	36	393	501	920	731	871	5113	4	7,068,386	**45**	***6***
FY33	36	404	503	907	720	812	5132	4	7,029,897	**52**	***7***
FY34	35	414	479	788	626	653	4682	4	6,348,046	**58**	***8***
FY35	34	424	469	722	574	557	4450	4	5,985,698	**64**	***9***
FY36	36	432	491	758	602	559	4665	5	6,276,878	**70**	***10***
FY37	37	437	508	796	633	562	4897	5	6,553,916	**77**	***11***
FY38	38	447	525	837	664	566	5136	5	6,858,330	**84**	***12***
FY39	39	456	546	877	696	569	5383	5	7,172,498	**91**	***13***
FY40	41	467	564	919	730	573	5649	6	7,530,802	**98**	***14***
FY41	42	477	584	962	764	576	5906	6	7,837,468	**106**	***15***
FY42	44	487	607	1008	800	580	6182	6	8,188,159	**114**	***16***
FY43	45	495	625	1052	836	583	6456	6	8,535,741	**123**	***17***
FY44	47	500	644	1100	874	587	6749	7	8,931,511	**132**	***18***
FY45	48	510	663	1149	913	590	7052	7	9,292,363	**141**	***19***
FY46	49	520	683	1202	955	595	7374	7	9,700,619	**151**	***20***



6.5 TESTING SCHEDULE

For evaluating the existing pavement and the characteristics of existing subgrade soils, field and laboratory investigations are carried out which are shown in **Table 6.3**. Reconnaissance survey of the existing pavement condition was conducted prior to commencement of investigation work. As per requirements in ToR and Reconnaissance survey, the frequency of testing was adopted.

Table 6-3: Pavement and Subgrade Investigation Testing Schedule

Sl. No.	Investigation	Frequency	Field Testing	Laboratory Testing Criteria	
				Description of Test/Findings	Standard Code Applicable
i)	Existing Subgrade - Small test Pit of Size 0.6mX0.6m	@ 0.5 Km	Pavement Thickness & Composition	Soil Classification	IS 1498
			Field DCP Test	Sieve Analysis	IS 2720 (Part – 4)
				Atterberg Limits	IS 2720 (Part – 5)
			In-situ Density	Laboratory Compaction Test (Modified Proctor Test)	IS 2720 (Part – 8)
			Moisture Content	4-days soaked and un-soaked CBR at 3 energy levels corresponding to 10, 35 & 65 blows	IS 2720 (Part – 16)
				Free Swell Index	IS 2720 (Part – 40)
ii)	Core Cutting	@ 5.0 Km		Thickness of core	
				Percent of bitumen used in bituminous layer	

6.6 DESIGN TRAFFIC ESTIMATION

The following IRC/internationals codes/guidelines/publications have been referred and used for pavement design and analysis.

- IRC: 37 – 2018, “Guidelines for the Design of Flexible Pavements, 4th Revision”.
- IRC: 115 – 2014, “Guidelines for Structural evaluation and strengthening of Flexible Road pavements using Falling Weight Deflectometer (FWD) Technique”.
- IRC: 82-2023, “Code of Practice for Maintenance of Bituminous Road Surfaces, 2nd Revision.
- ASTM D 6433-07, “Standard Practice for Roads and Parking Lots Pavement Condition Index Surveys”

6.7 PAVEMENT AND EXISTING SUBGARDE INVESTIGATION

6.7.1 Pavement Condition Survey

Detailed pavement condition survey was carried out in August 2025 by Network Survey Vehicle (NSV) by capturing pavement distresses through its digital imagining system. The distresses on the roads were identified and captured in a virtual environment through viewing of stereo-pair high resolution images. The images of the pavement captured are used to identify sample units (10 m section) and the type and severity of pavement distress is assessed by visualizing the processed digital image in the feature extraction software and then marking the distresses in the sample unit.

Detailed visual pavement condition is also carried out by the Senior Pavement Engineer of the Consultants separately, in order to have more clear understanding of the pavement condition with respect to adjoining areas and also have finer analysis of existing pavement which is not possible to be apprehended by NSV image analysis

such as narrow cracks (width<3mm) and texture of pavement surface. Moreover, the exact condition of earthen shoulder, embankment and drainage condition is also picked up during visual pavement condition which is not taken up by NSV. The frequency of the FWD testing was also decided based on visual pavement condition.

The objective of the pavement condition (NSV and Visual) was to identify distresses and sections with similar characteristics. All distresses were systematically recorded and quantified for the purpose of determining Pavement condition index (PCI) and mode of rehabilitation and maintenance. The survey covers following conditions.

- Pavement condition (surface distress type)
- Shoulder condition
- Embankment condition

The details of pavement condition survey taken from NSV survey and from visual condition survey. The photographs of condition of existing pavement are shown in **Figure 6.2**. The summary of pavement (as good, fair and poor) of main carriageway is shown in **Table 6.4**.

The project road is having Flexible as well as Rigid Pavement along the length of project road. The location wise type of pavement is presented below in **Table 6.4**

Table 6-4: Summary of Pavement Condition

S. No.	Existing Kilometre (Km) LHS		Pavement Type LHS	Existing Kilometre (Km) RHS		Pavement Type RHS
	From	To		From	To	
1	320+810	400+632	Flexible	320+810	400+632	Flexible

From the above summary, both side of carriageway 100% flexible pavement except toll plaza having rigid pavement. The condition of the Flexible pavement part of project road is fair to good throughout the section in LHS side and on RHS side. The flushing/bleeding is observed very few location at the project road on both LHS and RHS of main carriageway.

The details of pavement condition survey taken from NSV and visual condition survey. The photographs showing existing condition of existing pavement are shown in **Figure 6.2**.

There is no major problem noticed during the visual pavement condition of embankment and earthen shoulder condition at flexible pavement. At Rigid pavement section of service road/Slip Road is affected by cracks, and potholes throughout the section. Major portion of project road is having embankment which is in fair condition.

There are service roads to give access to public along the project road. The condition of the service road is fair to good with distresses such as minor cracking, ravelling, and bleeding is noticed. The main problem in the service road is having unauthorised access, poor maintenance shoulder and embankment as it has found to be broken at many places along the service road.

Fair Condition at Project Road

Fair Condition at Project Road

Rutting & Distresses at Project Road

Rutting & Distresses at Project Road

Figure 6.2: Pavement Conditions Photos

6.7.2 Pavement Composition Survey

Pavement Composition is determined from test pits investigations which are excavated along the project corridor at every 0.50 Km in staggered manner on either side of the project roads. It has been observed from the investigation that the existing pavement is flexible and the composition of layer predominantly consists of bituminous layers laid over granular base/granular subbase in flexible pavement. Typical photographs of test pits shown in **Figure 6.3**.

KM 386+100 LHS

KM 380+500 RHS

Figure 6.3: Trial Pit Photographs

After excavation up to subgrade, the thickness of each identified layer was measured with a measuring tape, at three different locations on the pit and the average of the three is noted as thickness of the layer. The existing pavement thicknesses for flexible pavement as measured in the test pits are shown for both LHS and RHS of carriageway separately in **Figure 6.4a** to **Figure 6.4d.**

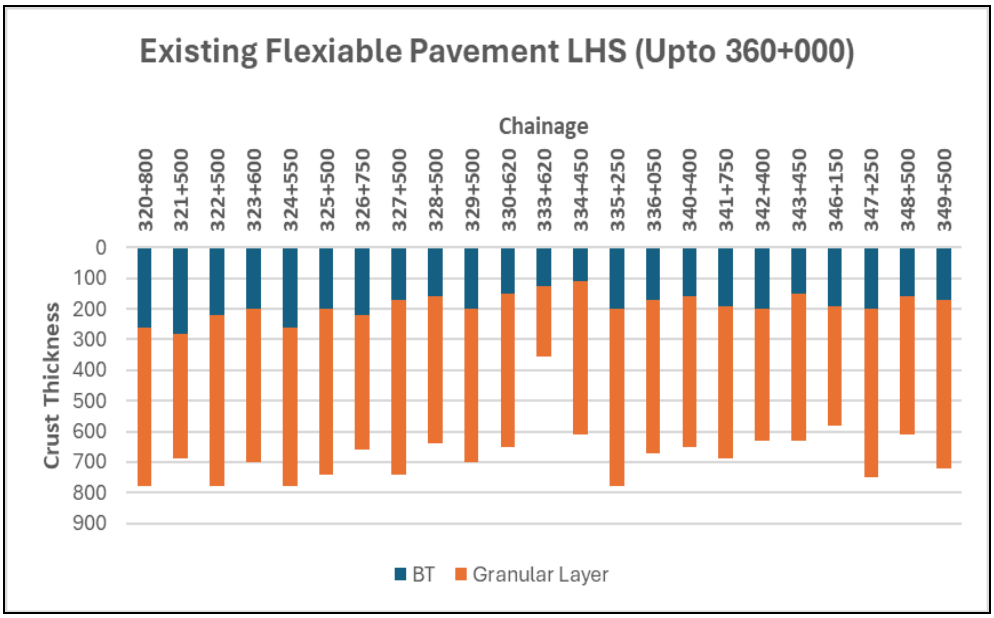


Figure 6.4a: Crust Composition of Existing Flexible Pavement

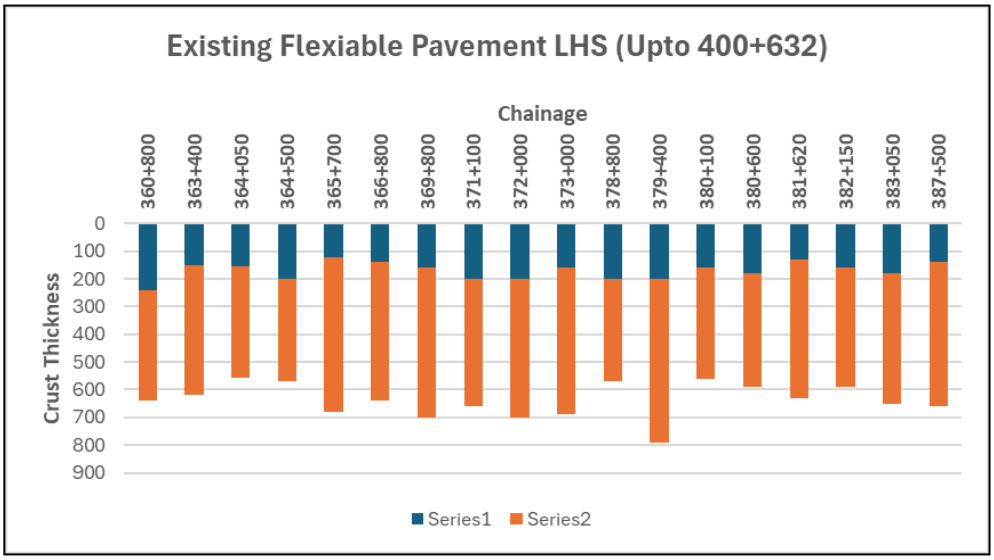


Figure 6.4b: Crust Composition of Existing Flexible Pavement

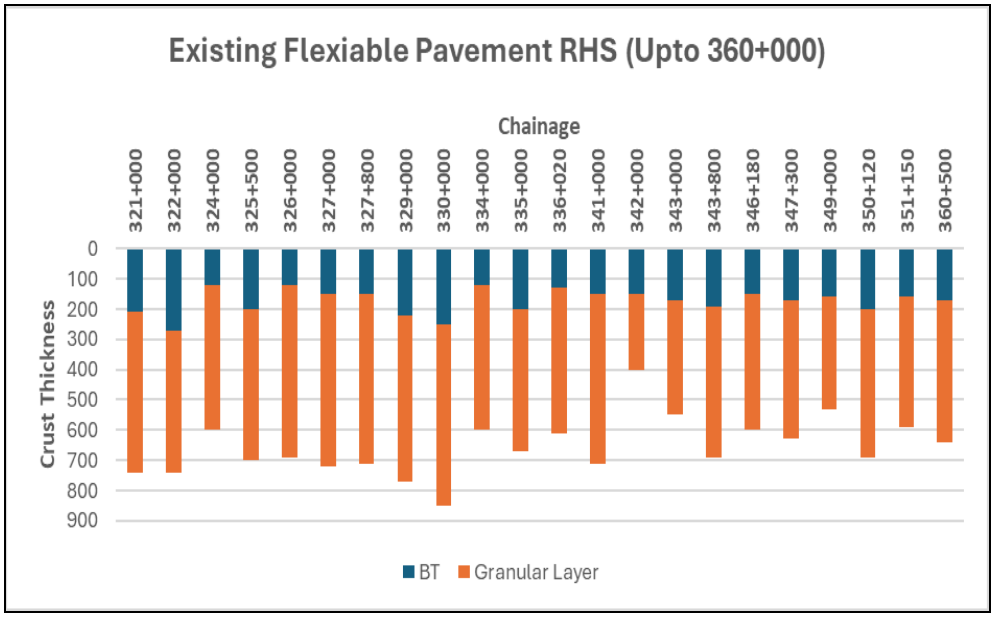


Figure 6.4c: Crust Composition of Existing Flexible Pavement

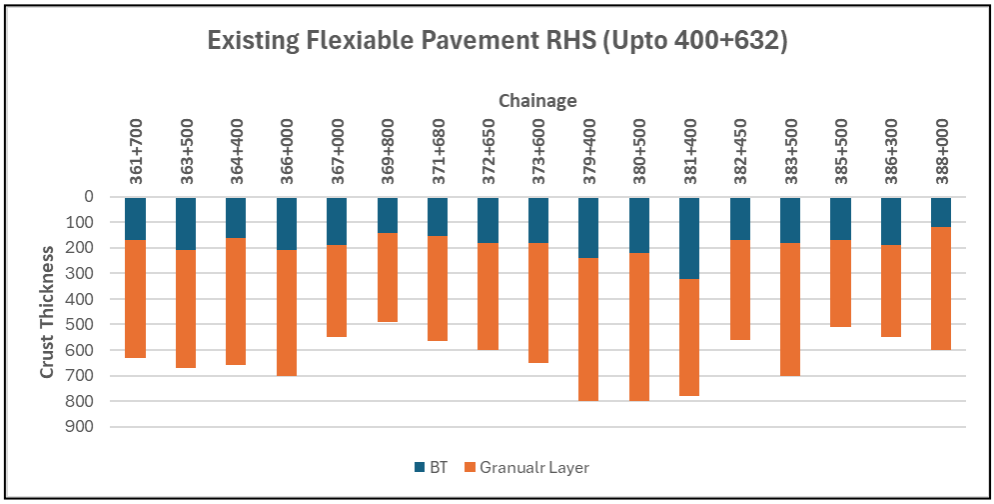


Figure 6.4d: Crust Composition of Existing Flexible Pavement

It has been observed from the test pit investigation that the existing flexible pavement structure consisted of bituminous layer, generally having thickness in the range of 230-600 mm. Both LHS and RHS of Main carriageway have almost similar pavement composition and layer thickness. The minimum, maximum and average thickness of the existing pavement (LHS & RHS) is shown in Table 6.5.

Table 6-5: Pavement Composition Summary for Flexible Pavement

	BT	WMM + GSB (Granular Layer	Total Crust
Average	180	473	652
Minimum	110	230	335
Maximum	320	600	850

GSB – Granular Subbase, WMM – Wet Mix Macadam

6.7.3 Existing Subgrade Investigation

The Subgrade investigations were carried out to know the strength properties of the existing soil. Visual inspection of the existing pavement condition was carried out prior to commencement of sub-grade investigation work. The general testing scheme of existing road will indicate testing of at least three subgrade soil samples for each homogeneous road segment or three samples for each soil type encountered, whichever is more. It was ensured to dig subgrade strength test pits at every 0.5 km (or) less on the project alignment, even though same soil strata encountered on lengthy homogeneous sections, while collecting samples. The various in-situ tests conducted, and laboratory tests included in the testing program on soil samples along the alignment as per the project requirements are summarized in Table 6.3 above. Details on the tests conducted and results obtained are presented in the following sections.

I. Laboratory Tests:

Various laboratory tests were conducted on existing subgrade soil sample as mentioned in **Table 6.3.** About 40 Kg of soil sample was collected in a bag from each test pit. Proper identification mark and location of the sample was recorded and sent to the laboratory for testing. As per requirements mentioned in ToR, the consultants have collected samples at 0.5 km interval and laboratory testing was conducted which includes soil classification, Atterberg limit, Soaked CBR. The results obtained adequately represent the entire project road.

The summary of subgrade soil samples is presented in **Table 6.6** which shows the general and broad characteristics of subgrade Soil.

Table 6-6: Summary of existing Subgrade Soil

Soil Properties	Value
Range of LL	21.90- 24.80
Range of PI	-
OMC (%)	9.10-13.00
MDD (gm/cc)	1.94 - 2.09
Range of 4-days Soaked CBR (97% Compaction) (%)	12.50 - 17.50
Range of Un-Soaked CBR (%)	-

The composition of representative existing subgrade material along the project road is presented in **Figure 6.6** below:

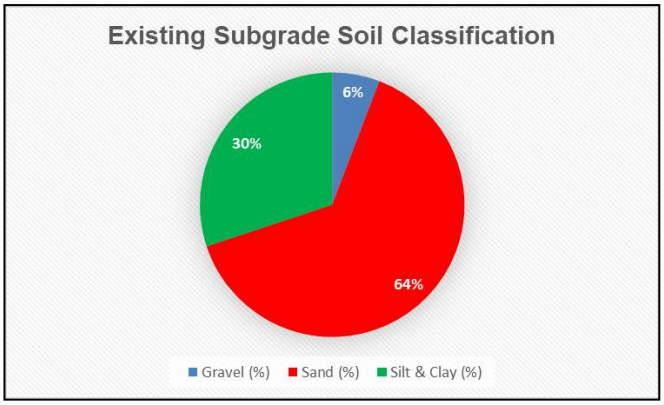


Figure 6.6: Soil Classifications of Subgrade Soil

Along the project road section, the existing subgrade soil is predominately comprising of Sandy soil of about 64.10 % and Silt and Clay is nearly about 30.10 % Gravel 5.80 % Gravel soil which is mainly found along the project corridor.

4-days Soaked CBR (at 97% Compaction) is varying in the range of 12.50% and 17.50 % with around 70% sample having CBR between 15-16 %.

I. Comparison and Analysis of Field and Laboratory Tests:

(a) Dry Density and Moisture Content

A comparison of OMC v/s FMC is included in **Table 6.7**. Graphical comparisons of OMC v/s FMC are shown in **Figure 6.7**

Table 6-7: Summary of Test Results of Existing Subgrade Soil

Value	MDD (gm/cc)	OMC (%)
Maximum	2.09	12.70
Minimum	1.95	9.10
Average	2.03	10.50

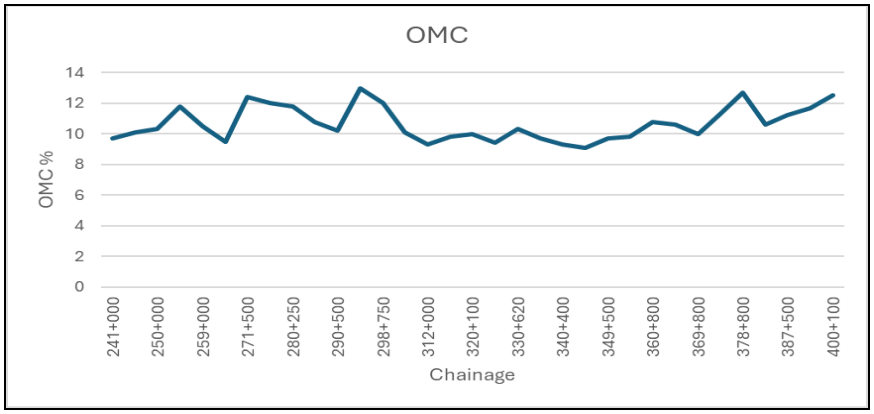


Figure 6.7: Optimum Moisture content

(b) California Bearing Ratio

The CBR values of existing Subgrade Laboratory Test is analysed. The graphical comparisons of Laboratory CBR (97% compaction) along the project corridor is presented in **Figure 6.8.**

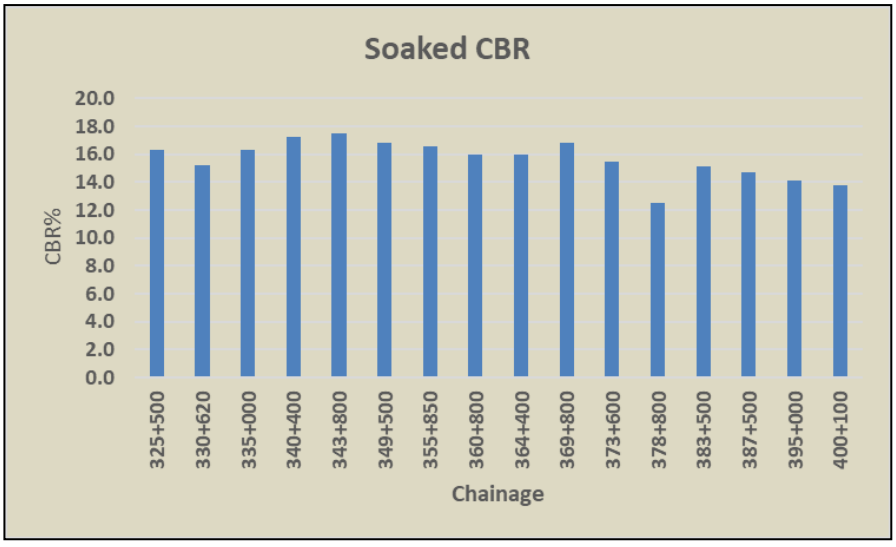


Figure 6.8: Existing Subgrade CBR

Laboratory soaked CBR (97% Compaction) is found varying between 9.30% and 16.00%. The details report of existing subgrade material is presented in **Table 6.8.**

6.7.4 Existing Pavement material Investigation

(i) Granular Base and Subbase Material

Total Sixteen (16) samples of granular material from existing pavement at an interval of about 5 km were collected. At the time of test pit investigation, it was observed that it is not possible to demarcate WMM and GSB separately in test pit as the material is get mixed at shoulder edge. The photos of test pit are shown in **Figure 6.9** for reference.

Figure 6.9: Test Pit Photographs

Thus, the samples were collected considering as granular materials and the laboratory test as mentioned in Table 6.3 was conducted and the test results are shown in **Table 6.8**.

Table 6-8: Summary of Subgrade Test Results

S. No.	Location	Side	Grain Size Analysis			Atterberg's Limit			OMC	MDD	Soaked	N.M.C (%)
			Gravel (%)	Sand (%)	Silt & Clay (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	%	gm/cc	CBR %	
1	325+500	RHS	7.3	57.3	35.4	24.5	N.P	N.P	9.40	2.07	16.3	6.3
2	330+620	LHS	5.5	59.0	35.5	24.3	N.P	N.P	10.3	2.03	15.2	6.1
3	335+000	RHS	6.9	62.5	30.6	23.6	N.P	N.P	9.70	2.06	16.3	6.0
4	340+400	LHS	8.3	55.1	36.6	24.5	N.P	N.P	9.30	2.09	17.2	6.8
5	343+800	RHS	8.8	56.9	34.3	24.1	N.P	N.P	9.10	2.09	17.5	7.1
6	349+500	LHS	7.2	61.8	31.0	23.8	N.P	N.P	9.70	2.07	16.8	5.5
7	355+850	RHS	7.4	60.3	32.3	23.8	N.P	N.P	9.80	2.05	16.6	5.9
8	360+800	LHS	6.1	57.0	36.9	24.8	N.P	N.P	10.8	2.02	16.0	6.6
9	364+400	RHS	6.5	58.9	34.6	24.4	N.P	N.P	10.6	2.01	16.0	6.6
10	369+800	LHS	7.7	62.0	30.3	23.5	N.P	N.P	10.0	2.06	16.8	6.0
11	373+600	RHS	5.3	66.6	28.1	22.9	N.P	N.P	11.3	2.00	15.5	6.8
12	378+800	LHS	2.9	64.3	32.8	23.6	N.P	N.P	12.7	1.95	12.5	7.2
13	383+500	RHS	5.0	70.7	24.3	22.2	N.P	N.P	10.6	2.02	15.1	7.0
14	387+500	LHS	4.6	67.3	28.1	23.0	N.P	N.P	11.2	2.01	14.7	6.3
15	395+000	RHS	4.1	63.2	28.7	23.4	N.P	N.P	11.7	2.00	14.1	6.1
16	400+100	LHS	3.2	64.4	32.3	24.1	N.P	N.P	12.5	1.98	13.8	5.8

Existing base and subbase layers' samples were collected at a regular interval of not more than 5 km along the Project Stretch. Care has taken to collect the appropriate granular layer like DLC/ WMM/GSB/ CTSB separately from the excavated test pit. The thickness of existing Granular layer is presented in **Table 6.9** as below:

Table 6-9: Existing Crust Thickness

Sr. No.	Chainage	Side	BT (mm)	Granular (mm)	Total thickness (mm)
1	320+800	LHS	260	520	780
2	321+000	RHS	210	530	740
3	321+500	LHS	280	410	690
4	322+000	RHS	270	470	740
5	322+500	LHS	220	560	780
6	323+600	LHS	200	500	700
7	324+000	RHS	120	480	600
8	324+550	LHS	260	520	780
9	325+500	RHS	200	500	700
10	325+500	LHS	200	540	740
11	326+000	RHS	120	570	690
12	326+750	LHS	220	440	660
13	327+000	RHS	150	570	720
14	327+500	LHS	170	570	740
15	327+800	RHS	150	560	710
16	328+500	LHS	160	480	640
17	329+000	RHS	220	550	770
18	329+500	LHS	200	500	700
19	330+000	RHS	250	600	850
20	330+620	LHS	150	500	650
21	333+620	LHS	125	230	355
22	334+000	RHS	120	480	600
23	334+450	LHS	110	500	610
24	335+000	RHS	200	470	670
25	335+250	LHS	200	580	780
26	336+020	RHS	130	480	610
27	336+050	LHS	170	500	670
28	340+400	LHS	160	490	650
29	341+000	RHS	150	560	710
30	341+750	LHS	190	500	690
31	342+000	RHS	150	250	400
32	342+400	LHS	200	430	630
33	343+000	RHS	170	380	550
34	343+450	LHS	150	480	630
35	343+800	RHS	190	500	690
36	346+150	LHS	190	390	580
37	346+180	RHS	150	450	600
38	347+250	LHS	200	550	750
39	347+300	RHS	170	460	530
40	348+500	LHS	160	450	610
41	349+000	RHS	160	370	530
42	349+500	LHS	170	550	720
43	350+120	RHS	200	490	690
44	351+150	RHS	160	430	590
45	360+500	RHS	170	470	640
46	360+800	LHS	240	400	640
47	361+700	RHS	170	460	630
48	363+400	LHS	150	470	620
49	363+500	RHS	210	460	670
50	364+050	LHS	155	400	555

Sr. No.	Chainage	Side	BT (mm)	Granular (mm)	Total thickness (mm)
51	364+400	RHS	160	500	660
52	364+500	LHS	200	370	570
53	365+700	LHS	120	560	680
54	366+000	RHS	210	490	700
55	366+800	LHS	140	500	640
56	367+000	RHS	190	360	550
57	369+800	RHS	140	350	490
58	369+800	LHS	160	540	700
59	371+100	LHS	200	460	660
60	371+680	RHS	155	410	565
61	372+000	LHS	200	500	700
62	372+650	RHS	180	420	600
63	373+000	LHS	160	530	690
64	373+600	RHS	180	470	650
65	378+800	LHS	200	370	570
66	379+400	LHS	200	590	790
67	379+400	RHS	240	560	800
68	380+100	LHS	160	400	560
69	380+500	RHS	220	580	800
70	380+600	LHS	180	410	590
71	381+400	RHS	320	460	780
72	381+620	LHS	130	500	630
73	382+450	RHS	170	390	560
74	382+150	LHS	160	430	590
75	383+050	LHS	180	470	650
76	383+500	RHS	180	520	700
77	385+500	RHS	170	340	510
78	386+300	RHS	190	360	550
79	387+500	LHS	140	520	660
80	388+000	RHS	120	480	600

WMM – Wet Mix Macadam, GSB – Granular Subbase

6.7.5 Existing Bituminous Layer/ PQC Testing

(I) Bituminous Layer Materials-Core Cutting

Bituminous layers' / PQC layer thickness measured during test pits for collection of subgrade material test and also by using core cutting drilling machine to obtain the bituminous / rigid pavement core specimens as shown in **Figure 6-10**.

Figure 6.10: Core Cutting Photographs

Consultants have carried out core cutting of rigid pavement and bituminous layers in order to carry out various test.

- **Flexible Pavement**: Binder Content and Density of Bituminous layers and the extent/depth of cracking if any in the layer.

The details of all bituminous specimens are mentioned in **Table 6.10**.

Table 6-10: Bituminous Layer

Sr. No.	Chainage	Side	Height of Core (mm)	Remarks
			BT	
1	325+000	RHS	170	Flexible Pavement
2	330+000	LHS	180	Flexible Pavement
3	335+000	RHS	200	Flexible Pavement
4	340+650	LHS	150	Flexible Pavement
5	345+400	RHS	180	Flexible Pavement
6	349+950	LHS	160	Flexible Pavement

Sr. No.	Chainage	Side	Height of Core (mm)	Remarks
			BT	
7	355+850	RHS	180	Flexible Pavement
8	360+340	LHS	190	Flexible Pavement
9	365+250	RHS	160	Flexible Pavement
10	369+900	LHS	180	Flexible Pavement
11	375+600	RHS	170	Flexible Pavement
12	380+600	LHS	150	Flexible Pavement
13	385+400	RHS	150	Flexible Pavement
14	389+700	LHS	180	Flexible Pavement
15	395+000	RHS	170	Flexible Pavement
16	400+100	LHS	190	Flexible Pavement

Laboratory tests were conducted on collected bituminous pavement samples. The test result for Flexible Pavement is presented in **Table 6.11**.

Table 6-11: Core Cutting Test Results of Bituminous Layer

Sl. No	Chainage	Side	Bulk Density g/cc	Bitumen Content (%)
1	325+000	RHS	2.57	4.78
2	330+000	LHS	2.56	4.92
3	335+000	RHS	2.54	5.12
4	340+650	LHS	2.58	5.20
5	345+400	RHS	2.59	5.00
6	349+950	LHS	2.65	4.60
7	355+850	RHS	2.66	4.66
8	360+340	LHS	2.61	4.41
9	365+250	RHS	2.63	4.32
10	369+900	LHS	2.60	4.20
11	375+600	RHS	2.54	4.70
12	380+600	LHS	2.55	4.80
13	385+400	RHS	2.50	5.00
14	389+700	LHS	2.58	5.10
15	395+000	RHS	2.61	5.05
16	400+100	LHS	2.63	5.15

From the above table, it has been observed that the binder content of the bituminous layer varies in the range of 4.20 % to 5.20 % with average value of 4.81%. The percentage of binder content is combined value of DBM and BC binder content.

6.7.6 Pavement Structural Strength by Falling Weight Deflectometer (FWD)- Flexible Pavement

(a) General Description of FWD Test

Falling Weight Deflectometer (FWD) test was carried out on Project Road in the months of August 2025. The objective was to evaluate the structural strength of existing flexible pavement in terms of deflections.

In FWD test, an impulsive load is applied on the road surface. The magnitude of the load, duration and area of loading is so adjusted that it corresponds to the effect of loading due to standard axle on an in-service pavement. The instantaneous deflections of the road surface are measured by geophones which are located at a number of points at different distances radially outward from the center of the falling weight. Thus, the shape of deflection bowl is obtained. Information on structural health condition can be extracted from the analysis (by back calculation) of FWD data. The spacing or frequency between tests points is as per IRC: 115-2014.

A trailer mounted falling weight deflectometer of Pave test UK make FWD machine with seven Geophones has been used for this project. A pre-determined offset has been kept between the sensors/ geophones to determine the deflection bowl at the test point. The locations of the sensors from loading point are given in the **Table 6.12**.

Table 6-12: Distribution of Geophones

Deflection Sensor	D1	D2	D3	D4	D5	D6	D7
Offset, mm	0	200	300	450	600	900	1500

The Component of FWD are:

- Load cells to measure the applied load
- Loading plate of dia. 300mm
- Rubber pad of 5mm thick glued to the bottom of loading plate for uniform distribution of load
- Falling mass in the range of 50kg to 350kg is dropped from a height of fall in the range of 100 to 600mm
- Data Acquisition system

Representative photographs showing FWD survey being conducted at project site are shown in **Figure 6.11.**

Figure 6.11: FWD conducted at Project Site

(b) Analysis of FWD Data

The FWD data collected from different drops at each point consist of peak load and peak deflection at different radial locations. Average values of load and deflections

were calculated from the drop test data collected at test locations. The deflections were normalized to correspond to a standard load of 40 kN. In addition to deflection values measured at site by FWD, the following data are required as input to KGP Back software for calculation of elastic modulus of pavement layers.

- Thickness of existing bituminous layer and granular crust.
- Field CBR / Modulus of existing subgrade.

Above information has been obtained by conducting pavement composition survey discussed earlier in this chapter. The data thus obtained had been used as an input to back analysis software (KGP- Back). Range of moduli values (termed as seed value) of existing pavement layers are further required as input to KGPBACK software to improve the accuracy of back-calculated moduli and also to shorten computation time. Layer moduli values adopted as per IRC: 115-2014.

(d) Back-Calculated Elastic Modulus of Pavement Layers

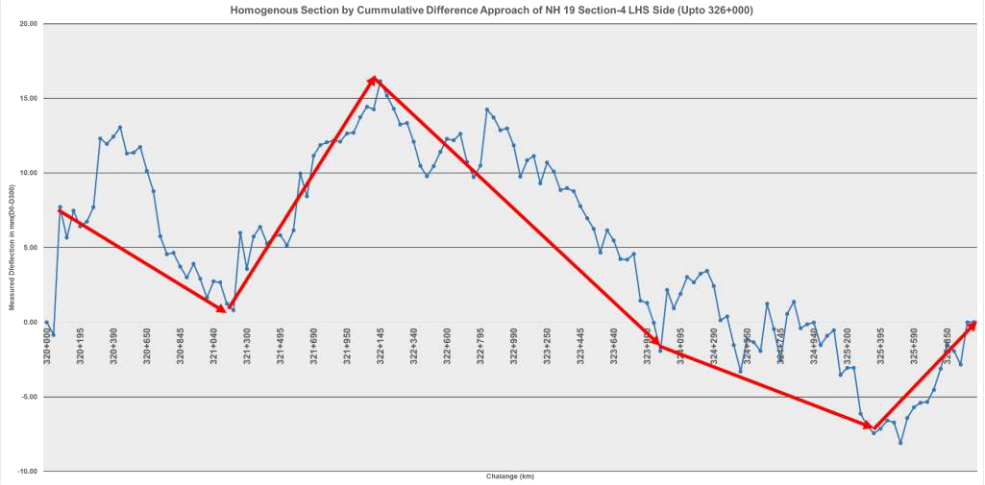
The collected FWD data has been analyzed to determine the elastic modulus of existing pavement layers. The back calculation was carried out using KGPBACK software, a product developed by IIT Kharagpur.

6.7.7 Deflection Characteristics and Estimation of Homogenous Section

The assessment of the remining life of existing pavement and the strengthening requirement in terms of bituminous overlay will be done on the basis of the backcalcualted moduli of in-service pavement layers. Therefore, it is essential to identify homogenous section for the purpose of structural design primarily based on deflection bowl parameters and other relevant information.

In order to identify homogeneous section for structural overlay, Peak deflection values (D_0) and surface curvature (D_0-D_{300}) values for LHS and RHS sides are plotted, Scatter in deflection data is quite normal in FWD test. It seems impossible to define visually the homogeneous section from these plots. Some statistical tools such as cumulative difference approach would be quite helpful. Cumulative difference approach (CDA) as suggested in IRC: 115-2014 and AASHTO guide for the design of pavement structure (1993) was used to divide the road into statically homogeneous units, also called analysis units. The pavement response parameters to delineate the pavement into homogeneous sections are (a) peak deflection, D_0, (b) surface curvature index, D_0-D_{300}, from FWD survey and (c) existing subgrade strength, from DCP_{CBR} etc. Peak deflection D0 and Surface curvature index (SCI) D_0-D_{300} were considered as variable “X” and the series of cumulative difference Z_x is plotted as per equation (3), clause 6.2.3 of IRC 115-2014.

As FWD was carried out separately for inner lane and outer lane on both LHS and RHS as per IRC 115-2014, the cumulative difference approach graph is prepared for all the lanes separately. Total Twenty-Eight homogenous sections are delineated for both LHS and Twenty-Two section for RHS from the graphs and the same is considered for estimating 15th percentile design elastic modulus values of existing pavement layers. **Figure 6.12** shows the unit delineation graphs of inner lanes of LHS and RHS based on deflection response using cumulative difference approach.


Homogenous Section by Cummulative Difference Approach of NH 19 Section-4 LHS Side (Upto 326+000)
Measured Diflection in mm(D0-D300)
Chainage (km)

Homogenous Section by Cummulative Difference Approach of NH 19 Section-4 RHS Side (Upto 326+000)
Measured Diflection in mm(D0-D300)
Chainage (km)

Homogenous Section by Cummulative Difference Approach of NH 19 Section-5 LHS Side
Measured Diflection in mm(D0-D300)
Chainage (km)

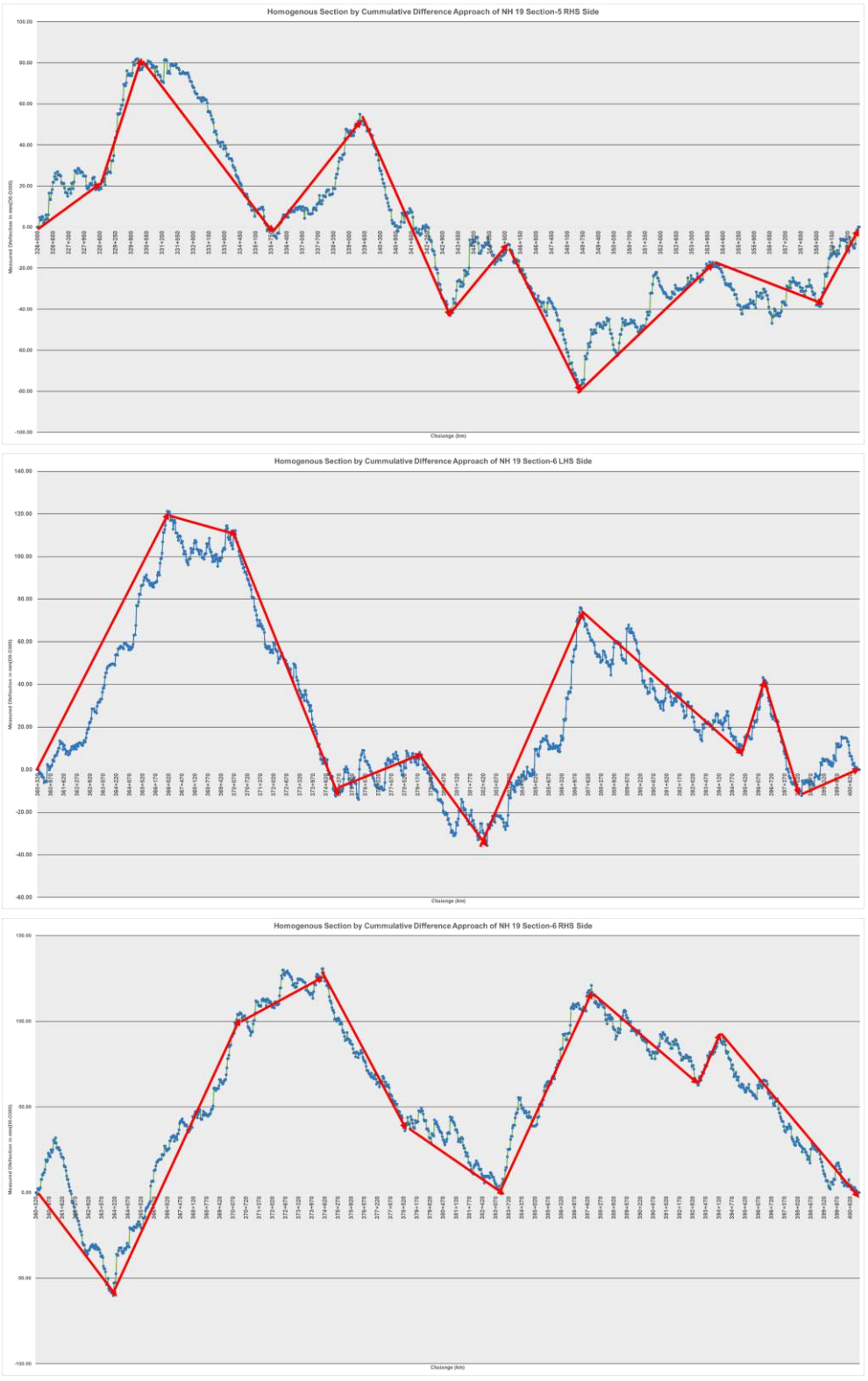


Figure 6.12 Delineation Graphs based on Deflection response using Cumulative Difference Approach

As discussed above, homogeneous section of the project (Flexible Pavement) is presented in **Table 6.13** as below: Homogeneous section.

Table 6-13: List of Homogeneous Section

(LHS)				(RHS)		
Section-1						
Sl No	**Chainage**		**Length (Km)**	**Chainage**		**Length (Km)**
	From	**To**		**From**	**To**	
1	320+000	321+000	1.00	320+000	321+000	1.00
2	321+000	322+000	1.00	321+000	324+000	3.00
3	322+000	324+000	2.00	324+000	326+000	2.00
4	324+000	325+000	1.00			
5	325+000	326+000	1.00			
Section-2						
6	326+000	328+000	2.00	326+000	328+000	2.00
7	328+000	330+000	2.00	328+000	330+000	2.00
8	330+000	333+000	3.00	330+000	336+000	6.00
9	333+000	336+000	3.00	336+000	339+000	3.00
10	336+000	338+000	2.00	339+000	343+000	4.00
11	338+000	342+000	4.00	343+000	345+000	2.00
12	342+000	346+000	4.00	345+000	348+000	3.00
13	346+000	348+000	2.00	348+000	354+000	6.00
14	348+000	351+000	3.00	354+000	358+000	4.00
15	351+000	353+000	2.00	358+000	360+000	2.00
16	353+000	355+000	2.00			
17	355+000	356+000	1.00			
18	356+000	360+000	4.00			
Section-3						
19	360+000	367+000	7.00	360+000	364+000	4.00
20	367+000	370+000	3.00	364+000	370+000	6.00
21	370+000	375+000	5.00	370+000	375+000	5.00
22	375+000	379+000	4.00	375+000	378+000	3.00
23	379+000	382+000	3.00	378+000	383+000	5.00
24	382+000	387+000	5.00	383+000	388+000	5.00
25	387+000	395+000	8.00	388+000	393+000	5.00
26	395+000	396+000	1.00	393+000	394+000	1.00
27	396+000	398+000	2.00	394+000	401+000	7.00
28	398+000	401+000	3.00			

The elastic moduli for each layer have been categorized for as Poor, Fair and Good based on the range obtained from FWD analysis for each layer. The rating for the moduli range and the direction wise summary of length of Project Stretch in each range is shown in the **Table 6.14** and presented graphically in **Figure 6.13a, 6.13b and 6.13c** of main carriageway as below:

Table 6-14: Direction wise Modulus Summary

Back calculated Elastic Modulus Values				
Layer Type	**Condition**	**Modulus Range**	**Length in km***	
			LHS	**RHS**
Bituminous	Good	More than 3000	0.00	0.00
	Fair	3000 – 750	81.00	81.00
	Poor	Less than 750	0.00	0.00
Granular	Good	More than 500	0.00	0.00
	Fair	500 – 100	81.00	81.00
	Poor	Less than 100	0.00	0.00
Subgrade	Good	More than 200	0.00	0.00
	Fair	65 – 200	81.00	81.00
	Poor	Less than 65	0.00	0.00

As per above table, the bituminous layer, granular layer and subgrade layer moduli are in fair conditions on both sides.

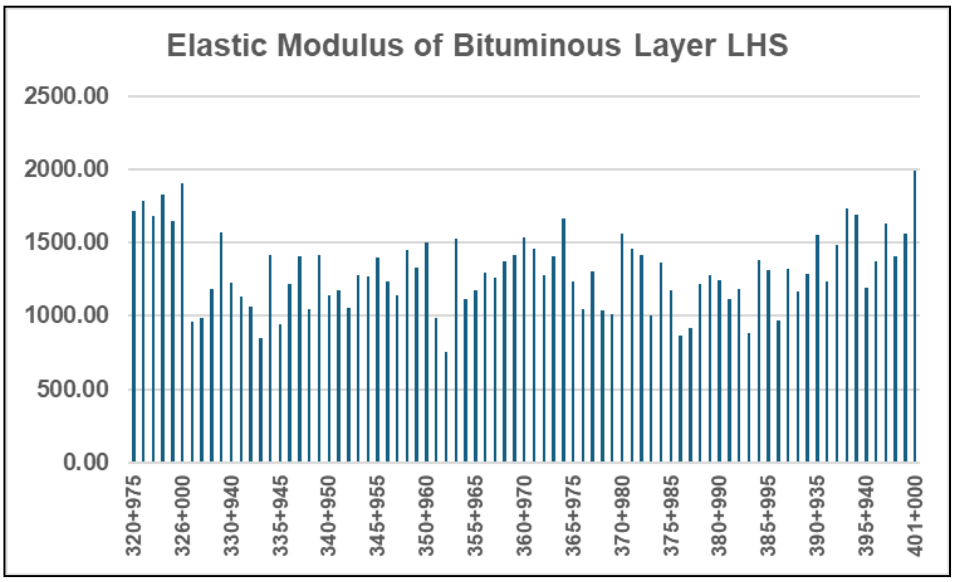


Figure 6.13a: Elastic Modulus Values of Bituminous Layers-LHS

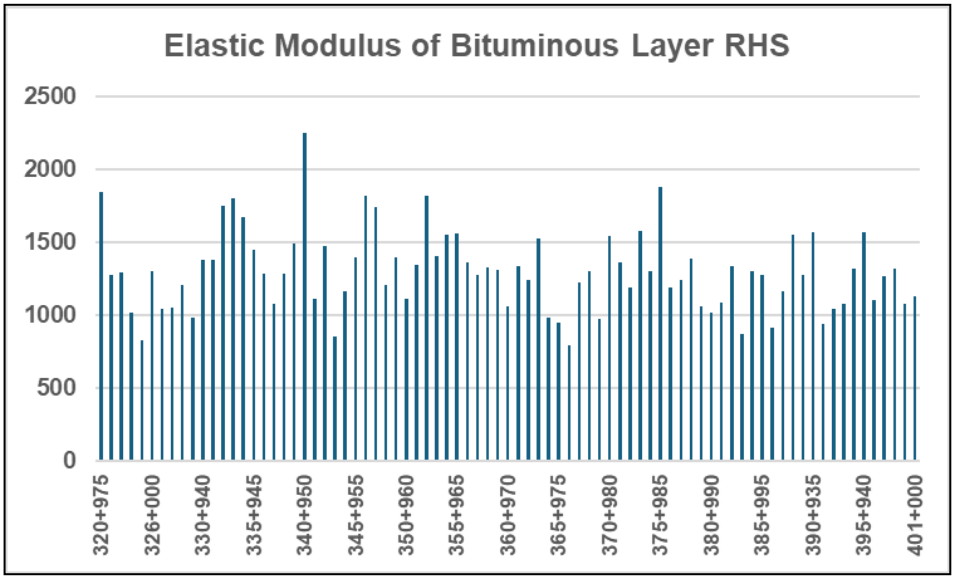


Figure 6.13a: Elastic Modulus Values of Bituminous Layers-RHS

The elastic moduli of Bituminous layer were found to be varying from 754.33 MPa to 2252.31 MPa as shown in the figures above.

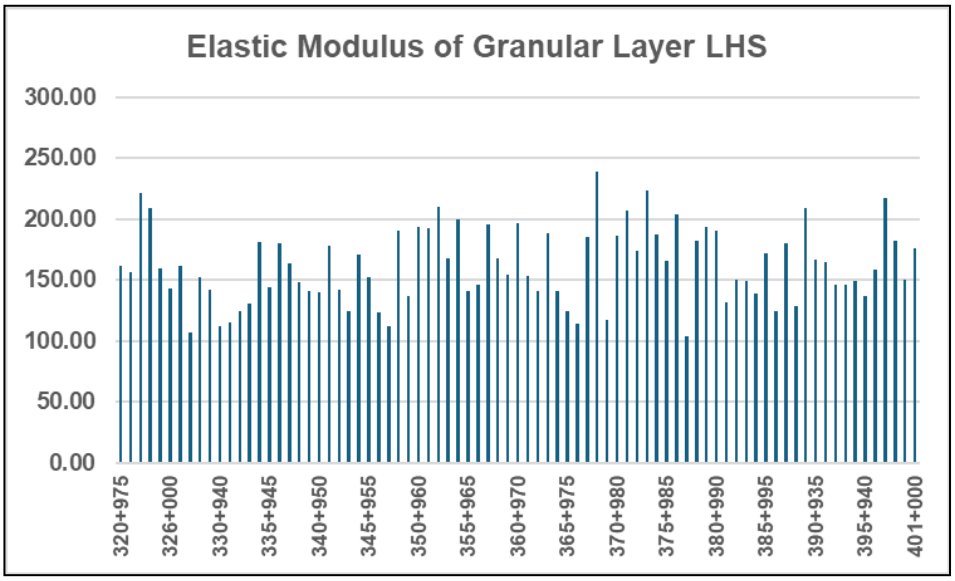


Figure 6.13b: Elastic Modulus Values of Granular Layers – LHS

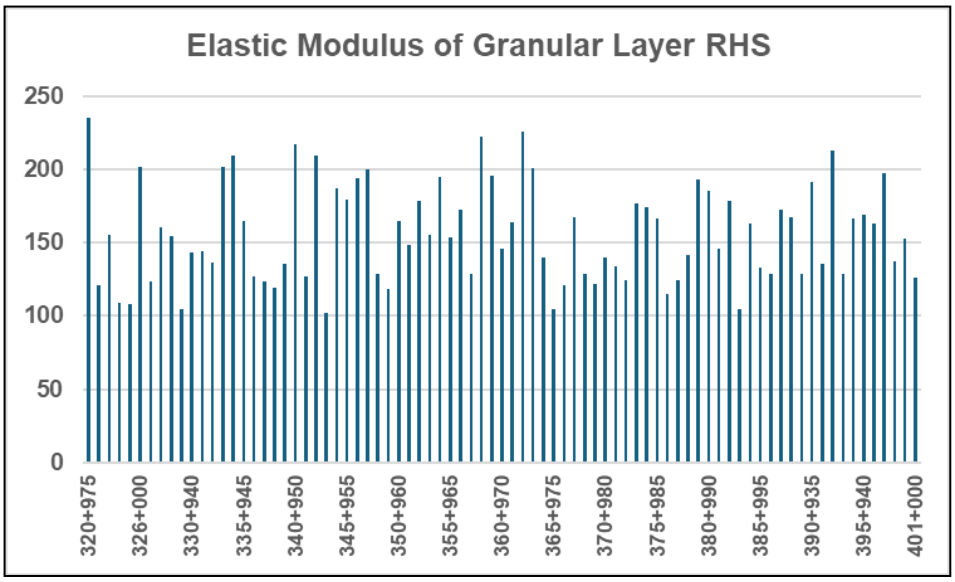


Figure 6.13b: Elastic Modulus Values of Granular Layers – RHS

The elastic moduli of granular layer were found to be varying from 102.08 MPa to 239 MPa as shown in the figures above.

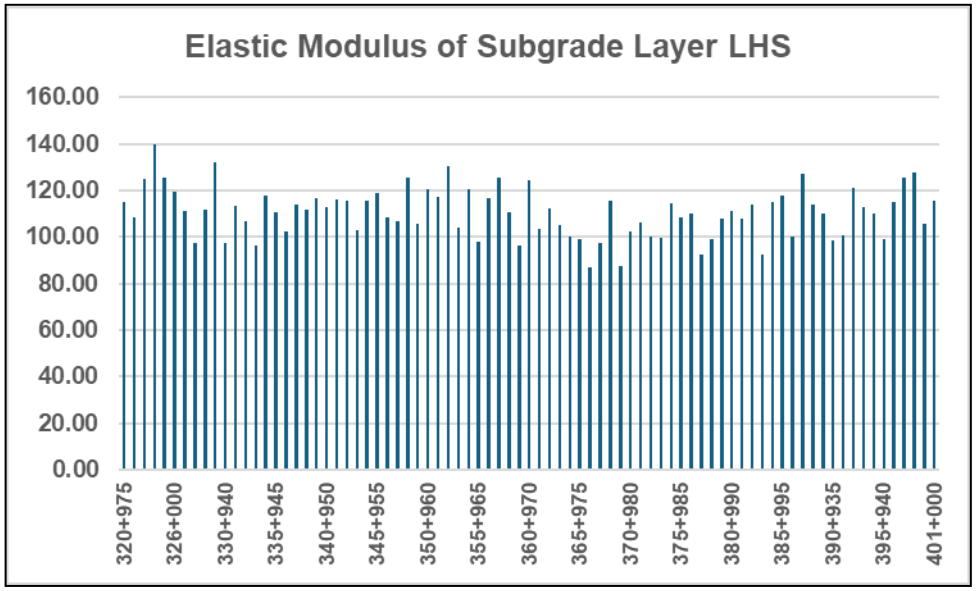


Figure 6.13c: Elastic Modulus Values of Subgrade Layers – LHS

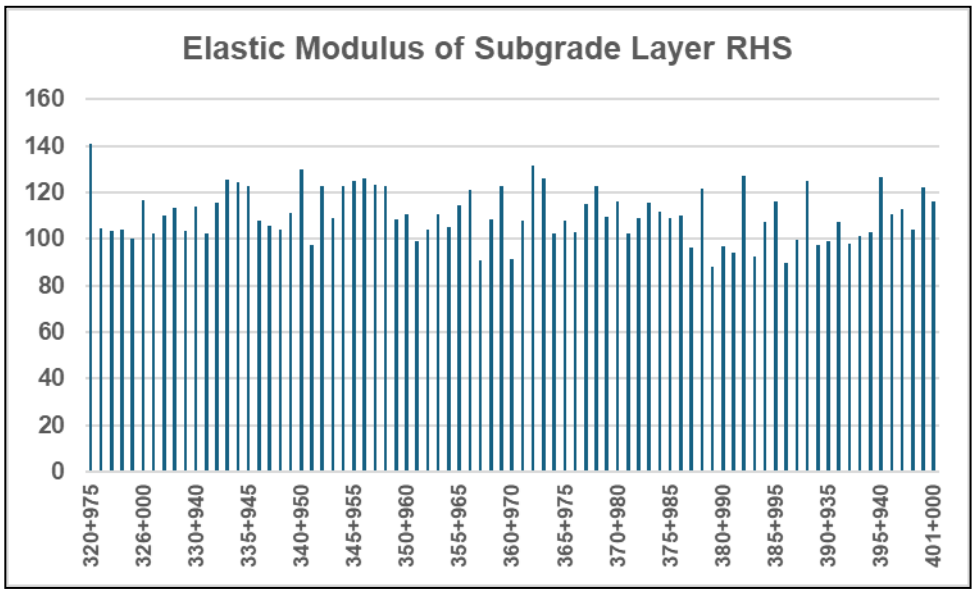


Figure 6.13c: Elastic Modulus Values of Subgrade Layers – RHS

The elastic moduli of subgrade layer were found to be in between 86.94 to 141.16 as shown in the figures above. The elastic modulus of the subgrade layer is greatly dependent on the CBR of subgrade soil.

6.7.8 Remaining Life of Pavement

(a) Design Elastic Modulus of existing pavement layers

For each homogeneous sub-section, the moduli of the existing bituminous layer (E1), granular crust (E2) and subgrade (E3) had been estimated by back analysis of measured deflection values as per IRC: 115-2014. The back calculated modulus values were duly corrected for temperature and moisture as appropriate. As per IRC 115; 2014, 15th percentile moduli are used as the design modulus for pavement design, thus the 15th percentile modulus values (corrected for temperature and moisture) of each pavement layers had been worked out for each homogenous section for both LHS and RHS. As the FWD was conducted

on inner lane and outer lane, 15th percentile modulus values are estimated for inner lane and outer lane separately and the most critical (lesser) elastic modulus values are considered as design modulus values. The back calculated design moduli (15th percentile) values for Bituminous, Granular and subgrade layers of existing pavement for each homogenous section for both LHS and RHS thus obtained are summarized in **Table 6.15.**

Table 6-15: 15th Percentile Elastic Moduli of Pavement Layers

Sl No	Chainage		Length (Km)	Avg Crust Thick		15th Percentile E Value (Mpa)		
	From	To		Bituminous	Granular Layer	Bituminous Layer	Granular Layer	Subgrade
LHS								
Section-1								
1	320+000	321+000	1.00	165	450	1720.26	161.07	114.92
2	321+000	322+000	1.00	165	450	1788.74	156.87	108.26
3	322+000	324+000	2.00	165	450	1684.79	218.25	126.60
4	324+000	325+000	1.00	165	450	1652.59	159.05	125.38
5	325+000	326+000	1.00	165	450	2024.29	147.88	121.65
Section-2								
1	326+000	328+000	2.00	165	450	992.45	132.16	101.36
2	328+000	330+000	2.00	165	450	1283.22	153.20	113.30
3	330+000	333+000	3.00	165	450	1191.51	119.92	103.19
4	333+000	336+000	3.00	165	450	918.53	152.36	111.02
5	336+000	338+000	2.00	165	450	1349.00	173.58	106.09
6	338+000	342+000	4.00	165	450	1221.15	149.28	116.24
7	342+000	346+000	4.00	165	450	1361.88	153.20	115.50
8	346+000	348+000	2.00	165	450	1176.09	120.86	109.21
9	348+000	351+000	3.00	165	450	1475.16	169.21	118.29
10	351+000	353+000	2.00	165	450	1083.54	190.02	116.99
11	353+000	355+000	2.00	165	450	1247.60	184.24	111.65
12	355+000	356+000	1.00	165	450	1206.96	148.38	103.52
13	356+000	360+000	4.00	165	450	1343.66	167.90	115.73
Section-3								
1	360+000	367+000	7.00	165	450	1320.19	147.57	104.76
2	367+000	370+000	3.00	165	450	1079.70	190.52	100.39
3	370+000	375+000	5.00	165	450	1436.77	193.82	106.46
4	375+000	379+000	4.00	165	450	1093.66	177.18	106.82
5	379+000	382+000	3.00	165	450	1247.86	178.57	109.77
6	382+000	387+000	5.00	165	450	1160.62	146.90	108.24
7	387+000	395+000	8.00	165	450	1375.72	165.38	112.90
8	395+000	396+000	1.00	165	450	1264.51	149.65	100.55
9	396+000	398+000	2.00	165	450	1565.40	200.50	125.10
10	398+000	401+000	3.00	165	450	1699.06	161.51	108.19

Sl No	Chainage		Length (Km)	Avg Crust Thick		15th Percentile E Value (Mpa)		
	From	To		Bituminous	Granular Layer	Bituminous Layer	Granular Layer	Subgrade
RHS								
Section-1								
1	320+000	321+000	1.00	165	450	1306.33	201.90	116.90
2	321+000	324+000	3.00	165	450	890.05	119.90	102.14
3	324+000	326+000	2.00	165	450	1392.78	150.10	111.76
Section-2								
1	326+000	328+000	2.00	165	450	1081.05	153.68	105.04
2	328+000	330+000	2.00	165	450	1023.93	123.90	107.90
3	330+000	336+000	6.00	165	450	1615.74	161.54	119.04

Sl No	Chainage		Length (Km)	Avg Crust Thick		15th Percentile E Value (Mpa)		
	From	To		Bituminous	Granular Layer	Bituminous Layer	Granular Layer	Subgrade
RHS								
4	336+000	339+000	3.00	165	450	1280.94	125.14	106.72
5	339+000	343+000	4.00	165	450	1433.92	177.01	116.13
6	343+000	345+000	2.00	165	450	1033.18	176.12	115.21
7	345+000	348+000	3.00	165	450	1583.99	191.89	125.56
8	348+000	354+000	6.00	165	450	1392.91	155.10	107.82
9	354+000	358+000	4.00	165	450	1415.48	159.92	105.68
10	358+000	360+000	2.00	165	450	1341.37	211.80	121.30
Section-3								
1	360+000	364+000	4.00	165	450	1211.00	189.70	113.96
2	364+000	370+000	6.00	165	450	1041.14	133.96	111.46
3	370+000	375+000	5.00	165	450	1461.53	157.44	110.30
4	375+000	378+000	3.00	165	450	1275.06	135.02	105.98
5	378+000	383+000	5.00	165	450	1113.36	177.39	102.86
6	383+000	388+000	5.00	165	450	1119.47	140.30	101.62
7	388+000	393+000	5.00	165	450	1281.97	154.67	107.89
8	393+000	394+000	1.00	165	450	1406.57	169.80	106.08
9	394+000	401+000	7.00	165	450	1245.13	165.62	116.31

(b) Remaining Life of Pavement

Remaining life of the in-service pavement is worked out considering the existing pavement as 3- layer system which is linear, homogeneous, and isotropic, each layer being characterized by its thickness, its elastic modulus E (as per table above used as input) and its Poisson's ratio μ as per IRC: 115-2014. The in-service three-layer pavement system has been analysed using IIT PAVE software with the estimated back calculated moduli values (15^{th} percentile). The interfaces between layers are assumed to be bonded. The FWD load of 40000N which exerts a uniform pressure of 0.56 MPa was considered.

The remaining life is calculated by using IIT Pave for LHS and RHS respectively. The IIT-Paved outputs for remaining. The models used for fatigue and rutting performance criteria are as per IRC 115-2014 and these models are shown below for reference.

Fatigue Model:

$$Nf = 0.711 * 10^{-04} \times [1/\varepsilon t]^{3.89} * [1/MR]^{0.854}$$

Where,

Nf = fatigue life in number of standard axles,

εt = Maximum Tensile strain at the bottom of the bituminous layer

MR= resilient modulus of the bituminous layer.

Rutting Model:

$$N= 1.41 \times 10^{-08} [1/\varepsilon v]^{4.5337}$$

Where,

N= Number of cumulative standard axles, and

εv= Vertical strain in the subgrade

Table 6-16: 15th Percentile Elastic Moduli of Pavement Layers and Remaining Life

Sl No	Chainage		Length (Km)	Avg Crust Thick		15th Percentile E Value (Mpa)			IIT Pave Result		Rutting Life	Fatigue Life	Remaining life
	From	To		Bituminous	Granular Layer	Bituminous Layer	Granular Layer	Subgrade	Tensile Strain at Bottom BT	Vertical Strain at top of Subgrade			
LHS													
Section-1													
1	320+000	321+000	1.00	165	450	1720.26	161.07	114.92	2.36E-04	2.31E-04	434.58	15.88	15.88
2	321+000	322+000	1.00	165	450	1788.74	156.87	108.26	2.33E-04	2.38E-04	374.48	16.07	16.07
3	322+000	324+000	2.00	165	450	1684.79	218.25	126.60	2.14E-04	2.08E-04	696.57	23.67	23.67
4	324+000	325+000	1.00	165	450	1652.59	159.05	125.38	2.46E-04	2.20E-04	536.77	13.83	13.83
5	325+000	326+000	1.00	165	450	2024.29	147.88	121.65	2.24E-04	2.16E-04	591.93	16.76	16.76
Section-2													
1	326+000	328+000	2.00	165	450	992.45	132.16	101.36	3.56E-04	2.89E-04	156.72	5.09	5.09
2	328+000	330+000	2.00	165	450	1283.22	153.20	113.30	2.90E-04	2.50E-04	303.01	9.14	9.14
3	330+000	333+000	3.00	165	450	1191.51	119.92	103.19	3.29E-04	2.78E-04	186.57	5.94	5.94
4	333+000	336+000	3.00	165	450	918.53	152.36	111.02	3.47E-04	2.70E-04	212.98	6.03	6.03
5	336+000	338+000	2.00	165	450	1349.00	173.58	106.09	2.67E-04	2.53E-04	287.04	11.96	11.96
6	338+000	342+000	4.00	165	450	1221.15	149.28	116.24	3.01E-04	2.49E-04	307.45	8.23	8.23
7	342+000	346+000	4.00	165	450	1361.88	153.20	115.50	2.80E-04	2.44E-04	339.58	9.91	9.91
8	346+000	348+000	2.00	165	450	1176.09	120.86	109.21	3.36E-04	2.68E-04	220.66	5.56	5.56
9	348+000	351+000	3.00	165	450	1475.16	169.21	118.29	2.57E-04	2.33E-04	417.90	12.97	12.97
10	351+000	353+000	2.00	165	450	1083.54	190.02	116.99	2.87E-04	2.44E-04	340.21	11.00	11.00
11	353+000	355+000	2.00	165	450	1247.60	184.24	111.65	2.71E-04	2.46E-04	325.41	12.14	12.14
12	355+000	356+000	1.00	165	450	1206.96	148.38	103.52	3.04E-04	2.70E-04	214.78	7.95	7.95
13	356+000	360+000	4.00	165	450	1343.66	167.90	115.73	2.71E-04	2.41E-04	357.85	11.33	11.33
Section-3													
1	360+000	367+000	7.00	165	450	1320.19	147.57	104.76	2.90E-04	2.63E-04	241.16	8.87	8.87
2	367+000	370+000	3.00	165	450	1079.70	190.52	100.39	2.87E-04	2.67E-04	222.53	10.94	10.94
3	370+000	375+000	5.00	165	450	1436.77	193.82	106.46	2.46E-04	2.44E-04	337.06	15.63	15.63
4	375+000	379+000	4.00	165	450	1093.66	177.18	106.82	2.96E-04	2.61E-04	248.37	9.69	9.69
5	379+000	382+000	3.00	165	450	1247.86	178.57	109.77	2.75E-04	2.50E-04	301.91	11.46	11.46
6	382+000	387+000	5.00	165	450	1160.62	146.90	108.24	3.12E-04	2.64E-04	234.62	7.46	7.46
7	387+000	395+000	8.00	165	450	1375.72	165.38	112.90	2.70E-04	2.44E-04	336.44	11.36	11.36

Sl No	Chainage		Length (Km)	Avg Crust Thick		15th Percentile E Value (Mpa)			IIT Pave Result		Rutting Life	Fatigue Life	Remaining life
	From	To		Bituminous	Granular Layer	Bituminous Layer	Granular Layer	Subgrade	Tensile Strain at Bottom BT	Vertical Strain at top of Subgrade			
LHS													
8	395+000	396+000	1.00	165	450	1264.51	149.65	100.55	2.96E-04	2.72E-04	207.35	8.55	8.55
9	396+000	398+000	2.00	165	450	1565.40	200.50	125.10	2.31E-04	2.16E-04	586.97	18.65	18.65
10	398+000	401+000	3.00	165	450	1699.06	161.51	108.19	2.42E-04	2.41E-04	359.88	14.49	14.49

Sl No	Chainage		Length (Km)	Avg Crust Thick		15th Percentile E Value (Mpa)			IIT Pave Result		Rutting Life	Fatigue Life	Remaining life
	From	To		Bituminous	Granular Layer	Bituminous Layer	Granular Layer	Subgrade	Tensile Strain at Bottom BT	Vertical Strain at top of Subgrade			
RHS													
Section-1													
1	320+000	321+000	1.00	165	450	1306.33	201.90	116.90	2.53E-04	2.33E-04	417.09	15.16	15.16
2	321+000	324+000	3.00	165	450	890.05	119.90	102.14	3.94E-04	2.97E-04	137.41	3.76	3.76
3	324+000	326+000	2.00	165	450	1392.78	150.10	111.76	2.79E-04	2.48E-04	310.83	9.85	9.85
Section-2													
1	326+000	328+000	2.00	165	450	1081.05	153.68	105.04	3.18E-04	2.71E-04	208.40	7.37	7.37
2	328+000	330+000	2.00	165	450	1023.93	123.90	107.90	3.60E-04	2.78E-04	188.10	4.78	4.78
3	330+000	336+000	6.00	165	450	1615.74	161.54	119.04	2.48E-04	2.29E-04	452.98	13.64	13.64
4	336+000	339+000	3.00	165	450	1280.94	125.14	106.72	3.15E-04	2.66E-04	227.12	6.59	6.59
5	339+000	343+000	4.00	165	450	1433.92	177.01	116.13	2.56E-04	2.35E-04	398.14	13.45	13.45
6	343+000	345+000	2.00	165	450	1033.18	176.12	115.21	3.05E-04	2.52E-04	292.78	9.04	9.04
7	345+000	348+000	3.00	165	450	1583.99	191.89	125.56	2.34E-04	2.17E-04	579.63	17.59	17.59
8	348+000	354+000	6.00	165	450	1392.91	155.10	107.82	2.76E-04	2.53E-04	284.99	10.35	10.35
9	354+000	358+000	4.00	165	450	1415.48	159.92	105.68	2.70E-04	2.54E-04	278.95	11.09	11.09
10	358+000	360+000	2.00	165	450	1341.37	211.80	121.30	2.44E-04	2.24E-04	493.70	17.11	17.11
Section-3													
1	360+000	364+000	4.00	165	450	1211.00	189.70	113.96	2.71E-04	2.43E-04	344.68	12.38	12.38
2	364+000	370+000	6.00	165	450	1041.14	133.96	111.46	3.44E-04	2.68E-04	220.28	5.57	5.57
3	370+000	375+000	5.00	165	450	1461.53	157.44	110.30	2.66E-04	2.46E-04	322.43	11.34	11.34
4	375+000	378+000	3.00	165	450	1275.06	135.02	105.98	3.07E-04	2.66E-04	229.06	7.35	7.35

Sl No	Chainage		Length (Km)	Avg Crust Thick		15th Percentile E Value (Mpa)			IIT Pave Result		Rutting Life	Fatigue Life	Remaining life
	From	To		Bituminous	Granular Layer	Bituminous Layer	Granular Layer	Subgrade	Tensile Strain at Bottom BT	Vertical Strain at top of Subgrade			
RHS													
5	378+000	383+000	5.00	165	450	1113.36	177.39	102.86	2.93E-04	2.66E-04	227.12	9.89	9.89
6	383+000	388+000	5.00	165	450	1119.47	140.30	101.62	3.25E-04	2.79E-04	182.67	6.57	6.57
7	388+000	393+000	5.00	165	450	1281.97	154.67	107.89	2.89E-04	2.58E-04	263.58	9.23	9.23
8	393+000	394+000	1.00	165	450	1406.57	169.80	106.08	2.64E-04	2.52E-04	292.78	12.15	12.15
9	394+000	401+000	7.00	165	450	1245.13	165.62	116.31	2.84E-04	2.44E-04	335.81	10.06	10.06

The existing HAM Concessionaire shall be responsible required overlay till Year 2036.

6.8 ANALYSIS OF NSV DATA – Pavement Condition

6.8.1 Pavement Condition Rating (PCI)

Analysis of Pavement Distress in terms of cracks, potholes, patching, rutting, shoving etc. has carried out to determine PCI. For this purpose, the pavement distress data obtained from NSV are analysed in this section to estimate pavement condition index (PCI). Types of distresses recorded by NSV are longitudinal cracking, Transverse cracking, Alligator cracking, Pothole, Patching, Ravelling, Shoving, Flushing/bleeding, Depression, Edge Break, Delamination, and corrugation along with its severity level. In order to estimates the present condition of the pavement and its future maintenance requirements, the analysis of these measured distresses are performed to determine the PCI of the project road kilometre-wise.

PCI provides a measure of the present condition of the pavement based on the distress observed on the surface of the pavement, which also indicates the structural integrity and surface operational condition (localized roughness and safety). The PCI cannot measure structural capacity, nor does it provide direct measurement of skid resistance or roughness. It provides an objective and rational basis for determining maintenance and repair needs and priorities".

For pavement monitoring, this codes states that, "Continuous monitoring of the PCI is used to establish the rate of pavement deterioration, which permits early identification of major rehabilitation needs. The PCI provides feedback on pavement performance for validation or improvement of current pavement design and maintenance procedures".

Pavement condition rating as per ASTM D 6433 as a function of the PCI value that varies from "failed" to "excellent" are shown in **Figure 6.14** and the same is used for this project.

Figure 6.14: Pavement Condition Index

The steps for calculating the PCI as per the IRC 82-2023 code from measured distress type are listed below.

While recording the distresses the details for the following pavement surface distresses are visually noted and recorded in percentage for each km length. Details surveys are attached at Annexture 2.1.

1. Cracking (Alligator or fatigue cracking, Longitudinal and transverse cracking).
2. Bleeding

3. Depressions/Settlements
4. Pothole
5. Patching
6. Ravelling

Pavement condition surveys can be broadly classified into manual methods and instrumented condition surveys. While manual methods are cumbersome, slow to perform and includes safety risks, automated surveys can be conducted at high speed with greater level of precision.

6.8.2 Instrumented Method

This method involves use of advanced laser and camera-based system for recording of international roughness index, rut depth and pavement surface distresses from a moving vehicle. Examples are Automatic Road Survey System (ARSS) / Network Survey Vehicle (NSV), which have become popular to record and assess pavement surface automatically at highway speeds and recommended for expressways, highways and urban roads.

Road Category	Roughness	Surface Distress	Rut Depth (mm)
Four Lane Divided or More	It is recommended that the roughness of the existing pavement Shall be assessed in terms of Roughness Index (mm/km) or International Roughness Index (m/km) as per the procedure given in IRC SP: 16-2019 document.	ARSS/NSV	ARSS/NSV

Following the ASTM D 6433 steps as mentioned above, the pavement condition index (PCI) has been worked out for project road from pavement distress data collected by NSV. PCI is estimated for LHS and RHS of main carriageway separately and are shown kilometre-wise in **Table 6.17.** The PCI variation along the stretch on RHS and LHS side is shown in **Figure 6.15.**

Table 6-17: Shown PCI Weighted kilometre-wise

Sl. No	Chainage		LHS		RHS	
	From	To	PCI Weighted	Maintenance Recommendation	PCI Weighted	Maintenance Recommendation
1	320+810	321+000	96.89	Routine Maintenance	76.07	Periodic Maintenance
2	321+000	322+000	79.11	Periodic Maintenance	79.36	Periodic Maintenance
3	322+000	323+000	80.03	Preventive Maintenance	80.75	Preventive Maintenance
4	323+000	324+000	69.00	Periodic Maintenance	85.76	Preventive Maintenance
5	324+000	325+000	76.13	Periodic Maintenance	67.76	Periodic Maintenance
6	325+000	326+000	84.26	Preventive Maintenance	79.00	Periodic Maintenance
7	326+000	327+000	75.77	Periodic Maintenance	68.23	Periodic Maintenance
8	327+000	328+000	70.28	Periodic Maintenance	66.55	Periodic Maintenance
9	328+000	329+000	93.48	Routine Maintenance	79.54	Periodic Maintenance
10	329+000	330+000	82.84	Preventive Maintenance	93.17	Routine Maintenance
11	330+000	331+000	73.11	Periodic Maintenance	78.66	Periodic Maintenance
12	331+000	332+000	66.44	Periodic Maintenance	65.29	Periodic Maintenance
13	332+000	333+000	79.86	Periodic Maintenance	69.21	Periodic Maintenance
14	333+000	334+000	90.34	Routine Maintenance	67.84	Periodic Maintenance
15	334+000	335+000	66.79	Periodic Maintenance	65.66	Periodic Maintenance
16	335+000	336+000	92.30	Routine Maintenance	58.19	Minor Rehabilitation

Sl. No	Chainage		LHS		RHS	
	From	To	PCI Weighted	Maintenance Recommendation	PCI Weighted	Maintenance Recommendation
17	336+000	337+000	74.25	Periodic Maintenance	66.93	Periodic Maintenance
18	337+000	338+000	73.08	Periodic Maintenance	95.06	Routine Maintenance
19	338+000	339+000	82.36	Preventive Maintenance	78.68	Periodic Maintenance
20	339+000	340+000	83.53	Preventive Maintenance	77.58	Periodic Maintenance
21	340+000	341+000	71.47	Periodic Maintenance	93.74	Routine Maintenance
22	341+000	342+000	69.73	Periodic Maintenance	63.93	Periodic Maintenance
23	342+000	343+000	66.00	Periodic Maintenance	92.09	Routine Maintenance
24	343+000	344+000	66.10	Periodic Maintenance	77.55	Periodic Maintenance
25	344+000	345+000	62.63	Periodic Maintenance	69.53	Periodic Maintenance
26	345+000	346+000	64.92	Periodic Maintenance	78.16	Periodic Maintenance
27	346+000	347+000	67.52	Periodic Maintenance	75.37	Periodic Maintenance
28	347+000	348+000	80.19	Preventive Maintenance	93.93	Routine Maintenance
29	348+000	349+000	80.85	Preventive Maintenance	81.54	Preventive Maintenance
30	349+000	350+000	72.20	Periodic Maintenance	77.06	Periodic Maintenance
31	350+000	351+000	74.61	Periodic Maintenance	69.56	Periodic Maintenance
32	351+000	352+000	76.77	Periodic Maintenance	66.08	Periodic Maintenance
33	352+000	353+000	77.39	Periodic Maintenance	66.24	Periodic Maintenance
34	353+000	354+000	67.30	Periodic Maintenance	70.34	Periodic Maintenance
35	354+000	355+000	91.92	Routine Maintenance	93.09	Routine Maintenance
36	355+000	356+000	66.82	Periodic Maintenance	94.08	Routine Maintenance
37	356+000	357+000	66.52	Periodic Maintenance	83.76	Preventive Maintenance
38	357+000	358+000	60.41	Periodic Maintenance	95.73	Routine Maintenance
39	358+000	359+000	64.13	Periodic Maintenance	95.28	Routine Maintenance
40	359+000	360+000	66.82	Periodic Maintenance	83.60	Preventive Maintenance
41	360+000	361+000	76.21	Periodic Maintenance	83.47	Preventive Maintenance
42	361+000	362+000	70.46	Periodic Maintenance	81.01	Preventive Maintenance
43	362+000	363+000	68.83	Periodic Maintenance	76.81	Periodic Maintenance
44	363+000	364+000	78.87	Periodic Maintenance	95.36	Routine Maintenance
45	364+000	365+000	75.18	Periodic Maintenance	94.68	Routine Maintenance
46	365+000	366+000	92.28	Routine Maintenance	72.33	Periodic Maintenance
47	366+000	367+000	92.95	Routine Maintenance	80.55	Preventive Maintenance
48	367+000	368+000	76.88	Periodic Maintenance	67.94	Periodic Maintenance
49	368+000	369+000	80.83	Preventive Maintenance	81.59	Preventive Maintenance
50	369+000	370+000	69.01	Periodic Maintenance	95.88	Routine Maintenance
51	370+000	371+000	83.69	Preventive Maintenance	64.19	Periodic Maintenance
52	371+000	372+000	56.46	Minor Rehabilitation	59.62	Minor Rehabilitation
53	372+000	373+000	84.35	Preventive Maintenance	84.16	Preventive Maintenance
54	373+000	374+000	71.57	Periodic Maintenance	96.57	Routine Maintenance
55	374+000	375+000	80.66	Preventive Maintenance	77.60	Periodic Maintenance
56	375+000	376+000	93.42	Routine Maintenance	73.76	Periodic Maintenance
57	376+000	377+000	70.20	Periodic Maintenance	74.30	Periodic Maintenance
58	377+000	378+000	95.07	Routine Maintenance	82.13	Preventive Maintenance
59	378+000	379+000	95.03	Routine Maintenance	82.39	Preventive Maintenance
60	379+000	380+000	93.94	Routine Maintenance	94.67	Routine Maintenance
61	380+000	381+000	82.92	Preventive Maintenance	95.40	Routine Maintenance
62	381+000	382+000	77.44	Periodic Maintenance	94.09	Routine Maintenance
63	382+000	383+000	77.54	Periodic Maintenance	95.21	Routine Maintenance
64	383+000	384+000	93.18	Routine Maintenance	84.10	Preventive Maintenance
65	384+000	385+000	92.28	Routine Maintenance	79.71	Periodic Maintenance
66	385+000	386+000	95.39	Routine Maintenance	96.69	Routine Maintenance
67	386+000	387+000	81.71	Preventive Maintenance	95.75	Routine Maintenance
68	387+000	388+000	93.19	Routine Maintenance	95.51	Routine Maintenance
69	388+000	389+000	95.03	Routine Maintenance	96.02	Routine Maintenance
70	389+000	390+000	93.57	Routine Maintenance	95.02	Routine Maintenance
71	390+000	391+000	93.28	Routine Maintenance	91.83	Routine Maintenance

Sl. No	Chainage		LHS		RHS	
	From	To	PCI Weighted	Maintenance Recommendation	PCI Weighted	Maintenance Recommendation
72	391+000	392+000	92.17	Routine Maintenance	74.00	Periodic Maintenance
73	392+000	393+000	92.50	Routine Maintenance	69.32	Periodic Maintenance
74	393+000	394+000	76.03	Periodic Maintenance	66.13	Periodic Maintenance
75	394+000	395+000	76.74	Periodic Maintenance	84.16	Preventive Maintenance
76	395+000	396+000	81.18	Preventive Maintenance	82.26	Preventive Maintenance
77	396+000	397+000	93.56	Routine Maintenance	86.94	Preventive Maintenance
78	397+000	398+000	64.86	Periodic Maintenance	65.94	Periodic Maintenance
79	398+000	399+000	77.33	Periodic Maintenance	96.31	Routine Maintenance
80	399+000	400+000	94.89	Routine Maintenance	96.01	Routine Maintenance
81	400+000	401+000	94.90	Routine Maintenance	76.81	Periodic Maintenance

The existing HAM Concessionaire shall be for maintenance of existing road till Year 2036 for Section 2 and Section 3. In case of section 1, DPR for six lanning is in progress and pavement shall be constructed for design life of 20 years. Therefore, routine maintenance has not considered in this project under Public InvIT.

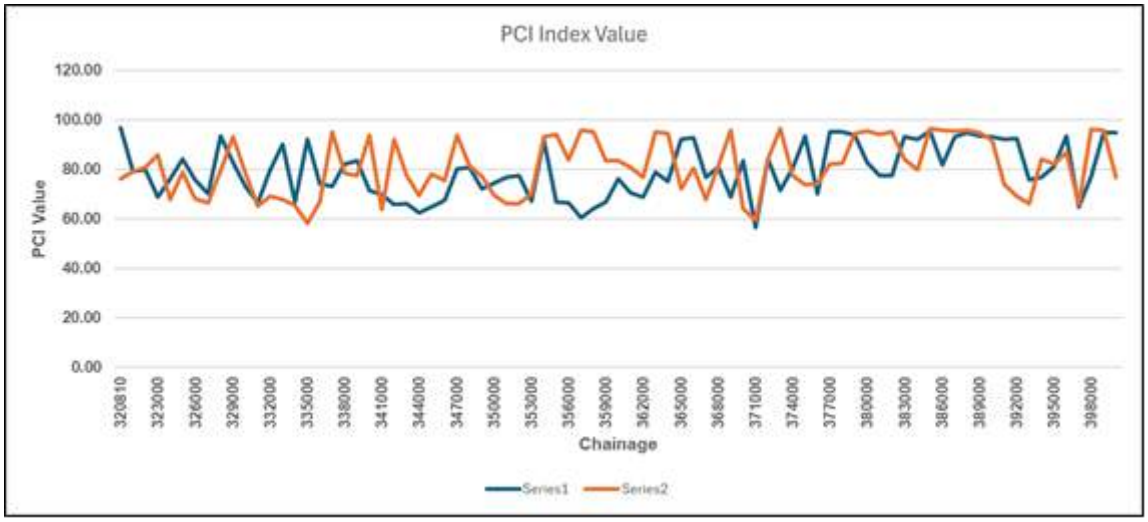


Figure 6.15: PCI Variation along the Project Road

As per above table and figure, the PCI value generally indicates good condition of pavement with LHS had better PCI than RHS from the start of the road. The summary of pavement condition as per ASTM D 6433 rating based on PCI is shown in **Table 6.18**.

Table 6-18: Pavement condition Summary based on PCI Values (Flexible)

Condition	PCI Rating	LHS		RHS	
		Length	Percentage	Length	Percentage
Excellent	**100-90**	22.19	27.67%	25.00	31.18%
Good	**90-80**	14.00	17.46%	16.00	19.95%
Satisfactory	**80-60**	43.00	53.62%	37.19	46.38%
Fair	**60-40**	1.00	1.25%	2.00	2.49%
Poor	**40-20**	0.00	0.00%	0.00	0.00%
Fail	**20-0**	0.00	0.00%	0.00	0.00%

6.8.3 NSV Rutting Data Analysis – Flexible Pavement

As per IRC 82-2023, “rutting is longitudinal depression or groove in the pavement

along the wheel path' and is one of the important parameters in determining the functional as well as structural performance of pavement and as per IRC 82-2023, the pavement condition with respect to value of rutting is shown below.

For the project road, digital laser profiler component (DLP) of NSV was used for determining the rutting. All data is measured and reported in accord with the recommendations contained within the Austroads Guide to Asset Management, Part 5C – Rutting. The DLP measures a 3-meter transverse profile measured every 50 mm of longitudinal travel and the processing software allows both lane and wheel path rutting to be measured using the string line and straight edge models.

For the project road, Rutting is measured along the inner and outer lane of both LHS and RHS of main carriageway. The average rut on each lane is presented at graphically and shown in **Figure 6.16 to Figure 6.19**.

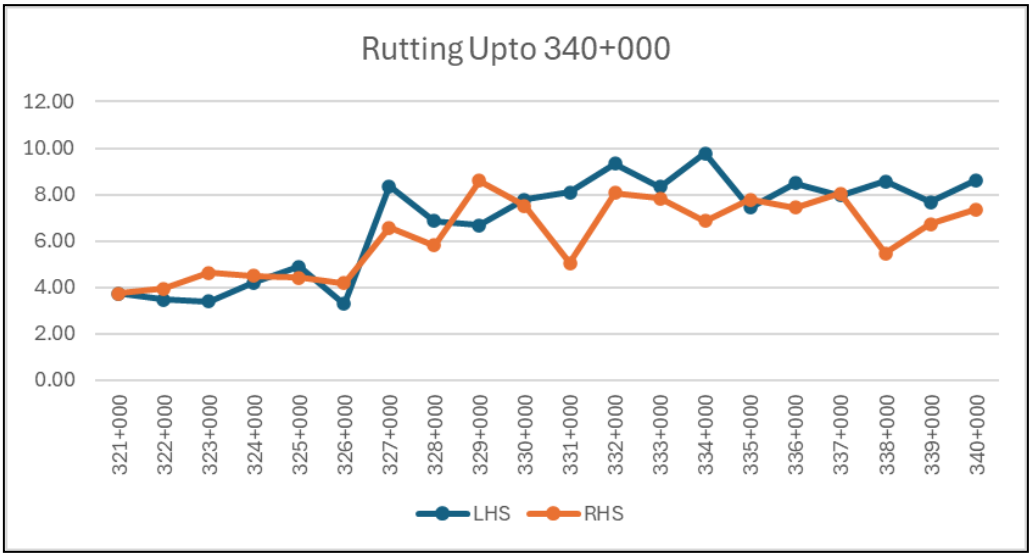


Figure 6.16: Rutting along the Project Road

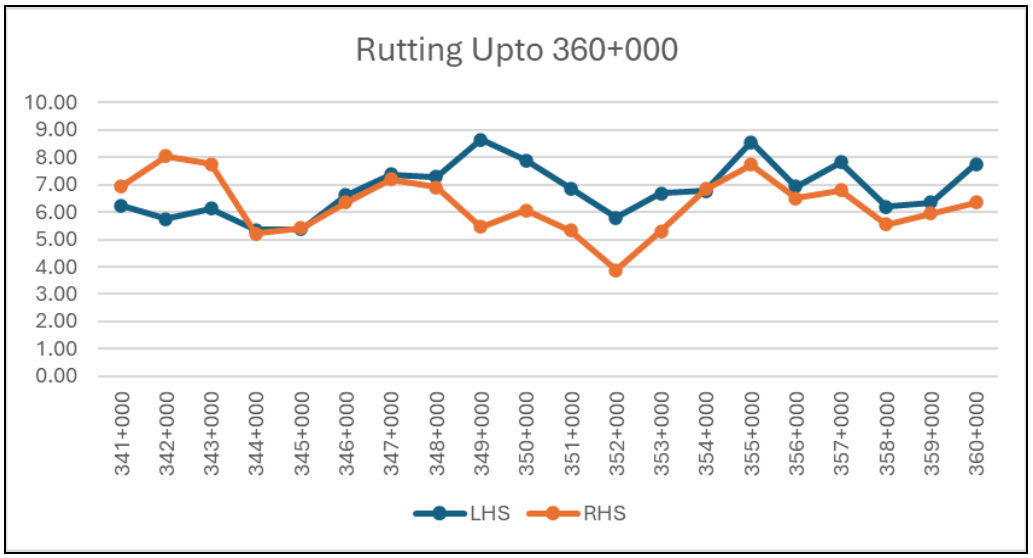


Figure 6.17: Rutting along the Project Road

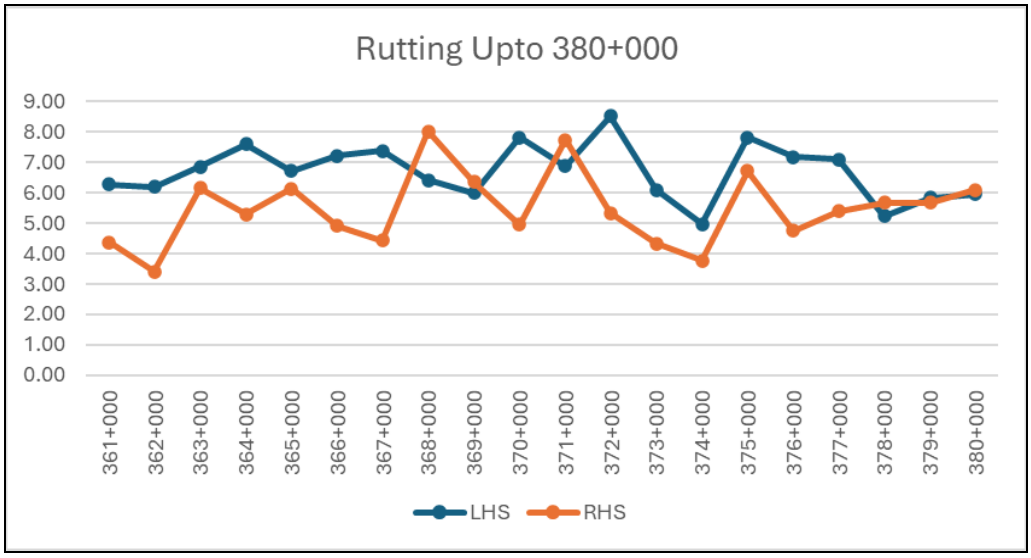


Figure 6.18: Rutting along the Project Road

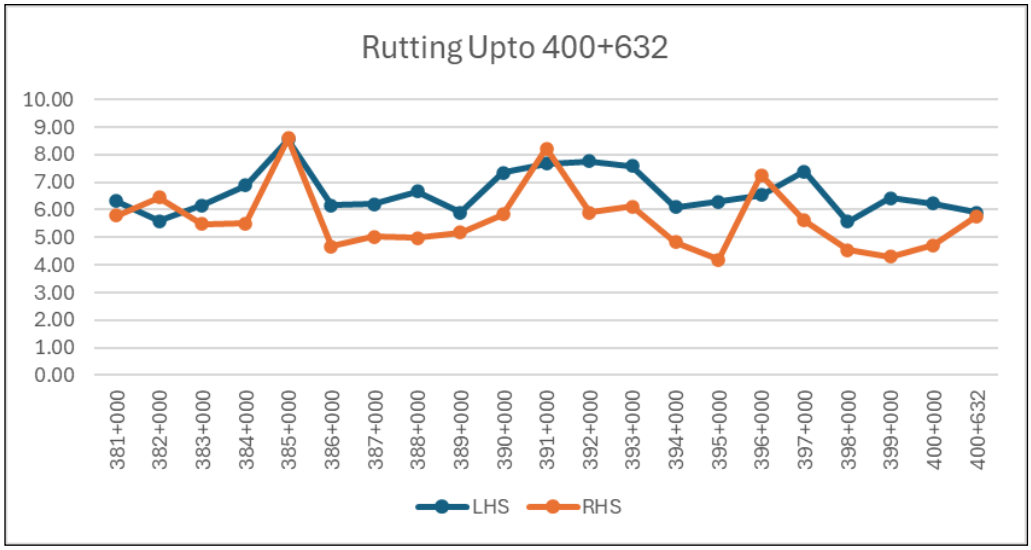


Figure 6.19: Rutting along the Project Road

The rutting found to have low severity varies in the range of 1.72 mm to 17.00 mm in LHS and in the range of 1.56 mm to 18.16 mm in RHS.

The pavement with respect to measured rut along the project road is summarized in **Table 6.19.**

Table 6-19: Pavement Condition based on Rutting

Sl No.	Pavement	Section	Chainage		Length (Km)	Range	Condition					
			From	To			L-1	L-2	L-3	R-1	R-2	R-3
1	Flexible Pavement	Section-1	320+810	326+000	5.19	<5	3.35	4.82	0.00	2.41	4.68	0.00
						5 to 10	1.61	0.36	0.00	2.52	0.49	0.00
						>10	0.23	0.01	0.00	0.26	0.02	0.00
2	Flexible Pavement	Section-2	326+000	360+300	34.30	<5	2.30	11.30	0.10	3.50	12.80	22.75
						5 to 10	21.90	17.70	0.00	19.85	18.20	0.00
						>10	10.10	5.30	0.00	10.95	3.30	0.70
3	Flexible Pavement	Section-3	360+300	400+632	40.33	<5	5.90	19.40	0.10	5.70	22.45	36.05
						5 to 10	28.33	18.43	0.00	25.63	15.88	0.00
						>10	6.10	2.50	0.00	9.00	2.00	0.00

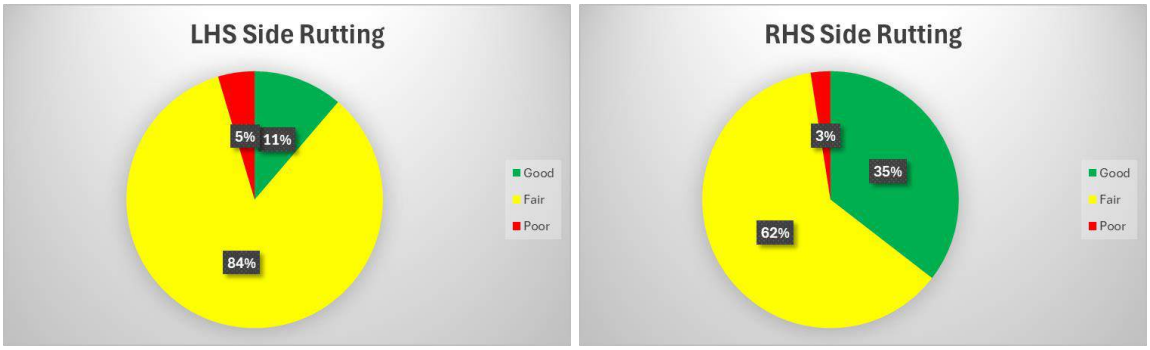


Figure 6.20: Rutting Index for LHS and RHS carriageway (Flexible)

6.8.4 NSV Roughness (IRI) Data Analysis

American Society for Testing and Materials (ASTM) specification E867-82A, Roughness is defined as "The deviations of a surface from a true planar surface with characteristic dimensions that affect vehicle dynamics, ride quality, dynamic loads and drainage." Roughness is a characteristic of the longitudinal profile in the wheel paths of the travelled surface and is best defined with respect to its impact on both the functional and structural performance of the road. As per World Bank Document-Road Deterioration and Maintenance Effects, “Roughness has an appreciable impact on vehicle operating costs and the safety, comfort and speed of travel. It also increases the dynamic loadings imposed by vehicles on the surface, accelerating the deterioration of the pavement structure”. Thus, Roughness is major parameter in evaluating the condition of the pavement generally functional aspect with respect to the user.

For the Project road, the roughness is measured by using the lasers and accelerometers located in each wheel path of the NSV. The roughness are presented in graphically at **Figure 6.21 to Figure 6.23** for both LHS and RHS.

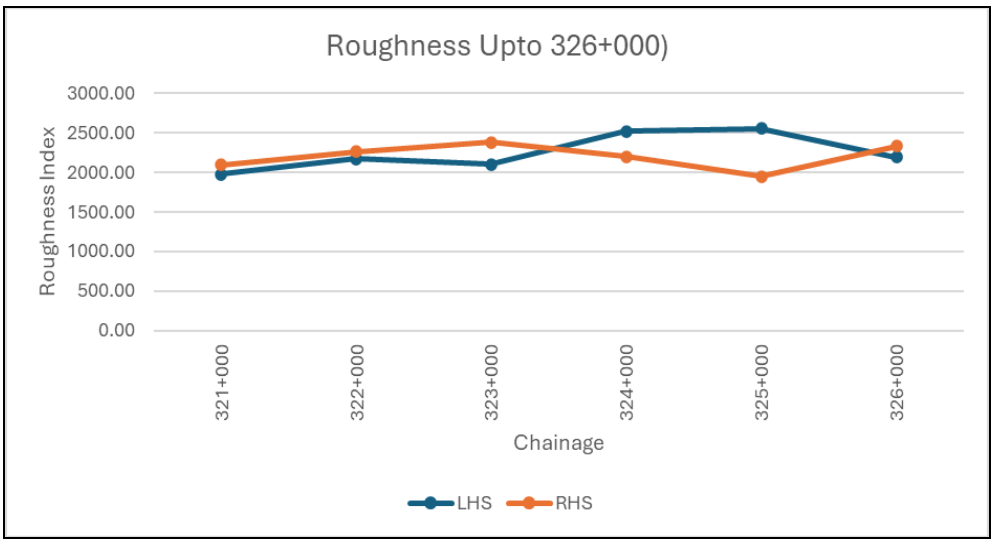


Figure 6.21: Roughness along the Project Road

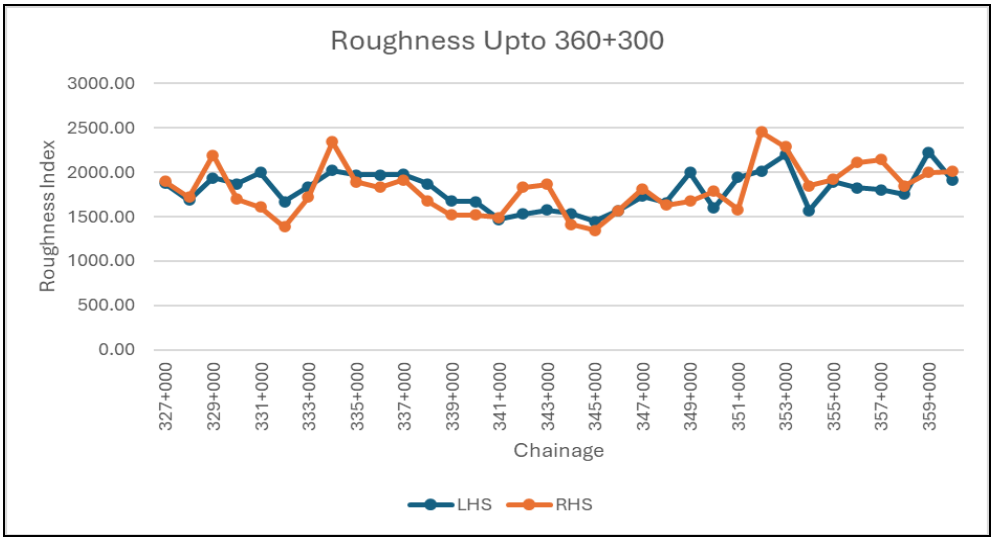


Figure 6.22: Roughness along the Project Road

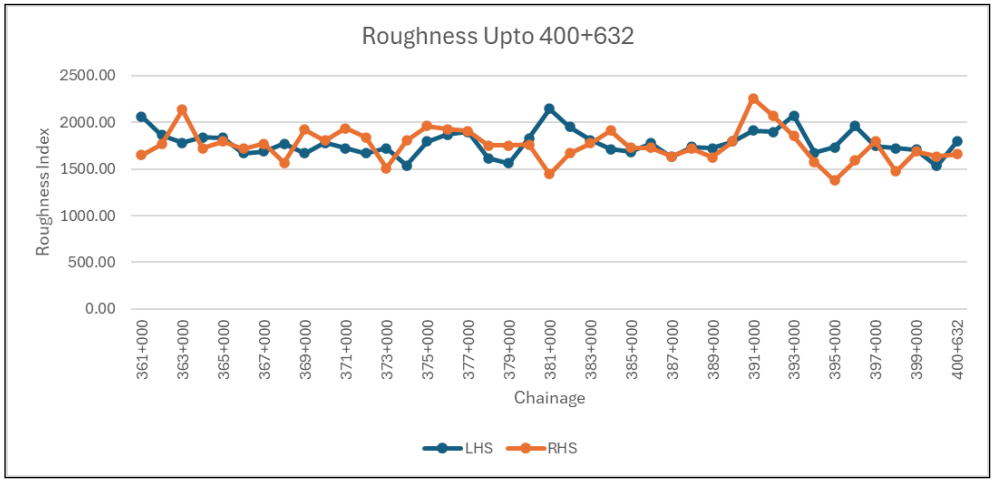


Figure 6.23: Roughness along the Project Road

It is observed that roughness index was similar in inner lane as compared to outer lane for both the direction. The Roughness Index of both lanes at many sections were beyond the desirable limit of 2000 mm/km in BHS.

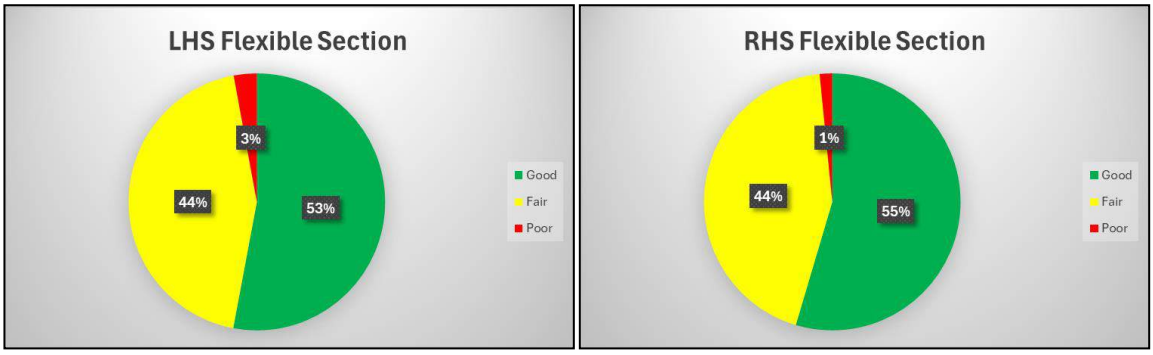


Figure 6.24: Roughness Condition Index for LHS and RHS carriageway

It is observed from pie-chart, 34% length of Project Stretch on LHS has roughness value in Poor condition as compared to 32% in RHS for Rigid Section & 3% length of Project Stretch on LHS has roughness value in Poor condition as compared to 1% in

RHS.

As per IRC SP 16-2004, the pavement condition of flexible pavement based on the roughness values are shown in **Table 6.20.**

Table 6-20: Pavement condition based on Roughness

Sl No.	Pavement	Section	Chainage		Length (Km)	Range	Condition	
			From	To			LHS	RHS
1	Flexible Pavement	Section-1	320+810	326+000	5.19	<1800	0	0
						1800 - 2400	3.19	4.94
						>2400	2	0.25
2	Flexible Pavement	Section-2	326+000	360+300	34.3	<1800	15	16.3
						1800 - 2400	19	17
						>2400	0.3	1
3	Flexible Pavement	Section-3	360+300	400+632	40.33	<1800	27	27
						1800 - 2400	13.33	13.33
						>2400	0	0

6.9 SUMMARY OF NSV Survey Report

A) Flexible Pavement

Based in NSV Survey the result are summarized in the following Table:

Table 6-21: NSV Survey Result (Flexible Pavement)

Chainage		Length (m)	Side	Roughness (mm/km)
From	To			
320+810	321+000	190	LHS	2261.60
321+000	322+000	1000	LHS	2169.13
322+000	323+000	1000	LHS	2103.74
323+000	324+000	1000	LHS	2517.05
324+000	325+000	1000	LHS	2557.06
325+000	326+000	1000	LHS	2191.94
326+000	327+000	1000	LHS	1873.68
327+000	328+000	1000	LHS	1688.89
328+000	329+000	1000	LHS	1937.97
329+000	330+000	1000	LHS	1867.34
330+000	331+000	1000	LHS	2000.13
331+000	332+000	1000	LHS	1668.30
332+000	333+000	1000	LHS	1837.69
333+000	334+000	1000	LHS	2020.22
334+000	335+000	1000	LHS	1970.35
335+000	336+000	1000	LHS	1970.90
336+000	337+000	1000	LHS	1973.67
337+000	338+000	1000	LHS	1871.24
338+000	339+000	1000	LHS	1673.69
339+000	340+000	1000	LHS	1670.83
340+000	341+000	1000	LHS	1469.99
341+000	342+000	1000	LHS	1528.46
342+000	343+000	1000	LHS	1577.19
343+000	344+000	1000	LHS	1537.91
344+000	345+000	1000	LHS	1445.40
345+000	346+000	1000	LHS	1571.19
346+000	347+000	1000	LHS	1729.39
347+000	348+000	1000	LHS	1656.63
348+000	349+000	1000	LHS	1998.97
349+000	350+000	1000	LHS	1595.79
350+000	351+000	1000	LHS	1941.22
351+000	352+000	1000	LHS	2015.50
352+000	353+000	1000	LHS	2199.08
353+000	354+000	1000	LHS	1568.98
354+000	355+000	1000	LHS	1892.74

Chainage		Length (m)	Side	Roughness (mm/km)
From	To			
355+000	356+000	1000	LHS	1822.89
356+000	357+000	1000	LHS	1801.31
357+000	358+000	1000	LHS	1755.44
358+000	359+000	1000	LHS	2224.60
359+000	360+000	1000	LHS	1916.17
360+000	360+300	300	LHS	2479.24
360+300	361+000	700	LHS	1887.54
361+000	362+000	1000	LHS	1862.57
362+000	363+000	1000	LHS	1780.96
363+000	364+000	1000	LHS	1841.96
364+000	365+000	1000	LHS	1835.16
365+000	366+000	1000	LHS	1671.10
366+000	367+000	1000	LHS	1690.44
367+000	368+000	1000	LHS	1770.02
368+000	369+000	1000	LHS	1668.29
369+000	370+000	1000	LHS	1780.33
370+000	371+000	1000	LHS	1720.95
371+000	372+000	1000	LHS	1671.24
372+000	373+000	1000	LHS	1724.55
373+000	374+000	1000	LHS	1538.34
374+000	375+000	1000	LHS	1796.31
375+000	376+000	1000	LHS	1870.27
376+000	377+000	1000	LHS	1896.21
377+000	378+000	1000	LHS	1617.20
378+000	379+000	1000	LHS	1562.06
379+000	380+000	1000	LHS	1832.42
380+000	381+000	1000	LHS	2146.51
381+000	382+000	1000	LHS	1953.79
382+000	383+000	1000	LHS	1812.32
383+000	384+000	1000	LHS	1714.73
384+000	385+000	1000	LHS	1685.72
385+000	386+000	1000	LHS	1775.94
386+000	387+000	1000	LHS	1628.64
387+000	388+000	1000	LHS	1737.31
388+000	389+000	1000	LHS	1721.57

Chainage		Length (m)	Side	Roughness (mm/km)
From	To			
389+000	390+000	1000	LHS	1797.19
390+000	391+000	1000	LHS	1912.17
391+000	392+000	1000	LHS	1897.30
392+000	393+000	1000	LHS	2072.33
393+000	394+000	1000	LHS	1675.67
394+000	395+000	1000	LHS	1735.45
395+000	396+000	1000	LHS	1961.63
396+000	397+000	1000	LHS	1749.98
397+000	398+000	1000	LHS	1722.85
398+000	399+000	1000	LHS	1708.77
399+000	400+000	1000	LHS	1532.54
400+000	401+000	1000	LHS	1795.96
320+810	321+000	190	RHS	2628.00
321+000	322+000	1000	RHS	2264.85
322+000	323+000	1000	RHS	2378.81
323+000	324+000	1000	RHS	2197.81
324+000	325+000	1000	RHS	1947.75
325+000	326+000	1000	RHS	2330.06
326+000	327+000	1000	RHS	1896.99
327+000	328+000	1000	RHS	1720.65
328+000	329+000	1000	RHS	2190.89
329+000	330+000	1000	RHS	1696.80
330+000	331+000	1000	RHS	1609.04
331+000	332+000	1000	RHS	1387.72
332+000	333+000	1000	RHS	1721.71
333+000	334+000	1000	RHS	2345.65
334+000	335+000	1000	RHS	1890.16
335+000	336+000	1000	RHS	1832.13
336+000	337+000	1000	RHS	1914.30
337+000	338+000	1000	RHS	1672.83
338+000	339+000	1000	RHS	1521.02
339+000	340+000	1000	RHS	1517.47
340+000	341+000	1000	RHS	1493.46
341+000	342+000	1000	RHS	1828.55
342+000	343+000	1000	RHS	1862.09
343+000	344+000	1000	RHS	1414.94
344+000	345+000	1000	RHS	1346.03
345+000	346+000	1000	RHS	1568.45
346+000	347+000	1000	RHS	1812.16
347+000	348+000	1000	RHS	1629.10
348+000	349+000	1000	RHS	1676.63
349+000	350+000	1000	RHS	1784.03
350+000	351+000	1000	RHS	1579.10
351+000	352+000	1000	RHS	2452.38
352+000	353+000	1000	RHS	2286.14
353+000	354+000	1000	RHS	1846.71
354+000	355+000	1000	RHS	1921.54
355+000	356+000	1000	RHS	2108.05
356+000	357+000	1000	RHS	2145.47

Chainage		Length (m)	Side	Roughness (mm/km)
From	To			
357+000	358+000	1000	RHS	1846.53
358+000	359+000	1000	RHS	1998.50
359+000	360+000	1000	RHS	2009.62
360+000	360+300	300	RHS	1446.78
360+300	361+000	700	RHS	1739.36
361+000	362+000	1000	RHS	1767.76
362+000	363+000	1000	RHS	2137.71
363+000	364+000	1000	RHS	1723.95
364+000	365+000	1000	RHS	1794.86
365+000	366+000	1000	RHS	1720.23
366+000	367+000	1000	RHS	1773.91
367+000	368+000	1000	RHS	1568.00
368+000	369+000	1000	RHS	1924.16
369+000	370+000	1000	RHS	1807.62
370+000	371+000	1000	RHS	1938.19
371+000	372+000	1000	RHS	1839.04
372+000	373+000	1000	RHS	1508.07
373+000	374+000	1000	RHS	1803.86
374+000	375+000	1000	RHS	1961.85
375+000	376+000	1000	RHS	1929.44
376+000	377+000	1000	RHS	1906.10
377+000	378+000	1000	RHS	1751.12
378+000	379+000	1000	RHS	1752.19
379+000	380+000	1000	RHS	1761.41
380+000	381+000	1000	RHS	1443.90
381+000	382+000	1000	RHS	1667.50
382+000	383+000	1000	RHS	1778.72
383+000	384+000	1000	RHS	1914.58
384+000	385+000	1000	RHS	1728.01
385+000	386+000	1000	RHS	1727.59
386+000	387+000	1000	RHS	1633.83
387+000	388+000	1000	RHS	1717.07
388+000	389+000	1000	RHS	1627.49
389+000	390+000	1000	RHS	1794.29
390+000	391+000	1000	RHS	2256.54
391+000	392+000	1000	RHS	2070.49
392+000	393+000	1000	RHS	1852.50
393+000	394+000	1000	RHS	1577.18
394+000	395+000	1000	RHS	1375.72
395+000	396+000	1000	RHS	1592.12
396+000	397+000	1000	RHS	1793.94
397+000	398+000	1000	RHS	1472.84
398+000	399+000	1000	RHS	1688.77
399+000	400+000	1000	RHS	1633.69
400+000	401+000	1000	RHS	1658.67

6.10 DETERMINATION OF MAINTENANCE REQUIREMENTS

The performance of a pavement is affected by the type, time of application, quality of the maintenance it receives. Preventive maintenance slows the rate of pavement deterioration due to traffic and environmentally applied loads. Delays in maintenance and deferred maintenance increase the quantity of defects and their severity so that, when corrected, the cost of repair is greater as shown in figure below:

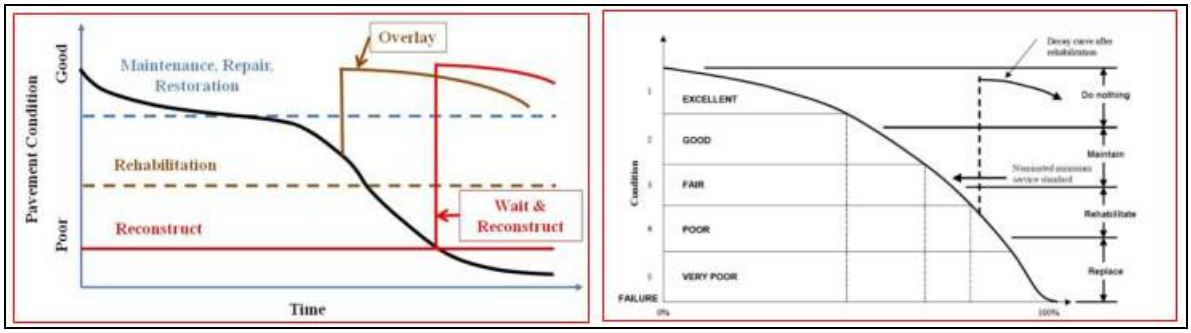


Figure: 6.25: Pavement Deterioration / Rehabilitation Relationship

The requirement of major maintenance is planned to carryout in stage construction. Base Year Major Maintenance Requirement based on current survey carried out and subsequent overpay requirement is forecasted based on HDM Analysis.

6.10.1 Base Year Maintenance Requirement (Base Year Cycle)

Based on the pavement investigation survey results, the sections along the Project Stretch were identified for overlay requirement and routine maintenance requirement. The sections have been rated based on four criteria, namely PCI, Roughness, Rutting and Remaining Life (based on FWD) in case of Flexible Pavement.

The limits and ranges for each criterion are mentioned below table:

Table 6-22: Ranges for Rating of each criteria (Flexible Pavement)

Ratings	Pavement Condition Index	Roughness (mm / km)	Rut Depth (mm)	Remaining Life of Pavement
Good	> 70	<2000	<5	<10 MSA
Average	40 – 70	2000-3000	5-10	
Poor	< 40	>3000	>10	> 10 MSA

6.11 PAVEMENT MAINTENANCE STRATEGY

The road maintenance activities can be categorized into three main categories i.e., routine maintenance, periodic maintenance and extraordinary maintenance:

- **Routine Maintenance**: It is done with a preventive approach with a purpose to preserve the pavement condition and keep it traffic worthy. Activities covered items such as filling of potholes, repairing of cracks and patch work, shoulder dressing, drain desilting etc., which are undertaken by the maintenance staff all through the year. Routine maintenance is also required for pavement markings on the bituminous surfaces to guide the road users and enhance road safety.
- **Preventive Maintenance**: Preventive maintenance is performed to improve or extend the functional life of pavement surface while in good structural condition. This may defer the timing for periodic maintenance and rehabilitation during the design life
- **Periodic Maintenance**: This includes regular maintenance operations compared to preventive maintenance such as applying a non-structural renewal coat. Periodic renewals are required to be carried out at specified frequency (scheduled response) or based upon condition and performance of road surface

(performance based) depending upon category of road, traffic and climatic conditions to improve the riding quality and reduce the rate of deterioration of the pavements.

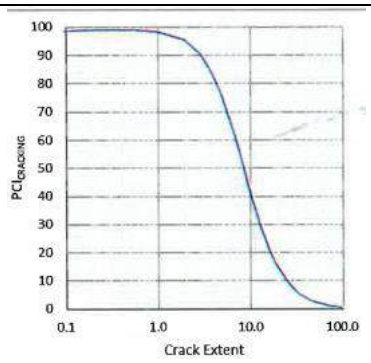
To establish an optimal maintenance strategy to preserve both functional and structural characteristics, it is necessary to predict the behaviour of the pavement under different maintenance strategies using Pavement Deterioration Models. These are mathematical models which forecast the behaviour of pavement on the basis of certain data inputs, collected directly from the road with precision equipment (Traffic loading, Roughness, deflections, layers thickness, etc.) and making reasonable assumptions in cases where data is not available.

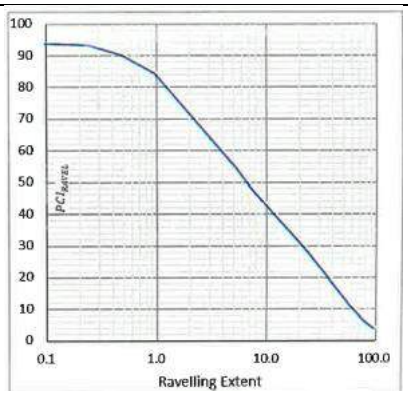
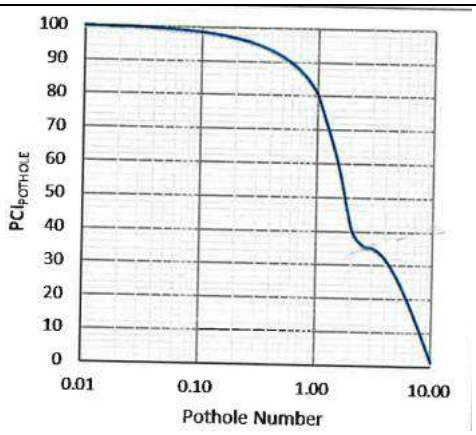
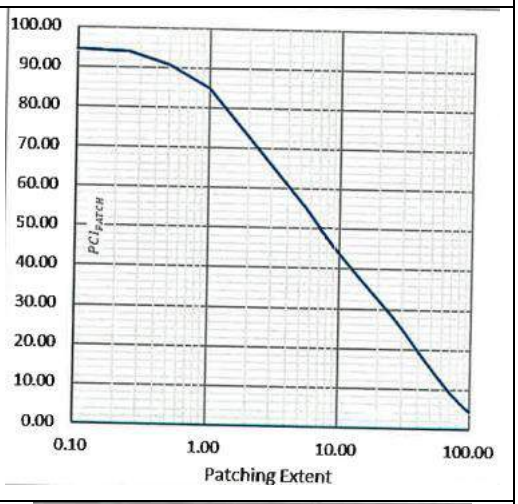
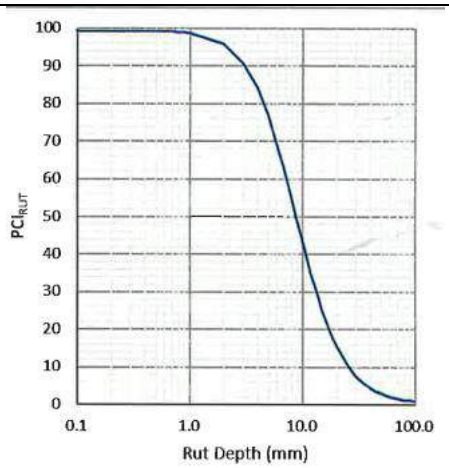
The first step towards planning of maintenance operations is the evaluation of the existing pavement surface in terms of its physical condition as well as structural capacity. For this purpose, pavement condition surveys may be undertaken using manual or instruments by identifying type, location and magnitude of the distress as described in paragraph 6.7.1. Determination of PCI for different classes of roads, are given in Table 6.24. Maintenance recommendations based on PCI value (0-100 scale) can be as per Table 6.23, As per IRC 82 – 2023 Determination of PCI for Highways/ Expressway using Table 6.24.

Table 6-23: PCI based ratings for Highways

Condition	Excellent to Good		Satisfactory to Fair		Poor to Fail	
	Excellent	Good	Satisfactory	Fair	Poor	Fail
PCI Rating	>90 to 100	>80 to 90	>60 to 80	>40 to 60	>20 to 40	0 to 20
Recommendations	Routine Maintenance	Preventive Maintenance	Resurfacing (based on structural evaluation)	Minor Rehabilitation (based on Structural evaluation)	Major Rehabilitation/ Structural Overlay	Re-Construction

Table 6-24: PCI based ratings for Highways.

Defects (Type)	Equations	Curve
Cracking (%)	$PCI_{CRACKING} = \frac{7231}{CE^2 - 0.737 \times CE + 73.09}$ Where CE=Crack Extent	

Defects (Type)	Equations	Curve
Ravelling (%)	$PCI_{RAVEL} = 52.92 * e^{-0.02525*RE} + 44.1 * e^{-0.2899*RE}$ Where RE=Ravelling Extent	
Pothole (Number)	$PCI_{POTHOLE} = \frac{-77.29 \times PN^3 + 1080 \times PN^2 - 3284 \times PN + 3192}{PN^3 + 5.665 \times PN^2 - 27.78 \times PN + 32.05}$ Where PN=Pothole Number	
Patching (%)	$PCI_{PATCH} = 52.92 * e^{-0.02525*PaE} + 44.1 * e^{-0.2899*PaE}$ Where PE=Patch Extent	
Rut Depth (mm)	$PCI_{RUT} = \frac{7231}{RD^2 - 0.737 \times RD + 73.09}$ Where RD = Rut Depth (mm)	

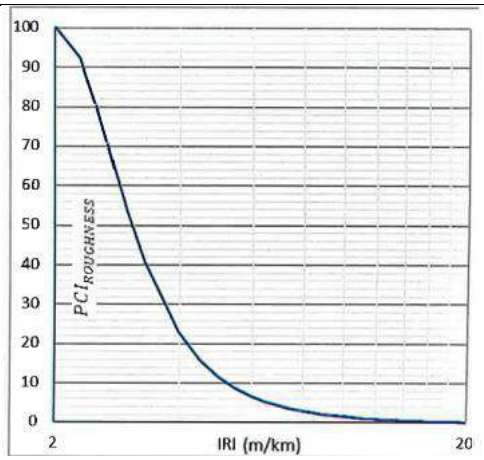
Defects (Type)	Equations	Curve
Roughness (IRI)	$PCI_{ROUGHNESS} = \frac{100}{IRI^{1.91} - 3.542 \times IRI + 4.315}$	

Table 6-25: PCI Condition Based on PCI Index

Condition	PCI Rating	LHS		RHS	
		Length	Percentage	Length	Percentage
Excellent	**100-90**	22.19	27.67%	25.00	31.18%
Good	**90-80**	14.00	17.46%	16.00	19.95%
Satisfactory	**80-60**	43.00	53.62%	37.19	46.38%
Fair	**60-40**	1.00	1.25%	2.00	2.49%
Poor	**40-20**	0.00	0.00%	0.00	0.00%
Fail	**20-0**	0.00	0.00%	0.00	0.00%

6.12 MAINTENANCE STRATEGY

The pavement strength, comfort, and safety are three key aspects in the operation and management of roads. Pavement Strength defines the capabilities of the pavement to absorb traffic loads in terms of ESALs. The designed pavement has the capacity to support a determined volume of commercial traffic. In addition, pavement strength will decrease due to external agents (traffic loads, environmental factors and inadequate drainage). Therefore, it is necessary to study how much traffic each homogeneous section is able to support, in order to know when it will be required to propose structural improvement works. At the same time user comfort and safety are related to the functional capacity of the pavement defined largely by Roughness Index. Simulates all major parameters of pavement distress i.e. cracking, rutting, ravelling etc. the Roughness draws together impact of all these pavement distress forms. In other words, Roughness is the dominant criteria of pavement performance and hence has been used in this study along with the Structural Number to work out the maintenance strategy.

As per IRC: SP:16-2019 the recommended standards for Roughness values are as follows:

Surface Type	Condition of Road Surface					
	Good		Average		Poor	
	BI mm/km	IRI (m/km)	BI mm/km	IRI (m/km)	BI (mm/km)	IRI (m/km)
Rigid Pavement	<2000	<2.81	200 to 2400	2.81 to 3.30	>2400	>3.30
Flexible Pavement	<1800	<2.55	1800 to 2400	2.55 to 3.30	>2400	>3.30

The pavement maintenance strategy has been prepared to ensure that the pavement roughness stays close to "Good" range i.e. less than 2.55m/km of IRI. "**Currently Project Highway are under HAM mode in Section 2 and 3. Section 1 is likely to awarded under** EPC Contractor for six lanning, therefore no routine and periodic maintenance required in this project till 2036."

Table 6-26: Project Details of Agency & Maintenance period

Sl. No.	Pavement	Section	Name of Agency	Mode of Contract	Chainage		PCOD / COD	O&M Handover Date
					From	To		
1	Flexible Pavement	Section-1	Progressive Construction Limited & Sunway Construction Berhad, Malaysia	Item Rate	320+810	326+000	Not Applicable	
2	Flexible Pavement	Section-2	M/s Gorhar Khairatunda Highways Pvt. Ltd.	HAM	326+000	360+300	16.10.2021/ 31.03.2022	15-10-2036
3	Flexible Pavement	Section-3	M/s Ashoka Khairatunda Barwa Adda Road Limited (AKBARL)	HAM	360+300	400+632	09.10.2021/ 21.04.2022	08.10.2036

The maintenance strategy worked out from IRC 82 - 2023 analysis is given in Table 6.27. It includes the Structural Overlays to improve the strength of the pavement to carry the traffic for further years as well as the Functional overlays to improve the surface condition of the pavement for better riding quality.

Table 6-27: Maintenance Strategy for Project Section

Chainage (PKG)	Year	Main Carriageway	Service Road
326+000 to 360+300 (Section-2)	FY 38	40 mm	Not required since existing pavement is rigid
360+300 to 400+632 (Section-3)	FY 38	40 mm	

Chapter 7. Condition Assessment of Toll Plaza

7. CONDITION ASSESSMENTS OF EXISTING TOLL PLAZA AND IMPROVEMENT PROPOSAL

7.1 GENERAL

The project road exists in Six lanes which starts from Km 320+810 and ends at Km 401+332 of NH-19 and old NH-2 is situated in the State of Jharkhand and the project was started in, 2022 Revenue collection operations are conducted at the designated Kulgo toll plaza at Km 352+100.

The toll collection is being collected by M/s West Well Iron & Steel, based in Kolkata.

The project road is having following toll plaza:

a) KULGO -TOLL PLAZA at KM 352+100

The condition assessment of each toll plaza is described in subsequent section below.

7.2 CONDITION ASSESSMENT OF KULUGO TOLL PLAZA at KM 352+100

This is an HAM project and has been currently operating M/S PATH LTD since

Km 352+100 Kulgo Toll Plaza

7.2.1 Inventory of Toll Plaza Infrastructure

Details of existing infrastructure at Toll Plaza are furnished in **Table 7.1**.

Table 7.1: Inventory of Existing Infrastructure at Fee Plaza

S. No.	Particulars	Details
1	Toll Plaza Chainage and name	352+100 Kulgo
3	Number of Toll Lanes	12+12 lanes
4	No. of ETC system	12+12 lanes
5	No. of Toll Booths	24
6	Canopy/ FOB	Yes
7	Admin Building	Yes
8	Availability of Tunnel	Yes
9	Toilets (Gents & Ladies)	Yes
10	Type of Pavement at Toll Lanes	Rigid
11	Medium Speed Weigh in Motion Facility	Yes
12	Static Weigh Bridge	Yes
13	Availability of loading/unloading facilities	No
14	Storage facility of overloaded material	No
15	High Mast Light	6 Nos
16	Streetlights	Yes

7.2.2 Existing Toll Management System

Toll collection is being done through Hybrid ETC System. The status of each component is as follows:

a) Km 352+100, Kulgo Toll Plaza

S. No.	Lane Equipment	Equipment per lane	Qty.	Specification	Status
(1) Lane Level Equipment					
1	RFID ETC with Mounted on Pole	01	24	ZEBRA/IDTECH	Working
2	Toll Lane Controller	01	24	DEVADITYA	Working
3	User Fare Display with mounting Pole	01	24	DEVADITYA	Working
4	Automatic barrier Gate	01	24	DEVADITYA	Working
5	Overhead Lane Status Light (OHLS)	01	24	ENVOYS	Working
6	Traffic Light with mounting Pole	01	24	ENVOYS	Working
7	Incident Capture Camera with mounting Pole	01	24	HIKVISION	Working
8	License Plate Image Capture Camera with mounting Pole or/ Automatic Number Plate Recognition System.	01	24	HIKVISION	Working but ANPR function not available
9	AOC TFT Monitor	01	24	LENOVA	Working
10	Customized Industrial Grade Keyboard	01	24	DEVADITYA	Working
11	Printers / Thermal Receipt Printers	01	24	EPSON	Working
12	Barcode Reader with Stand	00	00		NA
13	Violation Light & Alarm (on exiting Pole) and Foot Switch in Booth	01	24	DEVADITYA	Working
14	CCTV Camera with Voice Recording	01	24	HIKVISION	Working
15	Intercom Slave Unit in Booth	01	24	AI PHONE	Working
16	Height Sensor with Mounting Pole	02	24	DEVADITYA	Working
17	AVC including Sensor, loop and detector	01	24	DEVADITYA	Working
18	Loop with Detector	01	24	DEVADITYA	Working
19	Working of software/Lane level	01	24	DEVADITYA	Working
20	MSWIM	01	24	ESSAE	WORKING
21	SWB	01	01	ESSAE	NOT WORKING
(2) Plaza Level Equipment					
22	Plaza Server with Hot Standby configuration	01	01	HP	Single server without hot standby working
23	Office PC with Monitor and Keyboard Mouse	01	01	LENOVA	Working
24	PC with Keyboard/Mouse	04	04	LENOVA	4 TERMINALS FOR CASH, LSUD, POS AND REORTS
25	Network Printer	01	01	HP	Working
26	Network Switch	01	01	CISCO	24 PORT-01 Working
27	Internet Router for Connection to the CCH	01	02	DLINK	Working
28	UPS with Battery Bank	02	26	NUMERIC	2 KVA-24 LANE,10 KVA - 2 NOS FOR

S. No.	Lane Equipment	Equipment per lane	Qty.	Specification	Status
					SERVERS, Working,16 BATTERIES
29	Outdoor Wi-Fi Access Point (Managed & Rugged)	02	02	DLINK	Working
30	LED Display for CCTV Monitoring	01	01	55" SAMSUNG	Working
31	Network Video Recorder (NVR) For CCTV Recording	01	01	HIKVISION (32 PORT)	Working
32	CCTV Camera for Control Room, Cash Room, Manager Room, Office Out	01	04	HIKVISION	Working
33	Intercom Master Unit in Control Room	01	01	AI PHONE	working
34	DG Set	01	01	120 KVA	Working
35	Firewall	01	01	FORTNET	Working
36	Server Stabilizer	01	01	KRYCARD	Working
37	Cabling / Networking	01	01	DEVADITYA	Working
38	Broadband Internet Connection	02	02	AIRTEL, JIO	Working
39	Working of software/Plaza Level	01	01	DEVADITYA	Working

Some photographs of Toll Plaza are attached as below:

1. **Kulgo Toll Plaza at Km 352+100**

7.2.3 Upgradation of Toll Management System

NHAI has awarded M/s Path Ltd (Kulgo Toll Plaza) & M/s Software to install TMS System and work has commenced by the agency. The work is expected to be completed by end of October 24.

7.2.4 Condition Survey Status and Proposals

For improvisation we visited the toll and audited the existing condition of the Plaza WRT to Section 10 of IRC SP 84-2014 provisions for toll plaza. Proposals are recommended with condition report.
As per survey conducted below mentioned, Kulgo Toll Plaza area it is observed that the HETC system of M/S DEVADITYA is installed as an upgrade from IHMCL It is noticed that ICT 2.5 is installed and the condition of TMS and the toll plaza lanes is in good condition. The control room is established in a very unprofessional way with the TMS server, and the UPS are installed

7.2.5 Recommendation/ Suggestions for Improvement

a) Km 352+100 Kulgo Toll Plaza

1. The SI M/S DEVADITYA installed the system in 2021 and the Hybrid ETC system works in all 24 lanes in two staggered toll plazas with 12 lanes each WITH GANTRY. The ETC system was upgraded in 2021
2. There is a tunnel available for the mounting of LC and TC in both the plazas
3. The Hybrid ETC system with ANPR is installed in all 24 lanes and last two lanes are dedicated cash/VIP lanes in both plazas.
4. The average traffic is 8000 vehicles with an average collection of 35 lacs
   Out of total traffic MAV-30%, car/passenger -40% and truck/LCV/BUS-30%. Two wheelers are exempted from Toll
5. Penalty collection of non FASTAG vehicles is done in all lanes
6. Currently there is a FASTAG penetration of 96% and audit/validation of transactions done at the end of the shift
7. The current CCH is YES BANK and ICT 2.5 is implemented
8. There is tunnel available in both plazas
9. 2 Nos. of Plaza PTZ available and working
10. The toll collection is operated by M/S PATH TECHNOLOGIES with 130 manpower for 3 shifts
11. The control room for TMS with 1 NO OF 55” inch monitor is INSTALLED
12. The control room is in admin building with both TMS and ATMS servers with 2 - 10KVA central UPS FOR SERVERS and batteries. The lane UPS 2KVA is installed in booths. The TMS server currently has no backup server in hot standby provision
13. There is separate POS Windows on the ground floor
14. Handheld machines are not currently used for charging wrong/faulty/no FASTAG users in the lane
15. There is a DG of 125 KVA available for the backup of the toll plaza operations
16. The TMS system is not maintained well and needs further rectification. It is recently installed by M/S DEVADITYA.
17. NHAI is implementing Multi Lane Free Flow (MLFF) in all toll plaza, it is therefore recommended to provide MLFF system for toll collection at same location.

7.2.6 Toll Lane Requirement Analysis for Toll Plaza

All toll lanes are equipped with Hybrid ETC Lanes and capacity of each lane is considered as 400 vehicle / hour as per NHAI / Policy Guidelines/ Management of Plaza / 2021 dated 24th May 2022.

Based on above guidelines, Numbers of existing Toll Lane is derived, and it is found that existing toll lanes are sufficient for next 20 years.

7.3 ATMS

The existing ATMS equipment are as follows:

S. No.	Equipment Description	Unit	Total Quantity		
			Km 320+810 to Km 326+000	Km 326+000 to Km 360+300	Km 360+300 to Km 401.332
1	CCTV PTZ Cameras	No	DPR in Progress	11	9
2	VIDS/VIDES	No		2	8
3	ATCC	No		2	2
4	VMS	No		3	2
5	MET	No		1	-
6	Portable VMS	No		-	1
7	ECB	No		12	17

Conclusion: As per the new policy circular of ATMS, 2023 all projects installed with 2016 circular shall get upgraded to the same with change of scope being awarded by IHMCL. Hence it is advised that the current ATMS shall be migrated to 2023 at the earliest possible.

The Concessionaire shall also integrate existing ATMS with new ATMS. Entire ATMS shall retain and maintain all components throughout the Concession Period.

The Concessionaire shall also maintain existing ATMS after the O & M Handover Date.

Various Component of ATMS

7.3.1 CLOSE CIRCUIT (CCTV):

I. INFORMATION

The purpose of the Video surveillance system is to monitor specific areas of the Highway remotely from the CCR by use of cameras installed at such critical junctions. This shall help in managing incidents. The system shall also record and store video for analysis and future reference. The functional and technical requirement of the Closed-Circuit Television (CCTV) System to be used as a sub-system of ATMS Implementation shall include fixed cameras and PTZ cameras.

II. LOCATION: Currently not installed

The system monitors vehicles and other road related activity along the highway stretch.

CCTV system is required to ensure effective surveillance of the target road section

and related surrounding areas and generate a tamperproof record for post event analysis.

The software supplied and installed at the ATMS Control Centre to operate the CCTV systems shall be able to integrate with/Export data to and import data from the ATMS unified database located in ATMS Control Centre.

7.3.2 VIDEO INCIDENT DETECTION SYSTEM (VIDS)

I. PURPOSE AND GENERAL INFORMATION

The purpose of the VIDS is to sense, detect and record the incident. The system shall be an intelligent image detection using camera. The VIDS shall have inbuilt intelligence to ascertain when the image has meaningfully deviated from the standard image originally recorded. A pilot run for VIDS is suggested before implementation.

The specification, functional and technical requirement of the CCTV based VIDS to be used as a sub-system of ATMS implementation, for automatic detection of incidents and generation of local visual alerts. It also includes the associated visual alerts in the form of flashing lights which are connected to and activated by the VIDS. The system offered shall have the capability to also operate in low light conditions normally experienced during night. In very poor visibility conditions such as during winter fog/smog, the system shall detect the condition of poor visibility and generate visual alerts. Further it shall raise an alarm if signal/image quality is too poor to reliably process.

The Incident Detection system shall be capable of the following:

a) Measurement of traffic flow speed between 0 and 150 km/hr for up to 6-lanes.
b) Detection of vehicles driving in wrong direction
c) Automatic detection of 5 types of traffic flow: normal, dense, delayed, Congested, stop and go
d) Detection of stopped vehicles, within 10 secs and for up to 16 detections zones.
e) Monitor Zone occupancy of the detection area
f) Detection of deceleration
g) Detection of fog/smoke

II. LOCATION: Currently not installed

VIDS is established at strategic locations. The software supplied and installed at the ATMS Control Centre to operate the CCTV-based VIDS shall be able to integrate with/Export data to and import data from the ATMS unified database located in ATMS Control Centre.

Figure 7.1 : VIDS System

7.3.3 VEHICLE ACTUATED SPEED DISPLAY SYSTEM

Currently the speed detection and challan system in the project is installed and handled by Road Transport Authority of Pinakollu. There are 3 installations done on gantry by the department with 3 Nos of 2D cameras. The speed violation challan is generated after displaying the same to driver

VASD was introduced to ITS by considering the number of accidental deaths on highways causing by over speeding vehicles. Vehicle automatic speed detection system will be working as a violation warning for those vehicles which cross the maximum allowed speed on that route. This system will be capturing the Speed of each vehicle and also will capture the Image for those vehicles which crosses the speed limit on that route and find the details from vahan.nic.in and penalize the person to restrict them from repeating the same.

Figure 7.2: Vehicle Speed Display System

FEATURES:

a) Awareness of the road user about their speed.
b) Displaying the vehicle speed on bigger display.
c) Online Penalty impose on speed violation.
d) Reducing the number of over speeding vehicles
e) Increasing Road-Safety.

7.3.4 AUTOMATIC NUMBER PLATE RECOGNITION (ANPR):

Currently not installed in the project

Automatic Number Plate Recognition (ANPR) system is based on artificial intelligence, providing a robust and ready-to-integrate system, capturing diverse types of license plates.

ANPR is also known as Automatic License Plate Recognition (ALPR), is software used to recognize the number plates automatically by performing sophisticated optical character recognition on images to read the license plates of vehicles.

Figure 7.3: ANPR System

7.3.5 AUTOMATIC TRAFFIC COUNT AND CLASSIFIER (ATCC): CURRENTLY NOT INSTALLED

The ATCC is a data-gathering instrument for use in the field (roadway). With Phoenix ATCC and possible combinations of sensors; traffic data and vehicle classification can be recorded and later retrieved. Speed, Number of Axles, Vehicle Class Type are just a few types of data, which can be gathered with this instrument. For the unit itself, the welded aluminium case is durable, lightweight, and weather resistant. The Interior keypad & display are both sealed to prevent moisture from damaging them. Inside the case is the heart of the unit, the microprocessor. Printed circuit boards contain the microprocessor, backup battery, charging network, memory, and all other support circuitry for the unit.

Figure 7.4: ATCC System

7.3.6 TRAVEL TIME ESTIMATION SYSTEM: CURRENTLY NOT INSTALLED IN THE PROJECT

The Travel Time Measurement System (TTES) is used to estimate the travel time over a highway segment between any two defined locations. The TTES employs RFID transceivers at such defined locations to identify vehicles by reading the RFID FASTag or any valid 18000-6C RFID tag (e.g. the OEM tags on many new vehicles) affixed oon their windshields. The travel time estimation algorithm that executes on an exclusive server networked with the above transceivers, looks for the matching of tag numbers (the Tag-ID) read at the source (start location) of the segment with tag numbers read at the destination (end location of the segment). A statistical estimate of the travel time between the two locations is arrived at based on the calculated time difference between the reads at these two locations for several matching tags.

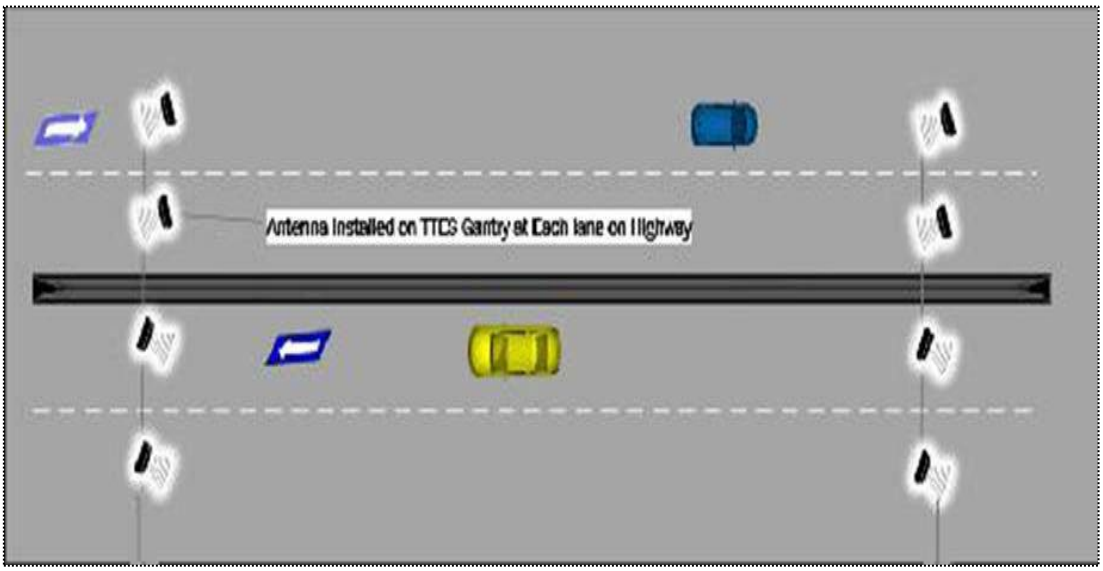


Figure 7.5: TTES System

7.3.7 OFC BACKBONE

I. PURPOSE AND GENERAL INFORMATION

The purpose of the OFC backbone is to transport voice, data, LAN and video services between the field equipment and CCR.

As the transmission system would be used as a backbone network, the system shall have following characteristics:

a) High Availability
b) High Reliability
c) Dual ring configuration
d) Easy to install and operate
e) Scalability
f) High degree of flexibility with respect to the types of interfaces

II. LOCATION: Currently not installed

OFC shall be laid all through the Highway. It may be laid on RHS or LHS of the main carriageway or in the median. Lateral elements shall be connected on OFC or copper.

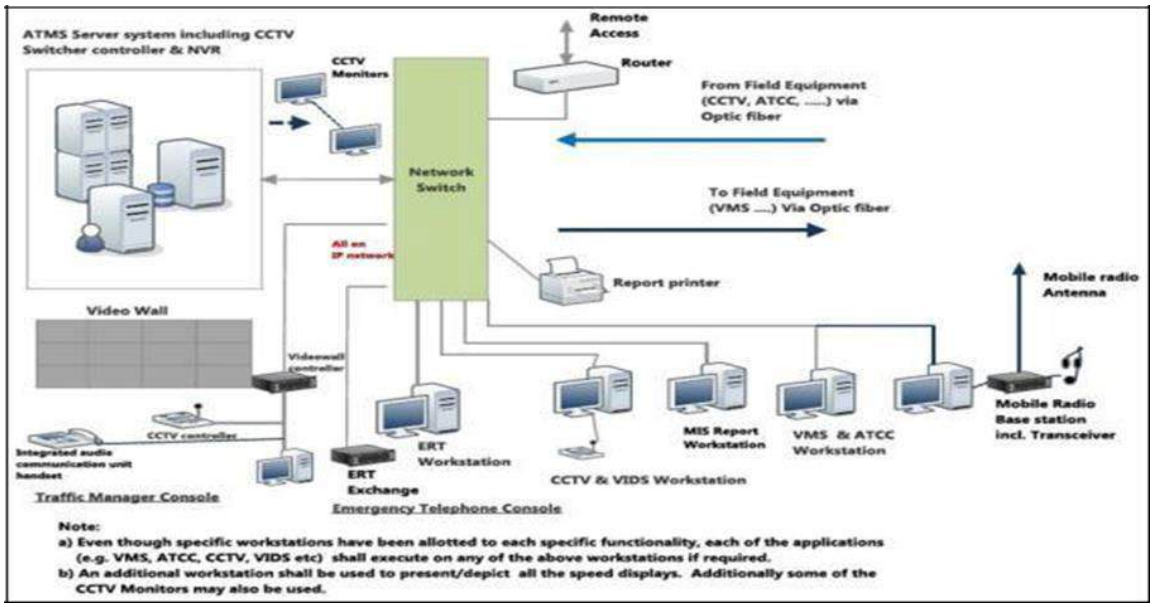


Figure 7.6: OFC Backbone

7.3.8 NETWORK MANAGEMENT SYSTEM

I. PURPOSE AND GENERAL INFORMATION

This system provides connectivity between ATMS Control Centre and outdoor equipment such as Emergency Roadside Phones, Variable Message Signs, Mobile and fixed CCTV cameras, Speed Displays, ATCC, Mobile Weigh in motion Stations, etc.

It also provides the external data connectivity required between the ATMS control centre and the NHAI ATMS Cloud as well as between the ATMS control center and the NHAI ATMS Master & relevant Regional Control Centres.

The Fiber Optic Transmission System shall be equipped with a user-friendly, Microsoft, Windows-based Network Management System (NMS). The NMS shall allow the operator to manage and monitor multiple sub-networks in an efficient way.

The NMS shall have the following functionality: network configuration, configuration of services, monitoring, diagnostics, activation-deactivation of interface modules, bandwidth allocation, alarms and event logging and graphical network representation.

The network management hardware shall consist of a Personal Computer, which at the time of installation is the current industry standard. The NMS architecture shall be based on Employer-server technology. It shall be possible to connect multiple active Employers to the NMS server allowing network management from multiple and/or remote locations or by multiple users.

II. LOCATION: Currently not installed in the project
Software at Central Control Room.

7.3.9 CENTRAL CONTROL ROOM (CCR)

I. PURPOSE AND GENERAL INFORMATION

The purpose of the CCR is to monitor the Highway and to provide information to the road user. The CCR also houses the central servers and data processing equipment.

The CCR shall provide the real-time information and assistance to the Highway users, collect data for the use of Highway authorities and to monitor and control the Traffic on the Highway as per the requirements.

The CCR shall be designed for round-the-clock operations of monitoring, on-line information acquisition and processing the same for decision making. The CCR shall be the repository of all the data acquired from the field and their processing, storing, and archiving. All the information for real time monitoring oh Highway shall be generated at the CCR, and the relevant information shall be disseminated to the users through VMS, and to O&M teams through mobile radio.

ATMS Control Centre would be the facility from where all the activities of the ATMS would be controlled. ATMS Control Centre would primarily comprise the indoor portion of CCTV, VMS, and other support systems. All the subsystems shall preferably reside in a dedicated permanent structure with adequate floor area to house the required manpower and equipment. Where such a permanent floor/building/structure cannot be made available, the ATMS Control Centre shall be housed in temporary portable cabins.

II. LOCATION: Currently not installed in the project
There shall be one CCR located in any toll plaza.

7.3.10 GRAPHIC USER INTERFACE (GUI)

The GUI for the system shall be map based and menu driven. The changes commands/ menu shall be simple to be executed by the operator. There shall be a

screen depicting the map of the highway along with other equipment installed on the route. The highway map shall be capable of displaying an overview level showing the whole area covered by the system. It shall then be possible with no loss of definition, to zoom to a detailed map. It shall be possible to display both static and dynamic data on the Map.

Two level of mapping shall be supported as a minimum:

a) Highway Overview.
b) Highway section wise detailed view.

Icons shall be placed on the map to identify different equipment types. Both shall be automatically tagged with grid reference data to allow them to appear in the correct relative positions at both levels of map. Positioning the mouse pointer over an icon or poly-line shall display the corresponding equipment status information.

For poly-lines representing route data, the user shall be able to configure a number of thresholds for the different data types available. An example would be congestion for links where up to X% percentage thresholds can be defined. Each threshold shall be represented by a distinct colour or changed shapes. The map shall use this scheme to display the poly-lines based on comparisons with the current real-time data.

The user shall have the ability to configure the map view to display the data layers of choice, for example to show Met Sensor only or ATCC together with current incidents.

Conclusion: The ATMS system to be installed as per the latest circular of the 2023 in the entire project of Gorhar to Barwa Adda covering the entire stretch of 80.522 km.

Chapter 8. Materials Investigation

8. MATERIALS INVESTIGATION

8.1 INTRODUCTION

This report presents the findings of the Materials Investigation conducted along with the alignment of the project road under in the state of Jharkhand. The project corridor begins at Km 320+810 and ends at Km 401+332 of NH-02 (New NH-19), covering the Gorhar to Barwa Adda section, located within the states of Jharkhand.

The survey and investigations include Identification of borrow area locations and laboratory testing on borrow soil samples, Identification and laboratory testing of Quarry materials and identification and laboratory testing of locally available industrial waste.

As per TOR, the scope of the services with regard to material investigation broadly includes:

(a) Locate, explore and evaluate the suitability of locally available sources of borrow soil / natural gravel, riverbed material for use in the embankment and subgrade.

(b) Identify existing sources of rock aggregates within short haulage distance from the project road for subbase / base course, cement concrete works and bituminous works.

(c) Identify potential sources of sand and water

(d) Identify existing sources of Fly ash and Pond ash material if available in the vicinity of project area for use in Embankment fill, pavement layers and concrete works. Identify sources of construction materials like cement, bitumen, steel, admixtures etc.

(e) Establish quality and quantity of various construction materials which mainly includes borrow soil, sand, aggregates & water and recommend their use on the basis of techno-economic principles.

(f) Perform relevant laboratory tests to determine engineering properties of the materials from (a) to (d) above and evaluate the suitability of each material for use in the construction of the project road.

(g) Preparation of mass haul diagram and quarry charts indicating the location of selected borrow areas and quarries.

(h) Preparation and testing of bituminous mixes for various layers and concrete mixes of different design mix grades using suitable materials (binders, aggregates, sand filler etc.) as identified during Material Investigation to conform to latest MoRT&H specification.

8.2 SAMPLING AND TESTING

For evaluating the characteristics and suitability of borrow soils and construction materials, representative samples of soil/construction materials as mentioned in TOR, were collected from identified borrow area, identified quarries of stone metal/sand and water sources. Fly ash samples are also collected for laboratory testing. The sampling and various laboratory tests conducted on soil and other construction materials are presented in **Table 8.1** below:

Table 8.1: Sampling and Testing Criteria

Sl. No.	Investigation	Frequency	Laboratory Testing Criteria	
			Description of Test	Standard Code Applicable
i)	Borrow Soil Samples	@ 8 Km	Soil Classification	IS 1498
			Sieve Analysis	IS 2720 (Part – 4)
			Atterberg Limits	IS 2720 (Part – 5)
			Laboratory Compaction Test (Modified Proctor Test)	IS 2720 (Part – 8)
			4-day soaked CBR at 3 energy levels corresponding to 10, 35 & 65 blows	IS 2720 (Part – 16)
			Free Swell Index	IS 2720 (Part – 40)
ii)	Stone metal samples from crushers/quarries	@ 25 Km	Sieve Analysis	IS:2386 (Part-1)
			Flakiness and Elongation Index	IS 2386 (Part – 1)
			Specific Gravity and Water Absorption	IS 2386 (Part – 3)
			Aggregate Impact Value (AIV)	IS 2386 (Part – 4)
			Stripping and Coating test	IS 6241
			Soundness if Water Absorption is more than 2%	IS: 2386 (Part 5)
iii)	Fine Aggregates	@ 25 Km	Grain Size Analysis	IS 2386 (Part – 1)
			Designation of sand zone	IS 383 - 1997
			Fineness Modulus	IS 383 - 1997
			Specific Gravity and Water Absorption	IS 2386 (Part – 3)
iv)	Water sample	@ 10 Km	pH Value, Chlorides, Sulphates (SO_3), Acidity, Alkalinity, Organic, Inorganic impurities and suspended matter	MORTH (5^{th} Revision)
v)	Pond/Fly Ash	One Source	Sieve Analysis	IS 2720 (Part-4)
			Atterberg's Limits	IS 2720 (Part-5)
			Compaction Test (Modified proctor test)	IS 2720 (Part-8)
			CBR at three energy level	IS 2720 (Part-16)
			Shear strength parameters (Direct shear)	IS 2720 (Part-13)

8.3 BORROW AREA INVESTIGATION AND TESTING

The objective of borrow area investigation was to identify suitable borrow sources (in terms of quantity and quality) in the near vicinity of the project road(s) for embankment fill & sub-grade. The exploration is conducted in each identified borrow area by excavating test pits measuring 1 m x 1m in plan to a depth of 1 to 2 m so that topsoil and vegetation layer shall not be collected for sampling. Soil samples were collected from excavated pits of each borrows area for laboratory testing. The laboratory testing conducted on borrows soil samples collected from identified locations are mentioned in **Table 8.2**

A total of Ten (10) borrow area have been identified, visited, inspected, and sampled. A summary description of the borrow areas indicating their location with respect to project road chainage, approximate distance from the source to the nearest point on the project road, estimated available quantity of soil at **Table 8.2**. The existing site conditions at borrow sources are presented in **Fig 8.1** and Lead chart has been shown in **Fig 8.3**

Table 8.2: Description of Soil Borrow Source for Pkg-1

BA No.	Chainage/ Side	Lead from Existing Road Km	Type of Land	Depth (m)
BA-1	321+650 L/S	1.0	PVT	1
BA-2	350+900 R/S	1.0	PVT	1
BA-3	360+300 R/S	1.6	PVT	1
BA-4	373+070 L/S	0.8	PVT	1
BA-5	395+700 R/S	1.0	PVT	1

BA-1 350+900 R/S

BA-3 373+070 L/S

Fig 8.1: Photographs of Borrow Area Sources

The test results of borrow area soil are summarized in **Table 8.4** From the **Table 8.2** the following conclusions can be made:

a) Borrow soil suitable for embankment and subgrade can be borrowed from these locations.

b) The lead of the borrow area location is within 5 Km with maximum lead distance is 2.0 km.

c) It is observed from the laboratory testing that the soils from the investigated borrow areas are predominantly fine grained i.e. silty or clayey (about 80% of the soil samples collected) classified as CL and ML.

d) The liquid limit of the borrow soil varies in the range of 2.46 to 35.9 and the soil PI found in the range of 3.1 to 12.0. The MDD of the soil is found to be in the range of 1.93 gm/cc to 9.80 gm/cc with OMC varying from 7.2% to 11.6%.

e) The soaked CBR (97% compaction) of the borrow soil sample is found to be in the range of 14.0% to 19.2% with 80% of soil samples have CBR at 97% compaction greater than 10%.

f) All the borrow soils are suitable for construction of embankment and subgrade as per the MORTH standards.

Table 8.4: Physical Characteristics of Borrow Area Soils

BA No.	Location / Chainage	Sieve Analysis (% Passing by Weight)							Atterberg Limit		Soil Classification as per IS	Laboratory Compaction		95% Compaction	97% Compaction
		100 mm	75 mm	19 mm	4.75 mm	2.0 mm	425 micron	75 micron	LL %	PI %		OMC (%)	MDD (gm/cc)	CBR (%)	CBR (%)
1	321+650 L/S	-	-	100	81.54	72.92	59.79	18.46	32.6	10.7	GC	10.40	2.010	15.45	16.30
2	350+900 R/S	-	-	87.59	71.54	59.92	47.21	28.46	24.6	3.1	GC	9.8	2.060	17.55	18.50
3	360+300 R/S	-	-	92.15	76.61	62.42	44.53	33.41	31.9	7.3	GC	10.90	1.955	14.2	15.1
4	373+070 L/S	-	-	94.80	74.29	61.51	46.21	29.92	32.2	30.2	GC	10.10	2.100	14.9	15.8
5	395+700 R/S	-	-	95.92	73.88	59.05	43.61	34.28	35.9	12.0	GC	11.60	1.935	13.0	14.0

8.4 SOURCE OF CRUSHED ROCK AGGREGATE, NATURAL SAND

The locations of most of the presently known sources of quarry and sand in the project vicinity have been examined.

The location and general details of quarry/ commercial crusher for aggregate source and natural sand with the approximate lead distance from each source to the nearest point on the project road are given in **Table 8.5a and 1.5b** respectively. Photos of identified crushing plant producing rock aggregate and sand source are shown in **Fig. 8.2.**

Table 8.5a: Description of Aggregate Source

Source ID	Existing Chainage / Side	Location / Village Name	Lead from Nearest Point of Project Road (km)	Quantity
Q1	400+132 L/S	Vikash Crusher	39.2	Plenty

Table 8.5b: Description of Natural Sand Source

Source ID	Location / Village Name	Lead from nearest point of project road (km)	Quantity	River
SQ1	Chirkunda	62.8	Huge	Barakar River

From each of the above-mentioned sources representative Aggregate samples & natural sand have been obtained.

Aggregate Source-Q1 (400+132 L/S)

Fig 8.2: Photographs of Stone Crusher and Sand Source

Representative samples of rock aggregate and sand have been collected from above sources for laboratory testing. Test results of aggregate samples and representative sand samples collected are presented in **Table 8.6** and **Table 8.7** respectively.

Table 8.6: Aggregate Test Results

Source ID.	Location / Chainage	Size (mm)	Specific Gravity	Water Absorption (%)	Combined Flakiness & Elongation	AIV (%)
Q1	Ekta Engineering Works	40	2.762	0.44	25.5	26.7
		20	2.738	0.55	27.2	
		10	2.722	0.93	27.4	
		Stone Dust	2.623	1.49	-	

Table 8.7: Natural Sand Test Results

Sieve Size (mm)	S1 Barakar River
	Cumulative % Passing (by mass) on the sieve
10 4.75 2.36 1.18 0.600 0.300 0.150 0.075	100 100 93.4 84.11 71.47 24.10 4.58 3.0
Fineness Modulus*	2.8
Grading Zone as per Clause 1008 of MORT&H	III
Specific Gravity	2.58
Water Absorption (%)	1.4

*Fineness modulus of fine aggregate shall neither be less than 2.0 nor greater than 3.5.

Comparing the above results (as available) with Table 8000-2 of MORT&H specification, it can be concluded that samples from sand from Narmada River (S1) are comply with the grading zone for concrete sand.

8.5 SOURCE OF CONSTRUCTION WATER

The primary source of water for concrete works could be natural streams, springs and ground water. The latter can be obtained from deep bore wells. Potable water is generally acceptable for concrete works.

8.6 SOURCES OF POND ASH & FLY ASH

Flyash and bottom ash are the by-products of combustion of pulverized coal in thermal power plants. Flyash is the fine grained dusty material collected from the flue gases using suitable precipitators and Bottom ash is the slag which accumulates on the heat absorbing surfaces of the furnace. Pond ash refers to the ash collected and stored in the ash ponds by the hydraulic fill method. It is obtained as the mixture of bottom ash and flyash. As per the circular issued by MoEF&CC, the Gazatte of India dated 25th January 2016, pond ash shall be collected for sampling if falls within 300km periphery of the project area.

One no of coal fired thermal power plants described in **Table 8.7** has been identified within 57 km of project road vicinity as source of pond ash. Representative samples of pond ash had been collected from this source. The location and the approximate distance

from power plant to the nearest poin.t on the project road are given in the table mentioned below.

Table 8.8: Description of Flyash Source

S.No	Plant	Details	Lead (km)
1	Koderma Thermal Power Station	Chandwara, Jharkhand	72.4

8.6.1 Lead Chart

following figure shows the lead chart for the Borrow Area, Aggregate Quarry and Sand Quarry of the Project Stretch.

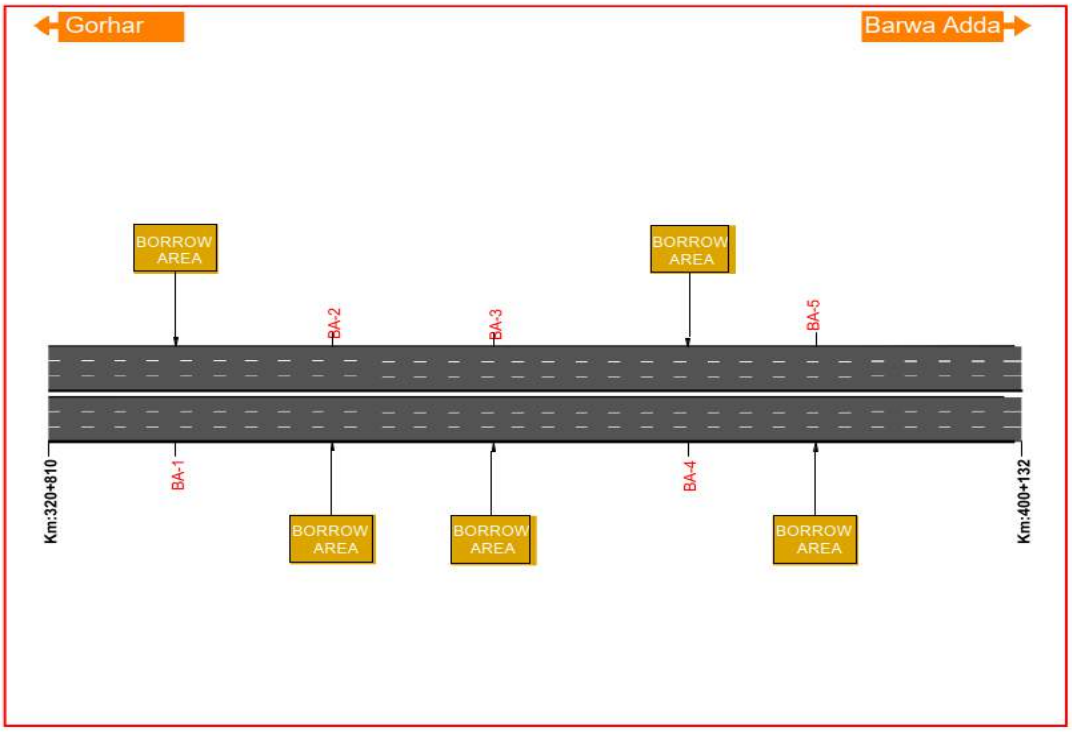


Fig 8.3: Lead Chart of borrow area location

Chapter 9. Road Safety Assessment

9. ROAD SAFETY ASSESSMENT

9.1 BACKGROUND

Ensuring road user safety is of utmost importance - whether for motorized road users, Vulnerable Road Users like pedestrians, cyclists & motorcyclists. Accordingly, road facilities and assets are reviewed from the perspective of all users, and wherever feasible, forgiving road furniture is recommended to enhance safe mobility. Elements such as road signs, markings, delineation, and safety barriers play a critical role in facilitating safe travel. Therefore, it is advised to adopt the latest specifications outlined in the revised IRC publications and policy circulars for integration with the existing project highway.

Road environment (land use around road) is very dynamic and hence highway needs to be augmented regularly to keep pace with changing land use. Accordingly, the existing service road is suggested to be extended to cover the extended urbanization / built-up.

Accordingly, a Road Safety Audit during the operation and maintenance period has been conducted along the Project Stretch to assess the gravity of the current situation, suggestions and improvement measures required along the Project Stretch.

The project road is divided into three (3) sections based on existing road configuration and concession period:

A. Km 320+810 to Km 326+000 (Four Lane Existing Retain)
B. Km 326+000 to Km 361+000 (Existing 360+300) (Six Lane completed under HAM by M/s DBL)
C. Km 361+300 (Existing 360+300) to Km 401+332 (Existing 400+632) (Six Lane completed under HAM by M/s ABL)

This Chapter covers the following:

- Desk study of GFC and As-built drawings and suggestion for safety enhancement.
- Latest specifications through revised manual or latest policy circulars to be adopted wherever possible/feasible
- Identifying road safety issues & their remedial action. Data is gathered through
  - Daytime site inspection/Audit.
  - Drone Video analysis

9.2 DESK STUDY

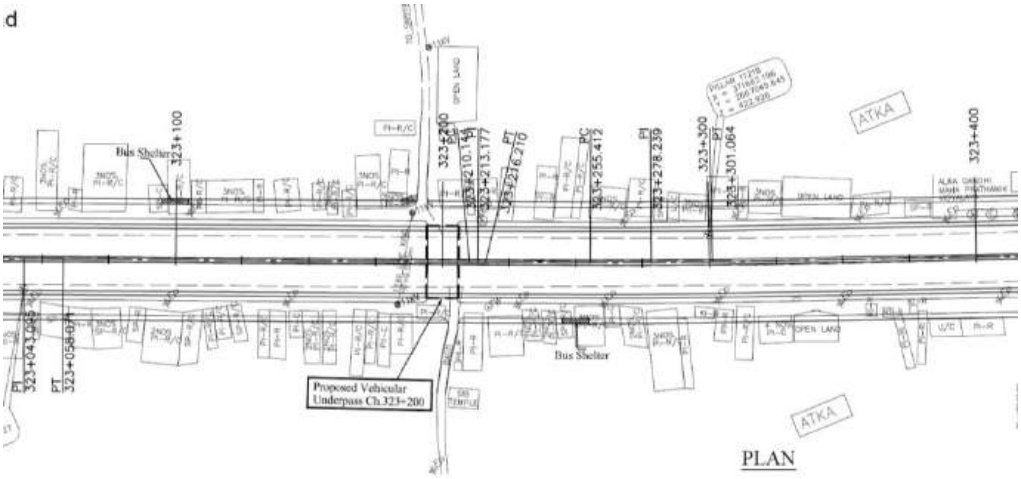
Consultant reviewed the GFC for all 3 sections and as-built drawing for any deficiency with respect to the revised specifications and/or site requirement. The findings from the review of GFC and As-Buit drawings are as follows:

A. Km 320+810 to Km 326+000 (Four Lane Existing Retain)

1. VUP

Observation –

Proposed VUP at 323+200 is not as per Schedule - A/B. This may incur additional cost.



Recommendation –

Remove VUP which are not included in Schedule - A/B.

2. Junctions are directly Connected with MCW:

Observation –

Junctions at 324+050 (LHS) & 324+140 (RHS) are connected to MCW with direct access without acceleration and deceleration lane without proper radius for turning.

Recommendation –

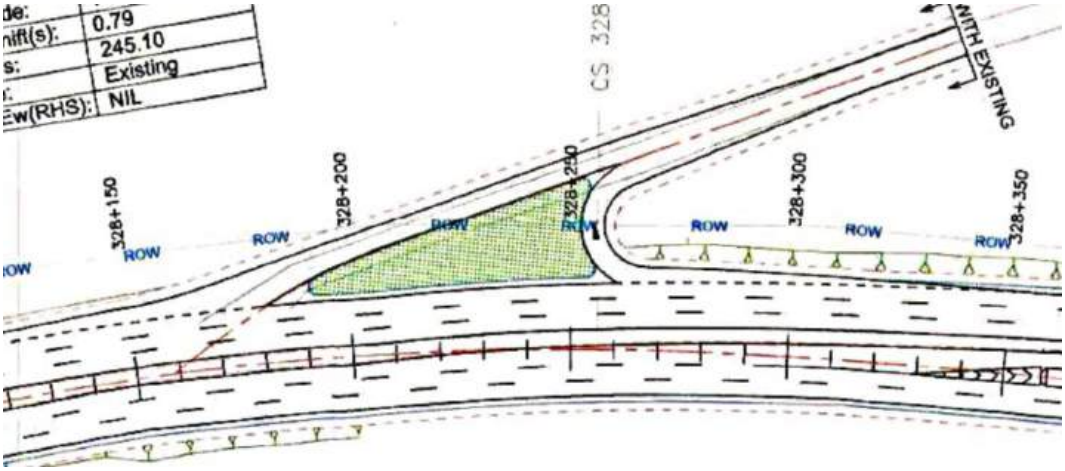
All junctions are to be developed with left-in/left-out as per Fig 3.7 of IRC: SP:87-2019.

B. Km 326+000 to Km 361+000 (Existing 360+300) (Six Lane completed)

1. Absence of Speed breaker on side road

Observation –

Absence of active traffic calming measures on side road at junction [328+250 (LHS)].



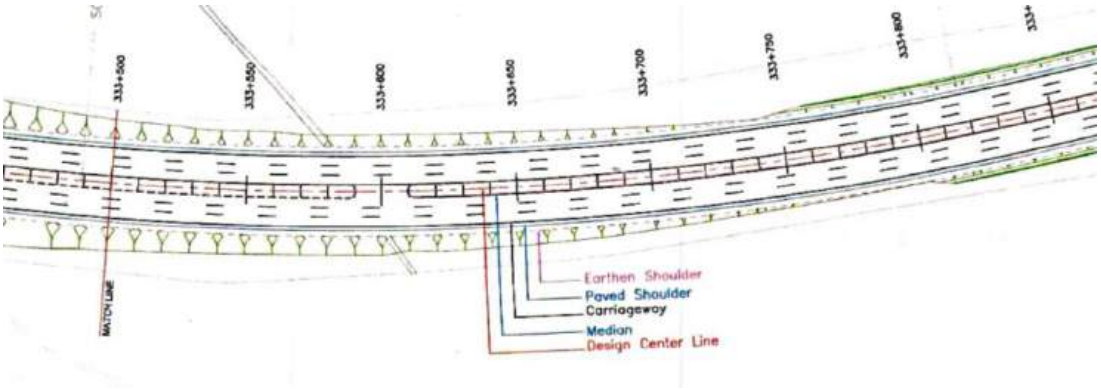
Recommendation –

Provide speed breaker on side road at junction as per IRC:99-2018 because vehicles approaching from the minor road need to slow down to “dead speed” before they can find gaps on the major road.

2. Median Opening

Observation –

Unauthorized Median opening found at 333+610.



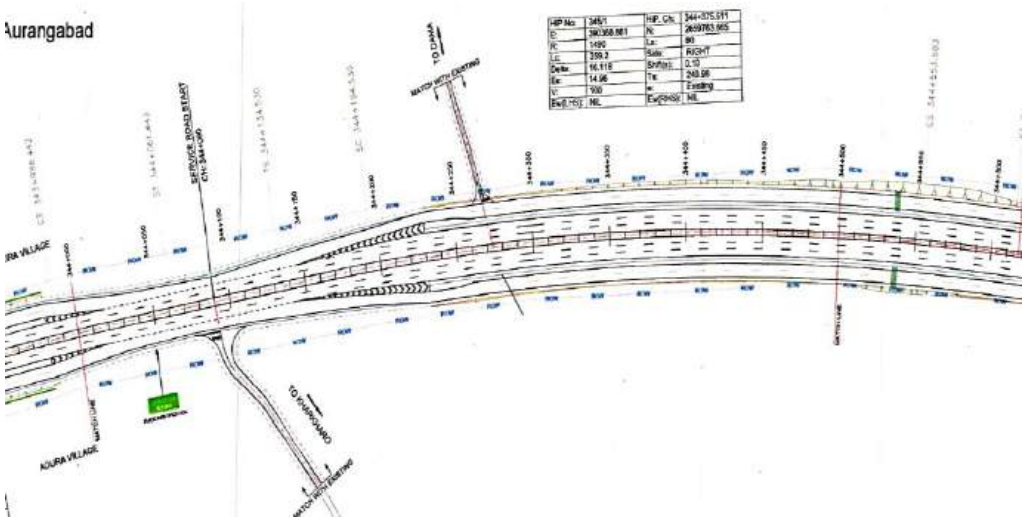
Recommendation –

Close Unauthorized Median opening at high priority to prevent accidents caused by illegal and dangerous crossing maneuvers.

3. Junction is directly Connected with MCW:

Observation –

Junction at 344+080 (RHS) is connected to MCW with direct access without acceleration and deceleration lane without proper radius for turning.

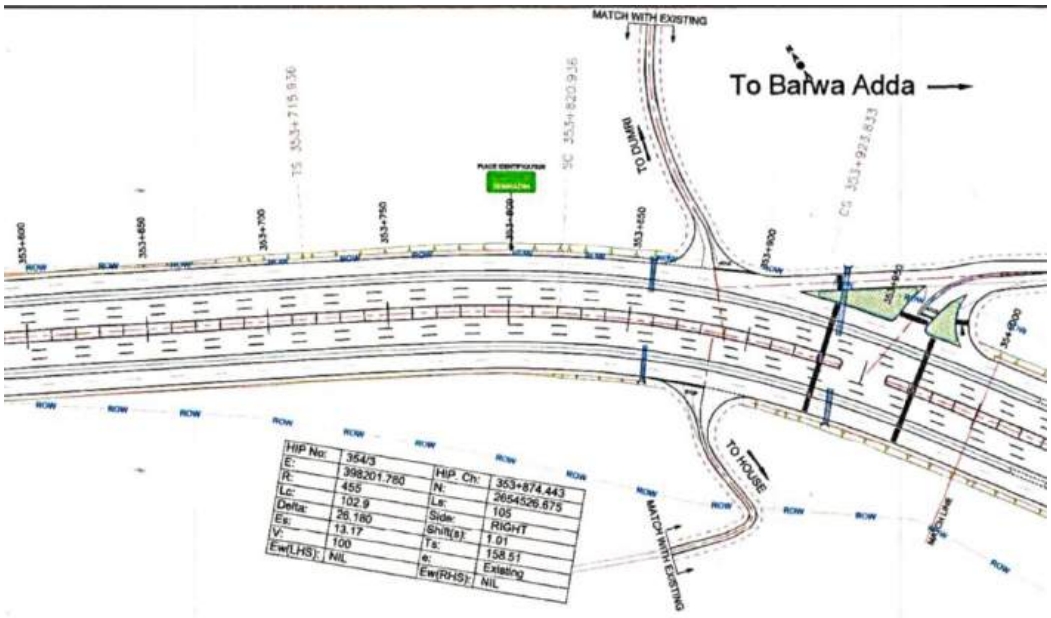


Recommendation –
All junctions are to be developed with left-in/left-out as per Fig 3.7 of IRC: SP:87-2019.

4. Unsafe Junction

Observation –

Junctions at 353+860 (LHS) & 353+970 (LHS) are not designed properly, very close to each other. This proximity could cause traffic conflicts, as it might not allow enough space for vehicles to merge, diverge, or turn safely without interfering with traffic from the other junction.



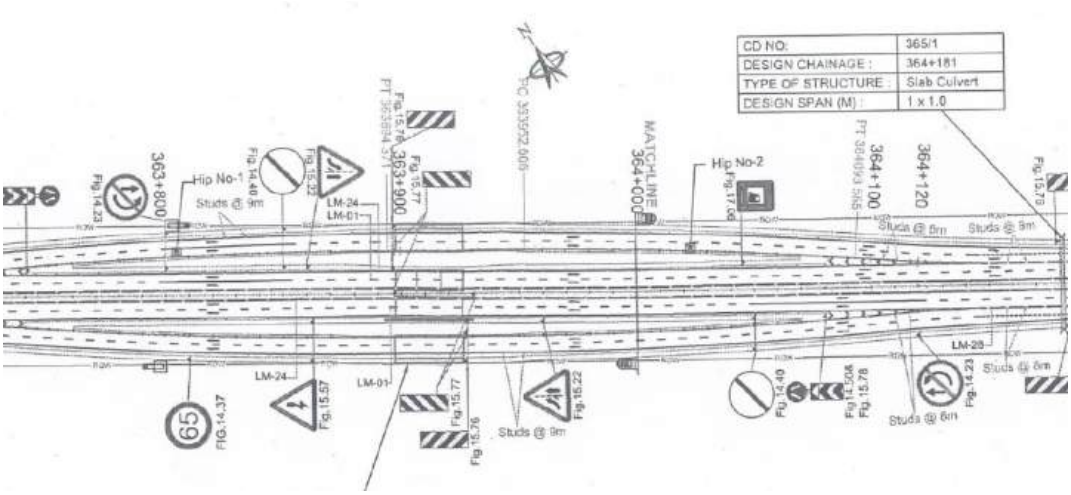
Recommendation –
It requires re-engineering the junction design to reduce conflict points and manage traffic flow safely.

C. Km 360+300 to Km 400+632 (Existing 401+132) (Six Lane completed)

1. Incorrect placement of Warning sign

Observation –

"Merging Traffic Ahead (From Left)" sign is provided at 363+880 (LHS) & 363+970 (RHS) which is way before the point where the traffic from service road is merging.



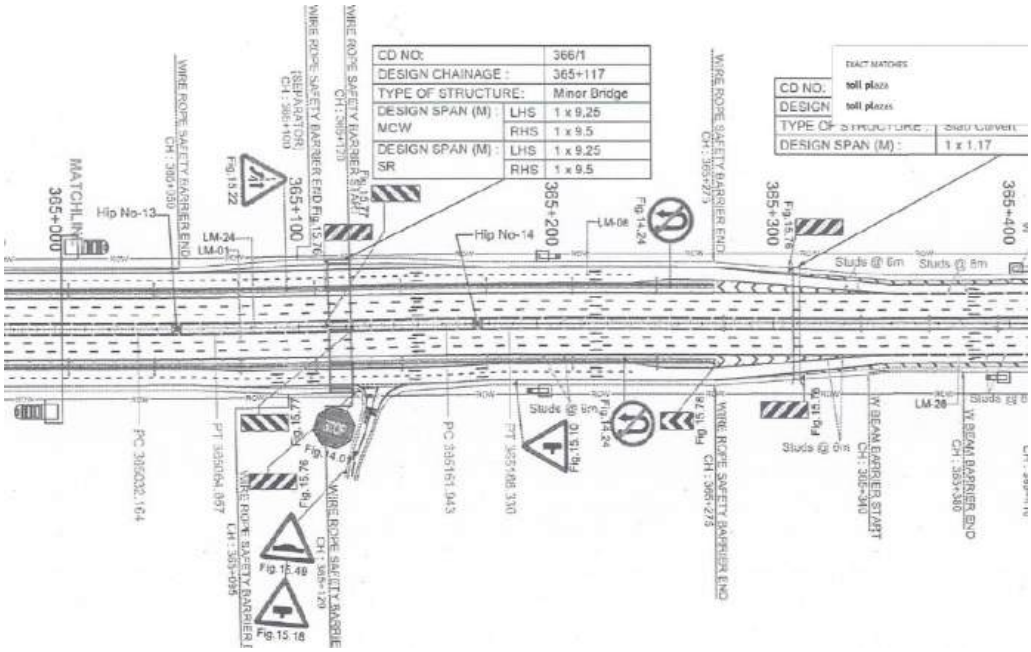
Recommendation –

Provide "Merging Traffic Ahead (From Left)" sign 150m before the point where the traffic from service road is merging.

2. Missing Informatory sign

Observation –

Advance Direction signs including Flag type sign are missing at 365+200 (RHS) before junction.

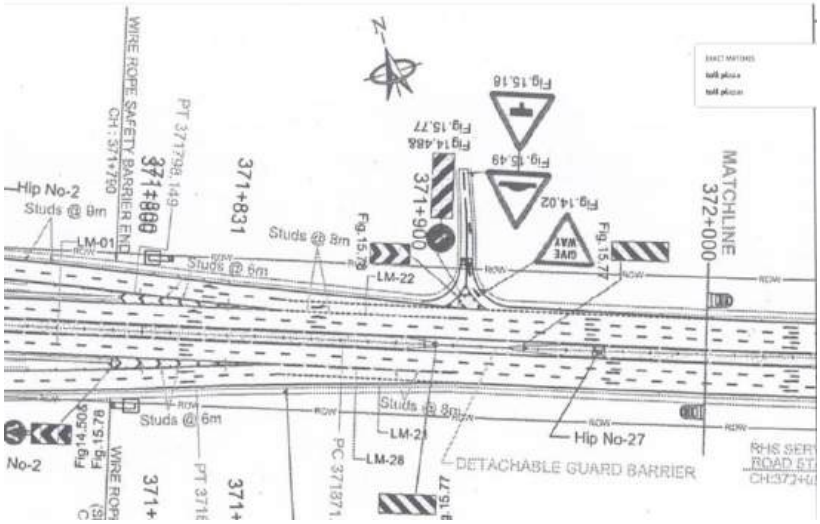


Recommendation –
All informatory signs must be provided before junction, as per IRC:67-2022, to give information to the road users about the destination.

3. Median Opening

Observation –

Unauthorized Median opening found at 371+900.

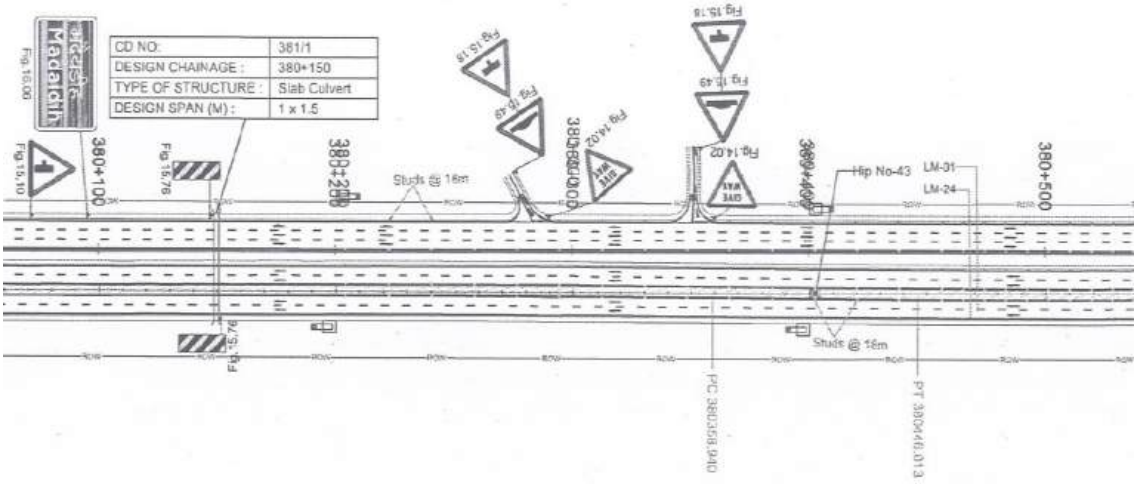


Recommendation –
Close Unauthorized Median opening at high priority to prevent accidents caused by illegal and dangerous crossing maneuvers.

4. Absence of Traffic Calming measures

Observation –

Vehicles traveling on MCW may continue to accelerate while meeting the slow speed traffic of side road at junctions 380+300 & 380+360 (LHS) which may result in a fatal crash.



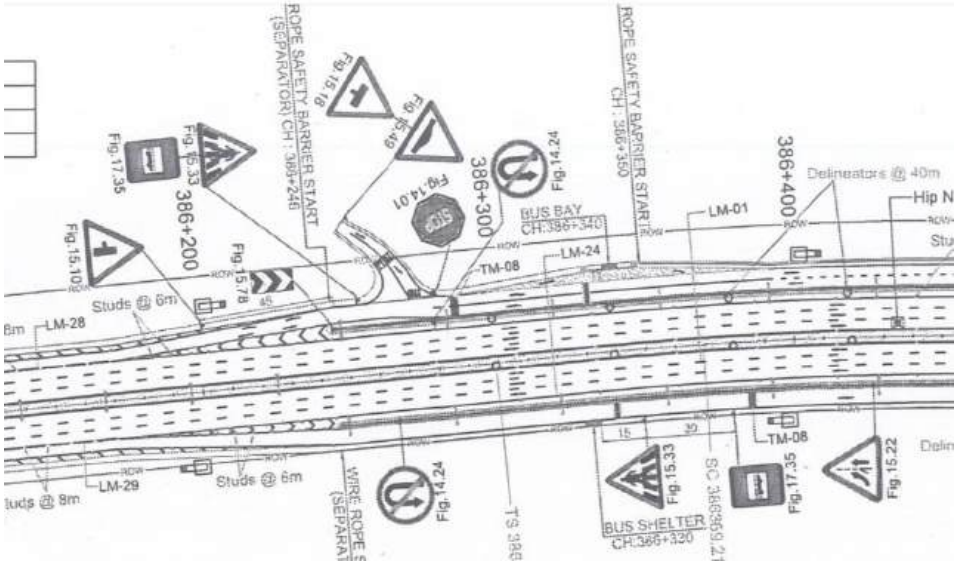
Recommendation –

Provide Active Traffic calming measures like Transverse Bar Markers (as per IRC:99-2018) on MCW well in advance of the junctions to alert drivers.

5. Bus Bay near intersection

Observation –

Buses stopping near an intersection at Bus bay [386+330 (LHS)] can conflict with vehicles attempting to make left turn, leading to potential side-on collisions or risky overtaking maneuvers. A stopped bus can obscure the line of sight for drivers on the main road, those on the minor road waiting to turn, and crossing pedestrians, significantly increasing the risk of collisions.



Recommendation –

At minor intersections (e.g. junctions with village roads), Bus bay should be provided at a distance of 60 m from the tangent point of intersections to start/end of the bus bay.

9.3 LATEST SPECIFICATIONS & POLICY CIRCULARS

Latest specifications through revised manual or latest policy circulars to be adopted wherever possible/feasible to upgrade the road network to be safe and efficient. Where there is a constraint of ROW width, the substandard specification may be adopted with adequate traffic control devices, road markings and road signages.

Road safety audit was carried out during daytime to evaluate the efficiency of the road safety measures existing along the project highway & to ascertain the need of additional road safety measures.

While auditing the existing road, the main emphasis is given on traffic control devices, road signages, road markings, provision of solar blinker, storage lane, clear visibility at median openings, location & safety arrangements at median openings, antiglare measures, Crash barriers, junctions, bus bays, truck lay byes, needs of vulnerable road users, and access management. Findings of the road safety audit of existing road are presented in this section.

Below mentioned general features of the road were investigated as per the revised manual & latest policy circulars to enhancing the effectiveness and safety of existing facilities.

Sr. No.	General Feature	Reference of latest manual & policy circulars	Minimum criteria to be adopted in case of available RoW
3.1	Median	Section 2.5 of manual & Circular RW-NH-29023/02/2019-S&R(P&B) dated 01.01.2020	Crash barrier is MUST on medians to check median crossovers.
			Vegetation / plantation on median need to be maintained & trimmed.
3.2	Kerb Shyness	Section 2.5.1 of Manual	Minimum 0.5m kerb shyness on either side of median.
			Incase existing kerb shyness of <0.5m, at the time of road marking edge & lane marking to be shifted towards the shoulder side. Additionally, it will improve the visibility of lane marking, road studs.
3.3	Median Drain	Section 2.5.2 of Manual	Water should not stagnate in the median
			Provide Rainwater Harvesting System (RWHS) is case of no drainage outfall. Rainwater harvesting system shall be designed as Type 4 confirming to clause 10.7.5 of IRC SP: 42-2014
3.4	Change in Median Width	refer section 2.5.4	Transition of 1 in 50 shall be provided

Sr. No.	General Feature	Reference of latest manual & policy circulars	Minimum criteria to be adopted in case of available RoW
3.5	Antiglare measures	refer section 2.5.6	Suitable antiglare measure shall be provided
			As a thumb rule spacing of antiglare screen is 3 times the width of screen.
3.6	Shoulder	refer section 2.6 of manual	Minimum Width 1.5m Dressing / proper surface finish.
			No edge drop, ***No undulation &*** ***No rain cuts allowed in shoulder***
			Encroachment by vegetation, shops, advertisement etc to be removed.
3.7	Entry/exit arrangement with service/Slip Road	refer section 2.12 of Manual	with main carriageway Exit must have 210m length & Entry must have 225m length. For markings and details (refer Fig 2.1 A & Fig 2.1 C of manual)
3.8	***Existing service road.***	***With the urbanization and ribbon development along the project highway.***	***Extend the existing service road to cover all the present-day settlements on either side of existing service road.***
3.9	Existing Median Openings (MO)	Clause 2.14 of Manual	Provide Solar Blinker & Shelter Lane. NO plantation & NO object in 120m length from MO tip to ensure visibility.
			High mast light arrangement to be provided at all median openings on project highway.
3.10	***Emergency median openings***		***Provide Swing type median opening for safe operation in case of requirement.***

Sr. No.	General Feature	Reference of latest manual & policy circulars	Minimum criteria to be adopted in case of available RoW
3.11	Entry/exit arrangement with Fuel Station & way side amenities etc	Ministry Circular RW-NH-33032/01/2017-S&R(R) dated 26.06.2020	Initial guidelines were issued vide circular no. RW-NH-33023/19/99/-DO-III dated 24.07.2013.
3.12	***Footpath cum drain***	***Clause 2.15 of Manual***	***Cover manholes, Surface finish of the footpath should be safe for pedestrian movement.*** ***Footpath should continue over culverts and minor bridges.***
3.13	Major junctions & Minor Junctions	Clause 3.2.5 of manual	At grade junctions to be augmented as per the junction layout given in Fig 3.1 through Fig 3.7 of manual.
			In case of significant increase of traffic, grade separation to be provided.
			Crossroad to be matched with service road or main carriageway at almost zero gradient.
3.14	Embankment	Section 4.2.3.2 of Manual	Side slope shall not be steeper than 2H:1V unless soil is retained by suitable soil retaining structure.
			Maintain free slope in 2H: 1V, this will save the road users in case of unfortunate incident of Run-off-road crashes.
			No rain cuts allowed in embankment slope.
			Vegetation / plantation need to be maintained & trimmed

Sr. No.	General Feature	Reference of latest manual & policy circulars	Minimum criteria to be adopted in case of available RoW
3.15	Surface Drainage	Section 6.2 of Manual	Connect drain to nearest outfall. Provide additional (Rainwater Harvesting System) RWHS. Rainwater harvesting system shall be designed as Type 4 confirming to clause 10.7.5 of IRC SP: 42-2014
3.16	Drainage of Service Road or slip road	Section 6.8.2.7 of Manual	Water from structure shall not be allowed to flow over the service road or Slip Road.
3.17	Drainage for structures	Section 6.8.3 of Manual	Where rainwater cannot flow by gravity provide vertical drains and/or pumping.
3.18	Width of Structures	Section 7.3 of Manual	Shoulder and or footpath shall continue over the culverts and minor bridges.
3.19	Road signs	Section 9.2 of Manual, IRC:67-2022 & Circular RT-25035/07/2023-RS (Part) (221534) dated 24.12.2024	Road signs ensure safe and efficient usage of the road network hence it is principally agreed that latest IRC and latest circulars related to road furniture in particular road signs need to be adopted.
3.20	Road Markings	Section 9.3 of Manual IRC:35-2015 Circular RT-25035/07/2023-RS (Part) (221534) dated 24.12.2024	Road markings need to be augment at following places. 1. Speed limit by road marking at 5km interval. 2. Chevron sign at all diversion of MCW & SR.
3.21	Road Delineator	Section 9.4 of Manual IRC:79-2015	All highway lighting poles, road signpost on median or shoulder shall be delineated. ***Provide three band reflective tape Yellow - Red - Yellow.***

Sr. No.	General Feature	Reference of latest manual & policy circulars	Minimum criteria to be adopted in case of available RoW
3.22	Reflective Pavement Markers (Road studs)	Section 9.5 of Manual	Replace all ineffective road studs.
3.23	Traffic Impact Attenuators	Section 9.6 of Manual	All diversions/gore area in-between 2L+2L bridges & in-between main carriageway and Service Road to be provided with Impact Attenuator & hazard sign.
3.24	Safety Barriers	Section 9.7 of Manual & and MORTH Circular No. RW/NH – 29023/02/2019-S&R (P&B) dated 01.01.2020	50-meter long MBCB (Modified Blocking Barriers) shall be installed on all four approaches to each grade-separated structure. On the median side, the MBCBs shall be joined at their ends in a semi-circular shape, as specified in the manual. RCC crash barriers shall commence at the start of the valley curve and extend beyond the end of the valley curve, after the grade separator. End Treatment of Steel barriers/Rope Barrier shall be specified i.e. MELT or P-4 confirming to EN 1317-4, TT, MBCB barrier to Concrete Barrier End Treatment to Concrete barrier shall be done as specified in the manual
3.25	Pedestrian Facility	Section 9.8 of Manual	Pedestrian Guard Rail to be provided at major built-up area. FOB to be provided at major crossing area.

Sr. No.	General Feature	Reference of latest manual & policy circulars	Minimum criteria to be adopted in case of available RoW
3.26	Prevention of Overloading	Section 10.6 of Manual	Weigh in motion in all toll lanes and static weigh bridge and area to hold off loaded goods from overloaded vehicle shall be provided.
3.27	Road Boundary wall	Section 12.2 of Manual & RW-NH-24036/27/2010-PPP dated 04.02.2019	Provide boundary wall in non-built-up areas. This will check unplanned development along project highway and restricts free cattle movement on highway.
3.28	Highway lighting	Section 12.5 of Manual	Augment the highway lighting to have a minimum 40 Lux. Provide solar lighting on median openings.
3.29	Truck Lay-byes	Section 12.6 of Manual	2 new Truck lay-byes are proposed to be provided.
3.30	Bus bays & Passenger Shelters	Section 12.7 of Manual	Augment the existing bus bays and bus shelters to the specification with more sitting area and to make it more user friendly.
3.31	Highway Patrol Units Emergency Medical Service & crane service	Section 12.10, 12.11 and 12.12 of Manual, NHAI/Policy/guidelines/Strengthening the incident management services/ 2018 Policy no 12.12 dated 20.03.18	Augment the existing system in line with latest specifications.
3.32	Advanced Traffic Management Systems (ATMS)	Section 12.14 of Manual	Augment the ATMS & incident management system as per the latest specifications.

Sr. No.	General Feature	Reference of latest manual & policy circulars	Minimum criteria to be adopted in case of available RoW
3.33	Sign Board	New Circular RT/25035/07/2023-RS (Part) (221534) dated 24.12.2024	Provide sign boards as per latest specifications.
3.34	QR Code on Sign Board	NHAI/ Policy Guidelines/ Road Safety / 2025 Policy Circular No. 12.41/2025 dated 23.09.2025	Install informatory signs having QR Code sign boards to provide relevant Project Stretch Information.

9.4 Safety Audit

Road safety audit was conducted during daytime to comprehend road user safety. Findings of the audit/inspection are as follows:

A. Km 320.810 to Km 326.000 (Four Lane Existing Retain)

The section of road is retained as four lanes which was originally proposed for Six Lane and work awarded to M/s DBL Gorhar Khairatunda Highway Pvt. Ltd. The section is descoped from M/s DBL and thus retained as four lane. The safety observations along four lane road are as follows:

Sr. No.	Safety Observation	Site Photograph
1.	**Observation:** Four Lane retained between six lane stretch for approximately 12 km length. **Recommendation**: It is advised to provide continuous six lane for 12 km long section as well. As per PIU, Hazaribagh, DPR Consultant has been appointed to prepare DPR for six laning work.	

Sr. No.	Safety Observation	Site Photograph
2	**321+230** **Observation:** Median Openings are provided without shelter lane and road safety devices. **Recommendation**: Median opening shall be provided with additional 3.0 m wide shelter lane by the side of median in both directions for waiting of vehicles to take U-turn. Additionally, provide Blinkers, sign boards, transverse bar marking, etc. for improved safety.	
3	**Observation:** Unauthorized median opening has been found at many locations causing road safety hazards. **Recommendation**: All Unauthorized median openings are to be closed on priority basis.	
4	**322+070** **Observation:** Minor Junction is connected to MCW without acceleration and deceleration lane without having proper radius for turning. **Recommendation**: All minor junctions are to be developed with left-in/ left-out as per Fig 3.5 of IRC:SP:84-2019.	
5	**Observation:** Narrow median without antiglare will be a safety hazard during nighttime. **Recommendation**: Provide Metal Beam Crash Barrier with Antiglare arrangement.	

Sr. No.	Safety Observation	Site Photograph
6	**325+730** **Observation:** Vehicles exiting from the Fuel pump may accelerate while meeting the high speed traffic of MCW which may cause side collision resulting in a fatal crash. **Recommendation**: Provide Rumble strip at the exit point of the fuel pump & Transverse Bar Markers on MCW well in advance of the exit point.	
7	**323+200** **Observation:** Absence of warning signs before junction. **Recommendation**: Provide traffic signs including warning signs before junction & pedestrian crossing as per IRC:67-2022.	

B. KM 326+000 to KM 360+300 (Six Lane completed)

The project road is already constructed as 6-lane. Some major traffic safety observations are presented below:

Sr. No.	Safety Observation	Site Photograph
1	**326+410 (LHS) & 326+500 (RHS)** **Observation:** Minor Junctions are connected to MCW without acceleration and deceleration lane without proper radius for turning. **Recommendation**: All minor junctions are to be developed with left-in/ left-out as per Fig 3.7 of IRC:SP:87-2019.	

Sr. No.	Safety Observation	Site Photograph
2	**328+000 (LHS)** **Observation:** Absence of Traffic Signs before Junction **Recommendation**: Provide Traffic Signs as per IRC:67-2022 and as per MoRTH Circular No. RT-25035/07/2023-RS (Part) (221534) dated 24th Dec 2024	
3	**328+210 (LHS)** **Observation:** Traffic Island at junction is NOT developed properly **Recommendation**: As per IRC:SP:88-2019, the minor/side road shall be flat for a minimum distance of 5 and desirably up to 10 m if the proportion of goods traffic entering from the minor road is substantial. Near to Flat Gradient for side road must be 0 to 0.5% so that vehicles entering the NH do not enter the NH suddenly and can wait on side road for suitable gap to safely enter the NH	
4	**327+250** **Observation:** Temporary stall/hut present near MCW, highly unsafe **Recommendation**: Remove such unauthorized stall/hut immediately for enhanced safety of high speed traffic	
5	**327+850 (RHS)** **Observation:** Unauthorized truck parking is noticed on MCW. These random parking issues cause safety hazards. **Recommendation**: Truck Lay-byes with facility to be provided to avoid unauthorized parking of trucks.	

Sr. No.	Safety Observation	Site Photograph
6	**330+120** **Observation:** Absence of Arrow Markings on LHS **Recommendation**: Provide Arrow Markings as per IRC:35-2015	
7	**331+580 (RHS)** **Observation:** Separator between SR & MCW is broken/open causing safety hazard **Recommendation**: Separator between SR & MCW must be closed immediately to protect road users especially VRUs.	
8	**333+210 (RHS)** **Observation:** Missing zebra crossing at junction **Recommendation**: A continuous facility shall be provided for pedestrian crossing at junction	
9	**333+600 (LHS)** **Observation:** Transverse Bar Markers are missing before junction. **Recommendation**: Provide Transverse Bar Markers as per IRC:99-2018 for traffic calming.	
10	**333+600 (LHS)** **Observation:** Unauthorized Median opening is found which is hazardous for all road users especially VRUs **Recommendation**: Unauthorized Median opening must be closed at high priority	

Sr. No.	Safety Observation	Site Photograph
11	**339+430** **Observation:** Median Opening is provided without shelter lane and road safety devices. **Recommendation**: Median opening shall be provided with additional 3.0 m wide shelter lane by the side of median in both directions for waiting of vehicles to take U-turn. Additionally, provide Blinkers, sign boards, transverse bar marking, etc. for improved safety.	
12	**344+700** **Observation:** No VUP found as per Schedule-B **Recommendation**: Provide VUP at 344+700 for safe crossing of vehicles under the project highway as proposed in Schedule-B	

C. KM 360+300 to KM 400+332 (Six Lane completed)

The project road is already constructed as 6-lane. Some major traffic safety observations are presented below:

Sr. No.	Safety Observation	Site Photograph
1.	**360+280** **Observation:** It is observed that no Informatory signs (flag type, stack type) are provided before junction. Also, Road Markings, particularly, Arrow markings are poorly maintained. **Recommendation**: Provide Informatory signs as per IRC:67-2022 & road markings as per IRC:35-2015.	
2	**364+400** **Observation:** Traffic calming measures are absent thereby leading to severe hazards **Recommendation**: Transverse Thermoplastic Bar Markings shall be provided as per NHAI Circular (105/2012) issued vide letter no. 11041/218/2007-Admn, dated- 11th June	

Sr. No.	Safety Observation	Site Photograph
	2012 and IRC:99-2018, at the hazardous locations like junctions	
3	**362+310** **Observation:** Plantation is missing in the median. **Recommendation**: Median width is more than 2.5 m, therefore, Shrubs shall be planted and maintained to cut-off headlight glare from traffic in the opposite direction.	
4	**365+750 (RHS)** **Observation:** Minor Junction is connected to MCW without acceleration and deceleration lane without proper radius for turning. **Recommendation**: All minor junctions are to be developed with left-in/ left-out as per Fig 3.7 of IRC:SP:87-2019.	
5	**365+750 (RHS)** **Observation:** Unsafe zebra crossing without adequate signs & signals **Recommendation**: Provide safe crossing facilities for pedestrians with refuge island in the median	
6	**369+210 (RHS)** **Observation:** Markings on Minor Road at junction are NOT provided as per IRC standards **Recommendation**: Provide road markings on minor road as per IRC:35-2015	
7	**369+490 (LHS)** **Observation:** Temporary stall/hut present near MCW, highly unsafe **Recommendation**: Remove such unauthorized stall/hut immediately for enhanced safety of high speed traffic	

Sr. No.	Safety Observation	Site Photograph
8	**379+920 (LHS)** **Observation:** Unauthorized truck parking is noticed on MCW. These random parking factors cause safety hazards. **Recommendation**: Truck Lay-bys with facility to be provided to avoid unauthorized parking.	
9	**381+400 (LHS)** **Observation:** Absence of Arrow Markings on MCW **Recommendation**: Provide Arrow Markings as per IRC:35-2015	
10	**389+710 (RHS)** **Observation:** Separator between SR & MCW is broken/open causing safety hazard **Recommendation**: Separator between SR & MCW must be closed immediately to protect road users especially VRUs.	
11	**383+450 (LHS)** **Observation:** Missing zebra crossing at junction **Recommendation**: A continuous facility shall be provided for pedestrian crossing at junction	
12	**380+410** **Observation:** Unauthorized Median opening is found which is hazardous for all road users especially VRUs **Recommendation**: Unauthorized Median opening must be closed at high priority	

Sr. No.	Safety Observation	Site Photograph
13	**375+850** **Observation:** No VUP found as per Schedule-B **Recommendation**: Provide VUP at 375+850 for safe crossing of vehicles under the project highway as proposed in Schedule-B	
14	**382+010** **Observation:** Broken crash barrier found **Recommendation**: Provide continuous crash barrier to avoid any fatal crash	

9.5 SAFETY ISSUES AND CONCERNS ON THE PROJECT ROAD

9.5.1 Existing median openings

There are 30 Median Openings provided in the project stretch. The location of the Median openings is given below:

S. No.	Chainage Km		Length of opening (m)	Storage Lane (Yes/No)
	From	To		
Section-1 from Km 320+810 to Km 326+000 (Retained 4 Lane)				
1	321+219	321+244	25	No
2	323+185	323+210	25	No
3	324+171	324+193	22	No
4	325+801	325+817	16	No
Section-2 from Km 326+000 to Km 361+040 (Ex. Km 360+300) (6 Lane)				
5	340+628	340+653	25	No
6	344+088	344+113	25	No
7	345+378	345+403	25	No
8	347+728	347+753	25	No
9	349+028	349+053	25	No
10	350+688	350+713	25	No
11	352+318	352+343	25	No
12	353+908	353+933	25	Yes
13	355+508	355+533	25	No
14	359+080	359+120	40	No
15	360+488	360+513	25	No

S. No.	Chainage Km		Length of opening (m)	Storage Lane (Yes/No)
	From	To		
Section-3 from Km 360+300 to Km 400+632 (Ex. Km 400+132) (6 Lane)				
16	361+038	361+063	25	No
17	364+338	364+363	25	No
18	365+638	365+663	25	No
19	367+608	367+633	25	No
20	371+888	371+913	25	No
21	375+825	375+875	50	Yes
22	377+688	377+713	25	Yes
23	379+088	379+113	25	No
24	381+438	381+463	25	No
25	382+938	382+963	25	No
26	386+798	386+823	25	No
27	388+438	388+463	25	No
28	393+438	393+463	25	No
29	397+638	397+663	25	No
30	399+198	399+223	25	No

Safety concerns observed at median openings

1. Shelter lanes are not provided in both directions as per clause 2.14.3 of IRC: SP:87-2019.
2. Blinkers were not provided at the median openings.
3. Transverse bar markers were not provided.
4. Sign Boards, road Studs not found at median openings.

Short Term Remedial Measures

1. Provide Solar Blinkers as shown in Fig.1 with Object markers at the central median.
2. Provide transverse bar markers to calm the speed of the vehicle near the median opening as shown for reference in Fig.2
3. Provide warning sign in the median to caution the road users about the median openings as per IRC:67-2022
4. Provide speed limit signboard before the median openings as per IRC:67-2022.

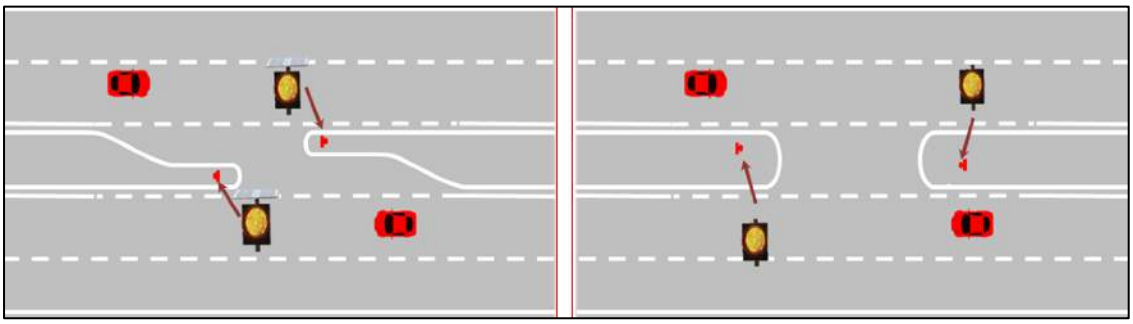


Figure-1

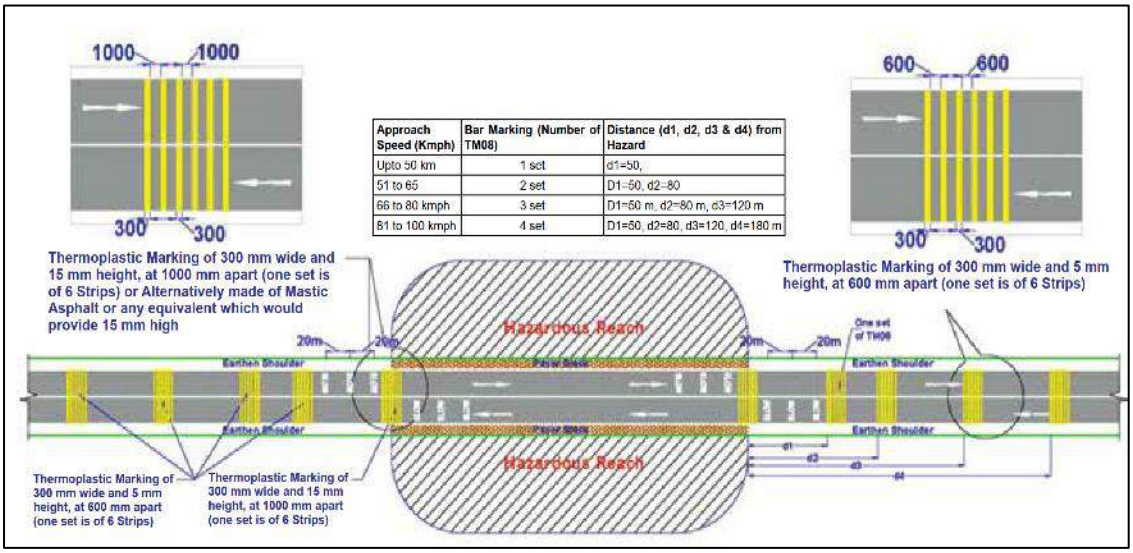


Figure-2

Long Term remedial Measures (Options)

1. Alter the Horizontal geometry of the road with additional land and provide a 3m additional shelter lane to the existing arrangement, including all the short-term measures mentioned earlier.
2. It is recommended to close all the unauthorized & non-standard median openings.
3. The median openings (other than closed ones which are used for emergency purposes) can be redesigned with a slight change in horizontal geometry by provisioning only for U-turn as shown in Fig.3. The proposed Median opening is more of a protected U-Turn Channelizing the traffic and limiting it to only for U-Turn.

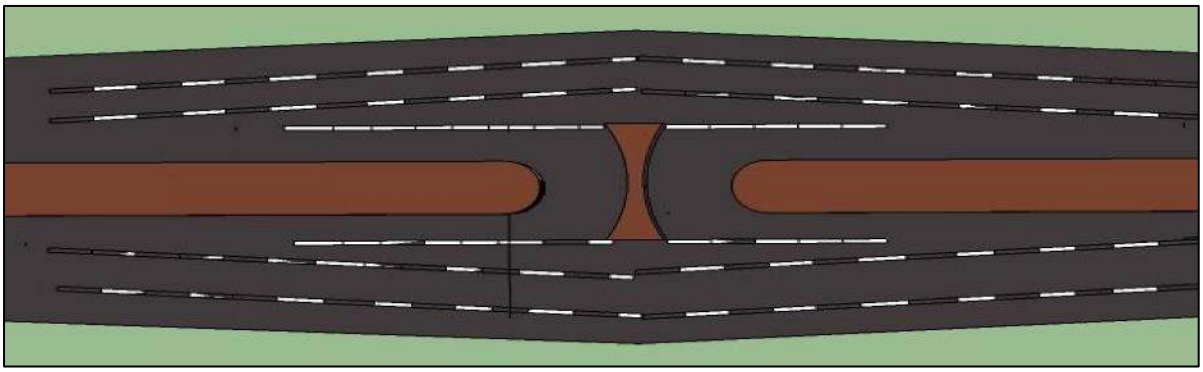


Figure-3

Following median openings need to be closed:

S. No.	Chainage Km		Length of opening (m)	Storage Lane Yes/No	Proposal	Remarks
	From	To				
1	344+088	344+113	25	No	Median Opening to be closed	VUP Proposed
2	347+728	347+753	25	No	Median Opening to be closed	Service Road
3	349+028	349+053	25	No	Median Opening to be closed	VUP Proposed

S. No.	Chainage Km		Length of opening (m)	Storage Lane Yes/No	Proposal	Remarks
	From	To				
4	350+688	350+713	25	No	Median Opening to be closed	Service Road
5	353+908	353+933	25	Yes	Median Opening to be closed	Service Road
6	359+080	359+120	40	No	Median Opening to be closed	Service Road
7	360+488	360+513	25	No	Median Opening to be closed	Service Road
8	364+338	364+363	25	No	Median Opening to be closed	Service Road
9	365+638	365+663	25	No	Median Opening to be closed	Service Road
10	375+825	375+875	50	Yes	Median Opening to be closed	VUP Proposed
11	379+088	379+113	25	No	Median Opening to be closed	VUP Proposed
12	381+438	381+463	25	No	Median Opening to be closed	Service Road
13	386+798	386+823	25	No	Median Opening to be closed	Service Road
14	397+638	397+663	25	No	Median Opening to be closed	Existing Service Road

9.5.2 Service Road along Built Up

Road environment (land use around road) is very dynamic and hence highway needs to be augmented regularly to keep pace with changing land use. Accordingly, the existing service road is suggested to be extended to cover the extended urbanization / built-up.

Proposed Service Road along the Project Stretch

S. No	Chainage		Side	Total Length
	From (Km)	To (Km)		
1	330+180	331+070	BHS	1780
2	333+500	335+000	BHS	3000
3	335+500	336+150	BHS	1300
4	336+100	336+400	RHS	300
5	340+720	342+300	BHS	3160
6	342+900	344+000	BHS	2200
7	345+900	346+450	LHS	550
8	345+900	346+450	RHS	550
9	346+930	347+550	LHS	620
10	346+930	347+550	RHS	620
11	347+880	348+920	BHS	2080
12	350+120	350+880	BHS	1520
13	352+600	352+980	BHS	760
14	360+100	360+400	BHS	600
15	360+820	360+860	LHS	40
16	361+690	361+770	RHS	80
17	363+380	363+700	BHS	640
18	364+080	364+550	BHS	940
19	365+250	366+400	BHS	2300
20	368+950	369+400	LHS	450
21	368+980	369+400	RHS	420
22	369+700	369+980	BHS	560
23	370+880	371+450	LHS	570
24	371+780	372+240	LHS	460
25	372+400	373+780	LHS	1380
26	372+400	373+450	RHS	1050
27	379+900	381+800	LHS	1900

S. No	Chainage		Side	Total Length
	From (Km)	To (Km)		
28	381+800	382+460	BHS	1320
29	383+050	383+690	LHS	640
30	383+050	383+690	RHS	640
31	385+150	386+220	BHS	2140
32	386+970	388+080	BHS	2220
33	399+020	399+130	RHS	110
Total Length				**36,900**

9.5.3 Major Junctions

It is noticed that major junctions are not designed properly causing safety hazards. Therefore, it is recommended to provide VUP at following locations:

Sr. No.	Chainage (Km)	LHS Roadway Width (m)	RHS Roadway Width (m)	Super Structure Provision in Median	Clear Span (m)	Minimum Vertical Clearance (m)	Skew Angle	Remarks
1	344+710	1x14.00	1x14.00	RCC Box	1x20	5.5	-	
2	349+610	1x14.00	1x14.00	RCC Box	1x20	5.5	-	
3	375+865	1x14.00	1x14.00	RCC+PCC Girder	1x15+1x30+1x15	5.5	-	SH
4	379+110	1x14.00	1x14.00	RCC Box	1x20	5.5	-	

9.5.4 Provision of ATMS

The main aim of Advance Traffic Management System (ATMS) is to provide traffic management solutions that enable authorities and stakeholders to take appropriate actions to improve the safety of road users along with improving the traffic flow, transportation system efficiency, increasing economic productivity and enhancing mobility.

The project road stretch currently lacks ATMS equipment. Hence, it is proposed to design, install, operate and maintain ATMS as part of the project facilities. ATMS shall be installed to achieve following objectives:

- Smooth and uninterrupted traffic flow
- Enhance road safety
- Provide Real–time traffic information and guide road users
- Display dynamic variable message signs providing informative message or warnings to road users.
- Emergency assistance and reduced response time to an accident. This leads to an improved coordination between police and emergency services.
- Alerts for abnormal road and weather conditions
- Reduced journey time and inconvenience

The ATMS system shall be provided and maintained as per NHAI / Policy Guidelines / Standard Documents 2023, Policy Circular No. 11.53/2023 dated 10th October 2023.

Components of ATMS

The ATMS components comprise of various ITS applications to be deployed and integrated with existing ATMS System.

It shall include the following components listed in table below:

- ***Video Surveillance system / Traffic monitoring camera system (TMCS).***
- ***Video Incident Detection Enforcement System (VIDES).***
- ***Vehicle Actuated Speed Display System (VASDS).***
- ***Communication Network with OFC Backbone.***
- ***ATMS Command & Control Center.***
- ***Power Supply for Field Equipment as well as for ATMS Command & Control Center.***
- ***Operation & Maintenance (O&M) of the entire ATMS Facility.***
- ***Maintenance Vehicle.***

Chapter 10. Improvement Proposal

10. IMPROVEMENT PROPOSALS

10.1 GENERAL

This chapter is covered all improvement proposal that are required based on Technical Due Diligence Study carried out by the Consultant.

Development of the Project Highway

The Project Highway shall generally follow the existing horizontal and vertical alignment. However, following Improvement Proposal shall be executed as per prescribed standard & specification and the engineering drawings for the same shall be approved by IE.

10.2 ADVANCED TRAFFIC MANAGEMENT SYSTEM (ATMS)

It is proposed to Advanced Traffic Management System as per standards and specifications specified in the manual and as per NHAI Policy Circular No. 11.53/2023 Dated 10th Oct 2023 and shall be maintained throughout the contract period. The entire system should efficiently as an integrated solution during the entire O&M period / Concession period.

10.2.1 Video Surveillance system / Traffic monitoring camera system (TMCS)

The system monitors vehicular and other road related activity along the highway stretch through PTZ Camera mounted on Poles. Generally, the camera should be placed at a distance not greater than 1km so as to effectively monitor all the lanes of the entire stretch of Highway. In case certain stretches include regular curves, ramps etc not allowing central line of sight, then additional TMCS camera shall be put to ensure effective surveillance of the entire stretch. The TMCS cameras should also be placed on the following Junctions below the Grade Separated Structure.

The minimum number of TMCS – 68 Nos

10.2.2 Video incident Detection System (VIDS)

The VIDS include Gantry Mounted ANPR Cameras, Overview Cameras and associated incident detection software system to effectively detect pre-defined actionable incidents which triggers enforcement and incident response system. The VIDS should also act as Automatic Traffic Counting and Classifying (ATCC) system. The VIDS should be provided at following locations:

S. No.	Location (Km)	LHS/ RHS/ BHS	Remarks
Km 320+810 to Km 401+332 - 8 Nos			

10.2.3 Vehicle Actuated Speed Display System (VASDS)

The VASD system shall include gantry mounted Radar and Speed Display system for each lane to warn the road users of their speed. The system shall act as a Speed Calming Measure.

S. No.	Location (Km)	LHS/ RHS/ BHS	Remarks
Km 320+810 to Km 401+332 - 4 Nos			

10.2.4 Communication Network with OFC Backbone

The entire 80.522 Km shall be provided with minimum 24 Core OFC Backbone as per the standards & specifications. The short haul connections like between field equipment to access points, access points to OFC backbone etc shall be done with minimum 12 Core cable required 80.190 Km. The OFC shall be laid strictly as per the Standards and Specification.

10.2.5 ATMS Command & Control Center

The ATMS Command and Control Centre structure will be at established at Toll Plaza. The ATMS Command and Control Center as per the Standards and Specification.

S. No.	Location (Km)	LHS/ RHS/ BHS	Remarks
1	Existing Kulgo Toll Plaza – 1 Nos		

10.2.6 Power Supply for Field Equipment as well as for ATMS Command & Control Center.

24x7 supply for the ATMS Command and Control Centre and Field Equipment with supply power from Electricity Department as primary source supported by UPS renewable power (Solar etc.) and DG Set of adequate capacity.

10.3 IMPROVEMENT OF TOLL COLLECTION SYSTEM

NHAI is implementing Multi-Lane Free Flow (MLFF) Barrier Less Tolling System throughout the nation for effective toll collection and to provide seamless traffic flow. It is proposed to provide MLFF system at existing Toll Plaza (Kulgo). The brief description of the system is as follows:

1. The Concessionaire shall implement Automatic Number Plate Recognition (ANPR) Camera and RFID (FASTAG) based Barrier Less Multi Lane Free Flow (MLFF) Tolling System at the proposed Toll Plaza location on the Highway stretch.

2. The Solution shall be integrated with e-Notice Module developed by National Informatics Center (NIC) through Central Clearing House (CCH) wherein the violators will be issued e-Notice in case they cross the Toll Plaza with FASTag that is not valid and functional. The Authority shall provide assistance in integrating the system with the e-Notice Module prepared by NIC.

3. The e-Notice shall be issued to the violators by NIC for amount equal to two times the fee applicable to that category of vehicles as per sub-rule (2) of rule 4 of the National Highways Fee (Determination of Rates and Collection) Rules 2008.The payment received against the e-Notice shall be settled through the Payment Gateway (PG) to the designated Bank Account(s) as per the prevailing guidelines.

4. In case of non-payment of fees against the e-Notice within prescribed time, the road user shall have restrictions on the VAHAN based services and blacklisting of VRN / FASTag under NETC system.

Chapter 11. Cost Estimate

11. COST ESTIMATE

11.1 GENERAL

The cost estimate is prepared for the Project Stretch. Details of Project Stretch are presented in table below for ready reference.

Table 11.1: Project Stretch

NH No.	Existing Kilometer (Km)		Description of Road	Length (Km)
	From	To		
NH-19	320+810	401+332	Gorhar-Barwa Adda	80.522

The Project cost estimates have been prepared for the following works:

- Advanced Traffic Management System (ATMS)
- Updation of Toll Collection System

11.2 COST ESTIAMTE FOR IMPROVEMENT PROPOSAL

Cost for FY 2025/26

Sl. No.	Item Description	Quantity		Amount (Rs in Cr.)
		Unit	Qty.	
1	Advanced Traffic Management System (ATMS)	Km	80.522	14.570
2	Providing Multi Lane Free Flow (MLFF) at Toll Plaza	Nos	1	5.00
Total Amount (excl GST)				**19.570**

11.3 ESTIMATE OF OPERATION AND MAINTENANCE COST

Operational Expenditure has calculated based on NHAI Circular dated 29.04.2011 and 25.11.11 with 5 % escalation to arrive cost for FY 2025 /26. The basis of calculation of OPEX is as follows:

Routine Maintenance Costs	0.035 crores/Km/Year (Year FY 2011-12) -flexible and 0.04 crores/Km/Year (Year FY 2011-12) -Rigid	As per the base documents provided by NHAI (circular no. NHAI/11033/CGM (Finn)/2011 dated 25th nov 2011 provided to us by NHAI). For four lane, for two lane 60% of this and 150 % for Six Lane has been assumed.
Periodic Maintenance Costs	0.35 crores/Km/every 6 Years (Year FY 2011-12)	As per the base documents provided by NHAI (circular no. NHAI/11033/CGM (Finn)/2011 dated 25th nov 2011 provided to us by NHAI). For four lane, for two lane 60% of this and 150 % for Six Lane has been assumed.
Electricity and Patrolling Expenses	0.0125 crores/Km/Year (Year FY 2010-11)	As per the base documents provided by NHAI (circular no. NHAI/11033/CGM (Finn)/2011 dated 29th April, 2011 provided to us by NHAI).For four lane, for two lane 60% of this and 150 % for Six Lane has been assumed.

Office Expenditure	2.5 crores/Year (Year FY 2010-11)	As per the base documents provided by NHAI (circular no. NHAI/11033/CGM (Finn)/2011 dated 29th April, 2011 provided to us by NHAI).
Insurance	0.15% of Total Project Cost (TPC	As per the base documents provided by NHAI (circular no. NHAI/11033/CGM (Finn)/2011 dated 29th April, 2011 provided to us by NHAI).
Toll Expense	1.60 crore per Toll Plaza (Year FY 2010-11) for Four Lane	As per the base documents provided by NHAI (circular no. NHAI/11033/CGM (Finn)/2011 dated 29th April, 2011 provided to us by NHAI).

The cost arrived as of 2025 / 26 is tabled as below:

Year	Routine Maintenance	Toll Plaza & ATMS Operation and Maintenance	Electricity & Patrolling expenses	Other office expenses	Insurance	Total Maintenance Amount incl GST (excluding Periodic Maintenance)	Total Periodic Maintenance Amount incl GST
2026-2027	-	2.13	0.14	0.30	0.19	3.25	-
2027-2028	-	2.13	0.14	0.30	0.19	3.25	-
2028-2029	0.19	3.72	0.14	0.30	0.19	5.35	-
2029-2030	0.38	5.32	0.14	0.30	0.19	7.46	-
2030-2031	0.38	5.32	0.14	0.30	0.19	7.46	-
2031-2032	0.38	5.32	0.14	0.30	0.19	7.46	-
2032-2033	0.57	5.32	0.21	0.30	0.28	7.88	-
2033-2034	0.57	5.32	0.21	0.30	0.28	7.88	-
2034-2035	0.57	5.32	0.21	0.30	0.28	7.88	-
2035-2036	0.57	5.32	0.21	0.30	0.28	7.88	-
2036-2037	12.92	5.32	3.30	5.46	3.90	36.45	-
2037-2038	-	5.32	3.30	5.46	3.90	21.21	103.70
2038-2039	12.92	5.32	3.30	5.46	3.90	36.45	-
2039-2040	12.92	5.32	3.30	5.46	3.90	36.45	-
2040-2041	12.92	5.32	3.30	5.46	3.90	36.45	-
2041-2042	12.92	5.32	3.30	5.46	3.90	36.45	-
2042-2043	12.92	5.32	3.30	5.46	3.90	36.45	-
2043-2044	-	5.32	3.30	5.46	3.90	21.21	103.70
2044-2045	12.92	5.32	3.30	5.46	3.90	36.45	-
2045-2046	12.92	5.32	3.30	5.46	3.90	36.45	-
2046-2047	12.92	5.32	3.30	5.46	3.90	36.45	-
2047-2048	12.92	5.32	3.30	5.46	3.90	36.45	-
2048-2049	12.92	5.32	3.30	5.46	3.90	36.45	-
2049-2050	-	5.32	3.30	5.46	3.90	21.21	103.70
Total	**145.73**	**119.67**	**47.83**	**79.40**	**56.84**	**530.36**	**311.11**

Tolling, Operation, Maintenance & Transfer of Four/Six Lane with paved shoulder Vijayawada- Chilakaluripet section from Km 355+000 to Km 422+605 & from Km 0+000 to Km 16+499 of NH-16 in the state of Andhra Pradesh, Chennai Bypass section from km 0+000 to Km 32+600 of NH 32 & NH-48, Chennai- Tada section from Km 21+400 to Km 54+400 of NH-16 in the state of Tamil Nadu and Neelmangla- Tumkur section from Km 29+500 to Km 74+168 of NH-48 in the state of Karnataka.

January-2026

Public InvIT-01 REPORT

Submitted by:-

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EXECUTIVE SUMMARY

1. INTRODUCTION

National Highways Authority of India (NHAI), an autonomous agency of the Government of India (GoI), is responsible for the development, maintenance and management of National highways network in India.

There are currently approximately 1,32,500 kilometres of national highways in India, constituting approximately 2.2% of India's entire road network but carrying approximately 40% of total road traffic.

To meet the growing need for further industrialization and development of the country, GoI has planned to expand the network of National Highways across the length and width of the country at a rapid pace. The various programmes which have been taken by GoI through NHAI are:

Phase I: Golden Quadrilateral (GQ) Comprising 4/6-laning of National Highways connecting four metro cities, namely, Delhi, Mumbai, Chennai and Kolkata with a total length of approximately 5846 km (which is mostly completed), and

Phase II: North-South and East-West Corridors (NSEW) comprising 4/6-laning of National Highways connecting Srinagar to Kanya Kumari and Silchar to Porbandar. Total length this NSEW corridor is approximately 7300 km. The projects of NSEW are mostly awarded and construction is also largely completed.

Bharatmala Pariyojana: A flagship highway development programme which envisions the development of 50 economic corridors, provide connectivity to 550 districts in the country through National Highway linkages and improve the average speed of road travel in India.

In addition to this, various NHDP programs has been taken up by NHAI to match the rapid pace of modernization and industrial development of the country. The Government has planned to continue developing the National Highways at a rapid pace, which will require significant funding in the near future.

The National Highways Authority of India (NHAI) has initiated the process of setting up an infrastructure investment trust to monetize its road assets. This is a private listed InvIT, through which institutional investors can invest in operational road projects offered by

NHAI to the InvIT. In this model, the offered road assets are acquired by the InvIT while the investors acquire the units issued by the InvIT. Income generated from the underlying road assets is paid out as distributions to the unit holders in the form of interest, dividend and return of capital. The InvIT is managed by a competent Investment Manager staffed with experts to manage the assets efficiently.

Under the InvIT frame work, the right of collection of user fees of selected NH projects is assigned for a specific time period to a Concessionaire. During this period, the O&M responsibility will also vest with the selected Concessionaire (unless costs are to be borne by existing concessionaires as per extant agreements). In return, the Concessionaire will pay an upfront quoted Concession Fee to NHAI.

Following is the stretches which shall be awarded in Publi InvIT model:

Section No.	Section Name		Chainage (Km)		Length (Km)
	From	To	From	To	
Section-1	Chilakaluripet	Vijayawada	355+000	357+342	2.342
	Chilakaluripet Bypass		0+000	16+499	16.499
	Chilakaluripet	Vijayawada	372+038	422+605	50.567
Section-2	Chennai Bypass		0+000	32+600	32.6
Section-3	Chennai Tada		21+400	54+400	33.0
Section-4	Neelmangla	Tumkur	29+500	61+520	32.02
	Tumkur Bypass		61+520	74+168	12.648

Accordingly, detailed reports on inventory & physical condition have been carried out for the above stretch including a study of improvement proposals. Below general details of Vijayawada-Chilakaluripet stretch is presented.

2. STUDY OBJECTIVE

The main objective of this assignment is to assess physical condition of selected National Highway Stretches and preparation of detailed project reports, technical and maintenance schedules for bidding process. Physical condition of any Stretch is established based on the geometric parameters of the highway, condition of pavement, structures, road safety features, condition of existing facilities like toll plazas etc. Based on physical condition of highway stretches, options are worked out for improvement of safety of existing road and strengthening of pavement and structures. Cost associated with all improvement proposals are also estimated as part of this Study. Scope of services as per Terms of Reference (ToR) are presented below:

- Investigation for accessing condition of pavement including shoulder, embankment, drainage etc. using visual means, advanced laser profilometer and image processing software and falling weight Deflectometer.
- Investigation for perception of existing pavement composition.
- Conducting road safety audit for evaluating geometry of road, adequacy and condition of existing of safety features etc.
- Identification of black spots along the Project Stretch and propose corrective measures for the same.
- Inventory of all structures along the Project Stretch like bridges, culverts, ROBs, underpasses, flyovers etc. covering physical and hydraulic parameters. Investigations shall be carried out for accessing structural conditions using Mobile Bridge Inspection Unit (MBIU) as per IRC-SP:35. For the bridges identified to be in a distressed condition based upon the visual condition survey, supplementary testing shall be carried out as per IRC-SP:35 and IRC-SP:40. Selection of tests may be made based on the specific requirement of the structure.
- Identification of source of construction materials quarry sites, sand source and borrow areas and assessment of quality of various construction materials.
- Preparation of improvement strategy for strengthening of pavement and structures, rehabilitation and design for road safety features, road furniture etc.
- Estimation of detailed cost based on improvement proposal.
- Preparation and submission of following items –

- Detailed project report and drawings covering all above-mentioned details.
- Technical schedule and bid documents for tendering.

3. PROJECT STRETCH

Vijayawada-Chilakaluripet: The Site of Six lane divided Project Highway comprises the section commencing from (Km 355+000 to Km 357+342), (Km 372+038 to Km 422+605), (Km 0+000 to Km 16+499) at Vijayawada of NH-16 and has Kaza toll Plazas at Km 420+500 on project Section in the state of Andhra Pradesh. The total length of Project Stretch is 69.408 km.

The Project Highway Vijayawada- Chilakaluripet section is under PBMC from Km 355+000 to Km 357+342 & from Km 372+038 to Km 422+605 and under HAM from Km 0+000 to Km 16+499. Existing Concessionaire/ Contractor shall operate and maintain the project up to Handover date pursuant to and in accordance with the existing Concession/Contract agreements. The details of agency, section and COD/PCOD date is tabled as below:

Vijayawada-Chilakaluripet section

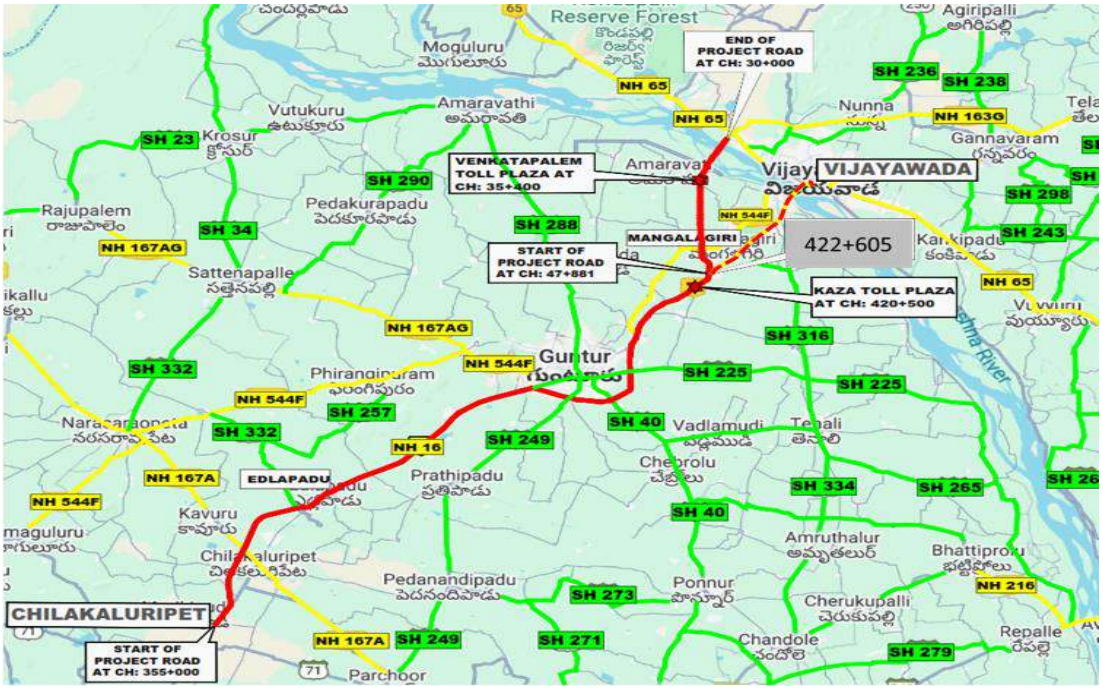
Name of Agency	Mode of Contract	Chainage (Km)		Length	COD/ PCOD	O&M Handover Date
		From	To	(Km)		
M/S. Shiva Build Tech Pvt. Ltd.	PBMC	355+000	357+342	2.342	-	24.03.2032
		372+038	422+605	50.567		
M/S. Chilakaluripet Bypass Pvt. Ltd.	HAM	0+000	16+499	16.499	29.10.2024	28.10.2039

**O&M Handover date mentioned above are tentative and may vary based on the actual completion date of the project and there will be no financial implication for that.*

Toll is being collected by Toll Collection Agency appointed by NHAI through open competitive bidding.

Project highway is a part of National Highway 16 which is a major Indian highway running along the country's, to eastern coast, connecting Kolkata, West Bengal Chennai, Tamil Nadu. It is a

crucial part of the Golden Quadrilateral project. The highway serves important cities including Bhubaneswar, Visakhapatnam, and Vijayawada.



Index Map of Project Highway

Chennai Bypass: Project Stretch starts from Km 0+000 and ends at Km 32+600 of NH-32/ NH-48 and has Vanagram toll Plazas at Km 16+500 and Surapattu toll Plazas at Km 28+600 on project Section in the state of Tamil Nadu. The total length of Project Stretch is 32.600 km.

The Project Highway Chennai bypasss section is under O&M (Annual Maintanance) from Km 0+000 to Km 32+600 and under EPC (Major Maintanance) from Km 0+000 to Km 32+600. Existing Concessionaire/ Contractor shall operate and maintain the project up to Handover date pursuant to and in accordance with the existing Concession/Contract agreements. The details of agency, section and COD/PCOD date is tabled as below:

Chennai Bypass section from Km 0+000 to Km 32+600

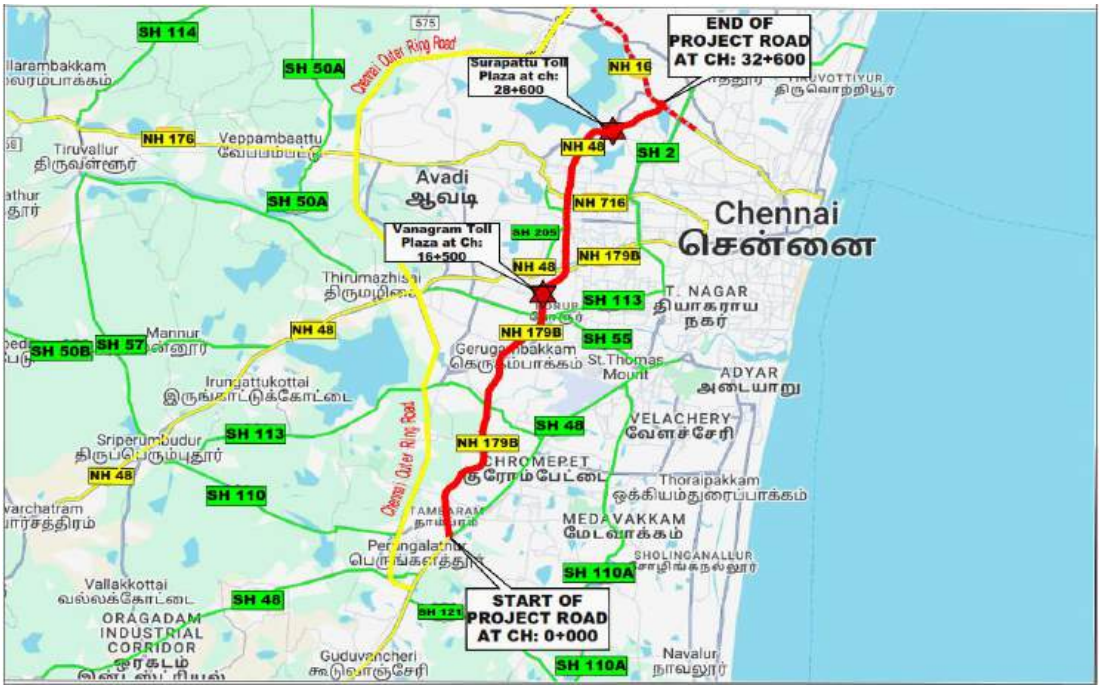
Name of Agency	Mode of Contract	Chainage (Km)		Length (Km)	COD/ PCOD	O&M Handover Date
		From	To			
M/s Arjunvaishanvi Infrastructure & Developers Pvt. Ltd	O&M (Annual Maintenance)	0+000	32+600	32.600	-	30.03.2026

Name of Agency	Mode of Contract	Chainage (Km)		Length (Km)	COD/ PCOD	O&M Handover Date
		From	To			
M/s Babuji Civil construction	EPC (Major Maintenance)				-	30.05.2028

**O&M Handover date mentioned above are tentative and may vary based on the actual completion date of the project and there will be no financial implication for that.*

Toll is being collected by Toll Collection Agency appointed by NHAI through open competitive bidding.

Project highway is a part of NH-48 and NH-32, National Highway 48 (NH-48), a major national highway connecting Delhi and Chennai, intersects with National Highway 32 (NH-32), which links Chennai to Thoothukudi, near the city of Chennai in Tamil Nadu. Formerly known as the East Coast Road (ECR), NH 32 serves as an important coastal route for transportation, trade, and tourism. NH-48, a much longer highway spanning seven states, is a critical part of the Golden Quadrilateral project.



Index Map of Project Highway

Chennai-Tada: Project Stretch starts from Km 21+400 and ends at Km 54+400 of NH-16 and has Nallur toll Plazas at Km 21+625 on project Section in the state of Tamil Nadu. The total length of Project Stretch is 33.00 km.

The Project Highway Chennai Tada section is under EPC (Six Laning) from Km 21+400 to Km 54+400. Existing Concessionaire/ Contractor shall operate and maintain the project up to Handover date pursuant to and in accordance with the existing Concession/Contract agreements. The details of agency, section and COD/PCOD date is tabled as below:

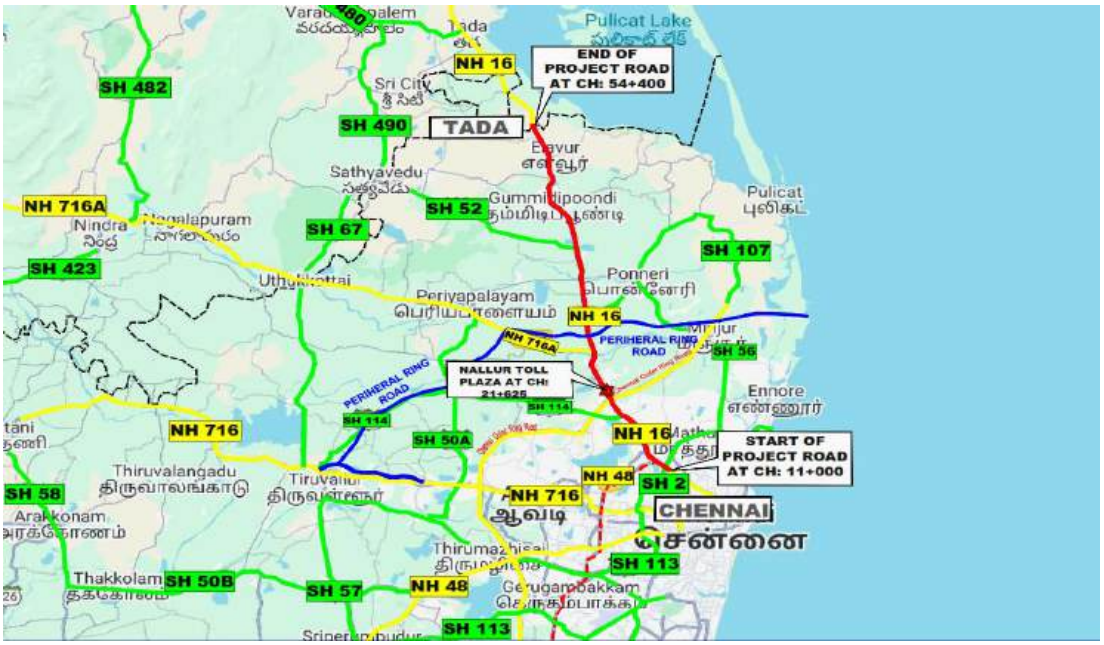
Chennai-Tada section from Km 21+400 to Km 54+400

Name of Agency	Mode of Contract	Chainage (Km)		Length (Km)	COD/ PCOD	O&M Handover Date
		From	To			
M/s. SPL Infrastructure Pvt Ltd	EPC (Six laning)	21+400	54+400	33.000	09.02.2022	09.02.2026

**O&M Handover date mentioned above are tentative and may vary based on the actual completion date of the project and there will be no financial implication for that.*

Toll is being collected by Toll Collection Agency appointed by NHAI through open competitive bidding.

Project highway is a part of National Highway 16 which is a major Indian highway running along the country's eastern coast, connecting Kolkata, West Bengal, to Chennai, Tamil Nadu. It is a crucial part of the Golden Quadrilateral project. The highway serves important cities including Bhubaneswar, Visakhapatnam, and Vijayawada.



Index Map of Project Highway

Note*:- In Chennai-Tada Section From Km 11+000 to Km 21+400 is descoped from Public InvIT-01

Neelmangla- Tumkur: Project Stretch starts from Km 29+500 and ends at Km 74+168 of NH-48 and has kulumepalya toll plazas at Km 30+000 and Chokkenahalli toll plaza Km 61+500 on project Section in the state of Karnataka. The total length of Project Stretch is 44.668 km.
The Project Highway Neelmangla- Tumkur section is under EPC (Six Laning) from Km 29+500 to Km 49+900, from Km 61+520 to 74+168 is under EPC and DPR is invited for section from km 49+900 to Km 61+520. Existing Concessionaire/ Contractor shall operate and maintain the project up to Handover date pursuant to and in accordance with the existing Concession/Contract agreements.

The section from Km 52+700 to Km 53+500 is an additional stretch along with Km 29+500 to Km 49+900 (EPC six-laning work) and falls under the scope of the EPC Contractor, M/s H.G. Infra Engineering Limited. The stretch from Km 52+700 to Km 53+500 shall be maintained by the EPC Contractor till completion of the DLP period. This section is not part of the DPR invited and does not fall under the scope of M/s Sri Chowdeshwari Concrete India Pvt. Ltd.

Currently, toll is collected at Kulumepalya (Ch. 30+000) and Chokkenahalli (Ch. 61+500). Upon completion of six-laning of the respective stretch, toll collection will be shifted to the new toll plazas at MCW (Ch. 53+100), Ramp RHS (Ch. 53+100), Ramp RHS (Ch. 46+375), LHS Ramp (Ch.49+900) and Ramp LHS (Ch. 47+425), and the existing toll plazas at Kulumepalya and Chokkenahalli will be demolished.

The details of agency, section and COD/PCOD date is tabled as below:

Neelmangla- Tumkur section from Km 29+500 to Km 74+168

Name of Agency	Mode of Contract	Chainage (Km)		Length	COD/ PCOD	O&M Handover Date
		From	To	(Km)		
M/s H G Infra Engineering Ltd.	EPC (Six laning)	29+500	49+900	20.4	31.03.2027	31.03.2032
	EPC	61+520	74+168	12.648	31.03.2027	31.03.2032

Name of Agency	Mode of Contract	Chainage (Km)		Length	COD/ PCOD	O&M Handover Date
		From	To	(Km)		
DPR Invited (Six laning)		49+900	61+520	11.62	30.09.2028	30.09.2033
Sri Chowdeshwari concrete India Pvt. Ltd.	**O&M**	49+900	61+520	11.62	-	05.06.2029

**O&M Handover date mentioned above are tentative and may vary based on the actual completion date of the project and there will be no financial implication for that.*

Toll is being collected by Toll Collection Agency appointed by NHAI through open competitive bidding.

The project highway is a part of National Highway 48 which is a major north-south highway in India, connecting the capital city of Delhi with Chennai in Tamil Nadu. As a critical part of the Golden Quadrilateral network, it is a key economic and infrastructure corridor for the country. The highway passes through seven states: Delhi, Haryana, Rajasthan, Gujarat, Maharashtra, Karnataka, and Tamil Nadu connecting numerous important cities, including Gurugram, Jaipur, Ahmedabad, Mumbai, Pune, and Bengaluru, and facilitates trade, logistics, and economic development along its path.

Index Map of Project Highway

4. SUMMARY ROAD INVENTORY

Detailed inventory of Project Stretch is captured through NSV and field reconnaissance. Salient features like built-up settlements, carriageway dimensions, surface type, junctions, service roads, road furniture etc. are recorded for entire Project Stretch. The road inventory is linked to the existing km stones established along the roadside.

Description		Vijayawada-Chilakaluripet	Chennai Bypass	Chennai-Tada	Neelmangla- Tumkur*	
					Neelmangla-Tumkur	Tumkur Bypass
Length of project stretch		69.408 km	32.600 Km	33.00 Km	32.020 Km	12.648 Km
Lane Configuration		6 Lane with paved shoulder	6 Lane with paved shoulder	6 Lane with paved shoulder	4/6 Lane with paved shoulder	6 Lane with paved shoulder
Pavement Type	**Flexible (m)**	68808	32455	32535	31220	12648
	Rigid (m)	600	145	465	800	0
Length of Service/Slip road (m)		121044	43205	67103	40800	24774
Major/ Minor Junction		20 Nos. /218 Nos.	10 Nos. /198 Nos.	10 Nos. /95 Nos.	2 Nos. /46 Nos.	3 Nos. /8 Nos.
Major/ Minor Bridge		3 Nos. /23 Nos.	3 Nos. /3 Nos.	3 Nos. /9 Nos.	2 Nos. /10 Nos.	2 Nos. /8 Nos.
Culverts		90 Nos.	140 Nos.	56 Nos.	50 Nos.	19 Nos.
ROBs/RUBs		1 Nos./0 No	1 Nos./1 No	0 Nos./0 No	2 Nos./0 No	1 Nos./0 No
VUPs/LVUPs/SVUPs		27 Nos	18 Nos	9 Nos	8 Nos	11 Nos
PUPs/CUPs		26 Nos.	2 Nos.	7 Nos.	1 Nos.	-
FOBs		0 Nos.	0 Nos.	1 Nos.	1 Nos.	1 Nos.
Toll Plazas		Kaza (420+500)	Vanagram (16+500) and Surapattu (28+600)	Nallur (21+625)	Kulumepalya (30+000) and	-

Description	Vijayawada-Chilakaluripet	Chennai Bypass	Chennai-Tada	Neelmangla- Tumkur*	
				Neelmangla-Tumkur	Tumkur Bypass
				Chokkenahalli (61+500)	
Bus Bays with shelters/ Bus Shelters	21 Nos.	1 Nos.	36 Nos.	12 Nos.	1 Nos.
Truck Lay Bye	1 Nos.	0 Nos.	0Nos.	2 Nos.	-
Median Openings	4 Nos.	9 Nos.	10 Nos.	12 Nos.	-

For Section-04 Neelmangla Tumkur

*These details are tentative these may varies as per site and same shall be maintained by TOT/InvIT concessionaire after end of DLP period.

5. REVIEW OF PAVEMENT

The project road has four/six lanes with paved shoulder. Field Survey for Surface Distress and Riding Quality was carried out using Network Survey Vehicle (NSV). NSV is a highly-specialized survey Vehicle designed and developed for in time assessment of Pavement Surface Condition by getting information with respect to distress type and its severity.

NSV is equipped with a fully integrated data collection system obtained from a Multi-Laser Profiler, Digital Imaging System and Video camera unit whose outputs are all linked via a highly accurate distance measuring instrument and this data is later processed with the help of adequate software applications to get for rutting, graveling, roughness (IRI), cracking etc; and subsequently many of this data was used to calculate the Pavement Condition Index (PCI) values.

Roughness and Rutting of pavement are measured using a Digital Laser Profiler (DLP), Integrated into the NSV.

The profiler is capable of measuring:

- Pavement Roughness (one laser in each wheel path and centre)
- Rutting (full transverse pavement measurement)

Roughness and Rutting are two most important quality parameters of pavement describing its riding quality and durability and are very significant in gaining negative or positive feedback from road users.

- **ROUGHNESS**

  The National Highway Authority of India (NHAI), via letter no. 11041/218/2007 –Admn. dated 03.11.2009 on POLICY MATTERS –TECHNICAL (37/2009) has approved the use of Laser Profiling devices for NHAI works. Consequently, IRI measurement has been progressively introduced in India. IRI correlation with BI values can be calculated by the following formula:

$$BI = 630 \cdot (IRI)^{1.12}$$

  where,

  BI: Bump Integrator Roughness or Unevenness Index (mm/km).

IRI: International Roughness Index.

Roughness of the project stretch is shown in the table below:

Vijayawada-Chilakaluripet (Km 355+000 to Km 422+605)

LHS

Criteria IRI (m/km)	Condition	LHS					
		L-1		L-2		L-3	
		Km	%	Km	%	Km	%
Less than 2.81	Good	69.41	100.00%	66.91	96.40%	65.51	94.93%
2.81 to 3.301	Fair	0.00	0.00%	1.50	2.16%	2.50	3.62%
More than 3.301	Poor	0.00	0.00%	1.00	1.44%	1.00	1.45%
Total		69.408	100%	69.408	100%	69.008	100%

RHS

Criteria IRI (m/km)	Condition	RHS					
		R-1		R-2		R-3	
		Km	%	Km	%	Km	%
Less than 2.81	Good	66.91	96.40%	66.91	96.40%	67.41	97.12%
2.81 to 3.301	Fair	2.00	2.88%	2.00	2.88%	2.00	2.88%
More than 3.301	Poor	0.50	0.72%	0.50	0.72%	0.00	0.00%
Total		69.408	100%	69.408	100%	69.008	100%

In LHS, 97.11% of the Project Stretch has a Roughness value in Good condition, whereas 1.93% of the Project Stretch is in Fair condition. And 0.96% of the project stretch is in Poor condition.

In RHS, 96.64% of the Project Stretch has a Roughness value in Good condition, whereas 2.88% of the Project Stretch is in Fair condition. And 0.48% of the project stretch is in Poor condition.

Chennai Bypass (Km 0+000 to Km 32+600)

LHS

Criteria IRI (m/km)	Condition	LHS					
		L-1		L-2		L-3	
		Km	%	Km	%	Km	%
Less than 2.81	Good	32.60	100.00%	32.60	100.00%	32.00	98.16%
2.81 to 3.301	Fair	0.00	0.00%	0.00	0.00%	0.00	0.00%
More than 3.301	Poor	0.00	0.00%	0.00	0.00%	0.60	1.84%
Total		32.600	100%	32.600	100%	32.600	100%

RHS

Criteria IRI (m/km)	Condition	RHS					
		R-1		R-2		R-3	
		Km	%	Km	%	Km	%
Less than 2.81	Good	32.60	100.00%	31.60	96.93%	32.60	100.00%
2.81 to 3.301	Fair	0.00	0.00%	1.00	3.07%	0.00	0.00%
More than 3.301	Poor	0.00	0.00%	0.00	0.00%	0.00	0.00%
Total		**32.600**	**100%**	**32.600**	**100%**	**32.600**	**100%**

In LHS,99.39% of the Project Stretch has a Roughness value in Good condition, whereas 0% of the Project Stretch is in Fair condition. And 0.61% of the project stretch is in Poor condition.

In RHS, 98.98% of the Project Stretch has a Roughness value in Good condition, whereas 1.02% of the Project Stretch is in Fair condition. And 0.0% of the project stretch is in Poor condition.

Chennai Tada (Km 21+400 to Km 54+400)

LHS

Criteria IRI (m/km)	Condition	LHS					
		L-1		L-2		L-3	
		Km	%	Km	%	Km	%
Less than 2.81	Good	33.00	100.00%	33.00	100.00%	33.00	100.00%
2.81 to 3.301	Fair	0.00	0.00%	0.00	0.00%	0.00	0.00%
More than 3.301	Poor	0.00	0.00%	0.00	0.00%	0.00	0.00%
Total		**33.000**	**100%**	**33.000**	**100%**	**33.000**	**100%**

RHS

Criteria IRI (m/km)	Condition	RHS					
		R-1		R-2		R-3	
		Km	%	Km	%	Km	%
Less than 2.81	Good	32.00	96.97%	33.00	100.00%	33.00	100.00%
2.81 to 3.301	Fair	1.00	3.03%	0.00	0.00%	0.00	0.00%
More than 3.301	Poor	0.00	0.00%	0.00	0.00%	0.00	0.00%
Total		**33.00**	**100%**	**33.000**	**100%**	**33.000**	**100%**

- **In LHS**, 100% of the Project Stretch has a Rutting value in Good condition, whereas 0.00% of the Project Stretch is in Fair condition. And 0% of the project stretch is in Poor condition.

- **In RHS**, 100.00% of the Project Stretch has a Rutting value in Good condition, whereas 0.00% of the Project Stretch is in Fair condition. And 0% of the project stretch is in Poor condition.
- **RUTTING**

  Rutting is one of the important factors which determine the functional performance of pavement. Rutting is characterized by permanent deformation of the pavement in wheel path due to heavy load vehicles. It is one of the main modes of failure in asphalt mixes. Length wise rutting condition details for both the direction are given in the table below:

  Vijayawada-Chilakaluripet (Km 355+000 to Km 422+605)

LHS

Criteria Rutting (mm)	Condition	LHS					
		L-1		L-2		L-3	
		Km	%	Km	%	Km	%
Less than 5 mm	Good	69.41	100.00%	69.41	100.00%	69.41	100.00%
5mm to 10 mm	Fair	0.00	0.00%	0.00	0.00%	0.00	0.00%
More than 10 mm	Poor	0.00	0.00%	0.00	0.00%	0.00	0.00%
Total		69.408	100%	69.408	100%	69.408	100%

RHS

Criteria Rutting (mm)	Condition	RHS					
		R-1		R-2		R-3	
		Km	%	Km	%	Km	%
Less than 5 mm	Good	69.41	100.00%	69.41	100.00%	69.41	100.00%
5mm to 10 mm	Fair	0.00	0.00%	0.00	0.00%	0.00	0.00%
More than 10 mm	Poor	0.00	0.00%	0.00	0.00%	0.00	0.00%
Total		69.408	100%	69.408	100%	69.408	100%

Chennai Bypass (Km 0+000 to Km 32+600)

LHS

Criteria Rutting (mm)	Condition	LHS					
		L-1		L-2		L-3	
		Km	%	Km	%	Km	%
Less than 5 mm	Good	32.60	100.00%	31.60	96.93%	32.60	100.00%
5mm to 10 mm	Fair	0.00	0.00%	1.00	3.07%	0.00	0.00%
More than 10 mm	Poor	0.00	0.00%	0.00	0.00%	0.00	0.00%
Total		32.600	100%	32.600	100%	32.600	100%

RHS

Criteria Rutting (mm)	Condition	RHS					
		R-1		R-2		R-3	
		Km	%	Km	%	Km	%
Less than 5 mm	Good	32.60	100.00%	31.60	96.93%	32.60	100.00%
5mm to 10 mm	Fair	0.00	0.00%	1.00	3.07%	0.00	0.00%
More than 10 mm	Poor	0.00	0.00%	0.00	0.00%	0.00	0.00%
Total		**32.600**	**100%**	**32.600**	**100%**	**32.600**	**100%**

In LHS, 98.98% of the Project Stretch has a Rutting value in Good condition, whereas 1.02% of the Project Stretch is in Fair condition. And 0% of the project stretch is in Poor condition.

In RHS, 98.98% of the Project Stretch has a Rutting value in Good condition, whereas 1.02% of the Project Stretch is in Fair condition. And 0% of the project stretch is in Poor condition.

Chennai Tada (Km 21+400 to Km 54+400)

LHS

Criteria Rutting (mm)	Condition	LHS					
		L-1		L-2		L-3	
		Km	%	Km	%	Km	%
Less than 5 mm	Good	31.60	95.76%	32.40	98.18%	21.60	65.45%
5mm to 10 mm	Fair	1.40	4.24%	0.60	1.82%	11.40	34.55%
More than 10 mm	Poor	0.00	0.00%	0.00	0.00%	0.00	0.00%
Total		**33.00**	**100%**	**33.00**	**100%**	**33.00**	**100%**

RHS

Criteria Rutting (mm)	Condition	RHS					
		R-1		R-2		R-3	
		Km	%	Km	%	Km	%
Less than 5 mm	Good	31.60	95.76%	28.00	84.85%	32.60	98.79%
5mm to 10 mm	Fair	1.40	4.24%	5.00	15.15%	0.40	1.21%
More than 10 mm	Poor	0.00	0.00%	0.00	0.00%	0.00	0.00%
Total		**33.00**	**100%**	**33.00**	**100%**	**33.00**	**100%**

In LHS, 87.47 % of the Project Stretch has a Rutting value in Good condition, whereas 12.53% of the Project Stretch is in Fair condition. And 0.0% of the project stretch is in Poor condition.

In RHS, 93.13 % of the Project Stretch has a Rutting value in Good condition, whereas 6.87% of the Project Stretch is in Fair condition. And 0.0% of the project stretch is in Poor condition.

- **VEHICLE DAMAGE FACTOR**

The VDF is a multiplier for converting the number of commercial vehicles of different axle loads to the number of standard axle load repetitions.

As per Traffic Consultant Report, the VDF is presented in the table below:

Vijayawada-Chilakaluripet (Km 355+000 to Km 437+500)

VDF of Kaza Toll Plaza

Vehicle Category	Vijayawada to Chilakaluripet	Chilakaluripet to Vijayawada
Minibus	0.04	0.05
Standard Bus	1.78	1.49
LCV 4 Wheel	0.06	0.06
LCV 6 Wheel	1.24	0.88
2 Axle Truck	1.74	2.49
3 Axle truck	3.86	6.13
MAV	7.34	8.88

Chennai Bypass (Km 0+000 to Km 32+600)

VDF of Vanagram Toll Plaza

Vehicle Category	Tambaram to Madhavaram	Madhavaram to Tambaram
Minibus	0.05	0.19
Standard Bus	1.28	1.59
LCV 4 Wheel	0.05	0.23
LCV 6 Wheel	0.71	0.75
2 Axle Truck	1.60	2.00
3 Axle truck	12.72	4.97
MAV	11.67	7.44

VDF of Surapattu Toll Plaza

Vehicle Category	Tambaram to Madhavaram	Madhavaram to Tambaram
Minibus	0.00	0.06
Standard Bus	0.54	0.81
LCV 4 Wheel	0.11	0.33
LCV 6 Wheel	0.70	0.81

Vehicle Category	Tambaram to Madhavaram	Madhavaram to Tambaram
2 Axle Truck	1.84	3.00
3 Axle truck	6.83	4.38
MAV	11.02	7.49

Chennai-Tada (Km 21+400 to Km 54+400)

VDF of Nallur Toll Plaza

Vehicle Category	Chennai to Tada	Tada to Chennai
Minibus	0.10	0.00
Standard Bus	1.34	0.92
LCV 4 Wheel	0.05	0.05
LCV 6 Wheel	0.54	0.87
2 Axle Truck	1.31	3.18
3 Axle truck	2.97	3.71
MAV	5.85	9.76

Neelmangla-Tumkur (Km 29+500 to Km 74+168)

VDF of Kulumepalya Toll Plaza

Vehicle Category	Neelmangla to Tumkur	Tumkur to Neelmangla
Minibus	0.18	0.00
Standard Bus	2.47	2.96
LCV 4 Wheel	0.11	0.38
LCV 6 Wheel	0.94	0.99
2 Axle Truck	2.62	2.19
3 Axle truck	9.12	8.79
MAV	9.38	10.07

VDF of Chokkenahalli Toll Plaza

Vehicle Category	Neelmangla to Tumkur	Tumkur to Neelmangla
Minibus	0.17	0.04
Standard Bus	1.52	1.60
LCV 4 Wheel	0.05	0.15
LCV 6 Wheel	0.91	1.36
2 Axle Truck	2.40	2.28
3 Axle truck	4.22	5.49
MAV	6.75	9.40

- **ESTIMATED DESIGN TRAFFIC**

The design traffic is calculated in terms of the cumulative number of standard axles in two directions of the carriageway during the design life of the road.

As per Traffic Consultant Report, the estimated Design MSA presented in the table below:

Vijayawada-Chilakaluripet (Km 355+000 to Km 437+500)

MSA Calculation of Kaza Toll Plaza

Financial Year	Minibus	Standard Bus	LCV-4	LCV-6	2A	3A	MAV	OSV	Yearly Design ESA	MSA
VDF	0.05	1.78	0.06	1.24	2.49	6.13	8.88	0.00		
FY26	335	2525	755	1307	693	1388	3164	3	48,95,376	5
FY27	351	2583	790	1361	721	1372	3030	4	47,80,960	10
FY28	368	2643	830	1416	750	1344	2786	4	45,63,801	14
FY29	386	2702	871	1500	795	1358	2944	4	47,50,311	19
FY30	406	2764	916	1592	844	1375	3138	4	49,89,773	24
FY31	425	2823	959	1685	893	1391	3335	4	52,31,184	29
FY32	455	2881	1025	1790	949	1408	3567	5	55,25,143	35
FY33	486	2948	1096	1900	1007	1423	3811	5	58,03,534	41
FY34	464	3007	1046	1799	953	1210	3156	5	50,03,306	46
FY35	434	3080	979	1712	907	995	2424	5	41,33,544	50
FY36	464	3137	1046	1683	892	890	2096	6	37,55,692	53
FY37	484	3192	1091	1762	934	897	2255	6	39,39,577	57
FY38	505	3255	1138	1843	976	904	2424	6	41,44,112	62
FY39	525	3308	1184	1925	1020	911	2601	6	43,55,468	66
FY40	547	3294	1233	2009	1065	918	2729	7	45,19,279	70
FY41	620	3316	1397	2067	1095	924	2887	7	46,87,734	75
FY42	647	3368	1460	2157	1143	931	3033	7	48,70,647	80
FY43	676	3427	1524	2249	1192	938	3183	8	50,59,680	85
FY44	706	3480	1592	2346	1243	944	3341	8	52,70,557	90
FY45	738	3532	1663	2446	1296	951	3506	8	54,62,023	96
FY46	763	3586	1721	2542	1347	957	3657	9	56,51,574	101

Chennai Bypass (Km 0+000 to Km 32+600)

MSA Calculation of Vanagram Toll Plaza

Financial Year	Minibus	Standard Bus	LCV-4	LCV-6	2A	3A	MAV	OSV	Yearly Design ESA	MSA
VDF	0.19	1.59	0.23	0.75	2.00	12.72	11.67	0.00		
FY26	1302	2945	747	877	184	551	2008	7	40,64,776	4
FY27	1335	3030	766	918	192	555	2062	7	41,63,851	8

Financial Year	Minibus	Standard Bus	LCV-4	LCV-6	2A	3A	MAV	OSV	Yearly Design ESA	MSA
FY28	1370	3118	786	957	201	564	2152	7	43,26,151	13
FY29	1407	3210	808	1004	211	577	2223	7	44,49,234	17
FY30	1440	3294	826	1026	215	581	2266	8	45,29,398	22
FY31	1472	3422	845	1050	220	585	2368	8	46,93,990	26
FY32	1505	3510	864	1087	228	589	2437	8	48,24,266	31
FY33	1538	3599	883	1132	237	593	2499	8	49,20,037	36
FY34	1569	3681	900	1173	246	597	2555	8	50,18,406	41
FY35	1603	3773	920	1197	251	601	2664	8	51,86,473	46
FY36	1635	3904	938	1242	260	605	2733	8	53,26,096	52
FY37	1648	3939	946	1252	263	606	2765	8	53,62,264	57
FY38	1657	3963	951	1258	264	607	2785	9	53,95,833	62
FY39	1663	3980	954	1267	266	608	2806	9	54,28,060	68
FY40	1666	3988	956	1270	266	608	2813	9	54,54,152	73
FY41	1669	4001	958	1272	267	609	2820	9	54,51,862	79
FY42	1672	4009	959	1276	268	609	2831	9	54,67,902	84
FY43	1674	4016	961	1280	268	609	2840	9	54,81,997	90
FY44	1677	4024	962	1283	269	609	2848	9	55,10,788	95
FY45	1680	4032	964	1287	270	610	2858	9	55,11,180	101
FY46	1683	4044	966	1290	271	610	2866	9	55,23,624	106

MSA Calculation of Surapattu Toll Plaza

Financial Year	Minibus	Standard Bus	LCV-4	LCV-6	2A	3A	MAV	OSV	Yearly Design ESA	MSA
VDF	0.06	0.81	0.33	0.81	3.00	6.83	11.02	0.00		
FY26	1312	265	1478	1078	254	1007	3765	13	57,39,547	6
FY27	1374	273	1548	1114	262	1015	3870	13	58,86,175	12
FY28	1440	281	1623	1140	269	1022	4016	13	60,98,997	18
FY29	1281	289	1444	982	231	875	3441	13	52,18,257	23
FY30	1097	297	1236	805	189	722	2827	14	42,96,572	27
FY31	1142	308	1287	816	192	727	2960	14	44,70,915	32
FY32	1189	316	1340	836	197	732	3049	14	46,04,573	36
FY33	1238	324	1395	861	203	737	3127	15	47,00,302	41
FY34	1283	332	1446	883	208	741	3197	15	47,97,606	46
FY35	1334	340	1503	895	211	746	3339	15	49,84,258	51
FY36	1384	352	1559	918	216	751	3428	15	51,20,155	56
FY37	1434	360	1616	930	219	755	3528	16	52,39,810	61
FY38	1480	367	1668	940	221	759	3618	16	53,59,650	67
FY39	1532	375	1726	964	227	764	3759	16	55,45,333	72
FY40	1584	383	1784	978	230	768	3852	16	56,85,465	78
FY41	1635	395	1843	989	233	772	3955	17	58,06,996	84
FY42	1688	403	1902	1013	238	776	4108	17	60,08,241	90

Financial Year	Minibus	Standard Bus	LCV-4	LCV-6	2A	3A	MAV	OSV	Yearly Design ESA	MSA
FY43	1735	410	1955	1034	244	780	4248	17	61,91,876	96
FY44	1784	417	2010	1053	248	784	4370	17	63,71,102	102
FY45	1823	423	2054	1071	252	787	4484	17	65,03,401	109
FY46	1857	431	2093	1080	254	789	4556	18	65,98,712	115

Chennai-Tada (Km 21+400 to Km 54+400)

MSA Calculation of Nallur Toll Plaza

Financial Year	Minibus	Standard Bus	LCV-4	LCV-6	2A	3A	MAV	OSV	Yearly Design ESA	MSA
VDF	0.10	1.34	0.05	0.87	3.18	3.71	9.76	0.00		
FY26	2135	1048	1224	1876	762	1394	6099	18	77,33,099	8
FY27	2235	1079	1281	1993	810	1423	6538	18	82,49,830	16
FY28	2336	1111	1339	2118	861	1450	7014	18	88,30,779	25
FY29	2444	1145	1401	2255	916	1477	7567	19	94,48,473	34
FY30	2549	1178	1461	2391	972	1502	8123	19	1,00,93,420	44
FY31	2618	1210	1501	2476	1006	1480	8443	19	1,04,52,681	55
FY32	2688	1242	1540	2567	1043	1454	8815	19	1,08,97,951	66
FY33	2791	1276	1600	2704	1099	1453	9296	20	1,14,22,390	77
FY34	2901	1307	1662	2853	1159	1462	9837	20	1,20,47,169	89
FY35	3018	1341	1730	3016	1225	1471	10475	20	1,27,80,457	102
FY36	3134	1373	1796	3177	1291	1481	11085	20	1,35,19,591	115
FY37	3248	1406	1862	3344	1359	1492	11719	21	1,42,11,873	130
FY38	3358	1437	1924	3506	1424	1501	12336	21	1,49,21,671	145
FY39	3473	1469	1990	3677	1494	1511	13001	21	1,56,84,754	160
FY40	3590	1486	2058	3854	1566	1520	13692	21	1,65,20,743	177
FY41	3707	1510	2124	4031	1638	1530	14461	21	1,73,50,347	194
FY42	3755	1535	2152	4104	1668	1534	14781	22	1,77,16,755	212
FY43	3799	1557	2177	4173	1695	1537	15084	22	1,80,62,842	230
FY44	3823	1580	2191	4210	1710	1539	15246	22	1,83,00,241	248
FY45	3835	1602	2198	4228	1718	1540	15329	22	1,83,46,491	267
FY46	3840	1623	2201	4237	1722	1540	15370	23	1,83,96,449	285

Neelmangla-Tumkur (Km 29+500 to Km 74+168)

MSA Calculation of Kulumepalya Toll Plaza

Financial Year	Minibus	Standard Bus	LCV-4	LCV-6	2A	3A	MAV	OSV	Yearly Design ESA	MSA
VDF	0.18	2.96	0.38	0.99	2.62	9.12	10.07	0.00		
FY26	2271	3850	2481	2774	890	1874	4940	25	94,23,785	9
FY27	2358	3986	2577	2951	947	1887	5283	25	99,08,084	19
FY28	2458	4125	2686	3137	1006	1909	5623	26	1,04,30,219	30

Financial Year	Minibus	Standard Bus	LCV-4	LCV-6	2A	3A	MAV	OSV	Yearly Design ESA	MSA
FY29	2383	4254	2604	2953	948	1623	4747	27	91,29,996	39
FY30	2288	4400	2500	2735	877	1332	3749	28	77,12,931	47
FY31	2335	4538	2551	2805	900	1288	3757	29	77,40,167	54
FY32	2381	4596	2602	2873	922	1236	3747	30	77,33,030	62
FY33	2468	4596	2696	3015	967	1238	3908	31	79,28,632	70
FY34	2551	4737	2788	3186	1022	1253	4151	32	83,03,057	78
FY35	2637	4881	2881	3365	1079	1268	4406	33	86,93,984	87
FY36	2721	5021	2973	3543	1137	1282	4663	33	91,09,602	96
FY37	2814	5149	3075	3729	1196	1290	4930	34	94,77,938	106
FY38	2900	5291	3169	3920	1258	1304	5208	35	98,94,577	115
FY39	2986	5433	3263	4115	1320	1318	5493	36	1,03,20,852	126
FY40	3073	5577	3358	4317	1385	1332	5790	37	1,07,91,322	137
FY41	3171	5708	3465	4526	1452	1346	6098	38	1,12,13,498	148
FY42	3261	5854	3564	4742	1521	1353	6417	39	1,16,77,230	159
FY43	3352	6001	3662	4963	1592	1366	6745	40	1,21,56,826	172
FY44	3444	6151	3764	5193	1666	1380	7089	41	1,26,93,404	184
FY45	3549	6289	3878	5434	1743	1394	7450	42	1,31,79,579	198
FY46	3647	6446	3986	5686	1824	1407	7830	43	1,37,29,280	211

MSA Calculation of Chokkenahalli Toll Plaza

Financial Year	Minibus	Standard Bus	LCV-4	LCV-6	2A	3A	MAV	OSV	Yearly Design ESA	MSA
VDF	0.17	1.60	0.15	1.36	2.40	5.49	9.40	0.00		
FY26	2155	3610	1656	2461	1181	1859	5389	23	83,25,594	8
FY27	2275	3737	1748	2621	1258	1874	5744	24	87,86,471	17
FY28	2401	3868	1845	2788	1338	1908	6120	25	93,08,588	26
FY29	2534	3989	1948	2966	1424	1943	6522	26	98,10,452	36
FY30	2672	4126	2054	3156	1515	1983	6997	27	1,04,25,129	47
FY31	2799	4255	2151	3304	1586	1991	7312	27	1,08,35,965	57
FY32	2930	4310	2252	3457	1659	1970	7633	28	1,12,53,796	69
FY33	3070	4309	2359	3636	1745	1992	8039	29	1,17,23,469	80
FY34	3220	4442	2475	3846	1846	2028	8543	30	1,23,72,468	93
FY35	3090	4560	2375	3186	1529	1573	6832	31	1,00,94,624	103
FY36	2933	4675	2254	2432	1167	1100	4861	32	75,19,806	110
FY37	3065	4794	2356	2561	1229	1104	5142	33	78,65,041	118
FY38	3201	4926	2460	2695	1293	1122	5435	33	82,54,048	127
FY39	3338	5058	2566	2831	1359	1141	5735	34	86,53,073	135
FY40	3480	5192	2674	2972	1427	1159	6048	35	90,91,686	144
FY41	3625	5314	2786	3118	1497	1177	6373	36	94,93,098	154
FY42	3774	5451	2901	3270	1569	1181	6711	37	99,28,361	164
FY43	3925	5587	3017	3424	1643	1199	7057	38	1,03,81,343	174

Financial Year	Minibus	Standard Bus	LCV-4	LCV-6	2A	3A	MAV	OSV	Yearly Design ESA	MSA
FY44	4082	5727	3137	3585	1721	1217	7420	39	1,08,86,105	185
FY45	4245	5856	3263	3754	1802	1235	7802	40	1,13,51,928	196
FY46	4415	6002	3393	3931	1887	1254	8204	41	1,18,74,321	208

- **PAVEMENT CRUST COMPOSITION**

Pavement is layered structures comprising a combination of materials. These materials, their associated properties, and their interactions determine properties of the resultant pavement. Therefore, a good understanding of these materials, how they are characterized, and how they perform is fundamental for understanding pavement behaviour and deterioration.

Details of existing pavement composition (pavement course, material type, and thickness) were recorded at every 500 m interval by measuring thickness of each crust layer in test pit excavated to evaluate the sub-grade strength along the Project Stretch.

Summary of Pavement Layer Thickness:

Section-01 Vijayawada-Chilakaluripet

S.No.	Side	Average Bituminous Layer(mm)	Average Granular Layer(mm)
1	LHS	175	450
2	RHS	175	450

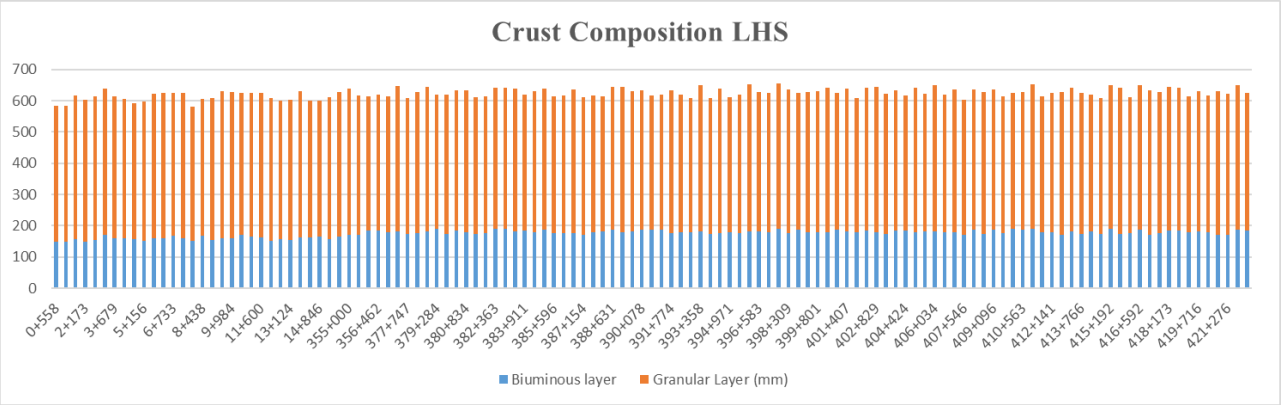
Section-02 Chennai Bypass

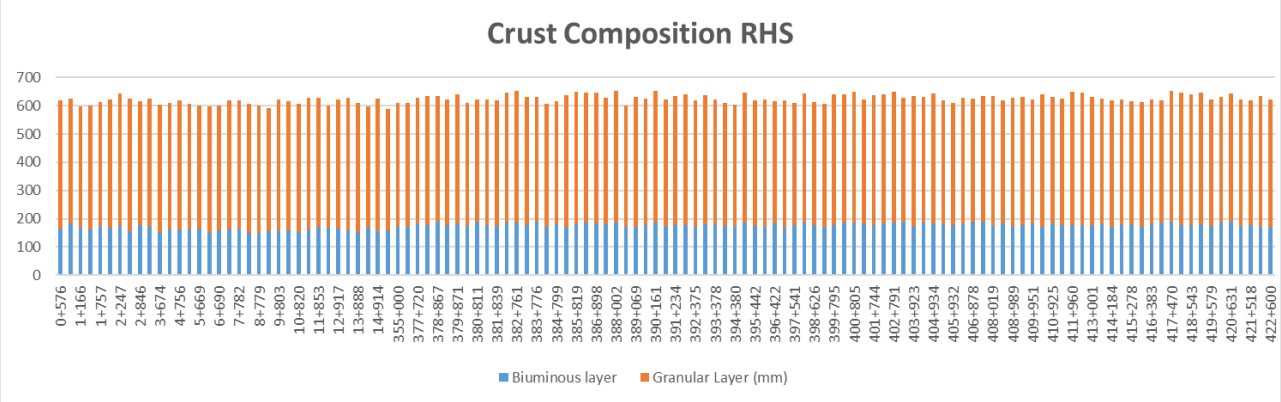
S.No.	Side	Average Bituminous Layer(mm)	Average Granular Layer(mm)
1	LHS	220	450
2	RHS	220	450

Section-03 Chennai-Tada

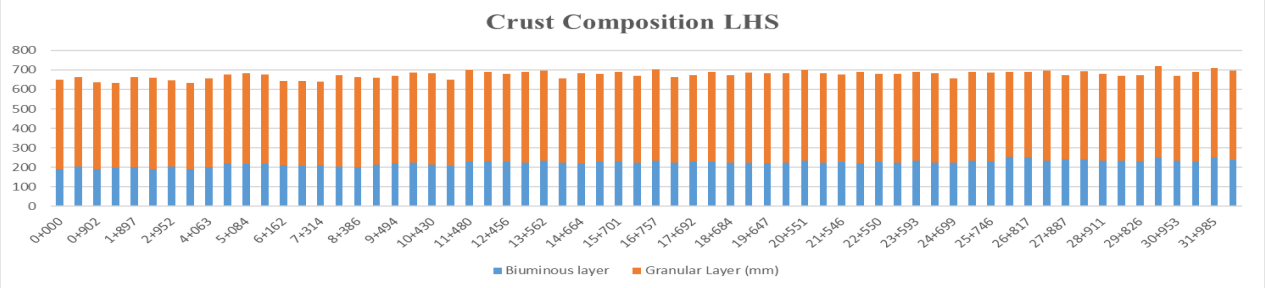
S.No.	Side	Average Bituminous Layer(mm)	Average Granular Layer(mm)
1	LHS	180	450
2	RHS	180	450

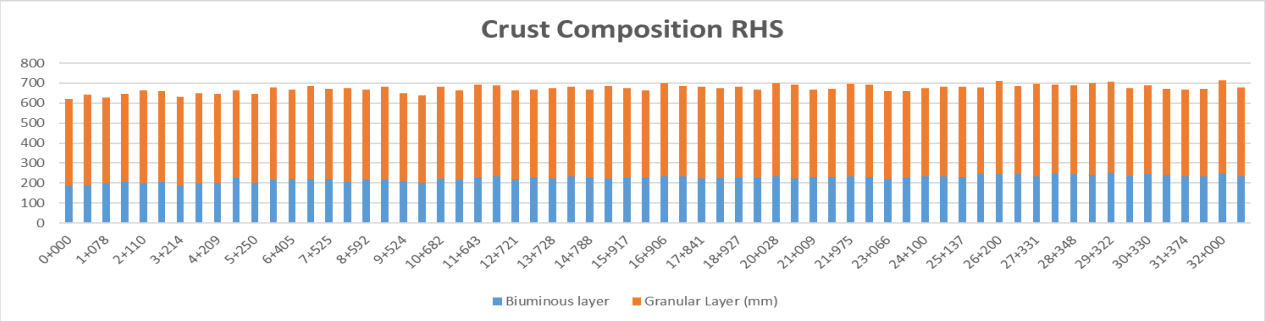
Section-01 Vijayawada-Chilakaluripet



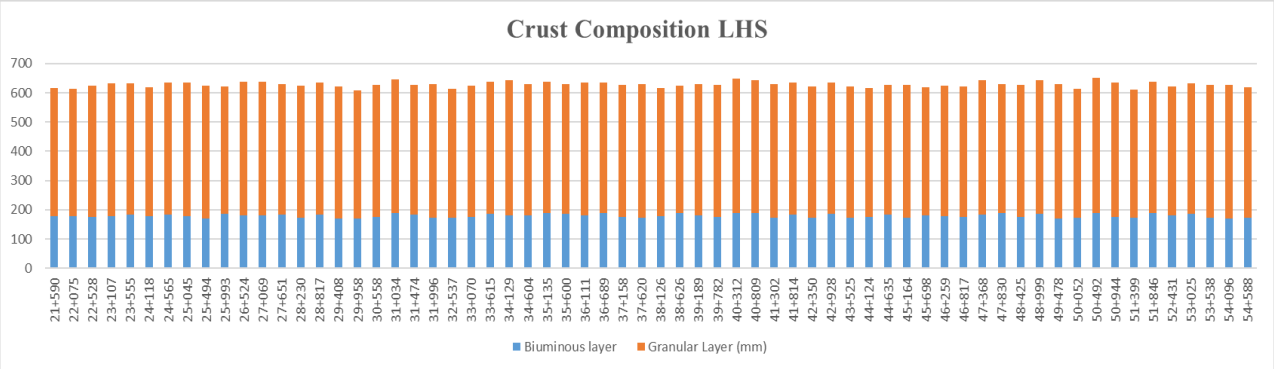


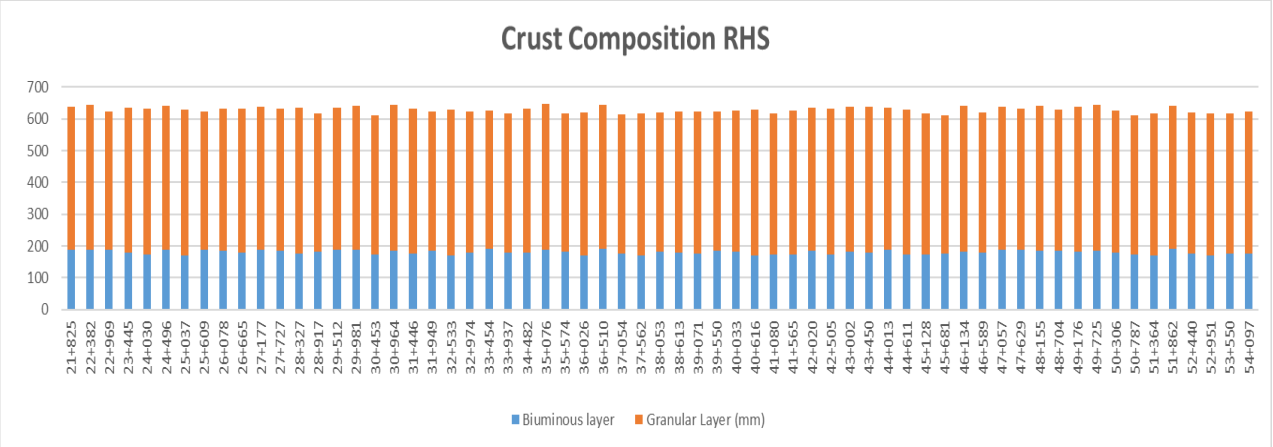
Section-02 Chennai Bypass





Section-03 Chennai-Tada





- **ANALYSIS OF PAVEMENT CONDITION DATA**

  Structural Condition of pavement has been evaluated using Falling Weight Deflectometer (FWD) and subsequent analysis was carried out to ascertain the relative performance of the pavement for entire Project Stretch, in the context of evaluating its residual life, overlay and other maintenance requirements based on Roughness and Rutting.

  - **Flexible Pavement Overlay on Main carriageway**

Section-01 Vijayawada-Chilakaluripet

Chainage (km)		Length (m)	Side	Adopted Overlay (mm)		Milling
From	To			BC	DBM	
Nil						

Section-02 Chennai Bypass

Chainage (km)		Length (m)	Side	Adopted Overlay (mm)		Milling
From	To			BC	DBM	
Nil						

Section-03 Chennai-Tada

Chainage (km)		Length (m)	Side	Adopted Overlay (mm)		Milling
From	To			BC	DBM	
Nil						

Recommended Overlay on Service Road

Section 01 Vijayawada Chilakaluripet

Chainage (km)		Length (m)	Side	Adopted Overlay (mm)		Milling
From	To			BC	DBM	
Nil						

Section 02 Chennai Bypass

Chainage (km)		Length (m)	Side	Adopted Overlay (mm)		Milling
From	To			BC	DBM	
Nil						

6. STRUCTURE REPAIR AND REHABILITATION

There are deficiencies noted in the structures and relevant repair-rehabilitation measures are suggested.

- Remove of vegetation and cleaning is required
- Expansion Joint Cleaning
- Cleaning of drainage Spout is required
- Cleaning, Greasing of Bearings and Corrosion protection of Bearings
- Replacement of Hand Railing with RCC Crash Barrier

- Providing of Missing Drain pipe
- Epoxy Grouting at Honey Combing locations
- Shortcreting & Guniting at reinforcement exposed locations

7. TOLL PLAZA

Toll Plaza on this project stretch is located near Kaza toll Plazas at Km 420+500 on Vijayawada-Chilakaluripet, Vanagram toll Plazas at Km 16+500 & Surapattu toll Plazas at Km 28+600 on Chennai Bypass, Nallur toll Plazas at Km 21+625 on Chennai- Tada and kulumepalya toll plazas at Km 30+000 and Chokkenahalli toll plaza Km 61+500 on Neelmangla- Tumkur.

Section-01 Vijayawada-Chilakaluripet

Kaza toll Plaza (420+500)

Section-02 Chennai Bypass

Vanagram toll Palaza (16+500)

Surapattu toll Plaza (28+600)

Section-03 Chennai-Tada

Nallur toll Plaza (21+625)

Nallur toll Plaza (21+625)

Section 04 Neelmangla-Tumkur

Kulumepalya toll Plaza (30+000)

Chokkenahalli (61+500)

8. COST ESTIMATE

The Project cost estimates have been prepared based on various items of works required and Initial Cost for Engineering and Safety Improvements for base year 2025-26 is provided below-

Section-01 Vijayawada-Chilakaluripet

Particulars	Unit	Quantity	Cost (in Cr.)
ATMS	KM	52.91	8.237
MLFF at existing Toll Plaza	Nos	1	5.000
Total Excluding @18% GST			**13.237**
GST @18%			**2.383**
Total Amount			**15.619**

Section-02 Chennai Bypass

Particulars	Unit	Quantity	Cost (in Cr.)
ATMS	KM	32.6	4.981
MLFF at existing Toll Plaza Lanes (Surapattu)	Nos	1	5.000
Total Excluding @18% GST			**9.981**
GST @18%			**1.797**
Total Amount			**11.777**

Section-03 Chennai-Tada

Particulars	Unit	Quantity	Cost (in Cr.)
ATMS	KM	33	5.498
New Toll Plaza with MLFF	Nos	1	8.436
Total Excluding @18% GST			**13.934**
GST @18%			**2.508**
Total Amount			**16.442**

Section-04 Neelmangla Tumkur

Particulars	Unit	Quantity	Cost (in Cr.)
Nil			

Note: - The rates for ATMS equipment and MLFF have been considered based on prevailing NHAI practices and accepted cost norms used in similar NHAI projects.

9. OPERATION AND MAINTENANCE COST

The Project Operation and Maintenance cost estimates have been prepared based on various circulars and analysis.

Total cost of operation and maintenance consist of both regular and periodic maintenance.

Total OMEX (Routine & Perodic) with Esclation

Section-01 Vijayawada-Chilakaluripet

Year	Total Maintenance Amount (in Cr) incl GST (excluding Periodic Maintenance)	Total Periodic Maintenance Amount(in Cr) incl GST	Total Amount (in Cr) incl GST
2026-2027	5.91	0.00	5.91
2027-2028	6.21	0.00	6.21
2028-2029	6.52	0.00	6.52
2029-2030	6.85	0.00	6.85
2030-2031	7.19	0.00	7.19
2031-2032	7.55	0.00	7.55
2032-2033	39.89	0.00	39.89
2033-2034	41.88	0.00	41.88
2034-2035	43.98	0.00	43.98
2035-2036	46.17	0.00	46.17
2036-2037	48.48	0.00	48.48
2037-2038	50.91	0.00	50.91
2038-2039	32.21	270.70	302.91
2039-2040	66.71	0.00	66.71
2040-2041	70.05	0.00	70.05

Section-02 Chennai Bypass

Year	Total Maintenance Amount (in Cr) incl GST (excluding Periodic Maintenance)	Total Periodic Maintenance Amount(in Cr) incl GST	Total Amount (in Cr) incl GST
2026-2027	23.92	0.00	23.92

Year	Total Maintenance Amount (in Cr) incl GST (excluding Periodic Maintenance)	Total Periodic Maintenance Amount(in Cr) incl GST	Total Amount (in Cr) incl GST
2027-2028	25.12	0.00	25.12
2028-2029	26.37	0.00	26.37
2029-2030	27.69	0.00	27.69
2030-2031	29.08	0.00	29.08
2031-2032	30.53	0.00	30.53
2032-2033	23.42	102.57	125.99
2033-2034	33.66	0.00	33.66
2034-2035	35.34	0.00	35.34
2035-2036	37.11	0.00	37.11
2036-2037	38.96	0.00	38.96
2037-2038	40.91	0.00	40.91
2038-2039	31.38	137.46	168.84
2039-2040	45.11	0.00	45.11
2040-2041	47.36	0.00	47.36

Section-03 Chennai-Tada

Year	Total Maintenance Amount (in Cr) incl GST (excluding Periodic Maintenance)	Total Periodic Maintenance Amount(in Cr) incl GST	Total Amount (in Cr) incl GST
2026-2027	21.59	0.00	21.59
2027-2028	22.66	0.00	22.66
2028-2029	23.80	0.00	23.80
2029-2030	24.99	0.00	24.99
2030-2031	26.24	0.00	26.24
2031-2032	27.55	0.00	27.55
2032-2033	28.93	0.00	28.93
2033-2034	19.51	139.42	158.93
2034-2035	31.89	0.00	31.89
2035-2036	33.49	0.00	33.49
2036-2037	35.16	0.00	35.16
2037-2038	36.92	0.00	36.92
2038-2039	38.76	0.00	38.76
2039-2040	26.15	186.83	212.98
2040-2041	42.74	0.00	42.74

Section-04 Neelmangla-Tumkur

Year	Total Maintenance Amount (in Cr) incl GST (excluding Periodic Maintenance)	Total Periodic Maintenance Amount(in Cr) incl GST	Total Amount (in Cr) incl GST
2026-2027	14.38	0.00	14.38
2027-2028	15.10	0.00	15.10
2028-2029	15.85	0.00	15.85
2029-2030	25.82	0.00	25.82
2030-2031	27.11	0.00	27.11
2031-2032	28.46	0.00	28.46
2032-2033	44.06	0.00	44.06
2033-2034	49.21	0.00	49.21
2034-2035	51.67	0.00	51.67
2035-2036	49.88	54.81	104.69
2036-2037	56.97	0.00	56.97
2037-2038	59.82	0.00	59.82
2038-2039	49.25	175.76	225.01
2039-2040	65.95	0.00	65.95
2040-2041	63.67	69.95	133.62

CHAPTER 1

PROJECT DESCRIPTION

National Highways Authority of India (NHAI), an autonomous agency of the Government of India (GoI), is responsible for the development, maintenance and management of National Highways network in India.

There are currently approximately 1,32,500 kilometres of National Highways in India, constituting approximately 2.2% of India's entire road network but carrying approximately 40% of total road traffic.

To meet the growing need for further industrialization and development of the country, GoI has planned to expand the network of National Highways across the length and width of the country at a rapid pace. The various programmes which have been taken by GoI through NHAI are:

Phase I: Golden Quadrilateral (GQ) Comprising 4/6-laning of National Highways connecting four metro cities, namely, Delhi, Mumbai, Chennai and Kolkata with a total length of approximately 5846 km (which is mostly complete), and

Phase II: North-South and East-West Corridors (NSEW) comprising 4/6-laning of National Highways connecting Srinagar to Kanyakumari and Silchar to Porbandhar. Total length this NSEW corridor is approximately 7300 km. The projects of NSEW are mostly awarded and construction is also largely complete.

Bharatmala Pariyojana: A flagship highway development programme which envisions the development of 50 economic corridors, provide connectivity to 550 districts in the country through National Highway linkages and improve the average speed of road travel in India.

In addition to this, various NHDP programs has been taken up by NHAI to match the rapid pace of modernization and industrial development of the country. The Government has planned to continue developing the National Highways at a rapid pace, which will require significant funding in the near future.

The National Highways Authority of India (NHAI) has initiated the process of setting up an infrastructure investment trust (InvIT) to monetize its road assets. This is a private listed InvIT, through which institutional investors can invest in operational road projects offered by NHAI to the InvIT. In this model, the offered road assets are acquired by the InvIT while the investors

acquire the units issued by the InvIT. Income generated from the underlying road assets is paid out as distributions to the unit holders in the form of interest, dividend and return of capital. The InvIT is managed by a competent Investment Manager staffed with experts to manage the assets efficiently.

Under the InvIT frame work, the right of collection of user fees of selected NH projects is assigned for a specific time period to a Concessionaire. During this period, the O&M responsibility will also vest with the selected Concessionaire (unless costs are to be borne by existing concessionaires as per extant agreements). In return, the Concessionaire will pay an upfront quoted Concession Fee to NHAI.

Following is the stretch which shall be awarded on TOT model:

Section No.	Section Name		Chainage (Km)		Length (Km)
	From	To	From	To	
Section-1	Chilakaluripet	Vijayawada	355+000	357+342	2.342
	Chilakaluripet Bypass		0+000	16+499	16.499
	Chilakaluripet	Vijayawada	372+038	422+605	50.567
Section-2	Chennai Bypass		0+000	32+600	32.6
Section-3	Chennai	Tada	21+400	54+400	33.0
Section-4	Neelmangla	Tumkur	29+500	61+520	32.02
	Tumkur Bypass		61+520	74+168	12.648

Accordingly, detailed reports on inventory & physical condition have been carried out for all stretches including a study of improvement proposals. Below general details of Project stretch are mentioned.

1.1 Objective of study and Scope of work

The main objective of this consultancy service is to access physical condition of selected National Highway Stretch for preparation of detailed project reports with technical schedules and bid documents for tendering. Physical condition of any Stretch shall be

established based on its highway design, pavement design, condition of structures, road safety features, condition of existing facilities like toll plazas etc.

Based on physical condition of highway Stretch, options shall be worked out for improvement of safety of existing road and strengthening of pavement and structures. Cost associated with all improvement proposals shall also be estimated as part of this Study.

Note: - This report has been prepared based on the information, data, and documents made available to the Consultant at the time of study. While due care has been exercised in the preparation of this report, the Consultant does not guarantee the accuracy or completeness of the information provided by third parties.

1.2 Scope of Service

The main objective of this assignment is to assess physical condition of selected National Highway Stretch and preparation of detailed project reports, technical and maintenance schedules for bidding process. Physical condition of any Stretch are established based on the geometric parameters of the highway, condition of pavement, structures, road safety features, condition of existing facilities like toll plazas etc. Based on physical condition of highway Stretches, options are worked out for improvement of safety of existing road and strengthening of pavement and structures. Cost associated with all improvement proposals are also estimated as part of this Study. Scope of services as per Terms of Reference (ToR) are presented below:

- Investigation for accessing condition of pavement including shoulder, embankment, drainage etc. using visual means, advanced laser profilometer and image processing software and falling weight Deflectometer.
- Investigation for perception of existing pavement composition.
- Conducting road safety audit for evaluating geometry of road, adequacy and condition of existing of safety features etc.
- Identification of black spots along the Project Stretch and propose corrective measures for the same.
- Inventory of all structures along the Project Stretch like bridges, culverts, ROBs, underpasses, flyovers etc. covering physical and hydraulic parameters.

Investigations shall be carried out for accessing structural conditions using Mobile Bridge Inspection Unit (MBIU) as per IRC-SP:35. For the bridges identified to be in a distressed condition based upon the visual condition survey, supplementary testing shall be carried out as per IRC-SP:35 and IRC-SP:40. Selection of tests may be made based on the specific requirement of the structure.

- Identification of source of construction materials quarry sites, sand source and borrow areas and assessment of quality of various construction materials.
- Preparation of improvement strategy for strengthening of pavement and structures, rehabilitation and design for road safety features, road furniture etc.
- Estimation of detailed cost based on improvement proposal.
- Preparation and submission of following items –
- Detailed project report and drawings covering all above-mentioned details.
- Technical schedule and bid documents for tendering.

1.3 Project Stretch

Vijayawada-Chilakaluripet: Project Stretch starts from Km 355+000 of NH-16 at Vijayawada and ends at Km 422+605 of NH-16 at Chilakaluripet and has Kaza toll Plazas at Km 420+500 on project Section in the state of Andhra Pradesh. The total length of Project Stretch is 69.408 km.

The Project Highway Vijayawada- Chilakaluripet section is under PBMC from Km 355+000 to Km 357+342 & from Km 372+038 to Km 422+605 and under HAM from Km 0+000 to Km 16+499. Existing Concessionaire/ Contractor shall operate and maintain the project up to Handover date pursuant to and in accordance with the existing Concession/Contract agreements. The details of agency, section and COD/PCOD date is tabled as below:

Vijayawada-Chilakaluripet section from Km 355+000 to Km 422+605 from Km 0+000 to Km 16+499

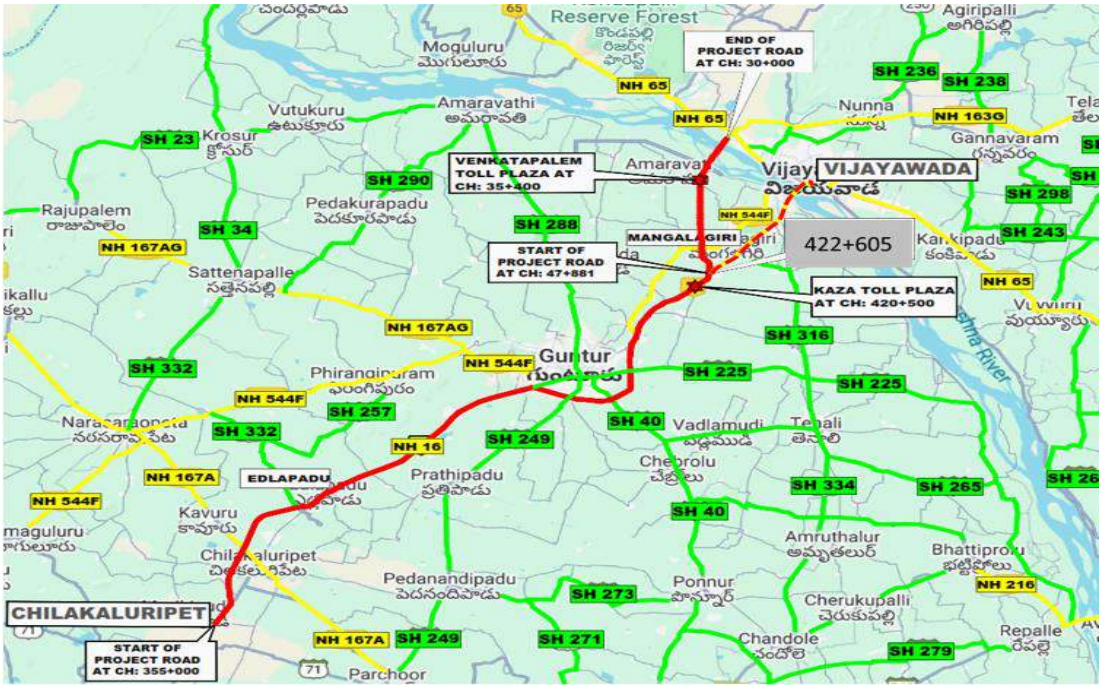
Name of Agency	Mode of Contract	Chainage (Km)		Length	COD/ PCOD	O&M Handover Date
		From	To	(Km)		
	PBMC	355+000	357+342	2.342	-	24.03.2032

Name of Agency	Mode of Contract	Chainage (Km)		Length (Km)	COD/ PCOD	O&M Handover Date
		From	To			
M/S. Shiva Build Tech Pvt. Ltd.		372+038	422+605	50.567		
M/S. Chilakaluripet Bypass Pvt. Ltd.	HAM	0+000	16+499	16.499	29.10.2024	28.10.2039

**O&M Handover date mentioned above are tentative and may vary based on the actual completion date of the project and there will be no financial implication for that.*

Toll is being collected by Toll Collection Agency appointed by NHAI through open competitive bidding.

Project highway is a part of National Highway 16 which is a major Indian highway running along the country's eastern coast, connecting Kolkata, West Bengal, to Chennai, Tamil Nadu. It is a crucial part of the Golden Quadrilateral project. The highway serves important cities including Bhubaneswar, Visakhapatnam, and Vijayawada.



Index Map of Project Highway

Chennai Bypass: Project Stretch starts from Km 0+000 and ends at Km 32+600 of NH-32/ NH-48 and has Vanagram toll Plazas at Km 16+500 and Surapattu at Km 28+600 on project Section in the state of Tamil Nadu. The total length of Project Stretch is 32.600 km.

The Project Highway Chennai bypasss section is under O&M (Annual Maintanance) from Km 0+000 to Km 32+600 and under EPC (Major Maintanance of Pavement) from Km 0+000 to Km 32+600. Existing Concessionaire/ Contractor shall operate and maintain the project up to Handover date pursuant to and in accordance with the existing Concession/Contract agreements. The details of agency, section and COD/PCOD date is tabled as below:

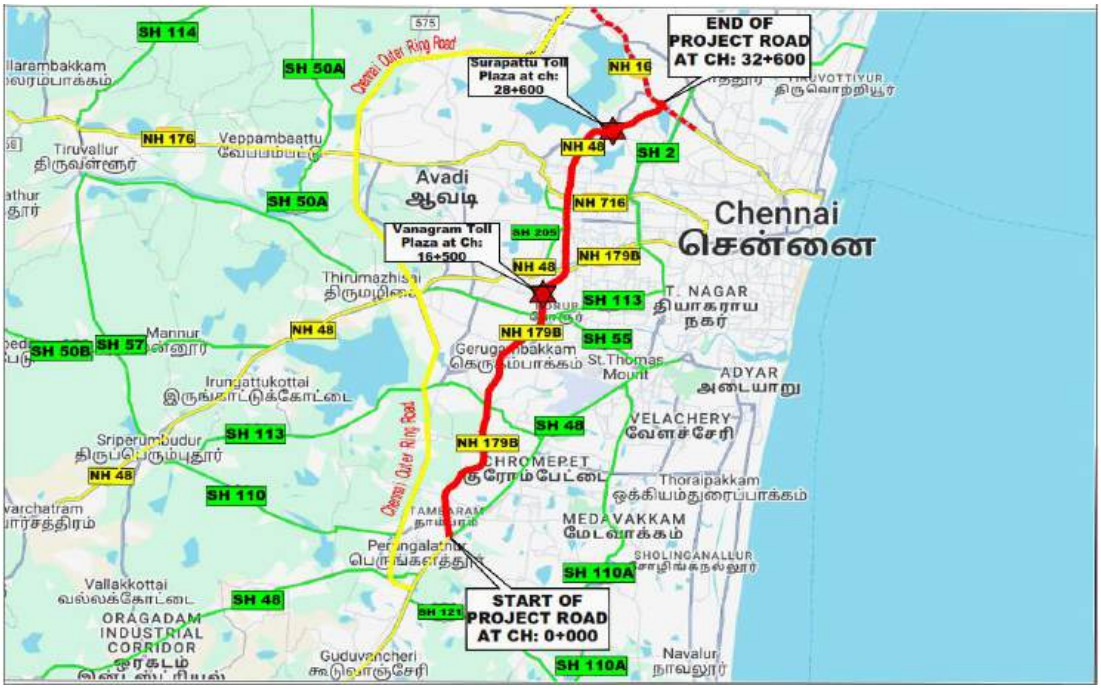
Chennai Bypass section from Km 0+000 to Km 32+600

Name of Agency	Mode of Contract	Chainage (Km)		Length (Km)	COD/ PCOD	O&M Handover Date
		From	To			
M/s. Arjunvaishanvi Infrastructure & Developers Pvt. Ltd	O&M (Annual Maintenance)	0+000	32+600	32.600	-	30.03.2026
M/s Babuji Civil construction	EPC (Major Maintenance)				-	30.05.2028

**O&M Handover date mentioned above are tentative and may vary based on the actual completion date of the project and there will be no financial implication for that.*

Toll is being collected by Toll Collection Agency appointed by NHAI through open competitive bidding.

Project highway is a part of NH-48 and NH-32, National Highway 48 (NH-48), a major national highway connecting Delhi and Chennai, intersects with National Highway 32 (NH-32), which links Chennai to Thoothukudi, near the city of Chennai in Tamil Nadu. Formerly known as the East Coast Road (ECR), NH-32 serves as an important coastal route for transportation, trade, and tourism. NH-48, a much longer highway spanning seven states, is a critical part of the Golden Quadrilateral project.



Index Map of Project Highway

Chennai-Tada: Project Stretch starts from Km 21+400 and ends at Km 54+400 of NH-16 and has Nallur at Km 21+625 on project Section in the state of Tamil Nadu. The total length of Project Stretch is 33.00 km.

The Project Highway Chennai Tada section is under EPC (Six Laning) from Km 21+400 to Km 54+400. Existing Concessionaire/ Contractor shall operate and maintain the project up to Handover date pursuant to and in accordance with the existing Concession/Contract agreements. The details of agency, section and COD/PCOD date is tabled as below:

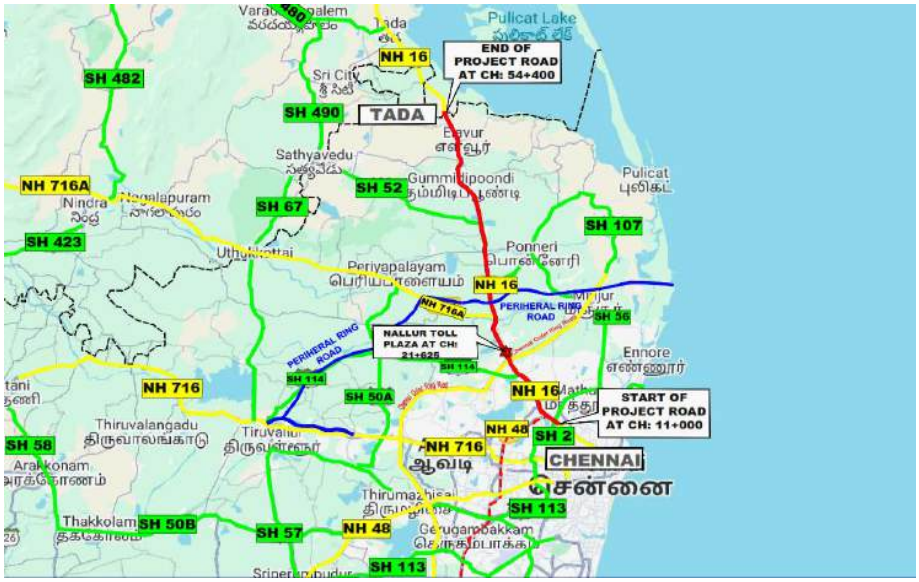
Chennai-Tada section from Km 21+400 to Km 54+400

Name of Agency	Mode of Contract	Chainage (Km)		Length (Km)	COD/ PCOD	O&M Handover Date
		From	To			
M/s. SPL Infrastructure Pvt Ltd	EPC (Six laning)	21+400	54+400	33.000	09.02.2022	09.02.2026

**O&M Handover date mentioned above are tentative and may vary based on the actual completion date of the project and there will be no financial implication for that.*

Toll is being collected by Toll Collection Agency appointed by NHAI through open competitive bidding.

Project highway is a part of National Highway 16 which is a major Indian highway running along the country's eastern coast, connecting Kolkata, West Bengal, to Chennai, Tamil Nadu. It is a crucial part of the Golden Quadrilateral project. The highway serves important cities including Bhubaneswar, Visakhapatnam, and Vijayawada.



Index Map of Project Highway

Note*:- In Chennai-Tada Section From Km 11+000 to Km 21+400 is descoped from Public InvIT-01

Neelmangla-Tumkur Project Stretch starts from Km 29+500 and ends at Km 74+168 of NH-48 and has kulumepalya toll plazas at Km 30+000 and Chokkenahalli toll plaza Km 61+500 on project Section in the state of Karnataka. The total length of Project Stretch is 44.668 km.

The Project Highway Neelmangla- Tumkur section is under EPC (Six Laning) from Km 29+500 to Km 49+900, from Km 61+520 to Km 74+168 is under EPC and DPR is invited for section from km 49+900 to Km 61+520. Existing Concessionaire/ Contractor shall operate and maintain the project up to Handover date pursuant to and in accordance with the existing Concession/Contract agreements.

The section from Km 52+700 to Km 53+500 is an additional stretch along with Km 29+500 to Km 49+900 (EPC six-laning work) and falls under the scope of the EPC Contractor, M/s H.G. Infra Engineering Limited. The stretch from Km 52+700 to Km 53+500 shall be maintained by the EPC Contractor till completion of the DLP period. This section is not part of the DPR invited and does not fall under the scope of M/s Sri Chowdeshwari Concrete India Pvt. Ltd.

Currently, toll is collected at Kulumepalya (Ch. 30+000) and Chokkenahalli (Ch. 61+500). Upon completion of six-laning of the respective stretch, toll collection will be shifted to the new toll plazas at MCW (Ch. 53+100), Ramp RHS (Ch. 53+100), Ramp RHS (Ch. 46+375), LHS Ramp (Ch.49+900) and Ramp LHS (Ch. 47+425), and the existing toll plazas at Kulumepalya and Chokkenahalli will be demolished.

The details of agency, section and COD/PCOD date is tabled as below:

Neelmangla-Tumkur section from Km 29+500 to Km 74+168

Name of Agency	Mode of Contract	Chainage (Km)		Length	COD/ PCOD	O&M Handover Date
		From	To	(Km)		
M/s H G Infra Engineering Ltd.	**EPC (Six laning)**	29+500	49+900	20.4	31.03.2027	31.03.2032
	EPC	61+520	74+168	12.648	31.03.2027	31.03.2032
DPR Invited (Six laning)		49+900	61+520	11.62	30.09.2028	30.09.2033
Sri Chowdeshwari concrete India Pvt. Ltd.	**O&M**	49+900	61+520	11.62	-	05.06.2029

**O&M Handover date mentioned above are tentative and may vary based on the actual completion date of the project and there will be no financial implication for that.*

Toll is being collected by Toll Collection Agency appointed by NHAI through open competitive bidding.

The project highway is a part of National Highway 48 which is a major north-south highway in India, connecting the capital city of Delhi with Chennai in Tamil Nadu. As a critical part of the Golden Quadrilateral network, it is a key economic and infrastructure corridor for the country. The highway passes through seven states: Delhi, Haryana, Rajasthan, Gujarat, Maharashtra, Karnataka, and Tamil Nadu connecting numerous important cities, including Gurugram, Jaipur, Ahmedabad, Mumbai, Pune, and Bengaluru, and facilitates trade, logistics, and economic development along its path.

Index Map of Project Highway

1. SUMMARY ROAD INVENTORY

Detailed inventory of Project Stretch is captured through NSV and field reconnaissance. Salient features like built-up settlements, carriageway dimensions, surface type, junctions, service roads, road furniture etc. are recorded for entire Project Stretch. The road inventory is linked to the existing km stones established along the roadside.

Description	Vijayawada-Chilakaluripet	Chennai Bypass	Chennai-Tada	Neelmangla- Tumkur*	
				Neelmangla-Tumkur	Tumkur Bypass
Length of project stretch	69.408 km	32.600 Km	33.00 Km	32.020 Km	12.648 Km
Lane Configuration	6 Lane with paved shoulder	6 Lane with paved shoulder	6 Lane with paved shoulder	4/6 Lane with paved shoulder	6 Lane with paved shoulder

Description		Vijayawada-Chilakaluripet	Chennai Bypass	Chennai-Tada	Neelmangla- Tumkur*	
					Neelmangla-Tumkur	Tumkur Bypass
Pavement Type	Flexible (m)	68808	32455	32535	31220	12648
	Rigid (m)	600	145	465	800	0
Length of Service/Slip road (m)		121044	43205	67103	40800	24774
Major/ Minor Junction		20 Nos. /218 Nos.	10 Nos. /198 Nos.	10 Nos. /95 Nos.	2 Nos. /46 Nos.	3 Nos. /8 Nos.
Major/ Minor Bridge		3 Nos. /23 Nos.	3 Nos. /3 Nos.	3 Nos. /9 Nos.	2 Nos. /10 Nos.	2 Nos. /8 Nos.
Culverts		90 Nos.	140 Nos.	56 Nos.	50 Nos.	19 Nos.
ROBs/RUBs		1 Nos./0 No	1 Nos./1 No	0 Nos./0 No	2 Nos./0 No	1 Nos./0 No
VUPs/LVUPs/SVUPs		27 Nos	18 Nos	9 Nos	8 Nos	11 Nos
PUPs/CUPs		26 Nos.	2 Nos.	7 Nos.	1 Nos.	-
FOBs		0 Nos.	0 Nos.	1 Nos.	1 Nos.	1 Nos.
Toll Plazas		Kaza (420+500)	Vanagram (16+500) and Surapattu (28+600)	Nallur (21+625)	Kulumepalya (30+000) and Chokkenahalli (61+500)	-

Description	Vijayawada-Chilakaluripet	Chennai Bypass	Chennai-Tada	Neelmangla- Tumkur*	
				Neelmangla-Tumkur	Tumkur Bypass
Bus Bays with shelters/ Bus Shelters	21 Nos.	1 Nos.	36 Nos.	12 Nos.	1 Nos.
Truck Lay Bye	1 Nos.	0 Nos.	0Nos.	2 Nos.	-
Median Openings	4 Nos.	9 Nos.	10 Nos.	12 Nos.	-

For Section-04 Neelmangla Tumkur

*These details are tentative these may varies as per site and same shall be maintained by TOT/InvIT concessionaire after end of DLP period.

CHAPTER 2

OVERVIEW OF NHAI

2.1 NHAI Establishment

The National Highways Authority of India was constituted by an act of Parliament, "The National Highways Authority of India Act, 1988". It is responsible for the development, maintenance and management of National Highways entrusted to it and for matters connected or incidental thereto. The Authority was operationalized in February 1995 with the appointment of full time Chairman and other Members. Additional information about NHAI activities and other details can be found on www.nhai.org. The source of information provided in this report is taken from NHAI website.

2.2 NHAI Vision

"To meet the nation's need for the provision and maintenance of National Highways network to global standards and to meet user's expectations in the most time bound and cost effective manner, within the strategic policy framework set by the Government of India and thus promote economic well-being and quality of life of the people."

2.3 NHDP Mandate

NHDP Programme

Primary mandate is time and cost bound implementation of National Highways Development Project (NHDP) through host of funding options including from external multilateral agencies like World Bank, Asian Development Bank, JBIC etc. Work mainly comprises of strengthening and four laning of high-density corridors around 13,146 Kms.

The components are:

- Golden Quadrilateral - 5,846 Kms connecting Delhi-Kolkata-Chennai-Mumbai
- North-South-East-West Corridor-7,300 Kms connecting Kashmir to Kanyakumari and Silchar to Porbandhar
- Providing Road connectivity to major Ports.

- Involving the private sector in financing the construction, maintenance and operation of National Highways and wayside amenities
- Improvement, maintenance and augmentation of the existing National Highways network.
- Implementation of road safety measures and environmental management.
- Introducing Information Technology in Construction, maintenance and all operation of NHAI.

Bharatmala Pariyojana

NHAI has been entrusted with the development of Bharat Mala Project comprising over 65000 Kms of National Highway and State roads. The objective of programme is to optimize the efficiency of freight and passenger movement across the country by bridging critical infrastructure gaps through development of Economic Corridors, Inter Corridors and Feeder Routes, National Corridor Efficiency Improvement, Border and International connectivity roads, Coastal and Port connectivity roads and Green field expressways. The stretches are to be developed to minimum 4- lane National Highway standards. The Bharat Mala Project will be implemented in two phases.

Construction of a total length of about 24800 Kms is being taken up under Phase-I of Bharatmala Pariyojana. In addition, Phase-I would also include about 10000 Kms of residual works of NHDP programme.

2.3.1 NHAI Organization

- A full-time Chairman heads NHAI. As per NHAI act, there are five full time Members, namely Member (Admn), Member (Finance) and three Members (Technical). There is also four-part time (ex officio) Members of the Authority.
- The Authority has its field offices in the form of Project Implementation Units (PIUs) and Corridor Management Units (CMU) spread all over the country. These units are headed by Project Directors (PD) who are responsible for implementation of various NHDP Projects and operation and maintenance of the completed sections. All procurement related to woks, services, equipment and goods i.e. civil contractors, consultants and suppliers are made by the head office. PDs are also responsible for all pre-construction activities and liaison with the

Departments concerned of Union and State Government for successful implementation of the Projects.

- The Government has approved a proposal of restructuring NHAI. The salient points of the proposal are, inter alia; increase of full-time Members from 5 to 6 and part time Members from 4 to 6, creation of 26 posts at the level of CGM and to build a core of permanent employees of NHAI over a period of time. However, this restructuring will involve amendment of NHAI act. This process has been taken up.
- A detailed organization chart of NHAI is given in Fig. 2.1.

2.3.2 National Highway Development Program (NHDP)

The National Highways have a total length of 70,548 km to serve as the arterial network of the country. National Highways comprise only about 2% of the total length of road network in the country but carry 40% of the road traffic. The development of National Highways is the responsibility of the Government of India. The Government of India has launched major initiatives to upgrade and strengthen National Highways through various phases of National Highways Development Project (NHDP). National Highway Development Project is envisaged to plan, design and construct a network of world class highways to support the economic growth of the country. Infrastructure in India has been found to be a bottleneck/ speed breaker for the trade and business, poverty alleviation and economic growth of the country.

National Highways Development Project is being implemented in 7 phases, which are briefly as under:

- NHDP Phase-I: NHDP Phase-I was approved by Cabinet Committee on Economic Affairs (CCEA) in December 2000 at an estimated cost of Rs30,000 crore comprises mostly of GQ (5,846 km) and NS-EW Corridor (981km), port connectivity (356 km) and other national highways (315 km), with a total of 7498km.
- NHDP Phase-II: NHDP Phase-II was approved by CCEA in December 2003 at an estimated cost of Rs. 34,339 crores (2002 prices) comprises mostly NS-EW

Corridor (6,161 km) and other National Highways of 486 km length. The total length of Phase II is 6,647 km.

- NHDP Phase-III: Government approved on 5.3.2005 up gradation and 4 laning of 4,035 km of National Highways on BOT basis at an estimated cost of Rs. 22,207 crores (2004 prices). Government approved in April 2007 up gradation and 4 laning at 8074 km at an estimated cost of Rs. 54,339 crores.
- NHDP Phase-IV: Government approved on 31.10.2013 up gradation and 4 laning of 20,000 km of National Highways out of which 14,799 km as assigned to NHAI remaining Km with MORT&H.
- NHDP Phase-V: CCEA has approved on 5.10.2006 six laning of 6,500 km of existing 4 lane highways under NHDP Phase V (on DBFO basis). Six laning of 6,500 km includes 5,700 km of GQ and other stretches.
- NHDP Phase-VI: CCEA has approved on November 2006 for 1000 km of expressways at an estimated cost of Rs. 16680 crores.
- NHDP Phase-VII: CCEA has approved on December 2007 for 700 km of Ring Roads, Bypasses and flyovers and selected stretches at an estimated cost of Rs. 16680 crores.

National Highway Development Project is envisaged to plan, design and construct a network of world class highways to support the economic growth of the country. Infrastructure in India has been found to be a bottleneck/ speed breaker for the trade and business, poverty alleviation and economic growth of the country. An advantage of providing well developed network of highways is as follows:

- Savings in vehicle operating costs by reduced fuel consumption and maintenance costs
- Travel time saving by faster and comfortable journeys
- Safer travel
- Benefits to trade especially in movement of perishable goods
- Reduce demographic shift to urban areas
- Poverty alleviation and all round development of areas

NHDP's focus is on developing International standard roads with facilities for uninterrupted flow of traffic with:

- Enhanced safety features
- Better Riding Surface.
- Better Road Geometry
- Better Traffic Management and Noticeable Signage.
- Divided carriageways and Service roads
- Grade separators
- Over bridges and Underpasses
- Bypasses
- Wayside amenities

2.3.3 Components of Bharatmala Pariyojana

a. Economic Corridors:

These are identified Highway Corridors of Economic importance and are expected to carry of freight in the coming years. Around 2620 km of Economic corridor have been identified to be developed as Economic corridors out of which 9000 Kms are being taken up in Phase-I of the program.

b. Inter-corridor and feeder roads to National and Economic Corridors:

Around 8000km of inter-corridor and around 7500km of feeder roads have been identified, out of which 6000kms are being taken up in Phase-I of the program.

c. National Corridors Efficiency Improvement:

The Golden-Quadrilateral and NS-EW corridors carry 35% of India's freight and would be declared as National corridors. Lane expansion and de-congestion of existing National Corridors through Ring roads and bypasses/elevated corridors will be undertaken. Around 5000kms are being taken up under this category in Phase-I of the program.

d. Border and International connectivity roads:

Around 3300km of border roads have been identified to be built along the international border for their strategic importance. Around 2000 km roads are required for connecting India's major highway corridor to International trade points so as to facilitate Export-Import (EXIM) trade with neighbouring countries. Around 2000 Kms are being taken up under this category in Phase-I of the program.

e. Coastal and Port connectivity roads:

Around 2100 km of coastal roads have been identified to be built along the coast of India, to boost both tourism and industrial development of the coastal region. Around 2000 km of port connectivity to non-major ports. Around 2000kms are being taken up under this category in Phase-I of the program.

f. Green-Field Expressways:

Certain sections of National and economic corridors with traffic exceeding 50000 PCUs have developed several choke points. Around 1900 km of these stretches have been identified for development of green-field expressways. Around 800kms are being taken up under this category in Phase-I of the program.

The Phase-I of Bharatmala Pariyojana program is to be implemented over a period of five years i.e. FY 2017-18 to FY 2021-2022. The Summary of components identified under Phase-I and the approved outlay for the same is given below:

Table 2-1 : Components of Bharatmala Pariyojana

S. No.	Components	Length (km)	Outlay (Crores)
A.	Bharatmala		
1	Economic corridors developments	9000	120000
2	Inter-corridor & feeder roads	6000	80000
3	National Corridors Efficiency improvements	5000	100000
4	Border & international connectivity roads	2000	25000
5	Coastal & port connectivity roads	2000	20000
6	Expressways	800	40000
	Sub Total	24800	385000
B.	Balance Road Works under NHDP		150000
	Total		**535000**

Finance Mechanisms: NHAI proposes to finance its projects by a host of financing mechanisms. Some of them are as follows:

The Government of India- Budgetary Allocation

In a historic decision, the Government of India introduced a Cess on both Petrol and Diesel. This amount at that time (at 1999 prices) came to a total of approximately Rs. 2,000 crores per annum. Further, Parliament decreed that the fund so collected were to be put aside in a non-lapsable Central Road Fund (CRF) for exclusive utilization for the development of a modern road network through Central Road Fund Act 2000. The developmental work that it could be tapped to fund, and the agencies to whom it was available were clearly defined as follows:

- Construction and Maintenance of State Highways by State Governments.
- Development of Rural Roads by State Governments.
- Construction of Rail over- bridges by Indian Railways.
- Construction and Maintenance of National Highways by NHAI and Ministry of Road Transport & Highway.

In 2016-2017 the total collection in CRF was about Rs. 80,800 cr.

Loan Assistance from International Funding Agencies

Loan assistance is available from multilateral development agencies like Asian Development Bank and World Bank or Other overseas lending agencies like Japanese Bank of International Co - Operation.

Market Borrowing

Government is allowing NHAI to tap the market by issuing Infrastructure bonds and support the NHDP.

Private Sector Participation

Major policy initiatives have been taken by the Government to attract foreign as well as domestic private investments. To promote involvement of the private sector in

construction and maintenance of National Highways, Projects are offered on Build Operate and Transfer (BOT) basis to private agencies. After the concession period, which can range up to 30 years, this road is transferred back to NHAI by the Concessionaries. NHAI funds are also leveraged by the setting up of Special Purpose Vehicles (SPVs). The SPVs borrow funds and repay these through toll revenues in the future. Some more models have emerged for better leveraging of funds available with NHAI such as Annuity, which is a variant of BOT model.

2.3.4 Government Policy Initiatives

Policy Initiatives for Attracting Private Investment

- Government will carry out all preparatory work including land acquisition and utility removal. Right of way (ROW) to be made available to concessionaires free from all encumbrances.
- NHAI / GOI to provide capital grant up to 40% of project cost to enhance viability on a case to case basis
- 100% tax exemption for 5 years and 30% relief for next 5 years, which may be availed of in 20 years.
- Concession period allowed up to 30 years
- Arbitration and Conciliation Act 1996 based on UNICITRAL provisions.
- In BOT projects entrepreneur are allowed to collect and retain tolls
- Duty free import of specified modern high capacity equipment for highway construction.

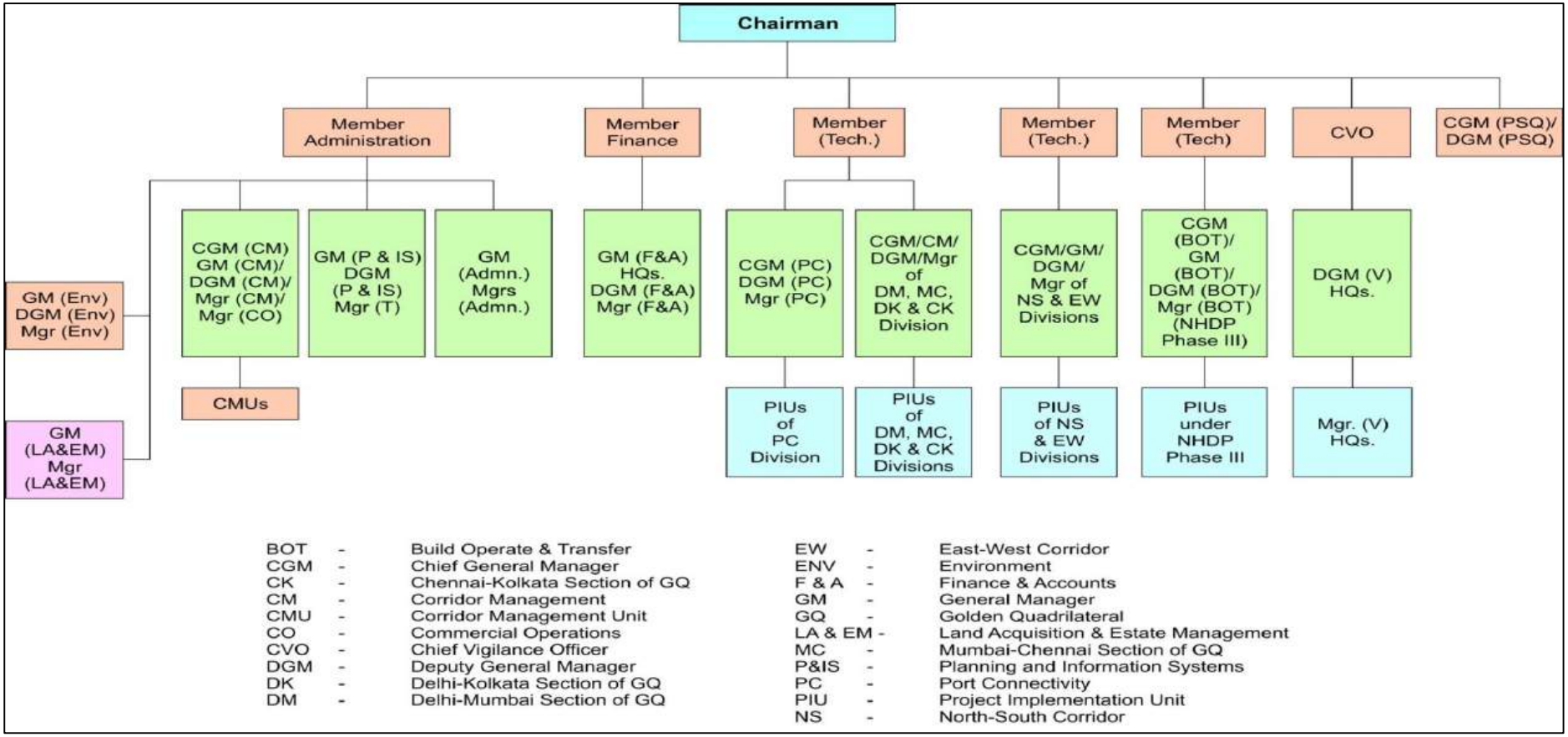


Figure 2-1– Organization Chart of NHAI

CHAPTER 3

METHODOLOGY ADOPTED

3.1 General

The broad methodology as outlined in the Inception Report, prepared on the basis of Scope of Work mentioned in the Terms of Reference, has been generally followed, with certain additions as felt necessary during conducting the study. The methodology has been described in details in the following sections.

3.2 Secondary Data

Secondary data related to Project Stretch are collected from various authorities, institution etc. and reviewed for understanding the Project Stretch. Following are the list of relevant documents collected, reviewed in this study.

- As Build drawings
- Highway and structure inventory
- ROW details
- Accident data

3.3 Survey and Investigations

Physical condition of Project Stretch is assessed based on data captured through various surveys and investigations. Details of all these surveys and investigations are presented in next few sections.

3.3.1 Site Visit (Visual Inspection)

Site visit was made by the team of engineers in the month of July to September 2025. The following parameters were recorded during site visit:

Detailed reconnaissance of the project area and recorded important features and that is importance in terms of operation & maintenance of the project.

Consultant recorded following features of project

- Existing pavement condition

- Intersecting/Crossroads
- Major water bodies
- Major CD structures
- Bottlenecks in road alignment
- Operational Issue, if any
- Visual inspection and assessment of the condition of the pavement surface
- Visual inspection and assessment of the condition of all major structures such as Bridges, ROBs, Flyovers, underpass and cross drainage structures in accordance with IRC: SP 18
- Review and assessment of Highway Traffic Management System (HTMS) and Toll Management System (TMS) along with scope of WIM and ETC
- Inventory of various elements of TMS and HTMS systems along with their remaining life
- Collection of local material aggregates, sand, cement rates
- Review of construction sites where facilities (e.g. service road, flyover, toll plaza etc.) are to be provided as per Schedule B of CA.

3.3.2 Pavement Investigation and Asset Inventory (NSV)

To access condition of existing pavement and assets, investigations are carried out using Network Survey Vehicle (NSV). Details of these investigations are presented in following sections.

Network Survey Vehicle

Network Survey Vehicle is manual method where each and every distress needs to assess using video data. In this systems all outputs are linked via a highly accurate distance measuring instrument and DGPS system. It allows all the data to be collected in a single pass consequently minimising both the cost and the time needed to complete the data collection.

Chaitanya Project Consultancy Ltd utilises a team of trained and experienced field staff. Having Network Survey Vehicle for all customised needs of client's requirement. We will deploy the team and our professional staff for data collections.

Figure 3-1 : NSV Survey along the project Stretch

Features

- Fully integrated system with common data and survey control referencing
- Enables safe and efficient data collection for both urban and rural surveys
- Survey time is reduced by collecting all condition data and imagery in a single pass.

Applications

- Network and project level road data collection
- Routine pavement monitoring surveys
- Roadside inventory and asset management

Laser Profile System

The data collected includes: International Roughness Index (IRI), Ride Number (RN), Rut Depth and Longitudinal / Transverse Profile of Road.

- **Features**

1. Operational at highway speeds to reduce survey time and costs.
2. Measurements possible on all sealed surfaces.
3. Data is linked to Chainage and GPS coordinates.

- **Applications**

1. Network level surveys with international standard results
2. Accurate quality assessments
3. Baseline information of road

- **Available Output**

1. Roughness
2. Longitudinal profile
3. Transverse profile
4. Rutting
5. Distance

- **Digital Imaging System**

The system comprises the latest digital camera technology and produces crisp, high-resolution video frames to ensure a continuous digital record of the roadway. The calibrated video cameras accurately log digital images of roadside assets against other parameters such as distance and GPS.

- **Features**

1. Provides continuous, high-resolution, full-coloured digital images.
2. Uses .AVI storage files.
3. Data is linked to Chainage and GPS coordinates.
4. Operational at highway speeds to reduce survey time and costs.
5. Images can be used to measure, geo-reference and note points of interest.

- **Applications**

1. Visual identification of roadside features and assets
2. Right-of-way roadside condition assessment

3. Asset location for GIS applications
4. Road safety assessment

- **Available Output**

1. Digital imagery
2. GPS location / distance

- **Criteria for Analysis**

From the digital images, a host of information are extracted. This information is linearly (Chainage) and spatially (GPS) referenced. The information extracted is presented in the table below:

Table 3-1 : NSV Information extracted from NSV

Coding Parameters	Coding Type
General Features and Utilities	
Built up Area	Length
Avenue plantation / Roadside arboriculture	Present/Not Present
Wayside amenities, Bus bays, truck lay Bye, etc...	Present/Not Present
Main Carriageway Features	
Pavement type	Bituminous, Concrete
Junction (Major / Minor & X / T/ Y) & type of road crossing / merging	Type
Carriageway width (lane wise)	Width
Paved shoulder (width)	Width
Earthen shoulder (width)	Width
Footpath (physical condition)	Present/Not Present, Condition
Drain width (lined & Unlined, along with general condition)	Lined/Unlined, Condition
Median (width)	Width
Median opening (length)	Length
Road markings (lane wise)	Condition
Presence of Road Studs (Lane wise) - Yes / No	Yes/No
Sign boards identifications (both sides of carriageway) – Type	Present/Not Present
Gantry boards identifications	Present/Not Present
Kilometre & hectometre stones	Present/Not present
Guard rails	Present/Not present Condition
Safety barriers – Type and Physical Condition	Present/Not present Condition

Coding Parameters	Coding Type
Delineators	Length
Guard / guide posts	Length
Street Light and High Mast Light	Type
Location of Structures	Type
Service Road	
Pavement type	Bituminous, Concrete
Carriageway width (lane wise)	Width
Drain width (lined & Unlined, along with general condition)	Lined/Unlined, Condition
Road markings (lane wise)	Condition

3.3.3 Falling Weight Deflectometer (FWD)

Structural Condition of pavement is evaluated using Falling Weight Deflectometer (FWD) and subsequent analysis is carried out to ascertain the relative performance of the pavement for all Project Stretches, in the context of evaluating residual life, overlay and other maintenance requirements.

Methodology of Falling Weight Deflectometer

Falling Weight Deflectometer is a non-destructive pavement testing device which provides accurate data on the response of the pavement (specifically the surface deflection bowl) to dynamic loads by simulating actual wheel loads in both responses and duration. This allows more accurate and rapid measurement of pavement deflection under load than traditional methods.

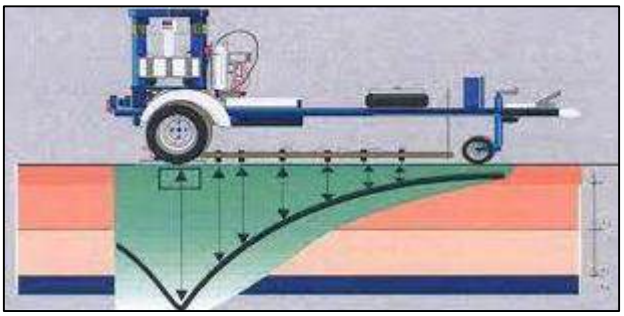


Figure 3-2: FWD Survey arrangement

A dynamic load is generated by the dropping of a mass from a pre-set height onto a 300 mm diameter plate. The magnitude of the load and the pavement response are measured by a load cell and nine geophones. One geophone is located immediately under the load, whilst the others are located at variable offsets from the centre of the load. The test load is varied between 7 and 150 KN to meet the requirements of the particular task and the pavement response for up to four different magnitudes of load are measured during any test sequence. The offsets of the geophones can be set to any distance up to 1800 mm from the centre of the load and a typical sequence is completed in approximately one minute. Highly accurate deflection bowl measurements are therefore obtained; therefore, it is very useful for carrying out large-scale pavement surveys. The FWD is integrally mounted on a trailer which is towed by a dedicated vehicle. All testing is controlled by a personal computer which is located in the vehicle towing the FWD. As a result, only one operator is required to conduct a survey on most occasions making it less labour/ equipment intensive than traditional methods.

Working Principle

- A set of weights is dropped onto a platform with springs (rubber buffers) and the impact load is transferred to the pavement through a loading plate.
- The load simulates the dynamic load from a truck.
- Normally, the load applied on road pavements is 40 KN.
- When subjected to a load, the pavement will bend and a deflection bowl is created. The deflections at various distances from the loading centre are recorded by the sensors (geophones) and stored in a data file.

Data Collection

Methods of data collection using FWD are described in steps given below.

- Preparing the FWD unit for deflection testing
- Bringing the FWD to a stopped position at the beginning of the test section, centred on the outside wheel path (or specific position), and take a measurement by applying load using following sequence: One settling drop to ensure proper contact. Three drops with an applied load of 40 KN ± 10% (or Specified Load).

- Deflections are recorded from the sensors located at the centre of the loading plate for each drop except the settling drop.
- Along with these deflection data, the parameter like Chainage, Temperature, Date and Time and position of Sensors will also be recorded.
- After each measurement, drive the FWD forward to next measurement point.

Figure 3-3: FWD Survey

Analysis Stages:

Analysis including back calculation of layer moduli and remaining life analysis is done on the basis of standard procedure and guidelines as give in IRC 115 and KGPBACK.

3.3.4 Test Pits, Core Cutting and Material Investigations

As per the Scope of Work mentioned in the RFP, the following field observations are carried out

1. Pavement Composition of the Project Stretches

2. Subgrade Characteristics and Strength

Visual inspection of the existing pavement condition has been carried out prior to commencement of pavement investigation work to finalize the test pit and core cutting locations.

Test Pits, Core Cutting and Material Investigations

Field studies are carried out to assess the adequacy of the pavement layers and effectiveness of the existing pavement layers. Efforts are made to examine the condition of existing sub-grade, and WMM by taking sample test pits of 1m x 1m at every 5 km interval at the interface of paved shoulder and earthen shoulders. Pavement composition details (pavement course, material type, and thickness) are recorded at every test pit.

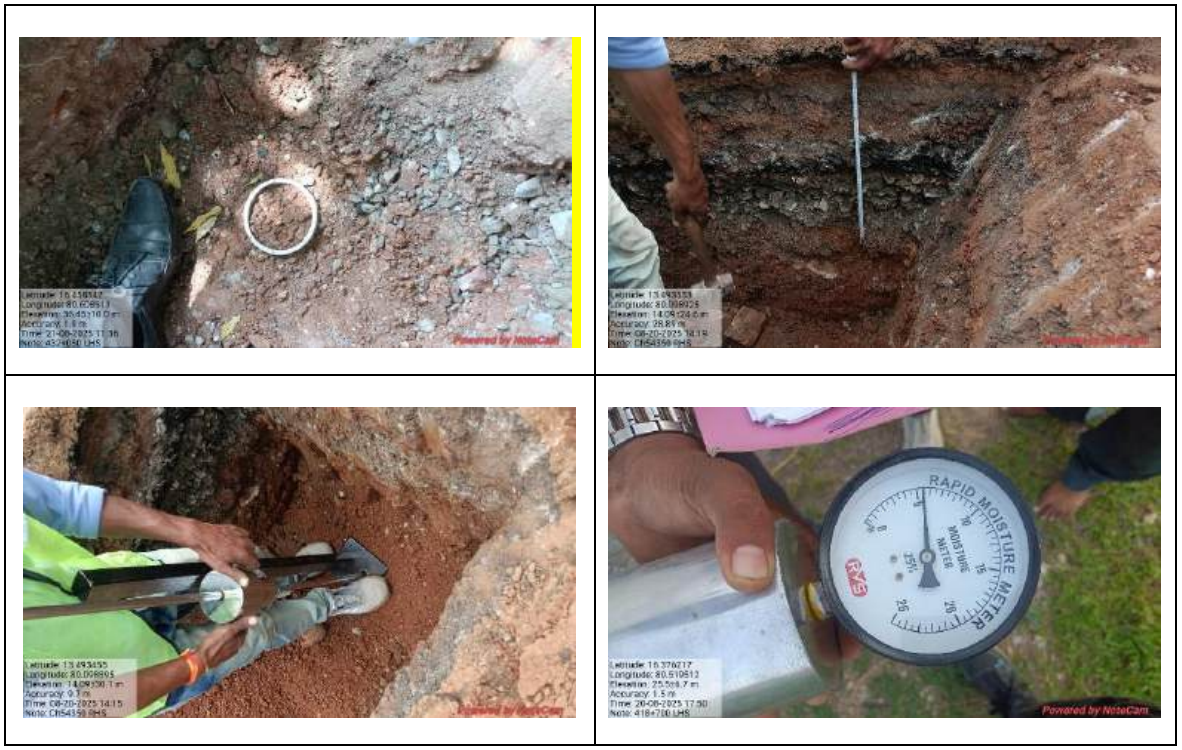


Figure 3-4: Test pit Survey

The various in-situ tests conducted and laboratory tests included in the testing program on soil, GSB and WMM samples along the alignment as per the requirements are summarized below:

Field Tests on Soil Subgrade

- Field Moisture Content & Field Dry Density Determination
- Filed CBR using Dynamic Cone Penetrometer at each test pit
- Laboratory Tests on Subgrade Soil Sample

- Soil Classification, Sieve Analysis, Atterberg Limits
- Laboratory Proctor Compaction Test
- 4 day soaked CBR Test
- Free swell index

Material Investigations:

The activities performed for material investigations include -

- Identification of potential sources near project stretch (including use of fly-ash/slag), quarry sites and borrow areas.
- Collection of samples and conducting relevant laboratory tests.
- Evaluation of test results and assessment of the suitability thereof for incorporation in various works and making recommendation on the use of the materials from different sources based on techno-economic principles.
- Assess adequacy of quality and quantities of various construction materials available.
- Preparation of mass haul diagram and quarry charts indicating the location of selected borrow areas, quarries and the respective estimated quantities
- Preparation and testing of bituminous mixes for various layers and concrete mixes of different grades using suitable materials (binders, aggregates, sand fillers etc.) as identified during material investigation to conform to latest specifications

The equipment's used during investigations include hand tools like crow bars, spades, wedges etc. for collecting representative samples. The samples are packed in suitable bags, labelled and sent to laboratory for testing. Samples of stone aggregates are collected from existing crushers using the stone from the respective quarries.

The Material Expert has reviewed all the laboratory test results for consistency and compatibility. For example, for soils and other granular materials, the quality given by classification and maximum dry density results are compared against that given by CBR. For rock samples, the specific gravity, water absorption and the aggregate impact values are checked.

Table 3-2 : Crusher Detail

Section No.	Section Name		Source	Latitude	Longitude
	From	To			
Section-1	Chlakaluripet	Vijayawada	377+480 (LHS)	16.192188	80.248731
			425+400 (LHS)	16.416153	80.565323
			426+600 (RHS)	16.42226	80.574327
Section-2	Chennai Bypass		4+500 (LHS)	12.95049	80.110187
			31+300 (RHS)	13.146127	80.203975
Section-3	Chennai	Tada	17+150 (RHS)	13.185623	80.1925
			44+300 (LHS)	13.409205	80.120062

3.3.5 Road Safety Audit

Methodology for identification of road safety concerns and development of improvement proposals along the project Stretches is listed in following steps.

i. Review of past data and identification of accident blackspot locations along the Project Stretches.

ii. Field investigations to understand the current safety concerns along the Project Stretches and specifically at the identified accident prone locations.

iii. Identification and prioritization of improvement proposals based on requirements as immediate, medium term and long term to provide safer driving conditions.

The detailed methodology followed the safety enhancement along the Project Stretches is described in further sections.

Review of Past Data and Identification of Accident Blackspot locations

Available past accident data on the Project Stretches are collected from NHAI and analysed in detail w.r.t. location, severity, number of accidents, causes of accidents etc. In addition to analysis of accident data, already identified blackspot locations by NHAI PIU are studied.

Field Investigations to understand Safety Concerns along the Project Stretch

Safe Road Environment along the highway depends upon condition of various components of the highway such as alignment, provision and placement of street furniture, intersection geometry, availability of adequate sight distance, night vision along the highway, etc. It is essential to understand all these aspects on the highway from safety point of view. For this purpose, the team of Certified Road Safety Auditor/Engineer and Transport Planner has carried out detailed site reconnaissance.

Figure 3-5: Road Safety Audit

Following details are recorded during the field investigations.

- Status of current signboards along the Project Stretch i.e. - condition, location, visibility in day and night, etc.
- Current arrangement at intersections, pedestrian crossings, adequacy of the same all along the Project Stretch.
- Condition of Service Roads and their intersection with main carriageway
- Identifying reasons for accidents at the identified accident prone locations such as – improper visibility, inadequacy of signage and information, inappropriate geometrical design, etc.
- Identification of locations for minor and major improvements

The above details are observed and recorded along the Project Stretches during the day as well as at night. Along with manual observations, entire Project Stretch is video graphed. In addition to above, current conditions of road furniture are obtained from Network Survey Vehicle.

Identification and Prioritization of Improvement Proposals along the Project Stretches:

As described above, details related to current situation of various road furniture and geometrical aspects are recorded during the field investigations. Along with current situations, the improvements required at various locations are also identified. Project Stretches were developed almost before a decade or more as a part of Golden Quadrilateral. While suggesting the improvement measures, Provisions of latest standards and best practices are taken in to consideration. IRC: SP:87-2019, Manual of Specifications and Standards for Six Laning of Highways (Second Revision) and latest specifications are followed for improvement proposals. Identification of safety improvement proposals are classified as immediate and long-term Improvement Proposals. Some of the proposals listed as below:

- **Immediate Proposals** – New Service Roads, Improvements in road furniture such as Sign Boards, Pavement Markings, Safety Barriers, Pedestrian Guard Rails, Street Lights, blinkers etc.
- **Long-term Proposals** – Major improvement proposals such as provision of underpasses, flyovers, corridor improvements etc.

Above safety improvement proposals are prioritised and finalised using the following parameters:

- Urgency of need for improvement
- Ease of implementation
- Cost of improvement

3.3.6 Structural Investigations

Inventory and condition survey of structures are the two most essential requirements for operation and maintenance of highway structure. These tasks are carried out as per procedure and guidelines corresponding to IRC: SP: 35. As part of this activity, detailed inventory and condition survey are carried out for all the existing structures in the Project Stretch.

Inventory and Visual Condition Survey

Salient features for which data is collected as part of inventory survey are in accordance with IRC: SP: 35 Performa. Main features recorded as part of inventory survey are listed below:

- Bridge number/ Name
- Location (Chainage)
- Type of structure (Major bridge, minor bridge, pipe culverts, box culverts, slab culverts, underpasses, flyovers etc.) and year of construction if available from records.
- Span Arrangement details like numbers of spans, span length, vent height from deepest stream bed level.
- Details and type of vehicle restraint systems such as safety barriers or R.C.C railing or parapet wall.
- Clear width and overall width of structure.
- Main features recorded as part of detailed condition survey are listed below.
- Condition of wearing coat such as potholes, cracks, and patches.
- Condition of expansion joints such as bump in riding, leakage in expansion joint, damaged sealing compound, silt and debris filled in expansion joint gap.
- Damaged and missing details of RCC railing/ safety barrier/ parapet wall.

- Damaged and missing details of drainage spouts and down take pipes extended below the soffit of deck slab, status of drainage spout chambers filled with debris and silt and missing or damaged gratings, covered on rainwater collection chambers.
- Spalling of concrete from super structure and sub structure elements.
- Delamination in girders, soffit of deck slab and substructure.
- Corroded reinforcement exposed anywhere in deck slab and substructure.
- Mapping of cracks in girders, deck slabs, sub structure.
- Visible voids and honey combing in concrete surfaces.

Scouring near foundations and damage to ***protection*** works.

Figure 3-6: Inventory and Condition Surveys of Existing Structures

3.3.7 Toll Plaza System Audit

Existing toll plazas including infrastructure, toll management system (TMS, if any) and operational activities are inspected thoroughly for understanding their suitability and deficiencies. A team of TMS expert and technical assistants have visited and reviewed all toll plazas. During the site visit, information related following heads are collected.

Lane terminals; software and database components related to lane terminals and lane operation

- Operation and health of plaza servers
- All system generated reports
- Audit procedure
- Cash-up procedure
- Point of Sale (POS)
- Incident generation and validation management

Vijayawada-Chilakaluripet (Km 355+000 to Km 422+605)

Kaza toll plaza at km 420+500

Chennai Bypass (Km 0+000 to Km 32+600)

Vanagram Toll Plaza at Km 16+500

Surapattu Toll Plaza at Km 28+600

Chennai Tada (Km 21+400 to Km 54+400)

Nallur Toll Plaza at Km 21+625

Neelmangla-Tumkur (Km 29+500 to Km 74+168)

Kulumepalya Toll Plaza at Km 30+000

Chokkenahalli Toll Plaza at Km 61+500

Figure 3-7: Toll Plaza Inventory

3.4 Schedule of Investigations

The following table presents schedule for all investigations outcomes of which are presented and used in this report.

Table 3-3 : Schedule of Investigations

S. No.	Description of Works	Stretch Name			
		Vijaywada-Chilakaluripet	Chennai Bypass	Chennai Tada	Neelmangala-Tumkur
1	Road and Structure Inventory and Condition Survey	31-07-2025	09-08-2025	14-08-2025	21-08-2025
2	Test Pit and Core Cutting	02-08-2025	11-08-2025	16-08-2025	23-08-2025
3	MBIU Survey	31-07-2025	09-08-2025	14-08-2025	21-08-2025
4	NSV Survey	31-07-2025	09-08-2025	14-08-2025	21-08-2025
5	FWD Survey	31-07-2025	09-08-2025	14-08-2025	21-08-2025
6	Topographic Survey (Arial Lidar)	13-08-2025	20-08-2025	23-08-2025	30-08-2025
7	Retro Reflective Survey	10-08-2025	17-08-2025	20-08-2025	27-08-2025

CHAPTER 4

INDICATIVE DESIGN STANDARD METHODOLOGY AND SPECIFICATION

4.1 General

The design standards for improvement proposals of the Project Stretch are adopted after reviewing the relevant latest Indian Roads Congress Codes (IRC), Manual of Specifications and Standards for Six Laning of Highways published by Indian Road Congress and international standards such as AASHTO etc:

Table 4-1 : IRC Codes adopted for the Highway Design

IRC Code	Description
IRC: 32-1969	Standard for vertical & horizontal clearances of overhead electric power and telecommunication lines as related to roads
IRC: 35-2015	Code of practice for road markings
IRC: 37-2019	Guidelines for the design of flexible pavements
IRC: 67-2022	Code of practice for road signs
IRC: 73 – 1990	Geometric Design Standards for Rural (Non-Urban) Highways
IRC: 98-2011	Guidelines on accommodation of utility services on roads in urban areas
IRC: 103-2012	Guidelines for pedestrian facilities
IRC: SP-42-2014	Guidelines on road drainage
IRC: SP-50-2013	Guidelines on Urban drainage
IRC: SP-41-1994	Guidelines for the design of At-Grade intersection in rural & urban areas
IRC SP 84- 2019	Manual of Specifications and Standards for Four Laning of Highways (Second Revision)
IRC SP 87- 2019	Manual of Specifications and Standards for Six Laning of Highways (Second Revision)

4.2 Lateral and Vertical Clearances at Underpasses for Vehicular Traffic as per IRC

Wherever a cross road is proposed to be taken below the Project Stretch, minimum clearances at underpasses are provided as given below:

S. No	Type of Underpass	Vertical Clearance	Horizontal Clearance
1.	VUP	5.5m	20m
2.	LVUP	4m/ 4.5m	12m
3.	SVUP	4m/ 4.5m	7m

4.3 Service Roads

Design speed

A minimum design speed of 40 kmph shall be adopted for service roads.

Width of Service road

(i) Width of Service Road: 7.50 m (minimum)

(ii) Merging as per IRC SP 84 or atleast with taper at merge: 1 in 15 beyond design length.

Width should be minimum 7.5 m as per Manual and Specification of 4-laning; however, 7/5.5 m width is proposed at some sections due to unviability of required Row.

4.4 Traffic Safety Features, Road Furniture, Road Markings and Other Facilities

For safety and operational reasons, it will be necessary to provide suitable safety features, road furniture and other facilities along the project road. These features will include safety barriers, road signs, road markings, road lighting, route markers, kilometre and hectometre stones, road delineators, ROW pillars, parking areas & rest areas, bus stops/bays, and landscaping. Where possible these features will be provided in accordance with relevant IRC or other standard, as detailed below. If no IRC Codes or MORTH Specifications are available, international standards such as BIS /AASHTO/ ASTM /British Standards should be used in detail

Safety Barriers - Traffic barriers to be provided as per IRC: 119-2015, Traffic barriers are protective devices that are placed between traffic and a potential hazard off the roadway, with the intention of reducing the severity of a collision when an errant vehicle leaves the travelled portion of the roadway.

Barriers are to be provided at high embankments, sharp curves and bridge approaches. The barrier is to be located in unpaved shoulders.

Road Signs - Road signs are to place according to IRC: 67-2012. The signs are to be placed on embankment such that extreme edge of sign would be 2.0m away from the edge of the carriageway. The location of each sign is to be decided in accordance with the guidelines therein.

Road Markings - Road markings shall be as per IRC: 35-2015. These markings shall be applied to road centre lines, edge line, continuity line, stop lines, give-way lines, diagonal/chevron markings, zebra crossing and at parking areas. The approach noses of the traffic islands will be marked for additional guidance of traffic by means of diagonal markings and chevrons.

Highway Lighting - Solar Street light system is proposed to be provided at the junctions provided in or nearby urban/semi-urban areas and over/ underpass/ flyovers. Lighting is also proposed to be provided at truck terminals, if any. In case of truck rest areas, the lighting shall be provided. It is proposed to provide solar lights with maintenance free battery or operation & maintenance of such streetlights may be given to

the same supplier.

Solar blinkers at Median opening - Traffic blinkers powered with solar energy required at the gaps in median openings. Adequate solar blinkers at every gap in median shall be provided.

Transverse Bar markings/ Rumble strips - Provide transverse bar markings before median openings, where the need for alerting the drivers for reduction in speed is desired. Rumble Strips are formed by a sequence of transverse strips laid across a carriageway.

Kilometre / Hectometre Stones / Posts - The design and placement of Highway kilometre stones, their dimensions, size, colour and arrangement of letters shall be as per IRC: 8-1980. For the 200-metre stones,

IRC:26-1967 shall be applied.

Road Delineators - The design and location for road delineators shall be as per IRC: 79-1981

4.5 Pavement Design

The design and construction of new pavement sections and of strengthening measures (overlay) for the existing pavement shall be carried out in accordance with the criteria, standards and specifications given in the IRC SP 84:2019. Where alternative specifications or materials are proposed to bring in innovation

in design etc., provisions of Paras 1.9 and 1.11 of IRC SP 84:2019 Manual shall apply.

- The design of new pavement sections or strengthening of existing pavements shall take into account all relevant factors for assuring reliable performance and shall also satisfy the specified minimum performance requirements.
- The Concessionaire shall undertake the necessary soil, material and pavement investigations, traffic volume and axle load studies in accordance with the good industry practice for preparing detailed designs.
- The materials, mixes and construction practice shall meet the requirements prescribed in the MORTH/IRC Specifications.
- Where problematic conditions such as expansive soils, swamps or marshes, flooding, poor drainage, frost susceptible areas etc. are found to exist, adequate measures shall be adopted to deal with such site conditions.

4.6 Toll Plaza

The Concessionaire shall provide the Toll Plazas at the locations specified in Schedule 'B' for collection of toll fee as per the Concession Agreement. The fee collection system shall be speedy, efficient and user friendly. The design of the Toll Plazas should be such that they are aesthetically pleasing and efficient and the fee collection staff should be quick, courteous and adequately trained before deployment.

The total number of toll booths and lanes shall be designed as per latrest circular policy for a period of 10 years. Refer ch.11 for details.

4.7 Lighting

i. The Concessionaire shall provide lighting at locations of the Project Highway specified in Schedule 'C' using appropriate system and source of electric power as per the requirements of IRC SP 87:2019.

ii. The Concessionaire shall make suitable arrangements for procuring power supply to ensure uninterrupted lighting during night and when visibility is low, including provision of DG sets as standby arrangements.

The Concessionaire shall bear all costs of procurement, installation, running and operation cost of all lighting.

CHAPTER 5

SOCIO AND ECONOMIC PROFILE OF INFLUENCE AREA

5.1 Introduction

This Chapter provides a socio-economic profile and the relative status of the state and districts. The aspects covered include demography, employment pattern, state income and major economic sectors including transport infrastructure. The profile discusses the past performance and the present scenario and also presents a broad assessment of the perspective growth of the economy as a basis for estimating the future growth in transport demand.

5.2 Demography

Andhra Pradesh is a state in the southern coastal region of India. It is the seventh-largest state and the tenth-most populous in the country. Telugu, one of India's classical languages, is the primary official language and the most widely spoken language in state and as well as in South India. Amaravati is the state capital, while the largest city is Visakhapatnam also the financial capital of AP. The state shares borders with Odisha to the northeast, Chhattisgarh to the north, Karnataka to the southwest, Tamil Nadu to the south, Telangana to the northwest and the Bay of Bengal to the east. It has the second-longest coastline in India at about 974 km (605 mi).

Based on the 2011 Census of India, the population of Andhra Pradesh is 49,577,103, with a density of 304/km2 (790/sq mi). The rural population accounts for 70.53%, while the urban population accounts for 29.47%. The state has 17.08% scheduled caste (SC) and 5.53% scheduled tribe (ST) population. Children in the age group of 0–6 years' number 5,222,384, constituting 10.6% of the total population. [110] The state has a sex ratio of 997 females per 1000 males, higher than the national average of 926 per 1000. The literacy rate in the state stands at 67.35%. Erstwhile West Godavari district has the highest literacy rate of 74.32%, and erstwhile Vizianagaram district has the lowest with 58.89%.

Human Development Index (HDI) of the state for the year 2022 is 0.642.

Tamil Nadu is a state in the southern coastal region of India. It is the tenth-largest state by area (approximately 130,058 km²) and the sixth-largest by population (72,147,030 as

of the 2011 Census). Tamil, one of India's classical languages, is the state's official language and the most widely spoken language. Chennai serves as both the state capital and the largest city. Tamil Nadu has the second-longest coastline in India, stretching approximately 1,076 km along the Coromandel Coast of the Bay of Bengal.

Based on the 2011 Census, Tamil Nadu had a population density of about 555 per km², with 51.6% of the population living in urban areas and 48.4% in rural areas. The sex ratio stood at 996 females per 1,000 males—higher than the national average of 943. Children aged 0–6 years numbered approximately 7.42 million, representing about 10.3% of the total population. The literacy rate was 80.09% as per the 2011 Census. Scheduled Castes accounted for around 20.0% and Scheduled Tribes around 1.1% of the population.

The Human Development Index (HDI) for Tamil Nadu in 2022 stood at 0.692.

Karnataka is a state in the southwestern region of India. It is the sixth-largest state by area, covering approximately 191,791 km², and the eighth-largest by population, with 61,095,297 residents according to the 2011 Census . Kannada, one of India's classical languages, is both the official and most widely spoken language in Karnataka. The state capital and largest city is Bengaluru, which had about 15.26 million in its metro area (or 10.46 million in the city proper, depending on definitions). Karnataka shares its western boundary with the Laccadive Sea and is bordered by Goa (northwest), Maharashtra (north), Telangana (northeast), Andhra Pradesh (east), Tamil Nadu (southeast), and Kerala (southwest).

According to the 2011 Census, Karnataka had a population density of about 319 per km², with 38.7% urban and 61.3% rural population. The sex ratio was 973 females per 1,000 males. The literacy rate was approximately 75.4% (overall), with male and female literacy reflecting typical regional patterns. Scheduled categories' percentages are not detailed here.

The HDI for Karnataka in 2022 was 0.673

5.3 Language

Andhra Pradesh: Telugu is the first official language, and Urdu is the second official language of the state. Telugu is the mother tongue of nearly 90% of the population.

Tamil, Kannada, and Odia are spoken in the border areas. Lambadi and several other languages are spoken by the scheduled tribes of the state. 19% of the population aged 12+ years can read and understand English, as per the Indian readership survey for Q4 2019.

Tamil Nadu: Tamil is the official language of the state and is spoken as the mother tongue by the vast majority of the population. Telugu, Kannada, and Malayalam are spoken in the border areas, while Urdu is spoken by a significant minority. Scheduled tribes of the state speak languages such as Irula, Toda, and Badaga. English is widely used in education, business, and administration, and about 21% of the population aged 12+ years can read and understand English, as per the Indian readership survey for Q4 2019.

Karnataka: Kannada is the official language of the state and is spoken as the mother tongue by around two-thirds of the population. Urdu, Telugu, Tamil, Marathi, Hindi, Konkani, Tulu, Kodava, and Malayalam are also spoken widely across different regions. Tribal communities of the state speak languages like Soliga and Yerava. English is commonly used in higher education, technology, and business sectors, and around 20% of the population aged 12+ years can read and understand English, as per the Indian readership survey for Q4 2019.

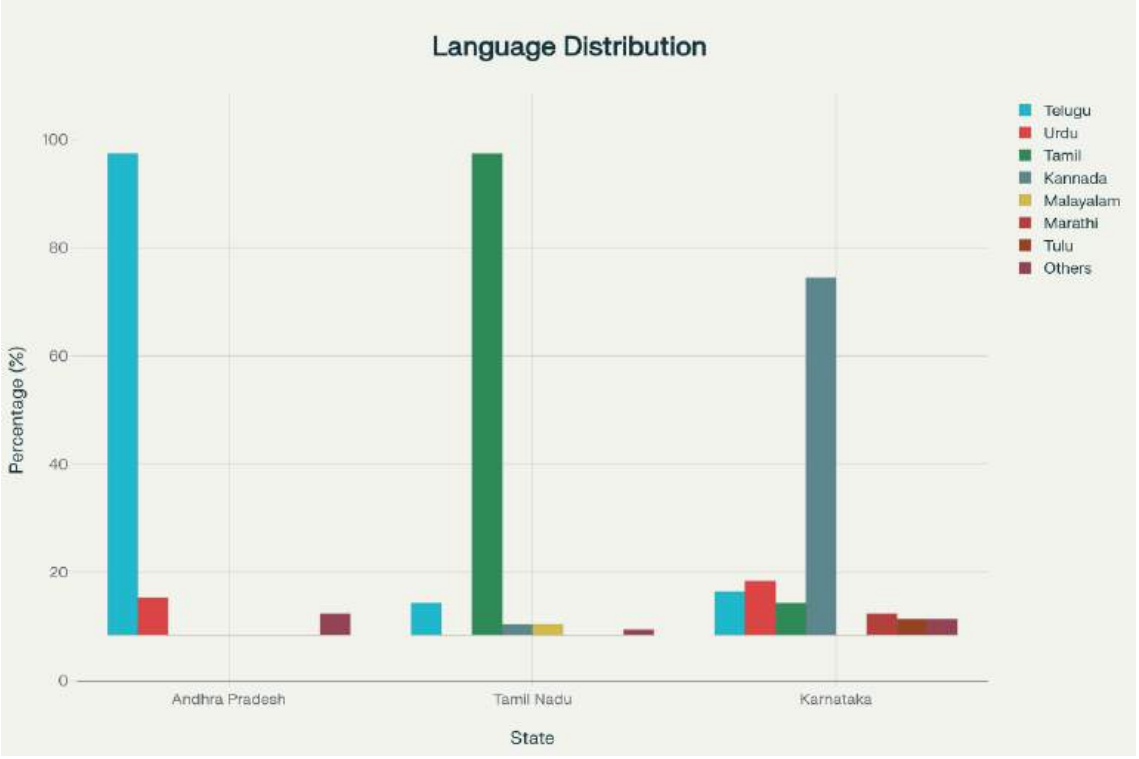


Figure 5-1: Language in Project Area

5.4 Economy

Andhra Pradesh's economy showcased robust growth in 2025, marked by a Gross State Domestic Product (GSDP) reaching ₹18.3 lakh crore, a 14% increase from the previous year. The state stands third among all states and union territories in per capita income growth, recording ₹2,66,240 in 2024-25, projected to climb to ₹2,98,065 in 2025-26. Agriculture forms the backbone, contributing significantly to value addition, with recent initiatives boosting the primary and secondary sectors, especially agriculture and construction. Infrastructure expansion, public-private partnership initiatives, and a declining revenue deficit (1.8% of GSDP) reflect the state's focus on sustainable growth and fiscal prudence.

Tamil Nadu has achieved the highest real economic growth rate in the country for 2025, registering 11.19% growth—a national record. The industrious state's success comes from its thriving manufacturing and construction sectors, driving the secondary sector's growth to 13.4% in 2024-25. Tamil Nadu's MSME sector has also expanded rapidly, with over 35 lakh registered units employing more than 2.47 crore people, contributing to both job creation and exports. The Dravidian Model Government's emphasis on industrial development and social welfare has propelled the state's per capita income to around ₹1,96,309, making it one of the strongest economies in India.

Karnataka's economy continues as a powerhouse, with a GSDP of ₹30.7 lakh crore projected for 2025-26, growing at 7% over 2024-25. The state boasts the highest per capita income in India for 2024-25, crossing ₹2,04,605—a 93.6% increase over a decade. Services, especially IT and financial services concentrated in Bengaluru, dominate the economy, complemented by manufacturing and a vibrant startup ecosystem. Karnataka's fiscal health is supported by inclusive development policies, a relatively low and declining revenue deficit (0.6% of GSDP), and strong investment in infrastructure and industry.

5.5 Climate

Andhra Pradesh generally experiences a hot and humid climate in its extensive coastal regions, while semi-arid conditions prevail inland in Rayalaseema and areas like Anantapur and Kadapa. Summers extend from March to June, with temperatures often surpassing 40°C, especially inland. The coastline's humidity leads to high heat indices. The state's key seasonal driver is the Southwest Monsoon (June–September), which

provides most rainfall, with about a third coming from the Northeast Monsoon in October. As a result, annual precipitation is highest along the coast (near 1,000–1,200 mm) and lowest in inland plateaus (as little as 300–400 mm). Winters (October–February) are milder, especially along the coast, and attract many visitors.

Tamil Nadu has a predominantly tropical climate, with major variation between the hot, humid coast—including Chennai and the Coromandel Coast—and the hotter, drier inland plains. The state depends heavily on the Northeast Monsoon (October–December) for rainfall, unlike much of India. Summers (March–June) are long and hot, with temperatures frequently over 40°C, especially in the interior north and northwest. Winters are generally mild, except for some chilly nights in highland pockets like the Nilgiris, which offer a much cooler, temperate climate. The climate supports multiple cropping seasons and a variety of agriculture.

Karnataka's climate ranges from coastal tropical monsoon (in districts like Udupi and Dakshina Kannada) to semi-arid (in the Deccan Plateau, such as Bijapur and Bagalkot). The Western Ghats induce heavy rainfall in coastal districts during the Southwest Monsoon (June–September), with parts of Malnad among the wettest in India. Inland, especially in the Deccan region, rainfall drops sharply, and droughts are not uncommon. Summers (March–May) are warm throughout the state, but highland regions like Coorg and Chikmagalur are cooler and favored as hill stations. Winters are short and generally pleasant, except for foggy cold spells in the plateau zone.

5.6 Tourism

Andhra Pradesh's tourism sector is experiencing rapid growth, with an ambitious target of 20% annual expansion and major investments in infrastructure and destination development. The state ranks third in domestic tourism, drawing over 278 million domestic visitors annually and aiming to enhance its international appeal. Key attractions include pilgrimage sites like Tirupati and Annavaram, natural wonders such as Araku Valley and Gandikota, beach circuits, hill stations, and pristine backwaters. The government is prioritizing sustainable tourism, event-based promotion, and immersive experiences like eco-tourism and cruise circuits, aiming to increase the average stay duration and tourist spending while boosting employment and private investment in the sector.

Tamil Nadu remains India's leading state for both domestic and foreign tourist arrivals, celebrated for its extraordinary temple architecture, UNESCO heritage sites, and vibrant festivals. Visitors flock annually to destinations like Mahabalipuram, Thanjavur, Madurai, and the hill stations of Ooty and Kodaikanal. The coastline, wildlife sanctuaries, and hill regions add natural beauty, making the state popular among culture, nature, and adventure enthusiasts. Major events, improved amenities, and strong marketing have driven tourist volumes upward, leveraging the state's economic strength and ongoing infrastructure improvements for tourism.

Karnataka is famed for its versatile tourism, merging history, nature, and technology. The state's tourist circuit includes UNESCO-listed monuments in Hampi, royal heritage in Mysuru, the cosmopolitan allure of Bengaluru, and the rainforests and beaches of coastal districts. Wildlife enthusiasts are drawn to Nagarhole and Bandipur reserves, while the coffee estates of Coorg and Chikmagalur offer tranquil hill vacations. Karnataka continues to innovate in eco-tourism and experiential travel, with active government investment supporting new adventure and heritage initiatives alongside urban tourism in Bengaluru and Mysuru.

5.7 Geology

Andhra Pradesh's geology is marked by its location along the eastern edge of the Indian peninsula, with the Eastern Ghats mountain range dominating its landscape. These mountains are composed mainly of ancient metamorphic rocks such as charnockite, granite, khondalite, and quartzite formed during the Archean and Proterozoic eras. The state features diverse topography with rugged hills in the interior, coastal plains, and plateaus. The Krishna basin in Andhra Pradesh mainly contains Archaean rock formations, Deccan Trap basalt lavas, and sedimentary sequences from the Cuddapah and Vindhyan groups. Lateritic soil and alluvium are found in various parts, especially in river basins. Hydrogeologically, groundwater occurs both under water table and confined conditions due to the fractured rock structures.

Tamil Nadu's geology is varied and characterized by the presence of the Eastern Ghats in the north and northwest, and the Western Ghats along the western border with Kerala and Karnataka. The state has ancient crystalline rocks including gneisses and charnockites, with large portions covered by sedimentary formations and volcanic rock deposits. The

Nilgiri hills, part of the Western Ghats, are a key geological feature comprising older rocks like granite and gneiss, giving rise to their rugged terrain and rich biodiversity. Sedimentary basins, including Cuddapah and Vindhyan formations, are also found in parts of Tamil Nadu. The diverse geology influences soil types ranging from alluvial and red soils in plains to lateritic and forest soils in hilly regions.

Karnataka's geology is dominated by the Deccan Plateau and significant mountain ranges, including the Western Ghats along the west coast and the eastern extension of the Eastern Ghats in the northeast. The state is rich in ancient crystalline rock formations such as granites, gneisses, and charnockites, forming much of the peninsular shield. It also contains volcanic basalt flows from the Deccan Traps, which cover large areas. Important mineral deposits like iron ore and manganese occur primarily in the Karnataka region. The terrain varies from coastal plains to undulating plateaus and forested hills, resulting in a wide range of geological and soil types supporting diverse ecosystems.

5.8 Districts along the Project Stretch

A. Krishna District, Andhra Pradesh

Krishna district, with its headquarters at Machilipatnam, is a coastal district in Andhra Pradesh named after the holy Krishna River that flows through it before emptying into the Bay of Bengal. Covering an area of approximately 3,773 sq. km and featuring an 88 km coastline, the district has a tropical climate with hot summers and mild winters. Agriculture is the mainstay of its economy, with paddy as the primary food crop. The district has a gross cropped area of about 3.76 lakh hectares, with a significant portion under irrigation via the Prakasam Barrage canals of the Krishna River. Other crops include sugarcane, mango, and tomato. The district is well-connected by roads and railways, including the major railway junction at Gudivada and the Machilipatnam port serving its minor seaport needs. Krishna district's population density is high, reflecting urban centers like Machilipatnam and Gudivada, and it has a strong emphasis on education and literacy initiatives.

B. Guntur District, Andhra Pradesh

(As Guntur district details were not specifically fetched, this is a summarized reference from general Andhra Pradesh data)

Guntur district is an agriculturally rich district in Andhra Pradesh known for its significant production of chili, cotton, and tobacco, besides paddy cultivation. The district lies in the fertile delta region of the Krishna River and features a mix of plains and some hilly terrain. The economy is primarily agrarian but increasingly diversifying into manufacturing and services. Guntur city is an important commercial hub with vibrant trade and commerce. The district benefits from good connectivity through road and rail, integrating it closely with the rest of the state's economic network.

C. Tiruvallur District, Tamil Nadu

Tiruvallur is an industrially growing district located on the northwestern border of the Chennai metropolitan region in Tamil Nadu. With a mix of urban, suburban, and rural areas, it functions as a key manufacturing and logistics hub due to proximity to Chennai Port and major highways. The district experiences a tropical climate with hot summers and moderate monsoon rainfall, mainly benefiting agriculture and industrial growth. Tiruvallur supports automobile, textile, and chemical industries and has rapidly developed infrastructure catering to its expanding population.

D. Chennai District, Tamil Nadu

Chennai district, housing the capital city of Tamil Nadu, is the pivotal metropolitan district of the state with a highly urbanized economy centered on IT, manufacturing, trade, and services. Chennai's coastal geography along the Bay of Bengal influences its tropical wet and dry climate. The district is a major cultural, economic, and educational center with a diverse population. Key industries include automobile manufacturing, software services, petrochemicals, and financial services. The extensive transport networks through roadways, railways, and one of the largest ports in India support its economic robustness.

E. Tumkur (Tumakuru) District, Karnataka

Tumkur district lies west of Bangalore and is characterized by a mix of agricultural land and growing industrial activities. It has a semi-arid to moderate climate and features undulating terrain with some forested hills. Agriculture dominates, with cultivation of

crops like ragi, groundnut, and sunflower, supported by irrigation projects. The district has been witnessing increased industrialization, particularly with the development of industrial estates and better connectivity to Bangalore and other regions. Education and infrastructure development are priorities in Tumkur for balanced socio-economic growth. Industrial activity in Supaul is limited but growing. Small-scale industries such as rice mills, agro-processing units, and brick kilns are operational. The region also has potential for dairy development and jute-based industries. Proximity to Nepal facilitates small-scale cross-border trade, further supporting local economic activity.

CHAPTER 6

HIGHWAY INVENTORY AND CONDITION ASSESMENT OF HIGHWAY ASSET

6.1 General

Existing inventory of features of Project Stretch is captured through NSV physical inventory and field reconnaissance. Features like built-up settlements, carriageway dimensions, service roads, junctions, road furniture etc. are recorded for entire Project Stretch. The highway inventory is linked to the existing km posts established along the Project Stretch. Detailed inventory including an overview of the Project Stretch is presented in this chapter.

The road inventory data presented in this Detailed Project Report (DPR) has been compiled from previous project documents and as per site. Since inventory details may vary as per site conditions.

Section No.	Section Name		Chainage (Km)		Length (Km)	Coordinates			
						From		To	
	From	To	From	To		Latitude	Longitude	Latitude	Longitude
Section-1	Chlakaluripet	Vijayawada	355+000	422+605	69.408	16° 1'40.03"N	80° 7'40.91"E	16°23'51.42"N	80°32'53.89"E
Section-2	Chennai Bypass		0+000	32+600	32.600	12°54'49.09"N	80° 6'5.55"E	13° 9'4.26"N	80°12'40.47"E
Section-3	Chennai	Tada	21+400	54+400	33.000	13° 8'31.37"N	80°13'25.27"E	13°29'36.20"N	80° 5'56.19"E
Section-4	Neelmangla	Tumkur	29+500	61+520	32.020	13° 6'40.38"N	77°22'39.82"E	13°18'16.86"N	77° 9'28.76"E
	Tumkur Bypass		61+520	74+168	12.648	13°18'16.86"N	77° 9'28.76"E	13°23'19.78"N	77° 5'38.26"E

6.2 Start and End Point

All details of Project Stretch are provided with respect to LHS and RHS. Description of LHS and RHS are given below:

Table 6-1 : Description of LHS and RHS

Section No.	Section Name		Direction	Chainage (Km)		Length (Km)	Remarks
	From	To		From	To		
Section-1	Chilakaluripet	Vijayawada	Left Hand Side (LHS)	355+000	357+342	2.342	From Chilakaluripet to Chilakaluripet

Section No.	Section Name		Direction	Chainage (Km)		Length (Km)	Remarks
	From	To		From	To		
			Right Hand Side (RHS)	357+342	355+000	2.342	From Chilakaluripet to Chilakaluripet
			Left Hand Side (LHS)	372+038	422+605	50.567	From Chilakaluripet to Vijayawada
			Right Hand Side (RHS)	422+605	372+038	50.567	From Vijayawada to Chilakaluripet
			Left Hand Side (LHS)	0+000	16+499	16.499	From Chilakaluripet to Vijayawada
			Right Hand Side (RHS)	16+499	0+000	16.499	From Vijayawada to Chilakaluripet
Section-2	Chennai Bypass		Left Hand Side (LHS)	0+000	32+600	32.6	From Tambram to Madhavaram
			Right Hand Side (RHS)	32+600	0+000	32.6	From Madhavaram to Tambram
Section-3	Chennai Tada		Left Hand Side (LHS)	21+400	54+400	33	From Chennai to Tada
			Right Hand Side (RHS)	54+400	21+400	33	From Tada to Chennai
Section-4	Neelmangla	Tumkur	Left Hand Side (LHS)	29+500	50+000	20.500	From Neelmangla to Tumkur
			Right Hand Side (RHS)	50+000	29+500	20.500	From Tumkur to Neelmangla
			Left Hand Side (LHS)	50+000	62+000	12.000	From Neelmangla to Tumkur
			Right Hand Side (RHS)	62+000	50+000	12.000	From Tumkur to Neelmangla
	Tumkur Bypss		Left Hand Side (LHS)	62+000	74+168	12.168	From Neelmangla to Tumkur
			Right Hand Side (RHS)	74+168	62+000	12.168	From Tumkur to Neelmangla

6.3 Summary of Inventory

While inventory is captured Chainage-wise with their existing conditions (wherever necessary), an overview of all inventory is presented in the table below for quick reference.

Table 6-2 : Summary of Inventory

Description		Vijayawada-Chilakaluripet	Chennai Bypass	Chennai-Tada	Neelmangla- Tumkur*	
					Neelmangla-Tumkur	Tumkur Bypass
Length of project stretch		69.408 km	32.600 Km	33.00 Km	32.020 Km	12.648 Km
Lane Configuration		6 Lane with paved shoulder	6 Lane with paved shoulder	6 Lane with paved shoulder	4/6 Lane with paved shoulder	6 Lane with paved shoulder
Pavement Type	**Flexible (m)**	68808	32455	32535	31220	12648
	Rigid (m)	600	145	465	800	0
Length of Service/Slip road (m)		121044	43205	67103	40800	24774
Major/ Minor Junction		20 Nos. /218 Nos.	10 Nos. /198 Nos.	10 Nos. /95 Nos.	2 Nos. /46 Nos.	3 Nos. /8 Nos.
Major/ Minor Bridge		3 Nos. /23 Nos.	3 Nos. /3 Nos.	3 Nos. /9 Nos.	2 Nos. /10 Nos.	2 Nos. /8 Nos.
Culverts		90 Nos.	140 Nos.	56 Nos.	50 Nos.	19 Nos.
ROBs/RUBs		1 Nos./0 No	1 Nos./1 No	0 Nos./0 No	2 Nos./0 No	1 Nos./0 No
VUPs/LVUPs/SVUPs		27 Nos	18 Nos	9 Nos	8 Nos	11 Nos
PUPs/CUPs		26 Nos.	2 Nos.	7 Nos.	1 Nos.	-
FOBs		0 Nos.	0 Nos.	1 Nos.	1 Nos.	1 Nos.

Description	Vijayawada-Chilakaluripet	Chennai Bypass	Chennai-Tada	Neelmangla- Tumkur*	
				Neelmangla-Tumkur	Tumkur Bypass
Toll Plazas	Kaza (420+500)	Vanagram (16+500) and Surapattu (28+600)	Nallur (21+625)	Kulumepalya (30+000) and Chokkenahalli (61+500)	-
Bus Bays with shelters/ Bus Shelters	21 Nos.	1 Nos.	36 Nos.	12 Nos.	1 Nos.
Truck Lay Bye	1 Nos.	0 Nos.	0Nos.	2 Nos.	-
Median Openings	4 Nos.	9 Nos.	10 Nos.	12 Nos.	-

For Section-04 Neelmangla Tumkur

*These details are tentative these may varies as per site and same shall be maintained by TOT/InvIT concessionaire after end of DLP period.

6.4 Highway Features

Details of Chainage-wise highway inventory are presented in below sections.

6.4.1 Built-up Settlement

There details of Settlements along with Length and Name of the settlement along the Project Stretch are given below:

Table 6-3 : Built-up Settlement
Section 01 Vijayawada-Chilakaluripet

S. No.	Chainage Km		Length (m)	Name of Settlement	
	From	To		LHS	RHS
1	373+700	374+600	900	Edlapadu	Edlapadu
2	374+750	375+300	550		Edlapadu
3	374+750	376+350	1600	Edlapadu	
4	377+250	377+450	200		Vankayalapadu
5	378+150	378+900	750	Boyapalem	
6	378+150	379+400	1250		Boyapalem
7	380+000	380+350	350	Thummalpalem	
8	380+750	381+450	700		Thummalpalem
9	383+400	383+850	450	Nadimpalem	
10	384+050	384+300	250	Nadimpalem	Nadimpalem
11	384+800	385+650	850	Chinakondrupadu	
12	387+100	387+450	350		Chowdavaram
13	388+150	388+550	400	Chowdavaram	
14	389+300	389+800	500	Dasaripalem	Dasaripalem
15	390+250	390+450	200		Chowdavaram
16	391+100	391+500	400	ObulnaiduPalem	
17	391+700	392+450	750		Pothur
18	392+500	393+300	800	Pothur	
19	394+450	395+200	750	Ankireddy Palem	
20	395+800	397+600	1800	Guntur	
21	396+600	397+900	1300		Guntur
22	398+950	399+200	250		Lalupuram
23	399+600	401+900	2300	Guntur	Guntur
24	410+000	410+250	250		Takkellapadu
25	410+400	411+750	1350	Autonagar	

S. No.	Chainage Km		Length (m)	Name of Settlement	
	From	To		LHS	RHS
26	412+750	413+850	1100	Yuvajananagar	Pedakakani
27	414+180	414+450	270	Pedakakani	
28	414+800	415+550	750	Namburu	
29	417+900	418+150	250		Kantheru
30	418+250	418+600	350	Namburu	
31	418+800	420+250	1450		Namburu
32	420+800	421+100	300	Kaza	
33	421+100	422+700	1600		Kaza
34	421+800	422+050	250	Kaza	
Total			**25570**		

Section 02 Chennai Bypass

S. No.	Chainage Km		Length (m)	Name of Settlement	
	From	To		LHS	RHS
1	0+000	3+200	3200	Tambaram	Tambaram
2	6+100	6+340	240	Tiruneermalai	Tiruneermalai
3	7+100	9+100	2000	Kundrathur	Anakaputhur
4	10+400	10+900	500	Thandalam	
5	10+900	14+100	3200		Gerugambakkam
6	11+980	14+000	2020	Paraniputhur	
7	15+850	19+000	3150	Vanagram	Vanagram
8	19+000	23+600	4600	Ayanambakkam	
9	19+000	29+400	10400		Ambattur
10	23+600	28+020	4420	Ambattur	
11	28+500	29+500	1000	Surapet	
12	29+400	32+600	3200		Kadirvedu
13	29+500	32+600	3100	Puzhal	
Total			**41030**		

Section 03 Chennai Tada

S. No.	Chainage Km		Length (m)	Name of Settlement	
	From	To		LHS	RHS
1	21+400	32+400	11000	Janappanchatram, Panjetty, Keelmeni	
2	21+400	24+400	3000		Nallur, Sholavaram
3	25+500	32+400	6900		Jaganathapuram, Pancheti
4	33+300	34+000	700		Durainallur
5	37+500	39+600	2100		Kavaraipettai
6	38+300	39+200	900	Deendayal Nagar	
7	43+000	46+900	3900	New Gummidipoondi, Kayalarmedu	
8	43+800	47+100	3300		Gummidipoondi, Peddikuppam
9	48+500	51+300	2800	Chinnaobulapuram	
10	48+500	49+300	800		Gummidipoondi
11	49+600	51+000	1400		Elavur
Total			**36800**		

Section 04 Neelmangla-Tumkur

S. No.	Chainage Km		Length (m)	Name of Settlement
	From	To		
1*	39+440	39+800	360	Dodderi
2*	41+300	41+600	300	Mahimapura gate
3*	47+240	47+500	260	Yedehalli
4*	49+814	50+000	186	Dobbaspet
5	55+380	55+500	120	Nandhalli
6	58+060	58+400	340	Chikkahalli and Hirehalli
7	59+720	60+320	600	Manchakalkuppe
8*	62+040	62+218	178	Tumkur Bypass Section
9*	62+238	62+317	79	
10*	62+809	63+084	275	
11*	65+100	65+713	613	

S. No.	Chainage Km		Length (m)	Name of Settlement
	From	To		
12*	66+645	66+828	183	
13*	66+848	66+878	30	
14*	67+172	67+437	265	
15*	67+453	67+820	367	
16*	67+830	67+978	148	
17*	68+309	68+754	445	
18*	68+770	68+897	127	
19*	68+907	69+345	438	
20*	69+357	69+859	502	
21*	70+003	71+179	1176	
22*	71+197	71+267	70	
23*	71+639	72+805	1166	
24*	73+247	73+460	213	
25*	74+020	74+168	180	
Total			**8621**	

For Section-04 Neelmangla Tumkur

a) *Under construction locations these details are tentative these may varies as per site and same shall be maintained by TOT/InvIT concessionaire after end of DLP period.

b) Other than the (*) locations, the remaining stretches fall within the ongoing DPR section. Hence, these details may vary as per site conditions and shall be maintained by the TOT/InvIT concessionaire after the completion of the DLP period.

6.4.2 Right of way

The details of ROW are given below:

Table 6-4 : ROW details along the Project Stretch

Section 01 Vijayawada-Chilakaluripet

S.No	Chainage (km)		Length (m)	ROW (m)
	From	To		
1	0+000	16+499	16499	80
2	355+000	357+342	2342	80

S.No	Chainage (km)		Length (m)	ROW (m)
	From	To		
3	372+035	373+800	1765	78
4	373+800	374+400	600	52
5	374+000	374+168	200	52
6	374+400	374+600	200	58
7	374+600	375+200	600	52
8	375+200	378+200	3000	78
9	378+200	378+400	200	52
10	378+400	378+600	200	52
11	378+600	378+800	200	52
12	378+800	395+740	16940	78
13	395+740	396+200	460	97
14	396+200	412+200	16000	78
15	412+200	415+200	3000	52
16	415+200	420+270	5070	78
17	420+270	420+300	30	113
18	420+300	420+400	100	173
19	420+400	420+433	33	173
20	420+433	420+600	167	98
21	420+600	420+800	200	129
22	420+800	421+000	200	105
23	421+000	422+605	1605	78

Section 02 Chennai Bypass

S.No	Chainage (km)		Lenth (m)	ROW (m)
	Start	End		
1	0+000	22+138	22138.00	60
2	22+138	24+600	2462.00	36
3	24+600	25+045	445.00	45.5
4	25+045	32+600	7555.00	60

Section 03 Chennai Tada

S.No	Chainage (km)		Length (m)	ROW (m)
	Start	End		
1	21+400	21+425	25	157
2	21+425	21+450	25	185
3	21+450	21+475	25	190
4	21+475	21+500	25	190
5	21+500	21+525	25	195
6	21+525	21+550	25	200
7	21+550	21+575	25	180
8	21+575	21+600	25	180
9	21+600	21+625	25	180
10	21+625	21+650	25	180
11	21+650	21+675	25	180
12	21+675	21+725	50	180
13	21+725	21+750	25	180
14	21+750	21+775	25	174
15	21+775	21+800	25	170
16	21+800	21+825	25	164
17	21+825	21+850	25	158
18	21+850	21+875	25	150
19	21+875	21+900	25	120
20	21+900	21+925	25	100
21	21+925	21+950	25	87
22	21+950	21+975	25	76
23	21+975	22+000	25	86
24	22+000	22+025	25	92
25	22+025	22+050	25	112
26	22+050	22+075	25	116
27	22+075	22+100	25	91
28	22+100	22+125	25	95
29	22+125	22+175	50	100

S.No	Chainage (km)		Length (m)	ROW (m)
	Start	End		
30	22+175	22+200	25	101
31	22+200	22+225	25	92
32	22+225	22+250	25	83
33	22+250	22+275	25	73
34	22+275	22+300	25	62
35	22+300	22+325	25	61
36	22+325	22+425	100	60
37	22+425	22+450	25	62
38	22+450	22+475	25	64
39	22+475	22+500	25	68
40	22+500	22+525	25	70
41	22+525	22+550	25	69
42	22+550	22+575	25	71
43	22+575	22+600	25	73
44	22+600	22+625	25	75
45	22+625	22+650	25	77
46	22+650	22+675	25	78
47	22+675	22+700	25	80
48	22+700	22+725	25	85
49	22+725	22+875	150	90
50	22+875	22+900	25	80
51	22+900	22+925	25	78
52	22+925	22+950	25	74
53	22+950	22+975	25	71
54	22+975	23+000	25	68
55	23+000	23+025	25	65
56	23+025	25+750	2725	60
57	25+750	25+775	25	63
58	25+775	25+800	25	74
59	25+800	25+825	25	90

S.No	Chainage (km)		Length (m)	ROW (m)
	Start	End		
60	25+825	25+850	25	134
61	25+850	25+900	50	140
62	25+900	25+925	25	129
63	25+925	25+950	25	88
64	25+950	25+975	25	83
65	25+975	26+000	25	78
66	26+000	26+025	25	89
67	26+025	26+050	25	94
68	26+050	26+075	25	103
69	26+075	26+100	25	105
70	26+100	26+125	25	107
71	26+125	26+150	25	110
72	26+150	26+250	100	120
73	26+250	26+275	25	108
74	26+275	26+300	25	95
75	26+300	26+325	25	86
76	26+325	26+350	25	78
77	26+350	26+375	25	69
78	26+375	26+400	25	64
79	26+400	26+875	475	60
80	26+875	26+900	25	62
81	26+900	26+950	50	64
82	26+950	26+975	25	62
83	26+975	27+275	300	60
84	27+275	27+325	50	61
85	27+325	27+375	50	63
86	27+375	27+400	25	62
87	27+400	27+525	125	61
88	27+525	27+550	25	63
89	27+550	27+600	50	65

S.No	Chainage (km)		Length (m)	ROW (m)
	Start	End		
90	27+600	27+625	25	63
91	27+625	27+875	250	61
92	27+875	27+925	50	66
93	27+925	27+950	25	63
94	27+950	28+600	650	62
95	28+600	28+625	25	61
96	28+625	28+650	25	63
97	28+650	28+700	50	64
98	28+700	28+725	25	58
99	28+725	29+175	450	50
100	29+175	29+550	375	51
101	29+550	30+125	575	50
102	30+125	30+150	25	58
103	30+150	30+175	25	59
104	30+175	30+200	25	54
105	30+200	30+225	25	53
106	30+225	30+250	25	52
107	30+250	30+275	25	51
108	30+275	31+150	875	50
109	31+150	31+175	25	52
110	31+175	31+200	25	56
111	31+200	31+225	25	62
112	31+225	31+250	25	64
113	31+250	31+275	25	58
114	31+275	31+300	25	53
115	31+300	31+325	25	51
116	31+325	31+350	25	53
117	31+350	31+375	25	54
118	31+375	31+400	25	56
119	31+400	31+425	25	57

S.No	Chainage (km)		Length (m)	ROW (m)
	Start	End		
120	31+425	31+450	25	58
121	31+450	31+475	25	59
122	31+475	31+800	325	60
123	31+800	31+825	25	61
124	31+825	32+175	350	62
125	32+175	32+200	25	65
126	32+200	32+225	25	64
127	32+225	32+250	25	62
128	32+250	32+425	175	61
129	32+425	32+775	350	60
130	32+775	32+825	50	63
131	32+825	32+850	25	62
132	32+850	33+000	150	60
133	33+000	33+050	50	61
134	33+050	33+075	25	63
135	33+075	33+125	50	65
136	33+125	33+150	25	63
137	33+150	33+875	725	61
138	33+875	33+925	50	68
139	33+925	33+950	25	63
140	33+950	34+600	650	60
141	34+600	34+625	25	67
142	34+625	34+650	25	70
143	34+650	34+675	25	121
144	34+675	34+725	50	141
145	34+725	34+750	25	120
146	34+750	34+775	25	90
147	34+775	34+875	100	82
148	34+875	34+900	25	66
149	34+900	34+975	75	65

S.No	Chainage (km)		Length (m)	ROW (m)
	Start	End		
150	34+975	35+000	25	64
151	35+000	35+025	25	60
152	35+025	35+075	50	59
153	35+075	35+125	50	56
154	35+125	35+150	25	50
155	35+150	35+175	25	52
156	35+175	35+275	100	60
157	35+275	35+325	50	51
158	35+325	35+350	25	52
159	35+350	35+375	25	51
160	35+375	35+400	25	50
161	35+400	35+425	25	51
162	35+425	35+450	25	52
163	35+450	35+475	25	51
164	35+475	35+500	25	50
165	35+500	35+575	75	52
166	35+575	35+600	25	53
167	35+600	35+675	75	55
168	35+675	35+700	25	56
169	35+700	35+750	50	58
170	35+750	35+775	25	61
171	35+775	35+800	25	63
172	35+800	35+825	25	64
173	35+825	35+850	25	62
174	35+850	35+925	75	63
175	35+925	36+000	75	60
176	36+000	36+050	50	61
177	36+050	36+250	200	62
178	36+250	36+275	25	63
179	36+275	36+300	25	64

S.No	Chainage (km)		Length (m)	ROW (m)
	Start	End		
180	36+300	36+325	25	63
181	36+325	36+575	250	62
182	36+575	36+600	25	63
183	36+600	36+650	50	65
184	36+650	36+675	25	63
185	36+675	36+825	150	62
186	36+825	36+850	25	64
187	36+850	36+875	25	66
188	36+875	36+900	25	69
189	36+900	36+925	25	73
190	36+925	36+950	25	76
191	36+950	36+975	25	86
192	36+975	37+000	25	102
193	37+000	37+025	25	96
194	37+025	37+050	25	66
195	37+050	37+075	25	61
196	37+075	37+325	250	62
197	37+325	37+350	25	64
198	37+350	37+375	25	66
199	37+375	37+400	25	81
200	37+400	37+425	25	91
201	37+425	37+475	50	101
202	37+475	37+500	25	91
203	37+500	37+525	25	81
204	37+525	37+550	25	76
205	37+550	37+575	25	71
206	37+575	37+600	25	61
207	37+600	37+875	275	62
208	37+875	37+900	25	67
209	37+900	37+925	25	66

S.No	Chainage (km)		Length (m)	ROW (m)
	Start	End		
210	37+925	37+950	25	63
211	37+950	37+975	25	62
212	37+975	38+000	25	60
213	38+000	38+050	50	59
214	38+050	38+225	175	58
215	38+225	38+250	25	56
216	38+250	38+300	50	51
217	38+300	39+150	850	52
218	39+150	39+225	75	57
219	39+225	39+275	50	58
220	39+275	39+325	50	59
221	39+325	39+400	75	60
222	39+400	39+450	50	61
223	39+450	39+875	425	62
224	39+875	40+175	300	61
225	40+175	40+225	50	62
226	40+225	40+250	25	68
227	40+250	40+275	25	66
228	40+275	40+300	25	63
229	40+300	41+350	1050	61
230	41+350	41+375	25	62
231	41+375	41+425	50	64
232	41+425	41+450	25	70
233	41+450	41+475	25	69
234	41+475	41+600	125	61
235	41+600	41+625	25	63
236	41+625	41+675	50	65
237	41+675	41+700	25	63
238	41+700	42+025	325	61
239	42+025	42+100	75	60

S.No	Chainage (km)		Length (m)	ROW (m)
	Start	End		
240	42+100	42+150	50	59
241	42+150	42+325	175	58
242	42+325	42+450	125	57
243	42+450	42+575	125	56
244	42+575	42+600	25	57
245	42+600	42+800	200	58
246	42+800	42+900	100	59
247	42+900	43+000	100	60
248	43+000	43+100	100	61
249	43+100	43+175	75	60
250	43+175	43+225	50	59
251	43+225	43+475	250	60
252	43+475	43+525	50	61
253	43+525	43+700	175	60
254	43+700	43+775	75	59
255	43+775	43+875	100	58
256	43+875	43+950	75	57
257	43+950	44+025	75	57
258	44+025	44+400	375	56
259	44+400	44+475	75	61
260	44+475	44+500	25	56
261	44+500	44+525	25	58
262	44+525	44+550	25	59
263	44+550	44+575	25	60
264	44+575	44+600	25	61
265	44+600	44+625	25	67
266	44+625	44+650	25	69
267	44+650	44+675	25	76
268	44+675	44+725	50	101
269	44+725	44+750	25	71

S.No	Chainage (km)		Length (m)	ROW (m)
	Start	End		
270	44+750	44+775	25	66
271	44+775	44+800	25	58
272	44+800	44+850	50	56
273	44+850	44+875	25	57
274	44+875	44+925	50	59
275	44+925	44+950	25	57
276	44+950	45+175	225	56
277	45+175	45+925	750	55
278	45+925	45+950	25	65
279	45+950	45+975	25	74
280	45+975	46+050	75	99
281	46+050	46+075	25	88
282	46+075	46+100	25	75
283	46+100	46+125	25	72
284	46+125	46+150	25	70
285	46+150	46+175	25	68
286	46+175	46+200	25	65
287	46+200	46+225	25	63
288	46+225	46+250	25	61
289	46+250	46+275	25	60
290	46+275	46+300	25	57
291	46+300	46+350	50	55
292	46+350	46+375	25	57
293	46+375	46+475	100	58
294	46+475	46+525	50	63
295	46+525	46+550	25	61
296	46+550	46+625	75	60
297	46+625	46+700	75	61
298	46+700	46+775	75	63
299	46+775	46+925	150	62

S.No	Chainage (km)		Length (m)	ROW (m)
	Start	End		
300	46+925	46+950	25	63
301	46+950	46+975	25	65
302	46+975	47+000	25	72
303	47+000	47+025	25	75
304	47+025	47+050	25	79
305	47+050	47+075	25	81
306	47+075	47+125	50	102
307	47+125	47+150	25	70
308	47+150	47+175	25	64
309	47+175	47+850	675	56
310	47+850	47+875	25	59
311	47+875	47+925	50	63
312	47+925	47+950	25	64
313	47+950	47+975	25	62
314	47+975	48+000	25	59
315	48+000	48+125	125	56
316	48+125	48+225	100	58
317	48+225	48+325	100	59
318	48+325	48+400	75	60
319	48+400	48+725	325	62
320	48+725	48+850	125	61
321	48+850	48+875	25	62
322	48+875	48+925	50	64
323	48+925	48+950	25	61
324	48+950	48+975	25	63
325	48+975	49+025	50	64
326	49+025	49+100	75	63
327	49+100	49+125	25	64
328	49+125	49+150	25	66
329	49+150	49+175	25	65

S.No	Chainage (km)		Length (m)	ROW (m)
	Start	End		
330	49+175	49+200	25	63
331	49+200	49+325	125	62
332	49+325	49+400	75	61
333	49+400	49+425	25	67
334	49+425	49+450	25	68
335	49+450	49+475	25	80
336	49+475	49+500	25	101
337	49+500	49+525	25	100
338	49+525	49+550	25	79
339	49+550	49+575	25	69
340	49+575	49+600	25	66
341	49+600	49+625	25	64
342	49+625	49+650	25	61
343	49+650	49+675	25	60
344	49+675	49+700	25	66
345	49+700	49+725	25	60
346	49+725	49+825	100	56
347	49+825	49+850	25	53
348	49+850	50+550	700	52
349	50+550	50+675	125	51
350	50+675	50+700	25	52
351	50+700	50+750	50	54
352	50+750	50+800	50	55
353	50+800	50+850	50	56
354	50+850	50+900	50	57
355	50+900	50+925	25	58
356	50+925	50+975	50	59
357	50+975	51+000	25	60
358	51+000	51+050	50	61
359	51+050	51+125	75	54

S.No	Chainage (km)		Length (m)	ROW (m)
	Start	End		
360	51+125	51+175	50	53
361	51+175	51+200	25	54
362	51+200	51+225	25	55
363	51+225	51+250	25	54
364	51+250	51+275	25	51
365	51+275	51+300	25	53
366	51+300	51+375	75	56
367	51+375	51+500	125	50
368	51+500	51+525	25	53
369	51+525	52+000	475	56
370	52+000	52+050	50	57
371	52+050	52+075	25	57
372	52+075	52+100	25	55
373	52+100	52+125	25	57
374	52+125	52+150	25	59
375	52+150	52+175	25	66
376	52+175	52+200	25	76
377	52+200	52+225	25	83
378	52+225	52+300	75	107
379	52+300	52+325	25	86
380	52+325	52+350	25	81
381	52+350	52+375	25	101
382	52+375	52+400	25	106
383	52+400	52+425	25	104
384	52+425	52+450	25	80
385	52+450	52+475	25	70
386	52+475	52+500	25	60
387	52+500	52+525	25	64
388	52+525	52+550	25	66
389	52+550	52+650	100	67

S.No	Chainage (km)		Length (m)	ROW (m)
	Start	End		
390	52+650	52+700	50	70
391	52+700	52+725	25	71
392	52+725	52+750	25	72
393	52+750	52+775	25	73
394	52+775	52+850	75	74
395	52+850	52+875	25	80
396	52+875	52+900	25	85
397	52+900	52+925	25	92
398	52+925	52+950	25	115
399	52+950	52+975	25	118
400	52+975	53+000	25	94
401	53+000	53+075	75	100
402	53+075	53+100	25	70
403	53+100	53+125	25	60
404	53+125	53+150	25	63
405	53+150	53+175	25	63
406	53+175	53+225	50	65
407	53+225	53+250	25	63
408	53+250	53+875	625	62
409	53+875	53+900	25	64
410	53+900	53+925	25	66
411	53+925	53+950	25	72
412	53+950	53+975	25	77
413	53+975	54+000	25	96
414	54+000	54+025	25	140
415	54+025	54+050	25	130
416	54+050	54+075	25	110
417	54+075	54+100	25	88
418	54+100	54+125	25	80
419	54+125	54+150	25	65

S.No	Chainage (km)		Length (m)	ROW (m)
	Start	End		
420	54+150	54+175	25	61
421	54+175	54+400	225	61

Section 04 Neelmangla-Tumkur

S. No.	Chainage (Km)		Length (m)	ROW (m)
	From	To		
1*	29+500	29+900	400	60
2*	29+900	30+100	200	60
3*	30+100	30+590	490	60
4*	30+590	30+610	20	80
5*	30+610	30+730	120	60
6*	30+730	31+550	820	52.5
7*	30+730	31+550	820	46.5
8*	31+550	32+092	542	60
9*	32+092	32+109	17	100
10*	32+110	32+600	490	60
11*	32+600	32+850	250	60
12*	32+850	33+750	900	60
13*	33+750	34+050	300	60
14*	34+050	34+237	187	60
15*	34+237	34+249	12	100
16*	34+249	34+450	201	60
17*	34+450	34+700	250	60
18*	34+700	39+500	4800	60
19*	39+500	39+800	300	60
20*	39+800	40+300	500	55
21*	40+300	43+045	2745	60
22*	43+045	43+065	20	100

S. No.	Chainage (Km)		Length (m)	ROW (m)
	From	To		
23*	43+065	43+650	585	52.5
24*	43+065	43+100	35	52.5
25*	43+100	43+450	350	46.5
26*	43+450	43+650	200	52.5
27*	43+650	43+800	150	60
28*	43+800	43+850	50	60
29*	43+850	43+900	50	60
30*	43+900	44+312	412	60
31*	44+312	44+324	12	100
32*	44+324	44+800	476	60
33*	44+800	45+000	200	60
34*	45+000	45+200	200	52.5
35*	45+000	45+200	200	46.5
36*	45+200	45+450	250	60
37*	45+450	46+200	750	60
38*	46+200	46+250	50	60
39*	46+250	46+550	300	60
40*	46+550	46+800	250	60
41*	46+800	46+900	100	60
42*	46+900	46+980	80	60
43*	46+980	47+020	40	100
44*	47+020	47+050	30	60
45*	47+050	48+150	1100	60
46*	48+150	48+200	50	60
47*	48+200	48+350	150	60
48*	48+350	48+400	50	60
49*	48+400	48+500	100	60
50*	48+500	48+650	150	60
51*	48+650	48+750	100	60
52*	48+750	49+500	750	60

S. No.	Chainage (Km)		Length (m)	ROW (m)
	From	To		
53	49+500	49+750	250	60
54	49+750	49+900	150	60
55	49+900	51+300	1400	45
56	51+300	51+450	150	45
57	51+450	53+000	1550	45
58	53+000	53+200	200	45
59	53+200	53+950	750	45
60	53+950	54+150	200	45
61	54+150	54+600	450	45
62	54+600	54+800	200	45
63	54+800	56+600	1800	45
64	56+600	56+950	350	45
65	56+950	57+300	350	45
66	57+300	57+550	250	45
67	57+550	58+250	700	45
68	58+250	58+300	50	45
69	58+300	58+500	200	45
70	58+500	58+550	50	45
71	58+550	59+100	550	45
72	59+100	59+300	200	45
73	59+300	59+600	300	45
74	59+600	59+850	250	45
75	59+850	61+150	1300	45
76	61+150	61+800	650	84.2
77	61+800	62+040	240	48.3
78*	62+040	62+150	110	60
79*	62+150	62+400	250	60
80*	62+400	62+950	550	60
81*	62+950	63+050	100	60
82*	63+050	74+168	11118	60

For Section-04 Neelmangla Tumkur

a) *Under construction locations these details are tentative these may varies as per site and same shall be maintained by TOT/InvIT concessionaire after end of DLP period.

b) Other than the (*) locations, the remaining stretches fall within the ongoing DPR section. Hence, these details may vary as per site conditions and shall be maintained by the TOT/InvIT concessionaire after the completion of the DLP period.

6.4.3 Carriageway

Generally, the existing carriageway is of four lane divided standards. The carriageway width slightly varies at merging and diverging at junctions, median openings, at approaches to structures and on structures. It may be noted that, details of carriageway on structures shall be referred from Structures Inventory section of this chapter. The existing paved shoulder varies from 0 to 2.5 m along the project length on both side and 0.25-0.5 m wide shyness towards median. The earthen shoulder varies from 0-1.5 m on the project highway.

Details of carriageway along the Project Stretch are provided below:

Figure 6-1 : Cross Sections along the Project Stretch

Table 6-5 : Details of Existing Carriageway

Section 01 Vijayawada-Chilakaluripet

Chainage		Length (m)	LHS				Median Width (m)	RHS			
From (km)	To (km)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)	Earthen Shoulder (m)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)	Earthen Shoulder (m)
0+000	0+100	100	0.5	10.5	1.5		4	0.5	10.5	1.5	
0+100	0+200	100	1	10.5	2		4	1	10.5	2	
0+200	0+300	100	1	10.5	2		4	1	10.5	2	
0+300	0+400	100	1	10.5	2		4	1	10.5	2	
0+400	0+500	100	1	10.5	2		4	1	10.5	2	
0+500	0+600	100	1	10.5	2		4	1	10.5	2	
0+600	0+700	100	1	10.5	2		4	1	10.5	2	
0+700	0+800	100	1	10.5	2		4	1	10.5	2	
0+800	0+900	100	1	10.5	2		4	1	10.5	2	
0+900	1+060	160	1	10.5	2		4	1	10.5	2	
1+060	1+100	40	0.5	10.5	2-1.5	0	4	0.5	10.5	2-1.5	0
1+100	1+200	100	0.5	10.5	2-1.5	0	4	0.5	10.5	2-1.5	0-2
1+200	1+300	100	0.5	10.5	1.5	0	4	0.5	10.5	1.5	2
1+300	1+400	100	0.5	10.5	1.5	0	4	0.5	10.5	1.5	2
1+400	1+500	100	0.5	10.5	1.5	0	4	0.5	10.5	1.5	2
1+500	1+600	100	0.5	10.5	1.5	0	4	0.5	10.5	1.5	2
1+600	1+700	100	0.5	10.5	1.5	0	4	0.5	10.5	1.5	2
1+700	1+800	100	0.5	10.5	1.5	0	4	0.5	10.5	1.5	2
1+800	1+900	100	0.5	10.5	1.5	0	4	0.5	10.5	1.5	2
1+900	2+000	100	0.5	10.5	1.5	0	4	0.5	10.5	1.5	2
2+000	2+100	100	0.5	10.5	1.5	0	4	0.5	10.5	1.5	2
2+100	2+200	100	0.5	10.5	1.5	0	4	0.5	10.5	1.5	2
2+200	2+300	100	1	10.5	2		4	1	10.5	2	
2+300	2+400	100	1	10.5	2		4	1	10.5	2	

Chainage		Length (m)	LHS				Median Width (m)	RHS			
From (km)	To (km)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)	Earthen Shoulder (m)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)	Earthen Shoulder (m)
2+400	2+500	100	1	10.5	2		4	1	10.5	2	
2+500	2+600	100	1	10.5	2		4	1	10.5	2	
2+600	2+700	100	1	10.5	2		4	1	10.5	2	
2+700	2+800	100	1	10.5	2		4	1	10.5	2	
2+800	2+900	100	1	10.5	2		4	1	10.5	2	
2+900	3+000	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
3+000	3+050	50	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
3+050	3+100	50	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
3+100	3+200	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
3+100	3+200	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
3+200	3+300	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
3+300	3+400	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
3+400	3+500	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
3+500	3+600	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
3+600	3+700	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
3+700	3+800	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
3+800	3+900	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
3+900	4+000	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
4+000	4+100	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
4+100	4+200	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
4+200	4+300	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
4+300	4+400	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
4+400	4+560	160	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
4+560	4+600	40	1	10.5	2		4	1	10.5	2	
4+600	4+700	100	1	10.5	2		4	1	10.5	2	
4+700	4+800	100	1	10.5	2		4	1	10.5	2	

Chainage		Length (m)	LHS				Median Width (m)	RHS			
From (km)	To (km)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)	Earthen Shoulder (m)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)	Earthen Shoulder (m)
4+800	4+900	100	1	10.5	2		4	1	10.5	2	
4+900	5+000	100	1	10.5	2		4	1	10.5	2	
5+000	5+100	100	1	10.5	2		4	1	10.5	2	
5+100	5+240	140	1	10.5	2		4	1	10.5	2	
5+240	5+300	60	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
5+300	5+400	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
5+400	5+500	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
5+500	5+600	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
5+600	5+700	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
5+700	5+800	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
5+800	5+900	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
5+900	6+000	100	1	10.5	2		4	1	10.5	2	
6+000	6+100	100	1	10.5	2		4	1	10.5	2	
6+100	6+200	100	1	10.5	2		4	1	10.5	2	
6+200	6+300	100	1	10.5	2		4	1	10.5	2	
6+300	6+400	100	1	10.5	2		4	1	10.5	2	
6+400	6+500	100	1	10.5	2		4	1	10.5	2	
6+500	6+600	100	1	10.5	2		4	1	10.5	2	
6+600	6+700	100	1	10.5	2		4	1	10.5	2	
6+700	6+800	100	1	10.5	2		4	1	10.5	2	
6+800	6+900	100	1	10.5	2		4	1	10.5	2	
6+900	7+000	100	1	10.5	2		4	1	10.5	2	
7+000	7+100	100	1	10.5	2		4	1	10.5	2	
7+100	7+200	100	1	10.5	2		4	1	10.5	2	
7+200	7+300	100	1	10.5	2		4	1	10.5	2	
7+300	7+400	100	1	10.5	2		4	1	10.5	2	

Chainage		Length (m)	LHS				Median Width (m)	RHS			
From (km)	To (km)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)	Earthen Shoulder (m)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)	Earthen Shoulder (m)
7+400	7+500	100	1	10.5	2		4	1	10.5	2	
7+500	7+600	100	1	10.5	2		4	1	10.5	2	
7+600	7+700	100	1	10.5	2		4	1	10.5	2	
7+700	7+800	100	1	10.5	2		4	1	10.5	2	
7+800	7+900	100	1	10.5	2		4	1	10.5	2	
7+900	8+000	100	1	10.5	2		4	1	10.5	2	
8+000	8+100	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
8+100	8+200	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
8+200	8+300	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
8+300	8+400	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
8+400	8+500	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
8+500	8+600	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
8+600	8+700	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
8+700	8+800	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
8+800	8+900	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
8+900	9+000	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
9+000	9+100	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
9+100	9+200	100	1	10.5	2		4	1	10.5	2	
9+200	9+300	100	1	10.5	2		4	1	10.5	2	
9+300	9+400	100	1	10.5	2		4	1	10.5	2	
9+400	9+500	100	1	10.5	2		4	1	10.5	2	
9+500	9+600	100	1	10.5	2		4	1	10.5	2	
9+600	9+700	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
9+700	9+800	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
9+800	9+900	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
9+900	10+000	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2

Chainage		Length (m)	LHS				Median Width (m)	RHS			
From (km)	To (km)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)	Earthen Shoulder (m)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)	Earthen Shoulder (m)
10+000	10+100	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
10+100	10+200	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
10+200	10+300	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
10+300	10+400	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
10+400	10+500	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
10+500	10+600	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
10+600	10+700	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
10+700	10+800	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
10+800	10+900	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
10+900	11+000	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
11+000	11+100	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
11+100	11+200	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
11+200	11+300	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
11+300	11+400	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
11+400	11+500	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
11+500	11+600	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
11+600	11+700	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
11+700	11+800	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
11+800	11+900	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
11+900	12+000	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
12+000	12+100	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
12+100	12+200	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
12+200	12+300	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
12+300	12+400	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
12+400	12+500	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
12+500	12+600	100	1	10.5	2		4	1	10.5	2	

Chainage		Length (m)	LHS				Median Width (m)	RHS			
From (km)	To (km)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)	Earthen Shoulder (m)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)	Earthen Shoulder (m)
12+600	12+700	100	1	10.5	2		4	1	10.5	2	
12+700	12+800	100	1	10.5	2		4	1	10.5	2	
12+800	12+900	100	1	10.5	2		4	1	10.5	2	
12+900	13+000	100	1	10.5	2		4	1	10.5	2	
13+000	13+100	100	1	10.5	2		4	1	10.5	2	
13+100	13+200	100	1	10.5	2		4	1	10.5	2	
13+200	13+300	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
13+300	13+400	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
13+400	13+500	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
13+500	13+600	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
13+600	13+700	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
13+700	13+800	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
13+800	13+900	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
13+900	14+000	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
14+000	14+100	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
14+100	14+200	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
14+200	14+300	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
14+300	14+400	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
14+400	14+500	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
14+500	14+650	150	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
14+650	14+700	50	1	10.5	2		4	1	10.5	2	
14+700	14+800	100	1	10.5	2		4	1	10.5	2	
14+800	14+900	100	1	10.5	2		4	1	10.5	2	
14+900	15+000	100	1	10.5	2		4	1	10.5	2	
15+000	15+100	100	1	10.5	2		4	1	10.5	2	
15+100	15+200	100	1	10.5	2		4	1	10.5	2	

Chainage		Length (m)	LHS				Median Width (m)	RHS			
From (km)	To (km)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)	Earthen Shoulder (m)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)	Earthen Shoulder (m)
15+200	15+300	100	1	10.5	2		4	1	10.5	2	
15+300	15+400	100	1	10.5	2		4	1	10.5	2	
15+400	15+500	100	1	10.5	2		4	1	10.5	2	
15+500	15+600	100	1	10.5	2		4	1	10.5	2	
15+600	15+700	100	1	10.5	2		4	1	10.5	2	
15+700	15+800	100	1	10.5	2		4	1	10.5	2	
15+800	15+900	100	1	10.5	2		4	1	10.5	2	
15+900	16+000	100	1	10.5	2		4	1	10.5	2	
16+000	16+140	140	1	10.5	2		4	1	10.5	2	
16+140	16+200	60	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
16+200	16+300	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
16+300	16+400	100	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
16+400	16+499	99	0.5	10.5	1.5	2	4	0.5	10.5	1.5	2
355+000	355+100	100	0.5	10.5	1.5	0-2	4.5	0.5	10.5	1.5	0-2
355+100	355+200	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
355+200	355+300	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
355+300	355+400	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
355+400	355+500	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
355+500	355+600	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
355+600	355+700	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
355+700	355+800	100	0.5	10.5	1.5	0-2	4.5	0.5	10.5	1.5	0-2
355+800	355+900	100	0.5	10.5	1.5	0-2	4.5	0.5	10.5	1.5	0-2
355+900	356+000	100	0.5	10.5	1.5	0-2	4.5	0.5	10.5	1.5	0-2
356+000	356+100	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
356+100	356+200	100	0.5	10.5	1.5	0-2	4.5	0.5	10.5	1.5	0-2
356+200	356+300	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-

Chainage		Length (m)	LHS				Median Width (m)	RHS			
From (km)	To (km)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)	Earthen Shoulder (m)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)	Earthen Shoulder (m)
356+300	356+400	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
356+400	356+500	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
356+500	356+600	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
356+600	356+700	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
356+700	356+800	100	0.5	10.5	1.5	0-2	4.5	0.5	10.5	1.5	0-2
356+800	356+900	100	0.5	10.5	1.5	0-2	4.5	0.5	10.5	1.5	0-2
356+900	357+000	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
357+000	357+100	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
357+100	357+200	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
357+200	357+300	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
357+300	357+342	42	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
372+038	372+100	62	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
372+100	372+200	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
372+200	372+300	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
372+300	372+400	100	0.5	10.5	-	-	4.5-5.5	0.5	10.5	-	-
372+400	372+500	100	0.5	10.5	-	-	4.5-5.5	0.5	10.5	-	-
372+500	372+600	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
372+600	372+700	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
372+700	372+800	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
372+800	372+900	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
372+900	373+000	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
373+000	373+100	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
373+100	373+200	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
373+200	373+300	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-

Chainage		Length (m)	LHS				Median Width (m)	RHS			
From (km)	To (km)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)	Earthen Shoulder (m)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)	Earthen Shoulder (m)
373+300	373+400	100	0.5	10.5	1.5	-	4.5 - 8.0	0.5	10.5	1.5	-
373+400	373+500	100	0.5	10.5	1.5	-	8 - 20.0	0.5	10.5	1.5	-
373+500	373+600	100	0.5	10.5	1.5	-	20	0.5	10.5	1.5	-
373+600	373+700	100	0.5	10.5	1.5	-	20	0.5	10.5	1.5	-
373+700	373+800	100	0.5	10.5	1.5	-	12.0-21.0	0.5	10.5	1.5	-
373+800	373+900	100	0.5	10.5	1.5	-	4.5 - 11.0	0.5	10.5	1.5	-
373+900	374+000	100	0.5	10.5	1.5	-	4.5-1.2	0.5	10.5	1.5	-
374+000	374+100	100	0.5	10.5	1.5	-	1.2	0.5	10.5	1.5	-
374+100	374+168	100	0.5	10.5	1.5	-	1.2	0.5	10.5	1.5	-
374+168	374+300	100	0.5	10.5	1.5	-	1.2	0.5	10.5	1.5	-
374+300	374+400	100	0.5	10.5	1.5	-	1.2	0.5	10.5	1.5	-
374+400	374+500	100	0.5	10.5	1.5	-	1.2	0.5	10.5	1.5	-
374+500	374+600	100	0.5	10.5	1.5	-	1.2	0.5	10.5	1.5	-
374+600	374+700	100	0.5	10.5	1.5	-	1.2	0.5	10.5	1.5	-
374+700	374+800	100	0.5	10.5	1.5	-	1.2	0.5	10.5	1.5	-
374+800	374+900	100	0.5	10.5	1.5	-	1.2	0.5	10.5	1.5	-
374+900	375+000	100	0.5	10.5	1.5	-	1.2	0.5	10.5	1.5	-
375+000	375+100	100	0.5	10.5	1.5	-	1.2	0.5	10.5	1.5	-
375+100	375+200	100	0.5	10.5	1.5	-	1.2	0.5	10.5	1.5	-
375+200	375+300	100	0.5	10.5	1.5	-	1.2	0.5	10.5	1.5	-
375+300	375+400	100	0.5	10.5	1.5	-	1.2	0.5	10.5	1.5	-
375+400	375+500	100	0.5	10.5	1.5	-	1.2	0.5	10.5	1.5	-

Chainage		Length (m)	LHS				Median Width (m)	RHS			
From (km)	To (km)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)	Earthen Shoulder (m)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)	Earthen Shoulder (m)
375+500	375+600	100	0.5	10.5	1.5	-	1.2-4.5	0.5	10.5	1.5	-
375+600	375+700	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
375+700	375+800	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
375+800	375+900	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
375+900	376+000	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
376+000	376+100	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
376+100	376+200	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
376+200	376+300	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
376+300	376+400	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
376+400	376+500	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
376+500	376+600	100	0.5	10.5	1.5	0-2	4.5	0.5	10.5	1.5	0-2
376+600	376+700	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
376+700	376+800	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
376+800	376+900	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
376+900	377+000	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
377+000	377+100	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
377+100	377+200	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
377+200	377+300	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
377+300	377+400	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
377+400	377+500	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
377+500	377+600	100	0.5	10.5	1.5	2	4.5	0.5	10.5	1.5	2
377+600	377+700	100	0.5	10.5	1.5	2	4.5	0.5	10.5	1.5	2
377+700	377+800	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
377+800	377+900	100	0.5	10.5	-	-	4.5	0.5	10.5	-	-
377+900	378+000	100	0.5	10.5	-	-	4.5	0.5	10.5	-	-
378+000	378+100	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-

Chainage		Length (m)	LHS				Median Width (m)	RHS			
From (km)	To (km)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)	Earthen Shoulder (m)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)	Earthen Shoulder (m)
378+100	378+200	100	0.5	10.5	1.5	-	1.2-4.5	0.5	10.5	1.5	-
378+200	378+300	100	0.5	10.5	1.5	-	1.2	0.5	10.5	1.5	-
378+300	378+400	100	0.5	10.5	1.5	-	1.2	0.5	10.5	1.5	-
378+400	378+500	100	0.5	10.5	1.5	-	1.2	0.5	10.5	1.5	-
378+500	378+600	100	0.5	10.5	1.5	-	1.2	0.5	10.5	1.5	-
378+600	378+700	100	0.5	10.5	1.5	-	1.2	0.5	10.5	1.5	-
378+700	378+800	100	0.5	10.5	1.5	-	1.2	0.5	10.5	1.5	-
378+800	378+900	100	0.5	10.5	1.5	-	1.2	0.5	10.5	1.5	-
378+900	379+000	100	0.5	10.5	1.5	-	1.2-4.5	0.5	10.5	1.5	-
379+000	379+100	100	0.5	10.5	1.5	0-2	4.5	0.5	10.5	1.5	0-2
379+100	379+200	100	0.5	10.5	1.5	0-2	4.5	0.5	10.5	1.5	0-2
379+200	379+300	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
379+300	379+400	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
379+400	379+500	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
379+500	379+600	100	0.5	10.5	-	-	4.5	0.5	10.5	-	-
379+600	379+700	100	0.5	10.5	-	-	4.5	0.5	10.5	-	-
379+700	379+800	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
379+800	379+900	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
379+900	380+000	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
380+000	380+100	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
380+100	380+200	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
380+200	380+300	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
380+300	380+400	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
380+400	380+500	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
380+500	380+600	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-

Chainage		Length (m)	LHS				Median Width (m)	RHS			
From (km)	To (km)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)	Earthen Shoulder (m)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)	Earthen Shoulder (m)
380+600	380+700	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
380+700	380+800	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
380+800	380+900	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
380+900	381+000	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
381+000	381+100	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
381+100	381+200	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
381+200	381+300	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
381+300	381+400	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
381+400	381+500	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
381+500	381+600	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
381+600	381+700	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
381+700	381+800	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
381+800	381+900	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
381+900	382+000	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
382+000	382+100	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
382+100	382+200	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
382+200	382+300	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
382+300	382+400	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
382+400	382+500	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
382+500	382+600	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
382+600	382+700	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
382+700	382+800	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
382+800	382+900	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
382+900	383+000	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
383+000	383+100	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
383+100	383+200	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-

Chainage		Length (m)	LHS				Median Width (m)	RHS			
From (km)	To (km)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)	Earthen Shoulder (m)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)	Earthen Shoulder (m)
383+200	383+300	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
383+300	383+400	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
383+400	383+500	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
383+500	383+600	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
383+600	383+700	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
383+700	383+800	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
383+800	383+900	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
383+900	384+000	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
384+000	384+100	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
384+100	384+200	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
384+200	384+300	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
384+300	384+400	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
384+400	384+500	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
384+500	384+600	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
384+600	384+700	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
384+700	384+800	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
384+800	384+900	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
384+900	385+000	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
385+000	385+100	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
385+100	385+200	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
385+200	385+300	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
385+300	385+400	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
385+400	385+500	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
385+500	385+600	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
385+600	385+700	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
385+700	385+800	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-

Chainage		Length (m)	LHS				Median Width (m)	RHS			
From (km)	To (km)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)	Earthen Shoulder (m)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)	Earthen Shoulder (m)
385+800	385+900	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
385+900	386+000	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
386+000	386+100	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
386+100	386+200	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
386+200	386+300	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
386+300	386+400	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
386+400	386+500	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
386+500	386+600	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
386+600	386+700	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
386+700	386+800	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
386+800	386+900	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
386+900	387+000	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
387+000	387+100	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
387+100	387+200	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
387+200	387+300	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
387+300	387+400	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
387+400	387+500	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
387+500	387+600	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
387+600	387+700	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
387+700	387+800	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
387+800	387+900	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
387+900	388+000	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
388+000	388+100	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
388+100	388+200	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
388+200	388+300	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
388+300	388+400	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-

Chainage		Length (m)	LHS				Median Width (m)	RHS			
From (km)	To (km)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)	Earthen Shoulder (m)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)	Earthen Shoulder (m)
388+400	388+500	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
388+500	388+600	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
388+600	388+700	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
388+700	388+800	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
388+800	388+900	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
388+900	389+000	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
389+000	389+100	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
389+100	389+200	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
389+200	389+300	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
389+300	389+400	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
389+400	389+500	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
389+500	389+600	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
389+600	389+700	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
389+700	389+800	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
389+800	389+900	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
389+900	390+000	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
390+000	390+100	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
390+100	390+200	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
390+200	390+300	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
390+300	390+400	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
390+400	390+500	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
390+500	390+600	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
390+600	390+700	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
390+700	390+800	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
390+800	390+900	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
390+900	391+000	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-

Chainage		Length (m)	LHS				Median Width (m)	RHS			
From (km)	To (km)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)	Earthen Shoulder (m)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)	Earthen Shoulder (m)
391+000	391+100	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
391+100	391+200	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
391+200	391+300	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
391+300	391+400	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
391+400	391+500	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
391+500	391+600	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
391+600	391+700	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
391+700	391+800	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
391+800	391+900	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
391+900	392+000	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
392+000	392+100	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
392+100	392+200	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
392+200	392+300	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
392+300	392+400	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
392+400	392+500	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
392+500	392+600	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
392+600	392+700	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
392+700	392+800	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
392+800	392+900	100	0.5	10.5	1.5	0-2	4.5	0.5	10.5	1.5	0-2
392+900	393+000	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
393+000	393+100	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
393+100	393+200	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
393+200	393+300	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
393+300	393+400	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
393+400	393+500	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
393+500	393+600	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-

Chainage		Length (m)	LHS				Median Width (m)	RHS			
From (km)	To (km)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)	Earthen Shoulder (m)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)	Earthen Shoulder (m)
393+600	393+700	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
393+700	393+800	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
393+800	393+900	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
393+900	394+000	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
394+000	394+100	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
394+100	394+200	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
394+200	394+300	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
394+300	394+400	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
394+400	394+500	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
394+500	394+600	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
394+600	394+700	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
394+700	394+800	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
394+800	394+900	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
394+900	395+000	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
395+000	395+100	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
395+100	395+200	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
395+200	395+300	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
395+300	395+400	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
395+400	395+500	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
395+500	395+600	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
395+600	395+700	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
395+700	395+800	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
395+800	395+900	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
395+900	396+000	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
396+000	396+100	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
396+100	396+200	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-

Chainage		Length (m)	LHS				Median Width (m)	RHS			
From (km)	To (km)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)	Earthen Shoulder (m)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)	Earthen Shoulder (m)
396+200	396+300	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
396+300	396+400	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
396+400	396+500	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
396+500	396+600	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
396+600	396+700	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
396+700	396+800	100	0.5	10.5	-	-	1.5-4.5	0.25	10.5	-	-
396+800	396+900	100	0.5	10.5	-	-	1.5	0.25	10.5	-	-
396+900	397+000	100	0.5	10.5	-	-	1.5	0.25	10.5	-	-
397+000	397+100	100	0.5	10.5	-	-	1.5	0.25	10.5	-	-
397+100	397+200	100	0.5	10.5	-	-	1.5	0.25	10.5	-	-
397+200	397+300	100	0.5	10.5	-	-	1.5	0.25	10.5	-	-
397+300	397+400	100	0.5	10.5	-	-	1.5	0.25	10.5	-	-
397+400	397+500	100	0.5	10.5	-	-	1.5-4.5	0.25	10.5	-	-
397+500	397+600	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
397+600	397+700	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
397+700	397+800	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
397+800	397+900	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
397+900	398+000	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
398+000	398+100	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
398+100	398+200	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
398+200	398+300	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
398+300	398+400	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
398+400	398+500	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
398+500	398+600	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
398+600	398+700	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-

Chainage		Length (m)	LHS				Median Width (m)	RHS			
From (km)	To (km)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)	Earthen Shoulder (m)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)	Earthen Shoulder (m)
398+700	398+800	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
398+800	398+900	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
398+900	399+000	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
399+000	399+100	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
399+100	399+200	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
399+200	399+300	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
399+300	399+400	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
399+400	399+500	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
399+500	399+600	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
399+600	399+700	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
399+700	399+800	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
399+800	399+900	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
399+900	400+000	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
400+000	400+100	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
400+100	400+200	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
400+200	400+300	100	0.5	10.5	1.5	-	1.5-4.5	0.25	11-10.5	-	-
400+300	400+400	100	0.25	10.5	0	-	1.5	0.25	10.5	-	-
400+400	400+500	100	0.25	10.5	0	-	1.5	0.25	10.5	-	-
400+500	400+600	100	0.25	10.5	0	-	1.5	0.25	10.5	-	-
400+600	400+700	100	0.25	10.5	0	-	1.5	0.25	10.5	-	-
400+700	400+800	100	0.25	10.5	0	-	1.5	0.25	10.5	-	-
400+800	400+900	100	0.25	10.5	0	-	1.5	0.25	10.5	-	-
400+900	401+000	100	0.25	10.5	0	-	1.5	0.25	10.5	-	-
401+000	401+100	100	0.25	11-10.5	0	-	1.5	0.25	11-10.5	-	-

Chainage		Length (m)	LHS				Median Width (m)	RHS			
From (km)	To (km)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)	Earthen Shoulder (m)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)	Earthen Shoulder (m)
401+100	401+200	100	0.5	10.5	1.5	-	1.5-4.5	0.5	10.5	1.5	-
401+200	401+300	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
401+300	401+400	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
401+400	401+500	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
401+500	401+600	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
401+600	401+700	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
401+700	401+800	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
401+800	401+900	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
401+900	402+000	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
402+000	402+100	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
402+100	402+200	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
402+200	402+300	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
402+300	402+400	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
402+400	402+500	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
402+500	402+600	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
402+600	402+700	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
402+700	402+800	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
402+800	402+900	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
402+900	403+000	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
403+000	403+100	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
403+100	403+200	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
403+200	403+300	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
403+300	403+400	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
403+400	403+500	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
403+500	403+600	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
403+600	403+700	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-

Chainage		Length (m)	LHS				Median Width (m)	RHS			
From (km)	To (km)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)	Earthen Shoulder (m)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)	Earthen Shoulder (m)
403+700	403+800	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
403+800	403+900	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
403+900	404+000	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
404+000	404+100	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
404+100	404+200	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
404+200	404+300	100	0.25	11-10.5	-	-	1.5-4.5	0.5	10.5	1.5	-
404+300	404+400	100	0.25	10.5	-	-	1.5	0.25	11-10.5	-	-
404+400	404+500	100	0.25	10.5	-	-	1.5	0.25	10.5	-	-
404+500	404+600	100	0.25	10.5	-	-	1.5	0.25	10.5	-	-
404+600	404+700	100	0.25	10.5	-	-	1.5	0.25	10.5	-	-
404+700	404+800	100	0.25	10.5	-	-	1.5	0.25	10.5	-	-
404+800	404+900	100	0.25	10.5	-	-	1.5	0.25	10.5	-	-
404+900	405+000	100	0.25	10.5	-	-	1.5	0.25	10.5	-	-
405+000	405+100	100	0.25	10.5	-	-	1.5	0.25	10.5	-	-
405+100	405+200	100	0.25	11-10.5	-	-	1.5-4.5	0.25	11-10.5	-	-
405+200	405+300	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
405+300	405+400	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
405+400	405+500	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
405+500	405+600	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
405+600	405+700	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
405+700	405+800	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
405+800	405+900	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
405+900	406+000	100	0.25	7	1.5	-	4.5	0.5	10.5	1.5	-
406+000	406+100	100	0.25	7	1.5	-	4.5	0.5	10.5	1.5	-

Chainage		Length (m)	LHS				Median Width (m)	RHS			
From (km)	To (km)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)	Earthen Shoulder (m)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)	Earthen Shoulder (m)
406+100	406+200	100	0.25	7	1.5	-	4.5-5	0.5	10.5	1.5	-
406+200	406+300	100	0.25	7	1.5	-	5.0 - 6.0	0.5	10.5	1.5	-
406+300	406+400	100	0.25	7	1.5	-	6	0.5	10.5	1.5	-
406+400	406+500	100	0.25	7	1.5	-	6	0.5	10.5	1.5	-
406+500	406+600	100	0.25	7	1.5	-	6	0.5	10.5	1.5	-
406+600	406+700	100	0.25	7	1.5	-	5.0 - 6.0	0.5	10.5	1.5	-
406+700	406+800	100	0.5	10.5	1.5	-	5-4.5	0.5	10.5	1.5	-
406+800	406+900	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
406+900	407+000	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
407+000	407+100	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
407+100	407+200	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
407+200	407+300	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
407+300	407+400	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
407+400	407+500	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
407+500	407+600	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
407+600	407+700	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
407+700	407+800	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
407+800	407+900	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
407+900	408+000	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
408+000	408+100	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
408+100	408+200	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
408+200	408+300	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
408+300	408+400	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
408+400	408+500	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
408+500	408+600	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-

Chainage		Length (m)	LHS				Median Width (m)	RHS			
From (km)	To (km)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)	Earthen Shoulder (m)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)	Earthen Shoulder (m)
408+600	408+700	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
408+700	408+800	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
408+800	408+900	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
408+900	409+000	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
409+000	409+100	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
409+100	409+200	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
409+200	409+300	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
409+300	409+400	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
409+400	409+500	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
409+500	409+600	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
409+600	409+700	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
409+700	409+800	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
409+800	409+900	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
409+900	410+000	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
410+000	410+100	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
410+100	410+200	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
410+200	410+300	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
410+300	410+400	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
410+400	410+500	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
410+500	410+600	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
410+600	410+700	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
410+700	410+800	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
410+800	410+900	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
410+900	411+000	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
411+000	411+100	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
411+100	411+200	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-

Chainage		Length (m)	LHS				Median Width (m)	RHS			
From (km)	To (km)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)	Earthen Shoulder (m)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)	Earthen Shoulder (m)
411+200	411+300	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
411+300	411+400	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
411+400	411+500	100	0.25	11-10.5	-	-	1.5-4.5	0.25	11-10.5	-	-
411+500	411+600	100	0.25	10.5	-	-	1.5	0.25	10.5	-	-
411+600	411+700	100	0.25	10.5	-	-	1.5	0.25	10.5	-	-
411+700	411+800	100	0.25	10.5	-	-	1.5	0.25	10.5	-	-
411+800	411+900	100	0.25	10.5	-	-	1.5	0.25	10.5	-	-
411+900	412+000	100	0.25	10.5	-	-	1.5	0.25	10.5	-	-
412+000	412+100	100	0.25	10.5	-	-	1.5	0.25	10.5	-	-
412+100	412+200	100	0.25	11-10.5	-	-	1.5	0.25	11-10.5	-	-
412+200	412+300	100	0.5	10.5	1.5	-	1.2	0.5	10.5	1.5	-
412+300	412+400	100	0.5	10.5	1.5	-	1.2	0.5	10.5	1.5	-
412+400	412+500	100	0.5	10.5	1.5	-	1.2	0.5	10.5	1.5	-
412+500	412+600	100	0.5	10.5	1.5	-	1.2	0.5	10.5	1.5	-
412+600	412+700	100	0.5	10.5	1.5	-	1.2	0.5	10.5	1.5	-
412+700	412+800	100	0.5	10.5	1.5	-	1.2	0.5	10.5	1.5	-
412+800	412+900	100	0.5	10.5	1.5	-	1.2	0.5	10.5	1.5	-
412+900	413+000	100	0.5	10.5	1.5	-	1.2	0.5	10.5	1.5	-
413+000	413+100	100	0.5	10.5	1.5	-	1.2	0.5	10.5	1.5	-
413+100	413+200	100	0.5	10.5	1.5	-	1.2	0.5	10.5	1.5	-
413+200	413+300	100	0.5	10.5	1.5	-	1.2	0.5	10.5	1.5	-
413+300	413+400	100	0.5	10.5	1.5	-	1.2	0.5	10.5	1.5	-
413+400	413+500	100	0.5	10.5	1.5	-	1.2	0.5	10.5	1.5	-
413+500	413+600	100	0.5	10.5	1.5	-	1.2	0.5	10.5	1.5	-
413+600	413+700	100	0.5	10.5	1.5	-	1.2	0.5	10.5	1.5	-

Chainage		Length (m)	LHS				Median Width (m)	RHS			
From (km)	To (km)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)	Earthen Shoulder (m)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)	Earthen Shoulder (m)
413+700	413+800	100	0.5	10.5	1.5	-	1.2	0.5	10.5	1.5	-
413+800	413+900	100	0.5	10.5	1.5	-	1.2	0.5	10.5	1.5	-
413+900	414+000	100	0.5	10.5	1.5	-	1.2	0.5	10.5	1.5	-
414+000	414+100	100	0.5	10.5	1.5	-	1.2	0.5	10.5	1.5	-
414+100	414+200	100	0.5	10.5	1.5	-	1.2	0.5	10.5	1.5	-
414+200	414+300	100	0.5	10.5	1.5	-	1.2	0.5	10.5	1.5	-
414+300	414+400	100	0.5	10.5	1.5	-	1.2	0.5	10.5	1.5	-
414+400	414+500	100	0.5	10.5	1.5	-	1.2	0.5	10.5	1.5	-
414+500	414+600	100	0.5	10.5	1.5	-	1.2	0.5	10.5	1.5	-
414+600	414+700	100	0.5	10.5	1.5	-	1.2	0.5	10.5	1.5	-
414+700	414+800	100	0.5	10.5	1.5	-	1.2	0.5	10.5	1.5	-
414+800	414+900	100	0.5	10.5	1.5	-	1.2	0.5	10.5	1.5	-
414+900	415+000	100	0.5	10.5	1.5	-	1.2	0.5	10.5	1.5	-
415+000	415+100	100	0.5	10.5	1.5	-	1.2	0.5	10.5	1.5	-
415+100	415+200	100	0.5	10.5	1.5	-	1.2-4.5	0.5	10.5	1.5	-
415+200	415+300	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
415+300	415+400	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
415+400	415+500	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
415+500	415+600	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
415+600	415+700	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
415+700	415+800	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
415+800	415+900	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
415+900	416+000	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
416+000	416+100	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
416+100	416+200	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
416+200	416+300	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-

Chainage		Length (m)	LHS				Median Width (m)	RHS			
From (km)	To (km)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)	Earthen Shoulder (m)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)	Earthen Shoulder (m)
416+300	416+400	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
416+400	416+500	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
416+500	416+600	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
416+600	416+700	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
416+700	416+800	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
416+800	416+900	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
416+900	417+000	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
417+000	417+100	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
417+100	417+200	100	0.5	10.5	1.5	-	5	0.5	10.5	1.5	-
417+200	417+300	100	0.5	10.5	1.5	-	5	0.5	10.5	1.5	-
417+300	417+400	100	0.5	10.5	1.5	-	5	0.5	10.5	1.5	-
417+400	417+500	100	0.5	10.5	1.5	-	5	0.5	10.5	1.5	-
417+500	417+600	100	0.5	10.5	1.5	-	5	0.5	10.5	1.5	-
417+600	417+700	100	0.5	10.5	1.5	-	5	0.5	10.5	1.5	-
417+700	417+800	100	0.5	10.5	1.5	-	5	0.5	10.5	1.5	-
417+800	417+900	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
417+900	418+000	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
418+000	418+100	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
418+100	418+200	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
418+200	418+300	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
418+300	418+400	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
418+400	418+500	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
418+500	418+600	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
418+600	418+700	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
418+700	418+800	100	0.5	10.5	1.5	-	5	0.5	10.5	1.5	-
418+800	418+900	100	0.5	10.5	1.5	-	5	0.5	10.5	1.5	-

Chainage		Length (m)	LHS				Median Width (m)	RHS			
From (km)	To (km)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)	Earthen Shoulder (m)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)	Earthen Shoulder (m)
418+900	419+000	100	0.5	10.5	1.5	-	5	0.5	10.5	1.5	-
419+000	419+100	100	0.5	10.5	1.5	-	5	0.5	10.5	1.5	-
419+100	419+200	100	0.5	10.5	1.5	-	5	0.5	10.5	1.5	-
419+200	419+300	100	0.5	10.5	1.5	-	5	0.5	10.5	1.5	-
419+300	419+400	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
419+400	419+500	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
419+500	419+600	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
419+600	419+700	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
419+700	419+800	100	0.5	10.5	1.5	-	5	0.5	10.5	1.5	-
419+800	419+900	100	0.5	10.5	1.5	-	5	0.5	10.5	1.5	-
419+900	420+000	100	0.5	10.5	1.5	-	5	0.5	10.5	1.5	-
420+000	420+100	100	-	15.8	-	-	5	-	16.5	-	-
420+100	420+200	100	-	15.8	-	-	5	-	16.5	-	-
420+200	420+800	100	-	20-52	-	-	-	-	20-52	-	-
420+800	420+900	100	-	18	-	-	4.5	-	18	-	-
420+900	421+000	100	-	18	-	-	4.5	-	18	-	-
421+000	421+100	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
421+100	421+200	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
421+200	421+300	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
421+300	421+400	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
421+400	421+500	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
421+500	421+600	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
421+600	421+700	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
421+700	421+800	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
421+800	421+900	100	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-
421+900	422+000	100	0.5	10.5	1.5	-	5	0.5	10.5	1.5	-

Chainage		Length (m)	LHS				Median Width (m)	RHS			
From (km)	To (km)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)	Earthen Shoulder (m)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)	Earthen Shoulder (m)
422+000	422+100	100	0.5	10.5	1.5	-	5	0.5	10.5	1.5	-
422+100	422+200	100	0.5	10.5	1.5	-	5	0.5	10.5	1.5	-
422+200	422+300	100	0.5	10.5	1.5	-	5	0.5	10.5	1.5	-
422+300	422+400	100	0.5	10.5	1.5	-	5	0.5	10.5	1.5	-
422+400	422+500	100	0.5	10.5	1.5	-	5	0.5	10.5	1.5	-
422+500	422+605	105	0.5	10.5	1.5	-	4.5	0.5	10.5	1.5	-

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Chainage		Length (m)	LHS		Median Width (m)	RHS	
From (km)	To (km)		Shyness each side (m)	MCW Width (m)		Shyness each side (m)	MCW Width (m)
0+000	0+100	100	0.5	7.5	5	0.5	7.5
0+100	0+200	100	0.5	7.5	5	0.5	7.5
0+200	0+300	100	0.5	7.5-11.5	5	0.5	7.5-11.5
0+300	0+400	100	0.5	11.5-10.5	5	0.5	11.5-10.5
0+400	0+500	100	0.5	10.5	5-10	0.5	11-17
0+500	0+600	100	0.5	10.5	5	0.5	10.5-13.5
0+600	0+700	100	0.5	10.5	5	0.5	10.5
0+700	0+800	100	0.5	10.5	5	0.5	10.5
0+800	0+900	100	0.5	10.5	5	0.5	10.5
0+900	1+000	100	0.5	10.5	1-5	0.5	10.5
1+000	1+100	100	0.5	10.5	0-5	0.5	10.5
1+100	1+200	100	0.5	10.5	5	0.5	10.5
1+200	1+300	100	0.5	10.5	5	0.5	10.5
1+300	1+400	100	0.5	10.5	5	0.5	10.5

Chainage		Length (m)	LHS		Median Width (m)	RHS	
From (km)	To (km)		Shyness each side (m)	MCW Width (m)		Shyness each side (m)	MCW Width (m)
1+400	1+500	100	0.5	10.5	5	0.5	10.5
1+500	1+600	100	0.5	10.5	5	0.5	10.5
1+600	1+700	100	0.5	10.5	5	0.5	10.5
1+700	1+800	100	0.5	10.5	5	0.5	10.5
1+800	1+900	100	0.5	10.5	5	0.5	10.5
1+900	2+000	100	0.5	10.5	5	0.5	10.5
2+000	2+100	100	0.5	10.5	5	0.5	10.5
2+100	2+200	100	0.5	10.5	5	0.5	10.5
2+200	2+300	100	0.5	10.5	5	0.5	10.5
2+300	2+400	100	0.5	10.5	5	0.5	10.5
2+400	2+500	100	0.5	10.5	5	0.5	10.5
2+500	2+600	100	0.5	10.5	5	0.5	10.5
2+600	2+700	100	0.5	10.5	5	0.5	10.5
2+700	2+800	100	0.5	10.5	5	0.5	10.5
2+800	2+900	100	0.5	10.5	5	0.5	10.5
2+900	3+000	100	0.5	10.5	5	0.5	10.5
3+000	3+100	100	0.5	10.5	5	0.5	10.5
3+100	3+200	100	0.5	10.5	5	0.5	10.5
3+200	3+300	100	0.5	10.5	5	0.5	10.5
3+300	3+400	100	0.5	10.5	5	0.5	10.5
3+400	3+500	100	0.5	10.5	5	0.5	10.5
3+500	3+600	100	0.5	10.5	5	0.5	10.5
3+600	3+700	100	0.5	10.5	5	0.5	10.5
3+700	3+800	100	0.5	10.5	5	0.5	10.5
3+800	3+900	100	0.5	10.5	5	0.5	10.5
3+900	4+000	100	0.5	10.5	5	0.5	10.5
4+000	4+100	100	0.5	10.5	5	0.5	10.5
4+100	4+200	100	0.5	10.5	5	0.5	10.5
4+200	4+300	100	0.5	10.5	5	0.5	10.5

Chainage		Length (m)	LHS		Median Width (m)	RHS	
From (km)	To (km)		Shyness each side (m)	MCW Width (m)		Shyness each side (m)	MCW Width (m)
4+300	4+400	100	0.5	10.5	5	0.5	10.5
4+400	4+500	100	0.5	10.5	5	0.5	10.5
4+500	4+600	100	0.5	10.5	5	0.5	10.5
4+600	4+700	100	0.5	10.5	5	0.5	10.5
4+700	4+800	100	0.5	10.5	5	0.5	10.5
4+800	4+900	100	0.5	10.5	5	0.5	10.5
4+900	5+000	100	0.5	10.5	5	0.5	10.5
5+000	5+100	100	0.5	10.5	5	0.5	10.5
5+100	5+200	100	0.5	10.5	5	0.5	10.5
5+200	5+300	100	0.5	10.5	5	0.5	10.5
5+300	5+400	100	0.5	10.5	5	0.5	10.5
5+400	5+500	100	0.5	10.5	5	0.5	10.5
5+500	5+600	100	0.5	10.5	5	0.5	10.5
5+600	5+700	100	0.5	10.5	5	0.5	10.5
5+700	5+800	100	0.5	10.5	5	0.5	10.5
5+800	5+900	100	0.5	10.5	5	0.5	10.5
5+900	6+000	100	0.5	10.5	5	0.5	10.5
6+000	6+100	100	0.5	10.5	5	0.5	10.5
6+100	6+200	100	0.5	10.5	5	0.5	10.5
6+200	6+300	100	0.5	10.5	5	0.5	10.5
6+300	6+400	100	0.5	10.5	5	0.5	10.5
6+400	6+500	100	0.5	10.5	5	0.5	10.5
6+500	6+600	100	0.5	10.5	5	0.5	10.5
6+600	6+700	100	0.5	10.5	5	0.5	10.5
6+700	6+800	100	0.5	10.5	5	0.5	10.5
6+800	6+900	100	0.5	10.5	5	0.5	10.5
6+900	7+000	100	0.5	10.5	5	0.5	10.5
7+000	7+100	100	0.5	10.5	5	0.5	10.5
7+100	7+200	100	0.5	10.5	5	0.5	10.5

Chainage		Length (m)	LHS		Median Width (m)	RHS	
From (km)	To (km)		Shyness each side (m)	MCW Width (m)		Shyness each side (m)	MCW Width (m)
7+200	7+300	100	0.5	10.5	5	0.5	10.5
7+300	7+400	100	0.5	10.5	5	0.5	10.5
7+400	7+500	100	0.5	10.5	5	0.5	10.5
7+500	7+600	100	0.5	10.5	5	0.5	10.5
7+600	7+700	100	0.5	10.5	5	0.5	10.5
7+700	7+800	100	0.5	10.5	5	0.5	10.5
7+800	7+900	100	0.5	10.5	5	0.5	10.5
7+900	8+000	100	0.5	10.5	5	0.5	10.5
8+000	8+100	100	0.5	10.5	5	0.5	10.5
8+100	8+200	100	0.5	10.5	5	0.5	10.5
8+200	8+300	100	0.5	10.5	5	0.5	10.5
8+300	8+400	100	0.5	10.5	5	0.5	10.5
8+400	8+500	100	0.5	10.5	5	0.5	10.5
8+500	8+600	100	0.5	10.5	5	0.5	10.5
8+600	8+700	100	0.5	10.5	5	0.5	10.5
8+700	8+800	100	0.5	10.5	5	0.5	10.5
8+800	8+900	100	0.5	10.5	5	0.5	10.5
8+900	9+000	100	0.5	10.5	5	0.5	10.5
9+000	9+100	100	0.5	10.5	5	0.5	10.5
9+100	9+200	100	0.5	10.5	5	0.5	10.5
9+200	9+300	100	0.5	10.5	5	0.5	10.5
9+300	9+400	100	0.5	10.5	5	0.5	10.5
9+400	9+500	100	0.5	10.5	5	0.5	10.5
9+500	9+600	100	0.5	10.5	5	0.5	10.5
9+600	9+700	100	0.5	10.5	5	0.5	10.5
9+700	9+800	100	0.5	10.5	5	0.5	10.5
9+800	9+900	100	0.5	10.5	5	0.5	10.5
9+900	10+000	100	0.5	10.5	5	0.5	10.5
10+000	10+100	100	0.5	10.5	5	0.5	10.5

Chainage		Length (m)	LHS		Median Width (m)	RHS	
From (km)	To (km)		Shyness each side (m)	MCW Width (m)		Shyness each side (m)	MCW Width (m)
10+100	10+200	100	0.5	10.5	5	0.5	10.5
10+200	10+300	100	0.5	10.5	5	0.5	10.5
10+300	10+400	100	0.5	10.5	5	0.5	10.5
10+400	10+500	100	0.5	10.5	5	0.5	10.5
10+500	10+600	100	0.5	10.5	5	0.5	10.5
10+600	10+700	100	0.5	10.5	5	0.5	10.5
10+700	10+800	100	0.5	10.5	5	0.5	10.5
10+800	10+900	100	0.5	10.5	5	0.5	10.5
10+900	11+000	100	0.5	10.5	5	0.5	10.5
11+000	11+100	100	0.5	10.5	5	0.5	10.5
11+100	11+200	100	0.5	10.5	5	0.5	10.5
11+200	11+300	100	0.5	10.5	5	0.5	10.5
11+300	11+400	100	0.5	10.5	5	0.5	10.5
11+400	11+500	100	0.5	10.5	5	0.5	10.5
11+500	11+600	100	0.5	10.5	5	0.5	10.5
11+600	11+700	100	0.5	10.5	5	0.5	10.5
11+700	11+800	100	0.5	10.5	5	0.5	10.5
11+800	11+900	100	0.5	10.5	5	0.5	10.5
11+900	12+000	100	0.5	10.5	5	0.5	10.5
12+000	12+100	100	0.5	10.5	5	0.5	10.5
12+100	12+200	100	0.5	10.5	5	0.5	10.5
12+200	12+300	100	0.5	10.5	5	0.5	10.5
12+300	12+400	100	0.5	10.5	5	0.5	10.5
12+400	12+500	100	0.5	10.5	5	0.5	10.5
12+500	12+600	100	0.5	10.5	5	0.5	10.5
12+600	12+700	100	0.5	10.5	5	0.5	10.5
12+700	12+800	100	0.5	10.5	5	0.5	10.5
12+800	12+900	100	0.5	10.5	5	0.5	10.5
12+900	13+000	100	0.5	10.5	5	0.5	10.5

Chainage		Length (m)	LHS		Median Width (m)	RHS	
From (km)	To (km)		Shyness each side (m)	MCW Width (m)		Shyness each side (m)	MCW Width (m)
13+000	13+100	100	0.5	10.5	5	0.5	10.5
13+100	13+200	100	0.5	10.5	5	0.5	10.5
13+200	13+300	100	0.5	10.5	5	0.5	10.5
13+300	13+400	100	0.5	10.5	5	0.5	10.5
13+400	13+500	100	0.5	10.5	5	0.5	10.5
13+500	13+600	100	0.5	10.5	5	0.5	10.5
13+600	13+700	100	0.5	10.5	5	0.5	10.5
13+700	13+800	100	0.5	10.5	5	0.5	10.5
13+800	13+900	100	0.5	10.5	5	0.5	10.5
13+900	14+000	100	0.5	10.5	5	0.5	10.5
14+000	14+100	100	0.5	10.5	5	0.5	10.5
14+100	14+200	100	0.5	10.5	5	0.5	10.5
14+200	14+300	100	0.5	10.5	5	0.5	10.5
14+300	14+400	100	0.5	10.5	5	0.5	10.5
14+400	14+500	100	0.5	10.5	5	0.5	10.5
14+500	14+600	100	0.5	10.5	5	0.5	10.5
14+600	14+700	100	0.5	10.5	5	0.5	10.5
14+700	14+800	100	0.5	10.5	5	0.5	10.5
14+800	14+900	100	0.5	10.5	5	0.5	10.5
14+900	15+000	100	0.5	10.5	5	0.5	10.5
15+000	15+100	100	0.5	10.5	5	0.5	10.5
15+100	15+200	100	0.5	10.5	5	0.5	10.5
15+200	15+300	100	0.5	10.5	5	0.5	10.5
15+300	15+400	100	0.5	10.5	5	0.5	10.5
15+400	15+500	100	0.5	10.5	5	0.5	10.5
15+500	15+600	100	0.5	10.5	5	0.5	10.5
15+600	15+700	100	0.5	10.5	5	0.5	10.5
15+700	15+800	100	0.5	10.5	5	0.5	10.5
15+800	15+900	100	0.5	10.5	5	0.5	10.5

Chainage		Length (m)	LHS		Median Width (m)	RHS	
From (km)	To (km)		Shyness each side (m)	MCW Width (m)		Shyness each side (m)	MCW Width (m)
15+900	16+000	100	0.5	10.5	5	0.5	10.5
16+000	16+100	100	0.5	10.5	5	0.5	10.5
16+100	16+200	100	0.5	10.5	5	0.5	10.5
16+200	16+300	100	0.5	10.5	5	0.5	10.5
16+300	16+400	100	0.5	10.5	5	0.5	10.5
16+400	16+500	100	0.5	10.5-14.5	3-5	0.5	10.5-14.5
16+500	16+600	100	0.5	14.5-24.5	-	0.5	14.5
16+600	16+700	100	0.5	24.5	-	0.5	14.5-24.5
16+700	16+800	100	0.5	14.5-24.5	-	0.5	14.5-24.5
16+800	16+900	100	0.5	10.5-14.5	0-5	0.5	13.7-14.5
16+900	17+000	100	0.5	10.5	0-5	0.5	10.5
17+000	17+100	100	0.5	10.5	5	0.5	10.5
17+100	17+200	100	0.5	10.5	5	0.5	10.5
17+200	17+300	100	0.5	10.5	5	0.5	10.5
17+300	17+400	100	0.5	10.5	5	0.5	10.5
17+400	17+500	100	0.5	10.5	5	0.5	10.5
17+500	17+600	100	0.5	10.5	5	0.5	10.5
17+600	17+700	100	0.5	10.5	5	0.5	10.5
17+700	17+800	100	0.5	10.5	5	0.5	10.5
17+800	17+900	100	0.5	10.5	5	0.5	10.5
17+900	18+000	100	0.5	10.5	5	0.5	10.5
18+000	18+100	100	0.5	10.5	5	0.5	10.5
18+100	18+200	100	0.5	10.5	5	0.5	10.5
18+200	18+300	100	0.5	10.5	5	0.5	10.5
18+300	18+400	100	0.5	10.5	5	0.5	10.5
18+400	18+500	100	0.5	10.5	5	0.5	10.5
18+500	18+600	100	0.5	10.5	5	0.5	10.5
18+600	18+700	100	0.5	10.5	5	0.5	10.5
18+700	18+800	100	0.5	10.5	5	0.5	10.5

Chainage		Length (m)	LHS		Median Width (m)	RHS	
From (km)	To (km)		Shyness each side (m)	MCW Width (m)		Shyness each side (m)	MCW Width (m)
18+800	18+900	100	0.5	10.5	5	0.5	10.5
18+900	19+000	100	0.5	10.5	5	0.5	10.5
19+000	19+100	100	0.5	10.5	5	0.5	10.5
19+100	19+200	100	0.5	10.5-14	5	0.5	10.5-14
19+200	19+300	100	0.5	14	5	0.5	14
19+300	19+400	100	0.5	14-10.5	5	0.5	14-10.5
19+400	19+500	100	0.5	10.5	5	0.5	10.5
19+500	19+600	100	0.5	10.5	5	0.5	10.5
19+600	19+700	100	0.5	10.5	5	0.5	10.5
19+700	19+800	100	0.5	10.5	5	0.5	10.5
19+800	19+900	100	0.5	10.5	5	0.5	10.5
19+900	20+000	100	0.5	10.5	5	0.5	10.5
20+000	20+100	100	0.5	10.5	5	0.5	10.5
20+100	20+200	100	0.5	10.5	5	0.5	10.5
20+200	20+300	100	0.5	10.5	5	0.5	10.5
20+300	20+400	100	0.5	10.5	5	0.5	10.5
20+400	20+500	100	0.5	10.5	5	0.5	10.5
20+500	20+600	100	0.5	10.5	5	0.5	10.5
20+600	20+700	100	0.5	10.5	5	0.5	10.5
20+700	20+800	100	0.5	10.5	5	0.5	10.5
20+800	20+900	100	0.5	10.5	5	0.5	10.5
20+900	21+000	100	0.5	10.5	5	0.5	10.5
21+000	21+100	100	0.5	10.5	5	0.5	10.5
21+100	21+200	100	0.5	10.5	5	0.5	10.5
21+200	21+300	100	0.5	10.5	5	0.5	10.5
21+300	21+400	100	0.5	10.5	5	0.5	10.5
21+400	21+500	100	0.5	10.5	5	0.5	10.5
21+500	21+600	100	0.5	10.5	5	0.5	10.5
21+600	21+700	100	0.5	10.5	5	0.5	10.5

Chainage		Length (m)	LHS		Median Width (m)	RHS	
From (km)	To (km)		Shyness each side (m)	MCW Width (m)		Shyness each side (m)	MCW Width (m)
21+700	21+800	100	0.5	10.5	5	0.5	10.5
21+800	21+900	100	0.5	10.5	5	0.5	10.5
21+900	22+000	100	0.5	10.5	5-8	0.5	10.5
22+000	22+100	100	0.5	10.5	8-13	0.5	10.5
22+100	22+200	100	0.5	10.5	-	0.5	10.5
22+200	22+300	100	0.5	10.5	-	0.5	10.5
22+300	22+400	100	0.5	10.5	-	0.5	10.5
22+400	22+500	100	0.5	10.5	-	0.5	10.5
22+500	22+600	100	0.5	10.5	-	0.5	10.5
22+600	22+700	100	0.5	10.5	-	0.5	10.5
22+700	22+800	100	0.5	10.5	-	0.5	10.5
22+800	22+900	100	0.5	10.5	-	0.5	10.5
22+900	23+000	100	0.5	10.5	-	0.5	10.5
23+000	23+100	100	0.5	10.5	-	0.5	10.5
23+100	23+200	100	0.5	10.5	-	0.5	10.5
23+200	23+300	100	0.5	10.5	-	0.5	10.5
23+300	23+400	100	0.5	10.5	-	0.5	10.5
23+400	23+500	100	0.5	10.5	-	0.5	10.5
23+500	23+600	100	0.5	10.5	-	0.5	10.5
23+600	23+700	100	0.5	10.5	-	0.5	10.5
23+700	23+800	100	0.5	10.5	-	0.5	10.5
23+800	23+900	100	0.5	10.5	-	0.5	10.5
23+900	24+000	100	0.5	10.5	-	0.5	10.5
24+000	24+100	100	0.5	10.5	-	0.5	10.5
24+100	24+200	100	0.5	10.5	-	0.5	10.5
24+200	24+300	100	0.5	10.5	-	0.5	10.5
24+300	24+400	100	0.5	10.5	-	0.5	10.5
24+400	24+500	100	0.5	10.5	-	0.5	10.5
24+500	24+600	100	0.5	10.5	-	0.5	10.5

Chainage		Length (m)	LHS		Median Width (m)	RHS	
From (km)	To (km)		Shyness each side (m)	MCW Width (m)		Shyness each side (m)	MCW Width (m)
24+600	24+700	100	0.5	10.5	-	0.5	10.5
24+700	24+800	100	0.5	10.5	-	0.5	10.5
24+800	24+900	100	0.5	10.5	-	0.5	10.5
24+900	25+000	100	0.5	10.5	-	0.5	10.5
25+000	25+100	100	0.5	10.5	-	0.5	10.5
25+100	25+200	100	0.5	10.5	-	0.5	10.5
25+200	25+300	100	0.5	10.5	-	0.5	16.5
25+300	25+400	100	0.5	14-16	1-5	0.5	14-16
25+400	25+500	100	0.5	11-14	5	0.5	11-14
25+500	25+600	100	0.5	10.5	5	0.5	10.5
25+600	25+700	100	0.5	10.5	5	0.5	10.5
25+700	25+800	100	0.5	10.5	5	0.5	10.5
25+800	25+900	100	0.5	10.5	5	0.5	10.5
25+900	26+000	100	0.5	10.5	5	0.5	10.5
26+000	26+100	100	0.5	10.5	5	0.5	10.5
26+100	26+200	100	0.5	10.5	5	0.5	10.5
26+200	26+300	100	0.5	10.5	5	0.5	10.5
26+300	26+400	100	0.5	10.5	5	0.5	10.5
26+400	26+500	100	0.5	10.5	5	0.5	10.5
26+500	26+600	100	0.5	10.5	5	0.5	10.5
26+600	26+700	100	0.5	10.5	5	0.5	10.5
26+700	26+800	100	0.5	10.5	5	0.5	10.5
26+800	26+900	100	0.5	10.5	5	0.5	10.5
26+900	27+000	100	0.5	10.5	5	0.5	10.5
27+000	27+100	100	0.5	10.5	5	0.5	10.5
27+100	27+200	100	0.5	10.5	5	0.5	10.5
27+200	27+300	100	0.5	10.5	5	0.5	10.5
27+300	27+400	100	0.5	10.5	5	0.5	10.5
27+400	27+500	100	0.5	10.5	5	0.5	10.5

Chainage		Length (m)	LHS		Median Width (m)	RHS	
From (km)	To (km)		Shyness each side (m)	MCW Width (m)		Shyness each side (m)	MCW Width (m)
27+500	27+600	100	0.5	10.5	5	0.5	10.5
27+600	27+700	100	0.5	10.5	5	0.5	10.5
27+700	27+800	100	0.5	10.5	5	0.5	10.5
27+800	27+900	100	0.5	10.5	5	0.5	10.5
27+900	28+000	100	0.5	10.5	5	0.5	10.5
28+000	28+100	100	0.5	10.5	5	0.5	10.5
28+100	28+200	100	0.5	10.5	5	0.5	10.5
28+200	28+300	100	0.5	10.5	5	0.5	10.5
28+300	28+400	100	0.5	10.5	5	0.5	10.5
28+400	28+500	100	0.5	10.5-18.5	5	0.5	10.5-18.5
28+500	28+600	100	0.5	18.5-30	-	0.5	18.5-30
28+600	28+700	100	0.5	25-32	-	0.5	30-35
28+700	28+800	100	0.5	20-25	-	0.5	16.5-30
28+800	28+900	100	0.5	10.5-16.5	5	0.5	10.5-16.5
28+900	29+000	100	0.5	10.5	5	0.5	10.5
29+000	29+100	100	0.5	10.5	5	0.5	10.5
29+100	29+200	100	0.5	10.5	5	0.5	10.5
29+200	29+300	100	0.5	10.5	5	0.5	10.5
29+300	29+400	100	0.5	10.5	5	0.5	10.5
29+400	29+500	100	0.5	10.5	5	0.5	10.5
29+500	29+600	100	0.5	10.5	5	0.5	10.5
29+600	29+700	100	0.5	10.5	5	0.5	10.5
29+700	29+800	100	0.5	10.5	5	0.5	10.5
29+800	29+900	100	0.5	10.5	5	0.5	10.5
29+900	30+000	100	0.5	10.5	5	0.5	10.5
30+000	30+100	100	0.5	10.5	5	0.5	10.5
30+100	30+200	100	0.5	10.5	5	0.5	10.5
30+200	30+300	100	0.5	10.5	5	0.5	10.5
30+300	30+400	100	0.5	10.5	5	0.5	10.5

Chainage		Length (m)	LHS		Median Width (m)	RHS	
From (km)	To (km)		Shyness each side (m)	MCW Width (m)		Shyness each side (m)	MCW Width (m)
30+400	30+500	100	0.5	10.5	5	0.5	10.5
30+500	30+600	100	0.5	10.5	5	0.5	10.5
30+600	30+700	100	0.5	10.5	5	0.5	10.5
30+700	30+800	100	0.5	10.5	5	0.5	10.5
30+800	30+900	100	0.5	10.5	5	0.5	10.5
30+900	31+000	100	0.5	10.5	5	0.5	10.5
31+000	31+100	100	0.5	10.5	5	0.5	10.5
31+100	31+200	100	0.5	10.5	5	0.5	10.5
31+200	31+300	100	0.5	10.5	5	0.5	10.5
31+300	31+400	100	0.5	10.5	5	0.5	10.5
31+400	31+500	100	0.5	10.5	5	0.5	10.5
31+500	31+600	100	0.5	10.5	5	0.5	10.5
31+600	31+700	100	0.5	10.5	5	0.5	10.5
31+700	31+800	100	0.5	10.5	5	0.5	10.5
31+800	31+900	100	0.5	10.5	5	0.5	10.5
31+900	32+000	100	0.5	10.5	5	0.5	10.5
32+000	32+100	100	0.5	10.5	5	0.5	10.5
32+100	32+200	100	0.5	10.5	5	0.5	10.5
32+200	32+300	100	0.5	10.5	5	0.5	10.5
32+300	32+400	100	0.5	10.5	5	0.5	10.5
32+400	32+500	100	0.5	10.5	5	0.5	10.5
32+500	32+600	100	0.5	10.5	5	0.5	10.5

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Chainage		Length (m)	LHS			Median Width (m)	RHS		
From (km)	To (km)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)
21+400	21+850	450	-	30-50	-	1.5-4.5	-	30-50	-
21+850	21+900	50	0.5	10.5	1	4.5	0.5	10.5	1
21+900	22+000	100	0.5	10.5	1	4.5	0.5	10.5	1
22+000	22+100	100	0.5	10.5	1	4.5	0.5	10.5	1
22+100	22+200	100	0.5	10.5	1	4.5	0.5	10.5	1
22+200	22+300	100	0.5	10.5	1	4.5	0.5	10.5	1
22+300	22+400	100	0.5	10.5	1	4.5	0.5	10.5	1
22+400	22+500	100	0.5	10.5	1	4.5	0.5	10.5	1
22+500	22+600	100	0.5	10.5	1	4.5	0.5	10.5	1
22+600	22+700	100	0.5	10.5	1	4.5	0.5	10.5	1
22+700	22+800	100	0.5	10.5	1	4.5	0.5	10.5	1
22+800	22+900	100	0.5	10.5	1	4.5	0.5	10.5	1
22+900	23+000	100	0.5	10.5	1	4.5	0.5	10.5	1
23+000	23+100	100	0.5	10.5	1	4.5	0.5	10.5	1
23+100	23+200	100	0.5	10.5	1	4.5	0.5	10.5	1
23+200	23+300	100	0.5	10.5	1	4.5	0.5	10.5	1
23+300	23+400	100	0.5	10.5	1	4.5	0.5	10.5	1
23+400	23+500	100	0.5	10.5	1	4.5	0.5	10.5	1
23+500	23+600	100	0.5	10.5	1	4.5	0.5	10.5	1
23+600	23+700	100	0.5	10.5	1	4.5	0.5	10.5	1
23+700	23+800	100	0.5	10.5	1	4.5	0.5	10.5	1
23+800	23+900	100	0.5	10.5	1	4.5	0.5	10.5	1
23+900	24+000	100	0.5	10.5	1	4.5	0.5	10.5	1
24+000	24+100	100	0.5	10.5	1	4.5	0.5	10.5	1
24+100	24+200	100	0.5	10.5	1	4.5	0.5	10.5	1
24+200	24+300	100	0.5	10.5	1	4.5	0.5	10.5	1
24+300	24+400	100	0.5	10.5	1	4.5	0.5	10.5	1

Chainage		Length (m)	LHS			Median Width (m)	RHS		
From (km)	To (km)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)
24+400	24+500	100	0.5	10.5	1	4.5	0.5	10.5	1
24+500	24+600	100	0.5	10.5	1	4.5	0.5	10.5	1
24+600	24+700	100	0.5	10.5	1	4.5	0.5	10.5	1
24+700	24+800	100	0.5	10.5	1	4.5	0.5	10.5	1
24+800	24+900	100	0.5	10.5	1	4.5	0.5	10.5	1
24+900	25+000	100	0.5	10.5	1	4.5	0.5	10.5	1
25+000	25+100	100	0.5	10.5	1	4.5	0.5	10.5	1
25+100	25+200	100	0.5	10.5	1	4.5	0.5	10.5	1
25+200	25+300	100	0.5	10.5	1	4.5	0.5	10.5	1
25+300	25+400	100	0.5	10.5	1	4.5	0.5	10.5	1
25+400	25+500	100	0.5	10.5	1	4.5	0.5	10.5	1
25+500	25+600	100	0.5	10.5	1	4.5	0.5	10.5	1
25+600	25+700	100	0.5	10.5	1	1.5	0.5	10.5	1
25+700	25+800	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
25+800	25+900	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
25+900	26+000	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
26+000	26+100	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
26+100	26+200	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
26+200	26+300	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
26+300	26+400	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
26+400	26+500	100	0.5	10.5	1	4.5	0.5	10.5	1
26+500	26+600	100	0.5	10.5	1	4.5	0.5	10.5	1
26+600	26+700	100	0.5	10.5	1	4.5	0.5	10.5	1
26+700	26+800	100	0.5	10.5	1	4.5	0.5	10.5	1
26+800	26+900	100	0.5	10.5	1	4.5	0.5	10.5	1
26+900	27+000	100	0.5	10.5	1.2	1.5-2	0.5	10.5	1
27+000	27+100	100	0.5	10.5	1.2	1.5	0.5	10.5	1
27+100	27+200	100	0.5	10.5	1.2	1.5	0.5	10.5	1

Chainage		Length (m)	LHS			Median Width (m)	RHS		
From (km)	To (km)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)
27+200	27+300	100	0.5	10.5	1.2	1.5	0.5	10.5	1
27+300	27+400	100	0.5	10.5	1.2	1.5	0.5	10.5	1
27+400	27+500	100	0.5	10.5	1.2	1.5	0.5	10.5	1
27+500	27+600	100	0.5	10.5	1.2	1.5	0.5	10.5	1
27+600	27+700	100	0.5	10.5	1	2-4.5	0.5	10.5	1
27+700	27+800	100	0.5	10.5	1	4.5	0.5	10.5	1
27+800	27+900	100	0.5	10.5	1	4.5	0.5	10.5	1
27+900	28+000	100	0.5	10.5	1	4.5	0.5	10.5	1
28+000	28+100	100	0.5	10.5	1.5	1.5-4.5	0.5	10.5	1.5
28+100	28+200	100	0.5	10.5	1.5	1.5	0.5	10.5	2
28+200	28+300	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
28+300	28+400	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
28+400	28+500	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
28+500	28+600	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
28+600	28+700	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
28+700	28+800	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
28+800	28+900	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
28+900	29+000	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
29+000	29+100	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
29+100	29+200	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
29+200	29+300	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
29+300	29+400	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
29+400	29+500	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
29+500	29+600	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
29+600	29+700	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
29+700	29+800	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
29+800	29+900	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
29+900	30+000	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5

Chainage		Length (m)	LHS			Median Width (m)	RHS		
From (km)	To (km)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)
30+000	30+100	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
30+100	30+200	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
30+200	30+300	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
30+300	30+400	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
30+400	30+500	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
30+500	30+600	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
30+600	30+700	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
30+700	30+800	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
30+800	30+900	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
30+900	31+000	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
31+000	31+100	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
31+100	31+200	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
31+200	31+300	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
31+300	31+400	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
31+400	31+500	100	0.5	10.5	1.5	2-4.5	0.5	10.5	1.5
31+500	31+600	100	0.5	10.5	1.5	4.5	0.5	10.5	1.5
31+600	31+700	100	0.5	10.5	-	4.5	0.5	10.5	-
31+700	31+800	100	0.5	10.5	-	4.5	0.5	10.5	-
31+800	31+900	100	0.5	10.5	-	4.5	0.5	10.5	-
31+900	32+000	100	0.5	10.5	-	4.5	0.5	10.5	-
32+000	32+100	100	0.5	10.5	-	4.5	0.5	10.5	-
32+100	32+200	100	0.5	10.5	-	4.5	0.5	10.5	-
32+200	32+300	100	0.5	10.5	-	4.5	0.5	10.5	-
32+300	32+400	100	0.5	10.5	-	4.5	0.5	10.5	-
32+400	32+500	100	0.5	10.5	-	4.5	0.5	10.5	-
32+500	32+600	100	0.5	10.5	-	4.5	0.5	10.5	-
32+600	32+700	100	0.5	10.5	-	4.5	0.5	10.5	-
32+700	32+800	100	0.5	10.5	-	4.5	0.5	10.5	-

Chainage		Length (m)	LHS			Median Width (m)	RHS		
From (km)	To (km)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)
32+800	32+900	100	0.5	10.5	-	4.5	0.5	10.5	-
32+900	33+000	100	0.5	10.5	-	4.5	0.5	10.5	-
33+000	33+100	100	0.5	10.5	-	4.5	0.5	10.5	-
33+100	33+200	100	0.5	10.5	-	4.5	0.5	10.5	-
33+200	33+300	100	0.5	10.5	-	2-4.5	0.5	10.5	-
33+300	33+400	100	0.5	10.5	-	1.5	0.5	10.5	-
33+400	33+500	100	0.5	10.5	-	1.5	0.5	10.5	-
33+500	33+600	100	0.5	10.5	-	1.5	0.5	10.5	-
33+600	33+700	100	0.5	10.5	-	1.5	0.5	10.5	-
33+700	33+800	100	0.5	10.5	-	1.5	0.5	10.5	-
33+800	33+900	100	0.5	10.5	-	1.5	0.5	10.5	-
33+900	34+000	100	0.5	10.5	-	2-4.5	0.5	10.5	-
34+000	34+100	100	0.5	10.5	-	4.5	0.5	10.5	-
34+100	34+200	100	0.5	10.5	-	4.5	0.5	10.5	-
34+200	34+300	100	0.5	10.5	-	4.5	0.5	10.5	-
34+300	34+400	100	0.5	10.5	-	4.5	0.5	10.5	-
34+400	34+500	100	0.5	10.5	-	4.5	0.5	10.5	-
34+500	34+600	100	0.5	10.5	-	4.5	0.5	10.5	-
34+600	34+700	100	0.5	10.5	-	4.5	0.5	10.5	-
34+700	34+800	100	0.5	10.5	-	1.5	0.5	10.5	-
34+800	34+900	100	0.5	10.5	-	1.5	0.5	10.5	-
34+900	35+000	100	0.5	10.5	-	1.5	0.5	10.5	-
35+000	35+100	100	0.5	10.5	-	1.5	0.5	10.5	-
35+100	35+200	100	0.5	10.5	-	1.5	0.5	10.5	-
35+200	35+300	100	0.5	10.5	-	1.5	0.5	10.5	-
35+300	35+400	100	0.5	10.5	-	1.5	0.5	10.5	-
35+400	35+500	100	0.5	10.5	-	1.5-4.5	0.5	10.5	-
35+500	35+600	100	0.5	10.5	-	4.5	0.5	10.5	-

Chainage		Length (m)	LHS			Median Width (m)	RHS		
From (km)	To (km)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)
35+600	35+700	100	0.5	10.5	-	4.5	0.5	10.5	-
35+700	35+800	100	0.5	10.5	-	4.5	0.5	10.5	-
35+800	35+900	100	0.5	10.5	-	4.2	0.5	10.5	-
35+900	36+000	100	0.5	10.5	-	4.5	0.5	10.5	-
36+000	36+100	100	0.5	10.5	-	4.5	0.5	10.5	-
36+100	36+200	100	0.5	10.5	-	4	0.5	10.5	-
36+200	36+300	100	0.5	10.5	-	4	0.5	10.5	-
36+300	36+400	100	0.5	10.5	-	4.5	0.5	10.5	-
36+400	36+500	100	0.5	10.5	-	4.5	0.5	10.5	-
36+500	36+600	100	0.5	10.5	-	4.5	0.5	10.5	-
36+600	36+700	100	0.5	10.5	-	4.5	0.5	10.5	-
36+700	36+800	100	0.5	10.5	-	4.5	0.5	10.5	-
36+800	36+900	100	0.5	10.5	-	4.5	0.5	10.5	-
36+900	37+000	100	0.5	10.5	-	4.5	0.5	10.5	-
37+000	37+100	100	0.5	10.5	-	4.5	0.5	10.5	-
37+100	37+200	100	0.5	10.5	-	4.5	0.5	10.5	-
37+200	37+300	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
37+300	37+400	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
37+400	37+500	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
37+500	37+600	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
37+600	37+700	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
37+700	37+800	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
37+800	37+900	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
37+900	38+000	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
38+000	38+100	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
38+100	38+200	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
38+200	38+300	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
38+300	38+400	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5

Chainage		Length (m)	LHS			Median Width (m)	RHS		
From (km)	To (km)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)
38+400	38+500	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
38+500	38+600	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
38+600	38+700	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
38+700	38+800	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
38+800	38+900	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
38+900	39+000	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
39+000	39+100	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
39+100	39+200	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
39+200	39+300	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
39+300	39+400	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
39+400	39+500	100	0.5	10.5	1.5	1.5-4.5	0.5	10.5	1.5
39+500	39+600	100	0.5	10.5	-	4.5	0.5	10.5	-
39+600	39+700	100	0.5	10.5	-	1.5-4.5	0.5	10.5	-
39+700	39+800	100	0.5	10.5	-	1.5	0.5	10.5	-
39+800	39+900	100	0.5	10.5	-	1.5	0.5	10.5	-
39+900	40+000	100	0.5	10.5	-	1.5	0.5	10.5	-
40+000	40+100	100	0.5	10.5	-	1.5	0.5	10.5	-
40+100	40+200	100	0.5	10.5	-	1.5	0.5	10.5	-
40+200	40+300	100	0.5	10.5	-	1.5-3	0.5	10.5	-
40+300	40+400	100	0.5	10.5	-	1.5-4.5	0.5	10.5	-
40+400	40+500	100	0.5	10.5	-	4.5	0.5	10.5	-
40+500	40+600	100	0.5	10.5	-	4.5	0.5	10.5	-
40+600	40+700	100	0.5	10.5	-	4.5	0.5	10.5	-
40+700	40+800	100	0.5	10.5	-	4.5	0.5	10.5	-
40+800	40+900	100	0.5	10.5	-	4.5	0.5	10.5	-
40+900	41+000	100	0.5	10.5	-	4.5	0.5	10.5	-
41+000	41+100	100	0.5	10.5	-	4.5	0.5	10.5	-
41+100	41+200	100	0.5	10.5	-	4.5	0.5	10.5	-

Chainage		Length (m)	LHS			Median Width (m)	RHS		
From (km)	To (km)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)
41+200	41+300	100	0.5	10.5	-	4.5	0.5	10.5	-
41+300	41+400	100	0.5	10.5	-	4.5	0.5	10.5	-
41+400	41+500	100	0.5	10.5	-	4.5	0.5	10.5	-
41+500	41+600	100	0.5	10.5	-	4.5	0.5	10.5	-
41+600	41+700	100	0.5	10.5	1	3-4.5	0.5	10.5	-
41+700	41+800	100	0.5	10.5	-	1.5-3	0.5	10.5	-
41+800	41+900	100	0.5	10.5	-	1.5	0.5	10.5	-
41+900	42+000	100	0.5	10.5	-	1.5	0.5	10.5	-
42+000	42+100	100	0.5	10.5	-	1.5	0.5	10.5	-
42+100	42+200	100	0.5	10.5	-	1.5	0.5	10.5	-
42+200	42+300	100	0.5	10.5	-	1.5	0.5	10.5	-
42+300	42+400	100	0.5	10.5	-	1.5	0.5	10.5	-
42+400	42+500	100	0.5	10.5	-	1.5	0.5	10.5	-
42+500	42+600	100	0.5	10.5	-	1.5	0.5	10.5	-
42+600	42+700	100	0.5	10.5	-	1.5	0.5	10.5	-
42+700	42+800	100	0.5	10.5	-	1.5-3	0.5	10.5	-
42+800	42+900	100	0.5	10.5	-	3	0.5	10.5	-
42+900	43+000	100	0.5	10.5	-	3	0.5	10.5	-
43+000	43+100	100	0.5	10.5	-	3	0.5	10.5	-
43+100	43+200	100	0.5	10.5	-	3	0.5	10.5	-
43+200	43+300	100	0.5	10.5	-	3	0.5	10.5	-
43+300	43+400	100	0.5	10.5	-	3-4.5	0.5	10.5	-
43+400	43+500	100	0.5	10.5	-	4.5	0.5	10.5	-
43+500	43+600	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
43+600	43+700	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
43+700	43+800	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
43+800	43+900	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5
43+900	44+000	100	0.5	10.5	1.5	1.5	0.5	10.5	1.5

Chainage		Length (m)	LHS			Median Width (m)	RHS		
From (km)	To (km)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)
44+000	44+100	100	0.5	10.5	-	1.5	0.5	10.5	-
44+100	44+200	100	0.5	10.5	-	1.5	0.5	10.5	-
44+200	44+300	100	0.5	10.5	-	1.5	0.5	10.5	-
44+300	44+400	100	0.5	10.5	-	1.5	0.5	10.5	-
44+400	44+500	100	0.5	10.5	-	1.5	0.5	10.5	-
44+500	44+600	100	0.5	10.5	-	1.5	0.5	10.5	-
44+600	44+700	100	0.5	10.5	-	1.5	0.5	10.5	-
44+700	44+800	100	0.5	10.5	-	1.5	0.5	10.5	-
44+800	44+900	100	0.5	10.5	-	1.5	0.5	10.5	-
44+900	45+000	100	0.5	10.5	-	1.5	0.5	10.5	-
45+000	45+100	100	0.5	10.5	-	1.5	0.5	10.5	-
45+100	45+200	100	0.5	10.5	-	1.5	0.5	10.5	-
45+200	45+300	100	0.5	10.5	-	1.5	0.5	10.5	-
45+300	45+400	100	0.5	10.5	-	1.5	0.5	10.5	-
45+400	45+500	100	0.5	10.5	-	1.5	0.5	10.5	-
45+500	45+600	100	0.5	10.5	-	1.5	0.5	10.5	-
45+600	45+700	100	0.5	10.5	-	1.5	0.5	10.5	-
45+700	45+800	100	0.5	10.5	-	1.5	0.5	10.5	-
45+800	45+900	100	0.5	10.5	-	1.5	0.5	10.5	-
45+900	46+000	100	0.5	10.5	-	1.5	0.5	10.5	-
46+000	46+100	100	0.5	10.5	-	1.5	0.5	10.5	-
46+100	46+200	100	0.5	10.5	-	1.5	0.5	10.5	-
46+200	46+300	100	0.5	10.5	-	1.5	0.5	10.5	-
46+300	46+400	100	0.5	10.5	-	1.5	0.5	10.5	-
46+400	46+500	100	0.5	10.5	-	1.5	0.5	10.5	-
46+500	46+600	100	0.5	10.5	-	1.5	0.5	10.5	-
46+600	46+700	100	0.5	10.5	-	1.5	0.5	10.5	-

Chainage		Length (m)	LHS			Median Width (m)	RHS		
From (km)	To (km)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)
46+700	46+800	100	0.5	10.5	-	1.5-4	0.5	10.5	-
46+800	46+900	100	0.5	10.5	-	4.5	0.5	10.5	-
46+900	47+000	100	0.5	10.5	-	4.5	0.5	10.5	-
47+000	47+100	100	0.5	10.5	-	2-4.5	0.5	10.5	-
47+100	47+200	100	0.5	10.5	-	1.5-2	0.5	10.5	-
47+200	47+300	100	0.5	10.5	-	1.5	0.5	10.5	-
47+300	47+400	100	0.5	10.5	-	1.5	0.5	10.5	-
47+400	47+500	100	0.5	10.5	-	1.5	0.5	10.5	-
47+500	47+600	100	0.5	10.5	-	1.5	0.5	10.5	-
47+600	47+700	100	0.5	10.5	-	1.5	0.5	10.5	-
47+700	47+800	100	0.5	10.5	-	1.5	0.5	10.5	-
47+800	47+900	100	0.5	10.5	-	1.5	0.5	10.5	-
47+900	48+000	100	0.5	10.5	-	1.5	0.5	10.5	-
48+000	48+100	100	0.5	10.5	-	1.5	0.5	10.5	-
48+100	48+200	100	0.5	10.5	-	1.5-3	0.5	10.5	-
48+200	48+300	100	0.5	10.5	-	3-4.5	0.5	10.5	-
48+300	48+400	100	0.5	10.5	-	4.5	0.5	10.5	-
48+400	48+500	100	0.5	10.5	-	3.5-4	0.5	10.5	-
48+500	48+600	100	0.5	10.5	-	4.5	0.5	10.5	-
48+600	48+700	100	0.5	10.5	-	4.5	0.5	10.5	-
48+700	48+800	100	0.5	10.5	-	3-4.5	0.5	10.5	-
48+800	48+900	100	0.5	10.5	-	1.5	0.5	10.5	-
48+900	49+000	100	0.5	10.5	-	1.5	0.5	10.5	-
49+000	49+100	100	0.5	10.5	-	1.5	0.5	10.5	-
49+100	49+200	100	0.5	10.5	-	1.5	0.5	10.5	-
49+200	49+300	100	0.5	10.5	-	1.5	0.5	10.5	-
49+300	49+400	100	0.5	10.5	-	1.5	0.5	10.5	-

Chainage		Length (m)	LHS			Median Width (m)	RHS		
From (km)	To (km)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)
49+400	49+500	100	0.5	10.5	-	1.5	0.5	10.5	-
49+500	49+600	100	0.5	10.5	-	1.5	0.5	10.5	-
49+600	49+700	100	0.5	10.5	-	1.5-4.5	0.5	10.5	-
49+700	49+800	100	0.5	10.5	-	4.5	0.5	10.5	-
49+800	49+900	100	0.5	10.5	-	1.5-4.5	0.5	10.5	-
49+900	50+000	100	0.5	10.5	-	1.5	0.5	10.5	-
50+000	50+100	100	0.5	10.5	-	1.5	0.5	10.5	-
50+100	50+200	100	0.5	10.5	-	1.5	0.5	10.5	-
50+200	50+300	100	0.5	10.5	-	1.5	0.5	10.5	-
50+300	50+400	100	0.5	10.5	-	1.5	0.5	10.5	-
50+400	50+500	100	0.5	10.5	1	1.5	0.5	10.5	1
50+500	50+600	100	0.5	10.5	1	1.5	0.5	10.5	1
50+600	50+700	100	0.5	10.5	1	1.5	0.5	10.5	1
50+700	50+800	100	0.5	10.5	1	1.5	0.5	10.5	1
50+800	50+900	100	0.5	10.5	1	1.5-4.5	0.5	10.5	1
50+900	51+000	100	0.5	10.5	1	4.5	0.5	10.5	1
51+000	51+100	100	0.5	10.5	1	4.5	0.5	10.5	1
51+100	51+200	100	0.5	10.5	1	4.5	0.5	10.5	1
51+200	51+300	100	0.5	10.5	1	4.5	0.5	10.5	1
51+300	51+400	100	0.5	10.5	1	4.5	0.5	10.5	1
51+400	51+500	100	0.5	10.5	1	4.5	0.5	10.5	1
51+500	51+600	100	0.5	10.5	1	1.5-4.5	0.5	10.5	1
51+600	51+700	100	0.5	10.5	1	1.5	0.5	10.5	1
51+700	51+800	100	0.5	10.5	1	1.5	0.5	10.5	1
51+800	51+900	100	0.5	10.5	1	1.5	0.5	10.5	1
51+900	52+000	100	0.5	10.5	1	1.5	0.5	10.5	1
52+000	52+100	100	0.5	10.5	1	1.5	0.5	10.5	1

Chainage		Length (m)	LHS			Median Width (m)	RHS		
From (km)	To (km)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)
52+100	52+200	100	0.5	10.5	1	1.5	0.5	10.5	1
52+200	52+300	100	0.5	10.5	1	1.5	0.5	10.5	1
52+300	52+400	100	0.5	10.5	1	1.5-4.5	0.5	10.5	1
52+400	52+500	100	0.5	10.5	1	4.5	0.5	10.5	1
52+500	52+600	100	0.5	10.5	1	4.5	0.5	10.5	1
52+600	52+700	100	0.5	10.5	1	4.5	0.5	10.5	1
52+700	52+800	100	0.5	10.5	1	4.5	0.5	10.5	1
52+800	52+900	100	0.5	10.5	1	4.5	0.5	10.5	1
52+900	53+000	100	0.5	10.5	1	4.5	0.5	10.5	1
53+000	53+100	100	0.5	10.5	1	4.5	0.5	10.5	1
53+100	53+200	100	0.5	10.5	1	4.5	0.5	10.5	1
53+200	53+300	100	0.5	10.5	1	4.5	0.5	10.5	1
53+300	53+400	100	0.5	10.5	1	4.5	0.5	10.5	1
53+400	53+500	100	0.5	10.5	1	4.5	0.5	10.5	1
53+500	53+600	100	0.5	10.5	1	4.5	0.5	10.5	1
53+600	53+700	100	0.5	10.5	1	4.5	0.5	10.5	1
53+700	53+800	100	0.5	10.5	1	4.5	0.5	10.5	1
53+800	53+900	100	0.5	10.5	1	4.5	0.5	10.5	1
53+900	54+000	100	0.5	10.5	1	4.5	0.5	10.5	1
54+000	54+100	100	0.5	10.5	1	4.8	0.5	10.5	1
54+100	54+200	100	0.5	10.5	1	4.8	0.5	10.5	1
54+200	54+300	100	0.5	10.5	1	4.8	0.5	10.5	1
54+300	54+400	100	0.5	10.5	1.5	4.8	0.5	10.5	1.5

Section 04 Neelmangla-Tumkur

Chainage		Length (m)	LHS			Median Width (m)	RHS		
From (km)	To (km)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)
29+500*	29+600*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
29+600*	29+700*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
29+700*	29+800*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
29+800*	29+900*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
29+900*	30+000*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
30+000*	30+100*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
30+100*	30+200*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
30+200*	30+300*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
30+300*	30+420*	120.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
30+420*	30+500*	80.00	0.5	13.5	-	4.5	0.5	13.5	-
30+500*	30+607*	107.00	0.5	13.5	-	4.5	0.5	13.5	-
30+607*	30+730*	123.00	0.5	13.5	-	4.5	0.5	13.5	-
30+730*	30+800*	70.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
30+800*	30+900*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
30+900*	31+000*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
31+000*	31+100*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
31+100*	31+200*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
31+200*	31+300*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
31+300*	31+400*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
31+400*	31+500*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
31+500*	31+550*	50.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
31+550*	31+600*	50.00	0.5	13.5	-	4.5	0.5	13.5	-
31+600*	31+700*	100.00	0.5	13.5	-	4.5	0.5	13.5	-
31+700*	31+800*	100.00	0.5	13.5	-	4.5	0.5	13.5	-
31+800*	31+900*	100.00	0.5	13.5	-	4.5	0.5	13.5	-
31+900*	32+000*	100.00	0.5	13.5	-	4.5	0.5	13.5	-
32+000*	32+092*	92.00	0.5	13.5	-	4.5	0.5	13.5	-
32+092*	32+208*	116.00	0.5	13.5	-	4.5	0.5	13.5	-

Chainage		Length (m)	LHS			Median Width (m)	RHS		
From (km)	To (km)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)
32+208*	32+300*	92.00	0.5	13.5	-	4.5	0.5	13.5	-
32+300*	32+400*	100.00	0.5	13.5	-	4.5	0.5	13.5	-
32+400*	32+500*	100.00	0.5	13.5	-	2.5	0.5	13.5	-
32+500*	32+600*	100.00	0.5	13.5	-	2.5	0.5	13.5	-
32+600*	32+700*	100.00	0.5	13.5	-	2.5	0.5	13.5	-
32+700*	32+800*	100.00	0.5	13.5	-	2.5	0.5	13.5	-
32+800*	32+900*	100.00	0.5	13.5	-	2.5	0.5	13.5	-
32+900*	33+000*	100.00	0.5	13.5	-	2.5	0.5	13.5	-
33+000*	33+100*	100.00	0.5	13.5	-	2.5	0.5	13.5	-
33+100*	33+200*	100.00	0.5	13.5	-	2.5	0.5	13.5	-
33+200*	33+300*	100.00	0.5	13.5	-	2.5	0.5	13.5	-
33+300*	33+400*	100.00	0.5	13.5	-	2.5	0.5	13.5	-
33+400*	33+500*	100.00	0.5	13.5	-	2.5	0.5	13.5	-
33+500*	33+600*	100.00	0.5	13.5	-	2.5	0.5	13.5	-
33+600*	33+700*	100.00	0.5	13.5	-	2.5	0.5	13.5	-
33+700*	33+840*	140.00	0.5	13.5	-	2.5	0.5	13.5	-
33+840*	33+900*	60.00	0.25	7	1.5	4.5	0.25	7	1.5
33+900*	34+000*	100.00	0.25	7	1.5	4.5	0.25	7	1.5
34+000*	34+100*	100.00	0.25	7	1.5	4.5	0.25	7	1.5
34+100*	34+200*	100.00	0.25	7	1.5	4.5	0.25	7	1.5
34+200*	34+300*	100.00	0.25	7	1.5	4.5	0.25	7	1.5
34+300*	34+400*	100.00	0.25	7	1.5	4.5	0.25	7	1.5
34+400*	34+500*	100.00	0.25	7	1.5	4.5	0.25	7	1.5
34+500*	34+599*	99.00	0.25	7	1.5	4.5	0.25	7	1.5
34+599*	34+700*	101.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
34+700*	34+800*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
34+800*	34+900*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
34+900*	35+000*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
35+000*	35+100*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5

Chainage		Length (m)	LHS			Median Width (m)	RHS		
From (km)	To (km)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)
35+100*	35+200*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
35+200*	35+240*	40.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
35+240*	35+300*	60.00	0.5	13.5	-	2.5	0.5	13.5	-
35+300*	35+400*	100.00	0.5	13.5	-	2.5	0.5	13.5	-
35+400*	35+500*	100.00	0.5	13.5	-	2.5	0.5	13.5	-
35+500*	35+600*	100.00	0.5	13.5	-	2.5	0.5	13.5	-
35+600*	35+700*	100.00	0.5	13.5	-	2.5	0.5	13.5	-
35+700*	35+800*	100.00	0.5	13.5	-	2.5	0.5	13.5	-
35+800*	35+900*	100.00	0.5	13.5	-	2.5	0.5	13.5	-
35+900*	36+000*	100.00	0.5	13.5	-	2.5	0.5	13.5	-
36+000*	36+100*	100.00	0.5	13.5	-	2.5	0.5	13.5	-
36+100*	36+200*	100.00	0.5	13.5	-	2.5	0.5	13.5	-
36+200*	36+300*	100.00	0.5	13.5	-	2.5	0.5	13.5	-
36+300*	36+440*	140.00	0.5	13.5	-	2.5	0.5	13.5	-
36+440*	36+500*	60.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
36+500*	36+600*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
36+600*	36+700*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
36+700*	36+800*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
36+800*	36+930*	130.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
36+930*	37+000*	70.00	0.5	13.5	-	2.5	0.5	13.5	-
37+000*	37+100*	100.00	0.5	13.5	-	2.5	0.5	13.5	-
37+100*	37+200*	100.00	0.5	13.5	-	2.5	0.5	13.5	-
37+200*	37+300*	100.00	0.5	13.5	-	2.5	0.5	13.5	-
37+300*	37+400*	100.00	0.5	13.5	-	2.5	0.5	13.5	-
37+400*	37+500*	100.00	0.5	13.5	-	2.5	0.5	13.5	-
37+500*	37+600*	100.00	0.5	13.5	-	2.5	0.5	13.5	-
37+600*	37+700*	100.00	0.5	13.5	-	2.5	0.5	13.5	-
37+700*	37+800*	100.00	0.5	13.5	-	2.5	0.5	13.5	-
37+800*	37+900*	100.00	0.5	13.5	-	2.5	0.5	13.5	-

Chainage		Length (m)	LHS			Median Width (m)	RHS		
From (km)	To (km)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)
37+900*	38+000*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
38+000*	38+100*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
38+100*	38+200*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
38+200*	38+300*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
38+300*	38+400*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
38+400*	38+500*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
38+500*	38+600*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
38+600*	38+700*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
38+700*	38+800*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
38+800*	38+900*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
38+900*	39+000*	100.00	0.5	13.5	-	4.5	0.5	13.5	-
39+000*	39+100*	100.00	0.5	13.5	-	4.5	0.5	13.5	-
39+100*	39+200*	100.00	0.5	13.5	-	4.5	0.5	13.5	-
39+200*	39+300*	100.00	0.5	13.5	-	4.5	0.5	13.5	-
39+300*	39+440*	140.00	0.5	13.5	-	4.5	0.5	13.5	-
39+440*	39+500*	60.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
39+500*	39+600*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
39+600*	39+700*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
39+700*	39+800*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
39+800*	39+900*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
39+900*	40+000*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
40+000*	40+100*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
40+100*	40+200*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
40+200*	40+300*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
40+300*	40+400*	100.00	0.5	13.5	-	4.5	0.5	13.5	-
40+400*	40+500*	100.00	0.5	13.5	-	4.5	0.5	13.5	-
40+500*	40+600*	100.00	0.5	13.5	-	4.5	0.5	13.5	-
40+600*	40+700*	100.00	0.5	13.5	-	4.5	0.5	13.5	-
40+700*	40+800*	100.00	0.5	13.5	-	4.5	0.5	13.5	-

Chainage		Length (m)	LHS			Median Width (m)	RHS		
From (km)	To (km)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)
40+800*	40+900*	100.00	0.5	13.5	-	4.5	0.5	13.5	-
40+900*	41+000*	100.00	0.5	13.5	-	4.5	0.5	13.5	-
41+000*	41+100*	100.00	0.5	13.5	-	4.5	0.5	13.5	-
41+100*	41+190*	90.00	0.5	13.5	-	4.5	0.5	13.5	-
41+190*	41+300*	110.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
41+300*	41+400*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
41+400*	41+500*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
41+500*	41+600*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
41+600*	41+700*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
41+700*	41+800*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
41+800*	41+900*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
41+900*	42+000*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
42+000*	42+100*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
42+100*	42+200*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
42+200*	42+300*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
42+300*	42+400*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
42+400*	42+500*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
42+500*	42+600*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
42+600*	42+700*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
42+700*	42+800*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
42+800*	42+870*	70.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
42+870*	42+970*	100.00	0.5	13.5	-	4.5	0.5	13.5	-
42+970*	43+065*	95.00	0.5	13.5	-	4.5	0.5	13.5	-
43+065*	43+257*	192.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
43+257*	43+300*	43.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
43+300*	43+400*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
43+400*	43+500*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
43+500*	43+560*	60.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
43+560*	43+600*	40.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5

Chainage		Length (m)	LHS			Median Width (m)	RHS		
From (km)	To (km)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)
43+600*	43+700*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
43+700*	43+800*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
43+800*	43+900*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
43+900*	44+010*	110.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
44+012*	44+100*	88.00	0.25	7	1.5	4.5	0.25	7	1.5
44+100*	44+200*	100.00	0.25	7	1.5	4.5	0.25	7	1.5
44+200*	44+300*	100.00	0.25	7	1.5	4.5	0.25	7	1.5
44+300*	44+400*	100.00	0.25	7	1.5	4.5	0.25	7	1.5
44+400*	44+500*	100.00	0.25	7	1.5	4.5	0.25	7	1.5
44+500*	44+604*	104.00	0.25	7	1.5	4.5	0.25	7	1.5
44+604*	44+700*	96.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
44+700*	44+800*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
44+800*	44+900*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
44+900*	45+000*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
45+000*	45+100*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
45+100*	45+200*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
45+200*	45+300*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
45+300*	45+400*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
45+400*	45+560*	160.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
45+560*	45+600*	40.00	0.5	13.5	-	4.5	0.5	13.5	-
45+600*	45+700*	100.00	0.5	13.5	-	4.5	0.5	13.5	-
45+700*	45+800*	100.00	0.5	13.5	-	4.5	0.5	13.5	-
45+800*	45+900*	100.00	0.5	13.5	-	4.5	0.5	13.5	-
45+900*	46+000*	100.00	0.5	13.5	-	4.5	0.5	13.5	-
46+000*	46+100*	100.00	0.5	13.5	-	4.5	0.5	13.5	-
46+100*	46+200*	100.00	0.5	13.5	-	4.5	0.5	13.5	-
46+200*	46+300*	100.00	0.5	13.5	-	4.5	0.5	13.5	-
46+300*	46+400*	100.00	0.5	13.5	-	4.5	0.5	13.5	-
46+400*	46+500*	100.00	0.5	13.5	-	4.5	0.5	13.5	-

Chainage		Length (m)	LHS			Median Width (m)	RHS		
From (km)	To (km)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)
46+500*	46+600*	100.00	0.5	13.5	-	4.5	0.5	13.5	-
46+600*	46+700*	100.00	0.5	13.5	-	4.5	0.5	13.5	-
46+700*	46+800*	100.00	0.5	13.5	-	4.5	0.5	13.5	-
46+800*	46+900*	100.00	0.5	13.5	-	4.5	0.5	13.5	-
46+900*	47+000*	100.00	0.5	13.5	-	4.5	0.5	13.5	-
47+000*	47+100*	100.00	0.5	13.5	-	4.5	0.5	13.5	-
47+100*	47+240*	140.00	0.5	13.5	-	4.5	0.5	13.5	-
47+240*	47+300*	60.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
47+300*	47+400*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
47+400*	47+500*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
47+500*	47+600*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
47+600*	47+700*	100.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
47+700*	47+820*	120.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
47+820*	47+900*	80.00	0.5	13.5	-	2.5	0.5	13.5	-
47+900*	48+000*	100.00	0.5	13.5	-	2.5	0.5	13.5	-
48+000*	48+100*	100.00	0.5	13.5	-	2.5	0.5	13.5	-
48+100*	48+200*	100.00	0.5	13.5	-	2.5	0.5	13.5	-
48+200*	48+300*	100.00	0.5	13.5	-	2.5	0.5	13.5	-
48+300*	48+400*	100.00	0.5	13.5	-	2.5	0.5	13.5	-
48+400*	48+560*	160.00	0.5	13.5	-	2.5	0.5	13.5	-
48+560*	48+600*	40.00	0.25	7	2.5	1.5	0.25	7	2.5
48+600*	48+731*	131.00	0.25	7	2.5	1.5	0.25	7	2.5
48+731*	48+800*	69.00	0.25	7	2.5	1.5	0.25	7	2.5
48+800*	48+900*	100.00	0.25	7	2.5	1.5	0.25	7	2.5
48+900*	49+000*	100.00	0.25	7	2.5	1.5	0.25	7	2.5
49+000*	49+100*	100.00	0.25	7	2.5	1.5	0.25	7	2.5
49+100*	49+200*	100.00	0.25	7	2.5	1.5	0.25	7	2.5
49+200*	49+300*	100.00	0.25	7	2.5	1.5	0.25	7	2.5
49+300*	49+400*	100.00	0.25	7	2.5	1.5	0.25	7	2.5

Chainage		Length (m)	LHS			Median Width (m)	RHS		
From (km)	To (km)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)
49+400*	49+500*	100.00	0.25	7	2.5	1.5	0.25	7	2.5
49+500*	49+600*	100.00	0.25	7	2.5	1.5	0.25	7	2.5
49+600*	49+700*	100.00	0.25	7	2.5	1.5	0.25	7	2.5
49+700*	49+814*	114.00	0.25	7	2.5	1.5	0.25	7	2.5
49+814*	49+900*	86.00	0.5	10.5	3.5	4.5	0.5	10.5	3.5
49+900	50+000	100.00	0.25	7	1.5	4.5	0.25	7	1.5
50+000	50+100	100.00	0.25	7	1.5	4.5	0.25	7	1.5
50+100	50+200	100.00	0.25	7	1.5	4.5	0.25	7	1.5
50+200	50+300	100.00	0.25	7	1.5	4.5	0.25	7	1.5
50+300	50+400	100.00	0.25	7	1.5	4.5	0.25	7	1.5
50+400	50+500	100.00	0.25	7	1.5	4.5	0.25	7	1.5
50+500	50+600	100.00	0.25	7	1.5	4.5	0.25	7	1.5
50+600	50+700	100.00	0.25	7	1.5	4.5	0.25	7	1.5
50+700	50+800	100.00	0.25	7	1.5	4.5	0.25	7	1.5
50+800	50+900	100.00	0.25	7	1.5	4.5	0.25	7	1.5
50+900	51+000	100.00	0.25	7	1.5	4.5	0.25	7	1.5
51+000	51+100	100.00	0.25	7	1.5	4.5	0.25	7	1.5
51+100	51+200	100.00	0.25	7	1.5	4.5	0.25	7	1.5
51+200	51+300	100.00	0.25	7	1.5	4.5	0.25	7	1.5
51+300	51+400	100.00	0.25	7	1.5	4.5	0.25	7	1.5
51+400	51+500	100.00	0.25	7	1.5	4.5	0.25	7	1.5
51+500	51+600	100.00	0.25	7	1.5	4.5	0.25	7	1.5
51+600	51+700	100.00	0.25	7	1.5	4.5	0.25	7	1.5
51+700	51+800	100.00	0.25	7	1.5	4.5	0.25	7	1.5
51+800	51+900	100.00	0.25	7	1.5	4.5	0.25	7	1.5
51+900	52+000	100.00	0.25	7	1.5	4.5	0.25	7	1.5
52+000	52+100	100.00	0.25	7	1.5	4.5	0.25	7	1.5
52+100	52+200	100.00	0.25	7	1.5	4.5	0.25	7	1.5
52+200	52+300	100.00	0.25	7	1.5	4.5	0.25	7	1.5
52+300	52+400	100.00	0.25	7	1.5	4.5	0.25	7	1.5
52+400	52+500	100.00	0.25	7	1.5	4.5	0.25	7	1.5

Chainage		Length (m)	LHS			Median Width (m)	RHS		
From (km)	To (km)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)
52+500	52+600	100.00	0.25	7	1.5	4.5	0.25	7	1.5
52+600	52+700	100.00	0.25	7	1.5	4.5	0.25	7	1.5
52+700	52+800	100.00	0.25	7	1.5	4.5	0.25	7	1.5
52+800	52+900	100.00	0.25	7	1.5	4.5	0.25	7	1.5
52+900	53+000	100.00	0.25	7	1.5	4.5	0.25	7	1.5
53+000	53+100	100.00	0.25	7	1.5	4.5	0.25	7	1.5
53+100	53+200	100.00	0.25	7	1.5	4.5	0.25	7	1.5
53+200	53+300	100.00	0.25	7	1.5	4.5	0.25	7	1.5
53+300	53+400	100.00	0.25	7	1.5	4.5	0.25	7	1.5
53+400	53+500	100.00	0.25	7	1.5	4.5	0.25	7	1.5
53+500	53+600	100.00	0.25	7	1.5	4.5	0.25	7	1.5
53+600	53+700	100.00	0.25	7	1.5	4.5	0.25	7	1.5
53+700	53+800	100.00	0.25	7	1.5	4.5	0.25	7	1.5
53+800	53+900	100.00	0.25	7	1.5	4.5	0.25	7	1.5
53+900	54+000	100.00	0.25	7	1.5	4.5	0.25	7	1.5
54+000	54+100	100.00	0.25	7	1.5	4.5	0.25	7	1.5
54+100	54+200	100.00	0.25	7	1.5	4.5	0.25	7	1.5
54+200	54+300	100.00	0.25	7	1.5	4.5	0.25	7	1.5
54+300	54+400	100.00	0.25	7	1.5	4.5	0.25	7	1.5
54+400	54+500	100.00	0.25	7	1.5	4.5	0.25	7	1.5
54+500	54+600	100.00	0.25	7	1.5	4.5	0.25	7	1.5
54+600	54+700	100.00	0.25	7	1.5	4.5	0.25	7	1.5
54+700	54+800	100.00	0.25	7	1.5	4.5	0.25	7	1.5
54+800	54+900	100.00	0.25	7	1.5	4.5	0.25	7	1.5
54+900	55+000	100.00	0.25	7	1.5	4.5	0.25	7	1.5
55+000	55+100	100.00	0.25	7	1.5	4.5	0.25	7	1.5
55+100	55+200	100.00	0.25	7	1.5	4.5	0.25	7	1.5
55+200	55+300	100.00	0.25	7	1.5	1.2-4.5	0.25	7	1.5
55+300	55+400	100.00	0.25	7	1.5	1.2-2.5	0.25	7	1.5
55+400	55+500	100.00	0.25	7	1.5	2.5-3	0.25	7	1.5
55+500	55+600	100.00	0.25	7	1.5	2.5-4	0.25	7	1.5

Chainage		Length (m)	LHS			Median Width (m)	RHS		
From (km)	To (km)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)
55+600	55+700	100.00	0.25	7	1	3.5	0.25	7	2.5
55+700	55+800	100.00	0.25	7	1.5	3.5-4.5	0.25	7	1.5
55+800	55+900	100.00	0.25	7	1.5	3.5-4.5	0.25	7	1.5
55+900	56+000	100.00	0.25	7	1.5	4.5	0.25	7	1.5
56+000	56+100	100.00	0.25	7	1.5	4.5	0.25	7	1.5
56+100	56+200	100.00	0.25	7	1.5	4.5	0.25	7	1.5
56+200	56+300	100.00	0.25	7	1.5	4.5	0.25	7	1.5
56+300	56+400	100.00	0.25	7	1.5	4.5	0.25	7	1.5
56+400	56+500	100.00	0.25	7	1.5	4.5	0.25	7	1.5
56+500	56+600	100.00	0.25	7	1.5	4.5	0.25	7	1.5
56+600	56+700	100.00	0.25	7	1.5	4.5	0.25	7	1.5
56+700	56+800	100.00	0.25	7	1.5	4.5	0.25	7	1.5
56+800	56+900	100.00	0.25	7	1.5	4.5	0.25	7	1.5
56+900	57+000	100.00	0.25	7	1.5	4.5	0.25	7	1.5
57+000	57+100	100.00	0.25	7	1.5	4.5	0.25	7	1.5
57+100	57+200	100.00	0.25	7	1.5	4.5	0.25	7	1.5
57+200	57+300	100.00	0.25	7	1.5	4.5	0.25	7	1.5
57+300	57+400	100.00	0.25	7	1.5	4.5	0.25	7	1.5
57+400	57+500	100.00	0.25	7	1.5	4.5	0.25	7	1.5
57+500	57+600	100.00	0.25	7	1.5	4.5	0.25	7	1.5
57+600	57+700	100.00	0.25	7	1.5	4.5	0.25	7	1.5
57+700	57+800	100.00	0.25	7	1.5	4.5	0.25	7	1.5
57+800	57+900	100.00	0.25	7	1.5	4.5	0.25	7	1.5
57+900	58+000	100.00	0.25	7	1.5	4.5	0.25	7	1.5
58+000	58+100	100.00	0.25	7	1.5	4.5	0.25	7	1.5
58+100	58+200	100.00	0.25	7	1.5	4.5	0.25	7	1.5
58+200	58+300	100.00	0.25	7	1.5	4.5	0.25	7	1.5
58+300	58+400	100.00	0.25	7	1.5	4.5	0.25	7	1.5
58+400	58+500	100.00	0.25	7	1.5	4.5	0.25	7	1.5
58+500	58+600	100.00	0.25	7	1.5	4.5	0.25	7	1.5
58+600	58+700	100.00	0.25	7	1.5	4.5	0.25	7	1.5

Chainage		Length (m)	LHS			Median Width (m)	RHS		
From (km)	To (km)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)
58+700	58+800	100.00	0.25	7	1.5	4.5	0.25	7	1.5
58+800	58+900	100.00	0.25	7	1.5	4.5	0.25	7	1.5
58+900	59+000	100.00	0.25	7	1.5	4.5	0.25	7	1.5
59+000	59+100	100.00	0.25	7	1.5	4.5	0.25	7	1.5
59+100	59+200	100.00	0.25	7	1.5	4.5	0.25	7	1.5
59+200	59+300	100.00	0.25	7	1.5	4.5	0.25	7	1.5
59+300	59+400	100.00	0.25	7	1.5	4.5	0.25	7	1.5
59+400	59+500	100.00	0.25	7	1.5	4.5	0.25	7	1.5
59+500	59+600	100.00	0.25	7	1.5	4.5	0.25	7	1.5
59+600	59+700	100.00	0.25	7	1.5	4.5	0.25	7	1.5
59+700	59+800	100.00	0.25	7	1.5	4.5	0.25	7	1.5
59+800	59+900	100.00	0.25	7	1.5	4.5	0.25	7	1.5
59+900	60+000	100.00	0.25	7	1.5	4.5	0.25	7	1.5
60+000	60+100	100.00	0.25	7	1.5	4.5	0.25	7	1.5
60+100	60+200	100.00	0.25	7	1.5	4.5	0.25	7	1.5
60+200	60+300	100.00	0.25	7	1.5	4.5	0.25	7	1.5
60+300	60+400	100.00	0.25	7	1.5	4.5	0.25	7	1.5
60+400	60+500	100.00	0.25	7	1.5	4.5	0.25	7	1.5
60+500	60+600	100.00	0.25	7	1.5	4.5	0.25	7	1.5
60+600	60+700	100.00	0.25	7	1.5	4.5	0.25	7	1.5
60+700	60+800	100.00	0.25	7	1.5	4.5	0.25	7	1.5
60+800	60+900	100.00	0.25	7	1.5	4.5	0.25	7	1.5
60+900	61+000	100.00	0.25	7	1.5	4.5	0.25	7	1.5
61+000	61+100	100.00	0.25	7	1.5	4.5	0.25	7	1.5
61+100	61+175	75.00	0.25	7	1.5	4.5	0.25	7	1.5
61+175	61+795	620.00	-	14-45	-	-	-	14-45	-
61+795	61+900	105.00	0.25	10.5	0.5	1.5	0.25	10.5	0.5
61+900	62+040	140.00	0.25	10.5	0.5	1.5	0.25	10.5	0.5
62+040*	62+100*	60.00	0.5	11	-	1.5	0.5	11	-
62+100*	62+200*	100.00	0.5	11	-	1.5	0.5	11	-
62+200*	62+317*	117.00	0.5	11	-	1.5	0.5	11	-

Chainage		Length (m)	LHS			Median Width (m)	RHS		
From (km)	To (km)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)
62+317*	62+400*	83.00	0.25	10.5	0.5	1.5	0.25	10.5	0.5
62+400*	62+500*	100.00	0.25	10.5	0.5	1.5	0.25	10.5	0.5
62+500*	62+600*	100.00	0.25	10.5	0.5	1.5	0.25	10.5	0.5
62+600*	62+700*	100.00	0.25	10.5	0.5	1.5	0.25	10.5	0.5
62+700*	62+800*	100.00	0.25	10.5	0.5	1.5	0.25	10.5	0.5
62+800*	62+900*	100.00	0.25	10.5	0.5	1.5	0.25	10.5	0.5
62+900*	63+000*	100.00	0.25	10.5	0.5	1.5	0.25	10.5	0.5
63+000*	63+100*	100.00	0.25	10.5	0.5	1.5	0.25	10.5	0.5
63+100*	63+200*	100.00	0.25	10.5	0.5	1.5	0.25	10.5	0.5
63+200*	63+296*	96.00	0.25	10.5	0.5	1.5	0.25	10.5	0.5
63+296*	63+400*	104.00	0.5	13.5	-	4.5	0.5	13.5	-
63+400*	63+500*	100.00	0.5	13.5	-	4.5	0.5	13.5	-
63+500*	63+600*	100.00	0.5	13.5	-	4.5	0.5	13.5	-
63+600*	63+700*	100.00	0.5	13.5	-	4.5	0.5	13.5	-
63+700*	63+800*	100.00	0.5	13.5	-	4.5	0.5	13.5	-
63+800*	63+900*	100.00	0.5	13.5	-	4.5	0.5	13.5	-
63+900*	64+000*	100.00	0.5	13.5	-	4.5	0.5	13.5	-
64+000*	64+100*	100.00	0.5	13.5	-	4.5	0.5	13.5	-
64+100*	64+200*	100.00	0.5	13.5	-	4.5	0.5	13.5	-
64+200*	64+300*	100.00	0.5	13.5	-	4.5	0.5	13.5	-
64+300*	64+400*	100.00	0.5	13.5	-	4.5	0.5	13.5	-
64+400*	64+500*	100.00	0.5	13.5	-	4.5	0.5	13.5	-
64+500*	64+600*	100.00	0.5	13.5	-	4.5	0.5	13.5	-
64+600*	64+700*	100.00	0.5	13.5	-	4.5	0.5	13.5	-
64+700*	64+800*	100.00	0.5	13.5	-	4.5	0.5	13.5	-
64+800*	64+900*	100.00	0.5	13.5	-	4.5	0.5	13.5	-
64+900*	65+000*	100.00	0.5	13.5	-	4.5	0.5	13.5	-
65+000*	65+100*	100.00	0.5	13.5	-	4.5	0.5	13.5	-
65+100*	65+200*	100.00	0.5	11	-	1.5	0.5	11	-

Chainage		Length (m)	LHS			Median Width (m)	RHS		
From (km)	To (km)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)
65+200*	65+300*	100.00	0.5	11	-	1.5	0.5	11	-
65+300*	65+400*	100.00	0.5	11	-	1.5	0.5	11	-
65+400*	65+500*	100.00	0.5	11	-	1.5	0.5	11	-
65+500*	65+600*	100.00	0.5	11	-	1.5	0.5	11	-
65+600*	65+713*	113.00	0.5	11	-	1.5	0.5	11	-
65+713*	65+800*	87.00	0.5	10.5	-	1.5	0.5	10.5	-
65+800*	65+900*	100.00	0.5	10.5	-	1.5	0.5	10.5	-
65+900*	66+000*	100.00	0.5	10.5	-	1.5	0.5	10.5	-
66+000*	66+100*	100.00	0.5	10.5	-	1.5	0.5	10.5	-
66+100*	66+200*	100.00	0.5	10.5	-	1.5	0.5	10.5	-
66+200*	66+300*	100.00	0.5	10.5	-	1.5	0.5	10.5	-
66+300*	66+400*	100.00	0.5	10.5	-	1.5	0.5	10.5	-
66+400*	66+500*	100.00	0.5	10.5	-	1.5	0.5	10.5	-
66+500*	66+600*	100.00	0.5	10.5	-	1.5	0.5	10.5	-
66+600*	66+645*	45.00	0.5	10.5	-	1.5	0.5	10.5	-
66+645*	66+700*	55.00	0.5	11	-	1.5	0.5	11	-
66+700*	66+800*	100.00	0.5	11	-	1.5	0.5	11	-
66+800*	66+878*	78.00	0.5	11	-	1.5	0.5	11	-
66+878*	66+900*	22.00	0.5	10.5	-	1.5	0.5	10.5	-
66+900*	67+000*	100.00	0.5	10.5	-	1.5	0.5	10.5	-
67+000*	67+100*	100.00	0.5	10.5	-	1.5	0.5	10.5	-
67+100*	67+172*	72.00	0.5	10.5	-	1.5	0.5	10.5	-
67+172*	67+300*	128.00	0.5	11	-	1.5	0.5	11	-
67+300*	67+400*	100.00	0.5	11	-	1.5	0.5	11	-
67+400*	67+500*	100.00	0.5	11	-	1.5	0.5	11	-
67+500*	67+600*	100.00	0.5	11	-	1.5	0.5	11	-
67+600*	67+700*	100.00	0.5	11	-	1.5	0.5	11	-
67+700*	67+800*	100.00	0.5	11	-	1.5	0.5	11	-
67+800*	67+900*	100.00	0.5	11	-	1.5	0.5	11	-

Chainage		Length (m)	LHS			Median Width (m)	RHS		
From (km)	To (km)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)
67+900*	67+978*	78.00	0.5	11	-	1.5	0.5	11	-
67+978*	68+100*	122.00	0.5	10.5	-	1.5	0.5	10.5	-
68+100*	68+200*	100.00	0.5	10.5	-	1.5	0.5	10.5	-
68+200*	68+309*	109.00	0.5	10.5	-	1.5	0.5	10.5	-
68+309*	68+400*	91.00	0.5	11	-	1.5	0.5	11	-
68+400*	68+500*	100.00	0.5	11	-	1.5	0.5	11	-
68+500*	68+600*	100.00	0.5	11	-	1.5	0.5	11	-
68+600*	68+700*	100.00	0.5	11	-	1.5	0.5	11	-
68+700*	68+800*	100.00	0.5	11	-	1.5	0.5	11	-
68+800*	68+900*	100.00	0.5	11	-	1.5	0.5	11	-
68+900*	69+000*	100.00	0.5	11	-	1.5	0.5	11	-
69+000*	69+100*	100.00	0.5	11	-	1.5	0.5	11	-
69+100*	69+200*	100.00	0.5	11	-	1.5	0.5	11	-
69+200*	69+300*	100.00	0.5	11	-	1.5	0.5	11	-
69+300*	69+400*	100.00	0.5	11	-	1.5	0.5	11	-
69+400*	69+500*	100.00	0.5	11	-	1.5	0.5	11	-
69+500*	69+600*	100.00	0.5	11	-	1.5	0.5	11	-
69+600*	69+700*	100.00	0.5	11	-	1.5	0.5	11	-
69+700*	69+859*	159.00	0.5	11	-	1.5	0.5	11	-
69+859*	69+900*	41.00	0.5	10.5	-	1.5	0.5	10.5	-
69+900*	70+003*	103.00	0.5	10.5	-	1.5	0.5	10.5	-
70+003*	70+100*	97.00	0.5	11	-	1.5	0.5	11	-
70+100*	70+200*	100.00	0.5	11	-	1.5	0.5	11	-
70+200*	70+300*	100.00	0.5	11	-	1.5	0.5	11	-
70+300*	70+400*	100.00	0.5	11	-	1.5	0.5	11	-
70+400*	70+500*	100.00	0.5	11	-	1.5	0.5	11	-
70+500*	70+600*	100.00	0.5	11	-	1.5	0.5	11	-
70+600*	70+700*	100.00	0.5	11	-	1.5	0.5	11	-
70+700*	70+800*	100.00	0.5	11	-	1.5	0.5	11	-

Chainage		Length (m)	LHS			Median Width (m)	RHS		
From (km)	To (km)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)
70+800*	70+900*	100.00	0.5	11	-	1.5	0.5	11	-
70+900*	71+000*	100.00	0.5	11	-	1.5	0.5	11	-
71+000*	71+100*	100.00	0.5	11	-	1.5	0.5	11	-
71+100*	71+200*	100.00	0.5	11	-	1.5	0.5	11	-
71+200*	71+267*	67.00	0.5	11	-	1.5	0.5	11	-
71+267*	71+400*	133.00	0.5	10.5	-	1.5	0.5	10.5	-
71+400*	71+500*	100.00	0.5	10.5	-	1.5	0.5	10.5	-
71+500*	71+639*	139.00	0.5	10.5	-	1.5	0.5	10.5	-
71+639*	71+800*	161.00	0.5	11	-	1.5	0.5	11	-
71+800*	71+900*	100.00	0.5	11	-	1.5	0.5	11	-
71+900*	72+000*	100.00	0.5	11	-	1.5	0.5	11	-
72+000*	72+100*	100.00	0.5	11	-	1.5	0.5	11	-
72+100*	72+200*	100.00	0.5	11	-	1.5	0.5	11	-
72+200*	72+300*	100.00	0.5	11	-	1.5	0.5	11	-
72+300*	72+400*	100.00	0.5	11	-	1.5	0.5	11	-
72+400*	72+500*	100.00	0.5	11	-	1.5	0.5	11	-
72+500*	72+600*	100.00	0.5	11	-	1.5	0.5	11	-
72+600*	72+700*	100.00	0.5	11	-	1.5	0.5	11	-
72+700*	72+805*	105.00	0.5	11	-	1.5	0.5	11	-
72+805*	72+900*	95.00	0.5	10.5	-	1.5	0.5	10.5	-
72+900*	73+000*	100.00	0.5	10.5	-	1.5	0.5	10.5	-
73+000*	73+100*	100.00	0.5	10.5	-	1.5	0.5	10.5	-
73+100*	73+247*	147.00	0.5	10.5	-	1.5	0.5	10.5	-
73+247*	73+300*	53.00	0.5	11	-	1.5	0.5	11	-
73+300*	73+460*	160.00	0.5	11	-	1.5	0.5	11	-
73+460*	73+500*	40.00	0.5	13.5	-	4.5	0.5	13.5	-
73+500*	73+600*	100.00	0.5	13.5	-	4.5	0.5	13.5	-
73+600*	73+700*	100.00	0.5	13.5	-	4.5	0.5	13.5	-
73+700*	73+800*	100.00	0.5	13.5	-	4.5	0.5	13.5	-

Chainage		Length (m)	LHS			Median Width (m)	RHS		
From (km)	To (km)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)		Shyness each side (m)	MCW Width (m)	Paved Shoulder (m)
73+800*	73+900*	100.00	0.5	13.5	-	4.5	0.5	13.5	-
73+900*	74+020*	120.00	0.5	13.5	-	4.5	0.5	13.5	-
74+020*	74+120*	100.00	0.5	11	-	1.5	0.5	11	-
74+120*	74+168*	80.00	0.5	11	-	1.5	0.5	11	-

For Section-04 Neelmangla Tumkur

a) *Under construction locations these details are tentative these may varies as per site and same shall be maintained by TOT concessionaire after end of DLP period.
b) other than the (*) locations, the remaining stretches fall within the ongoing DPR section. Hence, these details may vary as per site conditions and shall be maintained by the TOT concessionaire after the completion of the DLP period.

Carriageway widths and median widths varies at location of Structure approach, toll plaza, median opening, junctions etc.

6.4.4 Lined Drain

Details of Lined Drain along the Project Stretch are provided below:

Table 6-6 : Details of Lined Drain

Section 01 Vijayawada-Chilakaluripet

S. No.	Chainage (Km)		Length (m)	Side	Location	Type
	From	To				
1	0+000	0+200	200	LHS	SR Shoulder	RCC Open Drain
2	0+000	0+200	200	LHS	Seperator	RCC Open Drain
3	0+000	0+200	200	RHS	Seperator	RCC Open Drain
4	0+120	0+530	410	LHS	Seperator	RCC Open Drain
5	0+120	0+530	410	RHS	Seperator	RCC Open Drain
6	0+150	0+530	380	BHS	Median	RCC Open Drain
7	0+240	0+500	260	RHS	SR Shoulder	RCC Covered Drain
8	0+240	0+450	210	RHS	SR Shoulder	RCC Covered Drain
9	0+240	1+090	850	LHS	SR Shoulder	RCC Covered Drain
10	0+240	2+230	1990	LHS	SR Shoulder	RCC Covered Drain

S. No.	Chainage (Km)		Length (m)	Side	Location	Type
	From	To				
11	0+600	1+090	490	RHS	SR Shoulder	RCC Covered Drain
12	0+600	2+200	1600	RHS	SR Shoulder	RCC Covered Drain
13	0+600	1+150	550	BHS	Median	RCC Open Drain
14	0+600	2+480	1880	LHS	Seperator	RCC Open Drain
15	0+600	1+000	400	RHS	Seperator	RCC Open Drain
16	2+250	2+480	230	RHS	SR Shoulder	RCC Covered Drain
17	2+250	2+500	250	LHS	SR Shoulder	RCC Covered Drain
18	2+300	2+480	180	RHS	Seperator	RCC Open Drain
19	2+290	2+480	190	LHS	SR Shoulder	RCC Covered Drain
20	2+500	4+200	1700	LHS	Seperator	RCC Open Drain
21	2+500	2+900	400	RHS	Seperator	RCC Open Drain
22	2+500	2+940	440	RHS	SR Shoulder	RCC Covered Drain
23	2+550	4+200	1650	LHS	SR Shoulder	RCC Covered Drain
24	2+550	2+940	390	LHS	SR Shoulder	RCC Covered Drain
25	2+700	2+930	230	RHS	SR Shoulder	RCC Covered Drain
26	3+250	4+200	950	RHS	SR Shoulder	RCC Covered Drain
27	4+400	4+750	350	LHS	Seperator	RCC Open Drain
28	4+400	4+650	250	LHS	SR Shoulder	RCC Covered Drain
29	4+400	4+750	350	RHS	SR Shoulder	RCC Covered Drain
30	4+600	4+750	150	RHS	SR Shoulder	RCC Covered Drain
31	4+600	4+750	150	LHS	SR Shoulder	RCC Covered Drain
32	4+640	4+750	110	RHS	Seperator	RCC Open Drain
33	4+770	5+230	460	LHS	Seperator	RCC Open Drain
34	4+770	5+080	310	LHS	SR Shoulder	RCC Covered Drain
35	4+770	6+300	1530	RHS	SR Shoulder	RCC Covered Drain
36	4+770	5+230	460	RHS	Seperator	RCC Open Drain
37	4+770	5+280	510	LHS	SR Shoulder	RCC Covered Drain
38	4+800	5+280	480	RHS	SR Shoulder	RCC Covered Drain
39	5+280	6+300	1020	LHS	Seperator	RCC Open Drain
40	5+900	6+300	400	LHS	SR Shoulder	RCC Covered Drain
41	5+930	6+300	370	LHS	SR Shoulder	RCC Covered Drain

S. No.	Chainage (Km)		Length (m)	Side	Location	Type
	From	To				
42	5+930	6+300	370	RHS	SR Shoulder	RCC Covered Drain
43	5+930	6+300	370	RHS	Seperator	RCC Open Drain
44	6+320	7+430	1110	LHS	SR Shoulder	RCC Covered Drain
45	6+320	7+400	1080	RHS	SR Shoulder	RCC Covered Drain
46	6+320	6+920	600	RHS	Seperator	RCC Open Drain
47	6+320	7+040	720	LHS	Seperator	RCC Open Drain
48	6+320	7+400	1080	LHS	SR Shoulder	RCC Covered Drain
49	6+320	7+400	1080	RHS	SR Shoulder	RCC Covered Drain
50	6+990	7+400	410	RHS	SR Shoulder	RCC Covered Drain
51	7+120	7+400	280	LHS	Seperator	RCC Open Drain
52	7+480	8+400	920	RHS	SR Shoulder	RCC Covered Drain
53	7+480	8+030	550	RHS	Seperator	RCC Open Drain
54	7+480	8+030	550	LHS	SR Shoulder	RCC Covered Drain
55	7+500	8+030	530	RHS	SR Shoulder	RCC Covered Drain
56	7+500	8+190	690	LHS	Seperator	RCC Open Drain
57	7+500	8+080	580	LHS	SR Shoulder	RCC Covered Drain
58	8+200	8+400	200	LHS	Seperator	RCC Open Drain
59	8+520	8+900	380	LHS	SR Shoulder	RCC Covered Drain
60	8+520	8+900	380	LHS	Seperator	RCC Open Drain
61	8+520	8+900	380	RHS	SR Shoulder	RCC Covered Drain
62	8+960	9+390	430	LHS	SR Shoulder	RCC Covered Drain
63	8+960	9+390	430	LHS	Seperator	RCC Open Drain
64	8+960	9+390	430	RHS	SR Shoulder	RCC Covered Drain
65	9+120	9+390	270	LHS	SR Shoulder	RCC Covered Drain
66	9+120	9+390	270	RHS	SR Shoulder	RCC Covered Drain
67	9+200	9+390	190	RHS	Seperator	RCC Open Drain
68	9+400	12+850	3450	LHS	SR Shoulder	RCC Covered Drain
69	9+400	10+410	1010	LHS	Seperator	RCC Open Drain
70	9+400	12+800	3400	RHS	SR Shoulder	RCC Covered Drain
71	9+400	9+600	200	LHS	SR Shoulder	RCC Covered Drain
72	9+400	9+600	200	RHS	SR Shoulder	RCC Covered Drain
73	9+400	9+600	200	RHS	Seperator	RCC Open Drain

S. No.	Chainage (Km)		Length (m)	Side	Location	Type
	From	To				
74	10+420	12+850	2430	LHS	Seperator	RCC Open Drain
75	12+510	12+850	340	LHS	SR Shoulder	RCC Covered Drain
76	12+510	12+800	290	RHS	SR Shoulder	RCC Covered Drain
77	12+560	12+800	240	RHS	Seperator	RCC Open Drain
78	12+850	13+200	350	RHS	SR Shoulder	RCC Covered Drain
79	12+850	13+200	350	RHS	Seperator	RCC Open Drain
80	12+850	14+860	2010	RHS	SR Shoulder	RCC Covered Drain
81	12+890	14+860	1970	LHS	Seperator	RCC Open Drain
82	12+890	13+200	310	LHS	SR Shoulder	RCC Covered Drain
83	12+890	14+860	1970	LHS	SR Shoulder	RCC Covered Drain
84	14+630	14+860	230	LHS	SR Shoulder	RCC Covered Drain
85	14+630	14+860	230	RHS	SR Shoulder	RCC Covered Drain
86	14+680	14+860	180	RHS	Seperator	RCC Open Drain
87	14+900	15+400	500	RHS	SR Shoulder	RCC Covered Drain
88	14+900	15+400	500	RHS	Seperator	RCC Open Drain
89	14+900	15+400	500	RHS	SR Shoulder	RCC Covered Drain
90	14+900	15+400	500	LHS	Seperator	RCC Open Drain
91	14+900	15+400	500	LHS	SR Shoulder	RCC Covered Drain
92	14+900	15+400	500	LHS	SR Shoulder	RCC Covered Drain
93	15+480	15+800	320	BHS	Median	RCC Open Drain
94	15+480	15+800	320	RHS	SR Shoulder	RCC Covered Drain
95	15+480	15+800	320	RHS	Seperator	RCC Open Drain
96	15+480	15+800	320	RHS	SR Shoulder	RCC Covered Drain
97	15+480	15+800	320	LHS	Seperator	RCC Open Drain
98	15+480	16+140	660	LHS	SR Shoulder	RCC Covered Drain
99	15+480	16+400	920	LHS	SR Shoulder	RCC Covered Drain
100	15+900	16+140	240	RHS	SR Shoulder	RCC Covered Drain
101	15+900	16+140	240	RHS	Seperator	RCC Open Drain
102	15+900	16+400	500	RHS	SR Shoulder	RCC Covered Drain

S. No.	Chainage (Km)		Length (m)	Side	Location	Type
	From	To				
103	15+900	16+250	350	BHS	Median	RCC Open Drain
104	15+900	16+140	240	LHS	Seperator	RCC Open Drain
105	355+250	356+050	800	LHS	Separator	RCC Open Drain
106	355+250	356+050	800	RHS	Separator	RCC Open Drain
107	356+050	356+900	850	LHS	Separator	RCC Open Drain
108	356+050	356+900	850	RHS	Separator	RCC Open Drain
109	356+900	357+342	442	LHS	Separator	RCC Open Drain
110	356+900	357+342	442	RHS	Separator	RCC Open Drain
111	372+038	372+100	62	BHS	Median	RCC Open Drain
112	372+409	372+485	76	BHS	Median	RCC Open Drain
113	372+800	373+270	470	RHS	Separator	RCC Open Drain
114	372+800	373+300	500	LHS	Separator	RCC Open Drain
115	373+950	374+030	80	RHS	SR Shoulder	RCC Covered Drain
116	374+090	374+610	520	RHS	SR Shoulder	RCC Covered Drain
117	374+210	374+610	400	LHS	SR Shoulder	RCC Covered Drain
118	374+650	375+600	950	RHS	SR Shoulder	RCC Open Drain
119	374+650	375+600	950	LHS	SR Shoulder	RCC Open Drain
120	375+660	376+170	510	RHS	Separator	RCC Open Drain
121	375+660	376+170	510	LHS	Separator	RCC Open Drain
122	376+200	376+340	140	RHS	Separator	RCC Open Drain
123	376+200	376+400	200	LHS	Separator	RCC Open Drain
124	376+340	376+400	60	RHS	Separator	RCC Open Drain
125	376+400	377+780	1380	LHS	Separator	RCC Open Drain
126	376+400	377+780	1380	RHS	Separator	RCC Open Drain
127	377+780	378+120	340	LHS	Separator	RCC Open Drain
128	377+780	378+070	290	RHS	Separator	RCC Open Drain
129	378+170	378+900	730	RHS	SR Shoulder	RCC Covered Drain
130	378+150	378+300	150	LHS	SR Shoulder	RCC Open Drain
131	378+300	378+710	410	LHS	SR Shoulder	RCC Covered Drain
132	378+900	379+470	570	RHS	Separator	RCC Open Drain
133	378+900	379+470	570	LHS	Separator	RCC Open Drain

S. No.	Chainage (Km)		Length (m)	Side	Location	Type
	From	To				
134	379+530	379+720	190	RHS	Separator	RCC Open Drain
135	379+530	379+720	190	LHS	Separator	RCC Open Drain
136	379+720	380+530	810	LHS	Separator	RCC Open Drain
137	379+720	380+530	810	RHS	Separator	RCC Open Drain
138	380+550	380+780	230	RHS	Separator	RCC Open Drain
139	380+550	380+780	230	LHS	Separator	RCC Open Drain
140	380+780	381+930	1150	RHS	Separator	RCC Open Drain
141	380+780	381+930	1150	LHS	Separator	RCC Open Drain
142	381+950	382+600	650	RHS	Separator	RCC Open Drain
143	381+950	382+600	650	LHS	Separator	RCC Open Drain
144	382+600	384+280	1680	LHS	Separator	RCC Open Drain
145	382+600	384+270	1670	RHS	Separator	RCC Open Drain
146	384+280	384+700	420	LHS	Separator	RCC Open Drain
147	384+270	384+700	430	RHS	Separator	RCC Open Drain
148	384+720	385+740	1020	RHS	Separator	RCC Open Drain
149	384+720	385+740	1020	LHS	Separator	RCC Open Drain
150	385+750	387+085	1335	RHS	Separator	RCC Open Drain
151	385+750	387+070	1320	LHS	Separator	RCC Open Drain
152	387+090	387+510	420	RHS	Separator	RCC Open Drain
153	387+080	387+510	430	LHS	Separator	RCC Open Drain
154	387+520	388+000	480	LHS	Separator	RCC Open Drain
155	387+520	388+000	480	RHS	Separator	RCC Open Drain
156	388+010	389+770	1760	LHS	Separator	RCC Open Drain
157	388+010	389+770	1760	RHS	Separator	RCC Open Drain
158	388+250	388+400	150	LHS	SR Shoulder	RCC Covered Drain
159	389+660	389+770	110	BHS	Median	RCC Open Drain
160	389+790	390+440	650	LHS	Separator	RCC Open Drain
161	389+790	390+440	650	RHS	Separator	RCC Open Drain
162	390+440	392+500	2060	LHS	Separator	RCC Open Drain
163	390+440	392+500	2060	RHS	Separator	RCC Open Drain
164	392+500	392+970	470	RHS	Separator	RCC Open Drain
165	392+500	392+970	470	LHS	Separator	RCC Open Drain
166	392+980	394+300	1320	LHS	Separator	RCC Open Drain

S. No.	Chainage (Km)		Length (m)	Side	Location	Type
	From	To				
167	392+980	394+300	1320	RHS	Separator	RCC Open Drain
168	394+350	395+340	990	LHS	Separator	RCC Open Drain
169	394+350	395+340	990	RHS	Separator	RCC Open Drain
170	395+350	396+530	1180	LHS	Separator	RCC Open Drain
171	395+350	396+530	1180	RHS	Separator	RCC Open Drain
172	396+540	397+000	460	LHS	Separator	RCC Open Drain
173	396+540	397+100	560	RHS	Separator	RCC Open Drain
174	397+000	397+100	100	LHS	Separator	RCC Open Drain
175	397+150	397+540	390	LHS	Separator	RCC Open Drain
176	397+150	400+200	3050	RHS	Separator	RCC Open Drain
177	397+540	400+200	2660	LHS	Separator	RCC Open Drain
178	400+300	401+300	1000	LHS	Separator	RCC Open Drain
179	400+250	400+650	400	RHS	Separator	RCC Open Drain
180	400+700	400+800	100	RHS	Separator	RCC Open Drain
181	400+800	401+300	500	RHS	Separator	RCC Open Drain
182	401+280	401+390	110	BHS	Median	RCC Open Drain
183	401+300	403+120	1820	LHS	Separator	RCC Open Drain
184	401+300	403+120	1820	RHS	Separator	RCC Open Drain
185	403+120	404+200	1080	LHS	Separator	RCC Open Drain
186	403+120	405+050	1930	RHS	Separator	RCC Open Drain
187	403+470	403+680	210	BHS	Median	RCC Open Drain
188	404+200	404+250	50	LHS	Separator	RCC Open Drain
189	404+250	404+550	300	LHS	Separator	RCC Open Drain
190	404+550	404+650	100	LHS	Separator	RCC Open Drain
191	404+700	405+100	400	LHS	Separator	RCC Open Drain
192	405+050	405+700	650	RHS	Separator	RCC Open Drain
193	405+100	405+690	590	LHS	Separator	RCC Open Drain
194	406+697	406+890	193	BHS	Median	RCC Open Drain
195	406+950	411+450	4500	RHS	Separator	RCC Open Drain
196	406+980	411+450	4470	LHS	Separator	RCC Open Drain
197	411+460	412+170	710	LHS	Separator	RCC Open Drain
198	411+470	412+160	690	RHS	Separator	RCC Open Drain
199	412+170	412+470	300	LHS	SR Shoulder	RCC Open Drain

S. No.	Chainage (Km)		Length (m)	Side	Location	Type
	From	To				
200	411+850	412+360	510	RHS	SR Shoulder	RCC Open Drain
201	412+280	412+360	80	BHS	Median	RCC Open Drain
202	412+284	412+455	171	LHS	Separator	RCC Open Drain
203	412+360	412+770	410	RHS	SR Shoulder	RCC Covered Drain
204	412+364	412+455	91	RHS	Separator	RCC Open Drain
205	412+880	413+010	130	RHS	SR Shoulder	RCC Covered Drain
206	413+130	413+800	670	RHS	SR Shoulder	RCC Covered Drain
207	412+470	413+800	1330	LHS	SR Shoulder	RCC Covered Drain
208	414+230	415+150	920	LHS	SR Shoulder	RCC Covered Drain
209	414+580	414+930	350	RHS	SR Shoulder	RCC Covered Drain
210	414+930	415+180	250	RHS	SR Shoulder	RCC Open Drain
211	415+170	415+580	410	RHS	Separator	RCC Open Drain
212	415+180	415+690	510	LHS	Separator	RCC Open Drain
213	415+590	415+850	260	RHS	Separator	RCC Covered Drain
214	415+690	415+800	110	LHS	Separator	RCC Covered Drain
215	415+850	418+410	2560	RHS	Separator	RCC Open Drain
216	415+800	415+980	180	LHS	Separator	RCC Open Drain
217	416+140	417+950	1810	LHS	Separator	RCC Open Drain
218	417+950	418+150	200	LHS	Separator	RCC Covered Drain
219	417+410	417+660	250	BHS	Median	RCC Open Drain
220	419+080	419+190	110	BHS	Median	RCC Open Drain
221	419+805	420+000	195	BHS	Median	RCC Open Drain
222	418+150	418+360	210	LHS	Separator	RCC Open Drain
223	418+360	418+580	220	LHS	Separator	RCC Covered Drain
224	418+410	418+580	170	RHS	Separator	RCC Covered Drain
225	418+580	419+900	1320	LHS	Separator	RCC Open Drain
226	418+580	419+900	1320	RHS	Separator	RCC Open Drain
227	419+900	420+350	450	RHS	Separator	RCC Covered Drain
228	420+000	420+200	200	BHS	Median	RCC Open Drain
229	420+200	420+350	150	LHS	Separator	RCC Open Drain
230	420+300	420+800	500	RHS	Separator	RCC Covered Drain
231	420+350	420+400	50	RHS	Separator	RCC Open Drain
232	420+350	420+750	400	LHS	Separator	RCC Covered Drain

S. No.	Chainage (Km)		Length (m)	Side	Location	Type
	From	To				
233	420+400	420+550	150	RHS	Separator	RCC Covered Drain
234	420+750	420+800	50	LHS	Separator	RCC Open Drain
235	420+550	420+800	250	RHS	Separator	RCC Open Drain
236	421+050	421+340	290	RHS	Separator	RCC Open Drain
237	421+480	421+815	335	LHS	Separator	RCC Open Drain
238	421+600	421+740	140	RHS	Separator	RCC Open Drain
239	421+740	421+810	70	RHS	Separator	RCC Open Drain
240	421+810	422+740	930	RHS	Separator	RCC Open Drain
241	421+810	422+000	190	LHS	Separator	RCC Open Drain
242	422+000	422+605	605	LHS	Separator	RCC Open Drain

Section 02 Chennai Bypass

S. No.	Chainage (Km)		Length (m)	Side	Location	Type
	From	To				
1	1+200	1+250	50.00	LHS	Separator	RCC Open Drain
2	1+270	1+650	380.00	LHS	Separator	RCC Open Drain
3	1+635	2+225	590.00	LHS	Separator	RCC Covered Drain
4	2+225	2+520	295.00	LHS	Separator	RCC Open Drain
5	2+540	3+170	630.00	LHS	Separator	RCC Open Drain
6	3+170	3+750	580.00	LHS	Separator	RCC Covered Drain
7	3+750	3+800	50.00	LHS	Separator	RCC Open Drain
8	3+800	3+840	40.00	LHS	Separator	RCC Covered Drain
9	3+840	4+440	600.00	LHS	Separator	RCC Open Drain
10	4+440	4+950	510.00	LHS	Separator	RCC Covered Drain
11	4+950	5+230	280.00	LHS	Separator	RCC Open Drain
12	5+260	6+040	780.00	LHS	Separator	RCC Open Drain
13	6+040	7+070	1030.00	LHS	Separator	RCC Open Drain
14	7+110	7+410	300.00	LHS	Separator	RCC Open Drain
15	7+410	7+450	40.00	LHS	Separator	RCC Covered Drain
16	7+450	7+760	310.00	LHS	Separator	RCC Open Drain

S. No.	Chainage (Km)		Length (m)	Side	Location	Type
	From	To				
17	7+760	8+600	840.00	LHS	Separator	RCC Covered Drain
18	8+600	9+000	400.00	LHS	Separator	RCC Open Drain
19	9+180	9+750	570.00	LHS	Separator	RCC Open Drain
20	9+750	9+820	70.00	LHS	Separator	RCC Covered Drain
21	9+820	10+350	530.00	LHS	Separator	RCC Open Drain
22	10+380	10+580	200.00	LHS	Separator	RCC Open Drain
23	10+580	10+840	260.00	LHS	Separator	RCC Covered Drain
24	10+840	10+980	140.00	LHS	Separator	RCC Open Drain
25	10+980	11+630	650.00	LHS	Separator	RCC Covered Drain
26	11+630	12+100	470.00	LHS	Separator	RCC Open Drain
27	12+120	12+450	330.00	LHS	Separator	RCC Open Drain
28	12+450	12+830	380.00	LHS	Separator	RCC Covered Drain
29	12+830	13+500	670.00	LHS	Separator	RCC Open Drain
30	15+900	16+100	200.00	LHS	Shoulder	RCC Covered Drain
31	16+100	16+480	380.00	LHS	Shoulder	RCC Open Drain
32	16+160	17+220	1060.00	LHS	Separator	RCC Covered Drain
33	16+480	16+580	100.00	LHS	Shoulder	RCC Covered Drain
34	16+580	16+840	260.00	LHS	Shoulder	RCC Open Drain
35	16+840	19+200	2360.00	LHS	Shoulder	RCC Covered Drain
36	19+000	19+200	200.00	LHS	Separator	RCC Covered Drain
37	19+500	21+170	1670.00	LHS	Separator	RCC Covered Drain
38	21+170	21+450	280.00	LHS	Separator	RCC Open Drain
39	21+450	22+120	670.00	LHS	Separator	RCC Covered Drain
40	22+120	24+400	2280.00	LHS	Shoulder	RCC Covered Drain
41	24+400	25+100	700.00	LHS	Separator	RCC Open Drain
42	25+200	25+580	380.00	LHS	Separator	RCC Covered Drain
43	25+400	27+240	1840.00	LHS	Shoulder	RCC Covered Drain
44	25+580	25+670	90.00	LHS	Separator	RCC Open Drain
45	25+670	25+790	120.00	LHS	Separator	RCC Covered Drain
46	25+790	26+190	400.00	LHS	Separator	RCC Open Drain

S. No.	Chainage (Km)		Length (m)	Side	Location	Type
	From	To				
47	26+190	27+100	910.00	LHS	Separator	RCC Covered Drain
48	27+100	27+240	140.00	LHS	Separator	RCC Open Drain
49	27+260	27+450	190.00	LHS	Separator	RCC Open Drain
50	27+450	27+930	480.00	LHS	Separator	RCC Covered Drain
51	27+930	28+140	210.00	LHS	Separator	RCC Open Drain
52	28+180	28+530	350.00	LHS	Separator	RCC Open Drain
53	28+530	28+850	320.00	LHS	Separator	RCC Covered Drain
54	28+850	29+330	480.00	LHS	Separator	RCC Open Drain
55	29+330	29+950	620.00	LHS	Separator	RCC Covered Drain
56	29+950	30+390	440.00	LHS	Separator	RCC Open Drain
57	30+390	30+480	90.00	LHS	Separator	RCC Covered Drain
58	30+480	31+250	770.00	LHS	Separator	RCC Open Drain
59	31+250	31+300	50.00	LHS	Separator	RCC Covered Drain
60	31+300	31+350	50.00	LHS	Separator	RCC Open Drain
61	31+800	32+250	450.00	LHS	Shoulder	RCC Covered Drain
62	32+200	31+780	420.00	RHS	Shoulder	RCC Covered Drain
63	31+780	31+400	380.00	RHS	Separator	RCC Open Drain
64	31+450	30+480	970.00	RHS	Separator	RCC Open Drain
65	30+480	30+400	80.00	RHS	Separator	RCC Covered Drain
66	30+000	29+920	80.00	RHS	Separator	RCC Open Drain
67	29+920	29+800	120.00	RHS	Separator	RCC Covered Drain
68	29+730	29+700	30.00	RHS	Separator	RCC Open Drain
69	29+500	29+350	150.00	RHS	Separator	RCC Covered Drain
70	29+350	28+600	750.00	RHS	Separator	RCC Open Drain
71	28+600	28+260	340.00	RHS	Separator	RCC Covered Drain
72	28+260	28+160	100.00	RHS	Separator	RCC Open Drain
73	28+120	27+910	210.00	RHS	Separator	RCC Open Drain
74	27+910	27+450	460.00	RHS	Separator	RCC Covered Drain
75	27+450	27+280	170.00	RHS	Separator	RCC Open Drain
76	27+250	27+060	190.00	RHS	Separator	RCC Open Drain

S. No.	Chainage (Km)		Length (m)	Side	Location	Type
	From	To				
77	27+060	26+160	900.00	RHS	Separator	RCC Covered Drain
78	26+160	25+990	170.00	RHS	Separator	RCC Open Drain
79	25+960	25+750	210.00	RHS	Separator	RCC Open Drain
80	25+750	25+620	130.00	RHS	Separator	RCC Covered Drain
81	25+620	25+550	70.00	RHS	Separator	RCC Open Drain
82	25+550	25+200	350.00	RHS	Separator	RCC Covered Drain
83	25+100	24+400	700.00	RHS	Separator	RCC Open Drain
84	24+400	22+130	2270.00	RHS	Separator	RCC Covered Drain
85	22+130	21+950	180.00	RHS	Separator	RCC Covered Drain
86	22+130	19+500	2630.00	RHS	Shoulder	RCC Covered Drain
87	21+950	21+810	140.00	RHS	Separator	RCC Open Drain
88	21+810	21+500	310.00	RHS	Separator	RCC Covered Drain
89	21+500	21+350	150.00	RHS	Separator	RCC Open Drain
90	21+340	21+200	140.00	RHS	Separator	RCC Open Drain
91	21+200	19+500	1700.00	RHS	Separator	RCC Covered Drain
92	19+200	19+000	200.00	RHS	Shoulder	RCC Covered Drain
93	19+000	18+760	240.00	RHS	Shoulder	RCC Open Drain
94	18+760	18+400	360.00	RHS	Shoulder	RCC Covered Drain
95	18+400	18+300	100.00	RHS	Shoulder	RCC Open Drain
96	18+300	17+920	380.00	RHS	Shoulder	RCC Covered Drain
97	17+920	17+860	60.00	RHS	Shoulder	RCC Open Drain
98	17+860	17+600	260.00	RHS	Shoulder	RCC Covered Drain
99	17+600	17+500	100.00	RHS	Shoulder	RCC Open Drain
100	17+500	17+420	80.00	RHS	Shoulder	RCC Covered Drain
101	17+420	17+350	70.00	RHS	Shoulder	RCC Open Drain
102	17+350	17+300	50.00	RHS	Shoulder	RCC Covered Drain
103	17+300	17+180	120.00	RHS	Shoulder	RCC Open Drain
104	17+180	16+800	380.00	RHS	Shoulder	RCC Covered Drain

Section 03 Chennai Tada

S. No.	Chainage (Km)		Length (m)	Side	Location	Type
	From	To				
1	22+500	22+730	230	LHS	Separator	RCC Covered Drain
2	22+860	23+110	250	LHS	Separator	RCC Covered Drain
3	24+465	25+050	585	LHS	Shoulder	RCC Open Drain
4	26+260	26+360	100	LHS	Shoulder	RCC Covered Drain
5	26+940	27+700	760	LHS	Shoulder	RCC Covered Drain
6	27+630	28+020	390	LHS	Separator	RCC Covered Drain
7	28+020	28+970	950	LHS	Shoulder	RCC Covered Drain
8	34+400	34+620	220	LHS	Separator	RCC Covered Drain
9	34+680	35+400	720	LHS	Shoulder	RCC Covered Drain
10	35+950	36+190	240	LHS	Separator	RCC Covered Drain
11	37+100	39+000	1900	LHS	Shoulder	RCC Covered Drain
12	39+100	39+390	290	LHS	Shoulder	RCC Covered Drain
13	41+720	41+970	250	LHS	Shoulder	RCC Covered Drain
14	43+620	44+240	620	LHS	Shoulder	RCC Covered Drain
15	46+050	46+550	500	LHS	Shoulder	RCC Covered Drain
16	47+150	48+150	1000	LHS	Shoulder	RCC Covered Drain
17	48+720	48+930	210	LHS	Separator	RCC Covered Drain
18	45+850	49+600	3750	LHS	Shoulder	RCC Covered Drain
19	49+700	49+940	240	LHS	Separator	RCC Covered Drain
20	49+940	50+900	960	LHS	Shoulder	RCC Covered Drain
21	51+530	52+150	620	LHS	Shoulder	RCC Covered Drain
22	52+300	51+500	800	RHS	Shoulder	RCC Covered Drain
23	50+720	50+650	70	RHS	Separator	RCC Covered Drain
24	50+500	49+800	700	RHS	Shoulder	RCC Covered Drain
25	49+820	49+630	190	RHS	Separator	RCC Covered Drain
26	49+400	48+770	630	RHS	Shoulder	RCC Covered Drain
27	48+770	48+440	330	RHS	Separator	RCC Covered Drain
28	48+130	47+330	800	RHS	Shoulder	RCC Covered Drain
29	46+230	46+150	80	RHS	Shoulder	RCC Open Drain

S. No.	Chainage (Km)		Length (m)	Side	Location	Type
	From	To				
30	39+250	37+160	2090	RHS	Shoulder	RCC Covered Drain
31	36+120	35+870	250	RHS	Separator	RCC Covered Drain
32	35+320	35+000	320	RHS	Shoulder	RCC Covered Drain
33	31+060	30+900	160	RHS	Shoulder	RCC Covered Drain
34	29+000	27+960	1040	RHS	Shoulder	RCC Covered Drain
35	27+960	27+640	320	RHS	Separator	RCC Covered Drain
36	27+640	26+990	650	RHS	Shoulder	RCC Covered Drain
37	26+390	26+220	170	RHS	Shoulder	RCC Covered Drain
38	26+170	25+600	570	RHS	Shoulder	RCC Covered Drain
39	25+110	25+010	100	RHS	Shoulder	RCC Covered Drain
40	24+960	24+450	510	RHS	Shoulder	RCC Open Drain

Section 04 Neelmangla-Tumkur

S. No.	Chainage (Km)		Length (m)	Side	Location	Type
	From	To				
1*	29+500	30+730	1230	LHS	Shoulder	RCC Covered Drain
2*	29+500	30+730	1230	RHS	Shoulder	RCC Covered Drain
3*	29+500	30+730	1230	LHS	Separator	RCC Covered Drain
4*	29+500	30+730	1230	RHS	Separator	RCC Covered Drain
5*	30+730	31+550	820	RHS	Separator	RCC Covered Drain
6*	30+730	31+550	820	LHS	Shoulder	RCC Covered Drain
7*	30+730	31+550	820	LHS	Separator	RCC Covered Drain
8*	31+550	43+100	11550	LHS	Shoulder	RCC Covered Drain
9*	31+550	43+100	11550	RHS	Shoulder	RCC Covered Drain
10*	31+550	43+100	11550	LHS	Separator	RCC Covered Drain
11*	31+550	43+100	11550	RHS	Separator	RCC Covered Drain
12*	43+100	43+450	350	LHS	Separator	RCC Covered Drain
13*	43+100	43+450	350	RHS	Shoulder	RCC Covered Drain
14*	43+100	43+450	350	RHS	Separator	RCC Covered Drain
15*	43+450	44+980	1530	LHS	Shoulder	RCC Covered Drain

S. No.	Chainage (Km)		Length (m)	Side	Location	Type
	From	To				
16*	43+450	44+980	1530	RHS	Separator	RCC Covered Drain
17*	44+980	45+180	200	RHS	Separator	RCC Covered Drain
18*	44+980	45+180	200	LHS	Shoulder	RCC Covered Drain
19*	44+980	45+180	200	LHS	Separator	RCC Covered Drain
20*	45+180	49+900	4720	LHS	Shoulder	RCC Covered Drain
21*	45+180	49+900	4720	RHS	Shoulder	RCC Covered Drain
22*	45+180	49+900	4720	LHS	Separator	RCC Covered Drain
23*	45+180	49+900	4720	RHS	Separator	RCC Covered Drain
24*	62+000	66+620	4620	LHS	Shoulder	RCC Covered Drain
25*	62+000	66+620	4620	RHS	Shoulder	RCC Covered Drain
26*	62+000	66+620	4620	LHS	Separator	RCC Covered Drain
27*	62+000	66+620	4620	RHS	Separator	RCC Covered Drain
28*	66+620	66+920	300	LHS	Separator	RCC Covered Drain
29*	66+620	66+920	300	RHS	Separator	RCC Covered Drain
30*	66+920	67+140	220	LHS	Shoulder	RCC Covered Drain
31*	66+920	67+140	220	RHS	Shoulder	RCC Covered Drain
32*	66+920	67+140	220	LHS	Separator	RCC Covered Drain
33*	66+920	67+140	220	RHS	Separator	RCC Covered Drain
34*	67+140	67+540	400	LHS	Separator	RCC Covered Drain
35*	67+140	67+540	400	RHS	Separator	RCC Covered Drain
36*	67+540	74+168	6660	LHS	Shoulder	RCC Covered Drain
37*	67+540	74+168	6660	RHS	Shoulder	RCC Covered Drain
38*	67+540	74+168	6660	LHS	Separator	RCC Covered Drain
39*	67+540	74+168	6660	RHS	Separator	RCC Covered Drain

For Section-04 Neelmangla Tumkur

a) *Under construction locations these details are tentative these may varies as per site and same shall be maintained by TOT concessionaire after end of DLP period.

b) Other than the (*) locations, the remaining stretches fall within the ongoing DPR section. Hence, these details may vary as per site conditions and shall be maintained by the TOT concessionaire after the completion of the DLP period.

Apart from above, earthen drain is also available along the project stretch and same shall also be maintained by the TOT/InvIT Concessionaire during Concession Period.

6.4.5 Service Road and Slip Road

Details of Service Road along the Project Stretch are provided below.

Table 6-7 : Details of Service Road

Section 01 Vijayawada-Chilakaluripet

S. No.	Chainage (Km)		Length	Side	Pavement Type	Width (m)
	From	To	(m)			
1	0+100	1+060	960	LHS	Flexible	7.5
2	0+100	1+060	960	RHS	Flexible	7.5
3	1+060	2+200	1140	LHS	Flexible	7
4	2+200	2+900	700	LHS	Flexible	7.5
5	2+200	2+900	700	RHS	Flexible	7.5
6	2+900	4+560	1660	LHS	Flexible	7
7	4+560	5+240	680	LHS	Flexible	7.5
8	4+560	5+240	680	RHS	Flexible	7.5
9	5+240	5+900	660	LHS	Flexible	7
10	5+240	5+900	660	RHS	Flexible	7
11	5+900	8+000	2100	LHS	Flexible	7.5
12	5+900	8+000	2100	RHS	Flexible	7.5
13	8+000	9+100	1100	LHS	Flexible	7
14	9+100	9+600	500	LHS	Flexible	7.5
15	9+100	9+600	500	RHS	Flexible	7.5
16	9+600	10+700	1100	LHS	Flexible	7
17	10+700	12+500	1800	LHS	Flexible	7
18	12+500	13+200	700	LHS	Flexible	7.5
19	12+500	13+200	700	RHS	Flexible	7.5
20	13+200	14+650	1450	LHS	Flexible	7
21	14+650	16+200	1550	LHS	Flexible	7.5
22	14+650	16+200	1550	RHS	Flexible	7.5
23	355+100	357+342	2242	LHS	Flexible	7
24	355+100	357+342	2242	RHS	Flexible	5.5-7

S. No.	Chainage (Km)		Length	Side	Pavement Type	Width (m)
	From	To	(m)			
25	372+690	373+450	760	LHS	Flexible	7
26	372+690	373+400	710	RHS	Flexible	7
27	373+800	405+745	31945	LHS	Flexible	5.5-10
28	373+800	373+900	100	RHS	Flexible	7
29	374+100	405+745	31645	RHS	Flexible	7-10.5
30	406+900	413+250	6350	LHS	Flexible	7-10.5
31	406+900	420+000	13100	RHS	Flexible	7-10.5
32	413+250	413+450	200	LHS	Flexible	5.5
33	413+450	413+920	470	LHS	Flexible	7
34	414+150	420+000	5850	LHS	Flexible	7
35	421+125	422+605	1480	LHS	Flexible	7-10.5
Total			**121044**			

S. No.	Chainage (Km)		Length	Side	Pavement Type	Width (m)
	From	To	(m)			
1*	405+740	405+940	200	LHS	Flexible	8
2*	406+880	407+040	160	LHS	Flexible	8

*Under New Service Road these details are tentative these may varies as per site and same shall be maintained by TOT/InvIT concessionaire after end of DLP period.

Section 02 Chennai Bypass

S. No.	Chainage (Km)		Length	Side	Pavement Type	Width (m)
	From	To	(m)			
1	1+200	9+050	7850	LHS	Flexible	5.5
2	9+335	12+750	3415	LHS	Flexible	5.5
3	12+750	13+500	750	LHS	Flexible	9-12
4	15+870	19+100	3230	LHS	Flexible	5.5
5	19+220	22+130	2910	LHS	Flexible	5.5
6	22+130	24+650	2520	LHS	Flexible	7
7	24+650	25+200	550	LHS	Flexible	5.5
8	25+200	28+150	2950	LHS	Flexible	5.5
9	28+180	30+420	2240	LHS	Rigid	5.5

S. No.	Chainage (Km)		Length	Side	Pavement Type	Width (m)
	From	To	(m)			
10	30+420	31+400	980	LHS	Flexible	5.5
11	31+640	32+260	620	LHS	Flexible	6
12	31+800	32+260	460	LHS	Flexible	5.5
13	32+260	30+400	1860	RHS	Flexible	5.5
14	30+000	29+500	500	RHS	Rigid	5.5
15	29+500	25+200	4300	RHS	Flexible	5.5
16	25+200	24+650	550	RHS	Flexible	5.5
17	24+650	22+130	2520	RHS	Flexible	7
18	22+130	19+530	2600	RHS	Flexible	5.5
19	19+200	16+800	2400	RHS	Flexible	5.5
			43205			

Section 03 Chennai Tada

S. No.	Chainage (Km)		Length	Side	Pavement Type	Width (m)
	From	To	(m)			
1	22+020	24+590	2570	LHS	Flexible	7
2	24+590	24+780	190	LHS	Rigid	7
3	24+780	26+980	2200	LHS	Flexible	7
4	26+980	27+130	150	LHS	Rigid	17
5	27+130	50+475	23345	LHS	Flexible	6.5-7
6	51+330	53+960	263	LHS	Flexible	6.5-7
7	54+000	50+775	3225	RHS	Flexible	7
8	50+775	49+900	875	RHS	Flexible	6.5
9	49+900	43+475	6425	RHS	Flexible	7
10	42+665	25+700	16965	RHS	Flexible	7
11	25+700	25+600	100	RHS	Flexible	4.5
12	25+600	24+750	850	RHS	Flexible	7
13	24+750	24+585	165	RHS	Rigid	7
14	24+585	22+175	2410	RHS	Flexible	7
15	21+400	21+000	400	RHS	Flexible	7
16	20+520	20+450	70	RHS	Flexible	6.5
17	20+450	20+100	350	RHS	Flexible	4
18	20+100	19+800	300	RHS	Flexible	6.5

S. No.	Chainage (Km)		Length	Side	Pavement Type	Width (m)
	From	To	(m)			
19	19+800	19+700	100	RHS	Flexible	4
20	19+700	19+530	170	RHS	Flexible	6.5
21	19+530	19+250	280	RHS	Flexible	4.5
22	19+180	17+400	1780	RHS	Flexible	6.5
23	16+980	16+900	80	RHS	Flexible	6.5
24	16+870	16+135	735	RHS	Flexible	6.5
25	16+085	13+850	2235	RHS	Flexible	6.5
26	13+650	12+780	870	RHS	Flexible	6.5
	Total		**67103**			

Section 04 Neelmangla-Tumkur

S. No.	Chainage (Km)		Length	Side	Pavement Type	Width (m)
	From	To	(m)			
1*	29+500	30+730	1230	BHS	Flexible	8.75
2*	30+730	31+550	820	LHS	Flexible	8.75
3*	30+730	31+550	820	RHS	Flexible	5.75/7.25
4*	31+550	43+100	11550	BHS	Flexible	8.75
5*	43+100	43+450	350	LHS	Flexible	11.25
6*	43+100	43+450	350	RHS	Flexible	7.25
7*	43+450	44+012	562	BHS	Flexible	8.75
8*	44+012	44+604	592	LHS	Flexible	5.5-6.5
9	44+012	44+604	592	RHS	Flexible	5.5
10*	44+604	44+980	376	BHS	Flexible	8.75
11*	44+980	45+180	200	LHS	Flexible	8.75
12*	44+980	45+180	200	RHS	Flexible	11.25
13*	45+180	48+560	3380	BHS	Flexible	8.75
14*	48+560	49+814	1254	BHS	Flexible	7
15*	49+814	49+900	86	BHS	Flexible	8.75
16*	62+000	62+317	317	BHS	Flexible	8.75
17*	62+317	62+809	492	RHS	Flexible	7
18*	62+809	63+084	275	BHS	Flexible	8.75
19	63+084	63+300	216	BHS	Flexible	7
20*	63+300	64+300	1000	BHS	Flexible	11

S. No.	Chainage (Km)		Length	Side	Pavement Type	Width (m)
	From	To	(m)			
21*	64+300	65+100	800	LHS	Flexible	11
22*	65+100	65+710	610	BHS	Flexible	8.75
23*	65+710	66+620	910	BHS	Flexible	7
24*	66+620	66+920	300	BHS	Flexible	11.25
25*	66+920	67+140	220	LHS	Flexible	5.5
26*	66+920	67+140	220	RHS	Flexible	7
27*	67+140	67+540	400	BHS	Flexible	11.25
28*	67+540	67+978	438	BHS	Flexible	8.75
29*	67+978	68+309	331	BHS	Flexible	7
30*	68+390	69+859	1469	BHS	Flexible	8.75
31*	69+859	70+003	144	BHS	Flexible	5.5
32*	70+003	71+267	1264	BHS	Flexible	8.75
33*	71+267	71+639	372	BHS	Flexible	7
34*	71+639	72+805	1166	BHS	Flexible	8.75
35*	72+805	73+247	442	BHS	Flexible	7
36*	73+247	73+789	542	BHS	Flexible	8.75
37*	73+789	73+812	23	BHS	Flexible	5.5-7
38*	73+812	74+168	388	BHS	Flexible	8.75
	Total		**64642**			

For Section-04 Neelmangla Tumkur

a) *Under construction locations these details are tentative these may varies as per site and same shall be maintained by TOT concessionaire after end of DLP period.

b) Other than the (*) locations, the remaining stretches fall within the ongoing DPR section. Hence, these details may vary as per site conditions and shall be maintained by the TOT concessionaire after the completion of the DLP period.

Section 01 Vijayawada-Chilakaluripet

Section 02 Chennai Bypass

Section 03 Chennai Tada

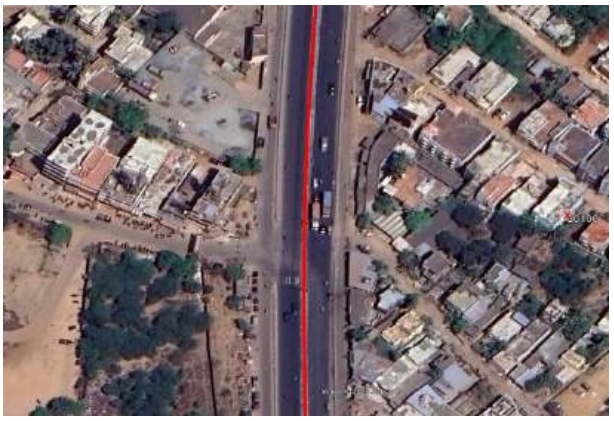

Figure 6-2 : Service Road along the Project Stretch

6.4.6 Ramp

The details of the Ramps along the Project highway are given below:

Section 01 Vijayawada-Chilakaluripet

S. No.	Chainage (Km)		Length	Side
	From	To	(m)	
NIL				

Section 02 Chennai Bypass

S. No.	Chainage (Km)		Length	Side
	From	To	(m)	
1	18+900	19+200	300	LHS
2	19+200	18+900	300	RHS
3	19+200	19+400	200	RHS
4	19+200	19+400	200	RHS

Section 03 Chennai Tada

S. No.	Chainage (Km)		Length	Side
	From	To	(m)	
1*	22+000	22+300	300	RHS
2*	22+770	23+200	430	LHS
3*	27+035	27+055	20	RHS
4	34+500	34+900	400	LHS
5*	35+900	36+200	300	RHS
6*	45+900	46+300	400	LHS
7	52+150	52+470	320	RHS
8	52+800	53+100	300	RHS
9*	54+000	54+120	120	LHS
10	21+900	21+100	800	LHS
11*	22+400	22+770	370	LHS
12*	27+035	27+055	20	LHS
13*	34+500	34+700	200	RHS
14*	35+950	36+180	230	LHS
15	46+900	47+200	300	LHS
16*	49+400	49+640	240	RHS

S. No.	Chainage (Km)		Length	Side
	From	To	(m)	
17	52+150	52+400	250	LHS
18	52+800	53+000	200	LHS
19*	54+000	54+200	200	RHS

a) * Is the location of entry and exit ramps fall under the scope of the existing contractor and shall be constructed by them. After completion of the DLP period, the same shall be maintained by the TOT concessionaire.

6.4.7 Bypass

In existing Project Stretch, Details of Bypass are provided below.

Section 01 Vijayawada-Chilakaluripet

S. No.	Chainage Km		Length (Km)	Name of Bypass
	From	To		
1	396+800	412+000	15.20	Guntur Bypass
2	0+000	16+499	16.499	Chilakaluripet Bypass
Total			31.699	

Section 02 Chennai Bypass

S. No.	Chainage Km		Length (Km)	Name of Bypass
	From	To		
NIL				

Section 03 Chennai Tada

S. No.	Chainage Km		Length (Km)	Name of Bypass
	From	To		
1	22+750	26+250	3.50	Sholavaram
2	42+200	47+800	5.60	Peddikuppam
Total			**9.10**	

Section 04 Neelmangla-Tumkur

S. No.	Chainage Km		Length (Km)	Name of Bypass
	From	To		
Nil				

6.4.8 Junction

In existing Project Stretch, Details of all junctions are provided below.

Table 6-8 : List of Major Junctions

Section 01 Vijayawada-Chilakaluripet

S.No.	Chainage Km	Type of Junction	Access Road Leads to	
			LHS	RHS
1	0+550	Y Junction	-	Old NH-16
2	7+420	X Junction	NH-167A	NH-167A
3	14+850	X Junction	SH-332	SH-332
4	15+820	Y Junction	-	Old NH-16
5	355+470	X Junction	MDR 43	MDR 43
6	374+084	T Junction		MDR 37
7	374+350	T Junction		MDR 10
8	378+543	X Junction	MDR 142	MDR 45
9	396+340	X Junction	MDR 189	MDR 189
10	397+085	Y Junction	NH 55F	
11	400+670	X Junction	SH 249	SH 249
12	404+685	X Junction	Guntur-Tenali Road	SH 40
13	408+737	T Junction	SH255	
14	408+737	T Junction		SH255
15	411+850	Y Junction	MDR 105	
16	413+408	X Junction	NH 544F	Pedakakani Main Road
17	416+100	Y Junction		MDR 42
18	418+245	T Junction	MDR 35	
19	419+470	T Junction	MDR 34	

Section 02 Chennai Bypass

S.No.	Chainage Km	Type of Junction	Access Road Leads to	
			LHS	RHS
1	1+270	X Junction	SH - 110	SH - 110
2	9+050	X Junction	SH- 113A	SH- 113A
3	12+110	X Junction	SH - 113	SH - 113
4	15+850	X Junction	SH - 55	SH - 55
5	19+210	X Junction	NH - 48	NH - 179B
6	22+300	X Junction	SH - 112	SH - 112
7	23+655	X Junction	NH - 716	NH - 716
8	27+255	X Junction	SH - 205	SH - 205
9	28+150	X Junction	SH - 205	SH - 205
10	31+380	X Junction	Perambur Red Hills Rd	Perambur Red Hills Rd

Section 03 Chennai Tada

S.No.	Chainage Km	Type of Junction	Access Road Leads to	
			LHS	RHS
1	22+770	Y Junction		GNT Rd
2	26+250	Y Junction		GNT Rd
3	27+210	T Junction	NH-716A	
4	31+100	T Junction		SH-56
5	35+390	T Junction	MDR 378	
6	35+680	T Junction		Ponneri
7	38+900	T Junction	SH-52	
8	42+225	Y Junction		MDR 634
9	44+710	T Junction	MDR 599	
10	47+770	Y Junction		GNT Rd

Section 04 Neelmangla-Tumkur

S.No.	Chainage Km	Type of Junction	Access Road Leads to	
			LHS	RHS
1*	49+000	Y	NH 948A(Ramanagra)	
2*	49+300	T		NH648(Doddaballapura)
3*	63+761	X	SH-94	SH-94
4*	66+150	Y	Bangalore - Honnavar	

S.No.	Chainage Km	Type of Junction	Access Road Leads to	
			LHS	RHS
5*	71+500	X	SH-33	SH-33

For Section-04 Neelmangla Tumkur

a) *Under construction locations these details are tentative these may varies as per site and same shall be maintained by TOT concessionaire after end of DLP period.

b) Other than the (*) locations, the remaining stretches fall within the ongoing DPR section. Hence, these details may vary as per site conditions and shall be maintained by the TOT concessionaire after the completion of the DLP period.

Table 6-9 : List of Minor Junctions

The details of the Minor Junction along the Project highway are given below:

Section 01 Vijayawada-Chilakaluripet

S.No.	Chainage Km	Type of Junction	Access Road Leads to	
			LHS	RHS
1	2+450	X Junction	Boppudi	Kotavaripalem
2	4+780	X Junction	MDR 51	MDR 51
3	6+300	X Junction	Pothavaram	Chilakaluripet
4	9+400	X Junction	Lingamguntla	Ganapavaram
5	12+800	X Junction	Nadendla	Ganapavaram
6	15+400	X Junction	Nadendla	Thimmapuram
7	356+831	T Junction		Tatapudi
8	357+300	T Junction	Murikipudi	
9	373+700	Y Junction	Nadendla	
10	373+725	Y Junction		Edlapadu
11	373+910	T Junction		Edlapadu
12	373+978	Y Junction		Edlapadu
13	374+000	Y Junction	Edlapadu	
14	374+050	T Junction	Maidavolu	
15	374+168	T Junction	Edlapadu	

S.No.	Chainage Km	Type of Junction	Access Road Leads to	
			LHS	RHS
16	374+168	T Junction		Edlapadu
17	374+237	T Junction		Edlapadu
18	374+274	T Junction		Edlapadu
19	374+315	Y Junction		Edlapadu
20	374+355	Y Junction	Edlapadu	
21	374+380	Y Junction		Edlapadu
22	374+422	Y Junction		Edlapadu
23	374+574	Y Junction	Edlapadu	
24	374+591	T Junction	Edlapadu	
25	374+635	T Junction	Edlapadu	
26	374+635	T Junction		Edlapadu
27	374+868	Y Junction		Edlapadu
28	375+130	T Junction	Edlapadu	
29	375+650	T Junction		Edlapadu
30	376+700	Y Junction		Vankayalapadu
31	376+265	X Junction	Spices Park Road	Vankayalapadu
32	377+475	T Junction		Vankayalapadu
33	377+490	T Junction	Vankayalapadu	
34	377+700	Y Junction	Vankayalapadu	
35	377+700	Y Junction		Vankayalapadu
36	378+300	T Junction	Boyapalem	
37	378+300	Y Junction		Boyapalem
38	378+434	T Junction	Boyapalem	
39	378+450	Y Junction		Boyapalem
40	378+617	Y Junction		Boyapalem
41	378+746	T Junction		Boyapalem

S.No.	Chainage Km	Type of Junction	Access Road Leads to	
			LHS	RHS
42	378+830	T Junction	Boyapalem	
43	379+275	Y Junction		Boyapalem
44	379+392	T Junction		Boyapalem
45	380+300	T Junction		Tummala Palem Road
46	380+831	Y Junction		Thummalpalem
47	381+110	Y Junction		Thummalpalem
48	381+160	Y Junction		Thummalpalem
49	381+450	X Junction	Nadimpalem	Thummalpalem
50	381+955	T Junction		Towards Farm
51	382+300	T Junction	Nadimpalem	
52	382+725	T Junction	Kondrupadu	
53	382+750	T Junction	Kondrupadu	
54	382+938	T Junction	Kondrupadu	
55	383+140	T Junction		Prathipadu
56	383+387	T Junction	Kondrupadu	
57	383+550	T Junction	Nadimpalem	
58	384+100	X Junction	Edulapalem	Prathipadu
59	38+050	T Junction		Guntur Engg. College Road
60	385+842	Y Junction		Yanamadala
61	386+050	T Junction		prathipadu
62	386+450	T Junction	Chinakondrupadu	
63	386+678	T Junction		Edulapalem
64	386+997	T Junction	Prathipadu	
65	387+035	T Junction	Prathipadu	
66	387+142	T Junction		Chowdavaram
67	387+173	T Junction		Chowdavaram
68	387+200	T Junction		Chowdavaram
69	387+225	T Junction		Chowdavaram

S.No.	Chainage Km	Type of Junction	Access Road Leads to	
			LHS	RHS
70	387+300	Y Junction		Chowdavaram
71	387+320	T Junction		Chowdavaram
72	387+385	T Junction	Chowdavaram	
73	387+492	T Junction		Chowdavaram
74	387+528	T Junction	Chowdavaram	
75	388+237	T Junction	Chowdavaram	
76	388+332	X Junction	Chowdavaram	Chowdavaram
77	388+595	Y Junction	Chandramoulipuram	
78	388+668	T Junction		Dasaripalem
79	388+834	T Junction		Dasaripalem
80	389+050	Y Junction	RVE & JC College Road	
81	389+422	X Junction	Dasaripalem	Gayatri Nivas Marg
82	389+639	T Junction		Dasaripalem
83	389+691	Y Junction		Dasaripalem
84	389+750	Y Junction	Pothur	
85	390+424	T Junction	Pothur	
86	391+128	Y Junction		Pothur
87	391+150	Y Junction	Pothur	
88	391+285	T Junction	Pothur	
89	391+460	Y Junction	ObulnaiduPalem	
90	392+050	Staggered	ObulnaiduPalem	Naidu Peta
91	392+215	Y Junction		Naidu Peta
92	392+272	Y Junction		Naidu Peta
93	392+378	T Junction		Naidu Peta
94	392+394	Y Junction	Pothur	
95	392+600	Y Junction		Vengalayapalem
96	392+885	T Junction	Pothur	
97	393+080	Y Junction		Vengalayapalem
98	393+150	T Junction		Vengalayapalem
99	393+200	T Junction		Vengalayapalem
100	393+950	Y Junction	Sattenapalli-Hyderabad Link Road	

S.No.	Chainage Km	Type of Junction	Access Road Leads to	
			LHS	RHS
101	394+000	Y Junction		Kornepadu
102	394+350	T Junction	Vengalayapalem	
103	394+526	Y Junction	Ankireddy Palem	
104	394+876	Y Junction	Ankireddy Palem	
105	395+050	T Junction	Bramha Reddy Nagar	
106	395+228	Y Junction	Ankireddy Palem	
107	395+360	T Junction	Mahatma Gandhi Ring Road	
108	395+400	T Junction		Lingayapalem
109	395+782	T Junction		Towards Factory
110	396+732	T Junction		Ankireddy Palem
111	397+315	T Junction		Lalupuram
112	398+400	T Junction		Lalupuram
113	398+400	Y Junction	Lalupuram	
114	399+200	Y Junction	Lalupuram	
115	399+200	Y Junction		Lalupuram
116	399+455	T Junction		Lalupuram
117	399+730	X Junction	VIP Road	Lalupuram
118	401+680	X Junction	Nallacheruvu	Arundelpet
119	401+890	Y Junction	Bonthapadu road	
120	403+100	X Junction	Sangadigunta	Mantri Estates Road
121	403+708	Y Junction	Towards Factory	
122	403+925	T Junction		Budampadu
123	404+100	Y Junction		Towards Godown
124	408+483	T Junction	Towards Complex	
125	410+200	T Junction	Vasavi Nagar	
126	410+211	T Junction		Takkellpadu Village Road
127	410+738	T Junction	Autonagar Road	
128	411+005	T Junction	Indra Autonagar	
129	411+117	T Junction	Autonagar	
130	411+350	T Junction	Autonagar	
131	411+535	T Junction	Autonagar	

S.No.	Chainage Km	Type of Junction	Access Road Leads to	
			LHS	RHS
132	411+657	T Junction	Autonagar	
133	412+190	T Junction		peda kakani
134	412+380	T Junction		peda kakani
135	412+420	T Junction	Towards warehouse	
136	412+520	T Junction	peda kakani	
137	412+555	T Junction		MV Road
138	412+600	T Junction		Towards Factory
139	412+840	T Junction	peda kakani	
140	412+920	T Junction		peda kakani
141	413+031	T Junction		Arundelpet
142	413+031	T Junction	Yuvajananagar	
143	413+058	T Junction		Arundelpet
144	413+074	T Junction	Yuvajananagar	
145	413+084	T Junction		Arundelpet
146	413+100	T Junction		Muthyala Reddy Nagar
147	413+136	T Junction		Muthyala Reddy Nagar
148	413+187	T Junction		Muthyala Reddy Nagar
149	413+200	T Junction	Yuvajananagar	
150	413+232	T Junction		Muthyala Reddy Nagar
151	413+232	T Junction	Yuvajananagar	
152	413+263	T Junction		Muthyala Reddy Nagar
153	413+300	T Junction	Yuvajananagar	
154	413+325	T Junction		peda kakani
155	413+571	T Junction	Venigandla Road	
156	413+571	T Junction		Old MRO office Road
157	413+621	T Junction	Yuvajananagar	
158	413+700	Y Junction		peda kakani
159	413+722	Y Junction	Yuvajananagar	
160	414+250	T Junction		peda kakani

S.No.	Chainage Km	Type of Junction	Access Road Leads to	
			LHS	RHS
161	414+280	T Junction	Yuvajananagar	
162	414+375	T Junction	Yuvajananagar	
163	414+460	T Junction	peda kakani	
164	414+550	Y Junction		peda kakani
165	414+586	T Junction	peda kakani	
166	415+015	T Junction	Vengalrao Nagar	
167	415+050	T Junction	Vengalrao Nagar	
168	415+085	T Junction	Vengalrao Nagar	
169	415+115	T Junction	Vengalrao Nagar	
170	415+150	T Junction	Vengalrao Nagar	
171	415+181	T Junction	Vengalrao Nagar	
172	415+220	T Junction	Vengalrao Nagar	
173	415+250	T Junction	Vengalrao Nagar	
174	415+300	T Junction	Vengalrao Nagar	
175	415+335	T Junction	Vengalrao Nagar	
176	415+376	T Junction	Vengalrao Nagar	
177	415+400	T Junction	Vengalrao Nagar	
178	415+440	T Junction	Vengalrao Nagar	
179	415+472	T Junction	Vengalrao Nagar	
180	415+577	X Junction	Nambur Rly Station Road	Nambur
181	415+690	T Junction		Nambur
182	415+855	T Junction	Nambur	
183	416+870	T Junction		Nambur
184	417+669	T Junction	Koppuravuru to NH-5 Road	
185	417+830	T Junction		Nambur
186	417+936	T Junction		Nambur
187	417+969	T Junction		Nambur
188	418+000	T Junction		Nambur
189	418+250	T Junction		Nambur Road
190	419+868	T Junction	Nagarjuna Nagar	
191	419+950	Y Junction		Ramakrishna Housing Road

S.No.	Chainage Km	Type of Junction	Access Road Leads to	
			LHS	RHS
192	420+785	Y Junction	Kaza	
193	420+960	Y Junction		Kaza
194	421+100	Y Junction		Panchayathi Road
195	421+105	T Junction		Kaza
196	421+273	T Junction		Kaza
197	421+293	Y Junction	Kaza	
198	421+350	T Junction	Kaza	
199	421+500	Y Junction		Narayana Theertha Road
200	421+637	Y Junction		Kaza
201	421+800	Y Junction	Kaza	
202	421+850	T Junction		Kaza
203	421+890	T Junction		
204	421+900	T Junction		Kaza
205	421+991	T Junction	Kaza	
206	422+006	T Junction		Kaza
207	422+050	T Junction		Venkatareddy Palem
208	422+085	T Junction		Venkatareddy Palem
209	422+133	T Junction		Venkatareddy Palem
210	422+185	T Junction		Venkatareddy Palem
211	422+226	T Junction		Venkatareddy Palem
212	422+264	T Junction		Venkatareddy Palem
213	422+285	T Junction	Kaza	
214	422+320	T Junction		Venkatareddy Palem
215	422+320	T Junction	Kaza	
216	422+350	T Junction	Kaza	
217	422+350	T Junction		Venkatareddy Palem
218	422+417	T Junction		Mangalagiri

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S.No.	Chainage Km	Type of Junction	Access Road Leads to	
			LHS	RHS
1	0+385	X Junction	Indra Nagar	Irumbuliyur

S.No.	Chainage Km	Type of Junction	Access Road Leads to	
			LHS	RHS
2	1+138	T Junction	Karumariamman Nagar	
3	1+480	T Junction	Lakshmipuram Extension	
4	1+540	X Junction	Lakshmipuram Extension	Lakshmipuram Extension
5	1+600	T Junction	Lakshmipuram Extension	
6	1+655	T Junction	CTO Colony	
7	1+712	T Junction	CTO Colony	
8	1+770	T Junction	CTO Colony	
9	1+820	T Junction	Sree Sai Nagar	
10	1+855	T Junction	Sree Sai Nagar	
11	2+012	T Junction	Sree Sai Nagar	
12	2+128	T Junction	Sree Sai Nagar	
13	2+168	T Junction	Sree Sai Nagar	
14	2+210	T Junction	Sree Sai Nagar	
15	2+257	T Junction	Sree Sai Nagar	
16	2+515	X Junction	Varadharajapuram	West Tambaram
17	3+000	T Junction	Kannadapalayam	
18	3+100	T Junction	Nadu Street	
19	3+200	T Junction	Ankaputhur	
20	3+915	T Junction		Pulikkuradu
21	4+015	T Junction	Ankaputhur	
22	4+060	T Junction	Ankaputhur	
23	5+050	T Junction	thirumangai alwarpuram	
24	5+230	X Junction	Tiruneermalai	West Tambaram
25	6+010	X Junction	Tiruneermalai	Chromepet
26	6+232	T Junction	Tiruneermalai	
27	7+100	X Junction	Tiruneermalai	Kamarajapuram
28	7+155	T Junction	Visveswarapuram	
29	7+205	T Junction	Visveswarapuram	

S.No.	Chainage Km	Type of Junction	Access Road Leads to	
			LHS	RHS
30	7+300	T Junction	Visveswarapuram	
31	7+342	T Junction	Visveswarapuram	
32	7+437	T Junction	Srinivasapuram	
33	7+540	X Junction	Srinivasapuram	Kamarajapuram
34	8+375	T Junction	Lakshmi Nagar	
35	8+655	T Junction	Thirumalai nagar	
36	8+750	T Junction	Thirumalai Nagar	
37	8+837	T Junction	Bommai Nagar	
38	8+925	T Junction	Quithe millath nagar	
39	8+943	T Junction	Quithe millath nagar	
40	10+377	X Junction	Thandalam	Sadanandapuram
41	10+718	T Junction	Thandalam	
42	10+956	T Junction	Thandalam	
43	11+475	Y Junction	Kovur	
44	11+748	T Junction	Kovur	
45	12+515	Y Junction	Rajappa Nagar	
46	12+800	Y Junction	Paraniputhur	
47	13+060	Y Junction	Periyapanicheri Road	
48	13+275	Y Junction	Paraniputhur	
49	13+545	X Junction	Paraniputhur	Mugalivakkam
50	15+890	T Junction	Gandhi Nagar	
51	16+060	T Junction	Gandhi Nagar	
52	16+125	T Junction	Devi Parasakthi Nagar	
53	16+505	T Junction	Rajas Garden	
54	16+555	T Junction	Rajas Garden	
55	16+595	T Junction	Rajas Garden	
56	16+645	T Junction	Rajas Garden	
57	16+800	T Junction		Porur Gardens
58	16+885	X Junction	Gandhi Nagar	Porur Gardens
59	16+930	X Junction	Vijaya Nagar	Gandhi Main Road

S.No.	Chainage Km	Type of Junction	Access Road Leads to	
			LHS	RHS
60	17+635	Y Junction	Indira Nagar	
61	17+690	Y Junction		Subbammal Road
62	18+020	X Junction	Mettukuppam Road	Mettukuppam Road
63	18+180	Y Junction		Odamanagar
64	18+760	Y Junction		Kanniyamman Nagar
65	19+530	X Junction	Union Rd	Union Rd
66	19+800	T Junction	Maduravoyal	
67	19+800	T Junction		Ambattur
68	19+825	T Junction		Ambattur
69	19+875	T Junction	Maduravoyal	
70	19+885	T Junction		Maduravoyal
71	20+460	T Junction	Ambattur	
72	20+815	T Junction		Ambattur
73	20+950	T Junction		Ambattur
74	20+985	T Junction	Indira Gandhi Street	
75	20+985	T Junction		Ambattur
76	21+190	T Junction		Mogappair West
77	21+225	T Junction	Ganapathy Street	
78	21+335	X Junction	TT Mathew Rd	Mogappair West
79	21+390	T Junction		Mogappair West
80	21+825	T Junction		Jaswant Nagar
81	21+970	Y Junction		Jaswant Nagar
82	22+505	T Junction		Ambattur
83	22+525	T Junction	Kalaivanar Nagar	
84	22+720	Y Junction		Ambattur
85	22+755	T Junction		Ambattur
86	22+775	T Junction	Ambattur	
87	22+955	T Junction	Ambattur	

S.No.	Chainage Km	Type of Junction	Access Road Leads to	
			LHS	RHS
88	22+972	T Junction		Ambattur
89	22+995	T Junction	Mariamman Koil Street	
90	23+120	T Junction	Ambattur	
91	23+190	T Junction	Ambattur	
92	23+230	T Junction		Ambattur
93	23+310	T Junction		Ambattur
94	23+320	T Junction	Ambattur	
95	23+355	T Junction		Ambattur
96	23+400	T Junction		Ambattur
97	23+455	T Junction		Ambattur
98	23+505	T Junction	Ambattur	
99	23+565	T Junction		Ambattur
100	23+792	T Junction	Ambattur	
101	23+792	T Junction		Ambattur
102	23+852	T Junction	Ambattur	
103	23+890	T Junction		Ambattur
104	24+052	T Junction	Ambattur	
105	24+205	T Junction		Ambattur
106	24+215	T Junction	Ambattur	
107	24+450	T Junction	Ambattur	
108	24+605	T Junction		Ambattur
109	24+745	T Junction	Pattravakkam Rd	
110	24+908	T Junction	Godrej Road	
111	25+185	T Junction	Gnanamurthi Nagar	
112	25+235	T Junction	Sivgami Ammal Street	
113	25+235	Y Junction		Sundaresa Pillai Street
114	25+280	T Junction		Sundaram Street
115	25+300	T Junction	Gnanamoorthy Nagar	
116	25+370	T Junction	Kathiresan Street	

S.No.	Chainage Km	Type of Junction	Access Road Leads to	
			LHS	RHS
117	25+415	T Junction	Sathyanarayana Street	
118	25+415	T Junction		Sathyanarayana Street
119	25+455	T Junction	Thirunavukarasu Street	
120	25+465	T Junction		Thirunavukarasu Street
121	25+515	T Junction	Bhanu Street	
122	25+540	T Junction		Bhanu Street
123	25+570	Y Junction	Vittal Street	
124	25+675	Y Junction		Krishna Street
125	25+705	T Junction		Netaji Street
126	25+755	Y Junction	Gandhi Street	
127	25+810	Y Junction	Pallavan Street	
128	25+950	X Junction	Karukku Main Road	Karukku Main Road
129	25+995	Y Junction	Menambedu	
130	26+300	T Junction	Menambedu	
131	26+455	T Junction	Indira Nagar Main Road	
132	26+460	Y Junction		Munusamy Kovii Street
133	26+578	T Junction		Rajaji Street
134	26+625	T Junction		Madurai Veeran Street
135	26+745	T Junction		Thilagavathi Street
136	26+775	T Junction	Kallikuppam	
137	26+820	T Junction	Kallikuppam	
138	26+865	T Junction	Kallikuppam	
139	26+892	T Junction		Gayatri Nagar
140	26+900	T Junction	Kamarajar Street	
141	26+925	T Junction		Thirunavukkarasu St
142	26+940	Y Junction	Indira Street	

S.No.	Chainage Km	Type of Junction	Access Road Leads to	
			LHS	RHS
143	26+982	T Junction		Samundeeswari Street
144	27+023	T Junction	Anna Street	
145	27+035	T Junction		Anna Main Road
146	27+070	T Junction		Sanjay Gandhi Street
147	27+080	T Junction	Kambar Street	
148	27+125	T Junction		Sai Baba Street
149	27+140	T Junction	Bharathi Street	
150	27+190	T Junction		Annai Theraza Street
151	27+378	T Junction	Padasalai Street	
152	27+400	T Junction		Gangai Amman Koil Street
153	27+500	Y Junction		East Balaji Nagar
154	27+530	Y Junction	Perumal Koil Street	
155	27+565	T Junction		East Balaji Nagar
156	27+605	Y Junction	Pillaiyar Koil Street	
157	27+665	T, Y Junction	Pillaiyar Koil Street	
158	27+685	T Junction		East Balaji Nagar
159	27+735	Y Junction	Kallikuppam	
160	27+760	Y Junction		East Balaji Nagar
161	27+785	Y Junction	East Balaji Nagar	
162	27+830	Y Junction		East Balaji Nagar
163	27+850	Y Junction	East Balaji Nagar	
164	27+915	Y Junction		East Balaji Nagar
165	27+915	Y Junction	East Balaji Nagar	
166	28+017	Y Junction	East Balaji Nagar	

S.No.	Chainage Km	Type of Junction	Access Road Leads to	
			LHS	RHS
167	28+017	Y Junction		East Balaji Nagar
168	28+035	Y Junction	Murugambedu Main Road	
169	28+460	T Junction		Kallikuppam
170	28+500	Y Junction	Jasmin Nagar Extension	
171	28+845	Y Junction	Madhanakuppam Rd	
172	29+065	X Junction	Andal Kovil Main Rd	Andal Kovil Main Rd
173	29+220	T Junction	Sivaprakasam Nagar	
174	29+270	T Junction	Sivaprakasam Nagar Main Road	
175	29+318	T Junction		Puthagaram
176	29+360	Y Junction	Gandhi Street	
177	29+755	X Junction	Puthagaram Road	Puthagaram Road
178	30+175	T Junction		Venkateshwara Nagar
179	30+175	X Junction	Surapet	Kolathur
180	30+222	Y Junction	Srinivasa Nagar Main Road	
181	30+280	Y Junction		Padmavathi Nagar
182	30+635	Y Junction		Padmavathi Nagar
183	30+785	Y Junction	Sathya Murthy Nagar	
184	30+790	Y Junction		Padmavathi Nagar
185	30+840	T Junction	Kadirvedu	
186	30+870	Y Junction		Padmavathi Nagar
187	30+935	T Junction	Iyappa Nagar	
188	30+990	T Junction		Kadirvedu
189	31+010	T Junction	Kadirvedu	
190	31+085	T Junction		Iyappa Nagar Extension

S.No.	Chainage Km	Type of Junction	Access Road Leads to	
			LHS	RHS
191	31+145	Y Junction	INTUC Nagar	
192	31+175	T Junction	Rasi Nagar Street	
193	31+515	Y Junction	Madhavaram	
194	31+580	Y Junction	Madhavaram	
195	31+688	T Junction		Katida Thozilalar Nagar
196	31+725	Y Junction	Madhavaram	
197	31+920	T Junction		Puzhal

Section 03 Chennai Tada

S.No.	Chainage Km	Type of Junction	Access Road Leads to	
			LHS	RHS
1	21+430	T Junction	Vijayanallur	
2	21+725	T Junction		Angadu
3	22+085	T Junction		Angadu
4	22+130	T Junction	Bungalow Rd	
5	22+350	T Junction		Bajanai Koil St
6	23+130	Y Junction	1st Street	
7	24+665	Y Junction		Deva Neri - Karanodai Rd
8	25+100	Y Junction	Deva Neri - Karanodai Rd	
9	25+155	Y Junction		Avvaiyar St
10	25+550	T Junction	Karanodai	
11	25+605	T Junction	Karanodai	
12	25+630	T Junction	Karanodai	
13	25+655	T Junction	Karanodai	
14	25+655	T Junction		Karanodai
15	25+680	T Junction	towards Athur Rd	
16	25+975	Y Junction		towards Athur Rd
17	27+630	T Junction		Irulipattu Rd
18	27+650	T Junction	Sundaram Rd	
19	27+670	T Junction		Irulipattu Rd

S.No.	Chainage Km	Type of Junction	Access Road Leads to	
			LHS	RHS
20	27+930	Y Junction	Azhinjivakkam Village	
21	28+395	T Junction	Alinjiwakkam	
22	28+460	T Junction		Jaganathapuram
23	28+500	Y Junction		Alinjiwakkam
24	28+780	T Junction	Nadi Company Rd	
25	28+830	Y Junction		Sivan Koil St
26	29+840	T Junction	White City	
27	29+965	T Junction	Panjetty	
28	29+980	T Junction		Natham Village
29	30+030	T Junction		Natham Village
30	30+130	T Junction		Panjetty
31	30+180	T Junction		Panjetty
32	31+140	T Junction	Golden City	
33	31+450	T Junction		Thatchoor
34	31+955	T Junction	Keelamani taluk	
35	31+980	T Junction		Peravallur
36	32+075	T Junction	Peravallur	
37	32+225	T Junction		Peravallur
38	32+900	Y Junction	Peravallur	
39	32+935	Y Junction		Perumal Koil Road
40	33+655	T Junction	Siruvapuri	
41	33+820	T Junction		Durainallur
42	33+980	T Junction		Durainallur
43	34+100	T Junction		Tiruvallur
44	34+735	T Junction	Siruvapuri Rd	
45	34+800	T Junction		Puduvoyal village
46	34+865	T Junction		Puduvoyal village
47	34+990	Y Junction		Perumal kovil street
48	35+350	Y Junction		Perumal kovil street
49	35+645	T Junction	Puduvoyal	
50	35+755	T Junction		Peruvaili
51	36+320	Y Junction	Peruvaili	

S.No.	Chainage Km	Type of Junction	Access Road Leads to	
			LHS	RHS
52	37+650	T Junction	Ariyathurai Temple Rd	
53	38+420	T Junction		Sir Thyagarayar Street
54	38+450	T Junction		Thiyagaraya St
55	38+525	T Junction		Raja St
56	38+585	T Junction	TC Rd	
57	38+595	T Junction		Railway Station Rd
58	38+645	T Junction		Pulicat Rd
59	39+985	T Junction		Perumal Koil St
60	40+110	T Junction	Kilmudalambedu	
61	41+040	T Junction	Verkadu	
62	41+380	T Junction	Verkadu	
63	43+400	Y Junction	Gummidipoondi	
64	43+600	Y Junction		Pattupalli - Gummudipundi Rd
65	43+610	T Junction	196 Kalathi St	
66	43+820	Y Junction	Pattupalli - Gummudipundi Rd	
67	43+965	T Junction		Maposi Nagar
68	44+020	T Junction	Pattupalli - Gummudipundi Rd	
69	44+275	T Junction		Vivekananda Nagar
70	44+460	T Junction		Gummidipoondi
71	45+050	T Junction	Anthoni Pillai Nagar	
72	45+050	T Junction		Jai Hind Nagar
73	45+725	T Junction	Gummidipundi	
74	45+745	T Junction		Pappankuppam
75	46+080	T Junction	Gummidipoondi	
76	46+320	T Junction		IRT Rd
77	46+410	T Junction	Kayalarmedu	
78	46+565	T Junction	Kandigai Rd	
79	46+745	Y Junction		Old Bypass Road
80	47+715	T Junction		Gummidipoondi

S.No.	Chainage Km	Type of Junction	Access Road Leads to	
			LHS	RHS
81	48+310	Y Junction	Tiruvallur	
82	48+515	T Junction	Chinnaobulapuram	
83	49+175	T Junction	Chinnaobulapuram	
84	49+235	T Junction		Elavur Bazzar
85	49+460	T Junction	Chinnaobulapuram	
86	49+925	T Junction	Elavur	
87	50+325	T Junction	Elavur	
88	50+535	T Junction	Elavur	
89	50+740	T Junction		Elavur
90	50+875	Y Junction	Tiruvallur	
91	51+000	T Junction		Elavur - Sunnambukulam Saalai
92	51+160	T Junction	Tiruvallur	
93	51+210	T Junction	Magalinga Nagar	
94	51+285	T Junction	Arambakkam	
95	52+730	T Junction	Gumpli	

Section 04 Neelmangla-Tumkur

S.No.	Chainage Km	Type of Junction	Access Road Leads To	
			LHS	RHS
1*	29+990	Y		Kulimepalya
2*	30+390	Y	Happegowdanapalya	
3*	30+990	Y	Bommanahalli	
4*	31+590	Y		Ueranangeepura
5*	32+510	T		Boodihal
6*	33+960	T	Chamundeshwari Nagar	
7*	35+200	T		Begur
8*	35+770	X	Begur	Malonagathihalli
9*	37+330	T	Badayapa Halli	
10*	37+950	Y	Thippagondana Halli	

S.No.	Chainage Km	Type of Junction	Access Road Leads To	
			LHS	RHS
11*	38+580	Y	Talakere	
12*	38+580	T		Dodden
13*	39+460	Y		Dodden
14*	40+760	X	Timsandra	Thyamagondlu
15*	41+410	Y	Mahimapura	
16*	42+660	T		Thyamagondlu
17*	43+050	X	Kerekathiganur	Shivaganga
18*	43+460	T	Aladahalli	
19*	43+460	T		Gundenahalli
20*	44+540	T	Billanakote	
21*	44+540	T		Thyamagondlu
22*	45+640	T		Hosahalli
23*	46+160	Y	Kengal Kempahalli	
24*	46+280	T	Avverahalli	
25*	46+610	Y	K G Srinivasapura	
26*	47+070	Y		Bharathipura
27*	47+750	T		Sompura Industrial Area
28*	48+260	T		Dobbaspet
29*	49+390	Y	Devara Hosahalli	
30	49+950	T		
31	51+210	T		Muddanayakanahalli
32	52+030	T		Hosanijagal
33	52+670	T		Rayanapalya
34	54+300	T	Hale Nijagal	
35	55+310	T		Nandihalli
36	56+500	Y		Devarahalli
37	56+830	T		Chikkahalli
38	58+810	T	Kodihalli	
39	58+230	T		Vrdigere

S.No.	Chainage Km	Type of Junction	Access Road Leads To	
			LHS	RHS
40	59+040	Y	Factories	
41	59+360	T	Singanahalli Colony	
42	59+360	T		Urdigere
43	59+880	T	Factories	
44	60+400	T	Village	
45	60+400	T		Village
46	61+350	T	Machanahalli	
47*	63+030	T		Mydala
48*	64+000	Y	Kyatsandra Town	
49*	65+380	Y		APMC Yard, Tumkur City
50*	65+970	Y		Devarayapattana
51*	69+080	T		Vaddarahalli
52*	72+480	T		Inside Industrail Area
53*	72+690	T	Inside Tumkur City	
54*	73+800	T		Industrail Area, Tumkur

For Section-04 Neelmangla Tumkur

a) *Under construction locations these details are tentative these may varies as per site and same shall be maintained by TOT concessionaire after end of DLP period.

b) Other than the (*) locations, the remaining stretches fall within the ongoing DPR section. Hence, these details may vary as per site conditions and shall be maintained by the TOT concessionaire after the completion of the DLP period.

Section 01 Vijayawada-Chilakaluripet

Section 02 Chennai Bypass

Section 03 Chennai Tada

Section 04 Neelmangla-Tumkur

Figure 6-3 : Junctions along the Project Stretch

6.4.9 Median Opening

Details of median openings of Project Stretch are given in table below:

Table 6-10 : List of Median Opening

Section 01 Vijayawada-Chilakaluripet

S. No	Chainage (Km)		Length (m)	Storage Lane	Remark
	From	To			
1	5+451	5+473	20	Not Present	Emergency MO
2	10+690	10+710	20	Not Present	Emergency MO
3	420+200	420+460	260	Not Present	Toll plaza U-turn Mo
4	420+550	420+800	250	Not Present	Toll plaza U-turn Mo

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S. No	Chainage (Km)		Length (m)	Storage Lane	Remark
	From	To			
1	1+005	1+020	15	Present	Authorized
2	9+300	9+305	5	Not Present	Unauthorized
3	16+500	16+600	100	Not Present	Toll plaza U-turn Mo
4	16+715	16+730	15	Not Present	Toll plaza U-turn Mo
5	16+850	16+870	20	Present	Emergency MO
6	16+990	17+010	20	Present	Emergency MO
7	28+500	28+550	50	Not Present	Toll plaza U-turn Mo
8	28+630	28+680	50	Not Present	Toll plaza U-turn Mo
9	31+390	31+400	10	Not Present	Unauthorized

Section 03 Chennai Tada

S. No	Chainage (Km)		Length (m)	Storage Lane	Remark
	From	To			
1	12+100	12+105	5	Not Present	Authorized
2	13+535	13+550	15	Not Present	Authorized
3	13+835	13+865	30	Not Present	Authorized
4	14+480	14+490	10	Not Present	Authorized
5	15+345	15+370	25	Not Present	Authorized
6	16+970	16+995	25	Not Present	Authorized
7	17+250	17+275	25	Not Present	Authorized
8	18+510	18+535	25	Not Present	Authorized
9	18+975	19+000	25	Not Present	Authorized
10	20+065	20+070	5	Not Present	Authorized
11	20+660	20+670	10	Not Present	Authorized
12	21+495	21+515	20	Not Present	Toll plaza U-turn Mo

S. No	Chainage (Km)		Length (m)	Storage Lane	Remark
	From	To			
13	21+760	21+775	15	Not Present	Toll plaza U-turn Mo
14	22+760	22+775	15	Not Present	Authorized
15	29+950	29+960	10	Not Present	Emergency MO
16	32+910	32+915	5	Not Present	Authorized
17	36+300	36+325	25	Not Present	Emergency MO
18	41+030	41+040	10	Not Present	Emergency MO
19	48+830	48+835	5	Not Present	Authorized
20	50+730	50+745	5	Not Present	Emergency MO
21	52+715	52+730	15	Not Present	Authorized

Section 04 Neelmangla-Tumkur

S. No	Chainage (Km)		Length (m)	Storage Lane	Remark
	From	To			
1	52+780	52+805	25	Not Present	Authorized
2	54+360	54+380	20	Not Present	Authorized
3	55+460	55+468	8	Not Present	Authorized
4	56+900	56+915	15	Not Present	Authorized
5	57+715	57+740	25	Not Present	Authorized
6	58+300	58+315	15	Not Present	Authorized
7	59+428	59+455	27	Not Present	Authorized
8	60+470	60+500	30	Not Present	Authorized
9	61+175	61+200	25	Not Present	Authorized
10	61+335	61+370	35	Not Present	Authorized
11	61+408	61+420	12	Not Present	Toll plaza U-turn
12	61+525	61+582	57	Not Present	Toll plaza U-turn

For Section-04 Neelmangla Tumkur

a) *Under construction locations these details are tentative these may varies as per site and same shall be maintained by TOT concessionaire after end of DLP period.

b) Other than the (*) locations, the remaining stretches fall within the ongoing DPR section. Hence, these details may vary as per site conditions and shall be maintained by the TOT concessionaire after the completion of the DLP period.

Section 01 Vijayawada-Chilakaluripet

Section 02 Chennai Bypass

Section 03 Chennai Tada

Section 04 Neelmangla-Tumkur

Figure 6-4 : Median Opening along the Project Stretch

6.4.10 Pavement Types

Pavement type along the Project Stretch including Toll Plaza area is as below:

Table 6-11 : Pavement Type

Section 01 Vijayawada-Chilakaluripet

S. No.	Chainage (Km)		Length (m)	Pavement Type
	From	To		
1	0+000	16+499	16499	Flexible
2	355+000	357+342	2342	Flexible
3	372+038	420+200	48162	Flexible
4	420+200	420+800	600	Rigid
5	420+800	422+605	1805	Flexible
Total			**69408**	

Section 02 Chennai Bypass

S. No.	Chainage (Km)		Length (m)	Pavement Type
	From	To		
1	0+000	16+630	16630	Flexible
2	16+630	16+700	70	Rigid
3	16+700	28+605	11905	Flexible
4	28+605	28+680	75	Rigid
5	28+680	32+600	3920	Flexible
Total			**32600**	

Section 03 Chennai Tada

S. No.	Chainage (Km)		Length (m)	Pavement Type
	From	To		
1	21+400	21+865	465	Rigid
2	21+865	54+400	32535	Flexible
Total			**33000**	

Section 04 Neelmangla-Tumkur

S. No.	Chainage (Km)		Length (m)	Pavement Type
	From	To		
1*	29+500	49+900	20400	Flexible
2	49+900	52+700	2800	Flexible
3*	52+700	53+500	800	Rigid
4	53+500	61+430	7930	Flexible
5	61+430	61+527	97	Flexible
6*	61+527	62+000	473	Flexible
7*	62+000	74+168	12168	Flexible
Total			**44668**	

For Section-04 Neelmangla Tumkur

a) *Under construction locations these details are tentative these may varies as per site and same shall be maintained by TOT concessionaire after end of DLP period.

b) Other than the (*) locations, the remaining stretches fall within the ongoing DPR section. Hence, these details may vary as per site conditions and shall be maintained by the TOT concessionaire after the completion of the DLP period..

6.5 Structure

Structures are broadly classified into two types - cross drainage structures and grade separated structures. Cross drainage structures are classified into following three broad types as per IRC5.

- Major bridges having total length more than 60 m,
- Minor bridges having length between 6 and 60 m and
- Culverts having length below 6m. Depending on type of construction, culverts are again grouped in to pipe culverts, slab culverts and box culverts.

Grade separated structures are grouped in to five major categories depending on their function.

- Flyovers: elevated bridges for crossing by Project Stretch over any cross road with raised Project Stretch over cross road level.
- Vehicle underpasses (VUP) are constructed below the Project Stretch lowered cross road level with proper drainage arrangements.
- PUP/CUP is similar to VUP except they are meant for pedestrians and cattle crossing under the Project Stretch.
- ROB is similar to flyover except it is to cross Project Stretch over existing railway line.
- RUB is to take Project Stretch under the existing rail line with proper drainage arrangements.

6.5.1 Summary of Structure

Numbers of existing structures on Project Stretch under each group are furnished in table below.

Table 6-12 : Summary of Structure

The total numbers of existing structures along Project Highway are given below.

Section 01 Vijayawada-Chilakaluripet

S. No	Type of Structures	Unit	Structures
1	Major Bridges	No	3
2	Minor Bridges	No	23
3	Flyover	No	7
4	ROB	No	1
5	RUB	No	0
6	VOP	No	1
7	VUP/LVUP/SVUP	No	27
8	PUP/CUP	No	26
9	EUP/AUP	No	0
10	FOB	No	0
11	Culverts	No	90

Section 02 Chennai Bypass

S. No	Type of Structures	Unit	Structures
1	Major Bridges	No	3
2	Minor Bridges	No	3
3	Flyover	No	2
4	ROB	No	1
5	RUB	No	1
6	VOP	No	0
7	VUP/LVUP/SVUP	No	18
8	PUP/CUP	No	2
9	EUP/AUP	No	0
10	FOB	No	0
11	Culverts	No	140
12	Elevated Corridor	No	1
13	Grade Separator	No	0
14	Interchange	No	1

Section 03 Chennai Tada

S. No	Type of Structures	Unit	Structures
1	Major Bridges	No	3

S. No	Type of Structures	Unit	Structures
2	Minor Bridges	No	9
3	Flyover	No	5
4	ROB	No	0
5	RUB	No	0
6	VOP	No	2
7	VUP/LVUP/SVUP	No	9
8	PUP/CUP	No	7
9	EUP/AUP	No	0
10	FOB	No	1
11	Culverts	No	56
12	Elevated Corridor	No	0
13	Grade Separator	No	0
14	Interchange	No	0
15	Subway	No	0

Section 04 Neelmangla-Tumkur

S. No	Type of Structures	Unit	Structures
1	Major Bridges	No	4
2	Minor Bridges	No	18
3	Flyover	No	4
4	ROB	No	3
5	RUB	No	0
6	VOP	No	4
7	VUP/LVUP/SVUP	No	19
8	PUP/CUP	No	1
9	EUP/AUP	No	0
10	FOB	No	2
11	Culverts	No	69
12	Elevated Corridor	No	0
13	Grade Separator	No	0
14	Interchange	No	0
15	Subway	No	1

6.5.2 Major Bridge

Detailed inventory survey of the existing major bridge was carried out by experienced bridge engineers and data is furnished in this section.

Section 01 Vijayawada-Chilakaluripet

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Section 02 Chennai Bypass

Section 03 Chennai Tada

Figure 6-5 : Major Bridges along the Project Stretch

Table 6-13 : Summary of Major Bridges

Section 01 Vijayawada-Chilakaluripet

S. No.	Chainage (Km)		Side	Span Arrangement (m)	Deck Width (m)	Sub Structure	Super Structure
	From	To					
1	4+200	4+380	LHS SR	6 X 30	11	RCC	PSC I Girder with RCC Slab
			LHS	6 X 30	14.5	RCC	PSC I Girder with RCC Slab
			RHS	6 X 30	14.5	RCC	PSC I Girder with RCC Slab
2	8+400	8+520	LHS SR	4 X 30	11	RCC	PSC I Girder with RCC Slab
			LHS	4 X 30	14.5	RCC	PSC I Girder with RCC Slab
			RHS	4 X 30	14.5	RCC	PSC I Girder with RCC Slab
3	373+592	373+658	LHS	2 x 33 M	14.05	RCC	PSC I Girder with RCC Slab
			RHS	2 x 33 M	14.05	RCC	PSC I Girder with RCC Slab

Section 02 Chennai Bypass

S. No.	Chainage Km		Side	Span Arrangement (m)	Deck Width (m)	Sub Structure	Super Structure
	From	To					
1	9+036	9+240	LHS	(1 x 37 M + 9 x 18.5 M)	1x12	RCC Circular Pier	RCC Deck Slab
			RHS	11x18.5	1x12	RCC Circular Pier	RCC Deck Slab
2	15+413	15+875	LHS	14*30.4+2*18.4	1x12	RCC Rectangular Pier	RC cast in situ Deck Slab with I Girder
			RHS		1x12	RCC Rectangular Pier	RC cast in situ Deck Slab with I Girder
3	19+235	19+670	LHS	(3 x 62 M +1 x 49M + 2 x 65 M + 1 x 7.949M + 2 x 26.998 M + 1 x 8.085 M)	1x13.8	RCC Circular Pier	RCC Deck Slab with I Girder
			RHS		1x13.8	RCC Circular Pier	RCC Deck Slab with I Girder

Section 03 Chennai Tada

S. No.	Chainage Km		Side	Span Arrangement (m)	Deck Width (m)	Sub Structure	Super Structure
	From	To					
1	26+439	26+873	LHS SR	1x50+9x37.1+1x50	1 x 10.2	RCC	PSC I Girder With RCC Slab
			LHS	11x37.1	1 x 14.25	RCC	PSC I Girder With RCC Slab
			RHS	11x37.1+2x12.95	1 x 14.25	RCC	PSC I Girder With RCC Slab
			RHS SR	11x37.1+2x12.95	1 x 10.2	RCC	PSC I Girder With RCC Slab
2	35+529	35+652	LHS SR	7x17.6	1 x 8.5	RCC	I Girder With RCC Slab
			LHS	7x17.6	1 x 14.25	RCC	PSC I Girder With RCC Slab
			RHS	14x8.8	1 x 14.25	RCC	RCC Deck Slab
			RHS SR	7x17.6	1 x 8.5	RCC	I Girder With RCC Slab

S. No.	Chainage Km		Side	Span Arrangement (m)	Deck Width (m)	Sub Structure	Super Structure
	From	To					
3	52+617	52+721	LHS SR	2x26.4+2x25.78	1 x 10.2	RCC	PSC I Girder With RCC Slab
			LHS	2x26.4+2x25.78	1 x 14.25	RCC	RCC Box Girder with Deck Slab
			RHS	2x26.4+2x25.78	1 x 14.25	RCC	RCC Box Girder with Deck Slab
			RHS SR	2x26.4+2x25.78	1 x 10.2	RCC	PSC I Girder With RCC Slab

Section 04 Neelmangla-Tumkur

S. No.	Chainage Km		Side	Span Arrangement (m)	Deck Width (m)	Sub Structure	Super Structure
	From	To					
1*	43+107	43+307	LHS SR	20x15	1 x 11.65	RCC	RCC Box Girder with Deck Slab
2*	44+980	45+180	RHS SR	14x14.3	1 x 11.65	RCC	RCC Box Girder with Deck Slab
3*	66+620	66+920	BHS SR	300			
4*	67+140	67+540	BHS SR	400			

For Section-04 Neelmangla Tumkur

a) *Under construction locations these details are tentative these may varies as per site and same shall be maintained by TOT/InvIT concessionaire after end of DLP period.

b) Other than the (*) locations, the remaining stretches fall within the ongoing DPR section. Hence, these details may vary as per site conditions and shall be maintained by the TOT/InvIT concessionaire after the completion of the DLP period.

6.5.3 Minor Bridge

Details of all the existing minor bridges are given in table below. Structure photographs are also given in figure below:

Figure 6-6 : Minor Bridges along the Project Stretch

Table 6-14 : Summary of Minor Bridges

Section 01 Vijayawada-Chilakaluripet

S. No.	Chainage (Km)	Side	Span Arrangement (m)	Deck Width (m)	Sub Structure	Super Structure
1	8+920	LHS SR	2 X 20	11	RCC	PSC I Girder with RCC Slab
		LHS	2 X 20	14.5	RCC	PSC I Girder with RCC Slab
		RHS	2 X 20	14.5	RCC	PSC I Girder with RCC Slab
2	15+400	LHS SR	1 X 25 + 1 X 15	11	RCC	PSC I Girder with RCC Slab
		LHS	1 X 25 + 1 X 15	14.5	RCC	PSC I Girder with RCC Slab
		RHS	1 X 25 + 1 X 15	14.5	RCC	PSC I Girder with RCC Slab
		RHS SR	1 X 25 + 1 X 15	11	RCC	PSC I Girder with RCC Slab
3	356+055	LHS SR	(2 x 3.75 M + 2 x 3.7 M)	10	RCC Box type	
		LHS	(2 x 3.75 M + 2 x 3.7 M)	13.5	RCC	Slab
		RHS	(2 x 3.75 M + 2 x 3.7 M)	13.5	RCC	Slab
		RHS SR	(2 x 3.75 M + 2 x 3.7 M)	10	RCC Box type	

S. No.	Chainage (Km)	Side	Span Arrangement (m)	Deck Width (m)	Sub Structure	Super Structure
4	372+340	LHS	3 x 19.75 M	14.05	RCC	PSC I Girder with RCC Slab
		RHS	3 x 19.75 M	12.25	RCC	PSC I Girder with RCC Slab
5	374+610	LHS SR	2 x 6.1 M	10	RCC	Slab
		LHS	2 x 6.1 M	13.5	RCC	Slab
		RHS	2 x 6.1 M	13.5	RCC	Slab
		RHS SR	2 x 6.1 M	10	RCC	Slab
6	377+786	LHS SR	2 x 6.75 M	10	RCC Box type	
		LHS	2 x 6.75 M	13.5	RCC	Slab
		RHS	2 x 6.75 M	13.5	RCC	Slab
		RHS SR	2 x 6.75 M	10	RCC Box type	
7	380+538	LHS SR	5 x 4.75 M	10	RCC Box type	
		LHS	5 x 4.75 M	13.5	RCC	Slab
		RHS	5 x 4.75 M	13.5	RCC	Slab
		RHS SR	5 x 4.75 M	10	RCC Box type	
8	384+710	LHS SR	6 x 3.75 M	10	RCC Box type	
		LHS	6 x 3.75 M	13.5	RCC Box type	
		RHS	6 x 3.75 M	13.5	RCC Box type	
		RHS SR	6 x 3.75 M	10	RCC Box type	
9	387+075	LHS SR	4 x 3.8 M	10.5	RCC Box type	
		LHS	4 x 3.8 M	15	RCC Box type	
		RHS	4 x 3.8 M	15	RCC Box type	
		RHS SR	4 x 3.8 M	10.5	RCC Box type	
10	388+000	LHS SR	3 x 5.8 M	10	RCC Box type	
		LHS	3 x 5.8 M	13.5	RCC	Slab
		RHS	3 x 5.8 M	13.5	RCC	Slab
		RHS SR	3 x 5.8 M	10	RCC Box type	
11	388+870	LHS SR	3 x 6.8 M	10	RCC Box type	
		LHS	3 x 6.8 M	13.5	RCC	Slab
		RHS	3 x 6.8 M	13.5	RCC	Slab
		RHS SR	3 x 6.8 M	10	RCC Box type	
12	389+782	LHS SR	5 x 3.8 M	10	RCC Box type	

S. No.	Chainage (Km)	Side	Span Arrangement (m)	Deck Width (m)	Sub Structure	Super Structure
		LHS	5 x 3.8 M	13.5	RCC	Slab
		RHS	5 x 3.8 M	13.5	RCC	Slab
		RHS SR	5 x 3.8 M	10	RCC Box type	
13	391+515	LHS SR	3 x 6.5 M	10	RCC Box type	
		LHS	3 x 6.5 M	13.5	RCC Box type	
		RHS	3 x 6.5 M	13.5	RCC Box type	
		RHS SR	3 x 6.5 M	10	RCC Box type	
14	391+816	LHS SR	2 x 6.75 M	10	RCC Box type	
		RHS SR	2 x 6.75 M	10	RCC Box type	
15	392+970	LHS SR	3 x 5.75 M	10	RCC Box type	
		LHS	3 x 5.75 M	13.5	RCC	Slab
		RHS	3 x 5.75 M	13.5	RCC	Slab
		RHS SR	3 x 5.75 M	10	RCC Box type	
16	393+550	LHS SR	2 x 10.30 M	10	RCC Box type	
		LHS	2 x 10.30 M	13.5	RCC	Slab
		RHS	2 x 10.30 M	13.5	RCC	Slab
		RHS SR	2 x 10.30 M	10	RCC Box type	
17	394+980	LHS SR	3 x 5.8 M	10	RCC Box type	
		LHS	3 x 5.8 M	13.5	RCC	Slab
		RHS	3 x 5.8 M	13.5	RCC	Slab
		RHS SR	3 x 5.8 M	10	RCC Box type	
18	396+528	LHS SR	2 x 4.750 M	10	RCC Box type	
		LHS	2 x 4.750 M	13.5	RCC	Slab
		RHS	2 x 4.750 M	13.5	RCC	Slab
		RHS SR	2 x 4.750 M	10	RCC Box type	
19	403+961	LHS SR	2 x 6.8 M	10	RCC Box type	
		LHS	2 x 6.8 M	13.5	RCC	Slab
		RHS	2 x 6.8 M	13.5	RCC	Slab
		RHS SR	2 x 6.8 M	10	RCC Box type	
20	410+346	LHS SR	4 x 6.750 M	10	RCC Box type	
		LHS	4 x 6.750 M	13.5	RCC	Slab
		RHS	4 x 6.750 M	13.5	RCC	Slab

S. No.	Chainage (Km)	Side	Span Arrangement (m)	Deck Width (m)	Sub Structure	Super Structure
		RHS SR	4 x 6.750 M	10	RCC Box type	
21	411+379	LHS SR	3 x 4.750 M	10	RCC Box type	
		LHS	3 x 4.750 M	13.5	RCC	Slab
		RHS	3 x 4.750 M	13.5	RCC	Slab
		RHS SR	3 x 4.750 M	10	RCC Box type	
22	420+827	LHS	5 x 2.70 M	13.5	RCC	Slab
		RHS	3 x 4.750 M	13.5	RCC	Slab
23	421+814	LHS SR	2 x 5.4 M	10	RCC Box type	
		LHS	4 x 2.7 M	13.5	RCC	Slab
		RHS	2 x 5.4 M	13.5	RCC	Slab
		RHS SR	2 x 5.4 M	10	RCC Box type	

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S.No.	Chainage Km	Side	Span Arrangement (m)	Deck Width (m)	Sub Structure	Super Structure
1	14+110	LHS	1 x 7.8 M	15	RCC	RCC Box
		RHS		15	RCC	RCC Box
2	30+425	LHS	13 x 4 M	11	RCC	RCC Box
		RHS		11	RCC	RCC Box
3	31+255	LHS	12 x 4 M	11	RCC	RCC Box
		RHS		11	RCC	RCC Box

Section 03 Chennai Tada

S.No.	Chainage Km	Side	Span Arrangement (m)	Deck Width (m)	Sub Structure	Super Structure
1	25+154	LHS SR	1x7	8.5	RCC	Voided Slab
		LHS	1x7	14.25	RCC	RCC GIRDER
		RHS	1x7	14.25	PCC	RCC Slab
		RHS SR	1x7	8.5	RCC	Voided Slab
2	31+517	LHS SR	3x13.5	8.5	RCC	Voided Slab
		LHS	3x13.5	14.25	RCC	RCC GIRDER
		RHS	6x6.7	14.25	PCC	RCC Slab
		RHS SR	3x13.5	8.5	RCC	Voided Slab

S.No.	Chainage Km	Side	Span Arrangement (m)	Deck Width (m)	Sub Structure	Super Structure
3	33+228	LHS SR	1x12.05	8.5	RCC	RCC GIRDER
		LHS	1x12.05	14.25	RCC	RCC GIRDER
		RHS	2x5.8	14.25	PCC	RCC Slab
		RHS SR	1x12.05	8.5	RCC	RCC GIRDER
4	34+009	LHS SR	1x7	8.5	RCC	RCC Box
		LHS	1x7	14.25	RCC	RCC Slab
		RHS	1x6.8	14.25	Masonry	RCC Slab
		RHS SR	1x6.8	8.5	RCC	RCC Box
5	37+127	LHS SR	1x21.625	8.5	RCC	Voided Slab
		LHS	1x21.625	14.25	RCC	RCC GIRDER
		RHS	1x5.4+1x10.825+1x5.4	14.25	Masonry	RCC Slab
		RHS SR	1x21.625	8.5	RCC	Voided Slab
6	40+563	LHS SR	1x12.05	8.5	RCC	Voided Slab
		LHS	1x12.05	14.25	RCC	RCC Girder
		RHS	2x5.6	14.25	Masonry	RCC Slab
		RHS SR	1x12.05	8.5	RCC	Voided Slab
7	40+841	LHS SR	3x5.7	8.5	RCC Box type	RCC Box type
		LHS	1x17.425	14.25	RCC	PSC Girder
		RHS	3x5.7	14.25	PCC	RCC Slab
		RHS SR	3x5.7	8.5	RCC Box type	RCC Box type
8	43+510	LHS SR	1x13.4	8.5	RCC	Voided Slab
		LHS	1x13.4	14.25	RCC	RCC Girder
		RHS	1x13.4	14.25	RCC	RCC Girder
		RHS SR	1x13.4	8.5	RCC	Voided Slab
9	53+807	LHS SR	3x13.3	8.5	RCC	Voided Slab
		LHS	3x13.3	14.25	RCC	RCC Girder
		RHS	3x13.3	14.25	PCC	RCC Girder
		RHS SR	3x13.3	8.5	RCC	Voided Slab

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S. No.	Chainage Km	Side	Span Arrangement (m)	Deck Width (m)	Sub Structure	Super Structure
1*	32+213	LHS SR	1x8.35	8	RCC	RCC Slab
		LHS	1x8.35	11.75		
		RHS	1x8.35	11.75		
		RHS SR	1x8.35	8		
2*	34+702	LHS SR	3x6.8	8	RCC	RCC Slab
		LHS	3x6.8	11.75		
		RHS	3x6.8	11.75		
		RHS SR	3x6.8	8		
3*	39+976	LHS SR	2x8.5	8	RCC	RCC Slab
		LHS	2x8.5	11.75		
		RHS	2x8.5	11.75		
		RHS SR	2x8.5	8		
4*	43+263	LHS SR	1x15.5+1x11.75	8	RCC	RCC Slab
		LHS	2x16+1x11.75	11.75		
		RHS	2x16+1x11.75	11.75		
		RHS SR	1x15.5+1x11.75	8		
5*	45+087	LHS SR	1x7.4	8	RCC	RCC Slab
		LHS	1x7.4	11.75		
		RHS	1x7.4	11.75		
		RHS SR	1x7.4	8		
6*	48+721	LHS SR	2x3.2	12.4	RCC Box Type	
		LHS	2x3.2	8.5		
		RHS	2x3.2	8.5		
		RHS SR	2x3.2	12.4		
7	50+192	LHS	1x11.3	12.7	RCC Wall type	RCC Solid Slab
		RHS		14.2		
8	50+975	LHS	3x3.1	12.7	RCC Wall type	RCC Box Bridge
		RHS		13.8		
9	53+374	LHS	1x6.9	11.7	RCC Wall type	RCC Solid Slab
		RHS		13.9		
10	60+904	LHS	1x6.8	12.3	RCC Wall type	RCC Solid Slab
		RHS		13.9		
11*	62+218	LHS SR	6x3.2	11.75	RCC Box Type	
		LHS	6x3.2	14.2		
		RHS	6x3.2	14.2		
		RHS SR	6x3.2	11.75		
12*	66+838	LHS SR	1x20	11.75		
		LHS	1x20	13.5	RCC	PSC Voided Slab

S. No.	Chainage Km	Side	Span Arrangement (m)	Deck Width (m)	Sub Structure	Super Structure
		RHS	1x20	13.5	RCC	PSC Voided Slab
		RHS SR	1x20	11.75		
13*	67+445	LHS SR	1x14	11.75		
		LHS	1x14	13.5	RCC	PSC Voided Slab
		RHS	1x14	13.5	RCC	PSC Voided Slab
		RHS SR	1x14	11.75		
14*	67+825	LHS SR	3x3.2	11.75	RCC Box Type	
		LHS	3x3.2	13.5		
		RHS	3x3.2	13.5		
		RHS SR	3x3.2	11.75		
15*	68+762	LHS SR	1x14	11.75	RCC	RCC Solid Slab
		LHS	1x14	13.5		
		RHS	1x14	13.5		
		RHS SR	1x14	11.75		
16*	68+902	LHS SR	1x9.2	11.75	RCC	RCC Solid Slab
		LHS	1x9.2	13.6		
		RHS	1x9.2	13.6		
		RHS SR	1x9.2	11.75		
17*	69+351	LHS SR	2x6.8	11.75	RCC	RCC Solid Slab
		LHS	2x6.8	13.5		
		RHS	2x6.8	13.5		
		RHS SR	2x6.8	11.75		
18*	71+188	LHS SR	2x8.1	11.75	RCC	RCC Solid Slab
		LHS	2x8.1	13.5		
		RHS	2x8.1	13.5		
		RHS SR	2x8.1	11.75		

For Section-04 Neelmangla Tumkur

a) *Under construction locations these details are tentative these may varies as per site and same shall be maintained by TOT/InvIT concessionaire after end of DLP period.

b) Other than the (*) locations, the remaining stretches fall within the ongoing DPR section. Hence, these details may vary as per site conditions and shall be maintained by the TOT/InvIT concessionaire after the completion of the DLP period.

6.5.4 Flyover

The details of Flyovers along the project Stretch are furnished in below:

Table 6-15 : Summary of Flyover

Section 01 Vijayawada-Chilakaluripet

S. No.	Chainage Km		Side	Span Arrangement (m)	Deck Width (m)	Sub Structure	Super Structure
	From	To					
1	0+560	0+620	LHS	2x30	1x14.50	RCC	PSC I Girder with RCC Slab
			RHS	2x30	1x14.50	RCC	PSC I Girder with RCC Slab
2	7+454	7+494	LHS	2x20	1x14.50	RCC	PSC I Girder with RCC Slab
			RHS	2x20	1x14.50	RCC	PSC I Girder with RCC Slab
3	15+840	15+900	LHS	2x30	1x14.50	RCC	PSC I Girder with RCC Slab
			RHS	2x30	1x14.50	RCC	PSC I Girder with RCC Slab
4	397+120	397+150	LHS	1x30	1x12.25	RCC	PSC I Girder with RCC Slab
			RHS	1x30	1x12.25	RCC	PSC I Girder with RCC Slab
5	400+650	400+680	LHS	1x30	1x12.25	RCC	PSC I Girder with RCC Slab
			RHS	1x30	1x12.25	RCC	PSC I Girder with RCC Slab
6	404+670	404+700	LHS	1x30	1x12.25	RCC	PSC I Girder with RCC Slab
			RHS	1x30	1x12.25	RCC	PSC I Girder with RCC Slab

S. No.	Chainage Km		Side	Span Arrangement (m)	Deck Width (m)	Sub Structure	Super Structure
	From	To					
7	411+815	411+845	LHS	1x30	1x12.25	RCC	PSC I Girder with RCC Slab
			RHS	1x30	1x12.25	RCC	PSC I Girder with RCC Slab

Section 02 Chennai Bypass

S. No.	Chainage Km		Side	Span Arrangement (m)	Deck Width (m)	Sub Structure	Super Structure
	From	To					
1	19+090	19+235	LHS	(2x48.22 M+1x49 M)	1x15.5	RCC Rectangular Pier	RCC Solid Slab with PSC Box Girder
			RHS		1x15.5	RCC Rectangular Pier	RCC Solid Slab with PSC Box Girder
2	32+238	32+283	LHS	1x45	1x12	RCC Rectangular Pier	RCC Solid Slab with PSC Box Girder
			RHS		1x12	RCC Rectangular Pier	RCC Solid Slab with PSC Box Girder

Section 03 Chennai Tada

S. No.	Chainage Km		Side	Span Arrangement (m)	Deck Width (m)	Sub Structure	Super Structure
	From	To					
1	31+057	31+157	LHS	4x25	13.5	RCC	PSC I Girder With RCC Slab
			RHS		13.5		
2	38+867	38+947	LHS	4x20	13.5	RCC	PSC I Girder With RCC Slab
			RHS		13.5		
3	42+175	42+275	LHS	4x25	13.5	RCC	PSC I Girder With RCC Slab
			RHS		13.5		
4	44+645	44+745	LHS	4x25	13.5	RCC	PSC I Girder With RCC Slab
			RHS		13.5		
5	47+688	47+788	LHS	4x25	13.5	RCC	PSC I Girder With RCC Slab
			RHS		13.5		

Section 04 Neelmangla-Tumkur

S. No.	Chainage Km		Side	Span Arrangement (m)	Deck Width (m)	Vertical Clearance (m)	Sub Structure	Super Structure
	From	To						
1*	46+990	47+030	LHS RHS	2x20	2x13	5.5	RCC	Girder + Box Girder
2*	48+956	49+043	LHS RHS	2x22.5+1x42	2x14	6.5	RCC	Girder + Box Girder
3*	49+296	49+426	LHS RHS	2x22.5+2x42.00	2x14	6.5	RCC	I Girder + Box Girder
4*	63+545	63+975	LHS RHS	13x30+1x40	2x13.5	5.5		

For Section-04 Neelmangla Tumkur

a) *Under construction locations these details are tentative these may varies as per site and same shall be maintained by TOT concessionaire after end of DLP period.

b) Other than the (*) locations, the remaining stretches fall within the ongoing DPR section. Hence, these details may vary as per site conditions and shall be maintained by the TOT concessionaire after the completion of the DLP period..

6.5.5 Road Over Bridge

The details of Road Over Bridge along the project Stretch are furnished in below:

Table 6-16 : Summary of ROB

The Details of ROB are as follows:

Section 01 Vijayawada-Chilakaluripet

S. No.	Chainage (Km)		Side	Span Arrangement (m)	Deck Width (m)	Sub Structure	Super Structure
	From	To					
1*	406+300	406+331	LHS	1 x 31.28	16	RCC	Steel T Girder
1	406+300	406+316	RHS	1 x 16	12	RCC	RCC Slab

a) *Under Re-construction Structure these details are tentative these may varies as per site and same shall be maintained by TOT/InvIT concessionaire after end of DLP period.

Section 02 Chennai Bypass

S. No.	Chainage Km		Side	Span Arrangement (m)	Deck Width (m)	Sub Structure	Super Structure
	From	To					
1	25+057	25+182	LHS	(3x25m+2x7.5m+1x35m)	1x20.75	RCC	RCC Deck Slab+Steel T Girder
			RHS		1x20.75	RCC	RCC Deck Slab+Steel T Girder

Section 03 Chennai Tada

S. No.	Chainage Km		Side	Span Arrangement (m)	Deck Width (m)	Sub Structure	Super Structure
	From	To					
NIL							

Section 04 Neelmangla-Tumkur

S. No.	Chainage Km	Side	Span Arrangement (m)	Deck Width (m)	Sub Structure	Super Structure
1	50+200	LHS	5x12.6	10.7	RCC	RCC Solid Slab
		RHS	7x12.6	14		
2	55+800	LHS	2x11.5+4x12.5	10.7	RCC	RCC Solid Slab
		RHS	6x12.6	14		
3*	64+635	LHS	6x12.6	10.7	RCC	Girder with RCC Deck Slab
		RHS	6x12.6	14		RCC Solid Slab

For Section-04 Neelmangla Tumkur

b) *Under construction locations these details are tentative these may varies as per site and same shall be maintained by TOT concessionaire after end of DLP period.

c) Other than the (*) locations, the remaining stretches fall within the ongoing DPR section. Hence, these details may vary as per site conditions and shall be maintained by the TOT concessionaire after the completion of the DLP period..

6.5.6 Road Under Bridge

The details of Road Under Bridge along the project Stretch are furnished in below:

Section 01 Vijayawada-Chilakaluripet

S. No.	Chainage Km		Side	Span Arrangement (m)	Deck Width (m)	Sub Structure	Super Structure
	From	To					
NIL							

Section 02 Chennai Bypass

S. No.	Chainage Km	Side	Deck Width (m)	Sub Structure	Super Structure
1	15+850	LHS	2x7	RCC	Steel T Girder
		RHS	2x7	RCC	Steel T Girder

Section 03 Chennai Tada

S. No.	Chainage Km		Side	Span Arrangement (m)	Deck Width (m)	Sub Structure	Super Structure
	From	To					
NIL							

Section 04 Neelmangla-Tumkur

S. No.	Chainage Km		Side	Span Arrangement (m)	Deck Width (m)	Sub Structure	Super Structure
	From	To					
NIL							

6.5.7 Vehicular Overpass

The details of Underpasses along the project Stretch are furnished in below:

Table 6-17 : Summary of VOP

Section 01 Vijayawada-Chilakaluripet

S. No.	Chainage (Km)	Side	Span Arrangement (m)	Deck Width (m)	Vertical Clearance (m)	Sub Structure	Super Structure
1	408+737	BHS	2 x 45m	12	5.5	RCC	PSC I Girder with RCC Slab

Section 02 Chennai Bypass

S. No.	Chainage Km	Side	Span Arrangement (m)	Deck Width (m)	Vertical Clearance (m)	Sub Structure	Super Structure
Nil							

Section 03 Chennai Tada

S. No.	Chainage Km	Side	Span Arrangement (m)	Deck Width (m)	Vertical Clearance (m)	Sub Structure	Super Structure
1	22+760	LHS	2x30	-	5.5	RCC	PSC Girder
		RHS					
2	25+670	LHS	2x17.5	11.5	5.5	RCC	PSC Girder
		RHS					

Section 04 Neelmangla-Tumkur

S. No.	Chainage Km	Side	Span Arrangement (m)	Deck Width (m)	Vertical Clearance (m)	Sub Structure	Super Structure
1*	33+350	LHS	2x22.7	1x12	5.5	RCC	PSC I Girder with RCC Slab
		RHS		1x12		RCC	PSC I Girder with RCC Slab
2*	35+785	LHS	2x22.7	1x12	5.5	RCC	PSC I Girder with RCC Slab
		RHS		1x12		RCC	PSC I Girder with RCC Slab
3*	37+305	LHS	2x22.7	1x12	5.5	RCC	PSC I Girder with RCC Slab
		RHS		1x12		RCC	PSC I Girder with RCC Slab
4*	48+100	LHS	2x22.7	2x15.1	5.5	RCC	PSC I Girder with RCC Slab
		RHS		2x15.1		RCC	PSC I Girder with RCC Slab

For Section-04 Neelmangla Tumkur

a) *Under construction locations these details are tentative these may varies as per site and same shall be maintained by TOT concessionaire after end of DLP period.

b) Other than the (*) locations, the remaining stretches fall within the ongoing DPR section. Hence, these details may vary as per site conditions and shall be maintained by the TOT concessionaire after the completion of the DLP period.

6.5.8 Vehicular Underpasses

The details of VUP along the project Stretch are furnished in below:

Table 6-18 : Summary of VUP

Section 01 Vijayawada-Chilakaluripet

S. No.	Chainage Km	Side	Span Arrangement (m)	Deck Width (m)	Vertical Clearance (m)	Sub Structure	Super Structure
1	2+509	LHS	1x12	1x14.5	5.5	RCC	Single Cell RCC Box
		RHS	1x12	1x14.5	5.5	RCC	Single Cell RCC Box
2	4+764	LHS	1x12	1x14.5	5.5	RCC	Single Cell RCC Box
		RHS	1x12	1x14.5	5.5	RCC	Single Cell RCC Box
3	6+316	LHS	1x12	1x14.5	5.5	RCC	Single Cell RCC Box
		RHS	1x12	1x14.5	5.5	RCC	Single Cell RCC Box
4	9+390	LHS	1x12	1x14.5	5.5	RCC	Single Cell RCC Box
		RHS	1x12	1x14.5	5.5	RCC	Single Cell RCC Box
5	12+849	LHS	1x12	1x14.5	5.5	RCC	Single Cell RCC Box
		RHS	1x12	1x14.5	5.5	RCC	Single Cell RCC Box
6	14+868	LHS	1x12	1x14.5	5.5	RCC	Single Cell RCC Box
		RHS	1x12	1x14.5	5.5	RCC	Single Cell RCC Box
7	355+470	LHS	1 x 20.0	1x13.75	5.5	RCC	RCC girder type
		RHS	1 x 20.0	1x13.75	5.5	RCC	RCC girder type
8	375+650	LHS	1 x 20.0	1x13.75	5.5	RCC	RCC girder type

S. No.	Chainage Km	Side	Span Arrangement (m)	Deck Width (m)	Vertical Clearance (m)	Sub Structure	Super Structure
		RHS	1 x 20.0	1x13.75	5.5	RCC	RCC girder type
9	381+440	LHS	1 x 20.0	1x13.75	5.5	RCC	RCC girder type
		RHS	1 x 20.0	1x13.75	5.5	RCC	RCC girder type
10	385+340	LHS	1 x 20.0	1x13.75	5.5	RCC	RCC girder type
		RHS	1 x 20.0	1x13.75	5.5	RCC	RCC girder type
11	391+288	LHS	1 x 20.0	1x13.75	5.5	RCC	RCC girder type
		RHS	1 x 20.0	1x13.75	5.5	RCC	RCC girder type
12	393+960	LHS	1 x 20.0	1x13.75	5.5	RCC	RCC girder type
		RHS	1 x 20.0	1x13.75	5.5	RCC	RCC girder type
13	407+510	LHS	1 x 20.0	1x13.75	5.5	RCC	RCC girder type
		RHS	1 x 20.0	1x13.75	5.5	RCC	RCC girder type
14	414+495	LHS	1 x 20.0	1x13.75	5.5	RCC	RCC girder type
		RHS	1 x 20.0	1x13.75	5.5	RCC	RCC girder type
15	416+110	LHS	1 x 20.0	1x13.75	5.5	RCC	RCC girder type
		RHS	1 x 20.0	1x13.75	5.5	RCC	RCC girder type
16	418+243	LHS	1 x 20.0	1x13.75	5.5	RCC	RCC girder type
		RHS	1 x 20.0	1x13.75	5.5	RCC	RCC girder type
17	422+170	LHS	1 x 20.0	1x13.75	5.5	RCC	RCC girder type
		RHS	1 x 20.0	1x13.75	5.5	RCC	RCC girder type

Section 02 Chennai Bypass

S. No.	Chainage Km	Side	Span Arrangement (m)	Deck Width (m)	Vertical Clearance (m)	Sub Structure	Super Structure
1	1+270	LHS	2 x 10.0	11.5	5.5	RCC	RCC Slab Tpye
		RHS	2 x 10.0	11.5	5.5	RCC	RCC Slab Tpye
2	27+248	LHS	2 x 10.0	14	5.5	RCC	RCC Box Type
		RHS	2 x 10.0	14	5.5	RCC	RCC Box Type
3	28+152	LHS	2 x 10.0	14	5.5	RCC	RCC Box Type
		RHS	2 x 10.0	14	5.5	RCC	RCC Box Type
4	31+380	LHS	2 x 10.0	14	6.5	RCC	RCC Box Type
		RHS	2 x 10.0	14	6.5	RCC	RCC Box Type

Section 03 Chennai Tada

S. No.	Chainage Km	Side	Span Arrangement (m)	Deck Width (m)	Vertical Clearance (m)	Sub Structure	Super Structure
1	27+205	LHS	2x25	13.5	5.5	RCC	PSC I Girder With RCC Slab
		RHS		13.5		RCC	PSC I Girder With RCC Slab
2	28+475	LHS	1x25	13.5	5.5	RCC	PSC I Girder With RCC Slab
		RHS		13.5		RCC	PSC I Girder With RCC Slab
3	35+100	LHS	1x25	13.5	5.5	RCC	PSC I Girder With RCC Slab
		RHS		13.5		RCC	PSC I Girder With RCC Slab
4	37+660	LHS	1x25	13.5	5.5	RCC	PSC I Girder With RCC Slab
		RHS		13.5		RCC	PSC I Girder With RCC Slab
5	51+912	LHS	1x25	13.5	5.5	RCC	PSC I Girder With RCC Slab
		RHS		13.5		RCC	PSC I Girder With RCC Slab

Section 04 Neelmangla-Tumkur

S. No.	Chainage Km	Side	Span Arrangement (m)	Deck Width (m)	Vertical Clearance (m)	Sub Structure	Super Structure
1*	32+100	LHS	1x15	15.5	5..5	RCC	RCC Slab
		RHS		15.5		RCC	RCC Slab
2*	34+243	LHS	1x10	13.5	5	RCC	RCC Slab
		RHS		13.5		RCC	RCC Slab
3*	43+055	LHS	1x20	15.5	5.5	RCC	RCC Slab
		RHS		15.5		RCC	RCC Slab
4*	43+400	LHS	1x15	15.5	5.5	RCC	Single Box
		RHS		15.5		RCC	Single Box
5*	44+311	LHS	1x10	13.6	5	RCC	RCC Slab
		RHS		13.6		RCC	RCC Slab
6*	62+547	LHS	1x22	13.5	5.5	RCC	Girder Box Girder
		RHS		13.5		RCC	

S. No.	Chainage Km	Side	Span Arrangement (m)	Deck Width (m)	Vertical Clearance (m)	Sub Structure	Super Structure
7*	64+535	LHS	1x25	12.5	5.5		
		RHS		12.5			
8*	64+825	LHS	1x25	12.5	5.5		
		RHS		12.5			
9*	66+113	LHS	1x40	13.5		RCC	Girder Box Girder
		RHS		13.5		RCC	
10*	68+098	LHS	1x21	13.5	5	RCC	RCC Solid Slab
		RHS		13.5		RCC	
11*	71+497	LHS	1x22.8	13.5	5.5	RCC	RCC Solid Slab
		RHS		13.5		RCC	
12*	72+935	LHS	1x40	13.5	5	RCC	Girder Box Girder
		RHS		13.5		RCC	

For Section-04 Neelmangla Tumkur

a) *Under construction locations these details are tentative these may varies as per site and same shall be maintained by TOT concessionaire after end of DLP period.

b) Other than the (*) locations, the remaining stretches fall within the ongoing DPR section. Hence, these details may vary as per site conditions and shall be maintained by the TOT concessionaire after the completion of the DLP period

6.5.9 Light Vehicular Underpasses

The details of LVUP along the project Stretch are furnished in below:

Table 6-19 : Summary of LVUP

Section 01 Vijayawada-Chilakaluripet

S. No.	Chainage (Km)	Side	Span Arrangement (m)	Deck Width (m)	Vertical Clearance (m)	Sub Structure	Super Structure
1	357+290	LHS	1 x 12.0	1x13.25	3.5	RCC	Single Cell RCC Box
		RHS	1 x 12.0	1x13.25	3.5	RCC	Single Cell RCC Box
2	374+040	LHS	1 x 12.0	1x13.25	3.5	RCC	Single Cell RCC Box
		RHS	1 x 12.0	1x13.25	3.5	RCC	Single Cell RCC Box
3	378+530	LHS	1 x 12.0	1x13.25	3.5	RCC	Single Cell RCC Box

S. No.	Chainage (Km)	Side	Span Arrangement (m)	Deck Width (m)	Vertical Clearance (m)	Sub Structure	Super Structure
		RHS	1 x 12.0	1x13.25	3.5	RCC	Single Cell RCC Box
4	388+330	LHS	1 x 12.0	1x13.25	4.5	RCC	Single Cell RCC Box
		RHS	1 x 12.0	1x13.25	4.5	RCC	Single Cell RCC Box
5	399+210	LHS	1 x 12.0	1x13.25	3.5	RCC	Single Cell RCC Box
		RHS	1 x 12.0	1x13.25	3.5	RCC	Single Cell RCC Box
6	399+730	LHS	1 x 12.0	1x13.25	3.5	RCC	Single Cell RCC Box
		RHS	1 x 12.0	1x13.25	3.5	RCC	Single Cell RCC Box
7	403+095	LHS	1 x 12.0	1x13.25	3.5	RCC	Single Cell RCC Box
		RHS	1 x 12.0	1x13.25	3.5	RCC	Single Cell RCC Box
8	410+000	LHS	1 x 12.0	1x13.25	4.5	RCC	Single Cell RCC Box
		RHS	1 x 12.0	1x13.25	4.5	RCC	Single Cell RCC Box
9	413+408	LHS	1 x 12.0	1x13.25	4.5	RCC	Single Cell RCC Box
		RHS	1 x 12.0	1x13.25	4.5	RCC	Single Cell RCC Box
10	419+470	LHS	1 x 12.0	1x13.25	3.5	RCC	Single Cell RCC Box
		RHS	1 x 12.0	1x13.25	3.5	RCC	Single Cell RCC Box

Section 02 Chennai Bypass

S. No.	Chainage Km	Side	Span Arrangement (m)	Deck Width (m)	Vertical Clearance (m)	Sub Structure	Super Structure
1	0+380	LHS	(1x10.0)	12.5	4.5	RCC	RCC Slab Deck
		RHS	(1x10.0)	20	4.5	RCC	RCC Slab Deck
	1+540	LHS	(1x10.0)	11.5	3.5	RCC	RCC Slab Deck

S. No.	Chainage Km	Side	Span Arrangement (m)	Deck Width (m)	Vertical Clearance (m)	Sub Structure	Super Structure
2		RHS	(1x10.0)	11.5	3.5	RCC	RCC Slab Deck
3	2+520	LHS	(1x10.0)	11.5	5.5	RCC	RCC Slab Deck
		RHS	(1x10.0)	11.5	5.5	RCC	RCC Slab Deck
4	5+235	LHS	(1x10.0)	11.5	5.5	RCC	RCC Slab Deck
		RHS	(1x10.0)	11.5	5.5	RCC	RCC Slab Deck
5	6+010	LHS	(1x10.0)	11.5	5	RCC	RCC Slab Deck
		RHS	(1x10.0)	11.5	5	RCC	RCC Slab Deck
6	7+100	LHS	(1x10.0)	11.5	5	RCC	RCC Slab Deck
		RHS	(1x10.0)	11.5	5	RCC	RCC Slab Deck
7	10+375	LHS	(1x10.0)	12	5.2	RCC	RCC Slab Deck
		RHS	(1x10.0)	12	5.2	RCC	RCC Slab Deck
8	12+110	LHS	(1x10.0)	12	5.5	RCC	RCC Slab Deck
		RHS	(1x10.0)	12	5	RCC	RCC Slab Deck
9	13+545	LHS	(1x10.0)	12	5	RCC	RCC Slab Deck
		RHS	(1x10.0)	12	5	RCC	RCC Slab Deck
10	18+020	LHS	(1x10.0)	12	4.5	RCC	RCC Slab Deck
		RHS	(1x10.0)	12	4.5	RCC	RCC Slab Deck
11	21+333	LHS	(1x10.0)	14	4.5	RCC	RCC Box Type
		RHS	(1x10.0)	14	4.5	RCC	RCC Box Type
12	25+952	LHS	(1x10.0)	14	5.1	RCC	RCC Box Type
		RHS	(1x10.0)	14	5.1	RCC	RCC Box Type
13	29+067	LHS	(1x10.0)	14	5.2	RCC	RCC Box Type
		RHS	(1x10.0)	14	5.2	RCC	RCC Box Type
14	30+176	LHS	(1x10.0)	14.09	5.5	RCC	RCC Box Type
		RHS	(1x10.0)	14	5.5	RCC	RCC Box Type

Section 03 Chennai Tada

S. No.	Chainage Km	Side	Span Arrangement (m)	Deck Width (m)	Vertical Clearance (m)	Sub Structure	Super Structure
1	26+100	LHS	1x25	13.5	4.5	RCC	PSC I Girder With RCC Slab
		RHS		13.5		RCC	PSC I Girder With RCC Slab

S. No.	Chainage Km	Side	Span Arrangement (m)	Deck Width (m)	Vertical Clearance (m)	Sub Structure	Super Structure
2	38+095	LHS	1x12	13.5	4	RCC	RCC BOX Type
		RHS		13.5		RCC	RCC BOX Type
3	38+595	LHS	1x12	13.5	3.5	RCC	RCC BOX Type
		RHS		13.5		RCC	RCC BOX Type
4	46+420	LHS	1x12	13.5	4	RCC	RCC BOX Type
		RHS		13.5		RCC	RCC BOX Type

Section 04 Neelmangla-Tumkur

S. No.	Chainage Km	Side	Span Arrangement (m)	Deck Width (m)	Vertical Clearance (m)	Sub Structure	Super Structure
1*	39+200	LHS	1x12	15.5	4	RCC	Single Box
		RHS		15.5		RCC	Single Box
2*	40+755	LHS	1x12	15.5	4	RCC	Single Box
		RHS		15.5		RCC	Single Box
3*	45+750	LHS	1x12	15.5	4	RCC	Single Box
		RHS		15.5		RCC	Single Box
4*	63+204	LHS	1x12	13.5	3.5	RCC	RCC Solid Slab
		RHS		13.5		RCC	RCC Solid Slab
5*	66+928	LHS	1x13.5	13.5	3.5	RCC	RCC Solid Slab
		RHS		13.5		RCC	RCC Solid Slab
6*	69+919	LHS	1x13.6	13.5	3.5	RCC	RCC Solid Slab
		RHS		13.5		RCC	RCC Solid Slab
7*	73+800	LHS	2x12	13.5	4	RCC	RCC Box
		RHS		13.5		RCC	RCC Box

For Section-04 Neelmangla Tumkur

a) *Under construction locations these details are tentative these may varies as per site and same shall be maintained by TOT concessionaire after end of DLP period.

b) Other than the (*) locations, the remaining stretches fall within the ongoing DPR section. Hence, these details may vary as per site conditions and shall be maintained by the TOT concessionaire after the completion of the DLP period.

6.5.10 Pedestrian/Cattle Underpasses

The details of Pedestrian/Cattle Underpasses along the project Stretch are furnished in below

Table 6-20 : Summary of PUP/CUP

Section 01 Vijayawada-Chilakaluripet

S. No.	Chainage Km	Side	Span Arrangement (m)	Deck Width (m)	Vertical Clearance (m)	Sub Structure	Super Structure
1	10+480	LHS SR	1x7	1x11	4	Box type Structure	
		LHS	1x7	1x14.5			
		RHS	1x7				
2	373+020	BHS	1 x 7.50	1x13.25	2.5	Box type Structure	
3	374+350	BHS	1 x 7.50	1x13.25	3.272	Box type Structure	
4	377+260	BHS	1 x 7.50	1x13.25	2.5	Box type Structure	
5	380+280	BHS	1 x 7.50	1x13.25	2.5	Box type Structure	
6	382+895	BHS	1 x 7.50	1x13.25	2.5	Box type Structure	
7	384+090	BHS	1 x 7.50	1x13.25	2.5	Box type Structure	
8	385+040	BHS	1 x 7.50	1x13.25	2.5	Box type Structure	
9	387+320	BHS	1 x 7.50	1x13.25	2.5	Box type Structure	
10	389+415	BHS	1 x 7.50	1x13.25	2.5	Box type Structure	
11	390+620	BHS	1 x 7.50	1x13.25	2.5	Box type Structure	
12	392+050	BHS	1 x 7.50	1x13.25	2.5	Box type Structure	
13	393+160	BHS	1 x 7.50	1x13.25	2.5	Box type Structure	
14	395+550	BHS	1 x 7.50	1x13.25	2.5	Box type Structure	
15	396+340	BHS	1 x 7.50	1x13.25	2.5	Box type Structure	
16	398+395	BHS	1 x 7.50	1x13.25	2.5	Box type Structure	
17	401+682	BHS	1 x 7.50	1x13.25	2.5	Box type Structure	
18	404+560	BHS	1 x 7.50	1x11.75	2.5	Box type Structure	
19	405+360	BHS	1 x 7.50	1x13.25	2.5	Box type Structure	
20	409+235	BHS	1 x 7.50	1x13.25	2.5	Box type Structure	
21	411+120	BHS	1 x 7.50	1x20	2.5	Box type Structure	
22	412+780	BHS	1 x 7.50	1x13.25	2.5	Box type Structure	
23	413+760	BHS	1 x 6.80	1x13.25	2.5	Box type Structure	
24	415+580	BHS	1 x 7.50	1x13.25	2.5	Box type Structure	
25	416+860	BHS	1 x 7.50	1x13.25	2.5	Box type Structure	
26	421+330	BHS	1 x 6.80	1x13.25	2.5	Box type Structure	

Section 02 Chennai Bypass

S. No.	Chainage Km	Side	Span Arrangement (m)	Deck Width (m)	Vertical Clearance (m)	Sub Structure	Super Structure
1	29+755	LHS	1x5.5	15	3.8	RCC	RCC Box Type
		RHS	1x5.5	15	3.8	RCC	RCC Box Type

Section 03 Chennai Tada

S. No.	Chainage Km	Side	Span Arrangement (m)	Deck Width (m)	Vertical Clearance (m)	Sub Structure	Super Structure
1	24+675	LHS	1x6	15	2.5	RCC	RCC Box Type
		RHS		15			
2	30+594	LHS	1x6	13.5	2.5	RCC	RCC Box Type
		RHS		13.5			
3	33+671	LHS	1x6	13.5	2.5	RCC	RCC Box Type
		RHS		13.5			
4	40+000	LHS	1x6	13.5	2.5	RCC	RCC Box Type
		RHS		13.5			
5	43+647	LHS	1x6	13.5	2.5	RCC	RCC Box Type
		RHS		13.5			
6	49+170	LHS	1x6	13.5	2.5	RCC	RCC Box Type
		RHS		13.5			
7	50+180	LHS	1x6	13.5	2.5	RCC	RCC Slab
		RHS		13.5			

Section 04 Neelmangla-Tumkur

S. No.	Chainage Km	Side	Span Arrangement (m)	Deck Width (m)	Vertical Clearance (m)	Sub Structure	Super Structure
1	55+927	LHS	1x4.1	14.6	5	RCC	RCC BOX
		RHS		14.6	5		

For Section-04 Neelmangla Tumkur

a) *Under construction locations these details are tentative these may varies as per site and same shall be maintained by TOT concessionaire after end of DLP period.

b) Other than the (*) locations, the remaining stretches fall within the ongoing DPR section. Hence, these details may vary as per site conditions and shall be maintained by the TOT concessionaire after the completion of the DLP period.

6.5.11 Foot Over Bridge

The details of Foot Over Bridge along the project Stretch are furnished in below

Table 6-21 : Summary of FOB

Section 01 Vijayawada-Chilakaluripet

S. No.	Chainage	Location
NIL		

Section 02 Chennai Bypass

S. No.	Chainage	Location
NIL		

Section 03 Chennai Tada

S. No.	Chainage	Location
1	35+700	Puduvoyal

Section 04 Neelmangla-Tumkur

S. No.	Chainage	Location
1*	47+700	Jindal
2*	65+100	Fire station in Tumkur town

For Section-04 Neelmangla Tumkur

a) *Under construction locations these details are tentative these may varies as per site and same shall be maintained by TOT concessionaire after end of DLP period.

b) Other than the (*) locations, the remaining stretches fall within the ongoing DPR section. Hence, these details may vary as per site conditions and shall be maintained by the TOT concessionaire after the completion of the DLP period.

6.5.12 Culvert

The details of Culverts along the project Stretch are furnished in below

Table 6-22 : Culvert Along the Project Highway

Section 01 Vijayawada-Chilakaluripet

S. No.	Chainage Km	Type of Culvert	Span Arrangement (m)	Side
1	0+695	Pipe Culvert	1x1.2	BHS
2	1+133	Pipe Culvert	1x1.2	BHS
3	2+215	Pipe Culvert	1x1.2	BHS
4	2+471	Pipe Culvert	2x1.2	BHS
5	2+542	Pipe Culvert	2x1.2	BHS
6	2+767	Box Culvert	1x2x2	BHS
7	2+927	Pipe Culvert	2x1.2	BHS
8	2+935	Pipe Culvert	2x1.2	BHS
9	3+200	Pipe Culvert	2x1.2	BHS
10	3+240	Pipe Culvert	2x1.2	BHS
11	5+060	Pipe Culvert	1x1.2	BHS
12	5+686	Pipe Culvert	1x1.2	BHS
13	6+307	Pipe Culvert	2x1.2	BHS
14	6+324	Pipe Culvert	2x1.2	BHS
15	6+720	Pipe Culvert	2x1.2	BHS
16	7+085	Pipe Culvert	1x1.2	BHS
17	7+225	Pipe Culvert	1x1.2	BHS
18	7+422	Pipe Culvert	2x1.2	BHS
19	7+494	Pipe Culvert	2x1.2	BHS
20	8+050	Pipe Culvert	2x1.2	BHS
21	9+340	Box Culvert	1x3x2	BHS
22	9+380	Pipe Culvert	2x1.2	BHS
23	9+403	Pipe Culvert	2x1.2	BHS
24	9+895	Pipe Culvert	1x1.2	BHS
25	10+440	Pipe Culvert	2x1.2	BHS
26	10+454	Pipe Culvert	2X1.2	BHS
27	12+124	Pipe Culvert	2x1.2	BHS

S. No.	Chainage Km	Type of Culvert	Span Arrangement (m)	Side
28	12+140	Pipe Culvert	2x1.2	BHS
29	12+838	Pipe Culvert	2x1.2	BHS
30	12+855	Pipe Culvert	2x1.2	BHS
31	13+599	Pipe Culvert	1x1.2	BHS
32	13+610	Pipe Culvert	1x1.2	BHS
33	13+762	Pipe Culvert	1x1.2	BHS
34	14+203	Pipe Culvert	2x1.2	BHS
35	14+508	Pipe Culvert	1x1.2	BHS
36	15+938	Box Culvert	1x2x2	BHS
37	375+595	Pipe Culvert	1x1.20	BHS
38	375+950	Box Culvert	1x3.00	BHS
39	376+695	Box Culvert	1x5.30	SR
		Slab Culvert	1x5.30	MCW
40	379+022	Box Culvert	1x3.00	BHS
41	379+379	Box Culvert	1x3.5	LHS SR
		Box Culvert	1x3.5	LHS
		Slab Culvert	1x3.5	RHS
		Box Culvert	1x3.5	RHS SR
42	379+715	Box Culvert	1x3.5	SR
		Slab Culvert	1x3.5	MCW
43	379+940	Box Culvert	1x4.0	SR
		Slab Culvert	1x4.0	MCW
44	380+975	Box Culvert	1x3.30	SR
		Slab Culvert	1x3.30	MCW
45	381+567	Box Culvert	1x2.00	SR
		Slab Culvert	1x2.00	MCW
46	381+932	Box Culvert	1x5.00	SR
		Slab Culvert	1x5.00	MCW
47	382+595	Box Culvert	1x4.0	SR
		Slab Culvert	1x4.0	MCW
48	383+510	Box Culvert	1x2.0	SR
		Slab Culvert	1x2.0	MCW

S. No.	Chainage Km	Type of Culvert	Span Arrangement (m)	Side
49	384+036	Box Culvert	1x2.0	BHS
50	385+004	Box Culvert	1x5.00	BHS
51	385+218	Box Culvert	1x5.00	LHS SR
		Box Culvert	1x6.00	MCW
		Box Culvert	1x6.00	RHS SR
52	385+745	Box Culvert	2x2.50	SR
		Slab Culvert	2x3.00	MCW
53	386+062	Box Culvert	2x3.65	SR
		Slab Culvert	2x3.65	MCW
54	386+783	Pipe Culvert	1x1.00	BHS
55	387+513	Box Culvert	1x5.80	BHS
56	390+435	Box Culvert	1x5.90	SR
		Slab Culvert	2x2.55	LHS MCW
		Slab Culvert	1x5.90	RHS MCW
57	392+510	Pipe Culvert	1x1.00	1x1.20
58	395+345	Box Culvert	1x5.00	SR
		Slab Culvert	1x5.00	MCW
59	399+228	Pipe Culvert	1x1.00	BHS
60	399+705	Pipe Culvert	1x1.20	BHS
61	400+631	Box Culvert	1x4.0	BHS
62	401+664	Pipe Culvert	1x1.20	BHS
63	403+125	Pipe Culvert	1x1.00	BHS
64	404+651	Box Culvert	1x4.0	BHS
65	405+565	Pipe Culvert	1x1.00	BHS
66*	406+052	Pipe Culvert	1x1	BHS
67*	406+280	Pipe Culvert	3x1	BHS
68*	406+583	Pipe Culvert	4x1	BHS
69	407+023	Pipe Culvert	4x1	BHS
70	407+470	Pipe Culvert	1x1.00	BHS
71	407+910	Pipe Culvert	1x1.00	BHS
72	408+700	Pipe Culvert	2x1.00	BHS
73	408+766	Pipe Culvert	3x1.00	BHS

S. No.	Chainage Km	Type of Culvert	Span Arrangement (m)	Side
74	412+360	Box Culvert	1x4.50	BHS
75	413+385	Pipe Culvert	1x1.2	BHS
76	413+782	Pipe Culvert	1x1.00	BHS
77	413+850	Pipe Culvert	1x1.20(MCW)	1x1.00 (SR)
78	413+872	Box Culvert	1x1.00	BHS
79	414+541	Box Culvert	1x6.00	BHS
80	414+839	Pipe Culvert	1x1.00	BHS
81	415+184	Pipe Culvert	1x1.00	BHS
82	415+985	Pipe Culvert	1x1.00	BHS
83	416+399	Pipe Culvert	2x1.00	BHS
84	416+750	Box Culvert	1x3.00	LHS SR
		Slab Culvert	1x3.00	MCW
		Slab Culvert	1x3.00	RHS SR
85	417+305	Pipe Culvert	1x1.00	BHS
86	417+620	Box Culvert	1x2.5	SR
		Slab Culvert	1x2.5	MCW
87	419+122	Pipe Culvert	1x1.00	BHS
88	419+742	Pipe Culvert	1x1.00	BHS
89	420+150	Pipe Culvert	1x1.00	BHS
90	421+695	Pipe Culvert	1x1.00	BHS
		Box Culvert	1x1.00	RHS MCW

*Under Widen Structure these details are tentative these may varies as per site and same shall be maintained by TOT/InvIT concessionaire after end of DLP period.

Section 02 Chennai Bypass

S. No.	Chainage Km	Type of Culvert	Span Arrangement (m)
1	0+050	Pipe Culvert	2x1.2
2	0+156	Box Culvert	2x3
3	0+673	Pipe Culvert	1x0.9
4	0+908	Pipe Culvert	1x0.9
5	1+010	Pipe Culvert	2x0.9

S. No.	Chainage Km	Type of Culvert	Span Arrangement (m)
6	1+118	Pipe Culvert	1x1.2
7	1+263	Utility Pipe Culvert	1x0.6
8	1+284	Pipe Culvert	2x0.9
9	1+428	Pipe Culvert	2x0.9
10	1+500	Utility Pipe Culvert	1x0.6
11	1+533	Pipe Culvert	1x0.9
12	1+800	Pipe Culvert	1x0.9
13	1+963	Pipe Culvert	1x0.9
14	2+308	Pipe Culvert	1x0.9
15	2+339	Pipe Culvert	1x1.2
16	2+473	Pipe Culvert	1x0.6
17	2+492	Pipe Culvert	1x0.6
18	2+512	Utility Pipe Culvert	1x0.9
19	2+710	Pipe Culvert	1x1.2
20	2+961	Pipe Culvert	1x0.9
21	3+108	Pipe Culvert	2x0.9
22	3+341	Pipe Culvert	1x0.9
23	3+635	Pipe Culvert	2x0.9
24	3+740	Pipe Culvert	2x0.9
25	4+065	Pipe Culvert	1x0.9
26	4+280	Pipe Culvert	2x0.9
27	5+141	Pipe Culvert	2x0.9
28	5+141	Utility Pipe Culvert	1x0.9
29	5+461	Pipe Culvert	2x1.2
30	5+913	Pipe Culvert	1x0.9
31	6+007	Pipe Culvert	1x0.9
32	6+014	Utility Pipe Culvert	1x0.6
33	6+286	Pipe Culvert	1x0.9
34	6+338	Pipe Culvert	1x0.9
35	6+814	Box Culvert	1x3

S. No.	Chainage Km	Type of Culvert	Span Arrangement (m)
36	6+960	Pipe Culvert	1x1.2
37	7+035	Utility Pipe Culvert	1x0.6
38	7+161	Pipe Culvert	1x0.9
39	7+443	Pipe Culvert	1x0.9
40	7+910	Pipe Culvert	1x0.9
41	8+030	Pipe Culvert	1x0.9
42	8+486	Pipe Culvert	1x0.9
43	8+813	Pipe Culvert	1x0.9
44	9+001	Pipe Culvert	1x0.9
45	9+445	Pipe Culvert	1x1.2
46	9+581	Pipe Culvert	1x1.2
47	9+814	Box Culvert	1x3
48	9+967	Pipe Culvert	2x1.2
49	10+168	Pipe Culvert	1x1.2
50	10+297	Utility Pipe Culvert	1x0.6
51	10+368	Utility Pipe Culvert	1x0.6
52	10+483	Pipe Culvert	2x1.2
53	10+783	Pipe Culvert	2x1.2
54	11+038	Pipe Culvert	1x1.2
55	11+109	Pipe Culvert	1x0.9
56	11+216	Pipe Culvert	1x0.9
57	11+295	Utility Pipe Culvert	1x0.6
58	11+426	Pipe Culvert	2x0.9
59	11+441	Pipe Culvert	1x1.2
60	11+458	Box Culvert	1x3
61	11+696	Pipe Culvert	2x1.2
62	11+806	Utility Pipe Culvert	1x0.6
63	11+843	Box Culvert	1x3
64	12+156	Pipe Culvert	1x0.9
65	12+189	Pipe Culvert	1x1.2

S. No.	Chainage Km	Type of Culvert	Span Arrangement (m)
66	12+250	Utility Pipe Culvert	1x0.6
67	12+290	Pipe Culvert	1x1.2
68	12+405	Utility Pipe Culvert	1x0.6
69	12+405	Utility Pipe Culvert	1x0.6
70	12+487	Pipe Culvert	2x1.2
71	12+679	Pipe Culvert	1x1.2
72	12+715	Box Culvert	1x3
73	12+746	Utility Pipe Culvert	1x0.6
74	12+975	Pipe Culvert	1x0.9
75	13+009	Utility Pipe Culvert	1x0.6
76	13+284	Pipe Culvert	1x1.2
77	13+451	Utility Pipe Culvert	1x0.6
78	13+550	Utility Pipe Culvert	1x0.6
79	13+738	Pipe Culvert	1x1.2
80	13+893	Pipe Culvert	1x1.2
81	14+239	Pipe Culvert	1x1.2
82	14+325	Pipe Culvert	1x0.9
83	14+328	Pipe Culvert	2x0.9
84	14+490	Pipe Culvert	2x0.9
85	14+640	Pipe Culvert	1x1.2
86	14+810	Pipe Culvert	2x1.2
87	14+989	Pipe Culvert	1x1.2
88	15+195	Pipe Culvert	2x1.2
89	15+900	Pipe Culvert	1x0.9
90	16+370	Pipe Culvert	1x0.9
91	19+500	Pipe Culvert(LHS SR)	12x1.2
92	20+378	Pipe Culvert	2x1.2
93	20+810	Pipe Culvert	2x1.2
94	20+850	Pipe Culvert	2x1.2
95	21+138	Pipe Culvert	2x1.2

S. No.	Chainage Km	Type of Culvert	Span Arrangement (m)
96	21+418	Slab Culvert	1x2
97	21+704	Pipe Culvert	2x1.2
98	22+233	Slab Culvert	1x2
99	22+806	Slab Culvert	1x2
100	24+414	Slab Culvert	1x2
101	25+638	Slab Culvert	1x2
102	25+896	Utility Pipe Culvert	1x0.6
103	25+902	Pipe Culvert	1x0.9
104	25+924	Utility Pipe Culvert	1x0.6
105	25+957	Pipe Culvert	3x1.2
106	26+000	Pipe Culvert	1x1.2
107	26+052	Pipe Culvert	1x1.2
108	26+098	Pipe Culvert	1x1.2
109	26+600	Utility Pipe Culvert	1x0.6
110	27+034	Pipe Culvert	2x0.9
111	27+177	Utility Pipe Culvert	1x0.6
112	27+182	Pipe Culvert	1x1.2
113	27+229	Pipe Culvert	1x1.2
114	27+234	Utility Pipe Culvert	1x0.6
115	27+325	Pipe Culvert	2x0.9
116	27+945	Pipe Culvert	2x0.9
117	28+077	Pipe Culvert	1x0.9
118	28+130	Utility Pipe Culvert	1x0.6
119	28+520	Pipe Culvert	1x0.9
120	28+600	Pipe Culvert	1x0.9
121	28+950	Utility Pipe Culvert	2x0.6
122	29+274	Box Culvert	1.3x1.579
123	29+297	Box Culvert	2x2.390
124	29+306	Slab Culvert	1x5
125	29+680	Pipe Culvert	2x1.2

S. No.	Chainage Km	Type of Culvert	Span Arrangement (m)
126	29+907	Pipe Culvert	2x0.9
127	30+120	Utility Pipe Culvert	1x0.6
128	30+147	Utility Pipe Culvert	1 x 0.6
129	30+383	Pipe Culvert	1x0.9
130	30+400	Box Culvert	1x1.5
131	30+439	Pipe Culvert	1x0.9
132	31+210	Pipe Culvert	1x0.9
133	31+266	Pipe Culvert	1x0.9
134	31+375	Utility Pipe Culvert	1x0.9
135	31+430	Pipe Culvert	2x1.2
136	31+640	Utility Pipe Culvert	1x0.6
137	31+870	Utility Pipe Culvert	1x0.6
138	31+950	Pipe Culvert	1x0.9
139	32+050	Utility Pipe Culvert	1x0.9
140	32+500	Pipe Culvert	1x1.2

Section 03 Chennai Tada

S. No.	Chainage Km	Type of Culvert	Span Arrangement (m)
1	21+963	Box Culvert	1 X 2
2	22+232	Box Culvert	1 X 2
3	23+255	Pipe Culvert	2 X 1
4	23+708	Box Culvert	1 X 2
5	24+040	Pipe Culvert	2 X 1.2
6	25+455	Pipe Culvert	2 X 1
7	26+000	Box Culvert	1 X 6
8	26+215	Box Culvert	1 X 2
9	27+384	Slab Culvert	1 X 1.8
10	28+134	Box Culvert	1 X 2
11	28+750	Box Culvert	1 X 2
12	29+400	Box Culvert	1 X 1.5
13	29+940	Box Culvert	1 X 3.5

S. No.	Chainage Km	Type of Culvert	Span Arrangement (m)
14	30+150	Slab Culvert	1 X 1.16
15	30+300	Box Culvert	1 X 1.5
16	31+281	Box Culvert	1 X 4.8
17	31+806	Box Culvert	1 X 3
18	32+820	Box Culvert	1 X 3.5
19	34+240	Box Culvert	1 X 4
20	34+865	Box Culvert	1 X 2
21	35+050	Box Culvert	1 X 2
22	35+170	Box Culvert	1 X 2
23	35+400	Box Culvert	1 X 3
24	35+865	Box Culvert	1 X 3.3
25	35+970	Pipe Culvert	1 X 0.9
26	36+220	Pipe Culvert	2 X 0.9
27	36+340	Pipe Culvert	1 X 0.9
28	36+560	Box Culvert	1 X 1.5
29	36+925	Pipe Culvert	1 X 0.9
30	37+404	Box Culvert	1 X 2
31	37+740	Pipe Culvert	1 X 0.9
32	38+100	Box Culvert	1 X 2
33	38+100	Pipe Culvert	2 X 0.9
34	38+394	Box Culvert	1 X 2
35	38+723	Box Culvert	1 X 2
36	38+959	Box Culvert	1 X 2
37	39+270	Box Culvert	1 X 5
38	39+615	Pipe Culvert	1 X 0.9
39	39+745	Box Culvert	1 X 1.5
40	40+130	Pipe Culvert	1 X 1
41	40+940	Pipe Culvert	1 X 0.9
42	41+310	Pipe Culvert	1 X 0.9
43	41+460	Pipe Culvert	1 X 0.9

S. No.	Chainage Km	Type of Culvert	Span Arrangement (m)
44	41+720	Box Culvert	1 X 1.5
45	42+200	Box Culvert	1 X 1.5
46	42+480	Box Culvert	1 X 1.5
47	42+750	Box Culvert	1 X 1.5
48	44+100	Box Culvert	1 X 2.5
49	44+500	Box Culvert	1 X 3
50	45+240	Pipe Culvert	1 X 0.9
51	45+330	Pipe Culvert	1 X 0.9
52	45+500	Pipe Culvert	1 X 0.9
53	47+150	Pipe Culvert	1 X 0.9
54	48+635	Pipe Culvert	1 X 0.9
55	49+700	Pipe Culvert	2 X 1
56	53+009	Box Culvert	1 X 2.5

Section 04 Neelmangla-Tumkur

S. No.	Chainage Km	Type of Culvert	Span Arrangement (m)
1*	29+778	Box Culvert	1 X 3
2*	30+180	Box Culvert	1 X 2
3*	30+549	Box Culvert	1 X 6
4*	31+496	Box Culvert	1 X 3
5*	32+309	Box Culvert	1 X 2
6*	32+400	Box Culvert	1 X 4
7*	34+378	Box Culvert	1 X 1.5
8*	34+955	Box Culvert	1 X 2
9*	35+086	Box Culvert	1 X 2
10*	35+150	Box Culvert	1 X 3
11*	38+137	Box Culvert	1 X 4
12*	39+206	Box Culvert	1 X 3
13*	41+878	Box Culvert	1 X 2
14*	43+201	Box Culvert	1 X 2
15*	43+341	Box Culvert	1 X 2
16*	44+254	Pipe	2 X 1
17*	45+748	Box Culvert	1 X 6
18*	46+740	Box Culvert	1 X 4

S. No.	Chainage Km	Type of Culvert	Span Arrangement (m)
19*	47+511	Box Culvert	1 X 2
20*	47+620	Box Culvert	1 X 2
21	50+015	Pipe	3x1.2
22	51+178	Slab	1x4
23	51+614	Pipe	5x0.8
24	51+785	Pipe	3x0.9
25	52+260	Slab	1x3
26	52+680	Pipe	3x1.2
27	52+720	Pipe	1x0.6
28	53+436	Slab	1x1.5
29	53+773	Slab	1x1.1
30	54+322	Stone Slab	3x1.5
31	54+357	Box	2x3
32	54+800	Slab	1x1.8
33	54+900	Slab	1x1
34	55+141	Slab	1x3
35	55+504	Pipe	1x1
36	56+370	Pipe	5x1.2
37	56+660	Pipe	2x1
38	57+185	Slab	1x3
39	57+241	Pipe	4x1
40	57+715	Pipe	1x1
41	57+905	Pipe	2x1
42	58+378	Pipe	3x1
43	58+400	Pipe	1x0.6
44	58+500	Pipe	1x0.6
45	58+797	Pipe	3x1
46	59+794	Pipe	2x1
47	59+849	Pipe	2x1
48	60+262	Pipe	1x1
49	60+808	Pipe	1x1
50	61+400	Pipe	1x1
51*	62+032	Pipe	1x1.2
52*	62+279	Box	1x6.5
53*	62+482	Pipe	1x1.2
54*	62+753	Pipe	1x1.2
55*	63+167	Pipe	3x1.2
56*	64+099	Box	1x6

S. No.	Chainage Km	Type of Culvert	Span Arrangement (m)
57*	65+031	Pipe	2x0.9
58*	68+090	Pipe	1x1
59*	68+121	Pipe	1x1
60*	68+997	Pipe	3x1.2
61*	69+070	Pipe	1x1
62*	70+373	Pipe	1x1
63*	70+389	Pipe	1x1
64*	70+811	Pipe	1x0.9
65*	71+464	Pipe	2x0.9
66*	71+519	Pipe	1x0.9
67*	72+584	Pipe	3x1
68*	73+536	Box	1x2
69*	73+658	Box	1x3.6

For Section-04 Neelmangla Tumkur

a) *Under construction locations these details are tentative these may varies as per site and same shall be maintained by TOT concessionaire after end of DLP period.

b) Other than the (*) locations, the remaining stretches fall within the ongoing DPR section. Hence, these details may vary as per site conditions and shall be maintained by the TOT concessionaire after the completion of the DLP period.

6.6 Project Facilities

6.6.1 Toll Plaza

Vijayawada-Chilakaluripet: Project Stretch starts from Km 355+000 of NH-16 at Vijayawada and ends at Km 422+605 of NH-16 at Chilakaluripet and has Kaza toll Plazas at Km 420+500 on project Section in the state of Andhra Pradesh. The total length of Project Stretch is 69.408 km.

Chennai Bypass: Project Stretch starts from Km 0+000 and ends at Km 32+600 of NH-32/ NH-48 and has Vanagram toll Plazas at Km 16+500 and Surapattu at Km 28+600 on project Section in the state of Tamil Nadu. The total length of Project Stretch is 32.600 km.

Chennai-Tada: Project Stretch starts from Km 21+400 and ends at Km 54+400 of NH-16 and has Nallur at Km 21+625 on project Section in the state of Tamil Nadu. The total length of Project Stretch is 33.00 km.

Neelmangla-Tumkur: Project Stretch starts from Km 29+500 and ends at Km 74+168 of NH-48 and has kulumepalya toll plazas at Km 30+000 and Chokkenahalli toll plaza Km 61+500 on project Section in the state of Karnataka. The total length of Project Stretch is 44.668 km.

Note*- The existing two toll plazas at Kulumepalya and Chokkenahalli will be demolished, and new toll plazas at MCW (Ch. 53+100), Ramp RHS (Ch. 53+100), Ramp RHS (Ch. 46+375), LHS Ramp (Ch.49+900) and Ramp LHS (Ch. 47+425) shall be constructed by the Authority. Accordingly, the Toll Management System (TMS) will be provided by the Authority and shall be maintained by the TOT/InvIT Concessionaire after the completion of the DLP period.

Section-01 Vijayawada-Chilakaluripet

Kaza toll Plaza (420+500)

Section-02 Chennai Bypass

Vanagram toll Palaza (16+500)

Surapattu toll Plaza (28+600)

Section-03 Chennai-Tada

Nallur toll Plaza (21+625)

Nallur toll Plaza (21+625)

Section 04 Neelmangla-Tumkur

Kulumepalya toll Plaza (30+000)

Chokkenahalli (61+500)

Table 6-23 : Infrastructure at Toll Plaza

Section 1 Vijayawada-Chilakaluripet

S. No.	Particulars	Details of Kaza Toll Plaza
1	Toll Plaza Chainage and name	420+500
2	Number of Toll Lanes	16
3	No of ETC system	16
4	No of Toll Booths	15
5	Canopy/ FOB	Canopy Available / FOB Not Available
6	Admin Building	Available
7	Availibility of Tunnel	Available

S. No.	Particulars	Details of Kaza Toll Plaza
8	Toilets (Gents & Ladies)	2
9	Type of Pavement at Toll Lanes	Rigid
10	Slow Speed Weigh in Motion Facility	Available (Not Working)
11	Static Weigh Bridge	2(1 Not working)
12	Availability of loading/unloading facilities	Not Available
13	Storage facility of overloaded material	Not Available
14	High Mast Light	4
15	Street Lights	28
16	Traffic Aid Post	Available
17	Medical Aid Post	Available
18	Control Room	Available
19	Server Room	Available
20	UPS & Battery room	Available
21	Plaza Manager Room	Available
22	Cash up Room	Available
23	Room for Cashier	Available
24	Cantilever/Gantry Board	Available
25	Electricity Supply	Available
26	Cash van garage	Available
27	PRO Office	Available
28	Meeting Room	Available
29	Changing room	Available
30	Lane Configuration	6 lane

Section 02 Chennai Bypass

S. No.	Particulars	Details of Vanagram Toll Plaza	Details of Surapattu Toll Plaza
1	Toll Plaza Chainage and name	16+500	28+600
2	Number of Toll Lanes	10	12
3	No of ETC system	10	12

S. No.	Particulars	Details of Vanagram Toll Plaza	Details of Surapattu Toll Plaza
4	No of Toll Booths	9	11
5	Canopy/ FOB	Canopy Available / FOB Not Available	Canopy Available / FOB Not Available
6	Admin Building	Not Available	Not Available
7	Availibility of Tunnel	Not Available	Not Available
8	Toilets (Gents & Ladies)	Not Available	2
9	Type of Pavement at Toll Lanes	Rigid	Rigid
10	Medium Speed Weigh in Motion Facility	0	0
11	Static Weigh Bridge	0	0
12	Availability of loading/unloading facilities	Not Available	Not Available
13	Storage facility of overloaded material	Not Available	Not Available
14	High Mast Light	2	2
15	Street Lights	20	0
16	Traffic Aid Post	Not Available	Not Available
17	Medical Aid Post	Not Available	Not Available
18	Control Room	Not Available	Not Available
19	Server Room	Not Available	Not Available
20	UPS & Battery room	Not Available	Not Available
21	Plaza Manager Room	Not Available	Not Available
22	Cash up Room	Not Available	Not Available
23	Room for Cashier	Not Available	Not Available
24	Cantilever/Gantry Board	Available	Available
25	Electricity Supply	Available	Available
26	Cash van garage	Available	Available
27	PRO Office	Not Available	Not Available
28	Meeting Room	Not Available	Not Available
29	Changing room	Not Available	Not Available
30	Lane Configuration	6-lane	6-lane

Note*- The existing toll plazas at Vanagram will be demolished, and new toll plazas at Ch. 6+500, shall be constructed by the Authority. Accordingly, the MLFF will be provided by the Authority and shall be maintained by the TOT/InvIT Concessionaire after the completion of the DLP period.

Section 03 Chennai Tada

S. No.	Particulars	Details of Nallur Toll Plaza
1	Toll Plaza Chainage and name	21+625
2	Number of Toll Lanes	14
3	No of ETC system	14
4	No of Toll Booths	13
5	Canopy/ FOB	Available
6	Admin Building	Available
7	Availibility of Tunnel	No
8	Toilets (Gents & Ladies)	2
9	Type of Pavement at Toll Lanes	Rigid
10	Medium Speed Weigh in Motion Facility	0
11	Static Weigh Bridge	0
12	Availability of loading/unloading facilities	Not Available
13	Storage facility of overloaded material	Not Available
14	High Mast Light	6
15	Traffic Aid Post	Not Available
16	Medical Aid Post	Available
17	Control Room	Available
18	Server Room	Available
19	UPS & Battery room	Available
20	Plaza Manager Room	Available
21	Cash up Room	Available
22	Room for Cashier	Available
23	Cantilever/Gantry Board	Available
24	Electricity Supply	Available

S. No.	Particulars	Details of Nallur Toll Plaza
25	Cash van garage	Available
26	PRO Office	Available
27	Meeting Room	Not Available
28	Changing room	Not Available
29	Lane Configuration	6-lane

Section 04 Neelmangla-Tumkur

S. No.	Particulars	Details of Kulumepalya Toll Plaza	Details of Chokkenahalli Toll Plaza
1	Toll Plaza Chainage and name	30+000	61+500
2	Number of Toll Lanes	10	10
3	No of ETC system	10	10
4	No of Toll Booths	9	9
5	Canopy/ FOB	Canopy Available/ FOB Available	Canopy Available/ FOB Available
6	Admin Building	Admin building is in FOB	Admin building is in FOB
7	Availibility of Tunnel	No	No
8	Toilets (Gents & Ladies)	2	1
9	Type of Pavement at Toll Lanes	Rigid	Rigid
10	Medium Speed Weigh in Motion Facility	0	0
11	Static Weigh Bridge	0	0
12	Availability of loading/unloading facilities	Not Avaliable	Not Avaliable
13	Storage facility of overloaded material	Not Avaliable	Not Avaliable
14	High Mast Light	2	2
15	Street Lights	0	0
16	Traffic Aid Post	Not Avaliable	Not Avaliable
17	Medical Aid Post	Not Avaliable	Not Avaliable
18	Control Room	Available	Available

S. No.	Particulars	Details of Kulumepalya Toll Plaza	Details of Chokkenahalli Toll Plaza
19	Server Room	Available	Available
20	UPS & Battery room	Available	Available
21	Plaza Manager Room	Available	Available
22	Cash up Room	Available	Available
23	Room for Cashier	Available	Available
24	Cantilever/Gantry Board	Available	Available
25	Electricity Supply	Available	Available
26	Cash van garage	Available	Available
27	PRO Office	Available	Available
28	Meeting Room	Available	Available
29	Changing room	Available	Available
30	Lane Configuration	4-lane	4&6 Lane

Note*- The existing two toll plazas at Kulumepalya and Chokkenahalli will be demolished, and New Toll Plaza with MLFF (Multi lane free flow system) shall be provided by Authority at MCW (Ch. 53+100), Ramp RHS (Ch. 53+100), Ramp RHS (Ch. 46+375), LHS Ramp (Ch.49+900) and Ramp LHS (Ch. 47+425), and the same shall be maintained by InvIT Concessionaire. after the completion of the DLP period.

6.6.2 Bus bays and Bus Shelter

Locations of bus shelter are presented in the table below:

Section 01 Vijayawada-Chilakaluripet

Section 02 Chennai Bypass

Section 03 Chennai Tada

Section 04 Neelmangla-Tumkur

Figure 6-7 : Bus Bay along the Project Stretch

***Table 6-24 :* Detail of Bus bay and Bus Shelter**

Section 01 Vijayawada-Chilakaluripet

S. No.	Chainage Km	Side	Name of Habitation	Type
1	2+358	LHS	Boppudi	Bus Bay with Shelter
2	2+637	RHS	Boppudi	Bus Bay with Shelter
3	4+630	LHS	Purushottapatnam	Bus Bay with Shelter
4	4+905	RHS	Purushottapatnam	Bus Bay with Shelter
5	7+300	LHS	Guntur	Bus Bay with Shelter
6	7+600	RHS	Guntur	Bus Bay with Shelter
7	15+044	RHS	Thimmapuram	Bus Bay with Shelter

S. No.	Chainage Km	Side	Name of Habitation	Type
8	15+062	LHS	Thimmapuram	Bus Bay with Shelter
9	355+150	LHS	Tatapudi	Bus Bay with Shelter
10	355+800	RHS	Tatapudi	Bus Bay with Shelter
11	374+400	RHS	Edlapadu	Bus Bay with Shelter
12	378+809	RHS	Boyapalem	Bus Bay with Shelter
13	378+812	LHS	Boyapalem	Bus Bay with Shelter
14	384+200	RHS	Kondrupadu	Bus Bay with Shelter
15	384+350	LHS	Kondrupadu	Bus Bay with Shelter
16	385+515	LHS	Chinakondrupadu	Bus Shelter
17	389+270	LHS	Chodavaram	Bus bay
18	389+706	RHS	Chodavaram	Bus Bay with Shelter
19	419+500	LHS	Namburu	Bus Shelter
20	421+995	RHS	Kaza	Bus Bay with Shelter
21	422+304	LHS	Kaza	Bus Bay with Shelter

Section 02 Chennai Bypass

S. No.	Chainage Km	Side	Name of Habitation	Type
1	21+720	RHS	Mogappair West	Bus Shelter

Section 03 Chennai Tada

S. No.	Chainage Km	Side	Name of Habitation	Type
1	22+100	LHS	Vijayanallur	Bus Shelter
2	22+505	RHS	Cholavaram	Bus Bay without Shelter
3	27+100	RHS	Jaganathapuram	Bus Shelter
4	27+375	LHS	Janappanchatram	Bus Shelter
5	27+580	RHS	Janappanchatram	Bus Bay without Shelter
6	30+200	LHS	Penneri	Bus Bay with Shelter
7	30+200	RHS	Panjetty	Bus Bay with Shelter
8	31+060	RHS	Ponneri	Bus Shelter
9	31+225	LHS	Thatchoor	Bus Shelter
10	31+280	RHS	Thatchoor	Bus Shelter

S. No.	Chainage Km	Side	Name of Habitation	Type
11	31+750	LHS	Thatchoor	Bus Bay with Shelter
12	32+210	RHS	Peravallur	Bus Bay with Shelter
13	32+785	LHS	Peravallur	Bus Bay with Shelter
14	33+080	RHS	Peravallur	Bus Bay with Shelter
15	33+900	LHS	Ponneri	Bus Bay with Shelter
16	33+900	RHS	Ponneri	Bus Bay with Shelter
17	35+210	LHS	Kollumedu	Bus Shelter
18	35+790	LHS	Peruvaili	Bus Bay with Shelter
19	36+230	LHS	Peruvaili	Bus Bay with Shelter
20	36+305	RHS	Peruvaili	Bus Bay with Shelter
21	37+870	RHS	RSM Nagar	Bus Bay with Shelter
22	40+010	RHS	Panpakkam	Bus Bay with Shelter
23	40+015	LHS	Panpakkam	Bus Bay with Shelter
24	41+400	RHS	Panpakkam	Bus Bay with Shelter
25	44+435	LHS	Sipcot Phase II	Bus Bay with Shelter
26	44+925	RHS	Sipcot	Bus Bay with Shelter
27	46+405	RHS	Kayalarmedu	Bus Bay with Shelter
28	46+520	LHS	Kayalarmedu	Bus Bay with Shelter
29	47+920	LHS	Peddikuppam	Bus Bay with Shelter
30	47+930	RHS	Peddikuppam	Bus Bay with Shelter
31	48+800	LHS	Chinnaobulapuram	Bus Bay with Shelter
32	49+325	RHS	Gummidipoondi	Bus Bay with Shelter
33	51+210	RHS	Gummidipoondi	Bus bay
34	51+325	LHS	Elavur	Bus Bay with Shelter
35	52+240	RHS	Elavur	Bus Bay with Shelter
36	53+175	LHS	Gumpli	Bus Bay with Shelter

Section 04 Neelmangla-Tumkur

S. No.	Chainage Km	Side	Name of Habitation	Type
1*	30+650	LHS	Bommanahalli	Bus Shelter
2*	32+485	BHS	Budhihal	Bus Shelter
3*	34+100	LHS	Tonachinnakuppe	Bus Shelter
4*	34+300	RHS	Tonachinnakuppe	Bus Shelter

S. No.	Chainage Km	Side	Name of Habitation	Type
5*	39+500	BHS	Dodderi	Bus Shelter
6*	40+650	LHS	Kuluvanahalli	Bus Shelter
7*	40+915	RHS	Kuluvanahalli	Bus Shelter
8*	44+450	BHS	Billanakote	Bus Shelter
9*	46+060	LHS	Kengalkempohalli	Bus Shelter
10*	46+380	RHS	Kengalkempohalli	Bus Shelter
11*	47+450	LHS	Sompura Industrial Area and Yedehalli	Bus Shelter
12*	47+550	RHS		Bus Shelter
13	54+275	LHS	Nandihalli	Bus Bay without Shelter
14	54+435	RHS	Nandihalli	Bus Bay without Shelter
15	55+385	LHS	Nandihalli	Bus Bay without Shelter
16	55+990	LHS	Pemmanahalli	Bus Bay with Shelter
17	56+050	RHS	Pemmanahalli	Bus Shelter
18	56+955	RHS	Chikkahalli	Bus Bay without Shelter
19	59+375	RHS	Kondanayakanahalli	Bus Bay without Shelter
20*	63+862	BHS	Kyatsandra	Bus Shelter

For Section-04 Neelmangla Tumkur

a) *Under construction locations these details are tentative these may varies as per site and same shall be maintained by TOT concessionaire after end of DLP period.

b) Other than the (*) locations, the remaining stretches fall within the ongoing DPR section. Hence, these details may vary as per site conditions and shall be maintained by the TOT concessionaire after the completion of the DLP period.

6.6.3 Truck lay bye

Locations of Truck lay bye are presented in table below:

Table 6-25 : **Detail of Truck lay bye**

Section 01 Vijayawada-Chilakaluripet

S. No.	Chainage Km	Side	Name of Habitation
1	395+950	RHS	Ankireddypalem

Section 02 Chennai Bypass

S. No.	Chainage Km	Side	Name of Habitation
Nil			

Section 03 Chennai Tada

S. No.	Chainage Km	Side	Name of Habitation
Nil			

Section 04 Neelmangla-Tumkur

S. No.	Chainage Km	Side	Name of Habitation
1*	46+950	LHS	Yadehalli

For Section-04 Neelmangla Tumkur

a) *Under construction locations these details are tentative these may varies as per site and same shall be maintained by TOT concessionaire after end of DLP period.

b) Other than the (*) locations, the remaining stretches fall within the ongoing DPR section. Hence, these details may vary as per site conditions and shall be maintained by the TOT concessionaire after the completion of the DLP period.

6.7 Road Furniture

Details of various road furniture like streetlight, safety barrier, sign board etc. are presented in sections below.

6.7.1 Crash Barrier

Various types of safety barriers are presented in table below:

Table 6-26 : Location of W-Beam Crash Barrier

Section 01 Vijayawada-Chilakaluripet

S. No.	Chainage (Km)		Length (m)	Side	Location
	From	To			
1	355+200	355+460	260	LHS	Separator
2	355+240	355+460	220	RHS	Separator
3	355+510	355+700	190	LHS	Separator
4	355+510	355+700	190	RHS	Separator
5	357+100	357+285	185	LHS	Separator
6	357+100	357+285	185	RHS	Separator

S. No.	Chainage (Km)		Length (m)	Side	Location
	From	To			
7	357+315	357+342	27	LHS	Separator
8	357+315	357+342	27	RHS	Separator
9	372+038	372+335	297	LHS	Shoulder
10	372+038	372+335	297	RHS	Shoulder
11	372+405	372+710	305	LHS	Shoulder
12	372+410	372+710	300	RHS	Shoulder
13	372+880	373+010	130	LHS	Separator
14	372+920	373+010	90	RHS	Separator
15	373+030	373+100	70	LHS	Separator
16	373+030	373+100	70	RHS	Separator
17	373+370	373+590	220	RHS	Shoulder
18	373+370	373+590	220	LHS	Shoulder
19	373+665	373+670	5	SR LHS	Shoulder
20	373+665	373+780	115	RHS	Shoulder
21	373+800	373+870	70	RHS	Shoulder
22	373+800	373+900	100	LHS	Shoulder
23	373+940	374+610	670	LHS	Median
24	374+620	375+540	920	LHS	Median
25	377+200	377+250	50	LHS	Separator
26	377+200	377+250	50	RHS	Separator
27	377+270	377+320	50	LHS	Separator
28	377+270	377+320	50	RHS	Separator
29	378+100	378+750	650	LHS	Median
30	380+230	380+275	45	LHS	Separator
31	380+230	380+275	45	RHS	Separator
32	380+290	380+330	40	LHS	Separator
33	380+290	380+330	40	RHS	Separator
34	381+280	381+420	140	LHS	Separator
35	381+280	381+420	140	RHS	Separator
36	381+470	381+670	200	LHS	Separator
37	381+470	381+670	200	RHS	Separator
38	382+820	382+890	70	LHS	Separator
39	382+820	382+890	70	RHS	Separator
40	382+905	382+980	75	LHS	Separator
41	382+905	382+980	75	RHS	Separator
42	383+980	384+085	105	LHS	Separator
43	383+980	384+085	105	RHS	Separator
44	384+105	384+190	85	LHS	Separator
45	384+105	384+190	85	RHS	Separator
46	384+730	384+750	20	RHS	Separator
47	385+000	385+030	30	LHS	Separator

S. No.	Chainage (Km)		Length (m)	Side	Location
	From	To			
48	385+000	385+030	30	RHS	Separator
49	385+050	385+315	265	LHS	Separator
50	385+050	385+315	265	RHS	Separator
51	385+365	385+610	245	LHS	Separator
52	385+365	385+610	245	RHS	Separator
53	385+750	385+760	10	RHS	Separator
54	386+070	386+080	10	RHS	Separator
55	387+030	387+060	30	LHS	Separator
56	387+090	387+120	30	RHS	Separator
57	387+220	387+310	90	LHS	Separator
58	387+220	387+310	90	RHS	Separator
59	387+330	387+360	30	LHS	Separator
60	387+330	387+360	30	RHS	Separator
61	387+480	387+520	40	LHS	Separator
62	387+510	387+530	20	RHS	Separator
63	387+750	387+770	20	LHS	Median
64	388+160	388+315	155	LHS	Separator
65	388+160	388+315	155	RHS	Separator
66	388+350	388+550	200	LHS	Separator
67	388+350	388+550	200	RHS	Separator
68	389+240	389+400	160	LHS	Separator
69	389+240	389+400	160	RHS	Separator
70	389+420	389+480	60	LHS	Separator
71	389+420	389+480	60	RHS	Separator
72	390+400	390+410	10	LHS	Separator
73	390+560	390+610	50	LHS	Separator
74	390+560	390+610	50	RHS	Separator
75	390+630	390+770	140	LHS	Separator
76	390+630	390+770	140	RHS	Separator
77	391+050	391+260	210	LHS	Separator
78	391+050	391+260	210	RHS	Separator
79	391+310	391+500	190	LHS	Separator
80	391+310	391+500	190	RHS	Separator
81	391+530	392+040	510	LHS	Separator
82	391+530	392+040	510	RHS	Separator
83	392+060	392+190	130	LHS	Separator
84	392+060	392+190	130	RHS	Separator
85	392+500	392+520	20	RHS	Separator
86	392+930	392+950	20	LHS	Separator
87	393+110	393+150	40	LHS	Separator
88	393+110	393+150	40	RHS	Separator

S. No.	Chainage (Km)		Length (m)	Side	Location
	From	To			
89	393+165	393+280	115	LHS	Separator
90	393+165	393+280	115	RHS	Separator
91	393+760	393+930	170	LHS	Separator
92	393+760	393+930	170	RHS	Separator
93	393+980	394+190	210	LHS	Separator
94	393+980	394+190	210	RHS	Separator
95	395+470	395+540	70	LHS	Separator
96	395+470	395+540	70	RHS	Separator
97	395+555	395+610	55	LHS	Separator
98	395+555	395+610	55	RHS	Separator
99	396+240	396+335	95	LHS	Separator
100	396+240	396+335	95	RHS	Separator
101	396+350	396+370	20	LHS	Separator
102	396+350	396+370	20	RHS	Separator
103	396+690	397+110	420	LHS	Median
104	397+140	397+440	300	LHS	Median
105	398+280	398+390	110	LHS	Separator
106	398+280	398+390	110	RHS	Separator
107	398+400	398+450	50	LHS	Separator
108	398+400	398+450	50	RHS	Separator
109	399+050	399+185	135	LHS	Separator
110	399+050	399+185	135	RHS	Separator
111	399+215	399+380	165	LHS	Separator
112	399+215	399+380	165	RHS	Separator
113	399+450	399+720	270	LHS	Separator
114	399+450	399+720	270	RHS	Separator
115	399+750	399+890	140	LHS	Separator
116	399+750	399+890	140	RHS	Separator
117	400+270	400+650	380	LHS	Median
118	400+685	401+090	405	LHS	Median
119	401+470	401+670	200	LHS	Separator
120	401+470	401+670	200	RHS	Separator
121	401+690	401+830	140	RHS	Separator
122	401+690	401+830	140	LHS	Separator
123	402+860	403+075	215	LHS	Separator
124	402+860	403+075	215	RHS	Separator
125	403+110	403+310	200	LHS	Separator
126	403+110	403+310	200	RHS	Separator
127	404+210	404+360	150	RHS	Separator
128	404+260	404+665	405		Median
129	404+700	405+080	380		Median

S. No.	Chainage (Km)		Length (m)	Side	Location
	From	To			
130	405+230	405+350	120	LHS	Separator
131	405+230	405+350	120	RHS	Separator
132	405+370	405+470	100	LHS	Separator
133	405+370	405+470	100	RHS	Separator
134	405+930	406+285	355	RHS	Shoulder
135	405+950	406+285	335	LHS	Shoulder
136	406+315	406+620	305	LHS	Shoulder
137	406+315	406+820	505	RHS	Shoulder
138	407+170	407+480	310	LHS	Separator
139	407+170	407+480	310	RHS	Separator
140	407+535	407+840	305	LHS	Separator
141	407+535	407+840	305	RHS	Separator
142	408+760	408+790	30	RHS	Separator
143	409+140	409+220	80	LHS	Separator
144	409+140	409+220	80	RHS	Separator
145	409+250	409+350	100	LHS	Separator
146	409+250	409+350	100	RHS	Separator
147	409+830	409+980	150	LHS	Separator
148	409+830	409+980	150	RHS	Separator
149	410+010	410+190	180	LHS	Separator
150	410+010	410+190	180	RHS	Separator
151	411+010	411+100	90	LHS	Separator
152	411+010	411+100	90	RHS	Separator
153	411+125	411+250	125	LHS	Separator
154	411+125	411+250	125	RHS	Separator
155	411+480	411+820	340		Median
156	411+850	414+480	2630		Median
157	412+180	412+240	60	LHS	Separator
158	412+180	412+240	60	RHS	Separator
159	413+820	414+180	360	SR LHS	Shoulder
160	414+505	415+070	565		Median
161	415+490	416+020	530	LHS	Median
162	415+490	415+570	80	RHS	Separator
163	415+585	416+080	495	RHS	Separator
164	416+130	416+430	300	LHS	Median
165	416+130	416+430	300	RHS	Separator
166	416+710	416+970	260	LHS	Median
167	416+710	416+840	130	RHS	Separator
168	416+865	416+970	105	RHS	Separator
169	417+800	418+210	410	LHS	Separator
170	417+840	418+080	240	RHS	Separator

S. No.	Chainage (Km)		Length (m)	Side	Location
	From	To			
171	418+300	418+580	280	LHS	Separator
172	418+300	418+580	280	RHS	Separator
173	419+110	419+140	30	RHS	Separator
174	419+260	419+450	190	LHS	Separator
175	419+260	419+450	190	RHS	Separator
176	419+480	419+690	210	LHS	Separator
177	419+480	419+690	210	RHS	Separator
178	421+250	421+320	70	LHS	Separator
179	421+330	421+360	30	LHS	Separator
180	421+330	421+360	30	RHS	Separator
181	421+380	421+780	400	SR LHS	Shoulder
182	421+690	421+800	110	RHS	Separator
183	421+815	422+145	330	RHS	Separator
184	421+860	422+145	285	LHS	Separator
185	422+190	422+440	250	LHS	Separator
186	422+190	422+440	250	RHS	Separator
187	422+370	422+580	210		Median

Section -2 Chennai Bypass

S. No.	Chainage (Km)		Length (m)	Side	Location
	From	To			
1	0+000	0+360	360	LHS	Seperator
2	0+030	0+380	350		Median
3	0+390	1+250	860	LHS	Seperator
4	0+410	0+420	10		Median
5	1+270	1+530	260	LHS	Seperator
6	1+550	2+500	950	LHS	Seperator
7	2+520	5+220	2700	LHS	Seperator
8	5+240	5+990	750	LHS	Seperator
9	6+020	7+060	1040	LHS	Seperator
10	7+090	7+520	430	LHS	Seperator
11	7+530	9+000	1470	LHS	Seperator
12	9+230	10+360	1130	LHS	Seperator
13	10+380	12+070	1690	LHS	Seperator
14	12+090	13+490	1400	LHS	Seperator
15	13+530	14+090	560	LHS	Seperator
16	14+110	15+380	1270	LHS	Seperator
17	15+850	16+580	730	LHS	Seperator
18	16+700	16+910	210	LHS	Seperator

S. No.	Chainage (Km)		Length (m)	Side	Location
	From	To			
19	16+950	18+020	1070	LHS	Seperator
20	18+030	18+825	795	LHS	Seperator
21	18+915	19+085	170	LHS	Seperator
22	19+670	21+320	1650	LHS	Seperator
23	21+340	21+710	370	LHS	Seperator
24	21+760	21+940	180	LHS	Seperator
25	25+550	25+940	390	LHS	Seperator
26	25+960	27+230	1270	LHS	Seperator
27	27+270	28+160	890	LHS	Seperator
28	28+200	28+780	580	LHS	Seperator
29	28+820	29+060	240	LHS	Seperator
30	29+080	29+770	690	LHS	Seperator
31	29+780	30+170	390	LHS	Seperator
32	30+190	31+390	1200	LHS	Seperator
33	31+420	32+060	640	LHS	Seperator
34	32+550	32+600	50	LHS	Seperator
35	32+600	32+285	315	RHS	Seperator
36	32+060	31+380	680	RHS	Seperator
37	31+350	30+190	1160	RHS	Seperator
38	30+170	29+750	420	RHS	Seperator
39	29+740	29+080	660	RHS	Seperator
40	29+060	28+340	720	RHS	Seperator
41	28+280	28+140	140	RHS	Seperator
42	28+110	27+270	840	RHS	Seperator
43	27+240	25+970	1270	RHS	Seperator
44	25+950	25+540	410	RHS	Seperator
45	21+950	21+740	210	RHS	Seperator
46	21+690	21+350	340	RHS	Seperator
47	21+330	19+680	1650	RHS	Seperator
48	19+090	18+910	180	RHS	Seperator
49	18+840	18+020	820	RHS	Seperator
50	18+010	16+950	1060	RHS	Seperator
51	16+645	16+610	35		Median
52	16+560	15+880	680	RHS	Shoulder
53	15+410	14+150	1260	RHS	Shoulder
54	14+130	13+580	550	RHS	Shoulder
55	13+550	12+130	1420	RHS	Shoulder

S. No.	Chainage (Km)		Length (m)	Side	Location
	From	To			
56	12+110	10+370	1740	RHS	Shoulder
57	10+350	9+250	1100	RHS	Shoulder
58	9+020	7+550	1470	RHS	Shoulder
59	7+540	7+120	420	RHS	Shoulder
60	7+100	6+700	400	RHS	Shoulder
61	6+620	6+540	80	RHS	Shoulder
62	6+430	6+010	420	RHS	Shoulder
63	5+990	5+230	760	RHS	Shoulder
64	5+210	3+920	1290	RHS	Shoulder
65	3+880	3+780	100	RHS	Shoulder
66	3+750	2+530	1220	RHS	Shoulder
67	2+510	1+540	970	RHS	Shoulder
68	1+520	1+310	210	RHS	Shoulder
69	1+260	0+440	820	RHS	Shoulder
70	0+470	0+430	40		Median
71	0+410	0+200	210		MEDIAN
72	0+350	0+200	150	RHS	Seperator
73	0+130	0+000	130	RHS	Seperator
74	0+130	0+000	130		Median

Section-03 Chennai Tada

Chainage (Km)		Length (m)	Type	Side	Location
From	To				
21+900	21+990	90	W Beam Crash Barrier	LHS	Seperator
22+030	24+650	2620	W Beam Crash Barrier	LHS	Seperator
24+710	25+660	950	W Beam Crash Barrier	LHS	Seperator
25+700	25+840	140	W Beam Crash Barrier	LHS	Seperator
26+300	26+450	150	W Beam Crash Barrier	LHS	Seperator
26+450	26+890	440	W Beam Crash Barrier	LHS	Median
26+890	27+010	120	W Beam Crash Barrier	LHS	Seperator
27+540	27+760	220	W Beam Crash Barrier	LHS	Seperator
27+770	27+870	100	W Beam Crash Barrier	LHS	Seperator
27+880	28+100	220	W Beam Crash Barrier	LHS	Seperator
28+910	29+960	1050	W Beam Crash Barrier	LHS	Seperator
29+990	30+460	470	W Beam Crash Barrier	LHS	Seperator
31+330	31+480	150	W Beam Crash Barrier	LHS	Seperator
31+530	31+940	410	W Beam Crash Barrier	LHS	Seperator
31+970	33+200	1230	W Beam Crash Barrier	LHS	Seperator

Chainage (Km)		Length (m)	Type	Side	Location
From	To				
33+230	33+540	310	W Beam Crash Barrier	LHS	Seperator
33+780	34+000	220	W Beam Crash Barrier	LHS	Seperator
34+015	34+020	5	W Beam Crash Barrier	LHS	Seperator
34+040	34+330	290	W Beam Crash Barrier	LHS	Seperator
34+330	34+750	420	W Beam Crash Barrier	LHS	Seperator
35+320	35+385	65	W Beam Crash Barrier	LHS	Seperator
35+385	35+480	95	W Beam Crash Barrier	LHS	Seperator
35+650	36+100	450	W Beam Crash Barrier	LHS	Seperator
36+100	36+300	200	W Beam Crash Barrier	LHS	Seperator
36+320	37+090	770	W Beam Crash Barrier	LHS	Seperator
37+150	37+350	200	W Beam Crash Barrier	LHS	Seperator
39+140	39+290	150	W Beam Crash Barrier	LHS	Seperator
39+320	39+860	540	W Beam Crash Barrier	LHS	Seperator
40+090	40+530	440	W Beam Crash Barrier	LHS	Seperator
40+550	40+800	250	W Beam Crash Barrier	LHS	Seperator
40+830	41+030	200	W Beam Crash Barrier	LHS	Seperator
41+040	41+310	270	W Beam Crash Barrier	LHS	Seperator
41+320	41+590	270	W Beam Crash Barrier	LHS	Seperator
41+620	41+900	280	W Beam Crash Barrier	LHS	Seperator
42+500	43+450	950	W Beam Crash Barrier	LHS	Seperator
43+460	43+470	10	W Beam Crash Barrier	LHS	Seperator
43+490	43+590	100	W Beam Crash Barrier	LHS	Seperator
43+880	44+120	240	W Beam Crash Barrier	LHS	Seperator
44+150	44+370	220	W Beam Crash Barrier	LHS	Seperator
45+070	45+970	900	W Beam Crash Barrier	LHS	Seperator
45+950	46+050	100	W Beam Crash Barrier	LHS	Seperator
46+080	46+240	160	W Beam Crash Barrier	LHS	Seperator
46+690	47+050	360	W Beam Crash Barrier	LHS	Seperator
47+050	47+140	90	W Beam Crash Barrier	LHS	Seperator
47+170	47+390	220	W Beam Crash Barrier	LHS	Seperator
48+000	48+270	270	W Beam Crash Barrier	LHS	Seperator
48+300	49+050	750	W Beam Crash Barrier	LHS	Seperator
49+290	49+550	260	W Beam Crash Barrier	LHS	Seperator
49+600	49+790	190	W Beam Crash Barrier	LHS	Seperator
49+980	50+060	80	W Beam Crash Barrier	LHS	Seperator
50+270	50+350	80	W Beam Crash Barrier	LHS	Seperator
50+750	50+870	120	W Beam Crash Barrier	LHS	Seperator

Chainage (Km)		Length (m)	Type	Side	Location
From	To				
50+890	50+960	70	W Beam Crash Barrier	LHS	Seperator
51+030	51+070	40	W Beam Crash Barrier	LHS	Seperator
51+100	51+280	180	W Beam Crash Barrier	LHS	Seperator
51+300	51+660	360	W Beam Crash Barrier	LHS	Seperator
52+270	52+330	60	W Beam Crash Barrier	LHS	Seperator
52+370	52+580	210	W Beam Crash Barrier	LHS	Seperator
52+770	52+940	170	W Beam Crash Barrier	LHS	Seperator
52+940	53+650	710	W Beam Crash Barrier	LHS	Seperator
53+670	53+760	90	W Beam Crash Barrier	LHS	Seperator
53+810	53+960	150	W Beam Crash Barrier	LHS	Seperator
53+930	54+360	430	W Beam Crash Barrier	LHS	Seperator
54+400	54+080	320	W Beam Crash Barrier	RHS	Shoulder
53+760	52+800	960	W Beam Crash Barrier	RHS	Seperator
52+590	52+510	80	W Beam Crash Barrier	RHS	Seperator
52+450	52+240	210	W Beam Crash Barrier	RHS	Seperator
51+670	50+810	860	W Beam Crash Barrier	RHS	Seperator
50+690	50+630	60	W Beam Crash Barrier	RHS	Seperator
50+400	50+250	150	W Beam Crash Barrier	RHS	Seperator
50+020	49+980	40	W Beam Crash Barrier	RHS	Seperator
49+850	49+560	290	W Beam Crash Barrier	RHS	Seperator
49+520	49+320	200	W Beam Crash Barrier	RHS	Seperator
49+060	48+500	560	W Beam Crash Barrier	RHS	Seperator
48+460	48+320	140	W Beam Crash Barrier	RHS	Seperator
48+300	48+070	230	W Beam Crash Barrier	RHS	Seperator
47+310	47+210	100	W Beam Crash Barrier	RHS	Seperator
47+190	46+700	490	W Beam Crash Barrier	RHS	Seperator
46+240	45+380	860	W Beam Crash Barrier	RHS	Seperator
45+350	45+020	330	W Beam Crash Barrier	RHS	Seperator
44+370	44+240	130	W Beam Crash Barrier	RHS	Seperator
44+210	43+950	260	W Beam Crash Barrier	RHS	Seperator
43+620	43+530	90	W Beam Crash Barrier	RHS	Seperator
42+690	42+500	190	W Beam Crash Barrier	RHS	Seperator
41+940	40+860	1080	W Beam Crash Barrier	RHS	Seperator
40+830	40+580	250	W Beam Crash Barrier	RHS	Seperator
40+560	40+130	430	W Beam Crash Barrier	RHS	Seperator
39+880	39+500	380	W Beam Crash Barrier	RHS	Seperator
39+450	39+370	80	W Beam Crash Barrier	RHS	Seperator

Chainage (Km)		Length (m)	Type	Side	Location
From	To				
39+320	39+190	130	W Beam Crash Barrier	RHS	Seperator
37+360	37+220	140	W Beam Crash Barrier	RHS	Seperator
37+120	36+100	1020	W Beam Crash Barrier	RHS	Seperator
36+140	35+710	430	W Beam Crash Barrier	RHS	Seperator
35+500	35+350	150	W Beam Crash Barrier	RHS	Seperator
34+790	34+570	220	W Beam Crash Barrier	RHS	Seperator
34+550	34+020	530	W Beam Crash Barrier	RHS	Seperator
34+000	33+790	210	W Beam Crash Barrier	RHS	Seperator
33+540	33+220	320	W Beam Crash Barrier	RHS	Seperator
33+200	31+620	1580	W Beam Crash Barrier	RHS	Seperator
31+590	31+540	50	W Beam Crash Barrier	RHS	Seperator
31+480	31+320	160	W Beam Crash Barrier	RHS	Seperator
30+460	30+000	460	W Beam Crash Barrier	RHS	Seperator
29+980	29+240	740	W Beam Crash Barrier	RHS	Seperator
29+200	28+900	300	W Beam Crash Barrier	RHS	Seperator
28+120	27+510	610	W Beam Crash Barrier	RHS	Seperator
26+970	26+880	90	W Beam Crash Barrier	RHS	Seperator
26+430	26+340	90	W Beam Crash Barrier	RHS	Seperator
25+830	25+730	100	W Beam Crash Barrier	RHS	Seperator
25+710	24+720	990	W Beam Crash Barrier	RHS	Seperator
24+640	22+810	1830	W Beam Crash Barrier	RHS	Seperator
22+780	22+190	590	W Beam Crash Barrier	RHS	Seperator

Table 6-27 : Location of RCC Crash Barrier

Section 01 Vijayawada-Chilakaluripet

S.no	Chainage		Length	Side	Location
	From	To			
1	355+460	355+510	50	LHS	Structure
2	355+460	355+510	50	RHS	Structure
3	355+470	355+500	30	Median	Structure
4	356+045	356+080	35	LHS	Structure
5	356+045	356+080	35	RHS	Structure
6	356+050	356+075	25	LHS	Structure
7	356+050	356+075	25	RHS	Structure
8	357+285	357+315	30	LHS	Structure
9	357+285	357+315	30	RHS	Structure

S.no	Chainage		Length	Side	Location
	From	To			
10	372+335	372+410	75	Median	Structure
11	372+335	372+410	75	RHS	Structure
12	372+340	372+405	65	LHS	Structure
13	373+010	373+030	20	LHS	Structure
14	373+010	373+030	20	RHS	Structure
15	373+590	373+665	75	LHS	Structure
16	373+590	373+665	75	RHS	Structure
17	373+760	373+790	30	LHS	Structure
18	373+790	374+530	740	LHS	Structure Approach
19	373+830	374+530	700	RHS	Structure Approach
20	374+600	374+630	30	LHS	Structure
21	374+600	374+630	30	RHS	Structure
22	374+610	374+620	10	Median	Structure
23	375+240	376+005	765	LHS	Structure Approach
24	375+240	376+005	765	RHS	Structure Approach
25	375+640	375+665	25	Median	Structure
26	375+940	375+960	20	LHS	Structure
27	375+940	375+960	20	RHS	Structure
28	375+950	375+955	5	LHS	Structure
29	375+950	375+955	5	RHS	Structure
30	376+670	376+680	10	RHS	Structure
31	376+680	376+685	5	RHS	Structure
32	376+705	376+710	5	LHS	Structure
33	376+720	376+730	10	LHS	Structure
34	377+250	377+270	20	LHS	Structure
35	377+250	377+270	20	RHS	Structure
36	377+775	377+800	25	LHS	Structure
37	377+775	377+800	25	LHS	Structure
38	377+780	377+795	15	Median	Structure
39	377+775	377+800	25	RHS	Structure
40	377+775	377+800	25	RHS	Structure
41	378+270	378+735	465	LHS	Structure Approach
42	378+310	378+735	425	RHS	Structure Approach
43	378+770	378+940	170	Median	
44	379+020	379+035	15	LHS	Structure
45	379+020	379+035	15	RHS	Structure
46	379+025	379+030	5	LHS	Structure

S.no	Chainage		Length	Side	Location
	From	To			
47	379+025	379+030	5	RHS	Structure
48	379+375	379+390	15	LHS	Structure
49	379+375	379+390	15	RHS	Structure
50	379+380	379+385	5	LHS	Structure
51	379+380	379+385	5	RHS	Structure
52	379+710	379+720	10	LHS	Structure
53	379+710	379+720	10	RHS	Structure
54	379+713	379+718	5	LHS	Structure
55	379+713	379+718	5	RHS	Structure
56	379+935	379+955	20	LHS	Structure
57	379+935	379+955	20	RHS	Structure
58	379+940	379+945	5	LHS	Structure
59	379+940	379+945	5	RHS	Structure
60	380+275	380+290	15	LHS	Structure
61	380+275	380+290	15	RHS	Structure
62	380+520	380+560	40	LHS	Structure
63	380+520	380+560	40	RHS	Structure
64	380+520	380+560	40	LHS	Structure
65	380+520	380+560	40	RHS	Structure
66	380+530	380+555	25	Median	Structure
67	380+970	380+990	20	LHS	Structure
68	380+970	380+990	20	RHS	Structure
69	380+975	380+980	5	LHS	Structure
70	380+975	380+980	5	RHS	Structure
71	381+420	381+470	50	LHS	Structure
72	381+420	381+470	50	RHS	Structure
73	381+430	381+455	25	Median	Structure
74	381+560	381+575	15	LHS	Structure
75	381+560	381+575	15	RHS	Structure
76	381+565	381+570	5	LHS	Structure
77	381+565	381+570	5	RHS	Structure
78	381+920	381+940	20	LHS	Structure
79	381+920	381+940	20	RHS	Structure
80	381+930	381+935	5	LHS	Structure
81	381+930	381+935	5	RHS	Structure
82	382+590	382+605	15	LHS	Structure
83	382+590	382+605	15	RHS	Structure

S.no	Chainage		Length	Side	Location
	From	To			
84	382+595	382+600	5	LHS	Structure
85	382+595	382+600	5	RHS	Structure
86	382+890	382+905	15	LHS	Structure
87	382+890	382+905	15	RHS	Structure
88	383+500	383+520	20	LHS	Structure
89	383+500	383+520	20	RHS	Structure
90	383+510	383+515	5	LHS	Structure
91	383+510	383+515	5	RHS	Structure
92	384+030	384+045	15	LHS	Structure
93	384+030	384+045	15	RHS	Structure
94	384+035	384+040	5	LHS	Structure
95	384+035	384+040	5	RHS	Structure
96	384+085	384+105	20	LHS	Structure
97	384+085	384+105	20	RHS	Structure
98	384+690	384+730	40	LHS	Structure
99	384+690	384+730	40	RHS	Structure
100	384+695	384+725	30	LHS	Structure
101	384+695	384+725	30	RHS	Structure
102	384+995	385+010	15	LHS	Structure
103	384+995	385+010	15	RHS	Structure
104	385+000	385+005	5	LHS	Structure
105	385+000	385+005	5	RHS	Structure
106	385+030	385+050	20	LHS	Structure
107	385+030	385+050	20	RHS	Structure
108	385+220	385+225	5	LHS	Structure
109	385+210	385+230	20	RHS	Structure
110	385+220	385+225	5	LHS	Structure
111	385+220	385+225	5	RHS	Structure
112	385+315	385+365	50	LHS	Structure
113	385+315	385+365	50	RHS	Structure
114	385+325	385+355	30	Median	Structure
115	385+735	385+755	20	LHS	Structure
116	385+735	385+755	20	RHS	Structure
117	385+745	385+750	5	LHS	Structure
118	385+745	385+750	5	RHS	Structure
119	386+050	386+075	25	LHS	Structure
120	386+050	386+075	25	RHS	Structure

S.no	Chainage		Length	Side	Location
	From	To			
121	386+060	386+070	10	LHS	Structure
122	386+060	386+070	10	RHS	Structure
123	387+050	387+075	25	LHS	Structure
124	387+070	387+100	30	RHS	Structure
125	387+060	387+080	20	LHS	Structure
126	387+070	387+095	25	RHS	Structure
127	387+065	387+085	20	Median	Structure
128	387+310	387+330	20	LHS	Structure
129	387+310	387+330	20	RHS	Structure
130	387+500	387+515	15	LHS	Structure
131	387+500	387+520	20	RHS	Structure
132	387+510	387+515	5	LHS	Structure
133	387+510	387+515	5	RHS	Structure
134	387+985	388+020	35	LHS	Structure
135	387+985	388+020	35	RHS	Structure
136	387+990	388+015	25	LHS	Structure
137	387+990	388+015	25	RHS	Structure
138	387+995	388+010	15	Median	Structure
139	388+315	388+350	35	LHS	Structure
140	388+315	388+350	35	RHS	Structure
141	388+850	388+890	40	LHS	Structure
142	388+850	388+890	40	RHS	Structure
143	388+855	388+885	30	LHS	Structure
144	388+855	388+885	30	RHS	Structure
145	389+400	389+420	20	LHS	Structure
146	389+400	389+420	20	RHS	Structure
147	389+765	389+800	35	LHS	Structure
148	389+765	389+800	35	RHS	Structure
149	389+770	389+795	25	LHS	Structure
150	389+770	389+795	25	RHS	Structure
151	389+775	389+790	15	Median	Structure
152	390+425	390+445	20	LHS	Structure
153	390+425	390+445	20	RHS	Structure
154	390+430	390+440	10	LHS	Structure
155	390+430	390+440	10	RHS	Structure
156	390+610	390+630	20	LHS	Structure
157	390+610	390+630	20	RHS	Structure

S.no	Chainage		Length	Side	Location
	From	To			
158	391+260	391+310	50	LHS	Structure
159	391+260	391+310	50	RHS	Structure
160	391+270	391+300	30	Median	Structure
161	391+500	391+530	30	LHS	Structure
162	391+500	391+530	30	RHS	Structure
163	391+500	391+530	30	LHS	Structure
164	391+500	391+530	30	RHS	Structure
165	391+800	391+830	30	LHS	Structure
166	391+800	391+830	30	RHS	Structure
167	391+800	391+830	30	LHS	Structure
168	391+800	391+830	30	RHS	Structure
169	392+040	392+060	20	LHS	Structure
170	392+040	392+060	20	RHS	Structure
171	392+950	392+985	35	LHS	Structure
172	392+950	392+985	35	RHS	Structure
173	392+955	392+980	25	LHS	Structure
174	392+955	392+980	25	RHS	Structure
175	392+960	392+975	15	Median	Structure
176	393+150	393+165	15	LHS	Structure
177	393+150	393+165	15	RHS	Structure
178	393+530	393+570	40	LHS	Structure
179	393+530	393+570	40	RHS	Structure
180	393+540	393+560	20	LHS	Structure
181	393+540	393+560	20	RHS	Structure
182	393+540	393+560	20	Median	Structure
183	393+930	393+980	50	LHS	Structure
184	393+930	393+980	50	RHS	Structure
185	393+950	393+970	20	Median	Structure
186	394+960	395+000	40	LHS	Structure
187	394+960	395+000	40	RHS	Structure
188	394+965	394+990	25	LHS	Structure
189	394+965	394+990	25	RHS	Structure
190	394+970	394+985	15	Median	Structure
191	395+330	395+355	25	LHS	Structure
192	395+330	395+355	25	RHS	Structure
193	395+340	395+345	5	LHS	Structure
194	395+340	395+345	5	RHS	Structure

S.no	Chainage		Length	Side	Location
	From	To			
195	395+540	395+555	15	LHS	Structure
196	395+540	395+555	15	RHS	Structure
197	396+335	396+350	15	LHS	Structure
198	396+335	396+350	15	RHS	Structure
199	396+520	396+545	25	LHS	Structure
200	396+520	396+545	25	RHS	Structure
201	396+525	396+540	15	LHS	Structure
202	396+525	396+540	15	RHS	Structure
203	396+525	396+535	10	Median	Structure
204	396+750	397+420	670	LHS	Structure Approach
205	396+750	397+420	670	RHS	Structure Approach
206	397+110	397+140	30	Median	Structure
207	398+390	398+400	10	LHS	Structure
208	398+390	398+400	10	RHS	Structure
209	399+185	399+215	30	LHS	Structure
210	399+185	399+215	30	RHS	Structure
211	399+720	399+750	30	LHS	Structure
212	399+720	399+750	30	RHS	Structure
213	400+300	401+020	720	LHS	Structure Approach
214	400+220	401+050	830	RHS	Structure Approach
215	400+650	400+685	35	Median	Structure
216	401+670	401+690	20	LHS	Structure
217	401+670	401+690	20	RHS	Structure
218	403+075	403+110	35	LHS	Structure
219	403+075	403+110	35	RHS	Structure
220	403+950	403+975	25	LHS	Structure
221	403+950	403+975	25	RHS	Structure
222	403+950	403+975	25	LHS	Structure
223	403+950	403+975	25	RHS	Structure
224	404+250	405+120	870	LHS	Structure Approach
225	404+380	405+000	620	RHS	Structure Approach
226	404+625	404+635	10	LHS	Structure
227	404+625	404+635	10	RHS	Structure
228	404+625	404+635	10	LHS	Structure
229	404+625	404+635	10	RHS	Structure
230	404+665	404+700	35	Median	Structure
231	405+350	405+370	20	LHS	Structure

S.no	Chainage		Length	Side	Location
	From	To			
232	405+350	405+370	20	RHS	Structure
233	406+285	406+315	30	LHS	Structure
234	406+285	406+315	30	RHS	Structure
235	406+290	406+305	15	Median	Structure
236	407+480	407+535	55	LHS	Structure
237	407+480	407+535	55	RHS	Structure
238	407+500	407+520	20	Median	Structure
239	409+220	409+250	30	LHS	Structure
240	409+220	409+250	30	RHS	Structure
241	409+980	410+010	30	LHS	Structure
242	409+980	410+010	30	RHS	Structure
243	410+325	410+365	40	LHS	Structure
244	410+325	410+365	40	RHS	Structure
245	410+325	410+365	40	LHS	Structure
246	410+325	410+365	40	RHS	Structure
247	411+100	411+125	25	LHS	Structure
248	411+100	411+125	25	RHS	Structure
249	411+360	411+380	20	LHS	Structure
250	411+360	411+380	20	RHS	Structure
251	411+360	411+380	20	LHS	Structure
252	411+360	411+380	20	RHS	Structure
253	411+360	411+380	20	Median	Structure
254	411+450	412+180	730	LHS	Structure Approach
255	411+470	412+180	710	RHS	Structure Approach
256	411+820	411+850	30	Median	Structure
257	412+500	413+000	500	LHS	Structure Approach
258	412+550	413+000	450	RHS	Structure Approach
259	413+110	413+850	740	LHS	Structure Approach
260	413+110	413+850	740	RHS	Structure Approach
261	414+180	414+800	620	LHS	Structure Approach
262	414+180	414+800	620	RHS	Structure Approach
263	414+480	414+505	25	Median	Structure
264	414+515	414+530	15	LHS	Structure
265	414+550	414+570	20	RHS	Structure
266	415+570	415+585	15	RHS	Structure
267	416+020	416+130	110	LHS	Structure
268	416+080	416+130	50	RHS	Structure

S.no	Chainage		Length	Side	Location
	From	To			
269	416+090	416+120	30	Median	Structure
270	416+730	416+750	20	LHS	Structure
271	416+730	416+750	20	RHS	Structure
272	416+740	416+745	5	LHS	Structure
273	416+740	416+745	5	RHS	Structure
274	416+840	416+865	25	RHS	Structure
275	417+600	417+620	20	LHS	Structure
276	417+600	417+620	20	RHS	Structure
277	417+610	417+615	5	LHS	Structure
278	417+610	417+615	5	RHS	Structure
279	418+080	418+300	220	RHS	Structure
280	418+210	418+300	90	LHS	Structure
281	418+225	418+250	25	Median	Structure
282	419+450	419+480	30	LHS	Structure
283	419+450	419+480	30	RHS	Structure
284	420+815	420+830	15	LHS	Structure
285	420+800	420+830	30	RHS	Structure
286	421+140	421+330	190	RHS	Structure
287	421+320	421+330	10	LHS	Structure
288	421+790	421+820	30	LHS	Structure
289	421+790	421+820	30	RHS	Structure
290	421+800	421+815	15	LHS	Structure
291	421+800	421+815	15	RHS	Structure
292	421+800	421+815	15	Median	Structure
293	422+145	422+190	45	LHS	Structure
294	422+145	422+190	45	RHS	Structure
295	422+150	422+175	25	Median	Structure

Section -2 Chennai Bypass

S. No.	Chainage (Km)		Length (m)	Side	Location
	From	To			
1	0+360	0+390	30	LHS	Seperator
2	0+380	0+410	30	LHS	Median
3	1+250	1+270	20	LHS	Seperator
4	1+250	1+280	30		Median
5	1+530	1+550	20	LHS	Seperator
6	1+530	1+550	20		Median
7	2+500	2+520	20	LHS	Seperator

S. No.	Chainage (Km)		Length (m)	Side	Location
	From	To			
8	2+500	2+520	20		Median
9	5+210	5+230	20		Median
10	5+220	5+240	20	LHS	Seperator
11	5+980	6+000	20		Median
12	5+990	6+020	30	LHS	Seperator
13	7+060	7+090	30	LHS	Seperator
14	7+060	7+090	30		Median
15	7+510	7+520	10		Median
16	7+520	7+530	10	LHS	Seperator
17	9+000	9+230	230	LHS	Shoulder
18	9+010	9+220	210		Median
19	10+350	10+370	20		Median
20	10+360	10+380	20	LHS	Seperator
21	12+070	12+090	20	LHS	Seperator
22	12+070	12+090	20		Median
23	13+490	13+530	40	LHS	Seperator
24	13+510	13+540	30		Median
25	14+090	14+110	20	LHS	Seperator
26	15+380	15+850	470	LHS	Shoulder
27	15+380	15+850	470		Median
28	16+580	16+700	120	LHS	Seperator
29	18+010	18+020	10		Median
30	18+020	18+030	10	LHS	Seperator
31	19+085	19+670	585	LHS	Seperator
32	19+085	19+670	585		Median
33	21+320	21+340	20	LHS	Seperator
34	21+940	25+550	3610	LHS	Shoulder
35	22+140	25+180	3040		Median
36	25+180	25+250	70		Median
37	25+940	25+960	20	LHS	Seperator
38	27+230	27+270	40	LHS	Seperator
39	28+160	28+200	40	LHS	Seperator
40	29+060	29+080	20	LHS	Seperator
41	29+770	29+780	10	LHS	Seperator
42	30+170	30+190	20	LHS	Seperator
43	31+390	31+420	30	LHS	Seperator
44	32+060	32+500	440	LHS	Shoulder

S. No.	Chainage (Km)		Length (m)	Side	Location
	From	To			
45	32+240	32+280	40		Median
46	32+285	32+060	225	RHS	Shoulder
47	31+380	31+350	30	RHS	Seperator
48	30+190	30+170	20	RHS	Seperator
49	29+750	29+740	10	RHS	Seperator
50	29+080	29+060	20	RHS	Seperator
51	28+140	28+110	30	RHS	Seperator
52	27+270	27+240	30	RHS	Seperator
53	25+970	25+950	20	RHS	Seperator
54	25+540	21+950	3590	RHS	Shoulder
55	25+190	22+130	3060		Median
56	21+350	21+330	20	RHS	Seperator
57	19+680	19+390	290	RHS	Seperator
58	19+370	19+320	50	RHS	Seperator
59	19+300	19+150	150	RHS	Seperator
60	19+130	19+090	40	RHS	Seperator
61	18+020	18+010	10	RHS	Seperator
62	15+880	15+410	470	RHS	Shoulder
63	14+150	14+130	20	RHS	Shoulder
64	13+580	13+550	30	RHS	Shoulder
65	12+130	12+110	20	RHS	Shoulder
66	10+370	10+350	20	RHS	Shoulder
67	9+250	9+020	230	RHS	Shoulder
68	7+550	7+540	10	RHS	Shoulder
69	7+120	7+100	20	RHS	Shoulder
70	6+010	5+990	20	RHS	Shoulder
71	5+230	5+210	20	RHS	Shoulder
72	2+530	2+510	20	RHS	Shoulder
73	1+540	1+520	20	RHS	Shoulder
74	1+300	1+260	40	RHS	Shoulder
75	0+440	0+420	20	RHS	Shoulder
76	0+430	0+410	20		Median
77	0+200	0+130	70	RHS	Shoulder
78	0+200	0+130	70	RHS	Median

Section -3 Chennai tada

Chainage (Km)		Length (m)	Type	Side	Location
From	To				
21+540	21+630	90	New Jersey	LHS	Median
21+700	21+780	80	New Jersey	LHS	Median
24+650	24+710	60	RCC	LHS	Seperator
25+530	25+750	220	RCC	LHS	Median
25+750	26+100	350	New Jersey	LHS	Median
25+840	26+300	460	RCC	LHS	Seperator
26+100	26+130	30	RCC	BHS	Median
26+130	26+400	270	New Jersey	LHS	Median
26+450	26+890	440	New Jersey	LHS	Seperator
26+450	26+890	440	RCC Railing	LHS	Median
27+000	27+190	190	New Jersey	LHS	Median
27+190	27+250	60	RCC	BHS	Median
27+250	27+600	350	New Jersey	LHS	Median
27+010	27+540	530	RCC	LHS	Seperator
28+070	28+450	380	New Jersey	LHS	Median
28+450	28+490	40	RCC	BHS	Median
28+490	31+390	2900	New Jersey	LHS	Median
28+100	28+910	810	RCC	LHS	Seperator
30+460	31+330	870	RCC	LHS	Seperator
31+480	31+530	50	RCC	LHS	Median
31+480	31+530	50	RCC	LHS	Seperator
33+200	33+230	30	RCC	LHS	Median
33+200	33+230	30	RCC	LHS	Seperator
33+320	33+920	600	New Jersey	LHS	Median
33+540	33+780	240	RCC	LHS	Seperator
34+000	34+015	15	RCC	LHS	Median
34+000	34+015	15	RCC	LHS	Seperator
34+020	34+040	20	New Jersey	LHS	Seperator
34+700	35+100	400	New Jersey	LHS	Median
34+750	35+330	580	RCC	LHS	Seperator
35+100	35+150	50	RCC	BHS	Median
35+150	35+380	230	New Jersey	LHS	Median
35+480	35+620	140	RCC	LHS	Median
35+480	35+650	170	RCC	LHS	Seperator
35+640	35+800	160	New Jersey	LHS	Median
36+280	36+300	20	New Jersey	LHS	Median

Chainage (Km)		Length (m)	Type	Side	Location
From	To				
36+300	36+320	20	New Jersey	LHS	Seperator
37+090	37+110	20	RCC	LHS	Median
37+090	37+110	20	RCC	LHS	Seperator
37+200	37+620	420	New Jersey	LHS	Median
37+620	37+660	40	RCC	BHS	Median
37+660	38+060	400	New Jersey	LHS	Median
38+060	38+090	30	RCC	BHS	Median
38+090	38+840	750	New Jersey	LHS	Median
38+840	38+930	90	RCC	BHS	Median
38+930	39+290	360	New Jersey	LHS	Median
37+350	39+140	1790	RCC	LHS	Seperator
39+300	39+320	20	New Jersey	LHS	Median
39+680	40+250	570	New Jersey	LHS	Median
39+860	40+090	230	RCC	LHS	Seperator
40+530	40+550	20	RCC	LHS	Median
40+530	40+550	20	RCC	LHS	Seperator
40+800	40+830	30	RCC	LHS	Median
40+800	40+830	30	RCC	LHS	Seperator
41+030	41+040	10	New Jersey	LHS	Median
41+750	42+150	400	New Jersey	LHS	Median
42+150	42+260	110	RCC	BHS	Median
42+260	42+620	360	New Jersey	LHS	Median
41+900	42+500	600	RCC	LHS	Seperator
43+470	43+490	20	RCC	LHS	Median
43+470	43+490	20	RCC	LHS	Seperator
43+570	43+610	40	New Jersey	LHS	Median
43+610	43+630	20	RCC	BHS	Median
43+630	44+200	570	New Jersey	LHS	Median
44+200	44+220	20	New Jersey	LHS	Median
44+220	45+140	920	New Jersey	LHS	Median
43+590	43+880	290	RCC	LHS	Seperator
44+370	45+070	700	RCC	LHS	Seperator
45+200	45+280	80	New Jersey	LHS	Median
45+280	45+310	30	New Jersey	LHS	Median
45+310	46+050	740	New Jersey	LHS	Median
46+110	46+400	290	New Jersey	LHS	Median
46+400	46+420	20	RCC	BHS	Median

Chainage (Km)		Length (m)	Type	Side	Location
From	To				
46+420	46+770	350	New Jersey	LHS	Median
46+240	46+690	450	RCC	LHS	Seperator
47+140	47+170	30	New Jersey	LHS	Seperator
47+170	48+140	970	New Jersey	LHS	Median
47+390	48+000	610	RCC	LHS	Seperator
48+980	49+350	370	New Jersey	LHS	Median
49+050	49+290	240	RCC	LHS	Seperator
49+550	49+570	20	New Jersey	LHS	Seperator
49+950	50+750	800	New Jersey	LHS	Median
50+060	50+270	210	RCC	LHS	Seperator
51+590	51+880	290	New Jersey	LHS	Median
51+880	51+920	40	RCC	BHS	Median
51+920	52+310	390	New Jersey	LHS	Median
51+660	52+270	610	RCC	LHS	Seperator
52+580	52+700	120	RCC	LHS	Median
52+580	52+700	120	RCC	LHS	Seperator
53+760	53+810	50	RCC	LHS	Median
53+760	53+810	50	RCC	LHS	Seperator
54+000	53+760	240	RCC	RHS	Median
54+000	53+760	240	RCC	RHS	Seperator
52+700	52+590	110	RCC	RHS	Median
52+700	52+590	110	RCC	RHS	Seperator
52+240	51+670	570	RCC	RHS	Seperator
50+250	50+020	230	RCC	RHS	Seperator
49+320	49+060	260	RCC	RHS	Seperator
48+070	47+310	760	RCC	RHS	Seperator
46+700	46+240	460	RCC	RHS	Seperator
45+380	45+350	30	New Jersey	RHS	Seperator
45+020	44+370	650	RCC	RHS	Seperator
43+950	43+620	330	RCC	RHS	Seperator
43+530	43+500	30	RCC	RHS	Median
43+530	43+500	30	RCC	RHS	Seperator
42+500	41+940	560	RCC	RHS	Seperator
41+060	41+040	20	New Jersey	RHS	Median
40+860	40+830	30	RCC	RHS	Median
40+860	40+830	30	RCC	RHS	Seperator
40+580	40+560	20	RCC	RHS	Median

Chainage (Km)		Length (m)	Type	Side	Location
From	To				
40+580	40+560	20	RCC	RHS	Seperator
40+130	39+880	250	RCC	RHS	Seperator
39+500	39+450	50	New Jersey	RHS	Seperator
39+350	39+320	30	New Jersey	RHS	Seperator
39+190	37+360	1830	RCC	RHS	Seperator
37+150	37+120	30	RCC	RHS	Median
37+150	37+120	30	RCC	RHS	Seperator
36+310	36+290	20	New Jersey	RHS	Median
35+650	35+500	150	RCC	RHS	Median
35+650	35+500	150	RCC	RHS	Seperator
35+350	34+790	560	RCC	RHS	Seperator
34+020	34+000	20	RCC	RHS	Median
34+020	34+000	20	RCC	RHS	Seperator
33+790	33+540	250	RCC	RHS	Seperator
33+220	33+200	20	RCC	RHS	Median
33+220	33+200	20	RCC	RHS	Seperator
31+540	31+480	60	RCC	RHS	Median
31+540	31+480	60	RCC	RHS	Seperator
31+320	30+460	860	RCC	RHS	Seperator
28+900	28+120	780	RCC	RHS	Seperator
27+510	26+970	540	RCC	RHS	Seperator
26+880	26+430	450	RCC	RHS	Median
26+880	26+430	450	RCC	RHS	Seperator
26+880	26+430	450	RCC Railing	RHS	Seperator
26+340	25+830	510	RCC	RHS	Seperator
24+720	24+640	80	RCC	RHS	Seperator

6.7.2 Street Light

Locations of Lighting are presented in table below:

Table 6-28 : Location of Street Light

Section 01 Vijayawada Chilakaluripet

S. No	Chainage		Length	Side	Location	Numbers	Type
	From	To					
1	355+100	355+800	700		Median	18	Double Arm
2	355+100	355+300	200	LHS	Service Road	6	Single Arm
3	355+100	355+300	200	RHS	Service Road	6	Single Arm
4	355+400	355+550	150	LHS	Seperator	6	Single Arm

S. No	Chainage		Length	Side	Location	Numbers	Type
	From	To					
5	355+400	355+550	150	RHS	Seperator	6	Single Arm
6	355+750	355+800	50	RHS	Service Road	4	Single Arm
7	357+200	357+342	142	RHS	Seperator	5	Single Arm
8	357+200	357+342	142	LHS	Service Road	6	Single Arm
9	372+550	372+770	220	LHS	Service Road	6	Single Arm
10	372+550	372+770	220	RHS	Service Road	6	Single Arm
11	373+300	373+480	180	LHS	Service Road	5	Single Arm
12	373+300	373+480	180	RHS	Service Road	6	Single Arm
13	373+720	373+920	200	RHS	Service Road	6	Single Arm
14	373+950	374+550	600		Median	15	Double Arm
15	374+168	375+600	1400	RHS	Service Road	46	Single Arm
16	374+168	374+460	260	LHS	Service Road	6	Single Arm
17	374+350	374+400	50	RHS	Service Road	4	Single Arm
18	374+270			LHS	Service Road	1	Double arm
19	374+700	374+900	200	LHS	Service Road	6	Single Arm
20	375+350	376+000	650		Median	14	Double arm
21	375+560	375+740	180	LHS	Seperator	6	Single Arm
22	375+600	375+770	170	RHS	Seperator	6	Single Arm
23	376+100	376+350	250	LHS	Seperator	12	Single Arm
24	376+100	376+350	250	RHS	Seperator	9	Single Arm
25	376+850	377+550	700		Median	17	Double Arm
26	377+190	377+380	190	LHS	Service Road	6	Single Arm
27	377+190	377+380	190	RHS	Service Road	6	Single Arm
28	377+840	378+100	260	LHS	Seperator	5	Single Arm
29	377+840	378+750	910	LHS	Service Road	21	Single Arm
30	377+840	378+100	260	RHS	Seperator	10	Single Arm
31	378+100	378+750	650	RHS	Service Road	13	Single Arm
32	378+130	378+900	770		Median	18	Double Arm
33	378+750	378+900	150	LHS	Service Road	4	Single Arm
34	378+750	378+900	150	RHS	Service Road	4	Single Arm
35	379+450	379+670	220	LHS	Service Road	6	Single Arm
36	379+450	379+670	220	LHS	Seperator	6	Single Arm
37	379+450	379+670	220	RHS	Service Road	6	Single Arm
38	379+450	379+670	220	RHS	Seperator	6	Single Arm
39	380+200	380+400	200	LHS	Service Road	6	Single Arm
40	380+200	380+400	200	RHS	Service Road	5	Single Arm
41	381+100	381+770	670		Median	16	Double Arm
42	381+350	381+600	250	LHS	Seperator	6	Single Arm
43	381+350	381+600	250	RHS	Seperator	6	Single Arm
44	382+850	383+000	150	LHS	Service Road	6	Single Arm
45	382+850	383+000	150	RHS	Service Road	6	Single Arm
46	383+180	383+450	270	LHS	Service Road	6	Single Arm
47	383+180	383+450	270	RHS	Seperator	9	Single Arm

S. No	Chainage		Length	Side	Location	Numbers	Type
	From	To					
48	383+180	383+450	270	LHS	Seperator	7	Single Arm
49	383+800	384+440	640		Median	15	Double Arm
50	384+000	384+200	200	LHS	Service Road	6	Single Arm
51	384+000	384+200	200	RHS	Service Road	6	Single Arm
52	384+200	384+300	100	RHS	Service Road	4	Single Arm
53	384+350	384+600	250	LHS	Seperator	12	Single Arm
54	384+350	384+450	100	LHS	Service Road	4	Single Arm
55	384+350	384+600	250	RHS	Seperator	8	Single Arm
56	384+950	385+150	200	LHS	Seperator	6	Single Arm
57	384+950	385+150	200	RHS	Seperator	6	Single Arm
58	385+250	385+450	200	LHS	Seperator	6	Single Arm
59	385+250	385+450	200	RHS	Seperator	6	Single Arm
60	385+250	385+900	650		Median	15	Double Arm
61	387+050	388+520	1470		Median	33	Double Arm
62	387+250	387+450	200	LHS	Service Road	6	Single Arm
63	387+250	387+450	200	RHS	Service Road	6	Single Arm
64	387+550	387+750	200	LHS	Service Road	6	Single Arm
65	387+550	387+750	200	RHS	Seperator	10	Single Arm
66	387+550	387+750	200	LHS	Seperator	5	Single Arm
67	388+250	388+450	200	LHS	Seperator	6	Single Arm
68	388+250	388+450	200	RHS	Seperator	6	Single Arm
69	388+950	389+600	650		Median	16	Double Arm
70	389+350	389+500	150	LHS	Service Road	6	Single Arm
71	389+300	389+500	200	RHS	Service Road	6	Single Arm
72	389+700	389+750	50	RHS	Service Road	4	Single Arm
73	390+050	390+250	200	LHS	Seperator	12	Single Arm
74	390+050	390+250	200	RHS	Seperator	11	Single Arm
75	390+500	390+700	200	LHS	Service Road	6	Single Arm
76	390+500	390+700	200	RHS	Service Road	6	Single Arm
77	390+900	391+620	720		Median	17	Double Arm
78	391+200	391+400	200	LHS	Seperator	6	Single Arm
79	391+200	391+400	200	RHS	Seperator	6	Single Arm
80	391+950	392+150	200	LHS	Service Road	6	Single Arm
81	391+950	392+150	200	RHS	Service Road	6	Single Arm
82	393+050	393+250	200	LHS	Seperator	6	Single Arm
83	393+050	393+250	200	RHS	Seperator	6	Single Arm
84	393+500	394+150	650		Median	16	Double Arm
85	393+850	394+050	200	LHS	Seperator	6	Single Arm
86	393+850	394+050	200	RHS	Seperator	6	Single Arm
87	394+250	394+450	200	LHS	Seperator	10	Single Arm
88	394+250	394+450	200	RHS	Seperator	5	Single Arm
89	394+250	394+450	200	RHS	Service Road	6	Single Arm
90	395+150	413+900	18750		Median	530	Double Arm

S. No	Chainage		Length	Side	Location	Numbers	Type
	From	To					
91	395+450	395+650	200	LHS	Service Road	6	Single Arm
92	395+450	395+650	200	RHS	Service Road	6	Single Arm
93	395+850	396+050	200	RHS	Truck Lay Bye	7	Single Arm
94	396+250	396+450	200	LHS	Service Road	6	Single Arm
95	396+250	396+450	200	RHS	Service Road	6	Single Arm
96	396+550	396+750	200	LHS	Service Road	4	Single Arm
97	396+550	396+750	200	RHS	Seperator	9	Single Arm
98	396+550	396+750	200	LHS	Seperator	5	Single Arm
99	397+050			LHS	Service Road	1	High-mast
100	397+000	397+230	230	RHS	Seperator	6	Single Arm
101	397+650	397+850	200	LHS	Seperator	10	Single Arm
102	397+650	397+850	200	RHS	Seperator	9	Single Arm
103	398+300	398+500	200	LHS	Seperator	5	Single Arm
104	398+300	398+500	200	RHS	Seperator	6	Single Arm
105	399+100	399+300	200	LHS	Seperator	6	Single Arm
106	399+100	399+300	200	RHS	Seperator	6	Single Arm
107	399+650	399+800	150	LHS	Seperator	6	Single Arm
108	399+650	399+800	150	RHS	Seperator	6	Single Arm
109	400+100	400+300	200	LHS	Seperator	8	Single Arm
110	400+100	400+300	200	RHS	Seperator	7	Single Arm
111	400+600	400+800	200	LHS	Seperator	6	Single Arm
112	400+600	400+800	200	RHS	Seperator	6	Single Arm
113	401+100	401+300	200	LHS	Service Road	6	Single Arm
114	401+100	401+300	200	RHS	Seperator	6	Single Arm
115	401+100	401+300	200	LHS	Seperator	6	Single Arm
116	401+600	401+650	50	LHS	Service Road	5	Single Arm
117	401+600	401+650	50	RHS	Service Road	6	Single Arm
118	403+000	403+200	200	LHS	Seperator	6	Single Arm
119	403+000	403+200	200	RHS	Seperator	6	Single Arm
120	404+050	404+250	200	LHS	Seperator	10	Single Arm
121	404+050	404+250	200	RHS	Seperator	9	Single Arm
122	404+450	404+650	200	LHS	Service Road	6	Single Arm
123	404+450	404+650	200	RHS	Service Road	6	Single Arm
124	404+650	404+750	100	LHS	Seperator	4	Single Arm
125	404+650	404+750	100	RHS	Seperator	4	Single Arm
126	405+250	405+450	200	LHS	Service Road	6	Single Arm
127	405+250	405+450	200	RHS	Service Road	6	Single Arm
128	405+600	405+800	200	LHS	Service Road	6	Single Arm
129	405+600	405+800	200	RHS	Service Road	6	Single Arm
130	406+800	406+950	150	LHS	Service Road	5	Single Arm
131	406+800	406+950	150	RHS	Service Road	5	Single Arm
132	407+000	407+600	600	LHS	Service Road	17	Single Arm
133	407+000	407+600	600	RHS	Service Road	17	Single Arm

S. No	Chainage		Length	Side	Location	Numbers	Type
	From	To					
134	409+150	409+350	200	LHS	Service Road	6	Single Arm
135	409+150	409+350	200	RHS	Service Road	6	Single Arm
136	409+500	409+700	200	LHS	Service Road	5	Single Arm
137	409+500	409+700	200	RHS	Service Road	5	Single Arm
138	409+500	409+700	200	LHS	Seperator	6	Single Arm
139	409+500	409+700	200	RHS	Seperator	6	Single Arm
140	409+900	410+100	200	LHS	Seperator	6	Single Arm
141	409+900	410+100	200	RHS	Seperator	6	Single Arm
142	410+450	410+650	200	LHS	Seperator	6	Single Arm
143	410+450	410+650	200	RHS	Seperator	6	Single Arm
144	410+450	410+650	200	RHS	Service Road	5	Single Arm
145	411+050	411+200	150	LHS	Service Road	6	Single Arm
146	411+050	411+200	150	RHS	Service Road	5	Single Arm
147	411+750	411+950	200	RHS	Seperator	6	Single Arm
148	411+800			LHS	Service Road	1	High-mast
149	412+150	412+420	270	LHS	Service Road	8	Single Arm
150	412+150	412+420	270	RHS	Service Road	8	Single Arm
151	413+450			RHS	Service Road	2	High-mast
152	413+850	414+200	350	LHS	Service Road	11	Single Arm
153	413+520	414+000	480	RHS	Service Road	17	Single Arm
154	415+150	415+350	200	RHS	Seperator	6	Single Arm
155	415+500	415+700	200	LHS	Service Road	6	Single Arm
156	415+500	415+700	200	RHS	Service Road	6	Single Arm
157	415+550	416+270	720		Median	16	Double arm
158	416+000	416+200	200	LHS	Seperator	6	Single Arm
159	416+000	416+200	200	RHS	Seperator	6	Single Arm
160	416+750	416+950	200	LHS	Service Road	4	Single Arm
161	416+750	416+950	200	RHS	Service Road	6	Single Arm
162	417+250	417+450	200	RHS	Seperator	6	Single Arm
163	417+250	417+450	200	RHS	Service Road	6	Single Arm
164	417+850	418+600	750		Median	17	Double arm
165	418+150	418+350	200	LHS	Seperator	6	Single Arm
166	418+150	418+350	200	RHS	Seperator	6	Single Arm
167	419+400	419+600	200	LHS	Seperator	6	Single Arm
168	419+400	419+600	200	RHS	Seperator	6	Single Arm
169	419+730	420+200	470		Median	12	Double arm
170	420+200	420+400	200	LHS	Toll Plaza	8	Single Arm
171	420+200	420+300	100	RHS	Toll Plaza	4	Single Arm
172	420+300	420+350	50	RHS	Toll Plaza	2	Double arm
173	420+350	420+700	350		Toll Plaza	4	High-mast
174	420+600	420+800	200	RHS	Toll Plaza	8	Single Arm
175	420+700	420+800	100	LHS	Toll Plaza	6	Single Arm
176	420+800	421+900	1100		Median	26	Double arm

S. No	Chainage		Length	Side	Location	Numbers	Type
	From	To					
177	421+950	422+000	50	RHS	Service Road	4	Single Arm
178	422+000	422+300	300	RHS	Service Road	7	Single Arm
179	422+050	422+300	250	LHS	Seperator	6	Single Arm
180	422+250	422+350	100	LHS	Service Road	4	Single Arm
181	422+450	422+600	150	RHS	Seperator	5	Single Arm
182	422+450	422+600	150	RHS	Service Road	4	Single Arm

Section-2 Chennai Bypass

S. No.	Chainage (Km)		Length (m)	Location	Side	Type	Numbers
	From	To					
1	0+080	0+430	350	Median	LHS	Single Arm	14
2	0+080	0+220	140	Shoulder	LHS	Double Arm	7
3	0+100	0+000	100	Shoulder	RHS	Double Arm	6
4	0+330	0+170	160	Shoulder	RHS	Double Arm	5
5	0+340	0+300	40	Shoulder	RHS	Single Arm	2
6	0+370	0+000	370	Median	RHS	Single Arm	18
7	0+400	1+200	800	SR Separator	LHS	Single Arm	32
8	0+450			Median	LHS	High Mast	1
9	0+490	1+000	510		LHS	Double Arm	19
10	1+050	9+000	7950	Median	LHS	Double Arm	295
11	1+200	1+250	50	SR Separator	LHS	Single Arm	3
12	1+300	9+060	7760	SR Separator	LHS	Single Arm	293
13	9+000	9+230	230	Median	LHS	Single Arm	8
14	9+200	9+000	200	Median	RHS	Single Arm	8
15	9+230	15+370	6140	Median	LHS	Double Arm	226
16	9+350	12+060	2710	SR Separator	LHS	Single Arm	103
17	12+100	13+490	1390	SR Separator	LHS	Single Arm	51
18	15+370	15+850	480	Median	LHS	Single Arm	18
19	15+850	16+470	620	Median	LHS	Double Arm	23
20	15+850	15+370	480	Median	RHS	Single Arm	18
21	15+900	16+180	280	SR Separator	LHS	Single Arm	10
22	16+210	16+440	230	Separator	LHS	Double Arm	10
23	16+470	16+670	200	Median	LHS	High Mast	2
24	16+670	16+780	110	Median	LHS	Double Arm	4
25	16+770	16+940	170	SR Separator	LHS	Double Arm	8
26	16+830	16+910	80	Median	LHS	Double Arm	4
27	16+950			SR Separator	LHS	Double Arm	1
28	16+960	18+840	1880	SR Separator	LHS	Single Arm	75
29	17+020	19+050	2030	Median	LHS	Double Arm	72

S. No.	Chainage (Km)		Length (m)	Location	Side	Type	Numbers
	From	To					
30	18+770	16+880	1890	SR Separator	RHS	Single Arm	75
31	18+840	18+930	90	SR Separator	LHS	Double Arm	3
32	19+040			SR Separator	RHS	Double Arm	1
33	19+050	19+640	590	Median	LHS	Single Arm	22
34	19+070	19+160	90	Between SR and Ramp	LHS	Double Arm	4
35	19+420			SR Shoulder	LHS	Double Arm	1
36	19+520	21+290	1770	SR Separator	LHS	Single Arm	62
37	19+550	19+680	130	SR Shoulder	LHS	Single Arm	3
38	19+590			SR Shoulder	RHS	Low Mast	1
39	19+640	21+890	2250	Median	LHS	Double Arm	81
40	19+650	19+060	590	Median	RHS	Single Arm	22
41	21+290	22+100	810	SR Shoulder	LHS	Single Arm	32
42	21+350	19+590	1760	SR Shoulder	RHS	Single Arm	64
43	21+610	21+350	260	SR Shoulder	RHS	Single Arm	8
44	21+720	21+610	110	SR Separator	RHS	Single Arm	4
45	21+890	22+130	240	Median	LHS	Single Arm	7
46	22+090	21+930	160	Median	RHS	Single Arm	6
47	22+120	23+570	1450	Median	LHS	Double Arm	56
48	22+130	24+950	2820	Separator	LHS	Single Arm	107
49	22+140	21+720	420	SR Shoulder	RHS	Single Arm	13
50	22+890			Median	LHS	High Mast	1
51	22+940			Median	LHS	Low Mast	1
52	23+650			Median	LHS	High Mast	1
53	23+670	25+260	1590	Median	LHS	Double Arm	58
54	24+540			Median	LHS	High Mast	1
55	24+660	24+860	200	SR Shoulder	LHS	Single Arm	6
56	24+920	25+040	120	SR Shoulder	LHS	Double Arm	4
57	25+000	25+200	200	Shoulder	LHS	Single Arm	7
58	25+000	22+090	2910	Separator	RHS	Single Arm	107
59	25+100	24+680	420	SR Shoulder	RHS	Single Arm	9
60	25+170	25+000	170	Shoulder	RHS	Single Arm	7
61	25+220	28+220	3000	SR Separator	LHS	Single Arm	118
62	25+240	28+320	3080	Median	LHS	Double Arm	125
63	27+250	25+190	2060	SR Separator	RHS	Single Arm	87
64	28+250	28+610	360	SR Separator	LHS	Only Pole	16
65	28+310	28+270	40	SR Shoulder	RHS	Double Arm	2

S. No.	Chainage (Km)		Length (m)	Location	Side	Type	Numbers
	From	To					
66	28+320	28+400	80	Median	LHS	Double Arm	4
67	28+480	28+650	170	Shoulder	LHS	High Mast	2
68	28+610	28+850	240	SR Separator	LHS	Single Arm	10
69	28+640	28+560	80	Shoulder	RHS	High Mast	1
70	28+650	32+160	3510	Median	LHS	Double Arm	132
71	28+850	29+300	450	SR Separator	LHS	Only Pole	19
72	29+300	31+360	2060	SR Separator	LHS	Single Arm	84
73	30+000	27+300	2700	SR Separator	RHS	Single Arm	110
74	31+550	31+610	60	Median	LHS	Double Arm	3
75	31+640	30+390	1250	SR Separator	RHS	Single Arm	60
76	31+800	32+280	480	SR Shoulder	LHS	Single Arm	20
77	31+910	31+640	270	SR Separator	RHS	Single Arm	11
78	32+160	32+220	60	Median	LHS	Single Arm	2
79	32+200	31+910	290	SR Shoulder	RHS	Single Arm	10
80	32+220	32+450	230	Median	LHS	Double Arm	7
81	32+250	32+190	60	Median	RHS	Single Arm	2
82	32+400	32+600	200	Median	LHS	Double Arm	7
83	32+530	32+430	100	Median	RHS	Single Arm	4
					Total		**2936**

Section-3 Chennai Tada

S. No.	Chainage (Km)		Length (m)	Location	Side	Type	Quantity
	From	To					
1	21+410	21+850	440	Shoulder	LHS	High Mast	6
2	24+320	25+020	700	Separator	LHS	Single arm	23
3	25+720	26+340	620	Separator	LHS	Double Arm	18
4	26+490	27+570	1080	Separator	LHS	Double Arm	26
5	28+050	29+000	950	Separator	LHS	Double Arm	28
6	29+080	30+190	1110	Median	LHS	Double Arm	35
7	29+050	29+990	940	Separator	LHS	Single arm	29
8	30+210	30+290	80	Separator	LHS	Single arm	3
9	34+720	35+420	700	Separator	LHS	Double Arm	20
10	35+535	35+605	70	Separator	LHS	Single arm	3
11	35+680			Median	LHS	High Mast	1
12	37+320	39+280	1960	Separator	LHS	Double Arm	54
13	42+640	43+200	560	Separator	LHS	Single arm	15
14	43+500	43+940	440	Separator	LHS	Double Arm	13
15	44+025			Median	LHS	Double Arm	1
16	45+240	45+880	640	Median	LHS	Double Arm	22

S. No.	Chainage (Km)		Length (m)	Location	Side	Type	Quantity
	From	To					
17	45+200	45+940	740	Separator	LHS	Single arm	25
18	46+150	46+790	640	Separator	LHS	Double Arm	19
19	46+840	46+970	130	Separator	LHS	Single arm	5
20	47+270	48+130	860	Separator	LHS	Double Arm	26
21	48+130	48+560	430	Separator	LHS	Single arm	13
22	49+990	50+320	330	Separator	LHS	Double Arm	9
23	51+520	52+350	830	Separator	LHS	Double Arm	24
24	52+350			Separator	LHS	High Mast	1
25	52+740			Median	LHS	High Mast	1
26	52+940			Separator	LHS	High Mast	1
27	53+965			Median	LHS	Single arm	1
28	15+060			SR Shoulder	LHS	High Mast	1
29	22+080	22+190	110	SR Shoulder	LHS	Single arm	2
30	22+010			Separator	LHS	High Mast	1
31	22+750			SR Shoulder	LHS	High Mast	1
32	27+165			SR Shoulder	LHS	High Mast	1
33	27+370	27+410	40	SR Shoulder	LHS	Single arm	2
34	29+960			SR Shoulder	LHS	High Mast	1
35	30+180	30+210	30	SR Shoulder	LHS	Single arm	2
36	30+300	30+700	400	SR Shoulder	LHS	Single arm	12
37	30+720	31+510	790	Separator	LHS	Single arm	23
38	31+970			SR Shoulder	LHS	High Mast	1
39	33+650			SR Shoulder	LHS	High Mast	1
40	33+880	33+920	40	SR Shoulder	LHS	Double Arm	2
41	35+200	35+240	40	SR Shoulder	LHS	Single arm	2
42	35+360			SR Shoulder	LHS	High Mast	1
43	35+800	35+860	60	SR Shoulder	LHS	Single arm	2
44	36+240	36+280	40	SR Shoulder	LHS	Single arm	2
45	36+335			SR Shoulder	LHS	High Mast	1
46	37+670			SR Shoulder	LHS	High Mast	1
47	40+010	40+040	30	SR Shoulder	LHS	Single arm	2
48	42+165	42+255	90	SR Shoulder	LHS	Single arm	4
49	43+600			SR Shoulder	LHS	High Mast	1
50	44+200	44+500	300	SR Shoulder	LHS	Single arm	8
51	44+665			Separator	LHS	High Mast	1
52	44+760	45+080	320	SR Shoulder	LHS	Single arm	9
53	46+050			SR Shoulder	LHS	High Mast	1
54	46+515	46+545	30	SR Shoulder	LHS	Single arm	2
55	47+030			Separator	LHS	High Mast	1
56	51+320	51+350	30	SR Shoulder	LHS	Single arm	2
57	53+180	53+210	30	SR Shoulder	LHS	Single arm	2

S. No.	Chainage (Km)		Length (m)	Location	Side	Type	Quantity
	From	To					
58	53+600	53+700	100	SR Shoulder	LHS	Single arm	3
59	53+870	53+730	140	SR Shoulder	RHS	Double Arm	5
60	52+380	51+550	830	Separator	RHS	Double Arm	23
61	52+350			Separator	RHS	High Mast	1
62	51+010	50+810	200	Separator	RHS	Single Arm	7
63	50+370	50+000	370	Separator	RHS	Double Arm	10
64	48+270	48+160	110	Separator	RHS	Single Arm	4
65	48+160	47+240	920	Separator	RHS	Double Arm	26
66	47+140	46+850	290	Separator	RHS	Single Arm	9
67	46+770	46+110	660	Separator	RHS	Double Arm	20
68	45+910	45+240	670	Separator	RHS	Single arm	20
69	44+000	43+530	470	Separator	RHS	Double Arm	13
70	39+300	37+320	1980	Separator	RHS	Double Arm	53
71	35+620	35+530	90	Separator	RHS	Single arm	3
72	35+430	34+710	720	Separator	RHS	Double Arm	21
73	31+470	29+020	2450	Separator	RHS	Single arm	67
74	29+020	28+040	980	Separator	RHS	Double Arm	27
75	27+610	26+920	690	Separator	RHS	Double Arm	20
76	26+840	26+630	210	Median	RHS	Single arm	6
77	26+530	26+420	110	Median	RHS	Single arm	4
78	26+380	25+730	650	Separator	RHS	Double Arm	18
79	25+000	24+340	660	Separator	RHS	Single arm	20
80	53+830	53+690	140	SR Shoulder	RHS	Double Arm	5
81	52+950			SR Shoulder	RHS	High Mast	1
82	52+230	52+200	30	SR Shoulder	RHS	Single arm	2
83	51+900			SR Shoulder	RHS	High Mast	1
84	50+950			SR Shoulder	RHS	High Mast	1
85	49+570			SR Shoulder	RHS	High Mast	1
86	49+310	49+280	30	SR Shoulder	RHS	Double Arm	2
87	49+240			SR Shoulder	RHS	Lowmast	1
88	47+930	47+890	40	SR Shoulder	RHS	Single arm	2
89	47+710			SR Shoulder	RHS	High Mast	1
90	46+420	46+390	30	SR Shoulder	RHS	Single arm	2
91	46+400			SR Shoulder	RHS	High Mast	1
92	45+150	44+320	830	SR Shoulder	RHS	Single arm	20
93	43+860			SR Shoulder	RHS	Lowmast	1
94	43+630			Separator	RHS	Lowmast	1
95	42+240			SR Shoulder	RHS	High Mast	1
96	40+060	40+020	40	SR Shoulder	RHS	Single arm	2
97	40+010			SR Shoulder	RHS	High Mast	1
98	38+880			SR Shoulder	RHS	High Mast	1

S. No.	Chainage (Km)		Length (m)	Location	Side	Type	Quantity
	From	To					
99	37+890	37+860	30	SR Shoulder	RHS	Single arm	2
100	36+340	36+300	40	SR Shoulder	RHS	Double Arm	2
101	35+050			SR Shoulder	RHS	High Mast	1
102	34+580			Separator	RHS	High Mast	1
103	33+910	33+870	40	SR Shoulder	RHS	Double Arm	2
104	33+090	33+060	30	SR Shoulder	RHS	Double Arm	2
105	32+200			SR Shoulder	RHS	Double Arm	1
106	31+080			SR Shoulder	RHS	High Mast	1
107	30+190	30+150	40	SR Shoulder	RHS	Single arm	2
108	28+510			SR Shoulder	RHS	High Mast	1
109	27+100	27+070	30	SR Shoulder	RHS	Single arm	2
110	26+840	26+420	420	SR Shoulder	RHS	Single arm	15
111	26+210			SR Shoulder	RHS	High Mast	1
112	25+700			SR Shoulder	RHS	High Mast	1
113	22+800			SR Shoulder	RHS	High Mast	1
114	22+530	22+500	30	SR Shoulder	RHS	Single arm	2

6.7.3 Solar Blinker

Locations of Solar Blinker are presented in table below:

Table 6-29 : Location of Solar Blinker

Section 01 Vijayawada Chilakaluripet

S. No.	Chainage (Km)	Quantity (Nos.)	Side	location
1	376+320	1	LHS SR	Separator
2	376+320	1	RHS SR	Separator
3	378+010	1	LHS SR	Separator
4	378+010	1	RHS SR	Separator
5	379+500	1	LHS SR	Separator
6	379+500	1	RHS SR	Separator
7	383+300	2	RHS SR	Separator
8	383+360	1	LHS SR	Separator
9	384+475	1	LHS SR	Separator
10	384+475	1	RHS SR	Separator
11	387+700	1	RHS SR	Separator
12	387+765	1	LHS SR	Separator
13	390+140	1	LHS SR	Separator
14	390+140	1	RHS SR	Separator

S. No.	Chainage (Km)	Quantity (Nos.)	Side	location
15	394+340	1	LHS SR	Separator
16	394+340	1	RHS SR	Separator
17	396+685	1	LHS SR	Separator
18	396+685	1	RHS SR	Separator
19	397+750	1	LHS SR	Separator
20	397+750	1	RHS SR	Separator
21	400+210	2	RHS SR	Separator
22	400+240	1	LHS SR	Separator
23	401+195	1	LHS SR	Separator
24	401+205	2	RHS SR	Separator
25	404+170	1	LHS SR	Separator
26	404+190	2	RHS SR	Separator
27	409+560	2	LHS SR	Separator
28	409+590	1	RHS SR	Separator
29	410+555	1	LHS SR	Separator
30	410+590	2	LHS SR	Separator
31	411+480	2	RHS	Separator
32	411+460	2	LHS	Separator
33	415+235	1	RHS	Separator
34	417+360	1	RHS	Separator
35	420+460	10	LHS	Toll
36	420+530	12	RHS	Toll

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S. No.	Chainage (Km)	Side	location
1	0+070	LHS	Median
2	1+030	LHS	Median
3	3+470	LHS	Median
4	4+140	LHS	Median
5	15+010	LHS	Median
6	17+610	LHS	Median
7	18+715	LHS	Median
8	21+700	LHS	Seperator
9	21+750	LHS	Seperator
10	31+670	LHS	Seperator
11	32+200	LHS	Median
12	30+900	RHS	Median

S. No.	Chainage (Km)	Side	location
13	28+400	RHS	Sholder
14	25+450	RHS	Median
15	25+380	RHS	Median
16	25+310	RHS	Median
17	35+280	RHS	Median
18	25+260	RHS	Median
19	25+190	RHS	Separator
20	21+690	RHS	Separator
21	19+000	RHS	Median
22	16+380	RHS	Median
23	7+620	RHS	Median
24	7+530	RHS	Median
25	5+790	RHS	Median
26	4+460	RHS	Median
27	3+960	RHS	Shoulder
28	0+630	RHS	Median
29	0+360	RHS	Separator
30	0+340	RHS	Separator

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S. No.	Chainage (Km)	Quantity (Nos.)	Side	location
21	22+690	1	LHS	Median
22	22+710	1	LHS	Median
23	23+370	1	LHS	Seperator
24	23+430	1	LHS	Seperator
25	25+540	1	LHS	Seperator
26	25+655	1	LHS	Seperator
27	25+660	1	LHS	Seperator
28	25+670	1	LHS	Seperator
29	27+730	1	LHS	Seperator
30	29+920	1	LHS	Seperator
31	29+940	1	LHS	Seperator
32	29+960	1	LHS	Seperator
33	31+930	1	LHS	Seperator
34	31+970	1	LHS	Seperator
35	34+680	1	LHS	Seperator
36	35+650	1	LHS	Seperator

S. No.	Chainage (Km)	Quantity (Nos.)	Side	location
37	35+670	1	LHS	Seperator
38	35+700	1	LHS	Seperator
39	36+200	1	LHS	Seperator
40	36+250	1	LHS	Median
41	36+270	1	LHS	Median
42	41+000	5	LHS	Median
43	44+150	1	LHS	Median
44	50+680	1	LHS	Median
45	50+700	2	LHS	Median
46	50+710	1	LHS	Median
47	50+720	1	LHS	Median
48	50+750	1	LHS	Median
49	50+750	1	LHS	Median
50	52+700	1	LHS	Seperator
51	52+700	1	LHS	Seperator
52	52+710	1	LHS	Median
53	53+700	1	RHS	Median
54	50+790	1	RHS	Median
55	50+760	3	RHS	Median
56	50+760	1	RHS	Seperator
57	44+210	1	RHS	Seperator
58	41+120	6	RHS	Median
59	36+420	1	RHS	Seperator
60	36+340	1	RHS	Seperator
61	36+220	1	RHS	Seperator
62	35+710	1	RHS	Median
63	32+950	1	RHS	Seperator
64	31+670	1	RHS	Median
65	30+040	1	RHS	Seperator
66	30+020	1	RHS	Seperator
67	30+000	1	RHS	Seperator
68	29+200	1	RHS	Seperator
69	27+620	1	RHS	Median
70	25+770	1	RHS	Seperator
71	25+750	1	RHS	Seperator
72	22+910	1	RHS	Seperator
73	22+850	1	RHS	Seperator

S. No.	Chainage (Km)	Quantity (Nos.)	Side	location
74	22+830	1	RHS	Median
75	22+820	1	RHS	Median
76	22+810	1	RHS	Median

6.7.4 Pedestrian Guard Rails

Locations of Pedestrian Guard Rail are presented in table below:

Table 6-30 : Location of PGR

Section 01 Vijayawada-Chilakaluripet

S. No.	Chainage (Km)		Length (m)	Side	Location
	From	To			
1	355+100	355+200	100	LHS SR	Bus Bay
2	355+716	355+816	100	RHS SR	Bus Bay
1	373+650	373+835	185		Median
2	373+830	373+850	20	RHS	Separator
3	374+365	374+400	35	RHS SR	Bus Bay
4	374+500	375+220	720	LHS	Separator
5	374+540	375+250	710	RHS	Separator
6	378+080	378+270	190	LHS	Separator
7	378+100	378+270	170	RHS	Separator
8	378+700	378+840	140	LHS	Separator
9	378+740	378+910	170	RHS	Separator
10	378+785	378+825	40	RHS SR	Bus Bay
11	378+790	378+855	65	LHS SR	Bus Bay
12	384+170	384+260	90	RHS SR	Bus Bay
13	384+310	384+415	105	LHS SR	Bus Bay
14	389+655	389+755	100	RHS SR	Bus Bay
15	395+890	396+050	160	RHS	Truck lay by island
16	412+200	412+460	260	LHS	Separator
17	412+250	412+540	290	RHS	Separator
18	412+950	413+060	110	LHS	Separator
19	412+990	413+120	130	RHS	Separator
20	413+810	413+840	30	LHS	Separator
21	413+850	414+180	330	RHS	Separator
22	414+760	415+130	370	LHS	Separator
23	414+810	415+100	290	RHS	Separator
24	421+360	421+490	130	RHS	Separator
25	421+510	421+540	30	RHS	Separator
26	421+955	422+005	50	RHS SR	Bus Bay
27	422+255	422+355	100	LHS SR	Bus Bay

S. No.	Chainage (Km)		Length (m)	Side	Location
	From	To			
28	422+370	422+580	210		Median

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S. No.	Chainage (Km)		Length (m)	Location
	From	To		
1	7+540	7+390	150	Median
2	11+600	11+420	180	Median
3	16+730	16+850	120	Median
4	16+870	17+050	180	Median
5	21+950	21+920	30	Median
6	25+590	25+660	70	Median

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S. No.	Chainage (Km)		Length (m)	Side	Location
	From	To			
1	23+390	23+600	210	LHS	Seperator
2	35+380	35+480	100	LHS	Median

6.7.5 Road Signage

Locations of Road Signage are presented in table below:

Table 6-31 : Location of Road Signs

Section 01 Vijayawada Chilakaluripet

S.No	Chainage (km)	Type of Sign	Side	Location
1	355+030	Informatory	LHS	Shoulder
2	355+050	Bus Stop	LHS	Shoulder
3	355+090	Pass Either	LHS	Island
4	355+090	Hazard Marker	LHS	Island
5	355+140	Pass Either	LHS	Separator
6	355+140	Hazard Marker	LHS	Separator
7	355+160	Route Marker	LHS	Separator
8	355+170	Informatory	LHS	Median
9	355+200	Hazard Marker	LHS	Separator
10	355+210	Informatory	RHS SR	Shoulder
11	355+270	Rumble Strip	RHS SR	Shoulder
12	355+310	Route Marker	LHS	Separator
13	355+310	Speed Limit	SR LHS	Shoulder

S.No	Chainage (km)	Type of Sign	Side	Location
14	355+360	Informatory	SR LHS	Shoulder
15	355+390	Cross Road	SR LHS	Shoulder
16	355+400	Route Marker	RHS	Separator
17	355+420	Hazard Marker	LHS	Median
18	355+420	Cross Road	RHS SR	Separator
19	355+450	Informatory	RHS SR	Separator
20	355+490	Cross Road	SR LHS	Separator
21	355+530	Informatory	RHS SR	Shoulder
22	355+560	Informatory	SR LHS	Separator
23	355+570	Cross Road	RHS SR	Shoulder
24	355+710	Hazard Marker	RHS	Separator
25	355+710	Hazard Marker	RHS	Median
26	355+800	Hazard Marker	RHS SR	Island
27	355+800	Pass Either	RHS SR	Island
28	355+840	Bus Stop	RHS SR	Shoulder
29	356+010	Hazard Marker	SR LHS	Separator
30	356+010	Hazard Marker	SR LHS	Shouder
31	356+020	Hazard Marker	LHS	Median
32	356+020	Hazard Marker	LHS	Separator
33	356+060	Hazard Marker	RHS SR	Shoulder
34	356+060	Hazard Marker	RHS SR	Separator
35	356+060	Hazard Marker	RHS SR	Shoulder
36	356+060	Hazard Marker	RHS SR	Separator
37	356+560	Emergency Contact	LHS	Shoulder
38	356+700	Route Marker	RHS	Separator
39	357+060	Hazard Marker	LHS	Separator
40	357+150	Height Limit	SR LHS	Shouder
41	357+210	Side Road Left	SR LHS	Shouder
42	357+220	Informatory	RHS SR	Separator
43	357+230	Informatory	LHS	Separator
44	357+230	Informatory	SR LHS	Shouder
45	357+250	Height Limit	RHS SR	Separator
46	357+250	Turn Left	RHS SR	Separator
47	357+280	Side Road Left	RHS SR	Separator
48	357+280	Route Marker	RHS	Separator
49	357+290	Height Limit	SR LHS	Separator
50	372+120	Overhead Cables	RHS	Shoulder

S.No	Chainage (km)	Type of Sign	Side	Location
51	372+200	Informatory	RHS	Shoulder
52	372+250	Speed Limit	RHS	Shoulder
53	372+300	Speed Limit	RHS	Shoulder
54	372+310	Informatory	LHS	Median
55	372+330	Hazard Marker	LHS	Shoulder
56	372+360	Informatory	RHS	Median
57	372+490	Route Marker	RHS	Shoulder
58	372+580	Informatory	LHS	Separator
59	372+670	Pass Either	LHS	Separator
60	372+670	Two way Hazard	LHS	Separator
61	372+760	Informatory	RHS SR	Shoulder
62	372+770	Speed Limit	SR LHS	Shoulder
63	372+810	Rumble Strip	RHS SR	Shoulder
64	372+880	Hazard Marker	LHS	Separator
65	372+970	Cattle Crossing	SR LHS	Shoulder
66	372+970	Cattle Crossing	RHS SR	Separator
67	372+990	Pedestrian Crossing	RHS SR	Separator
68	373+040	Cattle Crossing	SR LHS	Separator
69	373+040	Pedestrian Crossing	RHS SR	Shoulder
70	373+060	Cattle Crossing	RHS SR	Shoulder
71	373+090	Pedestrain crossing	SR LHS	Separator
72	373+180	Emergency Contact	LHS	Shoulder
73	373+280	Merging Ahead	LHS	Separator
74	373+280	Rumble Strip	SR LHS	Shoulder
75	373+320	Informatory	SR LHS	Shoulder
76	373+320	Speed Breaker	RHS SR	Shoulder
77	373+410	Informatory	LHS	Shoulder
78	373+410	Pass Either	RHS	Separator
79	373+420	Speed Limit	LHS	Shoulder
80	373+460	Informatory	RHS	Shoulder
81	373+540	Informatory	LHS	Shoulder
82	373+580	Hazard Marker	LHS	Separator
83	373+580	Hazard Marker	LHS	Median
84	373+610	Speed Limit	RHS	Shoulder
85	373+650	Informatory	LHS	Shoulder
86	373+690	Hazard Marker	RHS	Median
87	373+690	Hazard Marker	RHS	Separator

S.No	Chainage (km)	Type of Sign	Side	Location
88	373+760	Two way Hazard	LHS	Separator
89	373+760	Pass Either	LHS	Separator
90	373+820	Speed Limit	SR LHS	Shoulder
91	373+850	Speed Breaker	SR LHS	Shoulder
92	373+850	Hazard Marker	RHS SR	Shoulder
93	373+860	Informatory	RHS SR	Shoulder
94	373+890	No Overtaking	SR LHS	Shoulder
95	373+940	Chevron	LHS	Separator
96	373+940	Rumble Strip	RHS SR	Shoulder
97	373+990	Chevron	LHS	Separator
98	373+990	Chevron	RHS	Median
99	374+020	Chevron	RHS	Median
100	374+040	Chevron	LHS	Separator
101	374+070	Chevron	RHS	Median
102	374+220	Chevron	LHS	Median
103	374+270	Chevron	LHS	Median
104	374+310	Chevron	RHS	Separator
105	374+320	Chevron	LHS	Median
106	374+370	Chevron	RHS	Separator
107	374+450	Chevron	RHS	Separator
108	374+550	Chevron	RHS	Separator
109	374+610	Hazard Marker	RHS SR	Shoulder
110	374+610	Hazard Marker	RHS SR	Shoulder
111	375+350	Chevron	LHS	Separator
112	375+440	Chevron	LHS	Separator
113	375+550	Side Road Right	SR LHS	Shoulder
114	375+580	Side Road Left	RHS SR	Separator
115	375+580	Hazard Marker	RHS	Median
116	375+600	Informatory	SR LHS	Shoulder
117	375+610	Informatory	RHS SR	Separator
118	375+610	Hazard Marker	RHS SR	Shoulder
119	375+620	Hazard Marker	LHS	Median
120	375+690	Hazard Marker	RHS	Median
121	375+700	Informatory	SR LHS	Separator
122	375+710	Informatory	RHS SR	Shoulder
123	375+740	Side Road Left	SR LHS	Separator
124	375+740	Side Road Right	RHS SR	Shoulder

S.No	Chainage (km)	Type of Sign	Side	Location
125	375+940	Hazard Marker	SR LHS	Shoulder
126	375+940	Hazard Marker	SR LHS	Separator
127	375+950	Hazard Marker	SR LHS	Separator
128	375+950	Hazard Marker	SR LHS	Shoulder
129	375+950	Hazard Marker	RHS SR	Shoulder
130	375+950	Hazard Marker	RHS SR	Separator
131	375+950	Hazard Marker	RHS SR	Shoulder
132	375+950	Hazard Marker	RHS SR	Separator
133	375+990	Speed Limit	LHS	Separator
134	376+010	Informatory	LHS	Separator
135	376+030	Hazard Marker	RHS	Separator
136	376+040	Merging Ahead	LHS	Separator
137	376+040	Informatory	SR LHS	Shoulder
138	376+040	Emergency Contact	RHS	Separator
139	376+070	No Turn Left	LHS	Separator
140	376+070	Rumble Strip	RHS SR	Separator
141	376+080	Informatory	SR LHS	Shoulder
142	376+110	Rumble Strip	SR LHS	Shoulder
143	376+110	Ahead Complusory	RHS SR	Separator
144	376+140	Give Way	RHS SR	Separator
145	376+160	Keep Right	LHS	Separator
146	376+160	No Entry	RHS SR	Separator
147	376+170	Rumble Strip	SR LHS	Separator
148	376+170	Hazard Marker	SR LHS	Separator
149	376+170	Pass Either	SR LHS	Separator
150	376+180	Hazard Marker	SR LHS	Separator
151	376+180	Pass Either	SR LHS	Separator
152	376+190	Hazard Marker	RHS SR	Separator
153	376+190	Keep Right	RHS SR	Separator
154	376+200	Hazard Marker	RHS SR	Separator
155	376+200	Pass Either	RHS SR	Separator
156	376+200	Rumble Strip	RHS SR	Separator
157	376+230	Ahead Complusory	RHS SR	Shoulder
158	376+250	Rumble Strip	RHS SR	Shoulder
159	376+270	Speed Limit	RHS	Separator
160	376+280	Right Turn Probhited	RHS SR	Shoulder
161	376+330	Speed Limit	RHS	Separator

S.No	Chainage (km)	Type of Sign	Side	Location
162	376+350	Restriction End	LHS	Separator
163	376+400	Informatory	RHS SR	Shoulder
164	376+410	Informatory	RHS	Separator
165	376+470	Informatory	RHS	Separator
166	376+590	Route Marker	LHS	Separator
167	376+600	Speed Limit	RHS	Separator
168	376+670	Hazard Marker	RHS SR	Separator
169	376+670	Hazard Marker	RHS SR	Shoulder
170	376+670	Hazard Marker	RHS SR	Separator
171	376+680	Speed Limit	LHS	Separator
172	376+680	Hazard Marker	LHS	Separator
173	376+690	Hazard Marker	RHS	Separator
174	376+710	Hazard Marker	SR LHS	Separator
175	376+710	Hazard Marker	SR LHS	Shoulder
176	376+720	Hazard Marker	SR LHS	Separator
177	376+720	Hazard Marker	SR LHS	Shoulder
178	376+730	Informatory	RHS SR	Shoulder
179	377+150	Informatory	RHS SR	Separator
180	377+160	Pedestrain crossing	SR LHS	Shoulder
181	377+190	Pedestrian Crossing	RHS SR	Separator
182	377+200	Informatory	SR LHS	Shoulder
183	377+220	Cattle Crossing	SR LHS	Shoulder
184	377+230	Cattle Crossing	RHS SR	Separator
185	377+280	Cattle Crossing	SR LHS	Separator
186	377+290	Informatory	SR LHS	Separator
187	377+300	Cattle Crossing	RHS SR	Shoulder
188	377+310	Pedestrain crossing	SR LHS	Separator
189	377+320	Pedestrian Crossing	RHS SR	Shoulder
190	377+350	Informatory	RHS SR	Shoulder
191	377+370	Speed Limit	LHS	Separator
192	377+530	Speed Limit	RHS	Separator
193	377+620	Speed Limit	LHS	Separator
194	377+660	Informatory	LHS	Separator
195	377+730	Informatory	LHS	Separator
196	377+730	Hazard Marker	LHS	Separator
197	377+730	Hazard Marker	LHS	Median
198	377+770	Hazard Marker	SR LHS	Separator

S.No	Chainage (km)	Type of Sign	Side	Location
199	377+770	Hazard Marker	SR LHS	Shoulder
200	377+770	Hazard Marker	RHS SR	Shoulder
201	377+770	Hazard Marker	RHS SR	Separator
202	377+770	Hazard Marker	RHS SR	Shoulder
203	377+770	Hazard Marker	RHS SR	Separator
204	377+780	Informatory	LHS	Separator
205	377+780	Hazard Marker	SR LHS	Separator
206	377+780	Hazard Marker	SR LHS	Shoulder
207	377+820	Hazard Marker	RHS	Separator
208	377+820	Hazard Marker	RHS	Median
209	377+840	Restriction End	RHS	Separator
210	377+900	No Turn Right	SR LHS	Shoulder
211	377+920	Rumble Strip	RHS SR	Separator
212	377+950	Complusory Ahead	SR LHS	Shoulder
213	377+950	Informatory	RHS SR	Separator
214	377+990	Hazard Marker	SR LHS	Separator
215	377+990	Pass Either	SR LHS	Separator
216	377+990	Rumble Strip	SR LHS	Separator
217	377+990	Hazard Marker	SR LHS	Separator
218	377+990	Pass Either	SR LHS	Separator
219	378+000	Informatory	LHS	Separator
220	378+000	Hazard Marker	RHS SR	Separator
221	378+000	Pass Either	RHS SR	Separator
222	378+010	No Entry	SR LHS	Separator
223	378+010	Hazard Marker	RHS SR	Separator
224	378+010	Pass Either	RHS SR	Separator
225	378+010	Rumble Strip	RHS SR	Separator
226	378+040	Give way	SR LHS	Separator
227	378+050	Complusory Ahead	SR LHS	Separator
228	378+060	Rumble Strip	SR LHS	Separator
229	378+080	Restriction End	LHS	Separator
230	378+080	Left Turn Prohibhited	RHS	Separator
231	378+090	Hazard Marker	LHS	Median
232	378+090	Informatory	SR LHS	Shoulder
233	378+100	Informatory	RHS SR	Shoulder
234	378+120	Merging Ahead	RHS	Separator
235	378+280	Speed Limit	RHS	Separator

S.No	Chainage (km)	Type of Sign	Side	Location
236	378+430	School Ahead	RHS SR	Shoulder
237	378+750	Speed Limit	SR LHS	Shoulder
238	378+760	Informatory	LHS	Separator
239	378+770	Bus Bay	SR LHS	Shoulder
240	378+850	Informatory	LHS	Separator
241	378+850	School Ahead	RHS SR	Shoulder
242	378+850	Bus Stop	RHS SR	Shoulder
243	378+890	No Turn Left	SR LHS	Separator
244	378+930	Hazard Marker	RHS	Separator
245	378+960	Hazard Marker	RHS	Median
246	378+990	Hazard Marker	LHS	Separator
247	379+000	Hazard Marker	SR LHS	Shoulder
248	379+000	Hazard Marker	SR LHS	Separator
249	379+000	Hazard Marker	SR LHS	Shoulder
250	379+000	Hazard Marker	SR LHS	Separator
251	379+010	Hazard Marker	RHS SR	Shoulder
252	379+010	Hazard Marker	RHS SR	Separator
253	379+010	Hazard Marker	RHS SR	Shoulder
254	379+010	Hazard Marker	RHS SR	Separator
255	379+050	Hazard Marker	RHS	Separator
256	379+100	Informatory	LHS	Median
257	379+130	No Parking	RHS	Separator
258	379+270	Informatory	SR LHS	Shoulder
259	379+280	Informatory	RHS SR	Shoulder
260	379+290	Speed Limit	LHS	Separator
261	379+350	Hazard Marker	LHS	Separator
262	379+370	Hazard Marker	SR LHS	Shoulder
263	379+370	Hazard Marker	SR LHS	Separator
264	379+370	Hazard Marker	SR LHS	Shoulder
265	379+370	Hazard Marker	SR LHS	Separator
266	379+370	Hazard Marker	RHS SR	Separator
267	379+370	Hazard Marker	RHS SR	Shoulder
268	379+370	Hazard Marker	RHS SR	Separator
269	379+380	Rumble Strip	SR LHS	Shoulder
270	379+410	Informatory	SR LHS	Shoulder
271	379+420	Hazard Marker	RHS	Separator
272	379+430	No Turn Left	LHS	Separator

S.No	Chainage (km)	Type of Sign	Side	Location
273	379+430	Ahead Complusory	RHS SR	Separator
274	379+470	Pass Either	SR LHS	Separator
275	379+470	Rumble Strip	SR LHS	Separator
276	379+470	Hazard Marker	SR LHS	Separator
277	379+470	Pass Either	SR LHS	Separator
278	379+470	Give Way	RHS SR	Separator
279	379+480	No Entry	RHS SR	Separator
280	379+490	Hazard Marker	RHS SR	Separator
281	379+490	Pass Either	RHS SR	Separator
282	379+500	Hazard Marker	RHS SR	Separator
283	379+500	Keep Right	RHS SR	Separator
284	379+500	Rumble Strip	RHS SR	Separator
285	379+530	Ahead Complusory	RHS SR	Shoulder
286	379+560	Rumble Strip	SR LHS	Separator
287	379+560	Right Turn Probhited	RHS SR	Shoulder
288	379+620	Speed Breaker	RHS SR	Shoulder
289	379+630	Speed Limit	RHS	Separator
290	379+640	Informatory	SR LHS	Separator
291	379+670	Restriction End	LHS	Separator
292	379+690	hazard Marker	LHS	Separator
293	379+700	Hazard Marker	SR LHS	Separator
294	379+700	Hazard Marker	SR LHS	Shoulder
295	379+700	Hazard Marker	SR LHS	Separator
296	379+700	Hazard Marker	SR LHS	Shoulder
297	379+700	Speed Limit	RHS	Separator
298	379+710	Hazard Marker	RHS SR	Shoulder
299	379+710	Hazard Marker	RHS SR	Separator
300	379+710	Hazard Marker	RHS SR	Shoulder
301	379+710	Hazard Marker	RHS SR	Separator
302	379+750	Hazard Marker	RHS	Separator
303	379+910	hazard Marker	LHS	Separator
304	379+930	Hazard Marker	SR LHS	Separator
305	379+930	Hazard Marker	SR LHS	Shoulder
306	379+930	Hazard Marker	SR LHS	Separator
307	379+930	Hazard Marker	SR LHS	Shoulder
308	379+940	Hazard Marker	RHS SR	Shoulder
309	379+940	Hazard Marker	RHS SR	Separator

S.No	Chainage (km)	Type of Sign	Side	Location
310	379+940	Hazard Marker	RHS SR	Shoulder
311	379+940	Hazard Marker	RHS SR	Separator
312	379+940	Informatory	RHS	Separator
313	379+980	Hazard Marker	RHS	Separator
314	380+030	Speed Limit	RHS	Separator
315	380+050	Informatory	SR LHS	Shoulder
316	380+070	Emergency Contact	LHS	Separator
317	380+200	Hazard Marker	LHS	Separator
318	380+230	Pedestrain crossing	SR LHS	Separator
319	380+230	Cattle Crossing	RHS SR	Separator
320	380+250	Pedestrian Crossing	RHS SR	Separator
321	380+310	Cattle Crossing	SR LHS	Separator
322	380+310	Pedestrian Crossing	RHS SR	Shoulder
323	380+350	Cattle Crossing	RHS SR	Shoulder
324	380+360	Hazard Marker	RHS	Separator
325	380+370	Speed Limit	LHS	Separator
326	380+500	Hazard Marker	LHS	Median
327	380+530	Hazard Marker	SR LHS	Separator
328	380+530	Hazard Marker	SR LHS	Shoulder
329	380+530	Hazard Marker	SR LHS	Separator
330	380+530	Hazard Marker	SR LHS	Shoulder
331	380+530	Hazard Marker	RHS SR	Shoulder
332	380+530	Hazard Marker	RHS SR	Separator
333	380+530	Hazard Marker	RHS SR	Shoulder
334	380+530	Hazard Marker	RHS SR	Separator
335	380+580	Hazard Marker	RHS	Separator
336	380+940	Hazard Marker	LHS	Separator
337	380+960	Hazard Marker	SR LHS	Separator
338	380+960	Hazard Marker	SR LHS	Shoulder
339	380+960	Hazard Marker	SR LHS	Separator
340	380+960	Hazard Marker	SR LHS	Shoulder
341	380+970	Hazard Marker	RHS SR	Shoulder
342	380+970	Hazard Marker	RHS SR	Separator
343	380+970	Hazard Marker	RHS SR	Shoulder
344	380+970	Hazard Marker	RHS SR	Separator
345	381+010	Hazard Marker	RHS	Separator
346	381+150	Informatory	RHS SR	Shoulder

S.No	Chainage (km)	Type of Sign	Side	Location
347	381+250	Hazard Marker	LHS	Separator
348	381+340	Informatory	SR LHS	Shoulder
349	381+360	Cross Road	RHS SR	Shoulder
350	381+370	Cross Road	SR LHS	Shoulder
351	381+400	Hazard Marker	LHS	Median
352	381+480	Informatory	SR LHS	Separator
353	381+480	Informatory	RHS SR	Shoulder
354	381+480	Chevron	RHS	Median
355	381+490	Cross Road	SR LHS	Separator
356	381+520	Cross Road	RHS SR	Shoulder
357	381+560	Hazard Marker	SR LHS	Shoulder
358	381+560	Hazard Marker	SR LHS	Separator
359	381+560	Hazard Marker	SR LHS	Shoulder
360	381+560	Hazard Marker	SR LHS	Separator
361	381+560	Hazard Marker	RHS SR	Shoulder
362	381+560	Hazard Marker	RHS SR	Separator
363	381+560	Hazard Marker	RHS SR	Shoulder
364	381+560	Hazard Marker	RHS SR	Separator
365	381+620	Chevron	LHS	Median
366	381+680	Chevron	LHS	Median
367	381+680	Chevron	RHS	Separator
368	381+700	Hazard Marker	RHS	Separator
369	381+740	Chevron	RHS	Separator
370	381+900	Hazard Marker	LHS	Separator
371	381+910	Hazard Marker	SR LHS	Shoulder
372	381+910	Hazard Marker	SR LHS	Separator
373	381+910	Hazard Marker	SR LHS	Shoulder
374	381+910	Hazard Marker	SR LHS	Separator
375	381+930	Hazard Marker	RHS SR	Shoulder
376	381+930	Hazard Marker	RHS SR	Separator
377	381+930	Hazard Marker	RHS SR	Shoulder
378	381+930	Hazard Marker	RHS SR	Separator
379	381+970	Hazard Marker	RHS	Separator
380	382+560	Hazard Marker	LHS	Separator
381	382+570	Hazard Marker	SR LHS	Shoulder
382	382+570	Hazard Marker	SR LHS	Separator
383	382+570	Hazard Marker	SR LHS	Shoulder

S.No	Chainage (km)	Type of Sign	Side	Location
384	382+570	Hazard Marker	SR LHS	Separator
385	382+590	Hazard Marker	RHS SR	Shoulder
386	382+590	Hazard Marker	RHS SR	Separator
387	382+590	Hazard Marker	RHS SR	Shoulder
388	382+590	Hazard Marker	RHS SR	Separator
389	382+690	Informatory	LHS	Separator
390	382+730	Speed Limit	RHS	Separator
391	382+780	Hazard Marker	LHS	Separator
392	382+820	Cattle Crossing	SR LHS	Shoulder
393	382+840	Pedestrain crossing	SR LHS	Shoulder
394	382+850	Cattle Crossing	RHS SR	Separator
395	382+870	Pedestrian Crossing	RHS SR	Separator
396	382+920	Pedestrain crossing	SR LHS	Separator
397	382+920	Cattle Crossing	SR LHS	Separator
398	382+930	Pedestrian Crossing	RHS SR	Shoulder
399	382+940	Cattle Crossing	RHS SR	Shoulder
400	382+970	Speed Limit	LHS	Separator
401	383+000	Hazard Marker	RHS	Separator
402	383+020	Accident Prone Area	RHS	Separator
403	383+050	Informatory	LHS	Separator
404	383+130	Restriction End	RHS	Separator
405	383+220	Speed Limit	LHS	Separator
406	383+220	Rumble Strip	SR LHS	shoulder
407	383+220	Rumble Strip	RHS SR	Separator
408	383+240	Ahead Compulsory	SR LHS	shoulder
409	383+260	Informatory	RHS SR	Separator
410	383+270	Informatory	LHS	Separator
411	383+300	Hazard Marker	RHS SR	Separator
412	383+310	Hazard Marker	RHS SR	Separator
413	383+310	Pass Either	RHS SR	Separator
414	383+310	Rumble Strip	RHS SR	Separator
415	383+320	Rumble Strip	SR LHS	Separator
416	383+320	Hazard Marker	SR LHS	Separator
417	383+320	Pass Either	SR LHS	Separator
418	383+330	Hazard Marker	SR LHS	Separator
419	383+330	Keep Right	SR LHS	Separator
420	383+330	No Entry	SR LHS	Separator

S.No	Chainage (km)	Type of Sign	Side	Location
421	383+330	Hazard Marker	RHS	Separator
422	383+350	Give way	SR LHS	Separator
423	383+370	Ahead Compulsory	SR LHS	Separator
424	383+370	Left Turn Prohibhited	RHS	Separator
425	383+380	Informatory	RHS SR	Shoulder
426	383+410	Rumble Strip	RHS SR	Shoulder
427	383+420	Informatory	RHS SR	Shoulder
428	383+430	Merging Ahead	RHS	Separator
429	383+440	Restriction End	LHS	Separator
430	383+440	Informatory	SR LHS	Shoulder
431	383+470	Hazard Marker	LHS	Separator
432	383+480	Hazard Marker	SR LHS	Separator
433	383+480	Hazard Marker	SR LHS	Separator
434	383+480	Hazard Marker	SR LHS	Separator
435	383+480	Hazard Marker	SR LHS	Separator
436	383+490	Informatory	SR LHS	Shoulder
437	383+510	Hazard Marker	RHS SR	Shoulder
438	383+510	Hazard Marker	RHS SR	Separator
439	383+510	Hazard Marker	RHS SR	Shoulder
440	383+510	Hazard Marker	RHS SR	Separator
441	383+540	Informatory	RHS SR	Shoulder
442	383+540	Hazard Marker	RHS	Separator
443	383+540	Speed Limit	RHS	Separator
444	383+960	Informatory	SR LHS	Shoulder
445	383+980	Cattle Crossing	SR LHS	Shoulder
446	384+010	Hazard Marker	SR LHS	Shoulder
447	384+010	Hazard Marker	SR LHS	Separator
448	384+010	Hazard Marker	SR LHS	Shoulder
449	384+010	Hazard Marker	SR LHS	Separator
450	384+020	Pedestrain crossing	SR LHS	Shoulder
451	384+020	Side Road Right	RHS SR	Separator
452	384+020	Informatory	RHS	Median
453	384+060	Hazard Marker	RHS SR	Shoulder
454	384+060	Hazard Marker	RHS SR	Separator
455	384+060	Hazard Marker	RHS SR	Separator
456	384+060	Informatory	RHS SR	Separator
457	384+070	Cattle Crossing	RHS SR	Separator

S.No	Chainage (km)	Type of Sign	Side	Location
458	384+090	Pedestrain crossing	SR LHS	Separator
459	384+090	Pedestrian Crossing	RHS SR	Separator
460	384+120	Informatory	RHS SR	Shoulder
461	384+130	Informatory	SR LHS	Separator
462	384+140	Pedestrian Crossing	RHS SR	Shoulder
463	384+160	Cattle Crossing	SR LHS	Separator
464	384+160	Cattle Crossing	RHS SR	Shoulder
465	384+180	Informatory	SR LHS	Shoulder
466	384+180	Side Road Left	RHS SR	Shoulder
467	384+190	Informatory	RHS SR	Shoulder
468	384+230	Speed Limit	LHS	Separator
469	384+260	Informatory	SR LHS	Shoulder
470	384+260	Restriction End	RHS	Separator
471	384+280	Bus Bay	SR LHS	Bus Bay Island
472	384+300	Bus Stop	RHS SR	Shoulder
473	384+320	Merging Ahead	LHS	Separator
474	384+320	Hazard Marker	SR LHS	Bus Bay Island
475	384+320	Pass Either	SR LHS	Bus Bay Island
476	384+390	No Turn Left	LHS	Separator
477	384+390	Rumble Strip	SR LHS	Shoulder
478	384+410	Rumble Strip	RHS SR	Separator
479	384+430	Hazard Marker	LHS	Separator
480	384+430	Pass Either	LHS	Separator
481	384+430	Hazard Marker	SR LHS	Separator
482	384+430	Pass Either	SR LHS	Separator
483	384+440	Rumble Strip	SR LHS	Separator
484	384+440	Ahead Complusory	RHS SR	Separator
485	384+460	Give Way	RHS SR	Separator
486	384+480	No Entry	RHS SR	Separator
487	384+490	Hazard Marker	RHS SR	Separator
488	384+490	Keep Right	RHS SR	Separator
489	384+500	Hazard Marker	RHS SR	Separator
490	384+500	Pass Either	RHS SR	Separator
491	384+500	Rumble Strip	RHS SR	Separator
492	384+530	Rumble Strip	SR LHS	Separator
493	384+540	Hazard Marker	RHS SR	Shoulder

S.No	Chainage (km)	Type of Sign	Side	Location
494	384+540	Hazard Marker	RHS SR	Separator
495	384+540	Hazard Marker	RHS SR	Shoulder
496	384+540	Hazard Marker	RHS SR	Separator
497	384+550	Right Turn Probhited	RHS SR	Shoulder
498	384+580	Ahead Complusory	RHS SR	Shoulder
499	384+580	Speed Limit	RHS	Separator
500	384+600	Rumble Strip	RHS SR	Shoulder
501	384+610	Restriction End	LHS	Separator
502	384+640	Speed Limit	RHS	Separator
503	384+650	Informatory	SR LHS	Separator
504	384+660	Hazard Marker	LHS	Separator
505	384+660	Hazard Marker	LHS	Median
506	384+660	Informatory	RHS	Separator
507	384+680	Informatory	RHS	Separator
508	384+700	Hazard Marker	SR LHS	Shoulder
509	384+700	Hazard Marker	SR LHS	Separator
510	384+700	Hazard Marker	SR LHS	Shoulder
511	384+700	Hazard Marker	SR LHS	Separator
512	384+720	Hazard Marker	RHS SR	Shoulder
513	384+720	Hazard Marker	RHS SR	Separator
514	384+720	Hazard Marker	RHS SR	Shoulder
515	384+720	Hazard Marker	RHS SR	Separator
516	384+740	Hazard Marker	RHS	Median
517	384+820	Informatory	RHS	Separator
518	384+860	Emergency Contact	LHS	Separator
519	384+910	Speed Limit	RHS	Separator
520	384+940	Cattle Crossing	SR LHS	Shoulder
521	384+960	Hazard Marker	LHS	Separator
522	384+970	Hazard Marker	SR LHS	Shoulder
523	384+970	Hazard Marker	SR LHS	Separator
524	384+970	Hazard Marker	SR LHS	Shoulder
525	384+970	Hazard Marker	SR LHS	Separator
526	384+980	Pedestrain crossing	SR LHS	Shoulder
527	385+000	Cattle Crossing	RHS SR	Separator
528	385+000	Informatory	RHS	Separator
529	385+030	Cattle Crossing	SR LHS	Separator
530	385+030	Pedestrian Crossing	RHS SR	Separator

S.No	Chainage (km)	Type of Sign	Side	Location
531	385+030	Hazard Marker	RHS SR	Shoulder
532	385+030	Hazard Marker	RHS SR	Separator
533	385+030	Hazard Marker	RHS SR	Shoulder
534	385+030	Hazard Marker	RHS SR	Separator
535	385+060	Speed Limit	LHS	Separator
536	385+060	Pedestrain crossing	SR LHS	Separator
537	385+100	Cattle Crossing	RHS SR	Shoulder
538	385+120	Pedestrian Crossing	RHS SR	Shoulder
539	385+190	Hazard Marker	SR LHS	Shoulder
540	385+190	Hazard Marker	SR LHS	Separator
541	385+190	Hazard Marker	SR LHS	Shoulder
542	385+190	Hazard Marker	SR LHS	Separator
543	385+240	Hazard Marker	RHS SR	Shoulder
544	385+240	Hazard Marker	RHS SR	Separator
545	385+240	Hazard Marker	RHS SR	Shoulder
546	385+240	Hazard Marker	RHS SR	Separator
547	385+290	Speed Limit	LHS	Median
548	385+370	Hazard Marker	RHS	Median
549	385+630	Hazard Marker	RHS	Separator
550	385+700	Hazard Marker	LHS	Separator
551	385+730	Hazard Marker	SR LHS	Shoulder
552	385+730	Hazard Marker	SR LHS	Separator
553	385+730	Hazard Marker	SR LHS	Shoulder
554	385+730	Hazard Marker	SR LHS	Separator
555	385+770	Hazard Marker	RHS SR	Shoulder
556	385+770	Hazard Marker	RHS SR	Separator
557	385+780	Hazard Marker	RHS	Separator
558	385+800	Speed Limit	RHS	Separator
559	386+020	Hazard Marker	LHS	Separator
560	386+040	Hazard Marker	SR LHS	Shoulder
561	386+040	Hazard Marker	SR LHS	Separator
562	386+040	Hazard Marker	SR LHS	Shoulder
563	386+040	Hazard Marker	SR LHS	Separator
564	386+060	Hazard Marker	RHS SR	Shoulder
565	386+060	Hazard Marker	RHS SR	Separator
566	386+060	Hazard Marker	RHS SR	Shoulder
567	386+060	Hazard Marker	RHS SR	Separator

S.No	Chainage (km)	Type of Sign	Side	Location
568	386+160	Informatory	SR LHS	Shoulder
569	387+000	Hazard Marker	LHS	Median
570	387+020	Hazard Marker	LHS	Separator
571	387+030	Speed Limit	RHS	Separator
572	387+050	Hazard Marker	SR LHS	Shoulder
573	387+050	Hazard Marker	SR LHS	Separator
574	387+050	Hazard Marker	SR LHS	Shoulder
575	387+050	Hazard Marker	SR LHS	Separator
576	387+080	Informatory	RHS SR	Shoulder
577	387+100	Hazard Marker	RHS SR	Shoulder
578	387+100	Hazard Marker	RHS SR	Separator
579	387+100	Hazard Marker	RHS SR	Shoulder
580	387+100	Hazard Marker	RHS SR	Separator
581	387+140	Hazard Marker	RHS	Separator
582	387+140	Hazard Marker	RHS	Median
583	387+160	Informatory	SR LHS	Shoulder
584	387+160	Cattle Crossing	SR LHS	Shoulder
585	387+180	Hazard Marker	LHS	Separator
586	387+260	Pedestrain crossing	SR LHS	Shoulder
587	387+280	Cattle Crossing	RHS SR	Separator
588	387+290	Chevron	RHS	Separator
589	387+300	Pedestrain crossing	SR LHS	Separator
590	387+310	Pedestrian Crossing	RHS SR	Separator
591	387+320	Informatory	RHS SR	Separator
592	387+330	Chevron	RHS	Separator
593	387+340	Cattle Crossing	SR LHS	Separator
594	387+360	Speed Limit	LHS	Separator
595	387+370	Pedestrian Crossing	RHS SR	Shoulder
596	387+390	Cattle Crossing	RHS SR	Shoulder
597	387+390	Hazard Marker	RHS	Separator
598	387+410	Informatory	LHS	Separator
599	387+410	Chevron	LHS	Median
600	387+420	Informatory	RHS SR	Shoulder
601	387+450	Hazard Marker	LHS	Separator
602	387+470	Chevron	LHS	Median
603	387+490	Hazard Marker	SR LHS	Shoulder
604	387+490	Hazard Marker	SR LHS	Separator

S.No	Chainage (km)	Type of Sign	Side	Location
605	387+490	Hazard Marker	SR LHS	Shoulder
606	387+490	Hazard Marker	SR LHS	Separator
607	387+500	Restriction End	RHS	Separator
608	387+520	Chevron	LHS	Median
609	387+530	Speed Limit	LHS	Separator
610	387+530	Chevron	RHS	Separator
611	387+540	Hazard Marker	RHS SR	Shoulder
612	387+540	Hazard Marker	RHS SR	Separator
613	387+540	Hazard Marker	RHS SR	Shoulder
614	387+540	Hazard Marker	RHS SR	Separator
615	387+560	Hazard Marker	RHS	Separator
616	387+590	Chevron	LHS	Median
617	387+600	Rumble Strip	RHS SR	Separator
618	387+610	Rumble Strip	SR LHS	Shoulder
619	387+650	Ahead Compulsory	SR LHS	Shoulder
620	387+650	Informatory	RHS SR	Separator
621	387+650	Chevron	RHS	Separator
622	387+680	No Turn Right	SR LHS	Shoulder
623	387+700	Hazard Marker	SR LHS	Separator
624	387+710	Hazard Marker	SR LHS	Separator
625	387+710	Pass Either	SR LHS	Separator
626	387+720	Rumble Strip	SR LHS	Separator
627	387+720	Hazard Marker	SR LHS	Separator
628	387+720	Keep Right	SR LHS	Separator
629	387+730	Hazard Marker	RHS SR	Separator
630	387+730	Hazard Marker	RHS	Separator
631	387+730	Keep Right	RHS	Separator
632	387+740	Hazard Marker	LHS	Median
633	387+750	Hazard Marker	RHS SR	Separator
634	387+750	Pass Either	RHS SR	Separator
635	387+750	Rumble Strip	RHS SR	Separator
636	387+760	Give way	SR LHS	Separator
637	387+780	Left Turn Prohibhited	RHS	Separator
638	387+790	Ahead Compulsory	SR LHS	Separator
639	387+810	Hazard Marker	RHS	Median
640	387+820	Restriction End	LHS	Separator
641	387+820	Rumble Strip	SR LHS	Separator

S.No	Chainage (km)	Type of Sign	Side	Location
642	387+890	Informatory	RHS SR	Shoulder
643	387+890	Rumble Strip	RHS SR	Shoulder
644	387+950	Hazard Marker	LHS	Separator
645	387+950	Hazard Marker	LHS	Median
646	387+950	Informatory	RHS SR	Shoulder
647	387+980	Hazard Marker	SR LHS	Separator
648	387+980	Hazard Marker	SR LHS	Shoulder
649	387+980	Hazard Marker	SR LHS	Separator
650	387+980	Hazard Marker	SR LHS	Shoulder
651	387+990	Speed Limit	RHS	Separator
652	388+030	Hazard Marker	RHS SR	Shoulder
653	388+030	Hazard Marker	RHS SR	Separator
654	388+030	Hazard Marker	RHS SR	Shoulder
655	388+030	Hazard Marker	RHS SR	Separator
656	388+030	Hazard Marker	RHS	Median
657	388+030	Hazard Marker	RHS	Separator
658	388+050	Speed Limit	LHS	Separator
659	388+120	Hazard Marker	LHS	Separator
660	388+140	Speed Limit	RHS	Separator
661	388+180	Informatory	SR LHS	Shoulder
662	388+200	Cross Road	SR LHS	Shoulder
663	388+250	Height Limit	SR LHS	Shoulder
664	388+250	Turn Right	SR LHS	Shoulder
665	388+300	Cross Road	RHS SR	Separator
666	388+320	Turn Left	SR LHS	Separator
667	388+320	Height Limit	SR LHS	Separator
668	388+340	Cross Road	SR LHS	Separator
669	388+340	Turn Left	RHS SR	Separator
670	388+340	Height Limit	RHS SR	Separator
671	388+350	Informatory	RHS SR	Separator
672	388+370	Informatory	SR LHS	Separator
673	388+390	Turn Right	RHS SR	Shoulder
674	388+390	Height Limit	RHS SR	Shoulder
675	388+430	Cross Road	RHS SR	Shoulder
676	388+490	Informatory	RHS SR	Shoulder
677	388+570	Hazard Marker	RHS	Separator
678	388+820	Hazard Marker	LHS	Separator

S.No	Chainage (km)	Type of Sign	Side	Location
679	388+820	Hazard Marker	LHS	Median
680	388+850	Hazard Marker	SR LHS	Shoulder
681	388+850	Hazard Marker	SR LHS	Shoulder
682	388+890	Hazard Marker	RHS SR	Shoulder
683	388+890	Hazard Marker	RHS SR	Separator
684	388+890	Hazard Marker	RHS SR	Shoulder
685	388+890	Hazard Marker	RHS SR	Separator
686	388+890	Hazard Marker	RHS	Median
687	388+890	Hazard Marker	RHS	Separator
688	388+990	Informatory	LHS	Median
689	389+050	Informatory	RHS	Median
690	389+220	Speed Limit	RHS	Separator
691	389+310	Informatory	SR LHS	Shoulder
692	389+320	Cattle Crossing	SR LHS	Shoulder
693	389+340	Cattle Crossing	SR LHS	Shoulder
694	389+340	Informatory	RHS SR	Separator
695	389+390	Side Road Right	RHS SR	Separator
696	389+410	Pedestrain crossing	SR LHS	Separator
697	389+410	Cattle Crossing	RHS SR	Separator
698	389+420	Pedestrian Crossing	RHS SR	Separator
699	389+430	Cattle Crossing	SR LHS	Separator
700	389+440	Side Road Right	SR LHS	Separator
701	389+450	Chevron	LHS	Separator
702	389+470	Pedestrian Crossing	RHS SR	Shoulder
703	389+490	Chevron	LHS	Separator
704	389+500	Cattle Crossing	RHS SR	Shoulder
705	389+500	Hazard Marker	RHS	Separator
706	389+540	Chevron	LHS	Separator
707	389+540	Informatory	RHS SR	Shoulder
708	389+700	Chevron	LHS	Separator
709	389+740	Hazard Marker	RHS SR	Island
710	389+740	Pass Either	RHS SR	Island
711	389+750	Hazard Marker	LHS	Separator
712	389+760	Bus Stop	RHS SR	Shoulder
713	389+770	Hazard Marker	SR LHS	Shoulder
714	389+770	Hazard Marker	SR LHS	Separator
715	389+770	Hazard Marker	SR LHS	Shoulder

S.No	Chainage (km)	Type of Sign	Side	Location
716	389+770	Hazard Marker	SR LHS	Separator
717	389+790	Hazard Marker	RHS SR	Shoulder
718	389+790	Hazard Marker	RHS SR	Separator
719	389+790	Hazard Marker	RHS SR	Shoulder
720	389+790	Hazard Marker	RHS SR	Separator
721	389+810	Emergency Contact	LHS	Separator
722	389+810	Hazard Marker	RHS	Median
723	389+820	Hazard Marker	RHS	Separator
724	389+920	Hazard Marker	LHS	Separator
725	389+930	Speed Limit	LHS	Separator
726	389+940	Informatory	SR LHS	shoulder
727	389+970	Merging Ahead	LHS	Separator
728	389+990	Informatory	SR LHS	shoulder
729	390+010	No Turn Left	LHS	Separator
730	390+010	Restriction End	RHS	Separator
731	390+020	Rumble Strip	SR LHS	shoulder
732	390+040	Rumble Strip	RHS SR	Separator
733	390+080	Ahead Complusory	RHS SR	Separator
734	390+100	Hazard Marker	SR LHS	Separator
735	390+100	Pass Either	SR LHS	Separator
736	390+100	Rumble Strip	SR LHS	Separator
737	390+110	Hazard Marker	SR LHS	Separator
738	390+110	Pass Either	SR LHS	Separator
739	390+110	Give Way	RHS SR	Separator
740	390+140	No Entry	RHS SR	Separator
741	390+150	Hazard Marker	RHS SR	Separator
742	390+150	Keep Right	RHS SR	Separator
743	390+160	Hazard Marker	RHS SR	Separator
744	390+160	Pass Either	RHS SR	Separator
745	390+160	Rumble Strip	RHS SR	Separator
746	390+210	Ahead Complusory	RHS SR	Shoulder
747	390+220	Overhead Cable	LHS	Separator
748	390+220	Rumble Strip	SR LHS	Separator
749	390+240	Rumble Strip	RHS SR	Shoulder
750	390+270	Right Turn Probhited	RHS SR	Shoulder
751	390+280	Speed Limit	RHS	Separator
752	390+320	Restriction End	LHS	Separator

S.No	Chainage (km)	Type of Sign	Side	Location
753	390+380	Speed Limit	RHS	Separator
754	390+400	Hazard Marker	LHS	Separator
755	390+410	Hazard Marker	SR LHS	Separator
756	390+410	Hazard Marker	SR LHS	Shoulder
757	390+410	Hazard Marker	SR LHS	Separator
758	390+450	Hazard Marker	RHS SR	Shoulder
759	390+450	Hazard Marker	RHS SR	Separator
760	390+450	Hazard Marker	RHS SR	Shoulder
761	390+450	Hazard Marker	RHS SR	Separator
762	390+450	Hazard Marker	RHS	Separator
763	390+470	Informatory	RHS	Separator
764	390+530	Hazard Marker	LHS	Separator
765	390+540	Cattle Crossing	SR LHS	Shoulder
766	390+560	Pedestrain crossing	SR LHS	Shoulder
767	390+600	Cattle Crossing	RHS SR	Separator
768	390+610	Pedestrain crossing	SR LHS	Separator
769	390+610	Pedestrian Crossing	RHS SR	Separator
770	390+610	Informatory	RHS	Separator
771	390+630	Cattle Crossing	SR LHS	Separator
772	390+710	Pedestrian Crossing	RHS SR	Shoulder
773	390+770	Speed Limit	LHS	Separator
774	390+790	Hazard Marker	RHS	Separator
775	391+010	School Ahead	SR LHS	Shoulder
776	391+030	Hazard Marker	LHS	Separator
777	391+150	Informatory	SR LHS	Shoulder
778	391+170	Side Road Left	SR LHS	Shoulder
779	391+200	Side Road left	RHS SR	Separator
780	391+250	Hazard Marker	LHS	Median
781	391+250	School Ahead	SR LHS	Shoulder
782	391+250	Informatory	RHS SR	Separator
783	391+290	Informatory	SR LHS	Separator
784	391+300	Overhead Cables	SR LHS	Shoulder
785	391+310	Hazard Marker	RHS	Median
786	391+320	Side Road Right	SR LHS	Separator
787	391+420	School Ahead	SR LHS	Shoulder
788	391+450	Side Road Right	RHS SR	Shoulder
789	391+490	Overhead Cable	RHS SR	Shoulder

S.No	Chainage (km)	Type of Sign	Side	Location
790	391+490	Overhead Cables	RHS	Separator
791	391+510	Hazard Marker	SR LHS	Separator
792	391+510	Hazard Marker	SR LHS	Shoulder
793	391+510	Hazard Marker	SR LHS	Separator
794	391+510	Hazard Marker	SR LHS	Shoulder
795	391+520	Hazard Marker	RHS SR	Shoulder
796	391+520	Hazard Marker	RHS SR	Separator
797	391+520	Hazard Marker	RHS SR	Shoulder
798	391+520	Hazard Marker	RHS SR	Separator
799	391+670	Cattle Crossing	RHS SR	Shoulder
800	391+780	School Ahead	SR LHS	Separator
801	391+810	Hazard Marker	SR LHS	Shoulder
802	391+810	Hazard Marker	SR LHS	Separator
803	391+810	Hazard Marker	SR LHS	Shoulder
804	391+810	Hazard Marker	SR LHS	Separator
805	391+820	Hazard Marker	RHS SR	Shoulder
806	391+820	Hazard Marker	RHS SR	Separator
807	391+820	Hazard Marker	RHS SR	Shoulder
808	391+820	Hazard Marker	RHS SR	Separator
809	391+840	School Ahead	RHS SR	Separator
810	391+870	Informatory	SR LHS	shoulder
811	391+940	Cattle Crossing	SR LHS	shoulder
812	391+960	Pedestrain crossing	SR LHS	shoulder
813	391+970	Informatory	RHS SR	Separator
814	392+000	Side Road Right	RHS SR	Separator
815	392+030	Cattle Crossing	RHS SR	Separator
816	392+040	Pedestrian Crossing	RHS SR	Separator
817	392+060	Pedestrain crossing	SR LHS	Separator
818	392+080	Cattle Crossing	SR LHS	Separator
819	392+100	Pedestrian Crossing	RHS SR	Shoulder
820	392+110	Informatory	SR LHS	Separator
821	392+130	Cattle Crossing	RHS SR	Shoulder
822	392+150	Side Road Left	RHS SR	Shoulder
823	392+190	Informatory	RHS SR	Shoulder
824	392+210	Hazard Marker	RHS	Separator
825	392+270	School Ahead	RHS SR	Separator
826	392+380	School Ahead	RHS SR	Shoulder

S.No	Chainage (km)	Type of Sign	Side	Location
827	392+530	Hazard Marker	RHS	Separator
828	392+910	No Parking	RHS	Separator
829	392+930	Hazard Marker	LHS	Median
830	392+960	Hazard Marker	SR LHS	shoulder
831	392+960	Hazard Marker	SR LHS	Separator
832	392+960	Hazard Marker	SR LHS	shoulder
833	392+960	Hazard Marker	SR LHS	Separator
834	392+960	School Ahead	RHS SR	Shoulder
835	392+970	Hazard Marker	RHS SR	Shoulder
836	392+970	Hazard Marker	RHS SR	Separator
837	392+970	Hazard Marker	RHS SR	Shoulder
838	392+970	Hazard Marker	RHS SR	Separator
839	392+990	Hazard Marker	RHS	Separator
840	392+990	Hazard Marker	RHS	Median
841	393+070	Pedestrain crossing	SR LHS	Shoulder
842	393+080	Hazard Marker	LHS	Separator
843	393+100	Cattle Crossing	SR LHS	Shoulder
844	393+130	Cattle Crossing	RHS SR	Separator
845	393+130	Informatory	RHS SR	Shoulder
846	393+140	Pedestrian Crossing	RHS SR	Separator
847	393+170	Pedestrain crossing	SR LHS	Shoulder
848	393+190	Cattle Crossing	SR LHS	Shoulder
849	393+200	Pedestrian Crossing	RHS SR	Shoulder
850	393+240	Cattle Crossing	RHS SR	Shoulder
851	393+250	Cross Road	SR LHS	Separator
852	393+280	Hazard Marker	RHS	Separator
853	393+360	Speed Limit	LHS	Separator
854	393+500	Hazard Marker	LHS	Separator
855	393+500	Hazard Marker	LHS	Median
856	393+550	Hazard Marker	SR LHS	shoulder
857	393+550	Hazard Marker	SR LHS	Separator
858	393+550	Hazard Marker	SR LHS	shoulder
859	393+550	Hazard Marker	SR LHS	Separator
860	393+550	Hazard Marker	RHS SR	Shoulder
861	393+550	Hazard Marker	RHS SR	Separator
862	393+550	Hazard Marker	RHS SR	Shoulder
863	393+550	Hazard Marker	RHS SR	Separator

S.No	Chainage (km)	Type of Sign	Side	Location
864	393+570	Hazard Marker	RHS	Separator
865	393+570	Hazard Marker	RHS	Median
866	393+700	Speed Limit	RHS	Separator
867	393+730	Hazard Marker	LHS	Separator
868	393+810	Side Road Left	SR LHS	shoulder
869	393+810	T Intersection	SR LHS	shoulder
870	393+840	Informatory	SR LHS	shoulder
871	393+870	Informatory	RHS SR	Separator
872	393+900	Side Road Left	RHS SR	Separator
873	393+910	Hazard Marker	LHS	Median
874	393+920	Hazard Marker	RHS SR	Shoulder
875	393+960	Informatory	SR LHS	Separator
876	393+990	Side Road Right	SR LHS	Separator
877	394+010	Informatory	RHS	Median
878	394+030	Informatory	RHS SR	Shoulder
879	394+040	Side Road Right	RHS SR	Shoulder
880	394+160	Speed Limit	LHS	Separator
881	394+170	Informatory	SR LHS	Shoulder
882	394+190	Restriction End	RHS	Separator
883	394+200	Rumble Strip	SR LHS	Shoulder
884	394+200	Hazard Marker	RHS	Separator
885	394+220	Informatory	SR LHS	Shoulder
886	394+230	Merging Ahead	LHS	Separator
887	394+250	Rumble Strip	RHS SR	Separator
888	394+260	No Turn Left	LHS	Separator
889	394+270	Ahead Complusory	RHS SR	Separator
890	394+290	Give Way	RHS SR	Separator
891	394+300	Hazard Marker	LHS	Separator
892	394+300	Keep Right	LHS	Separator
893	394+300	Hazard Marker	SR LHS	Separator
894	394+300	Pass Either	SR LHS	Separator
895	394+300	Rumble Strip	SR LHS	Separator
896	394+310	Hazard Marker	SR LHS	Separator
897	394+310	Pass Either	SR LHS	Separator
898	394+340	Rumble Strip	RHS SR	Separator
899	394+340	Hazard Marker	RHS SR	Separator
900	394+340	Keep Right	RHS SR	Separator

S.No	Chainage (km)	Type of Sign	Side	Location
901	394+350	Hazard Marker	RHS SR	Separator
902	394+350	Pass Either	RHS SR	Separator
903	394+390	Rumble Strip	SR LHS	Separator
904	394+390	Right Turn Probhited	RHS SR	Shoulder
905	394+390	Ahead Complusory	RHS SR	Shoulder
906	394+430	Rumble Strip	RHS SR	Shoulder
907	394+440	Speed Limit	RHS	Separator
908	394+470	Informatory	SR LHS	Separator
909	394+490	Speed Limit	RHS	Separator
910	394+500	Restriction End	LHS	Separator
911	394+670	Informatory	RHS	Separator
912	394+750	Speed Limit	RHS	Separator
913	394+770	No Parking	LHS	Separator
914	394+930	Hazard Marker	LHS	Median
915	394+930	Hazard Marker	LHS	Separator
916	394+970	Hazard Marker	SR LHS	Separator
917	394+970	Hazard Marker	SR LHS	Separator
918	394+970	Hazard Marker	SR LHS	Separator
919	394+970	Hazard Marker	SR LHS	Separator
920	394+980	Hazard Marker	RHS SR	Shoulder
921	394+980	Hazard Marker	RHS SR	Separator
922	394+980	Hazard Marker	RHS SR	Shoulder
923	394+980	Hazard Marker	RHS SR	Separator
924	395+000	Hazard Marker	RHS	Separator
925	395+000	Hazard Marker	RHS	Median
926	395+280	Overhead Cables	SR LHS	Shoulder
927	395+330	Hazard Marker	SR LHS	Shoulder
928	395+330	Hazard Marker	SR LHS	Separator
929	395+330	Hazard Marker	SR LHS	Shoulder
930	395+330	Hazard Marker	SR LHS	Separator
931	395+350	Hazard Marker	RHS SR	Shoulder
932	395+350	Hazard Marker	RHS SR	Separator
933	395+350	Hazard Marker	RHS SR	Shoulder
934	395+350	Hazard Marker	RHS SR	Separator
935	395+360	Hazard Marker	RHS	Separator
936	395+430	Overhead Cable	RHS SR	Shoulder
937	395+440	Hazard Marker	LHS	Separator

S.No	Chainage (km)	Type of Sign	Side	Location
938	395+460	Overhead Cables	RHS	Separator
939	395+480	Cattle Crossing	SR LHS	Separator
940	395+500	Pedestrain crossing	SR LHS	Separator
941	395+510	Cattle Crossing	RHS SR	Separator
942	395+530	Pedestrian Crossing	RHS SR	Separator
943	395+560	Pedestrain crossing	SR LHS	Separator
944	395+580	Cattle Crossing	SR LHS	Separator
945	395+580	Emergency Contact	RHS	Separator
946	395+600	Pedestrian Crossing	RHS SR	Shoulder
947	395+620	Hazard Marker	RHS	Separator
948	395+630	Cattle Crossing	RHS SR	Shoulder
949	395+660	Overhead Cable	LHS	Separator
950	395+680	Overhead Cables	SR LHS	Shoulder
951	395+860	Overhead Cables	RHS	Separator
952	395+900	Overhead Cable	RHS SR	Island
953	396+030	Hazard Marker	RHS SR	Island
954	396+030	Pass Either	RHS SR	Island
955	396+120	Speed Limit	RHS	Separator
956	396+130	Truck Lay by	RHS SR	Shoulder
957	396+170	Informatory	SR LHS	Shoulder
958	396+190	Speed Limit	LHS	Separator
959	396+200	Hazard Marker	LHS	Separator
960	396+230	Pedestrain crossing	SR LHS	Shoulder
961	396+230	Informatory	RHS SR	Separator
962	396+260	Side Road Right	RHS SR	Separator
963	396+270	Route Marker	RHS	Separator
964	396+280	Cattle Crossing	SR LHS	Shoulder
965	396+280	Cattle Crossing	RHS SR	Separator
966	396+310	Pedestrian Crossing	RHS SR	Separator
967	396+320	Speed Limit	LHS	Separator
968	396+320	Informatory	LHS	Separator
969	396+350	Cattle Crossing	SR LHS	Separator
970	396+360	Pedestrian Crossing	RHS SR	Shoulder
971	396+370	Pedestrain crossing	SR LHS	Separator
972	396+380	Informatory	RHS SR	Shoulder
973	396+390	Informatory	SR LHS	Separator
974	396+410	Cattle Crossing	RHS SR	Shoulder

S.No	Chainage (km)	Type of Sign	Side	Location
975	396+410	Hazard Marker	RHS	Separator
976	396+480	Restriction End	RHS	Separator
977	396+490	Hazard Marker	LHS	Separator
978	396+490	Hazard Marker	LHS	Separator
979	396+510	Speed Limit	LHS	Separator
980	396+510	Hazard Marker	SR LHS	Shoulder
981	396+510	Hazard Marker	SR LHS	Separator
982	396+510	Hazard Marker	SR LHS	Shoulder
983	396+510	Hazard Marker	SR LHS	Separator
984	396+520	Restriction End	RHS SR	Shoulder
985	396+530	Hazard Marker	RHS SR	Shoulder
986	396+530	Hazard Marker	RHS SR	Separator
987	396+530	Hazard Marker	RHS SR	Shoulder
988	396+530	Hazard Marker	RHS SR	Separator
989	396+550	Hazard Marker	RHS	Separator
990	396+550	Hazard Marker	RHS	Median
991	396+560	Informatory	LHS	Separator
992	396+570	Ahead Compulsory	SR LHS	Shoulder
993	396+580	Restriction End	RHS SR	Shoulder
994	396+600	No Turn Right	SR LHS	Shoulder
995	396+620	Rumble Strip	RHS SR	Separator
996	396+650	Hazard Marker	SR LHS	Separator
997	396+650	Pass Either	SR LHS	Separator
998	396+650	Rumble Strip	SR LHS	Separator
999	396+660	Hazard Marker	SR LHS	Separator
1000	396+660	Keep Right	SR LHS	Separator
1001	396+660	No Entry	SR LHS	Separator
1002	396+670	Informatory	RHS SR	Separator
1003	396+680	Hazard Marker	LHS	Median
1004	396+690	Give way	SR LHS	Separator
1005	396+690	Hazard Marker	RHS SR	Separator
1006	396+690	Pass Either	RHS SR	Separator
1007	396+700	Hazard Marker	RHS SR	Separator
1008	396+700	Pass Either	RHS SR	Separator
1009	396+700	Rumble Strip	RHS SR	Separator
1010	396+710	hazard Marker	LHS	Separator
1011	396+710	Restriction End	LHS	Separator

S.No	Chainage (km)	Type of Sign	Side	Location
1012	396+740	Left Turn Prohibhited	RHS	Separator
1013	396+760	Informatory	RHS SR	Shoulder
1014	396+770	Rumble Strip	SR LHS	Separator
1015	396+770	Merging Ahead	RHS	Separator
1016	396+790	Rumble Strip	RHS SR	Shoulder
1017	396+870	Informatory	SR LHS	Separator
1018	396+890	Informatory	RHS SR	Shoulder
1019	396+900	Chevron	LHS	Separator
1020	396+950	Chevron	LHS	Separator
1021	397+000	side road left	SR LHS	shoulder
1022	397+000	Chevron	RHS	Median
1023	397+030	Informatory	RHS SR	Separator
1024	397+050	Hazard Marker	SR LHS	Junction Island
1025	397+050	Pass Either	SR LHS	Junction Island
1026	397+050	Chevron	RHS	Median
1027	397+080	Pass Either	SR LHS	Junction Island
1028	397+080	U-Turn	RHS SR	Separator
1029	397+130	Side Road Right	SR LHS	Separator
1030	397+160	Chevron	RHS	Median
1031	397+200	Informatory	SR LHS	Separator
1032	397+200	Side Road Left	RHS SR	Shoulder
1033	397+220	Chevron	RHS	Median
1034	397+230	Informatory	RHS SR	Shoulder
1035	397+260	Chevron	RHS	Median
1036	397+270	U-Turn	RHS SR	Shoulder
1037	397+440	Hazard Marker	RHS	Separator
1038	397+480	Hazard Marker	RHS	Median
1039	397+540	Restriction End	RHS	Separator
1040	397+590	Informatory	SR LHS	Shoulder
1041	397+680	No Turn Left	LHS	Separator
1042	397+680	Rumble Strip	SR LHS	Shoulder
1043	397+680	Ahead Complusory	RHS SR	Separator
1044	397+700	Give Way	RHS SR	Separator
1045	397+720	No Entry	RHS SR	Separator
1046	397+730	Rumble Strip	SR LHS	Separator

S.No	Chainage (km)	Type of Sign	Side	Location
1047	397+730	Hazard Marker	RHS SR	Separator
1048	397+730	Keep Right	RHS SR	Separator
1049	397+740	Rumble Strip	RHS SR	Separator
1050	397+760	Ahead Complusory	RHS SR	Separator
1051	397+830	Rumble Strip	RHS SR	Shoulder
1052	397+870	Informatory	RHS	Separator
1053	397+890	Restriction End	LHS	Separator
1054	397+920	Speed Limit	RHS	Separator
1055	397+940	Route Marker	LHS	Separator
1056	398+050	Informatory	RHS	Separator
1057	398+150	Speed Limit	LHS	Separator
1058	398+180	Speed Limit	RHS	Separator
1059	398+260	Hazard Marker	LHS	Separator
1060	398+270	Informatory	SR LHS	Shoulder
1061	398+310	Side Road Left	SR LHS	Shoulder
1062	398+330	Cattle Crossing	SR LHS	Shoulder
1063	398+330	Cattle Crossing	RHS SR	Separator
1064	398+350	Pedestrian Crossing	RHS SR	Separator
1065	398+360	Pedestrain crossing	SR LHS	Shoulder
1066	398+420	Pedestrain crossing	SR LHS	Separator
1067	398+430	Cattle Crossing	SR LHS	Separator
1068	398+450	Side Road Right	SR LHS	Separator
1069	398+450	Cattle Crossing	RHS SR	Shoulder
1070	398+480	Informatory	SR LHS	Separator
1071	398+620	Speed Limit	LHS	Separator
1072	398+970	informatory	LHS	Median
1073	399+020	Informatory	RHS	Median
1074	399+050	Informatory	RHS SR	Separator
1075	399+110	Informatory	SR LHS	Shoulder
1076	399+110	Cross Road	RHS SR	Separator
1077	399+120	Cross Road	SR LHS	Shoulder
1078	399+160	Height Limit	SR LHS	Shoulder
1079	399+160	Turn Right	SR LHS	Shoulder
1080	399+160	Turn Left	RHS SR	Separator
1081	399+160	Height Limit	RHS SR	Separator
1082	399+220	Turn Right	RHS SR	Shoulder
1083	399+220	Height Limit	RHS SR	Shoulder

S.No	Chainage (km)	Type of Sign	Side	Location
1084	399+230	Height Limit	SR LHS	Separator
1085	399+230	Turn Left	SR LHS	Separator
1086	399+240	Accident Prone Area	RHS	Separator
1087	399+250	Cross Road	RHS SR	Shoulder
1088	399+290	Informatory	SR LHS	Separator
1089	399+290	Informatory	RHS SR	Shoulder
1090	399+390	Speed Limit	RHS	Separator
1091	399+630	Informatory	RHS SR	Separator
1092	399+650	Cross Road	SR LHS	Shoulder
1093	399+650	Cross Road	RHS SR	Separator
1094	399+690	Height Limit	RHS SR	Separator
1095	399+690	Turn Left	RHS SR	Separator
1096	399+700	Height Limit	SR LHS	Shoulder
1097	399+700	Turn Right	SR LHS	Shoulder
1098	399+750	Turn Left	SR LHS	Separator
1099	399+750	Height Limit	SR LHS	Separator
1100	399+770	Cross Road	SR LHS	Separator
1101	399+770	Informatory	RHS SR	Shoulder
1102	399+770	Emergency Contact	RHS	Separator
1103	399+780	Speed Limit	LHS	Separator
1104	399+800	Cross Road	RHS SR	Shoulder
1105	399+800	Route Marker	RHS	Separator
1106	399+810	Informatory	SR LHS	Separator
1107	399+870	Informatory	LHS	Separator
1108	399+930	Route Marker	RHS	Separator
1109	399+930	Hazard Marker	RHS	Separator
1110	400+010	Speed Limit	LHS	Separator
1111	400+010	Restriction End	RHS	Separator
1112	400+050	Informatory	LHS	Separator
1113	400+080	Informatory	RHS SR	Separator
1114	400+090	Speed Limit	LHS	Separator
1115	400+130	Rumble Strip	SR LHS	shoulder
1116	400+140	Rumble Strip	RHS SR	Separator
1117	400+160	No Turn Right	SR LHS	shoulder
1118	400+170	Give Way	RHS SR	Separator
1119	400+180	Complusory Ahead	SR LHS	shoulder
1120	400+190	Rumble Strip	SR LHS	shoulder

S.No	Chainage (km)	Type of Sign	Side	Location
1121	400+190	Hazard Marker	RHS SR	Separator
1122	400+190	Pass Either	RHS SR	Separator
1123	400+200	Hazard Marker	RHS SR	Separator
1124	400+200	Pass Either	RHS SR	Separator
1125	400+200	Rumble Strip	RHS SR	Separator
1126	400+210	Keep Right	RHS	Separator
1127	400+210	Hazard Marker	RHS	Separator
1128	400+230	Hazard Marker	SR LHS	Separator
1129	400+230	Pass Either	SR LHS	Separator
1130	400+230	Merging Ahead	RHS	Separator
1131	400+240	No Entry	SR LHS	Separator
1132	400+240	Hazard Marker	SR LHS	Separator
1133	400+240	Keep Right	SR LHS	Separator
1134	400+240	Informatory	RHS SR	Separator
1135	400+280	Rumble Strip	RHS SR	Shoulder
1136	400+290	Restriction End	LHS	Separator
1137	400+290	Hazard Marker	LHS	Separator
1138	400+310	Give way	SR LHS	Separator
1139	400+350	Rumble Strip	SR LHS	Separator
1140	400+520	Informatory	SR LHS	Shoulder
1141	400+550	Cross Road	SR LHS	Shoulder
1142	400+570	Informatory	RHS SR	Separator
1143	400+590	Informatory	RHS SR	Separator
1144	400+620	Hazard Marker	SR LHS	Shoulder
1145	400+620	Hazard Marker	SR LHS	Separator
1146	400+620	Hazard Marker	SR LHS	Shoulder
1147	400+620	Hazard Marker	SR LHS	Separator
1148	400+620	Left Hand Curve	RHS SR	Separator
1149	400+670	Speed Limit	RHS SR	Separator
1150	400+690	No Overtaking	RHS SR	Separator
1151	400+710	U-Turn	SR LHS	Separator
1152	400+720	Informatory	RHS SR	Separator
1153	400+730	Cross Road	SR LHS	Separator
1154	400+750	Informatory	SR LHS	Separator
1155	400+780	Cross Road	RHS SR	Shoulder
1156	400+820	No Overtaking	RHS SR	Shoulder
1157	400+830	Speed Limit	RHS SR	Shoulder

S.No	Chainage (km)	Type of Sign	Side	Location
1158	400+850	Left Hand Curve	RHS SR	Shoulder
1159	400+920	Pedestrian Crossing	RHS SR	Shoulder
1160	401+000	Informatory	SR LHS	Separator
1161	401+010	Informatory	SR LHS	shoulder
1162	401+030	Merging Ahead	LHS	Separator
1163	401+060	Rumble Strip	SR LHS	shoulder
1164	401+060	One Way	SR LHS	shoulder
1165	401+080	No Entry	SR LHS	shoulder
1166	401+090	Rumble Strip	RHS SR	Separator
1167	401+110	Hazard Marker	RHS	Median
1168	401+120	Informatory	SR LHS	shoulder
1169	401+130	Ahead Complusory	RHS SR	Separator
1170	401+140	Left Turn Prohibhited	LHS	Separator
1171	401+150	Informatory	SR LHS	shoulder
1172	401+160	Hazard Marker	SR LHS	Separator
1173	401+160	Pass Either	SR LHS	Separator
1174	401+160	Give Way	RHS SR	Separator
1175	401+180	Hazard Marker	LHS	Separator
1176	401+180	No Entry	RHS SR	Separator
1177	401+190	Hazard Marker	RHS SR	Separator
1178	401+190	Keep Right	RHS SR	Separator
1179	401+200	Hazard Marker	RHS SR	Separator
1180	401+200	Pass Either	RHS SR	Separator
1181	401+200	Rumble Strip	RHS SR	Separator
1182	401+280	Right Turn Probhited	RHS SR	Shoulder
1183	401+310	Rumble Strip	RHS SR	Shoulder
1184	401+320	Speed Limit	RHS	Separator
1185	401+340	Chevron	LHS	Median
1186	401+350	Informatory	RHS	Separator
1187	401+380	Restriction End	LHS	Separator
1188	401+390	Chevron	LHS	Median
1189	401+390	Chevron	RHS	Separator
1190	401+430	Chevron	LHS	Median
1191	401+430	Speed Limit	RHS	Separator
1192	401+450	Chevron	RHS	Separator
1193	401+470	Informatory	RHS	Separator
1194	401+480	Hazard Marker	LHS	Separator

S.No	Chainage (km)	Type of Sign	Side	Location
1195	401+560	Side Road Left	SR LHS	Shoulder
1196	401+600	Speed Limit	RHS	Separator
1197	401+610	Informatory	SR LHS	Shoulder
1198	401+620	Cattle Crossing	RHS SR	Separator
1199	401+640	Pedestrain crossing	SR LHS	Shoulder
1200	401+640	Pedestrian Crossing	RHS SR	Separator
1201	401+690	Pedestrain crossing	SR LHS	Separator
1202	401+690	Pedestrian Crossing	RHS SR	Shoulder
1203	401+700	Hazard Marker	RHS	Separator
1204	401+710	Cattle Crossing	SR LHS	Separator
1205	401+720	Informatory	SR LHS	Separator
1206	401+720	Cattle Crossing	RHS SR	Shoulder
1207	401+790	Overhead Cable	LHS	Separator
1208	401+800	Overhead Cables	SR LHS	Shoulder
1209	401+860	Hazard Marker	RHS	Separator
1210	401+900	Speed Limit	LHS	Separator
1211	401+950	Overhead Cable	RHS SR	Shoulder
1212	401+990	Overhead Cables	RHS	Separator
1213	402+271	Overhead Cable	LHS	Separator
1214	402+750	Overhead Cables	SR LHS	Shoulder
1215	402+810	Overhead Cable	RHS SR	Shoulder
1216	402+860	Hazard Marker	LHS	Separator
1217	402+880	Overhead Cables	RHS	Separator
1218	402+990	Informatory	RHS SR	Separator
1219	403+000	Informatory	SR LHS	Shoulder
1220	403+020	Cross Road	SR LHS	Shoulder
1221	403+020	Cross Road	RHS SR	Separator
1222	403+050	Turn Right	SR LHS	Shoulder
1223	403+050	Height Limit	SR LHS	Shoulder
1224	403+050	Turn Right	RHS SR	Separator
1225	403+050	Height Limit	RHS SR	Separator
1226	403+100	Turn Right	SR LHS	Separator
1227	403+100	Height Limit	SR LHS	Separator
1228	403+110	Hazard Marker	SR LHS	Shoulder
1229	403+110	Hazard Marker	SR LHS	Separator
1230	403+110	Hazard Marker	SR LHS	Shoulder
1231	403+110	Hazard Marker	SR LHS	Separator

S.No	Chainage (km)	Type of Sign	Side	Location
1232	403+120	Turn Right	RHS SR	Shoulder
1233	403+120	Height Limit	RHS SR	Shoulder
1234	403+130	Informatory	SR LHS	Separator
1235	403+140	Cross Road	RHS SR	Shoulder
1236	403+150	side road left	SR LHS	Separator
1237	403+180	Informatory	RHS SR	Shoulder
1238	403+420	Speed Limit	RHS	Separator
1239	403+440	Chevron	LHS	Median
1240	403+460	Speed Limit	LHS	Separator
1241	403+520	Chevron	LHS	Median
1242	403+540	Chevron	RHS	Separator
1243	403+610	Chevron	RHS	Separator
1244	403+690	Chevron	RHS	Separator
1245	403+780	Speed Limit	LHS	Separator
1246	403+810	Route Marker	RHS	Separator
1247	403+880	Informatory	LHS	Separator
1248	403+910	Route Marker	RHS	Separator
1249	403+930	Hazard Marker	LHS	Separator
1250	403+940	Hazard Marker	SR LHS	Shoulder
1251	403+940	Hazard Marker	SR LHS	Separator
1252	403+940	Hazard Marker	SR LHS	Shoulder
1253	403+940	Hazard Marker	SR LHS	Separator
1254	403+950	Hazard Marker	RHS SR	Shoulder
1255	403+950	Hazard Marker	RHS SR	Shoulder
1256	403+980	Informatory	LHS	Median
1257	403+980	Hazard Marker	RHS	Separator
1258	403+990	Hazard Marker	RHS	Separator
1259	404+000	Informatory	RHS	Median
1260	404+020	Speed Limit	LHS	Separator
1261	404+020	Restriction End	RHS	Separator
1262	404+040	Informatory	LHS	Separator
1263	404+040	Rumble Strip	SR LHS	Shoulder
1264	404+080	Speed Limit	LHS	Separator
1265	404+100	Complusory Ahead	SR LHS	Shoulder
1266	404+130	Hazard Marker	SR LHS	Separator
1267	404+130	Pass Either	SR LHS	Separator
1268	404+130	Rumble Strip	SR LHS	Separator

S.No	Chainage (km)	Type of Sign	Side	Location
1269	404+140	Hazard Marker	SR LHS	Separator
1270	404+140	Keep Right	SR LHS	Separator
1271	404+160	No Entry	SR LHS	Separator
1272	404+170	Give way	SR LHS	Separator
1273	404+180	Hazard Marker	RHS SR	Separator
1274	404+180	Pass Either	RHS SR	Separator
1275	404+190	Hazard Marker	RHS SR	Separator
1276	404+190	Pass Either	RHS SR	Separator
1277	404+190	Rumble Strip	RHS SR	Separator
1278	404+210	Complusory Ahead	SR LHS	Separator
1279	404+210	Hazard Marker	RHS	Separator
1280	404+210	Keep Right	RHS	Separator
1281	404+220	Rumble Strip	RHS SR	Shoulder
1282	404+230	Hazard Marker	LHS	Separator
1283	404+230	Restriction End	LHS	Median
1284	404+250	Rumble Strip	SR LHS	Separator
1285	404+270	Hazard Marker	LHS	Median
1286	404+270	Left Turn Prohibhited	RHS	Separator
1287	404+280	Informatory	RHS SR	Shoulder
1288	404+290	Merging Ahead	RHS	Separator
1289	404+350	Informatory	RHS SR	Shoulder
1290	404+390	Speed Limit	RHS	Separator
1291	404+460	Chevron	LHS	Median
1292	404+470	Cattle Crossing	SR LHS	shoulder
1293	404+490	Chevron	LHS	Median
1294	404+490	Pedestrain crossing	SR LHS	shoulder
1295	404+490	Cattle Crossing	RHS SR	Separator
1296	404+490	Chevron	RHS	Separator
1297	404+520	Pedestrian Crossing	RHS SR	Separator
1298	404+530	Cross Road	SR LHS	shoulder
1299	404+560	Informatory	SR LHS	shoulder
1300	404+560	Cattle Crossing	SR LHS	Separator
1301	404+570	Chevron	RHS	Separator
1302	404+580	Pedestrain crossing	SR LHS	Separator
1303	404+590	Hazard Marker	SR LHS	shoulder
1304	404+590	Hazard Marker	SR LHS	Separator
1305	404+590	Hazard Marker	SR LHS	shoulder

S.No	Chainage (km)	Type of Sign	Side	Location
1306	404+590	Cross Road	RHS SR	Separator
1307	404+600	Pedestrian Crossing	RHS SR	Shoulder
1308	404+620	Cattle Crossing	RHS SR	Shoulder
1309	404+630	U-Turn	RHS SR	Separator
1310	404+640	Hazard Marker	RHS SR	Separator
1311	404+640	Hazard Marker	RHS SR	Shoulder
1312	404+640	Hazard Marker	RHS SR	Separator
1313	404+730	Overhead Cables	RHS	Median
1314	404+750	Cross Road	SR LHS	Separator
1315	404+810	Informatory	RHS SR	Shoulder
1316	404+880	U-Turn	RHS SR	Shoulder
1317	404+900	Overhead Cable	RHS SR	Shoulder
1318	405+110	Hazard Marker	RHS	Median
1319	405+110	Emergency Contact	RHS	Separator
1320	405+210	Hazard Marker	LHS	Separator
1321	405+260	Cattle Crossing	SR LHS	shoulder
1322	405+290	Pedestrain crossing	SR LHS	shoulder
1323	405+310	Cattle Crossing	RHS SR	Separator
1324	405+330	Pedestrian Crossing	RHS SR	Separator
1325	405+350	Pedestrain crossing	SR LHS	Separator
1326	405+380	Pedestrian Crossing	RHS SR	Shoulder
1327	405+390	Cattle Crossing	SR LHS	Separator
1328	405+420	Cattle Crossing	RHS SR	Shoulder
1329	405+450	Emergency Contact	LHS	Separator
1330	405+490	Hazard Marker	RHS	Separator
1331	405+510	Speed Limit	RHS	Separator
1332	405+620	Merging Ahead	LHS	Separator
1333	405+640	Route Marker	RHS	Separator
1334	405+670	Speed Limit	RHS SR	Shoulder
1335	405+710	No Entry	RHS SR	Separator
1336	405+730	Hazard Marker	RHS	Separator
1337	405+730	Pass Either	RHS	Separator
1338	405+760	Informatory	RHS	Shoulder
1339	405+820	No Parking	LHS	Shoulder
1340	405+860	Narrow Road Ahead	LHS	Shoulder
1341	405+860	Informatory	RHS	Shoulder
1342	406+010	Chevron	LHS	Median

S.No	Chainage (km)	Type of Sign	Side	Location
1343	406+020	Speed Limit	LHS	Shoulder
1344	406+050	Informatory	RHS	Shoulder
1345	406+090	No Overtaking	LHS	Shoulder
1346	406+130	Chevron	RHS	Shoulder
1347	406+140	Narrow Bridge Ahead	LHS	Shoulder
1348	406+180	Chevron	LHS	Median
1349	406+220	Chevron	RHS	Shoulder
1350	406+250	Chevron	LHS	Median
1351	406+260	Hazard Marker	LHS	Median
1352	406+290	Chevron	RHS	Shoulder
1353	406+310	Hazard Marker	RHS	Median
1354	406+360	Road Widen	LHS	Shoulder
1355	406+430	Chevron	LHS	Median
1356	406+450	Chevron	RHS	Shoulder
1357	406+500	Chevron	LHS	Median
1358	406+500	Chevron	RHS	Shoulder
1359	406+540	Chevron	RHS	Shoulder
1360	406+580	Chevron	RHS	Shoulder
1361	406+610	Chevron	RHS	Shoulder
1362	406+620	Chevron	LHS	Median
1363	406+650	Chevron	RHS	Shoulder
1364	406+670	Chevron	RHS	Shoulder
1365	406+680	Chevron	LHS	Median
1366	406+680	Informatory	LHS	Separator
1367	406+710	Informatory	LHS	Median
1368	406+720	Chevron	RHS	Shoulder
1369	406+800	Chevron	RHS	Shoulder
1370	406+830	Informatory	LHS	Shoulder
1371	406+860	Hazard Marker	LHS	Separator
1372	406+860	Emergency Contact	LHS	Separator
1373	406+860	Speed Limit	RHS	Separator
1374	406+900	Informatory	SR LHS	Shoulder
1375	406+920	No Entry	SR LHS	Separator
1376	406+950	Speed Limit	SR LHS	Shoulder
1377	406+960	Speed Limit	LHS	Separator

S.No	Chainage (km)	Type of Sign	Side	Location
1378	407+020	Route Marker	LHS	Separator
1379	407+020	Informatory	RHS SR	Shoulder
1380	407+040	Rumble Strip	RHS SR	Shoulder
1381	407+130	Hazard Marker	LHS	Separator
1382	407+460	Hazard Marker	LHS	Median
1383	407+540	Hazard Marker	RHS	Median
1384	407+570	Informatory	SR LHS	Shoulder
1385	407+850	Hazard Marker	RHS	Separator
1386	408+600	Height Limit	LHS	Separator
1387	408+600	Side Road Left	SR LHS	Shoulder
1388	408+640	Informatory	SR LHS	Shoulder
1389	408+650	Route Marker	RHS	Separator
1390	408+690	Side Road Right	RHS SR	Separator
1391	408+720	Hazard Marker	LHS	Separator
1392	408+730	Informatory	RHS SR	Separator
1393	408+780	Hazard Marker	RHS	Separator
1394	408+810	Informatory	SR LHS	Separator
1395	408+860	Informatory	RHS SR	Shoulder
1396	408+860	Height Limit	RHS	Separator
1397	408+880	Speed Breaker	RHS SR	Shoulder
1398	408+920	Side Road Left	RHS SR	Shoulder
1399	408+970	Informatory	LHS	Median
1400	409+030	Informatory	RHS	Median
1401	409+090	Hazard Marker	LHS	Separator
1402	409+170	Cattle Crossing	SR LHS	Shoulder
1403	409+200	Pedestrain crossing	SR LHS	Shoulder
1404	409+200	Cattle Crossing	RHS SR	Separator
1405	409+220	Pedestrian Crossing	RHS SR	Separator
1406	409+260	Pedestrain crossing	SR LHS	Separator
1407	409+290	Cattle Crossing	SR LHS	Separator
1408	409+310	Pedestrian Crossing	RHS SR	Shoulder
1409	409+340	Cattle Crossing	RHS SR	Shoulder
1410	409+360	Speed Limit	LHS	Separator
1411	409+380	Hazard Marker	RHS	Separator
1412	409+390	Restriction End	RHS	Separator
1413	409+420	Merging Ahead	LHS	Separator
1414	409+420	Speed Breaker	SR LHS	Shoulder

S.No	Chainage (km)	Type of Sign	Side	Location
1415	409+420	Speed Limit	RHS	Separator
1416	409+480	No Turn Left	LHS	Separator
1417	409+540	Pass Either	SR LHS	Separator
1418	409+540	Rumble Strip	SR LHS	Separator
1419	409+540	Rumble Strip	RHS SR	Separator
1420	409+550	Hazard Marker	SR LHS	Separator
1421	409+550	Pass Either	SR LHS	Separator
1422	409+580	Left Turn Prohibited	RHS SR	Separator
1423	409+590	Informatory	SR LHS	Separator
1424	409+610	Give Way	RHS SR	Separator
1425	409+620	Rumble Strip	SR LHS	Separator
1426	409+630	Hazard Marker	RHS SR	Separator
1427	409+630	Keep Right	RHS SR	Separator
1428	409+630	No Entry	RHS SR	Separator
1429	409+640	Hazard Marker	RHS SR	Separator
1430	409+640	Pass Either	RHS SR	Separator
1431	409+640	Rumble Strip	RHS SR	Separator
1432	409+650	Pass Either	RHS	Separator
1433	409+650	Hazard Marker	RHS	Separator
1434	409+680	Ahead Complusory	RHS SR	Shoulder
1435	409+700	Rumble Strip	RHS SR	Shoulder
1436	409+720	No Turn Right	RHS	Separator
1437	409+730	Restriction End	LHS	Separator
1438	409+730	Speed Limit	RHS	Separator
1439	409+780	Hazard Marker	LHS	Separator
1440	409+780	Speed Limit	RHS	Separator
1441	409+820	Route Marker	LHS	Separator
1442	409+840	Informatory	RHS	Separator
1443	409+910	Height Limit	SR LHS	shoulder
1444	409+910	Turn Right	SR LHS	shoulder
1445	409+920	Chevron	RHS	Median
1446	409+930	Overhead Cables	RHS	Separator
1447	409+950	Height Limit	RHS SR	Separator
1448	409+960	Speed Limit	RHS	Separator
1449	409+980	Overhead Cable	RHS SR	Shoulder
1450	410+020	No Turn Right	SR LHS	shoulder
1451	410+040	Height Limit	SR LHS	Separator

S.No	Chainage (km)	Type of Sign	Side	Location
1452	410+040	Turn Right	SR LHS	Separator
1453	410+040	Chevron	RHS	Median
1454	410+080	Speed Limit	RHS	Separator
1455	410+140	Side Road Right	RHS SR	Separator
1456	410+150	Chevron	RHS	Median
1457	410+160	Informatory	SR LHS	shoulder
1458	410+160	Turn Right	RHS SR	Shoulder
1459	410+160	Height Limit	RHS SR	Shoulder
1460	410+170	Informatory	RHS SR	Separator
1461	410+180	Hazard Marker	RHS	Separator
1462	410+210	Speed Limit	LHS	Separator
1463	410+240	Chevron	RHS	Median
1464	410+280	Informatory	LHS	Separator
1465	410+280	Hazard Marker	LHS	Separator
1466	410+290	Side Road Left	RHS SR	Shoulder
1467	410+290	Chevron	RHS	Median
1468	410+300	Hazard Marker	LHS	Median
1469	410+320	Route Marker	RHS	Separator
1470	410+330	Informatory	RHS SR	Shoulder
1471	410+330	Chevron	RHS	Median
1472	410+360	Speed Limit	LHS	Separator
1473	410+360	Hazard Marker	SR LHS	shoulder
1474	410+360	Hazard Marker	SR LHS	Separator
1475	410+360	Hazard Marker	SR LHS	shoulder
1476	410+360	Hazard Marker	SR LHS	Separator
1477	410+360	Informatory	SR LHS	Shoulder
1478	410+370	Hazard Marker	RHS SR	Shoulder
1479	410+370	Hazard Marker	RHS SR	Separator
1480	410+370	Hazard Marker	RHS	Median
1481	410+370	Hazard Marker	RHS	Separator
1482	410+410	Chevron	RHS	Median
1483	410+440	Speed Limit	LHS	Separator
1484	410+470	Complusory Ahead	SR LHS	Shoulder
1485	410+540	Hazard Marker	SR LHS	Separator
1486	410+540	Pass Either	SR LHS	Separator
1487	410+550	Hazard Marker	SR LHS	Separator
1488	410+550	Keep Right	SR LHS	Separator

S.No	Chainage (km)	Type of Sign	Side	Location
1489	410+560	No Entry	SR LHS	Separator
1490	410+570	Give way	SR LHS	Separator
1491	410+580	Rumble Strip	RHS SR	Shoulder
1492	410+610	Keep Right	RHS	Separator
1493	410+610	Hazard Marker	RHS	Separator
1494	410+630	Hazard Marker	RHS SR	Separator
1495	410+630	Pass Either	RHS SR	Separator
1496	410+640	Hazard Marker	RHS SR	Separator
1497	410+640	Pass Either	RHS SR	Separator
1498	410+640	Rumble Strip	RHS SR	Separator
1499	410+660	Left Turn Prohibhited	RHS	Separator
1500	410+710	Informatory	RHS SR	Shoulder
1501	410+780	Informatory	RHS SR	Shoulder
1502	410+790	Informatory	RHS SR	Shoulder
1503	410+930	Informatory	RHS SR	Shoulder
1504	410+960	Hazard Marker	LHS	Separator
1505	411+040	Side Road Left	SR LHS	Shoulder
1506	411+100	Cattle Crossing	RHS SR	Separator
1507	411+130	Pedestrian Crossing	RHS SR	Separator
1508	411+160	Informatory	SR LHS	Separator
1509	411+170	Cattle Crossing	SR LHS	Separator
1510	411+180	Pedestrian Crossing	RHS SR	Shoulder
1511	411+220	Pedestrain crossing	SR LHS	Separator
1512	411+220	Cattle Crossing	RHS SR	Shoulder
1513	411+260	Side Road Right	SR LHS	Separator
1514	411+260	Hazard Marker	RHS	Separator
1515	411+270	Accident Prone Area	LHS	Separator
1516	411+320	Hazard Marker	LHS	Separator
1517	411+320	Hazard Marker	LHS	Median
1518	411+350	Rumble Strip	SR LHS	shoulder
1519	411+380	Hazard Marker	SR LHS	shoulder
1520	411+380	Hazard Marker	SR LHS	shoulder
1521	411+380	Hazard Marker	SR LHS	Separator
1522	411+390	Hazard Marker	RHS	Separator
1523	411+390	Hazard Marker	RHS	Median
1524	411+410	Hazard Marker	LHS	Separator
1525	411+410	Pass Either	LHS	Separator

S.No	Chainage (km)	Type of Sign	Side	Location
1526	411+410	Hazard Marker	RHS SR	Separator
1527	411+410	Hazard Marker	RHS SR	Shoulder
1528	411+410	Hazard Marker	RHS SR	Separator
1529	411+410	Hazard Marker	RHS SR	Shoulder
1530	411+470	Hazard Marker	LHS	Median
1531	411+530	Rumble Strip	SR LHS	Separator
1532	411+580	Rumble Strip	RHS SR	Shoulder
1533	411+580	Accident Prone Area	RHS	Median
1534	411+760	U-Turn	RHS SR	Separator
1535	411+770	Informatory	SR LHS	shoulder
1536	411+800	Speed Breaker	RHS SR	Separator
1537	411+820	Informatory	RHS SR	Separator
1538	411+850	Chevron	LHS	Separator
1539	411+860	Cross Road	SR LHS	Separator
1540	411+900	Chevron	RHS	Median
1541	411+930	Chevron	LHS	Separator
1542	411+940	Informatory	RHS SR	Shoulder
1543	411+960	Side Road Right	RHS SR	Shoulder
1544	411+970	Informatory	SR LHS	Separator
1545	411+970	Side Road Left	RHS SR	Shoulder
1546	411+980	Cross Road	SR LHS	Separator
1547	411+980	Chevron	RHS	Median
1548	412+000	U-Turn	RHS SR	Shoulder
1549	412+030	Chevron	LHS	Separator
1550	412+070	Chevron	RHS	Median
1551	412+170	Chevron	LHS	Separator
1552	412+220	Chevron	LHS	Separator
1553	412+240	Chevron	LHS	Separator
1554	412+350	School Ahead	RHS SR	Shoulder
1555	412+390	Hazard Marker	RHS SR	Shoulder
1556	412+670	Rumble Strip	SR LHS	shoulder
1557	412+710	Chevron	LHS	Median
1558	412+770	Pedestrian Crossing	RHS SR	Shoulder
1559	412+800	Pedestrian Crossing	RHS SR	Shoulder
1560	412+810	School Ahead	SR LHS	shoulder
1561	412+860	Cattle Crossing	RHS SR	Shoulder
1562	412+870	Speed Breaker	RHS SR	Shoulder

S.No	Chainage (km)	Type of Sign	Side	Location
1563	413+330	Hazard Marker	SR LHS	SR island
1564	413+330	Pass Either	SR LHS	SR island
1565	413+470	Pass Either	RHS SR	Island
1566	413+470	Hazard Marker	RHS SR	Island
1567	413+520	Height Limit	RHS SR	Separator
1568	413+560	Cross Road	RHS SR	Separator
1569	413+720	Cattle Crossing	SR LHS	Shoulder
1570	413+770	Cattle Crossing	RHS SR	Shoulder
1571	413+790	Rumble Strip	SR LHS	Shoulder
1572	413+810	Chevron	RHS	Median
1573	413+820	Hazard Marker	SR LHS	Shoulder
1574	413+820	Cattle Crossing	RHS SR	Shoulder
1575	413+830	Chevron	RHS	Median
1576	413+850	Chevron	RHS	Median
1577	413+860	Informatory	SR LHS	Shoulder
1578	413+870	Speed Breaker	RHS SR	Shoulder
1579	413+870	Chevron	RHS	Median
1580	413+900	informatory	LHS	Shoulder
1581	413+900	Speed Limit	LHS	Shoulder
1582	413+900	Chevron	RHS	Median
1583	413+960	informatory	LHS	Shoulder
1584	414+010	informatory	LHS	Shoulder
1585	414+030	Chevron	RHS	Separator
1586	414+130	Hazard Marker	LHS	Separator
1587	414+130	Pass Either	LHS	Separator
1588	414+250	Speed Limit	SR LHS	Shoulder
1589	414+380	Informatory	SR LHS	Shoulder
1590	414+530	Hazard Marker	SR LHS	Shoulder
1591	414+560	Chevron	LHS	Separator
1592	414+590	Speed Breaker	RHS SR	Shoulder
1593	414+610	Hazard Marker	RHS SR	Shoulder
1594	414+620	Informatory	RHS SR	Shoulder
1595	414+630	Chevron	RHS	Median
1596	414+710	Chevron	RHS	Median
1597	414+760	Chevron	RHS	Median
1598	414+840	Chevron	RHS	Median
1599	414+880	Chevron	RHS	Median

S.No	Chainage (km)	Type of Sign	Side	Location
1600	415+160	Informatory	RHS	Median
1601	415+190	Rumble Strip	RHS SR	Separator
1602	415+220	Ahead Complusory	RHS SR	Separator
1603	415+240	Give Way	RHS SR	Separator
1604	415+250	No Entry	RHS SR	Separator
1605	415+260	Hazard Marker	RHS SR	Separator
1606	415+260	Keep Right	RHS SR	Separator
1607	415+270	Hazard Marker	RHS SR	Separator
1608	415+270	Pass Either	RHS SR	Separator
1609	415+270	Rumble Strip	RHS SR	Separator
1610	415+300	Ahead Complusory	RHS SR	Shoulder
1611	415+300	Hazard Marker	RHS	Separator
1612	415+300	Pass Either	RHS	Separator
1613	415+320	Right Turn Probhited	RHS SR	Shoulder
1614	415+350	Rumble Strip	RHS SR	Shoulder
1615	415+430	Speed Limit	RHS	Separator
1616	415+450	Hazard Marker	LHS	Separator
1617	415+470	Informatory	RHS	Separator
1618	415+490	Informatory	RHS	Separator
1619	415+510	Cattle Crossing	SR LHS	Shoulder
1620	415+540	Pedestrain crossing	SR LHS	Shoulder
1621	415+560	Cattle Crossing	RHS SR	Separator
1622	415+570	Speed Limit	RHS	Separator
1623	415+580	Pedestrian Crossing	RHS SR	Separator
1624	415+600	Chevron	RHS	Median
1625	415+610	Pedestrain crossing	SR LHS	Separator
1626	415+620	Cattle Crossing	SR LHS	Separator
1627	415+640	Pedestrian Crossing	RHS SR	Shoulder
1628	415+660	Cattle Crossing	RHS SR	Shoulder
1629	415+690	Chevron	LHS	Median
1630	415+720	Chevron	LHS	Median
1631	415+720	Chevron	RHS	Separator
1632	415+750	Chevron	RHS	Separator
1633	415+780	Chevron	RHS	Separator
1634	415+900	Chevron	RHS	Median
1635	415+910	Speed Limit	SR LHS	Shoulder
1636	415+940	Right Hand Curve	SR LHS	Shoulder

S.No	Chainage (km)	Type of Sign	Side	Location
1637	415+980	Hazard Marker	SR LHS	Shoulder
1638	415+980	Hazard Marker	SR LHS	Separator
1639	415+980	Hazard Marker	SR LHS	Shoulder
1640	415+980	Hazard Marker	SR LHS	Separator
1641	415+980	No Overtaking	SR LHS	Shoulder
1642	415+980	Chevron	RHS	Median
1643	416+000	Hazard Marker	RHS SR	Shoulder
1644	416+000	Hazard Marker	RHS SR	Separator
1645	416+000	Hazard Marker	RHS SR	Shoulder
1646	416+010	Side Road Right	SR LHS	Separator
1647	416+050	Informatory	SR LHS	Shoulder
1648	416+060	Hazard Marker	LHS	Median
1649	416+060	Side Road Right	RHS SR	Separator
1650	416+080	Chevron	RHS	Median
1651	416+110	Informatory	RHS SR	Separator
1652	416+120	Hazard Marker	RHS	Median
1653	416+140	Informatory	SR LHS	Separator
1654	416+180	No Overtaking	SR LHS	Separator
1655	416+190	Side Road Left	SR LHS	Separator
1656	416+200	Informatory	RHS SR	Shoulder
1657	416+210	speed Limit	SR LHS	Separator
1658	416+220	Left Hand Curve	SR LHS	Separator
1659	416+220	Side Road Left	RHS SR	Shoulder
1660	416+230	Chevron	RHS	Median
1661	416+430	Hazard Marker	RHS	Separator
1662	416+470	Speed Limit	LHS	Separator
1663	416+590	Chevron	LHS	Separator
1664	416+740	Chevron	LHS	Separator
1665	416+760	Hazard Marker	SR LHS	shoulder
1666	416+760	Hazard Marker	SR LHS	Shoulder
1667	416+760	Hazard Marker	SR LHS	Separator
1668	416+760	Hazard Marker	RHS SR	Shoulder
1669	416+760	Hazard Marker	RHS SR	Shoulder
1670	416+760	Hazard Marker	RHS SR	Separator
1671	416+790	Chevron	RHS	Median
1672	416+820	Cattle Crossing	SR LHS	shoulder
1673	416+830	Chevron	LHS	Separator

S.No	Chainage (km)	Type of Sign	Side	Location
1674	416+830	Pedestrian Crossing	RHS SR	Separator
1675	416+850	Pedestrain crossing	SR LHS	shoulder
1676	416+850	Cattle Crossing	RHS SR	Separator
1677	416+890	Cattle Crossing	SR LHS	Separator
1678	416+890	Speed Limit	RHS	Separator
1679	416+900	Cattle Crossing	RHS SR	Shoulder
1680	416+910	Chevron	LHS	Separator
1681	416+910	Pedestrain crossing	SR LHS	Separator
1682	416+920	Pedestrian Crossing	RHS SR	Shoulder
1683	416+930	Chevron	RHS	Median
1684	416+990	Hazard Marker	RHS	Separator
1685	417+160	Restriction End	RHS	Separator
1686	417+210	Informatory	RHS SR	Separator
1687	417+310	Rumble Strip	RHS SR	Separator
1688	417+360	Hazard Marker	RHS	Separator
1689	417+360	Keep Left	RHS	Separator
1690	417+370	Hazard Marker	RHS SR	Separator
1691	417+370	Pass Either	RHS SR	Separator
1692	417+380	Hazard Marker	RHS SR	Separator
1693	417+380	Pass Either	RHS SR	Separator
1694	417+380	Rumble Strip	RHS SR	Separator
1695	417+410	Left Turn Prohibhited	RHS	Separator
1696	417+430	Chevron	RHS	Separator
1697	417+440	Rumble Strip	RHS SR	Shoulder
1698	417+470	Informatory	RHS SR	Shoulder
1699	417+480	Merging Ahead	RHS	Separator
1700	417+510	Chevron	LHS	Median
1701	417+530	Informatory	RHS SR	Shoulder
1702	417+540	Chevron	RHS	Separator
1703	417+580	Speed Limit	RHS	Separator
1704	417+590	Hazard Marker	LHS	Separator
1705	417+600	Side Road Left	SR LHS	shoulder
1706	417+610	Chevron	RHS	Separator
1707	417+620	Hazard Marker	RHS SR	Shoulder
1708	417+620	Hazard Marker	RHS SR	Separator
1709	417+620	Hazard Marker	RHS SR	Shoulder
1710	417+620	Hazard Marker	RHS SR	Separator

S.No	Chainage (km)	Type of Sign	Side	Location
1711	417+630	Hazard Marker	SR LHS	Shoulder
1712	417+630	Hazard Marker	SR LHS	Separator
1713	417+630	Hazard Marker	SR LHS	Shoulder
1714	417+630	Hazard Marker	SR LHS	Separator
1715	417+630	Hazard Marker	RHS	Separator
1716	417+720	Side Road Right	SR LHS	Separator
1717	417+790	Hazard Marker	LHS	Separator
1718	417+790	Chevron	LHS	Separator
1719	417+870	Chevron	LHS	Separator
1720	418+100	Informatory	SR LHS	shoulder
1721	418+150	Informatory	SR LHS	shoulder
1722	418+190	Cross Road	SR LHS	shoulder
1723	418+190	Informatory	RHS SR	Separator
1724	418+200	Hazard Marker	LHS	Median
1725	418+210	Informatory	SR LHS	shoulder
1726	418+210	Cross Road	RHS SR	Separator
1727	418+250	Hazard Marker	RHS	Median
1728	418+280	Chevron	LHS	Separator
1729	418+290	Informatory	SR LHS	Separator
1730	418+320	Cross Road	RHS SR	Shoulder
1731	418+330	Cross Road	SR LHS	Separator
1732	418+360	Informatory	RHS SR	Shoulder
1733	418+390	Chevron	LHS	Separator
1734	418+390	Informatory	RHS SR	Shoulder
1735	418+410	Side Road Left	SR LHS	shoulder
1736	418+470	No Standing	SR LHS	shoulder
1737	418+560	Chevron	LHS	Median
1738	418+570	Speed Breaker	SR LHS	Separator
1739	418+580	Hazard Marker	RHS	Separator
1740	418+650	Chevron	LHS	Median
1741	418+730	Chevron	LHS	Median
1742	419+140	Chevron	RHS	Separator
1743	419+190	Chevron	RHS	Separator
1744	419+250	Chevron	RHS	Separator
1745	419+310	Cross Road	SR LHS	Shoulder
1746	419+390	informatory	SR LHS	Shoulder
1747	419+400	Speed Breaker	SR LHS	Shoulder

S.No	Chainage (km)	Type of Sign	Side	Location
1748	419+400	Speed Breaker	RHS SR	Separator
1749	419+420	Turn Right	SR LHS	Shoulder
1750	419+420	Height Limit	SR LHS	Shoulder
1751	419+420	Cross Road	RHS SR	Separator
1752	419+440	Informatory	RHS SR	Separator
1753	419+460	Height Limit	RHS SR	Separator
1754	419+460	Turn Left	RHS SR	Separator
1755	419+500	Turn Left	SR LHS	Shoulder
1756	419+500	Height Limit	SR LHS	Separator
1757	419+530	Informatory	SR LHS	Separator
1758	419+540	Cross Road	SR LHS	Separator
1759	419+540	Informatory	RHS SR	Shoulder
1760	419+550	Cross Road	RHS SR	Shoulder
1761	419+580	Speed Breaker	RHS SR	Shoulder
1762	419+600	Speed Limit	RHS	Separator
1763	419+610	Chevron	LHS	Separator
1764	419+630	Chevron	RHS	Median
1765	419+700	Hazard Marker	RHS	Separator
1766	419+710	Emergency Contact	RHS	Separator
1767	419+800	Route Marker	RHS	Separator
1768	419+840	Give way	SR LHS	Shoulder
1769	419+850	Side Road Left	SR LHS	Shoulder
1770	419+890	Chevron	LHS	Median
1771	419+910	No Turn Right	SR LHS	Shoulder
1772	419+910	Speed Limit	RHS SR	Shoulder
1773	419+930	Rumble Strip	SR LHS	Shoulder
1774	419+930	Chevron	RHS	Separator
1775	419+950	Rumble Strip	SR LHS	Shoulder
1776	419+950	No Entry	RHS SR	Separator
1777	419+970	Chevron	LHS	Median
1778	420+010	Hazard Marker	RHS	Separator
1779	420+010	Pass Either	RHS	Separator
1780	420+040	Informatory	LHS	Shoulder
1781	420+050	Chevron	LHS	Median
1782	420+090	Informatory	LHS	Shoulder
1783	420+110	Informatory	RHS	Shoulder
1784	420+130	Chevron	LHS	Median

S.No	Chainage (km)	Type of Sign	Side	Location
1785	420+130	Informatory	LHS	Shoulder
1786	420+140	Speed Limit	LHS	Median
1787	420+150	Informatory	RHS	Shoulder
1788	420+170	Informatory	LHS	Shoulder
1789	420+200	Hazard Marker	RHS	Median
1790	420+200	Keep Left	RHS	Median
1791	420+220	Informatory	LHS	Shoulder
1792	420+760	Informatory	RHS	Shoulder
1793	420+770	Hazard Marker	LHS	Median
1794	420+770	No Stoping No Standing	RHS	Shoulder
1795	420+780	Hazard Marker	LHS	Shoulder
1796	420+780	Hazard Marker	LHS	Shoulder
1797	420+800	Informatory	RHS	Shoulder
1798	420+880	Informatory	RHS	Shoulder
1799	420+890	Informatory	LHS	Shoulder
1800	420+940	Informatory	RHS	Shoulder
1801	420+970	Informatory	LHS	Shoulder
1802	421+000	Informatory	RHS	Shoulder
1803	421+020	Chevron	RHS	Median
1804	421+100	Hazard Marker	LHS	Separator
1805	421+100	Pass Either	LHS	Separator
1806	421+100	Chevron	RHS	Median
1807	421+170	Informatory	RHS SR	Shoulder
1808	421+180	Chevron	RHS	Median
1809	421+190	Speed Limit	SR LHS	Shoulder
1810	421+220	Chevron	RHS	Median
1811	421+240	No Entry	SR LHS	Separator
1812	421+260	Speed Limit	LHS	Separator
1813	421+260	Cattle Crossing	SR LHS	shoulder
1814	421+260	Chevron	RHS	Median
1815	421+300	Cattle Crossing	RHS SR	Separator
1816	421+300	Chevron	RHS	Median
1817	421+340	Chevron	RHS	Median
1818	421+370	Hazard Marker	RHS	Separator
1819	421+380	Cattle Crossing	SR LHS	Separator

S.No	Chainage (km)	Type of Sign	Side	Location
1820	421+450	Chevron	RHS	Median
1821	421+530	Chevron	RHS	Median
1822	421+630	Chevron	RHS	Median
1823	421+660	Side Road Right	RHS SR	Separator
1824	421+670	Left Turn Prohibhited	RHS	Separator
1825	421+680	Informatory	SR LHS	shoulder
1826	421+700	Chevron	LHS	Median
1827	421+710	Side Road Left	SR LHS	shoulder
1828	421+710	Merging Ahead	RHS	Separator
1829	421+710	Hazard Marker	RHS	Separator
1830	421+760	Hazard Marker	LHS	Median
1831	421+780	Hazard Marker	LHS	Separator
1832	421+790	Chevron	LHS	Median
1833	421+790	Hazard Marker	RHS SR	Shoulder
1834	421+790	Hazard Marker	RHS SR	Separator
1835	421+790	Hazard Marker	RHS SR	Separator
1836	421+820	Hazard Marker	SR LHS	shoulder
1837	421+820	Hazard Marker	SR LHS	Separator
1838	421+820	Hazard Marker	SR LHS	shoulder
1839	421+820	Hazard Marker	SR LHS	Separator
1840	421+830	Hazard Marker	LHS	Median
1841	421+830	Informatory	SR LHS	Separator
1842	421+850	Side Road Right	SR LHS	Separator
1843	421+860	Hazard Marker	LHS	Separator
1844	421+890	Hazard Marker	RHS	Median
1845	421+930	Side Road Left	RHS SR	Shoulder
1846	421+980	Hazard Marker	RHS SR	Island
1847	421+980	Pass Either	RHS SR	Island
1848	421+990	Speed Limit	LHS	Separator
1849	422+010	Bus Stop	RHS SR	Shoulder
1850	422+060	Speed Limit	LHS	Separator
1851	422+100	Speed Limit	LHS	Separator
1852	422+120	Hazard Marker	LHS	Median
1853	422+190	Hazard Marker	RHS	Median
1854	422+200	Chevron	LHS	Separator
1855	422+220	Bus Bay	SR LHS	shoulder
1856	422+230	No Overtaking	LHS	Separator

S.No	Chainage (km)	Type of Sign	Side	Location
1857	422+240	Chevron	LHS	Separator
1858	422+240	Chevron	RHS	Median
1859	422+280	Chevron	LHS	Separator
1860	422+280	Speed Limit	LHS	Separator
1861	422+280	Hazard Marker	SR LHS	Bus Bay Island
1862	422+280	Pass Either	SR LHS	Bus Bay Island
1863	422+310	Speed Limit	LHS	Separator
1864	422+320	Chevron	RHS	Median
1865	422+340	Chevron	LHS	Separator
1866	422+340	Speed Limit	SR LHS	Separator
1867	422+360	Speed Limit	LHS	Separator
1868	422+380	Turn Right	LHS	Separator
1869	422+410	Informatory	SR LHS	Shoulder
1870	422+420	Chevron	RHS	Median
1871	422+430	Hazard Marker	RHS	Separator
1872	422+450	Restriction End	RHS	Separator
1873	422+460	School Ahead	SR LHS	Shoulder
1874	422+490	Men at Work	LHS	Separator
1875	422+510	Informatory	SR LHS	Shoulder
1876	422+530	No Turn Left	LHS	Separator
1877	422+530	No Parking	RHS	Separator
1878	422+550	Go Slow	LHS	Separator
1879	422+550	Rumble Strip	SR LHS	Shoulder
1880	422+620	Hazard Marker	SR LHS	Separator
1881	422+620	Pass Either	SR LHS	Separator

Section-2 Chennai Bypass

S.No	Chainage (km)	Type of Sign	Side	Location
1	0+050	Speed Limit	LHS	Seperator
2	0+065	Informatry		Median
3	0+070	Informatry		Median
4	0+100	Traffic Merge		Median
5	0+250	No Parking	LHS	Seperator
6	0+380	Hazard Marking	LHS	Seperator
7	1+100	Accidet Prone zone		Median
8	1+250	Hazard Marking	LHS	Seperator

S.No	Chainage (km)	Type of Sign	Side	Location
9	2+440	Curve Ahead	LHS	Seperator
10	2+490	Chevron	LHS	Seperator
11	2+500	Hazard Marking	LHS	Seperator
12	2+620	Chevron	LHS	Seperator
13	2+660	Chevron	LHS	Seperator
14	2+740	Chevron	LHS	Seperator
15	2+790	Chevron	LHS	Seperator
16	2+840	Chevron	LHS	Seperator
17	2+940	Chevron	LHS	Seperator
18	2+990	Chevron	LHS	Seperator
19	3+040	Chevron	LHS	Seperator
20	3+420	Chevron	LHS	Median
21	3+460	Chevron	LHS	Median
22	3+510	Chevron	LHS	Median
23	3+570	Chevron	LHS	Median
24	3+950	Accidet Prone zone		Median
25	4+080	Curve Ahead	LHS	Seperator
26	4+090	Chevron	LHS	Seperator
27	4+150	Chevron	LHS	Seperator
28	4+200	Chevron	LHS	Seperator
29	4+240	Chevron	LHS	Seperator
30	4+300	Chevron	LHS	Seperator
31	4+350	Chevron	LHS	Seperator
32	4+400	Chevron	LHS	Seperator
33	5+200	Chevron	LHS	Median
34	5+330	Chevron	LHS	Median
35	5+430	Chevron	LHS	Median
36	5+480	Chevron	LHS	Median
37	5+520	Chevron	LHS	Median
38	5+580	Chevron	LHS	Median
39	5+990	Hazard Marking	LHS	Seperator
40	6+780	Steep Ascent	LHS	Seperator
41	6+900	Accident Prone Area	LHS	Seperator
42	6+940	Hump	LHS	Seperator
43	10+860	Chevron	LHS	Median
44	10+920	Chevron	LHS	Median
45	10+960	Chevron	LHS	Median

S.No	Chainage (km)	Type of Sign	Side	Location
46	11+010	Chevron	LHS	Median
47	11+070	Chevron	LHS	Median
48	11+120	Chevron	LHS	Median
49	11+160	Chevron	LHS	Median
50	11+220	Chevron	LHS	Median
51	12+200	Chevron	LHS	Seperator
52	12+320	Chevron	LHS	Seperator
53	12+420	Chevron	LHS	Seperator
54	13+080	Steep Ascent	LHS	Seperator
55	13+690	Go Slow		Median
56	13+970	Go Slow	LHS	Shoulder
57	14+130	Go Slow	LHS	Shoulder
58	14+600	Go Slow		Median
59	14+830	Chevron	LHS	Median
60	14+980	Chevron	LHS	Median
61	15+020	Chevron	LHS	Median
62	15+100	Chevron	LHS	Median
63	15+140	Chevron	LHS	Median
64	15+200	Chevron	LHS	Median
65	15+260	Chevron	LHS	Median
66	15+350	Go Slow		Median
67	15+370	Chevron	LHS	Median
68	16+190	fuel	LHS	Seperator
69	16+200	Informatry	LHS	Seperator
70	16+210	Go Slow	LHS	Seperator
71	16+230	Median Opening		Median
72	16+460	Informatry		Median
73	16+725	U Turn		Median
74	16+820	Traffic Merge	LHS	Seperator
75	16+825	Restricted Parking	LHS	Seperator
76	16+850	Junction	LHS	Seperator
77	16+950	Hazard Marking	LHS	Seperator
78	17+240	Curve Ahead	LHS	Seperator
79	17+350	Chevron	LHS	Seperator
80	17+390	Chevron	LHS	Seperator
81	17+480	Chevron	LHS	Seperator
82	17+500	Accidet Prone zone	LHS	Seperator

S.No	Chainage (km)	Type of Sign	Side	Location
83	17+510	Chevron	LHS	Seperator
84	17+530	Go Slow	LHS	Seperator
85	17+550	Chevron	LHS	Seperator
86	17+570	Go Slow		Median
87	17+590	Accident Zone		Median
88	17+610	Chevron	LHS	Seperator
89	18+715	Curve Ahead	LHS	Median
90	18+775	Accidet Prone zone		Median
91	18+875	Curve Ahead	LHS	Median
92	19+265	Informatry	LHS	Seperator
93	19+730	Speed Limit	LHS	Seperator
94	19+800	Accidet Prone zone	LHS	Seperator
95	19+880	Hump	LHS	Seperator
96	19+920	No Parking	LHS	Seperator
97	20+060	Accident Black Spot	LHS	Seperator
98	21+050	Steep Ascent	LHS	Seperator
99	21+320	Hazard Marking	LHS	Seperator
100	21+320	Informatry		Median
101	21+460	Hazard Marking	LHS	Seperator
102	21+570	Junction	LHS	Seperator
103	21+590	Rumle Strip	LHS	Seperator
104	21+640	Junction	LHS	Seperator
105	21+680	Curve Ahead	LHS	Seperator
106	21+750	Hazard Marking	LHS	Seperator
107	21+820	Chevron	LHS	Median
108	21+860	Chevron	LHS	Median
109	22+100	Chevron	LHS	Seperator
110	22+170	Chevron	LHS	Seperator
111	23+790	Chevron	LHS	Seperator
112	26+280	Informatry	LHS	Seperator
113	26+940	Steep Ascent	LHS	Seperator
114	27+620	Chevron	LHS	Seperator
115	27+630	Curve Ahead	LHS	Seperator
116	27+750	Chevron	LHS	Seperator
117	27+780	Steep Ascent	LHS	Seperator
118	27+790	Chevron	LHS	Seperator
119	27+840	Chevron	LHS	Seperator

S.No	Chainage (km)	Type of Sign	Side	Location
120	27+870	Chevron	LHS	Seperator
121	27+910	Chevron	LHS	Seperator
122	27+960	Chevron	LHS	Seperator
123	28+050	Curve Ahead	LHS	Seperator
124	28+070	Chevron	LHS	Seperator
125	28+120	Chevron	LHS	Seperator
126	28+290	toilet block	LHS	Seperator
127	28+460	Informatry	LHS	Median
128	28+870	Informatry	LHS	Median
129	28+880	Informatry	LHS	Median
130	29+360	Hazard Marking	LHS	Seperator
131	29+450	Informatry	LHS	Seperator
132	29+490	Steep Ascent	LHS	Seperator
133	29+770	Hazard Marking	LHS	Seperator
134	29+990	Curve Ahead	LHS	Median
135	30+170	Hazard Marking	LHS	Seperator
136	30+510	Chevron	LHS	Seperator
137	30+550	Chevron	LHS	Seperator
138	30+590	Chevron	LHS	Seperator
139	30+620	Chevron	LHS	Seperator
140	30+750	Chevron	LHS	Seperator
141	30+790	Chevron	LHS	Seperator
142	30+830	Chevron	LHS	Seperator
143	30+860	Chevron	LHS	Seperator
144	30+890	Chevron	LHS	Seperator
145	30+930	Chevron	LHS	Seperator
146	30+970	Chevron	LHS	Seperator
147	31+390	Hazard Marking	LHS	Seperator
148	31+510	Chevron	LHS	Median
149	31+530	Junction		Median
150	31+670	Chevron	LHS	Median
151	31+700	Chevron	LHS	Median
152	31+770	Chevron	LHS	Median
153	31+790	Chevron	LHS	Median
154	31+890	Chevron	LHS	Median
155	31+920	Chevron	LHS	Median
156	31+950	Chevron	LHS	Median

S.No	Chainage (km)	Type of Sign	Side	Location
157	32+100	Go Slow		Median
158	32+110	Speed Limit		Median
159	32+280	Steep Ascent		Median
160	32+310	Go Slow		Median
161	32+010	Chevron	RHS	Seperator
162	31+910	Chevron	RHS	Seperator
163	31+870	Chevron	RHS	Seperator
164	31+770	Chevron	RHS	Seperator
165	31+560	Go Slow	RHS	Seperator
166	31+520	Steep Ascent	RHS	Seperator
167	31+430	Speed Limit	RHS	Seperator
168	31+230	Speed Limit		Median
169	31+090	Curve Ahead		Median
170	31+020	Chevron		Median
171	31+960	Chevron		Median
172	30+920	Chevron		Median
173	30+880	Chevron		Median
174	30+830	Curve Ahead		Median
175	30+800	Chevron		Median
176	30+390	Chevron	RHS	Seperator
177	29+960	Steep Ascent	RHS	Seperator
178	29+350	Hazard Marking	RHS	Seperator
179	29+040	Go Slow		Median
180	28+960	toilet block	RHS	Seperator
181	28+960	Go Slow	RHS	Median
182	28+950	Go Slow	RHS	Seperator
183	28+890	Informatry		Median
184	28+885	U TURN		Median
185	28+880	Informatry	RHS	Median
186	28+380	Steep Ascent		Median
187	28+250	Go Slow	RHS	Seperator
188	28+110	Chevron		Median
189	28+070	Chevron		Median
190	28+030	Chevron		Median
191	27+970	Chevron		Median
192	27+900	Curve Ahead		Median
193	27+850	Chevron		Median

S.No	Chainage (km)	Type of Sign	Side	Location
194	27+800	Chevron		Median
195	27+770	Chevron		Median
196	27+740	Chevron		Median
197	27+440	Steep Ascent	RHS	Seperator
198	26+250	Steep Ascent	RHS	Seperator
199	25+950	Steep Ascent		Median
200	25+650	Steep Ascent	RHS	Seperator
201	25+590	Curve Ahead	RHS	Seperator
202	25+540	Hazard Marking	RHS	Seperator
203	25+510	Chevron	RHS	Seperator
204	21+960	Go Slow		Median
205	21+820	Rumle Strip	RHS	Seperator
206	21+690	Hazard Marking	RHS	Seperator
207	21+470	Hazard Marking	RHS	Seperator
208	21+350	Hazard Marking	RHS	Seperator
209	20+980	Informatry	RHS	Seperator
210	19+685	Curve Ahead	RHS	Seperator
211	19+410	Informatry	RHS	Seperator
212	19+370	Hazard Marking	RHS	Seperator
213	19+000	Junction	RHS	Seperator
214	18+920	Go Slow	RHS	Seperator
215	18+250	Curve Ahead	RHS	Seperator
216	17+850	Curve Ahead	RHS	Seperator
217	17+490	Curve Ahead		Median
218	17+440	Chevron		Median
219	17+390	NO U Turn		Median
220	17+380	Accident Prone Area		Median
221	16+930	Informatry		Median
222	16+430	Speed Limit		Median
223	16+280	Informatry	RHS	Shoulder
224	15+410	Hazard Marking	RHS	Median
225	15+160	Chevron	RHS	Shoulder
226	15+090	Chevron	RHS	Shoulder
227	14+150	Hazard Marking	RHS	Shoulder
228	12+630	Chevron		Median
229	12+580	Chevron		Median
230	12+480	Chevron		Median

S.No	Chainage (km)	Type of Sign	Side	Location
231	12+440	Chevron		Median
232	12+390	Chevron		Median
233	12+330	Chevron		Median
234	12+290	Chevron		Median
235	12+240	Chevron		Median
236	12+190	Chevron		Median
237	12+140	Chevron		Median
238	12+090	Chevron		Median
239	10+400	Hazard Marking		Median
240	10+210	Chevron		Median
241	10+160	Chevron		Median
242	10+110	Chevron		Median
243	8+520	Curve Ahead	RHS	Shoulder
244	8+510	Chevron	RHS	Shoulder
245	8+450	Chevron	RHS	Shoulder
246	7+690	Chevron		Median
247	7+630	Chevron		Median
248	7+580	Chevron		Median
249	7+550	Hazard Marking	RHS	Shoulder
250	7+320	Informatry	RHS	Shoulder
251	6+620	Hazard Marking	RHS	Seperator
252	5+820	Chevron	RHS	Shoulder
253	5+810	Curve Ahead	RHS	Shoulder
254	5+770	Chevron	RHS	Shoulder
255	5+720	Chevron	RHS	Shoulder
256	5+680	Chevron	RHS	Shoulder
257	5+620	Chevron	RHS	Shoulder
258	5+570	Chevron	RHS	Shoulder
259	5+480	Chevron	RHS	Shoulder
260	5+430	Chevron	RHS	Shoulder
261	5+410	Curve Ahead	RHS	Shoulder
262	5+380	Chevron	RHS	Shoulder
263	5+320	Chevron	RHS	Shoulder
264	5+270	Chevron	RHS	Shoulder
265	5+230	Chevron	RHS	Shoulder
266	4+830	Speed Limit		Median
267	4+580	Chevron		Median

S.No	Chainage (km)	Type of Sign	Side	Location
268	4+540	Chevron		Median
269	4+480	Chevron		Median
270	4+430	Chevron		Median
271	4+370	Chevron		Median
272	4+330	Chevron		Median
273	4+280	Chevron		Median
274	4+180	Chevron		Median
275	4+130	Chevron		Median
276	4+070	Chevron		Median
277	4+030	Chevron		Median
278	4+000	Accident Prone Area	RHS	Shoulder
279	3+950	STOP	RHS	Shoulder
280	3+830	Speed Limit	RHS	Shoulder
281	3+140	Chevron		Median
282	3+090	Chevron		Median
283	3+040	Chevron		Median
284	2+980	Chevron		Median
285	2+890	Chevron		Median
286	2+830	Chevron		Median
287	2+190	Chevron		Median
288	2+750	Chevron		Median
289	2+680	Chevron		Median
290	2+640	Chevron		Median
291	2+590	Chevron		Median
292	2+540	Chevron		Median
293	1+510	Speed Limit		Median
294	0+900	Speed Limit		Median
295	0+770	Go Slow		Median
296	0+630	Accident Prone Area		Median
297	0+610	Accident Prone Area		Median
298	0+550	Junction	RHS	Shoulder
299	0+500	Informatry	RHS	Shoulder
300	0+400	Chevron		Median
301	0+390	Chevron		Median
302	0+370	Chevron		Median
303	0+360	Chevron		Median
304	0+350	Speed Limit		Median

S.No	Chainage (km)	Type of Sign	Side	Location
305	0+340	Chevron	RHS	Seperator
306	0+340	Informatry	RHS	Seperator
307	0+340	Chevron		Median
308	0+320	Accident Prone Area	RHS	Seperator
309	0+300	NO Overtake		Median
310	0+300	Chevron	RHS	Shoulder
311	0+270	Speed Limit	RHS	Shoulder
312	0+260	Chevron	RHS	Shoulder
313	0+250	Curve Ahead	RHS	Shoulder
314	0+200	Chevron	RHS	Shoulder
315	0+130	Chevron	RHS	Shoulder
316	0+110	Chevron	RHS	Shoulder
317	0+090	Chevron	RHS	Shoulder
318	0+070	Chevron	RHS	Shoulder
319	0+050	Chevron	RHS	Shoulder
320	0+030	Chevron	RHS	Shoulder
321	0+010	Stop	RHS	Shoulder
322	0+000	keep left	RHS	Shoulder

Section 03 Chennai Tada

S. No.	Chainage (Km)	Side	Location	Type
1	21+420	LHS	Median	Accident Prone Area
2	21+425	LHS	Median	Informatry
3	21+440	LHS	Median	U turn
4	21+450	LHS	Median	Informatry
6	21+790	LHS	Median	Hazard
7	21+870	LHS	Median	Speed Limit
8	22+210	LHS	Median	Overtaking Prohibited
9	22+215	LHS	Median	Informatry
10	22+420	LHS	Median	Chevron
11	22+420	LHS	Seperator	Give way
12	22+470	LHS	Median	Chevron
13	22+480	LHS	Seperator	Merging Ahead
14	22+520	LHS	Median	Chevron
15	22+560	LHS	Median	Chevron
16	22+570	LHS	Median	Chevron

S. No.	Chainage (Km)	Side	Location	Type
17	22+580	LHS	Median	Speed Limit
18	22+630	LHS	Median	Chevron
19	22+640	LHS	Median	Chevron
20	22+660	LHS	Median	Chevron
21	22+670	LHS	Median	Gap in Median
22	22+700	LHS	Median	Chevron
23	22+710	LHS	Median	Chevron
24	22+720	LHS	Median	Go Slow
25	22+730	LHS	Median	Chevron
26	22+760	LHS	Seperator	Merging Ahead
27	22+780	LHS	Median	Stop Sign
28	22+800	LHS	Median	Chevron
29	22+800	LHS	Seperator	Speed Breaker
30	22+910	LHS	Median	Chevron
31	23+080	LHS	Seperator	Chevron
32	23+230	LHS	Seperator	Chevron
33	23+260	LHS	Seperator	Chevron
34	23+300	LHS	Seperator	Chevron
35	23+330	LHS	Seperator	Chevron
36	23+370	LHS	Seperator	Go Slow
37	23+390	LHS	Seperator	Accident Prone Area
38	23+420	LHS	Seperator	Chevron
39	23+430	LHS	Seperator	No Parking
40	23+450	LHS	Seperator	No Stopping
41	23+500	LHS	Seperator	
42	23+520	LHS	Seperator	No Stopping
43	23+550	LHS	Seperator	No Parking
44	24+410	LHS	Seperator	Overtaking Prohibited
45	25+400	LHS	Seperator	Chevron
46	25+480	LHS	Seperator	Chevron
47	25+560	LHS	Seperator	Accident Prone Area
48	25+600	LHS	Seperator	Speed Limit
49	25+620	LHS	Seperator	Chevron
50	25+630	LHS	Seperator	Accident Prone Area
51	25+700	LHS	Seperator	Hazard

S. No.	Chainage (Km)	Side	Location	Type
52	25+710	LHS	Seperator	Chevron
53	25+770	LHS	Seperator	Restriction End
54	25+820	LHS	Seperator	Start of Dual Carriageway
55	25+840	LHS	Seperator	Chevron
56	25+900	LHS	Seperator	Chevron
57	25+970	LHS	Seperator	Chevron
58	26+060	LHS	Median	Chevron
59	26+130	LHS	Median	Chevron
60	26+210	LHS	Median	Chevron
61	26+350	LHS	Median	Chevron
62	26+380	LHS	Median	Stop Sign
63	26+380	LHS	Median	Chevron
64	26+890	LHS	Median	Chevron
65	27+160	LHS	Median	Chevron
66	27+180	LHS	Median	Hazard
67	27+610	LHS	Seperator	No Stopping
68	27+630	LHS	Seperator	Restriction End
69	28+620	LHS	Seperator	Chevron
70	28+680	LHS	Seperator	Chevron
71	28+760	LHS	Seperator	Chevron
72	28+820	LHS	Seperator	Chevron
73	28+900	LHS	Seperator	Chevron
74	29+980	LHS	Seperator	Hazard
75	29+995	LHS	Seperator	Man at Work
76	30+460	LHS	Seperator	Hazard
77	31+450	LHS	Seperator	No Stopping
78	31+480	LHS	Seperator	Hazard
79	31+480	LHS	Median	Hazard
80	31+600	LHS	Seperator	NH Route Marker
81	31+940	LHS	Seperator	Pass Either Side
82	32+190	LHS	Seperator	Fuel Station
83	33+200	LHS	Seperator	Hazard
84	33+320	LHS	Median	Hazard
85	33+540	LHS	Seperator	Hazard
86	33+900	LHS	Seperator	No Stopping
87	33+920	LHS	Seperator	Restriction End

S. No.	Chainage (Km)	Side	Location	Type
88	34+000	LHS	Median	Hazard
89	34+000	LHS	Seperator	Hazard
90	34+300	LHS	Seperator	Give way
91	34+680	LHS	Seperator	Accident Prone Area
92	35+190	LHS	Seperator	Chevron
93	35+260	LHS	Seperator	Chevron
94	35+290	LHS	Seperator	Man at Work
95	35+310	LHS	Seperator	Speed Limit
96	35+340	LHS	Seperator	Speed Limit
97	35+350	LHS	Seperator	Accident Prone Area
98	35+385	LHS	Seperator	No Stopping
99	35+390	LHS	Seperator	Crossing Prohibited
100	35+410	LHS	Seperator	Chevron
101	35+420	LHS	Seperator	Restriction End
102	35+480	LHS	Seperator	Chevron
103	35+480	LHS	Median	Hazard
104	35+480	LHS	Seperator	Hazard
105	35+620	LHS	Seperator	Informatry
106	35+640	LHS	Seperator	Chevron
107	35+680	LHS	Seperator	Chevron
108	35+750	LHS	Seperator	Hazard
109	35+760	LHS	Seperator	Chevron
110	35+840	LHS	Seperator	Chevron
111	35+840	LHS	Median	Chevron
112	35+860	LHS	Seperator	Merging Ahead
113	36+100	LHS	Median	Chevron
114	36+100	LHS	Seperator	Hazard
115	36+100	LHS	Seperator	Give way
116	36+200	LHS	Median	Chevron
117	36+220	LHS	Median	Chevron
118	36+240	LHS	Seperator	Accident Prone Area
119	36+360	LHS	Median	Chevron
120	36+420	LHS	Median	Chevron
121	36+480	LHS	Median	Chevron
122	36+600	LHS	Median	Chevron

S. No.	Chainage (Km)	Side	Location	Type
123	36+870	LHS	Median	Go Slow
124	37+020	LHS	Median	Man at Work
125	37+070	LHS	Median	Speed Limit
126	37+090	LHS	Seperator	Hazard
127	37+090	LHS	Median	Hazard
128	37+120	LHS	Median	Keep Left
129	39+680	LHS	Seperator	Overtaking Prohibited
130	40+230	LHS	Seperator	Bus Stop
131	40+250	LHS	Seperator	Restriction End
132	40+530	LHS	Seperator	Hazard
133	40+530	LHS	Median	Hazard
134	40+800	LHS	Seperator	Hazard
135	40+800	LHS	Median	Hazard
136	40+800	LHS	Median	Informatry
137	41+370	LHS	Seperator	Bus Stop
138	41+580	LHS	Median	
139	41+580	LHS	Seperator	Informatry
140	41+750	LHS	Median	Hazard
141	42+050	LHS	Median	Chevron
142	42+270	LHS	Median	Chevron
143	42+360	LHS	Median	Chevron
144	42+450	LHS	Median	Chevron
145	42+590	LHS	Median	Chevron
146	42+620	LHS	Seperator	Restriction End
147	42+660	LHS	Median	Chevron
148	42+730	LHS	Median	Chevron
149	42+850	LHS	Median	Chevron
150	43+280	LHS	Seperator	Chevron
151	43+350	LHS	Seperator	Chevron
152	43+430	LHS	Seperator	Chevron
153	43+470	LHS	Median	Hazard
154	43+470	LHS	Seperator	Hazard
155	43+470	LHS	Seperator	Overtaking Prohibited
156	43+490	LHS	Seperator	Chevron
157	43+530	LHS	Seperator	Pedestrian Crossing

S. No.	Chainage (Km)	Side	Location	Type
158	43+790	LHS	Median	Chevron
159	43+880	LHS	Median	Chevron
160	43+950	LHS	Median	Chevron
161	44+400	LHS	Seperator	Chevron
162	44+490	LHS	Seperator	Chevron
163	44+590	LHS	Seperator	Chevron
164	44+670	LHS	Seperator	Chevron
165	44+730	LHS	Seperator	Chevron
166	44+800	LHS	Seperator	Chevron
167	44+900	LHS	Seperator	Chevron
168	44+960	LHS	Seperator	Chevron
169	45+030	LHS	Seperator	Chevron
170	45+160	LHS	Seperator	Chevron
171	45+170	LHS	Seperator	Chevron
172	45+210	LHS	Median	Hazard
173	45+800	LHS	Seperator	Merging Ahead
174	45+910	LHS	Seperator	Give way
175	45+950	LHS	Seperator	Hazard
176	46+080	LHS	Seperator	Hazard
177	46+100	LHS	Seperator	Overtaking Prohibited
178	46+480	LHS	Seperator	Chevron
179	46+540	LHS	Seperator	Chevron
180	46+630	LHS	Seperator	Chevron
181	46+750	LHS	Seperator	Restriction End
182	46+780	LHS	Seperator	Chevron
183	46+920	LHS	Seperator	Chevron
184	47+000	LHS	Seperator	Chevron
185	47+020	LHS	Seperator	Chevron
186	47+070	LHS	Seperator	Chevron
187	47+090	LHS	Seperator	Restriction End
188	47+170	LHS	Seperator	Chevron
189	47+170	LHS	Median	Chevron
190	47+230	LHS	Seperator	Chevron
191	47+300	LHS	Seperator	Overtaking Prohibited
192	47+300	LHS	Median	Chevron
193	47+350	LHS	Median	Chevron

S. No.	Chainage (Km)	Side	Location	Type
194	47+400	LHS	Median	Chevron
195	47+460	LHS	Median	Chevron
196	47+530	LHS	Median	Chevron
197	47+590	LHS	Median	Chevron
198	47+640	LHS	Median	Chevron
199	47+690	LHS	Median	Chevron
200	47+730	LHS	Median	Chevron
201	47+830	LHS	Median	Chevron
202	47+910	LHS	Median	Chevron
203	47+960	LHS	Median	Chevron
204	48+140	LHS	Median	Chevron
205	48+310	LHS	Seperator	Chevron
206	48+320	LHS	Seperator	Curve Ahead
207	48+350	LHS	Seperator	Chevron
208	48+360	LHS	Seperator	Chevron
209	48+410	LHS	Seperator	Chevron
210	48+450	LHS	Seperator	Chevron
211	48+460	LHS	Seperator	Chevron
212	48+500	LHS	Seperator	Chevron
213	48+520	LHS	Seperator	Chevron
214	48+560	LHS	Seperator	Chevron
215	48+890	LHS	Seperator	
216	48+980	LHS	Seperator	Hazard
217	49+420	LHS	Seperator	Restriction End
218	51+300	LHS	Seperator	Hazard
219	52+580	LHS	Seperator	Hazard
220	52+580	LHS	Median	Gap in Median
221	52+700	LHS	Seperator	Merging Ahead
222	52+720	LHS	Median	Hazard
223	52+730	LHS	Seperator	Speed Limit
224	52+930	LHS	Seperator	Two Way Hazard
225	52+940	LHS	Seperator	Keep Left
226	52+950	LHS	Sr Shoulder	Two Way Hazard
227	52+950	LHS	Sr Shoulder	Pass Either Side
228	53+100	LHS	Seperator	Pedestrian Crossing
229	53+110	LHS	Seperator	Bus Stop

S. No.	Chainage (Km)	Side	Location	Type
230	53+410	LHS	Seperator	Merging Ahead
231	53+760	LHS	Seperator	Hazard
232	53+760	LHS	Median	Hazard
233	54+100	LHS	Shoulder	Chevron
234	54+150	LHS	Shoulder	Chevron
235	54+250	RHS	Median	Informatry
236	54+190	RHS	Median	Chevron
237	54+130	RHS	Median	Chevron
238	53+810	RHS	Median	Hazard
239	53+810	RHS	Seperator	Hazard
240	53+700	RHS	Shoulder	
241	52+710	RHS	Median	Accident Prone Area
242	52+320	RHS	Seperator	Overtaking Prohibited
243	51+910	RHS	Median	Hazard
244	51+560	RHS	Seperator	Restriction End
245	51+080	RHS	Seperator	Speed Breaker
246	51+070	RHS	Seperator	T-Junction
247	51+050	RHS	Seperator	Accident Prone Area
248	50+840	RHS	Seperator	Curve Ahead
249	49+910	RHS	Seperator	No Stopping
250	49+670	RHS	Seperator	Merging Ahead
251	49+460	RHS	Seperator	Overtaking Prohibited
252	49+360	RHS	Median	Hazard
253	48+830	RHS	Seperator	No Stopping
254	48+750	RHS	Median	Chevron
255	48+600	RHS	Median	Chevron
256	48+530	RHS	Median	Chevron
257	48+500	RHS	Median	Chevron
258	48+450	RHS	Median	Chevron
259	48+400	RHS	Median	Chevron
260	48+390	RHS	Seperator	Informatry
261	48+320	RHS	Median	Chevron
262	48+300	RHS	Seperator	Informatry
263	48+160	RHS	Seperator	Chevron
264	47+980	RHS	Seperator	Chevron

S. No.	Chainage (Km)	Side	Location	Type
265	47+910	RHS	Seperator	Chevron
266	47+850	RHS	Seperator	Chevron
267	47+790	RHS	Seperator	Chevron
268	47+720	RHS	Seperator	Chevron
269	47+660	RHS	Seperator	Chevron
270	47+600	RHS	Seperator	Chevron
271	47+540	RHS	Seperator	Chevron
272	47+480	RHS	Seperator	Chevron
273	47+420	RHS	Seperator	Chevron
274	47+370	RHS	Seperator	Chevron
275	47+310	RHS	Seperator	Chevron
276	47+240	RHS	Seperator	Chevron
277	47+240	RHS	Seperator	Restriction End
278	47+190	RHS	Seperator	Hazard
279	47+180	RHS	Median	Chevron
280	47+020	RHS	Median	Chevron
281	46+990	RHS	Median	Chevron
282	46+930	RHS	Median	Chevron
283	46+860	RHS	Median	Chevron
284	46+800	RHS	Median	Chevron
285	46+780	RHS	Seperator	Overtaking Prohibited
286	46+720	RHS	Median	Chevron
287	46+500	RHS	Median	Chevron
288	46+140	RHS	Seperator	Restriction End
289	46+090	RHS	Median	Hazard
290	46+200	RHS	Seperator	Hazard
291	45+160	RHS	Median	Hazard
292	45+150	RHS	Seperator	Overtaking Prohibited
293	45+150	RHS	Median	Chevron
294	45+050	RHS	Median	Chevron
295	44+980	RHS	Median	Chevron
296	44+830	RHS	Median	Chevron
297	44+690	RHS	Median	Chevron
298	44+600	RHS	Median	Chevron
299	44+510	RHS	Median	Chevron
300	44+420	RHS	Median	Chevron

S. No.	Chainage (Km)	Side	Location	Type
301	44+270	RHS	Median	Restriction End
302	44+020	RHS	Seperator	Overtaking Prohibited
303	43+920	RHS	Seperator	Chevron
304	43+830	RHS	Seperator	Chevron
305	43+760	RHS	Seperator	Chevron
306	43+690	RHS	Seperator	Chevron
307	43+620	RHS	Seperator	Chevron
308	43+530	RHS	Median	Chevron
309	43+525	RHS	Median	Hazard
310	43+500	RHS	Seperator	Restriction End
311	43+450	RHS	Median	Chevron
312	43+380	RHS	Median	Chevron
313	43+300	RHS	Median	Chevron
314	42+830	RHS	Shoulder	Chevron
315	42+770	RHS	Shoulder	Chevron
316	42+690	RHS	Seperator	Chevron
317	42+640	RHS	Median	Hazard
318	42+620	RHS	Seperator	Chevron
319	42+610	RHS	Seperator	Overtaking Prohibited
320	42+480	RHS	Seperator	Chevron
321	42+390	RHS	Seperator	Chevron
322	42+300	RHS	Seperator	Chevron
323	41+030	RHS	Seperator	Informatry
324	40+860	RHS	Seperator	Hazard
325	40+580	RHS	Seperator	Hazard
326	40+300	RHS	Seperator	Overtaking Prohibited
327	40+260	RHS	Median	Hazard
328	39+810	RHS	Seperator	Restriction End
329	39+600	RHS	Median	Go Slow
330	39+560	RHS	Median	Overtaking Prohibited
331	39+560	RHS	Seperator	Speed Limit
332	39+500	RHS	Median	Overtaking Prohibited
333	37+120	RHS	Seperator	
334	36+730	RHS	Median	Curve Ahead

S. No.	Chainage (Km)	Side	Location	Type
335	36+630	RHS	Seperator	Chevron
336	36+520	RHS	Seperator	Chevron
337	36+460	RHS	Seperator	Chevron
338	36+420	RHS	Seperator	Chevron
339	36+400	RHS	Seperator	Speed Limit
340	36+390	RHS	Seperator	Chevron
341	36+350	RHS	Seperator	Accident Prone Area
342	36+320	RHS	Seperator	Chevron
343	36+300	RHS	Seperator	Restriction End
344	36+290	RHS	Median	Hazard
345	36+270	RHS	Seperator	Merging Ahead
346	36+240	RHS	Seperator	Speed Breaker
347	36+235	RHS	Seperator	Chevron
348	36+210	RHS	Seperator	Chevron
349	35+850	RHS	Median	Chevron
350	35+760	RHS	Median	Chevron
351	35+650	RHS	Median	Chevron
352	35+640	RHS	Seperator	Hazard
353	35+640	RHS	Median	Hazard
354	35+500	RHS	Seperator	Accident Prone Area
355	35+490	RHS	Median	Chevron
356	35+440	RHS	Seperator	Overtaking Prohibited
357	35+430	RHS	Seperator	Speed Limit
358	35+420	RHS	Seperator	Overtaking Prohibited
359	35+420	RHS	Median	Chevron
360	35+410	RHS	Seperator	No Stopping
361	35+260	RHS	Median	Chevron
362	35+200	RHS	Median	Chevron
363	34+700	RHS	Seperator	Restriction End
364	34+690	RHS	Seperator	Merging Traffic Ahead
365	34+640	RHS	Median	Informatry
366	34+630	RHS	Seperator	Restriction End
367	33+890	RHS	Median	Hazard
368	33+790	RHS	Seperator	Hazard

S. No.	Chainage (Km)	Side	Location	Type
369	33+380	RHS	Seperator	Restriction End
370	33+220	RHS	Seperator	Hazard
371	33+220	RHS	Median	Hazard
372	33+110	RHS	Seperator	Informatry
373	32+950	RHS	Median	Hazard
374	31+900	RHS	Median	Informatry
375	31+540	RHS	Seperator	Hazard
376	31+540	RHS	Median	Hazard
377	31+380	RHS	Median	Hazard
378	31+320	RHS	Seperator	Hazard
379	27+630	RHS	Seperator	Overtaking Prohibited
380	27+240	RHS	Seperator	Chevron
381	27+140	RHS	Seperator	Chevron
382	27+090	RHS	Seperator	Chevron
383	27+000	RHS	Seperator	Chevron
384	26+940	RHS	Seperator	Chevron
385	26+940	RHS	Seperator	Restriction End
386	26+940	RHS	Seperator	No Stopping
387	26+880	RHS	Seperator	Chevron
388	26+380	RHS	Seperator	Chevron
389	26+340	RHS	Seperator	Chevron
390	26+270	RHS	Seperator	Chevron
391	26+180	RHS	Seperator	Chevron
392	26+110	RHS	Seperator	Chevron
393	26+040	RHS	Seperator	Chevron
394	25+690	RHS	Median	Chevron
395	25+810	RHS	Seperator	Accident Prone Area
396	25+780	RHS	Median	Chevron
397	25+770	RHS	Seperator	Speed Limit
398	25+760	RHS	Seperator	No Stopping
399	25+750	RHS	Seperator	Accident Prone Area
400	25+730	RHS	Seperator	Hazard
401	25+710	RHS	Seperator	Hazard
402	25+610	RHS	Seperator	Chevron
403	25+560	RHS	Seperator	Chevron

S. No.	Chainage (Km)	Side	Location	Type
404	25+560	RHS	Seperator	Restriction End
405	25+480	RHS	Seperator	Chevron
406	25+410	RHS	Seperator	Chevron
407	24+720	RHS	Seperator	Hazard
408	23+660	RHS	Median	Speed Limit
409	23+630	RHS	Median	Chevron
410	23+480	RHS	Median	Chevron
411	23+410	RHS	Median	Chevron
412	23+340	RHS	Median	Chevron
413	23+300	RHS	Median	Chevron
414	23+270	RHS	Median	Chevron
415	23+260	RHS	Median	Chevron
416	23+240	RHS	Median	Chevron
417	23+210	RHS	Median	Chevron
418	23+170	RHS	Median	Informatry
419	23+150	RHS	Median	Chevron
420	23+010	RHS	Median	Chevron
421	23+940	RHS	Seperator	Chevron
422	23+940	RHS	Median	Gap in Median
423	22+935	RHS	Median	Chevron
424	22+910	RHS	Seperator	Chevron
425	22+890	RHS	Median	Go Slow
426	22+880	RHS	Median	Chevron
427	22+880	RHS	Seperator	Chevron
428	22+840	RHS	Seperator	Chevron
429	22+820	RHS	Median	Chevron
430	22+820	RHS	Seperator	Chevron
431	22+810	RHS	Seperator	Stop Sign
432	22+780	RHS	Seperator	Chevron
433	22+730	RHS	Seperator	Chevron
434	22+700	RHS	Seperator	Chevron
435	22+680	RHS	Median	Informatry
436	22+660	RHS	Seperator	Chevron
437	22+630	RHS	Seperator	Chevron
438	22+630	RHS	Median	Chevron
439	22+560	RHS	Seperator	Chevron
440	22+560	RHS	Median	Chevron

S. No.	Chainage (Km)	Side	Location	Type
441	22+510	RHS	Seperator	Chevron
442	22+470	RHS	Median	Informatry
443	22+460	RHS	Median	Chevron
444	22+460	RHS	Seperator	Chevron
445	22+450	RHS	Seperator	Merging Traffic Ahead
446	22+420	RHS	Median	Informatry
447	22+420	RHS	Seperator	Chevron
448	22+370	RHS	Median	Informatry
449	22+250	RHS	Median	Chevron
450	22+240	RHS	Seperator	Speed Limit
451	22+200	RHS	Seperator	Overtaking Prohibited
452	22+190	RHS	Median	Chevron
453	22+180	RHS	Median	Informatry
454	22+130	RHS	Median	Informatry
455	22+110	RHS	Median	Informatry
456	22+070	RHS	Median	Informatry
457	22+000	RHS	Median	Speed Limit
458	21+950	RHS	Median	Informatry
459	21+920	RHS	Median	Informatry
460	21+910	RHS	Median	Speed Limit
461	21+890	RHS	Median	Informatry
462	21+870	RHS	Seperator	Accident Prone Area
463	21+850	RHS	Median	U Turn
464	21+820	RHS	Median	Gap in Median
465	21+790	RHS	Median	U Turn

CHAPTER 7

CONDITION ASSESSMENT OF EXISTING PAVEMENT AND FUTURE MAINTENANCE REQUIREMENT

7.1 General

Highway pavements are layered structures comprising of combination of materials to carry traffic load in given climate for a specified time interval. The pavement structure is designed in such a way that the transmitted stresses due to wheel load are sufficiently reduced, so that they will not exceed bearing capacity of the sub-grade. It should also be able to provide a surface of acceptable riding quality under all weather conditions with the highest possible degree of safety.

The performance of any highway pavement is measured by two indicators, namely Functional Performance and Structural Performance. The functional performance includes aspects such as riding quality, surface distress and skid resistance. Whilst recognising these functional requirements, the pavement should also have adequate strength has a load be a ring structure that is required to carry the traffic load under the prevailing environmental conditions (structural performance).

Performance Type	Performance Indicator
Functional	Riding Quality (Roughness and Rutting) Surface Distress (Cracking, Potholes, and Ravelling etc.) Skid Resistance
Structural	Deflection, Elastic Modulus of Pavement layers and Remaining Life

Information about pavement condition and performance is critical to the decision-making process for successful management of highway pavements. The objective of condition assessment of the pavement is to collect accurate and timely data, analyse the level of deterioration, identify maintenance and reconstruction needs, and determine maintenance costs both routine as well as periodic (major maintenance). In this context, series of investigations and assessments was undertaken using a combination of state of the art, technology driven fully automated and semi-automated processes with high speed of data collection in field. The methodology and data collection involved in the above-mentioned surveys are elaborated in the Chapter 3. After collecting the pavement condition data from

these tests, the data is analysed to evaluate the pavement performance or condition which included the following aspects.

- Assessment of Lane Choice Behaviour
- Axle load Survey and estimation of Vehicle Damage Factor(VDF)
- Analysis of Riding Quality in terms of Roughness and Rutting parameters
- Analysis of Surface Distresses and evaluation of Pavement Condition Index (PCI)
- Test Pit Sand Evaluation of pavement Material Properties
- Structural Condition Assessment of the Pavement and Remaining Life Analysis

Based on the visual condition survey, the type of distress, its quantity and severity for each stretch is obtained. The same is used to evaluate, the present condition of the pavement in terms of PCI (Pavement Condition Index), which classifies condition of the pavement ranging from ’Poor’ to ‘Good’. The procedure for evaluating the same is described in the Section.

The remaining life of the pavement (in terms of the residual traffic load in MSA (Million Standard Axles) that the pavement can sustain) is evaluated using the results obtained from Falling Weight Deflectometer (FWD) survey and Test-pit survey results. The design traffic in terms of MSA for each financial year a head is calculated based on the VDF obtained from axle load data, and traffic projections. Strip chart indicating the performance rating for each stretch is then prepared using the above results. There habitation measures that needs to be provided is decided by comparing the results with the performance requirements out lined in the Standards and Specifications. In this regard, the pavement sections were identified for two cases, it includes the section with overlay requirement and the sections with good condition.

The steps involved areas follows

- Data collected from surveys is analysed for estimating different parameters like Remaining life of Pavement, PCI and projected MSA.
- The Remaining Life of the pavement is evaluated using the FWD and Test-p it surveys results.
- The traffic projections (MSA) are obtained from the combined results of axle load and traffic survey.

- The PCI of the existing pavement is calculated from the NSV data.
- Each stretch is divided into smaller sections and all the above parameters are listed for each section and strip chart is prepared.
- The sections with remaining life less than the design life (10 years in this study) are proposed for overlay.
- The sections with remaining life more than the design life but poor in either of the parameters like IRI, Rut depth and PCI are also considered for the overlay.
- Sections which satisfy both the functional parameters as well have a design life of more than 10 years are considered for routine maintenance only.

7.2 Lane Choice Behaviour

The lane choice behaviour of the carriageway describes the preferred lane by the commercial traffic moving along the Project Stretch. This in turn has effect on the pavement structure in terms of distress caused due to movement of heavy commercial traffic on the same preferred lane. The lane choice behaviour as observed in the Project Stretch is presented in the figure below:

Figure 7-1 : Lane Choice Behaviour along the Project Stretch

It was observed that the preferred lane by the commercial traffic is Inner lane on both LHS and RHS carriageways.

7.3 Analysis of NSV Data-Pavement Condition

The analysis of various performance parameter data as collected during NSV survey is presented in this section.

7.3.1 Roughness

Roughness is one of the important parameters for determining the functional characteristics of pavements. According to American Society for Testing and Materials (ASTM), roughness is defined as "the deviations of a pavement surface from a true planar surface with characteristic dimensions that affect vehicle dynamics, ride quality, dynamic loads, and drainage, for example, longitudinal profile, transverse profile and cross slope". The International Roughness Index (IRI), Bump Integrator Roughness (BI) is used to define the characteristics of a longitudinal road profile and constitutes a standardized roughness measurement.

IRI, BI is measured in metres per kilometre (m/km) or millimetres per metre (mm/m). The roughness of road surfaces is measured using different equipment/techniques such as rod and level survey; dip stick profiler, profile graphs, response type road roughness meters and profiling devices.

In India, the roughness is measured using fifth wheel bump integrator (developed by CRRI) and is reported as Unevenness Index (UI) in mm/km.

However, National Highway Authority of India (NHAI), via letterno.11041/218/2007–Admndated03.11.2009 on POLICYMATTERS–TECHNICAL (37/2009) has approved the use of Laser Profiling devices for NHAI works.

Correlation between Bump Integrator Roughness and International Roughness Index (IRI)

The accepted world standard is the International Roughness Index (IRI) for roughness. The IRI was an outcome of the International Road Roughness Experiment conducted in Brazil (Sayersetal, 1986a) and is reproducible, portable and stable with time. The equipment is included with software to

calculate and print various profile statistics including the IRI as well as the individual point elevation and local surface curvatures. For correlation with BI values the following relation should be used:

$BI=630*(IRI)^{1.12}$

Where, BI= Bump Integrator Roughness or Unevenness Index in mm/km

IRI= International Roughness Index

Roughness condition details length wise for both the direction given in table below

Table 7-1 : **Roughness Summary**

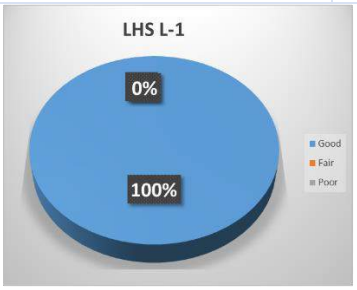
Vijayawada-Chilakaluripet (Km 355+000 to Km 422+605)

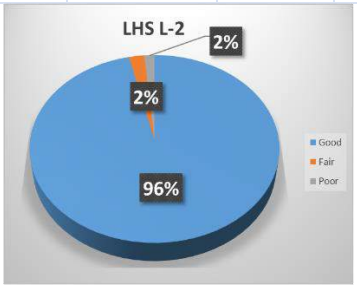
LHS

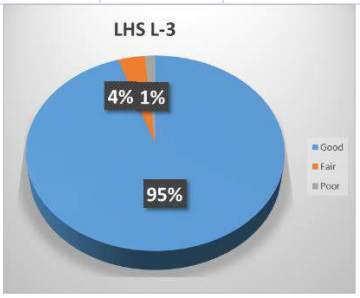
Criteria IRI (m/km)	Condition	LHS					
		L-1		L-2		L-3	
		Km	%	Km	%	Km	%
Less than 2.81	Good	69.41	100.00%	66.91	96.40%	65.51	94.93%
2.81 to 3.301	Fair	0.00	0.00%	1.50	2.16%	2.50	3.62%
More than 3.301	Poor	0.00	0.00%	1.00	1.44%	1.00	1.45%
Total		69.408	100%	69.408	100%	69.408	100%

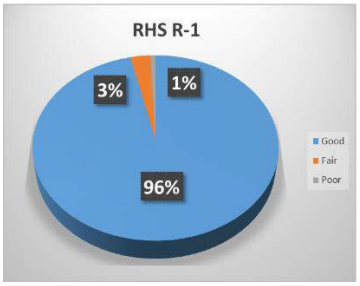
RHS

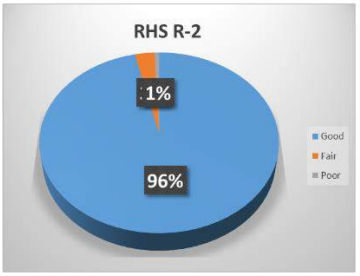
Criteria IRI (m/km)	Condition	RHS					
		R-1		R-2		R-3	
		Km	%	Km	%	Km	%
Less than 2.81	Good	66.91	96.40%	66.91	96.40%	67.41	97.12%
2.81 to 3.301	Fair	2.00	2.88%	2.00	2.88%	2.00	2.88%
More than 3.301	Poor	0.50	0.72%	0.50	0.72%	0.00	0.00%
Total		69.408	100%	69.408	100%	69.408	100%

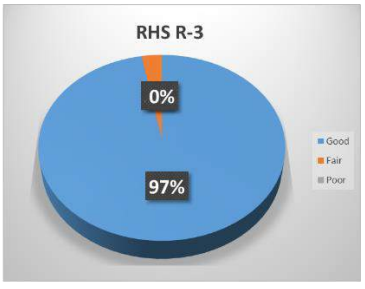












In LHS, 97.11% of the Project Stretch has a Roughness value in Good condition, whereas 1.93% of the Project Stretch is in Fair condition. And 0.96% of the project stretch is in Poor condition.

In RHS, 96.64% of the Project Stretch has a Roughness value in Good condition, whereas 2.88% of the Project Stretch is in Fair condition. And 0.48% of the project stretch is in Poor condition.

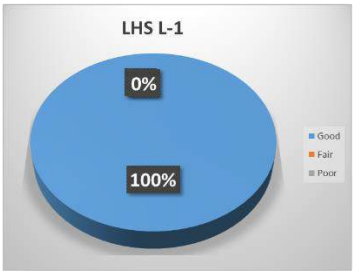
Chennai Bypass (Km 0+000 to Km 32+600)

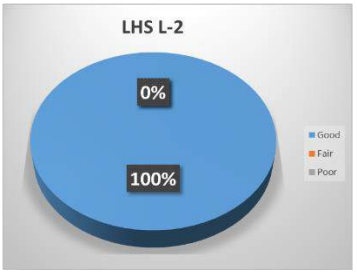
LHS

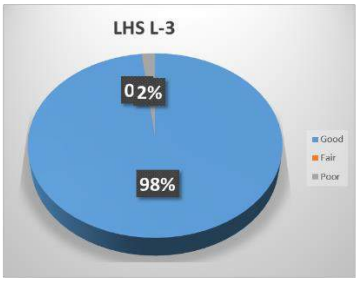
Criteria IRI (m/km)	Condition	LHS					
		L-1		L-2		L-3	
		Km	%	Km	%	Km	%
Less than 2.81	Good	32.60	100.00%	32.60	100.00%	32.00	98.16%
2.81 to 3.301	Fair	0.00	0.00%	0.00	0.00%	0.00	0.00%
More than 3.301	Poor	0.00	0.00%	0.00	0.00%	0.60	1.84%
Total		32.600	100%	32.600	100%	32.600	100%

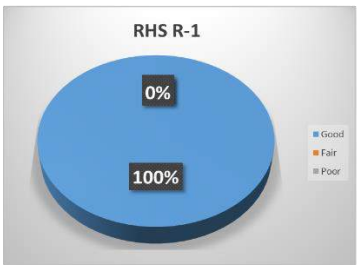
RHS

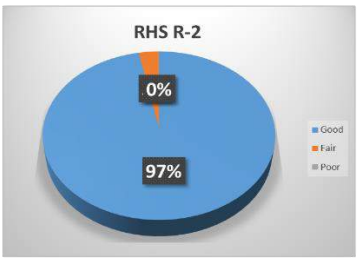
Criteria IRI (m/km)	Condition	RHS					
		R-1		R-2		R-3	
		Km	%	Km	%	Km	%
Less than 2.81	Good	32.60	100.00%	31.60	96.93%	32.60	100.00%
2.81 to 3.301	Fair	0.00	0.00%	1.00	3.07%	0.00	0.00%
More than 3.301	Poor	0.00	0.00%	0.00	0.00%	0.00	0.00%
Total		32.600	100%	32.600	100%	32.600	100%

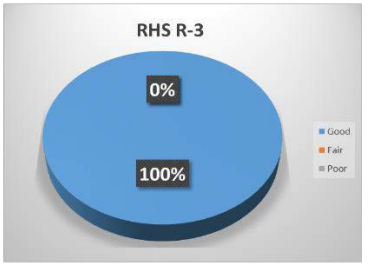












In LHS,99.39% of the Project Stretch has a Roughness value in Good condition, whereas 0% of the Project Stretch is in Fair condition. And 0.61% of the project stretch is in Poor condition.

In RHS, 98.98% of the Project Stretch has a Roughness value in Good condition, whereas 1.02% of the Project Stretch is in Fair condition. And 0.0% of the project stretch is in Poor condition.

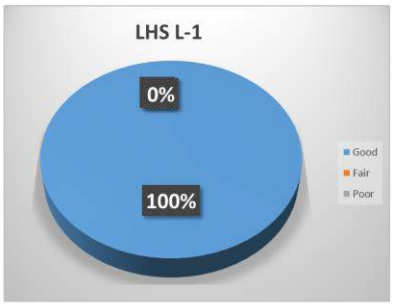
Chennai Tada (Km 21+400 to Km 54+400)

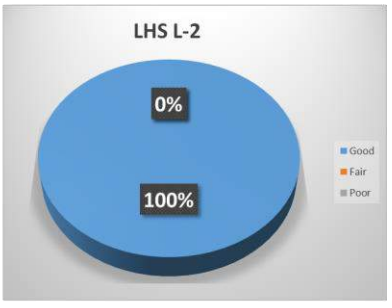
LHS

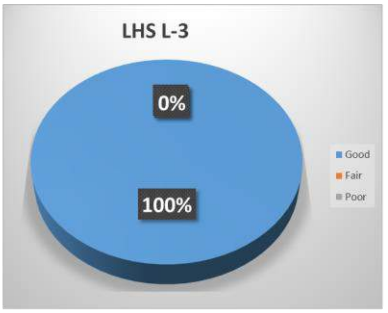
Criteria IRI (m/km)	Condition	LHS					
		L-1		L-2		L-3	
		Km	%	Km	%	Km	%
Less than 2.81	Good	33.00	100.00%	33.00	100.00%	33.00	100.00%
2.81 to 3.301	Fair	0.00	0.00%	0.00	0.00%	0.00	0.00%
More than 3.301	Poor	0.00	0.00%	0.00	0.00%	0.00	0.00%
Total		33.000	100%	33.000	100%	33.000	100%

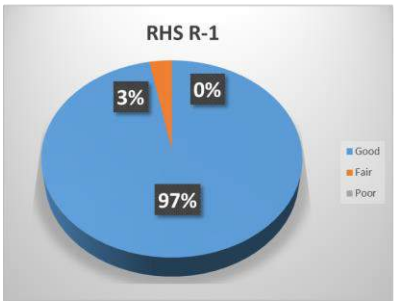
RHS

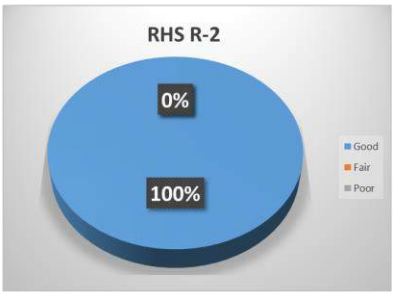
Criteria IRI (m/km)	Condition	RHS					
		R-1		R-2		R-3	
		Km	%	Km	%	Km	%
Less than 2.81	Good	32.00	96.97%	33.00	100.00%	33.00	100.00%
2.81 to 3.301	Fair	1.00	3.03%	0.00	0.00%	0.00	0.00%
More than 3.301	Poor	0.00	0.00%	0.00	0.00%	0.00	0.00%
Total		33.00	100%	33.000	100%	33.000	100%

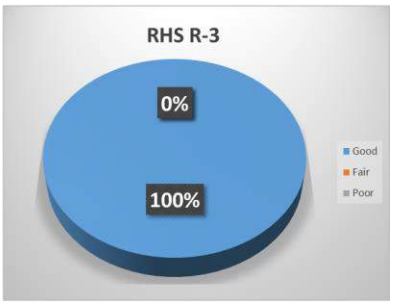












In LHS, 100 % of the Project Stretch has a Roughness value in Good condition, whereas 0% of the Project Stretch is in Fair condition. And 0.0% of the project stretch is in Poor condition.

In RHS, 98.99 % of the Project Stretch has a Roughness value in Good condition, whereas 1.01% of the Project Stretch is in Fair condition. And 0.0% of the project stretch is in Poor condition.

7.3.2 Rutting

Rutting is one of the important factors which determine the functional performance of pavement. Rutting is characterized by permanent deformation of the pavement in wheel path due to heavy load vehicles. It is one of the main modes of failure in asphalt mixes.

Criteria Rut Depth (mm)	Condition
< 5 mm	Good
5mm to 10 mm	Fair
> 10 mm	Poor

The rut depths observed for all 4 lanes (2-LHS and 2- RHS) are presented in the table shown below.

Table 7-2 : Rut Depth Summary

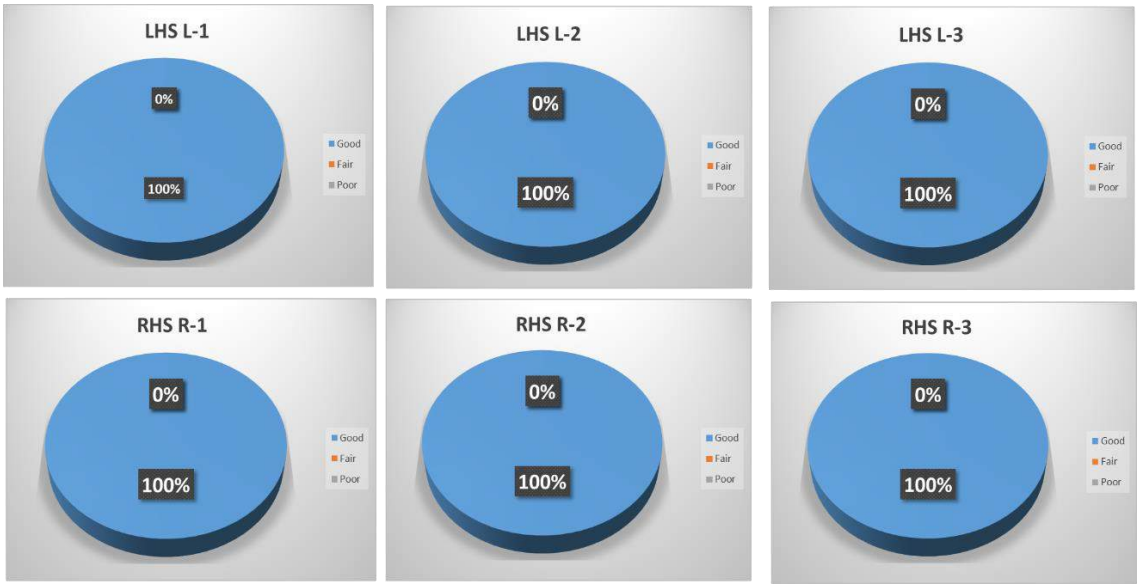
Vijayawada-Chilakaluripet (Km 355+000 to Km 437+500)

LHS

Criteria Rutting (mm)	Condition	LHS					
		L-1		L-2		L-3	
		Km	%	Km	%	Km	%
Less than 5 mm	Good	69.41	100.00%	69.41	100.00%	69.41	100.00%
5mm to 10 mm	Fair	0.00	0.00%	0.00	0.00%	0.00	0.00%
More than 10 mm	Poor	0.00	0.00%	0.00	0.00%	0.00	0.00%
Total		69.408	100%	69.408	100%	69.408	100%

RHS

Criteria Rutting (mm)	Condition	RHS					
		R-1		R-2		R-3	
		Km	%	Km	%	Km	%
Less than 5 mm	Good	69.41	100.00%	69.41	100.00%	69.41	100.00%
5mm to 10 mm	Fair	0.00	0.00%	0.00	0.00%	0.00	0.00%
More than 10 mm	Poor	0.00	0.00%	0.00	0.00%	0.00	0.00%
Total		69.408	100%	69.408	100%	69.408	100%



In LHS, 100% of the Project Stretch has a Rutting value in Good condition, whereas 0.00% of the Project Stretch is in Fair condition. And 0% of the project stretch is in Poor condition.

In RHS, 100.00% of the Project Stretch has a Rutting value in Good condition, whereas 0.00% of the Project Stretch is in Fair condition. And 0% of the project stretch is in Poor condition.

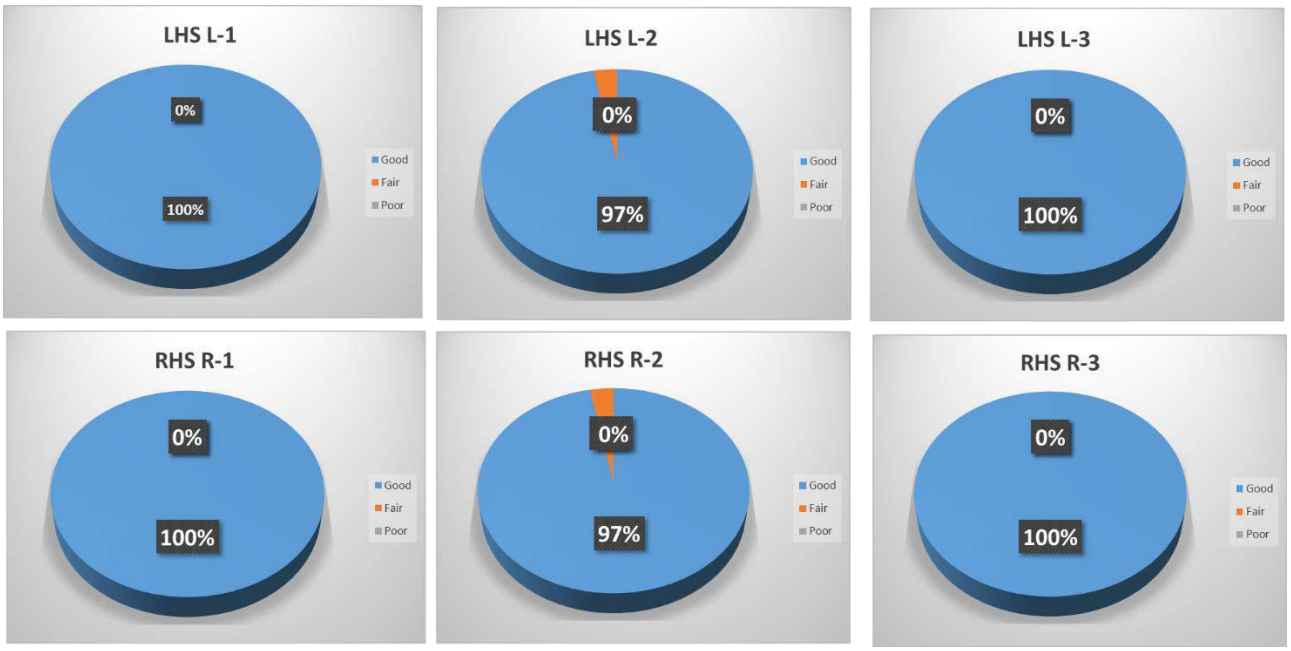
Chennai Bypass (Km 0+000 to Km 32+600)

LHS

Criteria Rutting (mm)	Condition	LHS					
		L-1		L-2		L-3	
		Km	%	Km	%	Km	%
Less than 5 mm	Good	32.60	100.00%	31.60	96.93%	32.60	100.00%
5mm to 10 mm	Fair	0.00	0.00%	1.00	3.07%	0.00	0.00%
More than 10 mm	Poor	0.00	0.00%	0.00	0.00%	0.00	0.00%
Total		32.600	100%	32.600	100%	32.600	100%

RHS

Criteria Rutting (mm)	Condition	RHS					
		R-1		R-2		R-3	
		Km	%	Km	%	Km	%
Less than 5 mm	Good	32.60	100.00%	31.60	96.93%	32.60	100.00%
5mm to 10 mm	Fair	0.00	0.00%	1.00	3.07%	0.00	0.00%
More than 10 mm	Poor	0.00	0.00%	0.00	0.00%	0.00	0.00%
Total		32.600	100%	32.600	100%	32.600	100%



In LHS, 98.98% of the Project Stretch has a Rutting value in Good condition, whereas 1.02% of the Project Stretch is in Fair condition. And 0% of the project stretch is in Poor condition.

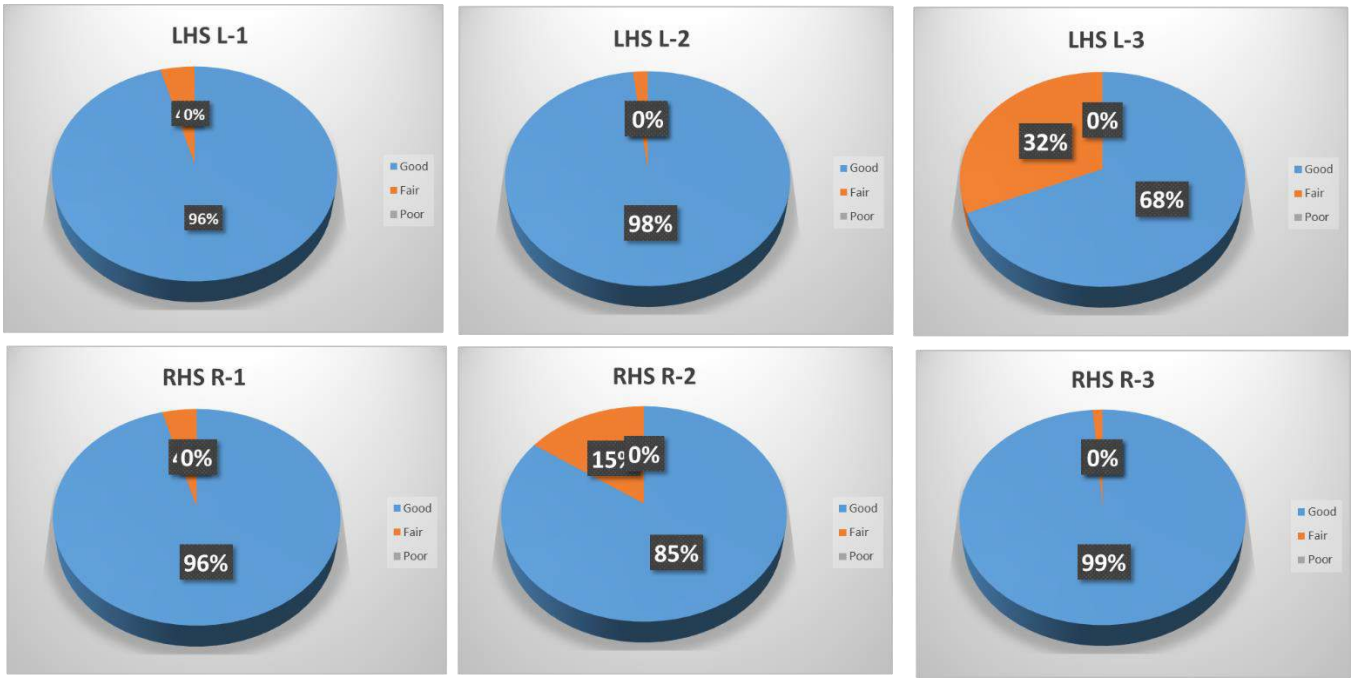
In RHS, 98.98% of the Project Stretch has a Rutting value in Good condition, whereas 1.02% of the Project Stretch is in Fair condition. And 0% of the project stretch is in Poor condition. **Chennai Tada (Km 21+400 to Km 54+400)**

LHS

Criteria Rutting(mm)	Condition	LHS					
		L-1		L-2		L-3	
		Km	%	Km	%	Km	%
Less than 5 mm	Good	31.60	95.76%	32.40	98.18%	22.60	68.48%
5mm to 10 mm	Fair	1.40	4.24%	0.60	1.82%	10.40	31.52%
More than 10 mm	Poor	0.00	0.00%	0.00	0.00%	0.00	0.00%
Total		33.00	100%	33.00	100%	33.00	100%

RHS

Criteria Rutting(mm)	Condition	RHS					
		R-1		R-2		R-3	
		Km	%	Km	%	Km	%
Less than 5 mm	Good	31.60	95.76%	28.00	84.85%	32.60	98.79%
5mm to 10 mm	Fair	1.40	4.24%	5.00	15.15%	0.40	1.21%
More than 10 mm	Poor	0.00	0.00%	0.00	0.00%	0.00	0.00%
Total		33.00	100%	33.00	100%	33.00	100%



In LHS, 87.47 % of the Project Stretch has a Rutting value in Good condition, whereas 12.53% of the Project Stretch is in Fair condition. And 0.0% of the project stretch is in Poor condition.

In RHS, 93.13 % of the Project Stretch has a Rutting value in Good condition, whereas 6.87% of the Project Stretch is in Fair condition. And 0.0% of the project stretch is in Poor condition.

7.4 Crust Composition and Evaluation of Pavement Material Properties

Pavements are layered structure comprising of combination of materials to carry traffic in a given climate over the existing soil conditions for a specified time interval. These materials, their associated properties, and their interactions determine properties of the resultant pavement. Therefore, a good understanding of these materials, how they are characterized, and how they perform is fundamental for understanding pavement behaviour and deterioration. As part of soils and materials investigations report preparation, soils and materials investigation was conducted. Also, analysis of sub grade soil properties along the project corridor as well as investigation on sources of available construction materials from quarries/crushers for the proposed construction works was carried out.

The schedule of testing covered the gamut of investigations in lights of Terms of Reference (TOR) includes the following. Investigation for Road Works: The investigations are carried out to assess the suitability (strength characteristics) of the existing sub-grade soil along the proposed project corridor for assessment.

pavement composition for the partial reconstruction & new construction based on good quality of soil and materials available at reasonable cost.

Investigation for Construction Materials: To ascertain the suitability and availability of quarry materials within a reasonable haulage for construction of sub-base, base and top layers (bituminous/concrete) of the designed pavement.

7.4.1 Field Investigation-Sampling and Testing

As mentioned earlier, Field tests were conducted and samples of soil / construction materials were collected from sub grade of existing road and pavement layers and stone metal / sand quarries. Table has also been presented for the sampling criteria, tests and testing procedures adopted for various field and laboratory tests.

7.4.2 Investigation on Existing Pavement of Subgrade

The Sub grade investigations were carried out to know the strength properties of the existing soil. Visual inspection of the existing pavement condition was carried out prior to commencement of subgrade investigation work. The general testing scheme of existing road will indicate testing of at least three sub grade soil samples for each homogeneous road segment or three samples for each soil type encountered, whichever is more. It was ensured to dig sub grade strength test pits at every 5.0km (or) less on the project alignment, even though same soil strata encountered on lengthy homogeneous
sections, while collecting samples. The various in-situ tests conducted and laboratory tests included in the testing program on soil samples along the alignment as per the project requirements are summarized in Table below. The pavement composition details (pavement course, material type, and thickness) are also recorded at every test pit.

Dynamic Cone Penetration Test

Dynamic Cone Penetration (DCP) tests were conducted at sub grade strength test pit locations to assess in-situ California Bearing Ratio (CBR) on existing alignment soil, which will be below subgrade level. The CBR value was calculated based on different

soil layers encountered. The slope change in the graph (Penetration vs Number of Blows) indicates the interface of two layers of different penetration resistance. From the graph, thickness of layer and slope (penetration mm / blow) were

calculated. The following IRC: 37-2012 equation has been used to calculate the layer DCP-CBR value for each layer:

$Log10CBR = 2.465 – 1.12 \log10N$

Dynamic Cone Penetration test results showing penetration of cone in cm and number of blows at each pit is plotted; DCP-CBR is calculated and given in Volume-II. The summary is included in Table.

Table 7-3 : Test Result CBR Value using DCPT

Section-01 Vijayawada-Chilakaluripet

S. No	Chainage (km)	Side (RHS/LHS)	DCP-CBR (%)
1	3+660	RHS	10%
2	10+060	RHS	20%
3	10+900	RHS	15%
4	13+660	LHS	11%
5	14+320	RHS	20%
6	42+100	LHS	9%
7	355+900	LHS	9%
8	356+100	RHS	11%
9	372+800	RHS	13%
10	373+200	LHS	8%
11	376+600	RHS	11%
12	377+700	LHS	6%
13	379+100	RHS	10%
14	380+000	LHS	8%.
15	380+000	LHS	18%
16	380+600	RHS	6%
17	381+100	RHS	11%.
18	382+100	LHS	9%
19	382+300	LHS	6%
20	382+620	RHS	15%
21	383+100	RHS	11%
22	384+800	LHS	6%
23	384+900	LHS	7%
24	386+900	RHS	13%
25	390+900	RHS	30%
26	392+900	LHS	8%
27	393+400	RHS	11%

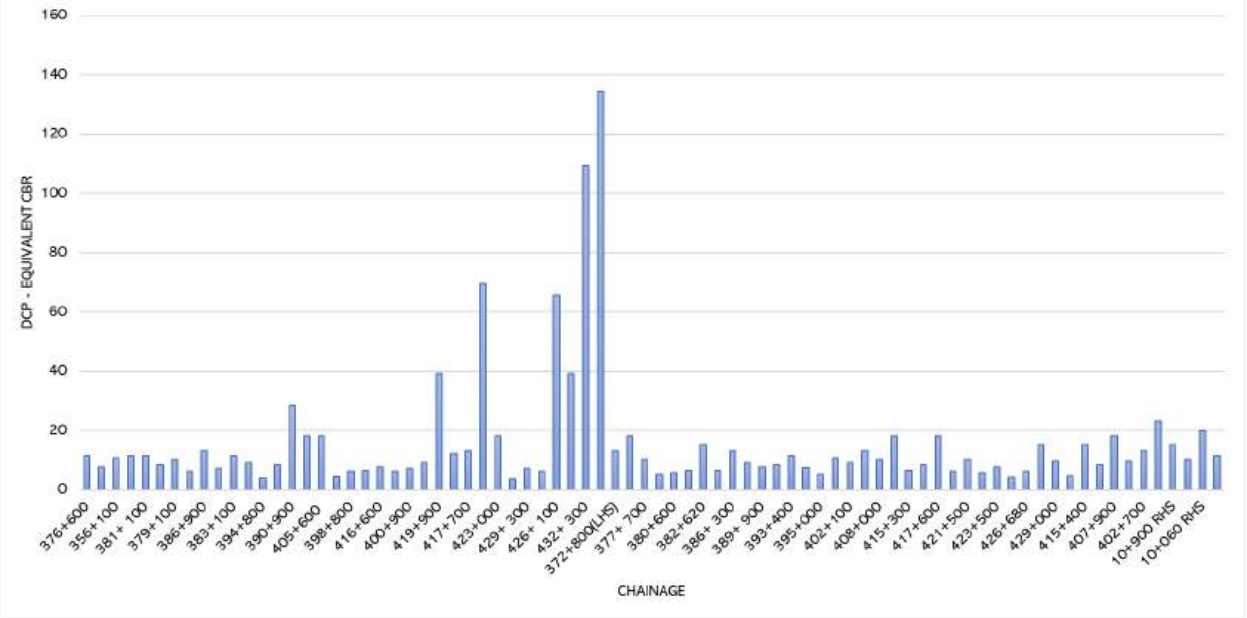
S. No	Chainage (km)	Side (RHS/LHS)	DCP-CBR (%)
28	394+550	LHS	7%
29	394+800	RHS	4%
30	395+000	RHS	5%
31	396+400	LHS	6%
32	398+140	LHS	10%
33	398+800	RHS	6%
34	400+900	RHS	7%
35	402+100	RHS	9%
36	402+700	RHS	13%
37	403+800	LHS	13%
38	403+900	LHS	4.40%
39	405+600	RHS	18%
40	407+100	LHS	10%
41	407+900	RHS	18%
42	408+000	RHS	10%
43	408+900	LHS	18%
44	409+500	LHS	8%
45	410+950	LHS	6%
46	415+300	RHS	6%
47	415+400	RHS	15%
48	416+550	LHS	8%
49	416+600	RHS	8%
50	417+600	RHS	18%
51	417+700	RHS	13%
52	418+700	LHS	6%
53	418+750	LHS	12%
54	419+900	RHS	40%
55	421+500	RHS	10%
56	422+500	LHS	3.70%
56	422+500	LHS	6%

Section-03 Chennai-Tada

S. No	Chainage (km)	Side (RHS/LHS)	DCP-CBR (%)
1	54+350	LHS	60%
2	54+350	RHS	15%

The field investigation photographs are presented in Figure and the graphical representation of DCP-CBR is presented in Figure.

Section-01 Vijayawada Chilakaluripet



Section-03 Chennai-Tada

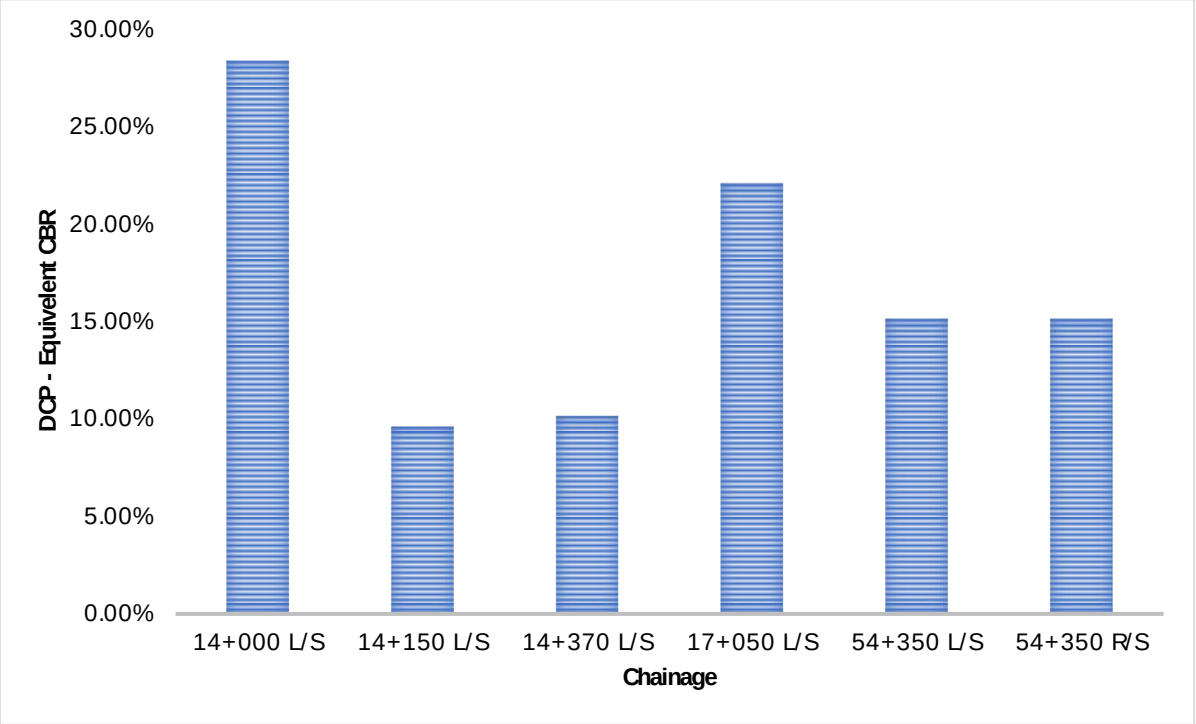


Figure 7-2 : Illustrative Summary of DCP-CBR

Laboratory Tests and Results

The laboratory testing for sub grade includes:

- Characterization (Grain size, Atterberg limits and free Swell Index) at each of the subgrade strength test pit
- Laboratory moisture-density characteristics
- 4-day soaked CBR test

About 50kg of soil sample was collected in damp proof bag (s) from each test pit from each sub grade strength test pit for testing purposes. The details like location / chain age & other identification mark were recorded for the sample bags and double packed with care so that no damage would occur while transporting to the laboratory for conducting the tests as indicated in Table.

Table 7-4 : Test Results of Soil Layer

Section-01 Vijayawada-Chilakaluripet

S. No.	Ch. (Km.)	Gradation: Percent by weight passing through the sieve (IS:2720-IV)			Clay & Silt Content (%)	Atterberg Limits (IS:2720-Pt-V)			Modified Proctor Test (IS: 2720-Pt-VIII)		In-situ Density		4-Days Soaked CBR (%)	Free Swell Index	Degree of Compaction (%)
		Gravel (%)	Sand (%)	Clay & Silt Content (%)		Liquid Limit (LL) (%)	Plastic Limit (PL) (%)	Plasticity Index (PI)	Max. dry density (gm/cc.)	OMC (%)	FDD (gm/cc)	FMC (%)			
1	3	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1	419+900	19.8	64.3	15.9	15.9	27.89	5.67	22.22	1.87	10.85	1.88	3	9.17	11	98.95
2	410+950	16.8	55.7	27.5	27.5	30.86	6.42	24.44	1.91	10.78	1.89	6.5	12.33	10.5	99.47
3	403+900	20.9	51.7	27.4	27.4	29.26	5.45	23.81	1.93	10.71	1.85	9	10.51	9	97.36
4	394+800	15.8	46.6	37.6	37.6	27.61	3.17	24.44	1.89	10.83	1.88	12	11.86	11	98.94
5	384+900	14.1	63.6	22.3	22.3	20.92	3.78	17.14	1.9	10.88	1.89	7	9.48	9.5	99.47
6	372+800	8.1	57.8	34.1	34.1	20.9	2.38	18.52	1.89	10.99	1.83	4	9.01	11	96.31
7	377+700	10.9	70.4	18.7	18.7	22.5	7.69	14.81	1.97	10.79	1.85	10	12.33	13	97.36
8	386+300	9.9	68.7	21.4	21.4	24.82	4.73	20.09	1.96	10.8	1.88	9	9.48	12.5	98.94
9	395+800	14.3	68.2	17.5	17.5	22.67	6.1	16.57	1.95	10.92	1.85	7	9.01	13.5	97.37
10	408+000	9.6	59	31.4	31.4	25	5.25	19.75	1.92	10.85	1.89	8	9.78	9	99.47
11	416+550	18.8	62.6	18.6	18.6	21.82	5.43	16.39	1.88	10.87	1.87	8	8.54	9.5	98.42
12	425+100	16.9	66.3	16.8	16.8	22.65	4.19	18.46	1.9	10.83	1.87	10	9.92	10.5	98.42

Observations and Conclusions:

From the above table, the degree of compaction along the project corridor is ranging between 86.84% to 99.47% with an average value of 97.26 % and the 4-days soaked CBR is ranging from 8.54% to 13.28% with an average value of 10.375%.

Section-03 Chennai-Tada

S. No.	Ch.	Gradation: Percent by weight passing through the sieve (IS:2720-IV)			Clay & Silt Content	Atterberg Limits (IS:2720-Pt-V)			Modified Proctor Test (IS: 2720-Pt-VIII)		In-situ Density		4-Days Soaked CBR (%)	Free Swell Index	Degree of Compaction (%)
		Gravel (%)	Sand (%)	Clay & Silt Content (%)		Liquid Limit (LL) (%)	Plastic Limit (PL) (%)	Plasticity Index (PI)	Max. dry density (gm/cc.)	OMC (%)	FDD (gm/cc)	FMC (%)			
1	3	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1	54+350	17.1	55.4	27.5	27.5	28	2.34	25.66	1.93	10.73	1.89	3	9.96	8.33	99.48
2	54+350	11.9	46.6	41.5	41.5	24.24	2.62	21.62	1.86	10.79	1.85	2	10.43	20	97.36

Observations and Conclusions:

From the above table, the degree of compaction along the project corridor is ranging between 93.16% to 99.48% with an average value of 97.28 % and the 4-days soaked CBR is ranging from 9.48% to 10.91% with an average value of 10.18%.

7.4.3 Existing Pavement Composition and Analysis

Existing pavement composition (pavement course, material type, and thickness) was recorded at every sub grade strength test pit dug at an interval of 500m along the Project Stretch.

The summary of existing pavement crust thickness is presented in following figure and table.

Table 7-5 : Crust Composition

Section-01 Vijayawada-Chilakaluripet

S.No	Chainage (Km.)	Side (LHS/RHS)	Existing Crust details	
			Biuminous layer (BC+DBM) (mm)	Granular Layer (mm)
1	0+558	LHS	150	433
2	0+576	RHS	165	454

S.No	Chainage (Km.)	Side (LHS/RHS)	Existing Crust details	
			Biuminous layer (BC+DBM) (mm)	Granular Layer (mm)
3	1+018	LHS	150	433
4	1+160	RHS	183	442
5	1+166	RHS	169	430
6	1+615	LHS	158	458
7	1+679	RHS	161	439
8	1+757	RHS	174	440
9	2+173	LHS	150	452
10	2+211	RHS	167	454
11	2+247	RHS	176	468
12	2+640	LHS	154	459
13	2+791	RHS	155	470
14	2+846	RHS	177	440
15	3+145	LHS	170	468
16	3+231	RHS	170	455
17	3+674	RHS	152	451
18	3+679	LHS	161	452
19	4+245	RHS	161	449
20	4+268	LHS	160	447
21	4+713	LHS	157	434
22	4+756	RHS	161	459
23	5+156	LHS	151	448
24	5+215	RHS	163	443
25	5+669	RHS	164	436
26	5+681	LHS	160	462
27	6+186	RHS	151	446
28	6+278	LHS	161	463
29	6+690	RHS	160	442
30	6+733	LHS	167	459
31	7+213	RHS	163	457
32	7+301	LHS	159	466
33	7+782	RHS	165	454
34	7+855	LHS	151	431
35	8+323	RHS	151	457
36	8+438	LHS	168	437
37	8+779	RHS	151	449

S.No	Chainage (Km.)	Side (LHS/RHS)	Existing Crust details	
			Biuminous layer (BC+DBM) (mm)	Granular Layer (mm)
38	9+001	LHS	155	454
39	9+265	RHS	155	436
40	9+452	LHS	161	470
41	9+803	RHS	160	461
42	9+984	LHS	161	466
43	10+295	RHS	159	457
44	10+524	LHS	170	454
45	10+820	RHS	152	456
46	11+033	LHS	166	460
47	11+321	RHS	161	468
48	11+600	LHS	162	464
49	11+853	RHS	170	457
50	12+041	LHS	151	459
51	12+440	RHS	167	433
52	12+596	LHS	156	445
53	12+917	RHS	164	457
54	13+124	LHS	153	451
55	13+372	RHS	160	468
56	13+689	LHS	162	469
57	13+888	RHS	154	455
58	14+260	LHS	162	439
59	14+383	RHS	167	430
60	14+846	LHS	164	437
61	14+914	RHS	157	469
62	15+343	LHS	156	455
63	15+415	RHS	158	432
64	15+919	LHS	166	462
65	355+000	LHS	170	469
66	355+000	RHS	173	438
67	355+452	LHS	172	444
68	355+995	LHS	184	431
69	356+462	LHS	184	437
70	356+927	LHS	179	434
71	377+200	LHS	183	463
72	377+200	RHS	172	437

S.No	Chainage (Km.)	Side (LHS/RHS)	Existing Crust details	
			Biuminous layer (BC+DBM) (mm)	Granular Layer (mm)
73	377+720	RHS	184	445
74	377+747	LHS	173	435
75	378+204	LHS	177	450
76	378+283	RHS	179	456
77	378+778	LHS	183	462
78	378+867	RHS	189	446
79	379+284	LHS	189	432
80	379+401	RHS	179	443
81	379+826	LHS	174	445
82	379+871	RHS	185	455
83	380+281	LHS	185	449
84	380+332	RHS	176	435
85	380+811	RHS	189	434
86	380+834	LHS	180	453
87	381+299	RHS	177	445
88	381+318	LHS	173	438
89	381+839	RHS	176	444
90	381+869	LHS	176	438
91	382+319	RHS	188	459
92	382+363	LHS	190	451
93	382+761	RHS	188	463
94	382+895	LHS	190	452
95	383+329	RHS	179	452
96	383+466	LHS	181	459
97	383+776	RHS	190	441
98	383+911	LHS	185	435
99	384+326	RHS	172	436
100	384+471	LHS	180	451
101	384+799	RHS	181	436
102	385+058	LHS	187	452
103	385+363	RHS	170	466
104	385+596	LHS	176	437
105	385+819	RHS	181	469
106	386+107	LHS	177	439
107	386+343	RHS	188	459

S.No	Chainage (Km.)	Side (LHS/RHS)	Existing Crust details	
			Biuminous layer (BC+DBM) (mm)	Granular Layer (mm)
108	386+574	LHS	175	461
109	386+898	RHS	183	463
110	387+154	LHS	170	441
111	387+479	RHS	182	447
112	387+661	LHS	180	436
113	388+002	RHS	187	466
114	388+148	LHS	183	432
115	388+488	RHS	171	431
116	388+631	LHS	188	456
117	389+069	RHS	170	462
118	389+075	LHS	179	466
119	389+555	LHS	183	447
120	389+593	RHS	178	447
121	390+078	LHS	186	448
122	390+161	RHS	188	463
123	390+676	LHS	186	430
124	390+678	RHS	176	445
125	391+216	LHS	188	431
126	391+234	RHS	179	454
127	391+774	LHS	175	458
128	391+829	RHS	179	460
129	392+239	LHS	180	440
130	392+375	RHS	173	446
131	392+803	LHS	180	430
132	392+850	RHS	182	456
133	393+358	LHS	182	467
134	393+378	RHS	182	441
135	393+841	RHS	176	435
136	393+954	LHS	174	436
137	394+380	RHS	173	432
138	394+502	LHS	177	462
139	394+883	RHS	186	459
140	394+971	LHS	180	431
141	395+442	RHS	174	444
142	395+471	LHS	177	442

S.No	Chainage (Km.)	Side (LHS/RHS)	Existing Crust details	
			Biuminous layer (BC+DBM) (mm)	Granular Layer (mm)
143	395+913	RHS	171	451
144	396+054	LHS	183	470
145	396+422	RHS	183	432
146	396+583	LHS	182	445
147	397+007	RHS	173	445
148	397+160	LHS	180	446
149	397+541	RHS	177	434
150	397+724	LHS	190	466
151	398+043	RHS	188	455
152	398+309	LHS	176	459
153	398+626	RHS	177	437
154	398+774	LHS	187	438
155	399+225	RHS	171	435
156	399+302	LHS	179	448
157	399+795	RHS	178	463
158	399+801	LHS	178	454
159	400+303	RHS	187	452
160	400+400	LHS	180	461
161	400+805	RHS	188	461
162	400+931	LHS	187	439
163	401+289	RHS	185	437
164	401+407	LHS	181	458
165	401+744	RHS	177	460
166	401+880	LHS	179	430
167	402+321	RHS	184	457
168	402+342	LHS	184	457
169	402+791	RHS	188	461
170	402+829	LHS	179	465
171	403+365	RHS	190	438
172	403+397	LHS	174	449
173	403+853	LHS	184	450
174	403+923	RHS	172	463
175	404+407	RHS	188	444
176	404+424	LHS	184	432
177	404+934	RHS	183	459

S.No	Chainage (Km.)	Side (LHS/RHS)	Existing Crust details	
			Biuminous layer (BC+DBM) (mm)	Granular Layer (mm)
178	404+975	LHS	180	462
179	405+438	RHS	182	438
180	405+513	LHS	183	440
181	405+932	RHS	179	430
182	406+034	LHS	183	466
183	406+384	RHS	181	446
184	406+497	LHS	179	441
185	406+878	RHS	189	437
186	406+997	LHS	180	456
187	407+441	RHS	189	446
188	407+546	LHS	171	431
189	408+019	RHS	174	460
190	408+064	LHS	188	447
191	408+531	RHS	183	437
192	408+644	LHS	174	454
193	408+989	RHS	176	452
194	409+096	LHS	187	448
195	409+477	RHS	177	455
196	409+632	LHS	177	437
197	409+951	RHS	185	438
198	410+097	LHS	189	435
199	410+423	RHS	172	469
200	410+563	LHS	188	439
201	410+925	RHS	185	445
202	411+087	LHS	190	463
203	411+422	RHS	177	447
204	411+638	LHS	178	435
205	411+960	RHS	179	470
206	412+141	LHS	178	446
207	412+560	RHS	178	468
208	412+693	LHS	172	457
209	413+001	RHS	178	452
210	413+290	LHS	182	461
211	413+598	RHS	180	445
212	413+766	LHS	174	450

S.No	Chainage (Km.)	Side (LHS/RHS)	Existing Crust details	
			Biuminous layer (BC+DBM) (mm)	Granular Layer (mm)
213	414+184	RHS	172	447
214	414+219	LHS	183	438
215	414+686	LHS	174	434
216	414+758	RHS	181	442
217	415+192	LHS	189	461
218	415+278	RHS	182	435
219	415+665	LHS	173	469
220	415+819	RHS	171	443
221	416+144	LHS	177	435
222	416+383	RHS	184	438
223	416+592	LHS	188	463
224	416+974	RHS	186	432
225	417+136	LHS	172	462
226	417+470	RHS	189	465
227	417+716	LHS	175	453
228	418+065	RHS	178	469
229	418+173	LHS	185	460
230	418+543	RHS	177	464
231	418+654	LHS	185	456
232	419+034	RHS	182	464
233	419+206	LHS	179	436
234	419+579	RHS	174	448
235	419+716	LHS	183	448
236	420+066	RHS	186	446
237	420+160	LHS	178	440
238	420+631	RHS	189	454
239	420+749	LHS	172	459
240	421+073	RHS	176	446
241	421+276	LHS	172	450
242	421+518	RHS	179	440
243	421+827	LHS	186	463
244	422+046	RHS	172	462
245	422+279	LHS	185	441
246	422+600	RHS	170	453

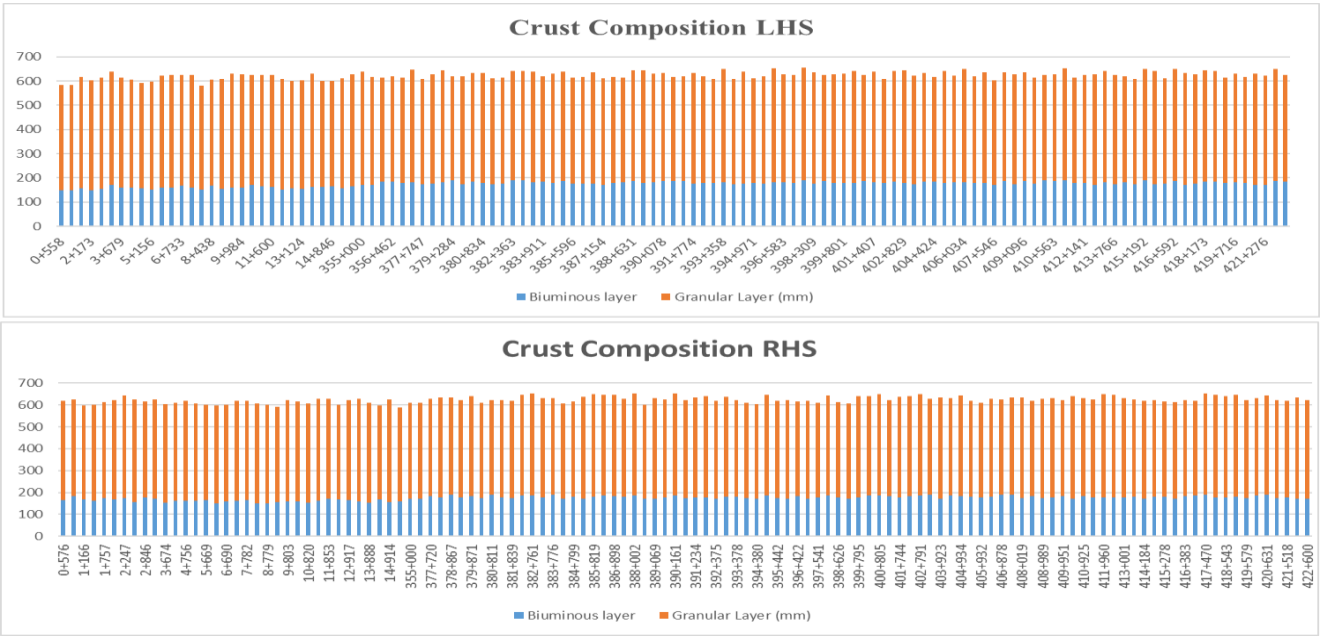


Figure 7-3 : Existing Crust composition

The Flexible pavement composition comprises of Bituminous Layer, Granular Layer-I (WMM) and Granular Layer-II (GSB) on subgrade with average of 175 mm thick bituminous layer over 450 mm thick Granular layer

Crust Composition

Section-02 Chennai Bypass

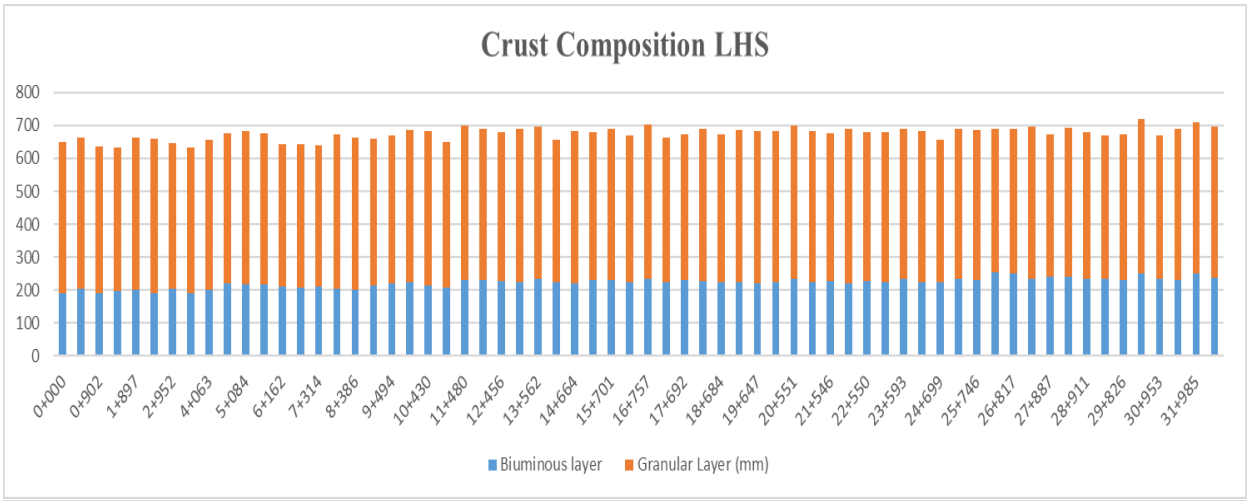
S.No	Chainage (Km.)	Side (LHS/RHS)	Existing Crust details	
			Biuminous layer (BC+DBM) (mm)	Granular Layer (mm)
1	0+000	RHS	186	435
2	0+453	LHS	203	459
3	0+484	RHS	192	449
4	0+902	LHS	192	444
5	1+078	RHS	196	432
6	1+356	LHS	198	435
7	1+662	RHS	204	441
8	1+897	LHS	200	463
9	2+110	RHS	199	463
10	2+353	LHS	192	468
11	2+677	RHS	204	457

S.No	Chainage (Km.)	Side (LHS/RHS)	Existing Crust details	
			Biuminous layer (BC+DBM) (mm)	Granular Layer (mm)
12	2+952	LHS	203	444
13	3+214	RHS	186	445
14	3+493	LHS	190	443
15	3+677	RHS	198	453
16	4+063	LHS	200	456
17	4+209	RHS	203	443
18	4+585	LHS	220	456
19	4+679	RHS	225	438
20	5+084	LHS	217	467
21	5+250	RHS	201	446
22	5+638	LHS	218	457
23	5+806	RHS	216	463
24	6+162	LHS	210	432
25	6+405	RHS	219	447
26	6+725	LHS	208	434
27	6+996	RHS	219	466
28	7+314	LHS	211	430
29	7+525	RHS	219	452
30	7+837	LHS	204	469
31	8+098	RHS	205	469
32	8+386	LHS	202	462
33	8+592	RHS	214	452
34	8+983	LHS	214	444
35	9+084	RHS	215	468
36	9+494	LHS	219	452
37	9+524	RHS	207	443
38	9+947	LHS	225	462
39	10+100	RHS	200	438
40	10+430	LHS	215	468
41	10+682	RHS	221	460
42	10+882	LHS	206	445
43	11+167	RHS	215	448
44	11+480	LHS	232	466
45	11+643	RHS	226	466
46	12+007	LHS	232	456

S.No	Chainage (Km.)	Side (LHS/RHS)	Existing Crust details	
			Biuminous layer (BC+DBM) (mm)	Granular Layer (mm)
47	12+189	RHS	235	455
48	12+456	LHS	226	455
49	12+721	RHS	220	445
50	13+029	LHS	225	463
51	13+177	RHS	226	441
52	13+562	LHS	235	462
53	13+728	RHS	223	452
54	14+075	LHS	225	432
55	14+218	RHS	233	447
56	14+664	LHS	221	462
57	14+788	RHS	227	439
58	15+109	LHS	231	448
59	15+386	RHS	221	465
60	15+701	LHS	231	458
61	15+917	RHS	227	448
62	16+187	LHS	223	448
63	16+401	RHS	227	435
64	16+757	LHS	235	468
65	16+906	RHS	234	465
66	17+225	LHS	223	441
67	17+371	RHS	233	454
68	17+692	LHS	231	442
69	17+841	RHS	223	459
70	18+133	LHS	227	464
71	18+441	RHS	225	450
72	18+684	LHS	225	447
73	18+927	RHS	226	454
74	19+187	LHS	223	462
75	19+522	RHS	225	441
76	19+647	LHS	220	464
77	20+028	RHS	234	464
78	20+110	LHS	223	461
79	20+551	LHS	233	468
80	20+557	RHS	223	469
81	21+002	LHS	224	460

S.No	Chainage (Km.)	Side (LHS/RHS)	Existing Crust details	
			Biuminous layer (BC+DBM) (mm)	Granular Layer (mm)
82	21+009	RHS	229	440
83	21+531	RHS	231	441
84	21+546	LHS	228	449
85	21+975	RHS	233	462
86	22+081	LHS	220	468
87	22+479	RHS	229	463
88	22+550	LHS	226	453
89	23+061	LHS	224	457
90	23+066	RHS	220	439
91	23+593	LHS	235	456
92	23+652	RHS	226	434
93	24+100	RHS	235	441
94	24+142	LHS	224	460
95	24+695	RHS	233	448
96	24+699	LHS	223	433
97	25+137	RHS	229	454
98	25+269	LHS	233	455
99	25+680	RHS	245	433
100	25+746	LHS	231	455
101	26+200	RHS	246	466
102	26+218	LHS	254	434
103	26+754	RHS	246	441
104	26+817	LHS	250	441
105	27+326	LHS	234	463
106	27+331	RHS	232	463
107	27+887	LHS	239	434
108	27+901	RHS	248	446
109	28+348	RHS	243	446
110	28+356	LHS	241	451
111	28+845	RHS	239	461
112	28+911	LHS	233	447
113	29+322	RHS	252	455
114	29+356	LHS	233	437
115	29+826	LHS	230	444
116	29+876	RHS	237	438

S.No	Chainage (Km.)	Side (LHS/RHS)	Existing Crust details	
			Biuminous layer (BC+DBM) (mm)	Granular Layer (mm)
117	30+330	RHS	244	445
118	30+416	LHS	249	469
119	30+906	RHS	239	431
120	30+953	LHS	235	435
121	31+374	RHS	235	431
122	31+402	LHS	231	458
123	31+946	RHS	232	440
124	31+985	LHS	250	461
125	32+000	RHS	247	467
126	32+100	RHS	235	443
127	32+515	LHS	236	461



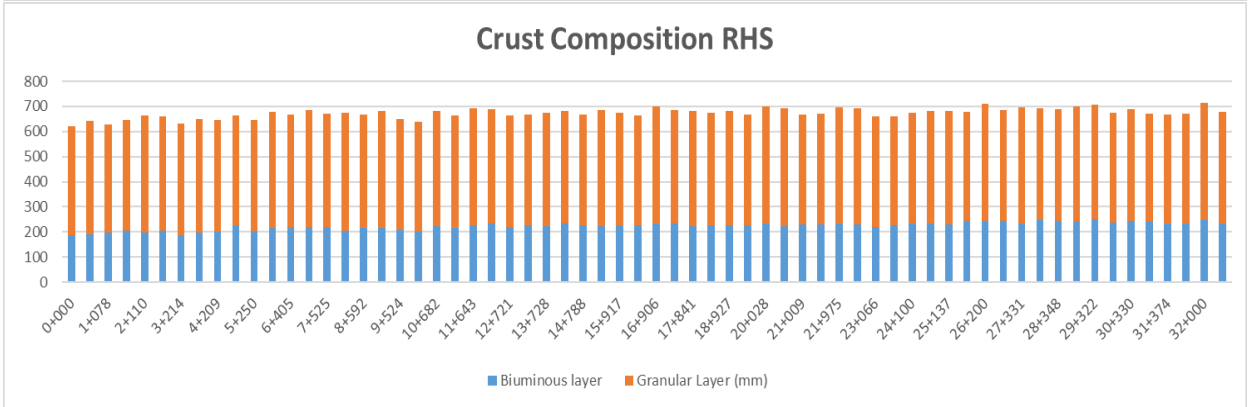


Figure 7-4 : Existing Crust composition

The Flexible pavement composition comprises of Bituminous Layer, Granular Layer-I (WMM) and Granular Layer-II (GSB) on subgrade with average of 220 mm thick bituminous layer over 450 mm thick Granular layer

Crust Composition

Section-03 Chennai-Tada

S.No	Chainage (Km.)	Side (LHS/RHS)	Existing Crust details	
			Biuminous layer (BC+DBM) (mm)	Granular Layer (mm)
1	21+590	LHS	179	436
2	21+825	RHS	188	451
3	22+075	LHS	179	435
4	22+382	RHS	187	457
5	22+528	LHS	176	449
6	22+969	RHS	187	435
7	23+107	LHS	179	453
8	23+445	RHS	178	458
9	23+555	LHS	183	449
10	24+030	RHS	172	459
11	24+118	LHS	177	441
12	24+496	RHS	188	453
13	24+565	LHS	183	452
14	25+037	RHS	170	460
15	25+045	LHS	177	457
16	25+494	LHS	170	455
17	25+609	RHS	187	437
18	25+993	LHS	185	438
19	26+078	RHS	186	445
20	26+524	LHS	181	458
21	26+665	RHS	179	454
22	27+069	LHS	182	455
23	27+177	RHS	188	450
24	27+651	LHS	184	446
25	27+727	RHS	184	447
26	28+230	LHS	173	452
27	28+327	RHS	175	460
28	28+817	LHS	184	452
29	28+917	RHS	181	437
30	29+408	LHS	170	452

S.No	Chainage (Km.)	Side (LHS/RHS)	Existing Crust details	
			Biuminous layer (BC+DBM) (mm)	Granular Layer (mm)
31	29+512	RHS	189	445
32	29+958	LHS	170	438
33	29+981	RHS	187	454
34	30+453	RHS	172	438
35	30+558	LHS	176	452
36	30+964	RHS	185	460
37	31+034	LHS	189	457
38	31+446	RHS	176	455
39	31+474	LHS	183	444
40	31+949	RHS	184	440
41	31+996	LHS	172	458
42	32+533	RHS	170	458
43	32+537	LHS	172	441
44	32+974	RHS	178	444
45	33+070	LHS	175	449
46	33+454	RHS	190	436
47	33+615	LHS	187	450
48	33+937	RHS	180	437
49	34+129	LHS	182	460
50	34+482	RHS	178	453
51	34+604	LHS	180	449
52	35+076	RHS	188	459
53	35+135	LHS	189	449
54	35+574	RHS	182	436
55	35+600	LHS	185	446
56	36+026	RHS	170	451
57	36+111	LHS	182	454
58	36+510	RHS	190	454
59	36+689	LHS	188	447
60	37+054	RHS	177	437
61	37+158	LHS	175	452
62	37+562	RHS	171	447
63	37+620	LHS	173	458
64	38+053	RHS	182	438
65	38+126	LHS	179	438
66	38+613	RHS	180	443

S.No	Chainage (Km.)	Side (LHS/RHS)	Existing Crust details	
			Biuminous layer (BC+DBM) (mm)	Granular Layer (mm)
67	38+626	LHS	189	435
68	39+071	RHS	177	446
69	39+189	LHS	180	449
70	39+550	RHS	186	436
71	39+782	LHS	176	451
72	40+033	RHS	181	446
73	40+312	LHS	188	460
74	40+616	RHS	171	458
75	40+809	LHS	189	455
76	41+080	RHS	174	444
77	41+302	LHS	172	458
78	41+565	RHS	172	455
79	41+814	LHS	183	452
80	42+020	RHS	185	451
81	42+350	LHS	174	449
82	42+505	RHS	173	459
83	42+928	LHS	186	450
84	43+002	RHS	183	455
85	43+450	RHS	180	457
86	43+525	LHS	174	449
87	44+013	RHS	188	448
88	44+124	LHS	175	440
89	44+611	RHS	172	458
90	44+635	LHS	183	445
91	45+128	RHS	174	444
92	45+164	LHS	174	452
93	45+681	RHS	177	435
94	45+698	LHS	181	438
95	46+134	RHS	183	459
96	46+259	LHS	179	445
97	46+589	RHS	178	442
98	46+817	LHS	176	446
99	47+057	RHS	188	449
100	47+368	LHS	183	460
101	47+629	RHS	187	445
102	47+830	LHS	190	440

S.No	Chainage (Km.)	Side (LHS/RHS)	Existing Crust details	
			Biuminous layer (BC+DBM) (mm)	Granular Layer (mm)
103	48+155	RHS	185	455
104	48+425	LHS	175	452
105	48+704	RHS	186	443
106	48+999	LHS	186	456
107	49+176	RHS	182	455
108	49+478	LHS	171	460
109	49+725	RHS	184	460
110	50+052	LHS	172	441
111	50+306	RHS	180	447
112	50+492	LHS	190	460
113	50+787	RHS	173	439
114	50+944	LHS	176	459
115	51+364	RHS	171	445
116	51+399	LHS	174	438
117	51+846	LHS	189	450
118	51+862	RHS	190	451
119	52+431	LHS	182	439
120	52+440	RHS	177	444
121	52+951	RHS	171	446
122	53+025	LHS	185	447
123	53+538	LHS	174	454
124	53+550	RHS	176	440
125	54+096	LHS	170	457
126	54+097	RHS	175	449
127	54+588	LHS	172	447

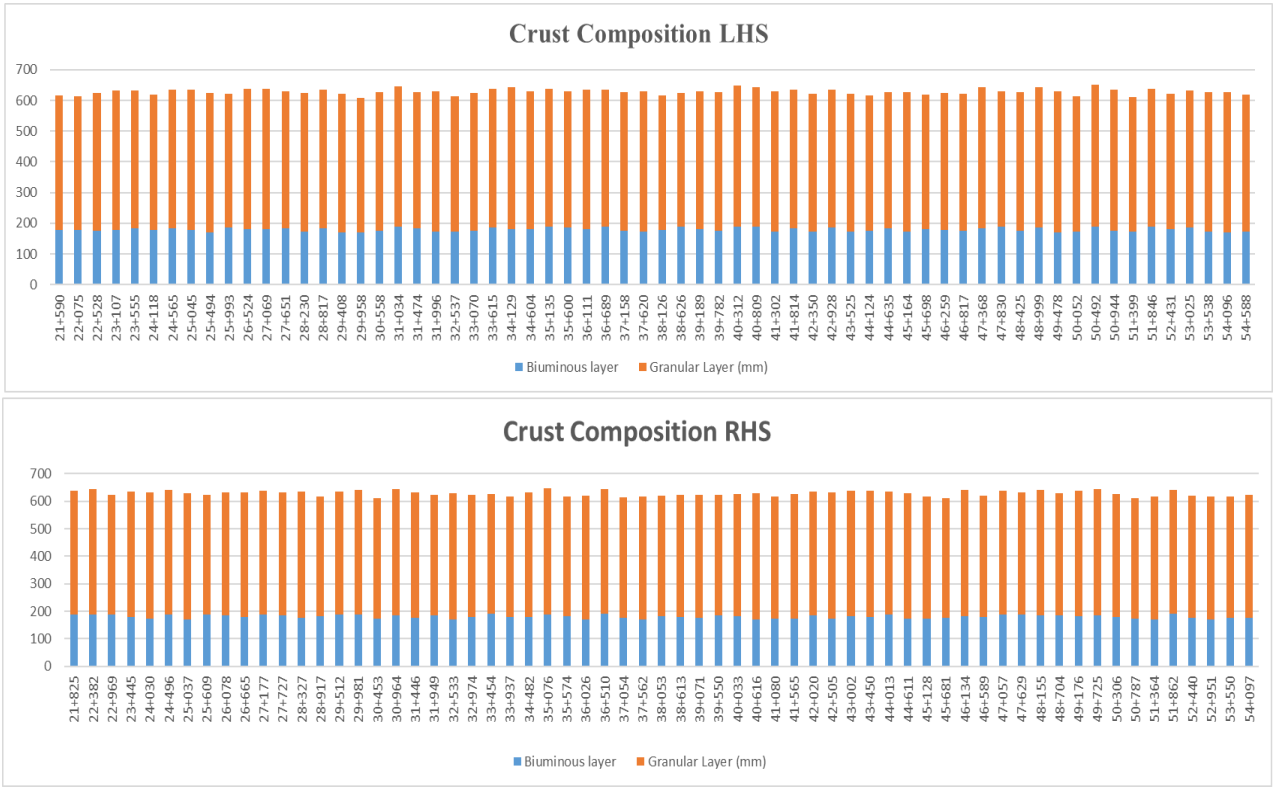


Figure 7-4 : Existing Crust composition

The Flexible pavement composition comprises of Bituminous Layer, Granular Layer-I (WMM) and Granular Layer-II (GSB) on subgrade with average of 180 mm thick bituminous layer over 450 mm thick Granular layer

7.5 Flexible Pavement

Design of flexible pavement uses the concept of layered system. Based on this, flexible pavement may be constructed in a number of layers and the top layer has to be of best quality to sustain maximum compressive stress, in addition to wear and tear. The lower layers will experience lesser magnitude of stress and low quality material can be used. Flexible pavements are constructed using bituminous materials. These can be either in the form of surface treatments (such as bituminous surface treatments generally found on low volume roads) or, asphalt concrete surface courses (generally used on high volume roads such as national highways). Flexible pavement layers reflect the deformation of the lower layers on to the surface layer (e.g., if there is any undulation in sub-grade then it will be transferred to the surface layer). In the case of flexible pavement, the design is based on overall performance of flexible pavement, and the stresses produced should be kept well below the allowable stresses of each pavement layer.

Estimation of Axle Load and Vehicle Damage Factor:

Traffic loading on highway pavements is a heterogeneous combination of different types of vehicles, carrying a wide spectrum of wheel loads. It is very much essential to convert this heterogeneous traffic to an equivalent homogenous traffic in terms of a chosen standard vehicle. One way of achieving this objective is the use of Equivalent Standard Axle Load (ESAL) factors like VDF. The VDF is a multiplier for converting the number of commercial vehicles of different axle loads to the number of standard axle load repetitions. Strengthening of existing pavement is based upon the cumulative number of 8.16 tonne Equivalent Standard Axles (ESA) that will pass over during the design period. The classes of traffic which lead to significant axle loads (or damage) to the pavement and accordingly considered for design are: Light Goods Vehicles, Buses, 2/3 axle Trucks and Multi Axle Vehicles (MAV). VDF are calculated in accordance with the guidelines provided in IRC: 37 –2018.

As per Traffic Consultant Report, the VDF is presented in the table below

Vijayawada-Chilakaluripet (Km 355+000 to Km 437+500)

VDF of Kaza Toll Plaza

Vehicle Category	Vijayawada to Chilakaluripet	Chilakaluripet to Vijayawada
Minibus	0.04	0.05
Standard Bus	1.78	1.49
LCV 4 Wheel	0.06	0.06
LCV 6 Wheel	1.24	0.88
2 Axle Truck	1.74	2.49
3 Axle truck	3.86	6.13
MAV	7.34	8.88

Chennai Bypass (Km 0+000 to Km 32+600)

VDF of Vanagram Toll Plaza

Vehicle Category	Tambaram to Madhavaram	Madhavaram to Tambaram
Minibus	0.05	0.19
Standard Bus	1.28	1.59
LCV 4 Wheel	0.05	0.23

Vehicle Category	Tambaram to Madhavaram	Madhavaram to Tambaram
LCV 6 Wheel	0.71	0.75
2 Axle Truck	1.60	2.00
3 Axle truck	12.72	4.97
MAV	11.67	7.44

VDF of Surapattu Toll Plaza

Vehicle Category	Tambaram to Madhavaram	Madhavaram to Tambaram
Minibus	0.00	0.06
Standard Bus	0.54	0.81
LCV 4 Wheel	0.11	0.33
LCV 6 Wheel	0.70	0.81
2 Axle Truck	1.84	3.00
3 Axle truck	6.83	4.38
MAV	11.02	7.49

Chennai-Tada (Km 21+400 to Km 54+400)

VDF of Nallur Toll Plaza

Vehicle Category	Chennai to Tada	Tada to Chennai
Minibus	0.10	0.00
Standard Bus	1.34	0.92
LCV 4 Wheel	0.05	0.05
LCV 6 Wheel	0.54	0.87
2 Axle Truck	1.31	3.18
3 Axle truck	2.97	3.71
MAV	5.85	9.76

Neelmangla-Tumkur (Km 29+500 to Km 74+168)

VDF of Kulumepalya Toll Plaza

Vehicle Category	Neelmangla to Tumkur	Tumkur to Neelmangla
Minibus	0.18	0.00
Standard Bus	2.47	2.96
LCV 4 Wheel	0.11	0.38
LCV 6 Wheel	0.94	0.99
2 Axle Truck	2.62	2.19
3 Axle truck	9.12	8.79
MAV	9.38	10.07

VDF of Chokkenahalli Toll Plaza

Vehicle Category	Neelmangla to Tumkur	Tumkur to Neelmangla
Minibus	0.17	0.04
Standard Bus	1.52	1.60
LCV 4 Wheel	0.05	0.15
LCV 6 Wheel	0.91	1.36
2 Axle Truck	2.40	2.28
3 Axle truck	4.22	5.49
MAV	6.75	9.40

As mentioned earlier, Axle load surveys of commercial vehicles were carried out to establish VDF for use in calculation of traffic loading on the pavement for pavement design and overlay designs. Since, lighter vehicles have a very small equivalent standard axle load value and less damaging effect, these vehicle types are excluded in the axle load survey. To estimate the ESAL of traffic, Axle Load Surveys were carried out at the toll plaza location. The overloaded vehicles have serious adverse impact on performance of pavement. It has been ascertained that the damaging effect of axles on flexible pavement is approximately proportional to the fourth power of the axle load.

Estimated Design MSA:

The design traffic is considered in terms of the cumulative number of standard axles in both directions of the carriageway during the design life of the road. This can be computed using the following equation:

$$N = \frac{365 \times [(1+r)^n - 1]}{r} \times A \times D \times F$$

where N is the cumulative number of standard axles to be catered for the design in terms of Million Standards Axle (MSA), A is the initial traffic in terms of the number of commercial vehicles per day, D is the lane distribution factors, F is the vehicle damage factor, n is the design life in years, and r is the annual growth rate of commercial vehicles. The traffic in the year of completion is estimated using the following formula:

$$A = P\ (1 + r)\ x$$

Where P is the number of commercial vehicles as per last count, and x is the number of years between the last count and the year of completion between the last count and the year of completion of the project.

As per Traffic Consultant Report, the estimated Design MSA presented in the table below:

Vijayawada-Chilakaluripet (Km 355+000 to Km 437+500)

MSA Calculation of Kaza Toll Plaza

Financial Year	Minibus	Standard Bus	LCV-4	LCV-6	2A	3A	MAV	OSV	Yearly Design ESA	MSA
VDF	0.05	1.78	0.06	1.24	2.49	6.13	8.88	0.00		
FY26	335	2525	755	1307	693	1388	3164	3	48,95,376	5
FY27	351	2583	790	1361	721	1372	3030	4	47,80,960	10
FY28	368	2643	830	1416	750	1344	2786	4	45,63,801	14
FY29	386	2702	871	1500	795	1358	2944	4	47,50,311	19
FY30	406	2764	916	1592	844	1375	3138	4	49,89,773	24
FY31	425	2823	959	1685	893	1391	3335	4	52,31,184	29
FY32	455	2881	1025	1790	949	1408	3567	5	55,25,143	35
FY33	486	2948	1096	1900	1007	1423	3811	5	58,03,534	41
FY34	464	3007	1046	1799	953	1210	3156	5	50,03,306	46
FY35	434	3080	979	1712	907	995	2424	5	41,33,544	50
FY36	464	3137	1046	1683	892	890	2096	6	37,55,692	53
FY37	484	3192	1091	1762	934	897	2255	6	39,39,577	57
FY38	505	3255	1138	1843	976	904	2424	6	41,44,112	62
FY39	525	3308	1184	1925	1020	911	2601	6	43,55,468	66
FY40	547	3294	1233	2009	1065	918	2729	7	45,19,279	70
FY41	620	3316	1397	2067	1095	924	2887	7	46,87,734	75
FY42	647	3368	1460	2157	1143	931	3033	7	48,70,647	80
FY43	676	3427	1524	2249	1192	938	3183	8	50,59,680	85
FY44	706	3480	1592	2346	1243	944	3341	8	52,70,557	90
FY45	738	3532	1663	2446	1296	951	3506	8	54,62,023	96
FY46	763	3586	1721	2542	1347	957	3657	9	56,51,574	101

Chennai Bypass (Km 0+000 to Km 32+600)

MSA Calculation of Vanagram Toll Plaza

Financial Year	Minibus	Standard Bus	LCV-4	LCV-6	2A	3A	MAV	OSV	Yearly Design ESA	MSA
VDF	0.19	1.59	0.23	0.75	2.00	12.72	11.67	0.00		
FY26	1302	2945	747	877	184	551	2008	7	40,64,776	4
FY27	1335	3030	766	918	192	555	2062	7	41,63,851	8
FY28	1370	3118	786	957	201	564	2152	7	43,26,151	13
FY29	1407	3210	808	1004	211	577	2223	7	44,49,234	17

Financial Year	Minibus	Standard Bus	LCV-4	LCV-6	2A	3A	MAV	OSV	Yearly Design ESA	MSA
FY30	1440	3294	826	1026	215	581	2266	8	45,29,398	22
FY31	1472	3422	845	1050	220	585	2368	8	46,93,990	26
FY32	1505	3510	864	1087	228	589	2437	8	48,24,266	31
FY33	1538	3599	883	1132	237	593	2499	8	49,20,037	36
FY34	1569	3681	900	1173	246	597	2555	8	50,18,406	41
FY35	1603	3773	920	1197	251	601	2664	8	51,86,473	46
FY36	1635	3904	938	1242	260	605	2733	8	53,26,096	52
FY37	1648	3939	946	1252	263	606	2765	8	53,62,264	57
FY38	1657	3963	951	1258	264	607	2785	9	53,95,833	62
FY39	1663	3980	954	1267	266	608	2806	9	54,28,060	68
FY40	1666	3988	956	1270	266	608	2813	9	54,54,152	73
FY41	1669	4001	958	1272	267	609	2820	9	54,51,862	79
FY42	1672	4009	959	1276	268	609	2831	9	54,67,902	84
FY43	1674	4016	961	1280	268	609	2840	9	54,81,997	90
FY44	1677	4024	962	1283	269	609	2848	9	55,10,788	95
FY45	1680	4032	964	1287	270	610	2858	9	55,11,180	101
FY46	1683	4044	966	1290	271	610	2866	9	55,23,624	106

MSA Calculation of Surapattu Toll Plaza

Financial Year	Minibus	Standard Bus	LCV-4	LCV-6	2A	3A	MAV	OSV	Yearly Design ESA	MSA
VDF	0.06	0.81	0.33	0.81	3.00	6.83	11.02	0.00		
FY26	1312	265	1478	1078	254	1007	3765	13	57,39,547	6
FY27	1374	273	1548	1114	262	1015	3870	13	58,86,175	12
FY28	1440	281	1623	1140	269	1022	4016	13	60,98,997	18
FY29	1281	289	1444	982	231	875	3441	13	52,18,257	23
FY30	1097	297	1236	805	189	722	2827	14	42,96,572	27
FY31	1142	308	1287	816	192	727	2960	14	44,70,915	32
FY32	1189	316	1340	836	197	732	3049	14	46,04,573	36
FY33	1238	324	1395	861	203	737	3127	15	47,00,302	41
FY34	1283	332	1446	883	208	741	3197	15	47,97,606	46
FY35	1334	340	1503	895	211	746	3339	15	49,84,258	51
FY36	1384	352	1559	918	216	751	3428	15	51,20,155	56
FY37	1434	360	1616	930	219	755	3528	16	52,39,810	61
FY38	1480	367	1668	940	221	759	3618	16	53,59,650	67
FY39	1532	375	1726	964	227	764	3759	16	55,45,333	72
FY40	1584	383	1784	978	230	768	3852	16	56,85,465	78
FY41	1635	395	1843	989	233	772	3955	17	58,06,996	84
FY42	1688	403	1902	1013	238	776	4108	17	60,08,241	90
FY43	1735	410	1955	1034	244	780	4248	17	61,91,876	96
FY44	1784	417	2010	1053	248	784	4370	17	63,71,102	102
FY45	1823	423	2054	1071	252	787	4484	17	65,03,401	109

Financial Year	Minibus	Standard Bus	LCV-4	LCV-6	2A	3A	MAV	OSV	Yearly Design ESA	MSA
FY46	1857	431	2093	1080	254	789	4556	18	65,98,712	115

Chennai-Tada (Km 21+400 to Km 54+400)

MSA Calculation of Nallur Toll Plaza

Financial Year	Minibus	Standard Bus	LCV-4	LCV-6	2A	3A	MAV	OSV	Yearly Design ESA	MSA
VDF	0.10	1.34	0.05	0.87	3.18	3.71	9.76	0.00		
FY26	2135	1048	1224	1876	762	1394	6099	18	77,33,099	8
FY27	2235	1079	1281	1993	810	1423	6538	18	82,49,830	16
FY28	2336	1111	1339	2118	861	1450	7014	18	88,30,779	25
FY29	2444	1145	1401	2255	916	1477	7567	19	94,48,473	34
FY30	2549	1178	1461	2391	972	1502	8123	19	1,00,93,420	44
FY31	2618	1210	1501	2476	1006	1480	8443	19	1,04,52,681	55
FY32	2688	1242	1540	2567	1043	1454	8815	19	1,08,97,951	66
FY33	2791	1276	1600	2704	1099	1453	9296	20	1,14,22,390	77
FY34	2901	1307	1662	2853	1159	1462	9837	20	1,20,47,169	89
FY35	3018	1341	1730	3016	1225	1471	10475	20	1,27,80,457	102
FY36	3134	1373	1796	3177	1291	1481	11085	20	1,35,19,591	115
FY37	3248	1406	1862	3344	1359	1492	11719	21	1,42,11,873	130
FY38	3358	1437	1924	3506	1424	1501	12336	21	1,49,21,671	145
FY39	3473	1469	1990	3677	1494	1511	13001	21	1,56,84,754	160
FY40	3590	1486	2058	3854	1566	1520	13692	21	1,65,20,743	177
FY41	3707	1510	2124	4031	1638	1530	14461	21	1,73,50,347	194
FY42	3755	1535	2152	4104	1668	1534	14781	22	1,77,16,755	212
FY43	3799	1557	2177	4173	1695	1537	15084	22	1,80,62,842	230
FY44	3823	1580	2191	4210	1710	1539	15246	22	1,83,00,241	248
FY45	3835	1602	2198	4228	1718	1540	15329	22	1,83,46,491	267
FY46	3840	1623	2201	4237	1722	1540	15370	23	1,83,96,449	285

Neelmangla-Tumkur (Km 29+500 to Km 74+168)

MSA Calculation of Kulumepalya Toll Plaza

Financial Year	Minibus	Standard Bus	LCV-4	LCV-6	2A	3A	MAV	OSV	Yearly Design ESA	MSA
VDF	0.18	2.96	0.38	0.99	2.62	9.12	10.07	0.00		
FY26	2271	3850	2481	2774	890	1874	4940	25	94,23,785	9
FY27	2358	3986	2577	2951	947	1887	5283	25	99,08,084	19
FY28	2458	4125	2686	3137	1006	1909	5623	26	1,04,30,219	30
FY29	2383	4254	2604	2953	948	1623	4747	27	91,29,996	39
FY30	2288	4400	2500	2735	877	1332	3749	28	77,12,931	47
FY31	2335	4538	2551	2805	900	1288	3757	29	77,40,167	54
FY32	2381	4596	2602	2873	922	1236	3747	30	77,33,030	62

Financial Year	Minibus	Standard Bus	LCV-4	LCV-6	2A	3A	MAV	OSV	Yearly Design ESA	MSA
FY33	2468	4596	2696	3015	967	1238	3908	31	79,28,632	70
FY34	2551	4737	2788	3186	1022	1253	4151	32	83,03,057	78
FY35	2637	4881	2881	3365	1079	1268	4406	33	86,93,984	87
FY36	2721	5021	2973	3543	1137	1282	4663	33	91,09,602	96
FY37	2814	5149	3075	3729	1196	1290	4930	34	94,77,938	106
FY38	2900	5291	3169	3920	1258	1304	5208	35	98,94,577	115
FY39	2986	5433	3263	4115	1320	1318	5493	36	1,03,20,852	126
FY40	3073	5577	3358	4317	1385	1332	5790	37	1,07,91,322	137
FY41	3171	5708	3465	4526	1452	1346	6098	38	1,12,13,498	148
FY42	3261	5854	3564	4742	1521	1353	6417	39	1,16,77,230	159
FY43	3352	6001	3662	4963	1592	1366	6745	40	1,21,56,826	172
FY44	3444	6151	3764	5193	1666	1380	7089	41	1,26,93,404	184
FY45	3549	6289	3878	5434	1743	1394	7450	42	1,31,79,579	198
FY46	3647	6446	3986	5686	1824	1407	7830	43	1,37,29,280	211

MSA Calculation of Chokkenahalli Toll Plaza

Financial Year	Minibus	Standard Bus	LCV-4	LCV-6	2A	3A	MAV	OSV	Yearly Design ESA	MSA
VDF	0.17	1.60	0.15	1.36	2.40	5.49	9.40	0.00		
FY26	2155	3610	1656	2461	1181	1859	5389	23	83,25,594	8
FY27	2275	3737	1748	2621	1258	1874	5744	24	87,86,471	17
FY28	2401	3868	1845	2788	1338	1908	6120	25	93,08,588	26
FY29	2534	3989	1948	2966	1424	1943	6522	26	98,10,452	36
FY30	2672	4126	2054	3156	1515	1983	6997	27	1,04,25,129	47
FY31	2799	4255	2151	3304	1586	1991	7312	27	1,08,35,965	57
FY32	2930	4310	2252	3457	1659	1970	7633	28	1,12,53,796	69
FY33	3070	4309	2359	3636	1745	1992	8039	29	1,17,23,469	80
FY34	3220	4442	2475	3846	1846	2028	8543	30	1,23,72,468	93
FY35	3090	4560	2375	3186	1529	1573	6832	31	1,00,94,624	103
FY36	2933	4675	2254	2432	1167	1100	4861	32	75,19,806	110
FY37	3065	4794	2356	2561	1229	1104	5142	33	78,65,041	118
FY38	3201	4926	2460	2695	1293	1122	5435	33	82,54,048	127
FY39	3338	5058	2566	2831	1359	1141	5735	34	86,53,073	135
FY40	3480	5192	2674	2972	1427	1159	6048	35	90,91,686	144
FY41	3625	5314	2786	3118	1497	1177	6373	36	94,93,098	154
FY42	3774	5451	2901	3270	1569	1181	6711	37	99,28,361	164
FY43	3925	5587	3017	3424	1643	1199	7057	38	1,03,81,343	174
FY44	4082	5727	3137	3585	1721	1217	7420	39	1,08,86,105	185
FY45	4245	5856	3263	3754	1802	1235	7802	40	1,13,51,928	196
FY46	4415	6002	3393	3931	1887	1254	8204	41	1,18,74,321	208

The proposed pavement composition for Main Carriageway is done by, using MSA and CBR value as per IRC 37-2018.

7.6 Determination of Structural Strength of Pavement using FWD and Remaining Life in Flexible Pavement

Pavement structure is typically composed of several layers of different material, each of which receives the loads from the above layer, spreads the load, and then passes the load to the layer below. Material layers are usually arranged with in a pavement structure in order of descending load bearing capacity with the highest load bearing capacity material on the top and the lowest load bearing capacity material on the bottom. In general pavements should be designed to perform satisfactorily without developing unacceptable levels of distresses during the design life period. The structural adequacy of the existing pavement is demonstrated based on the study of structural performance of the pavement. If a pavement shows load associated distress like fracture, permanent deformation etc., then it is considered to have failed structurally. To ensure that unacceptable levels of distresses do not occur during design period, the critical strains developed under the load should be less than the limiting strain values corresponding to the design traffic selected. Structural evaluation of pavements involves application of a standard load to the pavement and measuring its response in terms of stress, strain or deflection. Among the equipment available for structural evaluation of pavements, the Falling Weight Deflectometer (FWD) is extensively used world-wide because it stimulates, to a large extent, the actual loading conditions of the pavement. The resulting load-deflection data can be interpreted through appropriate analytical techniques, such as back calculation technique, to estimate the elastic module of the pavement layers. The computed module is, in turn, used for

i. The strength evaluation of different layers of in-service pavements

ii. the estimation of the remaining life of in-service pavement

iii. determination of strengthening requirement, if any and

iv. Evaluation of different rehabilitation alternatives (overlay, recycling, partial reconstruction, etc.).

The guidelines for the test and evaluation of structural condition of in-service pavements are detailed in IRC- 115:2014. The test was carried out using 300mm diameter plate and standard load of 40KN (+/-4KN). The deflections were measured at 7 points, each at a radial distance of 0, 200, 300, 450, 600, 900, and 1200 (all mm). The pavement layer thicknesses of Bituminous and Granular layers were obtained from the test pits as given above.

7.6.1 Analysis Methodology

This methodology provides detailed procedure for the evaluation of structural condition of in-service pavements using deflection data from Falling Weight Deflectometer as well as other pavement data as inputs to a back-calculation model for determining the elastic module of pavement layers, and, thereafter, using these modules as inputs to a pavement design model for estimating the overlay requirement.

Accordingly, the sequence of analysis steps as per the IRC: 115-2014 is as follows

1. The recorded data will be normalized to a standard load of 40 KN.

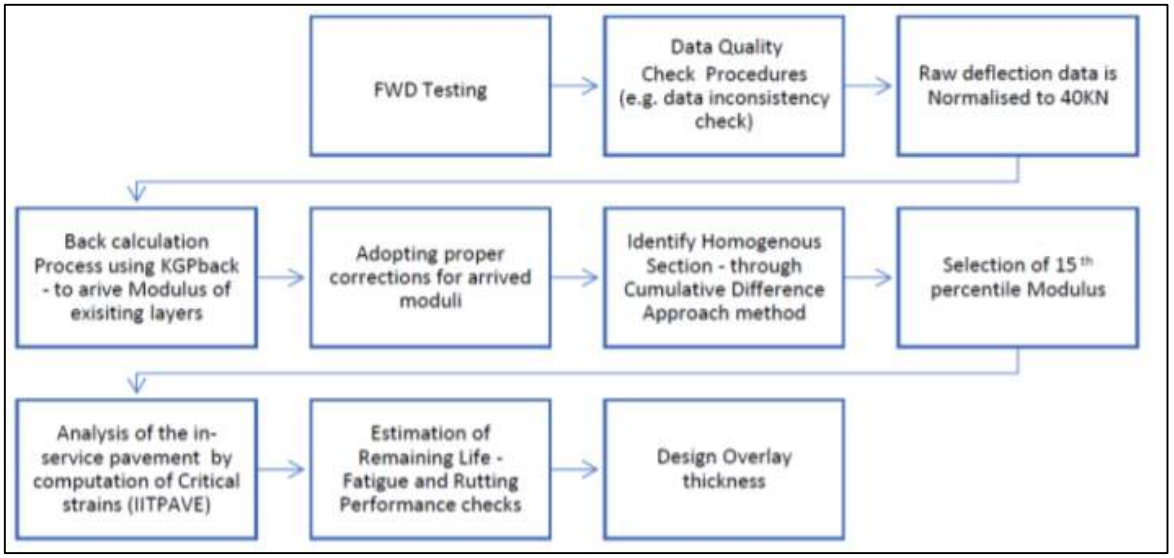
2. The normalized deflections will be then processed and back calculated using KGPBACK to obtain Elastic Modulus values of Bituminous, Granular layer and Sub-grade.

3. The corrections factors for temperature correction sand seasonal variations will be applied to all layers as suggested in IRC: 115-2014.

4. Preparation of Homogenous sections and selecting 15th percentile Module values for the purpose of design.

5. Checking the in-service ability of the Pavement layers through Performance criteria-analysing the Remaining life. Sequence of FWD data analysis and snapshot of applications used for analysis are presented in figures below.

Sequence of FWD data analysis and snapshot of applications used for analysis are presented in figures below.



```
!!!!!            PRINT INPUT DATA            !!!!
!!!!!   PL. SEE THE MANUAL SUPPLIED FOR HELP   !!!!

TYPE PEAK FWD LOAD (N), CONTACT PRESSURE (MPa)
Standard Values are 40000  0.56
40000 0.56

HOW MANY DEFLECTIONS WERE MEASURED (4 TO 10)?
7

PRINT RAD.DISTANCES (mm) WHERE DEFLECT. WERE MEASURED
eg: 0, 300, 600, 900, 1200, 1500 is a Typical
    Configuration for six Geophones

0 200 300 450 600 900 1200

PRINT MEASURED DEFLECTIONS IN mm.
0.306 0.255 0.226 0.2 0.161 0.114 0.066
GIVE THE PAVEMENT RELATED INPUTS (3-LAYER SYSTEM)
TYPE EACH LAYER THICKNESS(mm). START FROM TOP
210 490

TYPE POISSON RATIO OF EACH LAYER. START FROM TOP
Suggested values are 0.5 0.4 0.4
0.35 0.35 0.35

INPUT RANGE (lower and upper) FOR EACH LAYER MODULUS
Please note that Backcalculation Results will depend
on the selection of appropriate Ranges. The slection
of Ranges has to be made judiciously on the basis of
of the Pavement Condition

PRINT LOWER AND UPPER BOUND MODULI (MPa) LAYERS
Pl. See the Manual supplied for guidance

750 3000
100 500
46.5 100
```

Figure 7-5 : Typical KGPBACK Input

```
#########################################################
#         !!!  THANKS FOR USING KGPBACK  !!!            #
#              THE RESULTS ARE GIVEN BELOW              #
#########################################################

################
#  INPUT DATA  #
################
No.of Layers                              =  3
FWD Load (N)                              = 40000.00
Contact Pressure (MPa)                    =  .56
No.of Deflection points                   =  7
Deflections measured using FWD (mm)       =  .30600   .25500   .22600   .20000   .16100   .11400   .06600
Radial distances from centre of load(mm) =    .0  200.0  300.0  450.0   600.0   900.0  1200.0
Layer thickness (mm)                      = 210.00 490.00
Poisson ratio values                      = .35 .35 .35
Layer Modulus (MPa) Ranges Selected :-
(a) Bituminous Surfacing                  =  750.0   3000.0
(b) Granular Base                         =  100.0   500.0
(c) Subgrade                              =   46.5   100.0


################
# OUTPUT DATA  #
################

Backcalculated Layer Moduli are:
Surface (MPa)  =    2338.0
Base (MPa)     =     226.3
Subgrade (MPa) =     100.0
```

Figure 7-6 : Typical KGPBACK Output

7.6.2 Procedure

The FWD measurements have been carried out at slow lane and fast lane respectively in the provided stretches.

deflections measured by the FWD equipment are influenced by pavement temperature. Measurements made when the pavement temperature is different than standard temperature has be corrected. The deflection measurements, pavement temperature, subgrade soil & deflection, and other information collected during the deflection study have been recorded.

Following procedure has been followed for measurement of FWD:

- The test location is marked on the field.
- The loading plate along with the deflection sensors have been lowered at the test location
- The target load has been applied and the deflections have been measured for 3 times.
- The first load is considered as a seating load and the values are not considered for analysis.

7.6.3 Procedure

The FWD measurements have been carried out at slow lane and fast lane respectively in the provided stretches.

deflections measured by the FWD equipment are influenced by pavement temperature. Measurements made when the pavement temperature is different than standard temperature has be corrected. The deflection measurements, pavement temperature, subgrade soil & deflection, and other information collected during the deflection study have been recorded.

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- The first load is considered as a seating load and the values are not considered for analysis.

7.6.4 Procedure

The FWD measurements have been carried out at slow lane and fast lane respectively in the provided stretches.

deflections measured by the FWD equipment are influenced by pavement temperature. Measurements made when the pavement temperature is different than standard temperature has be corrected. The deflection measurements, pavement temperature, subgrade soil & deflection, and other information collected during the deflection study have been recorded.

Following procedure has been followed for measurement of FWD:

- The test location is marked on the field.
- The loading plate along with the deflection sensors have been lowered at the test location
- The target load has been applied and the deflections have been measured for 3 times.
- The first load is considered as a seating load and the values are not considered for analysis.

Temperature Measurement & Correction

The standard temperature for doing the experiment is 350C. Since it is always not possible to conduct the test at the standard temperature, a correction factor has to be applied for the deflection. The correction factor is determined by knowing the temperature at the time of the survey. The pavement temperature during the survey has been measured at every one-hour interval by drilling a hole of 40mm in the pavement and filling it with glycerol and measuring the temperature using digital thermometer. The temperature correction factor applied on bituminous back calculated moduli is calculated as

$ET1 = \prod ET2$

Where,

$\prod$, temperature correction factor, is given as

$$\prod = 1\text{-}0.238 \ln T1 / 1\text{-}0.238 \ln T2$$

Where,

ET1 = back calculated modulus (MPa) at temperature T1 (°C)

ET2 = back calculated modulus (MPa) at temperature T2 (°C)

Correction for Seasonal Variation

Moisture content affects the strength of subgrade and granular subbase/base layers. The extent to which the strength is affected will depend on the nature of subgrade soil, gradation and nature of fines in the granular layers, etc. For the purpose of applying these guidelines, it is intended that the pavement layer moduli values should pertain to the period when the subgrade is at its weakest condition. In India, this period occurs during the recession of monsoon. It is, therefore, desirable to conduct deflection measurements during this period. Where the same is not feasible, a correction procedure should be adopted. The correction factor for subgrade and base is as

- **Correction factor for subgrade**

E sub_mon = 3.351* (E sub_win) 0-7688-28.9

E sub_mon = 0.8554*(E sub_sum) - 8.461

where,

E sub_mon = subgrade modulus in monsoon (MPa)

E sub_win = subgrade modulus in winter (MPa)

E sub_sum = subgrade modulus in summer (MPa)

- **Correction factor for granular layers**

E gran_mon = - 0.0003 *(E gran_sum) 2 + 0.9584* (E gran_sum) - 32.989

E gran_mon = 10.5523 *(E gran_win)0.624 – 113.857

where, E gran_mon = granular layer modulus in monsoon (MPa)

E gran_win = granular layer modulus in winter (MPa)

E gran_sum = granular layer modulus in summer (MPa)

7.6.5 Back Calculation to Obtain Resilient Modulus of Existing Layers

Software used:

KGPBACK – Genetic Algorithm based software for back calculating the layer moduli. Works on three-layer system (Bituminous, Granular & Subgrade).

Data required:

- Deflections at various radial distances.
- Existing layer thickness – the existing layer thicknesses of various stretches have been obtained from the test pit.
- Layer moduli range – the layer moduli adopted for the analysis is shown in next section
- Poisson's ratio: BT-0.35, Granular-0.35, Subgrade-0.35 (For Back calculation).

Table 7-6 : Range of module (MPa)

Type of Layer	Lower and Upper Limit (Mpa)	
	Good to Fair	Fair to Poor
Subgrade	As per Existing Subgrade 5*CBR to 100	
Granular	100 to 500	100 to 500
Bituminous	750 to 3000	400 to 1500

7.6.6 Homogeneous Section

The Identification of homogeneous sections is done on the basis of the peak deflections or peak deflection bowl parameters, subgrade strength, design traffic, layer thicknesses and extent and severity of distress.

Here in this section, Homogeneous Section is divided into Km Wise.

Based on homogeneous section of LHS and RHS carriageway, it is clear that the sections are not the same for both carriageways, based on these homogeneous sections, the overlay calculation was done.

7.6.7 Data Analysis

Resilient Moduli of each layer are calculated using KGPBACK for each test point. Details of input parameters are given in Appendix to Main Report. The summary of back calculated and corrected modulus of the all the three layers are presented in the following table for LHS pavement.

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Table 7-7 : L.H.S Corrected Back Calculated Module (MPa)

Chainage (Km)		Length (m)	15th PerCentile Modulus		
			Bituminous Layer	Granular Layer	Subgarde Layer
From	To				
355+000	357+342	2342.00	2645.77	364.10	75.88
372+038	385+612	13574.00	2388.12	356.45	75.88
385+612	405+012	19400.40	2400.45	350.02	76.91
405+012	412+001	6988.30	2536.97	362.93	76.99
412+001	422+605	10604.30	2559.82	333.66	76.99

Chilakaluripet Bypass

Chainage (Km)		Length (m)	15th PerCentile Modulus		
			Bituminous Layer	Granular Layer	Subgarde Layer
From	To				
0+000	3+105	3104.813	2801.09	367.32	76.82
3+105	7+006	3901.187	2804.19	368.31	76.61
7+006	11+606	4599.627	2790.22	345.85	45.81
11+606	13+099	1493	2807.40	367.75	76.74
13+099	16+499	3400.373	2784.53	367.32	76.31

Table 7-8 : R.H.S Corrected Back Calculated Module (MPa)

Chainage (Km)		Length (m)	15th PerCentile Modulus		
			Bituminous Layer	Granular Layer	Subgarde Layer
From	To				
355+000	357+342	2342.00	2386.97	364.20	75.77
372+038	382+258	10219.50	2388.12	363.36	75.88

Chainage (Km)		Length (m)	15th PerCentile Modulus		
			Bituminous Layer	Granular Layer	Subgarde Layer
From	To				
382+258	398+756	16498.00	2274.45	362.40	75.88
398+756	407+514	8758.00	2348.66	361.65	75.97
407+514	420+000	12486.50	2408.68	351.75	76.99
420+000	422+605	2605.00	2705.54	355.88	77.08

Chilakaluripet Bypass

Chainage (Km)		Length (m)	15th PerCentile Modulus		
			Bituminous Layer	Granular Layer	Subgarde Layer
From	To				
0+000	2+264	2264	2714.18	368.39	76.74
2+264	5+246	2982	2710.18	367.32	76.91
5+246	11+013	5767	2704.18	368.43	76.74
11+013	16+499	5486	2697.99	367.55	76.91

Section-02 Chennai Bypass

Table 7-9 : L.H.S Corrected Back Calculated Module (MPa)

Chainage (Km)		Length (m)	15th PerCentile Modulus		
			Bituminous Layer	Granular Layer	Subgarde Layer
From	To				
0+000	3+256	3256	2801.61	350.85	76.99
3+256	11+857	8601	2786.23	298.05	72.40
11+857	22+095	10238	2129.78	344.56	76.99
25+107	32+600	7493	2105.23	365.34	76.91

Table 7-10 : R.H.S Corrected Back Calculated Module (MPa)

Chainage (Km)		Length (m)	15th PerCentile Modulus		
			Bituminous Layer	Granular Layer	Subgarde Layer
From	To				
0+000	1+771	1771	2376.34	328.73	54.93
1+771	7+765	5994	2316.79	365.79	76.91
7+765	12+259	4494	2147.05	365.66	76.91
12+259	22+090	9831	2135.91	366.59	76.82
25+109	30+012	4903	2080.49	365.75	76.91
30+012	32+600	2588	1951.43	363.20	76.82

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Table 7-11 : L.H.S Corrected Back Calculated Module (MPa)

Chainage (Km)		Length (m)	15th PerCentile Modulus		
From	To		Bituminous Layer	Granular Layer	Subgarde Layer
22+000	25+345	3345	2345.84	308.46	99.83
25+345	29+343	3998	2404.13	309.78	99.90
29+343	33+102	3759	2439.65	323.26	99.90
33+102	38+239	5137	2545.44	311.47	99.90
38+239	40+528	2289	2306.99	342.69	99.80
40+528	43+746	3218	2292.65	308.73	99.90
43+746	50+339	6593	2300.36	310.07	99.90
50+339	54+400	4061	2360.29	337.30	96.40

Table 7-12 : R.H.S Corrected Back Calculated Module (MPa)

Chainage (Km)		Length (m)	15th PerCentile Modulus		
From	To		Bituminous Layer	Granular Layer	Subgarde Layer
22+000	27+537	5537	2639.9	324.8	96.2
27+537	34+027	6490	2852.2	302.2	99.9
34+027	42+850	8823	2585.3	327.7	99.8
42+850	48+015	5165	2441.6	317.4	99.9
48+015	50+514	2499	2457.2	301.2	99.7
50+514	54+400	3886	2481.5	303.3	99.9

7.6.8 Remaining Life and Overlay Estimation

The in-service three-layer pavement system has been analysed with the 15th percentile back-calculated corrected layer moduli and layer thicknesses. The critical strains have been calculated by IITPAVE program. From the performance criteria equations, the residual/remaining rutting and fatigue life has been estimated.

7.6.9 Performance Criteria

The layer moduli of in-service pavement back calculated from FWD deflection data are used to analyse the pavement for critical strains which are indicators of pavement performance in terms of rutting and fatigue cracking. The remaining life of pavement can

be obtained using the Fatigue and Rutting criteria mentioned in IRC – 115:2014 and in IRC-37:2018, the same approach can be used for design of bituminous overlays for existing flexible pavements. The performance models are as follows.

Fatigue in Bituminous layer:

As specified in IRC-37:2018, the fatigue model for 90 percent reliability (4.0 % air voids and 11.5% bitumen) was used as below;

Nf = 0.9206 * 10 -04 x [1/εt] 3.89 * [1/MR] 0.854

Where, Nf = fatigue life in number of standard axles,

εt = Maximum Tensile strain at the bottom of the bituminous layer

MR= resilient modulus of the bituminous layer.

Rutting in Subgrade:

Rutting model for 90 percent reliability level as specified in IRC: 115-2014 was used as below;

N= 1.41 x 10-08 [1/εv] 4.5337

Where, N= Number of cumulative standard axles,

εv= Vertical strain in the subgrade

Section-01 Vijayawada-Chilakaluripet

Table 7-13 : Remaining Life of Existing Pavement-LHS

Chainage (Km)		Length (m)	Rutting Life(MSA)	Fatigue Life(MSA)	Remaining life of Pavement (MSA)
From	To				
355+000	357+342	2342.00	575	128	128
372+038	385+612	13574.00	503	112	112
385+612	405+012	19400.40	509	109	109
405+012	412+001	6988.30	553	120	120
412+001	422+605	10604.30	489	100	100

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Chainage (Km)		Length (m)	Rutting Life(MSA)	Fatigue Life(MSA)	Remaining life of Pavement (MSA)
From	To				
0+000	3+105	3104.813	438.9	96.0	96.0
3+105	7+006	3901.187	438.9	96.8	96.8
7+006	11+606	4599.627	144.5	80.5	80.5
11+606	13+099	1493	439.7	96.4	96.4
13+099	16+500	3401.373	430.3	95.6	95.6

Table 7-14 : Remaining Life of Existing Pavement-RHS

Chainage (Km)		Length (m)	Rutting Life(MSA)	Fatigue Life(MSA)	Remaining life of Pavement (MSA)
From	To				
355+000	357+342	2342.00	533	121	121
372+038	382+258	10219.50	532	121	121
382+258	398+756	16498.00	499	114	114
398+756	407+514	8758.00	491	111	111
407+514	420+000	12486.50	510	110	110
420+000	422+605	2605.00	551	117	117

Chilakaluripet Bypass

Chainage (Km)		Length (m)	Rutting Life(MSA)	Fatigue Life(MSA)	Remaining life of Pavement (MSA)
From	To				
0+000	2+264	2264	427.8	94.4	94.4
2+264	5+246	2982	427.8	93.7	93.7
5+246	11+013	5767	427.0	94.2	94.2
11+013	16+499	5486	426.1	93.5	93.5

Section-02 Chennai Bypass

Table 7-152 : Remaining Life of Existing Pavement-LHS

Chainage (Km)		Length (m)	Rutting Life(MSA)	Fatigue Life(MSA)	Remaining life of Pavement (MSA)
From	To				
0+000	3+256	3256	821.0	172.8	172.8
3+256	11+857	8601	791.9	173.0	173.0

Chainage (Km)		Length (m)	Rutting Life(MSA)	Fatigue Life(MSA)	Remaining life of Pavement (MSA)
From	To				
11+857	22+095	10238	1091.3	243.0	243.0
25+107	32+600	7493	1415.5	335.3	335.3

Table 7-13 : Remaining Life of Existing Pavement-RHS

Chainage (Km)		Length (m)	Rutting Life(MSA)	Fatigue Life(MSA)	Remaining life of Pavement (MSA)
From	To				
0+000	1+771	1771	382.4	151.5	151.5
1+771	7+765	5994	946.6	213.2	213.2
7+765	12+259	4494	837.9	191.7	191.7
12+259	22+090	9831	579.6	131.8	131.8
25+109	30+012	4903	705.8	161.9	161.9
30+012	32+600	2588	655.6	152.6	152.6

Section-03 Chennai-Tada (21+400 to 54+400)

Table 7-162 : Remaining Life of Existing Pavement-LHS

Chainage (Km)		Length (m)	Rutting Life(MSA)	Fatigue Life(MSA)	Remaining life of Pavement (MSA)
From	To				
22+000	25+345	3345	712.0	78.6	79
25+345	29+343	3998	732.6	81.0	81
29+343	33+102	3759	783.1	89.8	90
33+102	38+239	5137	779.6	86.3	86
38+239	40+528	2289	799.1	97.1	97
40+528	43+746	3218	698.1	77.2	77
43+746	50+339	6593	704.2	78.2	78
50+339	54+400	4061	737.5	95.2	95

Table 7-13 : Remaining Life of Existing Pavement-RHS

Chainage (Km)		Length (m)	Rutting Life(MSA)	Fatigue Life(MSA)	Remaining life of Pavement (MSA)
From	To				
22+000	27+537	5537	776.1	97.0	97
27+537	34+027	6490	839.8	91.0	91
34+027	42+850	8823	837.9	97.0	97
42+850	48+015	5165	765.8	86.5	87
48+015	50+514	2499	721.4	78.2	78
50+514	54+400	3886	737.5	79.9	80

CHAPTER 8

REPAIR AND REHABILITATION OF STRUCURES

8.1 General

This chapter provides the repair and rehabilitation works on the distressed structures wherever observed along the project stretches. The repair and rehabilitation of the structures proposed below are based upon the conditional survey conducted which are furnished in Appendix to Main Report.

The success of repair and rehabilitation activity depends on the identification of the root cause of the deterioration of the structures. If this cause is properly identified appropriate repairs can be done for the improvement of strength and durability, thus extending the life of the structure. General procedures in the repair of distressed concrete structure are as mentioned below.

Remove all cracked, spalled and loose concrete.

Clean the exposed concrete surfaces and steel reinforcement.

Provide additional reinforcing bars, if there is loss in reinforcement.

Apply shotcrete/ polymer concrete for patch repair work and grouting for porous/ honeycombed concrete.

Apply protective coatings over the exposed/repaired surface.

Servicing of all bearings including lubrication, painting and replacement of damaged bearings.

Removal of vegetation and debris from the structural elements.

8.2 Crust

8.3 Condition Survey and Assessment

Along with structures inventory, present health condition of all the structures was recorded for all the elements of the bridges or culverts except foundations which are buried underground. Suitable repair and rehabilitation measures are proposed to maintain or restore their service life.

8.4 Repair and Rehabilitation

Based on condition survey and structure evaluation, various repair and rehabilitation measures were recommended. Different types of repairs and their methodologies are given below.

Based on condition survey and structure evaluation, various repair and rehabilitation measures were recommended. Different types of repairs and their methodologies are given below.

Wearing Coat and Camber

The repair of bituminous and cement concrete wearing coat shall be done by removing the loose materials and all failed material and filled with material of the equivalent specifications to the original construction.

Expansion joint

The Expansion joints shall be cleaned from the dust and debris. Elastomeric sealant compound in strip seal expansion joint shall be replaced to stop leakage from the expansion joints. All the damaged expansion joints shall be repaired by replacing joint sealant compound.

RCC railing

All the cracks in RCC railing shall be rectified using the cement/ epoxy grouting. The RCC railing where damaged shall be reconstructed by chipping the existing surface for better bonding with new concrete and wherever reinforcement is missing, new reinforcement bars of suitable diameter are anchored into existing deck slab. Nito bond or equivalent shall needs to applied to existing concrete surfaces before placing wet concrete to achieve the proper bondage between the existing concrete surface and wet concrete.

Cracks in girders and in deck soffit

All the cracks observed in girders and soffit of deck slab shall be treated by injecting epoxy resin.

Spalling of concrete

The spalled concrete shall be rectified by epoxy mortar / polymer mortar. The epoxy resins to be used shall have minimum bond strength of 12 N/mm2 and minimum tensile strength of 16 N/mm2.

The sand to be used in epoxy mortar shall be graded quartz sand.

Surface preparation shall be done either by mechanical (grinding and water blasting) or chemical method (acid etching and flushing with high pressure steam of water).

Detailed application of epoxy mortar shall be as per manufacture specifications and in accordance with section 2804 of MoRTH specifications.

Treatment to Exposed and corroded steel

To clean the rebar manually & by mechanical means to remove all scales, rust residue to make the rebars clean or any other means and ready for Rust Inhibition application. Then to wash the rebars with clean water and dry the surface immediately with soft cloth complete and providing and applying 2 coats of approved rust inhibition coat / system to exposed rebars and new rebars by using chemicals.

Honey combing and cavities in concrete surfaces.

The rectification of Honey combing and voids in concrete is similar to Spalling of concrete apart from pressured grouting prior to application of epoxy mortar to cover the voids and honey combing.

Vegetation growth on structural members.

Wherever the vegetation observed in the structural members shall be removed from root. The system can be adopted by acid itching or by manual/mechanical means. The hollow portion followed after removing the vegetation shall be covered with rich mortar in masonry structural member and with epoxy / polymer mortar for RCC structural members.

Carbonation resistance coat

To prevent carbonation effect in structural members, apply carbonation resistant coat.

8.5 Proposal for Structure

Table 7-17 : Improvement Proposal summary of Existing Structures

Section-01 Vijayawada-Chilakaluripet

Chainage (km)	Type of Structure	Side	Recommendation
Nil			

Section-02 Chennai Bypass

Chainage (km)	Type of Structure	Side	Recommendation
Nil			

Section-03 Chennai Tada

Chainage (km)	Type of Structure	Side	Recommendation
Nil			

Section-04 Neelmangla-Tumkur

Chainage (km)	Type of Structure	Side	Recommendation
Nil			

CHAPTER 9

CONDITION ASSESSMENT OF EXISTING TOLL PLAZA AND PROPOSAL OF FEASIBLE TOLL LANES

9.1 General

Vijayawada-Chilakaluripet: The Site of Six lane divided Project Highway comprises the section commencing from (Km 355+000 to Km 357+342), (Km 372+038 to Km 422+605), (Km 0+000 to Km 16+499) at Vijayawada of NH-16 and has Kaza toll Plazas at Km 420+500 and at km 35+400 (Venkatapalem on project Section in the state of Andhra Pradesh. The total length of Project Stretch is 69.408 km.

Chennai Bypass: Project Stretch starts from Km 0+000 and ends at Km 32+600 of NH-32/ NH-48 and has Vanagram toll Plazas at Km 16+500 and Surapattu toll Plazas at Km 28+600 on project Section in the state of Tamil Nadu. The total length of Project Stretch is 32.600 km.

Chennai-Tada: Project Stretch starts from Km 21+400 and ends at Km 54+400 of NH-16 and has Nallur toll Plazas at Km 21+625 on project Section in the state of Tamil Nadu. The total length of Project Stretch is 33.00 km.

Neelmangla- Tumkur: Project Stretch starts from Km 29+500 and ends at Km 74+168 of NH-48 and has kulumepalya toll plazas at Km 30+000 and Chokkenahalli toll plaza Km 61+500 on project Section in the state of Karnataka. The total length of Project Stretch is 44.668 km.

Section-01 Vijayawada-Chilakaluripet

Kaza toll Plaza (420+500)

Section-02 Chennai Bypass

Vanagram toll Palaza (16+500)

Surapattu toll Plaza (28+600)

Section-03 Chennai-Tada

Nallur toll Plaza (21+625)

Nallur toll Plaza (21+625)

Section 04 Neelmangla-Tumkur

Kulumepalya toll Plaza (30+000)

Chokkenahalli (61+500)

Figure 7-7 : Toll Plaza Locations

9.2 Salient Features of Toll Plaza

Table 7-18 : Salient Feature of Toll Plazas

Section 1 Vijayawada-Chilakaluripet

S. No.	Particulars	Details of Kaza Toll Plaza
1	Toll Plaza Chainage and name	420+500
2	Number of Toll Lanes	16
3	No of ETC system	16
4	No of Toll Booths	15
5	Canopy/ FOB	Canopy Available / FOB Not Available
6	Admin Building	Available
7	Availibility of Tunnel	Available
8	Toilets (Gents & Ladies)	2
9	Type of Pavement at Toll Lanes	Rigid
10	Slow Speed Weigh in Motion Facility	Available (Not Working)
11	Static Weigh Bridge	2(1 Not working)
12	Availability of loading/unloading facilities	Not Available
13	Storage facility of overloaded material	Not Available
14	High Mast Light	4
15	Street Lights	28
16	Traffic Aid Post	Available
17	Medical Aid Post	Available
18	Control Room	Available
19	Server Room	Available
20	UPS & Battery room	Available
21	Plaza Manager Room	Available
22	Cash up Room	Available
23	Room for Cashier	Available

S. No.	Particulars	Details of Kaza Toll Plaza
24	Cantilever/Gantry Board	Available
25	Electricity Supply	Available
26	Cash van garage	Available
27	PRO Office	Available
28	Meeting Room	Available
29	Changing room	Available
30	Lane Configuration	6 lane

Note*:- MLFF (Multi lane free flow system) shall be provided at Existing Toll Plaza Km 420+500 (Kaza toll plaza) by InvIT Concessionaire.

Section 02 Chennai Bypass

S. No.	Particulars	Details of Vanagram Toll Plaza	Details of Surapattu Toll Plaza
1	Toll Plaza Chainage and name	16+500	28+600
2	Number of Toll Lanes	10	12
3	No of ETC system	10	12
4	No of Toll Booths	9	11
5	Canopy/ FOB	Canopy Available / FOB Not Available	Canopy Available / FOB Not Available
6	Admin Building	Not Available	Not Available
7	Availibility of Tunnel	Not Available	Not Available
8	Toilets (Gents & Ladies)	Not Available	2
9	Type of Pavement at Toll Lanes	Rigid	Rigid
10	Medium Speed Weigh in Motion Facility	0	0
11	Static Weigh Bridge	0	0
12	Availability of loading/unloading facilities	Not Available	Not Available
13	Storage facility of overloaded material	Not Available	Not Available

S. No.	Particulars	Details of Vanagram Toll Plaza	Details of Surapattu Toll Plaza
14	High Mast Light	2	2
15	Street Lights	20	0
16	Traffic Aid Post	Not Available	Not Available
17	Medical Aid Post	Not Available	Not Available
18	Control Room	Not Available	Not Available
19	Server Room	Not Available	Not Available
20	UPS & Battery room	Not Available	Not Available
21	Plaza Manager Room	Not Available	Not Available
22	Cash up Room	Not Available	Not Available
23	Room for Cashier	Not Available	Not Available
24	Cantilever/Gantry Board	Available	Available
25	Electricity Supply	Available	Available
26	Cash van garage	Available	Available
27	PRO Office	Not Available	Not Available
28	Meeting Room	Not Available	Not Available
29	Changing room	Not Available	Not Available
30	Lane Configuration	6-lane	6-lane

Note*-

- The existing toll plazas at Vanagram will be demolished, and new toll plazas at Ch. 6+500, shall be constructed by the Authority. Accordingly, Multi lane free flow (MLFF) will be provided by the Authority and shall be maintained by the TOT/InvIT Concessionaire after the completion of the DLP period.
- MLFF (Multi lane free flow system) for 6 lanes shall be provided at Existing Toll Plaza km 28+600 (Surapattu Toll Plaza) by InvIT Concessionaire.

Section 03 Chennai Tada

S. No.	Particulars	Details of Nallur Toll Plaza
1	Toll Plaza Chainage and name	21+625
2	Number of Toll Lanes	14
3	No of ETC system	14
4	No of Toll Booths	13
5	Canopy/ FOB	Available
6	Admin Building	Available
7	Availibility of Tunnel	No
8	Toilets (Gents & Ladies)	2
9	Type of Pavement at Toll Lanes	Rigid
10	Medium Speed Weigh in Motion Facility	0
11	Static Weigh Bridge	0
12	Availability of loading/unloading facilities	Not Available
13	Storage facility of overloaded material	Not Available
14	High Mast Light	6
15	Traffic Aid Post	Not Available
16	Medical Aid Post	Available
17	Control Room	Available
18	Server Room	Available
19	UPS & Battery room	Available
20	Plaza Manager Room	Available
21	Cash up Room	Available
22	Room for Cashier	Available
23	Cantilever/Gantry Board	Available
24	Electricity Supply	Available
25	Cash van garage	Available
26	PRO Office	Available
27	Meeting Room	Not Available

S. No.	Particulars	Details of Nallur Toll Plaza
28	Changing room	Not Available
29	Lane Configuration	6-lane

Section 04 Neelmangla-Tumkur

S. No.	Particulars	Details of Kulumepalya Toll Plaza	Details of Chokkenahalli Toll Plaza
1	Toll Plaza Chainage and name	30+000	61+500
2	Number of Toll Lanes	10	10
3	No of ETC system	10	10
4	No of Toll Booths	9	9
5	Canopy/ FOB	Canopy Available/ FOB Available	Canopy Available/ FOB Available
6	Admin Building	Admin building is in FOB	Admin building is in FOB
7	Availibility of Tunnel	No	No
8	Toilets (Gents & Ladies)	2	1
9	Type of Pavement at Toll Lanes	Rigid	Rigid
10	Medium Speed Weigh in Motion Facility	0	0
11	Static Weigh Bridge	0	0
12	Availability of loading/unloading facilities	Not Avaliable	Not Avaliable
13	Storage facility of overloaded material	Not Avaliable	Not Avaliable
14	High Mast Light	2	2
15	Street Lights	0	0
16	Traffic Aid Post	Not Avaliable	Not Avaliable
17	Medical Aid Post	Not Avaliable	Not Avaliable
18	Control Room	Available	Available
19	Server Room	Available	Available

S. No.	Particulars	Details of Kulumepalya Toll Plaza	Details of Chokkenahalli Toll Plaza
20	UPS & Battery room	Available	Available
21	Plaza Manager Room	Available	Available
22	Cash up Room	Available	Available
23	Room for Cashier	Available	Available
24	Cantilever/Gantry Board	Available	Available
25	Electricity Supply	Available	Available
26	Cash van garage	Available	Available
27	PRO Office	Available	Available
28	Meeting Room	Available	Available
29	Changing room	Available	Available
30	Lane Configuration	4-lane	4 & 6-lane

Note*- The existing two toll plazas at Kulumepalya and Chokkenahalli will be demolished, and new toll plazas at MCW (Ch. 53+100), Ramp RHS (Ch. 53+100), Ramp RHS (Ch. 46+375), LHS Ramp (Ch.49+900) and Ramp LHS (Ch. 47+425) shall be constructed by the Authority. Accordingly, the MLFF will be provided by the Authority and shall be maintained by the TOT/InvIT Concessionaire after the completion of the DLP period.

9.3 Condition Survey Status and Proposals

For improvisation, we visited the toll and audited the existing condition of the Plaza with respect to Section 10 of IRC SP 84-2014 provisions for toll plaza. Proposals are recommended with condition report.

Figure 7-8 : **Condition Assessment**

Section-01 Vijayawada-Chilakaluripet

Kaza toll Plaza (420+500)

Kaza toll Plaza (420+500)

Section-02 Chennai Bypass

Vanagram toll Palaza (16+500)

Surapattu toll Plaza (28+600)

Section-03 Chennai-Tada

Nallur toll Plaza (21+625)

Nallur toll Plaza (21+625)

Section 04 Neelmangla-Tumkur

Kulumepalya toll Plaza (30+000)

Chokkenahalli (61+500)

9.4 TMS

Table 7-19 : Existing Details of Toll Plaza's Lane Level Equipment

Section 1 Vijayawada-Chilakaluripet

Kaza Toll Plaza

S.No	Equipment Description	Unit	Qty	Operational	Remarks
A	Lane Level Equipment				
1	RFID ETC transceiver near Pay-axis - mounted on canopy/pole	No	16	16	

S.No	Equipment Description	Unit	Qty	Operational	Remarks
2	Electronics Enclosure	No	16	16	
3	Lane Controller with Industrial PC	No	16	16	
4	AVCC/ Axle Sensor with foundation	Set	16	16	
5	User Fare Display with mounting pole	No	16	16	
6	Automatic Barrier Gate	No	16	16	
7	Overhead Lane Status light (OHLS)	No	16	16	
8	Traffic light with mounting pole	No	16	16	
9	Loops with detector	No	32	16	1 Per Lane
10	Incident Capture Camera with mounting pole	No	16	16	
11	Automatic Number Plate Recognition Camera with mounting pole (1 per lane)	No	16	16	
12	Customized industrial grade keyboard	No	16	16	
13	TFT Monitor	No	16	16	
14	Thermal Receipt Printer	No	16	16	
15	Barcode Reader with Stand	No	2	0	Not installed
16	Violation light & Alarm (on existing pole) and Foot switch in booth	No	16	16	
17	Booth CCTV camera with voice recording	No	16	16	
18	Intercom Slave unit in booth	No	16	16	
19	Height Sensor with mounting pole	No	16	0	Not installed
20	Fog Lights	No	16	0	Not installed
21	Weigh in Motion	No	16	0	Not working
22	Lane Level UPS	No	16	16	
23	Network Switch	No	2	0	Not installed
24	Lane level software	LS	16	16	
B	**Plaza Level Equipment**				
25	Plaza Server (ETC Server) with Monitor and Keyboard	No	1	1	

S.No	Equipment Description	Unit	Qty	Operational	Remarks
26	Workstations for MIS, Cashup, Audit & LSDU	No	4	4	
27	Nerwork Printer	No	1	0	Not installed
28	Plaza Level Software	LS	1	0	Not installed
29	Internet Router for Connection to the CCH	No	1	0	Not installed
30	UPS system with battery as required for complete ETC system (10 KVA or above)	No	2	2	
31	Outdore wifi access point(Managed & Rugged)	No	1	-	Not Installed
32	LED Display for CCTV Monitoring (55" inch)	No	1	1	Not installed
33	Network Video Recorder (NVR)	No	2	2	
34	CCTV cameras for Plaza building surveillance (server room, control room, cash room, admin)	No	4	4	
35	Intercom Master unit in control room	No	1	1	
36	DG Set	No	2	2	
37	Firewall	No	1	1	
38	Servo Stabilizer (60 KVA -3 phase or as available at the plaza)	No	1	1	
39	Cabling/ Networking	LS	1	1	
40	Broadband Internet Connection	No	3	3	
41	24 Port Network switch (Layer 3)	No	2	2	
42	Static Weigh Bridge	No	2	1	Not working
43	PTZ CCTV Cameras	No	2	2	

Note*:- MLFF (Multi lane free flow system) for 6 lanes shall be provided at Existing Toll Plaza Km 420+500 (Kaza toll plaza) by InvIT Concessionaire.

Section 02 Chennai Bypass

Vanagram Toll Plaza

S.No	Equipment Description	Unit	Qty	Operational	Remarks
A	**Lane Level Equipment**				
1	RFID ETC transceiver near Pay- axis - mounted on canopy/pole	No	10	10	
2	Electronic Enclosure				Not Installed
3	Lane Controller with Industrial PC	No	10	10	
4	AVCC/ Axle Sensor with foundation	Set	10	6	Not installed
5	User Fare Display with mounting pole	No	10	6	Not installed
6	Automatic Barrier Gate	No	10	10	
7	Overhead Lane Status light (OHLS)	No	10	6	Not installed
8	Traffic light with mounting pole	No	10	6	Not installed
9	Loops with detector	No	20	12	Not installed
10	Incident Capture Camera with mounting pole	No	10	6	Not installed
11	Automatic Number Plate Recognition Camera with mounting pole (1 per lane)	No	10	10	
12	Customized industrial grade keyboard	No	10	6	Not installed
13	TFT Monitor	No	10	10	
14	Thermal Receipt Printer	No	10	9	Not working
15	Barcode Reader with Stand	No	2	0	Not installed
16	Violation light & Alarm (on existing pole) and Foot switch in booth	No	10	6	Not installed
17	Booth CCTV camera with voice recording	No	10	10	
18	Intercom Slave unit in booth	No	10	6	Not installed
19	Height Sensor with mounting pole	No	10	0	
20	Fog Lights	No	10	0	
21	Weigh in Motion	No	10	0	
22	Lane Level UPS	No	10	10	
23	Network Switch	No	2	0	
24	Lane level software	LS	10	10	

S.No	Equipment Description	Unit	Qty	Operational	Remarks
B	**Plaza Level Equipment**				
26	Plaza Server (ETC Server) with Monitor and Keyboard	No	1	1	
27	Workstations for MIS, Cashup, Audit & LSDU	No	4	4	
28	Nerwork Printer	No	1	0	Not installed
29	Plaza Level Software	LS	1	1	
30	Internet Router for Connection to the CCH	No	1	1	
31	UPS system with battery as required for complete ETC system (10 KVA or above)	No	2	2	
32	LED Display for CCTV Monitoring (55" inch)	No	1	0	Not installed
33	Network Video Recorder (NVR)	No	1	1	
34	CCTV cameras for Plaza building surveillance (server room, control room, cash room, admin)	No	4	4	
35	Intercom Master unit in control room	No	1	1	
36	DG Set	No	1	1	
37	Firewall	No	1	1	
38	Servo Stabilizer (60 KVA -3 phase or as available at the plaza)	No	1	1	
39	Cabling/ Networking	LS	1	1	
40	Broadband Internet Connection	No	2	2	
41	24 Port Network switch (Layer 3)	No	2	2	
42	Static Weigh Bridge	No	2	0	Not installed
43	PTZ CCTV Cameras	No	2	2	

Note*-

- The existing toll plaza at Vanagram will be demolished, and new toll plazas at Ch. 6+500, shall be constructed by the Authority. Accordingly, the MLFF will be provided by the Authority and shall be maintained by the TOT/InvIT Concessionaire after the completion of the DLP period.

Surapattu Toll Plaza

S.No	Equipment Description	Unit	Qty	Operational	Remarks
A	**Lane Level Equipment**				
1	RFID ETC transceiver near Pay-axis - mounted on canopy/pole	No	12	12	
2	Lane Controller with Industrial PC	No	12	12	
3	AVCC/ Axle Sensor with foundation	Set	12	12	Not Working
4	User Fare Display with mounting pole	No	12	12	
5	Automatic Barrier Gate	No	12	12	
6	Overhead Lane Status light (OHLS)	No	12	12	
7	Traffic light with mounting pole	No	12	12	
8	Loops with detector	No	24	0	Not Installed
9	Incident Capture Camera with mounting pole	No	12	12	
10	License Plate Image Capture Camera with mounting poles	No	10	0	Not Installed
11	Automatic Number Plate Recognition Camera with mounting pole (1 per lane)	No	12	0	Not Installed
12	Customized industrial grade keyboard	No	12	0	Not Installed
13	TFT Monitor	No	12	0	Not Installed
14	Thermal Receipt Printer	No	12	12	
15	Barcode Reader with Stand	No	12	12	
16	Violation light & Alarm (on existing pole) and Foot switch in booth	No	12	12	
17	Booth CCTV camera with voice recording	No	12	0	Not Installed
18	Intercom Slave unit in booth	No	12	0	Not Installed
19	Height Sensor with mounting pole	No	12	12	
20	Fog Lights	No	12		Not Installed
21	Weigh in Motion	No	12		Not Installed
22	Lane Level UPS	No	12	12	
23	Network Switch	No	2	2	
24	Lane level software	LS	12		Not Installed

S.No	Equipment Description	Unit	Qty	Operational	Remarks
B	**Plaza Level Equipment**				
25	Plaza Server (ETC Server) with Monitor and Keyboard	No	1	1	
26	Office PC with Monitor and Keyboard	No			Not Installed
27	Workstations for MIS, Cashup, Audit & LSDU	No	4	4	
28	Nerwork Printer	No	1		Not Installed
29	Plaza Level Software	LS	1		Not Installed
30	Internet Router for Connection to the CCH	No	1		Not Installed
31	UPS system with battery as required for complete ETC system (10 KVA or above)	No	2		Not Installed
32	Outdore wifi access point(Managed & Rugged)	No	1	1	
33	LED Display for CCTV Monitoring (55" inch)	No	1		Not Installed
34	Network Video Recorder (NVR)	No	1	1	
35	CCTV cameras for Plaza building surveillance (server room, control room, cash room, admin)	No	4		Not Installed
36	Intercom Master unit in control room	No	1		Not Installed
37	DG Set	No	1		Not Installed
38	Firewall	No	1		Not Installed
39	Servo Stabilizer (60 KVA -3 phase or as available at the plaza)	No	1		Not Installed
40	Cabling/ Networking	LS	1		Not Installed
41	Broadband Internet Connection	No	2		Not Installed
42	24 Port Network switch (Layer 3)	No	2		Not Installed
43	Static Weigh Bridge	No	1		Not Installed
44	PTZ CCTV Cameras	No	2		Not Installed

Note*:- MLFF (Multi lane free flow system) for 6 lanes shall be provided at Existing Toll Plaza Km 28+600 (Surapattu toll plaza) by InvIT Concessionaire.

Section 03 Chennai Tada

Nallur Toll Plaza

S.No	Equipment Description	Unit	Qty	Operational	Remarks
A	**Lane Level Equipment**				
1	RFID ETC transceiver near Pay-axis - mounted on canopy/pole	No	14	14	
2	Electronics Enclosure	No	14	14	
3	Lane Controller with Industrial PC	No	14	14	
4	AVCC/ Axle Sensor with foundation	Set	14	14	
5	User Fare Display with mounting pole	No	14	14	
6	Automatic Barrier Gate	No	14	14	
7	Overhead Lane Status light (OHLS)	No	14	14	
8	Traffic light with mounting pole	No	14	14	
9	Loops with detector	No	28	28	
10	Incident Capture Camera with mounting pole	No	14	14	
11	License Plate Image Capture Camera with mounting poles	No	14	-	Not Installed
12	Automatic Number Plate Recognition Camera with mounting pole (1 per lane)	No	14	14	
13	Customized industrial grade keyboard	No	14	14	
14	TFT Monitor	No	14	14	
15	Thermal Receipt Printer	No	14	14	
16	Barcode Reader with Stand	No	2	0	Not Installed
17	Violation light & Alarm (on existing pole) and Foot switch in booth	No	14	14	
18	Booth CCTV camera with voice recording	No	14	14	
19	Intercom Slave unit in booth	No	14	14	
20	Height Sensor with mounting pole	No	14	0	Not Installed
21	Fog Lights	No	14	0	Not Installed
22	Weigh in Motion	No	14	0	Not Installed
23	Lane Level UPS	No	14	14	

S.No	Equipment Description	Unit	Qty	Operational	Remarks
23	Network Switch	No	2	0	Not Installed
24	Lane level software	LS	14	14	
B	**Plaza Level Equipment**				
25	Plaza Server (ETC Server) with Monitor and Keyboard	No	1	1	
26	Office PC with Monitor and Keyboard	No	3	0	
27	Workstations for MIS, Cashup, Audit & LSDU	No	4	4	
28	Nerwork Printer	No	1		Not Installed
29	Plaza Level Software	LS	1	1	
30	Internet Router for Connection to the CCH	No	1	1	
31	UPS system with battery as required for complete ETC system (10 KVA or above)	No	2	2	
32	Outdore wifi access point(Managed & Rugged)	No	1	-	Not Installed
33	LED Display for CCTV Monitoring (55" inch)	No	1	-	Not Installed
34	Network Video Recorder (NVR)	No	2	2	
35	CCTV cameras for Plaza building surveillance (server room, control room, cash room, admin)	No	4	4	
36	Intercom Master unit in control room	No	1	1	
37	DG Set	No	1	1	
38	Firewall	No	1	1	
39	Servo Stabilizer (60 KVA -3 phase or as available at the plaza)	No	1	1	
40	Cabling/ Networking	LS	1	1	
41	Broadband Internet Connection	No	2	2	
42	24 Port Network switch (Layer 3)	No	2	2	
43	Static Weigh Bridge	No	2	0	Not Installed
44	PTZ CCTV Cameras	No	2	2	

Section 04 Neelmangla-Tumkur

Kulumepalya Toll Plaza

S.No	Equipment Description	Unit	Qty	Operational	Remarks
A	**Lane Level Equipment**				
1	RFID ETC transceiver near Pay-axis - mounted on canopy/pole	No	10	10	
2	Lane Controller with Industrial PC	No	10	10	
3	AVCC/ Axle Sensor with foundation	Set	10	10	
4	User Fare Display with mounting pole	No	10	10	
5	Automatic Barrier Gate	No	10	10	
6	Overhead Lane Status light (OHLS)	No	10	10	
7	Traffic light with mounting pole	No	10	10	
8	Loops with detector	No	20	20	
9	Incident Capture Camera with mounting pole	No	10	10	
10	License Plate Image Capture Camera with mounting poles	No	10	10	
11	Automatic Number Plate Recognition Camera with mounting pole (1 per lane)	No	10	0	Not Installed
12	Customized industrial grade keyboard	No	10	10	
13	TFT Monitor	No	10	10	
14	Thermal Receipt Printer	No	10	10	
15	Barcode Reader with Stand	No	0	0	
16	Violation light & Alarm (on existing pole) and Foot switch in booth	No	10	10	
17	Booth CCTV camera with voice recording	No	10	10	
18	Intercom Slave unit in booth	No	10	10	
19	Height Sensor with mounting pole	No	10	0	Not Installed
20	Fog Lights	No	10	0	Not Installed
21	Weigh in Motion	No	10	0	Not Installed
22	Lane Level UPS	No	10	10	
23	Network Switch	No	2	2	

S.No	Equipment Description	Unit	Qty	Operational	Remarks
24	Lane level software	LS	10	10	
B	**Plaza Level Equipment**				
25	Plaza Server (ETC Server) with Monitor and Keyboard	No	1	1	
26	Office PC with Monitor and Keyboard	No			
27	Workstations for MIS, Cashup, Audit & LSDU	No	4	4	
28	Nerwork Printer	No	1	1	
29	Plaza Level Software	LS	1	1	
30	Internet Router for Connection to the CCH	No	2	1	1 not available
31	UPS system with battery as required for complete ETC system (10 KVA or above)	No	2	2	
32	Outdore wifi access point(Managed & Rugged)	No	1	-	Not Installed
33	LED Display for CCTV Monitoring (55" inch)	No	1	0	Not Installed
34	Network Video Recorder (NVR)	No	2	2	
35	CCTV cameras for Plaza building surveillance (server room, control room, cash room, admin)	No	4	4	
36	Intercom Master unit in control room	No	1	1	
37	DG Set	No	1	1	
38	Firewall	No	1	1	
39	Servo Stabilizer (60 KVA -3 phase or as available at the plaza)	No	1	1	
40	Cabling/ Networking	LS	1	1	
41	Broadband Internet Connection	No	2	1	1 not available
42	24 Port Network switch (Layer 3)	No	2	2	
43	Static Weigh Bridge	No	2	0	Not Installed
44	PTZ CCTV Cameras	No	2	2	

Chokkenahalli Toll Plaza

S.No	Equipment Description	Unit	Qty	Operational	Remarks
A	**Lane Level Equipment**				
1	RFID ETC transceiver near Pay-axis - mounted on canopy/pole	No	10	10	
2	Lane Controller with Industrial PC	No	10	10	
3	AVCC/ Axle Sensor with foundation	Set	10	10	
4	User Fare Display with mounting pole	No	10	10	
5	Automatic Barrier Gate	No	10	10	
6	Overhead Lane Status light (OHLS)	No	10	10	
7	Traffic light with mounting pole	No	10	10	
8	Loops with detector	No	20	20	
9	Incident Capture Camera with mounting pole	No	10	10	
10	License Plate Image Capture Camera with mounting poles	No	10	10	
11	Automatic Number Plate Recognition Camera with mounting pole (1 per lane)	No	10	0	Not installed
12	Customized industrial grade keyboard	No	10	0	Not Working
13	TFT Monitor	No	10	10	
14	Thermal Receipt Printer	No	10	10	
15	Barcode Reader with Stand	No	0	0	
16	Violation light & Alarm (on existing pole) and Foot switch in booth	No	10	10	
17	Booth CCTV camera with voice recording	No	10	10	
18	Intercom Slave unit in booth	No	10	10	
19	Height Sensor with mounting pole	No	10	0	Not Installed
20	Fog Lights	No	10	0	Not Installed
21	Weigh in Motion	No	10	0	Not Installed
22	Lane Level UPS	No	10	10	
23	Network Switch	No	2	2	Not Installed
24	Lane level software	LS	10	10	

S.No	Equipment Description	Unit	Qty	Operational	Remarks
B	**Plaza Level Equipment**				
25	Plaza Server (ETC Server) with Monitor and Keyboard	No	1	1	
26	Workstations for MIS, Cashup, Audit & LSDU	No	4	4	
27	Nerwork Printer	No	1	1	
28	Plaza Level Software	LS	1	1	
29	Internet Router for Connection to the CCH	No	2	1	
30	UPS system with battery as required for complete ETC system (10 KVA or above)	No	2	2	
31	LED Display for CCTV Monitoring (55" inch)	No	1	1	
32	Network Video Recorder (NVR)	No	2	2	
33	CCTV cameras for Plaza building surveillance (server room, control room, cash room, admin)	No	4	4	
34	Intercom Master unit in control room	No	1	1	
35	DG Set	No	1	1	
36	Firewall	No	1	1	
37	Servo Stabilizer (60 KVA -3 phase or as available at the plaza)	No	1	1	
38	Cabling/ Networking	LS	1	1	
39	Broadband Internet Connection	No	2	1	
40	24 Port Network switch (Layer 3)	No	2	2	
41	Static Weigh Bridge	No	2	0	Not Installed
42	PTZ CCTV Cameras	No	2	2	

Note*- The existing two toll plazas at Kulumepalya and Chokkenahalli will be demolished, and new toll plazas at MCW (Ch. 53+100), Ramp RHS (Ch. 53+100), Ramp RHS (Ch. 46+375), LHS Ramp (Ch.49+900) and Ramp LHS (Ch. 47+425) shall be constructed by the Authority.

Accordingly, the MLFF will be provided by the Authority and shall be maintained by the TOT/InvIT Concessionaire after the completion of the DLP period.

Existing Toll Plazas (layout, Buildings and TMS Equipment) at Kaza Toll Plaza (Km 420+500) till implementation of MLFF by InvIT Concessionaire, Vanagram Toll Plaza (Km 16+500) {until the construction of new Toll Plaza at Km 6+500 (Tiruneermalai) by Authority}, Surapattu Toll Plaza (Km 28+600) till implementation of MLFF by InvIT Concessionaire, Nallur Toll Plaza(Km 21+625)- {until the construction of new Toll Plaza with MLFF at Km 34+180 (Durainallur) by the InvIT Concessionaire}, {kulumepalya Toll Plaza (Km 30+000) and Chokkenahalli Toll Plaza (Km 61+500) [until the construction new toll plazas with MLFF at MCW (Ch. 53+100), Ramp RHS (Ch. 53+100), Ramp RHS (Ch. 46+375), LHS Ramp (Ch.49+900) and Ramp LHS (Ch. 47+425) by Authority]}shall be retained and maintained.

MLFF shall be provided at Kaza Plaza (Km 420+500), Surapattu Plaza (Km 28+600), and Durainallur (Km 34+180) by the InvIT Concessionaire as per the specifications attached in Annexure-1. Any additional items required during the concession period for the proper functioning of the MLFF system shall also be provided, and no COS shall be considered.

After the implementation of MLFF, all existing facilities—such as the Admin Building, Traffic Aid Post, Medical Aid Post, Vehicle Rescue Post, toilet block, highway mini nest, and all other amenities within the toll plaza complex—shall be retained and maintained throughout the concession period.

The Concessionaire shall maintain/repair/replace existing TMS till implementation of MLFF.

Toll Plaza Maintenance shall be done by the Concessionaire as per provisions/ guidelines of MoRT&H/ Relevant Codal Provisions/ Circulars.

New Facilities such as electrical systems, Admin building, Traffic Aid Post, Medical Aid Post, Vehicle Rescue Post, 2 nos of toilet block, highway mini nest and all other facilities required/ mentioned in manual shall be provided shall be provided at following locations:

Table B- 1 Proposed Toll Plaza (Chennai Tada Section)

S. No.	Chainage of Toll Plaza (km)	Location
1	At Km 34+180	Durainallur

The Chainage of proposed toll plaza is tentative Chainage and exact location shall be finalized in coordination with IE and Authority

Note*:-

After completion of MLFF at Durainallur (Km 34+180), the existing plaza at Km 21+625 (Nallur) shall be demolished, and the carriageway and median shall be constructed and matched with the carriageway on both sides at the location given Below: -

S.No.	Chainage		Remark
	From	To	
1	21+400	21+865	Reconstruction (Flexible Pavement)

9.5 ATMS

- The following Specifications and Standards shall be applied in addition to 'Manual on Specifications and Standards for Highways published as IRC: SP: 99-2018 with all amendments and additions till date. Provision of ATMS in latest NHAI policy in vogue (currently, NHAI Policy Circular-Technical (11.53/2023) dt.10.10.2023 is being practiced which may be amended in due course of time) will govern the implementation. Latest Policy / Circular at the time of execution shall prevail.
- The ATMS implementation shall cover design, supply, installation, commissioning and operation and maintenance of Advanced Traffic Management Systems.
- The system would include out-door equipment including emergency call boxes, variable message signs systems, meteorological data system, close circuit TV camera (CCTV) system, traffic counting and classification system and transmission system. The indoor equipment would comprise a large display board, central computer (with Network Management System - NMS), CCTV monitor system, call centre system or management of emergency call boxes housed in a control centre with uninterrupted power supply. Any

new technology, meeting the requirements specified in these specifications should not be excluded. The systems shall meet following objectives:

a) Smooth and uninterrupted traffic flow
b) Enhance road safety
c) Real time information and guidance to users
d) Emergency assistance round the clock
e) Alerts for abnormal road and weather conditions
f) Reduced journey time and inconvenience

I. ATMS shall provide the following facilities to Highway users:

a) Make emergency calls to Control Centre in case of accidents, breakdown, fire and ambulance.
b) Pre-warn the Highway users about unusual condition on the road.
c) Alarming users on Over Speeding
d) Provide estimate details to cross particular stretch on highway between two pre-defined locations.

II. ATMS shall provide the following information/data to traffic managers for efficient and effective handling of traffic:

a) Information regarding location of any incident, incoming calls, help required and messages to be passed to third parties.
b) Information regarding traffic congestion, speed and weather conditions.

c) Information to users on over speeding and provides E challan as its integrated with Vahan and local state portal.

III. ATMS shall provide the following controls to traffic managers:

a) Change the variable message signs from the Control Centre.

b) Mobilize the movement of ambulances, cranes & patrolling vehicles.

c) Ensure timely help to users in emergency situations.

d) Monitoring traffic conditions and review incidents detected by VIDS and ANPR.

e) Monitoring video recording of accidents/ incidents for adding value addition to control accidents at prompt locations.

IV. The ATMS system shall include following sub-system:

a) Variable Message Sign system (Fixed and Portable)

b) Video Surveillance system / Traffic Monitoring Camera System (TMCS)

c) Video Incident Detection and Enforcement System (VIDES)

d) Vehicle Actuated Speed Display (VASD)

e) Emergency Call Boxes (ECB)

f) Mobile Radio Communication System

g) ATMS Command & Control Center with ATMS Software.

h) Power supply for Field Equipment as well as for ATMS Command & Control Center.

i) Communication Network with OFC Backbone.

V. These systems will include the following value additions:

a) Value Added Systems in the form of real time information on traffic conditions, unusual events, congestion levels, weather conditions etc.; to facilitate project users as also the Operator.

b) Through relevant websites including that for the Project SPV/Concessionaire.

c) Subscription based alert systems.

d) Dedicated TV channels pertaining to traffic movement.

e) Dedicated Toll-Free Telephone Systems.

9.6 Availability Requirements:

The inability to perform any required function, the occurrence of unexpected action or degradation of performance below the specifications shall be considered as a failure. The Mean-time-between-failure (MTBF) shall be the average operating time accumulated by the total population of identical items between failures. The system supplier/contractor shall submit MTBF and MTTR figures. The ATMS shall have an overall system availability of better than 99 percent. The ATMS shall be considered unavailable if any of its function cannot be properly executed and when any of the following conditions persist for more than 8 hours on the entire stretch: -

i. Variable Message System Failure: No display/Improper Display of VMS or failure of their related transmission/control system which would render the VMS inoperative.

ii. Emergency Call System Failure: Failure of any three consecutive Call boxes or failure of their related transmission system which would render the call boxes inoperative.

iii. ATCC Failure: Failure of more than one ATCC or failure of their related transmission system which would render the ATCC inoperative.

iv. Met Failure: Failure of more than one Met or failure of their related transmission system which would render the Met inoperative.

v. Video Surveillance System Failure: Failure of more than two Video Cameras or failure of their related transmission/control system which would render the cameras inoperative.

vi. Video Incident Detection System Failure: Failure of more than one Video Cameras or failure of their related transmission/control system which would render the cameras inoperative.

vii. Display at Control Centre: Whenever Control Centre is unable to get display of messages initiated by the Control Centre in-charge.

In addition to the above the system shall be considered unavailable when failure of the integrated ATMS Software or its hardware persists for more than 8 hours

9.7 Variable Message Signs (VMS):

Variable Massage Signs (VMSs) are to be installed for conveying the traffic conditions ahead to the drivers on real time basis

- Fixed VMS: Fixed VMS shall be mounted on a sturdy and aesthetically pleasing gantry structure with vertical clearance of at least 5.5 m
- Portable VMS: Portable signs shall be mounted at the back of a truck or similar vehicle

Variable message signs (VMSs) shall provide traveller information for warning, regulating, routing, and managing the traffic in order to improve the overall traffic flow.

Figure 7-9 : VMS System

9.8 Traffic Monitoring Camera System (TMCS):

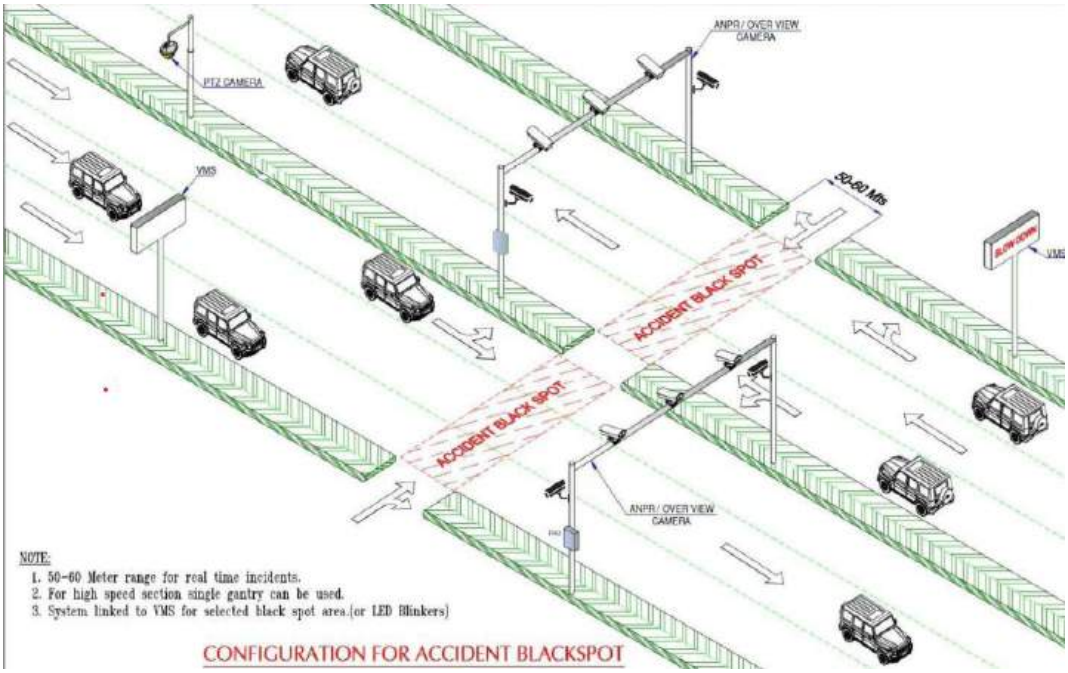
- Pan-Tilt-Zoom Cameras
- At least 1 every kilometre
- 100m night range minimum
- Placement should be such that entire highway Stretch is visible

- Basic intelligence included (Accident + Stalled Vehicles)
- AI Can be centralized or edge-based
- One Traffic Operator manually viewing per 15 Cameras

9.9 Video Incident Detection and Enforcement System (VIDES):

- **System of Camera(s):**
  - Overview Camera
  - Side Camera
  - ANPR Camera(s)
  - Radar (if needed)
  - IR and Thermal if needed
- Generally, every 10 kilometre in accident prone areas or areas with likely over-speeding or traffic rule violations.
- 14 kinds of incidents to be detected using AI.
  - 8 of which are eChallan based
- ATCC will be part of it.

- VIDES will have dedicated operators(s) and Smart TV in Command Center

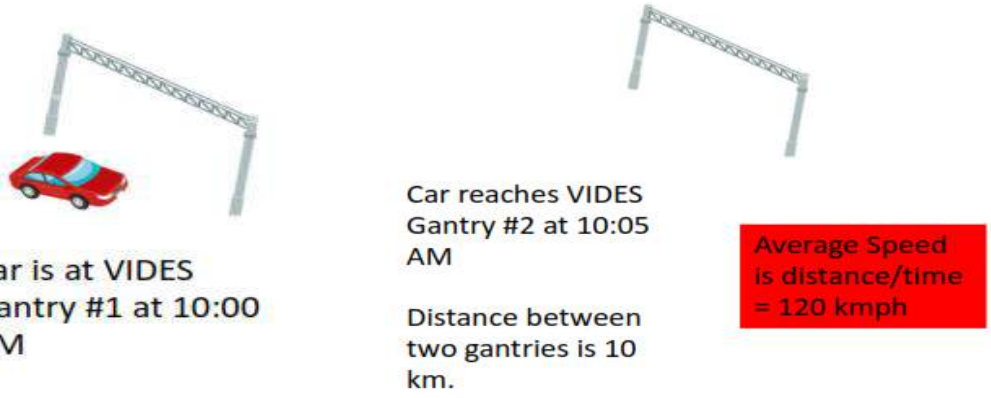


VIDES Incidents

Incident Type	Actionable
Accident	RPV/Ambulance/VMS/Rajmargyatra
Fog/Smoke	RPV/VMS/Rajmargyatra
Debris	RPV/VMS/Rajmargyatra
Pedestrian Crossing	RPV/VMS/Rajmargyatra
Animals on the carriageway	RPV/VMS/Rajmargyatra
Traffic Flow	Analysis/Messaging/Rajmargyatra
Overspeeding	eChallan

Incident Type	Actionable
Opposite Side Traffic	eChallan
Stalled or Stationary Vehicle	eChallan
Wrong Lane Driving	eChallan
Seatbelt Violation	eChallan
No Helmer in Two Wheeler	eChallan
Triple Ridings in Two Wheeler	eChallan
Two Wheeler or Banned Vehicle on Expressway	eChallan

Sectional Speeding



9.10 Vehicle Actuated Speed Display System (VASD):

- Radar and Lane-wise displays.
- No number plate recognition therefore no challan.
- Every 20 km and separated from VIDES.
- This is inexpensive way to warn before punishing offender through VIDES.

9.11 Automatic Number Plate Recognition (ANPR):

Automatic Number Plate Recognition (ANPR) system is based on artificial intelligence, providing a robust and ready-to-integrate system, capturing diverse types of license plates.

ANPR is also known as Automatic License Plate Recognition (ALPR), is software used to recognize the number plates automatically by performing sophisticated optical character recognition on images to read the license plates of vehicles.

Figure 7-10: ANPR System

9.12 Automatic Traffic Count and Classifier (ATCC):

The ATCC is a data-gathering instrument for use in the field (roadway). With Phoenix ATCC and possible combinations of sensors; traffic data and vehicle classification can be recorded and later retrieved. Speed, Number of Axles, Vehicle Class Type are just a few types of data, which can be gathered with this instrument. For the unit itself, the

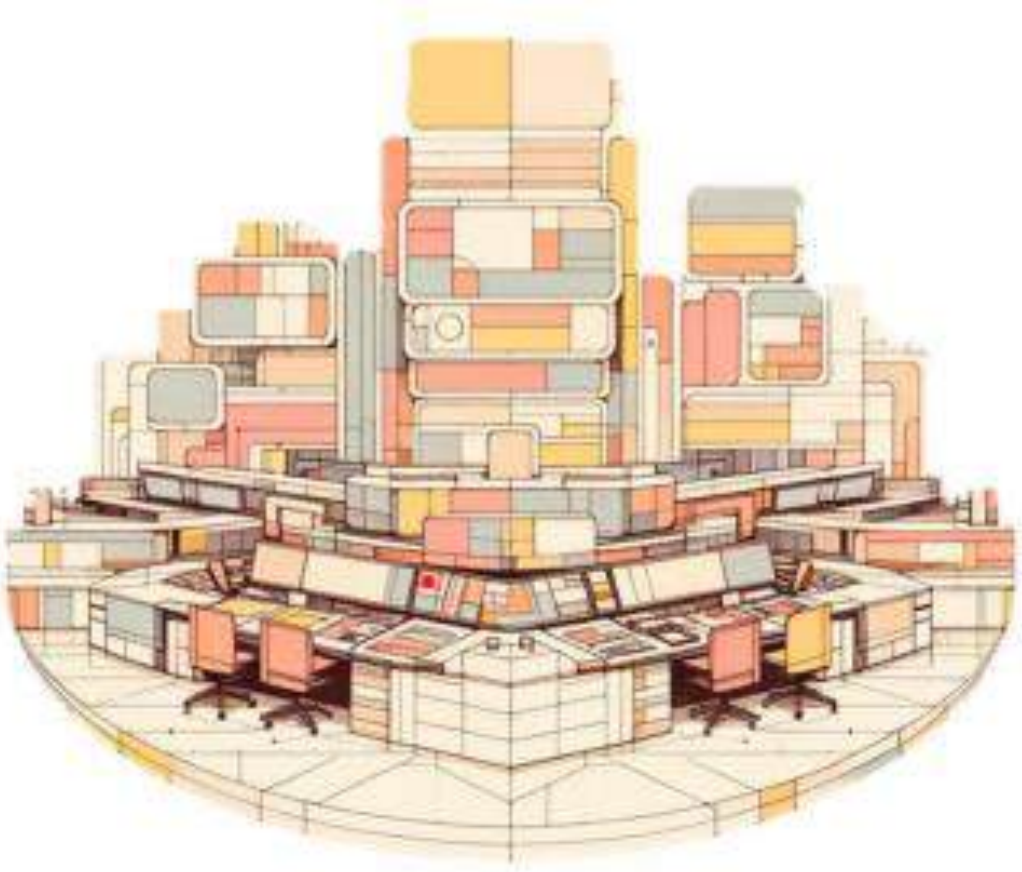
welded aluminium case is durable, lightweight, and weather resistant. The Interior keypad & display are both sealed to prevent moisture from damaging them. Inside the case is the heart of the unit, the microprocessor. Printed circuit boards contain the microprocessor, backup battery, charging network, memory, and all other support circuitry for the unit.

Figure 7-11: ATCC System

9.13 Command Centre-The Brain:

- Two Video walls (TMCS/General and VIDES)
- Hardware upgraded to modern standards

- Unifying ATMS software that integrates with sub- system software such as VIDES, TMCS etc.
- Software(s) should be STQC certified
- Video recording saved for 180 days
- Aadhaar Based Attendance
- 1 Traffic Operator Per 15 TMCS Cameras
- Highway O&M & Data Analyst added (Appendix C)



OFC Backbone:

- Protocol for Laying OFC Cable (9.7)

- Minimum depth is 1.65 m from ground and width greater than 0.3 m for OFC Cable.
- No trench should be left open overnight
- Backbone is 24 cores
- Backbone to peripheral equipment can be 8/12 cores

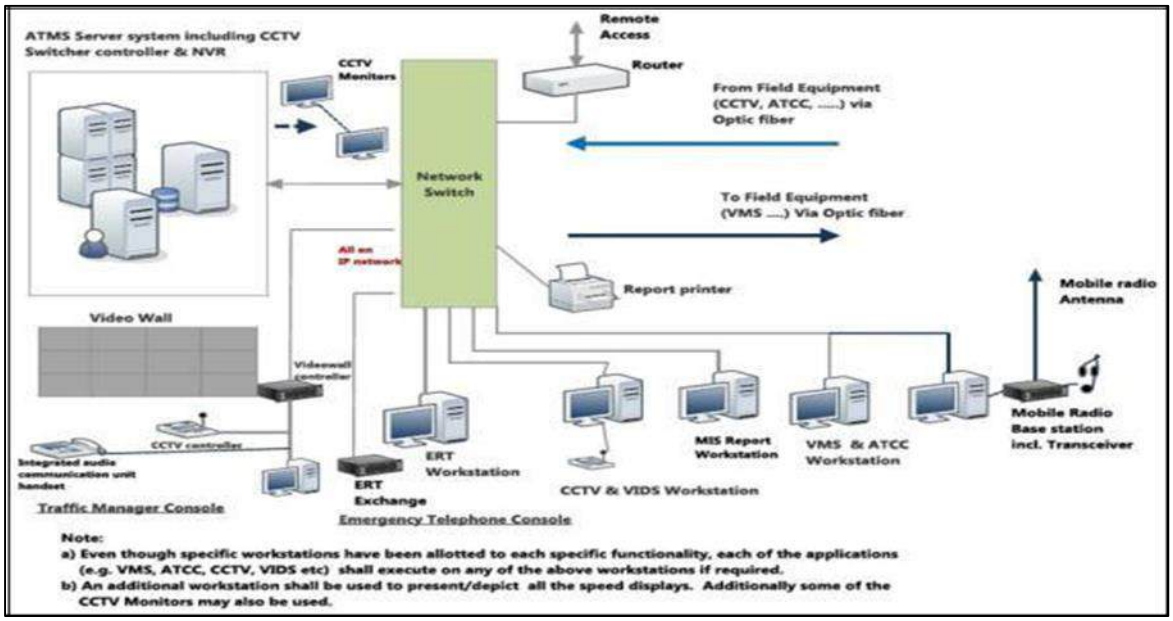


Figure 7-12: OFC Backbone

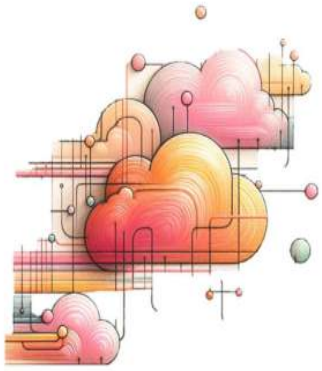
Other Sub-Systems

Sl No	ATMS Sub-Systems covered in 2016 Circular	Comments on relevance and adequacy
1	Variable Message Sign	1. Circular gives all sizes of VMS. 5x1.8m or higher size full gantry proposed for 4/6 Lane NH and Expressways. 2.4x1.5m L Type (cantilever) proposed for 2L+PS Highways and Blackspot Locations. 2. All other specifications as per IRC 67:2022 & IRC SP 85:2023 3. Location- At start and end of Project, Blackspot Locations and Junctions with NH & Expressways.
2	Emergency Call Box	1. Specifications as-is. 2. Mandatorily proposed for Greenfield Expressways and Hill Roads 3. PDs/ROs may see their relevance in other NHs or else may be de-scoped.
3	Mobile Radio Communication System	1. Specifications as-is. 2. Circular provides RPV, Ambulance, Crane to have vehicle mounted Units and staff to have handheld units 3. Mandatorily proposed for Expressways and Hill Roads 4. PDs/ROs may see their relevance in other NHs or else may be de-scoped.

Sl No	ATMS Sub-Systems covered in 2016 Circular	Comments on relevance and adequacy
4	Portable WIMs	Not relevant after installation of WIMs in all Toll Plazas (Descope)
5	Automatic Traffic Counter and Classifier	Not relevant as it will be done with VIDS ANPR cameras (Integrated with ANPR from VIDS)
6	Travel Time Estimation System	Not relevant as it will be done with VIDS ANPR cameras. (Descope)
7	Meteorological System (MET)	Not relevant in general in view of Meghdoot and other Apps. (Descope)
8	Communication & Networking	Adequately covered Made future-ready with 5G and cloud provisions
9	Power Supply	Adequately covered

Integrations

- DataLake for daily reporting and camera access **[API]**
- IP based video access with NHAI HQ for ICCC and Traffic Police Command Centers
- Integration with Rajmargyatra for broadcasting incidents **[API]**
- Provision to integrate with centralized computer aided dispatch system **[API]**
- Dedicated Work station for Traffic Enforcement Agency to sit in ATMS Control Room to improve coordination **[Physical]**
- Re-use of VIDES Gantry as Enforcement Gantry for GNSS Based Tolling



Provision for Dedicated 100 Mbps internet connectivity with Command Center for sharing of feeds/data over internet.

Suggestive Location of ATMS Equipment

Equipment	Locations
Video Surveillance System (PTZ Camera)	Min. 1 camera per km, alternating on both sides or on median. Additional cameras to be put up depending on non-linear structure, clovers, interchanges etc such effective surveillance of the entire highway stretch is achieved.
Video Incident Detection and Enforcement System (Overview Camera, ANPR Camera, Radar etc)	Min. 1 VIDES at every 10 km covering each side of Highway. Exact location of the VIDS should be such that it is placed facing accident and incident prone areas (blackspots, potential accident spot locations, clovers, interchanges, busy junctions etc, between two flyovers, IRAD data based etc). Additional VIDES can be put up depending on number of such locations as per audit by NHAI or Road Safety Experts or Recommendation of Local Traffic Police.
Variable Message Sign	At entry and exit of Project stretch, Blackspot locations, Major Junctions with NH/Expressways. Minimum 2 Portable VMS per Project Package
Vehicle Actuated Speed Display	Gantry Mounted System to be located after every 20km with minimum 2 in each package. Over speeding prone areas should also be considered.

Suggestive Location of ATMS Equipment (contd...)

Equipment	Locations
Emergency Road Side Telephone	Only for Zones experiencing telecom blackspots along highway need to be provided by ERT. On long highway stretches (> 2 km) suffering from telecom blackspots, ERT to be located at every 2 Km on both sides of the highway stretch.
Mobile Communication System	Mobile wireless towers (towers for the main base station and repeater stations) to be appropriately designed and quantities arrived at depending mainly on the highway terrain. Handsets with relevant members of the Dispatch & O&M team along with Portable/Mobile wireless sets on O&M vehicles
ATMS Command and Control Center	Typically at 1 location per 100 km for a highway or depending on the scheme/structure of the project

Table 7-20 :Existing ATMS along the project stretch

Section 01 Vijayawada-Chilakaluripet

SL No	Equipment Description	Unit	Total Installed Quantity
1	CCTV PTZ Cameras	No	17
2	VIDS	No	2 (LHS+RHS)
3	VASD	No	1 (LHS+RHS)
4	VMS	No	2
5	Portable VMS	No	2
6	ECB	No	16
7	Surveillance Cameras	No	58

Section 02 Chennai Bypass

SL No	Equipment Description	Unit	Total Installed Quantity
Nil			

Section 03 Chennai Tada

SL No	Equipment Description	Unit	Total Installed Quantity
1	CCTV PTZ Cameras	No	16
2	ATCC	No	3
3	RF tower	No	11
4	ECB	No	11

Section 04 Neelmangla-Tumkur

SL No	Equipment Description	Unit	Total Installed Quantity
Nil			

Table 7-21.1 : ATMS Requirement along the project stretch

Video Surveillance system / Traffic monitoring camera system (TMCS)

Section 01 Vijayawada-Chilakaluripet

ITS Devices / System	User Need / Application	Rationale for Equipment location	Quantity
PTZ CCTV Camera TMCS with basic analytics	To monitor traffic conditions (Day & Night) on the highway stretch including junctions, curves, ramps	Min. 1 camera per km, alternating on both side or on median. Additional cameras to be put up depending on non-linear structure, clovers, interchanges etc. such effective surveillance of the entire highway stretch is achieved.	52

Section 02 Chennai Bypass

ITS Devices / System	User Need / Application	Rationale for Equipment location	Quantity
PTZ CCTV Camera TMCS with basic analytics	To monitor traffic conditions (Day & Night) on the highway stretch including junctions, curves, ramps	Min. 1 camera per km, alternating on both side or on median. Additional cameras to be put up depending on non-linear structure, clovers, interchanges etc. such effective surveillance of the entire highway stretch is achieved.	32

Section 03 Chennai tada

ITS Devices / System	User Need / Application	Rationale for Equipment location	Quantity
PTZ CCTV Camera TMCS with basic analytics	To monitor traffic conditions (Day & Night) on the highway stretch including junctions, curves, ramps	Min. 1 camera per km, alternating on both side or on median. Additional cameras to be put up depending on non-linear structure, clovers, interchanges etc. such effective surveillance of the entire highway stretch is achieved.	33

Video incident Detection Enforcement System (VIDES)

Section 01 Vijayawada-Chilakaluripet

ITS Devices / System	User Need / Application	Rationale for Equipment location	Quantity
VIDES (Overview and ANPR Cameras) for VIDE with video analytics, enforcement and supported with local warning lights/VMS and e-challans generation	To automatically detect violations of traffic rules and collect evidence for e-Challan generation. Further, monitor (Day and Night) and warn road users on the main carriageway about dangerous traffic conditions (e.g. Contraflow, stopped traffic at Service road merged points, blind turns on the main carriageway & junctions with considerable traffic	Min. 1 VIDES at every 10 km covering each side of Highway. Exact location of the VIDES should be such that it is placed facing accident and incident prone areas (blackspots, potential accident spot location, clovers, interchanges, busy junctions etc.). Additional VIDES can be put up depending on number of such locations as per audit by NHAI or Road Safety Experts or Recommendation of Local Traffic Police. Provision of warning with flashing lights: 150 m before the area of detection.250 m before the area of detection to warn arriving vehicles. Provision of VMS linked to VIDES on Blackspots or high accident prone location decided by PD, NHAI. If warning VMS is used, then warning flashing lights may not be used on that location.	10

Section 02 Chennai Bypass

ITS Devices / System	User Need / Application	Rationale for Equipment location	Quantity
VIDES (Overview and ANPR Cameras) for VIDE with video analytics, enforcement and supported with local warning lights/VMS and e-challans generation	To automatically detect violations of traffic rules and collect evidence for e-Challan generation. Further, monitor (Day and Night) and warn road users on the main carriageway about dangerous traffic conditions (e.g. Contraflow, stopped traffic at Service road merged points, blind turns on the main carriageway & junctions with considerable traffic	Min. 1 VIDES at every 10 km covering each side of Highway. Exact location of the VIDES should be such that it is placed facing accident and incident prone areas (blackspots, potential accident spot location, clovers, interchanges, busy junctions etc.). Additional VIDES can be put up depending on number of such locations as per audit by NHAI or Road Safety Experts or Recommendation of Local Traffic Police. Provision of warning with flashing lights: 150 m before the area of detection.250 m before the area of detection to warn arriving vehicles. Provision of VMS linked to VIDES on Blackspots or high accident prone location decided by PD, NHAI. If warning VMS is used, then warning flashing lights may not be used on that location.	4

Section 03 Chennai tada

ITS Devices / System	User Need / Application	Rationale for Equipment location	Quantity
VIDES (Overview and ANPR Cameras) for VIDE with video analytics, enforcement and supported with local warning lights/VMS and e-challans generation	To automatically detect violations of traffic rules and collect evidence for e-Challan generation. Further, monitor (Day and Night) and warn road users on the main carriageway about dangerous traffic conditions (e.g. Contraflow, stopped traffic at Service road merged points, blind turns on the main carriageway & junctions with considerable traffic	Min. 1 VIDES at every 10 km covering each side of Highway. Exact location of the VIDES should be such that it is placed facing accident and incident prone areas (blackspots, potential accident spot location, clovers, interchanges, busy junctions etc.). Additional VIDES can be put up depending on number of such locations as per audit by NHAI or Road Safety Experts or Recommendation of Local Traffic Police. Provision of warning with flashing lights: 150 m before the area of detection.250 m before the area of detection to warn arriving vehicles. Provision of VMS linked to VIDES on Blackspots or high accident prone location decided by PD, NHAI. If warning VMS is used, then warning flashing lights may not be used on that location.	6

Vehicle Actuated Speed Display System (VASDS)

Section 01 Vijayawada-Chilakaluripet

ITS Devices / System	User Need / Application	Rationale for Equipment location	Quantity
Vehicle Actuated speed detection and warning system	To warm road users on over speeding	Gantry Mounted System to be located after every 20km with minimum 2 in each package. Exact of Location of VASD shall be such that it is at maximum distance from nearby videos to avoid duplication as videos take care of speed violation as well whereas VASD is just for warning. Further, over speeding prone area may be considered for exact placement.	4

Section 02 Chennai Bypass

ITS Devices / System	User Need / Application	Rationale for Equipment location	Quantity
Vehicle Actuated speed detection and warning system	To warm road users on over speeding	Gantry Mounted System to be located after every 20km with minimum 2 in each package. Exact of Location of VASD shall be such that it is at maximum distance from nearby videos to avoid duplication as videos take care of speed violation as well whereas VASD is just for warning. Further, over speeding prone area may be considered for exact placement.	2

Section 03 Chennai tada

ITS Devices / System	User Need / Application	Rationale for Equipment location	Quantity
Vehicle Actuated speed detection and warning system	To warm road users on over speeding	Gantry Mounted System to be located after every 20km with minimum 2 in each package. Exact of Location of VASD shall be such that it is at maximum distance from nearby videos to avoid duplication as videos take care of speed violation as well whereas VASD is just for warning. Further, over speeding prone area may be considered for exact placement.	4

Variable Message sign (VMS) System

Section 01 Vijayawada-Chilakaluripet

ITS Devices / System	User Need / Application	Rationale for Equipment location	Quantity
VMS Displays (Full Gantry in 4/6 Lane Highway/ Expressways and L Type in 2L+PS Highways, Blackspot Locations, Major Junctions with NH/Expressway)	To inform/warn/guide road users at start of highway stretch & important junctions on highway conditions for travel planning	Minimum 2 in each Project to be Temporarily deployed before locations related to road words and incidents affecting traffic movement. Message languages: Hindi, English & local Language	4

Section 02 Chennai Bypass

ITS Devices / System	User Need / Application	Rationale for Equipment location	Quantity
VMS Displays (Full Gantry in 4/6 Lane Highway/ Expressways and L Type in 2L+PS Highways, Blackspot Locations, Major Junctions with NH/Expressway)	To inform/warn/guide road users at start of highway stretch & important junctions on highway conditions for travel planning	Minimum 2 in each Project to be Temporarily deployed before locations related to road words and incidents affecting traffic movement. Message languages: Hindi, English & local Language	2

Section 03 Chennai tada

ITS Devices / System	User Need / Application	Rationale for Equipment location	Quantity
VMS Displays (Full Gantry in 4/6 Lane Highway/ Expressways and L Type in 2L+PS Highways, Blackspot Locations, Major Junctions with NH/Expressway)	To inform/warn/guide road users at start of highway stretch & important junctions on highway	Minimum 2 in each Project to be Temporarily deployed before locations related to road words and incidents affecting traffic movement. Message languages: Hindi, English & local Language	2

ITS Devices / System	User Need / Application	Rationale for Equipment location	Quantity
	conditions for travel planning		

The Concessionaire shall provide 2 (Nos.) Trolley Mounted Portable VMS.

ATMS Command & Control Center

Section 01 Vijayawada-Chilakaluripet

ITS Devices / System	User Need / Application	Rationale for Equipment location	Quantity
ATMS Control Centre	Using a suitable electronic and IT system (hardware and software) integrated with the ATMS field equipment, it supports centralized Monitoring of highway stretch receiving emergency calls and active management of accidents including providing system aided guidance and traffic Management activities.	Typically, at 1 location per 100 km for a highway or one per project depending upon the scheme	1

Section 02 Chennai Bypass

ITS Devices / System	User Need / Application	Rationale for Equipment location	Quantity
ATMS Control Centre	Using a suitable electronic and IT system (hardware and software) integrated with the ATMS field equipment, it supports centralized Monitoring of highway stretch receiving emergency calls and active management of accidents including providing system aided guidance and traffic Management activities.	Typically, at 1 location per 100 km for a highway or one per project depending upon the scheme	1

Section 03 Chennai tada

ITS Devices / System	User Need / Application	Rationale for Equipment location	Quantity
ATMS Control Centre	Using a suitable electronic and IT system (hardware and software) integrated with the ATMS field equipment, it supports centralized Monitoring of highway stretch receiving emergency calls and active management of accidents including providing system aided guidance and traffic Management activities.	Typically, at 1 location per 100 km for a highway or one per project depending upon the scheme	1

For Section 04 Neelmangla-Tumkur-ATMS Shall be Provided by Authority and same shall be maintained by InvIT concessionaire after end of DLP period.

CHAPTER 10

DESIGN AND DOCUMENT REVIEW

10.1 DESIGN REVIVEW

10.1.1 General

Design is one of the important aspects of highway project. In four laning projects of NHAI, specifications and standards are defined as per four laning manual. Most of the elements of four laning like cross sections, super structures, drains, amenities etc. are typical and standard. Foundation of structure and pavement design are aspects which have major impact on life of highway asset to sustain during concession period and thereafter.

10.1.2 Pavement Design

Pavement design is basically an interplay between ground strata strength and traffic loading on pavement.

Vijayawada- Chilakaluripet.

A. Soil Strata

Section-01 Vijayawada-Chilakaluripet

The degree of compaction along the project corridor is ranging between 86.84% to 99.47% with an average value of 93.15% and the 4-days soaked CBR is ranging from 8.54% to 13.28% with an average value of 10.91%.

B. Traffic Loading

As per the trial pit survey, The existing pavement along the project corridor is Flexible in nature. The Flexible pavement composition comprises of Bituminous Layer, Granular Layer-I (WMM) and Granular Layer-II (GSB) on subgrade with average of 180 mm thick bituminous layer over 450 mm thick Granular layer

Chennai Bypass.

A. Soil Strata

Section-02 Chennai Bypass

The 4-days soaked CBR is ranging from 9.86% to 10.11% with an average value of 9.98%.

B. Traffic Loading

As per the trial pit survey, The existing pavement along the project corridor is Flexible in nature. The Flexible pavement composition comprises of Bituminous Layer, Granular Layer-I (WMM) and Granular Layer-II (GSB) on subgrade with average of 220 mm thick bituminous layer over 450 mm thick Granular layer

Chennai- Tada.

A. Soil Strata

Section-03 Chennai-Tada

The degree of compaction along the project corridor is ranging between 93.16% to 99.48% with an average value of 96.32% and the 4-days soaked CBR is ranging from 9.48% to 10.91% with an average value of 10.195%.

B. Traffic Loading

As per the trial pit survey, The existing pavement along the project corridor is Flexible in nature. The Flexible pavement composition comprises of Bituminous Layer, Granular Layer-I (WMM) and Granular Layer-II (GSB) on subgrade with average of 180 mm thick bituminous layer over 450 mm thick Granular layer

The FWD analysis is given in Chapter-7: Repair and rehabilitation of pavement.

10.1.3 Structure Design

Design drawing of structures were studied at site. All designs of structures are approved by IE. Elements of structural design were as per standard.

A detailed inventory of structures was carried out during which some minor issues were observed at structures on project road, a detailed structure wise inventory along with observations and recommendations is given in Chapter-8.

10.1.4 Toll Plaza

Toll plaza was visited for assessment of the existing condition of the Plaza with respect to Section 10 of IRC SP 84-2014 during which some shortfalls were observed in the existing infrastructure at toll plaza. A detailed inventory along with shortcomings and improvement proposals is given in Chapter-11.

10.2 DOCUMENT REVIEW

10.2.1 General

Vijayawada-Chilakaluripet: The Site of Six lane divided Project Highway comprises the section commencing from (Km 355+000 to Km 357+342), (Km 372+038 to Km 422+605), (Km 0+000 to Km 16+499) at Vijayawada of NH-16 and has Kaza toll Plazas at Km 420+500 on project Section in the state of Andhra Pradesh. The total length of Project Stretch is 69.408 km.

Chennai Bypass: Project Stretch starts from Km 0+000 and ends at Km 32+600 of NH-32/ NH-48 and has Vanagram toll Plazas at Km 16+500 and Surapattu toll Plazas at Km 28+600 on project Section in the state of Tamil Nadu. The total length of Project Stretch is 32.600 km.

Chennai-Tada: Project Stretch starts from Km 21+400 and ends at Km 54+400 of NH-16 and has Nallur toll Plazas at Km 21+625 on project Section in the state of Tamil Nadu. The total length of Project Stretch is 33.000 km.

Neelmangla- Tumkur: Project Stretch starts from Km 29+500 and ends at Km 74+168 of NH-48 and has kulumepalya toll plazas at Km 30+000 and Chokkenahalli toll plaza Km 61+500 on project Section in the state of Karnataka. The total length of Project Stretch is 44.668 km.

10.2.2 Under Consideration/Construction Work

S. No.	Particulars	Locations	Chainage	Tentative Hand Over Date	Brief Description of proposed improvement work
Vijayawada-Chilakaluripet					
2	DPR Tender invited For Access Controlled Highway	Addanki to Vijayawada	355+000 to 422+605	-	Part of BKV(Banglore-Kadappa-Vijayawada) Project
Chennai Bypass					
1	Shifting of Vanagram Toll plaza	Tiruneermalai	6+500	-	Shifting of Vanagram Toll plaza from 16+500 to 6+500
2	Construction of VUP	Porur	16+890	-	Construction of VUP of size 20*5.5
3	Construction of cut and cover RCC drain	Thamvaram	(Km. 0+370 to 1+280 and 31+400 to 31+800)LHS and (30+400 to 30+000) on RHS	-	Construction of cut and cover RCC drain from Km. (0+370 to 1+280 and 31+400 to 31+800)LHS and (30+400 to 30+000) on RHS
4	FOB	Nolambur	21+800	-	Construction of FOB with Width of 59.505m including Light

S. No.	Particulars	Locations	Chainage	Tentative Hand Over Date	Brief Description of proposed improvement work
5	Construction of Entry-Exit ramp	Porur	(km. 5+200 to 5+700)	-	Widening of Service Road and new construction of entry ramp (from Chainage 5+200 to 5+410 & 5+410 to 5+727) - 527m (LHS) including acceleration lane length and New Construction of exit ramp (from Chainage 5+696 to 5+510 & 5+510 to 5+200) - 496m (RHS) including deceleration length.
6	Construction of Causeway across Coovum River at Km 19+000	Maduravoyal	19+000	-	Construction of Causeway bridge (5.5m wide) across Coovum River underneath the Grade Separator at Km 19.000, Maduravoyal (from Km 19.180 to Km 19.520, RHS)
Chennai Tada					
NIL					
Neelmangla-Tumkur					

S. No.	Particulars	Locations	Chainage	Tentative Hand Over Date	Brief Description of proposed improvement work
	• The section from Chainage 29+000 to 49+900 ,52+700 to 53+500 is currently under construction of six-laning . After the completion of the DLP period for this section, it shall maintained by the TOT/InvIT concessionaire. • The DPR for six-laning has been invited by the authority for the stretch from Chainage 49+900 to 61+520. After the completion of the DLP period for this six-laning stretch, it shall be maintained by the TOT/InvIT concessionaire. • New Toll Plaza with MLFF (Multi lane free flow system) shall be provided by Authority at MCW (Ch. 53+100), Ramp RHS (Ch. 53+100), Ramp RHS (Ch. 46+375), LHS Ramp (Ch.49+900) and Ramp LHS (Ch. 47+425) and the same shall be maintained by InvIT Concessionaire.				

10.3 Toll Contracts

Toll is being collected by Toll Collection Agency appointed by NHAI through open competitive bidding.

CHAPTER 11

COST ESTIMATE

11.1 General

The cost estimate has been prepared for the Project Stretch. Detail of the Project Stretch is presented in table below for ready reference.

Table 7-22 : Project Stretch

Section No.	Section Name		Chainage (Km)		Length (Km)
	From	To	From	To	
Section-1	Chilakaluripet	Vijayawada	355+000	357+342	2.342
	Chilakaluripet Bypass		0+000	16+499	16.499
	Chilakaluripet	Vijayawada	372+038	422+605	50.567
Section-2	Chennai Bypass		0+000	32+600	32.6
Section-3	Chennai	Tada	21+400	54+400	33.0
Section-4	Neelmangla	Tumkur	29+500	61+520	32.02
	Tumkur Bypass		61+520	74+168	12.648
Total					**179.676**

The Project cost estimates have been prepared based on various items of works required such as:

- ATMS
- MLFF
- New Toll plaza

11.2 Improvement Proposal

11.3 Rate Analysis

Basic Schedule Rates 2025-26 for has been considered for cost estimates. Following the review, some items not available in SOR, have been considered as per prevailing industry /Market rates.

11.4 Estimates of Cost for Engineering and Safety Improvements

Initial Cost for Engineering and Safety Improvements for Base year 2025-26:

Section-01 Vijayawada-Chilakaluripet

Particulars	Unit	Quantity	Cost (in Cr.)
ATMS	KM	52.91	8.237
MLFF at existing Toll Plaza	Nos	1	5.000
Total Excluding @18% GST			**13.237**
GST @18%			**2.383**
Total Amount			**15.619**

Section-02 Chennai Bypass

Particulars	Unit	Quantity	Cost (in Cr.)
ATMS	KM	32.6	4.981
MLFF at existing Toll Plaza Lanes (Surapattu)	Nos	1	5.000
Total Excluding @18% GST			**9.981**
GST @18%			**1.797**
Total Amount			**11.777**

Section-03 Chennai-Tada

Particulars	Unit	Quantity	Cost (in Cr.)
ATMS	KM	33	5.498
New Toll Plaza with MLFF	Nos	1	8.436
Total Excluding @18% GST			**13.934**
GST @18%			**2.508**
Total Amount			**16.442**

Section-04 Neelmangla Tumkur

Particulars	Unit	Quantity	Cost (in Cr.)
Nil			

Note: - The rates for ATMS equipment and MLFF have been considered based on prevailing NHAI practices and accepted cost norms used in similar NHAI projects.

CHAPTER 12

OPERATION & MAINTENANCE REQUIREMENT

12.1 General

Operation & Maintenance requirement of project stretch is assessed in following heads

A. Regular / Routine Operation and Maintenance

B. Periodic Operation and Maintenance

Regular maintenance consists of primarily highway maintenance which covers road repairs of pavement, shoulders, other traffic amenities and systems, structure, median, plants etc. cleaning, and maintenance Highway patrolling and surveillance, accident management are also part of regular Operation and Maintenance (O&M).

operation is not in Concessionaire scope this being an Annuity based contract.

At certain period elements like pavement, structures, etc. require major maintenance in form of overlays, replacement etc. These come under periodic maintenance.

Cost of such regular and periodic maintenance is worked out and has been given in subsequent sections of this chapter.

The assumptions used in this analysis have been discussed

Particulars	Assumptions
Routine Maintenance Costs	0.035 crores/Km/Year (Year FY 2011-12) -flexible and 0.04 crores/Km/Year (Year FY 2011-12) -Rigid
Periodic Maintenance Costs	0.35 crores/Km/every 6 Years (Year FY 2011-12)
Electricity and Patrolling Expenses	0.0125 crores/Km/Year (Year FY 2010-11)
Office Expenditure	2.5 crores/Year (Year FY 2010-11)
Insurance	0.15% of Total Project Cost (TPC
Toll Expense	1.60 crore per Toll Plaza (Year FY 2010-11) for Four Lane

12.1.1 Routine Operation and Maintenance

Cost of Routine Operation and Maintenance of project is given below.

Table 7-23 : Cost of Routine Maintenance at current rates

Section-01 Vijayawada-Chilakaluripet

Year	Routine Maintenance (in Cr)	Toll Plaza & ATMS Operation and Maintenance (in Cr)	Electricity & Patrolling expenses (in Cr)	Other office expenses (in Cr)	Insurance (in Cr)	Total Maintenance Amount (in Cr) incl GST (excluding Periodic Maintenance)
2026-2027	0.00	4.69	0.00	0.30	0.02	5.91
2027-2028	0.00	4.69	0.00	0.30	0.02	5.91
2028-2029	0.00	4.69	0.00	0.30	0.02	5.91
2029-2030	0.00	4.69	0.00	0.30	0.02	5.91
2030-2031	0.00	4.69	0.00	0.30	0.02	5.91
2031-2032	0.00	4.69	0.00	0.30	0.02	5.91
2032-2033	10.02	4.69	1.44	5.46	3.61	29.76
2033-2034	10.02	4.69	1.44	5.46	3.61	29.76
2034-2035	10.02	4.69	1.44	5.46	3.61	29.76
2035-2036	10.02	4.69	1.44	5.46	3.61	29.76
2036-2037	10.02	4.69	1.44	5.46	3.61	29.76
2037-2038	10.02	4.69	1.44	5.46	3.61	29.76
2038-2039	0.00	4.69	1.44	5.46	3.61	17.94
2039-2040	12.87	5.07	1.89	5.46	4.70	35.38
2040-2041	12.87	5.07	1.89	5.46	4.70	35.38

Section-02 Chennai Bypass

Year	Routine Maintenance (in Cr)	Toll Plaza & ATMS Operation and Maintenance (in Cr)	Electricity & Patrolling expenses (in Cr)	Other office expenses (in Cr)	Insurance (in Cr)	Total Maintenance Amount (in Cr) incl GST (excluding Periodic Maintenance)
2026-2027	5.46	7.72	0.89	5.46	0.74	23.92
2027-2028	5.46	7.72	0.89	5.46	0.74	23.92
2028-2029	5.46	7.72	0.89	5.46	0.74	23.92
2029-2030	5.46	7.72	0.89	5.46	0.74	23.92
2030-2031	5.46	7.72	0.89	5.46	0.74	23.92
2031-2032	5.46	7.72	0.89	5.46	0.74	23.92
2032-2033	0.00	7.72	0.89	5.46	0.74	17.47
2033-2034	5.46	7.72	0.89	5.46	0.74	23.92

Year	Routine Maintenance (in Cr)	Toll Plaza & ATMS Operation and Maintenance (in Cr)	Electricity & Patrolling expenses (in Cr)	Other office expenses (in Cr)	Insurance (in Cr)	Total Maintenance Amount (in Cr) incl GST (excluding Periodic Maintenance)
2034-2035	5.46	7.72	0.89	5.46	0.74	23.92
2035-2036	5.46	7.72	0.89	5.46	0.74	23.92
2036-2037	5.46	7.72	0.89	5.46	0.74	23.92
2037-2038	5.46	7.72	0.89	5.46	0.74	23.92
2038-2039	0.00	7.72	0.89	5.46	0.74	17.47
2039-2040	5.46	7.72	0.89	5.46	0.74	23.92
2040-2041	5.46	7.72	0.89	5.46	0.74	23.92

Section-03 Chennai-Tada

Year	Routine Maintenance (in Cr)	Toll Plaza & ATMS Operation and Maintenance (in Cr)	Electricity & Patrolling expenses (in Cr)	Other office expenses (in Cr)	Insurance (in Cr)	Total Maintenance Amount (in Cr) incl GST (excluding Periodic Maintenance)
2026-2027	6.54	4.24	0.90	5.46	1.15	21.59
2027-2028	6.54	4.24	0.90	5.46	1.15	21.59
2028-2029	6.54	4.24	0.90	5.46	1.15	21.59
2029-2030	6.54	4.24	0.90	5.46	1.15	21.59
2030-2031	6.54	4.24	0.90	5.46	1.15	21.59
2031-2032	6.54	4.24	0.90	5.46	1.15	21.59
2032-2033	6.54	4.24	0.90	5.46	1.15	21.59
2033-2034	0.00	4.24	0.90	5.46	1.15	13.87
2034-2035	6.54	4.24	0.90	5.46	1.15	21.59
2035-2036	6.54	4.24	0.90	5.46	1.15	21.59
2036-2037	6.54	4.24	0.90	5.46	1.15	21.59
2037-2038	6.54	4.24	0.90	5.46	1.15	21.59
2038-2039	6.54	4.24	0.90	5.46	1.15	21.59
2039-2040	0.00	4.24	0.90	5.46	1.15	13.87
2040-2041	6.54	4.24	0.90	5.46	1.15	21.59

Section-04 Neelmangla-Tumkur

Year	Routine Maintenance (in Cr)	Toll Plaza & ATMS Operation and Maintenance (in Cr)	Electricity & Patrolling expenses (in Cr)	Other office expenses (in Cr)	Insurance (in Cr)	Total Maintenance Amount (in Cr) incl GST (excluding Periodic Maintenance)
2026-2027	0.00	11.87	0.00	0.30	0.01	14.38

Year	Routine Maintenance (in Cr)	Toll Plaza & ATMS Operation and Maintenance (in Cr)	Electricity & Patrolling expenses (in Cr)	Other office expenses (in Cr)	Insurance (in Cr)	Total Maintenance Amount (in Cr) incl GST (excluding Periodic Maintenance)
2027-2028	0.00	11.87	0.00	0.30	0.01	14.38
2028-2029	0.00	11.87	0.00	0.30	0.01	14.38
2029-2030	0.89	11.87	0.33	5.46	0.35	22.30
2030-2031	0.89	11.87	0.33	5.46	0.35	22.30
2031-2032	0.89	11.87	0.33	5.46	0.35	22.30
2032-2033	7.29	12.61	1.22	5.46	1.29	32.88
2033-2034	8.79	12.89	1.22	5.46	1.29	34.98
2034-2035	8.79	12.89	1.22	5.46	1.29	34.98
2035-2036	6.40	12.89	1.22	5.46	1.29	32.16
2036-2037	8.79	12.89	1.22	5.46	1.29	34.98
2037-2038	8.79	12.89	1.22	5.46	1.29	34.98
2038-2039	2.39	12.89	1.22	5.46	1.29	27.43
2039-2040	8.79	12.89	1.22	5.46	1.29	34.98
2040-2041	6.40	12.89	1.22	5.46	1.29	32.16

12.1.2 Periodic Operation and Maintenance

Cost of Periodic operation and maintenance is given below.

Table 7-24 : Cost of Periodic & Routine Maintenance at current rates

Section-01 Vijayawada-Chilakaluripet

Year	Total Maintenance Amount (in Cr) incl GST (excluding Periodic Maintenance)	Total Periodic Maintenance Amount (in Cr) incl GST
2026-2027	5.91	0.00
2027-2028	5.91	0.00
2028-2029	5.91	0.00
2029-2030	5.91	0.00
2030-2031	5.91	0.00
2031-2032	5.91	0.00
2032-2033	29.76	0.00
2033-2034	29.76	0.00
2034-2035	29.76	0.00
2035-2036	29.76	0.00
2036-2037	29.76	0.00

Year	Total Maintenance Amount (in Cr) incl GST (excluding Periodic Maintenance)	Total Periodic Maintenance Amount (in Cr) incl GST
2037-2038	29.76	0.00
2038-2039	17.94	150.73
2039-2040	35.38	0.00
2040-2041	35.38	0.00

Section-02 Chennai Bypass

Year	Total Maintenance Amount (in Cr) incl GST (excluding Periodic Maintenance)	Total Periodic Maintenance Amount (in Cr) incl GST
2026-2027	23.92	0.00
2027-2028	23.92	0.00
2028-2029	23.92	0.00
2029-2030	23.92	0.00
2030-2031	23.92	0.00
2031-2032	23.92	0.00
2032-2033	17.47	76.54
2033-2034	23.92	0.00
2034-2035	23.92	0.00
2035-2036	23.92	0.00
2036-2037	23.92	0.00
2037-2038	23.92	0.00
2038-2039	17.47	76.54
2039-2040	23.92	0.00
2040-2041	23.92	0.00

Section-03 Chennai-Tada

Year	Total Maintenance Amount (in Cr) incl GST (excluding Periodic Maintenance)	Total Periodic Maintenance Amount (in Cr) incl GST
2026-2027	21.59	0.00
2027-2028	21.59	0.00
2028-2029	21.59	0.00
2029-2030	21.59	0.00
2030-2031	21.59	0.00
2031-2032	21.59	0.00
2032-2033	21.59	0.00
2033-2034	13.87	99.08
2034-2035	21.59	0.00
2035-2036	21.59	0.00
2036-2037	21.59	0.00

Year	Total Maintenance Amount (in Cr) incl GST (excluding Periodic Maintenance)	Total Periodic Maintenance Amount (in Cr) incl GST
2037-2038	21.59	0.00
2038-2039	21.59	0.00
2039-2040	13.87	99.08
2040-2041	21.59	0.00

Section-04 Neelmangla-Tumkur

Year	Total Maintenance Amount (in Cr) incl GST (excluding Periodic Maintenance)	Total Periodic Maintenance Amount (in Cr) incl GST
2026-2027	14.38	0.00
2027-2028	14.38	0.00
2028-2029	14.38	0.00
2029-2030	22.30	0.00
2030-2031	22.30	0.00
2031-2032	22.30	0.00
2032-2033	32.88	0.00
2033-2034	34.98	0.00
2034-2035	34.98	0.00
2035-2036	32.16	35.33
2036-2037	34.98	0.00
2037-2038	34.98	0.00
2038-2039	27.43	97.87
2039-2040	34.98	0.00
2040-2041	32.16	35.33

12.2 Total Cost of Operation and Maintenance

Total cost of operation and maintenance consist of both regular and periodic maintenance.

Table 7-25 : Total OMEX Routine & Perodic with escalation

Section-01 Vijayawada-Chilakaluripet

Year	Total Maintenance Amount (in Cr) incl GST (excluding Periodic Maintenance)	Total Periodic Maintenance Amount(in Cr) incl GST	Total Amount (in Cr) incl GST
2026-2027	5.91	0.00	5.91
2027-2028	6.21	0.00	6.21
2028-2029	6.52	0.00	6.52
2029-2030	6.85	0.00	6.85
2030-2031	7.19	0.00	7.19
2031-2032	7.55	0.00	7.55
2032-2033	39.89	0.00	39.89
2033-2034	41.88	0.00	41.88
2034-2035	43.98	0.00	43.98
2035-2036	46.17	0.00	46.17
2036-2037	48.48	0.00	48.48
2037-2038	50.91	0.00	50.91
2038-2039	32.21	270.70	302.91
2039-2040	66.71	0.00	66.71
2040-2041	70.05	0.00	70.05

Section-02 Chennai Bypass

Year	Total Maintenance Amount (in Cr) incl GST (excluding Periodic Maintenance)	Total Periodic Maintenance Amount(in Cr) incl GST	Total Amount (in Cr) incl GST
2026-2027	23.92	0.00	23.92
2027-2028	25.12	0.00	25.12
2028-2029	26.37	0.00	26.37
2029-2030	27.69	0.00	27.69
2030-2031	29.08	0.00	29.08
2031-2032	30.53	0.00	30.53
2032-2033	23.42	102.57	125.99
2033-2034	33.66	0.00	33.66
2034-2035	35.34	0.00	35.34
2035-2036	37.11	0.00	37.11
2036-2037	38.96	0.00	38.96
2037-2038	40.91	0.00	40.91
2038-2039	31.38	137.46	168.84
2039-2040	45.11	0.00	45.11
2040-2041	47.36	0.00	47.36

Section-03 Chennai-Tada

Year	Total Maintenance Amount (in Cr) incl GST (excluding Periodic Maintenance)	Total Periodic Maintenance Amount(in Cr) incl GST	Total Amount (in Cr) incl GST
2026-2027	21.59	0.00	21.59
2027-2028	22.66	0.00	22.66
2028-2029	23.80	0.00	23.80
2029-2030	24.99	0.00	24.99
2030-2031	26.24	0.00	26.24
2031-2032	27.55	0.00	27.55
2032-2033	28.93	0.00	28.93
2033-2034	19.51	139.42	158.93
2034-2035	31.89	0.00	31.89
2035-2036	33.49	0.00	33.49
2036-2037	35.16	0.00	35.16
2037-2038	36.92	0.00	36.92
2038-2039	38.76	0.00	38.76
2039-2040	26.15	186.83	212.98
2040-2041	42.74	0.00	42.74

Section-04 Neelmangla-Tumkur

Year	Total Maintenance Amount (in Cr) incl GST (excluding Periodic Maintenance)	Total Periodic Maintenance Amount(in Cr) incl GST	Total Amount (in Cr) incl GST
2026-2027	14.38	0.00	14.38
2027-2028	15.10	0.00	15.10
2028-2029	15.85	0.00	15.85
2029-2030	25.82	0.00	25.82
2030-2031	27.11	0.00	27.11
2031-2032	28.46	0.00	28.46
2032-2033	44.06	0.00	44.06
2033-2034	49.21	0.00	49.21
2034-2035	51.67	0.00	51.67
2035-2036	49.88	54.81	104.69
2036-2037	56.97	0.00	56.97
2037-2038	59.82	0.00	59.82
2038-2039	49.25	175.76	225.01
2039-2040	65.95	0.00	65.95
2040-2041	63.67	69.95	133.62

Annexure-I

Standard Specification of MLFF

Multi-Lane Free Flow (MLFF) Barrier Less Tolling

A. General

1. The Concessionaire shall implement Automatic Number Plate Recognition (ANPR) Camera and RFID (FASTAG) based Barrier Less Multi Lane Free Flow (MLFF) Tolling System at the proposed Toll Plaza location on the Highway stretch.
2. The Solution shall be integrated with e-Notice Module developed by National Informatics Center (NIC) through Central Clearing House (CCH) wherein the violators will be issued e-Notice in case they cross the Toll Plaza with FASTag that is not valid and functional. The Authority shall provide assistance in integrating the system with the e-Notice Module prepared by NIC.
3. The e-Notice shall be issued to the violators by NIC for amount equal to two times the fee applicable to that category of vehicles as per sub-rule (2) of rule 4 of the National Highways Fee (Determination of Rates and Collection) Rules 2008.The payment received against the e-Notice shall be settled through the Payment Gateway (PG) to the designated Bank Account(s) as per the prevailing guidelines.
4. In case of non-payment of fees against the e-Notice within prescribed time, the road user shall have restrictions on the VAHAN based services and blacklisting of VRN / FASTag under NETC system.

B. Standards & Specifications

1. **MLFF Project**

    a. The Concessionaire shall either:

        1) Implement MLFF based tolling facility by installing new Gantries on main carriageway of the highway (minimum 02 (01 Main & 01 redundant)) for each direction (LHS & RHS) for MLFF based tolling within approx. 350m of existing fee plaza provided:

            i. The Concessionaire shall be fully responsible for ensuring the continuous safety, security, and illumination of the installed gantries, covering all necessary measures to protect the infrastructure and provide clear visibility under all weather and lighting conditions.

            ii. The Concessionaire shall be required to submit detailed design drawings including design calculations of gantries which should be approved from any of the Indian Institute of Technology (IIT)/ National Institute of Technology (NIT).

            OR

        2) Use existing infrastructure for barrier less tolling.

b. The MLFF Project shall broadly include, but not limited to the following components to be provided as per the functional and technical specifications mentioned in Schedule-C:

   1. Radio Frequency Identification (RFID) Reader
   2. Radio Frequency Identification (RFID) Antenna
   3. Automatic Number Plate Reader (ANPR) Camera System and Application
   4. IR Illuminator
   5. Audit Surveillance Camera System
   6. Detectors – Radar
   7. Detectors-Lidar
   8. High Speed Weigh In Motion (HSWIM)
   9. Networking and Communications
   10. Software Application, Dashboard and Portal
   11. MLFF Control Center
   12. Power Supply for Field Equipment as well as for MLFF Control Center
   13. Operation & Maintenance (O&M) of the entire MLFF Facility

c. Integration with CCH: The Concessionaire must process transactions from the MLFF Plaza Server in an online-only mode, ensuring toll fare calculations and transaction processing to Central Clearing House (CCH) as per NETC guidelines as amended from time to time. The host system should be capable of supporting both online and offline transaction processing based on internet connectivity availability.

d. Compliance with Interface Control Document (ICD) 2.5 or latest: The Concessionaire must ensure to comply with ICD 2.5 or latest specifications for processing the transactions.

e. Integration with TMCC –

   i. All Transactional Data: The Concessionaire shall integrate the MLFF System with the Toll Monitoring and Control Centre (TMCC) software or any such software, via API for the purpose of sharing all transactional data.

   ii. Equipment Health Monitoring: All Critical MLFF equipment shall be integrated with TMCC software for monitoring the real time health status. The SLA of MLFF equipment shall be calculated based on TMCC software and through other measures by IHMCL. Concessionaire shall strictly ensure provisioning of necessary arrangement including but not limited to proper network infrastructure, mapping of correct IP address etc. for reflection of correct uptime of equipment on TMCC dashboard.

f. Future integration with advanced technologies: The Concessionaire's solution should include API based integration with future tolling

technologies like GNSS and NHAI Applications like Raj Marg Yatra etc. or, Advance Traffic Management System (ATMS), any other similar system at no extra cost. The API for the same shall be provided by the Authority.

g. Service Levels: The Concessionaire shall implement the solution such that the MLFF Tolling System has accuracy levels above 99% especially with respect to vehicle count, classification and Registration Number readability.

h. Grievance Handling: The Concessionaire shall promptly resolve all the grievance related to e-Notice through an integrated system.

2. **Data Retention and Handover**

a) **Data Retention Period**:

The Concessionaire shall ensure the retention of the following data for the specified durations throughout the Concession Agreement:

i. **ANPR and Audit Surveillance Camera Images**: Minimum retention period of **180 days**
ii. **Video Recordings**: Minimum retention period of **30 days**.
iii. **Transaction Data and Reports**: Retention throughout the Concession Agreement.
iv. **Images, videos of all e**-Notice cases and other dispute cases shall be retained till the time the e-Notice or such case is disposed of.

b) **Data Handover:**

Upon the expiry or termination of the Concession Agreement, the Concessionaire shall hand over all retained transaction data, including images, videos, and reports, in a complete and organized manner to the Authority.

c) **Data Access and Evidence Provision**:

a. During the Concession period, the Concessionaire shall provide requisite image evidence and video recordings to the Authority within the defined storage limits upon request.
b. The data shall be made available promptly to assist the Authority in its operations, audits, or legal proceedings.

d) **Compliance and Penalty**:

The Concessionaire shall ensure compliance with the above requirements. Non-compliance may result in penalties or other actions as deemed appropriate by the Authority.

e) **Confidentiality and Security**:

The Concessionaire shall ensure the confidentiality and security of the retained data, preventing unauthorized access, misuse, or loss during the retention and handover period.

3. **Point of Sale (POS) setup for Sale of FASTag and Plaza Specific Discount Pass**

Concessionaire is responsible for setting up a **24*7** POS at the Control Centre

Building for issuance of FASTag as per NETC Guidelines and providing services of Plaza Specific Discount Pass.

The POS executive should be trained to assist road users with making payments for e-Notices.

ANNEXURE C

TRAFFIC REPORTS

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Gorhar Barwa Adda section of NH19 in Jharkhand

Traffic Due Diligence – Final Report

National Highways Authority of India

January 2026

TRANSLINK®
Infrastructure Consultants Pvt Ltd
Smart Consulting

Control information

Contract Reference: Letter of Commencement - FINDIV-16014(11)/1/2024-O/o CGM (Finance-II)/e-265207/116 dated 7th August 2025	**Identification & Traceability:** TIC/401/TF/TDD/R1-Final Report
Assignment Title: Traffic Due Diligence – Gorhar Barwa Adda section of NH19 in Jharkhand	
Client	**National Highways Authority of India** Sector 10, Dwarka, New Delhi 110075
Consultant	**Translink Infrastructure Consultants Private Limited in association with Infra Brainiacs Private Limited** 1103, I Square Corporate Park Science City Road, Ahmedabad 380060

Issue and Revision Records

Date	Revisions	Originator	Checker	Approver	Description
09.01.2026	R1	Darshan Doshi Parthav Parikh Rutvik Dhameliya	Rinku Kanani Karan Dave	Tejas Patel	Traffic Due Diligence – Final Report

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Appendices

Appendix A: Vehicle category-wise visual representation of origin-destination zones

Vehicle category-wise top origin-destination pairs

Appendix B: Detailed traffic and revenue forecast – most likely scenario without overloading

Abbreviations (1)

AADC	Annual Average Daily Collection
AADT	Annual Average Daily Traffic
ADB	Asian Development Bank
ADT	Average Daily Traffic
AL	Axle Load
APC	Annual Potential Collection
BOT	Build-Operate-Transfer
BPCL	Bharat Petroleum Corporation Limited
CAGR	Compound Annual Growth Rate
CCL	Central Coalfields Limited
CII	Confederation of Indian Industry
CJV	Car/ Jeep/ Van
Ch	Chainage
CM	Chief Minister
CPI	Consumer Price Index
CTVC	Classified Traffic Volume Count
DBFOT	Design, Build, Finance, Operate, and Transfer
DFCCIL	Dedicated Freight Corridor Corporation of India Limited
DPR	Detailed Project Report
EDFC	Eastern Dedicated Freight Corridor
EPC	Engineering, Procurement and Construction
ETC	Electronic Toll Collection
EV	Electric Vehicle
FMC	First Mile Connectivity
FMCG	Fast Moving Consumer Goods

FY	Financial Year
GDP	Gross Domestic Product
GSDP	Gross State Domestic Product
GST	Goods and Services Tax
GVA	Gross Value Added
HAM	Hybrid Annuity Mode
HCV	Heavy Commercial Vehicle
HPCL	Hindustan Petroleum Corporation Limited
HQ	Headquarter
IEA	International Energy Agency
IHMCL	Highways Management Company Limited
IL&FS	Infrastructure Leasing & Financial Services Limited
IMD	India Meteorological Department
IMF	International Monetary Fund
INR	Indian Rupee
IOCL	Indian Oil Corporation Limited
IRC	Indian Road Congress
IWAI	Inland Waterways Authority of India
JH	Jharkhand
Km	Kilometer
LCV	Light Commercial Vehicle
LPG	Liquefied Petroleum Gas
MADT	Monthly Average Daily Traffic
MAV	Multi Axle Vehicle
MLFF	Multi Lane Free Flow

Abbreviations (2)

MoRTH	Ministry of Road Transport and Highways
MoSPI	Ministry of Statistics and Programme Implementation
MT	Million Tonnes
MTPA	Million Tonnes Per Annum
NCR	National Capital Region
NH	National Highway
NHAI	National Highways Authority of India
NICDC	National Industrial Corridor Development Corporation
NW1	National Waterway 1
NMP	National Monetisation Pipeline
OD	Origin – Destination
OECD	Organisation for Economic Co-operation and Development
OSV	Oversized Vehicle
PCI	Per Capita Income
PCU	Passenger Car Unit
PIA	Project Influence Area
PIU	Project Implementation Unit
PNGRB	Petroleum & Natural Gas Regulatory Board
POL	Petroleum, Oil, and Lubricant
PPP	Public-Private Partnership
QADT	Quarterly Average Daily Traffic
RBI	Reserve Bank of India
RO	Regional Office
RTO	Regional Transport Office
SAIL	Steel Authority of India
SCF	Seasonal Correction Factor
SH	State Highway
SIAM	Society of Indian Automobile Manufacturers
SME	Small and Medium Enterprises
TAZ	Traffic Analysis Zone
TC	Toll Cost
TIC	Translink Infrastructure Consultants Private Limited
TMT	Thermo-Mechanically Treated
TOT	Toll, Operate, Transfer
TP	Toll Plaza
UPEIDA	Uttar Pradesh Expressways Industrial Development Authority
VOC	Vehicle Operating Cost
VOT	Value of Time
WADT	Weekly Average Daily Traffic
WB	West Bengal
WPI	Wholesale Price Index
2A	2 Axle
3A	3 Axle
3PL	Third-Party Logistics

Chapter 1: Introduction

- The assignment
- Objective and Scope of Work
- Approach and methodology
- Organisation of the report

This chapter outlines assignment background, scope of work, approach and methodology employed to ensure successful execution of the assignment.

Approach and methodology section highlights the structured approach which has been followed to gather data, conduct analysis, and make informed decisions throughout the project lifecycle. By employing a robust methodology, the consultant aims to ensure the accuracy, efficiency and reliability of the assignment's outcomes.

The assignment

Ministry of Road Transport and Highways (MoRTH) has entrusted **National Highways Authority of India** (hereinafter referred to as '**NHAI'** or '**Client'**) for monetisation of public funded operational national highway projects under the framework of National Monetisation Pipeline (NMP).

In this context, NHAI has commissioned Translink Infrastructure Consultants Private Limited in association with Infra Brainiacs Private Limited (hereinafter referred to as '**TIC'** or '**consultant'**) to carry out traffic due diligence for following national highway section in Jharkhand (hereinafter referred to as '**project highway**').

Project highway under asset monetization programme

National highway section	Toll plaza	Concerned NHAI field office
Gorhar Barwa Adda section of NH19	Kulgo (Giridih district)	Project Implementation Unit – Dhanbad Regional Office – Ranchi

Source: Client

This document is the final report incorporating traffic data updates received up to October 2025 and confirmation from the client dated 15th December 2025 for recommended scenario. The report presents our understanding of the project highway, trend analysis of traffic and revenue, primary data analysis and traffic and revenue forecast for a concession period of 15 years.

Objective and Scope of Work

The principal objective of the study is to determine traffic and revenue forecast for 15 years. This assessment provides input to stakeholders to evaluate viable monetization options for the project highway.

The broad **scope of the work** of the assignment is as follows:

- Review of available historical traffic and revenue data and relevant document received from the client
- Carrying out traffic survey and analysis at the project highway :
  - 7 days continuous and direction-wise classified traffic volume count
  - 3 days origin-destination
  - 3 days axle load
  - Any other surveys on the project highway and alternate corridors as per the need
- Site visit and stakeholder consultation to understand traffic characteristics and network dynamics
- Review of observed growth trends of the project highway and corridor subject to availability of data
- Estimate vehicle category-wise traffic and revenue for the base year
- Determine future toll rates
- Assessing diversion due to competing transportation modes and routes, network development, future development plans in the region, etc.
- Vehicle category and ticket distribution-wise traffic and revenue forecast for concession period
- Scenario development: most likely, optimistic and pessimistic

Approach

The consultant adopted comprehensive approach to address the need of this assignment with key five focus areas as summarised in below figure.

Approach for the assignment

Expertise in motion	Forecasting forward flow	Economy drive highways	Data drives decisions; paves road to resilience	Trust in travel
Team with transportation engineering expertise and experience	Encapsulate all possible exogeneous impacts on traffic growth	Models integrating economic indicators for traffic growth projections	Using statistical techniques and tools for accurate insights and risk assessments	Maintain integrity, transparency, and ethical practices

Source: TIC

Methodology (1)

Methodology for the assignment

Key sections	Particulars
Project highway appreciation	▪ Assess the macro and micro road network, considering the overall road infrastructure and its specific sections ▪ Identify homogeneous/tollable sections with similar traffic patterns ▪ Evaluate any developments in the vicinity of the project highway that may impact economic growth and traffic volume ▪ Finalise survey locations and formats for data collection
Secondary data collection	▪ Gather relevant past detailed project report / traffic study report and draft concession agreement ▪ Collect historical monthly traffic data for the toll plaza of the project highway and neighbouring toll plazas on the corridor, both upstream and downstream ▪ Source vehicle category/mapper class wise electronic toll collection (ETC) data as most reliable dataset from Indian Highways Management Company Limited (IHMCL) through the client for toll plazas under study and on the corridor and alternate corridors as well as across the country (subject to receipt from the client or as per availability in the public domain) for understanding of the various trends of economy as well as modal / vehicle technology shift ▪ Gather economic indicators such as Consumer Price Index (CPI), Wholesale Price Index (WPI), per capita income, national, state and district Gross Domestic Product (GDP), employment rates and specific commodities related sales e.g., automobile, agriculture production etc. ▪ Gather demographic profiles, population data, industrial production etc. ▪ Collect secondary data related to alternative routes and modal shift developments if applicable
Primary data collection	▪ 7 days continuous videography-based classified traffic volume count survey to gather independent traffic volume data ▪ 3 days origin-destination and commodity survey to understand travel patterns, trip purposes, influence region, growth drivers etc. ▪ 3 days axle load survey to determine the load characteristics of vehicles ▪ 1 day vehicle registration number plate survey to estimate ticket segmentation of local commercial vehicle without national permit if required ▪ Stakeholder consultation through interviews and focused group discussions

Source: TIC

Methodology (2)

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Methodology for the assignment

Key sections	Particulars
Data analysis	▪ Review historical traffic and revenue data to understand growth trend, seasonality variation, elasticities for identified growth drivers through regression analysis subject to data availability and benchmark analysis of corridor ▪ Conduct data hygiene checks to identify errors, biases and inconsistencies in the collected data ▪ Analyse Weekly Average Daily Traffic (WADT) including peak hour, day and night traffic variances, as well as directional distribution of traffic for further input to various analysis ▪ Identify Traffic Analysis Zones (TAZ) and Primary Influence Areas (PIA) ▪ Determine vehicle category-wise origin-destination matrices, trip lengths and purposes ▪ Develop geographical distribution diagrams of traffic to visualize travel patterns ▪ Perform commodity and loading analysis ▪ Analyse historical journey tickets, including single, 24-hour return, daily multiple, monthly, local pass tickets and annual pass for passenger cars and understand the ground level situations for underlying patterns especially forced exemption if any in the case specific region and possibilities of reduction through proposed technological and administrative measures ▪ Estimate Annual Average Daily Traffic (QADT/AADT) for the base and future years as per case specific requirement ▪ Develop a traffic diversion model using IRC:SP:30 modality
Forecasting	▪ Utilize an econometric model based on IRC: 108-2015 guidelines to analyse the relationship between vehicle traffic/PIA and socio-economic parameters such as Per Capita Income (PCI), Gross Domestic Product (GDP) of district/state/national, population, specific economic activities etc. as relevant with the identified growth drivers ▪ Calculate growth rates for each vehicle category. Adjust the growth rates based on induced traffic and traffic diversion effects, if applicable ▪ Perform traffic forecasting for 15 years period - normal traffic followed by generated and diverted traffic due to network and developmental impacts ▪ Conduct capacity analysis to assess the adequacy of the project highway ▪ Forecast annual toll revenue for 15 years based on traffic and toll rates projections
Sensitivity and risk analysis	▪ Identify variables (macro-economic, growth drivers and relationships, scale and timeline of diversions, etc.) that significantly impact annual toll revenue and assess their sensitivity ▪ Develop scenarios for identified risks

Source: TIC

Organisation of the report

Report structure

Sr. No.	Chapter	Particulars
1	**Introduction**	Scope of the assignment, approach and methodology
2	**Project highway profile**	Characteristics of the project highway like network understanding, socio-economic background of the region and proposed infrastructure developments in the influence region and network
3	**Traffic analysis**	Past performance of the project highway based on historical traffic and revenue data, traffic survey data analysis
4	**Economic context and traffic growth**	Economic context of influence region – Jharkhand and West Bengal, determination of traffic growth drivers and associated travel demand elasticities
5	**Baseline traffic and revenue forecast**	Elaborates method adopted for determining base year AADT, toll ticket distribution and revenue reconciliation
6	**Diversion analysis**	Impacts on the project highway due to proposed infrastructure developments in the influence region and network, assessment of induced traffic demand
7	**Final traffic and revenue forecast**	Traffic and revenue forecasts including diversions, scenario cases: most likely with and without overloading, optimistic and pessimistic

Source: TIC

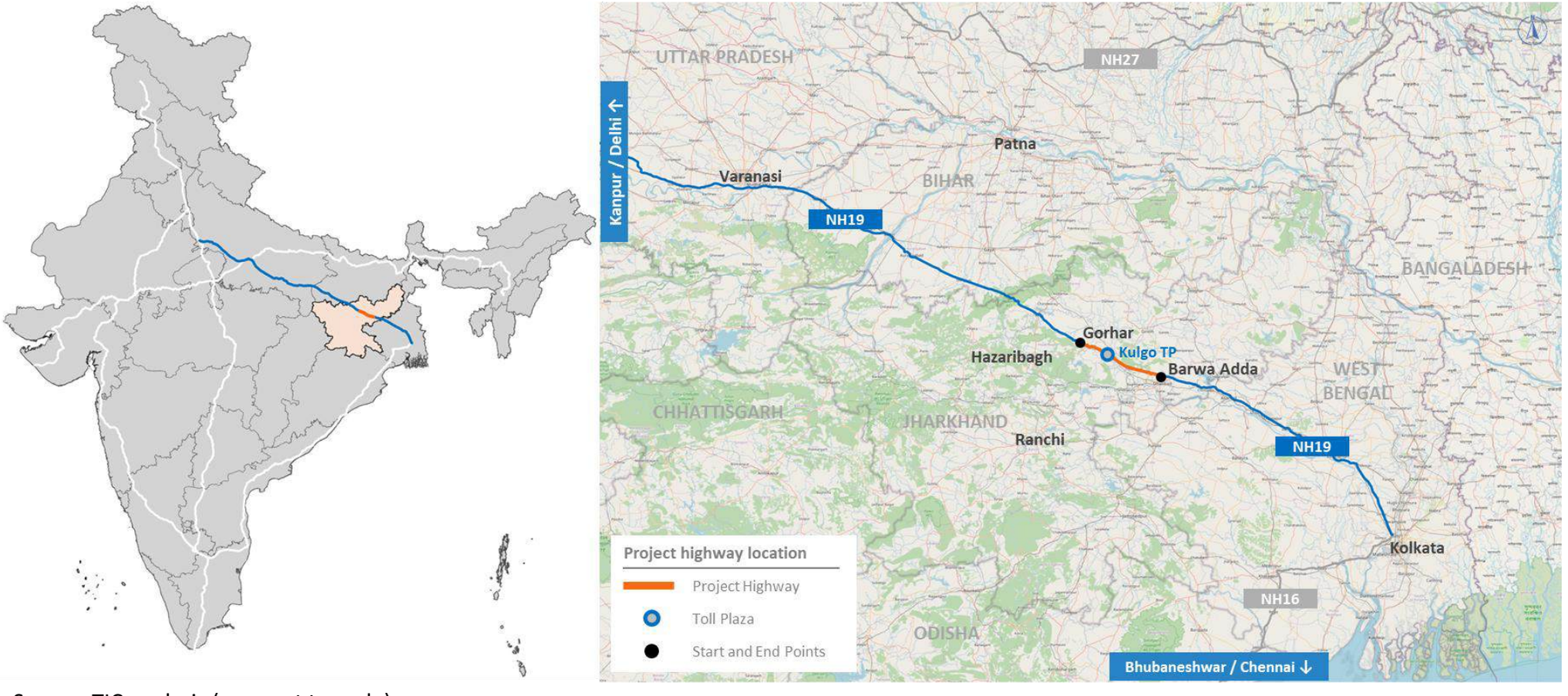
Chapter 2: Project highway profile

- Location and key details
- Economic activities in the region
- Understanding of network and traffic corridors
- Proposed road network and infrastructure development in the influence region

This chapter exhibits our understanding of the project highway and key details, economic activities in the region and strategic network context based on site visit and stakeholder consultation. It covers list of infrastructure project development in the region and network which would have impact on the performance of the project highway.

Location of the project highway

Project highway location in national and state context



Source: TIC analysis (map not to scale)

- The project highway is an integral part of golden quadrilateral along NH19, a strategic long-distance transport corridor linking Delhi/Agra and Kolkata.
- It serves as a critical inter-state traffic, ensuring all-weather connectivity among Uttar Pradesh, Bihar, Jharkhand and West Bengal and supporting efficient regional freight and passenger movement.
- ~80 km section along with other national highway linkages extend the connectivity to Patna – the capital of Bihar, Dhanbad/Hazaribagh – the two-highest coal reserve in Jharkhand and Ranchi – the capital of Jharkhand, respectively.

Project snapshot (1)

TRANSLINK® Infrastructure Consultants Pvt Ltd *Smart Consulting*

Key project details

Particulars	Gorhar Barwa Adda section of NH19 (old NH2)
Length (km)	80.522
Lane and pavement	4 / 6 lane divided carriageway, flexible pavement / rigid at toll plaza
Chainage	km 320.810 (near Gorhar village) to km 401.332 (Barwa Adda near Dhanbad)
History	▪ **Gorhar Atka Village to Khairatunda (chainages km 320.810 to km 360.300 / design chainage km 361.000):** 6 lane construction completed in December 2022 through HAM mode by Dilip Buildcon Limited. Out of which Gorhar to Atka Village section (chainages km 320.810 to km 326.000) is 4 lane as descoped from HAM concession. ▪ **Khairatunda to Barwa Adda (chainages km 360.300 to km 401.332):** 6 lane construction completed in April 2022 through HAM mode Ashoka Buildcon Limited ▪ Present tolling modality: under public funded with short term tolling contracts
Nos. of toll plaza	1 ETC enabled
Toll plaza locations	**Kulgo** at km 352.100 (known as Ghanghri toll plaza in local region)
District	Physically located within Giridih district Socio-economic activities and traffic patterns are significantly influenced by Hazaribagh and Dhanbad districts
Tolling start date	15th December 2010
Tolling length (km)	87.231
Overloading penalty	No overloading penalty / fee is being levied at present based on understanding from site visit and discussion with the client
Micro-diversions at toll plaza location	Nil

Source: NHAI

Project snapshot (2)

TRANSLINK® Infrastructure Consultants Pvt Ltd *Smart Consulting*

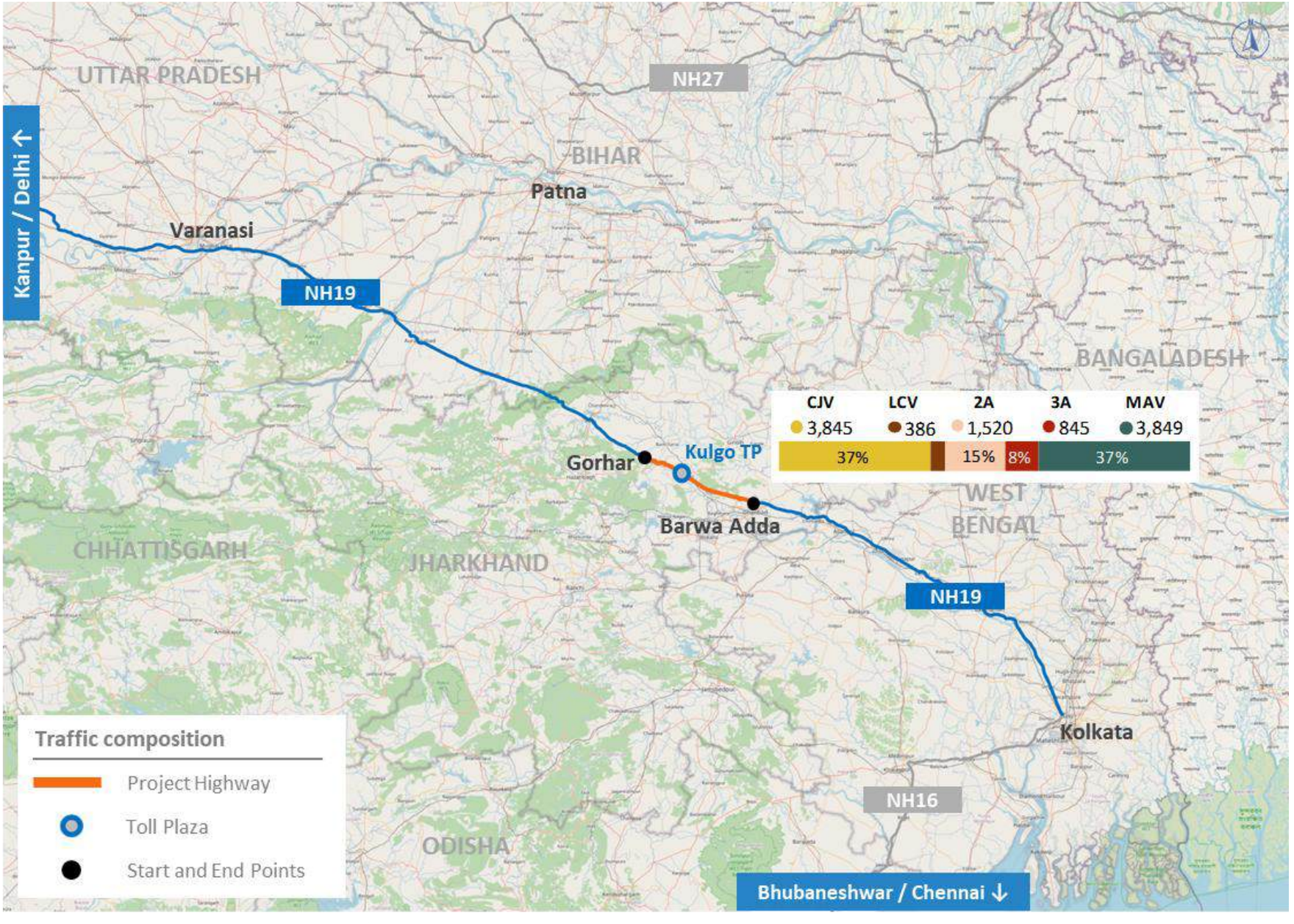
Key project details

Particulars	Gorhar Barwa Adda section of NH19 (old NH2)
Toll plaza locations	**Kulgo** (also known as Ghanghri toll plaza)
ETC Traffic (FY26 till October 2025)	7 months ADT: 10,470 PCU corresponding 7 months ADT: 28,851
ETC Traffic composition (FY26 till October 2025)	37% CJV/Mini LCV 14% 2A/LCV 3% Bus 46% 3A/MAV
ETC Revenue	FY25: INR 148 Crore FY26 till October 2025: INR 88 Crore
ETC Revenue composition (FY26 till October 2025)	10% CJV/Mini LCV 14% 2A/LCV 3% Bus 73% 3A/MAV
Present toll operator with Annual Potential Collection and quoted remittance	**Prakash Asphalts & Toll Highways (India) Limited** **Duration** : February 2025 to January 2026 (1 Year) **Annual Potential Collection** : INR 144.75 Crore **Quoted remittance** : INR 146.15 Crore (FY25 tolling rates) Revised to INR 151.14 on 1st April 2025 with FY26 tolling rates Future round of bidding completed for 1 year toll contract in November 2025. **Skylark Infra Engineering Private Limited** **Duration** : New toll operator is expected to take handover in January 2026 for 1 year **Annual Potential Collection** : INR 156.51 Crore **Quoted remittance** : INR 151.90 Crore (FY26 tolling rates)
Previous tolling operator with Annual Potential Collection (APC) and Quoted Remittance	**West Well Iron & Steel Private Limited** **Duration** : January 2024 to January 2025 (1 Year) **Annual Potential Collection** : INR 134.34 Crore **Quoted remittance** : INR 137.35 Crore (FY24 tolling rates)

Source: NHAI

Project snapshot (3)

ETC Traffic composition of FY26 till October 2025

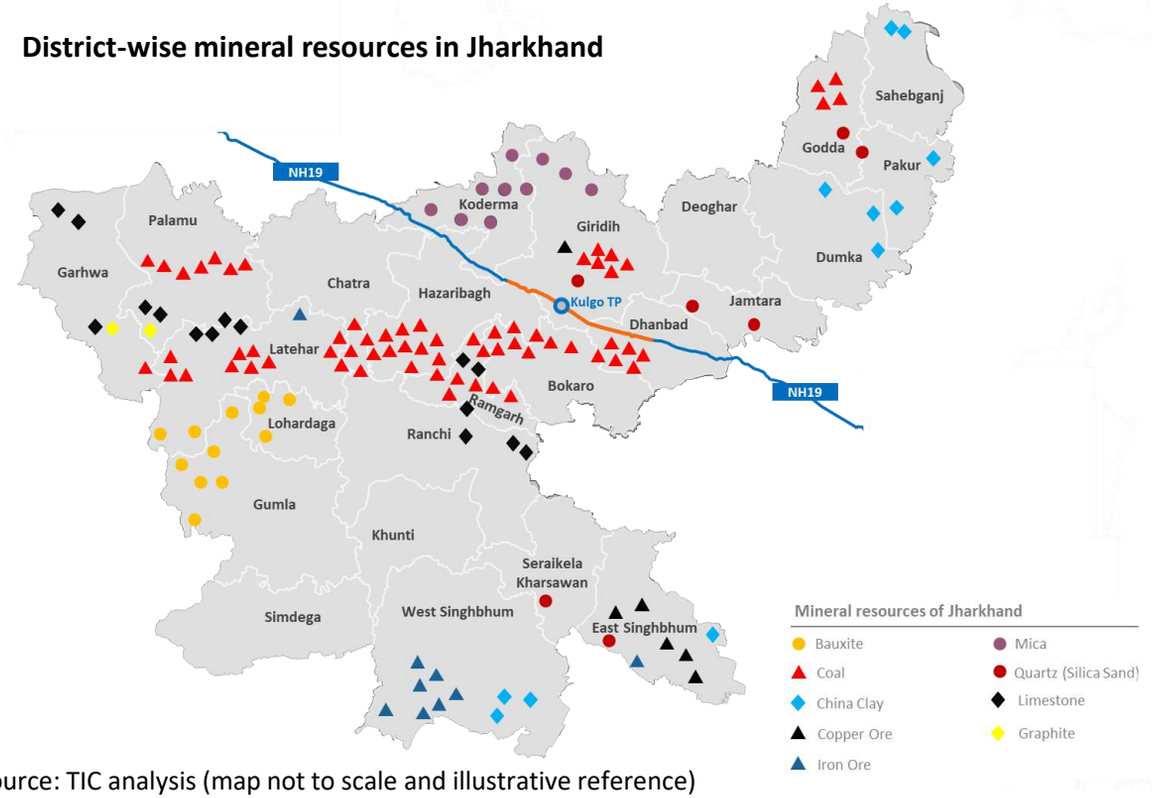


Source: TIC analysis (map not to scale)

Economic activities in influence region (1)

- Jharkhand consists of about 40% of the country's mineral wealth which includes coal (~27% of country's reserve), iron ore (~25% of country's reserve), copper ore (~18% of country's reserve), uranium, mica, bauxite, granite, limestone, silver, graphite, magnetite and dolomite. The state is sole producer of coking coal, uranium and pyrite in India.
- Primary producer of high-quality coking coal, vital for the steel industry, with the Jharia Coalfield in Dhanbad district holding the largest deposits. Dhanbad is known as the "Coal Capital of India".
- In addition to Jharia, key coalfield region includes Bokaro, Karanpura, Hazaribagh and Palamu.
- Minerals / mining industry drives a substantial part of Jharkhand's economy by employment, revenue generation through royalty and exports but often at the cost of environmental degradation and community disruption due to illegal/overexploited mining, lack of infrastructure and skilled labour.
- Jamshedpur, Dhanbad, Bokaro, Ranchi, Deoghar and Hazaribagh are major cities and industrial areas in the state.
- The state's industries enjoy location advantage within eastern India being close to the in the region, raw material and access to ports of Kolkata, Haldia and Paradip.
- 80% of the state's population dependent on agriculture. Rice is the major food crop of the state.

District-wise mineral resources in Jharkhand



Source: TIC analysis (map not to scale and illustrative reference)

Minerals and industrial applications

Mineral	Applications / Use
Coal	Power, Seel
Bauxite	Extraction of Aluminium
Copper Ore	Extraction of Copper
Iron Ore	Pig/Sponge Iron, Steel, TMT Bars, Wire Rods
Limestone	Cement, Iron industry
Mica	Electrical, Paint & Pigment

Mineral	Applications / Use
Pyroxenite	Steel industry as flux
Manganese	Steel, Battery, Chemical
Graphite	Lubricant, Paint, Electrical
Quartz	Refractory, Glass, Ceramic, Watch
China Clay	Crockery, Paint, Paper
Dolomite	Cement, Magnesia

Source: TIC secondary research

Economic activities in influence region (2)

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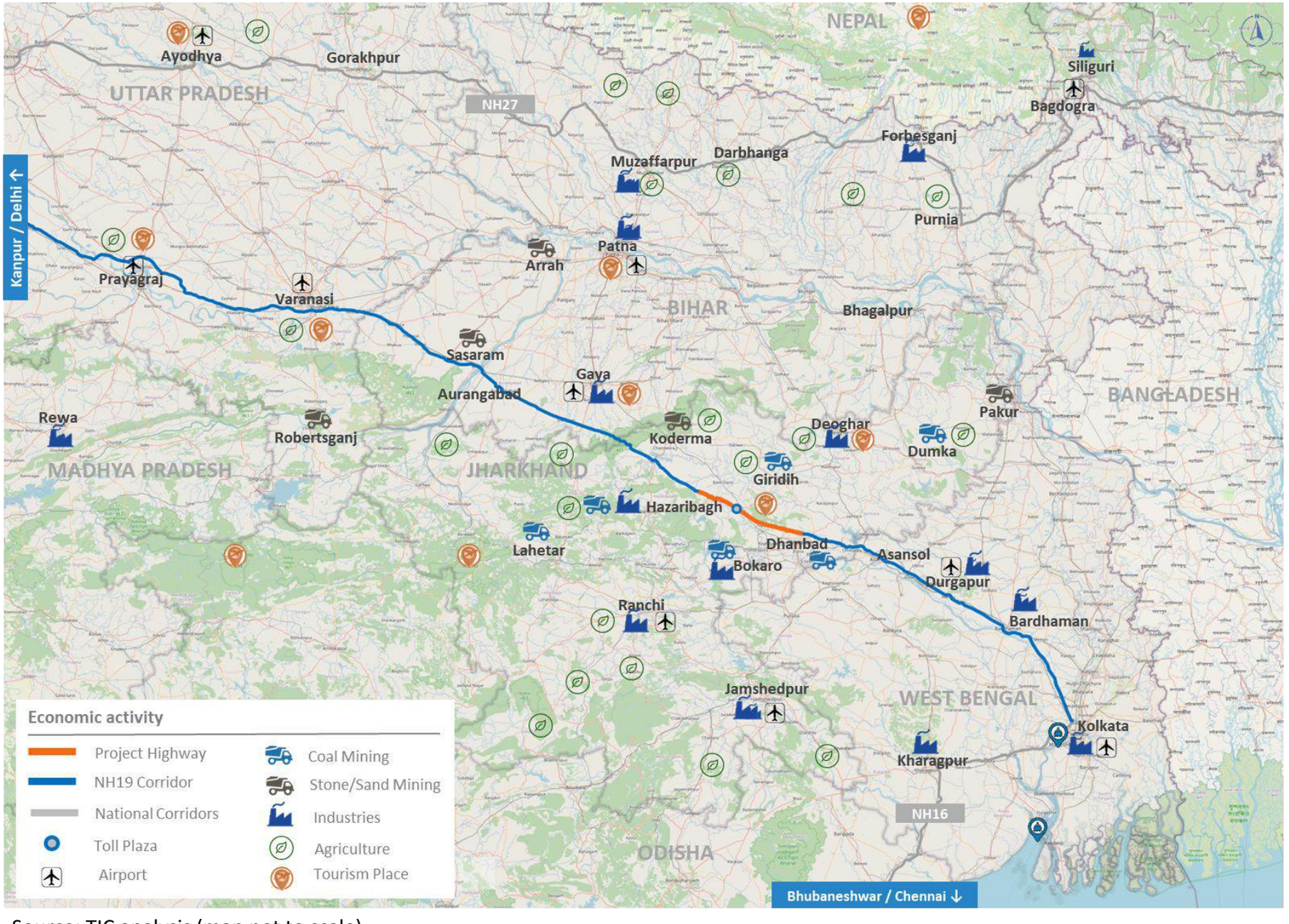
Economic activities in influence region



Source: TIC analysis (map not to scale)

Economic activities in influence region (3)

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1 Industry in Jharkhand

- **Dhanbad - The Coal Capital of India,** located on the east of the project highway is known as the Coal Capital of India with the presence of some of the largest coal mines in the country. Industries located between Durgapur and Kolkata is also being supplied from Dhanbad in addition to imported coal from Haldia Port.
- **Hazaribagh,** located along the project highway is known for its rich mineral resources, particularly coal reserves under the North Karanpura Coalfields. The region holds several large coal mining projects operated by Central Coalfields Limited (CCL). Koderma-Hazaribagh belt is emerging industrial hub in Jharkhand.
- **Bokaro - The Powerhouse of Steel,** is best known for the presence of the Bokaro Steel Plant, one of the largest integrated steel plants in India operated by Steel Authority of India (SAIL). It serves as a major hub for steel production and allied industries in eastern India.
- **Jamshedpur – The Steel City of India,** Jamshedpur is the biggest and most developed industrial hub in Jharkhand, which was built by Tata Group and is now home to Tata Steel, Tata Motors, and various other manufacturing units. It plays a vital role in India's steel and automobile manufacturing.
- **Adityapur Industrial Area – emerging SME Hub** near Jamshedpur, hosting about 1,000 SMEs with presence of heavy/light engineering, ferro casting, chemicals, plastic and rubber, forging/mineral based units.
- **Ranchi** has presence of engineering (machining fabrication), mines and mineral-based units, chemicals, electrical and electronics, metallurgy (foundry and forge), casting and rolling, plastics and rubber industries.
- **Sindri – The Fertilizer Town,** legacy currently being revitalized by Hindustan Urvarak & Rasayan Limited through setting up new fertilizer facilities, aiming to re-establish Sindri as a major player in the sector.
- **Cement plants:** Bokaro, Sindri, Hansda, Jamshedpur, Godda (Jharkhand) and Asansol, Durgapur and Kolkata regions (West Bengal) to capitalize availability of limestone and fly ash from power plants in eastern India.
- State government has implemented several initiatives to promote cottage industries, including providing financial assistance, infrastructure support, and training programs – handicraft, handloom, sericulture, leather, pottery, bamboo crafts etc.
- Food Park at Ranchi and Apparel Park at Chaibasa act as mini-growth centre of Jharkhand.

Source: TIC secondary research

Economic activities in influence region (4)

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2 Industry in West Bengal

- **Dankuni**, outskirts of Kolkata, is logistics and industrial hub with presence of various local/national transport/3PL companies and manufacturing units adding industrial flavor to goods traffic i.e., Coca Cola, Lux Hosiery, IFB Agro, Himani Specialty Chemicals, Ultratech, Aditya Birla, Hyundai, FCI, SAIL etc.
- **Durgapur** is planned and biggest industrial city with presence of dry dock. It houses about 20+ major steel industries like Durgapur Steel Plant (SAIL), Jay Balaji Steel Industries, Alloy Steel Plant etc.
- **Rajabandh**, outskirts of Durgapur, has presence of all three Oil PSUs (HPCL, BPCL, IOCL) with their bottling and fuel distribution terminals which sources LPG from Haldia port and petroleum products through rakes from various part of India. These terminals distribute both products in the nearby region of Jharkhand and Bihar. LPG is being supplied to east Uttar Pradesh (Gorakhpur Bottling Terminal) from Haldia port.
- **The well-established trade relationship between Jharkhand and West Bengal is reflected in freight traffic movements, contributing about 30–40% across freight vehicle categories.**

3 Agriculture and allied activities

- **Food Grains:** Rice (Kharif), Maize (Kharif), Wheat (Rabi)
- Rice is a dominant crop in Hazaribagh and Giridih districts along the project highway with cultivation spread across small and medium farms. Maize and pulses are also grown as secondary crops.
- **Pulses:** Arhar, Urad, Moong, Chickpea
- **Oilseeds:** Mustard, Groundnut
- **Cash Crops:** Potatoes, Tomatoes, Chilies (grown in various pockets)
- **Agro based industries** includes rice mills, oil mills, food processing units, dairy industry, and poultry farming are located across Ranchi, Hazaribagh, Palamu, Garhwa, Simdega, Gumla, Lohardaga. Swastik Group produces ‘Frooti’ and ‘Appy Fizz’ brand for Parle Agro at Ranchi.
- Prominent trading hubs (mandis) for Rice and Potato are established at Sealdah, Howarah, Diamond Harbour, Durgapur and Kolkata regions in West Bengal.
- Fish is mainly supplied from West Bengal and stored near the Jharkhand border for regional distribution
- **Inter and intra-state movement of agricultural produces are observed during all seasons.**

Source: TIC secondary research

Economic activities in influence region (5)

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4 Tourism

- **Jharkhand** is known for its natural landscapes, wildlife, and religious sites. **Ranchi**, the state capital, is popular for waterfall such as Dassam, Hundru and Jonha.
- **Deoghar** is a major pilgrimage destination, famous for the Baidyanath Jyotirlinga Temple, attracting lakhs of devotees during the Shravani Mela.
- **Parasnath Hills (Shikharji)** in Giridih district is one of the holiest sites for the Jain community.

Source: TIC secondary research

Our understanding of traffic corridors and road network

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National corridor (long-distance traffic)

- The project highway is a part of the Golden Quadrilateral / NH19 long-distance strategic corridor connecting Delhi / Agra with Kolkata in West Bengal.
- It directly connects national capital Delhi / NCR and northern states including other major cities/ industrial and logistics nodes along the corridor i.e.,
  - **Uttar Pradesh:** Mathura, Agra, Kanpur, Prayagraj, Varanasi (religious and industry)
  - **Bihar:** Sasaram, Aurangabad (agrarian economy), Gaya as future industrial node being developed by NICDC
  - **Jharkhand:** Gobindpur, Dhanbad (coal mining and collieries, steel industry)
  - **West Bengal:** Asansol, Durgapur, Panagarh (coal mining, largescale steel industry with captive power plants), Dankuni (warehouse / logistics hub), Kolkata (regional trade center, port, industry)
- Goods traffic (LCV/2A/MAV) includes to the movement between urban and industrial centers of Kolkata, Haldia Port, Durgapur, Dankuni, Assam, Bangladesh and Uttar Pradesh, Delhi / NCR, Punjab, Madhya Pradesh and Rajasthan.
- Kolkata, being state capital and regional trade center for east India, attracts/generates substantial volume of traffic.

Regional linkages (medium-distance traffic)

- In addition to role as national connector, the project highway establishes noteworthy regional connectivity between neighboring states of Bihar and Uttar Pradesh i.e., traffic between Patna, Raxaul (Bihar), Gorakhpur (Uttar Pradesh) and Kolkata (including Haldia Port) and Bhubaneshwar, Sambalpur, Baripada (Odisha).
- The project corridor experiences substantial medium-distance traffic, predominantly comprising manufacturing consignments, construction materials (notably steel), and petroleum products, transported from Jharkhand to the adjoining states of West Bengal, Bihar, and Uttar Pradesh.

Local connectivity (short-distance traffic)

- Short-distance traffic is predominantly observed between the regional nodes of Gaya, Ranchi, Dhanbad, Barhi, Chouparan, and Hazaribagh for business and social needs. Round the year regular traffic is being witnessed among these locations as local/regional commuters.
- Dhanbad, mining capital of Jharkhand, is connected with West Bengal through the project highway and supplies coal to industrial area of West Bengal.

Corridor traffic summary (1)

Kanpur – Kolkata corridor of NH19

Highway section	Lane configuration	Concessionaire / Operator	Toll Plazas with average PCU Traffic in FY26 YTD	Approx. Length (km)
Chakeri (Kanpur) – Kokhraj	6 lane	Toll - Public Funded	Badauri (~32,000 PCU) Katoghan (~30,000 PCU)	145
Allahabad bypass	4 lane	TOT (Toll) – Cube Highways	Kokhraj / Handia Main Line Plazas (~25,000 PCU)	84
Handia – Rajatalab	6 lane	TOT (Toll) – NIIF	Lalanagar (~28,000 PCU)	72
Varanasi – Aurangabad	6 lane**	DBBOT (Toll) – Roadis road platform backed by PSP Investments	Dafi (~60,000 PCU) Mohania (~48,000 PCU) Sasaram (~40,000 PCU)	192
Aurangabad – Barachatti	4 / 6 lane	Toll - Public Funded	Saukala (~34,000 PCU)	60
Barachatti – Gorhar	4 / 6 lane *	Toll - Public Funded	Rasoiya Dhamna (~34,000 PCU)	80
Gorha – Barwa Adda (Project Highway)	4 / 6 lane *	Toll - Public Funded	Kulgo (~29,000 PCU)	80
Barwa Adda – Panagarh	6 lane	DBFOT (Toll) - IL&FS	Beliyad (~30,000 PCU) Banskopa (~58,000 PCU)	123
Panagarh – Palsit	6 lane	BOT (Toll) – Adani Group	Palsit (~62,000 PCU)	68
Palsit – Dankuni	6 lane	BOT (Toll) – IRB Infrastructure	Dankuni (~64,000 PCU)	64

Source: TIC analysis

* partial section is under 4 to 6 lane construction

Corridor traffic summary (2)

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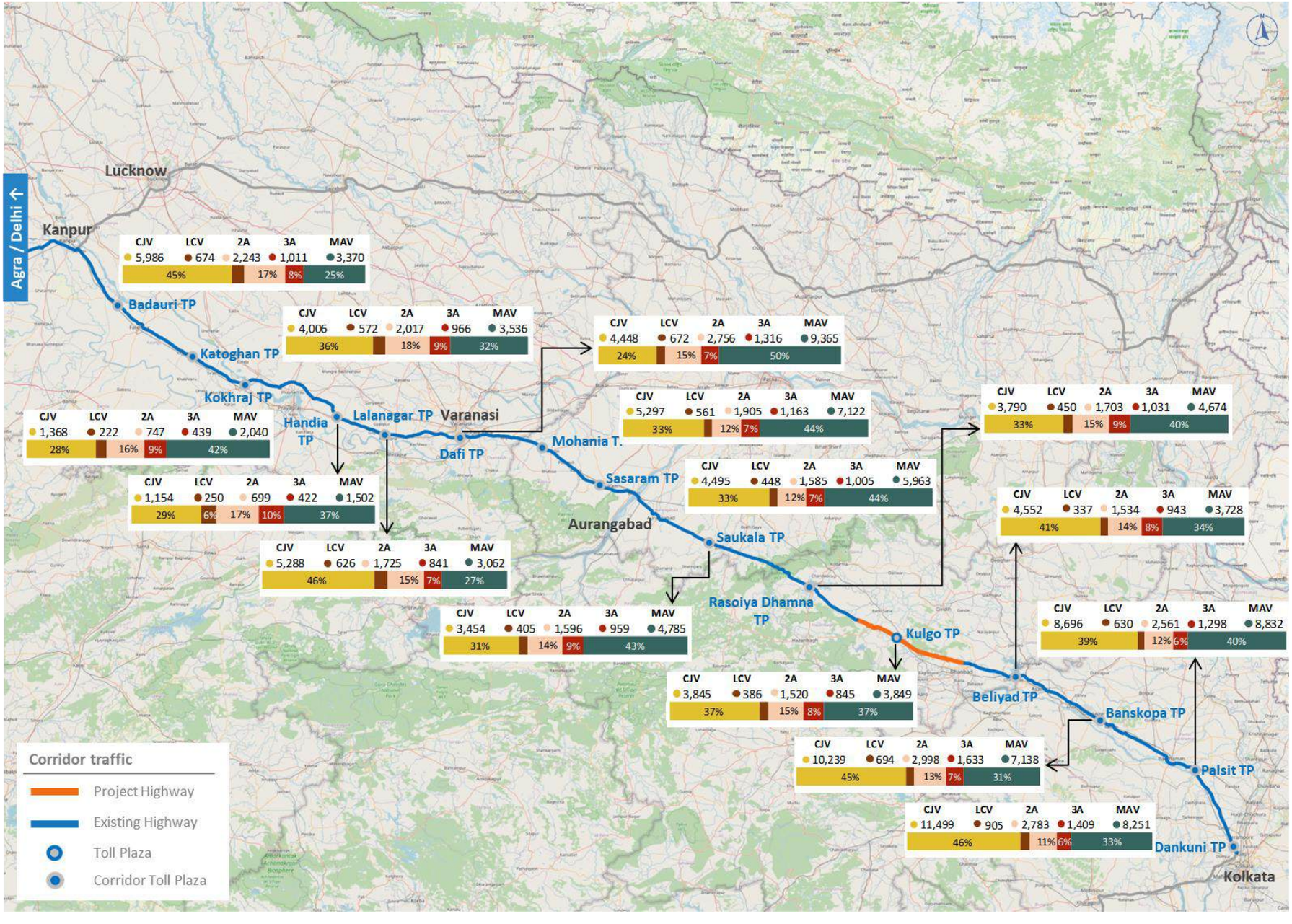
Traffic composition on the corridor: 7 months ADT of FY26 till October 2025



Source: TIC analysis (map not to scale)

Site photographs

Kulgo Toll Plaza

Cross section

Rice farming adjacent to the NH19 corridor

Coal mining at Jharia

Ongoing 6 lane widening construction work at neighbouring section of Barachatti–Gorhar

Source: TIC site visit

Proposed infrastructure development in the region (1)

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Network and infrastructure development in the influence region (refer map on Pg 31)

Particulars of the development	Authority / Mode of Development / Developer	Status / expected completion	Possible impact
Varanasi Kolkata Highspeed Corridor (NH319B)	NHAI Hybrid Annuity Mode (HAM) Multiple packages	Greenfield 6 lane access controlled highspeed corridor to be developed as National Highway passing through Uttar Pradesh, Bihar, Jharkhand, West Bengal **Uttar Pradesh (No. of construction package: 1):** Package 1 - awarded in 2023, appointed date in November 2024 (10% physical progress) **Bihar (Nos. of construction package: 6):** Package 2, 3, 6, 7 - awarded in 2023, appointed date in October 2025 Package 4 and 5: revision in alignment due to forest objections. Appointed date expected by end of FY27 **Jharkhand (Nos. of construction package: 6):** Package 8 to 13 - awarded in 2023, appointed date is expected by end of FY26. In principle approval received from various stakeholder. **West Bengal (Construction packages are yet to be decided):** DPR in-progress – submitted to NHAI HQ for comments. Appointed date expected by end of FY28 **Expected completion:** Varanasi Jharkhand/West Bengal border section – FY30 Jharkhand/West Bengal border - Kolkata section – Q3 FY33	**Negative** Traffic movement between Varanasi/west and Hazaribagh/Bokaro/south from FY31 onwards Traffic movement between Varanasi/west and Kolkata/Kharagpur/Haldia from Q4 FY33 onwards Traffic movement between Dobhi/north and Hazaribagh/south from Q4 FY33 onwards

Source: TIC research and analysis

Proposed infrastructure development in the region (2)

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Network and infrastructure development in the influence region (refer map on Pg 31)

Particulars of the development	Authority / Mode of Development / Developer	Status / expected completion	Possible impact
Raxual Haldia Economic Corridor	NHAI Mode of development yet to be decided	DPR in-progress Expected completion by end of FY33	**Negative** Traffic movement between Muzaffarpur/north-west Bihar and Kolkata/ Haldia/south
Eastern Dedicated Freight Corridor	Dedicated Freight Corridor Corporation of India Limited (DFCCIL) and Ministry of Railway	Sahnewal to Sonnagar: Operational Sonnagar to Dankuni – Under implementation, construction activity is about to start in FY25 Expected completion by FY28	**Negative** For long-distance (> 600-700 km) commercial traffic on the corridor from Delhi/NCR/east and Dankuni/nearby region/east
Kandla Gorakhpur LPG Pipeline	Petroleum & Natural Gas Regulatory Board IHB Limited – a joint venture of Indian Oil Corporation Limited (IOCL), Bharat Petroleum Corportaion Limited (BPCL) and Hindustan Petroleum Corportaion Limited (HPCL)	Expected completion by end of FY27	**Negative** Pipeline will transport LPG sourced from import terminals at Kandla, Dahej, and Pipavav, and refineries at Koyali and Bina. It will directly supply 22 LPG bottling plants 3 in Gujarat, 6 in Madhya Pradesh, and 13 in Uttar Pradesh—ensuring reliable and safe LPG distribution across northern India instead of road movement from Haldia port.
LPG pipeline from Haldia to Panagarh and Rajabandh (HPCL / BPCL)	HPCL and BPCL	Expected to be operational by FY28	**Nil** Bottling Terminals of both PSUs are located on east of the project highway
Vande Bharat Express Train: Varanasi Howrah route	Ministry of Railway	Train route will traverse through Gaya, Dhanbad, Asansol, Durgapur, Bardhaman between Varanasi and Howrah	**Negative** Applicable on passenger vehicle categories (Car and Bus)

Source: TIC research and analysis

Proposed infrastructure development in the region (3)

TRANSLINK® Infrastructure Consultants Pvt Ltd
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Network and infrastructure development in the influence region (refer map on Pg 31)

Particulars of the development	Authority / Mode of Development / Developer	Status / expected completion	Possible impact
National Waterway 1	Inland Waterways Authority of India (IWAI)	Spanning 1,620 km along the Ganga River Connects Haldia in West Bengal to Prayagraj (Allahabad) in Uttar Pradesh, passing through the states of West Bengal, Bihar and Uttar Pradesh	**Negative** Freight traffic movement between Prayagraj and Kolkata / Haldia
Ganga Expressway	Uttar Pradesh Expressways Industrial Development Authority / Adani Group and IRB Developers DBFOT (Toll)	Under construction; Expected completion by FY27	**Nil** Induced traffic on NH19 corridor post-Prayagraj / Varanasi is considered as part of regular traffic growth. No additional impact.
Pending 4 to 6 lane construction of the project highway and neighbouring stretch of Barachatti – Gorhar	NHAI EPC / HAM	Construction expected during FY27 / FY28	**Nil** Construction traffic is granted exemption status at toll plazas in past. Further, location of aggregates / cement is in nearby vicinity so will not cross toll plaza frequently.
Govindpur Nirsa elevated road		Sanctioned and under planning Construction expected during FY28 / FY29	Removes bottlenecks on the corridor.

Source: TIC research and analysis

Proposed infrastructure development in the region (4)

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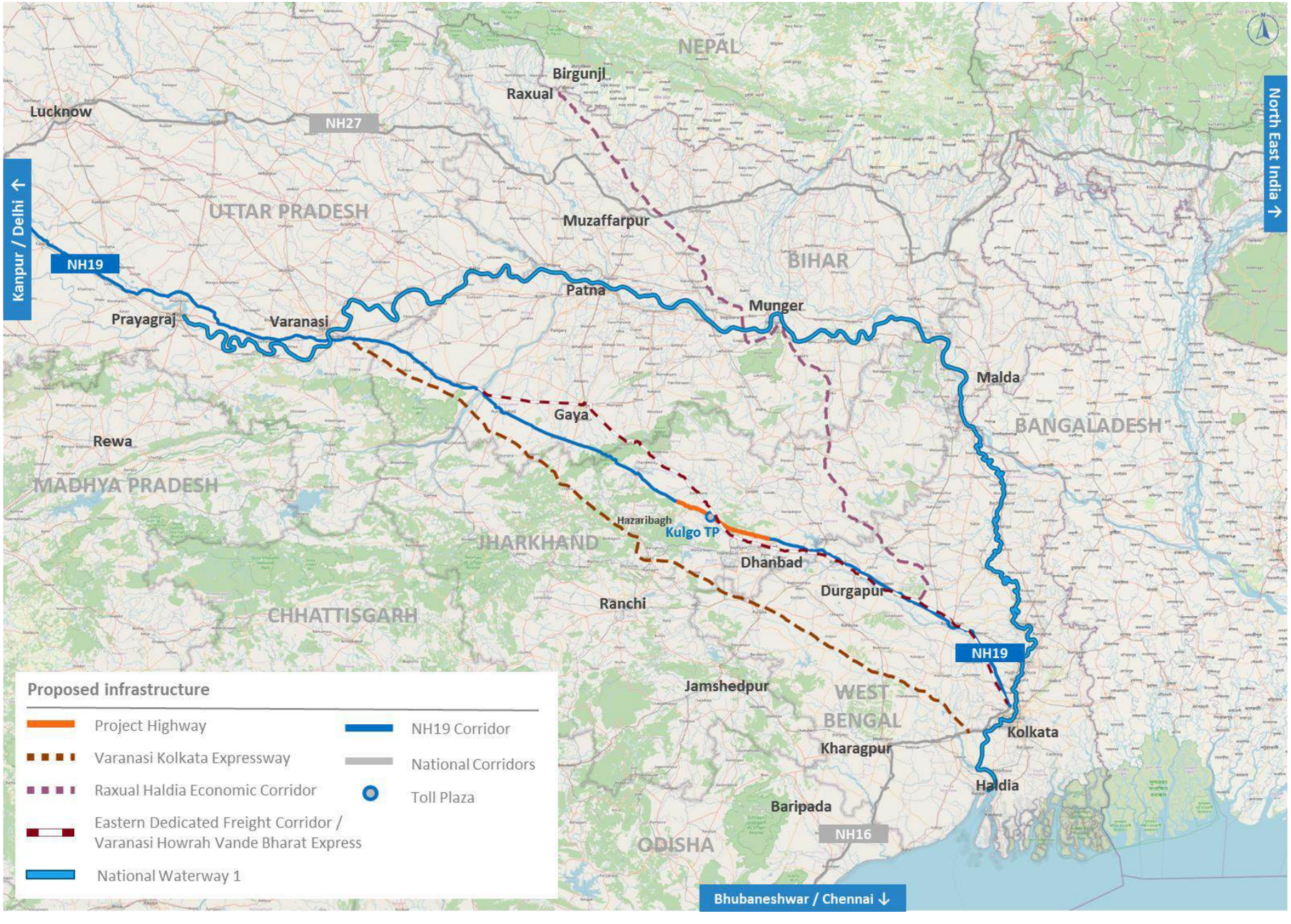
Network and infrastructure development in the influence region



Source: TIC analysis (map not to scale)

Chapter 3: Traffic analysis

- Historical data sources
- Historical traffic and revenue trends
- Seasonality variation
- Historical ticket distribution
- Commodity analysis
- Zonal influence and trip distance

This chapter covers various datasets received from NHAI followed by assessment of historical performance of the project highway. This analysis helps to understand baseline traffic patterns comprising traffic and revenue growth rates, seasonality variations, trip factors, ticket distribution and overloading characteristics.

Survey analysis helps to validate traffic volume, commodity movement pattern, network understanding received from site visit, inputs for ticket distribution, overloading pattern based on independent survey exercise.

Historical datasets

- The project highway is currently being operated under the public-funded mode where toll is collected by third party tolling agencies through short-term contracts. Third party tolling agencies submit traffic and revenue report on monthly basis which is titled as Schedule V.
- The consultant observes that availability and accuracy of these reports are many times under question due to inadequate quality of technology interventions and record keeping during short term contracts by tolling agencies.
- Hence, availability followed by reliability of these datasets is essential to be addressed for historical analysis as well as further processing for base year and future traffic forecasts.
- ETC data is independently system generated and hence more reliable. The client sourced vehicle category-wise traffic data which doesn't include toll ticket distribution.
- Monthly reports submitted by contractors / tolling agencies to NHAI field offices (Schedule M/G/V) which is start point to validate the toll ticket distributing including cash components, violation/exemptions, overloading fee etc.

Summary of the historical traffic and revenue data available for Kulgo Toll Plaza

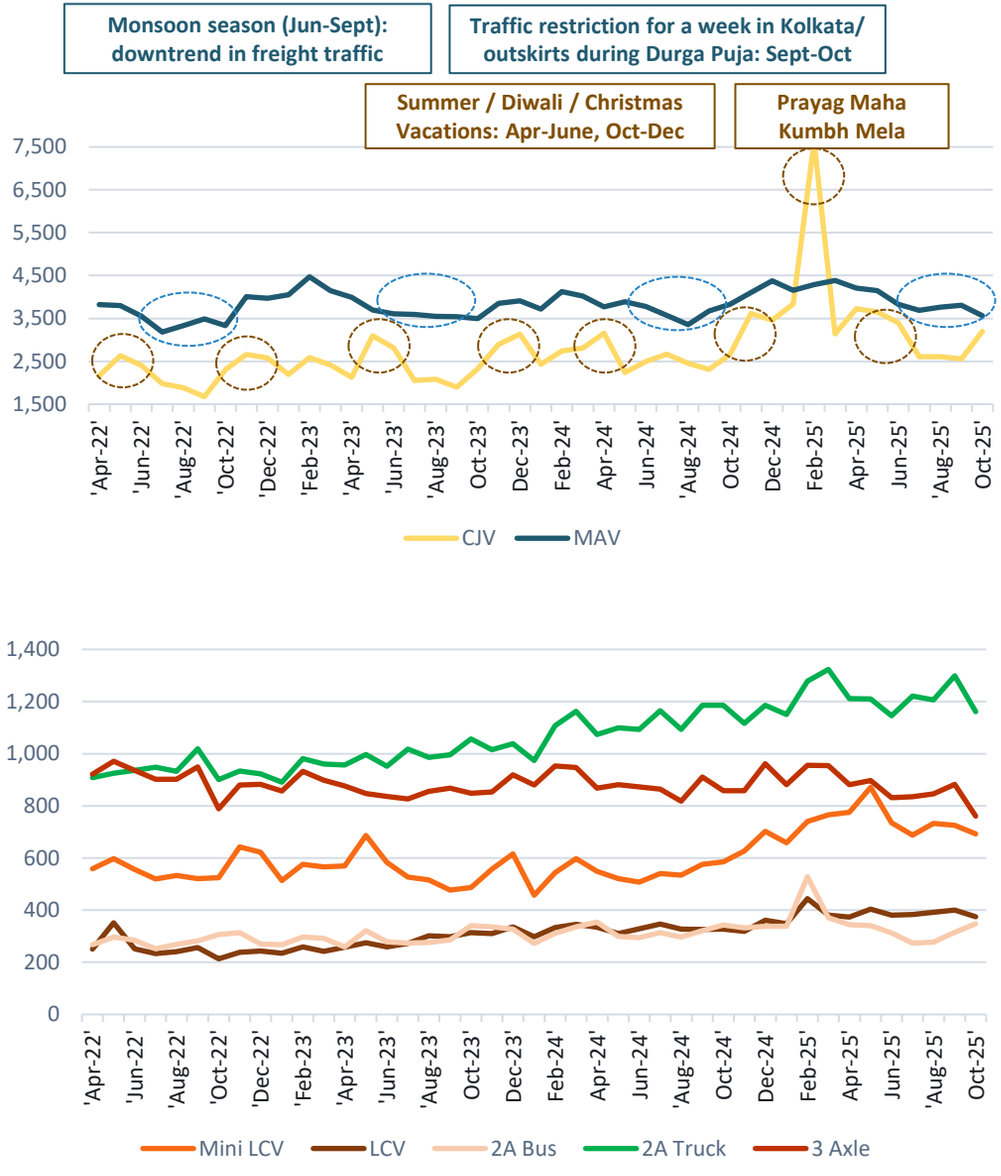
Data sources	Duration of data	Observations
Schedule V - Part A & B (monthly)	FY18: Q4 only FY19: Full year FY20: all month except Aug'19 FY21: Full year FY22: all months except Nov'21 to Jan'22 FY23 and FY24: Full year FY25: all months except Dec'24 FY26: Q1, Q2, Oct'25 (7 months)	**Part A:** Vehicle category-wise total user fee collection **Part B:** Vehicle category total traffic Ticket distribution data: Yes Exemption/violation/ cash traffic data: Yes
ETC Data (monthly)	FY23: Full year FY24: Full year FY25: Full year FY26: Q1, Q2, Oct'25 (7 months)	Vehicle category-wise ETC transactions covering total traffic and user fee collection Ticket distribution data: No
Overloading Reports (weekly)	No overloading penalty / fee is being levied at present based on understanding from site visit and discussion with PIU	
Neighbouring highways	Historical traffic data to determine corridor growth trend	

Source: TIC compilation of data received from NHAI

ETC and Schedule V datasets have been used for historical analysis due to their consistency and reliability.

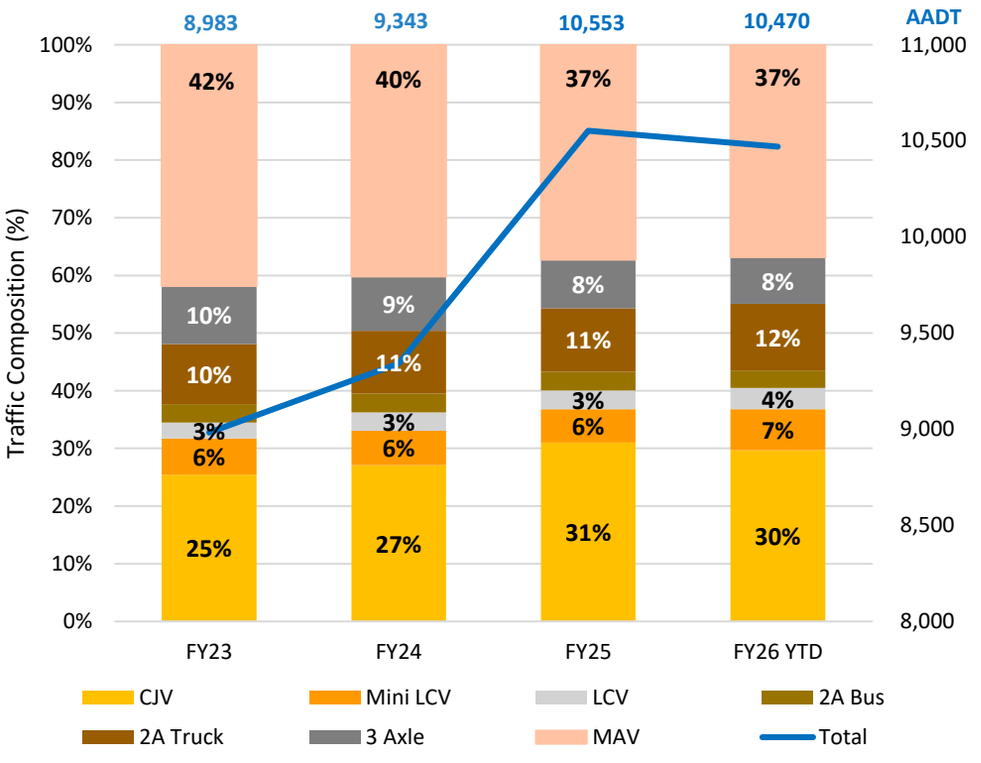
Historical traffic analysis (1)

Vehicle category-wise monthly traffic trend - ETC



Source: TIC analysis

Vehicle category-wise annual traffic composition - ETC



- Traffic has trended in the range of 10,500 AADT (27,000-29,000 PCUs) in recent past with CJVs (30%) and MAVs (37%) as major contributors. High number of CJVs is due to proximity to Dhanbad / Hazaribagh.
- The corridor is susceptible to demand-supply fluctuations of illegally mined coal which is being mainly transported through 5A Trucks due to optimum cost-tonnage ratio including overloading.
- 2A Trucks and LCV contribution is on increasing trend on the corridor in last three years.

Historical traffic analysis (2)

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Vehicle category-wise traffic growth trend - ETC

Vehicle Category	CJV	Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	Total	PCU
Annual Average Daily Traffic (AADT)									
FY23	2,287	561	251	283	938	901	3,762	**8,983**	**26,518**
FY24	2,533	552	300	301	1,022	876	3,759	**9,343**	**27,047**
FY25	3,273	608	345	343	1,162	890	3,931	**10,553**	**29,274**
FY26 till Oct'25	3,106	746	387	316	1,208	847	3,859	**10,470**	**28,913**
Growth trends									
FY24 vs FY23	10.8%	(1.6%)	19.3%	6.6%	8.9%	(2.8%)	(0.1%)	**4.0%**	**2.0%**
FY25 vs FY24	29.2%	10.2%	15.1%	13.7%	13.7%	1.6%	4.6%	**13.0%**	**8.2%**
FY26* vs FY25	(5.1%)	22.6%	12.1%	(7.9%)	3.9%	(4.8%)	(1.8%)	**(0.8%)**	**(1.2%)**
CAGR (FY23 – FY26 YTD)	13.0%	12.1%	18.9%	4.5%	10.6%	(2.4%)	1.0%	**6.3%**	**3.5%**

Source: TIC analysis * against FY25 for 7 months i.e., April-October

Corridor growth trends (project highway and neighbouring sections)

CAGR	CJV	Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	Total	PCU
Gorhar - Barwa Adda (Kulgo TP)									
Medium-term (5 Years)	~9% (CJV+Mini LCV)		~11%	~9% (Bus+2A Truck)		(~3%)	~2%	**~5%**	**~3.5%**
Neighbouring highway sections (upstream and downstream)									
Barchhati – Gorhar (short-term)	3.2%	(0.4%)	6.9%	(4.0%)	4.5%	(0.6%)	1.4%	2.0%	1.6%
Barchhati – Gorhar (medium-term)	~5% (CJV+Mini LCV)		~12%	~9% (Bus+2A Truck)		~0.5%	~6%	**~5%**	**~6%**

Source: TIC analysis

Historical traffic analysis (3)

Illegal coal mining and its correlation with MAV traffic on the corridor:

- The corridor is highly susceptible for illegal coal mining in Jharkhand since 2000 (post split from Bihar) which flourished under relatively weaker coalition state governments.
- Karanpura (Hazaribagh) and Jharia (Dhanbad) are two major coalfield regions from which coal is transported by road towards Uttar Pradesh and West Bengal. The project highway lies between these two coalfield regions and hence coal carrying traffic crosses Kulgo toll plaza subject to production-dispatch pairing between two coalfields regions and demand centers in neighbouring states.
- Similar fluctuations were observed at upstream and downstream highway sections i.e., Rasoiya Dhamna TP (towards Uttar Pradesh) and Beliyad TP (towards West Bengal) in past.
- MAV traffic recorded a 25% growth in FY2022, as road transport remained a significant mode of coal evacuation in Jharkhand as illegal / fake documents is not possible in case of rail logistics.
- This double-digit growth was followed by drop in MAV traffic which is mainly attributed:
  - **FY2023:** Stricter actions on illegal mining during May 2022 to June 2023
  - **FY2024:** Road to rail shift of coal logistics ~4 times higher movement by rail than earlier to Uttar Pradesh, Bihar, Nepal.
    A major focus during the year was the development of mechanized First Mile Connectivity (FMC) projects to eliminate the first leg of road transport from mine pitheads.
    - Tori-Shivpur rail line - significantly boosted rail capacity for the North Karanpura coalfields (covering Hazaribagh, Chatra, Ranchi, Latehar districts) from 45 MTPA to 100 MTPA
    - North Urimari Coal Handling Plant in South Karanpur coalfields (covering Hazaribagh, Ramgarh districts)
    - Ministry of Coal's target is to reach 87% by 2030 through rail logistics
  - **FY2025:** State government elections in May/June 2024
  - **FY2026:** Heavy monsoon during June to September 2025 i.e., 60%+ more rain fall than decadal average in Dhanbad, Ramgarh and Latehar districts as per reports published by India Meteorological Department (IMD) in Oct'25. These districts have major coal fields where operations impacted which led to shortfall of about 350-400 5A Trucks on the corridor.
- Post regularization of coal mining and shift to rail, the corridor witnesses coal movement for industrial demand and brick manufacturers established in neighbouring states which is of regular nature.

Historical traffic analysis (4)

LCV / Mini LCV / 2A Trucks witnessed double digit growth rate on the corridor as well as eastern states of Bihar, Jharkhand and Purvanchal region of Uttar Pradesh in last 2-3 years, mainly due to following reasons:

- **Connectivity to remote areas:** Improved rural road networks are making it easier for goods to be delivered to smaller towns and villages. This expands the market for businesses, who then purchase LCV / Mini LCV for distribution.
- **last-mile delivery boom :** Rapid growth of online shopping, spurred by greater internet penetration and smartphone usage, has increased the need for fast and reliable last-mile delivery services. Compact and efficient LCV / Mini LCV are ideal for navigating urban and semi-urban areas to deliver goods to customers' doorsteps.
- **Increased tier 2 and tier 3 demand:** Demand from tier 2 and tier 3 cities in Bihar and Jharkhand is a key driver for the LCV / 2A market. E-commerce / 3PL logistics companies and local businesses are in LCV fleets to meet delivery requirements efficiently.
- **Ease of finance and empowerment of rural economy:** Drivers started purchasing their own vehicle and approaching aggregators for transport business. These vehicles are affordable and versatile, making them suitable for transporting agricultural produce, livestock, and other goods for local inter and intra-state trade.
- Though recently reduced GST on auto components will sustain the momentum but not in double digit growth for future.

Overall decrease in traffic of passenger vehicles is due to heavy monsoon in H1 FY26 which is expected to revive during festivity and H2FY26.

Historical revenue analysis

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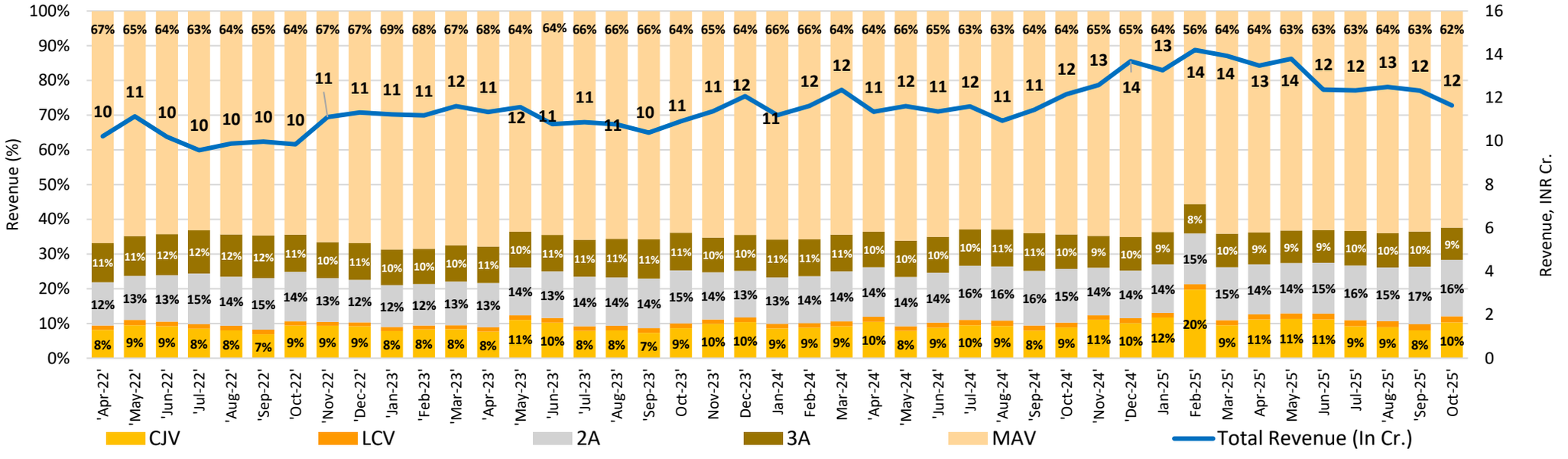
Vehicle category-wise monthly revenue composition and trend - ETC



Vehicle Category	CJV	Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	Total	AADC
Annual Revenue (in INR Crore) / Annual Average Daily Collection (AADC, in INR Lakh)									
FY23	8.8	2.1	1.6	3.4	13.2	14.1	84.0	**127.3**	**34.89**
FY24	10.1	2.1	1.8	3.6	15.1	14.4	88.2	**135.3**	**36.97**
FY25	13.3	2.3	2.1	4.1	17.7	14.6	94.0	**148.2**	**40.59**
FY26 till Oct'25	7.2	1.7	1.5	2.3	11.2	8.5	56.1	**88.5**	**41.34**
Growth trends									
FY24 vs FY23	14.2%	0.6%	14.2%	4.0%	14.3%	1.8%	5.0%	**6.3%**	**6.0%**
FY25 vs FY24	32.1%	12.3%	17.8%	13.2%	17.0%	1.5%	6.5%	**9.5%**	**9.8%**
FY26* vs FY25	19.9%	39.7%	27.0%	11.9%	12.0%	1.6%	8.6%	**9.9%**	**9.9%**

Source: TIC analysis

* against FY25 for 7 months i.e., April-October

Ticket distribution (1)

Schedule V (Part B) is a monthly statement presenting vehicle category and ticket distribution-wise traffic data including exemption, local concession / other discounted details.

Toll ticket distribution refers to share of total revenue with respect to various journey types and related discounts applicable. This distribution depends on vehicle category, trip lengths, trip frequency and percentage of local traffic.

As per Toll Plaza Gazette Notification and Toll Rate Revision Circular of FY26 for Kulgo TP, types of toll tickets are being issued are presented in the below table.

Ticket Category	Description
Single Ticket	One-way journey on the project highway is considered as single journey. For such journeys, users are required to pay the complete notified one-way fee.
Return Ticket	Two one-way journeys on the Project highway within 24 hours are covered under this category. For such journeys, users are required to pay one and half times of the fee payable for one-way journey.
Monthly Pass	Fifty one-way journeys on the Project highway within a month covered under this category. The concessionaire shall, upon request from any person, issue a monthly pass for fifty one-way journeys at a discounted rate equivalent to two-thirds of fifty one-way journeys.
Local Pass (Local Personal)	Road user who owns a mechanical vehicle registered for non-commercial purposes and resides within a distance of 20 km from the toll plaza can get local monthly pass.
Commercial vehicle registered within district of plaza (Local Commercial)	Commercial vehicles (excluding vehicles plying under national permit) registered in the district where the toll plaza is located. Fee shall be 50% prescribed rate for that category of vehicle provided no service road or alternative road is available for use of such commercial vehicles.
Exempted	This journey ticket category is for all users (like Police, Fire Brigade, Ambulance, Defence, etc.) which are exempted from paying toll as per NHAI Toll rules.
Annual Pass for private non-commercial CJV vehicles	On June 18, 2025, MoRTH introduced a FASTag-based annual pass to facilitate seamless highway travel. This pass is valid for non-commercial private vehicles such as cars, jeeps, and vans, and remains effective for one year from the date of activation or up to 200 trips—whichever comes first for INR 3,000. Trip counting method is as follows: Open Tolling: Each entry / exit counts as one trip Closed Tolling: One entry to exit trip counts as one

Source: DCA, NH Fee Rules 2008 and subsequent amendments and existing gazette notifications

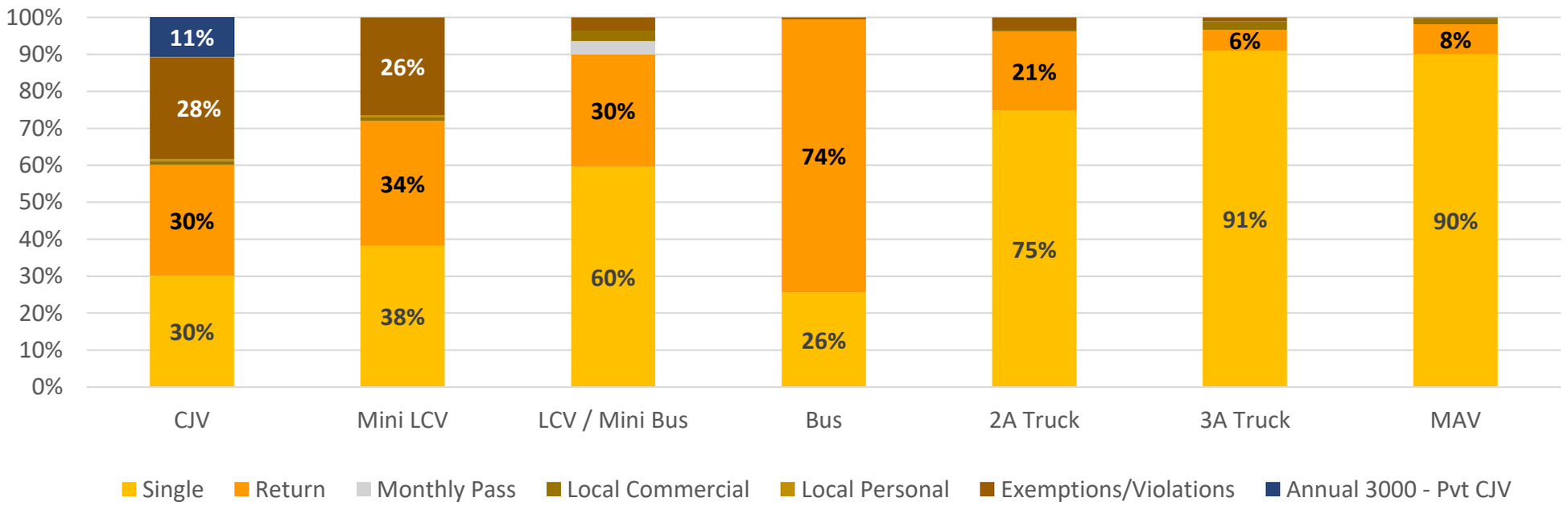
Ticket distribution (2)

Currently it is envisaged that annual passes will be issued directly by concerned authority and hence revenue from sale of annual passes will not accrue to the concessionaire. NHAI has issued advisory for reimbursement of loss of revenue due to annual pass usage to the concessionaire which is part of Draft Concession Agreement as Clause 27.1.5 and described below:

- The concessionaire acknowledges and agrees that any user owning a non-commercial vehicle and holding a valid and functional FASTag Pass in accordance with MoRTH Gazette Notification No. G.S.R. 388(E) dated 17th June 2025shall be entitled to use the project highway without any restrictions, except to the extent specified in any applicable law, applicable permit or the provisions of the draft concession agreement.
- In respect of such vehicle crossing the toll plaza(s), the concessionaire shall be entitled to receive compensation from the authority equivalent to the product of:
  - The number of non-commercial vehicles crossing the toll plaza(s) with such pass; and
  - 90% of the applicable fee for single journey of such vehicle.
- Provided, however, that for the purpose of computation of such compensation, the counting of any particular vehicle shall be limited 2 crossing per day, notwithstanding that such vehicle may cross the toll plaza(s) multiple times on that day.
- The compensation payable under this clause shall be due and payable in monthly instalments within 7 days of the close of the month.

Ticket distribution (3)

Kulgo TP



Source: TIC analysis

- Local trips by CJVs and Buses along Dumri, Bagodar, Dhanbad, Hazaribagh and Isri accounts for ~30% and ~74% of the return ticket category while similar nature of local trips of CJV and Mini LCV account for higher local commercial ticket category.
- More than 75% of the goods vehicles (2A, 3A and MAV) opt for single journey tickets showcasing higher influence of long-haul traffic.
- ~11% of CJV traffic is being witnessed using Annual Pass of INR 3,000 as on 31st October 2025 which is expected to increase to 1.5 to 2 times in future through gradual awareness among road users.

Commodity analysis (1)

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Direction-wise commodity distribution

Commodity	Mini LCV		LCV		2A Truck		3A Truck		MAV	
	Gorhar to Dhanbad	Dhanbad to Gorhar	Gorhar to Dhanbad	Dhanbad to Gorhar	Gorhar to Dhanbad	Dhanbad to Gorhar	Gorhar to Dhanbad	Dhanbad to Gorhar	Gorhar to Dhanbad	Dhanbad to Gorhar
Agriculture / Animal Husbandry	28%	7%	7%	5%	4%	5%	7%	4%	14%	6%
Fruit and Vegetables	13%	27%	7%	12%	8%	9%	5%	2%	5%	1%
FMCG / Food Products	7%	9%	11%	13%	13%	12%	19%	11%	12%	6%
Building / Construction Material	1%	1%	1%	0%	1%	1%	1%	0%	6%	1%
Cement	0%	0%	0%	1%	1%	1%	1%	2%	1%	5%
Aggregates / Sand	--	--	0%	0%	--	--	1%	2%	2%	2%
Minerals / Mining Commodities (majorly Coal)	0%	--	0%	1%	1%	1%	1%	2%	8%	8%
Iron Ore / Pellets	--	--	--	--	--	--	--	--	0%	3%
Manufacturing	7%	11%	19%	12%	14%	16%	14%	16%	10%	11%
Automobile and Spares	0%	--	5%	0%	7%	1%	3%	1%	3%	0%
Chemicals / Fertilizers	--	0%	0%	1%	1%	1%	2%	5%	3%	6%
Steel / Metal Products	0%	4%	2%	5%	2%	5%	1%	14%	3%	28%
Petroleum Products	0%	2%	1%	2%	1%	3%	2%	5%	2%	10%
Parcel / E-commerce	5%	9%	24%	33%	22%	30%	23%	25%	8%	5%
Miscellaneous	--	0%	0%	1%	1%	--	0%	1%	0%	0%
Empty	38%	27%	23%	13%	24%	14%	19%	9%	25%	10%

Source: TIC analysis

*0% indicates value less than 1% and -- represents no presence of such commodity for the vehicle category

Commodity analysis (2)

- Jharkhand's economy and population are heavily dependent on agriculture, with about 65% of its workforce relying on it for livelihood, especially in rural areas. This trend is clearly visible in the **Agriculture / Animal Husbandry (7–10%)** category. An equal proportion of long-haul traffic is observed under this category, carrying grains and pulses from Madhya Pradesh, Delhi, Rajasthan, Haryana, Bihar to West Bengal is a major trade centre for agricultural commodities.
- **Fruits and Vegetables (10%)** include medium-distance regional traffic movement across neighbouring states of Uttar Pradesh, Bihar, Jharkhand and West Bengal i.e., from farm to wholesale yard / retail market.
- **FMCG / Food Products (~15%)** including short-, medium-, and long-distance movements, have a considerable presence considerable presence on the project highway from production to consumption centers across corridors.
- **Steel/Metal Products** such as TMT Bars, Wires, Rods, Coils, Fabricated Engineering Items mainly being transported through MAV and 3A Trucks which contribute ~30% and ~15% respectively for MAV and 3A.
- **Coal (~10%)** movement was observed in both directions as the project highway is located between two major coalfields as discussed in earlier sections and hence movement towards Uttar Pradesh/Bihar and West Bengal is clearly visible through MAV (mainly 5A Trucks.)
- Regular movement of **petroleum products (~10%)** carrier between eastern Uttar Pradesh/Jharkhand/Bihar and Durgapur/Rajbandh where all three Oil PSUs (HPCL, BPCL, IOCL) have presence with bottling and fuel distribution terminals as well as from Haldia Port.
- **E-commerce / Parcel** items are mainly being carried through LCV / 2A / 3A Trucks and contribute about 30% in traffic of these categories.
- **Empty vehicle movement (~20% for Gorhar to Dhanbad direction and ~10% in opposite direction)** was clearly visible during site visit which mainly includes:
  - Cement bulk carrier returning to cement manufacturing clusters at Jharkhand
  - Petroleum product carriers returning to Durgapur/Rajbandh
  - High volume of goods vehicles return to Transport Nagar at Varanasi/Dhanbad
- Commodity distribution exhibits characteristics that are in line with corridor and economic activities observed in the influence region.

Zonal influences and trip distances

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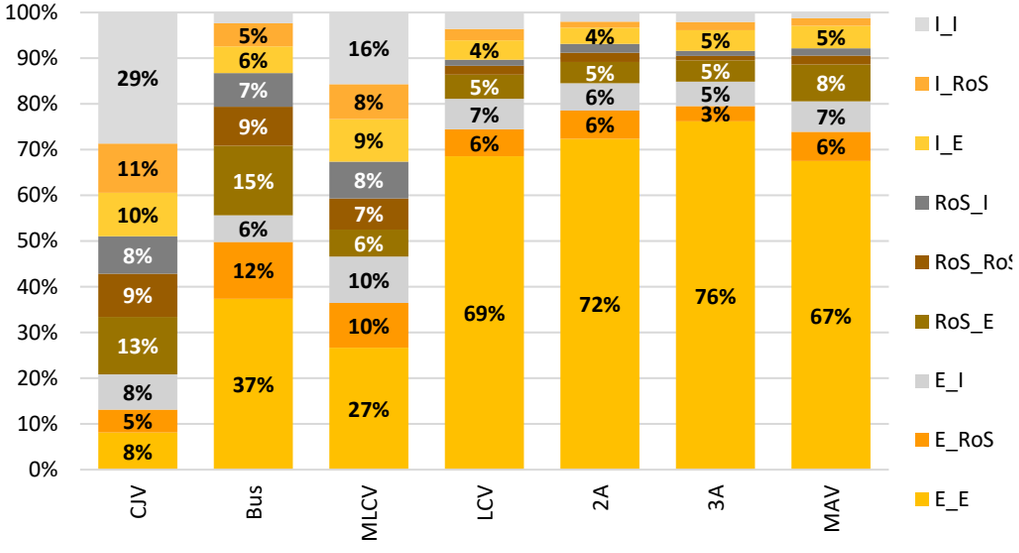
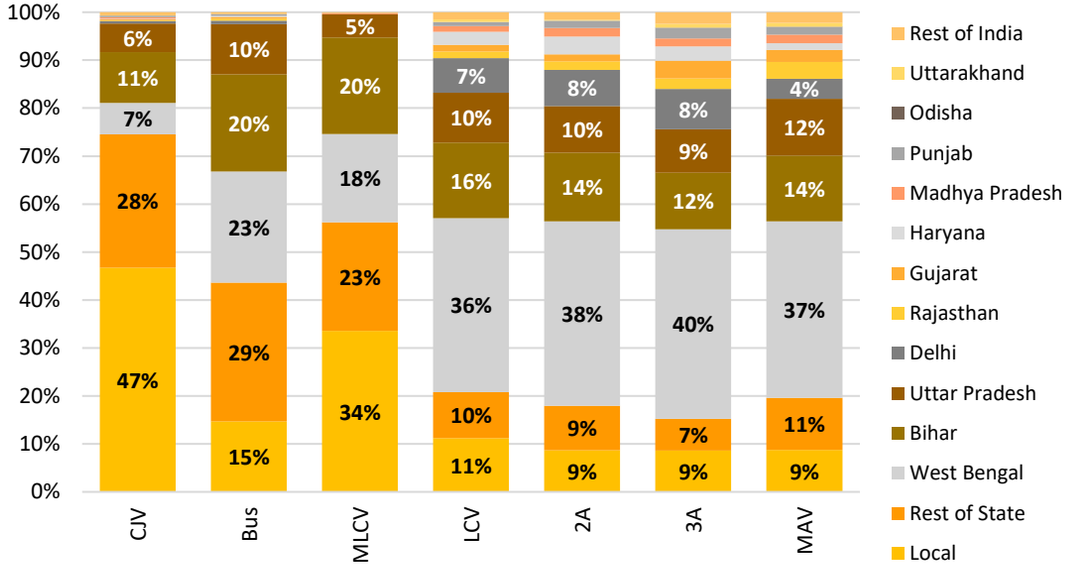
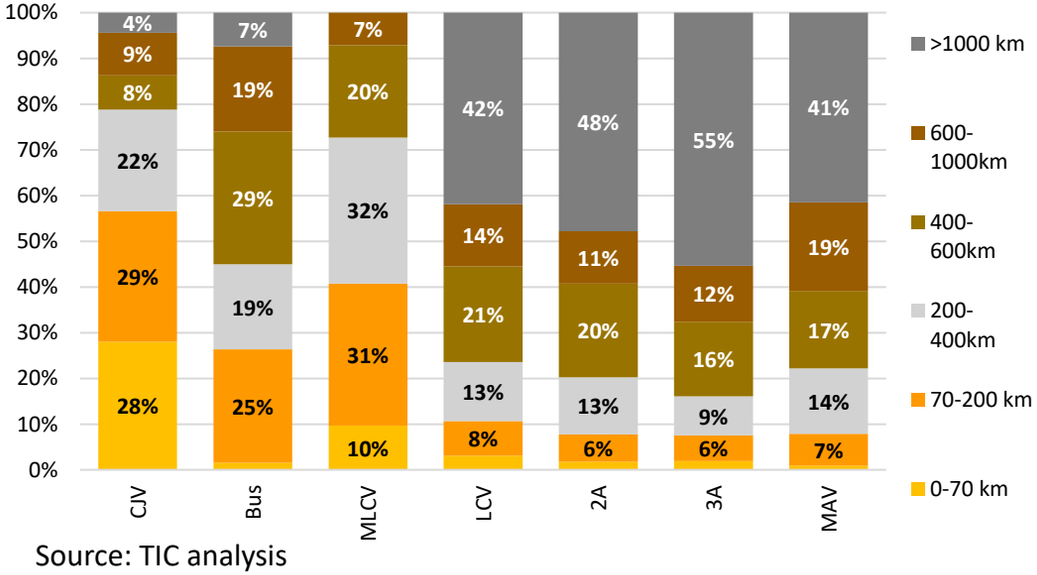
Vehicle category-wise zone characteristics



Vehicle category-wise project influence region



Vehicle category-wise trip lengths and average distances



Vehicle Category	Distances (in km)
CJV	276
Bus	455
Mini LCV	290
LCV	894
2A	958
3A	1,081
MAV	922

Source: TIC analysis

Vehicle category-wise visual representation of origin-destination zones and top pairs are provided in Appendix A.

Chapter 4: Economic context and traffic growth

- Economic context of influence region
- Determination of traffic growth drivers
- Estimation of demand elasticities
- Forecasts for growth drivers

IRC: 108-2015 mentions that traffic growth is typically driven by a combination of macro-economic trends and industry/commodity specific factors, known as independent variables or traffic growth drivers.

These growth drivers have two critical characteristics:

1) the rate at which it increases i.e., forecasts of independent variable
2) the project highway's relationship with the growth driver to attract, capture and retain the traffic over the forecast horizon i.e., travel demand elasticity

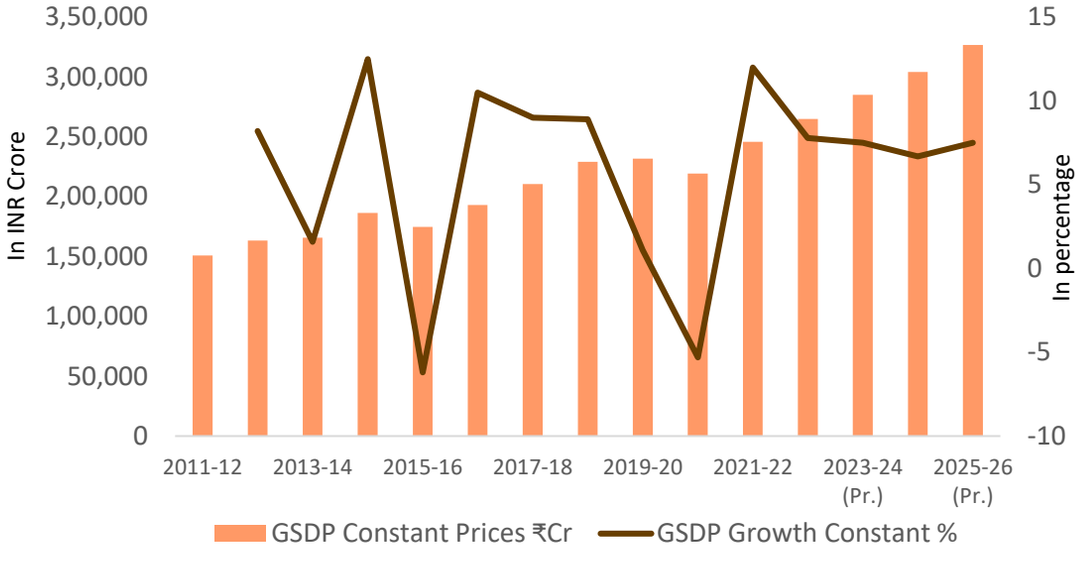
Growth drivers are typically identified through analysis of origin–destination data, site visits and a detailed understanding of the highway.

Travel demand elasticity is influenced by socio-economic conditions both within the region served by the project highway and across the wider national area of influence.

This chapter explains the growth drivers and elasticity in context of economic snapshot of primary districts / state and their correlation with the country.

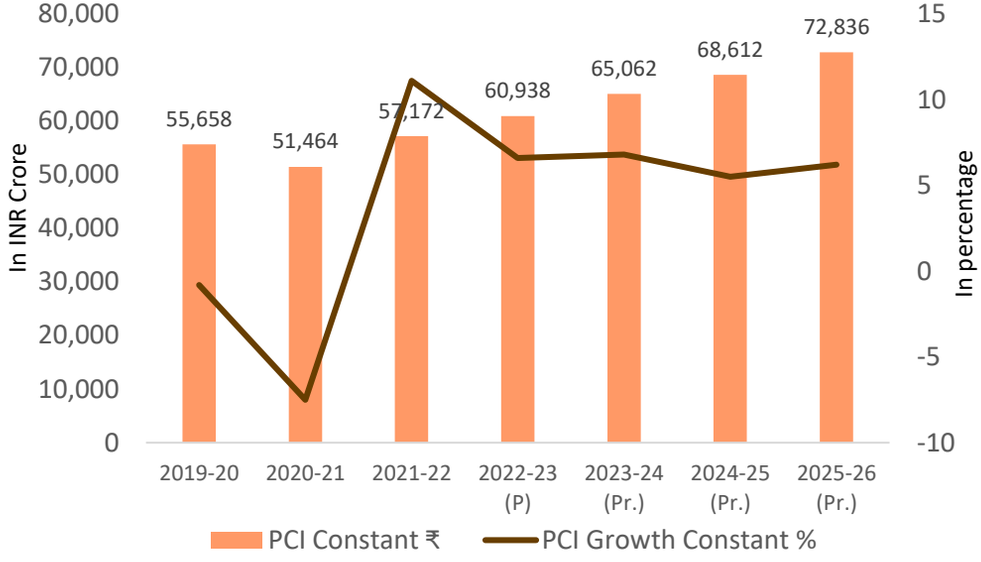
Jharkhand: From ‘Coal and Crops’ to ‘Factories and Services’

Jharkhand GSDP levels and growth rate



GSDP grew 7.7% p.a. between FY2022 and FY2024

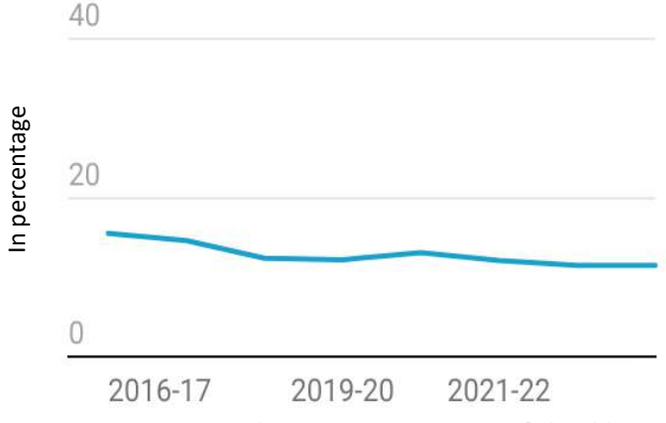
Jharkhand PCI levels and growth rate



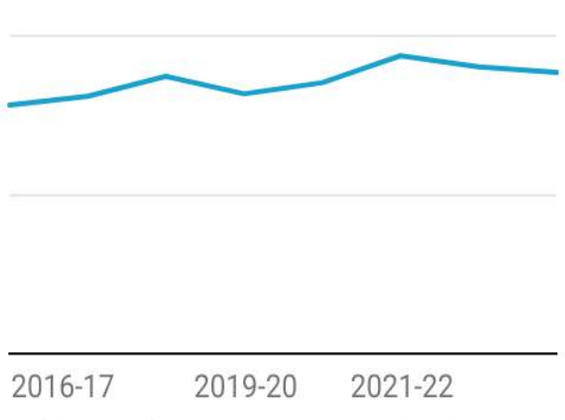
PCI growth observed a plateau in the last couple of years

Primary sector reliance reducing, economy structurally shifting towards industry and service led growth

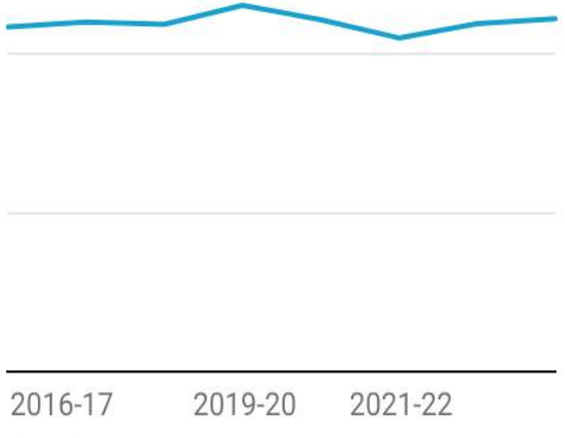
Agriculture & Mining (%)



Secondary Total (%)



Tertiary Total (%)

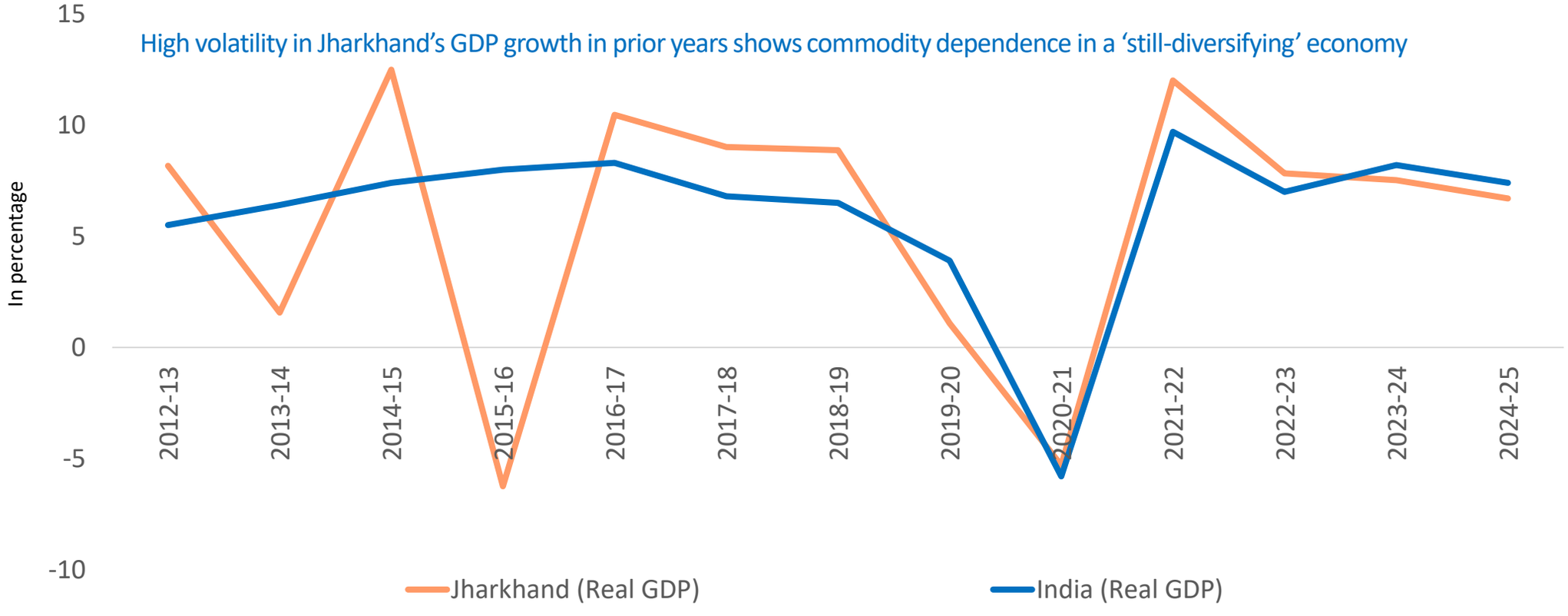


Source: MoSPI, Economic Survey of Jharkhand and TIC analysis

P – Provisional, Pr. - Projections

Jharkhand and India GDP growth trend

Jharkhand and India GDP growth trend

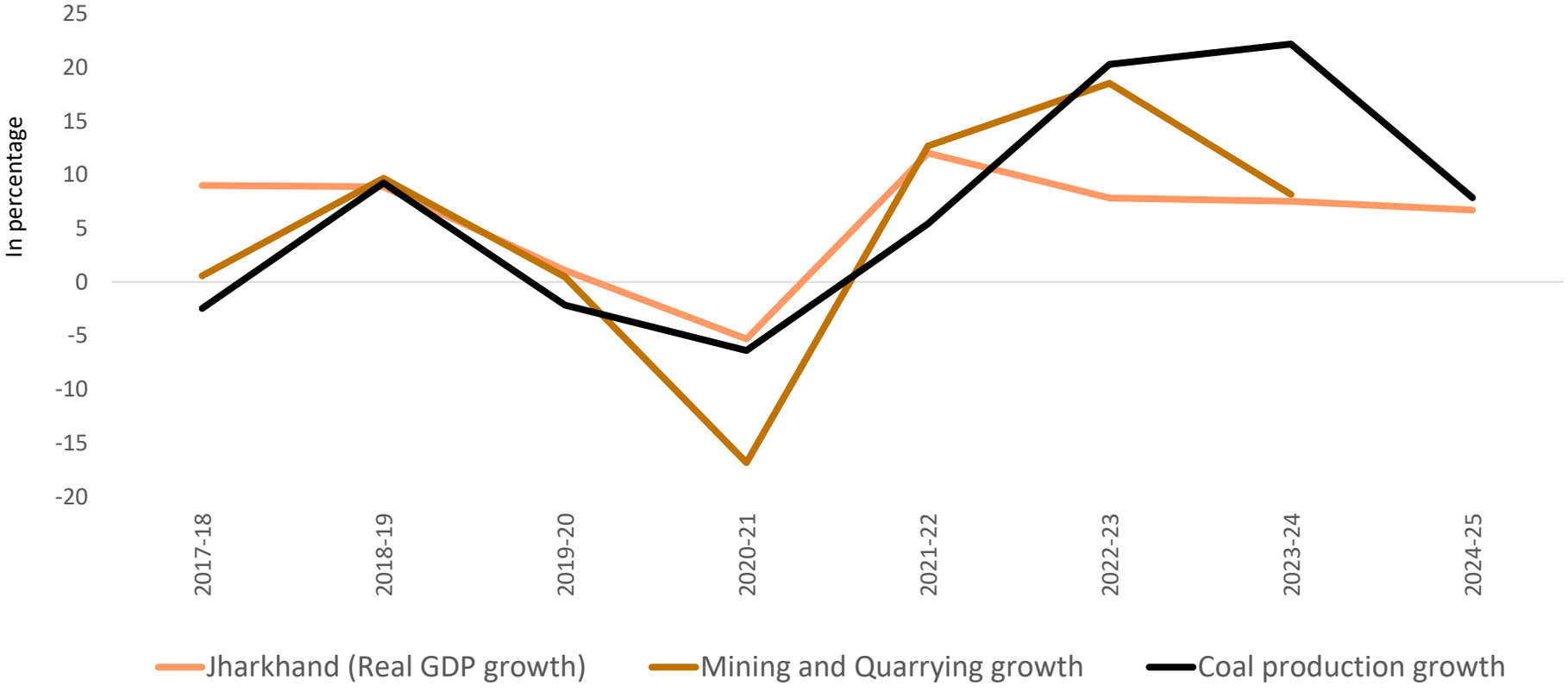


Source: MoSPI, Economic Survey of Jharkhand and TIC analysis

- Share of Mining and Quarrying in overall state GVA has slightly come down from 9.8% in FY2017 to 8.7% in FY2024, although the post-Covid growth in mining has remained solid.
- Share of Agriculture has decreased from 15.5% to 11.5%, while the manufacturing has increased from 21.2% to 24.2% in the same period.
- The sub-optimal performance of the agriculture sector reflects change in composition of demand with the increase in income.

Coal: The “Just Transition” risk

Sectoral dependence



Source: Economic Survey of Jharkhand and TIC analysis

- Commodity sector (primarily coal) dependence indicates pressure on the growth as many legacy mines are nearing the end of their productive life. New mining licenses ae being issued but coal is fossil fuel and can’t be replenished.
- As India gradually transitions towards renewable energy to meet climate goals, coal demand may plateau in the coming decades. While this may not have a significant impact in the near term—as most coal supplied to power plants is transported by rail—it cannot be ignored in the larger context.

Districts in immediate influence region (1)

Sectoral contribution in district and state GDP (FY2024)

District	Agriculture and Mining (Primary)	Industry (Secondary)	Services (Tertiary)
Dhanbad	11.9%	60.5%	27.5%
Hazaribagh	20.6%	37.9%	41.5%
Giridih	20.0%	31.4%	48.5%
Jharkhand	20.1%	35.4%	44.4%

Source: Department of Economic Survey of Jharkhand and TIC Analysis

Contribution in state GDP and overall rank (FY2022, Current Prices)

District	Contribution in State GDP	Rank	Per Capita Income	Rank
Dhanbad	14.8%	1	1,54,955	1
Hazaribagh	5.31%	6	87,931	10
Giridih	4.22%	8	49,401	22

Dhanbad district leads among all the districts - both in district income and per capita income

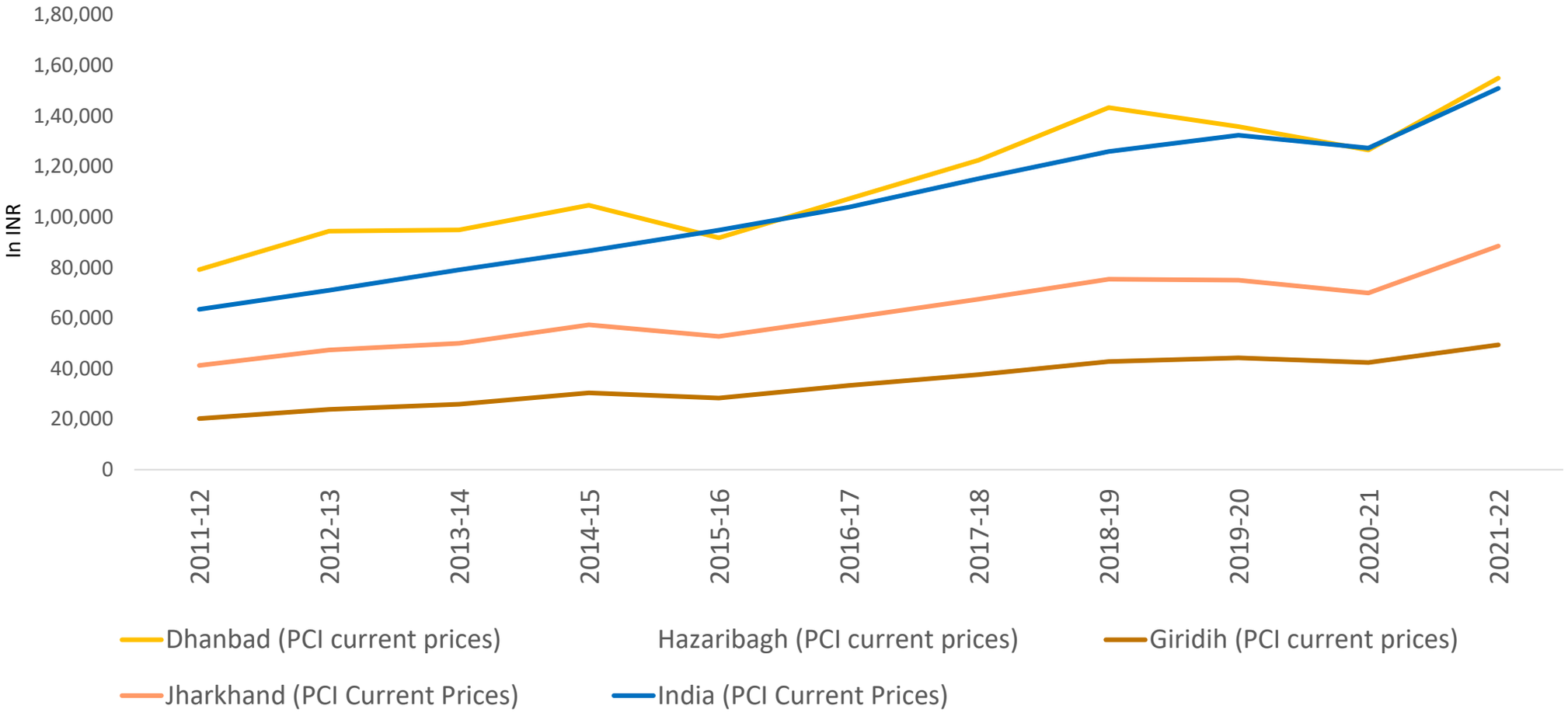
Key district characteristics

Parameter	Dhanbad	Hazaribagh	Giridih
Economic profile	Industrial economy	Balanced, mixed economy	Service oriented economy
GVA structure	Mining hub and high industrial GVA Minimal agriculture and services secondary	Agriculture and services together outweigh industry	Nearly half of GVA from services, relatively weak industry
Income position	Leads Jharkhand on district income and per capita income Broadly in line with India average	Per capita income close to the Jharkhand state average	Per capita income below Dhanbad but improving over time
Growth profile	High growth and high volatility Classic industrial boom bust profile	Slightly above state average growth indicating balanced expansion	Above average but smoother than Dhanbad, reflecting service led stability

Source: TIC secondary research and analysis

Districts in immediate influence region (2)

Per capita income comparison: Jharkhand, India and districts in immediate influence region



Source: Department of Economic Survey of Jharkhand and TIC analysis

Dhanbad's per capita income levels are comparable to India's, while Hazaribagh's are closer to Jharkhand's, reflecting differences in demand composition.

Districts in immediate influence region (3)

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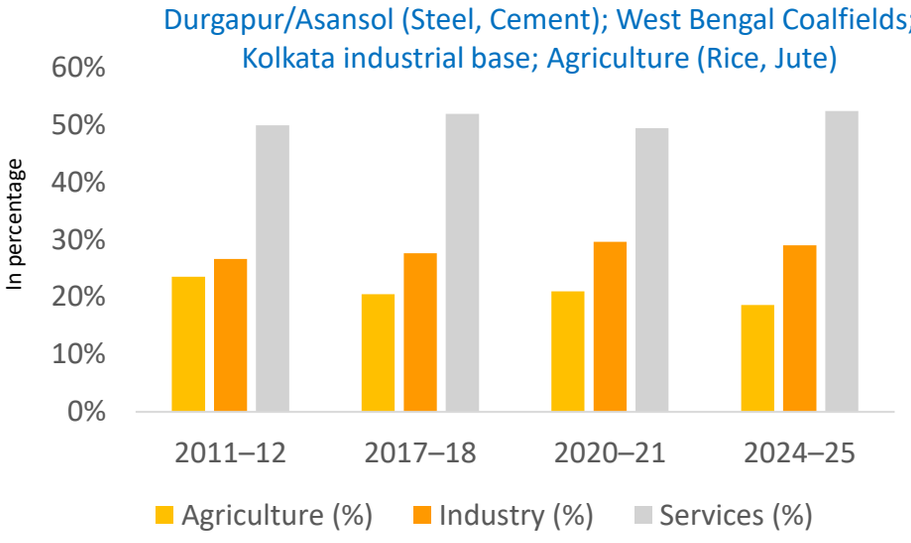
District-wise summary of risk and opportunities

Parameter	Dhanbad	Hazaribagh	Giridih
Primary driver	Heavy Industry (Coal/Steel)	Mining and education	SME industry; religious tourism (Sammed Shikharji - Jainism's holiest pilgrimage)
Key resource	Coking Coal	Thermal Coal	Mica, Coal, Iron Ore
Major risk	Mine subsidence/fire	Land acquisition protests	Illegal mining and water issues, naxalism
Growth opportunity	Coal Bed Methane (CBM)	Logistics and smart city development	Eco and religious tourism
Predicted strong growth segment	HCV (Trucks)	Passenger Cars / HCV (Trucks)	Passenger Cars / Mini LCV / LCV
Conclusion			
Profile and metrics (GVA share or growth)	Jharkhand's top economy (largest district GDP) Mining/industry dominates GVA Per Capita Income ~national level Volatile high growth	Balanced economy: agriculture + services together exceed industry; modestly above-average growth Moderate Per Capita Income (≈state avg)	Service-oriented (~50% of GVA from services) Industry weaker; above-average growth but less volatile Lower Per Capita Income
Toll traffic implication	Heavy industrial base drives **huge freight flows** (many coal/steel products trucks) Correlation: Dhanbad's growth strongly uplifts toll volumes	Mixed cargo-passenger traffic Steady growth means **stable toll volumes** (bus/truck flows from agri-business and services)	Primarily local passenger traffic (cars, buses) rather than long-haul freight. Toll plazas here see relatively **weaker heavy-vehicle flows**

Source: TIC analysis

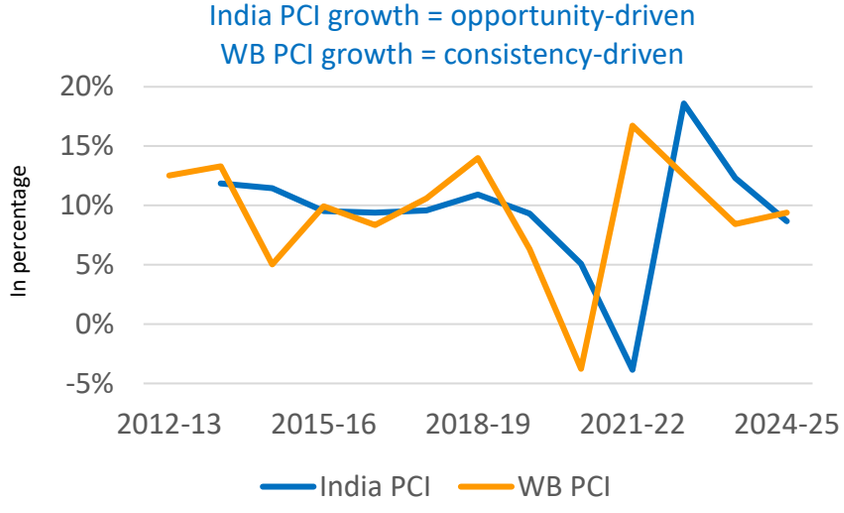
West Bengal: substantial contributor to freight flow of NH19

West Bengal GSDP sectoral composition



Source: TIC analysis

West Bengal and India PCI growth



Source: TIC analysis

- Economy steadily shifted towards services, with agriculture's share declining and industry remaining broadly stable, signaling a consumption- and services-led growth model. **Trade (28%), real estate (22%) and logistics (15%)** dominate services sector.
- West Bengal grows more consistently but at a slightly lower pace than India. State's growth cycle is less volatile, and while WB occasionally outperforms (notably in FY16 and again in FY25), the typical gap favors India.
- West Bengal's long-term PCI growth rate is marginally higher than India's, but this is base-effect driven (lower starting income).

Particulars	India	West Bengal
Income growth style	Opportunity / capex-led	Consumption / services-led
Volatility	Higher	Lower
Traffic implication	Cyclical surges	Persistent baseline traffic
Revenue predictability	Moderate	High

Source: TIC analysis

PESTLE analysis

Parameter	Key factors / trends	Implication for toll traffic
Political	▪ Strong central/state infrastructure push BJP-led government during 2014-2019 prioritizes roads and even during collation governments ▪ Elections highlight connectivity focus and trade development including rural economy ▪ Coalition governments and increased instances of illegal coal mining	▪ Continued policy support ensures funding and execution of new highways, boosting trade and rural economy followed by future traffic volumes ▪ Any illegal coal mining will be up-side as it will be transported through road. The consultant has not considered any up-side for illegal coal mining observed n past.
Economic	▪ Robust GDP (~7%-8%) driven by industry/services; diversifying from agrarian base in Jharkhand and WB ▪ Rising per capita incomes (highest in Dhanbad)	▪ Broad-based growth fuels both freight and passenger traffic growth, underpinning toll revenue growth
Social	▪ Population ~33 m, ~26% Scheduled Tribes (rural/agrarian); urbanization ~28% ▪ Literacy improving to ~70%	▪ Lower urbanization and incomes suppress initial vehicle ownership, but expanding middle class gradually increases travel (especially in cities)
Technological	▪ Multi Lane Free Flow (MLFF) implementation at toll plazas will improve efficiency but not volumes ▪ FASTag penetration: freight traffic ~100% but high violation in local CJV/Mini LCV ▪ EV policy targets (10% by 2027) but charging network still sparse	▪ MLFF to be linked with state government (RTO) for stricter actions in case of blacklisted FASTag during barrier free toll plazas; increase in forced violation ▪ EV uptake currently minimal so toll usage unchanged. In long term, EV trucks may alter fuel tax vs toll mix – far in future
Environmental	▪ Push for cleaner coal technologies and afforestation; monsoon irrigation projects; climate adaptation programs gaining traction	▪ Stringent clearances can delay road projects. Transition away from coal may reduce future heavy freight on highways
Legal / Regulatory	▪ Land acquisition and forest rights delays are common; state support agreement for stricter enforcement of initiatives for all aspects	▪ Regulatory hurdles slow project completion, deferring new toll collections. ▪ Once ecosystem is established, tolling framework is stable and predictable across Jharkhand

Source: TIC analysis

Determination of growth drivers and elasticity (1)

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Potential socio-economic indicators as growth drivers in context of IRC: 108-2015 and benchmark studies

Socio-economic indicators	Observations for availability/reliability of historical and forecast data
Vehicle registration / Automobile Sales	Sourcing vehicle registration data from concerned Regional Transport Office (RTO) within influence region is herculean task. In addition, it is not mandatory that Project Influence Area (PIA) matches with vehicle registration cases at ground level so not useful. Society of Indian Automobile Manufacturers (SIAM) publishes automobile sales at region level but not at granular level. Can be used as proxy data to validate specific trends. The consultant includes regional dealers' association of freight vehicles (if any) and local financing agencies to understand and validate specific trends observed in traffic.
Per Capita Income	Can be used as proxy data which reflects demand composition but not specific to commodities / vehicle category. Underlying forces are complex and changing at every strata of administrative structure i.e., districts, state, national. Historical data at state / national level available in public domain but not for district level. Further, availability of forecast data is major constraint in India.
Population	Population data are compiled on a decennial basis, with the latest census conducted in 2011, and do not provide a robust annual time series suitable for econometric modelling. In addition, migration trends across socio-economic segments and income-based geographies are highly volatile and difficult to forecast with confidence. Accordingly, population growth has not been adopted as a driver for forecasting future travel demand on the project highway.
GDP / GSDP	Dataset from national and international publications and government agencies which are highly reliable in context of forecast e.g., Focus Economics, RBI / RBI's Survey of Professional Forecasters (96th Round), SBI Research, CII, multilateral banks (ADB, World Bank etc.), IMF, OECD, Oxford etc. The consultant typically uses Focus Economics monthly subscription and in-house/empaneled economists for correlation for state and district level GDP and industry specific aspects. The client provides views on the consultant's draft and recommends the final forecast.

Source: TIC research and analysis

Determination of growth drivers and elasticity (2)

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- For any potential indicator (economic, commodity, or industry-related) to be used as a traffic growth driver, availability and reliability of both historical data and credible forecasts are critical success factors.
- Among the key socio-economic indicators discussed above, Gross Domestic Product (GDP) at the national level and Gross State Domestic Product (GSDP) at the state level are the only indicators for which robust historical data and reliable forecasts are consistently available. Accordingly, GDP/GSDP have been adopted as the primary growth drivers for traffic forecasting.
- In addition, steel and coal production have been incorporated as project-specific growth drivers, given that approximately 30% and 8% of traffic on the project highway, respectively, are attributable to the transportation of steel products and coal.
- The consultant held discussions with regional dealers' associations of freight vehicles, agricultural wholesale yards (popularly known as mandis), pilgrimage trusts where tourist footfall data are well organised, and inter-city bus terminals in the immediate influence region to validate specific traffic trends such as seasonality and growth patterns.
- In many cases, historical data show varying traffic trends due to various external events in the economy and region. In addition, variations in data recording by third-party tolling agencies and the presence of historical data gaps, as observed in this business case, necessitated further validation.
- Accordingly, validation of the historical data was carried out using traffic data from neighbouring toll plazas on the corridor and benchmark highway sections.
- Traffic growth may not be uniform during the forecasting period, considering factors such as increasing total traffic volumes relative to the capacity of the corridor and the project highway, technological advancements in the automotive industry, cost–tonnage ratios of specific commodity–vehicle combinations, and overloading trends versus strict government enforcement in the region.
- In India, the freight vehicle mix has been changing over the last decade, favouring multi-axle vehicles (MAVs) over 2-axle and 3-axle vehicles for long-distance traffic, given the operational efficiencies achievable with larger vehicles. At the same time, Mini LCVs and LCVs have become more popular for short-distance traffic and more localised supply movements compared to 2-axle vehicles.
- Considering ongoing technological advancements in the automotive industry, standard 2-axle and 3-axle trucks have been increasingly replaced by 6-tyre LCVs over the last couple of years, a trend that is expected to continue.
- The projected elasticity values are typically assumed to remain constant over the concession period in the Indian context; however, they may vary over time due to factors such as increasing traffic volumes relative to corridor capacity, technological advancements in the automotive industry, changes in cost–tonnage ratios of specific commodity–vehicle combinations, overloading trends versus enforcement intensity, and correction of regional imbalances.
- Considering all these aspects, vehicle category-wise elasticities have been estimated.

Determination of growth drivers and elasticity (3)

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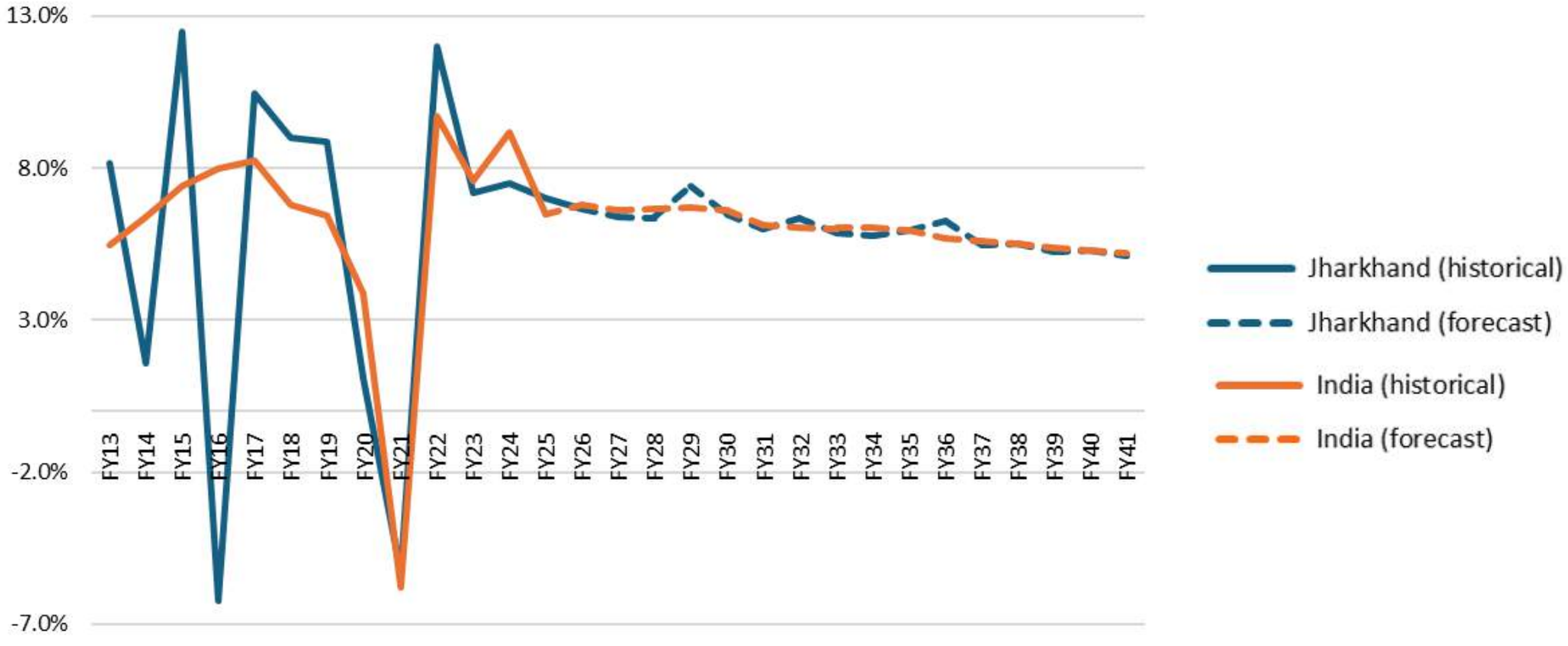
Vehicle category-wise adopted elasticity

Vehicle Category	Kulgo TP	Independent variable
CJV	0.75 - 1.10	Weighted average of: GSDP of Jharkhand, West Bengal, Bihar and Uttar Pradesh
Mini LCV	0.65 - 0.75	
Bus	0.40 with periodical decrease in every 3rd year as per past trend	
LCV / Mini Bus	0.60 - 0.65	
2A Truck	0.85 - 0.95	Weighted average of: GDP of the country, GSDP of Jharkhand, West Bengal, Bihar and Uttar Pradesh Production of Finished Steel in the influence region i.e. Jharkhand, West Bengal and Odisha
3A Truck	0.10 - 0.30	
MAV	0.85 - 1.00	Weighted average of: GDP of the country, GSDP of Jharkhand, West Bengal, Bihar and Uttar Pradesh Production of Finished Steel in the influence region i.e. Jharkhand, West Bengal and Odisha Production of Coal from Jharkhand and West Bengal

Source: TIC estimate using historical traffic data for the project highway and benchmark references of up-stream / downstream toll plazas

Forecasts for growth drivers (1)

GDP and GSDP forecast



Source: Client input and TIC estimates

- By analyzing historical patterns of state-level GSDP growth in relation to national GDP growth, state-wise GSDP projections have been developed. Under performing states compared to the national GDP are expected to witness an acceleration in growth and gradual convergence will realise by 2040 followed similar growth by 2047 with Viksit Bharat vision.
- WPI will be 3.24% throughout the concession period except 0.25% for FY27 to revise toll rates as provided by the Client.

Forecasts for growth drivers (2)

Production of finished steel

- As per Annual Steel Report, Ministry of Steel – 230 MTPA is the National Steel Policy target for FY31; beyond FY31, India production is extrapolated based on historical CAGR.
- Latest media reports suggest that Odisha state's CM claiming Odisha to account for 50% of India's steelmaking capacity by 2030 i.e., capacity of 130 MT by FY31 up from 41 MT currently located in the state. This capacity assumes both crude and finished steel as well as capacity and not necessarily the production.
- The consultant believes this is overly optimistic (compared to current production) and therefore assume the share of Odisha to rise to 1/3rd (33%) by FY31 up from 16% production share of finished steel in FY24. Steep increase in share of Odisha (assumption) lead to moderate reduction in share for Jharkhand and West Bengal.

Production of coal

- Coal will be the main source of net demand growth through 2030, driven by electricity demand, cement, steel, and coal-based industrial processes in India. Coal's share in India's electricity mix is projected to fall from over 70% in 2025 to about 60% by 2030, even as the country's overall coal demand is expected to rise 17% over the next five years, according to the International Energy Agency (IEA).
- The largest absolute increase in coal consumption to 2030 is expected to take place in India, where demand is set to rise by 3% per year on average, leading to an overall increase of 225 million tonnes as per International Energy Agency's Coal 2025 report.

Chapter 5: Baseline traffic and revenue forecast

- Base year AADT (FY26)
- Toll ticket distribution
- Revenue reconciliation

This chapter presents our approach to reach baseline forecast. The consultant estimated base year AADT and toll ticket distribution to reconcile base year traffic and revenue.

Base year AADT estimate

- The consultant reviewed H1 FY26 ETC traffic data received from the client. Based on which traffic profiling for balance half of FY26 has been estimated using seasonality correction factors followed by estimation of FY26 AADT.
- An independent CTVC survey was undertaken to validate the ETC reported traffic data. The variance between CTVC and ETC data is comparatively higher for Car/Jeep/Van, Mini LCV, and Bus categories. For CJV/Mini LCV, this is attributed to local vehicles from nearby urban centre of Dhanbad and villages in surrounding area like Kulgo, Isri, Dumri, Bagodar at Kulgo toll plaza. For Bus, higher forced exemption was observed across the corridor in Jharkhand and Bihar. Conversely, the variance for LCV, Truck 2A, Truck 3A, and MAV categories remains marginal and within acceptable industry standards.
- Hence, the consultant multiplied variance factor with ETC AADT to determine the corrected FY26 AADT.

Base Year AADT (FY26)

Particulars	ETC AADT	Variance factor	Corrected Base Year AADT
Car/Jeep/Van	3,352	1.3772	4,617
Mini LCV	671	1.3547	909
Mini Bus/LCV	383	1.0209	391
Bus	338	1.0118	342
2A Truck	1,221	1.0057	1,228
3A Truck	865	1.0127	876
MAV	4,129	1.0015	4,135
OSV	3	1.0000	3
AADT	**10,962**		**12,500**
PCU	**30,461**		**32,069**

Source: TIC estimate

Ticket distribution

Kulgo TP

Vehicle categories	Car/Jeep/Van		MLCV	Bus	LCV	2A	3A	MAV
Ticket types	FY26	FY27 onwards	FY26 onwards					
Single	30.1%	25.6%	38.2%	25.5%	59.6%	74.8%	91.0%	90.0%
Return	30.0%	28.0%	33.8%	73.9%	30.5%	21.4%	5.6%	8.2%
Monthly Pass	-	-	-	-	3.5%	-	-	-
Local Commercial	-	-	1.6%	-	2.9%	0.5%	2.3%	1.6%
Local Personal	1.5%	1.5%	-	-	-	-	-	-
Exemptions/Violations	27.6%	27.6%	26.4%	0.5%	3.6%	3.4%	1.1%	0.2%
Annual Pass - Pvt CJV	10.7%	17.2%	-	-	-	-	-	-

Source: TIC estimate

- ~11% of CJV traffic is being witnessed using Annual Pass of INR 3,000 as on 30th October 2025 which is expected to increase by ~1.7 times in future through gradual awareness among road users.
- The consultant did not consider penetration of annual pass from estimated exemption/violation in future.
- For all vehicle categories, prevailing exemption/violation has considered for future. As per discussion with the client, prevailing forced exemption is likely to reduce post-implementation of Multi Lane Free Flow (MLFF) tolling system.
- Future segmentation will change due to expected diversions presented in Chapter 6.

Validation of base year traffic and revenue

- The Consultant calculated base year revenue by multiplying traffic AADT with prevailing toll rates in accordance with estimated toll ticket distribution.
- Comparison summary with quoted remittance by tolling agency is presented in the below table.
- Quoted daily remittance should be lower than estimated revenue by approx. 5%-10% considering profit margins of tolling agencies.

Traffic and revenue reconciliation for base year (all values are estimated with FY26 toll rate with old linking factor)

Toll Plaza	Base year revenue estimate by the Consultant (INR Crore)	Annual Potential Collection estimate by NHAI (INR Crore)	FY26 estimate vs NHAI APC	Quoted remittance By prevailing tolling agency (INR Crore)	Consultant estimate vs Quoted remittance
Asanpur	160.49	149.70	7.2%	151.14	6.2%

Source: TIC estimate

Chapter 6: Diversion analysis

- Varanasi Ranchi Kolkata highspeed corridor (NH319B)
- Raxual Haldia economic corridor
- Eastern dedicated freight corridor
- Kandla Gorakhpur LPG pipeline
- Vande Bharat express train: Varanasi Howrah route
- National Waterways 1

This chapter elaborates impacts of proposed infrastructure developments in the project influence and network in form of positive/negative diversion to/from the project highway. Analysis has been exercised using IRC: 108 - 2015 and IRC: SP: 30 - 2019.

Varanasi Ranchi Kolkata highspeed corridor (1)

- Varanasi Ranchi Kolkata highspeed corridor (NH319B) will be 6-lane greenfield access-controlled highspeed corridor conceptualized under Bharatmala Pariyojana and now will be part of Vision 2047, connecting Varanasi (Uttar Pradesh) with Kolkata (West Bengal).
- ~700 km highspeed corridor will be developed as National Highway with access-controlled and closed tolling modality.
- This will establish seamless connectivity among states Uttar Pradesh, Bihar, Jharkhand, and West Bengal and expected to reduce current travel time from 12-14 hours to 7-9 hours. This will significantly enhance economic corridor and traffic flow along one of India's historically critical trade routes, parallel to the Grand Trunk Road.
- Present status and expected completion of the proposed development is as follows:
  - **Uttar Pradesh (Nos. of construction package: 1):**
    Package 1 - awarded in 2023, appointed date in November 2024 (10% physical progress)
  - **Bihar (Nos. of construction package: 6):**
    Package 2, 3, 6, 7 - awarded in 2023, appointed date in October 2025
    Package 4 and 5: revision in alignment due to forest objections. Appointed date expected by end of FY27.
  - **Jharkhand (Nos. of construction package: 6):**
    Package 8 to 13 - awarded in 2023, appointed date is expected by end of FY26. In principle approval received from various stakeholders.
  - **West Bengal (Nos. of construction package: yet to be decided):**
    State government proposed a revised alignment requiring a new bridge over the Hooghly River at Bagnan, connecting to Pujali. Centre has accepted the proposal, the final alignment's clearance and land acquisition in West Bengal are still pending, which could potentially extend the overall execution period. DPR in-progress – submitted to NHAI HQ for comments. Appointed date expected by end of FY28.
- The consultant analysed expected diversion for three traffic movements considering expected entry-exit at about distance of 40-50 km and expected completion of sections between Varanasi – Jharkhand/West Bengal border by FY30 and Jharkhand/West Bengal border to Kolkata by Q3 FY33:
  - Traffic movement between Varanasi/west and Bokaro/surrounding region from FY31 onwards
  - Traffic movement between Varanasi/west and Kolkata/Kharagpur/Haldia from Q4 FY33 onwards
  - Traffic movement between Dobhi/north and Hazaribagh/south from Q4 FY33 onwards
- Change in ticket distribution is considered as part of this diversion because long-haul traffic will have significant impact.

Varanasi Ranchi Kolkata highspeed corridor (2)

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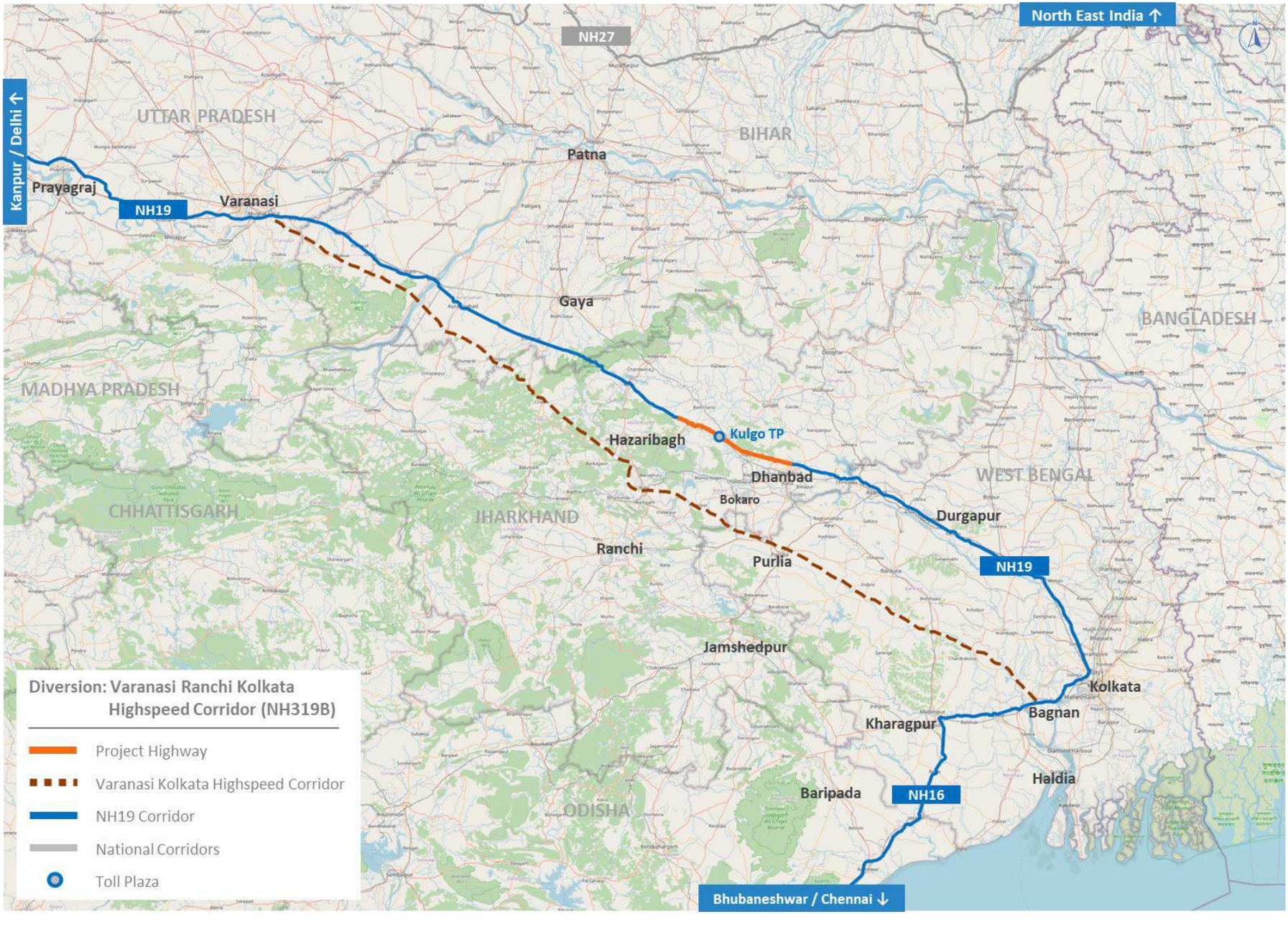
Varanasi Ranchi Kolkata highspeed corridor alignment and project highway context



Source: TIC analysis (map not to scale)

Varanasi Ranchi Kolkata highspeed corridor (3)

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Diversion due to Varanasi Ranchi Kolkata highspeed corridor

Diversion	Affected traffic movement	Timeline	Toll Plaza	Diversion as % of Base Year AADT					
				CJV	Mini LCV	LCV	2A Trucks	3A Trucks	MAV
Varanasi – Jharkhand/West Bengal border									
Negative diversion	Traffic movement between Varanasi/west and Bokaro/surrounding region	FY31 (50%) FY32 onwards (100%)	Kulgo	(0.94%)	-	-	(1.25%)	(1.67%)	(2.66%)
Jharkhand/West Bengal border to Kolkata									
Negative diversion	Traffic movement between Varanasi/west and Kolkata/Kharagpur/ Haldia Traffic movement between Dobhi/north and Hazaribagh/south	FY33 (20%) FY34 (70%) FY35 onwards (100%)	Kulgo	(11.15%)	-	(15.79%)	(31.26%)	(34.73%)	(22.87%)

Source: TIC estimate

Raxual Haldia Economic Corridor (1)

- Raxaul Haldia Economic Corridor is a planned 695 km, 6 lane, access-controlled greenfield highway development that will connect Raxaul on the India-Nepal border in Bihar to Haldia Port in West Bengal.
- Passing through parts of Bihar, Jharkhand, and West Bengal, the expressway is aimed at improving regional connectivity, reducing travel time, and facilitating smoother movement of goods and passengers across eastern India.
- By offering a faster and more efficient link between Nepal and an important maritime hub, it will play a key role in boosting cross-border trade and regional development.
- Development of this expressway will attract traffic between Nepal, Bihar, Jharkhand and southern West Bengal impacting negatively to project highway.

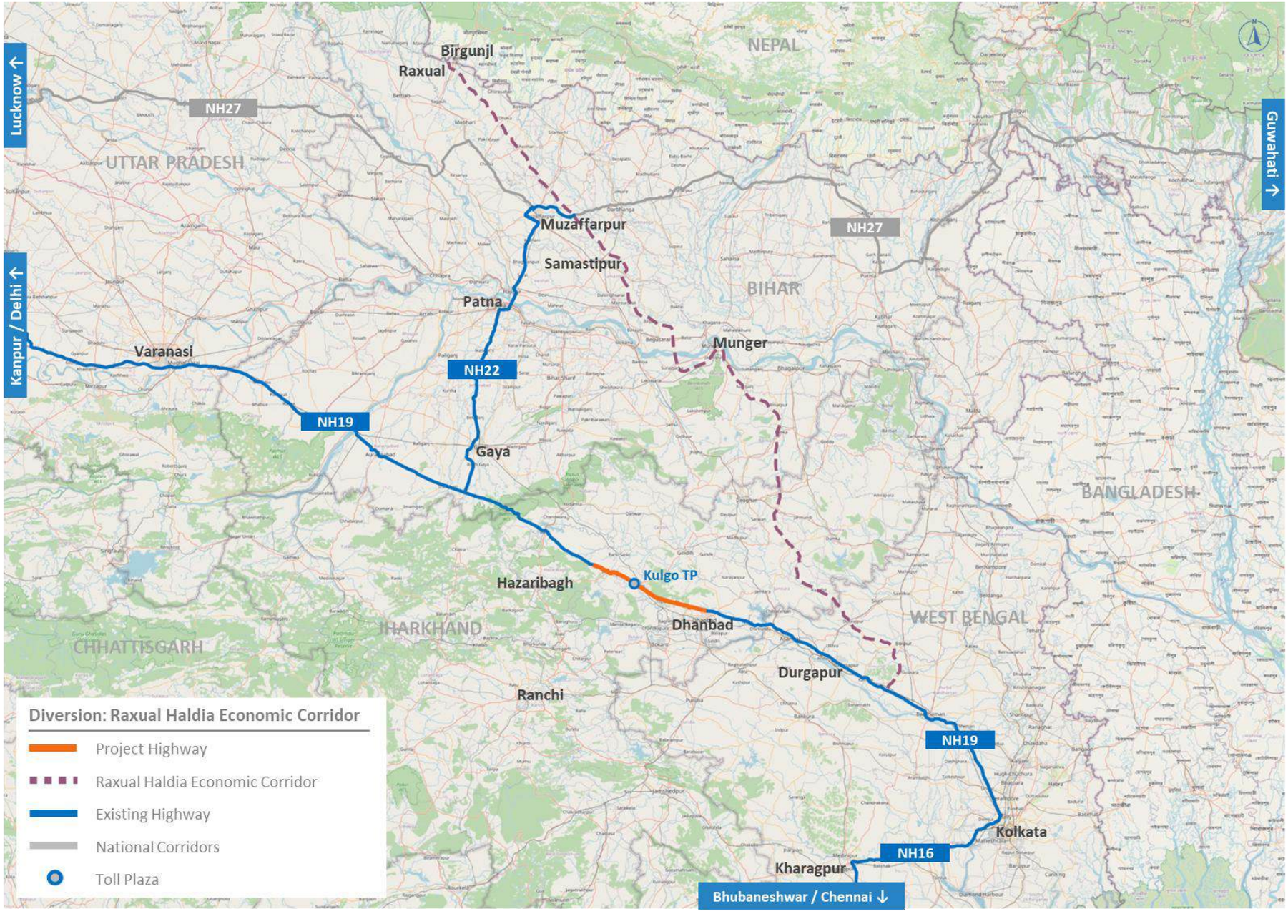
Diversion due to Raxaul Haldia Economic Corridor

Diversion	Affected traffic movement	Timeline	Toll Plaza	Diversion as % of Base Year AADT					
				CJV	Mini LCV	LCV	2A Trucks	3A Trucks	MAV
Negative diversion	Traffic movement between Muzaffarpur/ north and Kolkata / Kharagpur / Haldia	FY34 (50%) FY35 onwards (100%)	Kulgo	(0.10%)	-	(0.11%)	(0.30%)	(0.35%)	(0.36%)

Source: TIC estimate

Raxual Haldia Economic Corridor (2)

Raxaul Haldia Economic Corridor alignment and project highway context



Source: TIC analysis (map not to scale)

Eastern Dedicated Freight Corridor (1)

- Sonnagar - Dankuni section is the eastern extension of the Eastern Dedicated Freight Corridor (EDFC), designed to connect the existing freight corridor from Sonnagar in Bihar to Dankuni near Kolkata in West Bengal. Spanning approximately 538 kilometers, this stretch will establish a vital link between northern and eastern India, facilitating seamless movement of goods to and from eastern ports such as Haldia.
- Project is being implemented by the Dedicated Freight Corridor Corporation of India Limited (DFCCIL), with the objective of enhancing freight capacity, reducing congestion on existing railway lines, and improving transport efficiency for industries located in Bihar, Jharkhand, and West Bengal.
- This section was earlier planned to be executed under the Public-Private Partnership (PPP) model (but now likely through EPC), with the Sonnagar - Andal to be developed in the first phase, followed by the Andal - Dankuni stretch. Once operational, it will enable faster and more cost-effective transportation of bulk commodities such as coal, steel, cement, fertilizers, and food grains, supporting the industrial and port connectivity in eastern India.
- Sonnagar - Dankuni link is expected to significantly decongest the existing Howrah - Delhi main line, improve supply chain efficiency, and contribute to the government's goal of developing a modern, high-capacity freight network across the country.

Diversion due to Eastern Dedicated Freight Corridor

Diversion	Affected traffic movement	Timeline	Toll Plaza	Diversion as % of Base Year AADT					
				CJV	Mini LCV	LCV	2A Trucks	3A Trucks	MAV
Negative diversion	Traffic movement along the alignment of DFC with trip length more than 700 km	FY28 (30%) FY29 (70%) FY30 onwards (100%)	Kulgo	-	-	-	(3.57%)	(4.37%)	(5.86%)

Source: TIC estimate

Eastern Dedicated Freight Corridor (2)

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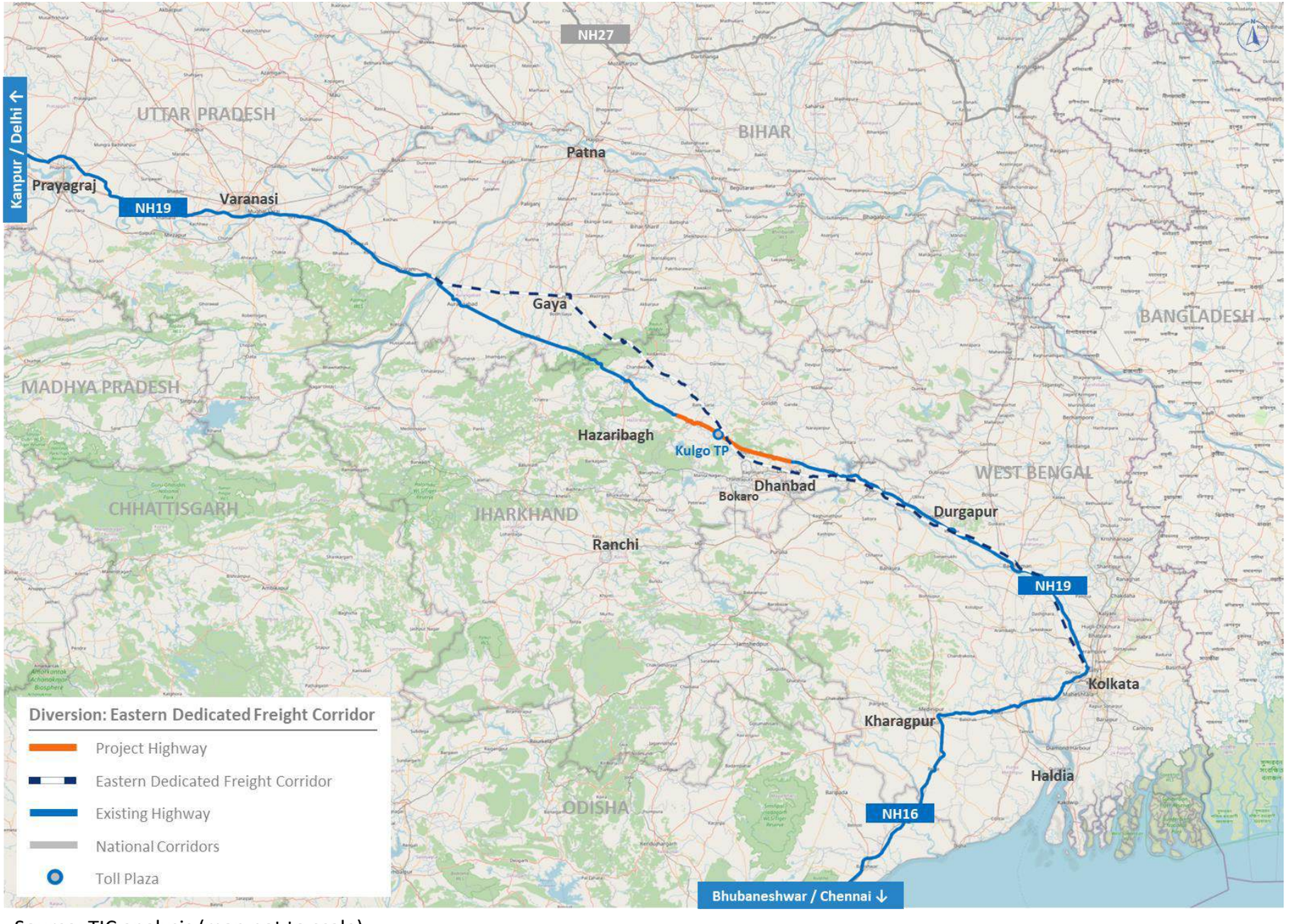
Eastern Dedicated Freight Corridor and project highway context



Source: TIC analysis (map not to scale)

Kandla Gorakhpur LPG Pipeline (1)

- Kandla - Gorakhpur LPG Pipeline is a 2,805 km long project world's longest LPG pipeline being developed by IHB Limited, a joint venture of Indian Oil, BPCL, and HPCL. Authorized by the Petroleum & Natural Gas Regulatory Board (PNGRB) under the Common Carrier category, the pipeline traverses Gujarat, Madhya Pradesh, and Uttar Pradesh.
- The pipeline will transport LPG sourced from import terminals at Kandla, Dahej, and Pipavav, and refineries at Koyali and Bina. It will directly supply 22 LPG bottling plants 3 in Gujarat, 6 in Madhya Pradesh, and 13 in Uttar Pradesh—ensuring reliable and efficient LPG distribution across western and northern India.
- Development of this pipeline is expected to impact LPG transportation from Haldia Port (via Durgapur Bottling Plant to Purvanchal region, Bihar, Jharkhand), as Kandla serves as a major hub for handling petroleum, oil, and lubricants (POL) and will cater to a significant share of LPG movement through the new network.

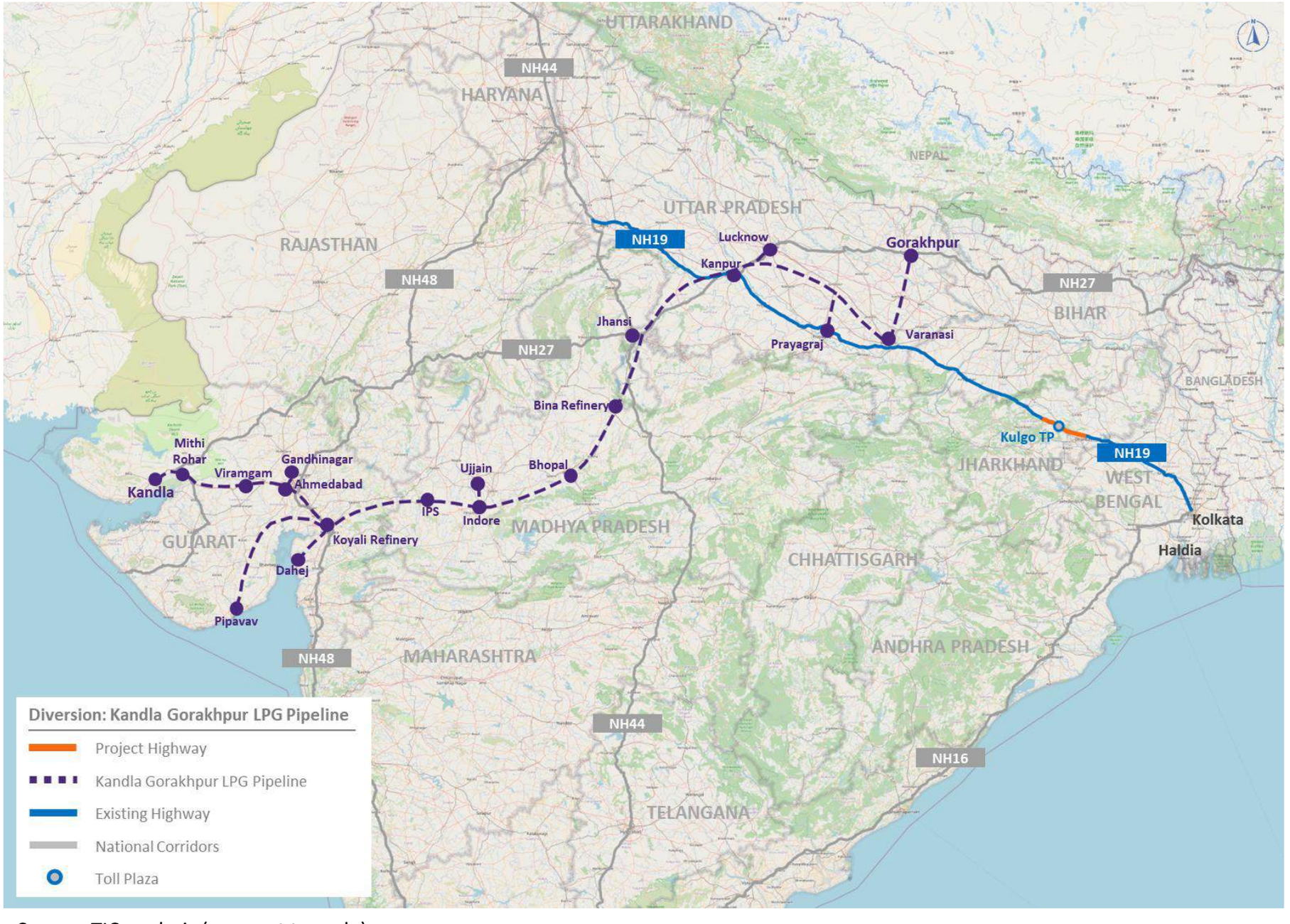
Diversion due to Kandla Gorakhpur LPG Pipeline

Diversion	Affected traffic movement	Timeline	Toll Plaza	Diversion as % of Base Year AADT					
				CJV	Mini LCV	LCV	2A Trucks	3A Trucks	MAV
Negative diversion	Traffic movement from Haldia	FY27 (70%) FY28 onwards (100%)	Kulgo	-	-	-	(0.06%)	(0.35%)	(3.86%)

Source: TIC estimate

Kandla Gorakhpur LPG Pipeline (2)

Kandla Gorakhpur LPG Pipeline and project highway context



Source: TIC analysis (map not to scale)

Varanasi Howrah Vande Bharat Express (1)

Varanasi - Howrah Vande Bharat Express is a semi-high-speed train covering about 760 km between Varanasi and Howrah in around 7.5 to 8 hours, offering faster and more comfortable travel. It enhances connectivity across major cities like Patna, Gaya, and Asansol, boosting regional mobility and tourism in eastern India.

Diversion due to Varanasi - Howrah Vande Bharat Express Train

Diversion	Affected traffic movement	Timeline	Toll Plaza	Diversion as % of Base Year AADT					
				CJV	Mini LCV	LCV	2A Trucks	3A Trucks	MAV
Negative diversion	Traffic movement between Varanasi and Kolkata	FY27 onwards (100%)	Kulgo	(0.16%)	-	-	-	-	-

Source: TIC estimate

Varanasi Howrah Vande Bharat Express (2)

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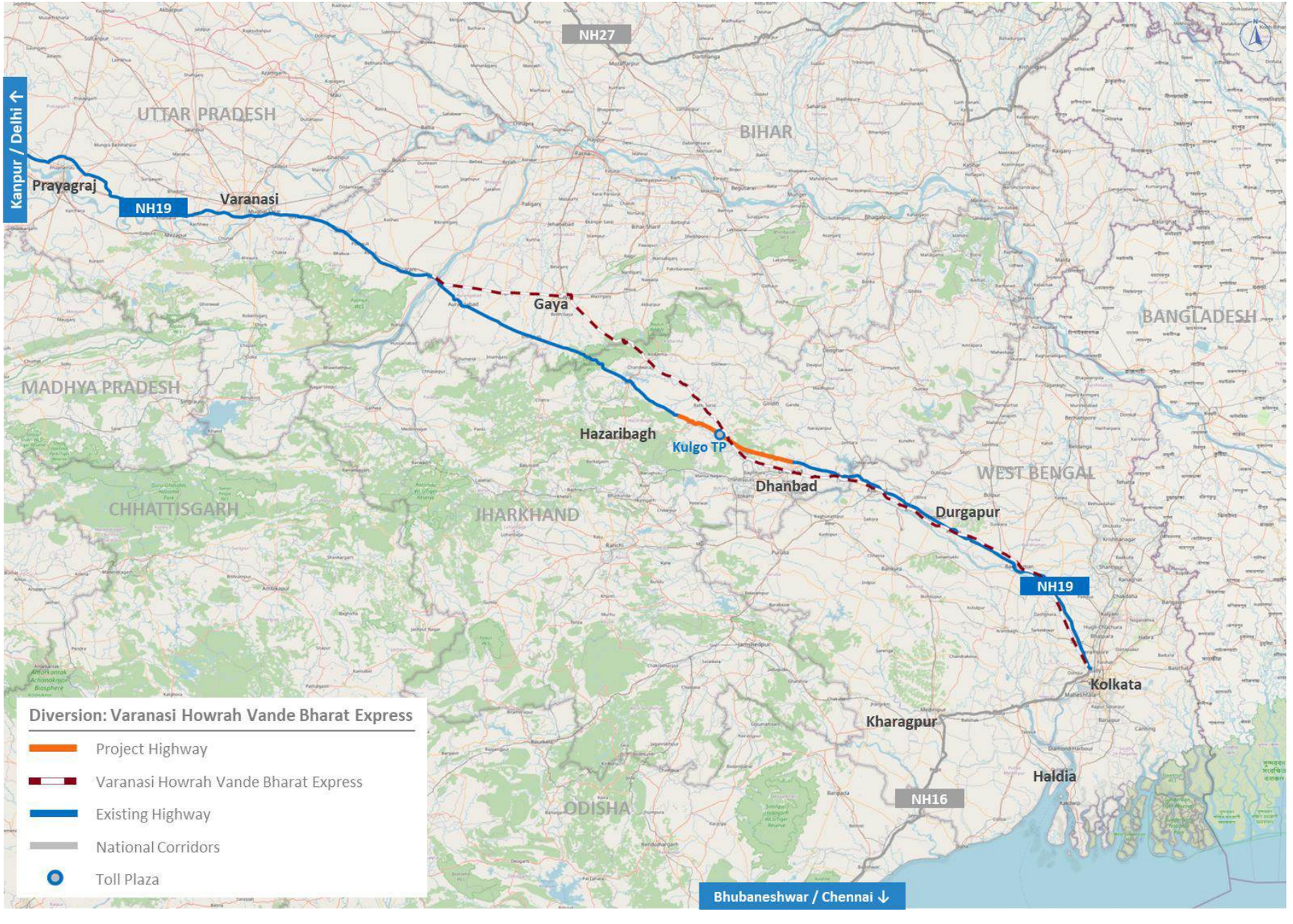
Varanasi Howrah Vande Bharat Express Train route and project highway context



Source: TIC analysis (map not to scale)

National Waterway 1 (NW1)

National Waterway 1 (NW1), also known as the Allahabad–Haldia Inland Waterway, is one of India's longest and most significant inland navigation corridors, spanning 1,620 km along the Ganga River. It connects Haldia in West Bengal to Prayagraj (Allahabad) in Uttar Pradesh, passing through the states of West Bengal, Jharkhand, Bihar, and Uttar Pradesh.

Diversion due to National Waterway 1

Diversion	Affected traffic movement	Timeline	Toll Plaza	Diversion as % of Base Year AADT					
				CJV	Mini LCV	LCV	2A Trucks	3A Trucks	MAV
Negative diversion	Traffic movement between Varanasi and Kolkata	FY26 onwards (100%)	Kulgo	-	-	-	(0.73%)	(0.62%)	(0.95%)

Source: TIC estimate

National Waterway 1 (NW1)

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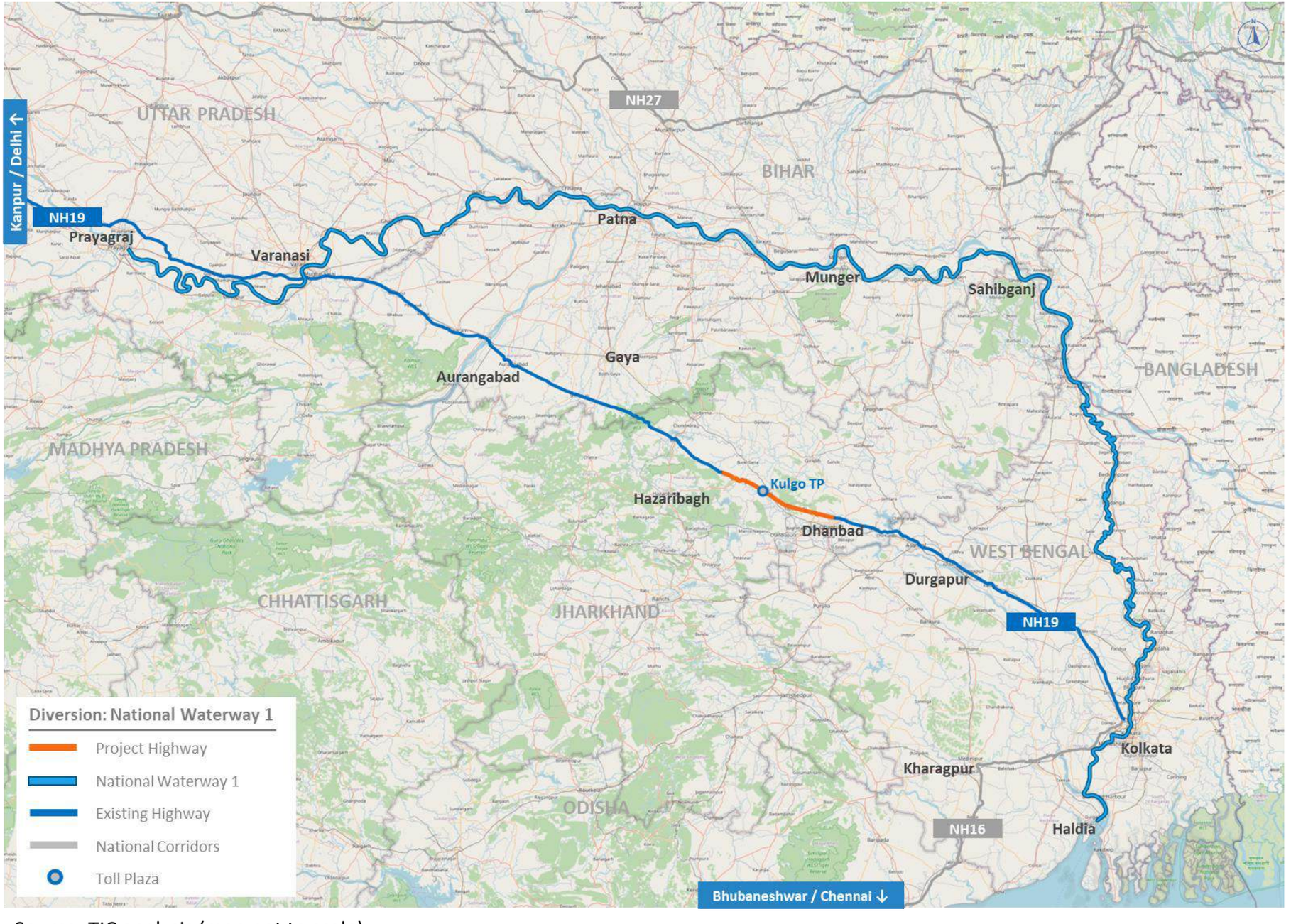
National Waterway 1 and project highway context



Source: TIC analysis (map not to scale)

Chapter 7: Final traffic and revenue forecast

- Traffic growth forecast
- Traffic and revenue forecast
- Scenario development

Following pre-diversion traffic forecast and diversion analysis, this chapter presents final traffic and revenue forecast for various scenarios: most likely with and without overloading, pessimistic and optimistic.

Transactional Support Agreement and FY27 revenue estimate

- The project highway is proposed to be included in NHAI's Public InvIT.
- A Transactional Support Agreement will be executed between NHAI and the Public InvIT for the management of toll plaza operations for FY27.
- Tolling operations during FY27 will be undertaken by NHAI under the prevailing short-term contract modality.
- Accordingly, FY27 revenue has been estimated based on historical bidding trends for tolling contracts and is assumed to be 5%–10% lower than the estimated actual revenue.
- Consistent with this arrangement, manpower-related expenses for tolling operations have been excluded from O&M costs as confirmed by the client.

Traffic and revenue forecast: Kulgo TP (1)

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Pre-diversion growth rate

Vehicle Category	FY26 FY27	FY27 FY28	FY28 FY29	FY29 FY30	FY30 FY31	FY26 FY31	FY31 FY36	FY36 FY41	FY27 FY41
CJV	8.7%	7.4%	6.8%	6.7%	6.2%	7.2%	6.5%	5.9%	6.4%
Mini LCV	4.9%	4.5%	5.0%	4.5%	4.3%	4.6%	4.1%	3.8%	4.1%
LCV	9.6%	6.6%	5.1%	4.0%	3.7%	5.8%	3.9%	3.5%	4.0%
Bus	2.7%	2.7%	2.3%	1.3%	2.5%	2.3%	2.4%	2.0%	2.2%
2A Truck	6.1%	6.2%	6.2%	6.1%	5.6%	6.0%	5.5%	5.0%	5.4%
3A Truck	1.1%	1.1%	1.1%	1.2%	0.9%	1.1%	0.7%	0.7%	0.8%
MAV	5.8%	6.0%	6.3%	6.3%	5.6%	6.0%	5.7%	4.9%	5.5%
AADT	**6.6%**	**6.1%**	**5.9%**	**5.8%**	**5.3%**	**5.9%**	**5.5%**	**5.0%**	**5.4%**
PCU	**5.8%**	**5.7%**	**5.8%**	**5.8%**	**5.2%**	**5.7%**	**5.3%**	**4.8%**	**5.2%**

Post-diversion growth rate

Vehicle Category	FY26 FY27	FY27 FY28	FY28 FY29	FY29 FY30	FY30 FY31	FY26 FY31	FY31 FY36	FY36 FY41	FY27 FY41
CJV	8.6%	7.4%	6.8%	6.7%	5.7%	7.0%	3.9%	5.9%	5.4%
Mini LCV	4.9%	4.5%	5.0%	4.5%	4.3%	4.6%	4.1%	3.8%	4.1%
LCV	9.6%	6.6%	5.1%	4.0%	3.7%	5.8%	0.3%	3.5%	2.7%
Bus	2.7%	2.7%	2.3%	1.3%	2.5%	2.3%	2.4%	2.0%	2.2%
2A Truck	6.1%	5.0%	4.6%	4.9%	4.9%	5.1%	(2.9%)	4.9%	2.0%
3A Truck	0.9%	(0.3%)	(0.8%)	(0.2%)	(0.1%)	(0.1%)	(8.5%)	0.6%	(3.0%)
MAV	2.9%	2.8%	3.6%	4.3%	3.9%	3.5%	(1.0%)	4.8%	2.4%
AADT	**5.5%**	**4.8%**	**4.8%**	**5.0%**	**4.5%**	**4.9%**	**1.1%**	**5.0%**	**3.5%**
PCU	**4.1%**	**3.6%**	**3.9%**	**4.4%**	**4.0%**	**4.0%**	**(0.5%)**	**4.7%**	**2.6%**

Source: TIC estimate

Traffic and revenue forecast: Kulgo TP (2)

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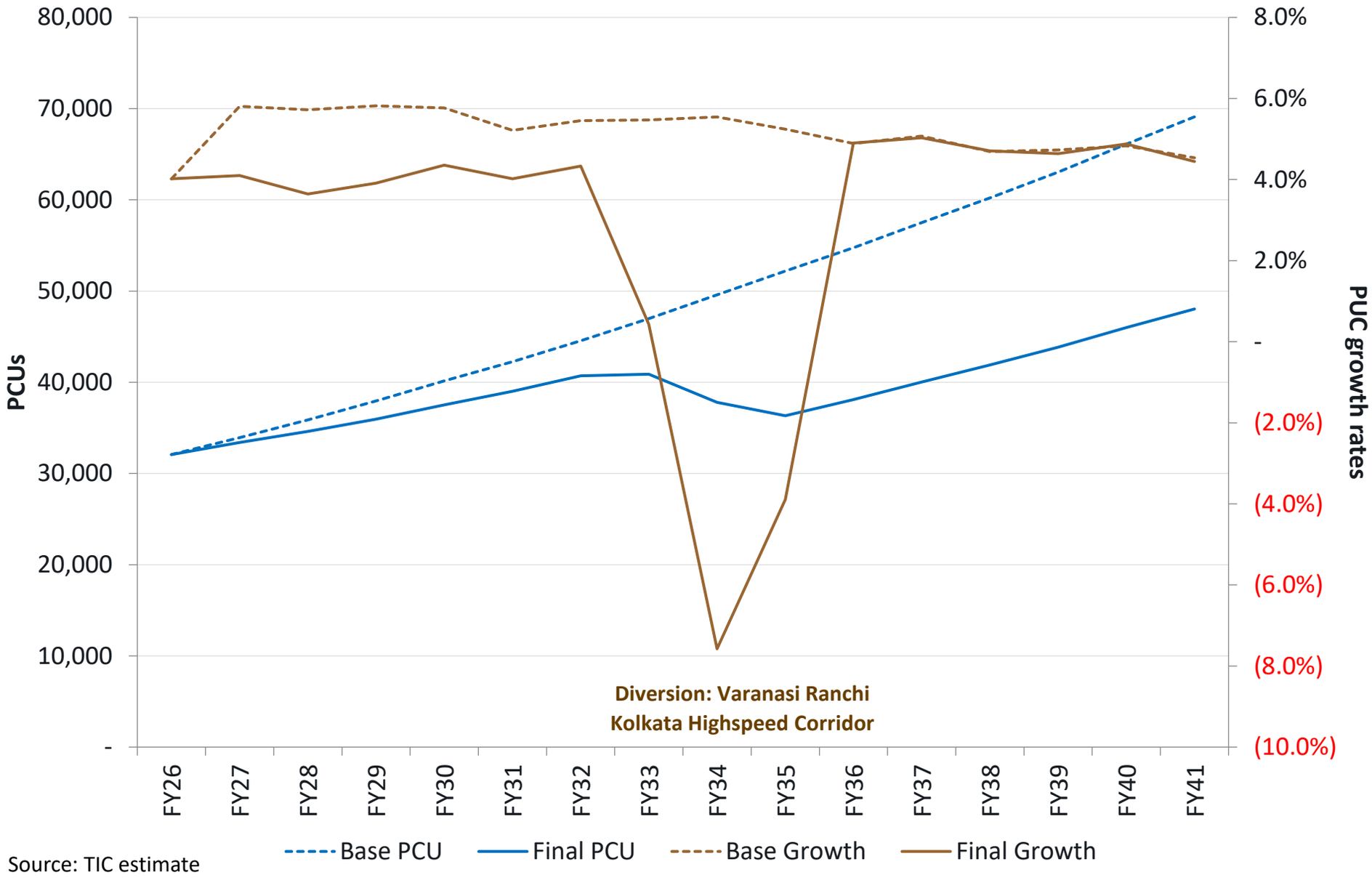
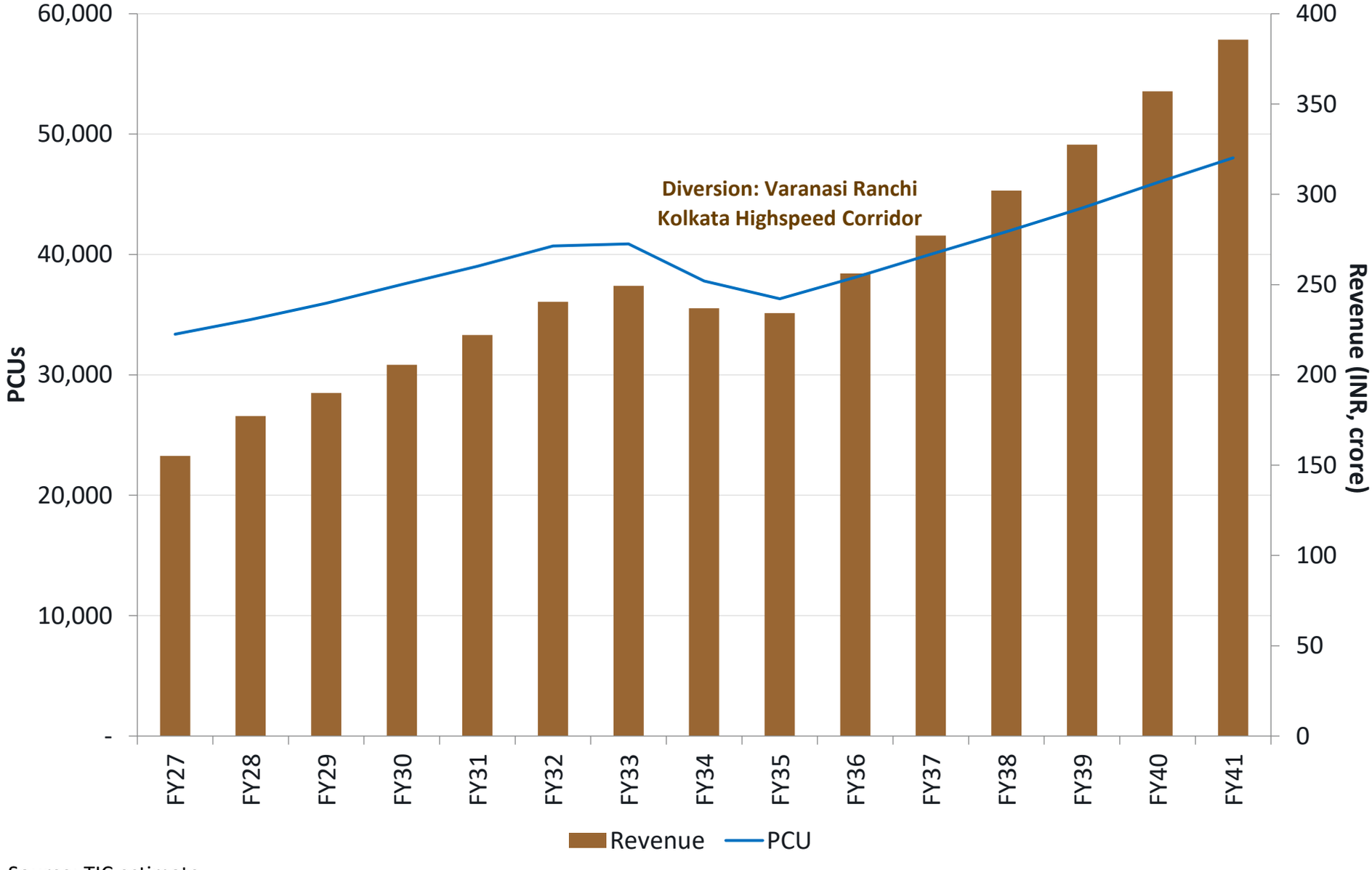
Pre- and Post-diversion growth rate snapshot



Source: TIC estimate

Traffic and revenue forecast: Kulgo TP (3)

Revenue and PCU snapshot



Source: TIC estimate

Scenario development definition

Most Likely Scenario without overloading

- No overloading penalty/fees is considered at present based on understanding from site visit. In context of present ground situation and possibility of diversion in case of collecting overloading fees, the consultant did not consider overloading fee collection in most likely scenario.
- The consultant has considered no reduction in toll rates during capacity augmentation implementation i.e., 4 to 6 lane construction of Gorhar to Atka Village (chainages km 320.810 to km 326.000). DPR for 6 laning is in-progress and completion of 6 lane construction is expected by end of FY28.
- Concession Agreement mentions that if the concessionaire incurs any financial loss due to modification in toll rates during capacity augmentation which is initiated post-handover of the project highway to the concessionaire, the authority (NHAI) shall pay the difference amount to the concessionaire on a quarterly basis considering no toll reduction during capacity augmentation and traffic census as per Article 19.

Most Likely Scenario with overloading

The consultant considered following changes from the most likely (with overloading) case to determine most likely (with overloading) scenario:

- Overloading penalty/fees will be levied in future as per the overloading characteristics observed in axle load survey.

Optimistic Scenario

The consultant considered following changes from the most likely (with overloading) case to determine optimistic scenario:

- GDP: increase (addition) of 0.25% from FY27 to FY35
- Overloading penalty/fees will be levied in future as per the overloading characteristics observed in axle load survey
- Delayed diversion of Varanasi Ranchi Kolkata Highspeed Corridor by a year

Pessimistic Scenario

The consultant considered following changes from the most likely (with overloading) case to determine pessimistic scenario:

- GDP: decrease (subtraction) of 0.25% from FY27 to FY35
- No overloading penalty/fees is being levied

Detailed traffic and revenue forecast for “Most likely scenario without overloading” is exhibited in Appendix B.

Scenario summary: Kulgo TP (1)

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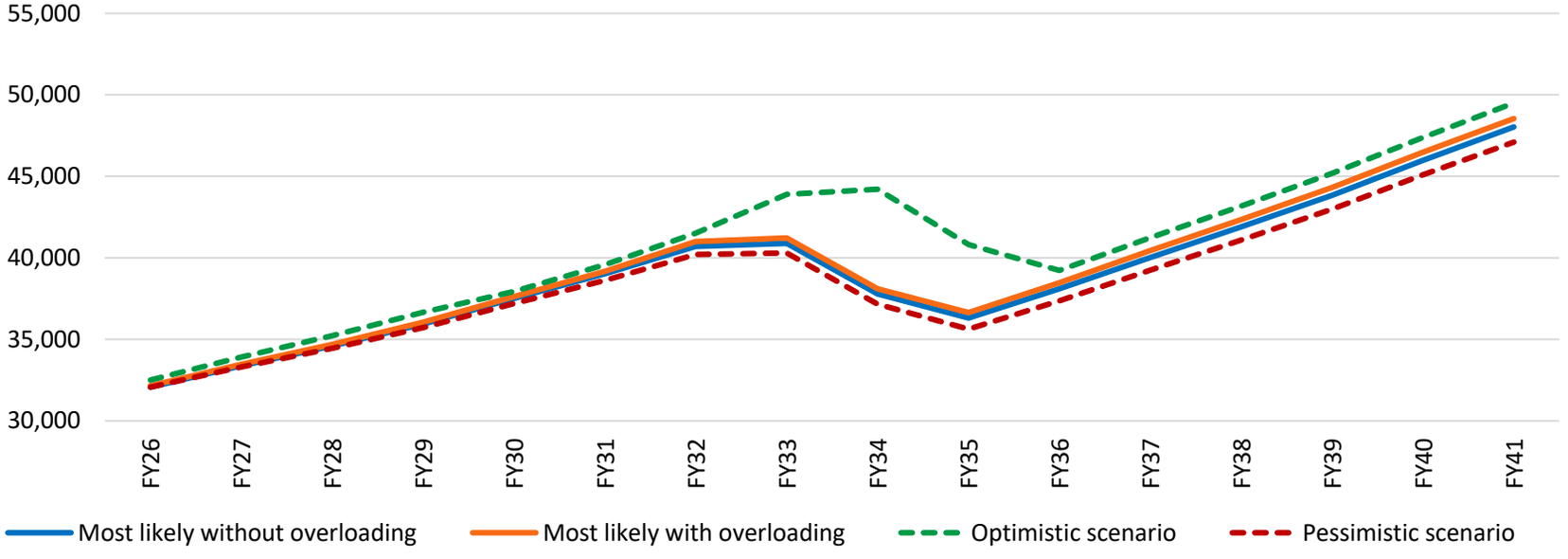
	Most likely without overloading			Most likely with overloading			Optimistic scenario			Pessimistic scenario		
FY	PCU	PCU growth	Revenue (INR Cr)	PCU	PCU growth	Revenue (INR Cr)	PCU	PCU growth	Revenue (INR Cr)	PCU	PCU growth	Revenue (INR Cr)
FY27	33,383	4.1%	155	33,474	4.1%	155	33,909	4.3%	155	33,313	3.9%	155
FY28	34,599	3.6%	177	34,693	3.6%	209	35,217	3.9%	181	34,456	3.4%	177
FY29	35,951	3.9%	190	36,049	3.9%	224	36,668	4.1%	194	35,729	3.7%	189
FY30	37,516	4.4%	206	37,618	4.4%	243	37,930	3.4%	245	37,207	4.1%	204
FY31	39,023	4.0%	222	39,172	4.1%	260	39,578	4.3%	262	38,622	3.8%	220
FY32	40,714	4.3%	240	41,003	4.7%	269	41,518	4.9%	272	40,207	4.1%	237
FY33	40,889	0.4%	249	41,216	0.5%	276	43,889	5.7%	293	40,291	0.2%	246
FY34	37,792	(7.6%)	237	38,111	(7.5%)	260	44,216	0.7%	302	37,154	(7.8%)	233
FY35	36,322	(3.9%)	234	36,647	(3.8%)	254	40,809	(7.7%)	283	35,631	(4.1%)	230
FY36	38,103	4.9%	256	38,479	5.0%	272	39,227	(3.9%)	277	37,375	4.9%	251
FY37	40,020	5.0%	277	40,450	5.1%	287	41,239	5.1%	293	39,252	5.0%	272
FY38	41,904	4.7%	302	42,354	4.7%	313	43,183	4.7%	319	41,098	4.7%	296
FY39	43,847	4.6%	328	44,317	4.6%	339	45,187	4.6%	346	43,002	4.6%	321
FY40	45,987	4.9%	357	46,478	4.9%	370	47,393	4.9%	377	45,098	4.9%	350
FY41	48,033	4.4%	386	48,544	4.4%	400	49,503	4.5%	407	47,101	4.4%	378
Total (FY27 - FY41)			**3,817**			**4,132**			**4,207**			**3,760**

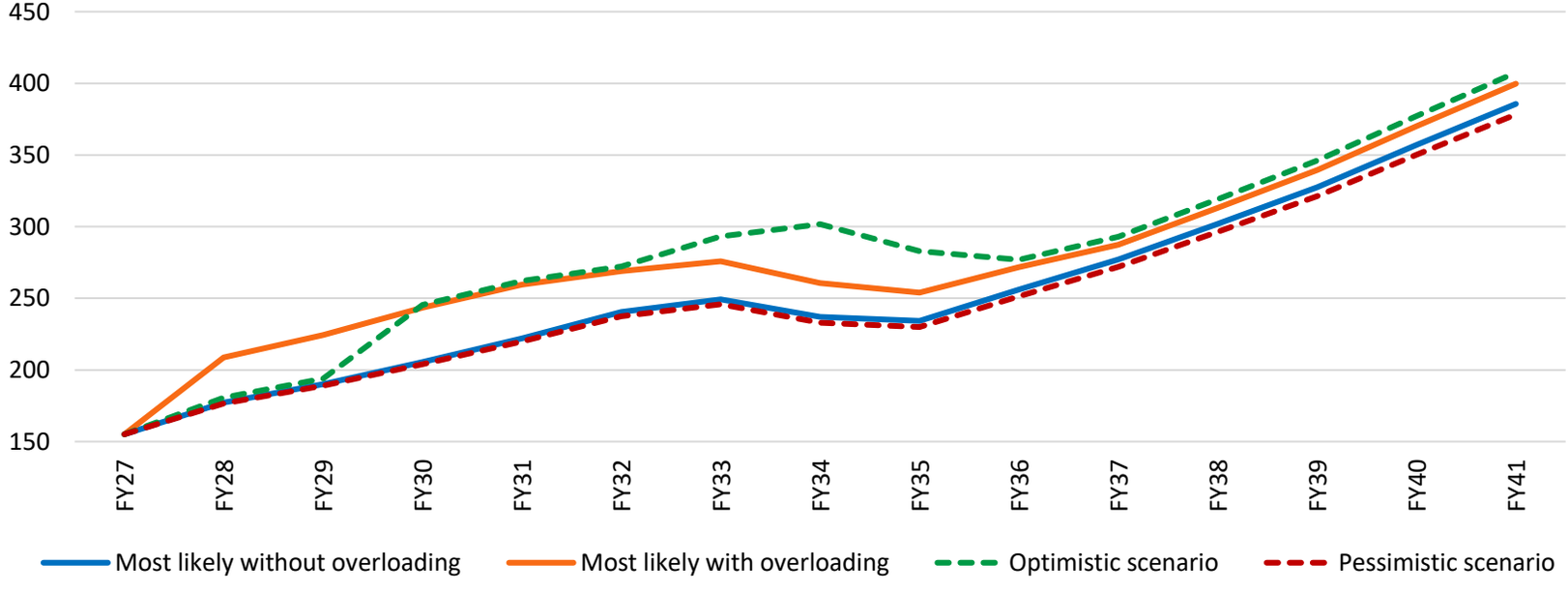
Source: TIC estimate

Scenario summary: Kulgo TP (2)

PCU comparison



Revenue comparison



Source: TIC estimate

List of Appendices

Appendix A: Vehicle category-wise visual representation of origin-destination zones and top origin-destination pairs

Appendix B: Detailed traffic and revenue forecast – most likely scenario without overloading

Appendix A:

- Vehicle category-wise visual representation of origin-destination zones
- Vehicle category-wise top origin-destination pairs

Vehicle category-wise visual representation of OD (1)

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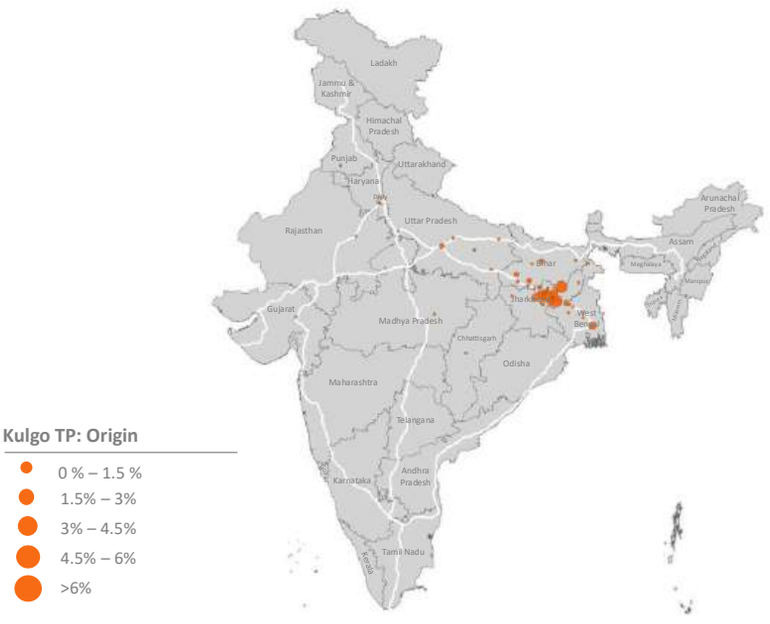
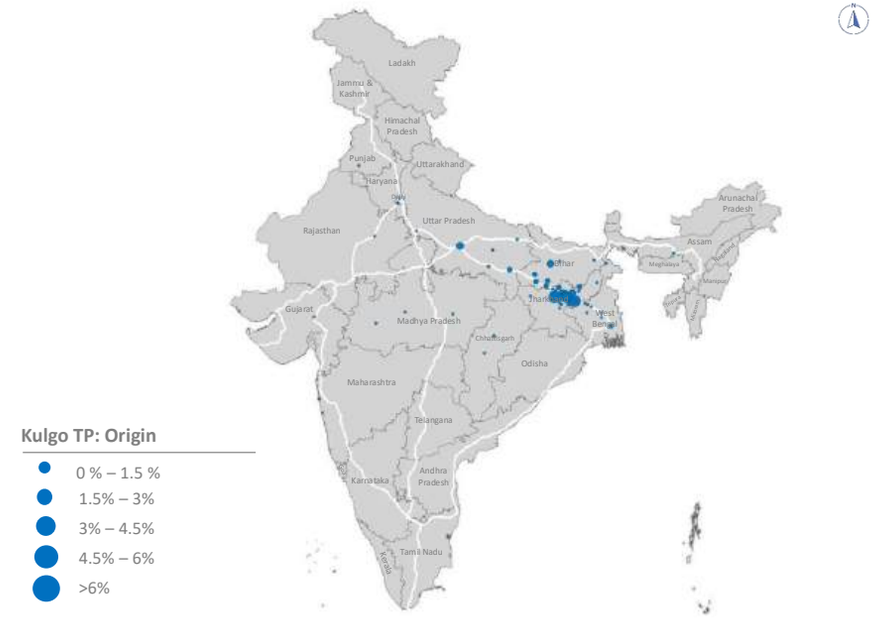
Origin

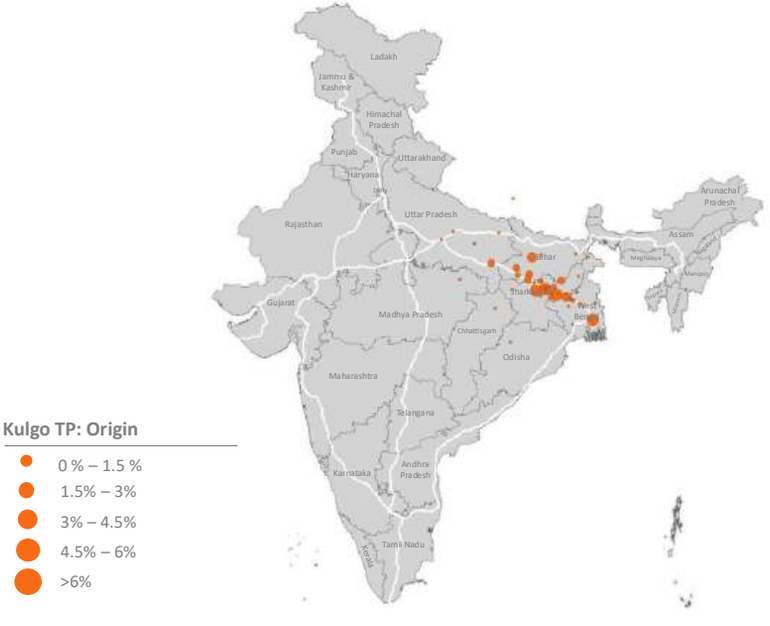
Destination

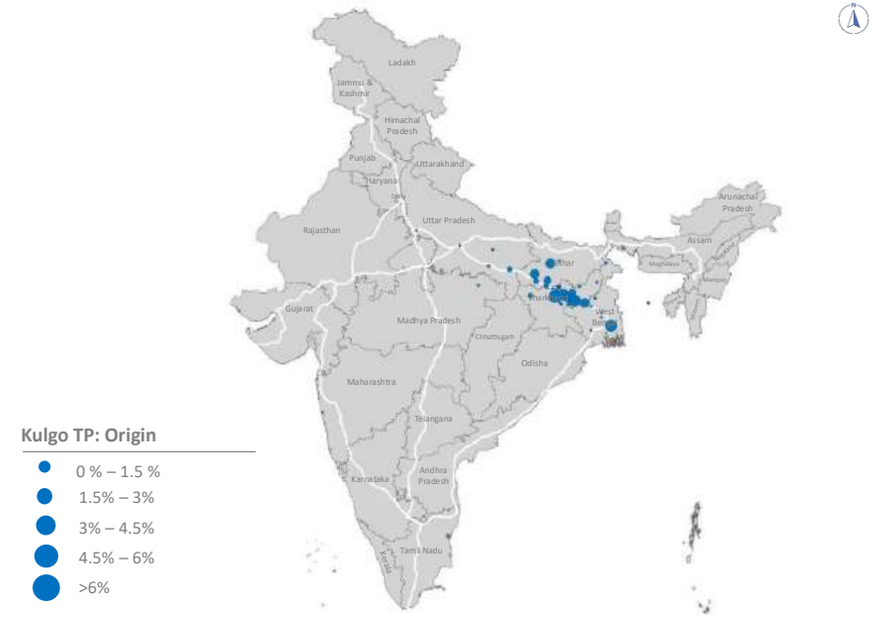
CJV





Mini LCV





Source: TIC analysis (map not to scale)

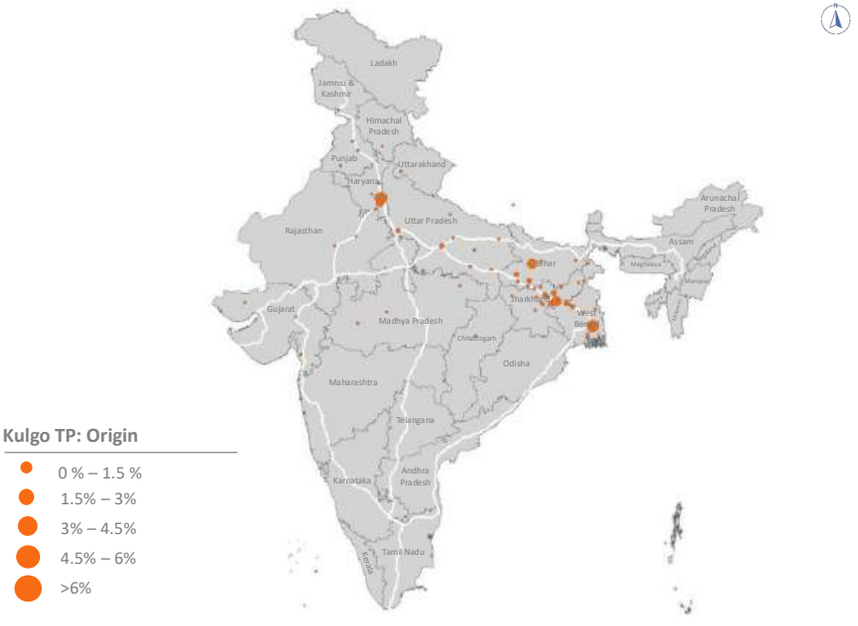
Vehicle category-wise visual representation of OD (2)

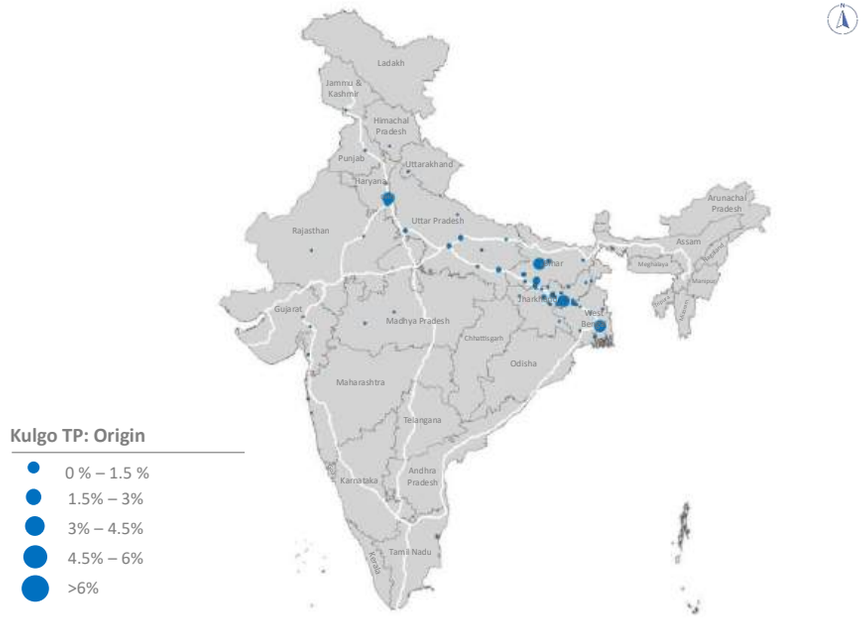
TRANSLINK® Infrastructure Consultants Pvt Ltd
Smart Consulting

Origin

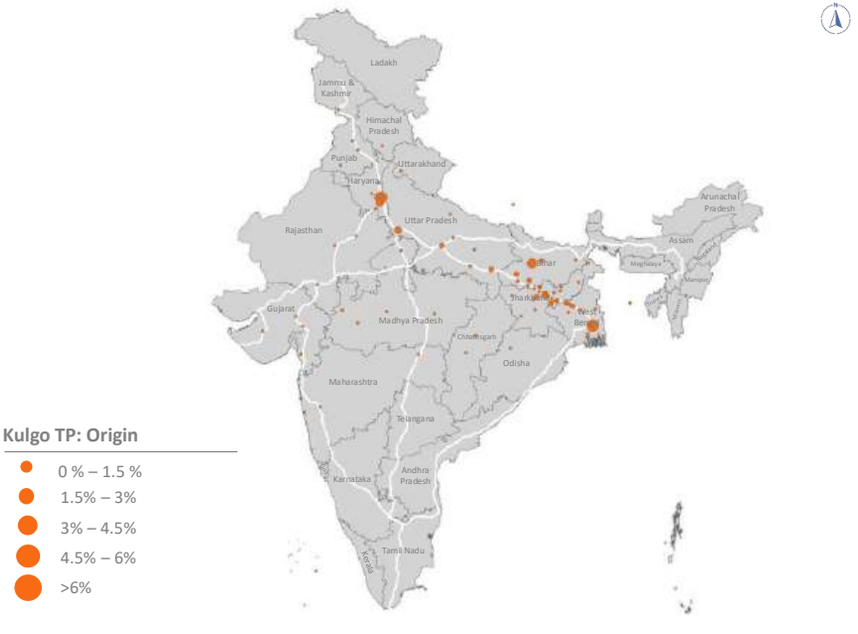
Destination

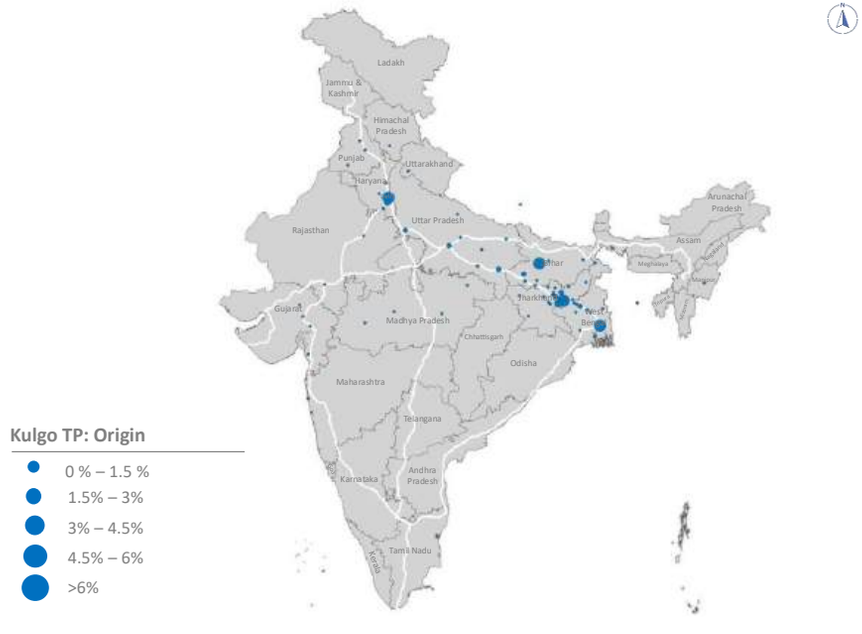
LCV





2A





Source: TIC analysis (map not to scale)

Vehicle category-wise visual representation of OD (3)

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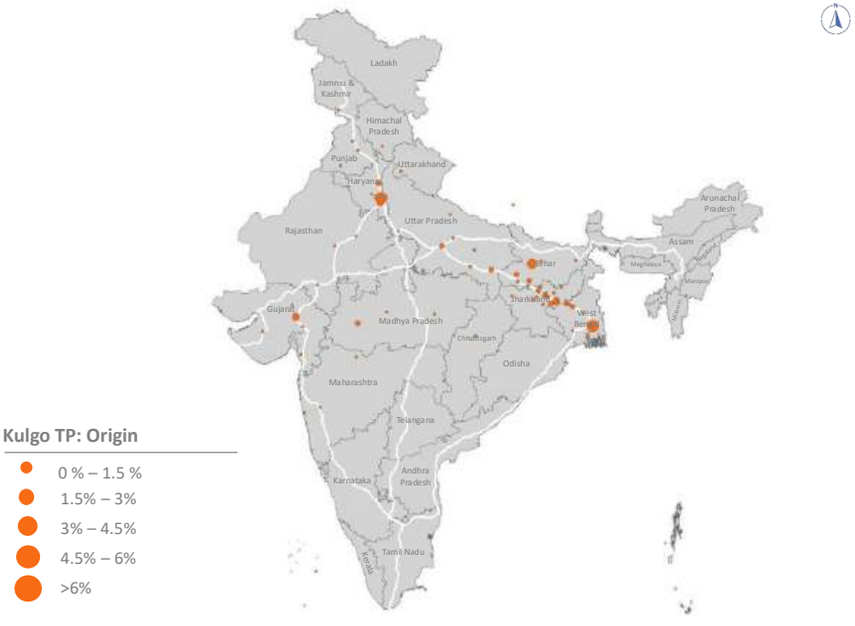
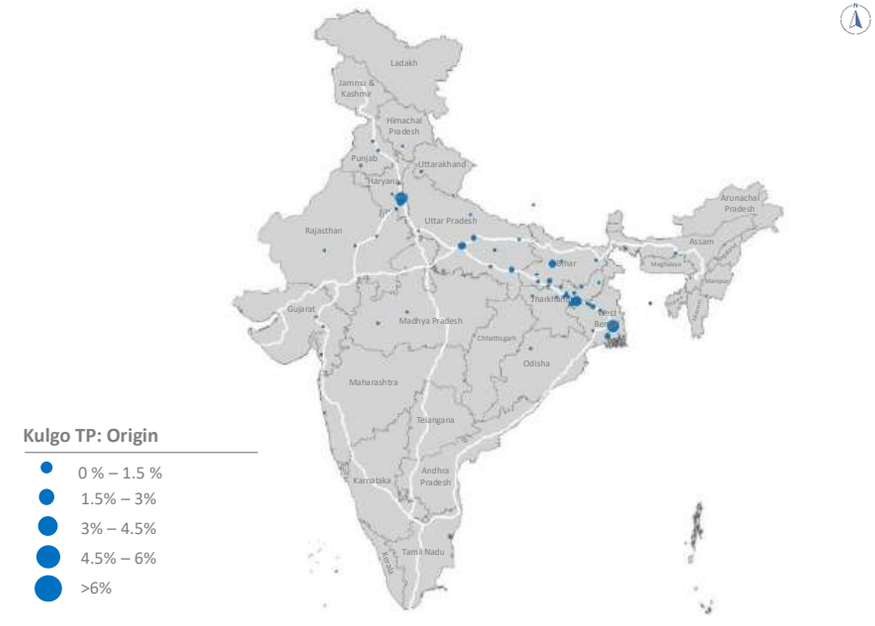
Smart Consulting

Origin

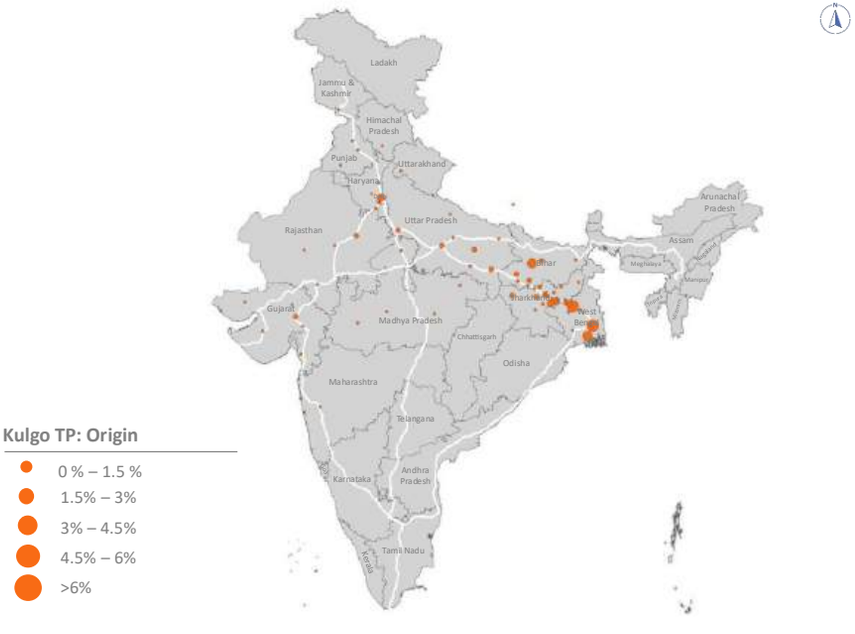
Destination

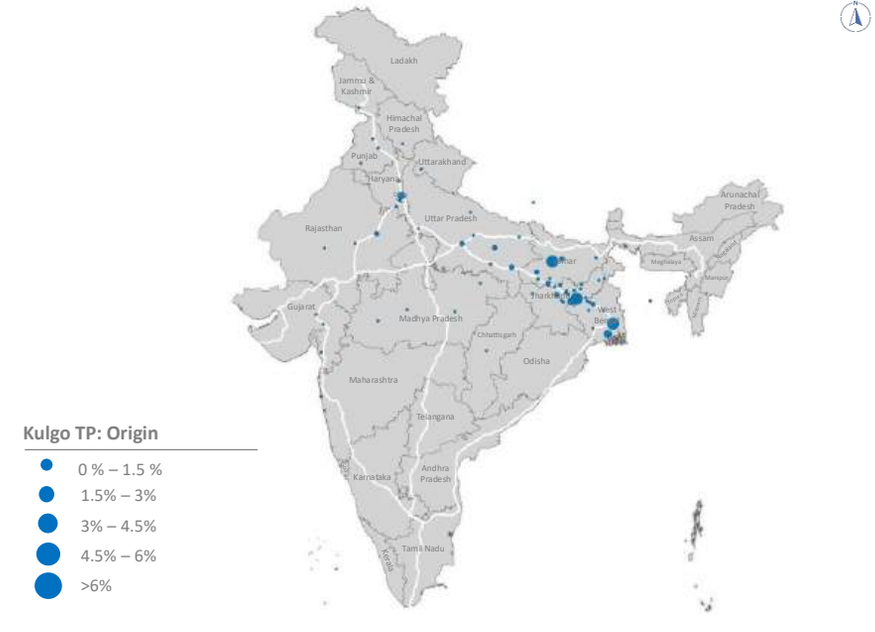
3A





MAV





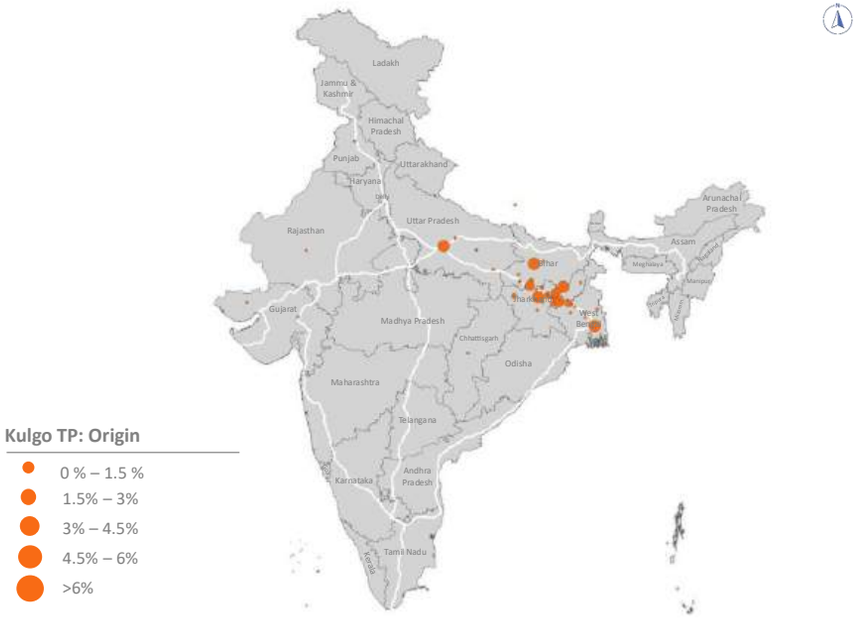
Source: TIC analysis (map not to scale)

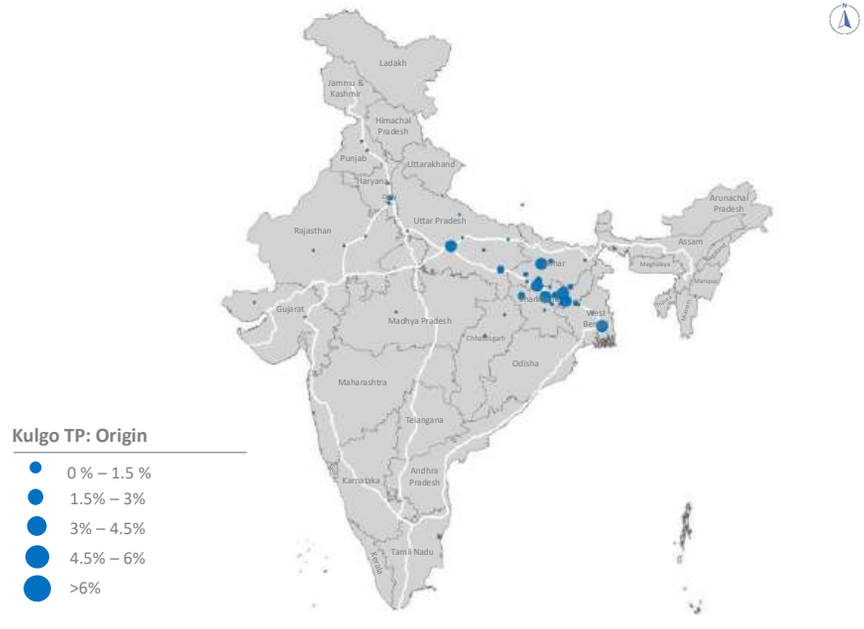
Vehicle category-wise visual representation of OD (4)

TRANSLINK® Infrastructure Consultants Pvt Ltd *Smart Consulting*

Origin | **Destination**

Bus





Source: TIC analysis (map not to scale)

Vehicle category-wise top OD pairs (1)

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CJV

Sr. No.	Origin-Destination Pairs		Share
1	Dumri	Bagodar	3%
2	Dhanbad	Hazaribagh	3%
3	Deoghar	Hazaribagh	3%
4	Bagodar	Dhanbad	3%
5	Bagodar	Dumri	2%
6	Dhanbad	Bagodar	2%
7	Hazaribagh	Dhanbad	2%
8	Deoghar	Kanpur	2%
9	Isri	Bagodar	1%
10	Beko	Dumri	1%

Mini LCV

Sr. No.	Origin-Destination Pairs		Share
1	Bagodar	Dhanbad	4%
2	Dhanbad	Bagodar	3%
3	Patna	Kolkata	3%
4	Hazaribagh	Dhanbad	3%
5	Kolkata	Patna	2%
6	Baradih	Dhanbad	2%
7	Dhanbad	Hazaribagh	2%
8	Deoghar	Hazaribagh	2%
9	Asansol	Chatra	2%
10	Bagodar	Dumri	1%

Bus

Sr. No.	Origin-Destination Pairs		Share
1	Kolkata	Patna	5%
2	Hazaribagh	Dhanbad	5%
3	Patna	Kolkata	4%
4	Kanpur	Giridih	3%
5	Giridih	Kanpur	3%
6	Kolkata	Gaya	2%
7	Dhanbad	Hazaribagh	2%
8	Deoghar	Kanpur	2%
9	Hazaribagh	Giridih	2%
10	Kolkata	Nawada	2%

LCV

Sr. No.	Origin-Destination Pairs		Share
1	Kolkata	Patna	8%
2	Kolkata	Delhi	7%
3	Delhi	Kolkata	5%
4	Patna	Kolkata	4%
5	Kolkata	Varanasi	2%
6	Kolkata	Kanpur	1%
7	Kolkata	Lucknow	1%
8	Kanpur	Kolkata	1%
9	Gurgaon	Kolkata	1%
10	Bagodar	Dhanbad	1%

Source: TIC analysis

Vehicle category-wise top OD pairs (2)

TRANSLINK® Infrastructure Consultants Pvt Ltd Smart Consulting

2A Truck

Sr. No.	Origin-Destination Pairs		Share
1	Kolkata	Patna	7%
2	Delhi	Kolkata	6%
3	Kolkata	Delhi	6%
4	Patna	Kolkata	4%
5	Kanpur	Kolkata	1%
6	Kolkata	Varanasi	1%
7	Kolkata	Kanpur	1%
8	Gaya	Kolkata	1%
9	Varanasi	Kolkata	1%
10	Ahmedabad	Kolkata	1%

3A Truck

Sr. No.	Origin-Destination Pairs		Share
1	Delhi	Kolkata	9%
2	Kolkata	Delhi	6%
3	Ahmedabad	Kolkata	4%
4	Patna	Kolkata	3%
5	Kolkata	Patna	3%
6	Kolkata	Kanpur	2%
7	Indore	Kolkata	2%
8	Kolkata	Lucknow	1%
9	Kolkata	Varanasi	1%
10	Kolkata	Ahmedabad	1%

MAV

Sr. No.	Origin-Destination Pairs		Share
1	Delhi	Kolkata	3%
2	Patna	Kolkata	3%
3	Kolkata	Patna	2%
4	Kolkata	Delhi	2%
5	Ahmedabad	Kolkata	1%
6	Varanasi	Kolkata	1%
7	Kolkata	Jaipur	1%
8	Haldia	Patna	1%
9	Kanpur	Kolkata	1%
10	Kolkata	Varanasi	1%

Source: TIC analysis

Appendix B: Detailed traffic and revenue forecast – most likely scenario without overloading

Kulgo TP (1): Traffic forecast (AADT)

Financial Year	CJV	Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	AADT	PCU
FY26	4,617	909	391	342	1,228	876	4,138	**12,500**	**32,069**
FY27	5,012	954	428	351	1,303	884	4,258	**13,190**	**33,383**
FY28	5,384	997	457	361	1,368	881	4,379	**13,826**	**34,599**
FY29	5,750	1,047	480	369	1,431	874	4,536	**14,487**	**35,951**
FY30	6,136	1,093	499	374	1,501	873	4,732	**15,209**	**37,516**
FY31	6,486	1,140	518	384	1,574	872	4,918	**15,892**	**39,023**
FY32	6,950	1,187	537	393	1,651	871	5,117	**16,706**	**40,714**
FY33	7,209	1,235	539	404	1,627	812	5,136	**16,961**	**40,889**
FY34	7,267	1,290	513	414	1,411	652	4,674	**16,221**	**37,792**
FY35	7,421	1,342	503	424	1,293	555	4,442	**15,980**	**36,322**
FY36	7,849	1,393	527	432	1,360	559	4,670	**16,791**	**38,103**
FY37	8,409	1,451	545	437	1,429	562	4,902	**17,734**	**40,020**
FY38	8,879	1,505	563	447	1,501	566	5,141	**18,602**	**41,904**
FY39	9,365	1,559	586	456	1,573	569	5,388	**19,497**	**43,847**
FY40	9,945	1,620	605	467	1,650	573	5,654	**20,514**	**45,987**
FY41	10,473	1,677	626	477	1,727	576	5,912	**21,468**	**48,033**

Source: TIC estimate

Kulgo TP (2): Traffic AADT growth rates

TRANSLINK® Infrastructure Consultants Pvt Ltd
Smart Consulting

Financial Year	CJV	Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	AADT	PCU
FY26	-	-	-	-	-	-	-	**-**	**-**
FY27	8.6%	4.9%	9.6%	2.7%	6.1%	0.9%	2.9%	**5.5%**	**4.1%**
FY28	7.4%	4.5%	6.6%	2.7%	5.0%	(0.3%)	2.8%	**4.8%**	**3.6%**
FY29	6.8%	5.0%	5.1%	2.3%	4.6%	(0.8%)	3.6%	**4.8%**	**3.9%**
FY30	6.7%	4.5%	4.0%	1.3%	4.9%	(0.2%)	4.3%	**5.0%**	**4.4%**
FY31	5.7%	4.3%	3.7%	2.5%	4.9%	(0.1%)	3.9%	**4.5%**	**4.0%**
FY32	7.2%	4.1%	3.7%	2.5%	4.9%	(0.1%)	4.0%	**5.1%**	**4.3%**
FY33	3.7%	4.1%	0.4%	2.7%	(1.5%)	(6.8%)	0.4%	**1.5%**	**0.4%**
FY34	0.8%	4.5%	(4.8%)	2.5%	(13.2%)	(19.7%)	(9.0%)	**(4.4%)**	**(7.6%)**
FY35	2.1%	4.0%	(2.0%)	2.4%	(8.4%)	(14.8%)	(5.0%)	**(1.5%)**	**(3.9%)**
FY36	5.8%	3.8%	4.7%	2.0%	5.2%	0.7%	5.1%	**5.1%**	**4.9%**
FY37	7.1%	4.1%	3.4%	1.1%	5.0%	0.6%	5.0%	**5.6%**	**5.0%**
FY38	5.6%	3.7%	3.3%	2.2%	5.1%	0.7%	4.9%	**4.9%**	**4.7%**
FY39	5.5%	3.6%	4.1%	2.2%	4.8%	0.6%	4.8%	**4.8%**	**4.6%**
FY40	6.2%	3.9%	3.2%	2.4%	4.9%	0.7%	4.9%	**5.2%**	**4.9%**
FY41	5.3%	3.5%	3.5%	2.1%	4.7%	0.6%	4.6%	**4.6%**	**4.4%**

Source: TIC estimate

Kulgo TP (3): Revenue forecast (INR Crore)

Financial Year	CJV	Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	Total
FY27	-	-	-	-	-	-	-	**155.1**
FY28	16.6	3.2	3.2	4.9	21.0	15.7	112.6	**177.3**
FY29	18.4	3.5	3.5	5.2	22.8	16.1	120.4	**190.1**
FY30	20.3	3.7	3.8	5.5	24.9	16.7	130.6	**205.6**
FY31	22.8	4.1	4.0	5.9	27.0	17.3	141.0	**222.0**
FY32	25.3	4.5	4.3	6.2	29.5	18.0	152.6	**240.4**
FY33	26.9	4.8	4.5	6.6	30.0	17.4	159.0	**249.3**
FY34	28.1	5.2	4.5	7.1	27.2	14.4	150.5	**237.0**
FY35	30.2	5.6	4.5	7.5	25.8	12.8	147.8	**234.3**
FY36	33.0	6.0	5.0	8.0	28.3	13.4	162.4	**256.2**
FY37	36.3	6.5	5.3	8.3	30.6	14.0	176.1	**277.2**
FY38	40.4	7.1	5.7	8.9	33.5	14.6	192.0	**302.0**
FY39	43.7	7.5	6.2	9.4	36.6	15.2	208.8	**327.5**
FY40	48.6	8.2	6.6	10.0	39.8	16.0	227.8	**357.1**
FY41	52.6	8.7	7.1	10.6	43.0	16.6	246.9	**385.6**

Source: TIC estimate

Kulgo TP (4): Revenue growth rates

Financial Year	CJV	Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	Total
FY27	-	-	-	-	-	-	-	**-**
FY28	19.0%	15.9%	18.1%	13.6%	15.5%	10.3%	13.9%	**14.3%**
FY29	10.9%	9.0%	9.6%	6.0%	8.7%	2.9%	6.9%	**7.2%**
FY30	10.1%	7.7%	8.1%	5.1%	9.2%	3.6%	8.5%	**8.2%**
FY31	12.1%	10.5%	6.6%	6.3%	8.2%	3.6%	7.9%	**8.0%**
FY32	11.3%	8.2%	8.2%	6.7%	9.3%	3.8%	8.2%	**8.3%**
FY33	6.3%	6.5%	4.0%	6.2%	1.9%	(3.2%)	4.2%	**3.7%**
FY34	4.2%	8.1%	(1.3%)	6.8%	(9.4%)	(17.1%)	(5.3%)	**(5.0%)**
FY35	7.4%	9.3%	1.6%	6.0%	(5.2%)	(11.4%)	(1.8%)	**(1.1%)**
FY36	9.4%	7.4%	10.0%	6.3%	9.9%	4.8%	9.9%	**9.3%**
FY37	10.1%	7.1%	6.9%	4.5%	8.2%	4.0%	8.5%	**8.2%**
FY38	11.2%	9.2%	6.7%	6.4%	9.2%	4.9%	9.0%	**9.0%**
FY39	8.4%	6.6%	8.8%	6.0%	9.3%	4.0%	8.8%	**8.4%**
FY40	11.1%	8.5%	6.9%	6.5%	8.9%	4.9%	9.1%	**9.0%**
FY41	8.3%	6.6%	7.6%	5.5%	8.0%	4.1%	8.4%	**8.0%**

Source: TIC estimate

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Chilakaluripet Vijayawada section of NH16 in Andhra Pradesh

Traffic Due Diligence – Final Report

National Highways Authority of India

January 2026

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Control information

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Client	**National Highways Authority of India** Sector 10, Dwarka, New Delhi 110075
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Appendices

Appendix A: Vehicle category-wise visual representation of origin-destination zones

Vehicle category-wise top origin-destination pairs

Appendix B: Detailed traffic and revenue forecast – most likely scenario without overloading

Abbreviations (1)

AADC	Annual Average Daily Collection
AADT	Annual Average Daily Traffic
ADB	Asian Development Bank
ADT	Average Daily Traffic
AL	Axle Load
AP	Andhra Pradesh
APC	Annual Potential Collection
APCRDA	Andhra Pradesh Capital Region Development Authority
BOT	Build-Operate-Transfer
CAGR	Compound Annual Growth Rate
CBIC	Chennai – Bengaluru Industrial Corridor
CJV	Car/ Jeep/ Van
CPI	Consumer Price Index
CSIR	Central Road Research Institute
CTVC	Classified Traffic Volume Count
CUMTA	Chennai Unified Metropolitan Transport Authority
DBFOT	Design, Build, Finance, Operate, and Transfer
DPR	Detailed Project Report
EPC	Engineering, Procurement and Construction
ETC	Electronic Toll Collection
EV	Electric Vehicle
FMCG	Fast Moving Consumer Goods
FSI	Floor Space Index
FY	Financial Year

GDP	Gross Domestic Product
GI	Geographical Indication
GSDP	Gross State Domestic Product
GST	Goods and Services Tax
HAM	Hybrid Annuity Mode
HCV	Heavy Commercial Vehicle
HQ	Headquarter
IHMCL	Highways Management Company Limited
IMF	International Monetary Fund
INR	Indian Rupee
IRC	Indian Road Congress
ISRO	Indian Space Research Organisation
IWAI	Inland Waterways Authority of India
Km	Kilometer
LCV	Light Commercial Vehicle
MADT	Monthly Average Daily Traffic
MAV	Multi Axle Vehicle
MLFF	Multi Lane Free Flow
MMTPA	Million Metric Tonnes Per Annum
MoRTH	Ministry of Road Transport and Highways
MSME	Micro, Small, and Medium Enterprises
MTPA	Million Tonnes Per Annum
NH	National Highway
NHAI	National Highways Authority of India

Abbreviations (2)

NHIT	National Highways Infra Trust
NMP	National Monetisation Pipeline
NW	National Waterway
OD	Origin – Destination
OECD	Organisation for Economic Co-operation and Development
ORR	Outer Ring Road
OSV	Oversized Vehicle
PCI	Per Capita Income
PCU	Passenger Car Unit
PIA	Project Influence Area
PIU	Project Implementation Unit
PPP	Public-Private Partnership
QADT	Quarterly Average Daily Traffic
RBI	Reserve Bank of India
RO	Regional Office

RoS	Rest of State
RTO	Regional Transport Office
SCF	Seasonal Correction Factor
SH	State Highway
SIAM	Society of Indian Automobile Manufacturers
TAZ	Traffic Analysis Zone
TIC	Translink Infrastructure Consultants Private Limited
TOT	Toll, Operate, Transfer
TP	Toll Plaza
VCIC	Vishakhapatnam – Chennai Industrial Corridor
VGTM	Vijayawada, Guntur, Tenali, Manglagiri
WADT	Weekly Average Daily Traffic
WPI	Wholesale Price Index
2A	2 Axle
3A	3 Axle

Chapter 1: Introduction

- The assignment
- Objective and Scope of Work
- Approach and methodology
- Organisation of the report

This chapter outlines assignment background, scope of work, approach and methodology employed to ensure successful execution of the assignment.

Approach and methodology section highlights the structured approach which has been followed to gather data, conduct analysis, and make informed decisions throughout the project lifecycle. By employing a robust methodology, the consultant aims to ensure the accuracy, efficiency and reliability of the assignment's outcomes.

The assignment

Ministry of Road Transport and Highways (MoRTH) has entrusted **National Highways Authority of India** (hereinafter referred to as '**NHAI'** or '**client'**) for monetisation of public funded operational national highway projects under the framework of National Monetisation Pipeline (NMP).

In this context, NHAI has commissioned Translink Infrastructure Consultants Private Limited in association with Infra Brainiacs Private Limited (hereinafter referred to as '**TIC'** or '**consultant'**) to carry out traffic due diligence for following national highway section in Andhra Pradesh. (hereinafter referred to as '**project highway**').

Project highway under asset monetization programme

National highway section	Toll plaza	Concerned NHAI field office
Vijayawada Chilakaluripet section of NH16	Kaza (Guntur district)	Project Implementation Unit – Amaravati Regional Office – Vijayawada

Source: Client

This document is the final report incorporating traffic data updates received up to October 2025 and confirmation from the client dated 15th December 2025 for recommended scenario. The report presents our understanding of the project highway, trend analysis of traffic and revenue, primary data analysis and traffic and revenue forecast for a concession period of 15 years.

Objective and Scope of Work

The principal objective of the study is to determine traffic and revenue forecast for 15 years. This assessment provides input to stakeholders to evaluate viable monetization options for the project highway.

The broad **scope of the work** of the assignment is as follows:

- Review of available historical traffic and revenue data and relevant document received from the client
- Carrying out traffic survey and analysis at the project highway :
    - 7-days continuous and direction-wise classified traffic volume count
    - 3-days origin-destination
    - 3-days axle load
    - Any other surveys on the project highway and alternate corridors as per the need
- Site visit and stakeholder consultation to understand traffic characteristics and network dynamics
- Review of observed growth trends of the project highway and corridor subject to availability of data
- Estimate vehicle category-wise traffic and revenue for the base year
- Determine future toll rates
- Assessing diversion due to competing transportation modes and routes, network development, future development plans in the region, etc.
- Vehicle category and ticket distribution-wise traffic and revenue forecast for concession period
- Scenario development: most likely, optimistic and pessimistic

Approach

The consultant adopted comprehensive approach to address the need of this assignment with key five focus areas as summarised in below figure.

Approach for the assignment

Expertise in motion	Forecasting forward flow	Economy drive highways	Data drives decisions; paves road to resilience	Trust in travel
Team with transportation engineering expertise and experience	Encapsulate all possible exogeneous impacts on traffic growth	Models integrating economic indicators for traffic growth projections	Using statistical techniques and tools for accurate insights and risk assessments	Maintain integrity, transparency, and ethical practices

Source: TIC

Methodology (1)

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Methodology for the assignment

Key sections	Particulars
Project highway appreciation	▪ Assess the macro and micro road network, considering the overall road infrastructure and its specific sections ▪ Identify homogeneous/tollable sections with similar traffic patterns ▪ Evaluate any developments in the vicinity of the project highway that may impact economic growth and traffic volume ▪ Finalize survey locations and formats for data collection
Secondary data collection	▪ Gather relevant past detailed project report / traffic study report and draft concession agreement as per availability ▪ Collect historical monthly traffic data for the toll plazas of the project highway and neighbouring toll plazas on the corridor, both upstream and downstream ▪ Source vehicle category/mapper class wise electronic toll collection (ETC) data as most reliable dataset from Indian Highways Management Company Limited (IHMCL) through the client for toll plazas under study and on the corridor and alternate corridors as well as across the country (subject to receipt from the client or as per availability in the public domain) for understanding of the various trends of economy as well as modal / vehicle technology shift ▪ Gather economic indicators such as Consumer Price Index (CPI), Wholesale Price Index (WPI), per capita income, national, state and district Gross Domestic Product (GDP), employment rates and specific commodities related sales e.g., automobile, agriculture production etc. ▪ Gather demographic profiles and population data ▪ Collect secondary data related to alternative routes and modal shift developments if applicable
Primary data collection	▪ 7-day continuous videography-based classified traffic volume count survey to gather independent traffic volume data ▪ 3-day origin-destination and commodity survey to understand travel patterns, trip purposes, influence region, growth drivers etc. ▪ 3-day axle load survey to determine the load characteristics of vehicles ▪ 1-day vehicle registration number plate survey to estimate ticket segmentation of local commercial vehicle without national permit if required ▪ Stakeholder consultation through interviews and focused group discussions

Source: TIC

Methodology (2)

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Methodology for the assignment

Key sections	Particulars
Data analysis	▪ Review historical traffic and revenue data to understand growth trend, seasonality variation, elasticities for identified growth drivers through regression analysis subject to data availability and benchmark analysis of corridor ▪ Conduct data hygiene checks to identify errors, biases and inconsistencies in the collected data ▪ Analyse Weekly Average Daily Traffic (WADT) including peak hour, day and night traffic variances, as well as directional distribution of traffic for further input to various analysis ▪ Identify Traffic Analysis Zones (TAZ) and Primary Influence Areas (PIA) ▪ Determine vehicle category-wise origin-destination matrices, trip lengths and purposes ▪ Develop geographical distribution diagrams of traffic to visualize travel patterns ▪ Perform commodity and loading analysis ▪ Analyse historical journey tickets, including single, 24-hour return, daily multiple, monthly, local pass tickets and annual pass for passenger cars and understand the ground level situations for underlying patterns especially forced exemption if any in the case specific region and possibilities of reduction through proposed technological and administrative measures ▪ Estimate Annual Average Daily Traffic (QADT/AADT) for the base and future years as per case specific requirement ▪ Develop a traffic diversion model using IRC:SP:30 modality
Forecasting	▪ Utilize an econometric model based on IRC: 108-2015 guidelines to analyse the relationship between vehicle traffic/PIA and socio-economic parameters such as Per Capita Income (PCI), Gross Domestic Product (GDP) of district/state/national, population, specific economic activities etc. as relevant with the identified growth drivers ▪ Calculate growth rates for each vehicle category. Adjust the growth rates based on induced traffic and traffic diversion effects, if applicable ▪ Perform traffic forecasting for 15 years period - normal traffic followed by generated and diverted traffic due to network and developmental impacts ▪ Conduct capacity analysis to assess the adequacy of the project highway ▪ Forecast annual toll revenue for 15 years based on traffic and toll rates projections
Sensitivity and risk analysis	▪ Identify variables (macro-economic, growth drivers and relationships, scale and timeline of diversions, etc.) that significantly impact annual toll revenue and assess their sensitivity ▪ Develop scenarios for identified risks

Source: TIC

Organisation of the report

Report structure

Sr. No.	Chapter	Particulars
1	**Introduction**	Scope of the assignment, approach and methodology
2	**Project highway profile**	Characteristics of the project highway like network understanding, socio-economic background of the region and proposed infrastructure developments in the influence region and network
3	**Traffic analysis**	Past performance of the project highway based on historical traffic and revenue data, traffic survey data analysis
4	**Economic context and traffic growth**	Economic context of influence region – Jharkhand and West Bengal, determination of traffic growth drivers and associated travel demand elasticities
5	**Baseline traffic and revenue forecast**	Elaborates method adopted for determining base year AADT, toll ticket distribution and revenue reconciliation
6	**Diversion analysis**	Impacts on the project highway due to proposed infrastructure developments in the influence region and network, assessment of induced traffic demand
7	**Final traffic and revenue forecast**	Traffic and revenue forecasts including diversions, scenario cases: most likely with and without overloading, optimistic and pessimistic

Source: TIC

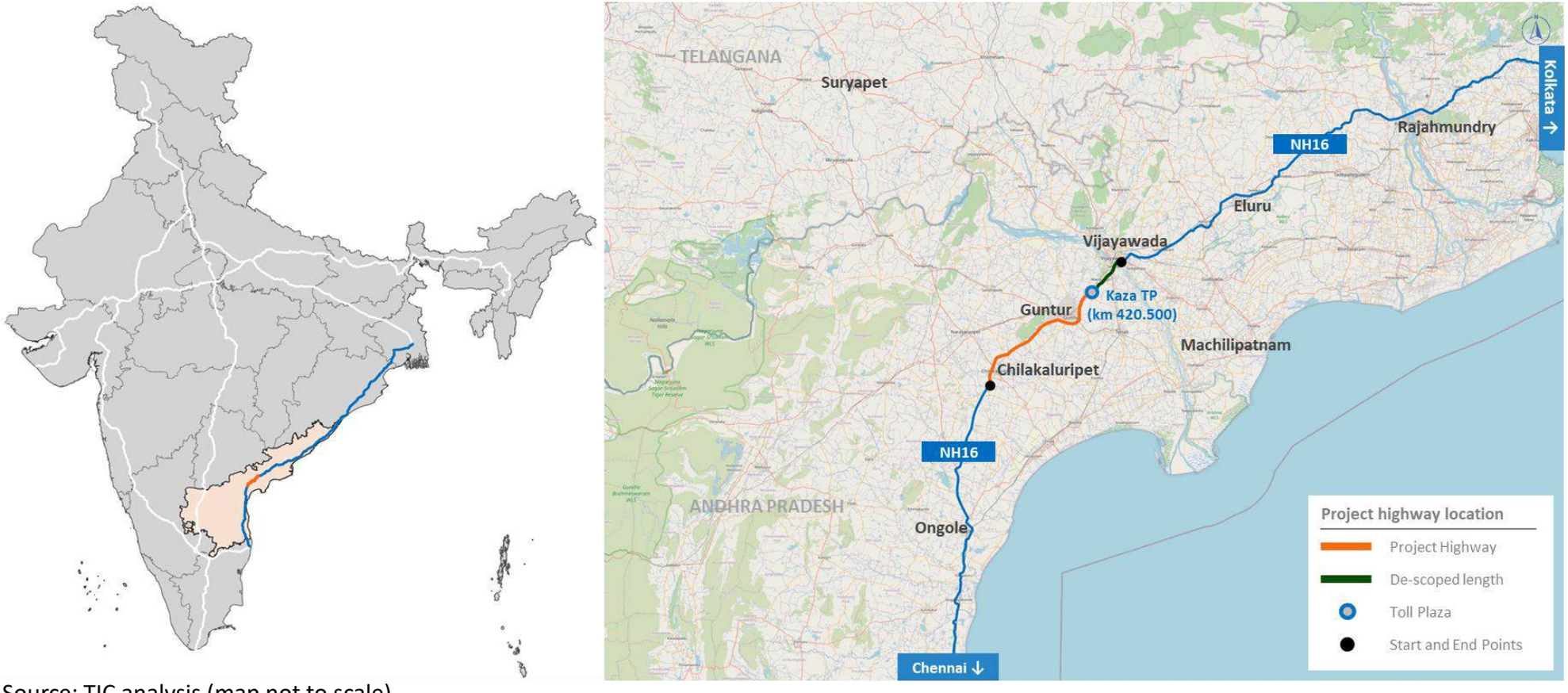
Chapter 2: Project highway profile

- Location and key details
- Economic activities in the region
- Understanding of network and traffic corridors
- Proposed road network and infrastructure development in the influence region

This chapter exhibits our understanding of the project highway and key details, economic activities in the region and strategic network context based on site visit and stakeholder consultation. It covers list of infrastructure project development in the region and network which would have impact on the performance of the project highway.

Location of the project highway

Project highway location in national and state context



Source: TIC analysis (map not to scale)

- An integral part of Golder Quadrilateral (GQ) / East Coast Corridor which connects Kolkata and Chennai.
- NH16 corridor has evolved over the period in past few years and witnessed hike in traffic along with improvement of level of service across the corridor.
- The project highway strategically located at central region of Andhra Pradesh and hence as acts as spinal cord for the state by extending the connectivity to different parts of the country i.e., West Bengal/Odisha in north and Karnataka/Tamil Nadu in south.
- Additionally, the corridor plays a vital role in supporting port-led industrial development, logistics parks, and regional economic hubs along the eastern coast, strengthening Andhra Pradesh's integration with national and international supply chains.

Project snapshot (1)

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Key project details

Particulars	Chilakaluripet Vijayawada section of NH16
Length (km)	**Present length:** 84.303 km **Revised length:** 69.408 km (post de-scope due to development of Vijayawada Bypass) Construction of Vijayawada Bypass (ending at km 422.605 on NH16) is in advance stage and likely to be completed by January 2026. Post construction of Vijayawada Bypass, the section from km 422.605 to km 437.500 shall be de-notified and handed over to state government and will be excluded from present configuration of Vijayawada Chilakaluripet section of NH16 i.e., 14.895 km and hence the length for of the project highway will be 69.408 km asset monetization proposal.
Lane and pavement	6-lane divided carriageway, flexible pavement / rigid at toll plaza
Chainage	km 355.000 (Chilakaluripet) to km 422.605 (end of Vijayawada Bypass) excluding km 357.342 to 372.038 and including km 0.000 to km 16.499
History	▪ Vijayawada Chilakaluripet section of NH16 was earlier developed and operated under a DBFOT (Toll) for 4 to 6 lane widening concession by IJM (India) Infrastructure Limited during May 2009 to September 2024 including construction period. Six laning work completed in 2010 while Chilakaluripet Bypass was constructed in 2024. ▪ Post BOT concession, section has been managed under public-funded mode with short term toll contracts.
Nos. of toll plaza and location	1 ETC enabled
Toll plaza locations	**Kaza** at km 420.500
District	Physically located within Guntur jurisdiction Socio-economic activities and traffic patterns are significantly influenced by Vijayawada, Amaravati, Guntur and Tenali.
Tolling start date	1st May 2009
Tolling length (km)	80.802
Overloading penalty	No overloading penalty/fee being levied at present based on understanding from site visit and discussion with PIU Amaravati/toll operators.
Micro-diversions at toll plaza location	Nil

Source: NHAI

Project snapshot (2)

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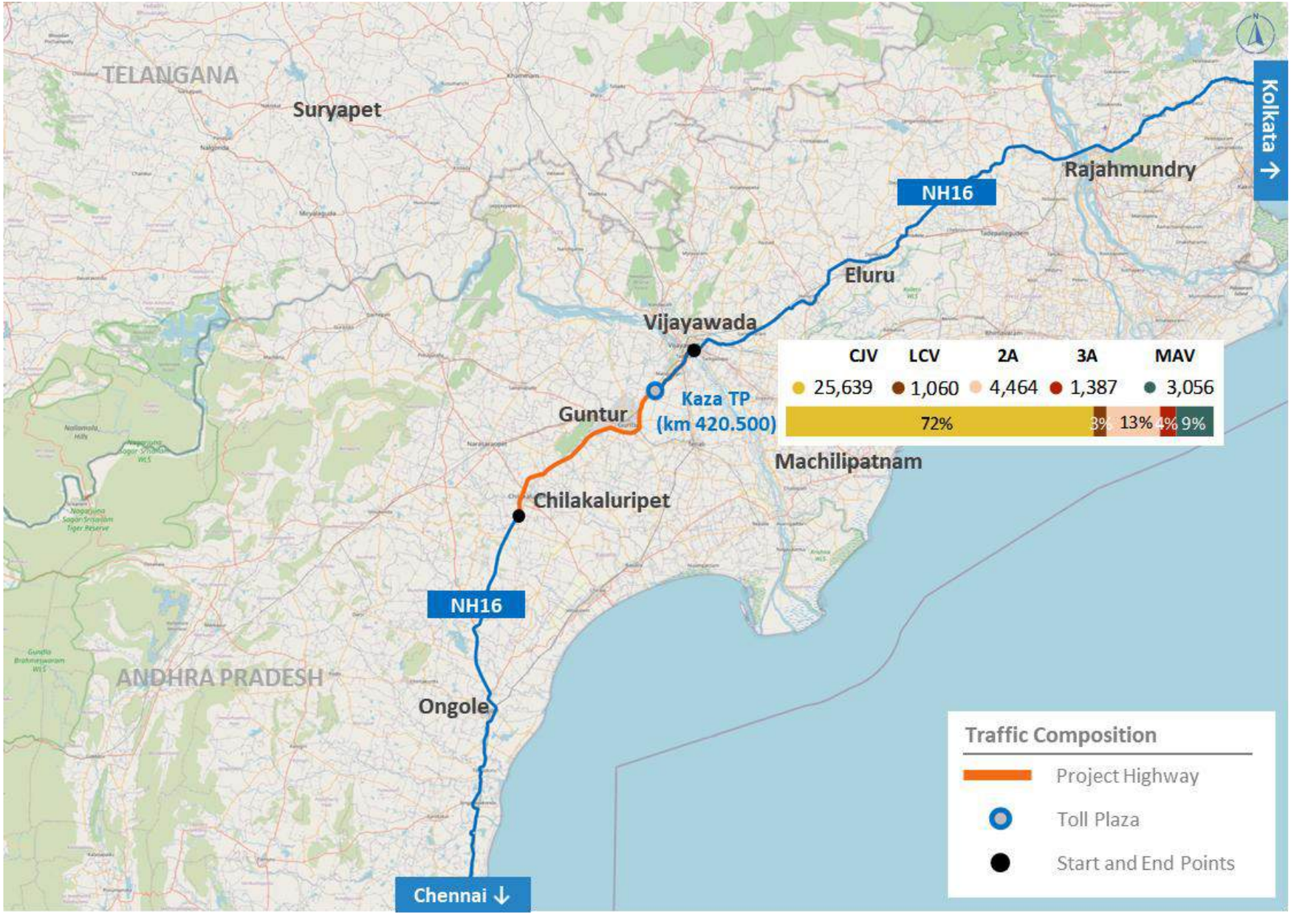
Key project details

Particulars	Vijayawada Chilakaluripet section of NH16
Toll plaza locations	**Kaza**
ETC Traffic (FY26 till October 2025)	7 months ADT: 35,609 PCU corresponding 7 months ADT: 58,546
ETC Traffic composition (FY26 till October 2025)	72% CJV/Mini LCV 8% 2A/LCV 8% Bus 12% 3A/MAV
ETC Revenue	FY25: INR 243 Crore FY26 (till October 2025): INR 181 Crore Considering old tolling length including 14.895 km to be de-scoped from start of FY27
ETC Revenue composition (FY26 till October 2025)	32% CJV/Mini LCV 15% 2A/LCV 11% Bus 41% 3A/MAV
Present toll operator with quoted remittance	**Sri Sai Enterprises** **Duration** : January 2025 to December 2025 (1 Year) **Annual Potential Collection** : INR 310.80 Crore **Quoted remittance** : INR 303.67 Crore (FY25 tolling rates) Revised to INR 322.71 on 1st April 2025 with FY26 tolling rates Future round of bidding completed for 1 year toll contract in December 2025. **Highway Infrastructure Limited** **Duration** : New toll operator is expected to take handover in January 2026 for 1 year **Annual Potential Collection** : INR 321.09 Crore **Quoted remittance** : INR 328.77 Crore (FY26 tolling rates)
Previous tolling operator	**Sri Sai Enterprises** **Duration** : October 2024 to January 2025 (3 months) **Annual Potential Collection** : INR 289.13 Crore **Quoted remittance** : INR 247.07Crore (FY25 tolling rates) Bidding was low as shifted from BOT (Toll) to public funded modality in recent past as well as freight traffic (3A/MAV) was in transit state of being diverted to NH216 from July 2024.

Source: NHAI

Project snapshot (3)

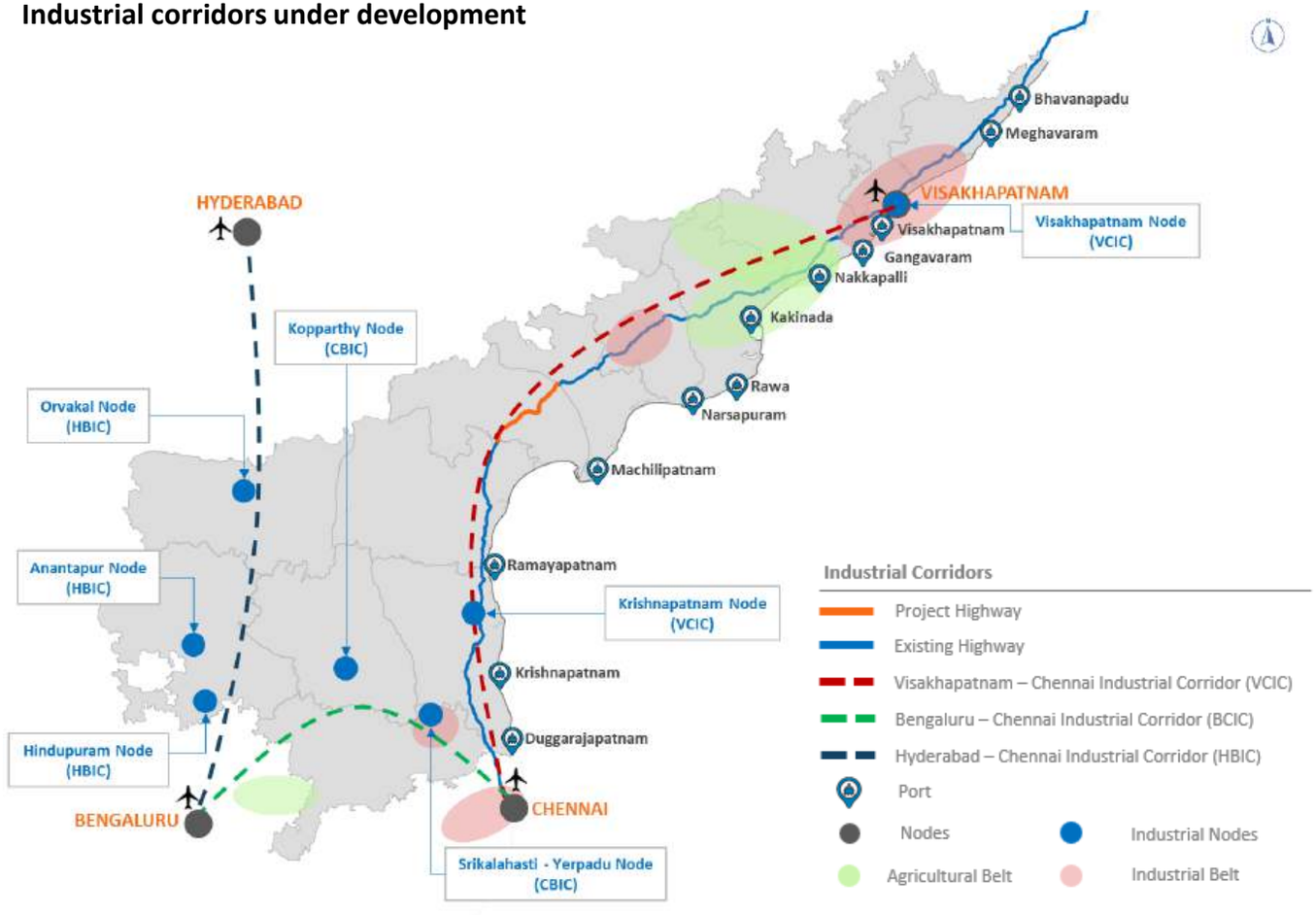
ETC Traffic composition of FY26 till October 2025



Source: TIC analysis (map not to scale)

Economic activities in influence region (1)

Industrial corridors under development



Source: TIC analysis (map not to scale)

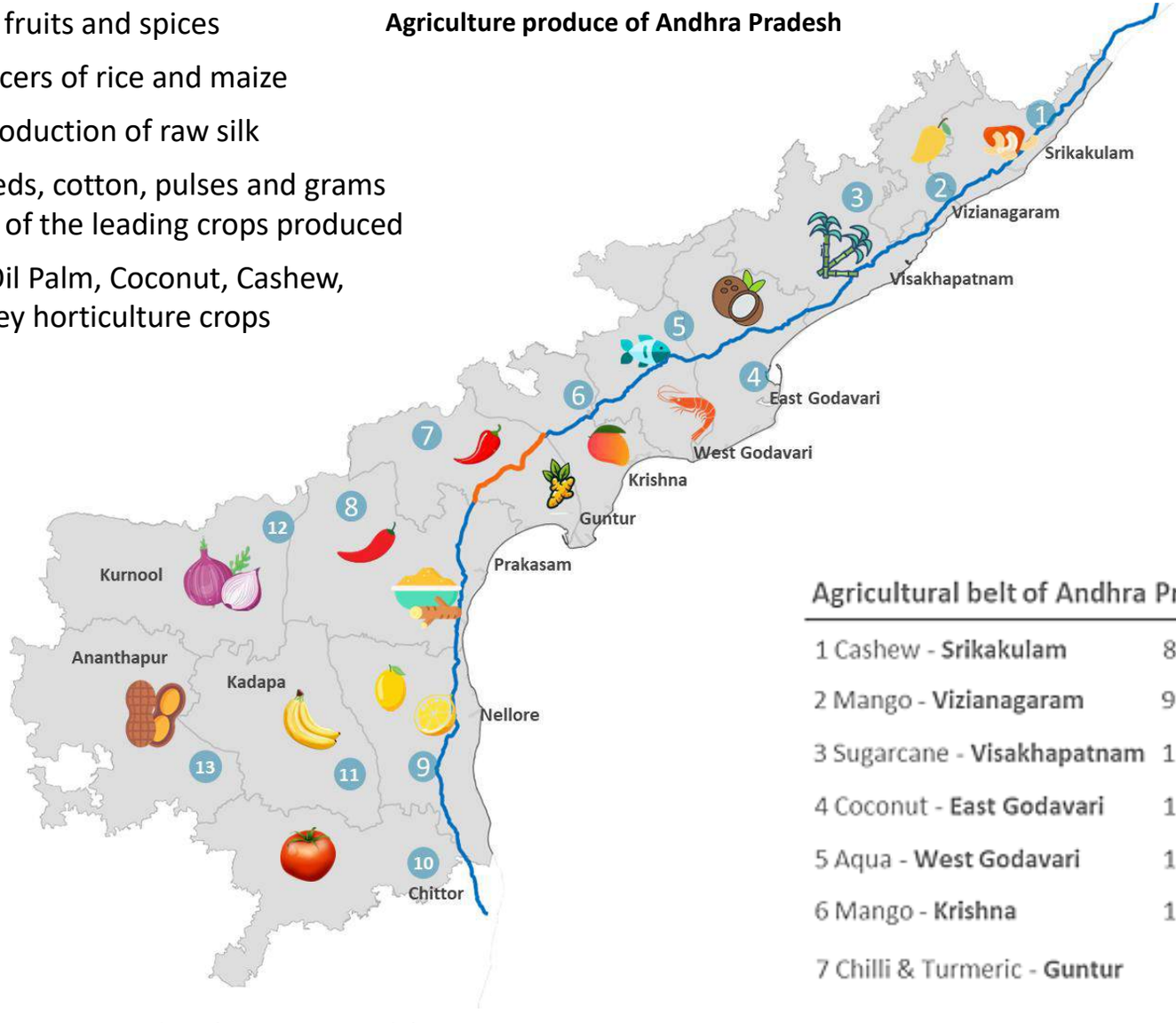
- Visakhapatnam – Chennai Industrial Corridor (VCIC) is hosts three industrial nodes at Vizag, Chittoor and Kopparthy
- Chennai – Bengaluru Industrial Corridor (CBIC) proposes high impact / market driven nodes in Tamil Nadu, Andhra Pradesh and Karnataka. Krishnapatnam and Nellore are two major nodes of CBIC in Andhra Pradesh.

- Industry landscape includes fisheries, textiles and pharmaceutical
- 15 operational ports along the coastline helps in uplifting the industry landscape
- Amongst the top 5 exporting states of India. The important industry / economic centers of the state has a well-connected road network of NH and SH
- NH16 which is an integral part of golden quadrilateral passes through Andhra Pradesh with about 50% of length of ~990 kms
- 1st state in the country to launch single window portal to boost its industry landscape
- The state further envisages to boosts its economy by capitalizing the full potential of industrial corridors in context of recent change of ruling party during state election
- Visakhapatnam – Chennai Industrial Corridor (VCIC) is hosts three industrial nodes at Vizag, Chittoor and Kopparthy
- The project highway is the important road asset connecting the nodes of industrial corridors.

Economic activities in influence region (2)

- 1st production of fruits and spices
- 2nd largest producers of rice and maize
- 2nd position in production of raw silk
- Rice, chilly, oilseeds, cotton, pulses and grams are amongst few of the leading crops produced
- Mango, Guava, Oil Palm, Coconut, Cashew, Lemon etc. are key horticulture crops

Agriculture produce of Andhra Pradesh



Agricultural belt of Andhra Pradesh

1 Cashew - **Srikakulam**	8 Chilli & Turmeric - **Prakasam**
2 Mango - **Vizianagaram**	9 Citrus - **Nellore**
3 Sugarcane - **Visakhapatnam**	10 Tomato - **Chittor**
4 Coconut - **East Godavari**	11 Banana - **Kadapa**
5 Aqua - **West Godavari**	12 Onion - **Kurnool**
6 Mango - **Krishna**	13 Gorundnut - **Ananthapur**
7 Chilli & Turmeric - **Guntur**	

Source: TIC analysis (map not to scale)

Economic activities in influence region (3)

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Economic activities in influence region

Source: TIC analysis (map not to scale)

Economic activities in influence region (4)

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1 Industry

- **Vijayawada,** major commercial and industrial hub with automobile body-building, food processing, textile, and agro-based industries; serves as a key logistics and trading center in Andhra Pradesh.
- **Guntur,** prominent agro-industrial zone known for chilli processing, cotton ginning, tobacco curing, and fertilizer industries; hosts one of Asia's largest agricultural markets.
- **Tenali & Mangalagiri,** centers for rice milling, handloom weaving, and small-scale manufacturing, contributing to rural employment and local trade.
- **Amaravati Capital Region,** emerging administrative and urban hub driving growth in construction, real estate, logistics, and service sectors.
- **Sand Mining from Krishna River,** regulated sand mining supports construction demand in the Amaravati region and generates moderate traffic at the Kaza TP.

2 Agriculture and allied activities

- **Rice (Paddy)** is the dominant crop across Krishna and Guntur districts, supported by fertile alluvial soils and irrigation from the Krishna River and Prakasam Barrage.
- **Chilli, cotton, maize,** and **pulses** are major secondary crops; **Guntur Sannam chilli (GI-tagged)** is globally recognized for its export value. **Sugarcane** and **turmeric** are cultivated in select regions, contributing to crop diversification and agri-based processing industries.
- **Kavali and Ongole** are key centers for **tobacco** trading.
- Horticulture and vegetable farming (banana, mango, tomato, brinjal) are practiced commercially, supplying fresh produce to Vijayawada, Guntur, and Amaravati markets.
- Allied activities such as dairy, floriculture, and aquaculture (especially inland fish and prawn farming) provide additional income to rural communities. **Nellore** region is known as **'Shrimp Capital of India'.**

3 Tourism

- **Vijayawada,** major pilgrimage and tourist hub known for the Kanaka Durga Temple and Krishna Riverfront; Bhavani Island promotes eco and leisure tourism.
- **Amaravati,** ancient Buddhist heritage site featuring the Amaravati Stupa and Dhyana Buddha statue, attracting national and international visitors.
- **Mangalagiri,** renowned for the Lakshmi Narasimha Swamy Temple, a major religious destination between Vijayawada and Guntur.

Source: TIC secondary research

Guntur Sannam Chilli (GI-tagged)

- Andhra Pradesh is India's largest chilli producer, contributing 40-50% of the national output. The Guntur district alone is the '**Chilli Capital of India'** responsible for about 15% of the total Indian chilli production and largest exporter after Mexico.
- Guntur Market Yard is the largest chilli market in Asia, playing a direct role in setting both domestic and international chilli prices.
- Production has shown consistently positive two decadal growth trend (FY94 to FY23), driven by strong market demand and continuous adoption of modern agricultural technology.
- Guntur chilli is vital to India's spice trade. It's a key export to countries like China, Vietnam, Thailand, and the USA, contributing significantly to India's overall spice exports.
- Geographical Indication (GI) tag for Guntur Sannam Chilies ensures product authenticity, helps farmers secure better prices, and maintains its international reputation for fiery hotness and pungency.
- As a crucial commercial crop, Guntur Chilli secures a prime status in Andhra Pradesh's agriculture and export economy, boosting the state's GDP, trade balance, and rural income. Cultivating the GI-tagged variety offers higher net returns and economically viable for farmers.

Chilli Farming in Guntur district

Cold Storage for Chillies on Guntur Bypass

Source: TIC site visit

Our understanding of traffic corridor and road network

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National corridor (long-distance traffic)

- The project highway forms a vital part of the Golden Quadrilateral (NH16), serving as east coast economic corridor connecting Kolkata and Chennai through key cities such as Cuttack, Bhubaneswar, Visakhapatnam, Rajahmundry, Vijayawada, Guntur, Ongole (extends to Kadapa region), Nallur, Sri City (south Andhra Pradesh), Chennai and extends to Bengaluru via Naidupeta/Tirupati.
- It facilitates movement of long-distance freight traffic between the southern, eastern, and northeastern regions of India. This includes industrial goods, agricultural produce, fertilizers, petroleum products, and port-based cargo from Chennai, Krishnapatnam, Gangavaram, and Visakhapatnam ports supporting national-level trade and logistics operations.
- The project highway establishes link to Tirupati Balaji (located approximately 130 km south of the Nellore on the corridor), one of the richest temples in the world and an important Hindu pilgrimage site. Passenger traffic from north Andhra Pradesh being witnessed on the project highway.

Regional linkages (medium-distance traffic)

- At the regional level, the corridor connects important urban and industrial centers such as Vijayawada, Guntur, Tenali, Chilakaluripet, and Ongole, ensuring efficient movement of goods between coastal Andhra Pradesh and the inland districts.
- Project highway supports substantial medium-distance freight such as agricultural produce (rice, cotton, chillies), fertilizers, construction materials, and consumer goods, transported to and from Guntur, Prakasam, and Krishna districts. It also plays a vital role in facilitating regional trade with Hyderabad, Tirupati, and Nellore through well-developed road linkages.

Local connectivity (short-distance traffic)

- Short-distance traffic primarily includes daily commuters, agricultural transport, and local trade movement between regional nodes such as Guntur, Mangalagiri, NTR, and Chilakaluripet.
- This section also supports the movement of perishable goods and produce from nearby mandals and rural areas to Vijayawada and Guntur markets, including the Guntur Mirchi Yard and NTR Wholesale Market.
- The corridor thus acts as a critical enabler of local economic activity, linking industrial, agricultural, and service-based growth centers within central Andhra Pradesh.

Corridor traffic summary (1)

Kolkata Chennai corridor of NH19

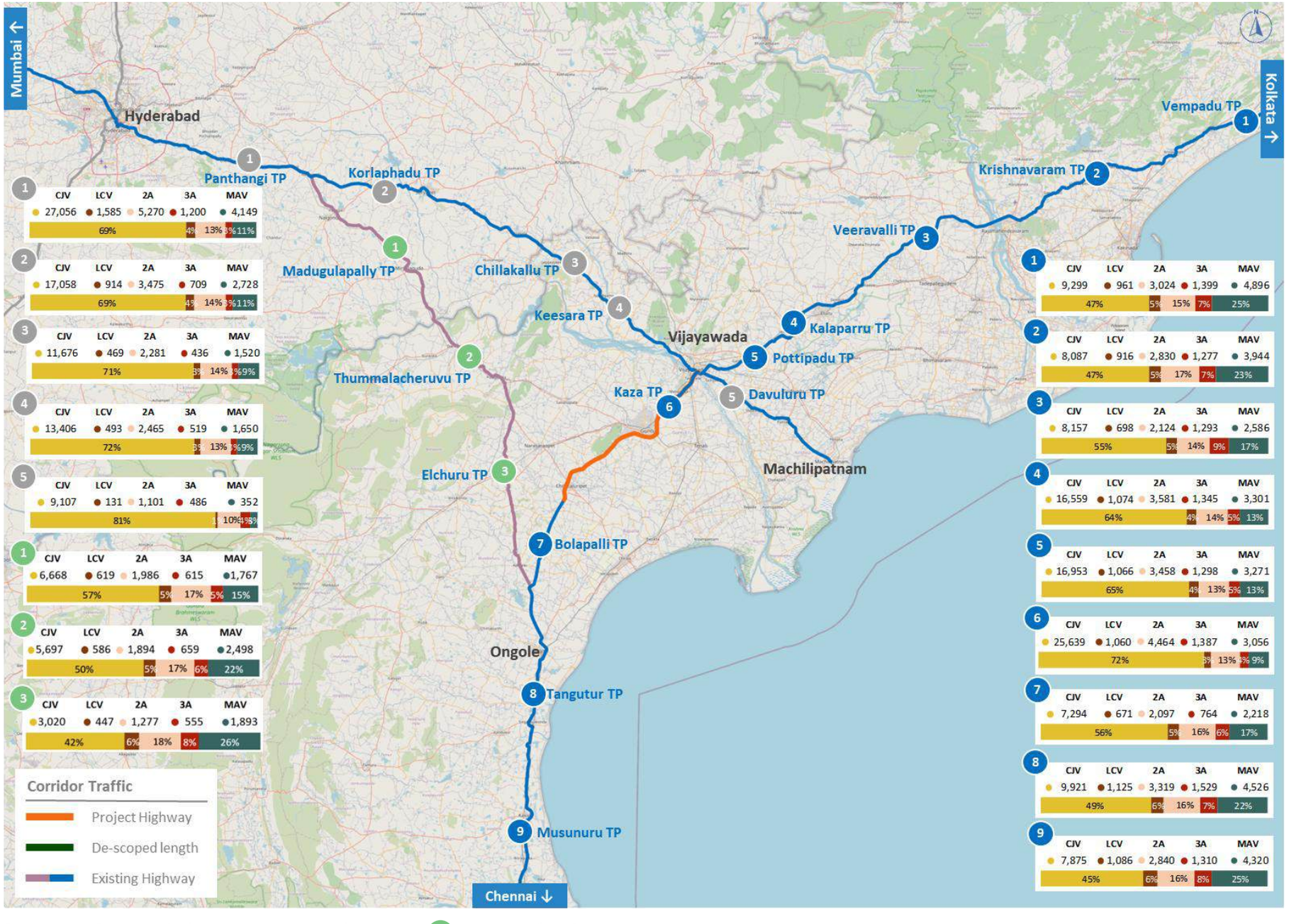
Highway section	Concessionaire / Operator	Average PCU (approx.)
Dhankuni – Kharagpur	BOT (Toll) – Maple Highways	80,000
Kharagpur – Baleshwar	BOT (Toll) – IL&FS	18,000
Baleshwar – Bhadrak	Toll - Public Funded	32,000
Bhadrak – Chandikhole	Toll - Public Funded	35,000
Chandikhol – Bhubaneshwar	BOT (Toll) – Maple Highways	45,000
Bhubaneshwar – Sunakhala	Toll - Public Funded	25,000
Sunakhala – Puintola	Toll - Public Funded	25,000
Puintola – Icchapuram	TOT (Toll) – Safeway Concession/Macquire	21,000
Icchapuram – Nandigaon	TOT (Toll) – Safeway Concession/Macquire	20,000
Nandigama – Srikakulam	NHIT (Private InvIT Bundle 4)	28,000
Champavati/ Kopperla – Visakhapatnam	NHIT (Private InvIT Bundle 4)	32,000
Anakapall – Anandapuram	NHIT (Private InvIT Bundle 4)	25,000
Anandapuram – Tuni	Toll - Public Funded	44,000
Tuni – Diwancheruvu	Toll - Public Funded	40,000
Diwancheruvu – Kovvuru	BOT (Toll) – PATH Group State Authority	51,000
Kovvuru – Devarapalli – Gundugolanu	NHIT (Private InvIT Bundle 4)	33,000
Gundugolanu – Vijayawada	Toll - Public Funded	50,000
Vijayawada – Chilakaluripet	Toll - Public Funded	60,000
Chilkaluripet – Nellore	BOT (Toll) – Interise (CPPIB)	30,000 / 50,000 / 45,000
Nellore – Tada	BOT (Toll) – Vertis (KKR)	52,000 / 33,000
Tada – Chennai	Toll - Public Funded	62,000

Source: TIC analysis

Corridor traffic summary (2)

TRANSLINK® Infrastructure Consultants Pvt Ltd *Smart Consulting*

Traffic composition on the corridor: AADT of FY26 till October 2025



Source: TIC analysis (map not to scale)

AADT of FY25

Site photographs

Start Point (km 355.000)

Kaza Toll Plaza (km 420.500)

Cross section

End Point (km 437.500)

Advance stage of construction at Vijayawada Bypass

Source: TIC site visit

Proposed infrastructure development in the region (1)

TRANSLINK® Infrastructure Consultants Pvt Ltd Smart Consulting

Network and infrastructure development in the influence region (refer map on Pg 31)

Particulars of the development	Authority / Mode of Development / Developer	Status / expected completion	Possible impact
Vijayawada Western Bypass	NHAI / HAM Two packages	Construction of Vijayawada Bypass (ending at km 422.605 on NH16) is in advance stage and likely to be completed by January 2026.	**Negative – reduction on tolling length from FY27** Post construction of Vijayawada Bypass, the section from km 422.605 to km 437.500 shall be de-notified and handed over to state government and will be excluded from present configuration of Vijayawada Chilakaluripet section of NH16 i.e., 14.895 km. Hence, the length for of the project highway will be 69.400 km from start of FY27.
Amaravati Outer Ring Road	NHAI / HAM Multiple packages Mode of development is yet to be decided	Alignment is finialled and DPR work is in advance stage Expected completion is in FY33	**Negative** Three sets of traffic movement will be affected: ▪ Northend region outside ORR towards Eluru/Rajahmundry: locations on north Pottipadu which is the junction of NH16 and ORR ▪ Western region outside ORR towards Hyderabad: locations on west of Saidapuram which is the junction of NH65 and ORR ▪ Eastern region outside ORR towards Machilipatnam: locations on east of Davuluru which is the junction of NH65 and ORR
Development of Amaravati Capital City and nearby region	Andhra Pradesh Capital Region Development Authority	As major phases of the capital city's infrastructure such as government administrative complexes, educational institutions, housing townships and commercial centers become operational, travel demand within the region is expected to rise throughout the concession period	**Positive** This growth will lead to increased daily commuting between Amaravati/Vijayawada and Guntur, as well as heightened movement of goods and services supporting the expanding urban ecosystem.

Source: TIC research and analysis

Proposed infrastructure development in the region (2)

TRANSLINK® Infrastructure Consultants Pvt Ltd Smart Consulting

Network and infrastructure development in the influence region (refer map on Pg 31)

Particulars of the development	Authority / Mode of Development / Developer	Status / expected completion	Possible impact
Ramayapatnam Port	Andhra Pradesh Maritime Board through Ramayapatnam Port Development Corporation Limited	About 65% work of Phase-1 completed as of June 2025 including 4 km of dredging. Expected to be operational by end of FY27.	**Positive** for 2A, 3A, MAV
Chennai Hyderabad high-speed rail	National High Speed Rail Corporation Limited in support with concerned state governments	South Central Railway submitted final alignment to be included in the detailed project report (DPR) to State Government of Tamil Nadu and requested approvals in November 2025 to keep the survey work on track. Expected to be operational in FY38	**Negative** Traffic movement from/ to Hyderabad, Vijayawada and Chennai
Bengaluru Vijayawada Expressway	NHAI / HAM Multiple packages and developers	**Brownfield section:** NH44 Bengaluru to Kodikonda (73 km) & NH16 Addanki to Vijayawada (113 km) **Greenfield section:** Kodikonda to Addanki (343 km) Likely expected to be completion in FY28	**Nil** as on date as the proposed development ends at Adanki. As per preliminary discussion with the client, the project highway may upgrade to access control corridor in long-term future in continuation of Bengaluru Vijayawada Expressway. It is at pre-proposal stage and no decision yet finalised. As per client, there should not be major impact on overall revenue in case of access control modality because significant freight traffic diverted due to Amaravati Outer Ring Road (FY34) will pay for Guntur – Chilakaluripet section while traffic between Guntur – Vijayawada will pay for this section instead of full length.

Source: TIC research and analysis

Proposed infrastructure development in the region (3)

Network and infrastructure development in the influence region (refer map on Pg 31)

Particulars of the development	Authority / Mode of Development / Developer	Status / expected completion	Possible impact
4 laning of Kathipudi Ongole section of NH216	MoRTH Mode of development to be decided Multiple Packages	DPR to be initiated followed by land acquisition which is complex in coastal agriculture belt of Andhra Pradesh. Expected to be completed in FY33.	**Nil** Potential divertible traffic and timeline is similar for proposed development and Amaravati Outer Ring Road and hence not considered.
National Waterway 4 (NW4)	Inland Waterway Authority of India (IWAI)	Kakinada to Puducherry through canal which is integrated with Bhadrachalam Rajahmundry section of Godavari River and Wazira Vijayawada section of Krishna River Additional reaches: Godavari River: Bhadrachalam to Nasik Krishna River: Wazirabad to Galagali Canal system to be strengthened in next 5 – 6 years to extend the reach up to Tamil Nadu	**Nil** Not directly affecting cargo hinterland is coastal agriculture belt being served by NH216

Source: TIC research and analysis

Proposed infrastructure development in the region (4)

TRANSLINK® Infrastructure Consultants Pvt Ltd
Smart Consulting

Network and infrastructure development in the influence region

Source: TIC analysis (map not to scale)

Chapter 3: Traffic analysis

- Historical data sources
- Historical traffic and revenue trends
- Seasonality variation
- Historical ticket distribution
- Commodity analysis
- Zonal influence and trip distance

This chapter covers various datasets received from NHAI followed by assessment of historical performance of the project highway. This analysis helps to understand baseline traffic patterns comprising of traffic and revenue growth rates, seasonality variations, trip factors, ticket distribution and overloading characteristics if any.

Survey analysis helps to understand and validate traffic volume, commodity movement pattern, network understanding received from site visit, inputs for ticket distribution, overloading pattern based on independent survey exercise.

Historical datasets

- The project highway was operated under BOT (Toll) during May 2009 to September 2024 followed by being operated under the public-funded mode where toll is collected by third party toll agencies through short-term contracts. Third party toll agencies submit traffic and revenue report on monthly basis which is titled as Schedule V.
- The consultant observes that availability and accuracy of these reports are many times under question due to inadequate quality of technology interventions and record keeping during short term contracts by tolling agencies.
- Hence, availability followed by reliability of these datasets is essential to be addressed for historical analysis as well as further processing for base year and future traffic forecasts.
- ETC data is independently system generated and hence more reliable. The client sourced vehicle category-wise traffic data which doesn't include toll ticket distribution.
- Monthly reports submitted by contractors / tolling agencies to NHAI field offices (Schedule M/G/V) which is start point to validate the toll ticket distributing including cash components, violation/exemptions, overloading fee etc.

Summary of the historical traffic and revenue data available for Kaza Toll Plaza

Data sources	Duration of data	Observations
Schedule V - Part A & B (monthly)	FY11 : Q4 only FY12 to FY24 : Full year FY25 : 9 month Except Jul/Oct/Nov'24 FY26 : Q1, Q2, Oct'25 (7 months)	**Part A:** Vehicle category-wise total user fee collection **Part B:** Vehicle category total traffic Ticket distribution data: Yes Exemption/violation/ cash traffic data: Yes
ETC Data (monthly)	FY23 : Full year FY24 : Full year FY25 : Full year FY26 : Apr-Oct'25 (7 months)	Vehicle category-wise ETC transactions covering total traffic and user fee collection Ticket distribution data: No
Overloading Reports (weekly)	No overloading penalty / fee is being levied at present based on understanding from site visit and discussion with PIU Amaravati	
Neighbouring highways	Historical traffic data to determine corridor growth trend	

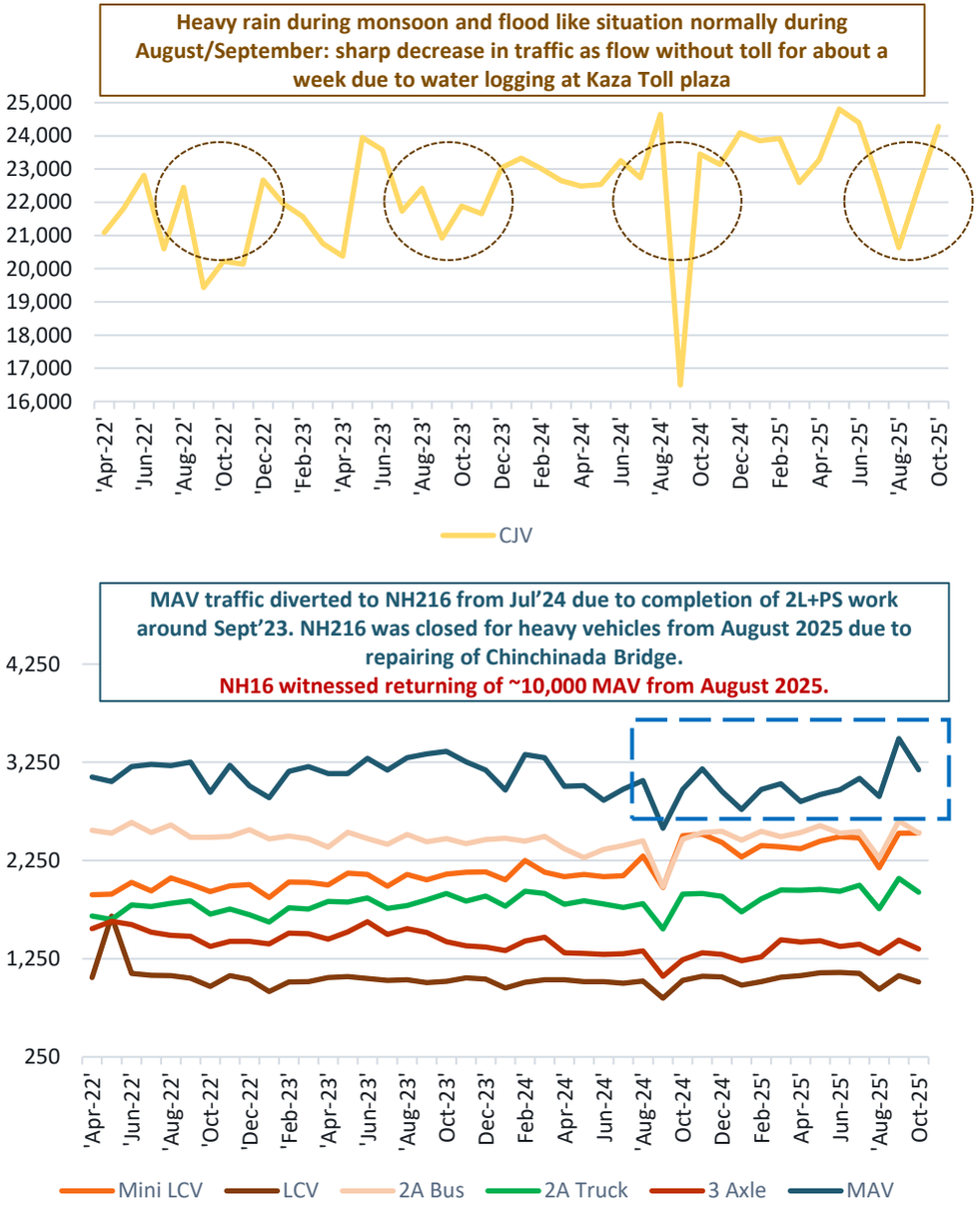
Source: TIC compilation of data received from NHAI

Monthly toll reports (Schedule M/G) submitted during BOT (Toll) was as per NH Fee Rules 1997 with internal swapping of traffic for freight vehicle categories as per discussion with the client and BOT (Toll) concessionaire. Hence, Schedule M/G during BOT (Toll) tenure is useful in terms broad level freight traffic characteristics instead of vehicle category-wise (separately for LCV, 2A, 3A, MAV) growth pattern.

ETC data was reviewed for historical analysis as it is reliable.

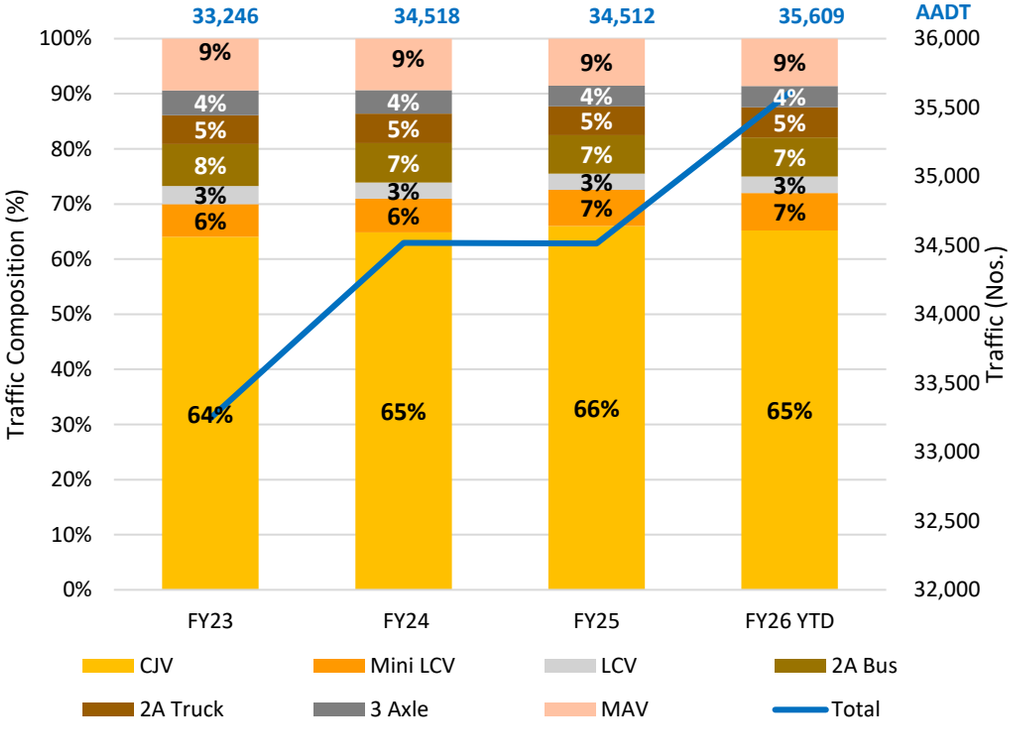
Historical traffic analysis (1)

Vehicle category-wise monthly traffic trend - ETC



Source: TIC analysis

Vehicle category-wise annual traffic composition - ETC



- Traffic has trended in the range of 34,500 AADT (56,000 PCUs) in recent past with CJVs (30%) and MAVs (37%) as major contributors. High number of CJVs is due to proximity to Dhanbad / Hazaribagh.
- The corridor is susceptible to demand-supply fluctuations of illegally mined coal which is being mainly transported through 5A Trucks due to optimum cost-tonnage ratio including overloading.
- 2A Trucks and LCV contribution is on increasing trend on the corridor in last three years.

Historical traffic analysis (2)

NH16 vs NH216: dynamic equilibrium during FY26 to FY29

Source: TIC analysis (map not to scale)

- NH216 is important coastal highway running from Kathipudi to Ongole along the coast, connecting districts of east Godawari, West Godavari, Krishna, Guntur and Prakasam, serving as vital economic corridor for fisheries, tourism and agriculture. The same was improved to 2L+PS in September 2023 including Kakinada Bypass.
- Due to this development MAV traffic diverted to NH216 gradually from July 2024 and achieved almost equilibrium in July 2025.
- Core reasons for this diversion even after lower Level of Service (4L/6L NH16 vs 2L+PS NH216) are as follows:
  - Toll cost is ~25% lower than NH16
  - Cheaper fuel cost at Yanam part of the Union Territory of Puducherry.

- NH216 got closed for heavy vehicles from August 2025 due to repairing of Chinchinada Bridge.
- Hence, the project highway witnessed sharp jump of ~10,000 MAV, ~2,000 3A, ~15,000 2A trucks per month from August 2025 which is due to return of diverted traffic from NH216. This incremental gain is expected till March 2026 till heavy vehicle movement is prohibited due to major bridge repairing.
- The consultant estimated base year FY26 with this incremental gain followed by diversion to NH216 from April 2026 (FY27) at higher pace as well as additional diversion of ~25% in FY28 which was under transition. It is expected that traffic will stabilize between NH16 and NH216 from H2FY29.

Historical traffic analysis (3)

TRANSLINK® Infrastructure Consultants Pvt Ltd *Smart Consulting*

Vehicle category-wise traffic growth trend - ETC

Vehicle Category	CJV	Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	Total	PCU
Annual Average Daily Traffic (AADT)									
FY23	21,295	1,976	1,091	2,528	1,739	1,492	3,125	**33,246**	**56,246**
FY24	22,385	2,099	1,030	2,462	1,850	1,494	3,229	**34,518**	**57,886**
FY25	22,774	2,264	1,013	2,407	1,819	1,283	2,951	**34,512**	**56,367**
FY26 till Oct'25	23,207	2,431	1,060	2,523	1,941	1,387	3,058	**35,609**	**58,546**
Growth trends									
FY24 vs FY23	5.1%	6.2%	(5.6%)	(2.6%)	6.4%	(1.9%)	3.3%	**3.8%**	**2.9%**
FY25 vs FY24	1.7%	7.9%	(1.6%)	(2.2%)	(1.6%)	(12.4%)	(8.6%)	**0.0%**	**(2.6%)**
FY26* vs FY25	4.3%	12.3%	6.5%	8.2%	8.7%	9.7%	4.4%	**5.6%**	**6.0%**
CAGR (FY23 - FY26 YTD)	3.5%	8.6%	(1.1%)	(0.1%)	4.5%	(2.9%)	(0.9%)	**2.8%**	**1.6%**

Source: TIC analysis * against FY25 for 7 months i.e., April-October

- **FY2019/FY2020:** The project highway is integral part of strategic NH16, traffic growth was witnessed at healthy and sustainable pace every year till FY20. **Revision of Safe Axle Weights for Transport Vehicles by MoRTH** was introduced in July 2018 (FY19), increasing loads by 15-25% to match international standards, boosting vehicle capacity and lowering logistics costs. This led to decrease in 3A/MAV traffic as lower number of trucks plying to carry similar tonnage in past. In addition, the state government **banned sand mining** and transportation in FY2020.
- **FY2021:** decrease of traffic as inter/intra-state travel was affected due to **Covid19 pandemic**.
- Toll plaza faces challenge of water logging for 3-4 days during heavy monsoon like recent August 2025 during which traffic flows without toll and sharp dip in traffic was observed.

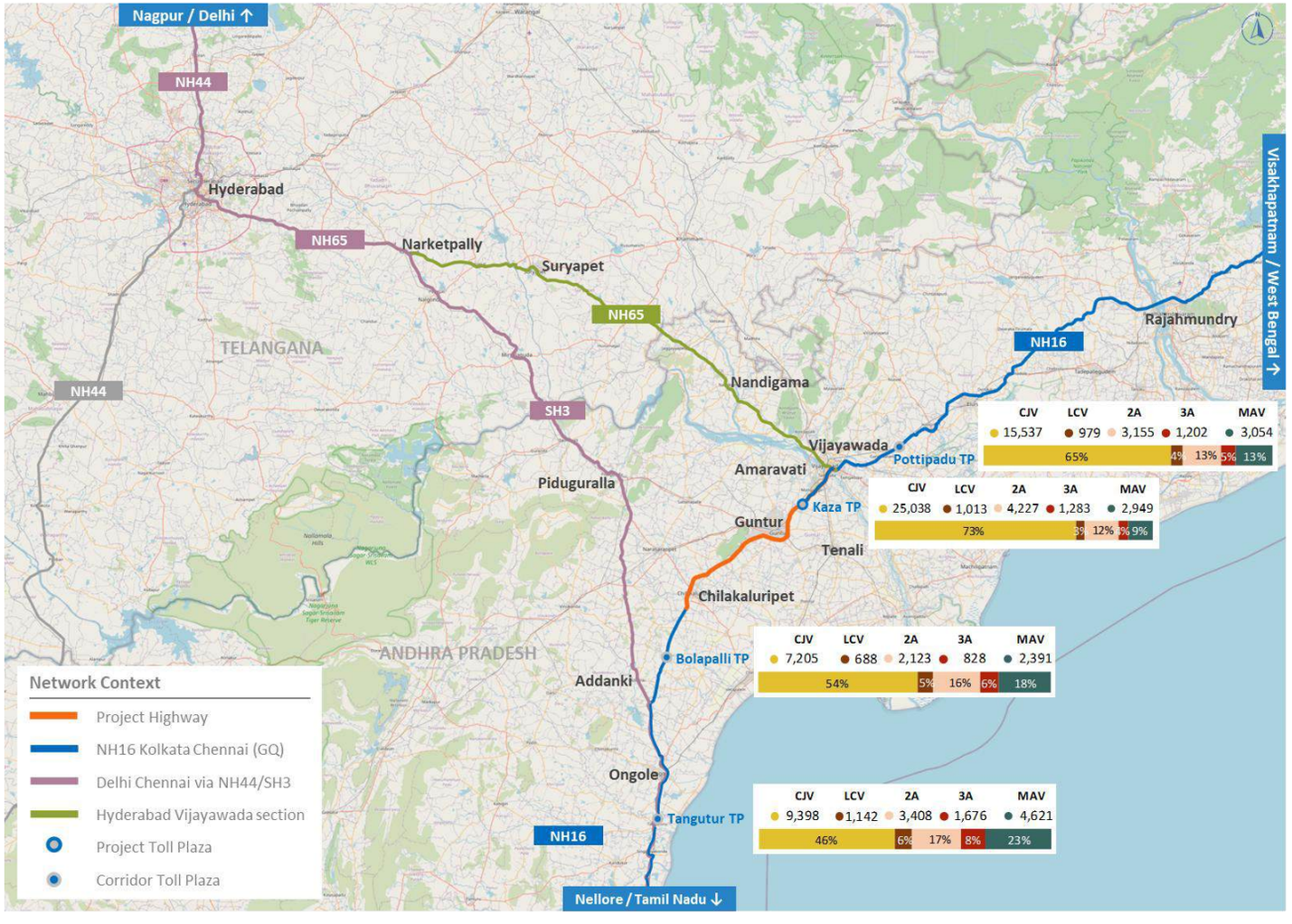
Andhra Pradesh weather forecast: Low pressure area over Bay of Bengal to trigger heavy rainfall - The Hindu
Kaza Toll Plaza : జలదిగ్బంధంలో మంగళగిరి కాజా టోల్ ప్లాజా | Mangalagiri | Special Report | NTV Telugu - YouTube

Kaza Toll Plaza during heavy rain in Aug'25

Source: Secondary research

Historical traffic analysis (4)

Benchmark road section on NH16 corridor for long-term growth trend



Source: TIC analysis (map not to scale)

- Neighbouring highway section (Pottipadu TP) on north of the project highway (Kaza TP) witness traffic of Hyderabad and till Vijayawada. Hence, traffic characteristics are different.
- While highway sections on south of the project highway, except homogeneous section covered under immediate tollable section, witness traffic between Hyderabad/north and Ongole/south. This is significant long-haul traffic volume with different characteristics.
- Hence, only immediate tollable section in south of the project highway can act as benchmark for determining long-term growth rate.

Corridor growth trends

CAGR	CJV/Mini LCV	LCV	Bus/2A Truck	3A/MAV*	Total	PCU
FY15 – FY19	10.8%	(2.3%)	7.2%	2.9%	**6.7%**	**5.0%**
FY15 – FY24	8.0%	0.5%	4.0%	1.9%	**5.0%**	**3.0%**

Source: TIC analysis

* observed lower growth is driven by the joint influence of the 3A/MAV

Historical revenue analysis

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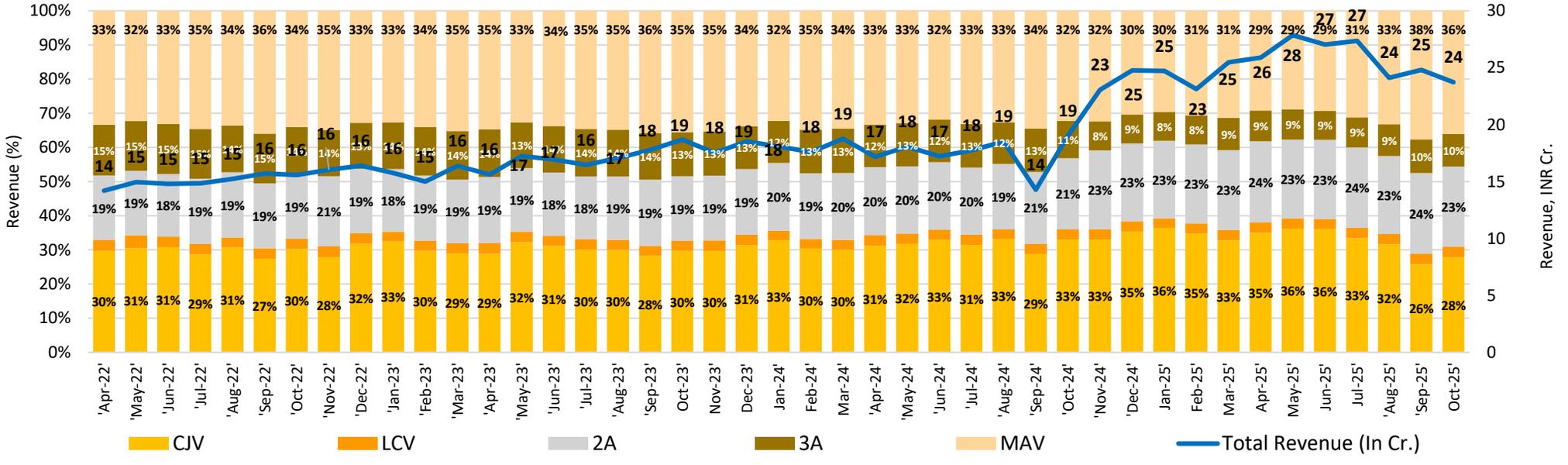
Smart Consulting

Vehicle category-wise monthly revenue composition and trend - ETC



Vehicle Category	CJV	Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	Total	AADC
Annual Revenue (in INR Crore) / Annual Average Daily Collection (AADC, in INR Lakh)									
FY23	50.0	5.4	5.7	15.4	19.7	26.2	62.7	**184.9**	**50.66**
FY24	57.6	6.4	6.2	16.9	23.2	27.8	72.3	**210.3**	**57.47**
FY25	72.2	8.6	7.2	24.6	27.7	25.5	77.5	**243.2**	**66.63**
FY26 till Oct'25	51.5	7.2	5.5	20.4	21.8	16.4	58.0	**180.8**	**84.50**
Growth trends									
FY24 vs FY23	15.3%	18.3%	9.4%	10.0%	17.9%	6.0%	15.4%	**13.8%**	**13.4%**
FY25 vs FY24	25.3%	34.0%	17.1%	45.3%	19.3%	(8.2%)	7.2%	**15.6%**	**16.0%**
FY26* vs FY25	47.6%	79.0%	50.2%	96.9%	55.6%	9.6%	44.5%	**48.1%**	**48.1%**

Source: TIC analysis

* against FY25 for 7 months i.e., April-October

Ticket distribution (1)

Schedule V (Part B) is a monthly statement presenting vehicle category and ticket distribution -wise traffic data including exemption, local concession / other discounted details.
Toll ticket distribution refers to share of total revenue with respect to various journey types and related discounts applicable. This distribution depends on vehicle category, trip lengths, trip frequency and percentage of local traffic.
As per Toll Plaza Gazette Notification and Toll Rate Revision Circular of FY26 for Kulgo TP, types of toll tickets are being issued are presented in the below table.

Ticket Category	Description
Single Ticket	One-way journey on the project highway is considered as single journey. For such journeys, users are required to pay the complete notified one-way fee.
Return Ticket	Two one-way journeys on the Project highway within 24 hours are covered under this category. For such journeys, users are required to pay one and half times of the fee payable for one-way journey.
Monthly Pass	Fifty one-way journeys on the Project highway within a month covered under this category. The concessionaire shall, upon request from any person, issue a monthly pass for fifty one-way journeys at a discounted rate equivalent to two-thirds of fifty one-way journeys.
Local Pass (Local Personal)	Road user who owns a mechanical vehicle registered for non-commercial purposes and resides within a distance of 20 km from the toll plaza can get local monthly pass.
Commercial vehicle registered within district of plaza (Local Commercial)	Commercial vehicles (excluding vehicles plying under national permit) registered in the district where the toll plaza is located. Fee shall be 50% prescribed rate for that category of vehicle provided no service road or alternative road is available for use of such commercial vehicles.
Exempted	This journey ticket category is for all users (like Police, Fire Brigade, Ambulance, Defence, etc.) which are exempted from paying toll as per NHAI Toll rules.
Annual Pass for private non-commercial CJV vehicles	On June 18, 2025, MoRTH introduced a FASTag-based annual pass to facilitate seamless highway travel. This pass is valid for non-commercial private vehicles such as cars, jeeps, and vans, and remains effective for one year from the date of activation or up to 200 trips—whichever comes first for INR 3,000. Trip counting method is as follows: Open Tolling: Each entry / exit counts as one trip Closed Tolling: One entry to exit trip counts as one

Source: DCA, NH Fee Rules 2008 and subsequent amendments and existing gazette notifications

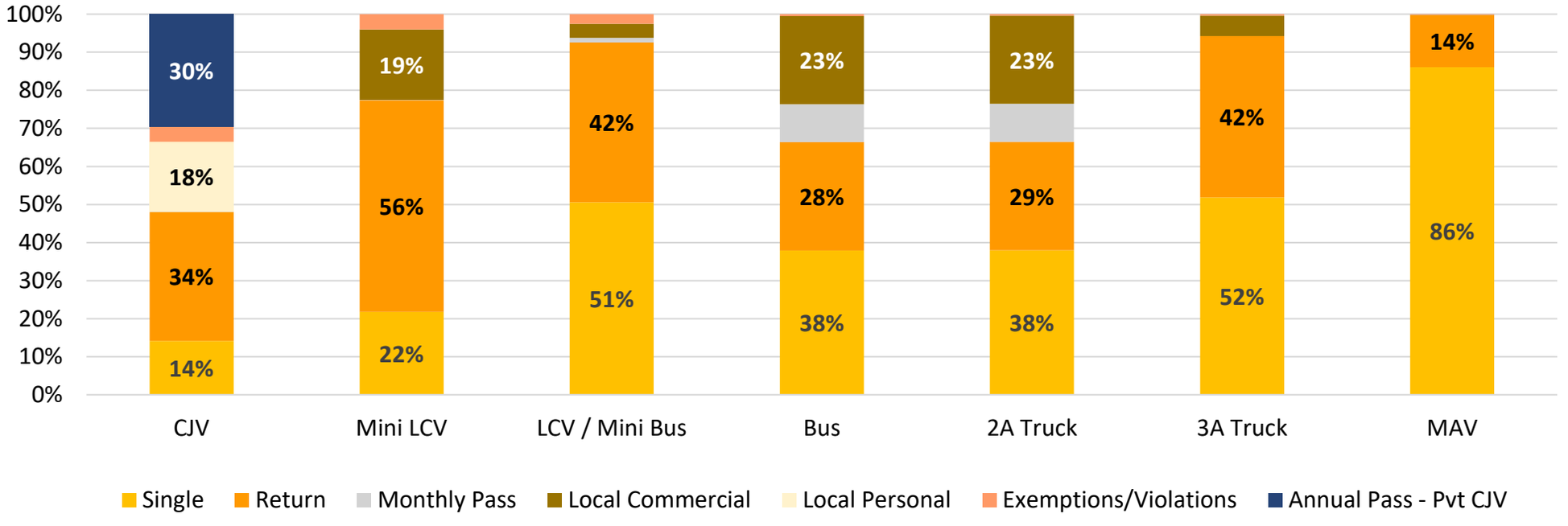
Ticket distribution (2)

Currently it is envisaged that annual passes will be issued directly by concerned authority and hence revenue from sale of annual passes will not accrue to the concessionaire. NHAI has issued advisory for reimbursement of loss of revenue due to annual pass usage to the concessionaire which is part of Draft Concession Agreement as Clause 27.1.5 and described below:

- The concessionaire acknowledges and agrees that any user owning a non-commercial vehicle and holding a valid and functional Fastag Pass in accordance with MoRTH Gazette Notification No. G.S.R. 388(E) dated 17th June 2025shall be entitled to use the project highway without any restrictions, except to the extent specified in any applicable law, applicable permit or the provisions of the draft concession agreement.
- In respect of such vehicle crossing the toll plaza(s), the concessionaire shall be entitled to receive compensation from the authority equivalent to the product of:
  - The number of non-commercial vehicles crossing the toll plaza(s) with such pass; and
  - 90% of the applicable fee for single journey of such vehicle.
- Provided, however, that for the purpose of computation of such compensation, the counting of any particular vehicle shall be limited 2 crossing per day, notwithstanding that such vehicle may cross the toll plaza(s) multiple times on that day.
- The compensation payable under this clause shall be due and payable in monthly instalments within 7 days of the close of the month.

Ticket distribution (3)

Historical ticket distribution at Kaza TP



Source: TIC analysis

- Passenger traffic is predominantly local, with CJV and buses showing a high share of local personal/return tickets, indicating frequent short-distance travel between Vijayawada, Guntur and adjoining towns.
- ~19% of Mini LCV uses commercial pass which reflecting short-haul movements linked to agriculture, trade and urban logistics.
- Goods traffic is mainly long-haul, as over 85%+ of MAV and 50%+ of 3A of traffic opt for single journey tickets, emphasizing the corridor's inter-state freight presence.
- ~30% of CJV traffic is being witnessed using Annual Pass of INR 3,000 as on 31st October 2025 which is expected to be increase to 1.25 times in future through gradual awareness among road users.

Commodity analysis

TRANSLINK® Infrastructure Consultants Pvt Ltd Smart Consulting

Direction-wise commodity distribution

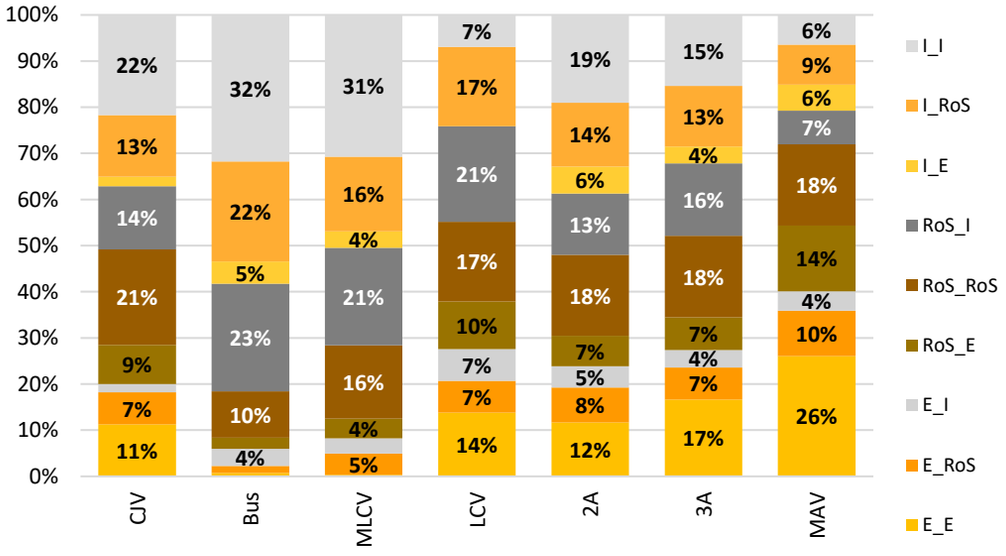
Commodity	MLCV		LCV		2A		3A		MAV	
	Vijayawada to Guntur	Guntur to Vijayawada	Vijayawada to Guntur	Guntur to Vijayawada	Vijayawada to Guntur	Guntur to Vijayawada	Vijayawada to Guntur	Guntur to Vijayawada	Vijayawada to Guntur	Guntur to Vijayawada
Agriculture / Animal Husbandry	18%	10%	16%	10%	10%	8%	14%	8%	10%	13%
Fruits and Vegetables	15%	18%	--	15%	9%	11%	7%	11%	4%	19%
FMCG / Food Products	4%	5%	--	5%	5%	6%	6%	9%	5%	5%
Building & Construction Material	1%	1%	--	--	0%	1%	0%	1%	1%	2%
Cement	1%	1%	8%	--	2%	1%	3%	4%	6%	7%
Aggregates / Sand	--	--	--	--	1%	1%	12%	4%	3%	1%
Minerals / Mining Commodities	--	--	--	--	--	--	0%	0%	1%	2%
Manufacturing	10%	11%	4%	15%	9%	8%	6%	6%	8%	11%
Automobile and Spares	0%	1%	--	2%	1%	4%	2%	2%	6%	8%
Chemicals / Fertilisers	1%	1%	4%	--	1%	1%	1%	2%	6%	3%
Steel / Metal Products	3%	2%	4%	2%	5%	3%	8%	4%	23%	8%
Petroleum Products	2%	2%	15%	2%	11%	10%	12%	12%	6%	4%
Parcel / E-commerce	13%	18%	26%	22%	18%	26%	12%	17%	5%	9%
Miscellenaeous	1%	2%	--	--	3%	1%	3%	4%	1%	0%
Empty	32%	29%	23%	25%	25%	21%	16%	16%	15%	7%

Source: TIC analysis *0% indicates value less than 1% and -- represents no presence of such commodity for the vehicle category

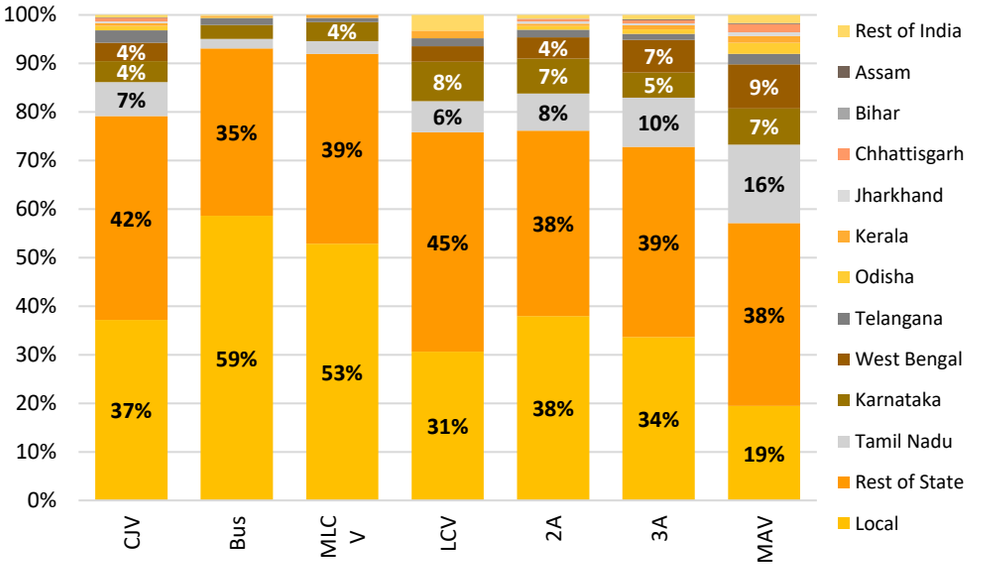
Commodity distribution exhibits characteristics that are in line with corridor and economic activities observed in the influence region.

Zonal influences and trip distances

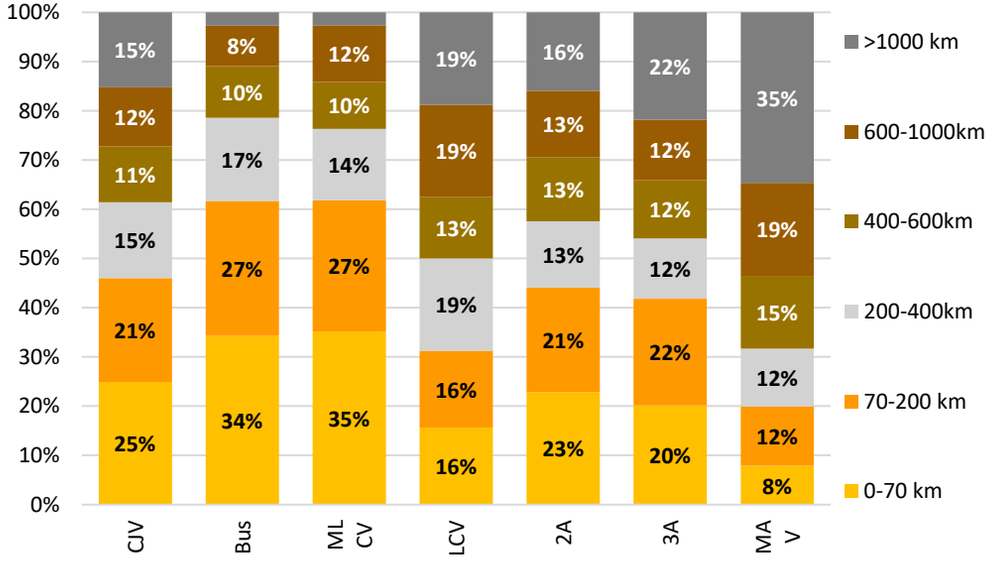
Vehicle category-wise zone characteristics



Vehicle category-wise project influence region



Vehicle category-wise trip lengths and average distance



Source: TIC analysis

Vehicle Category	Distance (in km)
CJV	468
Bus	212
Mini LCV	276
LCV	440
2A	581
3A	586
MAV	837

Vehicle category-wise visual representation of origin-destination zones and top pairs are exhibited in Appendix A.

Chapter 4: Economic context and traffic growth

- Economic context of influence region
- Determination of traffic growth drivers
- Estimation of demand elasticities
- Forecasts for growth drivers

IRC: 108-2015 mentions that traffic growth is typically driven by a combination of macro-economic trends and industry/commodity specific factors, known as independent variables or traffic growth drivers.

These growth drivers have two critical characteristics:

1) the rate at which it increases i.e., forecasts of independent variable
2) the project highway's relationship with the growth driver to attract, capture and retain the traffic over the forecast horizon i.e., travel demand elasticity

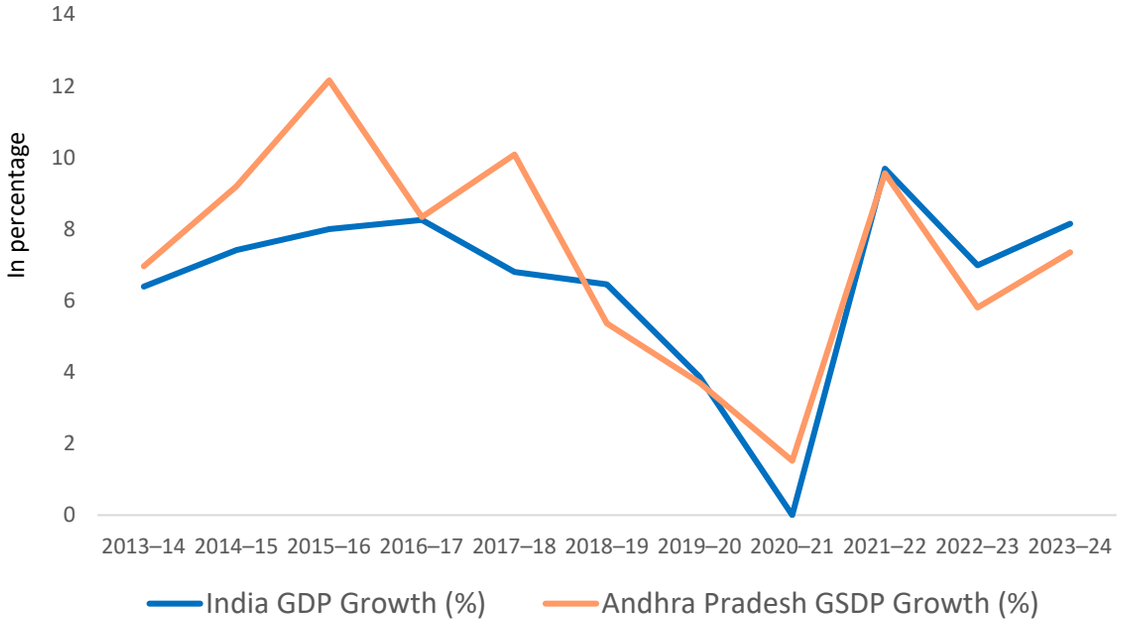
Growth drivers are typically identified through analysis of origin–destination data, site visits and a detailed understanding of the highway.

Travel demand elasticity is influenced by socio-economic conditions both within the region served by the project highway and across the wider national area of influence.

This chapter explains the growth drivers and elasticity in context of economic snapshot of primary districts / state and their correlation with the country.

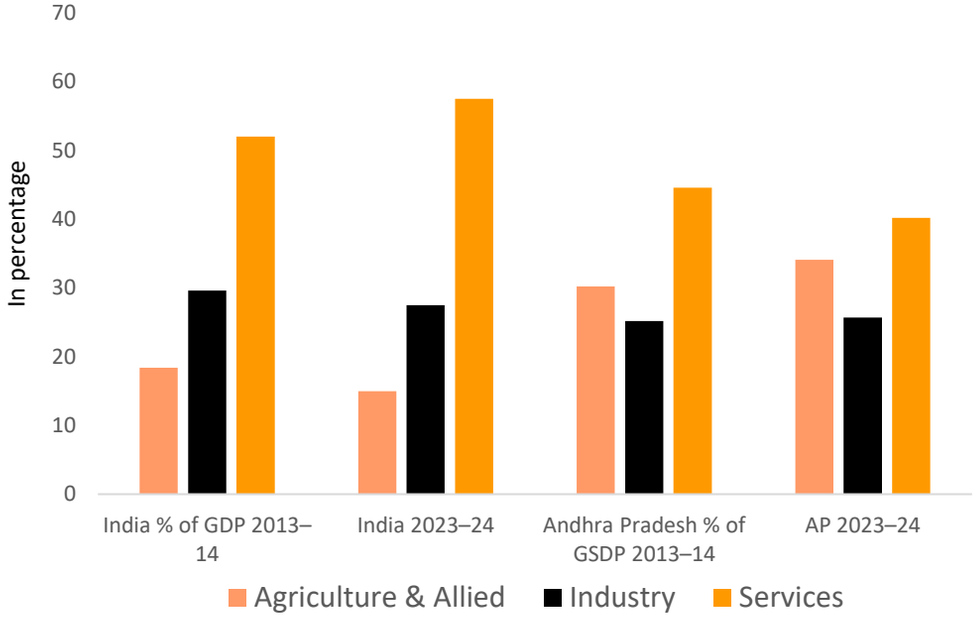
Andhra Pradesh remains a key high performing growth state

GDP: India vs Andhra Pradesh



Source: Economic Survey of Andhra Pradesh and TIC analysis

Sectoral composition shift (India vs Andhra Pradesh)



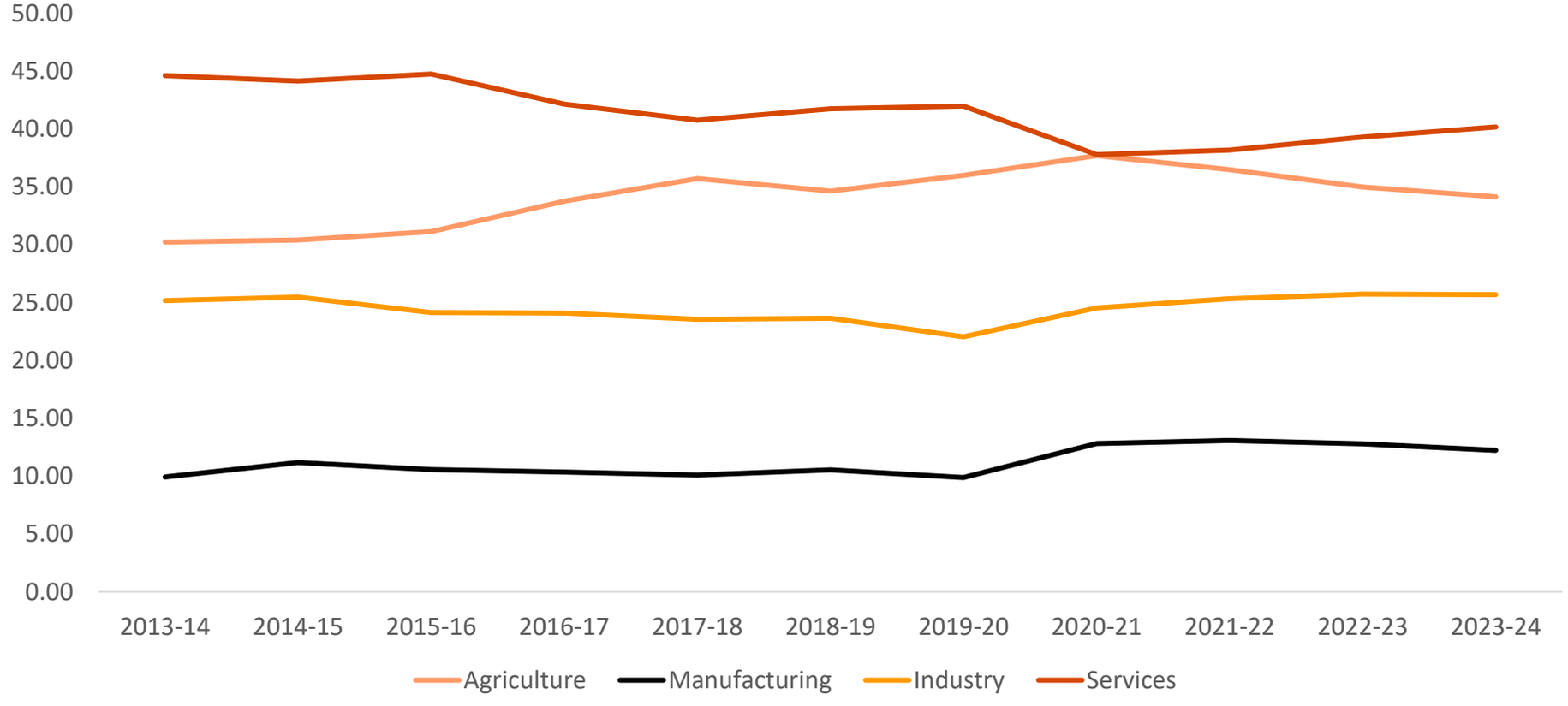
Source: MoSPI, Economic Survey of Andhra Pradesh and TIC analysis

- **Resilient Outperformer:** Andhra Pradesh consistently grew faster than India, except during FY19–20 when bifurcation-related fiscal strain and weak monsoons reduced output. Over the decade real growth has averaged nearly 7.9 %, outperforming India's ~6.8 %.
- The gap is most evident in FY2015-16 and FY2017-18 when state investments and irrigation projects spurred rapid expansion.
- **Pandemic Contrast**: While India's GDP shrank –5.8 % in FY21, AP still posted +1.5 % growth — underscores the stabilising role of agriculture and public spending.
- **Structural Divergence**: Unlike India's shift toward services, AP's agriculture share rose from 30 % to 34 %, led by allied sectors (livestock + fisheries), keeping the economy land- and production-linked.

Andhra Pradesh represents a distinct structural path within India's growth story

Recent trend shows diversification from agriculture in the state

Andhra Pradesh GSDP composition (% share)

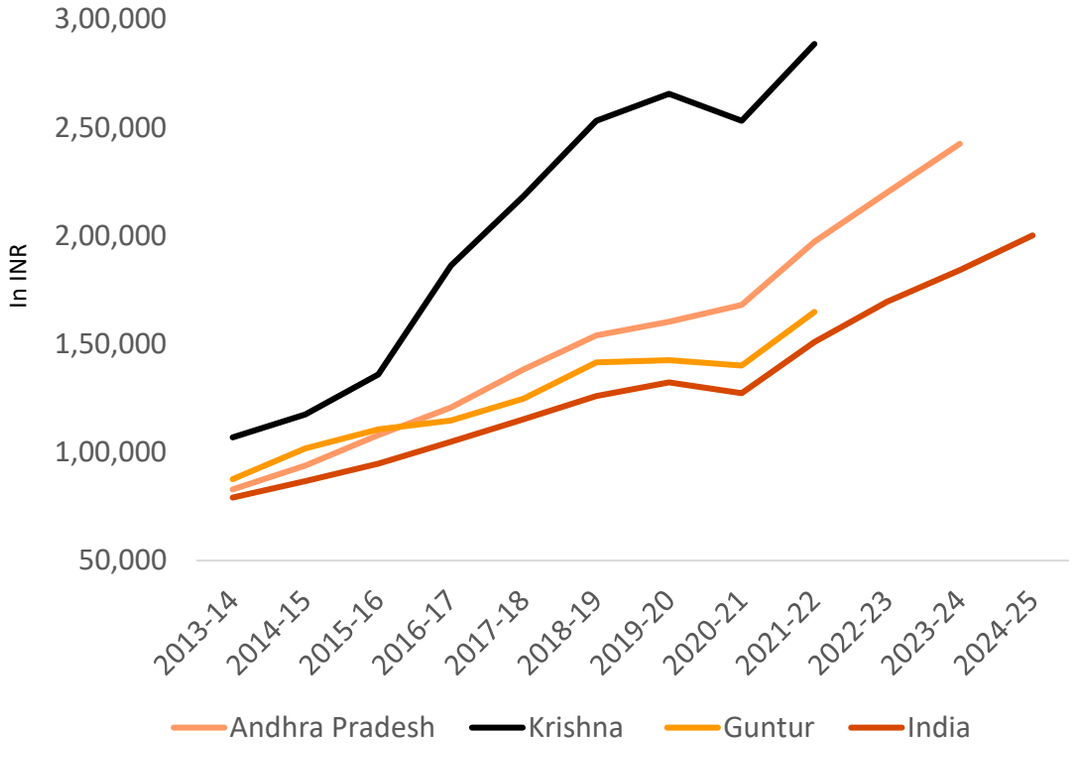


Source: Economic Survey of Andhra Pradesh and TIC analysis

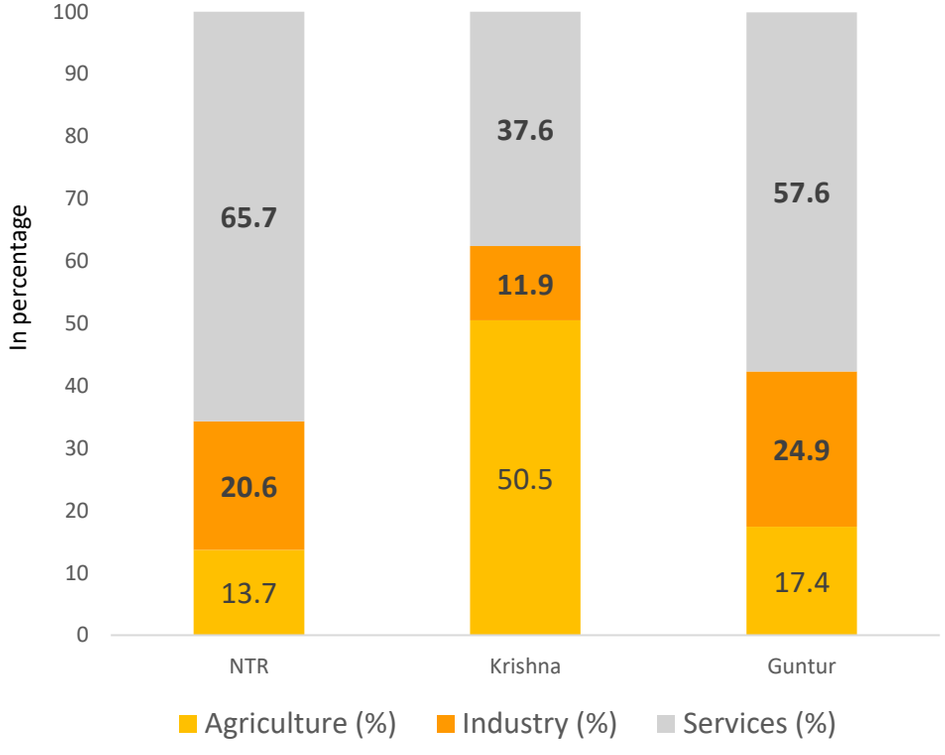
- Andhra Pradesh remains agrarian; share rises due to livestock and fisheries growth. Instead of de-agrarianisation, the state has diversified within the rural economy.
- Manufacturing remains modest but is rising slowly thanks to construction materials, textiles and agro-processing industries.
- Andhra Pradesh has yet to undergo the urban-services boom seen nationally. This pattern suggests a production-oriented, land-linked economy supported by irrigation, logistics, and agro-industry rather than finance and IT.

This creates a significant income gap

Per capita income



Sectoral contribution in district



Source: Economic Survey of Andhra Pradesh and TIC analysis

Summary of Tamil Nadu's economic performance

District	Growth Focus	PCI CAGR (10-Year growth)
Guntur	Agro-industrial expansion; dairy, aquaculture, and logistics	**~8.2%**
Krishna	Services, logistics, and trade hub (Vijayawada, Machilipatnam)	**~13.2%**
Andhra Pradesh (overall)	Balanced structural growth with high infra intensity	**~11.4%**

Source: Economic Survey of Andhra Pradesh and TIC analysis

Districts in immediate influence region

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District-wise summary of risk and opportunities

Parameter	Andhra Pradesh (State)	Guntur	Krishna	NTR (Vijayawada)
Primary driver	▪ Dual-engine: primary sector + services	▪ Agriculture + agro-processing ▪ Textiles and MSMEs	▪ Agriculture, fisheries and logistics	▪ Urban services and administration (Vijayawada core)
Key resource	▪ Irrigated deltas, fisheries ▪ growing financial & real-estate services	▪ GI-Tag Chilli, cotton/tobacco belts; processing clusters ▪ Education and health institutions	▪ Delta irrigation, coastal access, freight corridors (NH, port linkage)	▪ Transport hub (rail/road) ▪ Administrative concentration ▪ Jawaharlal Nehru Auto Nagar Industrial Estate
Major risk	▪ Monsoon variability, state-wide agri sensitivity ▪ fiscal space constraints	▪ Commodity price swings and crop volatility ▪ Need for value-add and storage/cold-chain depth	▪ Exposure to fisheries/agrarian shocks ▪ Industrial depth lower than Vizag/Tirupati belt	▪ Urban congestion and land/water constraints with rapid real-estate growth
Growth opportunity	▪ Services and manufacturing upgrades horticulture & fisheries value-chains ▪ Logistics	▪ Spice value-addition (extracts, sauces) ▪ Textiles/apparel ▪ Food-processing clusters ▪ Education-health services	▪ Logistics, cold chains and light manufacturing around port/industrial corridors ▪ Tourism	▪ Service exports, retail, construction, smart-city style urban renewal ▪ Skill hubs
Predicted strong growth segment	▪ LCV/HCV for agri and industrial goods ▪ Passenger traffic with rising incomes	▪ LCV/HCV (agri produce and processed foods) ▪ Urban passenger flows	▪ Mixed freight (fisheries/agri/logistics) ▪ Regional passenger growth	▪ Passenger cars and buses (commuter/services) ▪ LCV for urban distribution

Source: TIC secondary research and analysis

Growth scenarios

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Growth scenario summary

Scenario	Expected real growth	Core drivers	Key conditions	Likely outcomes
High-growth / Accelerated	8–9%	▪ Rapid execution of industrial corridors and expressways ▪ Large anchor investments (food-tech, textiles, electronics, green energy) ▪ Amaravati revival spurs services, real estate, tourism ▪ Multimodal logistics parks operational	▪ Strong public and private capex ▪ Investor-friendly reforms ▪ Favourable global trade ▪ climate-resilient infrastructure	▪ District GDP more than doubles by 2030 ▪ Per-capita income rises sharply ▪ Manufacturing and services deepen ▪ Logistics, freight and passenger traffic accelerate strongly across corridors
Baseline / Central Case	6.5–7%	▪ Steady growth in allied agriculture and agro-processing ▪ MSME expansion ▪ Services and logistics grow along NH corridors ▪ Housing and credit demand remains stable	▪ Timely but phased project execution ▪ Stable credit environment ▪ Moderate inflation ▪ Policy continuity	▪ District GDP roughly doubles by 2030 ▪ Per-capita income grows 1.8–2× ▪ Balanced sectoral mix improves resilience ▪ Corridor spillovers lift urban services and logistics
Conservative / Downside	5.5–6%	▪ Slow allied agriculture growth ▪ Delays in corridor and port projects ▪ Weak industrial park occupancy ▪ Subdued services expansion	▪ Fiscal stress limits capex ▪ Global slowdown ▪ Climate shocks ▪ MSME stress	▪ Growth remains near state average ▪ Income gains driven more by inflation than productivity ▪ Weaker investor interest ▪ Limited traffic upside beyond baseline levels

Source: TIC secondary research and analysis

PESTEL Analysis

Factor	Forward-looking positives	Potential downsides
Political	▪ Stable central–state relations ▪ Commitment to industrial corridors and port projects ▪ Rural welfare schemes maintain demand	▪ State finances are tight ▪ Any change in political priorities (e.g., shift away from Amaravati) could stall projects
Economic	▪ Continued public capex ▪ Corridor-led manufacturing ▪ Allied agriculture and aquaculture growth	▪ Global slowdown and weaker national services growth may cap Andhra Pradesh's export earnings ▪ Interest rates remain high
Social / Demographic	▪ Rising literacy, moderate population growth (~0.6% p.a.), urbanisation in Krishna (~52%) drives services	▪ Ageing rural population could shrink farm labour ▪ Income inequalities between coastal (Krishna) and hinterland (Guntur interior) may widen
Technological	▪ Digital payments, fintech and e-commerce adoption ▪ Potential for EV manufacturing and renewable energy ▪ Agro-processing technology	▪ Skills mismatch in rural areas ▪ Delayed adoption of technology due to infrastructure gaps
Legal / Regulatory	▪ Land pooling reforms for Amaravati ▪ Ease-of-doing business improvements ▪ MSME dispute resolution	▪ Litigation over land acquisition ▪ Uncertainty around property rights in capital region ▪ Potential trade regulations
Environmental	▪ Emphasis on drip irrigation, crop diversification and cyclone preparedness ▪ EV push reduces emissions	▪ Climate volatility (cyclones, droughts) threatens agriculture and port operations ▪ Coastal erosion could affect shrimp farms

Source: TIC analysis

Determination of growth drivers and elasticity (1)

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Potential socio-economic indicators as growth drivers in context of IRC: 108-2015 and benchmark studies

Socio-economic indicators	Observations for availability/reliability of historical and forecast data
Vehicle registration / Automobile Sales	Sourcing vehicle registration data from concerned Regional Transport Office (RTO) within influence region is herculean task. In addition, it is not mandatory that Project Influence Area (PIA) matches with vehicle registration cases at ground level so not useful. Society of Indian Automobile Manufacturers (SIAM) publishes automobile sales at region level but not at granular level. Can be used as proxy data to validate specific trends. The consultant includes regional dealers' association of freight vehicles (if any) and local financing agencies to understand and validate specific trends observed in traffic.
Per Capita Income	Can be used as proxy data which reflects demand composition but not specific to commodities / vehicle category. Underlying forces are complex and changing at every strata of administrative structure i.e., districts, state, national. Historical data at state / national level available in public domain but not for district level. Further, availability of forecast data is major constraint in India.
Population	Population data are compiled on a decennial basis, with the latest census conducted in 2011, and do not provide a robust annual time series suitable for econometric modelling. In addition, migration trends across socio-economic segments and income-based geographies are highly volatile and difficult to forecast with confidence. Accordingly, population growth has not been adopted as a driver for forecasting future travel demand on the project highway.
GDP / GSDP	Dataset from national and international publications and government agencies which are highly reliable in context of forecast e.g., Focus Economics, RBI / RBI's Survey of Professional Forecasters (96th Round), SBI Research, CII, multilateral banks (ADB, World Bank etc.), IMF, OECD, Oxford etc. The consultant typically uses Focus Economics monthly subscription and in-house/empaneled economists for correlation for state and district level GDP and industry specific aspects. The client provides views on the consultant's draft and recommends the final forecast.

Source: TIC research and analysis

Determination of growth drivers and elasticity (2)

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- For any potential indicator (economic, commodity, or industry-related) to be used as a traffic growth driver, availability and reliability of both historical data and credible forecasts are critical success factors.
- Among the key socio-economic indicators discussed above, Gross Domestic Product (GDP) at the national level and Gross State Domestic Product (GSDP) at the state level are the only indicators for which robust historical data and reliable forecasts are consistently available. Accordingly, GDP/GSDP have been adopted as the primary growth drivers for traffic forecasting.
- The consultant held discussions with regional dealers' associations of freight vehicles, agricultural wholesale yards (popularly known as mandis) and inter-city bus terminals in the immediate influence region to validate specific traffic trends such as seasonality and growth patterns.
- In many cases, historical data show varying traffic trends due to various external events in the economy and region. In addition, variations in data recording by third-party tolling agencies and the presence of historical data gaps, as observed in this business case, necessitated further validation.
- Accordingly, validation of the historical data was carried out using traffic data from neighbouring toll plazas on the corridor and benchmark highway sections.
- Traffic growth may not be uniform during the forecasting period, considering factors such as increasing total traffic volumes relative to the capacity of the corridor and the project highway, technological advancements in the automotive industry, cost–tonnage ratios of specific commodity–vehicle combinations, and overloading trends versus strict government enforcement in the region.
- In India, the freight vehicle mix has been changing over the last decade, favouring multi-axle vehicles (MAVs) over 2-axle and 3-axle vehicles for long-distance traffic, given the operational efficiencies achievable with larger vehicles. At the same time, Mini LCVs and LCVs have become more popular for short-distance traffic and more localised supply movements compared to 2-axle vehicles.
- Considering ongoing technological advancements in the automotive industry, standard 2-axle and 3-axle trucks have been increasingly replaced by 6-tyre LCVs over the last couple of years, a trend that is expected to continue.
- The projected elasticity values are typically assumed to remain constant over the concession period in the Indian context; however, they may vary over time due to factors such as increasing traffic volumes relative to corridor capacity, technological advancements in the automotive industry, changes in cost–tonnage ratios of specific commodity–vehicle combinations, overloading trends versus enforcement intensity, and correction of regional imbalances.
- Considering all these aspects, vehicle category-wise elasticities have been estimated.

Determination of growth drivers and elasticity (3)

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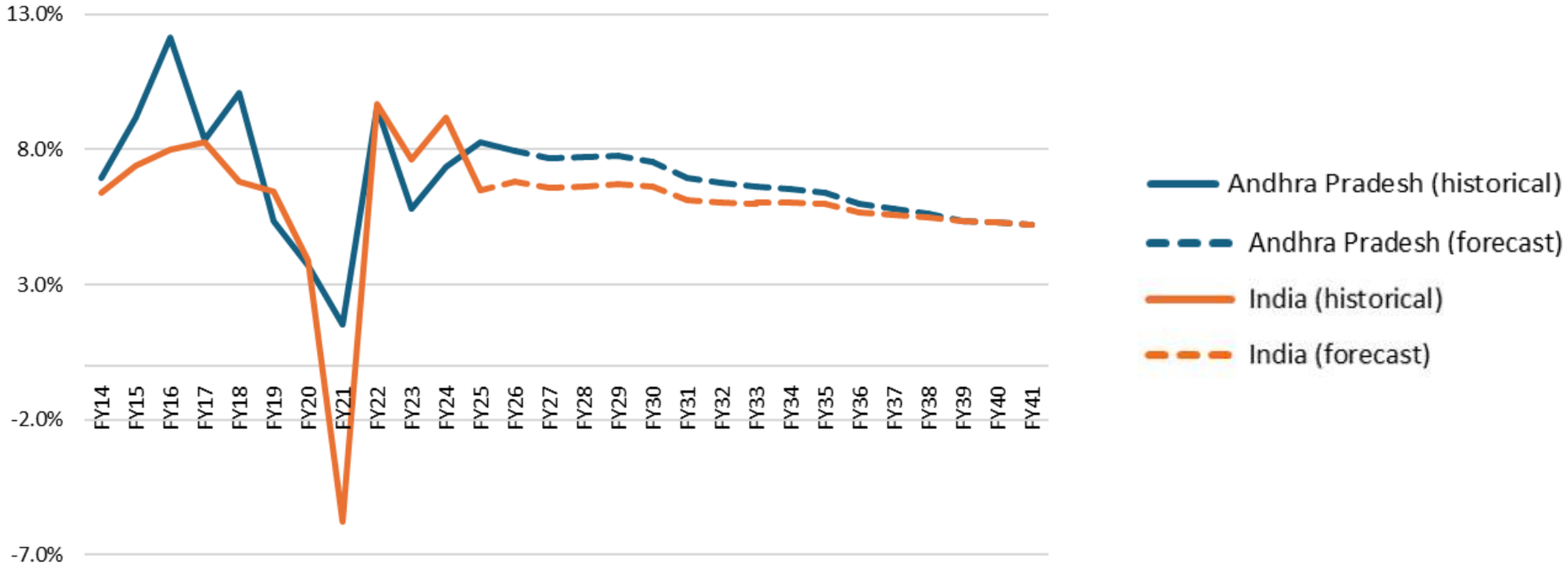
Vehicle category-wise adopted elasticity

Vehicle Category	Asanpur	Independent variable
CJV	1.10	GSDP of Andhra Pradesh
Mini LCV	0.60	Weighted average of GDP, GSDP of Andhra Pradesh and Tamil Nadu
Bus	0.35	GSDP of Andhra Pradesh
LCV / Mini Bus	0.70	
2A Truck	0.80	
3A Truck	0.35 followed by gradual decrease	Weighted average of GDP, GSDP of Andhra Pradesh and Tamil Nadu
MAV	0.90	

Source: TIC estimate using historical traffic data for the project highway and benchmark references of up-stream / downstream toll plazas

Forecasts for growth drivers

GDP and GSDP forecast



Source: Client input and TIC estimates

- By analysing historical patterns of state-level GSDP growth in relation to national GDP growth, state-wise GSDP projections have been developed. Under performing states compared to the national GDP are expected to witness an acceleration in growth and gradual convergence will realise by 2040 followed similar growth by 2047 with Viksit Bharat vision.
- WPI will be 3.24% throughout the concession period except 0.25% for FY27 to revise toll rates as provided by the Client.

Chapter 5: Baseline traffic and revenue forecast

- Base year AADT (FY26)
- Toll ticket distribution
- Revenue reconciliation

This chapter presents our approach to reach baseline forecast. The consultant estimated base year AADT and toll ticket distribution to reconcile base year traffic and revenue.

Base year AADT estimate (1)

- **CJV, Mini LCV, LCV, Bus:** The consultant reviewed H1 FY26 ETC traffic data received from the client. Based on which traffic profiling for balance half of FY26 has been estimated using seasonality correction factors followed by estimation of FY26 AADT.
- **2A, 3A, MAV:** as explained in Chapter 3 (Pg 34)
  - NH216 got closed for heavy vehicles from August 2025 due to repairing of Chinchinada Bridge.
  - Hence, the project highway witnessed sharp jump of ~10,000 MAV, ~2,000 3A, ~15,00 2A trucks per month from August 2025 which is due to return of diverted traffic from NH216. This incremental gain is expected till March 2026 till heavy vehicle movement is prohibited due to major bridge repairing.
  - The consultant estimated base year FY26 with this incremental gain. followed by diversion to NH216 from April 2026 (FY27) at higher pace as well as additional diversion in FY28 of ~25% which was under transition. It is expected that traffic will stabilize between NH16 and NH216 from H2FY29.
- An independent CTVC survey was undertaken to validate the ETC reported traffic data. The variance between CTVC and ETC data is comparatively higher for Car/Jeep/Van, Mini LCV, and Bus categories. For CJV/Mini LCV, this is attributed to local vehicles from nearby urban centres of Vijayawada and Guntur and villages in surrounding area like Mangalagiri, Vaddeswaram, Namburu, Old Guntur at Kaza toll plaza. Conversely, the variance for LCV, Bus, Truck 2A, Truck 3A, and MAV categories remains marginal and within acceptable industry standards.
- Hence, the consultant multiplied variance factor with ETC AADT to determine the corrected FY26 AADT.

Base year AADT estimate (2)

Base Year AADT (FY26) – Kaza TP

Particulars	ETC AADT	Variance factor	Corrected Base Year AADT
Car/Jeep/Van	24,092	1.0407	25,073
Mini LCV	2,385	1.0407	2,482
Mini Bus/LCV	1,070	1.0176	1,089
Bus	2,511	1.0054	2,525
2A Truck	1,993	1.0038	2,000
3A Truck	1383	1.0040	1,388
MAV	3,159	1.0015	3,164
OSV	3	1.0208	3
Total AADT	**36,596**		**37,725**
Total PCU	**59,972**		**61,180**

Source: TIC estimate

Ticket distribution

Ticket distribution in FY26

Ticket types	Car/Jeep/Van	MLCV	Bus	LCV	2A	3A	MAV
Single	14.2%	21.8%	37.9%	50.6%	38.0%	51.8%	86.0%
Return	33.9%	55.6%	28.5%	42.0%	28.5%	42.4%	13.7%
Monthly Pass	0.1%	0.1%	10.0%	1.2%	10.0%	-	-
Local Commercial	-	18.6%	23.1%	3.7%	23.2%	5.4%	0.1%
Local Personal	18.4%	-	-	-	-	-	-
Exemptions/Violations	4.0%	4.0%	0.5%	2.5%	0.4%	0.4%	0.2%
Annual Pass - Pvt CJV	29.6%	-	-	-	-	-	-

Source: TIC estimate

- ~30% of CJV traffic is being witnessed using Annual Pass of INR 3,000 as on 30th October 2025 which is expected to increase by ~1.25 times in future through gradual awareness among road users.
- The consultant did not consider penetration of annual pass from estimated exemption/violation in future.
- For all vehicle categories, prevailing exemption/violation has considered for future. As per discussion with the client, prevailing forced exemption is likely to reduce post-implementation of Multi Lane Free Flow (MLFF) tolling system.
- Future segmentation will significantly change due to expected diversions especially post-construction of Amaravati Outer Ring Road in FY34 as discussed in Chapter 6.

Validation of base year traffic and revenue

- The Consultant calculated base year revenue by multiplying traffic AADT with prevailing toll rates in accordance with estimated toll ticket distribution.
- Comparison summary with quoted remittance by tolling agency is presented in the below table.
- Quoted daily remittance should be lower than estimated revenue by approx. 5%-10% considering profit margins of tolling agencies.

Traffic and revenue reconciliation for base year (all values are estimated with FY26 toll rate with old linking factor)

Toll Plaza	Base year revenue estimate by the Consultant (INR Crore)	Annual Potential Collection estimate by NHAI (INR Crore)	FY26 estimate vs NHAI APC	Quoted remittance By tolling agency (INR Crore)	Consultant estimate vs Quoted remittance
Kaza	335.25	330.28	1.5%	322.71	3.89%

Source: TIC estimate

Chapter 6: Diversion analysis

- Amaravati Outer Ring Road
- Ramayapatnam Port
- Developmental traffic due to Amaravati Capital City
- Chennai Hyderabad high-speed rail

This chapter elaborates impacts of proposed infrastructure developments in the project influence and network in form of positive/negative diversion to/from the project highway. Analysis has been exercised using IRC: 108-2015 and IRC: SP: 30-2019.

Amaravati Outer Ring Road (1)

- Amaravati Outer Ring Road (ORR) is a major proposed infrastructure project designed to circle the new capital city of Amaravati in Andhra Pradesh. Proposed outer ring road will be around 189 km long, six-lane, access-controlled greenfield road being developed by National Highways Authority of India. Alignment is finialled and DPR work is in advance stage.
- Proposed ring road is planned to connect Guntur, Tenali, Vuyyuru and Amaravati to support the region's growth as outlined in Master Plan 2050 by Andhra Pradesh Capital Region Development Authority.
- A part of the project highway including the existing Kaza TP will be within the boundary to be established by proposed ring road which will encircle Vijayawada, Amaravati and Guntur. Consequently, a significant portion of through traffic is expected to divert to the ring road, as vehicles will prefer to bypass the city to avoid congestion, leading to a significant reduction in through traffic.
- Negative diversion due to proposed outer ring road has been estimated for three sets of traffic (refer map on next page)
  - Northend region outside ORR towards Eluru/Rajahmundry: locations on north Pottipadu which is the junction of NH16 and ORR
  - Western region outside ORR towards Hyderabad: locations on west of Saidapuram which is the junction of NH65 and ORR
  - Eastern region outside ORR towards Machilipatnam: locations on east of Davuluru which is the junction of NH65 and ORR

Diversion due to Amaravati Outer Ring Road

Diversion	Affected traffic movement	Timeline	Toll Plaza	Diversion as % of Base Year AADT					
				CJV	Mini LCV	LCV	2A Trucks	3A Trucks	MAV
Negative diversion	Traffic movement between Pottipadu/north and Lingayapalem/south	FY34 (40%) FY35 (80%) FY36 (100%) onwards	Kaza	(35.49%)	-	(21.00%)	(24.01%)	(33.67%)	(51.90%)
	Traffic movement between Saidapuram/west and Lingayapalem/south	FY34 (40%) FY35 (80%) FY36 (100%) onwards	Kaza	(5.07%)	-	(4.36%)	(3.89%)	(3.37%)	(4.51%)
	Traffic movement between Davuluru/east and Lingayapalem/south	FY34 (40%) FY35 (80%) FY36 (100%) onwards	Kaza	(1.49%)	-	(1.17%)	(2.21%)	(2.59%)	(1.42%)

Source: TIC estimate

Amaravati Outer Ring Road (2)

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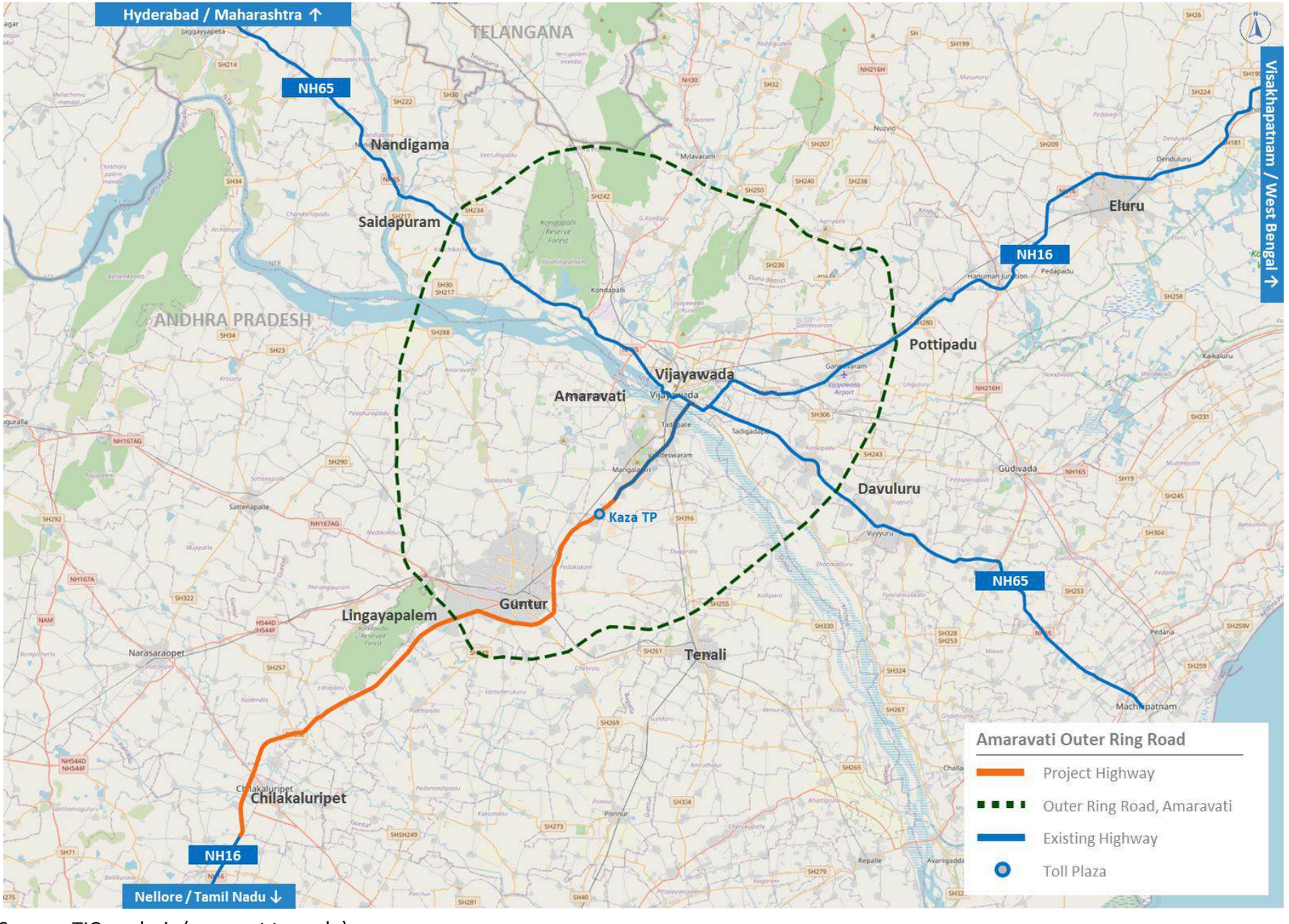
Amaravati Outer Ring Road alignment and project highway context



Source: TIC analysis (map not to scale)

Amaravati Outer Ring Road (3)

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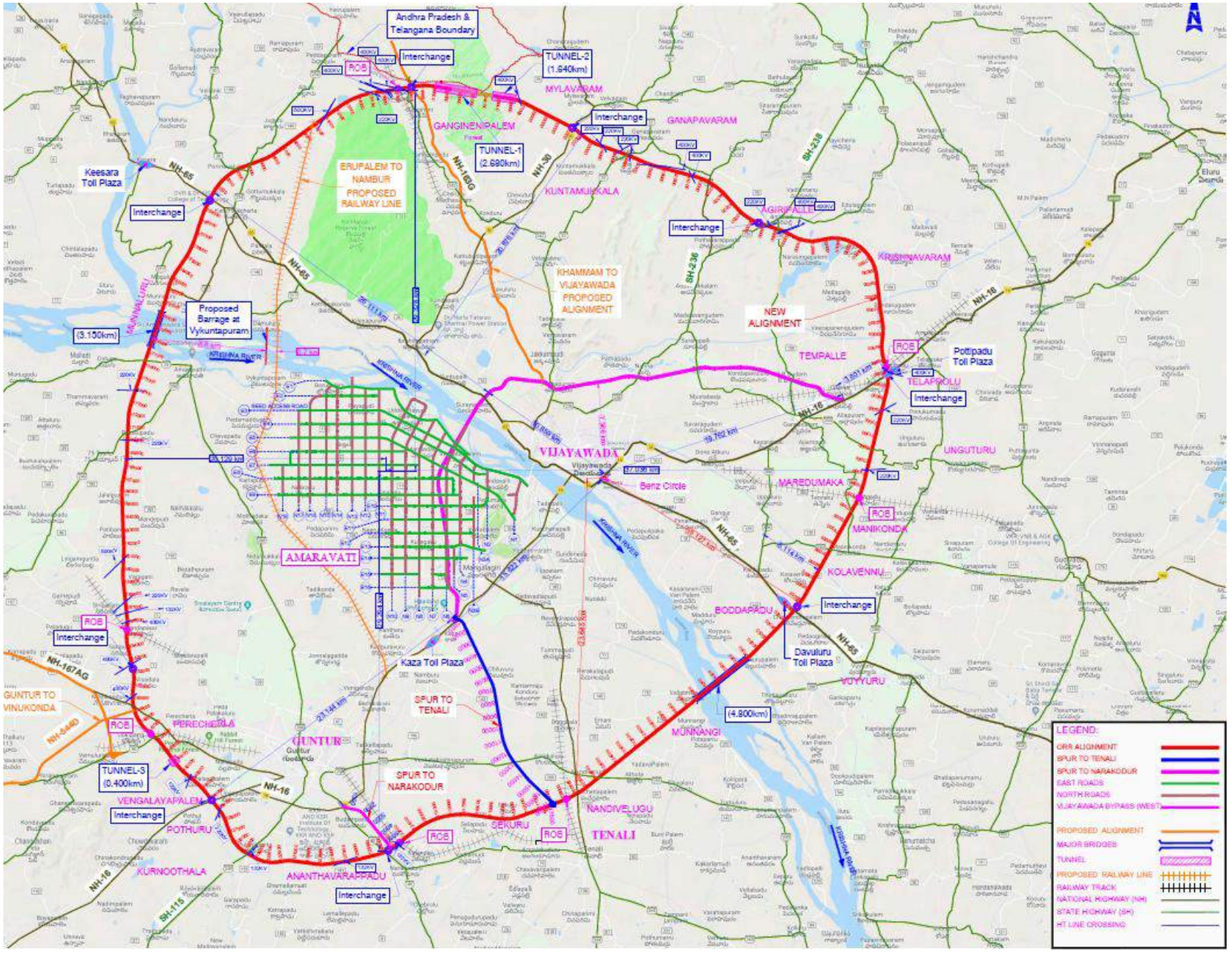
Amaravati Outer Ring Road alignment in regional context



Source: NHAI

Ramayapatnam Port (1)

- Ramayapatnam port is a greenfield development by the state government in Prakasam district and implemented by Andhra Pradesh Maritime Board through Ramayapatnam Port Development Corporation Limited.
- Construction of Phase-1 commenced in July 2022 and expected to be operational by end of FY27. Phase-1 development includes four multipurpose berths, breakwaters and dredging works with cargo handling capacity of 30 MTPA extended to 19 berths with 138 MTPA capacity in future. This port-led economic development will strengthen trade and growth of the region.
- About 65% work completed as of June 2025 including 4 km of dredging works.
- This development is likely to attract additional traffic to the project road, leading to a developmental traffic.
- The consultant carried out following steps to determine developmental traffic based on details available in DPR:
  - Primary hinterland of Ramayapatnam Port:
    - Andhra Pradesh: Prakasam, Guntur, Kurnool districts
    - Telangana: Nalgonda, Mahboobnagar, Rangareddy, Hyderabad
  - Target traffic: exports of agricultural goods, granite and seafood and imports of coal and fertilizers
  - Determining origin-destination zones which will use the project highway i.e. VGTM region – Vijaywada, Guntur, Tenali, Mangaligiri including Amaravati Capital City in future
  - Tonnage forecast including ramp-up during phased development and competition split due to proposed greenfield port development like Machilipatnam and proposed
  - Other associated port-led economic development like integrated refinery and petrochemical complex with 9-12 MMTPA capacity and an ethylene cracker by Bharat Petroleum Corporation Limited (BPCL) by 2030, logistics and warehousing facilities in the region
  - Modal split for determined cargo-tonnage combination of traffic: road vs rial logistics expected
  - Determining volume of trucks from expected tonnage traffic based on existing pattern on the project highway

Ramayapatnam Port (2)

Ramayapatnam Port and project highway context

Source: TIC analysis (map not to scale)

Developmental traffic due to Ramayapatnam Port

Diversion	Affected traffic movement	Timeline	Toll Plaza	Diversion as % of Base Year AADT		
				2A	3A	MAV
Developmental traffic	Traffic movement from identified hinterland to Ramayapatnam Port	FY28 (85%) FY29 (90%) FY30 (90%) FY31 (95%) FY32 (100%)	Kaza	1.22%	0.84%	1.01%

Source: TIC estimate

Amaravati Capital City (1)

- Development related to Amaravati Capital City and nearby region is expected to generate significant developmental and induced traffic at the project highway.
- As major phases of the capital city's infrastructure such as government administrative complexes, educational institutions, housing townships and commercial centers become operational, travel demand within the region is expected to rise. This growth will lead to increased daily commuting between Amaravati/Vijayawada and Guntur, as well as heightened movement of goods and services supporting the expanding urban ecosystem.
- In the long term, the enhanced connectivity and economic opportunities offered by the Amaravati Capital City and nearby region will act as strong promoter for traffic growth through the project highway. The induced traffic will primarily consist of passenger vehicles, public transport and logistics movement associated with residential and business development.
- Consequently, the Kaza TP is likely to experience a steady rise in traffic.

The consultant carried out following steps as preparatory work to determine developmental traffic for Amaravati Capital City and nearby region:

- Comprehensive economic assessment of the Vijayawada, Guntur, Tenali, Manglagiri (VGTM) region with focus on Guntur Vijayawada corridor region
- Present and future transport movement in VGTM region and potential movement that will use the project highway
- Benchmark with existing planned city progress against envisaged development and population i.e. Noida (Uttar Pradesh), Naya Raipur (Chhattisgarh), Navi Mumbai (Maharashtra), Gandhinagar (Gujarat) and implications for Amaravati Capital City development
- All the planned cities next to big cities are unable to achieve their planned population within the stipulated time frame. About 30% - 40% of population is achieved from the planned population.
- Phasing of identified development, investment and population at Amaravati Capital City e.g. Quantum Valley, Health City, Pharma Zone, Educational Campuses, Mangalagiri Gold Cluster etc.

Amaravati Capital City (2)

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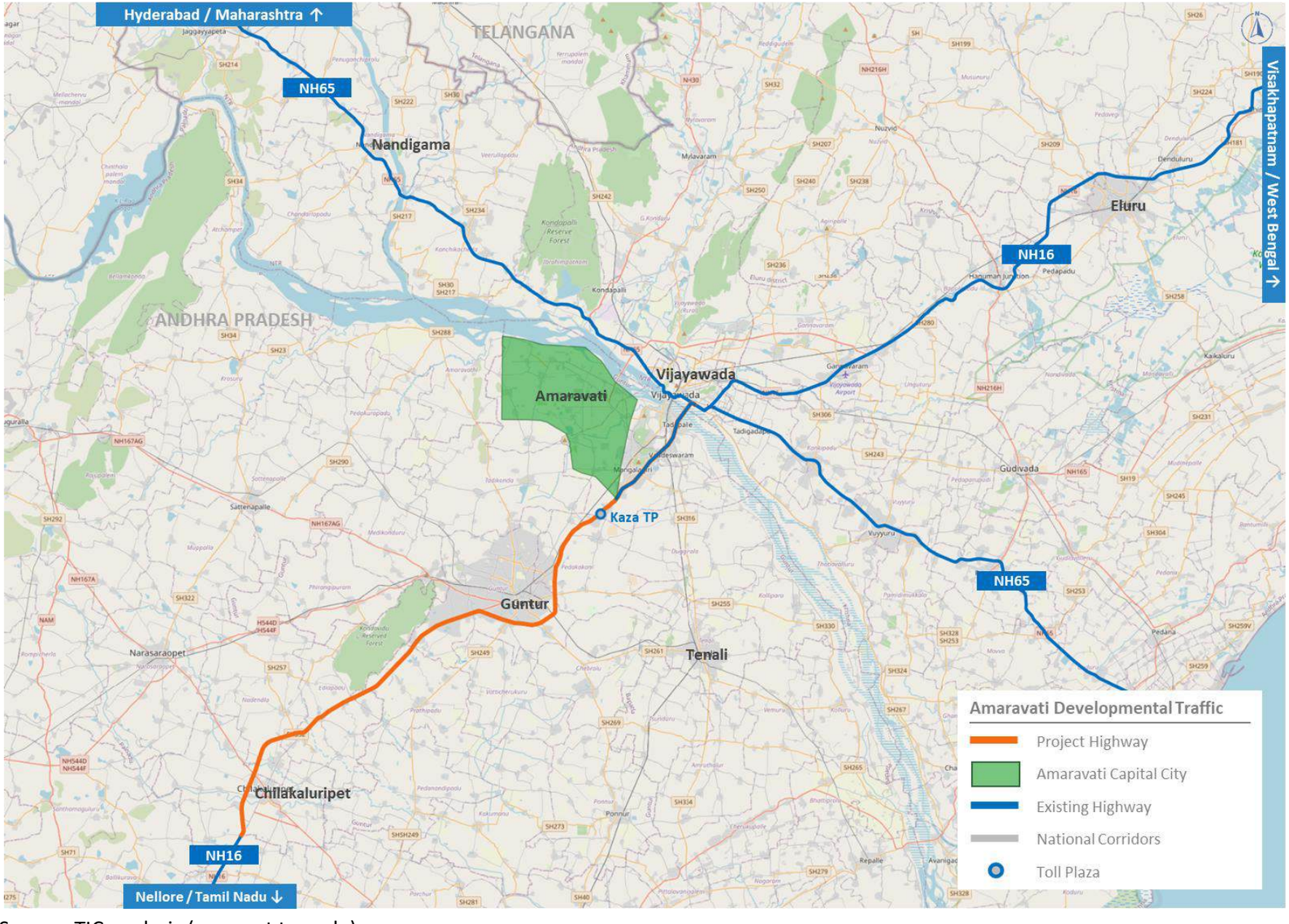
Ramayapatnam Port and project highway context



Source: TIC analysis (map not to scale)

Amaravati Capital City (3)

Two methods adopted to determine the developmental traffic:

- **Floating population method:**
  - Determining external trip rate (External-Internal, Internal-External) for passenger and freight traffic for benchmark case of Chandigarh Urban Complex and associated region
  - Trip rates applied for Amaravati Master Plan followed by determination of volume estimate based on existing occupancy pattern on the project highway
  - Identification of share of traffic movement between Guntur direction and Amaravati Capital City region for passenger and freight traffic
  - Phasing of the volume estimate for target traffic movement
- **Land-use based trip generation method** using Trip Generation Manual for Indian Cities developed by CSIR – Central Road Research Institute
  - Determining land use pattern from Amaravati Master Plan and calculate 'Total Built-Up Area' using area and Floor Space Index (FSI) for Residential, Commercial, Industrial, Open Space and Recreation, Institutional Facilities, Infrastructure Reserve and sub-categories
  - Derived vehicle-category wise traffic volume for each land use (and sub-categories) using land-use based trip generation equations for each vehicle category mentioned in Trip Generation Manual for Indian Cities
  - Determining external trip rate (External-Internal, Internal-External) for passenger and freight traffic for benchmark cases of Chandigarh and Vijayawada cities
  - Trip rates applied for Amaravati Master Plan followed by determination of volume estimate based on existing occupancy pattern on the project highway
  - Identification of share of traffic movement between Guntur direction and Amaravati Capital City region for passenger and freight traffic
  - Phasing of the volume estimate for target traffic movement

The consultant developed three scenarios (most likely, optimistic and pessimistic) for 5-year period during FY30 to FY45 with combination of proposed scale of development and phasing options followed by ramping-up of traffic volume for target movement.

Amaravati Capital City (4)

Developmental traffic due to Amaravati Capital City

Toll Plaza	Affected traffic movement	Scenario	Timeline	Diversion as % of Base Year AADT				
				CJV	LCV	2A Trucks	3A Trucks	MAV
Kaza	Traffic movement between Amaravati and Guntur/south	**Most likely**	**FY30**	2.88%	-	0.43%	-	0.46%
			FY46	8.72%	27.28%	7.11%	-	9.12%
		Optimistic	**FY30**	5.35%	-	0.37%	-	0.48%
			FY46	8.72%	27.28%	7.11%	-	9.12%
		Pessimistic	**FY30**	2.88%	-	0.43%	-	0.46%
			FY46	5.97%	18.38%	8.44%	-	8.75%

Source: TIC estimate

Chennai Hyderabad high-speed rail (1)

- Chennai–Hyderabad High Speed Rail Corridor is a proposed 778 km high-speed rail link connecting Chennai Central, Minjur (on Chennai Ring Road), Tirupati, Amaravati/Vijayawada, and Hyderabad across Tamil Nadu, Andhra Pradesh and Telangana.
- Proposed development will transform regional connectivity, boosts trade, tourism, and economic growth, becoming a key part of India's high-speed network.
- Upon completion, it is expected to reduce the current Chennai–Hyderabad travel time from approximately 12 hours to about ~3 hours.
- South Central Railway submitted final alignment to be included in the detailed project report (DPR) to State Government of Tamil Nadu and requested approvals in November 2025 to keep the survey work on track.
- Latest media reports suggest that:
  - Chennai Unified Metropolitan Transport Authority (CUMTA) confirmed that DPR for the highspeed rail corridor will be finalized within a month after the state government grants its approval as the alignment had been revised to include a station at Tirupati, replacing the earlier plan to pass through Gudur.
  - In a letter to the state transport department earlier this week, the South Central Railway sought early finalization of the alignment and station locations, in-principle approval for the acquisition of land, and incorporation of the rail corridor into Tamil Nadu's long-term infrastructure master plan.
- The consultant considered that proposed development will be operational in FY38 with benchmark case of Ahmedabad Mumbai high-speed rail and present political leadership at Telangana, Andhra Pradesh and Tamil Nadu.

Diversion due to Chennai Hyderabad high-speed rail

Diversion	Affected traffic movement	Timeline	Toll Plaza	Diversion as % of Base Year AADT					
				CJV	LCV	Bus	2A Trucks	3A Trucks	MAV
Amaravati Developmental Traffic									
Negative diversion	Traffic movement from/ to Hyderabad, Vijayawada and Chennai	FY38 (70%) FY39 (100%)	Kaza	(4.29%)	-	(2.87%)	-	-	-

Source: TIC estimate

Chennai Hyderabad high-speed rail (2)

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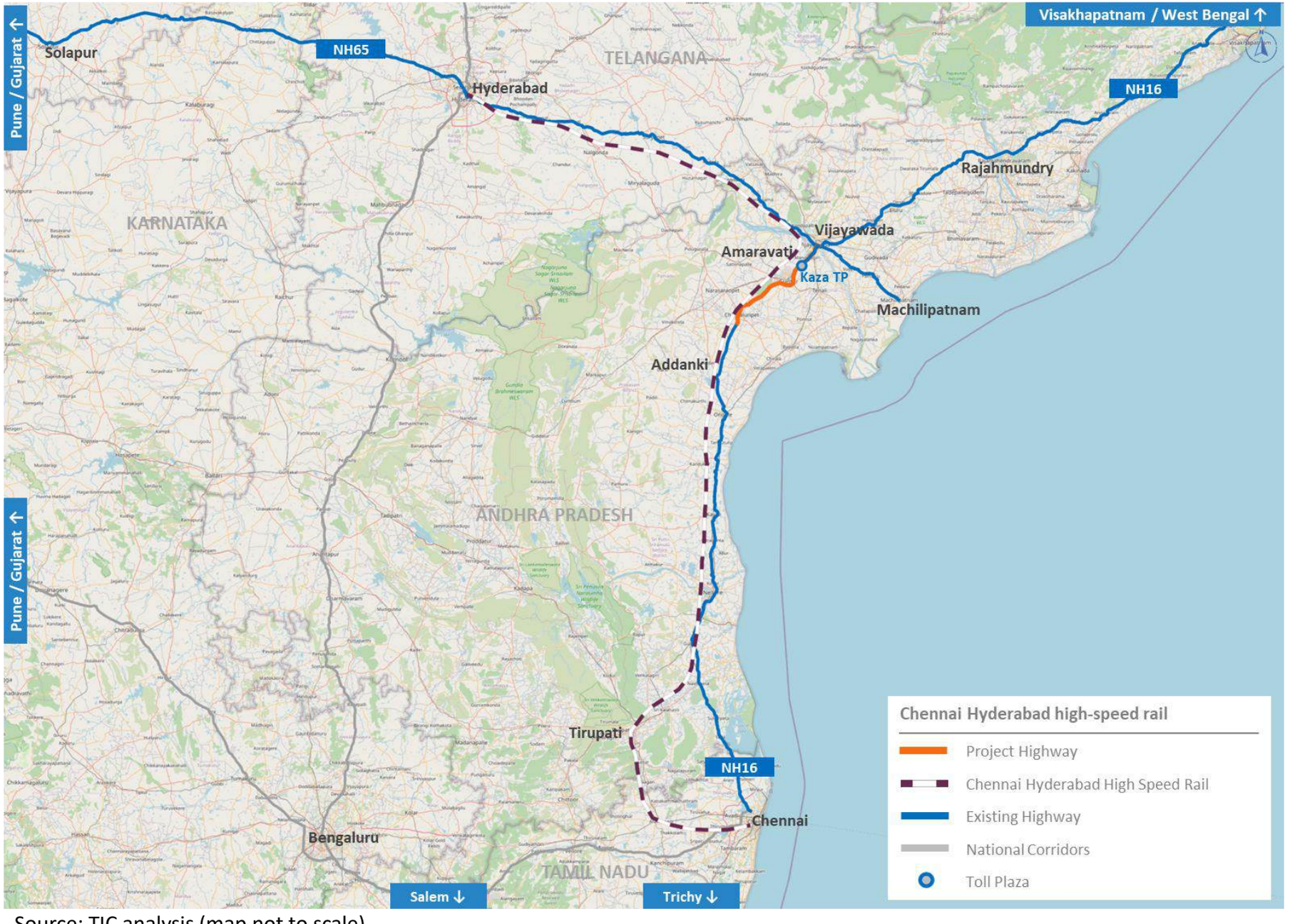
Chennai Hyderabad high-speed rail alignment and project highway context



Source: TIC analysis (map not to scale)

Chapter 7: Final traffic and revenue estimate

- Traffic growth forecast
- Traffic and revenue forecast
- Scenario development

Following pre-diversion traffic forecast and diversion analysis, this chapter presents final traffic and revenue forecast for various scenarios: most likely with and without overloading, pessimistic and optimistic.

Transactional Support Agreement and FY27 revenue estimate

- The project highway is proposed to be included in NHAI's Public InvIT.
- A Transactional Support Agreement will be executed between NHAI and the Public InvIT for the management of toll plaza operations for FY27.
- Tolling operations during FY27 will be undertaken by NHAI under the prevailing short-term contract modality.
- Accordingly, FY27 revenue has been estimated based on historical bidding trends for tolling contracts and is assumed to be 5%–10% lower than the estimated actual revenue.
- Consistent with this arrangement, manpower-related expenses for tolling operations have been excluded from O&M costs as confirmed by the client.

Traffic and revenue forecast: Kaza TP (1)

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Pre-diversion growth rate

Vehicle Category	FY26 FY27	FY27 FY28	FY28 FY29	FY29 FY30	FY30 FY31	FY26 FY31	FY31 FY36	FY36 FY41	FY27 FY41
CJV	5.0%	5.3%	6.6%	6.6%	7.2%	6.2%	6.9%	6.0%	6.4%
Mini LCV	4.3%	4.6%	4.3%	4.4%	4.1%	4.3%	3.8%	3.3%	3.8%
LCV	4.8%	5.0%	5.0%	5.1%	4.7%	4.9%	4.4%	3.8%	4.4%
Bus	2.3%	2.3%	2.2%	2.3%	2.1%	2.3%	2.1%	1.7%	2.0%
2A Truck	4.1%	3.0%	5.8%	5.7%	5.8%	4.9%	5.4%	4.3%	4.9%
3A Truck	(1.2%)	(2.7%)	1.0%	1.2%	1.1%	(0.1%)	1.0%	0.8%	0.7%
MAV	(4.2%)	(8.9%)	5.6%	6.1%	6.2%	0.8%	6.1%	4.9%	4.5%
AADT	**3.7%**	**3.6%**	**5.9%**	**5.9%**	**6.3%**	**5.1%**	**6.1%**	**5.3%**	**5.6%**
PCU	**2.0%**	**1.0%**	**5.3%**	**5.4%**	**5.7%**	**3.9%**	**5.6%**	**4.8%**	**5.0%**

Post-diversion growth rate

Vehicle Category	FY26 FY27	FY27 FY28	FY28 FY29	FY29 FY30	FY30 FY31	FY26 FY31	FY31 FY36	FY36 FY41	FY27 FY41
CJV	5.0%	5.3%	6.6%	9.7%	7.3%	6.8%	(2.9%)	5.5%	2.9%
Mini LCV	4.3%	4.6%	4.3%	4.4%	4.1%	4.3%	3.8%	3.3%	3.8%
LCV	4.8%	5.0%	5.0%	5.1%	4.7%	4.9%	1.8%	6.0%	4.2%
Bus	2.3%	2.3%	2.2%	2.3%	2.1%	2.3%	2.1%	1.1%	1.8%
2A Truck	4.1%	4.1%	5.9%	6.2%	5.9%	5.2%	(0.0%)	4.2%	3.0%
3A Truck	(1.2%)	(2.0%)	1.0%	1.2%	1.2%	0.0%	(8.5%)	0.8%	(2.8%)
MAV	(4.2%)	(8.1%)	5.7%	6.6%	6.3%	1.1%	(8.9%)	6.6%	(0.3%)
AADT	**3.7%**	**3.7%**	**5.9%**	**8.1%**	**6.4%**	**5.5%**	**(2.3%)**	**4.9%**	**2.6%**
PCU	**2.0%**	**1.4%**	**5.3%**	**6.9%**	**5.8%**	**4.3%**	**(2.8%)**	**4.6%**	**2.0%**

Source: TIC estimate

Traffic and revenue forecast: Kaza TP (2)

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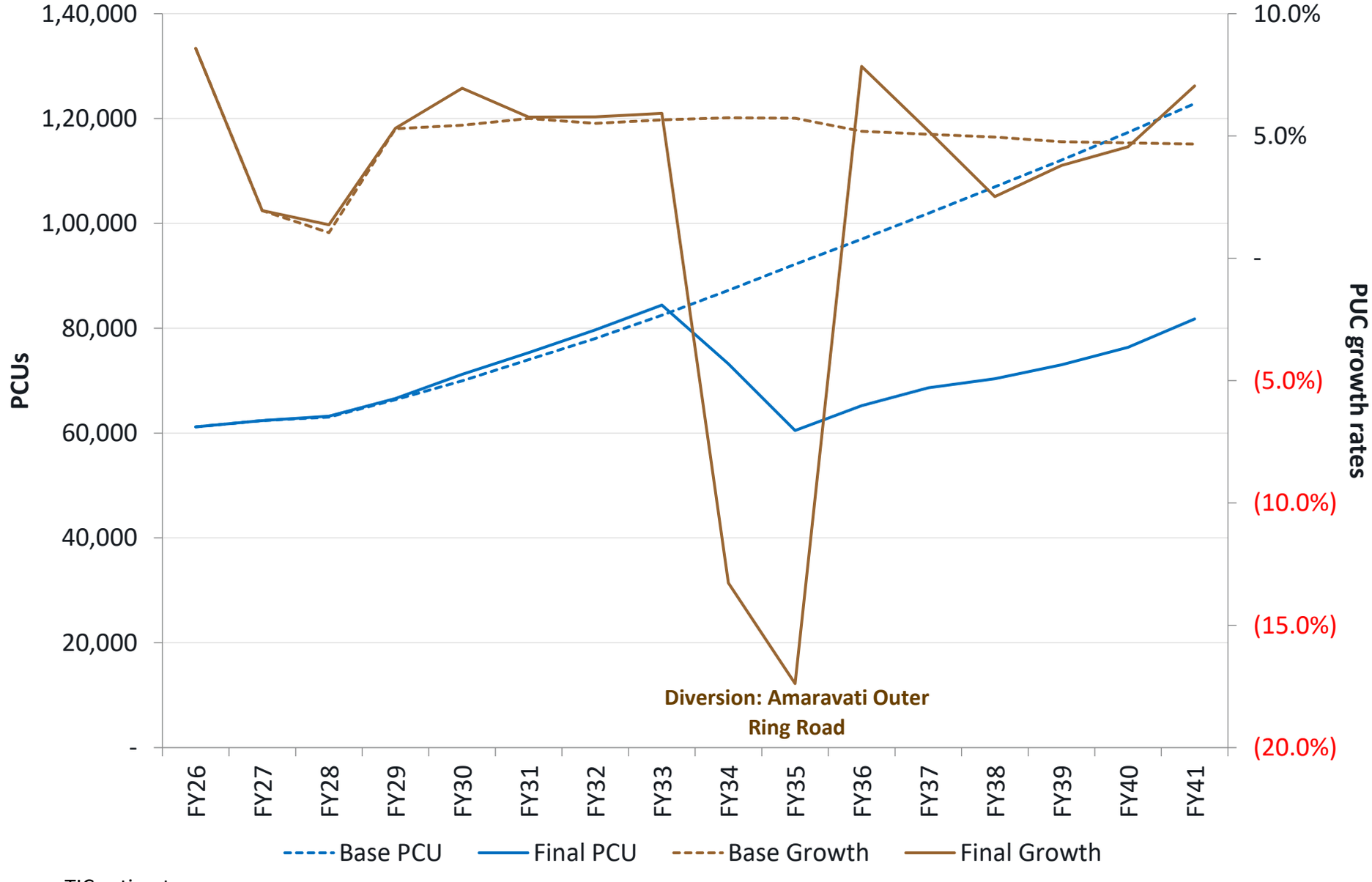
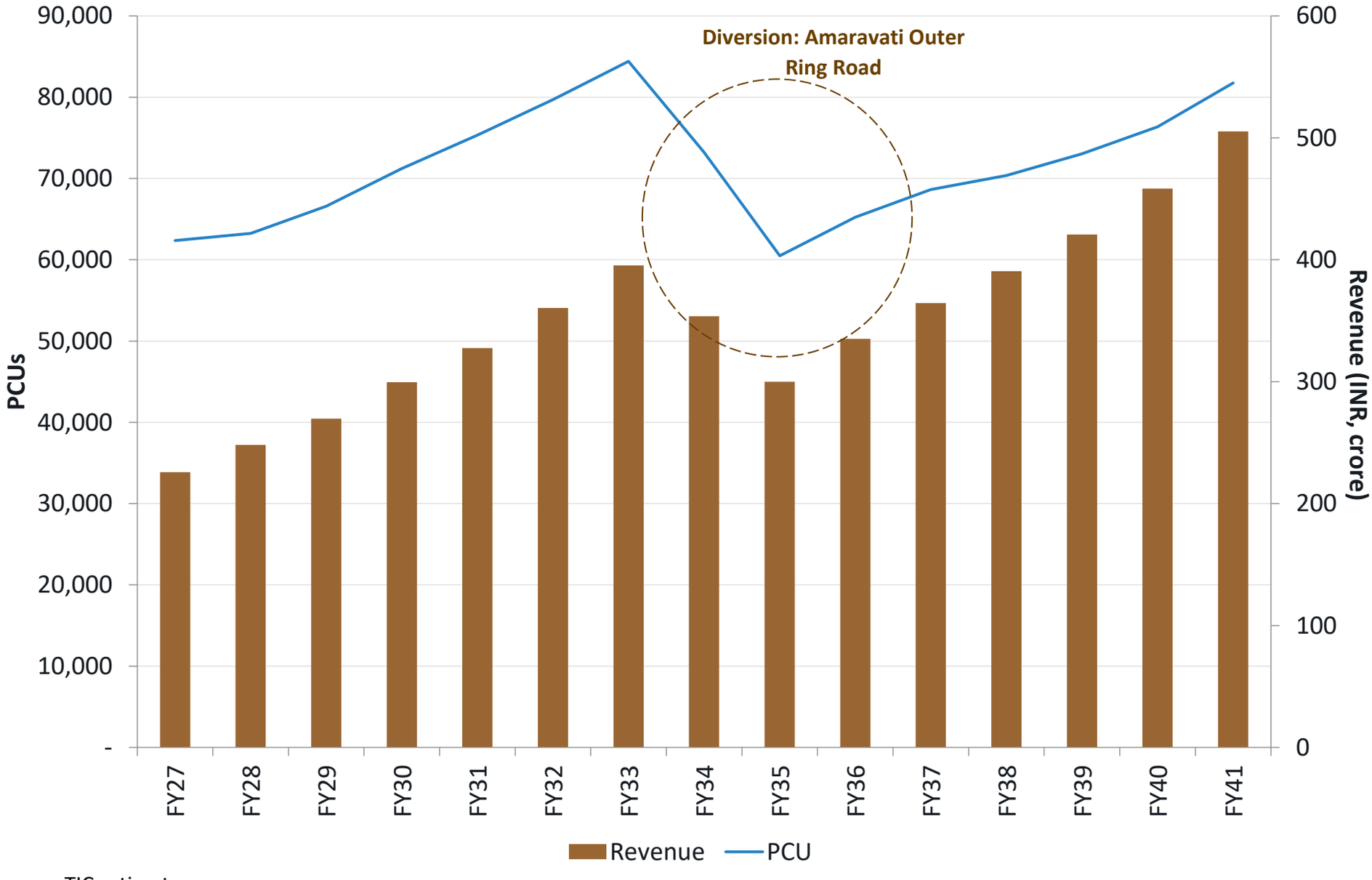
Pre- and Post-diversion growth rate snapshot



Source: TIC estimate

Traffic growth forecast: Kaza TP (3)

Revenue and PCU snapshot



Source: TIC estimate

Scenario development definition

Most Likely Scenario without overloading

- No overloading penalty/fees is considered at present based on understanding from site visit. In context of present ground situation and possibility of diversion in case of collecting overloading fees, the consultant did not consider overloading fee collection in most likely scenario.

Most Likely Scenario with overloading

The consultant considered following changes from the most likely (with overloading) case to determine most likely (with overloading) scenario:

- Overloading penalty/fees will be levied in future as per the overloading characteristics observed in axle load survey.

Optimistic Scenario

The consultant considered following changes from the most likely (with overloading) case to determine optimistic scenario:

- GDP: increase (addition) of 0.25% from FY27 to FY35
- Overloading penalty/fees will be levied in future as per the overloading characteristics observed in axle load survey
- Delayed the impact due to Outer Ring Road, Amaravati by a year

Pessimistic Scenario

The consultant considered following changes from the most likely (with overloading) case to determine pessimistic scenario:

- GDP: decrease (subtraction) of 0.25% from FY27 to FY35
- No overloading penalty/fees is being levied

Detailed traffic and revenue forecast for 'Most likely scenario without overloading' is exhibited in Appendix B.

Scenario summary: Kaza TP (1)

	Most likely without overloading			Most likely with overloading			Optimistic scenario			Pessimistic scenario		
FY	PCU	PCU growth	Revenue (INR Cr)	PCU	PCU growth	Revenue (INR Cr)	PCU	PCU growth	Revenue (INR Cr)	PCU	PCU growth	Revenue (INR Cr)
FY27	62,377	2.0%	226	62,423	2.0%	226	62,606	1.9%	226	62,377	2.0%	226
FY28	63,234	1.4%	248	63,277	1.4%	261	63,448	1.3%	249	63,234	1.4%	248
FY29	66,596	5.3%	270	66,641	5.3%	283	66,945	5.5%	271	66,471	5.1%	269
FY30	71,224	6.9%	299	71,271	6.9%	315	72,324	8.0%	318	70,951	6.7%	298
FY31	75,337	5.8%	328	75,407	5.8%	342	76,713	6.1%	347	74,880	5.5%	326
FY32	79,697	5.8%	361	79,834	5.9%	372	81,461	6.2%	379	79,039	5.6%	358
FY33	84,419	5.9%	395	84,586	6.0%	406	86,578	6.3%	415	68,341	(13.5%)	318
FY34	73,217	(13.3%)	354	73,383	(13.2%)	363	92,134	6.4%	456	56,181	(17.8%)	269
FY35	60,489	(17.4%)	300	60,646	(17.4%)	308	80,523	(12.6%)	409	59,620	6.1%	296
FY36	65,233	7.8%	335	65,417	7.9%	341	67,743	(15.9%)	352	61,390	3.0%	318
FY37	68,633	5.2%	364	68,844	5.2%	368	71,317	5.3%	380	63,839	4.0%	342
FY38	70,363	2.5%	391	70,584	2.5%	395	75,008	5.2%	417	67,079	5.1%	374
FY39	73,038	3.8%	421	73,269	3.8%	426	78,764	5.0%	454	70,368	4.9%	407
FY40	76,367	4.6%	458	76,607	4.6%	464	80,374	2.0%	484	73,548	4.5%	443
FY41	81,752	7.1%	505	82,002	7.0%	511	83,240	3.6%	519	78,721	7.0%	488
Total (FY27 - FY41)			5,255			5,381			5,676			4,979

Source: TIC estimate

Reaches LOS B of 6-Laning 60,000 PCU/day

Reaches LOS C and D

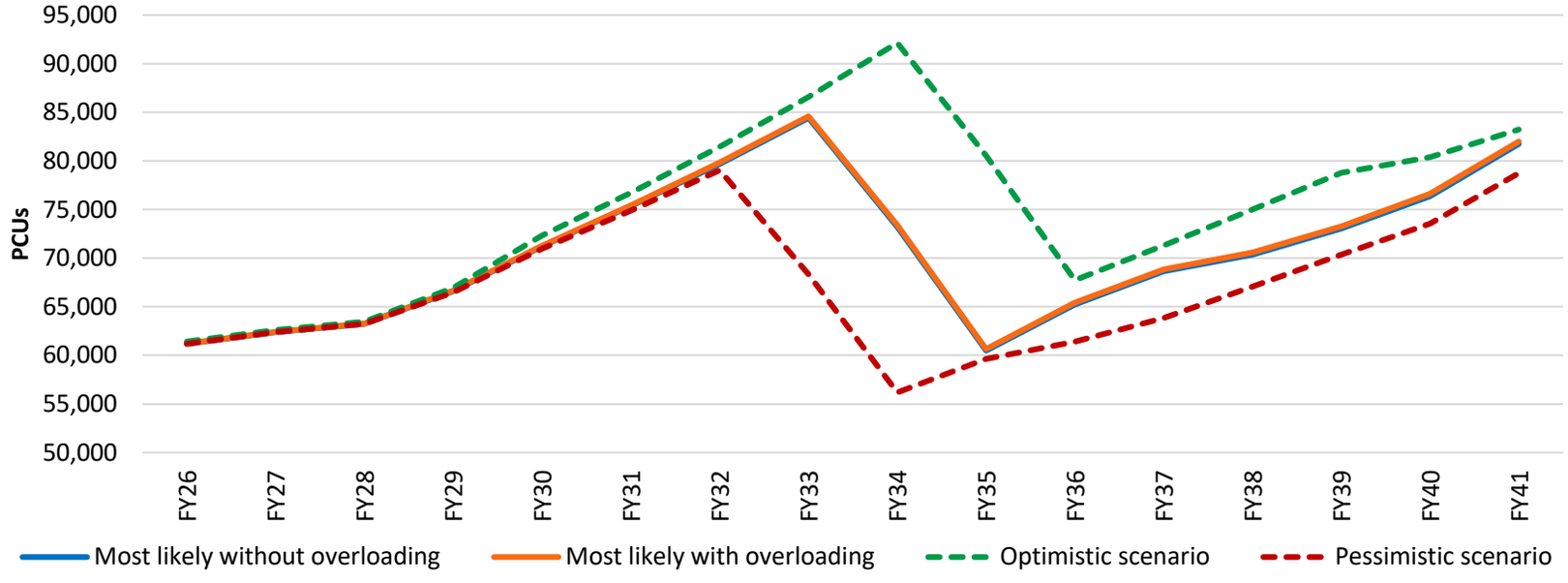
Benchmark cases:

Gujarat: Ahmedabad Mumbai Corridor (Mandva Toll) – 1,45,000 PCU
Gujarat: Ahmedabad Mumbai Corridor (Choryasi Toll) – 1,22,000 PCU
Haryana: Delhi Panipat Corridor (Bhagan Toll) – 1,07,000 PCU

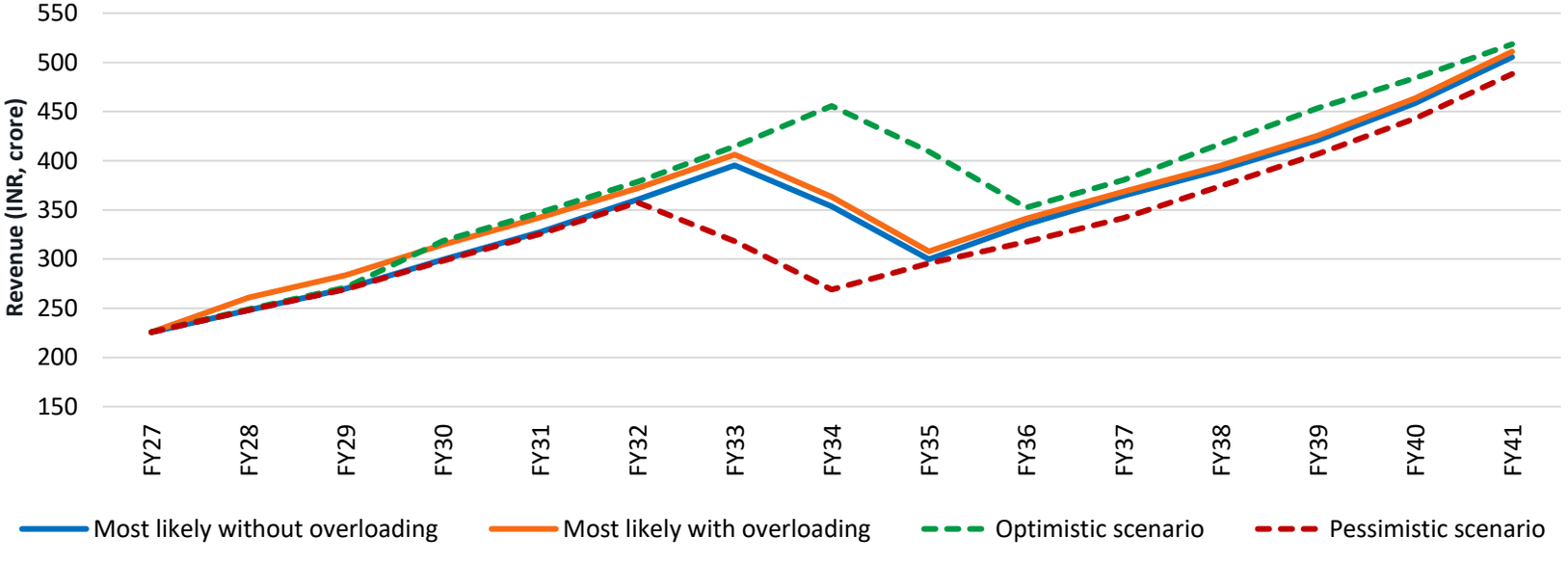
Design capacity for 6-lane National Highway is determined as per as per IRC: 106 and IRC: SP 87 and standard industry practice for determining Level of Service C/D/E.

Scenario summary: Kaza TP (2)

PCU comparison



Revenue comparison



Source: TIC estimate

List of Appendices

Appendix A: Vehicle category-wise visual representation of origin-destination zones and top origin-destination pairs

Appendix B: Detailed traffic and revenue forecast – most likely scenario without overloading

Appendix A:

- Vehicle category-wise visual representation of origin-destination zones
- Vehicle category-wise top origin-destination pairs

Vehicle category-wise visual representation of OD (1)

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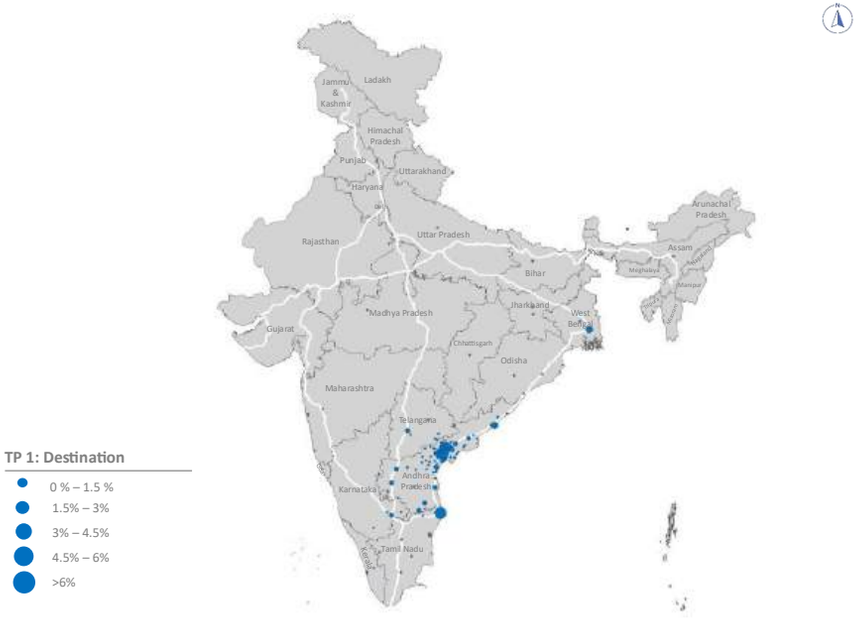
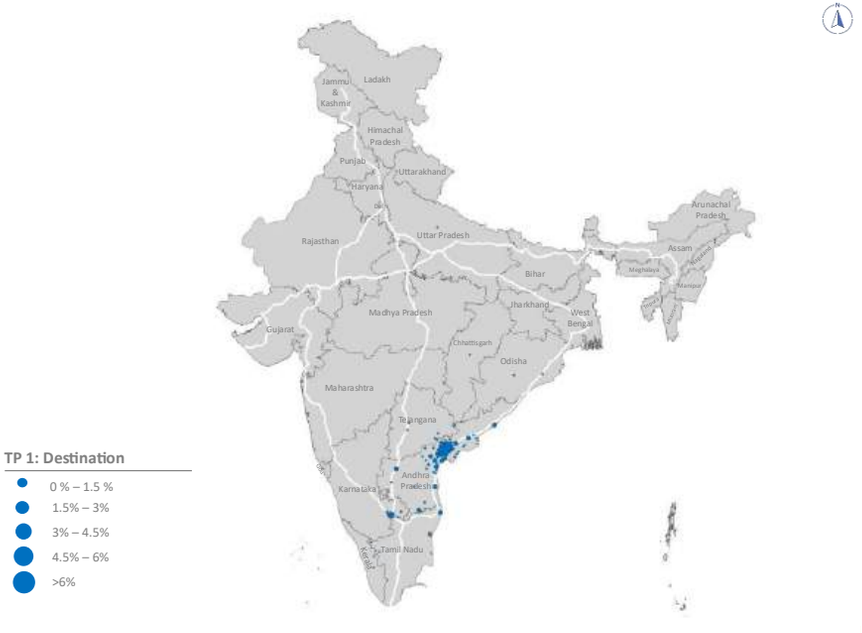
Origin | **Destination**

CJV



Mini LCV



Source: TIC analysis (map not to scale)

Vehicle category-wise visual representation of OD (2)

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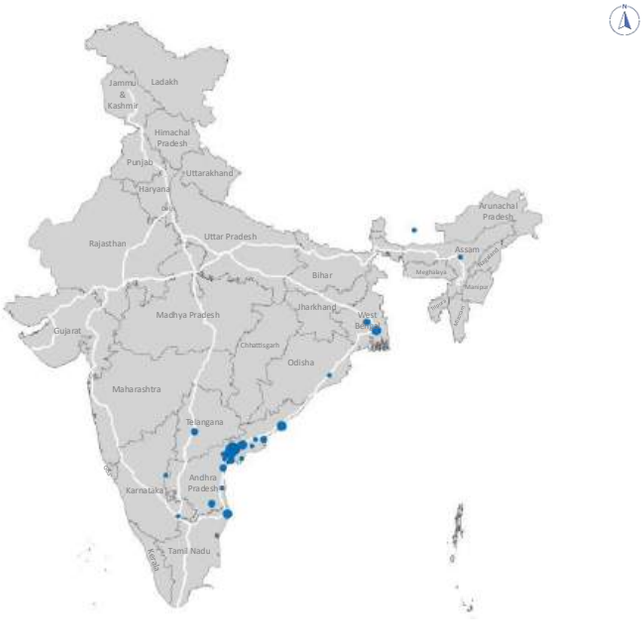
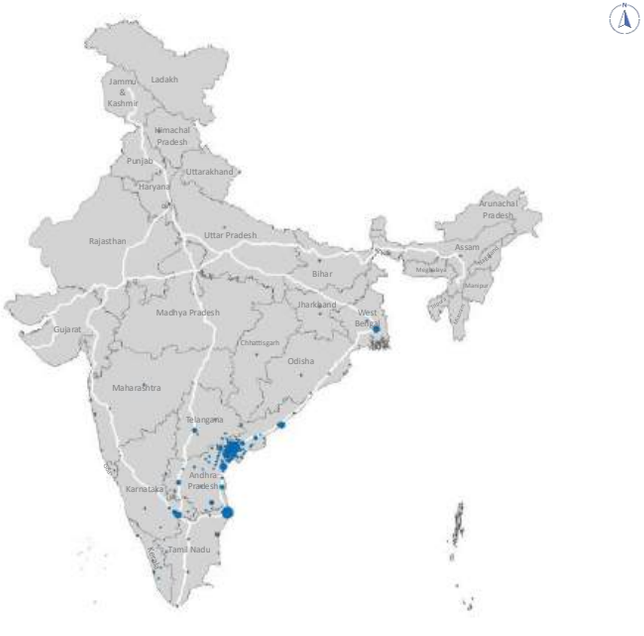
	Origin	Destination
LCV		
2A		

Source: TIC analysis (map not to scale)

Vehicle category-wise visual representation of OD (3)

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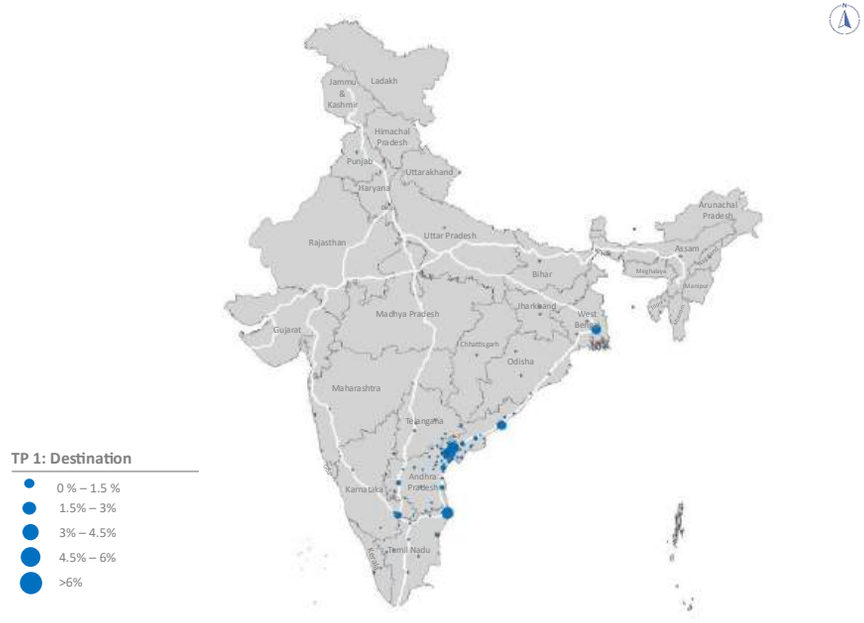
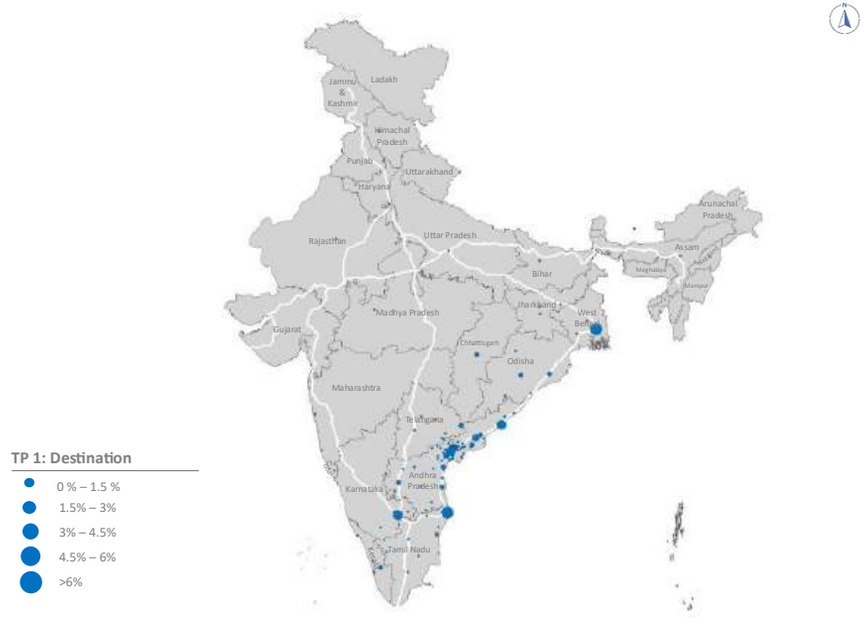
Origin | **Destination**

3A



MAV



Source: TIC analysis (map not to scale)

Vehicle category-wise visual representation of OD (4)

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Bus

Origin

Destination

Vehicle category-wise top OD pairs (1)

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CJV

Sr. No.	Origin-Destination Pairs		Share
1	Guntur	Amaravati	3%
2	Amaravati	Guntur	2%
3	Guntur	Vijayawada	2%
4	Tiruvallur	Visakhapatnam	2%
5	Vijayawada	Guntur	2%
6	Tiruvallur	West Bengal	2%
7	West Bengal	Bellary	2%
8	Visakhapatnam	Tiruvallur	1%
9	West Bengal	Tiruvallur	1%
10	Amaravati	Namburu	1%

Mini LCV

Sr. No.	Origin-Destination Pairs		Share
1	Guntur	Vijayawada	4%
2	Guntur	Amaravati	4%
3	Amaravati	Guntur	4%
4	Vijayawada	Guntur	4%
5	Guntur	Eluru	1%
6	Bellary	Rajamahendravaram	1%
7	Ongole	Dakshin Bastar Dantewada	1%
8	Guntur	Kondapalli	1%
9	Guntur	Gundimeda	1%
10	Rajamahendravaram	Guntur	1%

Bus

Sr. No.	Origin-Destination Pairs		Share
1	Vijayawada	Guntur	6%
2	Guntur	Vijayawada	6%
3	Amaravati	Guntur	5%
4	Guntur	Amaravati	3%
5	Ongole	Vijayawada	2%
6	Vijayawada	Vinukonda	2%
7	Vijayawada	Ongole	2%
8	Vinukonda	Vijayawada	2%
9	Bellary	Vijayawada	1%
10	Vijayawada	Nellore	1%

LCV

Sr. No.	Origin-Destination Pairs		Share
1	Guntur	Kondapalli	3%
2	Vijayawada	Tiruvallur	3%
3	West Bengal	Bellary	3%
4	Vijayawada	Bellary	3%
5	Martur	Visakhapatnam	2%
6	Guntur	Tadepalle	2%
7	Guntur	Visakhapatnam	2%
8	Guntur	Amaravati	2%
9	Ongole	Vijayawada	2%
10	Tiruvallur	Chhattisgarh	2%

Source: TIC analysis

Vehicle category-wise top OD pairs (2)

TRANSLINK® Infrastructure Consultants Pvt Ltd Smart Consulting

2A

Sr. No.	Origin-Destination Pairs		Share
1	Guntur	Amaravati	3%
2	Amaravati	Guntur	2%
3	Guntur	Vijayawada	2%
4	West Bengal	Bellary	2%
5	Vijayawada	Guntur	2%
6	Tiruvallur	West Bengal	1%
7	Tiruvallur	Vijayawada	1%
8	Bellary	West Bengal	1%
9	Tiruvallur	Visakhapatnam	1%
10	West Bengal	Tiruvallur	1%

3A

Sr. No.	Origin-Destination Pairs		Share
1	Tiruvallur	West Bengal	3%
2	Guntur	Vijayawada	2%
3	West Bengal	Tiruvallur	2%
4	Visakhapatnam	Tiruvallur	2%
5	Guntur	Amaravati	2%
6	Tiruvallur	Visakhapatnam	2%
7	West Bengal	Bellary	2%
8	Amaravati	Guntur	2%
9	Guntur	North Valluru	1%
10	Vijayawada	Guntur	1%

MAV

Sr. No.	Origin-Destination Pairs		Share
1	Tiruvallur	Visakhapatnam	3%
2	West Bengal	Bellary	3%
3	Tiruvallur	West Bengal	3%
4	West Bengal	Tiruvallur	2%
5	Visakhapatnam	Tiruvallur	2%
6	Bellary	West Bengal	2%
7	Tiruvallur	Vijayawada	1%
8	Tiruvallur	Rajamahendravaram	1%
9	Guntur	Amaravati	1%
10	Bellary	Visakhapatnam	1%

Source: TIC analysis

Appendix B:

- Detailed traffic and revenue forecast – most likely scenario without overloading

Kaza TP (1): Traffic forecast (AADT)

Financial Year	CJV	Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	AADT	PCU
FY26	25,073	2,482	1,089	2,525	2,000	1,388	3,167	**37,725**	**61,180**
FY27	26,314	2,590	1,141	2,583	2,081	1,372	3,034	**39,115**	**62,377**
FY28	27,714	2,709	1,198	2,643	2,166	1,344	2,790	**40,564**	**63,234**
FY29	29,555	2,826	1,258	2,702	2,294	1,358	2,948	**42,941**	**66,596**
FY30	32,426	2,950	1,322	2,764	2,436	1,375	3,142	**46,416**	**71,224**
FY31	34,787	3,070	1,384	2,823	2,578	1,391	3,339	**49,373**	**75,337**
FY32	37,133	3,193	1,480	2,881	2,739	1,408	3,571	**52,403**	**79,697**
FY33	39,726	3,318	1,582	2,948	2,906	1,423	3,815	**55,719**	**84,419**
FY34	33,906	3,446	1,468	3,007	2,662	1,154	2,932	**48,574**	**73,217**
FY35	27,002	3,576	1,326	3,080	2,429	881	1,945	**40,239**	**60,489**
FY36	30,004	3,703	1,510	3,137	2,575	890	2,101	**43,920**	**65,233**
FY37	31,908	3,832	1,575	3,192	2,696	897	2,261	**46,361**	**68,633**
FY38	32,268	3,960	1,642	3,189	2,819	904	2,430	**47,212**	**70,363**
FY39	33,448	4,088	1,710	3,213	2,944	911	2,607	**48,921**	**73,038**
FY40	35,399	4,217	1,780	3,265	3,074	918	2,736	**51,389**	**76,367**
FY41	39,146	4,349	2,017	3,316	3,162	924	2,894	**55,809**	**81,752**

Source: TIC estimate

Kaza TP (2): Traffic AADT growth rates

Financial Year	CJV	Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	AADT	PCU
FY26	-	-	-	-	-	-	-	**-**	**-**
FY27	5.0%	4.3%	4.8%	2.3%	4.1%	(1.2%)	(4.2%)	**3.7%**	**2.0%**
FY28	5.3%	4.6%	5.0%	2.3%	4.1%	(2.0%)	(8.1%)	**3.7%**	**1.4%**
FY29	6.6%	4.3%	5.0%	2.2%	5.9%	1.0%	5.7%	**5.9%**	**5.3%**
FY30	9.7%	4.4%	5.1%	2.3%	6.2%	1.2%	6.6%	**8.1%**	**6.9%**
FY31	7.3%	4.1%	4.7%	2.1%	5.9%	1.2%	6.3%	**6.4%**	**5.8%**
FY32	6.7%	4.0%	6.9%	2.1%	6.2%	1.2%	7.0%	**6.1%**	**5.8%**
FY33	7.0%	3.9%	6.9%	2.3%	6.1%	1.1%	6.8%	**6.3%**	**5.9%**
FY34	(14.7%)	3.9%	(7.2%)	2.0%	(8.4%)	(18.9%)	(23.2%)	**(12.8%)**	**(13.3%)**
FY35	(20.4%)	3.8%	(9.7%)	2.5%	(8.8%)	(23.6%)	(33.8%)	**(17.2%)**	**(17.4%)**
FY36	11.1%	3.6%	13.9%	1.8%	6.0%	1.0%	8.1%	**9.1%**	**7.8%**
FY37	6.3%	3.5%	4.3%	1.8%	4.7%	0.8%	7.6%	**5.6%**	**5.2%**
FY38	1.1%	3.4%	4.2%	(0.1%)	4.6%	0.8%	7.5%	**1.8%**	**2.5%**
FY39	3.7%	3.2%	4.1%	0.7%	4.4%	0.8%	7.3%	**3.6%**	**3.8%**
FY40	5.8%	3.2%	4.1%	1.6%	4.4%	0.7%	4.9%	**5.0%**	**4.6%**
FY41	10.6%	3.1%	13.3%	1.6%	2.9%	0.7%	5.8%	**8.6%**	**7.1%**

Source: TIC estimate

Kaza TP (3): Revenue forecast (INR Crore)

Financial Year	CJV	Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	Total
FY27	-	-	-	-	-	-	-	**225.7**
FY28	87.1	9.1	7.6	32.0	26.5	19.8	66.0	**248.0**
FY29	95.9	9.8	8.2	33.9	29.1	20.7	72.1	**269.7**
FY30	109.8	10.7	9.0	36.0	32.0	21.8	80.1	**299.5**
FY31	121.6	11.4	9.9	38.3	35.4	22.8	88.1	**327.5**
FY32	135.4	12.5	10.8	40.5	39.0	24.1	98.3	**360.5**
FY33	150.0	13.4	12.0	43.0	42.9	25.3	108.8	**395.4**
FY34	135.6	14.5	11.5	45.6	40.2	20.9	85.6	**353.8**
FY35	111.8	15.5	10.7	48.5	38.0	16.6	58.8	**299.9**
FY36	128.7	16.8	12.7	51.3	41.9	17.5	66.3	**335.1**
FY37	141.0	18.0	13.7	54.2	45.5	18.2	73.9	**364.4**
FY38	149.8	19.3	14.8	56.0	49.3	19.1	82.3	**390.6**
FY39	159.9	20.6	16.1	58.7	53.5	19.9	91.9	**420.8**
FY40	177.7	22.3	17.4	62.0	58.1	20.9	100.1	**458.4**
FY41	202.4	23.9	20.4	65.3	61.9	21.8	109.6	**505.4**

Source: TIC estimate

Kaza TP (4): Revenue growth rates

Financial Year	CJV	Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	Total
FY27	-	-	-	-	-	-	-	**-**
FY28	15.9%	16.0%	15.2%	11.9%	13.8%	6.6%	0.4%	**9.9%**
FY29	10.1%	6.8%	8.3%	6.1%	9.9%	4.7%	9.3%	**8.7%**
FY30	14.5%	9.7%	9.5%	6.1%	10.1%	5.4%	11.1%	**11.0%**
FY31	10.7%	6.7%	9.5%	6.5%	10.4%	4.6%	10.0%	**9.4%**
FY32	11.3%	9.2%	9.9%	5.9%	10.2%	5.3%	11.5%	**10.1%**
FY33	10.8%	7.4%	11.2%	6.1%	10.1%	5.1%	10.6%	**9.7%**
FY34	(9.6%)	8.1%	(4.8%)	5.9%	(6.4%)	(17.3%)	(21.3%)	**(10.5%)**
FY35	(17.6%)	7.3%	(6.2%)	6.3%	(5.3%)	(20.8%)	(31.3%)	**(15.2%)**
FY36	15.2%	8.0%	18.5%	5.8%	10.1%	5.3%	12.7%	**11.7%**
FY37	9.5%	7.2%	7.8%	5.6%	8.6%	4.4%	11.4%	**8.8%**
FY38	6.2%	7.3%	7.9%	3.4%	8.3%	4.8%	11.5%	**7.2%**
FY39	6.8%	6.9%	8.6%	4.8%	8.7%	4.3%	11.6%	**7.7%**
FY40	11.1%	7.9%	8.2%	5.6%	8.5%	4.7%	8.9%	**8.9%**
FY41	14.0%	7.3%	17.0%	5.3%	6.6%	4.6%	9.5%	**10.2%**

Source: TIC estimate

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Chennai Bypass section in Tamil Nadu

Traffic Due Diligence – Final Report

National Highways Authority of India

January 2026

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Control information

Contract Reference: Letter of Commencement - FINDIV-16014(11)/1/2024-O/o CGM (Finance-II)/e-265207/116 dated 7th August 2025	**Identification & Traceability:** TIC/401/TF/TDD/R1-Final Report
Assignment Title: Traffic Due Diligence – Chennai Bypass section in Tamil Nadu	
Client	**National Highways Authority of India** Sector 10, Dwarka, New Delhi 110075
Consultant	**Translink Infrastructure Consultants Private Limited in association with Infra Brainiacs Private Limited** 1103, I Square Corporate Park Science City Road, Ahmedabad 380060

Issue and Revision Records

Date	Revisions	Originator	Checker	Approver	Description
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Appendices

Appendix A: Additional entry/exit request by Chennai Unified Metropolitan Transport Authority (CUMTA)

Appendix B: Vehicle category-wise visual representation of origin-destination zones

Vehicle category-wise top origin-destination pairs

Appendix C: Detailed traffic and revenue forecast – most likely scenario without overloading

Abbreviations (1)

AADC	Annual Average Daily Collection
AADT	Annual Average Daily Traffic
ADB	Asian Development Bank
ADT	Average Daily Traffic
AL	Axle Load
AP	Andhra Pradesh
APC	Annual Potential Collection
BFSI	Banking, Financial Services, and Insurance
BOT	Build-Operate-Transfer
BPO	Business Process Outsourcing
CAGR	Compound Annual Growth Rate
CBIC	Chennai – Bengaluru Industrial Corridor
CFS	Container Freight Station
CJV	Car/ Jeep/ Van
CPI	Consumer Price Index
CPRR	Chennai Peripheral Ring Road
CTVC	Classified Traffic Volume Count
CUMTA	Chennai Unified Metropolitan Transport Authority
DBFOT	Design, Build, Finance, Operate, and Transfer
DPR	Detailed Project Report
DTA	Domestic Tariff Area
EPC	Engineering, Procurement and Construction
ETC	Electronic Toll Collection
EV	Electric Vehicle
FMCG	Fast Moving Consumer Goods

FY	Financial Year
GDP	Gross Domestic Product
GSDP	Gross State Domestic Product
GST	Goods and Services Tax
GVA	Gross Value Added
HAM	Hybrid Annuity Mode
HCV	Heavy Commercial Vehicle
HQ	Headquarter
IEA	International Energy Agency
IHMCL	Highways Management Company Limited
IMF	International Monetary Fund
INR	Indian Rupee
IRC	Indian Road Congress
ISRO	Indian Space Research Organisation
IT	Information technology
ITES	Information Technology Enabled Services
IWAI	Inland Waterways Authority of India
JV	Joint Venture
Km	Kilometer
LCV	Light Commercial Vehicle
LNG	Liquefied Natural Gas
LPG	Liquefied Petroleum Gas
MADT	Monthly Average Daily Traffic
MAV	Multi Axle Vehicle
MLFF	Multi Lane Free Flow

Abbreviations (2)

MMBT	Madhavaram Mofussil Bus Terminus
MMLP	Multimodal Logistics Park
MMTPA	Million Metric Tonnes Per Annum
MoFHW	Ministry of Health and Family Welfare
MoRTH	Ministry of Road Transport and Highways
MoSPI	Ministry of Statistics and Programme Implementation
MRF	Madras Rubber Factory
MRO	Maintenance, Repair, and Operations
MSME	Micro, Small, and Medium Enterprises
MT	Million Tonnes
MTPA	Million Tonnes Per Annum
NE	National Expressway
NH	National Highway
NHAI	National Highways Authority of India
NHIT	National Highways Infra Trust
NMP	National Monetisation Pipeline
NW	National Waterway
OD	Origin – Destination
OECD	Organisation for Economic Co-operation and Development
OSV	Oversized Vehicle
PCI	Per Capita Income
PCU	Passenger Car Unit
PIA	Project Influence Area
PIU	Project Implementation Unit
PPP	Public-Private Partnership
PSU	Public Sector Undertaking
QADT	Quarterly Average Daily Traffic
RBI	Reserve Bank of India
RO	Regional Office
RoS	Rest of State
RTO	Regional Transport Office
SaaS	Software as a Service
SCF	Seasonal Correction Factor
SEZ	Special Economic Zone
SH	State Highway
SIAM	Society of Indian Automobile Manufacturers
SIPCOT	State Industries Promotion Corporation of Tamil Nadu
TAZ	Traffic Analysis Zone
TIC	Translink Infrastructure Consultants Private Limited
TMT	Thermo-Mechanically Treated
TN	Tamil Nadu
TNRDC	Tamil Nadu Road Development Company Ltd
TOT	Toll, Operate, Transfer
TP	Toll Plaza
UNESCO	United Nations Educational, Scientific and Cultural Organization
VCIC	Vishakhapatnam – Chennai Industrial Corridor
WADT	Weekly Average Daily Traffic
WPI	Wholesale Price Index
2A	2 Axle
3A	3 Axle

Chapter 1: Introduction

- The assignment
- Objective and Scope of Work
- Approach and methodology
- Organisation of the report

This chapter outlines assignment background, scope of work, approach and methodology employed to ensure successful execution of the assignment.

Approach and methodology section highlights the structured approach which has been followed to gather data, conduct analysis, and make informed decisions throughout the project lifecycle. By employing a robust methodology, the consultant aims to ensure the accuracy, efficiency and reliability of the assignment's outcomes.

The assignment

Ministry of Road Transport and Highways (MoRTH) has entrusted **National Highways Authority of India** (hereinafter referred to as '**NHAI'** or '**client'**) for monetisation of public funded operational national highway projects under the framework of National Monetisation Pipeline (NMP).

In this context, NHAI has commissioned Translink Infrastructure Consultants Private Limited in association with Infra Brainiacs Private Limited (hereinafter referred to as '**TIC'** or '**consultant'**) to carry out traffic due diligence for following national highway section in Tamil Nadu (hereinafter referred to as '**project highway**').

Project highway under asset monetization programme

National highway section	Toll plaza	Concerned NHAI field office
Chennai Bypass	Vanagaram (Chennai district) Tiruneermalai (Chengalpattu district) * Surapattu (Tiruvallur district)	Project Implementation Unit – Chennai 2 Regional Office – Chennai

Source: Client

^^ existing toll plaza at Vanagaram will be shifted to Tiruneermalai from 1st April 2028 (FY29)

This document is the final report incorporating traffic data updates received up to October 2025 and confirmation from the client dated 15th December 2025 for recommended scenario. The report presents our understanding of the project highway, trend analysis of traffic and revenue, primary data analysis and traffic and revenue forecast for a concession period of 15 years.

Objective and Scope of Work

The principal objective of the study is to determine traffic and revenue forecast for 15 years. This assessment provides input to stakeholders to evaluate viable monetization options for the project highway.

The broad **scope of the work** of the assignment is as follows:

- Review of available historical traffic and revenue data and relevant document received from the client
- Carrying out traffic survey and analysis at the project highway :
  - 7 days continuous and direction-wise classified traffic volume count
  - 3 days origin-destination
  - 3 days axle load
  - Any other surveys on the project highway and alternate corridors as per the need
- Site visit and stakeholder consultation to understand traffic characteristics and network dynamics
- Review of observed growth trends of the project highway and corridor subject to availability of data
- Estimate vehicle category-wise traffic and revenue for the base year
- Determine future toll rates
- Assessing diversion due to competing transportation modes and routes, network development, future development plans in the region, etc.
- Vehicle category and ticket distribution-wise traffic and revenue forecast for concession period
- Scenario development: most likely, optimistic and pessimistic

Approach

The consultant adopted comprehensive approach to address the need of this assignment with key five focus areas as summarised in below figure.

Approach for the assignment

Expertise in motion	Forecasting forward flow	Economy drive highways	Data drives decisions; paves road to resilience	Trust in travel
Team with transportation engineering expertise and experience	Encapsulate all possible exogeneous impacts on traffic growth	Models integrating economic indicators for traffic growth projections	Using statistical techniques and tools for accurate insights and risk assessments	Maintain integrity, transparency, and ethical practices

Source: TIC

Methodology (1)

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Methodology for the assignment

Key sections	Particulars
Project highway appreciation	▪ Assess the macro and micro road network, considering the overall road infrastructure and its specific sections ▪ Identify homogeneous/tollable sections with similar traffic patterns ▪ Evaluate any developments in the vicinity of the project highway that may impact economic growth and traffic volume ▪ Finalize survey locations and formats for data collection
Secondary data collection	▪ Gather relevant past detailed project report / traffic study report and draft concession agreement as per availability ▪ Collect historical monthly traffic data for the toll plazas of the project highway and neighbouring toll plazas on the corridor, both upstream and downstream ▪ Source vehicle category/mapper class wise electronic toll collection (ETC) data as most reliable dataset from Indian Highways Management Company Limited (IHMCL) through the client for toll plazas under study and on the corridor and alternate corridors as well as across the country (subject to receipt from the client or as per availability in the public domain) for understanding of the various trends of economy as well as modal / vehicle technology shift ▪ Gather economic indicators such as Consumer Price Index (CPI), Wholesale Price Index (WPI), per capita income, national, state and district Gross Domestic Product (GDP), employment rates and specific commodities related sales e.g., automobile, agriculture production etc. ▪ Gather demographic profiles and population data ▪ Collect secondary data related to alternative routes and modal shift developments if applicable
Primary data collection	▪ 7-day continuous videography-based classified traffic volume count survey to gather independent traffic volume data ▪ 3-day origin-destination and commodity survey to understand travel patterns, trip purposes, influence region, growth drivers etc. ▪ 3-day axle load survey to determine the load characteristics of vehicles ▪ 1-day vehicle registration number plate survey to estimate ticket segmentation of local commercial vehicle without national permit if required ▪ Stakeholder consultation through interviews and focused group discussions

Source: TIC

Methodology (2)

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Methodology for the assignment

Key sections	Particulars
Data analysis	▪ Review historical traffic and revenue data to understand growth trend, seasonality variation, elasticities for identified growth drivers through regression analysis subject to data availability and benchmark analysis of corridor ▪ Conduct data hygiene checks to identify errors, biases and inconsistencies in the collected data ▪ Analyse Weekly Average Daily Traffic (WADT) including peak hour, day and night traffic variances, as well as directional distribution of traffic for further input to various analysis ▪ Identify Traffic Analysis Zones (TAZ) and Primary Influence Areas (PIA) ▪ Determine vehicle category-wise origin-destination matrices, trip lengths and purposes ▪ Develop geographical distribution diagrams of traffic to visualize travel patterns ▪ Perform commodity and loading analysis ▪ Analyse historical journey tickets, including single, 24-hour return, daily multiple, monthly, local pass tickets and annual pass for passenger cars and understand the ground level situations for underlying patterns especially forced exemption if any in the case specific region and possibilities of reduction through proposed technological and administrative measures ▪ Estimate Annual Average Daily Traffic (QADT/AADT) for the base and future years as per case specific requirement ▪ Develop a traffic diversion model using IRC:SP:30 modality
Forecasting	▪ Utilize an econometric model based on IRC: 108-2015 guidelines to analyse the relationship between vehicle traffic/PIA and socio-economic parameters such as Per Capita Income (PCI), Gross Domestic Product (GDP) of district/state/national, population, specific economic activities etc. as relevant with the identified growth drivers ▪ Calculate growth rates for each vehicle category. Adjust the growth rates based on induced traffic and traffic diversion effects, if applicable ▪ Perform traffic forecasting for 15 years period - normal traffic followed by generated and diverted traffic due to network and developmental impacts ▪ Conduct capacity analysis to assess the adequacy of the project highway ▪ Forecast annual toll revenue for 15 years based on traffic and toll rates projections
Sensitivity and risk analysis	▪ Identify variables (macro-economic, growth drivers and relationships, scale and timeline of diversions, etc.) that significantly impact annual toll revenue and assess their sensitivity ▪ Develop scenarios for identified risks

Source: TIC

Organisation of the report

Report structure

Sr. No.	Chapter	Particulars
1	**Introduction**	Scope of the assignment, approach and methodology
2	**Project highway profile**	Characteristics of the project highway like network understanding, socio-economic background of the region and proposed infrastructure developments in the influence region and network
3	**Traffic analysis**	Past performance of the project highway based on historical traffic and revenue data, traffic survey data analysis
4	**Economic context and traffic growth**	Economic context of influence region, determination of traffic growth drivers and associated travel demand elasticities
5	**Baseline traffic and revenue forecast**	Elaborates method adopted for determining base year AADT, toll ticket distribution and revenue reconciliation
6	**Diversion analysis**	Impacts on the project highway due to proposed infrastructure developments in the influence region and network, assessment of induced traffic demand
7	**Final traffic and revenue forecast**	Traffic and revenue forecasts including diversions, scenario cases: most likely with and without overloading, optimistic and pessimistic

Source: TIC

Chapter 2: Project highway profile

- Location and key details
- Economic activities in the region
- Understanding of network and traffic corridors
- Proposed road network and infrastructure development in the influence region

This chapter exhibits our understanding of the project highway and key details, economic activities in the region and strategic network context based on site visit and stakeholder consultation. It covers list of infrastructure project development in the region and network which would have impact on the performance of the project highway.

Location of the project highway

Project highway location in national and state context

Source: TIC analysis (map not to scale)

- The project highway is a 32 km bypass section of Chennai city, part of two national highways i.e., Golden Quadrilateral (Mumbai – Bengaluru – Chennai corridor NH48) and NH179B (old NH32/NH45) connecting Chennai to south Tamil Nadu. It starts at Irumbuliyur junction (near Tambaram in southern Chennai) and extends to Madhavaram junction on NH16 on north of the city.
- Chennai bypass plays significant role in reducing congestion within Chennai city and streamlining traffic flow along the north-south corridor in the state and upwards journey towards Andhra Pradesh when conceptualized.
- With the rapid urban expansion and integration of peripheral areas into the Chennai Metropolitan Region, the bypass effectively become part of the city but being access control (with open tolling and limited entry-exit) modality still comparatively effective for road users. It caters to substantial intra-city and port-related traffic, including movements between Bengaluru/western and Chennai maritime cluster covering ports of Chennai, Ennore and Kattupalli.

Project snapshot (1)

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Key project details

Particulars	Chennai Bypass	
Length (km)	32.600	
Lane and pavement	6-lane divided carriageway, flexible pavement / rigid at toll plaza	
Chainage	km 0.000 (Tambaram) to km 32.600 (Madhavaram)	
History	▪ May 2011: Construction of Chennai Bypass Phase-II connecting NH48 (old NH4) and NH16 (old NH5) and widening of Chennai Bypass Phase-I connecting NH32 (old NH45) and NH48 (old NH4) through EPC by Hindustan Construction Company Limited ▪ Present tolling modality: under public funded with short term toll contracts	
Nos. of toll plaza and location	2 ETC enabled	
Toll plaza locations	**Vanagaram** (km 16.500) / **Tiruneermalai** (km 6.500)*	**Surapattu** (km 28.600)
Tolling start date	4th June 2003	14th May 2013
District	Chennai / Chengalpattu	Tiruvallur
	Socio-economic activities and traffic is influenced by districts under Chennai Unified Metropolitan Authority (CUMTA) i.e., Chennai, Chengalpattu, Kancheepuram, Tiruvallur and Ranipet	
Tolling length (km)	35.813	49.723
Overloading penalty	No overloading penalty / fee is being levied at present based on understanding from site visit and discussion with PIU Chennai II	
Micro-diversions at toll plaza location	Nil	Nil

Source: PIU Chennai 2 and NHAI HQ

* Present toll plaza at Vanagram location is to be shifted to Tiruneermalai due to identified black spot near toll plaza and proposed construction of Vehicular Underpass (VUP) at km 16.890

Project snapshot (2)

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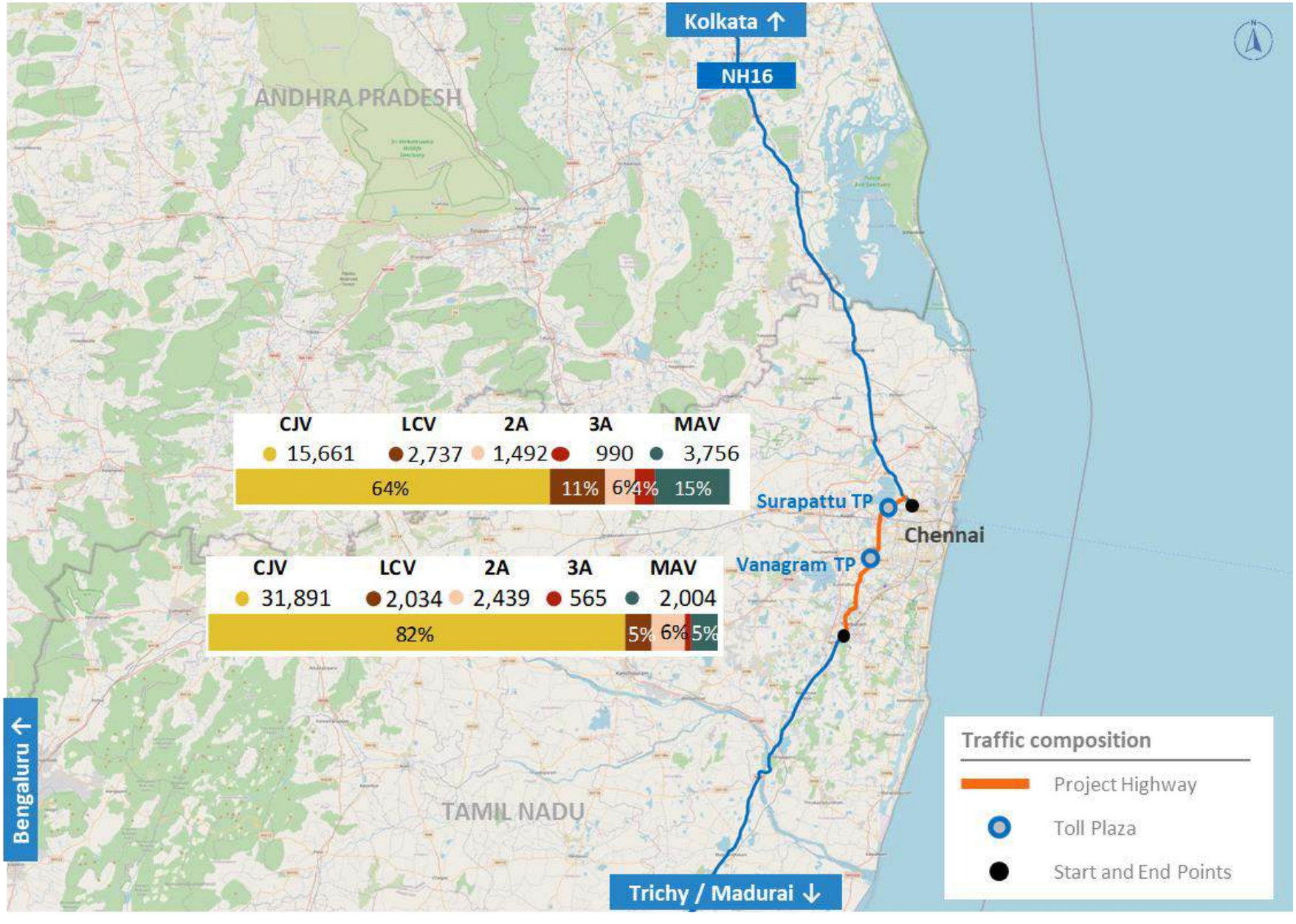
Key project details

Particulars	Chennai Bypass	
Toll plaza locations	**Vanagaram** (km 16.500) / **Tiruneermalai** (km 6.500)	**Surapattu** (km 28.600)
ETC Traffic (FY26 till October 2025)	7 months ADT: 38,936 PCU corresponding 7 months ADT: 52,985	7 months ADT: 24,645 PCU corresponding 7 months ADT: 44,154
ETC Traffic composition (FY26 till October 2025)	82% CJV/Mini LCV 8% 2A/LCV 4% Bus 6% 3A/MAV	64% CJV/Mini LCV 16% 2A/LCV 1% Bus 19% 3A/MAV
ETC Revenue	FY25: INR 81 Crore FY26 till Oct'25: INR 54 Crore	FY25: INR 105 Crore FY26 till Oct'25: INR 66 Crore
ETC Revenue composition (FY26 till October 2025)	55% CJV/Mini LCV 12% 2A/LCV 9% Bus 24% 3A/MAV	30% CJV/Mini LCV 18% 2A/LCV 1% Bus 51% 3A/MAV
Present toll operator with Annual Potential Collection (APC) and quoted remittance	**Eagle Infra India Limited** Duration: April 2025 to April 2026 (1 Year) **APC:** INR 87.80 Crore (FY26 tolling rates) **Quoted remittance:** INR 83.39 Crore (FY26 tolling rates)	**Skylark Infra Engineering Private Limited** Duration: September 2025 to September 2026 (1 Year) **APC:** INR 108.10 Crore (FY26 tolling rates) **Quoted remittance:** INR 106.57 Crore (FY26 tolling rates)
Previous tolling operator with Annual Potential Collection (APC) and Quoted Remittance	**Eagle Infra India Limited** Duration: April 2024 to April 2025 (1 Year) **APC:** INR 75.18 Crore (FY25 tolling rates) **Quoted remittance:** INR 73.94 Crore (FY25 tolling rates)	**Skylark Infra Engineering Private Limited** Duration: September 2024 to August 2025 (1 Year) **APC:** INR 105.82 Crore (FY25 tolling rates) **Quoted remittance:** INR 105.57 Crore (FY25 tolling rates)

Source: PIU Chennai 2 and NHAI HQ

Project snapshot (3)

ETC Traffic composition of FY26 till October 2025



Source: TIC analysis (map not to scale)

Economic activities in influence region (1)

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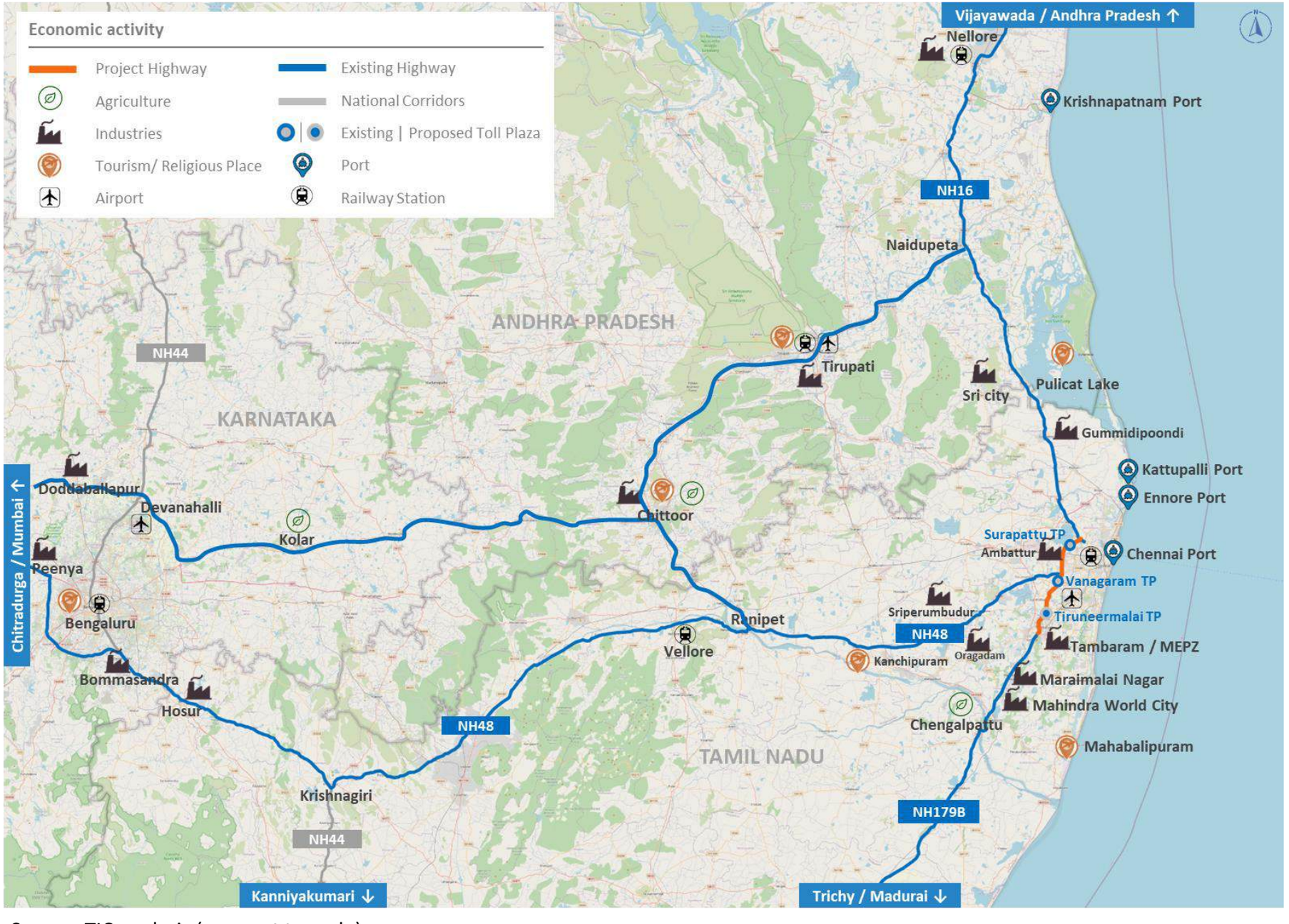
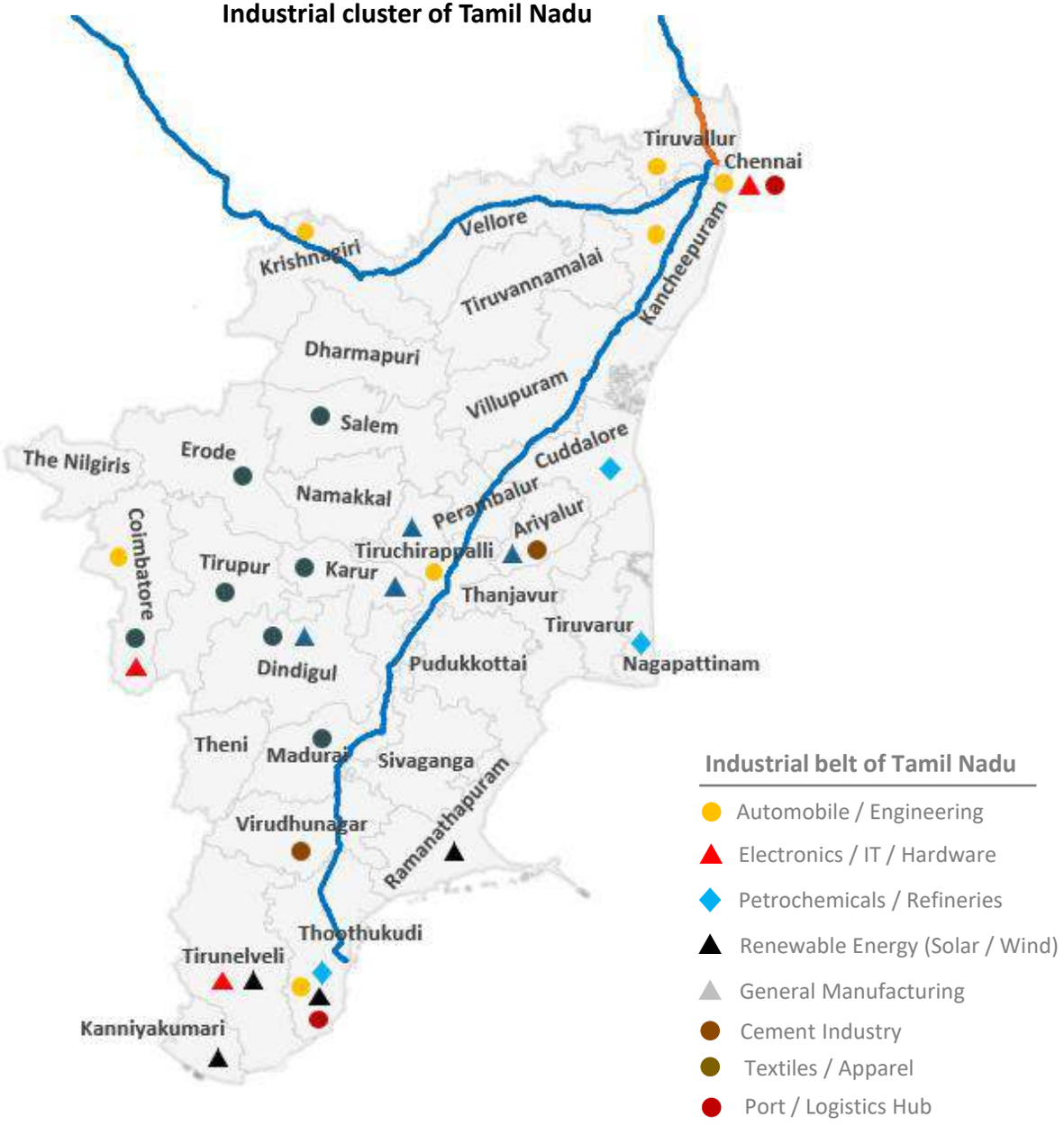
Economic activities in influence region



Source: TIC analysis (map not to scale)

Economic activities in influence region (2)

Industrial cluster of Tamil Nadu



- Tamil Nadu is one of India's most industrialized state with a diversified economy driven by manufacturing, services and agriculture.
- The state's strategic coastal location along the bay of Bengal supports strong maritime trade through Chennai, Ennore, Kattupalli and Thoothukudi ports.
- Agriculture remains important in the state's southern and delta regions, with key crops including paddy, sugarcane, cotton and millets.
- Major cluster-wise industrial capabilities are:
  - **Chennai:** Automotive, Precision Manufacturing, Electronics, Warehousing
  - **Hosur:** Automobiles and MRO
  - **Salem:** Technical Textiles, Polymers, General Engineering
  - **Tiruchirappalli:** Fabrication, general Engineering
  - **Coimbatore:** General Engineering, Space Technology and Precision Manufacturing

Source: TIC analysis (map not to scale); illustrative reference

Economic activities in influence region (3)

1 Industry

- **North Chennai Cluster**
  - **Manali:** home to chemical, general engineering, logistics and manufacturing units
  - **Ennore:** key port-related industries, auto (Ashok Leyland, MRF), Oil PSU – bottling/distribution terminals
  - **Redhills:** features Horizon Industrial Parks with plug-and-play facilities
  - **Outside Chennai:** Gummidipoondi – Tamil Nadu's oldest and Sri City – integrated multi-sector SEZ and DTA zones with residential and social facilities (part of Andhra Pradesh but situated on border of TN/AP)
- **South West Cluster (Automotive and Electronic)**
  - **Sriperumbudur:** SIPCOT Industrial Park, includes areas like Pillaipakkam, Sunguvarchatram, and Araneri
  - **Oragadam:** huge auto hub with global names (BMW, Nissan), logistics, and energy sectors
  - **Irungattukottai:** significant cluster with modern infrastructure
  - This belt is a major automobile and electronics hub with presence of Hyundai, Nissan, Samsung, Dell etc. generating large export freight volume via Chennai and Ennore Ports.
- **West cluster: Ambattur** and **Puzhal** host engineering and small-scale industries
- **South Cluster**
  - **Madras Export Processing Zone:** SEZ in Tambaram with presence of IT, ITES, electronics, logistics and manufacturing (leather and footwear, agro, pharma, plastics, textiles)
  - **Maraimalai Nagar:** home to automotive, pharmaceutical and chemicals
  - **Mahindra World City:** India's first integrated business and residential township having IT/ITeS, manufacturing (auto ancillaries, Electronics), and logistics, with major firms like BMW, Infosys, Pegatron, BASF, and TVS Group operating within its multi-sector SEZ and DTA zones
  - **Ariyalur Cement Manufacturing cluster** (near Trichy) supplies cement to Chennai and nearby region.
- **Sriperumbudur - Maduravoyal** stretch serves as a logistics and warehousing corridor, with multiple CFSs and distribution hubs supporting port-based trade.
- **Porur and Chennai Metropolitan Region periphery,** Rapidly growing commercial and service sectors, with rising movement of goods, construction materials, and workforce through the bypass.
- Chennai Bypass acts as a key industrial and logistics connector, integrating manufacturing, warehousing, and port operations within the Chennai Metropolitan Region.

Source: TIC secondary research

Economic activities in influence region (4)

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2 Maritime Cluster

- **Chennai Maritime Cluster** comprises three ports i.e., **Chennai, Ennore (Kamarajar) and Kattupalli**. Chennai maritime cluster is preferred choice for Far East origin/destinations for hinterland identified.
- **Hinterland served by Chennai Bypass:** south/south-west Tamil Nadu, Karnataka, Chennai and nearby industrial region discussed earlier in this section.
- **Major commodities handled:**
  - **Chennai Port:** mainly import cargo which includes **Container Cargo (~63%)**, Petroleum, Oil, Lubricants and LPG/LNG (~25%), Dry and Break Bulk Cargo (~10%)
  - **Ennore Port:** both export-import cargo which includes **Container Cargo (~25%)**, Petroleum, Oil, Lubricants and LPG/LNG (~12%), **Coal (~50% including Thermal, Steam, Coking)**, Dry and Break Bulk Cargo (~10%)
  - **Kattupalli Port:** Container Cargo, Soda Ash (major contribution), Black Oil Products (including Bitumen)
- **Capacity utilisation:** Chennai (36%) and Ennore (57%) in FY25 with designed capacity of 136 MMTPA and 97 MMTPA respectively.
- Port traffic especially container cargo is heavily dependent on road logistics.
- **Container Cargo and petroleum products are major items observed at the project highway** as regular movement between hinterland and maritime cluster which is highly volatile in monthly trend.
- Area nearby port cluster (Manali, Ennore Port Road, Redhill) is hub of logistics facilities like Container Freight Stations (CFS), warehousing/container yards, truck terminals, lodging/boarding for truckers.
- Chennai Multimodal Logistics Park (MMLP) is under construction at Mappedu (accessible through NH48 and at west of Chennai). Phase 1 commercial operations is expected by start of FY27. This will improve freight efficiency, reduce last-mile delivery challenges, link ports (Chennai, Ennore, Kattupalli) with industries and boost economic growth.
- Well established container ecosystem of this cluster and planned capacity expansion of container berths will ensure the associated traffic from hinterland on the project highway.
- NHAI is developing elevated corridor exclusively for Chennai Port (Maduravoyal to Chennai Port Gate 10) strengthen external evacuation infrastructure which will have a negative impact at Surapattu TP.

Source: TIC secondary research

Economic activities in influence region (5)

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3 Agriculture and allied activities

- **Paddy (rice)** is the primary crop grown in Tiruvallur, Kanchipuram and Chengalpattu districts, supported by irrigation from Poondi and Chembarambakkam reservoirs, while groundnut, sugarcane, millets and pulses are major secondary crops contributing to local agri-based processing.
- **Horticulture** and **floriculture** including banana, tomato, brinjal, mango and jasmine are commercially cultivated, supplying fresh produce to Koyambedu Market and surrounding urban centers.
- Allied activities such as dairy, poultry, and inland aquaculture are prominent near Red Hills and Minjur, driven by high urban demand and proximity to the Chennai Metropolitan Region.
- **Koyambedu Wholesale Market Complex**, located along the Chennai Bypass, spans about 295 acres and houses over 3,000 shops. It is one of the largest hubs for perishable goods in India, handling thousands of tonnes of fruits, vegetables, and flowers every day. The market supplies produce to the entire region and attracts heavy volume of business travelers and vehicles daily. It draws traffic from all directions, including southern Tamil Nadu, areas north of Chennai/Andhra Pradesh, and as far as Kolar and western Karnataka for fruits and vegetables.
- Nellore is known as 'Shrimp capital of India' with aquaculture influence in the region.

4 Tourism

- **Chennai** offers a mix of coastline, history, spirituality, and wildlife experiences for visitors which attracts a large volume of domestic and international tourists e.g., historic Fort St. George, cultural hubs like Kalakshetra, Kapaleeshwarar Temple, spiritual sites - Santhome Basilica and unique Madras Crocodile Bank.
- **Sri Venkateshwara Swami Vaari Temple at Tirupati** (richest temple in the world) attracts thousands of devotees from across India. IN addition to the same, Mypadu beach, Pulikat lake, ISRO center etc. are locate on the north of Chennai.
- **Kanchipuram**, known as the City of Thousand Temples, is a key spiritual and heritage destination, also famous for its traditional silk weaving.
- **Mahabalipuram**, a UNESCO World Heritage Site, promotes heritage and coastal tourism, collectively enhancing the region's religious, cultural, and leisure tourism along the Chennai Bypass corridor.

Source: TIC secondary research

Economic activities in influence region (6)

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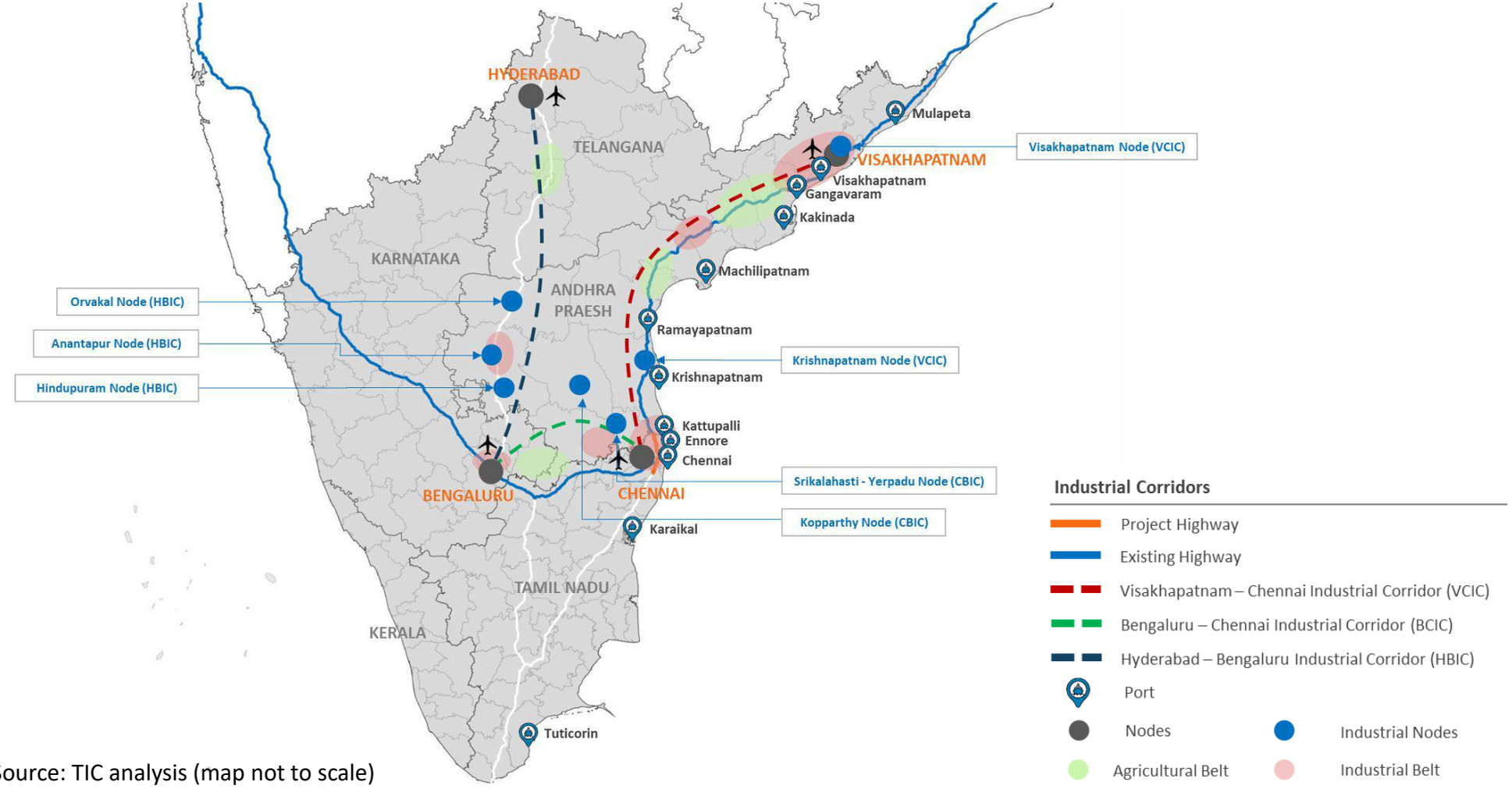
5 Social / Educational

- Various educational institutes, hospitals, social amenities are established along the bypass especially at Maduravoyal junction and immediate vicinity of 5 km on both end which sustain regular passenger traffic.
- Kalaignagar Centenary Bus Terminus (KCBT) near Kilambakkam (southern part of Chennai) and Madhavaram Mofussil Bus Terminus (MMBT) near end point (northern part of Chennai) facilitates regular bus services which use the project highway.

Source: TIC secondary research

Economic activities in influence region (7)

Industrial corridors under development



Source: TIC analysis (map not to scale)

- **Chennai – Bengaluru Industrial Corridor (CBIC)** proposes high impact / market driven nodes at **Ponneri in Tamil Nadu (NH16), Tumkur in Karnataka (NH48), Krishnapatnam/Nellore in Andhra Pradesh (NH16).**
- Industrial hubs and logistics with improved road/rail links, connecting Bengaluru and Chennai through strategic locations like Tumakuru, Kolar, Sriperumbudur and Krishnapatnam - leveraging proximity to Chennai Maritime Cluster for East Asia trade.

Our understanding of traffic corridor and road network

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National corridor (long-distance traffic)

- Chennai Bypass forms a strategic link within the Golden Quadrilateral (NH48), connecting the Mumbai–Bengaluru–Chennai corridor and South Tamil Nadu – Chennai linkages which facilitates long-distance freight movement across southern and western India, enabling continuous movement of goods between Bengaluru, Hosur, Sriperumbudur and Chennai, and further linking to eastern coastal ports such as Chennai, Ennore and Kattupalli.
- Project highway carries high volumes of industrial, containerized and port-based cargo, including automobiles, electronics, machinery and FMCG products, forming a key component of the Delhi–Chennai and Mumbai–Chennai freight corridors that support national-level logistics and trade.

Regional linkages (medium-distance traffic)

- The bypass connects major industrial and logistics zones within the Chennai Metropolitan Region (CMR) — including Tambaram, Chengalpattu, Sriperumbudur, Porur, Maduravoyal, Ambattur and Puzhal — supporting efficient freight transfer between manufacturing hubs and port terminals.
- It serves as a connector for automobile and electronic industries located along the Sriperumbudur–Oragadam–Irungattukottai industrial belt, facilitating transport to Chennai, Ennore, and Kattupalli ports for export and distribution. The corridor also links regional traffic between western approaches (NH44/Bengaluru) and northern/eastern sectors of Chennai city, reducing congestion on inner urban routes.

Local connectivity (short-distance traffic)

- Due to the rapid urbanization of Chennai, the bypass now functions as an integral part of the city's internal road network, handling substantial intra-city and suburban traffic. It supports the daily movement of commuters, goods vehicles, and port-related transport between industrial clusters, residential zones, and logistics parks.
- Additionally, it provides last-mile connectivity to city distribution centers and container yards, contributing to the efficient functioning of the urban freight ecosystem within the Chennai region.

Chennai bypass, initially designed to cater to intercity and freight traffic, is now being extensively used by urban commuters making it function more as urban corridor. Majority of traffic has either destination/origination within core city that is on eastern side of Chennai Bypass. Being access-controlled (with open tolling and limited entry-exit) modality makes it still effective for road users with sustaining a level of service comparable to a national highway. It caters to substantial intra-city and port-related traffic, including movements between Bengaluru/western and Chennai maritime cluster covering ports of Chennai, Ennore and Kattupalli.

Corridor traffic summary (1)

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Kolkata-Chennai corridor of NH16 and NH719B (old NH32/NH45)

Highway section	Concessionaire / Operator	Average PCU (approx.)
Dhankuni – Kharagpur	BOT (Toll) – Maple Highways	80,000
Kharagpur – Baleshwar	BOT (Toll) – IL&FS	18,000
Baleshwar – Bhadrak	Toll - Public Funded	32,000
Bhadrak – Chandikhole	Toll - Public Funded	35,000
Chandikhol – Bhubaneshwar	BOT (Toll) – Maple Highways	45,000
Bhubaneshwar – Sunakhala	Toll - Public Funded	25,000
Sunakhala – Puintola	Toll - Public Funded	25,000
Puintola – Icchapuram	TOT (Toll) – Safeway Concession/Macquire	21,000
Icchapuram – Nandigaon	TOT (Toll) – Safeway Concession/Macquire	20,000
Nandigama – Srikakulam	NHIT (Private InvIT Bundle 4)	28,000
Champavati/ Kopperla – Visakhapatnam	NHIT (Private InvIT Bundle 4)	32,000
Anakapall – Anandapuram	NHIT (Private InvIT Bundle 4)	25,000
Anandapuram – Tuni	Toll - Public Funded	44,000
Ankapalli – Tuni	Public Funded	44,000
Tuni – Diwancheruvu	Public Funded	40,000

Highway section	Concessionaire / Operator	Average PCU (approx.)
Gundugolanu – Devarapalli – Kovvuru	NHIT (Private InvIT 4)	33,000
Gundugolanu – Vijayawada	Public Funded – Under Monetization (Pvt InvIT 5)	50,000
Vijayawada – Chilakaluripet	Toll - Public Funded	60,000
Chilkaluripet – Nellore	BOT (Toll) – Interise (CPPIB)	30,000 / 50,000 / 45,000
Nellore – Tada	BOT (Toll) – Vertis (KKR)	52,000 / 33,000
Tada – Chennai	Toll - Public Funded	62,000
Chennai Bypass	Toll - Public Funded	45,000 / 52,000
Tambaram – Tindivanam	Public Funded	77,000 / 55,000
Tindivanam – Ulundurpet	BOT (Toll) – Vertis (KKR)	53,000
Ulundurpet – Padalur	BOT (Toll) – Abertis India	50,000
Padalur – Trichy	BOT (Toll) – Uniquest Infra Ventures	40,000
Trichy – Madurai	Public Funded	24,000
Madurai – Thoothukudi	Public Funded – TOT 19 (Under Bidding)	25,000

Source: TIC analysis

Corridor traffic summary (2)

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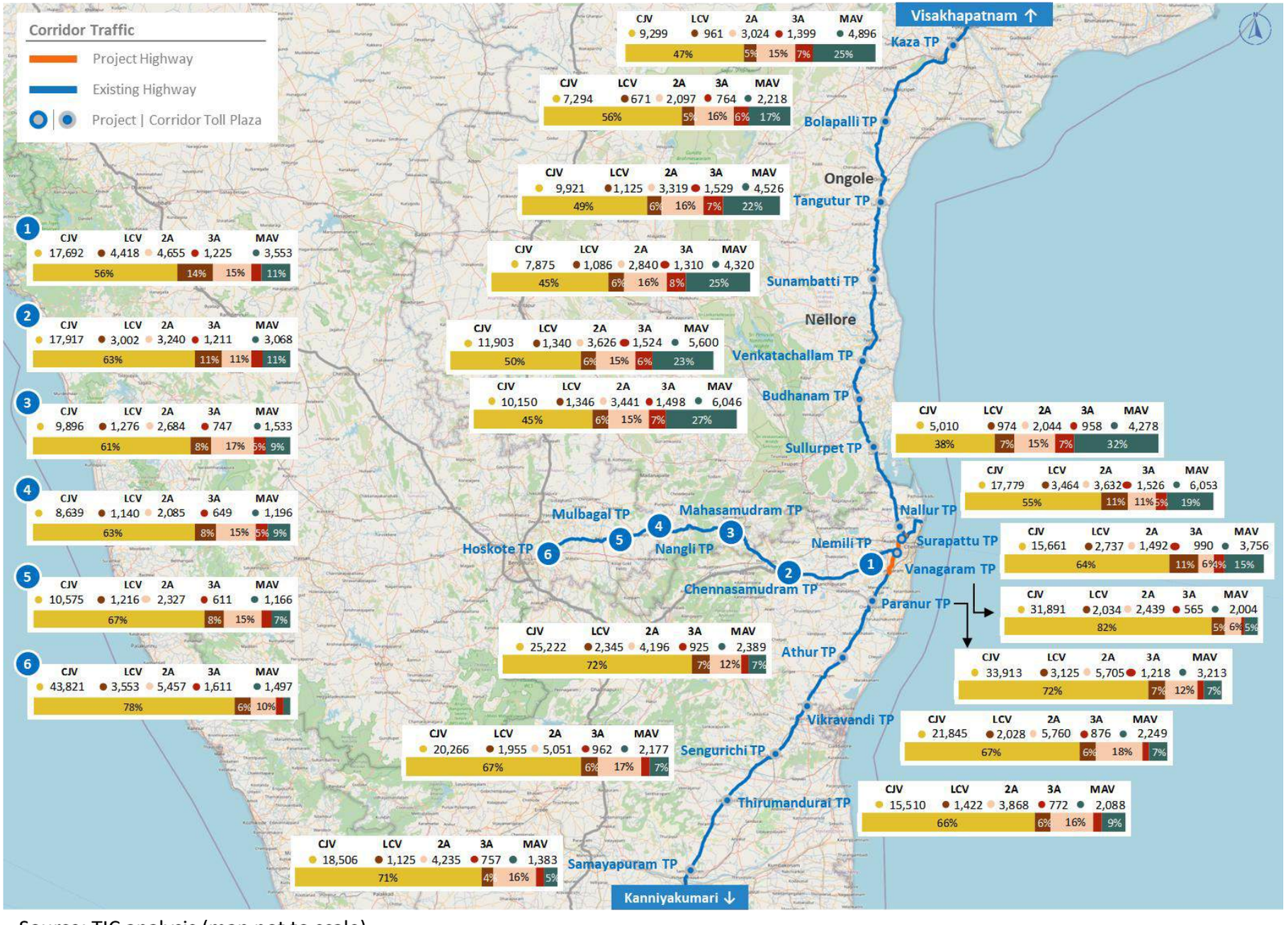
Traffic composition on the corridor: 7 months ADT of FY26 till October 2025



Source: TIC analysis (map not to scale)

Competing corridor: network and traffic summary (1)

- **Chennai Outer Ring Road** (ORR) is a 62 km 6-lane access-controlled corridor developed in two phases by state government to ease city traffic.
- ORR was developed in two phases:
  - Phase-1: Vandalur to Nemilicheri; started in 2014 without toll till January 2022
  - Phase-2: Nemilicheri to Minjur; started around March 2021 without toll till January 2022
- ORR connects Chennai - Tirchy Highways at Vandalur with Thivottiyur - Ponneri - Panchetti road at Minjur. It passes through NH48 at Nazarathpet, NH205 at Nemilicheri, Padiyanallur at NH16
- Vehicles coming from via Tada/Bengaluru/Tirchy can reach the ports in north Chennai through ORR without entering Chennai bypass road. Similarly, vehicles from Madhavaram, Red Hills, Puzhal, Thiruvottiyur and other northern parts of the city heading to Tirupati can reach Chennai - Tirupati NH through ORR. The vehicles from the Madhavaram bus terminus can enter NH48 (towards Bengaluru) through Nazarathpet.
- 6-lane access-controlled road has service roads on either side and designed with standards of express highway with no U-turns (except at toll gates) and vehicles are permitted to run at 100 km.
- The user fee is collected at four toll plaza locations (open tolling modality with access-controlled) in order of starting from Vandalur to Minjur i.e., Varatharajapuram (Ch km 6.000) Kolappancheri (Ch km 21.800), Palavedu (Ch km 30.850 and Chinnamullaivoyal (Ch km 56.700).
- Traffic between Chennai Bypass and ORR has attained dynamic equilibrium during FY25 to FY26 YTD as per traffic data, origin-destination survey at both the highway sections (2 TPs on Chennai Bypass and 4 TPs on ORR), site visit and stakeholder consultation.
- Traffic diversion takes place from Chennai Bypass to alternate routes including ORR during various during Diwali/Pongal/Ayudha Pooja etc. festivity, VIP movement, peak hours diversion, water logging at Chennai Bypass due to heavy monsoon etc.
- Comparative summary of traffic volume of FY25 and FY26 till September 2025 for Chennai Bypass and ORR is presented on next page.

Competing corridor: network and traffic summary (2)

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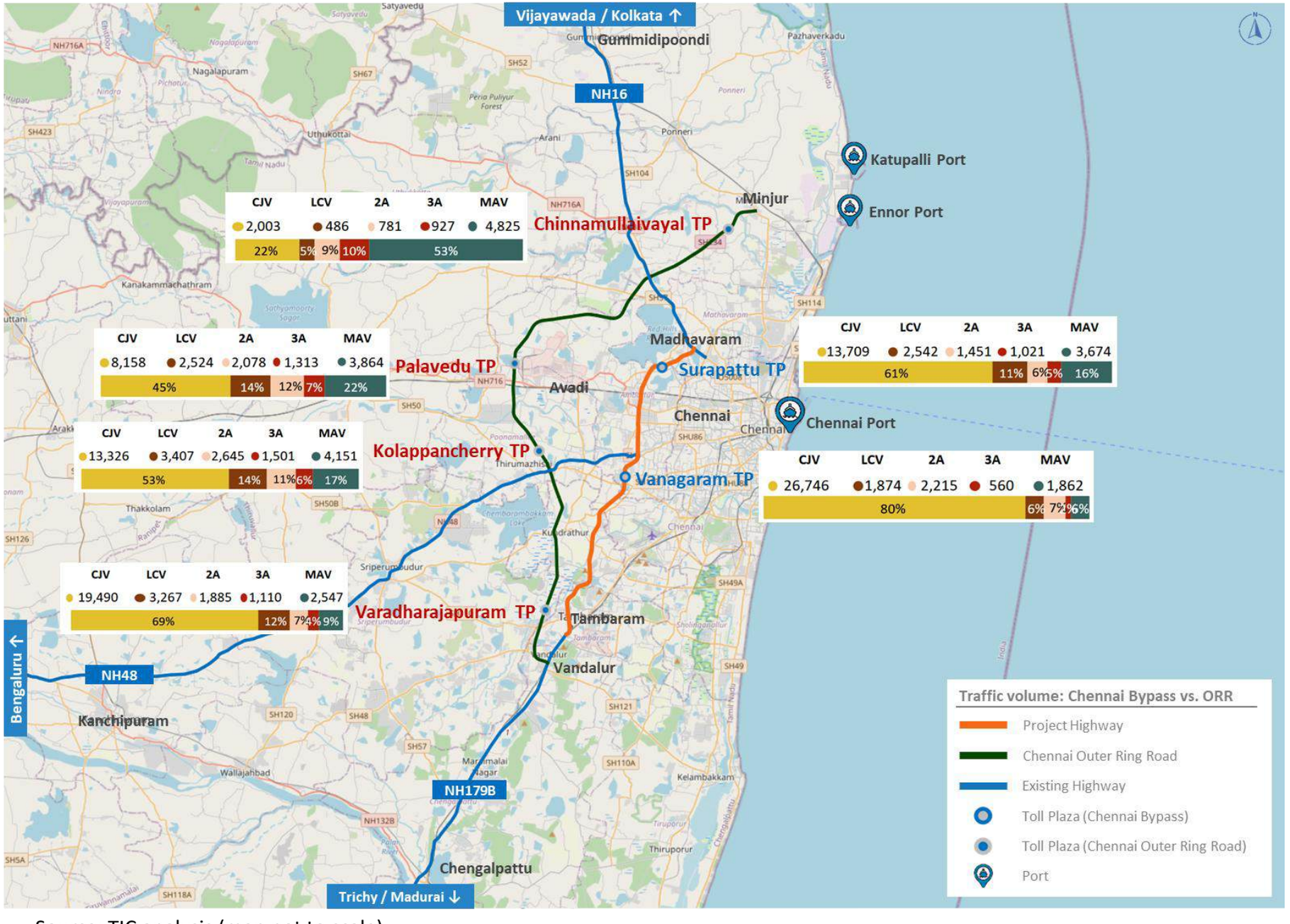
Traffic composition: Chennai Bypass and ORR (FY25)

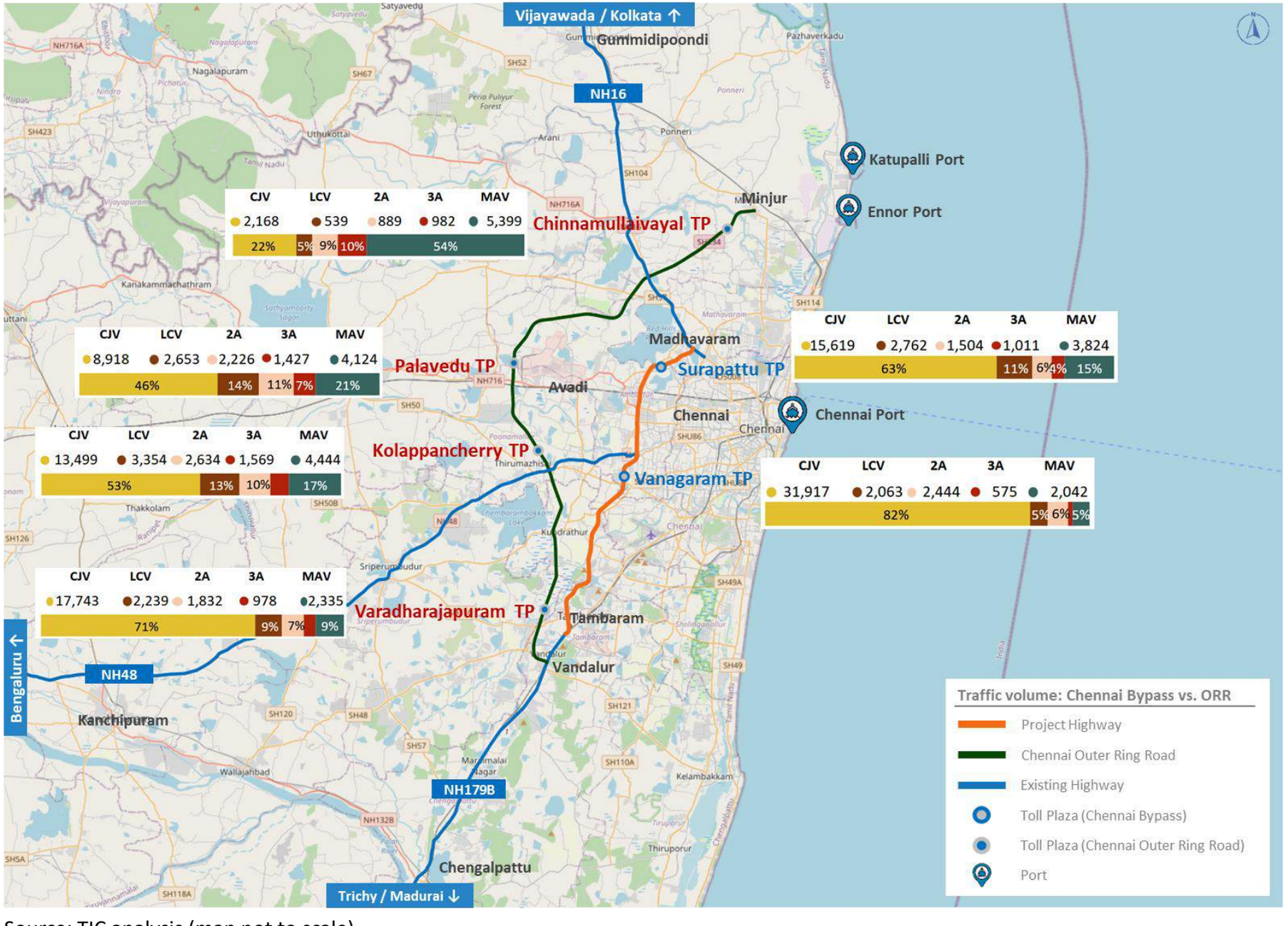


Source: TIC analysis (map not to scale)

Competing corridor: network and traffic summary (3)

TRANSLINK® Infrastructure Consultants Pvt Ltd *Smart Consulting*

Traffic composition: Chennai Bypass and ORR (7 months ADT of FY26 till September 2025)



Source: TIC analysis (map not to scale)

Site photographs

Start Point (km 0.000)

Vanagaram Toll Plaza (km 16.620)

Maduravoyal Interchange

Cross Section

Surapattu Toll Plaza (km 28.600)

End Point (km 32.600)

Source: TIC site visit

Proposed infrastructure development in the region (1)

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Network and infrastructure development in the influence region (refer map on Pg 35)

Particulars of the development	Authority / Mode of Development / Developer	Status / expected completion	Possible impact
Chennai Peripheral Ring Road (CPRR) (6 lane + PS with Service Road)	Tamil Nadu Road Development Corporation / EPC 5 Sections with multiple packages and developers	**Section 1:** Northern port access road (Ennore Port to Thatchur on NH16 (25.40 Km) Under construction; expected completion in FY28 **Section 2:** Thatchur on NH16 to start of Thiruvallur Bypass (26.10 Km) **Section 3:** Start of Thiruvallur Bypass to Sriperumbudur on NH48 (30.10 Km) Only Package 3: Start of Thiruvallur Bypass to Vengathur (10.40 Km) Under construction **Section 4:** Sriperumbudur NH48 to Singaperumalkoli on NH38/NH719B (23.80 Km) **Section 5:** Singaperumalkoli on NH38/NH719B to Mamallapuram (28.24 Km) Under bidding process	**Negative** for Surapattu TP **Chennai – Bengaluru Industrial Corridor (CBIC)** proposes high impact / market driven nodes at Ponneri in Tamil Nadu (NH48), Tumkur in Karnataka (NH48), Krishnapatnam/Nellore in Andhra Pradesh (NH16). Bengaluru – Chittor – Thatchoor corridor in association with northern end of Chennai Peripheral Ring Road (CPRR) will **be backbone to this mega industrial corridor.** Traffic movement between Bengaluru/west and Ennore/Kattupalli Port without using logistics facility (CFS/Container Yard) at Manali area
Bengaluru Chennai Expressway (4 lane)	NHAI / HAM Multiple phases/packages and developers	**Phase 1 of NE7 (Karnataka):** operational **Phase 2 of NE7 (Andhra Pradesh):** Total 3 packages; under construction and expected to be operational by mid FY28 **Phase 3 of NE7 (Tamil Nadu):** Total 3 packages; under construction and expected to be operational by mid FY28 **Chittoor Thatchur section of NH716B:** Total 4 packages; under construction and expected to be operational by end of FY28	
Chittoor Thatchoor section NH716B (6 lane)	NHAI / HAM Multiple packages and developers	Total 4 packages; under construction and expected to be operational by end of FY28	

Source: TIC research and analysis

Proposed infrastructure development in the region (2)

TRANSLINK® Infrastructure Consultants Pvt Ltd Smart Consulting

Network and infrastructure development in the influence region (refer map on Pg 35)

Particulars of the development	Authority / Mode of Development / Developer	Status / expected completion	Possible impact
Chennai Port Maduravoyal elevated corridor (Double tier 4-lane elevated corridor)	NHAI / 4 EPC Packages J. Kumar Infra Projects Limited in JV with Azvirt LLC	Under construction Expected completion in FY29	**Negative** for Surapattu Toll Plaza ▪ NHAI is developing elevated corridor exclusively for Chennai Port (Maduravoyal to Chennai Port Gate No. 10) strengthen external evacuation infrastructure. ▪ Double tier 4-lane elevated corridor along the Coum River as part of NH48 and will land inside premise of Chennai Port. ▪ Further, Chennai Port is implementing strengthening program of internal roads for ease on movement between Gate No. 1 to 10 followed by internal elevated corridor as long-term solution to ease out internal congestion. ▪ This development will provide ease to port-bound traffic, improve freight access, and reduce congestion.
Surat Chennai Expressway	NHAI / HAM Multiple packages and developers	Multiple sections at various stages i.e., land acquisition, bidding, and construction Expected completion by FY30	**Nil**
Proposals mentioned in Comprehensive Mobility Plan Chennai Metropolitan Area (Executive Version 2023 – 2048)	Chennai Unified Metropolitan Transport Authority (CUMTA) ▪ Additional entry/exit ramp request on Chennai Bypass ▪ Metro rail development	Additional entry/exit at Ch km 5.200 in context of Madras Export Processing Zone (MEPZ) Airport – Kilambakkam – Chengalpattu (42.1 km; Corridor 1 Extension) by 2030 Perungalathur to Madhavaram Mofussil Bus Terminus (MMBT) along Chennai Bypass (34.6 km; by 2040)	**Positive** Perungalathur to Madhavaram Mofussil Bus Terminus (MMBT) along Chennai Bypass (34.6 km; by 2040) has been considered under effect of capacity constraint as one of the alternate option for commuters Refer **Appendix A: Additional entry/exit request on Chennai Bypass other than in context of MEPZ and Metro Planning**

Source: TIC research and analysis

Proposed infrastructure development in the region (3)

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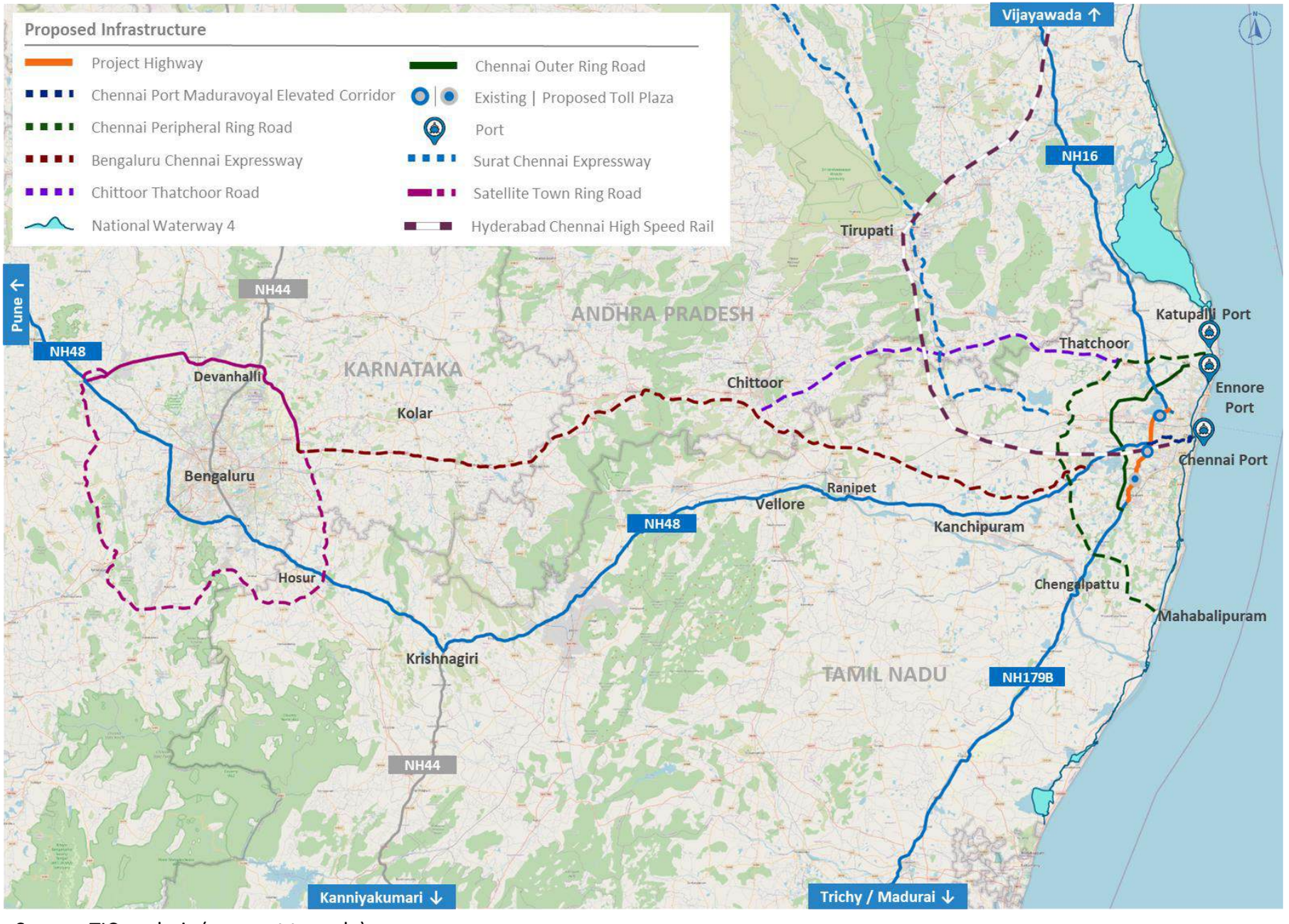
Network and infrastructure development in the influence region



Source: TIC analysis (map not to scale)

Chapter 3: Traffic analysis

- Historical data sources
- Historical traffic and revenue trends
- Seasonality variation
- Historical ticket distribution
- Commodity analysis
- Zonal influence and trip distance

This chapter covers various datasets received from NHAI followed by assessment of historical performance of the project highway. This analysis helps to understand baseline traffic patterns comprising traffic and revenue growth rates, seasonality variations, trip factors, ticket distribution and overloading characteristics.

Survey analysis helps to validate traffic volume, commodity movement pattern, network understanding received from site visit, inputs for ticket distribution, overloading pattern based on independent survey exercise.

Historical datasets

- The project highway is currently being operated under the public-funded mode where toll is collected by third party tolling agencies through short-term contracts. Third party tolling agencies submit traffic and revenue report on monthly basis which is titled as Schedule V.
- The consultant observes that availability and accuracy of these reports are many times under question due to inadequate quality of technology interventions and record keeping during short term contracts by tolling agencies.
- Hence, availability followed by reliability of these datasets is essential to be addressed for historical analysis as well as further processing for base year and future traffic forecasts.
- ETC data is independently system generated and hence more reliable. The client sourced vehicle category-wise traffic data which doesn't include toll ticket distribution.
- Monthly reports submitted by contractors / tolling agencies to NHAI field offices (Schedule M/G/V) which is start point to validate the toll ticket distributing including cash components, violation/exemptions, overloading fee etc.

Summary of the historical traffic and revenue data available for Vanagaram and Surapattu Toll Plazas

Data sources	Duration of data	Observations
Schedule V - Part A & B (monthly)	FY14: Full year (except Apr-13) FY15: Full year FY16: Full year FY17: Full year FY18: Full year FY19: Full year FY20: Full year FY21: Partial for both toll plazas FY22: Nil FY23: Full year FY24: Full year FY25: Full year FY26: H1 (except Apr-25) (6 months)	**Part A:** Vehicle category-wise total user fee collection **Part B:** Vehicle category total traffic Ticket distribution data: Yes Exemption/violation/ cash traffic data: Yes
ETC Data (monthly)	FY23: Full year FY24: Full year FY25: Full year FY26: Q1, Q2, Oct'25 (7 months)	Vehicle category-wise ETC transactions covering total traffic and user fee collection Ticket distribution data: No
Overloading Reports (weekly)	No overloading penalty / fee is being levied at present based on understanding from site visit and discussion with PIU Chennai 2	
Neighbouring highways	Historical traffic data to determine corridor growth trend	

Source: TIC compilation of data received from NHAI

ETC data was reviewed for historical analysis as it is reliable. Schedule M/V dataset observed intermittent anomalies but useful at broad level for analysing long-term growth trend.

Historical traffic analysis (1): Vanagram TP

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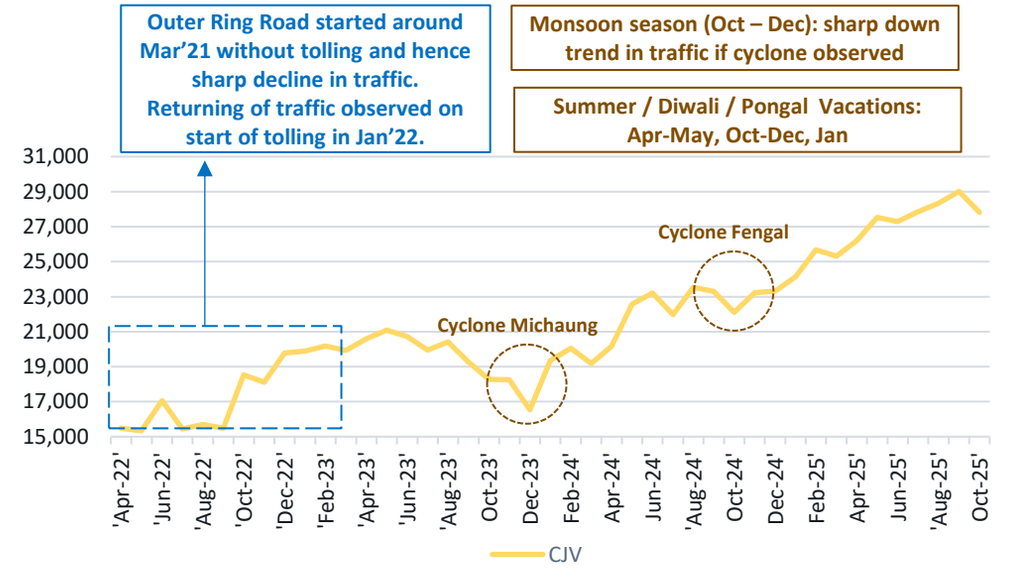
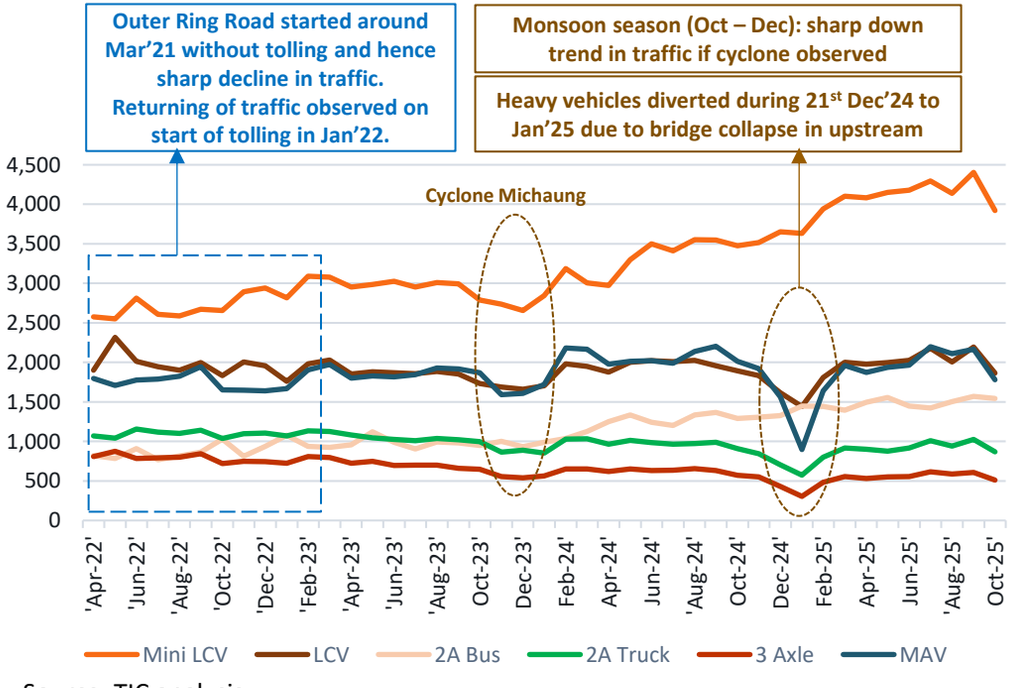
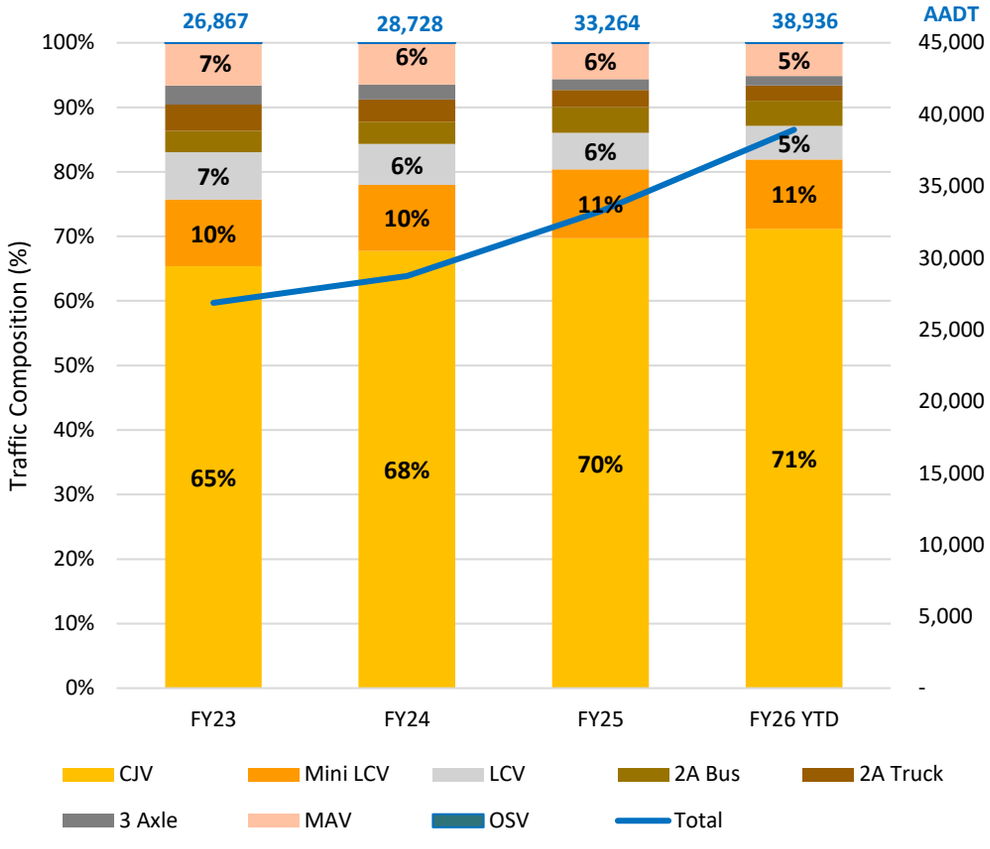
Vehicle category-wise monthly traffic trend - ETC





Source: TIC analysis

Vehicle category-wise annual traffic composition - ETC



- Traffic has trended in the range of 39,000 AADT (53,000 PCUs) in recent past with CJVs (70%) and Mini LCV (10%) as major contributors while balance ~20% is total contribution of heavy freight vehicles.
- High number of CJVs is obviously because of urban nature of bypass section which is mainly destined/originated within Chennai city i.e., inside the area of virtual semi-circle established by Chennai Bypass.

Historical traffic analysis (2): Vanagram TP

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Vehicle category-wise traffic growth trend

Vehicle Category	CJV	Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	Total	PCU
Annual Average Daily Traffic (AADT)									
FY23	17,566	2,772	1,970	890	1,100	788	1,781	**26,867**	**39,641**
FY24	19,468	2,927	1,826	998	990	653	1,866	**28,728**	**41,454**
FY25	23,197	3,549	1,874	1,328	887	560	1,869	**33,264**	**46,293**
FY26 till Oct'25	27,725	4,166	2,034	1,505	934	565	2,007	**38,936**	**52,985**
Growth trends									
FY24 vs FY23	10.8%	5.6%	(7.3%)	12.2%	(10.0%)	(17.1%)	4.5%	**6.9%**	**4.6%**
FY25 vs FY24	19.2%	21.2%	2.6%	33.0%	(10.4%)	(14.3%)	0.4%	**15.8%**	**11.7%**
FY26* vs FY25	23.7%	22.7%	3.3%	16.8%	(3.9%)	(9.9%)	(2.3%)	**19.0%**	**13.5%**
CAGR (FY23 – FY26 YTD)	20.0%	17.7%	1.3%	23.4%	(6.3%)	(12.5%)	4.9%	**16.0%**	**12.3%**

Source: TIC analysis * against FY25 for 7 months i.e., April-October

Long and medium-term growth rate of project highway

CAGR	CJV/Mini LCV	LCV	Bus/2A Truck	3A Truck	MAV/OSV	Total	PCU
Vanagram TP							
Short-term	18.0%	3.1%	10.4%	(6.5%)	5.6%	14.9%	12.2%
Medium-term	17.8%	(8.7%)	6.8%	(8.8%)	4.1%	11.7%	8.9%
Long-term	13% - 15%	1% - 3%	12% - 15%	(~3%)	~5%	12% - 13%	

Source: TIC analysis

Short-term is realistic as exhibits growth post-ORR Phase-2 commencement in FY21/FY22 without/with toll and return of loyal traffic

Medium-term reestablishes growth trend as includes shock due to diversion of ORR Phase-2 commencement in FY21/FY22

Long-term reassures the growth potential of the project highway as includes shock due to diversion of ORR Phase-1 (FY15/FY16) and Phase-2 (FY21/FY22)

Historical traffic analysis (3): Surapattu TP

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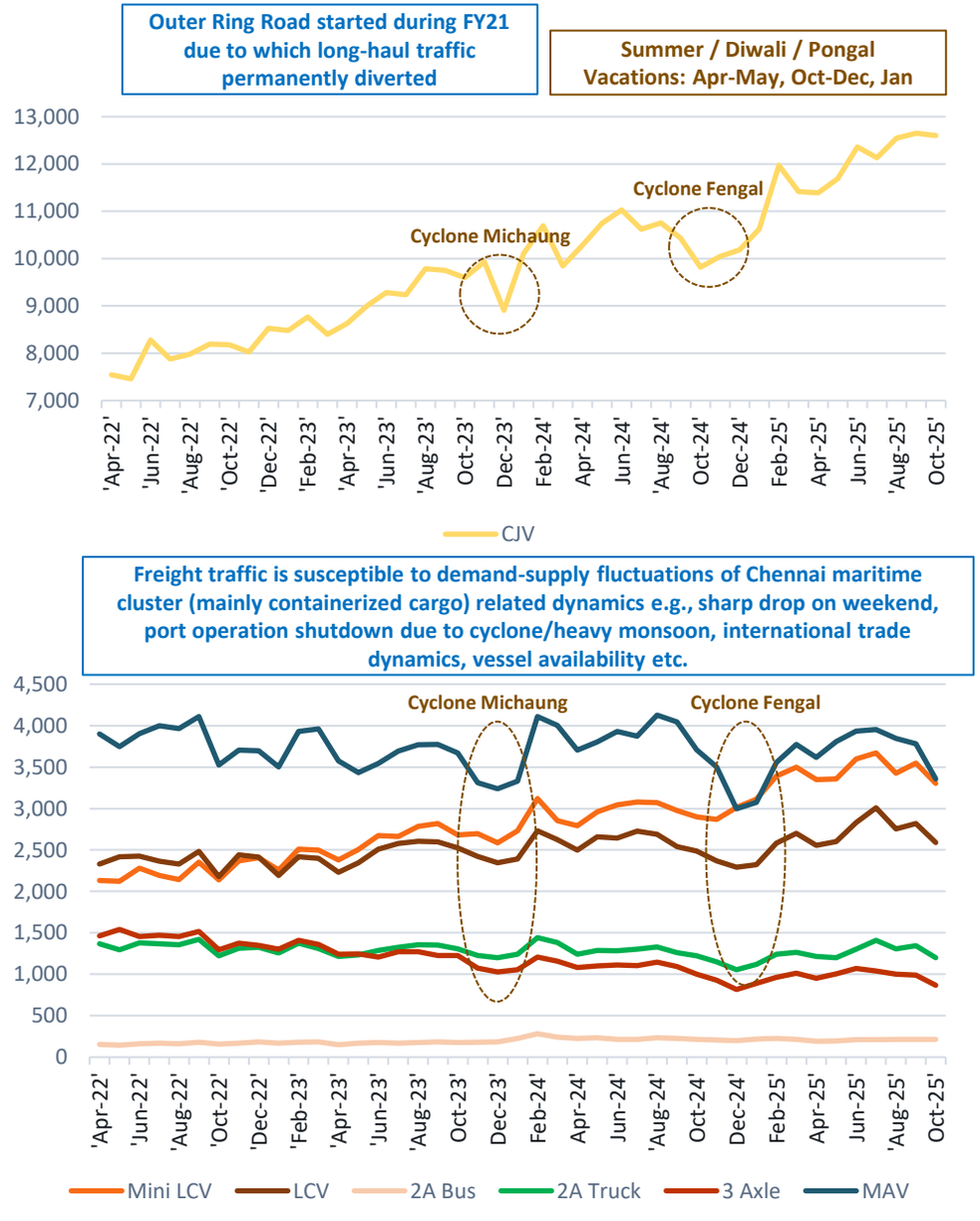
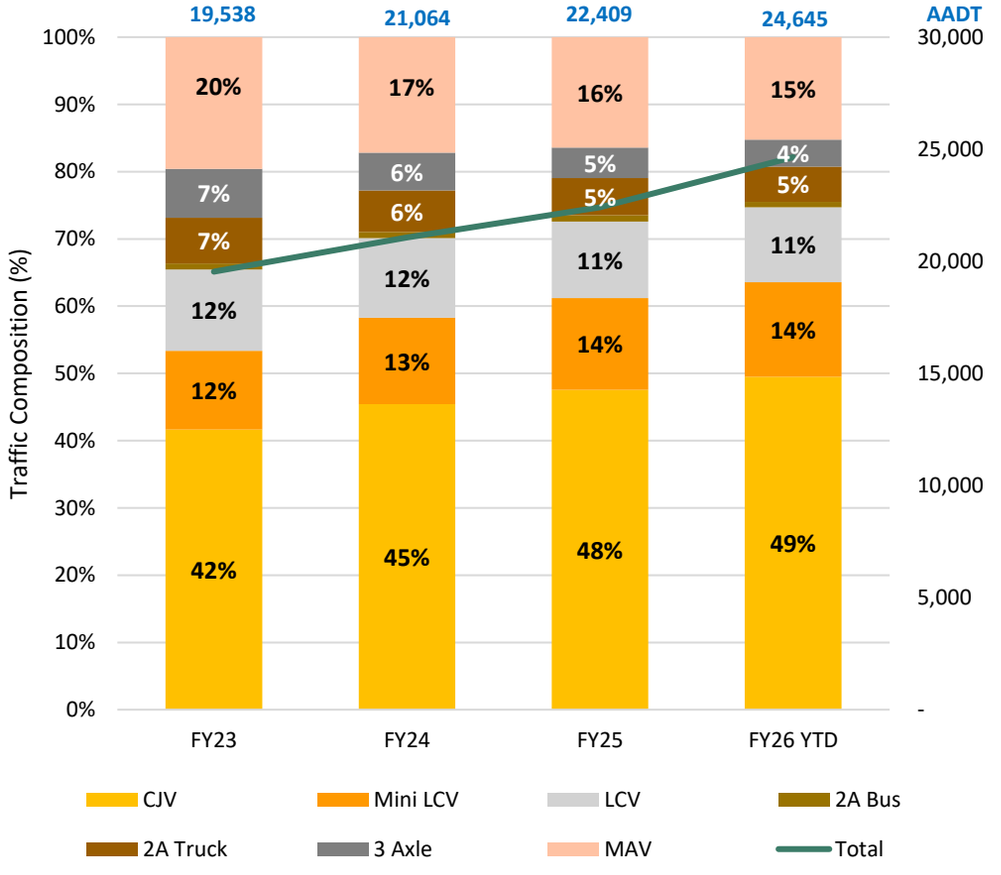
Vehicle category-wise monthly traffic trend - ETC



Vehicle category-wise annual traffic composition - ETC



- Surapattu TP observed a significantly lower volume of CJV (~44% of Vanagram TP) and Bus (~15% of Vanagram TP) which is because traffic uses internal routes passing through Ambattur residential and industrial area.
- While freight traffic observed higher volume than Vanagram TP due to addition of traffic from industrial clusters in south-west of Chennai and Karnataka, merging through NH48 at Maduravoyal junction i.e., LCV (~35% ↑), 2A (~40% ↑), 3A (~75% ↑) and MAV (~90% ↑).

Source: TIC analysis

Historical traffic analysis (4): Surapattu TP

TRANSLINK® Infrastructure Consultants Pvt Ltd Smart Consulting

Vehicle category-wise traffic growth trend

Vehicle Category	CJV	Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	Total	PCU
Annual Average Daily Traffic (AADT)									
FY23	8,139	2,282	2,365	168	1,333	1,417	3,836	**19,538**	**39,980**
FY24	9,558	2,706	2,491	193	1,297	1,185	3,633	**21,064**	**40,377**
FY25	10,652	3,057	2,542	220	1,231	1,021	3,686	**22,409**	**41,526**
FY26 till Oct'25	12,197	3,464	2,737	208	1,283	990	3,765	**24,645**	**44,154**
Growth trends									
FY24 vs FY23	17.4%	18.6%	5.3%	15.1%	(2.7%)	(16.4%)	(5.4%)	**7.8%**	**1.0%**
FY25 vs FY24	11.4%	13.0%	2.0%	14.0%	(5.1%)	(13.8%)	1.5%	**6.4%**	**2.8%**
FY26* vs FY25	15.9%	16.5%	5.0%	(7.3%)	0.5%	(9.3%)	(3.3%)	**9.1%**	**3.3%**
CAGR (FY23 – FY26 YTD)	17.6%	18.2%	6.0%	8.9%	(1.5%)	(13.4%)	(0.7%)	**9.7%**	**4.1%**

Source: TIC analysis * against FY25 for 7 months i.e., April-October

Long and medium-term growth rate of project highway

CAGR	CJV/Mini LCV	LCV	Bus/2A Truck	3A Truck	MAV/OSV	Total	PCU
Surapattu TP							
Short-term	13.4%	5.2%	(4.9%)	(9.1%)	0.3%	7.5%	3.1%
Medium-term	~14%	~4.5%	~6.5%	(~3.5%)	~9%	11.7%	8.9%
Long-term	~15%	~4%	~6%	(~3.5%)	~10%	8% - 10%	

Source: TIC analysis

Short-term is realistic as exhibits growth post-ORR Phase-2 commencement in FY21/FY22 without/with toll and return of loyal traffic

Medium-term reestablishes growth trend as includes shock due to diversion of ORR Phase-2 commencement in FY21/FY22

Long-term reassures the growth trend as includes shocks due to diversion of ORR Phase-1 (FY15/FY16) and Phase-2 (FY21/FY22)

Historical traffic analysis (5)

- The project highway, being of urban nature, passenger traffic contributes heavily as observed in trend analysis.
- Key characteristics for CJVs traffic are as follows in addition to discussed in preceding of pages:
  - The project highway observed periodical diversion of traffic from southern or northern end of the bypass e.g., during Diwali/Pongal/Ayudha Pooja etc. festive periods, VIP movement, peak hours diversion, water logging in upstream due to heavy monsoon etc. Diversions planned en-route Kilambakkam ahead of Diwali | Chennai News - The Times of India
  - Traffic observed lower on weekend and during flood/cyclone like situations which is obvious for an urban corridor like Chennai Bypass. While, during monsoon moderately down as road users have social and work commitments to be fulfilled.
  - Traffic observed on higher during festivity / school vacations / marriage seasons i.e., April-May, Jan-Feb, Oct-Nov.
  - Vanagram TP observed forced exemption in CJV/Mini LCV categories during peak hours due to identified black spot near toll plaza. Traffic police requests toll operating agency to open boom barrier for faster evacuation of traffic. This challenge will be eliminated on shifting of toll plaza to new location and hence improvement in forced exemption/violation is expected.
- Vegetable/Fruits/Flowers traffic carrying by Mini LCV / LCV / 2A is of captive nature at both toll plazas in context of Koyambedu Wholesale Market.
- Across Tamil Nadu, all vehicle categories observes higher traffic during months of January and May due to Pongal and Jalikattu Festivity / vacations / marriage season (after 14th January) which leads to higher social travel of passenger vehicles. This also contributes to increase in consumption at urban centers.
- Last week of December and first half of January is harvesting season followed by increase in rural demand (annual grocery purchase) in second half of the month is being witnessed.
- May observes higher real estate and construction material movement as pre-monsoon completion of work.
- 2A/3A observed very limited effect of restrictions on illegal sand mining in Southern Tamil Nadu during FY24 at the project highway.

Historical traffic analysis (6)

- Container cargo and petroleum products are major items observed at the project highway as regular movement between hinterland and maritime cluster which is highly volatile in monthly trend. Traffic gets affected as and when port operations are temporarily shutdown due to cyclone. Decrease in port traffic is visible on weekend compared to weekdays.
- Cyclone has affected the traffic in past due to lower social/business movement as well as temporary shutdown of port operations.
  - **FY2025:** Cyclone Fengel in November-December 2024
  - **FY2024:** Cyclone Michaung in December 2023
  - **FY2023:** Cyclone Mandous in December 2022
  - **FY2021:** Cyclone Nivar in November 2020
  - **FY2019:** Cyclone Gaza in November 2018
  - **FY2017:** Cyclone Vardah in December 2016
  - **FY2016:** Tamil Nadu recorded an exceptionally heavy rainfall during November - December 2015 due to the north-east Monsoons. This unprecedented rainfall took place in four spells, and which has badly affected traffic across Tamil Nadu mainly Chennai and adjoining districts.

Historical revenue analysis (1): Vanagaram TP

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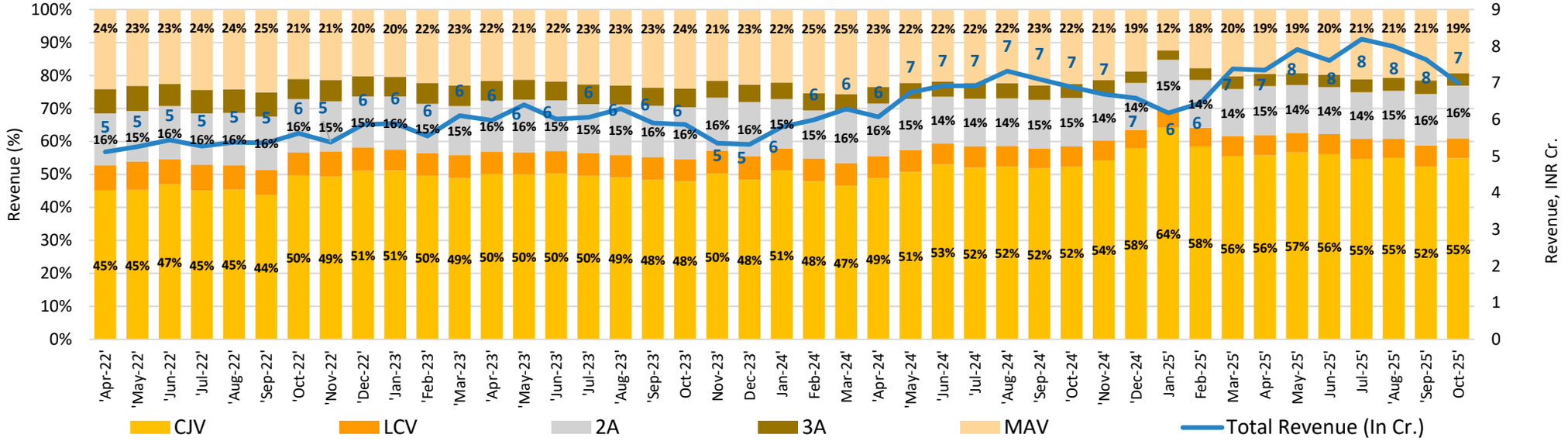
Vehicle category-wise monthly revenue composition and trend - ETC



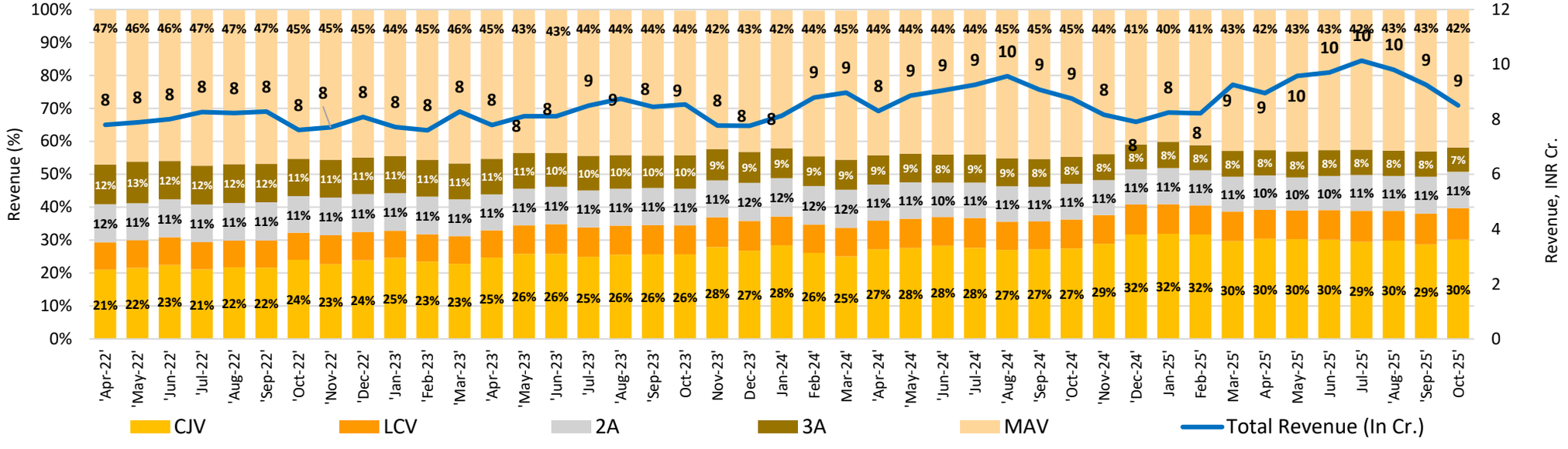
Vehicle Category	CJV	Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	Total	AADC
Annual Revenue (in INR Crore) and Annual Average Daily Collection (in INR Lakh)									
FY23	27.4	4.2	4.9	4.6	5.7	4.4	15.0	**66.2**	**18.14**
FY24	30.5	4.5	4.9	5.5	5.6	4.0	16.4	**71.3**	**19.46**
FY25	38.3	5.8	5.0	6.9	5.0	3.4	16.8	**81.2**	**22.25**
FY26 till Oct'25	25.6	4.0	3.3	4.8	3.2	2.1	10.8	**53.7**	**25.08**
Growth trends									
FY24 vs FY23	11.3%	6.8%	(0.4%)	19.5%	(3.4%)	(10.9%)	9.5%	**7.6%**	**7.3%**
FY25 vs FY24	25.5%	28.0%	2.1%	26.4%	(10.0%)	(13.2%)	2.8%	**14.0%**	**14.3%**
FY26* vs FY25	18.6%	24.1%	7.0%	21.7%	(0.3%)	(7.8%)	0.5%	**12.0%**	**12.0%**

Source: TIC analysis * against FY25 for 7 months i.e., April-October

Historical revenue analysis (2): Surapattu TP

TRANSLINK® Infrastructure Consultants Pvt Ltd *Smart Consulting*

Vehicle category-wise monthly revenue composition and trend - ETC



Vehicle Category	CJV	Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	Total	AADC
Annual Revenue (in INR Crore) and Annual Average Daily Collection (in INR Lakh)									
FY23	16.8	4.8	8.0	1.2	9.7	11.0	44.0	**95.5**	**26.16**
FY24	20.1	5.8	8.8	1.5	9.8	9.8	43.9	**99.7**	**27.24**
FY25	23.2	6.9	9.2	1.7	9.5	8.6	45.5	**104.7**	**28.68**
FY26 till Oct'25	14.9	4.8	6.0	1.0	6.0	5.1	28.2	**66.0**	**30.81**
Growth trends									
FY24 vs FY23	19.9%	22.0%	9.7%	21.0%	1.7%	(10.8%)	(0.4%)	**4.4%**	**4.1%**
FY25 vs FY24	15.5%	18.8%	5.2%	16.0%	(3.0%)	(12.5%)	3.7%	**5.0%**	**5.3%**
FY26* vs FY25	11.5%	21.6%	9.4%	(2.4%)	5.0%	(5.6%)	0.7%	**4.9%**	**4.9%**

Source: TIC analysis * against FY25 for 7 months i.e., April-October

Ticket distribution (1)

Schedule V (Part B) is a monthly statement presenting vehicle category and ticket distribution-wise traffic data including exemption, local concession / other discounted details.
Toll ticket distribution refers to share of total revenue with respect to various journey types and related discounts applicable. This distribution depends on vehicle category, trip lengths, trip frequency and percentage of local traffic.
As per Toll Plaza Gazette Notification and Toll Rate Revision Circular of FY26 for Kulgo TP, types of toll tickets are being issued are presented in the below table.

Ticket Category	Description
Single Ticket	One-way journey on the project highway is considered as single journey. For such journeys, users are required to pay the complete notified one-way fee.
Return Ticket	Two one-way journeys on the Project highway within 24 hours are covered under this category. For such journeys, users are required to pay one and half times of the fee payable for one-way journey.
Monthly Pass	Fifty one-way journeys on the Project highway within a month covered under this category. The concessionaire shall, upon request from any person, issue a monthly pass for fifty one-way journeys at a discounted rate equivalent to two-thirds of fifty one-way journeys.
Local Pass (Local Personal)	Road user who owns a mechanical vehicle registered for non-commercial purposes and resides within a distance of 20 km from the toll plaza can get local monthly pass.
Commercial vehicle registered within district of plaza (Local Commercial)	Commercial vehicles (excluding vehicles plying under national permit) registered in the district where the toll plaza is located. Fee shall be 50% prescribed rate for that category of vehicle provided no service road or alternative road is available for use of such commercial vehicles.
Exempted	This journey ticket category is for all users (like Police, Fire Brigade, Ambulance, Defence, etc.) which are exempted from paying toll as per NHAI Toll rules.
Annual Pass for private non-commercial CJV vehicles	On June 18, 2025, MoRTH introduced a FASTag-based annual pass to facilitate seamless highway travel. This pass is valid for non-commercial private vehicles such as cars, jeeps, and vans, and remains effective for one year from the date of activation or up to 200 trips—whichever comes first for INR 3,000. Trip counting method is as follows: Open Tolling: Each entry / exit counts as one trip Closed Tolling: One entry to exit trip counts as one

Source: DCA, NH Fee Rules 2008 and subsequent amendments and existing gazette notifications

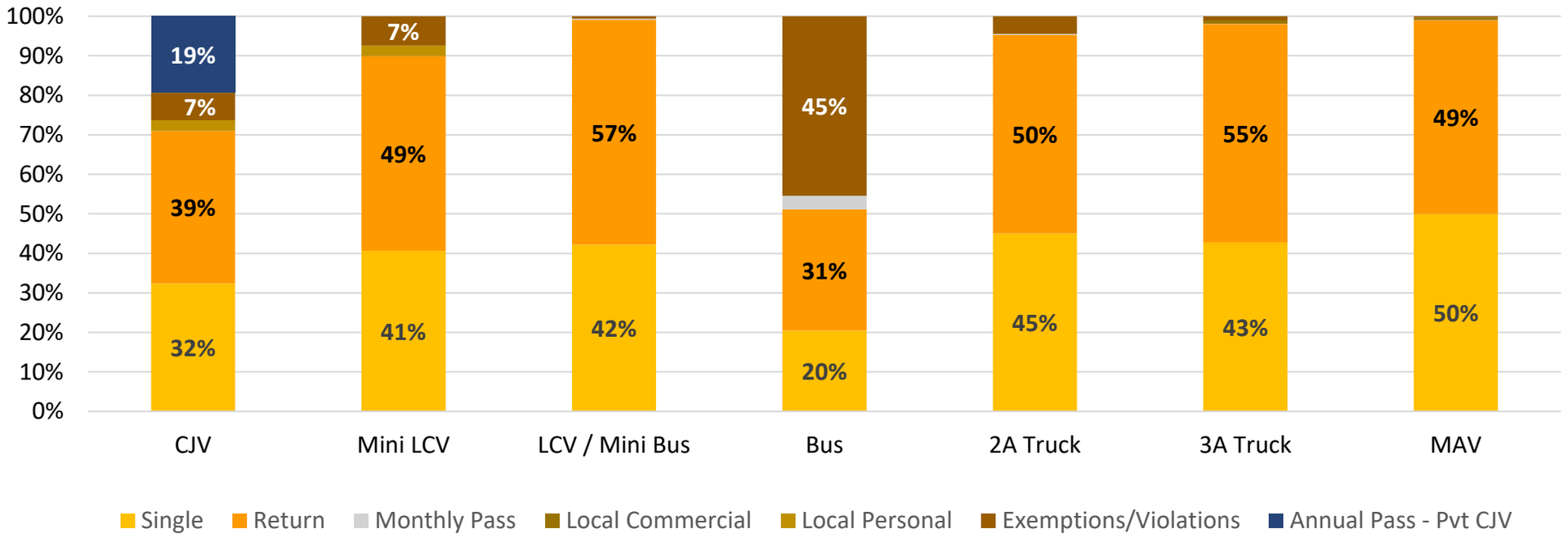
Ticket distribution (2)

Currently it is envisaged that annual passes will be issued directly by concerned authority and hence revenue from sale of annual passes will not accrue to the concessionaire. NHAI has issued advisory for reimbursement of loss of revenue due to annual pass usage to the concessionaire which is part of Draft Concession Agreement as Clause 27.1.5 and described below:

- The concessionaire acknowledges and agrees that any user owning a non-commercial vehicle and holding a valid and functional FASTag Pass in accordance with MoRTH Gazette Notification No. G.S.R. 388(E) dated 17th June 2025 shall be entitled to use the project highway without any restrictions, except to the extent specified in any applicable law, applicable permit or the provisions of the draft concession agreement.
- In respect of such vehicle crossing the toll plaza(s), the concessionaire shall be entitled to receive compensation from the authority equivalent to the product of:
  - The number of non-commercial vehicles crossing the toll plaza(s) with such pass; and
  - 90% of the applicable fee for single journey of such vehicle.
- Provided, however, that for the purpose of computation of such compensation, the counting of any particular vehicle shall be limited 2 crossing per day, notwithstanding that such vehicle may cross the toll plaza(s) multiple times on that day.
- The compensation payable under this clause shall be due and payable in monthly instalments within 7 days of the close of the month.

Ticket distribution (3): Vanagaram TP

Ticket distribution

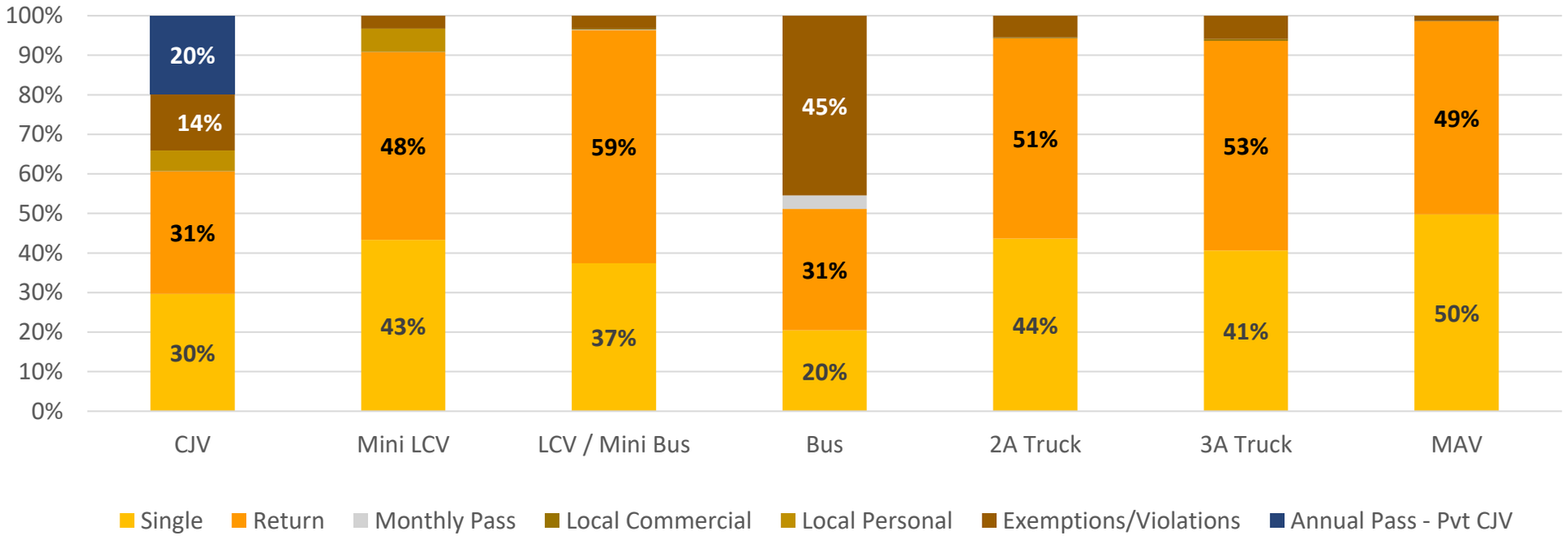


Source: TIC analysis

- Urban nature of the project highway is evident from the ticket distribution of CJVs, Mini LCVs and LCVs, where the share of return tickets exceeds single-journey tickets, indicating frequent short-distance trips associated with daily commuting. About 19% of CJV users have opted for the Annual Pass of INR 3,000 as on 31st October 2025 and is expected to increase further with awareness and adoption.
- Bus category experiences a notable quantum of exemptions or violations (54%), due to the TNSTC government buses in Tamil Nadu opting for monthly pass valid for 50 trips yet frequently exceeding this limit. While approximately 34% of private/semi-private bus traffic uses return tickets, reflecting inter-district and inter-state movement.
- Goods vehicles (2A, 3A and MAV) show a broadly similar ticketing pattern, with around 50% opting for single and return tickets, indicating substantial intra-state goods movement, largely to and from Chennai, which functions as the state's largest consumption and production hub in addition to trips to Chennai/Ennore maritime cluster.

Ticket distribution (4): Surapattu TP

Ticket distribution



Source: TIC analysis

- Ticketing patterns for CJVs, Mini LCVs and LCVs reflect the urban character of the corridor, with return tickets forming a higher/equal share than single-journey tickets, indicating frequent short-distance and daily commuter trips.
- Annual Pass of INR 3,000 adoption among CJVs is around 20% as on 31st October 2025 and this proportion is expected to increase with awareness and regular usage.
- Goods vehicles (2A, 3A and MAV) exhibit a similar distribution between single and return tickets (around 50%), highlighting significant intra-state freight movement, primarily to and from Chennai, the state's major consumption and production hub.
- Volume of bus is about 200-225 so violation of TNSTC bus category doesn't affect much compared to Vanagram TP.

Commodity analysis (1): Vanagaram TP

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Direction-wise Commodity Distribution

Commodity	MLCV		LCV		2A		3A		MAV	
	Tambaram to Madhavaram	Madhavaram to Tambaram	Tambaram to Madhavaram	Madhavaram to Tambaram	Tambaram to Madhavaram	Madhavaram to Tambaram	Tambaram to Madhavaram	Madhavaram to Tambaram	Tambaram to Madhavaram	Madhavaram to Tambaram
Agriculture / Animal Husbandry	3%	3%	4%	1%	5%	2%	7%	1%	3%	2%
Fruit and Vegetables	8%	13%	12%	7%	8%	4%	7%	2%	4%	6%
FMCG / Food Products	4%	6%	3%	5%	4%	5%	3%	9%	4%	4%
Building & Construction Material	0%	1%	1%	2%	1%	--	1%	--	0%	2%
Cement	--	2%	1%	9%	1%	--	2%	6%	2%	7%
Sand	2%	1%	3%	1%	1%	1%	7%	3%	8%	3%
Aggregates / Stone	0%	--	0%	0%	--	--	--	--	--	0%
Manufacturing	13%	15%	17%	11%	13%	9%	14%	11%	14%	11%
Automobile and Spares	2%	1%	2%	1%	1%	2%	4%	0%	2%	2%
Chemicals / Fertilisers	--	--	1%	0%	--	0%	0%	0%	1%	1%
Steel / Metal Products	4%	5%	6%	9%	4%	5%	4%	12%	6%	14%
Petroleum Products	2%	6%	3%	6%	3%	7%	5%	12%	7%	13%
Parcel / E-commerce	2%	2%	3%	4%	3%	5%	4%	6%	1%	6%
Miscellaneous	0%	1%	1%	--	--	1%	0%	--	0%	1%
Empty	58%	44%	45%	41%	56%	59%	41%	36%	46%	28%

Source: TIC analysis *0% indicates value less than 1% and -- represents no presence of such commodity for the vehicle category

Commodity distribution exhibits characteristics that are in line with corridor and economic activities observed in the influence region.

Commodity analysis (2): Surapattu TP

TRANSLINK® Infrastructure Consultants Pvt Ltd Smart Consulting

Direction-wise Commodity Distribution

Commodity	MLCV		LCV		2A		3A		MAV	
	Tambaram to Madhavaram	Madhavaram to Tambaram	Tambaram to Madhavaram	Madhavaram to Tambaram	Tambaram to Madhavaram	Madhavaram to Tambaram	Tambaram to Madhavaram	Madhavaram to Tambaram	Tambaram to Madhavaram	Madhavaram to Tambaram
Agriculture / Animal Husbandry	3%	5%	3%	3%	4%	3%	5%	6%	1%	2%
Fruit and Vegetables	1%	5%	2%	2%	3%	3%	1%	2%	1%	3%
FMCG / Food Products	4%	9%	3%	3%	4%	3%	1%	2%	3%	3%
Fly Ash / Construction Material	3%	1%	0%	2%	1%	2%	0%	1%	1%	1%
Cement	0%	0%	0%	2%	2%	3%	1%	2%	2%	4%
Aggregates / Stone	0%	1%	1%	1%	3%	2%	3%	2%	4%	1%
Minerals and Mining Commodities	1%	0%	1%	--	0%	0%	1%	0%	1%	0%
Manufacturing	13%	20%	7%	14%	17%	12%	16%	12%	10%	24%
Automobile and Spares	1%	2%	1%	1%	0%	0%	1%	2%	3%	2%
Chemicals / Fertilisers	1%	2%	1%	0%	1%	0%	1%	2%	1%	1%
Steel / Metal Products	6%	6%	8%	8%	7%	10%	6%	6%	8%	17%
Petroleum Products	3%	4%	4%	6%	5%	9%	5%	15%	6%	9%
Parcel / E-commerce	7%	10%	13%	11%	10%	6%	7%	9%	4%	8%
Miscellaneous	2%	1%	1%	0%	4%	--	1%	0%	1%	0%
Empty	54%	34%	55%	48%	39%	48%	51%	38%	57%	27%

Source: TIC analysis *0% indicates value less than 1% and -- represents no presence of such commodity for the vehicle category

Commodity distribution exhibits characteristics that are in line with corridor and economic activities observed in the influence region.

Zonal influences and trip distances (1): Vanagaram TP

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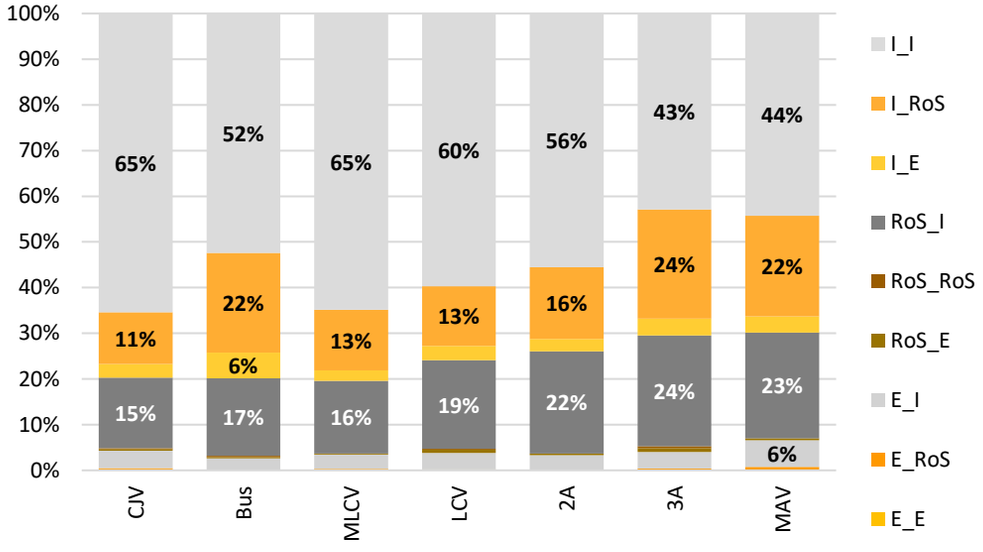
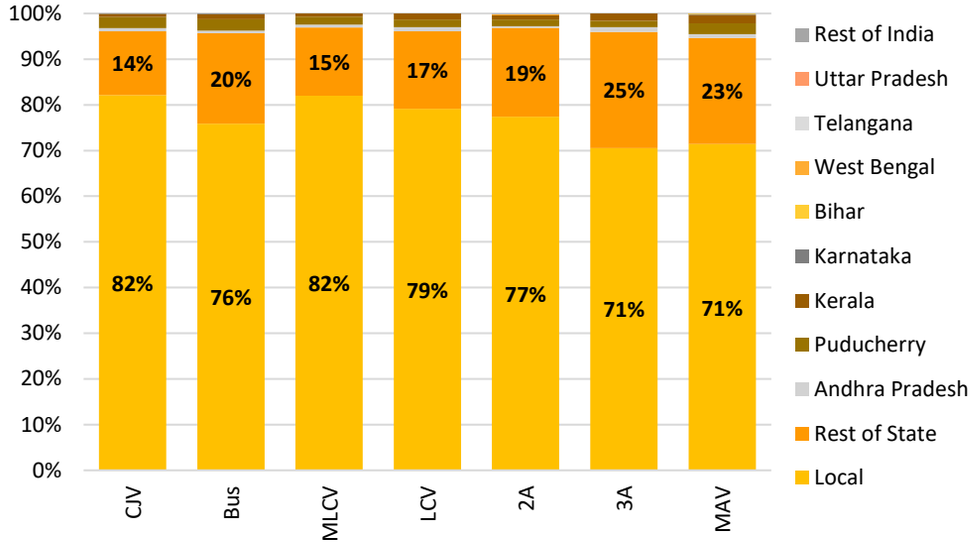
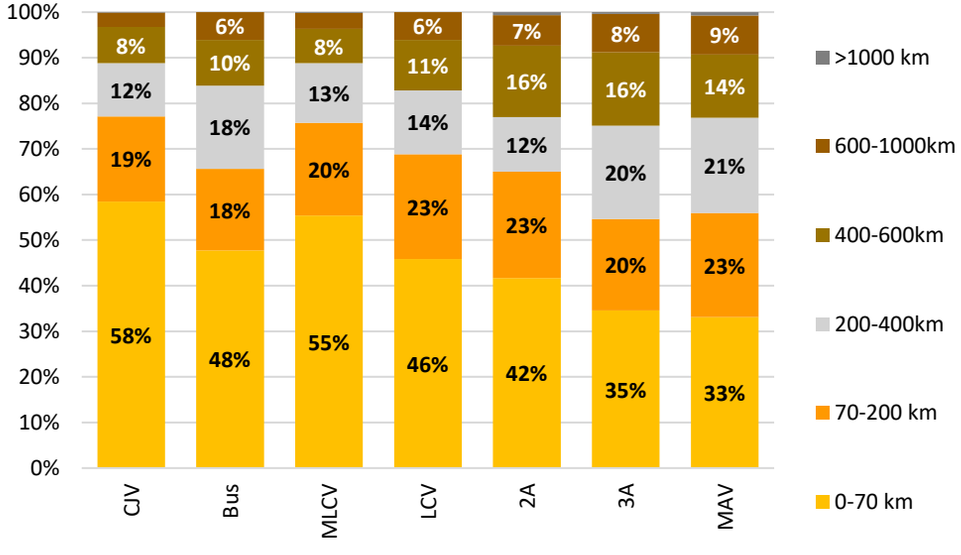
Vehicle category-wise zone characteristics



Vehicle category-wise project influence region



Vehicle category-wise trip lengths and average distances



Vehicle Category	Distances (in km)
CJV	147
Bus	171
Mini LCV	159
LCV	191
2A	217
3A	253
MAV	251

Vehicle category-wise visual representation of origin-destination zones and top pairs are provided in Appendix B.

Source: TIC analysis

Zonal influences and trip distances (2): Surapattu TP

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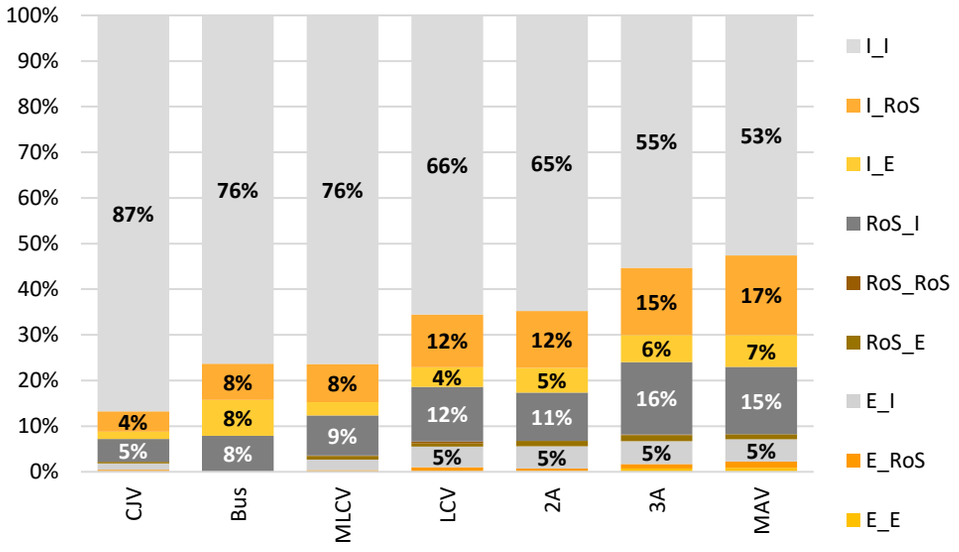
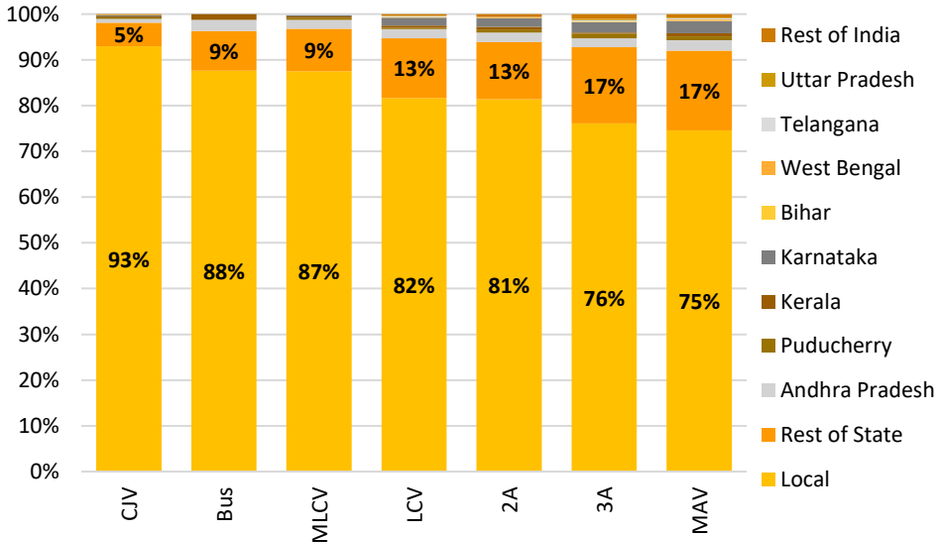
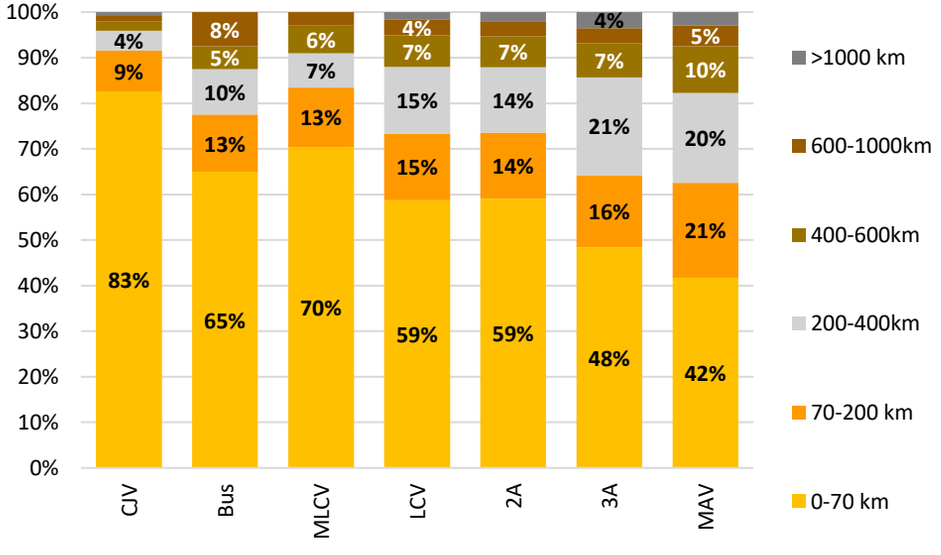
Vehicle category-wise zone characteristics



Vehicle category-wise project influence region



Vehicle category-wise trip lengths and average distances



Source: TIC analysis

Vehicle Category	Distances (in km)
CJV	88
Bus	127
Mini LCV	117
LCV	182
2A	185
3A	238
MAV	245

Vehicle category-wise visual representation of origin-destination zones and top pairs are provided in Appendix B.

Chapter 4: Economic context and traffic growth

- Economic context of influence region
- Determination of traffic growth drivers
- Estimation of demand elasticities
- Forecasts for growth drivers

IRC-108:2015 mentions that traffic growth is typically driven by a combination of macro-economic trends and industry/commodity specific factors, known as independent variables or traffic growth drivers.

These growth drivers have two critical characteristics:

1) the rate at which it increases i.e., forecasts of independent variable
2) the project highway's relationship with the growth driver to attract, capture and retain the traffic over the forecast horizon i.e., travel demand elasticity

Growth drivers are typically identified through analysis of origin–destination data, site visits and a detailed understanding of the highway.

Travel demand elasticity is influenced by socio-economic conditions both within the region served by the project highway and across the wider national area of influence.

This chapter explains the growth drivers and elasticity in context of economic snapshot of primary districts / state and their correlation with the country.

Beating the national curve: Tamil Nadu's growth story in numbers

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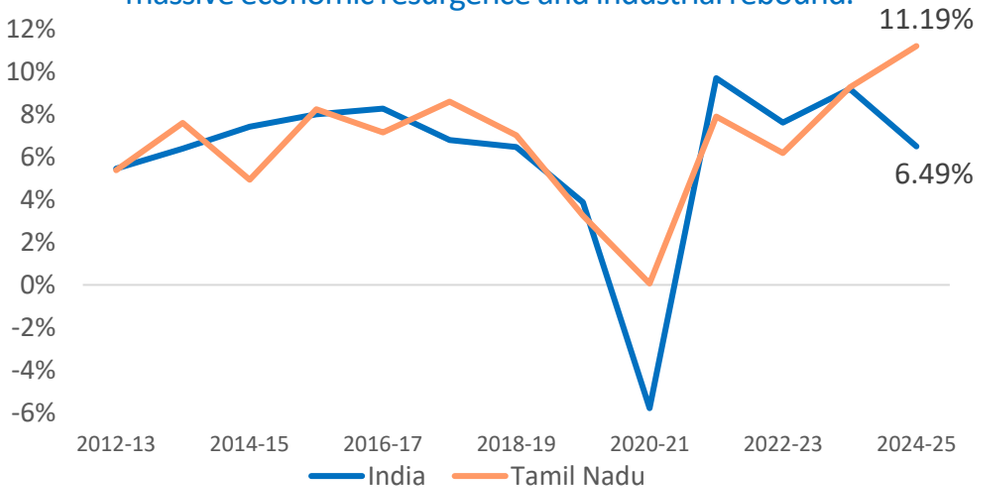
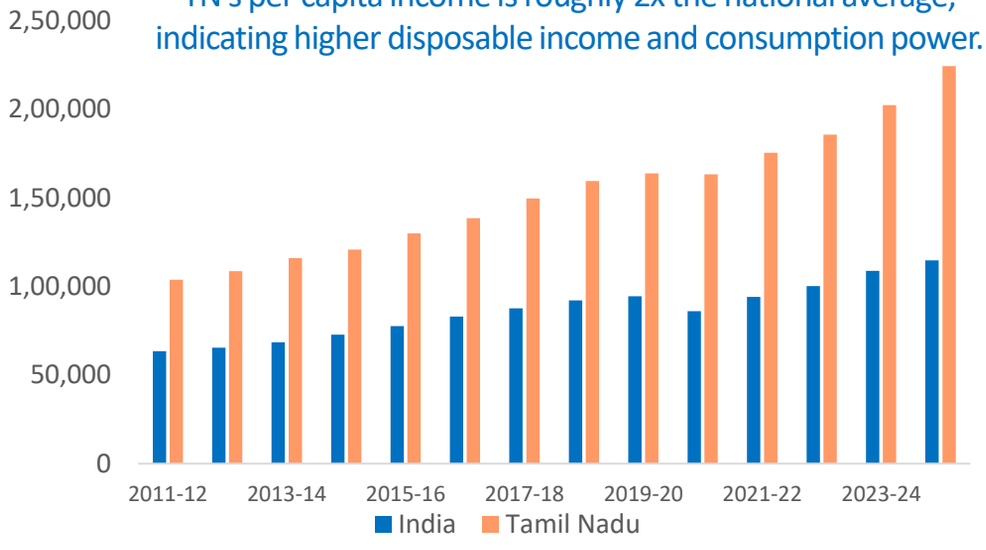
Real GDP growth rate: India vs Tamil Nadu

TN is2x faster than the national average in FY25, signaling a massive economic resurgence and industrial rebound.

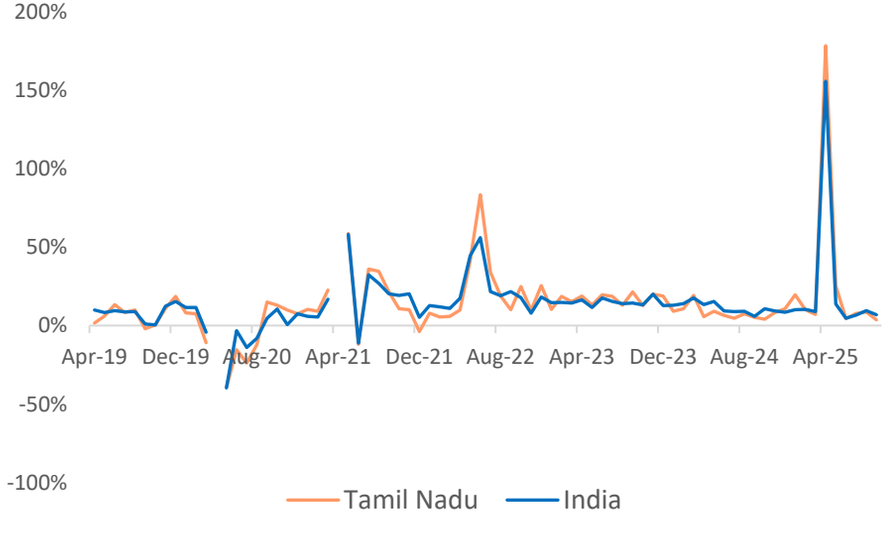


Per Capita Income (in INR): India vs Tamil Nadu

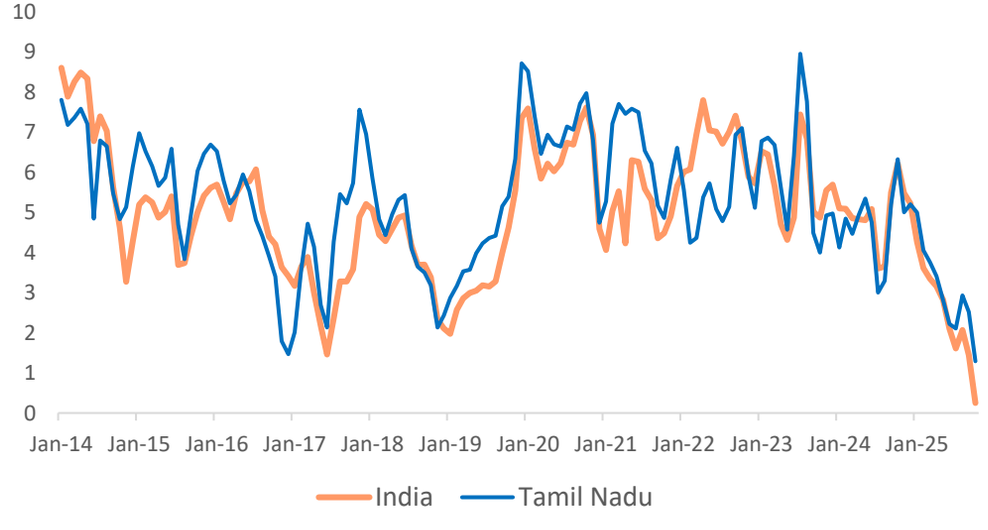
TN's per capita income is roughly 2x the national average, indicating higher disposable income and consumption power.



GST growth rate: India vs Tamil Nadu



Consumer Price Indiex: India vs. Tamil Nadu



Source: MoSPI, GST Council, TIC analysis

GST and CPI show that TN tracks all-India pattern very closely, confirming that state is tightly integrated with the national business cycle.

Sectoral contribution to Tamil Nadu's economic output

Tamil Nadu's GVA split

	2017-18	2024-25	CAGR	Share of GVA(2024-25)
Agriculture, forestry and fishing	111,270.61	151,804	4.5	9.8
Mining and quarrying	4,859.62	6,914	5.2	0.4
Manufacturing	248,985	376,911	6.1	24.5
Electricity, gas, water supply & other utility services	9,514.42	14,622	6.3	0.9
Construction	117,806	190,591	7.1	12.4
Trade, repair, hotels and restaurants	118,017.44	173,287	5.6	11.2
Transport, storage, communication & services related to broadcasting	66,365.54	80,649	2.8	5.2
Financial services	63,873.07	88,346	4.7	5.7
Real estate, ownership of dwelling & professional services	167,515.67	269,279	7	17.5
Public administration	29,428.67	40,030	4.5	2.6
Other services	76,854.7	149,119	9.9	9.7
TOTAL GSVA at basic prices	1,014,491	1,541,551	6.2	100

Source: MoSPI and TIC analysis

- 'Manufacturing, Real Estate Ownership and professional Services' and 'Construction' contribute more than 50% of the total state GVA.
- 'Manufacturing industries' contributing to the GVA includes Manufacturing of Motor Vehicles, Machinery and Equipment, Textiles, Wearing Apparels and Food Products.

Tamil Nadu's industrial base and export performance

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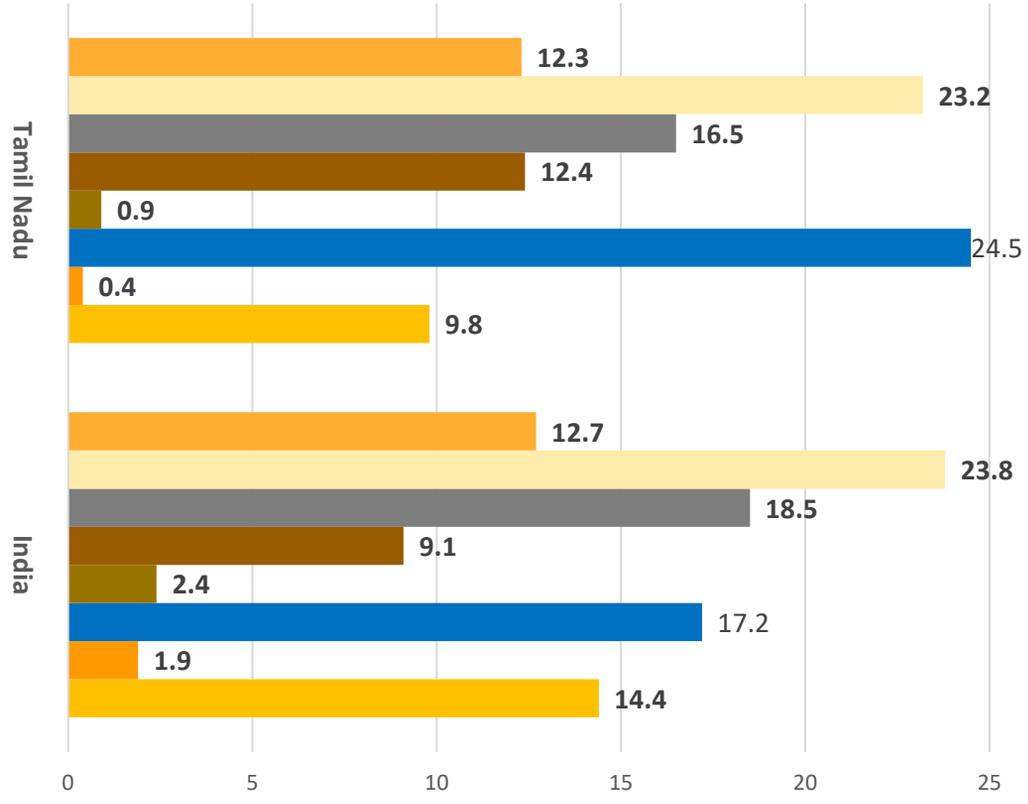
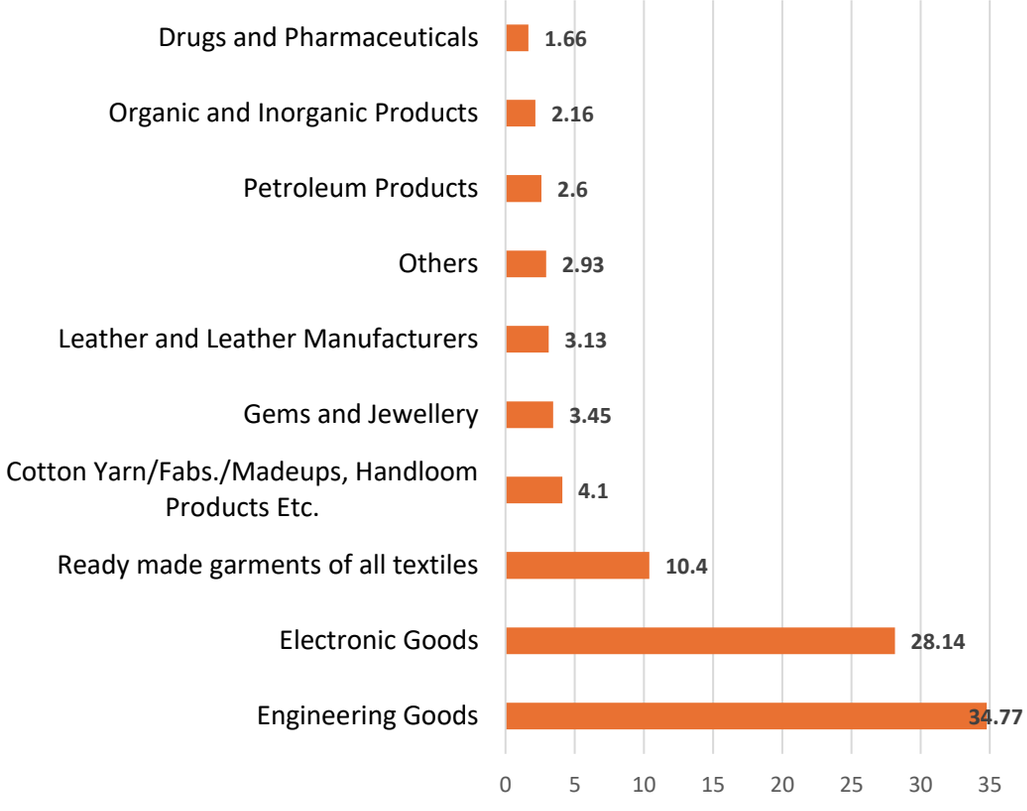
Share of GVA across sectors: India vs Tamil Nadu



Source: MoSPI, TIC analysis

% share in Tamil Nadu's export



Source: MoSPI, TIC Analysis

- TN has a **significantly higher industrial base** (Secondary Sector) of 37.7% than the national average of 28.7% , driven by manufacturing and construction.
- TN earned Exports worth US$52.07Bn, **11.9% of Total Indian Exports** in FY25.
- **Engineering Goods, Electronic Goods and Ready-made garments were the top exported commodities.**

Tamil Nadu is a major player in key manufacturing

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Tamil Nadu's Manufacturing Sector: Output and National Share

Industry group	All India output (INR Crore)	Tamil Nadu output (INR Crore)	TN share in India
Basic metals	21,53,243	66,446	3.09%
Coke and refined petroleum products	20,30,771	91,117	4.49%
Food products	17,90,378	1,38,749	7.75%
Chemicals and chemical products	13,15,603	62,573	4.76%
Motor vehicles, trailers and semi-trailers	11,32,869	2,69,415	23.78%

Source: Annual Survey of Industries –Tamil Nadu, 2022-23, TIC analysis

- TN is a major player in key manufacturing sectors such as leather products, engineering goods, automotive components, castings, pumps and readymade garments.
- The State is also emerging as a hub for many sunrise sectors like Electric Vehicles and Startups in the areas of FinTech and Software as a Service (SaaS).

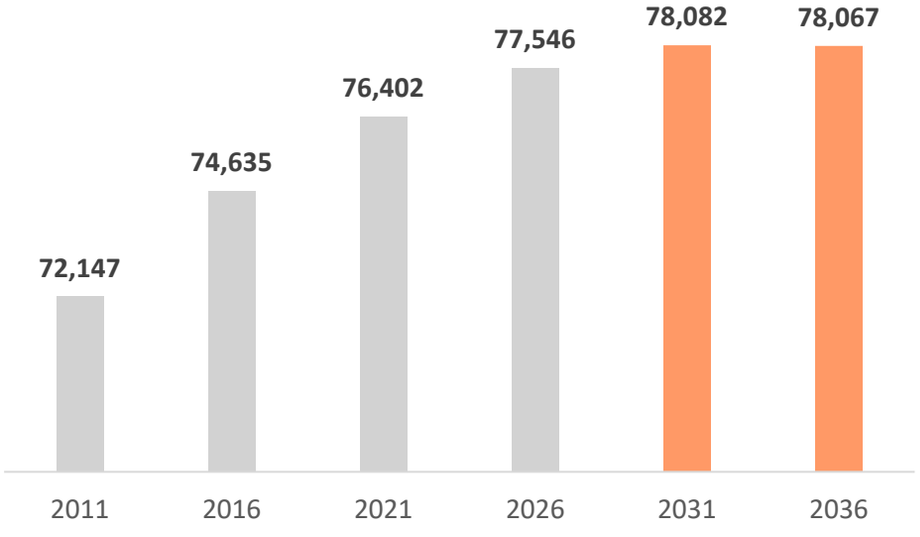
Summary of Tamil Nadu's economic performance

Parameter	Key evidence (data-backed)	Interpretation / Implication
Manufacturing-led state (vs India)	Manufacturing share: **24.5% (TN)** vs **17.2% (India)**; Agriculture: **9.8% (TN)** vs **14.4% (India)**	Tamil Nadu is structurally **industrial and value-added**, not primary-sector dependent; reflects mature manufacturing base and productivity-led growth.
Strong construction and industrial ecosystem	Construction share: **12.4% (TN)** vs **9.1% (India)**; Manufacturing + Construction = **36.9% of GVA**	Indicates sustained **capex, urbanisation and infrastructure build-out**, supporting industrial expansion, employment, and logistics demand.
Production-linked services dominance	Financial, real estate & professional services: **23.2% (TN)** vs **23.8% (India)**	Services depth comparable to India, but **less consumption-heavy** and more **manufacturing- and asset-linked**, reinforcing industrial supply chains.
High-value export basket	Engineering goods **34.8%** + Electronics **28.1%** = **~62.9% of exports**	Export profile is **technology- and capital-goods driven**, with strong global integration; textiles, leather, gems add diversification but are secondary.
Trade- and freight-intensive growth model	Manufacturing-heavy GVA + engineering/electronics exports	Structural drivers point to **high freight intensity**, supporting strong demand for **container traffic, ports, industrial corridors, and highway logistics**.

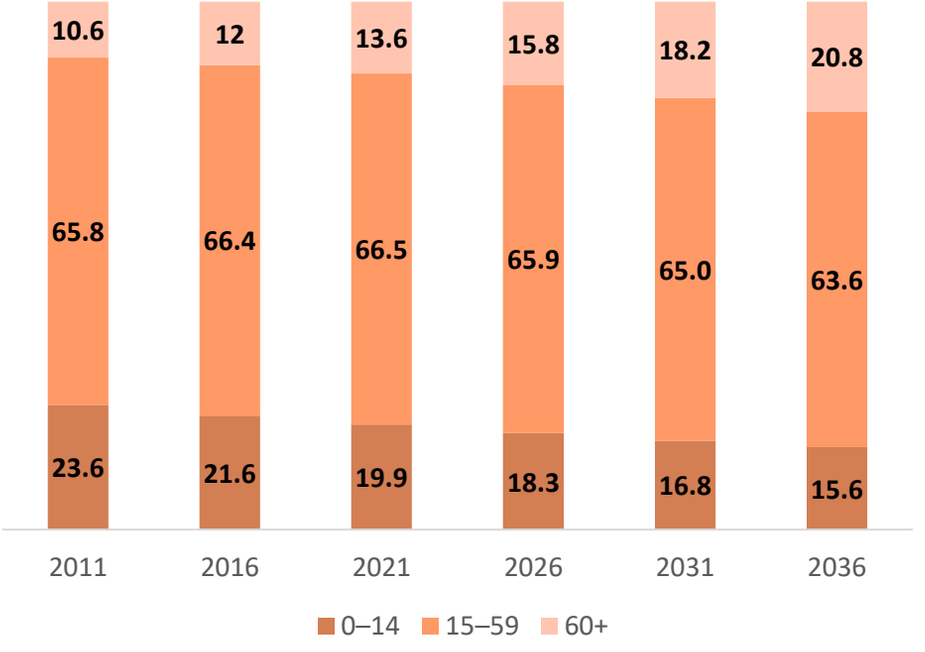
Source: MoSPI, TIC analysis

Demographics

Population growth ('000s)



Population share (%)



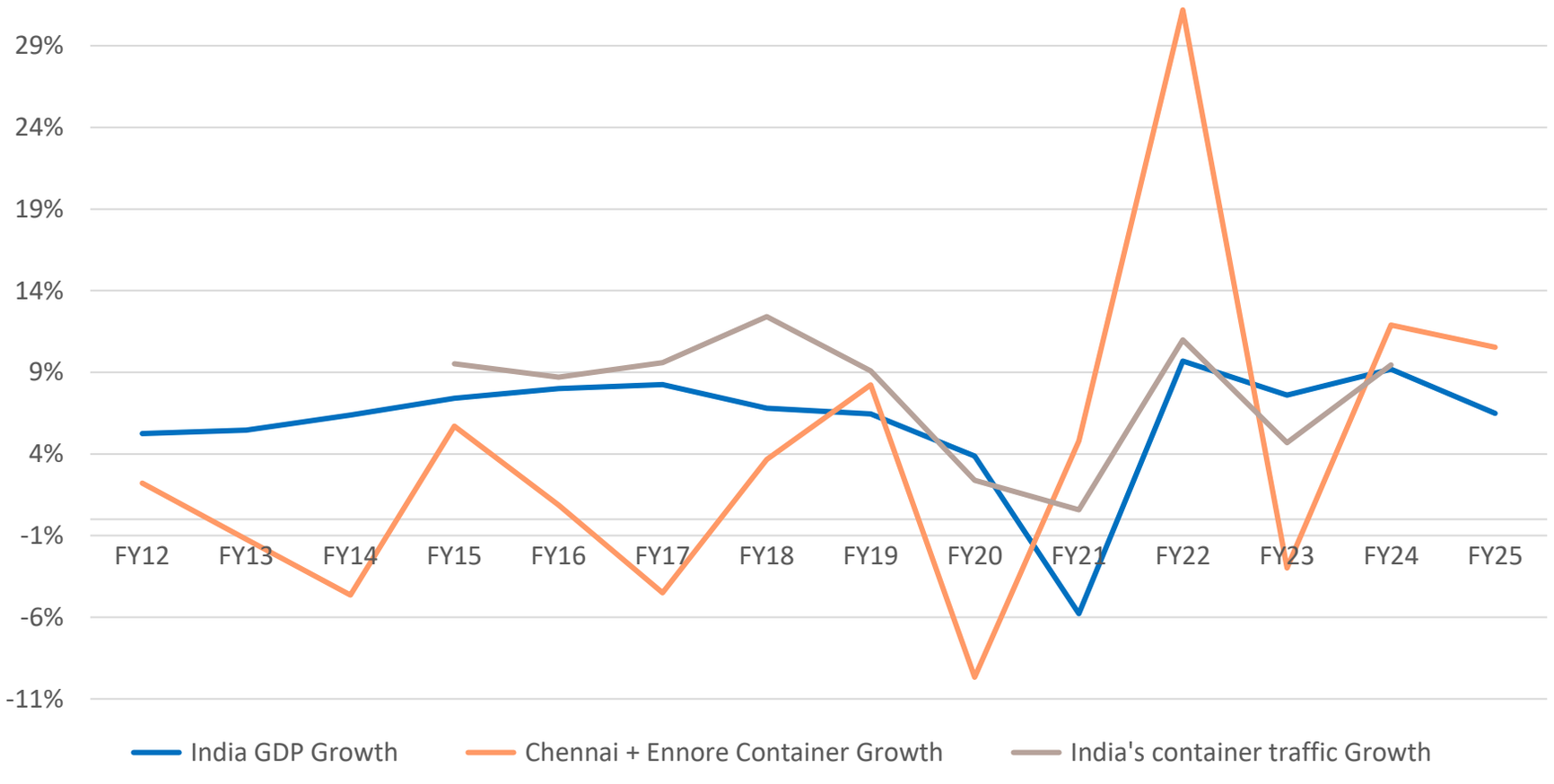
Implication for Toll Traffic

Parameter	Impact	Target plaza	Direction	Evidence
Population	Increased state liability Shift to agrarian economy for 60+ age group after two decades Moderate decrease in consumption base	Nallur (NH16) Surapattu and Vanagram (Chennai Bypass)	Moderate in longer run of 20 years	Tamil Nadu's population grew at CAGR 0.48% between 2026 and 2011 as per MoFHW estimates, lower than India's population at 1.1% in the same period. The trend shows that Tamil Nadu has high aging population (60+) of 15.8%, much higher than India estimates of 11.4%.

Source: MoFHW, TIC analysis

Chennai maritime cluster – container traffic

Container traffic trend at Chennai maritime cluster (Chennai and Ennore Port)



Implication for Toll Traffic

Parameter	Impact	Target plaza	Direction	Evidence
Port throughput	Causes MAV traffic swings	Nallur (NH16) Surapattu (Chennai Bypass)	Volatile	Linked to seasonal shipping & EXIM cycles

Source: Indian Port Association, TIC analysis

Economic variables and impact on toll traffic

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Economic variables and impact on toll traffic

Economic Indicator (Tamil Nadu)	Latest Data/Trend	Implication for Toll Traffic
IIP – Manufacturing (Index of Industrial Production)	Index **157** (Apr-Jun 2025), up from 153.9 a year prior (~**2%** increase)	**Steady goods traffic:** Manufacturing index shows modest 2% growth. Manufacturing growth supports current LCV/Truck volumes. Observed traffic (average growth rate of ~10%) exceeds manufacturing growth, indicating other factors (urbanization, services) also drive traffic.
IIP – Electricity (power generation index)	Index **163.68** (Apr-Jun 2025), down from 179.9 a year prior (**-8,9%** YoY)	↓ **Decline, followed by modest rise in heavy freight:** YoY decline of 8.9% but June 2025 showed +16.7% MoM recovery. Coal transport to power plants affects Ennore Port Cargo and Surapattu TP commercial traffic.
GSDP growth (Real)	**+11.9%** Real GDP growth rate in FY25 > national GDP (6.49%)	↑ **Overall traffic:** Strong economic growth drives higher travel demand – more freight shipments and passenger trips on toll roads.
Manufacturing GVA & growth	Manufacturing output **₹3.769 lakh Cr** (2024–25), **14.7%** growth; Industry ~24.5% o GVA (Industry ~37.7% share)	↑ **Goods traffic, primarily intra-district:** 14.7% manufacturing growth drives commercial vehicles.
Road infrastructure expansion	State and National Highway length **6,805 km** as per 2024–25 report	↑ **Traffic capacity:** New/expanded roads improve connectivity, inducing more traffic. Added NH mileage encourages inter-district travel and freight movement, raising toll road usage.
Agriculture trends (Agri GVA, Horticulture)	Agri GVA growth **~2.5%** (2024–25); Tamil Nadu **exported 1.34 lakh tonnes of fish products**, generating ₹6,854 crore in foreign exchange in 2023-24.	↑ **Seasonal freight:** Steady agri growth and high horticultural produce volume drive produce shipments (e.g., vegetables to markets). Expect more **LCV/2A truck traffic** during harvest peaks (perishables to cities).
Exports contribution	Exports grew by ~20% in FY25 to US$52.07 led by electronic goods, engineering goods, ready made garments	↑ **Long-haul trucks:** 20% export growth generates outbound freight to Chennai/Ennore ports. This is also visible in Chennai Container growth rate of 10.5% in FY25 despite high base of 11.9% in FY24.
MSME base	**58.13 lakh** MSME units registered in Tamil – vibrant small industry ecosystem	↑ **Local distribution:** A large MSME sector implies dispersed production and consumption, leading to more **LCV and small-truck trips** ferrying raw materials and finished goods between industrial estates, warehouses, and markets.
Port throughput volatility	Causes MAV traffic swings	Linked to seasonal shipping & EXIM cycles

Source: MoSPI, Directorate of Economics and Statistics, TIC analysis

District-level growth and manufacturing focus (1)

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Economic variables and impact on toll traffic

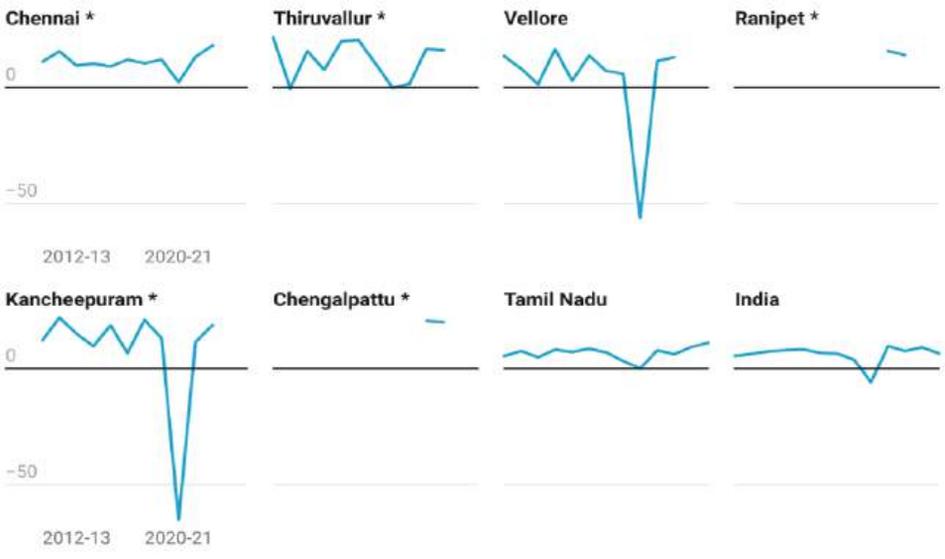
District	GDP (INR Crore)	Growth Rate (FY22-23)	Share in State GDP	PCI (INR)	Growth focus	Strategic Role
Chennai*	1,78,898	18.20%	12.30%	5,85,501	Services, finance, IT hub (77% services in District GVA)	Gateway for port-linked services, financial center, and IT/BPO employment
Thiruvallur*	1,05,781	16.10%	7.30%	4,30,950	Balanced manufacturing-services; fastest growing district	Heavy engineering hub (INR 51,952 Crore fixed capital), auto components, SIPCOT estates with spillover from Chennai
Vellore	24,700	13.10%	1.70%	1,43,808	Educational hub with emerging manufacturing	Functions as educational hub (VIT) supporting skilled labour needs; 388 factories, INR 564 Crore fixed capital
Kancheepuram*	59,514	18.80%	4.10%	7,44,980	Manufacturing powerhouse; automotive & electronics leader	Contributes ~20% of Tamil Nadu's fixed capital and ~24% of industrial output; hosts Hyundai, Renault-Nissan, Samsung, Foxconn
Chengalpattu*	1,30,965	20.10%	9.00%	7,46,994	Manufacturing-services mix; IT corridor + industrial zones	IT/ITES hub (Siruseri), automotive suppliers, balanced industrial growth with highest PCI in region
Ranipet*	18,439	14.00%	1.30%	2,40,069	Chemical & pharmaceutical manufacturing base	Specialty chemicals, pharmaceutical exporters, transitioning from traditional industries
Chennai Metropolitan Area	**4,93,598**	**17.40%**	**34.00%**	**5,49,699**	**Diversified manufacturing-services engine**	**State's economic powerhouse; balances high-end services with advanced manufacturing**
Tamil Nadu	**14,51,929**		**100.00%**		**Service-led (52%) with strong industrial base (37.7%)**	**2x national GDP growth; 11.9% of India's exports; 2x national PCI**

Source: Statistical Handbook of Tamil Nadu (2022-23), TIC analysis

* part of Chennai Metropolitan Area

District-level growth and manufacturing focus (2)

GDP growth rate: district vs State/India



- Since FY24, Tamil Nadu's real growth has been above the India average, and within the focus districts Thiruvallur is the fastest growing at around 13%, driven by large SIPCOT Gummidipoondi Industrial Estates, auto and electronics manufacturing and strong spill overs from Chennai.
- **The Six focus districts contribute ~36% to Tamil Nadu's GDP** FY23. ~44% of total Manufacturing GDP and ~56% of Financial Services of Tamil Nadu comes from this region. Chennai has the highest contribution of 12.32%, due to high Financial service industry base and Port infrastructure

Source: Statistical Handbook of Tamil Nadu (2022-23), TIC analysis

* The expanded Chennai Metropolitan Area (CMA)MA falls in five Districts of Tamil Nadu State, viz. Chennai District, parts of Thiruvallur District, Kancheepuram District, Chengalpattu District, and part of Arakkonam Taluk of Ranipet District.

* Kancheepuram district was split to create Chengalpattu district, which was formed in 2019; Vellore district was split into three districts: Vellore, Ranipet, and Tirupattur, in August 2019

Six districts drive ~35% of state GDP through an integrated industrial corridor spanning services, manufacturing, and export excellence

Service and Knowledge Core

Chennai and Chengalpattu lead as the financial capital and tech hub, anchoring SaaS, BFSI, and R&D sectors across the state

Manufacturing Powerhouse

Kancheepuram and Thiruvallur form Asia's auto corridor, hosting global OEMs and generating the highest industrial output at INR 3.34 lakh crore

Export and Engineering Belt

Ranipet and Vellore provide specialised manufacturing clusters and workforce infrastructure, pivoting towards future mobility and EV production

District-wise risks and opportunities

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District-wise risks and opportunities

District	Key opportunities	Key risks
Chennai	▪ Port-led trade growth supported by expressway and metro expansion ▪ Strong BFSI, IT and corporate services base ▪ Improved regional connectivity via metro expansion and proposed Parandur airport, strengthening talent access	▪ Urban flooding and monsoon vulnerability in low-lying areas ▪ Severe inner-city congestion near port zones until de-bottlenecking is completed ▪ Rising cybersecurity and data-governance compliance risks for BFSI and tech firms
Thiruvallur	▪ Western industrial cluster (Sriperumbudur–Oragadam) driving auto, FMCG and 3PL demand ▪ Strong growth in Grade-A warehousing and logistics ▪ Strategic positioning along key industrial corridors	▪ Rapid land price escalation affecting project viability ▪ High exposure to global automotive demand cycles ▪ Freight bottlenecks until corridor upgrades are fully operational
Kancheepuram	▪ Core auto, EV and electronics manufacturing hub (Oragadam–Sriperumbudur) ▪ Large-format industrial and warehouse parks ▪ Corridor extensions improving hinterland connectivity	▪ Infrastructure strain from heavy truck movement ▪ Cyclical risks linked to automotive exports ▪ Increasing environmental and regulatory compliance requirements
Chengalpattu	▪ Engineering, textiles, apparel and precision manufacturing growth ▪ Rising 3PL and FMCG warehousing demand ▪ Proximity to ports and proposed airport enhances logistics attractiveness	▪ Peak-hour congestion along GST Road ▪ Land-use pressure from rapid urbanisation ▪ Competition with Kancheepuram for large industrial projects
Ranipet	▪ Expanding industrial–logistics corridor linking Chennai to western Tamil Nadu ▪ Established engineering and legacy manufacturing base ▪ Relatively lower land costs enable scalable industrial expansion	▪ Environmental compliance challenges in legacy industries ▪ Lower skilled-labour density compared to Chennai core ▪ Growth dependent on timely completion of corridor infrastructure

Source: TIC analysis

PESTEL Analysis

Factor	State-level insight	District-level implication
Political / Policy	▪ **Corridor development:** The state is advancing industrial corridors like Chennai-Bengaluru Industrial Corridor (CBIC) to integrate manufacturing hubs ▪ **Governance and stability**: Tamil Nadu is recognized for "Good Governance" and maintaining peaceful labour relations, a key attractor for FDI ▪ **Proactive policy:** Specific policies for sunrise sectors (EV, FinTech) and a target to become a $1 Trillion economy	▪ **Ranipet/Vellore:** These districts are critical nodes on the industrial corridor, benefiting from infrastructure upgrades. ▪ **Greater Chennai:** Policy stability supports the massive long-term capital commitments in this region (e.g., INR 32,861 Crore in Oragadam)
Economic	▪ **Hyper-urbanization:** The state has a high industrial density with 31,859 factories (Rank 1 in India) ▪ **Growth engines:** A dual-engine economy driven by Services (53.63% of GVA) and Industry (33.37% of GVA) ▪ **Capital investment:** High fixed capital investment, particularly in heavy engineering and auto sectors	▪ **Chennai:** The service & financial capital with the highest GDDP contribution (12.30%) ▪ **Thiruvallur:** The heavy industry hub with massive fixed capital investment (INR 51,952 Crore) ▪ **Kancheepuram:** The manufacturing leader with the highest total output (INR 3.34 Lakh Crore)
Social	▪ **Urban workforce:** High urbanization rate (~49%) supports a deep pool of skilled labour for services and industry ▪ **Human development:** High rankings in Human Development Index (HDI) and literacy ensure a steady supply of "employable" talent	▪ **Chengalpattu:** High concentration of knowledge workers for the IT corridor ▪ **Vellore**: Functions as an educational hub (VIT) supporting the skilled labour needs of the Ranipet industrial belt
Technological	▪ **Electronics hardware:** A strategic shift from assembly to high-value component manufacturing (e.g., Foxconn, Dell) ▪ **Future mobility:** Rapid growth in Electric Vehicle (EV) technology and manufacturing ▪ **SaaS & IT**: Chennai and Chengalpattu are established global hubs for SaaS/ITeS	▪ **Kancheepuram (Sriperumbudur):** The "Electronics Corridor" hosting major mobile and hardware OEMs ▪ **Chengalpattu (Siruseri):** The tech R&D hub with the largest IT park (407 acres allotted) ▪ Implementation support to MLFF from state
Environmental	▪ **Sustainable mobility:** Push for EV manufacturing aligns with green energy goals ▪ **Climate resilience:** Coastal industrial zones require robust planning against climate risks ▪ **Resource management:** Focus on water supply and waste management within SIPCOT parks	▪ **Thiruvallur/Chennai:** As coastal districts, infrastructure resilience is key for long-term sustainability ▪ **Ranipet:** Transitioning from traditional tanning (high pollution risk) to cleaner engineering and non-leather footwear industries
Legal / Regulatory	▪ **Land Acquisition:** SIPCOT plays a central role in acquiring land (over 33,000 acres acquired state-wide) to provide legally clear titles to industries ▪ **Regulatory Ease:** Single-window clearances and transparent regulatory frameworks facilitate ease of doing business	▪ **All focus districts:** SIPCOT has developed specific industrial complexes (e.g., Oragadam, Ranipet SEZ, Gummidipoondi,) to handle land and zoning legally, shielding investors from acquisition hurdles

Source: TIC analysis

Determination of growth drivers and elasticity (1)

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Potential socio-economic indicators as growth drivers in context of IRC: 108-2015 and benchmark studies

Socio-economic indicators	Observations for availability/reliability of historical/forecast data
Vehicle registration / Automobile Sales	Sourcing vehicle registration data from concerned Regional Transport Office (RTO) within influence region is herculean task. In addition, it is not mandatory that Project Influence Area (PIA) matches with vehicle registration cases at ground level so not useful. Society of Indian Automobile Manufacturers (SIAM) publishes automobile sales at region level but not at granular level. Can be used as proxy data to validate specific trends. The consultant includes regional dealers' association of freight vehicles (if any) and local financing agencies to understand and validate specific trends observed in traffic.
Per Capita Income	Can be used as proxy data which reflects demand composition but not specific to commodities / vehicle category. Underlying forces are complex and changing at every strata of administrative structure i.e., districts, state, national. Historical data at state / national level available in public domain but not for district level. Further, availability of forecast data is major constraint in India.
Population	Population data are compiled on a decennial basis, with the latest census conducted in 2011, and do not provide a robust annual time series suitable for econometric modelling. In addition, migration trends across socio-economic segments and income-based geographies are highly volatile and difficult to forecast with confidence. Accordingly, population growth has not been adopted as a driver for forecasting future travel demand on the project highway.
GDP / GSDP / GDDP	Dataset from national and international publications and government agencies which are highly reliable in context of forecast e.g., Focus Economics, RBI / RBI's Survey of Professional Forecasters (96th Round), SBI Research, CII, multilateral banks (ADB, World Bank etc.), IMF, OECD, Oxford etc. The consultant typically uses Focus Economics monthly subscription and in-house/empaneled economists for correlation for state and district level GDP and industry specific aspects. The client provides views on the consultant's draft and recommends the final forecast.

Source: TIC research and analysis

Determination of growth drivers and elasticity (2)

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- For any potential indicator (economic, commodity, or industry-related) to be used as a traffic growth driver, availability and reliability of both historical data and credible forecasts are critical success factors.
- Among the key socio-economic indicators discussed above, Gross Domestic Product (GDP) at the national level, Gross State Domestic Product (GSDP) and Gross District Domestic Product (GDDP) at the state level are the only indicators for which robust historical data and reliable forecasts are consistently available. Accordingly, GDP/GSDP have been adopted as the primary growth drivers for traffic forecasting.
- In addition, port traffic (general and container traffic) have been incorporated as project-specific growth drivers.
- The consultant held discussions with regional dealers' associations of freight vehicles, agricultural wholesale yards (popularly known as mandis), pilgrimage trusts where tourist footfall data are well organised, and inter-city bus terminals in the immediate influence region to validate specific traffic trends such as seasonality and growth patterns.
- In many cases, historical data show varying traffic trends due to various external events in the economy and region. In addition, variations in data recording by third-party tolling agencies and the presence of historical data gaps, as observed in this business case, necessitated further validation.
- Accordingly, validation of the historical data was carried out using traffic data from neighbouring toll plazas on the corridor and benchmark highway sections.
- Traffic growth may not be uniform during the forecasting period, considering factors such as increasing total traffic volumes relative to the capacity of the corridor and the project highway, technological advancements in the automotive industry, cost–tonnage ratios of specific commodity–vehicle combinations, and overloading trends versus strict government enforcement in the region.
- In India, the freight vehicle mix has been changing over the last decade, favouring multi-axle vehicles (MAVs) over 2-axle and 3-axle vehicles for long-distance traffic, given the operational efficiencies achievable with larger vehicles. At the same time, Mini LCVs and LCVs have become more popular for short-distance traffic and more localised supply movements compared to 2-axle vehicles.
- Considering ongoing technological advancements in the automotive industry, standard 2-axle and 3-axle trucks have been increasingly replaced by 6-tyre LCVs over the last couple of years, a trend that is expected to continue.
- The projected elasticity values are typically assumed to remain constant over the concession period in the Indian context; however, they may vary over time due to factors such as increasing traffic volumes relative to corridor capacity, technological advancements in the automotive industry, changes in cost–tonnage ratios of specific commodity–vehicle combinations, overloading trends versus enforcement intensity, and correction of regional imbalances.
- Considering all these aspects, vehicle category-wise elasticities have been estimated.

Determination of growth drivers and elasticity (3)

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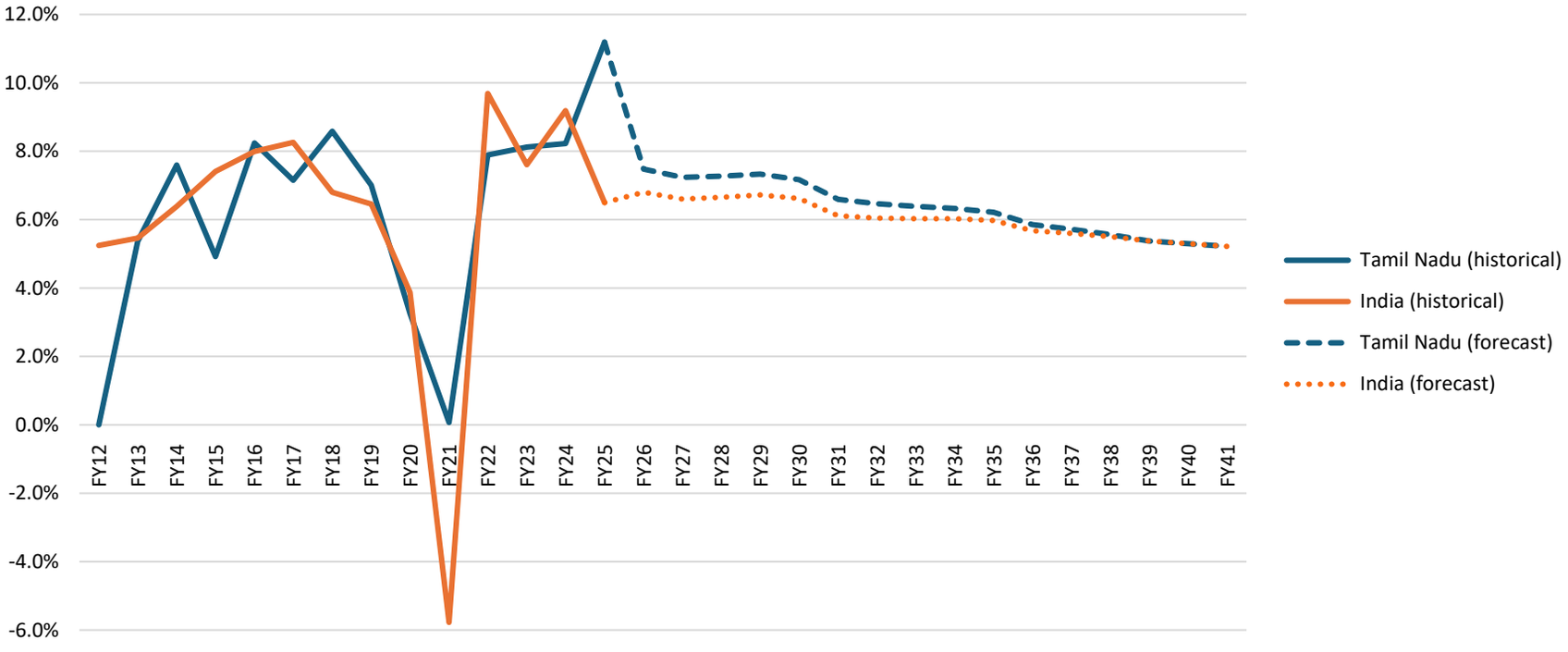
Vehicle category-wise adopted elasticity

Vehicle Category	Vanagram TP / Tiruneermalai TP	Surapattu TP	Independent variable
CJV	1.25 – 1.90	1.25 – 1.90	Weighted average of: GSDP of Tamil Nadu GDDP of Chennai, Kancheepuram, Chengalpattu and Thiruvallur districts
Mini LCV	1.50 – 1.90	1.50 – 1.90	
Bus	0.40	0.40	Weighted average of GSDP of Tamil Nadu, GDDP of Chennai
LCV / Mini Bus	1.50 – 1.90	1.15 – 1.80	Weighted average of: GSDP of Tamil Nadu GDDP of Chennai, Kancheepuram, Chengalpattu and Thiruvallur districts
2A Truck	0.30 – 0.90	0.20 – 0.75	Weighted average of: GSDP of Tamil Nadu GDDP of Chennai, Kancheepuram, Chengalpattu districts Chennai port cluster – container traffic
3A Truck	0.10	0.10	
MAV	0.30 – 0.90	0.30 – 0.90	

Source: TIC estimate using historical traffic data for the project highway and benchmark references of up-stream / downstream toll plazas

Forecasts for growth drivers (1)

GDP and GSDP forecast



Source: Client input and TIC estimates

- Tamil Nadu's growth is **institution-led, not personality-led**, which sharply limits political downside risk to economic momentum.
- Even when political leadership changes, **industrial approvals, land allotments, port expansion, and corridor projects continue largely uninterrupted**. This is *critical* for long-gestation assets like highways, toll roads, ports, and logistics parks.
- Tamil Nadu politics is often described as "populist", but **this has not translated into anti-growth outcomes**. Welfare-heavy politics **boosts passenger traffic** (buses, 2W/4W), while industry policy continuity sustains **freight traffic**.
- District GDP are expected to grow at higher pace than state GDP for initial 7 year followed by moderately higher for balance concession period.
- WPI will be 3.24% throughout the concession period except 0.25% for FY27 to revise toll rates as provided by the Client.

Forecasts for growth drivers (2)

Chennai port cluster – container and general traffic

- In context of Chennai Port Cluster discussion in earlier sections (Pg 22) and Chennai Port Authority Comprehensive Master Plan 2047 (February 2023), the consultant believes that Chennai Port's cargo is projected to rise steadily from ~49 MT in FY22 to ~76 MT by FY35, driven by 3.3%–3.5% CAGR anchored to the Port's Master Plan forecasts. Ennore Port resembles the similar growth trajectory.
- The growth trajectory reflects ongoing capacity upgrades and improved evacuation infrastructure outlined in the Master Plan.
- Container traffic is expected to grow at ~6% CAGR with volatile nature like trend discussed in earlier sections (Pg 60) as linked to seasonal shipping and EXIM cycles for Chennai maritime cluster (Chennai, Ennore and Kattupalli ports).

Chapter 5: Baseline traffic and revenue forecast

- Base year AADT (FY26)
- Toll ticket distribution
- Revenue reconciliation

This chapter presents our approach to reach baseline forecast. The consultant estimated base year AADT and toll ticket distribution to reconcile base year traffic and revenue.

Base year AADT estimate

- The consultant reviewed H1 FY26 ETC traffic data received from the client. Based on which traffic profiling for balance half of FY26 has been estimated using seasonality correction factors followed by estimation of FY26 AADT.
- An independent CTVC survey was undertaken to validate the ETC reported traffic data. The variance between CTVC and ETC data is comparatively higher for Car/Jeep/Van, Mini LCV, and Bus categories. For CJV/Mini LCV, this is attributed to local vehicles from nearby urban centres of Chennai and villages in surrounding area like Tambaram, Guduvancheri, Chengalpattu and Medavakkam at Vanagram and Surapattu toll plazas. For Bus, higher forced exemption was observed across the corridor in Tamil Nadu. Conversely, the variance for LCV, Truck 2A, Truck 3A, and MAV categories remains marginal and within acceptable industry standards.
- Hence, the consultant multiplied variance factor with ETC AADT to determine the corrected FY26 AADT.

Base Year AADT (FY26)

Particulars	Vanagram TP / Tiruneermalai TP			Surapattu TP		
	ETC AADT	Variance factor	Corrected Base Year AADT	ETC AADT	Variance factor	Corrected Base Year AADT
Car/Jeep/Van	26,451	1.1053	29,235	12,181	1.1560	14,081
Mini LCV	4,094	1.1106	4,546	3,469	1.0316	3,579
Mini Bus/LCV	2,014	1.0174	2,049	2,702	1.0330	2,791
Bus	1,416	2.0793	2,945	225	1.1793	265
2A Truck	1,018	1.0416	1,060	1,260	1.0571	1,332
3A Truck	543	1.0140	551	950	1.0600	1,007
MAV	1,997	1.0054	2,008	3,715	1.0135	3,765
OSV	7	1.0000	7	13	1.0000	13
Total AADT	**37,540**		**42,400**	**24,515**		**26,833**
Total PCU	**51,514**		**59,587**	**43,783**		**46,659**

Source: TIC estimate

Ticket Distribution (1): Vanagram TP / Tiruneermalai TP

Ticket distribution for CJV/Mini LCV

Vehicle categories	Car/Jeep/Van				Mini LCV			
Ticket types	FY26	FY27	FY28	FY29 onwards	FY26	FY27	FY28	FY29 onwards
Single	32.3%	26.0%	26.0%	26.0%	40.6%	40.6%	40.6%	40.6%
Return	38.7%	30.5%	30.5%	30.5%	49.3%	49.3%	49.3%	49.3%
Monthly Pass	-	-	-	-	-	-	-	-
Local Commercial	-	-	-	-	2.7%	2.7%	2.7%	4.7%
Local Personal	2.7%	2.7%	2.7%	3.7%	-	-	-	-
Exemptions/Violations	6.9%	6.9%	6.9%	5.9%	7.4%	7.4%	7.4%	5.4%
Annual Pass - Pvt CJV	19.4%	33.9%	33.9%	33.9%	-	-	-	-

Source: TIC estimate

- Vanagram TP observed forced exemption in CJV/Mini LCV categories during peak hours due to identified black spot near toll plaza. Traffic police requests toll operating agency to open boom barrier for faster evacuation of traffic. This challenge will be eliminated on shifting of toll plaza to new location and hence improvement in forced exemption/violation is expected.
- ~19% of CJV traffic is observed using Annual Pass of INR 3,000 as on 31st October 2025 which is expected to increase by ~1.6 times in future through gradual awareness among road users. The consultant did not consider penetration of annual pass from estimated exemption/violation in future.

Ticket distribution for Bus / LCV / 2A / 3A / MAV

Vehicle categories	Bus	LCV	2A	3A	MAV
Ticket types	FY26 onwards				
Single	20.5%	42.2%	45.0%	42.7%	49.9%
Return	30.7%	56.9%	50.2%	55.3%	49.0%
Monthly Pass	3.4%	0.3%	0.2%	0.1%	0.1%
Local Commercial	-	0.0%	0.1%	0.8%	0.6%
Exemptions/Violations	45.4%	0.6%	4.5%	1.1%	0.4%

Source: TIC estimate

- For all vehicle categories, prevailing exemption/violation has considered for future. As per discussion with the client, prevailing forced exemption is likely to reduce post-implementation of Multi Lane Free Flow (MLFF) tolling system.
- Future segmentation will change due to expected diversions presented in Chapter 6.

Ticket Distribution (2): Surapattu TP

Ticket distribution

Vehicle categories	Car/Jeep/Van			
Ticket types	**FY26**	**FY27**	**FY28**	**FY29 onwards**
Single	29.6%	23.1%	23.1%	23.1%
Return	31.0%	22.7%	22.7%	22.7%
Monthly Pass	0.1%	0.1%	0.1%	0.1%
Local Commercial	-	-	-	-
Local Personal	5.2%	5.2%	5.2%	5.2%
Exemptions/Violations	14.3%	14.3%	14.3%	14.3%
Annual Pass - Pvt CJV	19.8%	34.6%	34.6%	34.6%

Vehicle categories	Mini LCV	Bus	LCV	2A	3A	MAV
Ticket types	**FY26 onwards**					
Single	43.3%	20.5%	37.4%	43.7%	40.6%	49.8%
Return	47.5%	30.7%	58.9%	50.6%	53.0%	48.8%
Monthly Pass	0.1%	3.4%	0.1%	0.02%	-	-
Local Commercial	5.8%	-	0.3%	0.2%	0.5%	0.1%
Local Personal	-	-	-	-	-	-
Exemptions/Violations	3.3%	45.4%	3.3%	5.5%	5.9%	1.3%
Annual Pass - Pvt CJV	-	-	-	-	-	-

Source: TIC estimate

- ~19% of CJV traffic is observed using Annual Pass of INR 3,000 as on 31st October 2025 which is expected to increase by ~1.65 times in future through gradual awareness among road users.
- The consultant did not consider penetration of annual pass from estimated exemption/violation in future.
- For all vehicle categories, prevailing exemption/violation has considered for future. As per discussion with the client, prevailing forced exemption is likely to reduce post-implementation of Multi Lane Free Flow (MLFF) tolling system.
- Future segmentation will change due to expected diversions presented in Chapter 6.

Validation of base year traffic and revenue

- The Consultant calculated base year revenue by multiplying traffic AADT with prevailing toll rates in accordance with estimated toll ticket distribution.
- Comparison summary with quoted remittance by tolling agency is presented in the below table.
- Quoted daily remittance should be lower than estimated revenue by approx. 5%-10% considering profit margins of tolling agencies.

Traffic and revenue reconciliation for base year (all values are estimated with FY26 toll rate with old linking factor)

Toll plaza	Base year revenue estimate by the Consultant (INR Crore)	Annual Potential Collection estimate by NHAI (INR Crore)	FY26 estimate vs NHAI APC	Quoted remittance By tolling agency (INR Crore)	Consultant estimate vs Quoted remittance
Vanagram	95.79	87.80	9.1%	83.39	14.9%
Surapattu	113.45	108.10	4.9%	106.57	6.5%

Source: TIC estimate

Chapter 6: Diversion analysis

- Bengaluru – Chittor – Thatchoor corridor and Chennai Peripheral Ring Road link
- Chennai Port Maduravoyal elevated corridor
- Additional entry/exit at Ch 5.200 km of Chennai Bypass

This chapter elaborates impacts of proposed infrastructure developments in the project influence and network in form of positive/negative diversion to/from the project highway. Analysis has been exercised using IRC: 108-2015 and IRC: SP: 30-2019.

Bengaluru – Chittor – Thatchoor corridor and CPRR link (1)

- **Chennai – Bengaluru Industrial Corridor (CBIC)** proposes high impact / market driven nodes at Ponneri in Tamil Nadu (NH48), Tumkur in Karnataka (NH48), Krishnapatnam/Nellore in Andhra Pradesh (NH16).
- Bengaluru – Chittor – Thatchoor corridor in association with northern end of Chennai Peripheral Ring Road (CPRR) will be backbone to this mega industrial corridor.
- **Bengaluru Chennai Expressway (NE7)** and **Chittoor Thatchur section of NH716B** will link both states to Chennai Maritime Cluster covering ports of Chennai, Ennore and Kattupalli. Both will be access-controlled development.
  - **Phase 1 of NE7 (Karnataka):** operational
  - **Phase 2 of NE7 (Andhra Pradesh):** Total 3 packages; physical progress by August 2025 are Package 1 (~60%), Package 2 (~35%), Package 3 (~80%) and expected to be operational by mid FY28
  - **Phase 3 of NE7 (Tamil Nadu):** Total 3 packages; physical progress by August 2025 are Package 1 (~85%), Package 2 (~55%), Package 3 (~80%) and expected to be operational by mid FY28
  - **Chittoor Thatchur section of NH716B:** Total 4 packages; physical progress by August 2025 are Package 1 (~55%), Package 2 (~30%), Package 3 (~70%), Package 4 (~15%) and expected to be operational by end of FY28
- **CPRR,** 6-lane 132 km access-controlled expressway under development in Tamil Nadu by Tamil Nadu Road Development Company, will **act as last mile connectivity for this maritime cluster.** This last mile section is expected to be operational by FY28.
- Presently traffic uses either NH48/Chennai Bypass or NH69/Chennai Bypass link to reach Chennai Maritime Cluster.

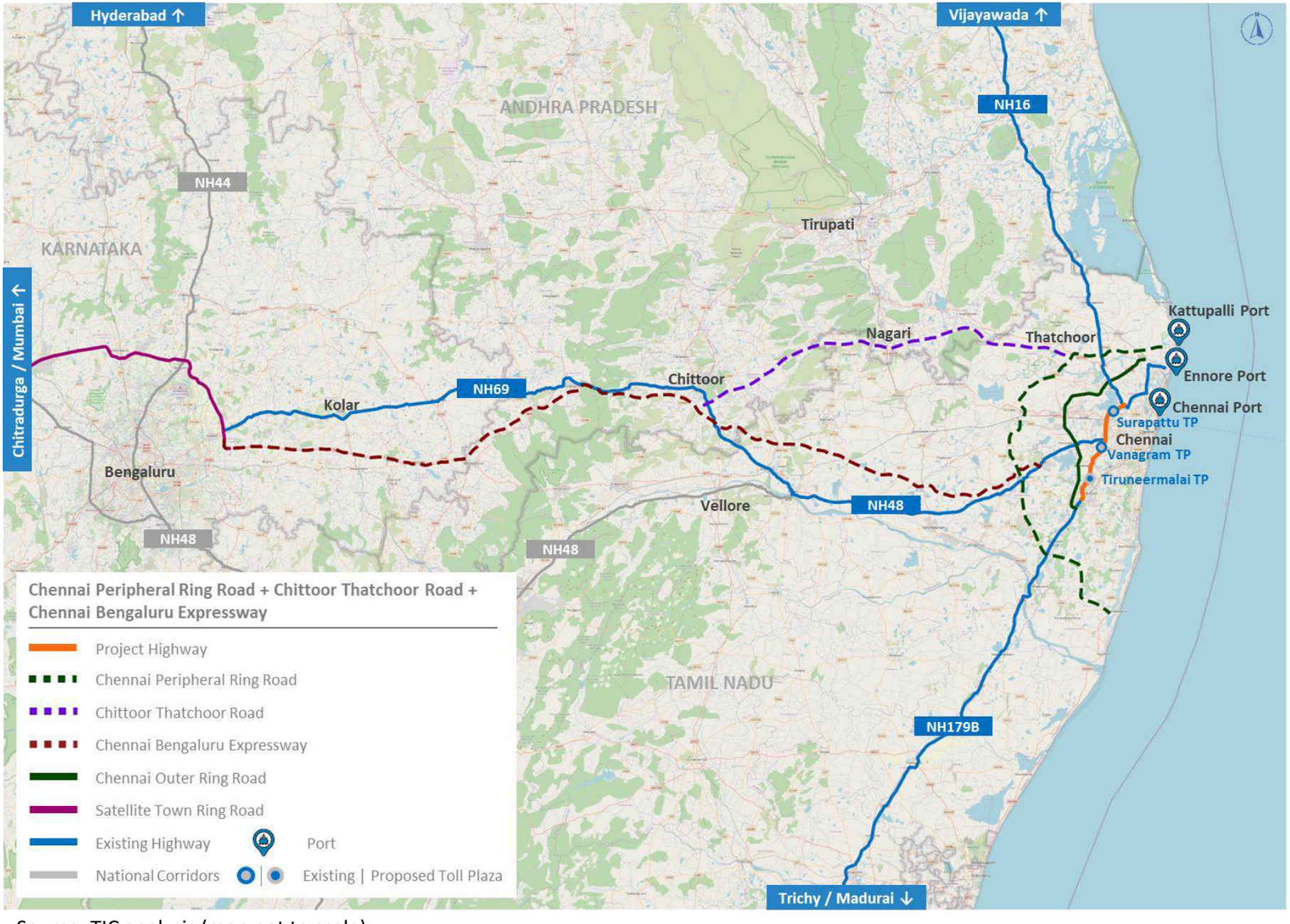
Diversion due to Bengaluru – Chittor – Thatchoor corridor and CPRR link

Diversion	Affected traffic movement	Timeline	Toll Plaza	Diversion as % of Base Year AADT					
				CJV	Mini LCV	LCV	2A Trucks	3A Trucks	MAV
Negative diversion	Traffic movement between Bengaluru/west and Ennore/Kattupalli Port without using logistics facility (CFS/Container Yard) at Manali area	-	Vanagram / Tiruneermal	-	-	-	-	-	-
		FY28 (20%) FY29 (70%) FY30 (100%) onwards	Surapattu	(0.17%)	-	-	(2.40%)	(2.46%)	(2.32%)

Source: TIC estimate

Bengaluru – Chittor – Thatchoor corridor and CPRR link (2)

Bengaluru – Chittor – Thatchoor corridor and CPRR alignment and project highway context



Source: TIC analysis (map not to scale)

Chennai Port Maduravoyal elevated corridor (1)

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Chennai Port Maduravoyal elevated corridor (under implementation with expected completion by mid FY29)

- NHAI is developing elevated corridor exclusively for Chennai Port (Maduravoyal to Chennai Port Gate No. 10) strengthen external evacuation infrastructure.
- Double tier 4-lane elevated corridor along the Cooum River as part of NH48 and will land inside premise of Chennai Port. Divided into four construction packages and awarded to J. Kumar Infra Projects Limited in JV with Azvirt LLC through EPC mode.
- Further, Chennai Port is implementing strengthening program of internal roads for ease on movement between Gate No. 1 to 10 followed by internal elevated corridor as long-term solution to ease out internal congestion.
- This development will provide ease to port-bound traffic, improve freight access, and reduce congestion.

Integrated logistics facility at Chennai (Mappedu) Multimodal Logistics Park (MMLP) – acts as dry port for Chennai Maritime Cluster

- Area nearby Chennai maritime cluster (Manali, Ennore Port Road, Redhill) is hub of logistics facilities like Container Freight Stations (CFS), warehousing/container yards, truck terminals, customs, lodging/boarding for truckers.
- Chennai Multimodal Logistics Park (MMLP) is under construction at Mappedu (accessible through NH48 and at west of Chennai). Phase 1 commercial operations is expected by start of FY27. This will improve freight efficiency, reduce last-mile delivery challenges, link ports (Chennai, Ennore, Kattupalli) with industries and boost economic growth.

Sriperumbudur to Maduravoyal Elevated Corridor (long-term)

- In addition to this, DPR of 'Construction of 6 lane Elevated Corridor from Sriperumbudur to Maduravoyal' for future connectivity is under process by Chennai Metro Rail Limited in close coordination with NHAI as plan is to integrate metro connectivity with the elevated corridor. This will further enhance seamless connectivity for Chennai port bound traffic.

Altogether will have two-layer impact on the present network:

- Traffic which is associated to Chennai Port **without using logistics facility (CFS/Yard) at Manali area** – elevated corridor will act as natural choice for such traffic i.e., factory stuffing/sealed container to/from manufacturing facility
- Traffic which is associated to Chennai Port **using logistics facility (CFS/Yard) at Manali area** – partly will use Mappedu MMLP as dry port followed by elevated corridor as seamless connectivity.

Chennai Port Maduravoyal Elevated Corridor will be the natural choice irrespective any other combinational options like CPRR/ORR etc. for traffic associated with Chennai Port in longer run as extended ecosystem for containerized cargo.

Chennai Port Maduravoyal elevated corridor (2)

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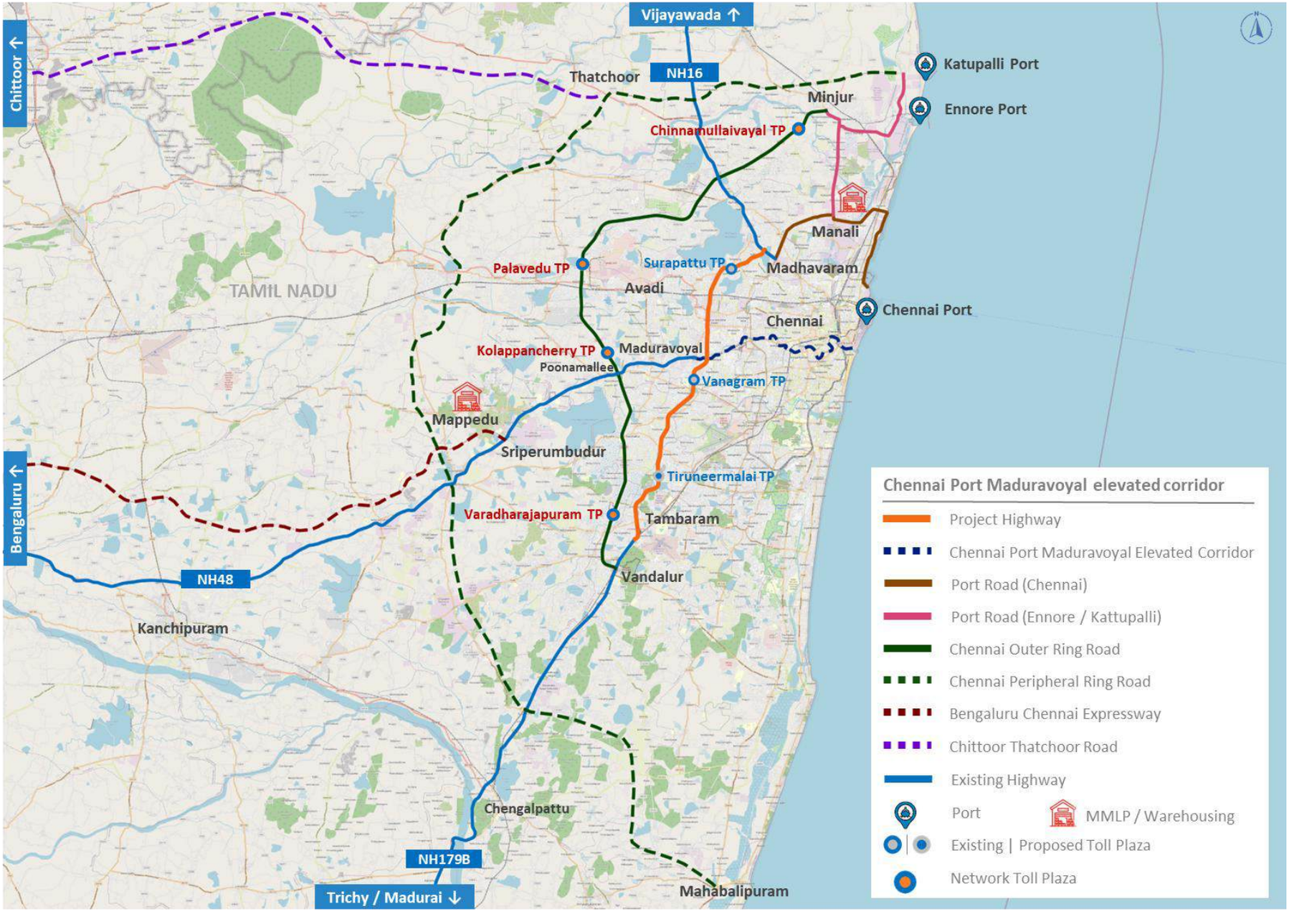
Chennai Port Maduravoyal elevated corridor alignment and project highway context



Source: TIC analysis (map not to scale)

Chennai Port Maduravoyal elevated corridor (3)

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Diversion due to Chennai Port Maduravoyal elevated corridor

Diversion	Affected traffic movement	Timeline	Toll Plaza	Diversion as % of Base Year AADT					
				CJV	Mini LCV	LCV	2A Trucks	3A Trucks	MAV
Negative diversion	Traffic movement from/to Chennai Port with/without using logistics facility at Manali Area including associated empty movement	-	Vanagram / Tiruneermalai	-	-	-	-	-	-
		FY29 (50%) FY30 (100%) onwards	Surapattu	-	-	(30.41%)	(31.22%)	(29.31%)	(31.03%)

Source: TIC estimate

Additional entry/exit at Ch km 5.200 (1)

- Madras Export Processing Zone (MEPZ) is multi-product Special Economic Zone (SEZ) established near Tambaram in southern part of Chennai in 1984. Its proximity to these ports enables efficient port-linked trade and supports Tamil Nadu's export growth.
- Being SEZ, it is closely liked with port for EXIM cargo. Major imports is raw materials like electronic components, chemicals, fabrics and exports of finished goods such as electronics, engineering products, garments, and pharmaceuticals.
- Reference discussion with MEPZ Authority, daily about 150-200 freight vehicles movement is realized between Chennai Maritime Cluster and MEPZ. Thes vehicles use Outer Ring Road (ORR) which is about 40 km higher in distance and accordingly toll rates.
- As Chennai Bypass is access-controlled with limited entry-exit, the present route via ORR require a long detour, causing delays in the movement of export and import goods.
- In this context, MEPZ has requested NAHI to develop a dedicated entry and exit ramp at Ch km 5.200 on Chennai Bypass. The proposed ramp will provide direct connectivity, improving logistics efficiency, reducing travel time for freight vehicles, and facilitating smoother port-linked trade operations through Chennai Port.
- The proposed development is under bidding process and expected to be operational by mid FY28.
- The consultant carried out volume count and origin-destination surveys at MEPZ Goods entry-exit gate and on alternate route to determine quantum of such induced traffic due to development of additional entry-exit at Ch km 5.200.
- In addition to MEPZ, nearby industrial area at Thirumudivakkam and Tambaram originated/destined traffic will use the proposed facility at Ch km 5.200 which is before Vanagaram / Tiruneermalai TP (Ch km 6.500) and hence will be positive impact for the project highway.

Positive impact due to Additional entry/exit at Ch 5.200 Km

Diversion	Affected traffic movement	Timeline	Toll Plaza	Diversion as % of Base Year AADT					
				CJV	Mini LCV	LCV	2A Trucks	3A Trucks	MAV
Positive impact	Traffic movement between MEPZ and Madhavaram / Manali / Ports (Ennore, Chennai, Kattupalli)	FY28 (30%) FY29 (100%) onwards	Vanagaram / Tiruneermalai	-	0.86%	0.21%	3.32%	2.30%	1.57%
		FY28 (30%) FY29 (100%) onwards	Surapattu	-	1.14%	0.15%	2.32%	1.24%	0.82%

Source: TIC estimate

Additional entry/exit at Ch km 5.200 (2)

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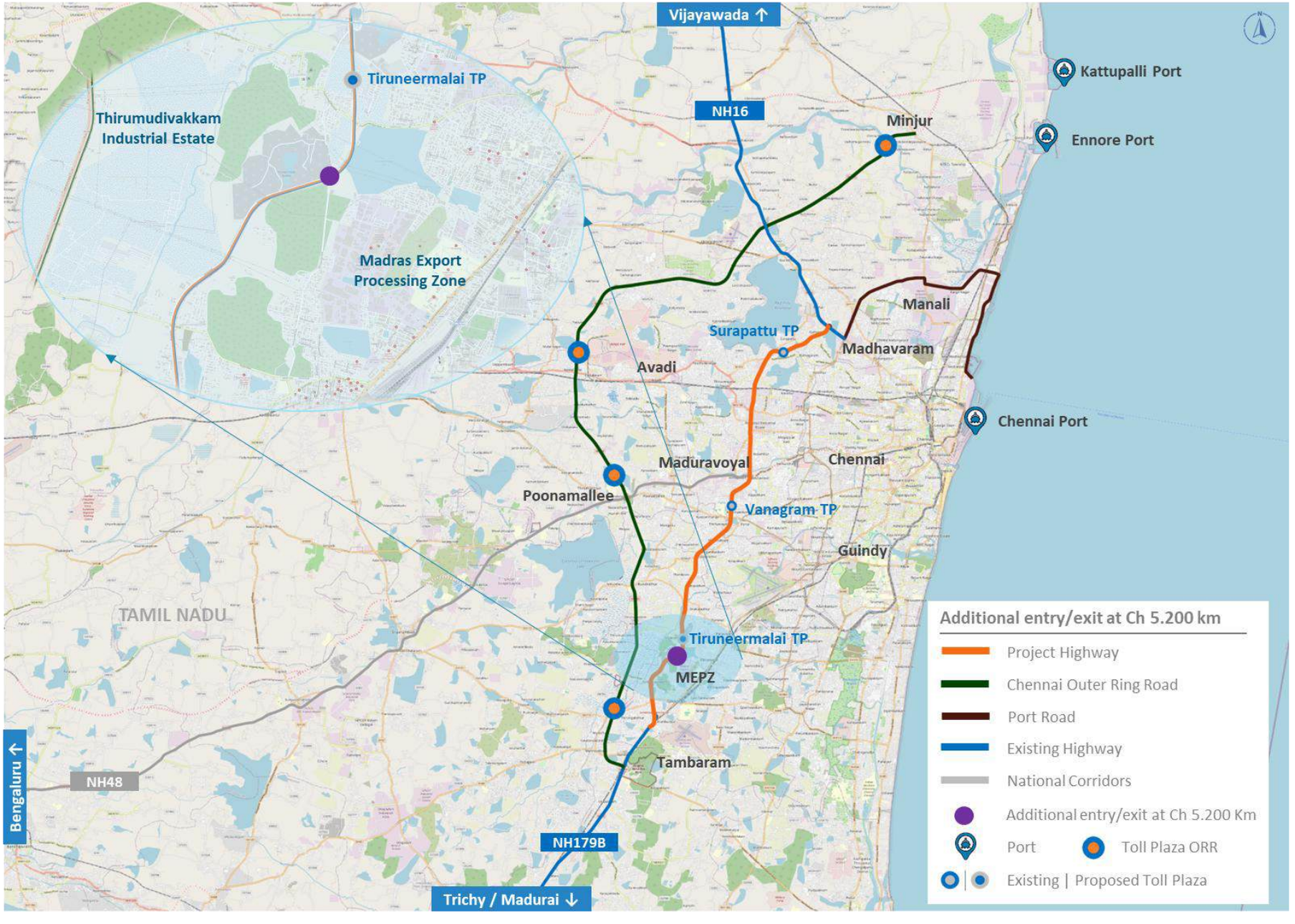
Chennai Port Maduravoyal elevated corridor alignment and project highway context



Source: TIC analysis (map not to scale)

Chapter 7: Final traffic and revenue forecast

- Capacity analysis
- Traffic growth forecast
- Traffic and revenue forecast
- Scenario development

Following pre-diversion traffic forecast and diversion analysis, this chapter presents final traffic and revenue forecast for various scenarios: most likely with and without overloading, pessimistic and optimistic.

Capacity analysis (1)

Assumption for design capacity determination and tollable section-wise capacity analysis

Tollable sections / Level of Service	Capacity (PCU / Hour)	Tambaram - Maduravoyal (Vanagaram TP / Tiruneermalai TP)	Maduravoyal - Madhavaram (Surapattu TP)
Lane configuration	6 Lane	6 Lane	6 Lane
Level of Service B	5,400	5,400	5,400
Level of Service C	7,560	7,560	7,560
Level of Service D	8,640	8,640	8,640
Level of Service E	9,720	9,720	9,720
Level of Service F	10,800	10,800	10,800
Peak Hour Factor		5.92%	6.12%
Peak Hour PCU (FY41)		8,974	6,888
Capacity Saturation (LOS B)		**Yes**	**Yes**
Capacity Saturation (LOS C)		**Yes**	**No**
Capacity Saturation (LOS D)		**Yes**	**No**
Capacity Saturation (LOS E)		**No**	**No**
Capacity Saturation (LOS F)		**No**	**No**

Source: TIC estimate

Design capacity for 6-lane National Highway is determined as per as per IRC: 106 and IRC: SP 87 and standard industry practice for determining Level of Service C/D/E

Capacity analysis (2)

Tambaram Maduravoyal section (Vanagaram TP / Tiruneermalai TP)

- Tambaram Maduravoyal section is heavily congested, crossing Level of Service (LOS) B by FY31, LOS C by FY35 and LOS D by FY37, primarily due to high volumes of daily commuter CJV traffic associated with the urban catchment of Chennai and surrounding districts.
- This section experiences extended peak-hour conditions of nearly 8 hours per day (approx. 4 hours each during morning and evening with no possibility of readjustment of peak hours considering business hours during day-time), which is expected to result in LOS E by FY40.
- At this stage, traffic is likely to redistribute to alternate routes.
- Accordingly, the consultant has considered capacity constraints for the Tambaram–Maduravoyal section from FY37 to FY41 at LOS D being access control corridor with limited entry/exit.

Maduravoyal – Madhavaram (Surapattu TP)

- Maduravoyal Madhavaram section carries a relatively higher proportion of freight traffic, driven largely by port-led goods movement.
- As a result, this section will observe LOS C from FY38 to FY41 (horizon years), and hence no capacity constraint has been considered for this section.

Transactional Support Agreement and FY27 revenue estimate

- The project highway is proposed to be included in NHAI's Public InvIT.
- A Transactional Support Agreement will be executed between NHAI and the Public InvIT for the management of toll plaza operations for FY27.
- Tolling operations during FY27 will be undertaken by NHAI under the prevailing short-term contract modality.
- Accordingly, FY27 revenue has been estimated based on historical bidding trends for tolling contracts and is assumed to be 5%–10% lower than the estimated actual revenue.
- Consistent with this arrangement, manpower-related expenses for tolling operations have been excluded from O&M costs as confirmed by the client.

Traffic and revenue forecast: Vanagaram TP / Tiruneermalai TP (1)

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Pre-diversion growth rate

Vehicle Category	FY26 FY27	FY27 FY28	FY28 FY29	FY29 FY30	FY30 FY31	FY26 FY31	FY31 FY36	FY36 FY41	FY27 FY41
CJV	14.2%	13.8%	13.9%	12.3%	12.8%	13.4%	10.7%	2.1%	8.2%
Mini LCV	13.1%	13.2%	13.3%	11.8%	11.5%	12.6%	10.8%	2.0%	8.0%
LCV	2.5%	2.6%	2.6%	2.3%	2.3%	2.5%	2.1%	0.4%	1.6%
Bus	2.9%	2.9%	2.9%	2.6%	3.9%	3.1%	2.7%	0.5%	2.0%
2A Truck	4.7%	3.3%	2.5%	2.2%	2.3%	3.0%	3.4%	0.5%	2.1%
3A Truck	0.8%	0.8%	0.8%	0.7%	0.7%	0.8%	0.7%	0.1%	0.5%
MAV	2.7%	3.9%	2.2%	1.9%	4.5%	3.0%	2.9%	0.6%	2.1%
AADT	**11.8%**	**11.7%**	**11.9%**	**10.6%**	**11.3%**	**11.5%**	**9.7%**	**2.0%**	**7.3%**
PCU	**9.2%**	**9.4%**	**9.5%**	**8.6%**	**9.6%**	**9.3%**	**8.4%**	**1.7%**	**6.2%**

Post-diversion growth rate

Vehicle Category	FY26 FY27	FY27 FY28	FY28 FY29	FY29 FY30	FY30 FY31	FY26 FY31	FY31 FY36	FY36 FY41	FY27 FY41
CJV	14.2%	13.8%	13.9%	12.3%	12.8%	13.4%	10.7%	2.1%	8.2%
Mini LCV	13.1%	14.2%	13.3%	11.8%	11.5%	12.8%	10.8%	2.0%	8.1%
LCV	2.5%	2.8%	2.6%	2.3%	2.3%	2.5%	2.1%	0.4%	1.6%
Bus	2.9%	2.9%	2.9%	2.6%	3.9%	3.1%	2.7%	0.5%	2.0%
2A Truck	4.7%	6.7%	2.5%	2.2%	2.3%	3.7%	3.4%	0.5%	2.4%
3A Truck	0.8%	3.1%	0.8%	0.7%	0.7%	1.2%	0.7%	0.1%	0.7%
MAV	2.7%	5.5%	2.2%	1.9%	4.5%	3.4%	2.9%	0.6%	2.3%
AADT	**11.8%**	**12.0%**	**11.9%**	**10.6%**	**11.3%**	**11.5%**	**9.7%**	**2.0%**	**7.4%**
PCU	**9.2%**	**9.9%**	**9.4%**	**8.6%**	**9.5%**	**9.3%**	**8.3%**	**1.7%**	**6.2%**

Source: TIC estimate

Traffic and revenue forecast: Vanagaram TP / Tiruneermalai TP (2)

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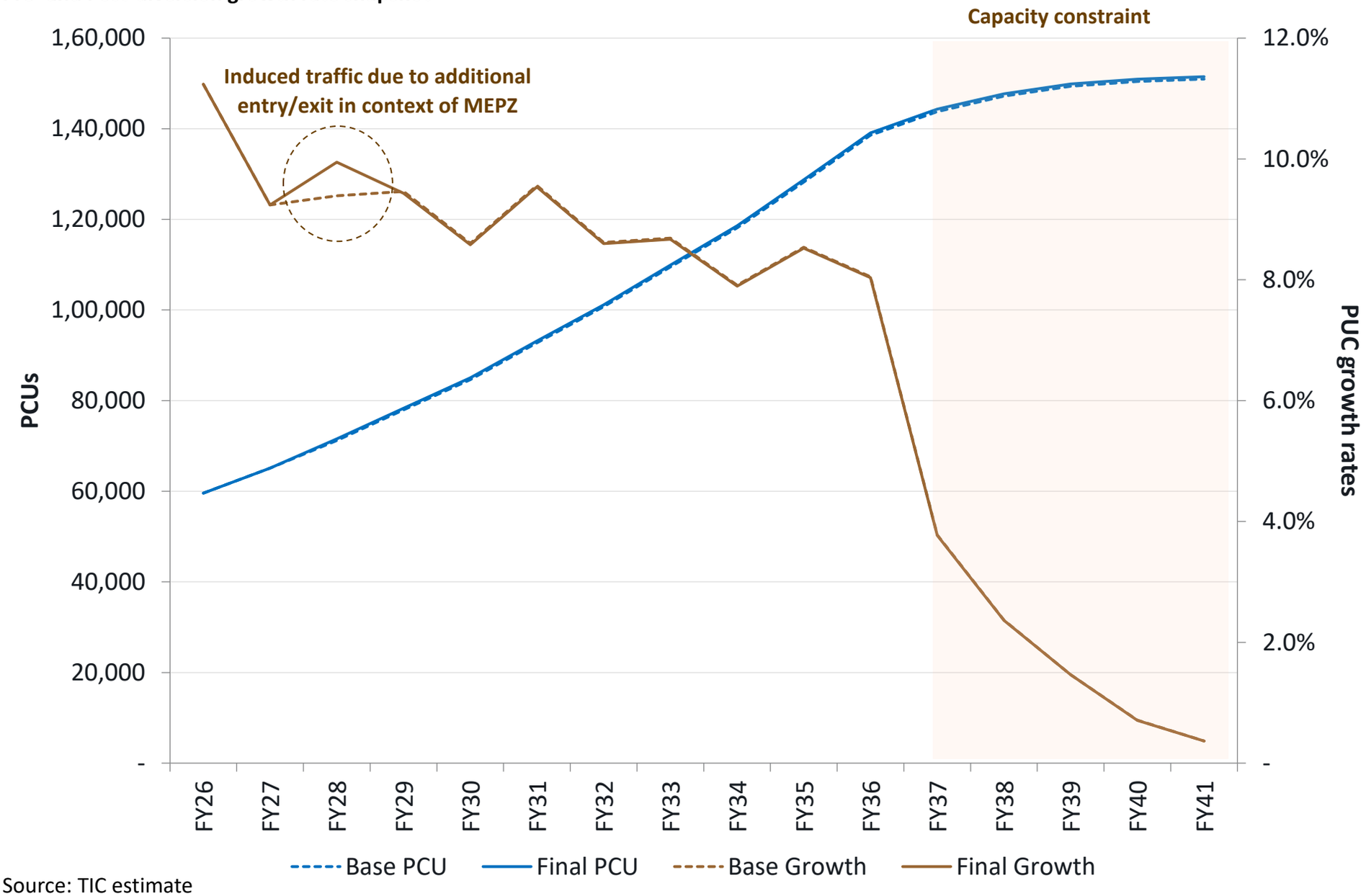
Pre- and Post-diversion growth rate snapshot

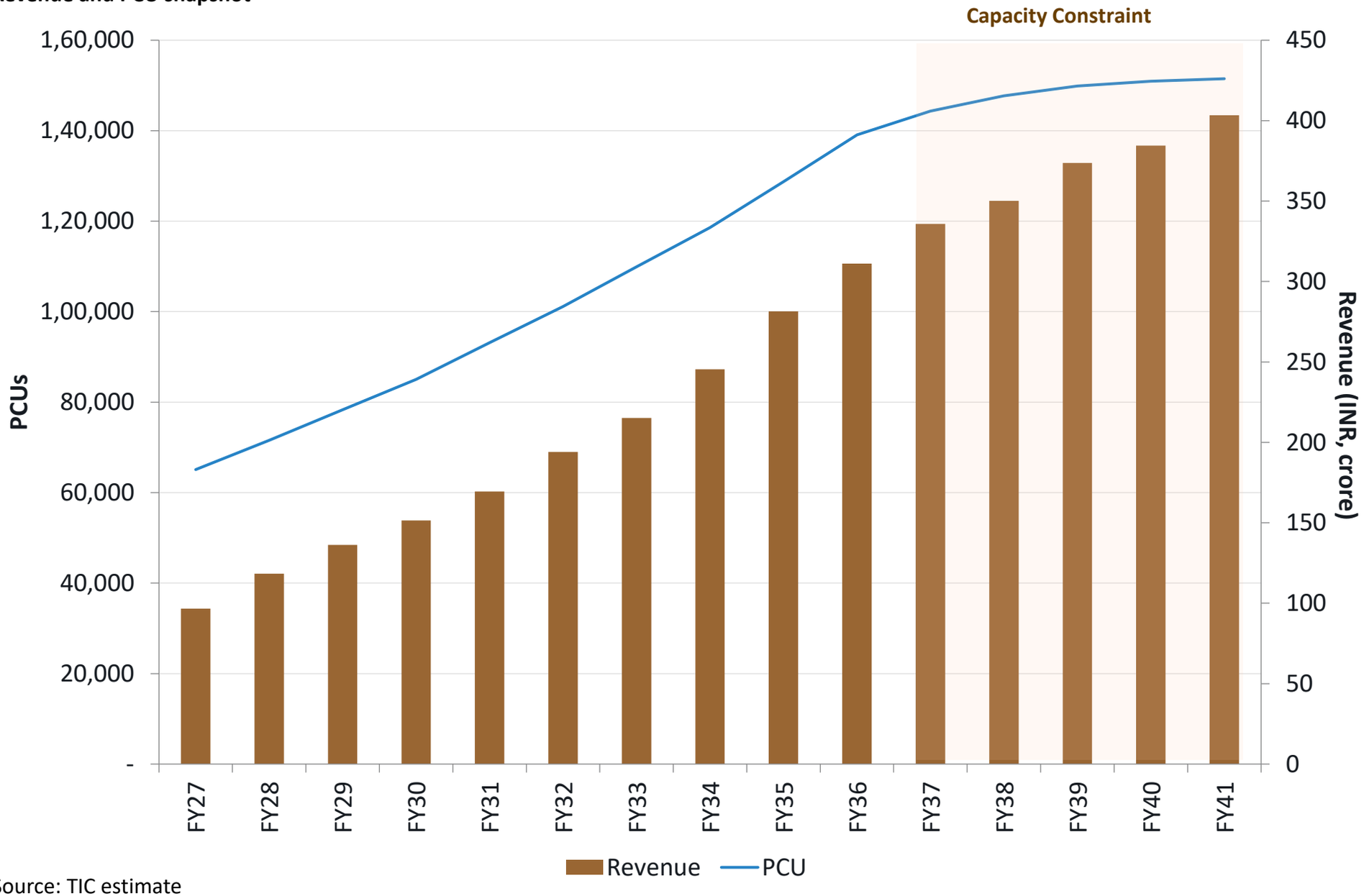


Source: TIC estimate

Traffic and revenue forecast Vanagaram TP / Tiruneermalai TP (3)

TRANSLINK® Infrastructure Consultants Pvt Ltd Smart Consulting

Revenue and PCU snapshot



Source: TIC estimate

Traffic and revenue forecast: Surapattu TP (1)

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Pre-diversion growth rate

Vehicle Category	FY26 FY27	FY27 FY28	FY28 FY29	FY29 FY30	FY30 FY31	FY26 FY31	FY31 FY36	FY36 FY41	FY27 FY41
CJV	14.0%	13.6%	13.7%	12.1%	12.7%	13.2%	10.6%	8.7%	10.6%
Mini LCV	12.8%	12.9%	13.0%	11.5%	11.2%	12.3%	10.5%	9.1%	10.5%
LCV	4.7%	4.8%	4.8%	4.2%	4.2%	4.5%	3.9%	3.4%	3.9%
Bus	2.9%	2.9%	2.9%	2.6%	3.9%	3.1%	2.7%	2.3%	2.7%
2A Truck	3.3%	2.1%	1.5%	1.4%	1.4%	1.9%	2.4%	1.5%	1.8%
3A Truck	0.8%	0.8%	0.8%	0.7%	0.7%	0.8%	0.7%	0.6%	0.7%
MAV	2.8%	4.0%	2.2%	1.9%	4.7%	3.1%	3.0%	2.9%	3.0%
AADT	**10.2%**	**10.3%**	**10.3%**	**9.3%**	**10.1%**	**10.0%**	**8.9%**	**7.7%**	**8.8%**
PCU	**7.0%**	**7.5%**	**7.1%**	**6.6%**	**7.8%**	**7.2%**	**7.0%**	**6.4%**	**6.8%**

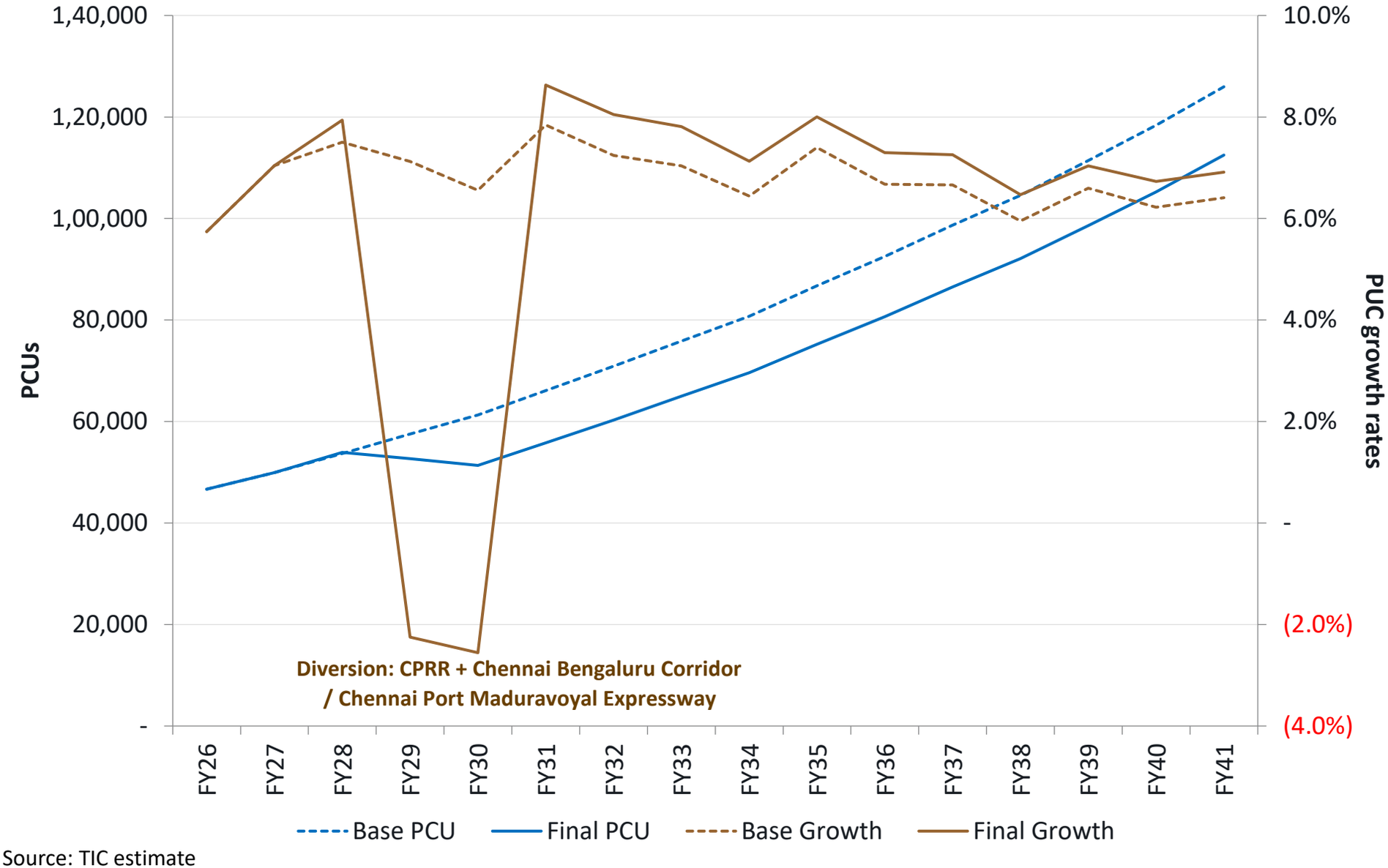
Post-diversion growth rate

Vehicle Category	FY26 FY27	FY27 FY28	FY28 FY29	FY29 FY30	FY30 FY31	FY26 FY31	FY31 FY36	FY36 FY41	FY27 FY41
CJV	14.0%	13.6%	13.6%	12.1%	12.7%	13.2%	10.6%	8.7%	10.6%
Mini LCV	12.8%	14.2%	13.0%	11.5%	11.2%	12.5%	10.5%	9.1%	10.6%
LCV	4.7%	4.9%	(11.1%)	(14.4%)	4.2%	(2.7%)	3.9%	3.4%	1.3%
Bus	2.9%	2.9%	2.9%	2.6%	3.9%	3.1%	2.7%	2.3%	2.7%
2A Truck	3.3%	4.0%	(15.2%)	(18.1%)	1.4%	(5.4%)	2.4%	1.5%	(0.8%)
3A Truck	0.8%	1.6%	(15.1%)	(17.5%)	0.7%	(6.3%)	0.7%	0.6%	(1.9%)
MAV	2.8%	4.4%	(14.8%)	(17.8%)	4.7%	(4.7%)	3.0%	2.9%	0.2%
AADT	**10.2%**	**10.6%**	**5.4%**	**5.0%**	**10.6%**	**8.4%**	**9.4%**	**8.0%**	**8.5%**
PCU	**7.0%**	**7.9%**	**(2.2%)**	**(2.6%)**	**8.6%**	**3.6%**	**7.7%**	**6.9%**	**6.0%**

Source: TIC estimate

Traffic growth forecast: Surapattu TP (2)

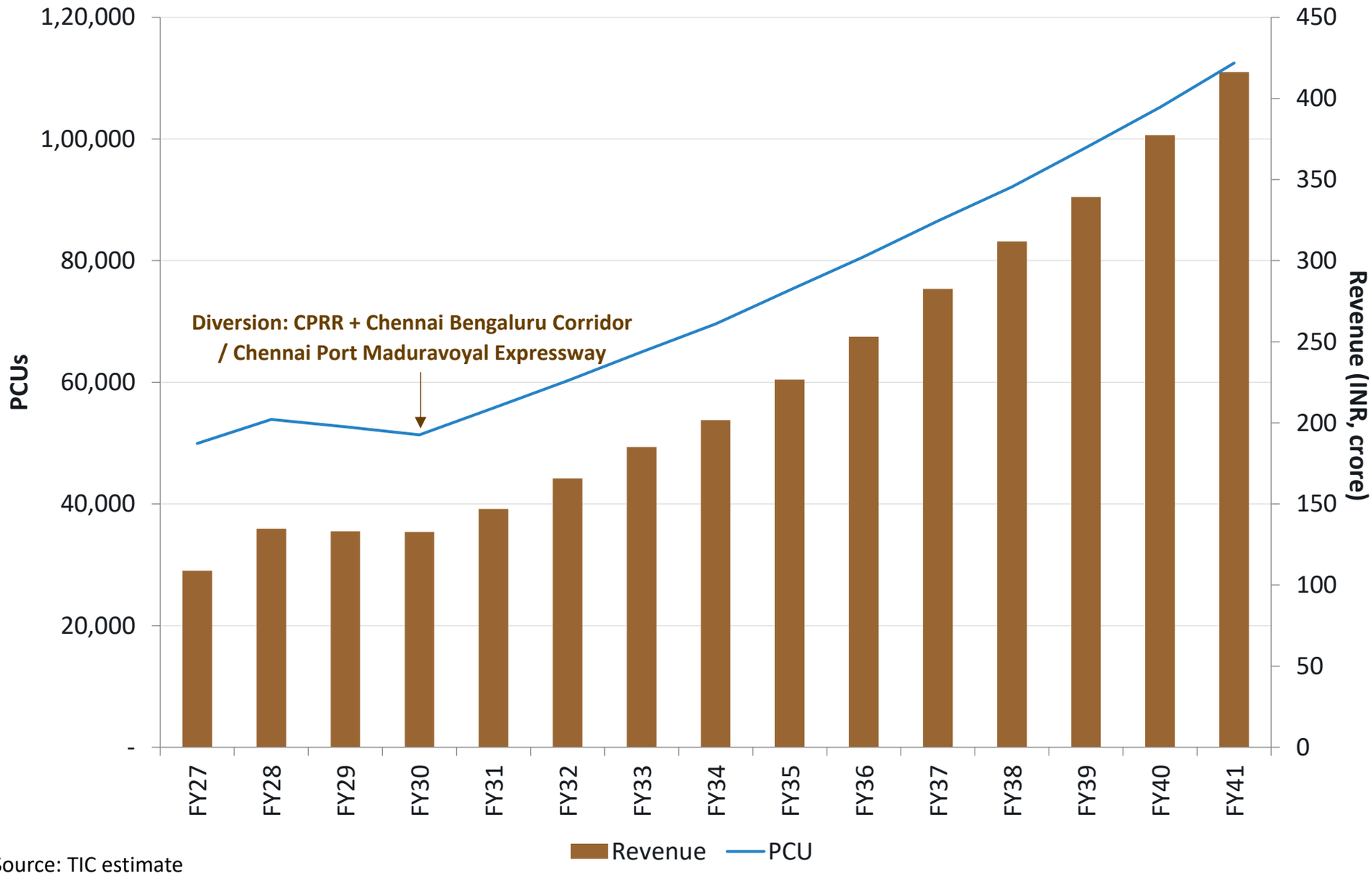
Pre- and Post-diversion growth rate snapshot



Source: TIC estimate

Traffic growth forecast: Surapattu TP (3)

Revenue and PCU snapshot



Source: TIC estimate

Scenario development definition

Most Likely Scenario without overloading

- No overloading penalty/fees is considered at present based on understanding from site visit. In context of present ground situation and possibility of diversion in case of collecting overloading fees, the consultant did not consider overloading fee collection in most likely scenario.

Most Likely Scenario with overloading

The consultant considered following changes from the most likely (with overloading) case to determine most likely (with overloading) scenario:

- Overloading penalty/fees will be levied in future as per the overloading characteristics observed in axle load survey.

Optimistic Scenario

The consultant considered following changes from the most likely (with overloading) case to determine optimistic scenario:

- GDP: increase (addition) of 0.25% from FY27 to FY35
- Overloading penalty/fees will be levied in future as per the overloading characteristics observed in axle load survey
- Delayed the impact due to Chennai Port Maduravoyal elevated corridor by a year

Pessimistic Scenario

The consultant considered following changes from the most likely (with overloading) case to determine pessimistic scenario:

- GDP: decrease (subtraction) of 0.25% from FY27 to FY35
- No overloading penalty/fees is being levied

Detailed traffic and revenue forecast for 'Most likely scenario without overloading' is exhibited in Appendix C.

Scenario summary: Vanagaram TP / Tiruneermalai TP (1)

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	Most likely without overloading			Most likely with overloading			Optimistic scenario			Pessimistic scenario		
FY	**PCU**	**PCU growth**	**Revenue (INR Cr)**	**PCU**	**PCU growth**	**Revenue (INR Cr)**	**PCU**	**PCU growth**	**Revenue (INR Cr)**	**PCU**	**PCU growth**	**Revenue (INR Cr)**
FY27	65,092	9.2%	97	65,124	9.2%	97	65,458	9.6%	97	64,884	8.9%	97
FY28	71,566	9.9%	118	71,600	9.9%	123	72,200	10.3%	119	71,102	9.6%	118
FY29	78,317	9.4%	136	78,351	9.4%	141	79,265	9.8%	138	77,547	9.1%	135
FY30	85,036	8.6%	151	85,070	8.6%	156	86,191	8.7%	158	83,929	8.2%	149
FY31	93,147	9.5%	169	93,197	9.6%	174	94,788	10.0%	177	91,583	9.1%	167
FY32	1,01,157	8.6%	194	1,01,252	8.6%	197	1,03,349	9.0%	201	99,103	8.2%	190
FY33	1,09,930	8.7%	215	1,10,042	8.7%	218	1,12,734	9.1%	224	1,07,304	8.3%	210
FY34	1,18,609	7.9%	245	1,18,738	7.9%	248	1,22,057	8.3%	255	1,15,384	7.5%	239
FY35	1,28,721	8.5%	281	1,28,870	8.5%	284	1,32,960	8.9%	293	1,24,763	8.1%	273
FY36	1,39,066	8.0%	311	1,39,234	8.0%	313	1,43,706	8.1%	323	1,34,739	8.0%	302
FY37	1,44,309	3.8%	336	1,44,495	3.8%	337	1,49,166	3.8%	348	1,39,790	3.7%	325
FY38	1,47,718	2.4%	350	1,47,905	2.4%	351	1,52,705	2.4%	363	1,43,075	2.3%	339
FY39	1,49,880	1.5%	374	1,50,068	1.5%	375	1,54,948	1.5%	387	1,45,159	1.5%	362
FY40	1,50,942	0.7%	384	1,51,131	0.7%	386	1,56,050	0.7%	398	1,46,183	0.7%	372
FY41	1,51,494	0.4%	403	1,51,683	0.4%	405	1,56,623	0.4%	418	1,46,715	0.4%	391
Total (FY27–FY41)			**3,767**			**3,805**			**3,899**			**3,668**

Source: TIC estimate

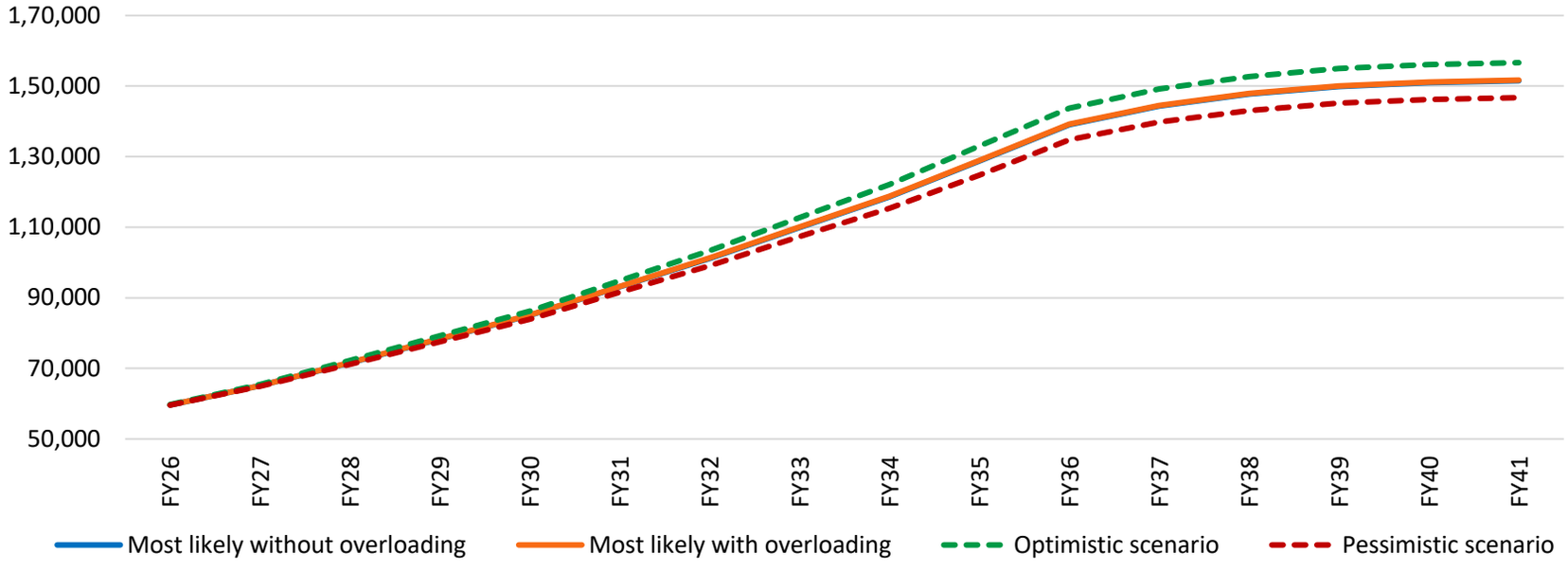
Benchmark cases for traffic at present:
Karnataka: Bengaluru Nelmangala Urban Corridor (6 Lane) – 1,22,000 PCU
Karnataka: Bengaluru Airport Corridor (Devanhalli TP) – 1,07,000 PCU
Gujarat: Ahmedabad Ring Road (4 Lane, Ramol TP) – 1,02,000 PCU

Refer Capacity Analysis (Pg 85)

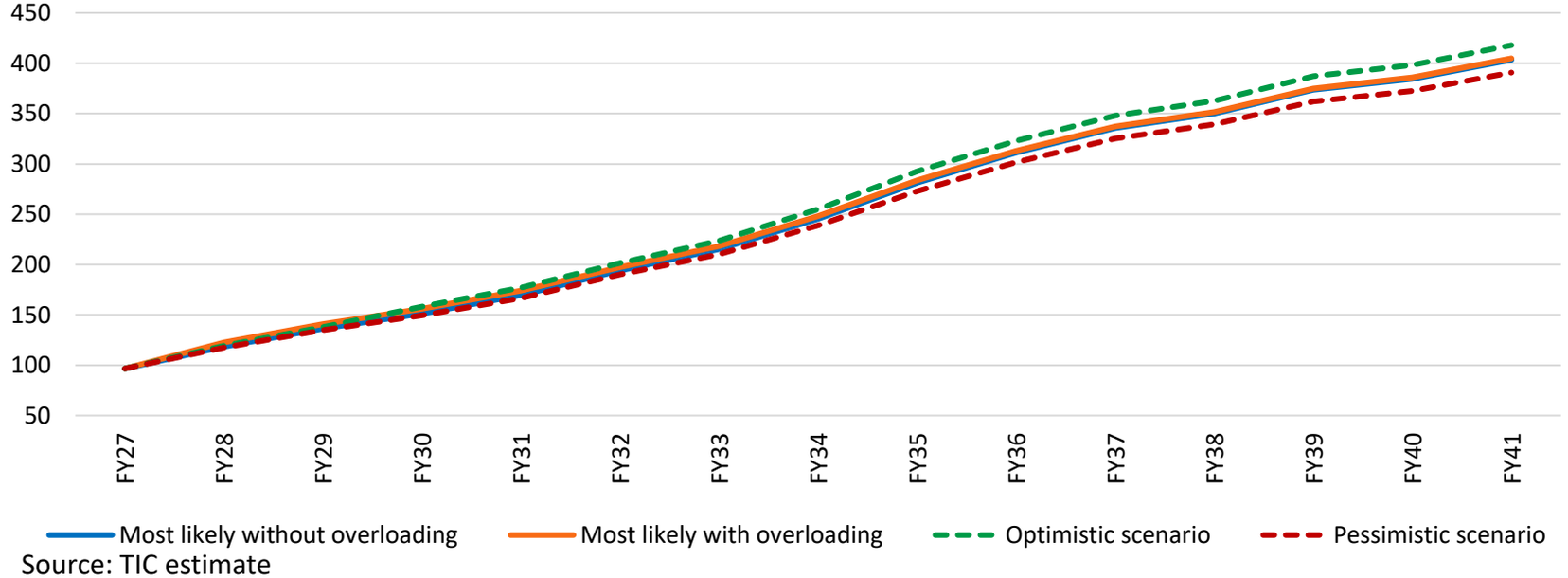
- LOS B Peak Hour 5,400 PCU/day
- LOS C Peak Hour 7,560 PCU/day
- LOS D Peak Hour 8,640 PCU/day

Scenario summary: Vanagaram TP / Tiruneermalai TP (2)

PCU comparison



Revenue comparison



Source: TIC estimate

Scenario summary: Surapattu TP (1)

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	Most likely without overloading			Most likely with overloading			Optimistic scenario			Pessimistic scenario		
FY	**PCU**	**PCU growth**	**Revenue (INR Cr)**	**PCU**	**PCU growth**	**Revenue (INR Cr)**	**PCU**	**PCU growth**	**Revenue (INR Cr)**	**PCU**	**PCU growth**	**Revenue (INR Cr)**
FY27	49,943	7.0%	109	50,001	7.0%	109	50,357	7.3%	109	49,819	6.8%	109
FY28	53,908	7.9%	135	53,969	7.9%	146	54,492	8.2%	136	53,629	7.6%	134
FY29	52,696	(2.2%)	133	52,747	(2.3%)	145	58,179	6.8%	149	52,261	(2.6%)	132
FY30	51,349	(2.6%)	133	51,391	(2.6%)	145	56,845	(2.3%)	161	50,753	(2.9%)	131
FY31	55,780	8.6%	147	55,842	8.7%	159	56,697	(0.3%)	161	54,939	8.2%	145
FY32	60,269	8.0%	166	60,387	8.1%	174	61,522	8.5%	177	59,158	7.7%	163
FY33	64,975	7.8%	185	65,115	7.8%	193	66,563	8.2%	197	63,562	7.4%	181
FY34	69,606	7.1%	202	69,768	7.1%	208	71,545	7.5%	213	67,878	6.8%	197
FY35	75,177	8.0%	227	75,365	8.0%	232	77,556	8.4%	239	73,055	7.6%	221
FY36	80,663	7.3%	253	80,875	7.3%	257	83,262	7.4%	264	78,351	7.2%	246
FY37	86,516	7.3%	283	86,754	7.3%	285	89,352	7.3%	293	84,001	7.2%	275
FY38	92,111	6.5%	312	92,355	6.5%	315	95,155	6.5%	324	89,401	6.4%	303
FY39	98,591	7.0%	339	98,842	7.0%	342	1,01,871	7.1%	352	95,659	7.0%	330
FY40	1,05,224	6.7%	377	1,05,481	6.7%	381	1,08,751	6.8%	392	1,02,058	6.7%	367
FY41	1,12,496	6.9%	416	1,12,759	6.9%	420	1,16,295	6.9%	432	1,09,074	6.9%	404
Total (FY27-FY41)			**3,416**			**3,511**			**3,600**			**3,338**

Source: TIC estimate

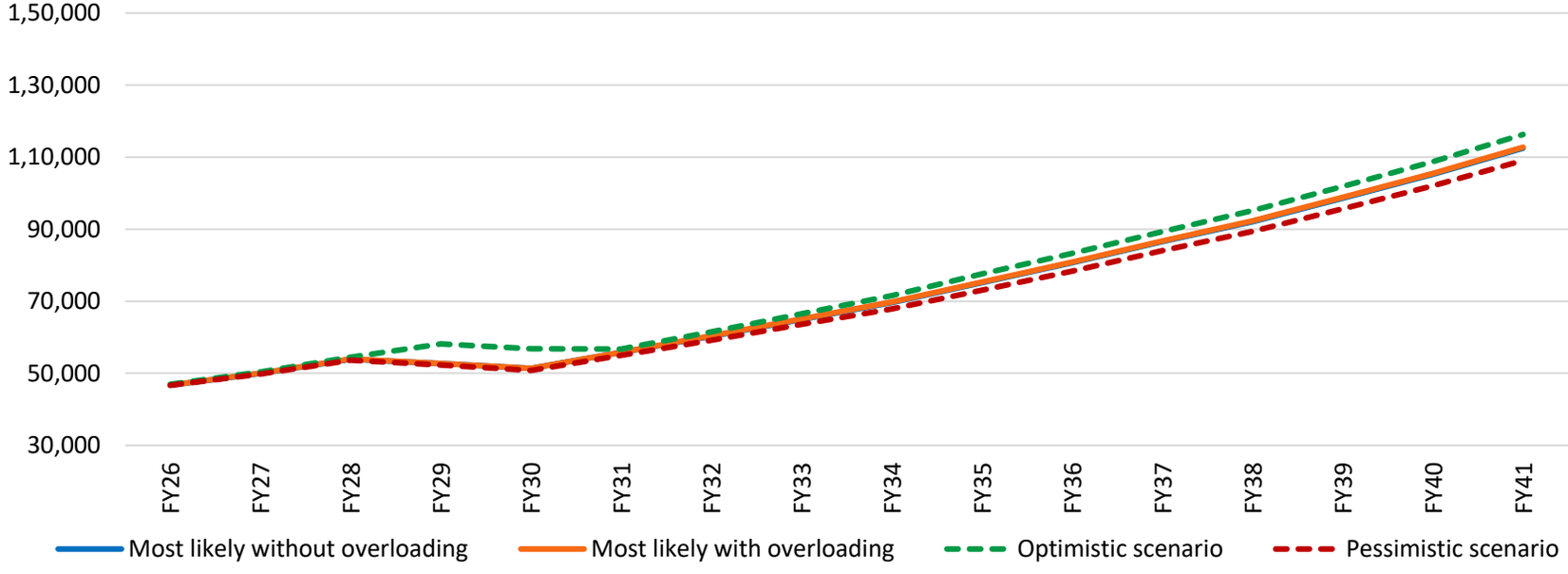
Benchmark cases for traffic at present:
Karnataka: Bengaluru Nelmangala Urban Corridor (6 Lane) – 1,22,000 PCU
Karnataka: Bengaluru Airport Corridor (Devanhalli TP) – 1,07,000 PCU
Gujarat: Ahmedabad Ring Road (4 Lane, Ramol TP) – 1,02,000 PCU

Refer Capacity Analysis (Pg 85)

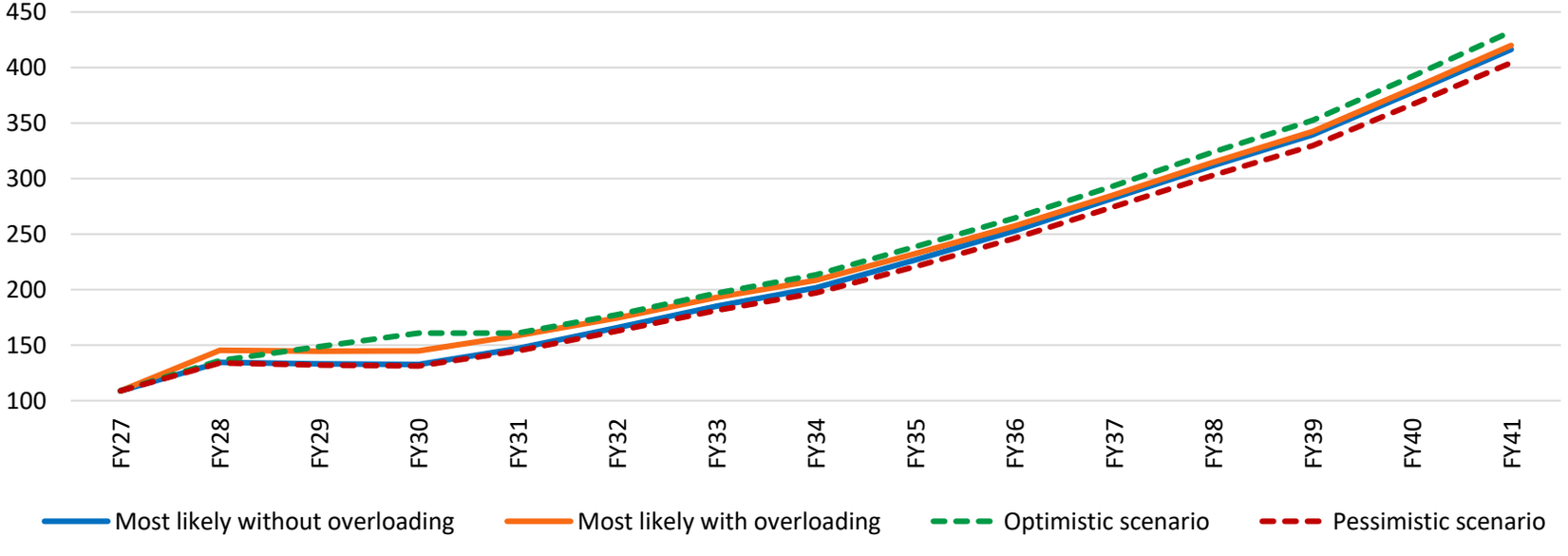
- LOS B Peak Hour 5,400 PCU/day
- LOS C Peak Hour 7,560 PCU/day
- LOS D Peak Hour 8,640 PCU/day

Scenario summary: Surapattu TP (2)

PCU comparison



Revenue comparison



Source: TIC estimate

List of Appendices

Appendix A: Additional entry/exit request by Chennai Unified Metropolitan Transport Authority (CUMTA)

Appendix B: Vehicle category-wise visual representation of origin-destination zones
Top origin-destination pairs

Appendix C: Detailed traffic and revenue forecast – most likely scenario without overloading

Appendix A:

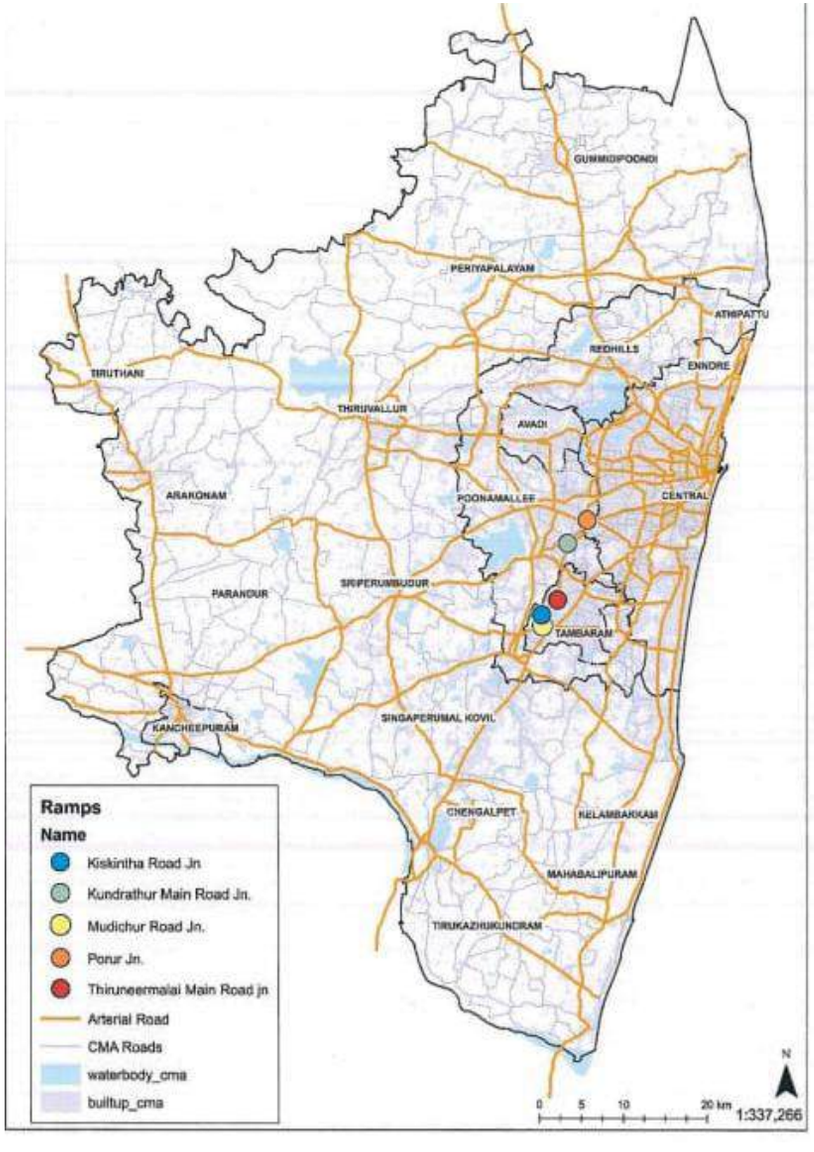
- Additional entry/exit request by Chennai Unified Metropolitan Transport Authority (CUMTA)
- Metro along Chennai Bypass

Additional entry/exit request by CUMTA (1)

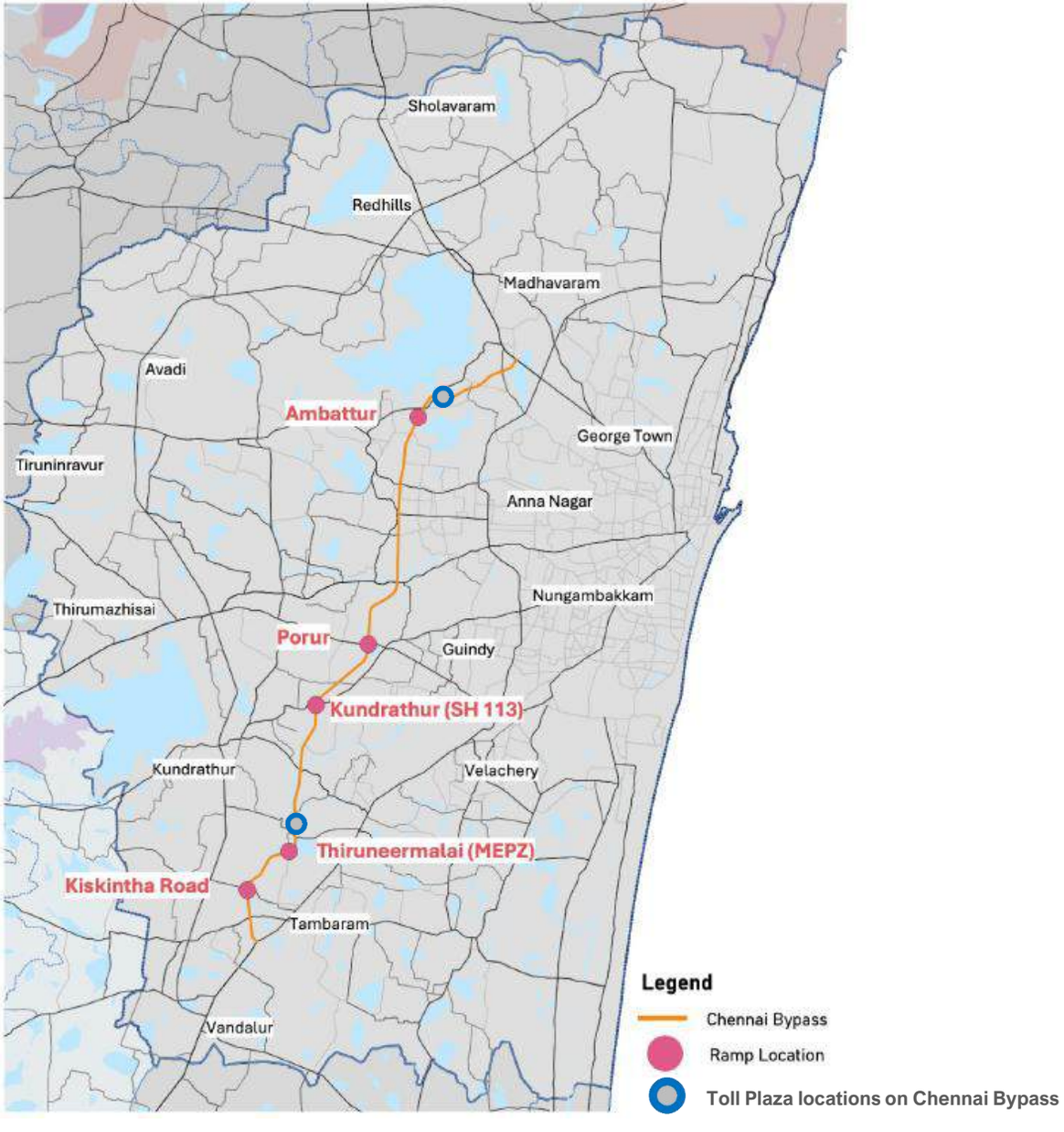
- Chennai Unified Metropolitan Transport Authority (CUMTA) has requested NHAI for additional entry/exit on Chennai Bypass considering urban nature of intra-city traffic as follows:
  - Mudichar road junction
  - Thirumazhisai road junction
  - Kiskintha road junction
  - Kundrathur main road junction
  - Porur junction
- NHAI has decided to provide only Thirumazhisai road junction at Ch 5.200 km which is in context of Madras Export Processing Zone (MEPZ) as discussed in earlier sections.
- No other proposals for remining locations as per the client/NHAI.
- In case of consideration of requested additional entry/exit ramp on Chennai Bypass, prima facie it will help to boos the traffic as tolling modality is access-controlled with limited entry-exit and open tolling at Tiruneermalai (km 6.500) and Surapattu (km 28.600).

Additional entry/exit request by CUMTA (2)

Additional entry/exit request by CUMTA



Source: PIU Chennai 2



Source: CMP for Chennai Metropolitan Area (Executive Version 2023 – 2048)

Metro along Chennai Bypass

Action Plan for Public Transport

Metro

Short-Term (2030)

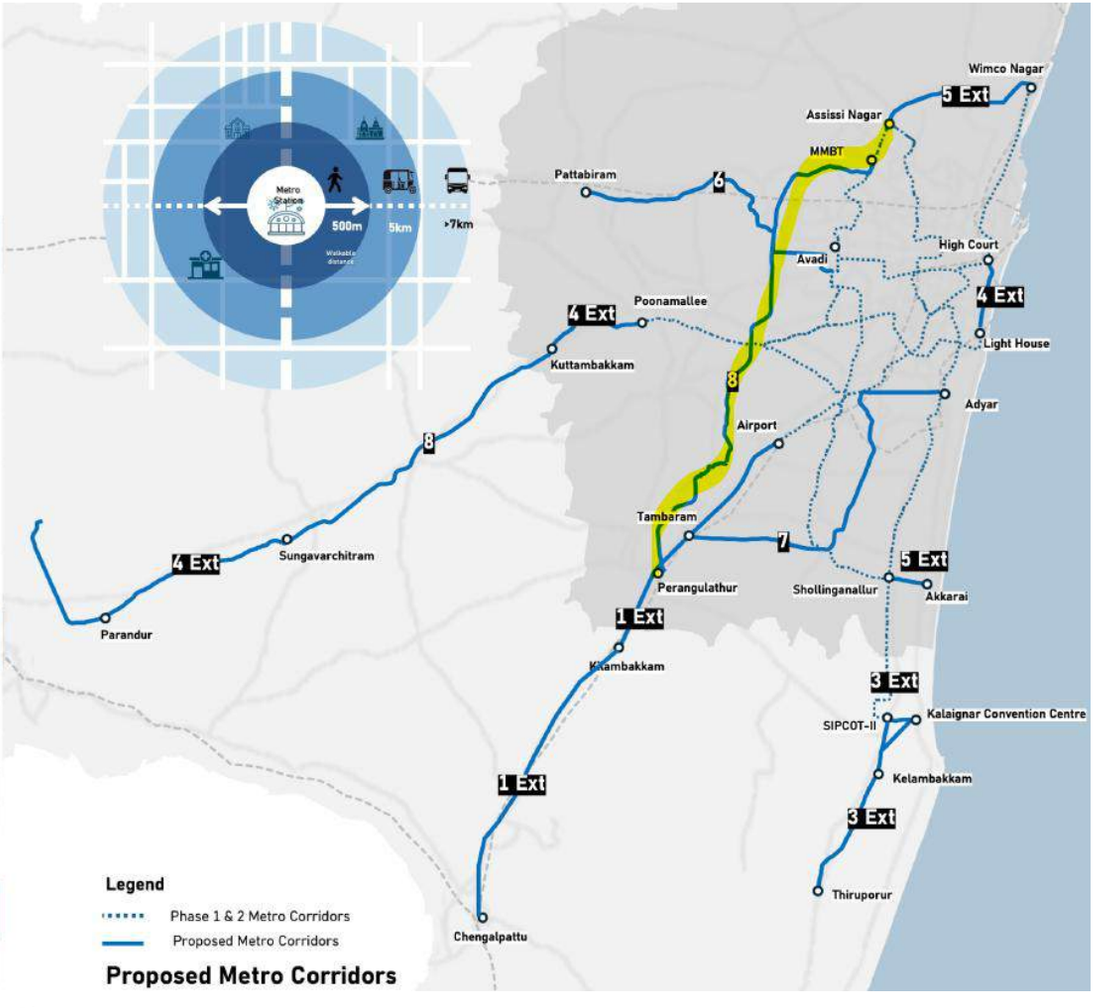
Details	Corridor	PHPDT 2048	Corridor Length in Km
Corridor 6 New	Koyambedu to Pattabiram (Via Avadi)	15,635	20.8
Corridor 1 Ext	Airport –Kilambakkam-Chengalpattu	12,471	42.4
Corridor 4 Ext	Poonamallee - Kuthambakkam terminal - Sunguvachatram (Phase 1 of line to Parandur)	10,307	27.9
Corridor 5 Ext.	Assisi Nagar to Wimco Nagar	10,647	11.0
Corridor 4 Ext	Light House to High court	7,539	4.7
Corridor 3 Ext	SIPCOT-II to Kalaignar Convention Centre/ Muttukadu	Connectivity to Convention Centre	2.0

Medium-Term (2040)

Details	Corridor	PHPDT 2048	Corridor Length in Km
Corridor 4 Ext	Sungavarchatram – Parandur (Phase 2 of Parandur line)	8,940	25.0
Corridor 3 Ext	Kalaignar Convention Centre to Kelambakkam	Network Synergy	4.7
Corridor 5 Ext	Sholinganallur to Akkarai		2.0
Corridor 7 New	Tambaram to Adyar (Via Guindy-Velachery)	11,328	25
Corridor 8 New	Perungalathur to MMBT along Bypass*	11,002	34.6

Long-Term (2048)

Details	Corridor	PHPDT 2048	Corridor Length in Km
Corridor 3 Ext	Kelambakkam to Thiruporur	Connectivity to Thiruporur Town	8.0



Source: CMP for Chennai Metropolitan Area (Executive Version 2023 – 2048)

Metro development Perungalathur to Madhavaram Mofussil Bus Terminus (MMBT) along Chennai Bypass (34.6 km; by 2040) has been considered under effect of capacity constraint as one of the alternate option for commuters

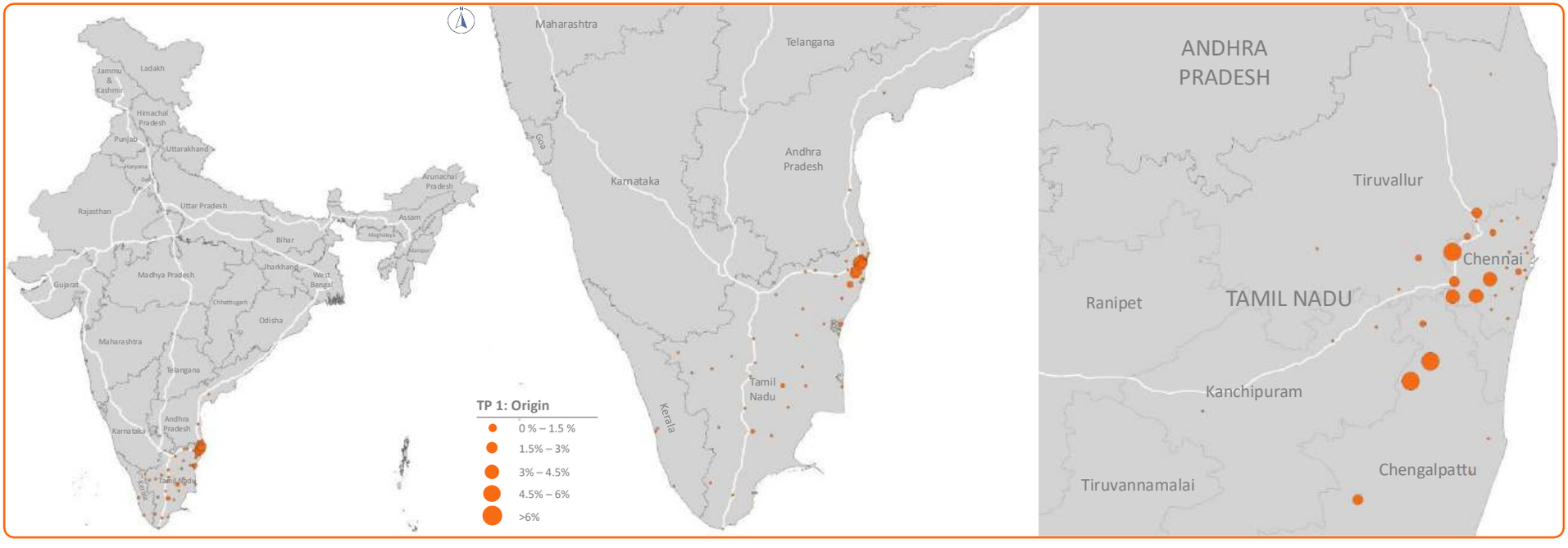
Appendix B:

- Vehicle category-wise visual representation of origin-destination zones for Chennai Bypass
- Vehicle category-wise top origin-destination pairs

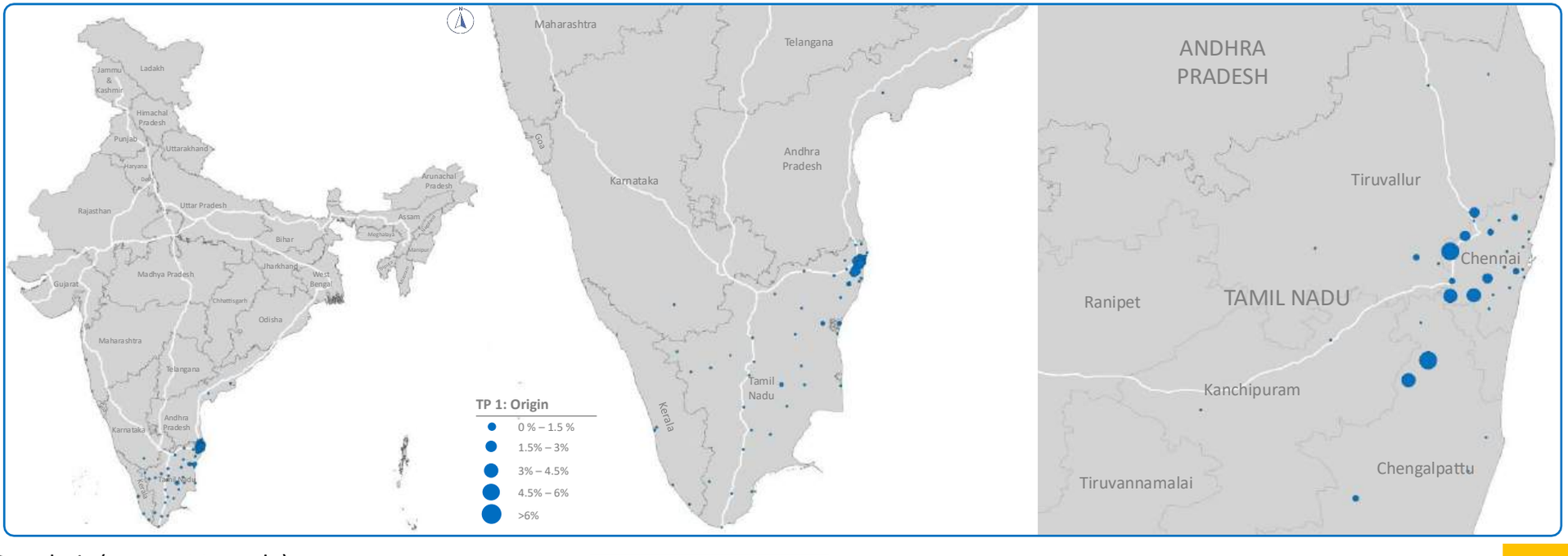
Vehicle category-wise visual representation of OD (CJV): Vanagaram TP

TRANSLINK® Infrastructure Consultants Pvt Ltd
Smart Consulting

Origin



Destination

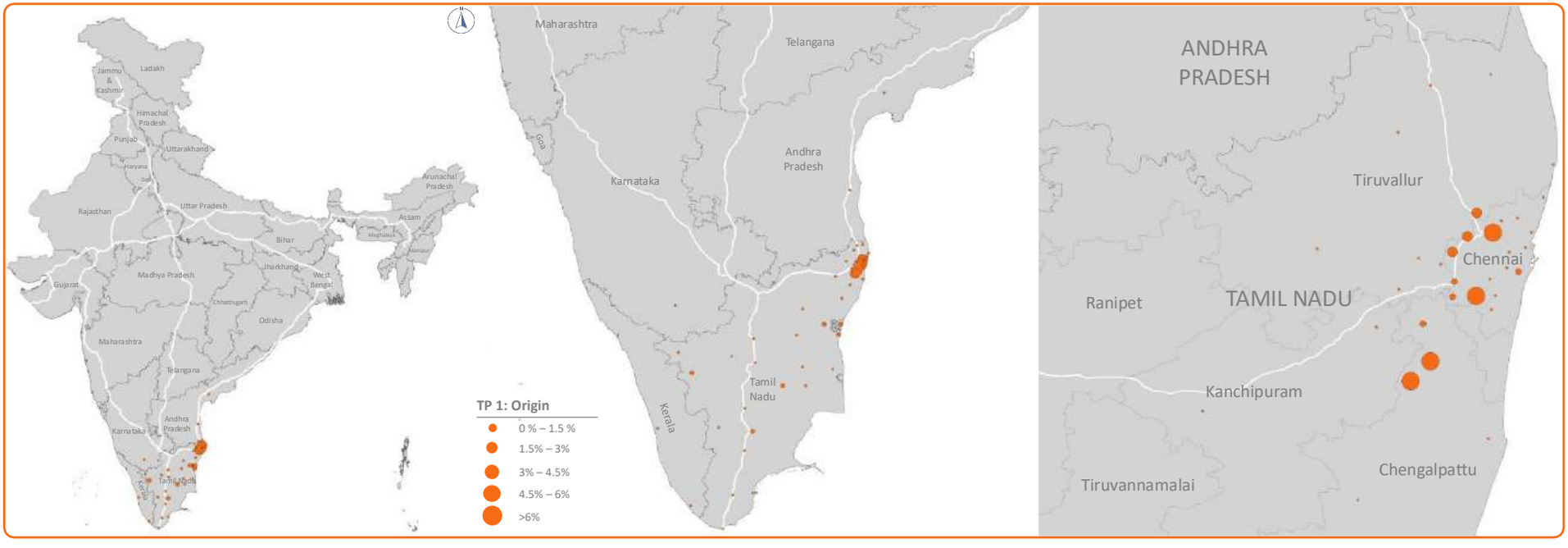


Source: TIC analysis (map not to scale)

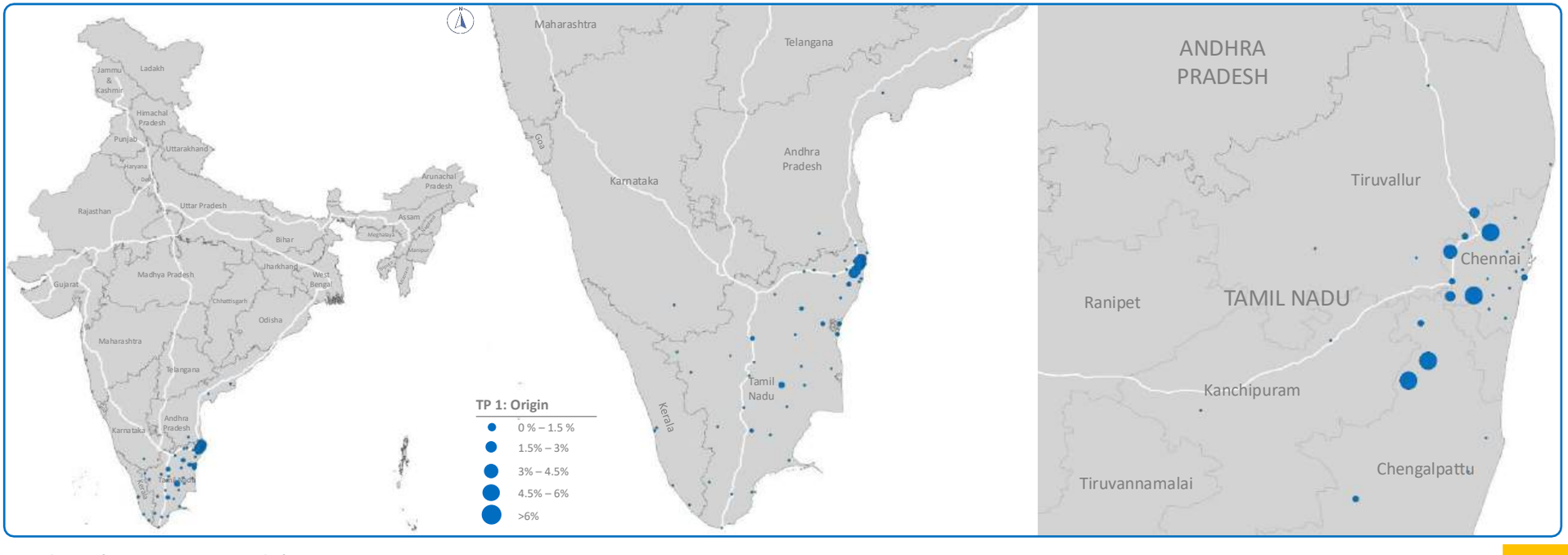
Vehicle category-wise visual representation of OD (Bus): Vanagaram TP

TRANSLINK® Infrastructure Consultants Pvt Ltd
Smart Consulting

Origin



Destination

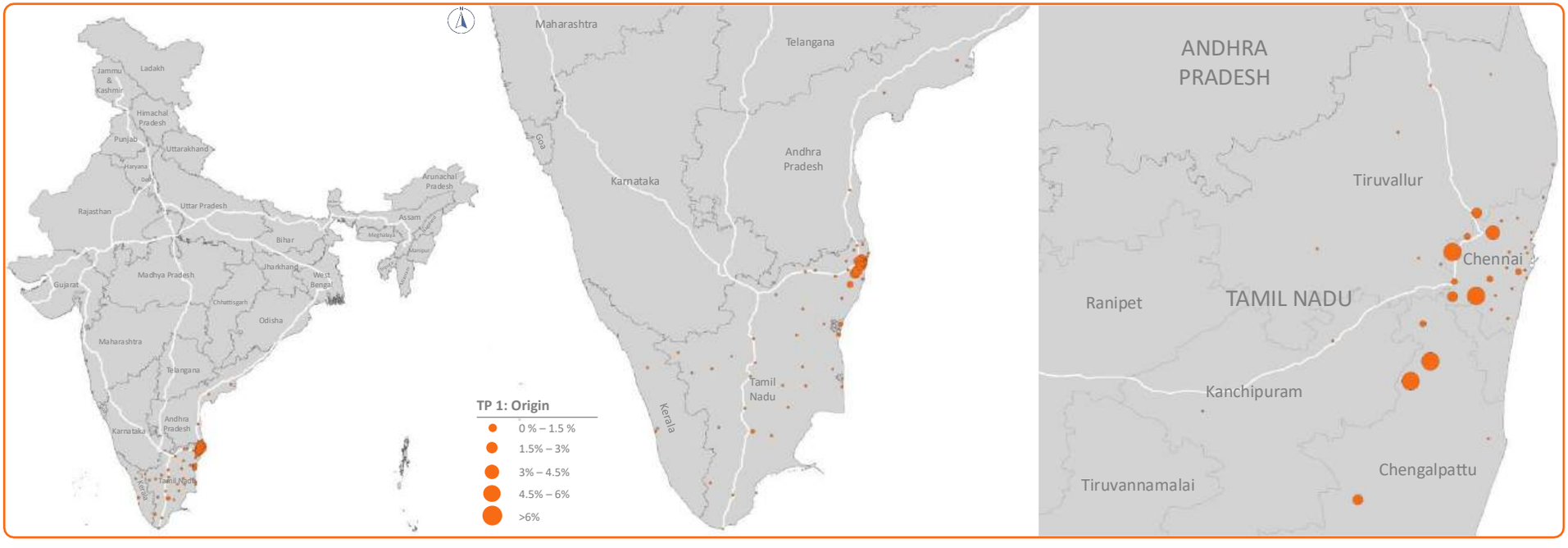


Source: TIC analysis (map not to scale)

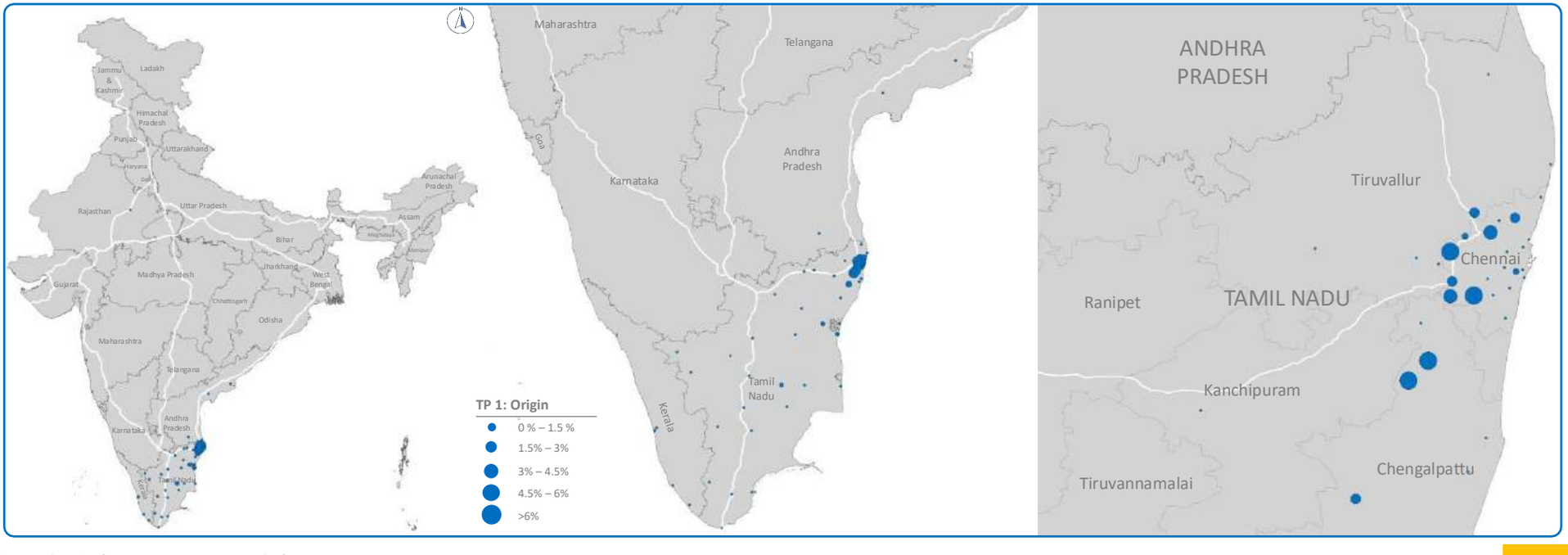
Vehicle category-wise visual representation of OD (Mini LCV): Vanagaram TP

TRANSLINK® Infrastructure Consultants Pvt Ltd
Smart Consulting

Origin



Destination

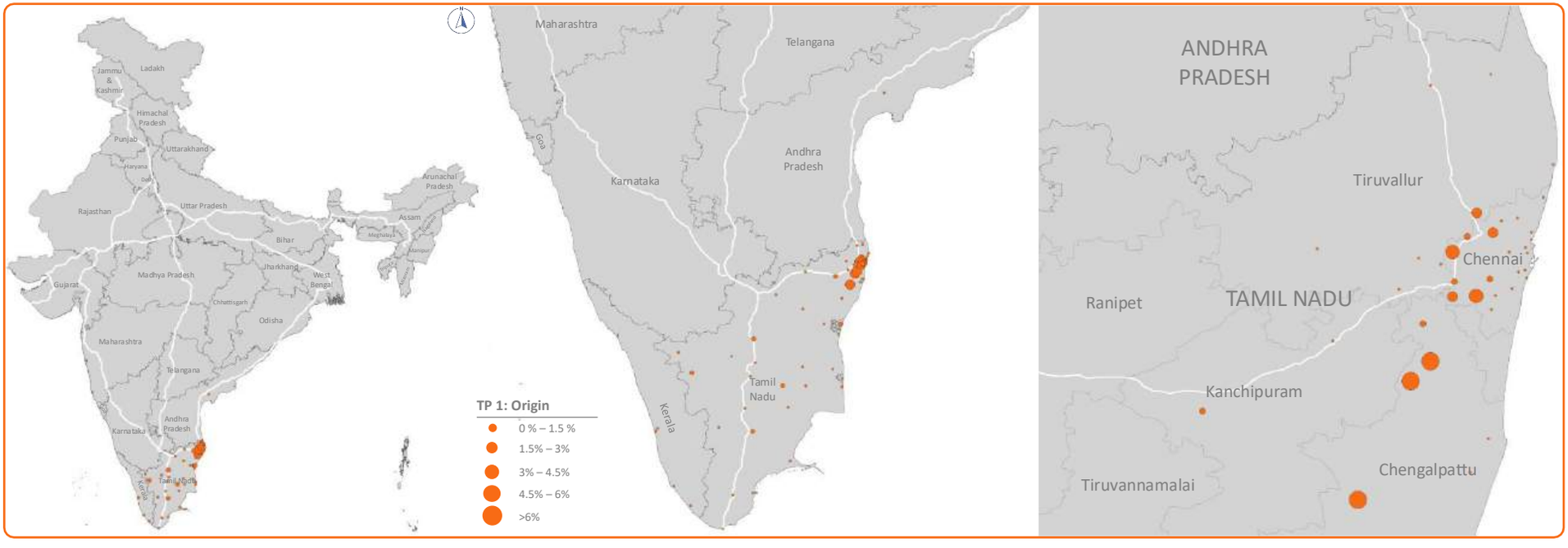


Source: TIC analysis (map not to scale)

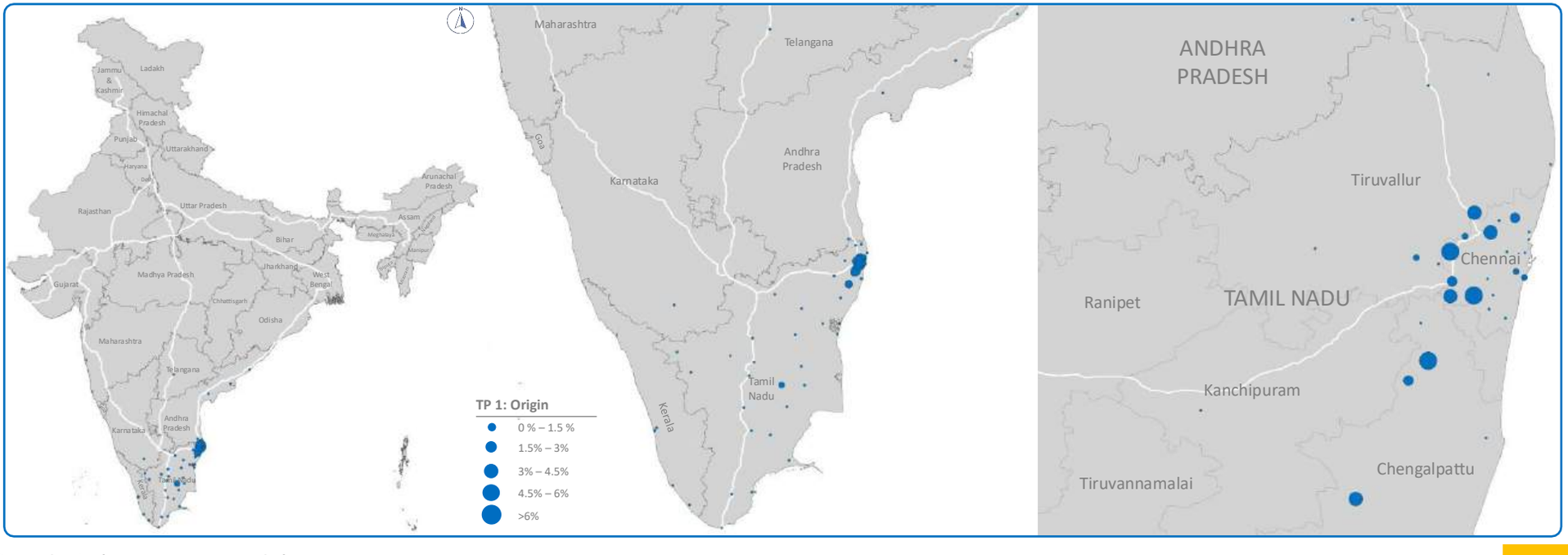
Vehicle category-wise visual representation of OD (LCV): Vanagaram TP

TRANSLINK® Infrastructure Consultants Pvt Ltd
Smart Consulting

Origin



Destination

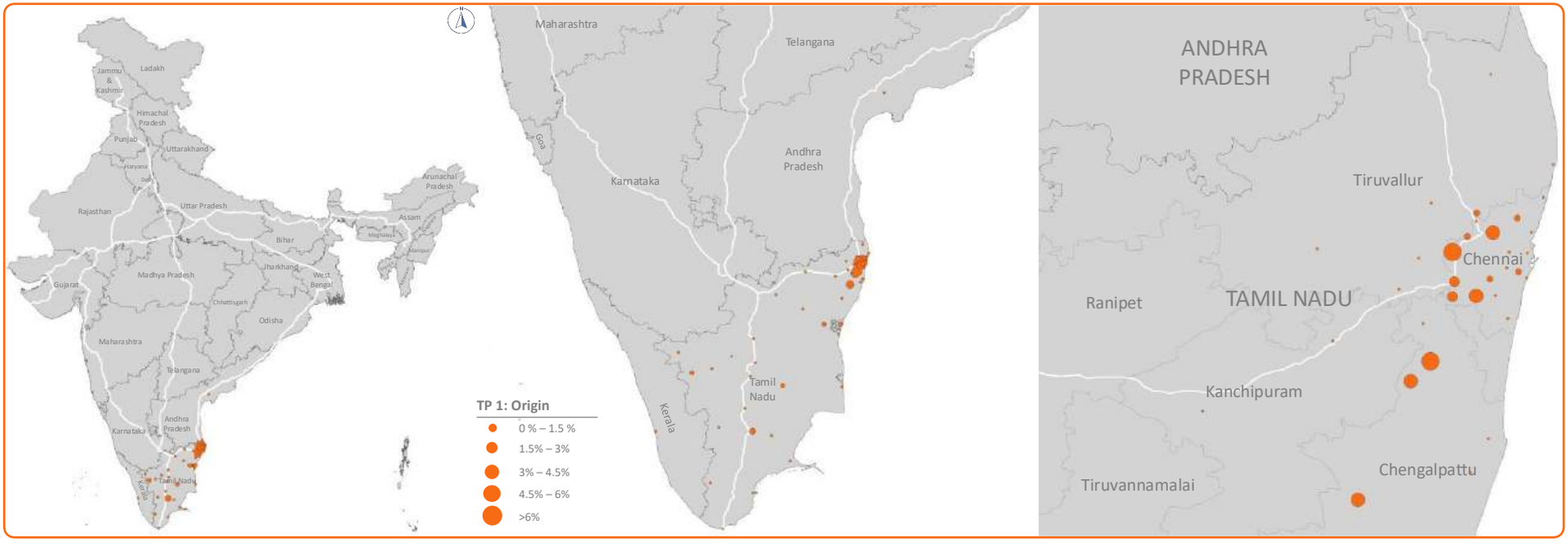


Source: TIC analysis (map not to scale)

Vehicle category-wise visual representation of OD (2A): Vanagaram TP

TRANSLINK® Infrastructure Consultants Pvt Ltd
Smart Consulting

Origin



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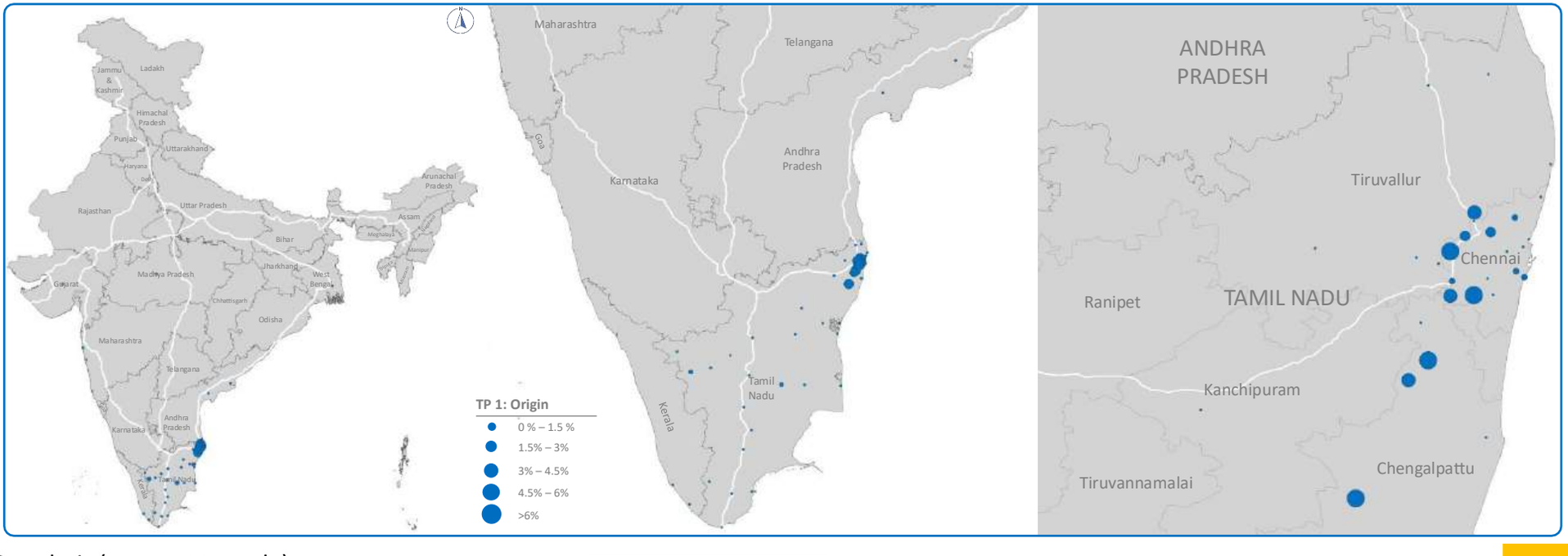
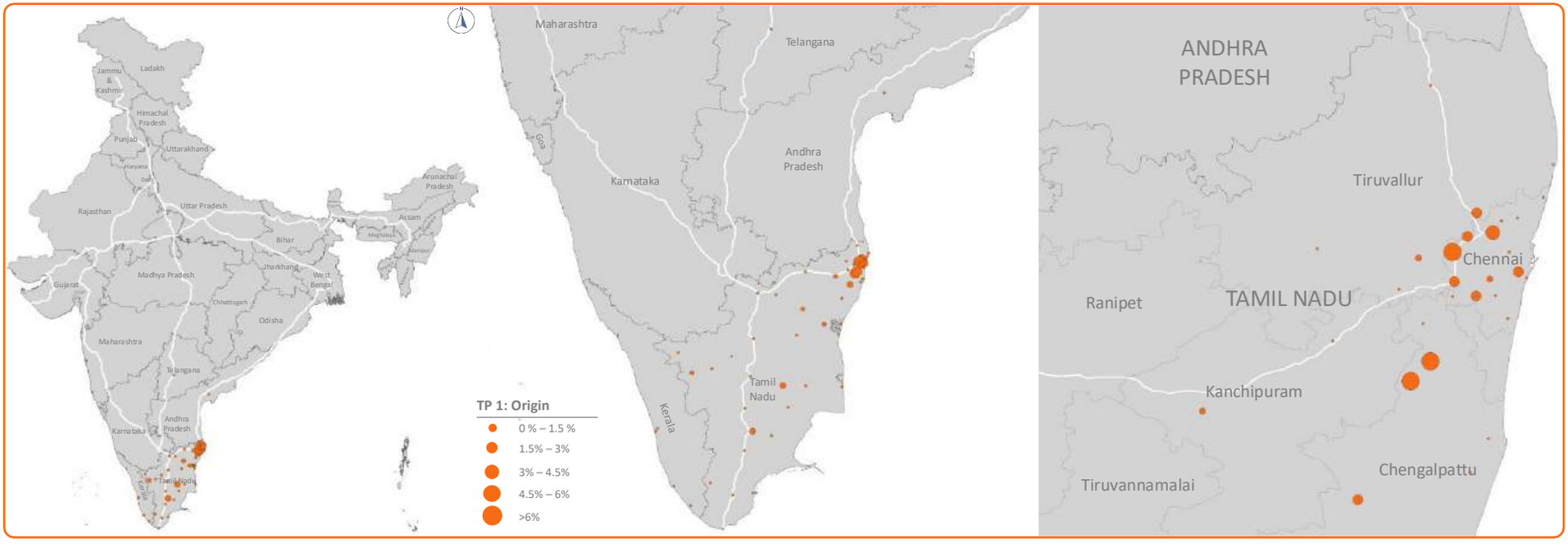


Source: TIC analysis (map not to scale)

Vehicle category-wise visual representation of OD (3A): Vanagaram TP

TRANSLINK® Infrastructure Consultants Pvt Ltd
Smart Consulting

Origin



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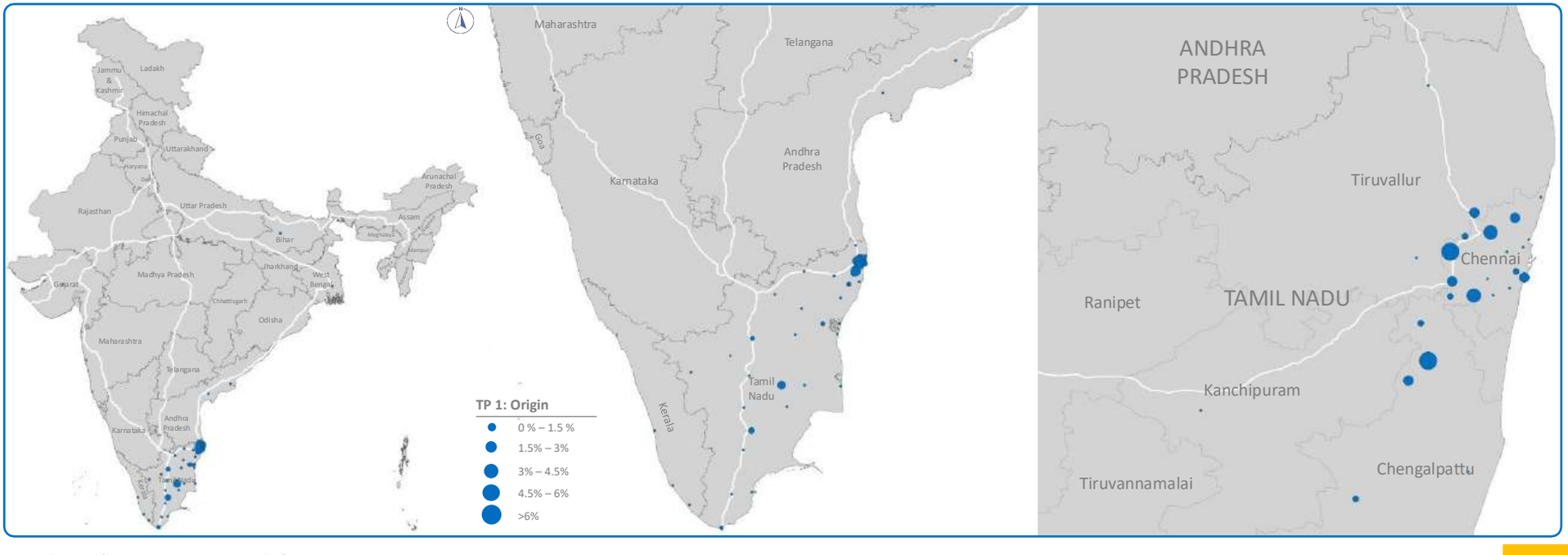
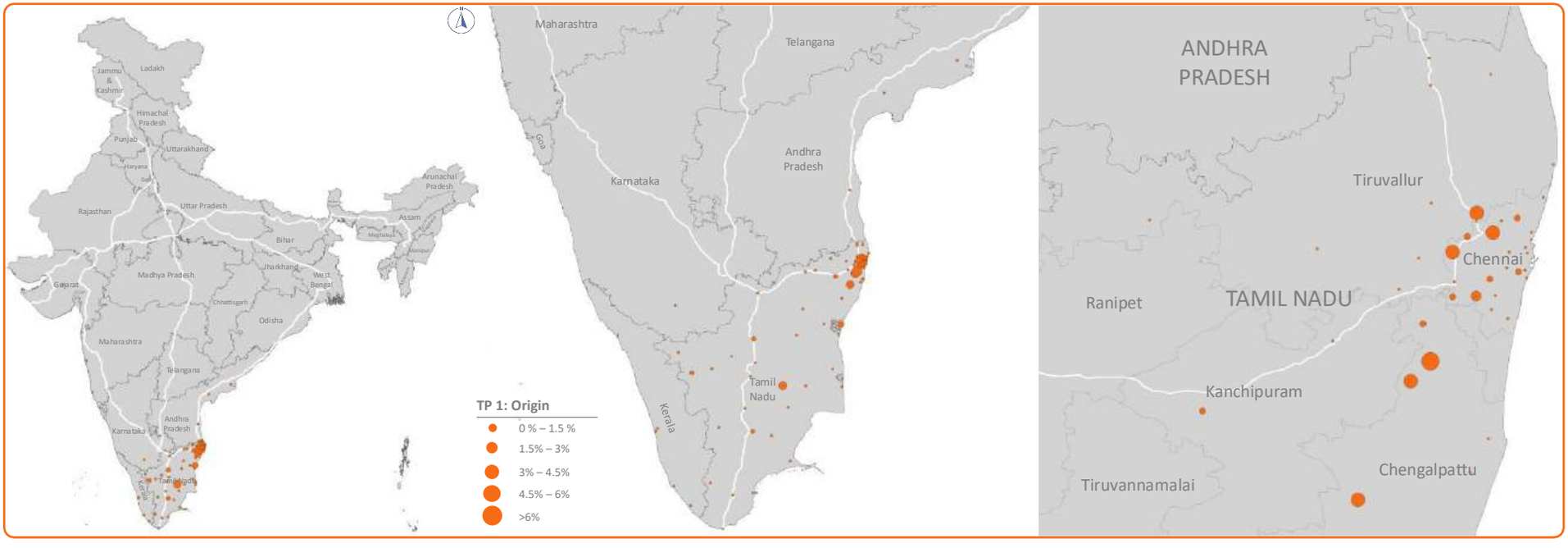


Source: TIC analysis (map not to scale)

Vehicle category-wise visual representation of OD (MAV): Vanagaram TP

TRANSLINK® Infrastructure Consultants Pvt Ltd
Smart Consulting

Origin



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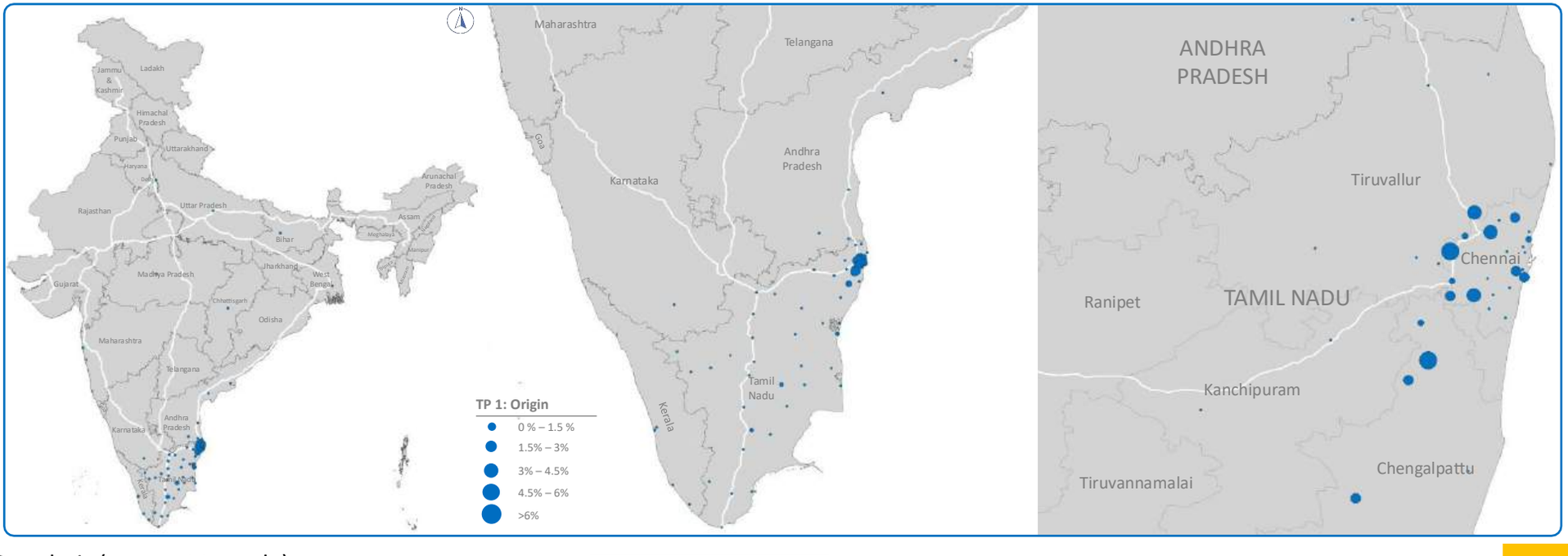
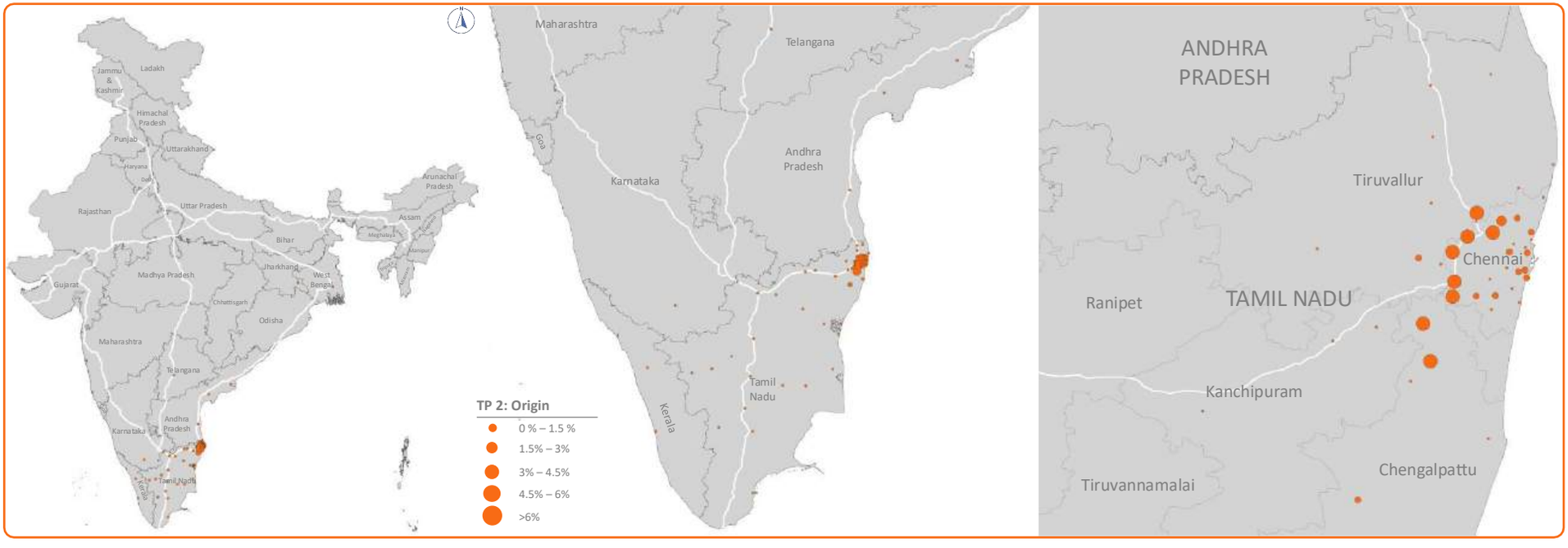


Source: TIC analysis (map not to scale)

Vehicle category-wise visual representation of OD (CJV): Surapattu TP

TRANSLINK® Infrastructure Consultants Pvt Ltd
Smart Consulting

Origin



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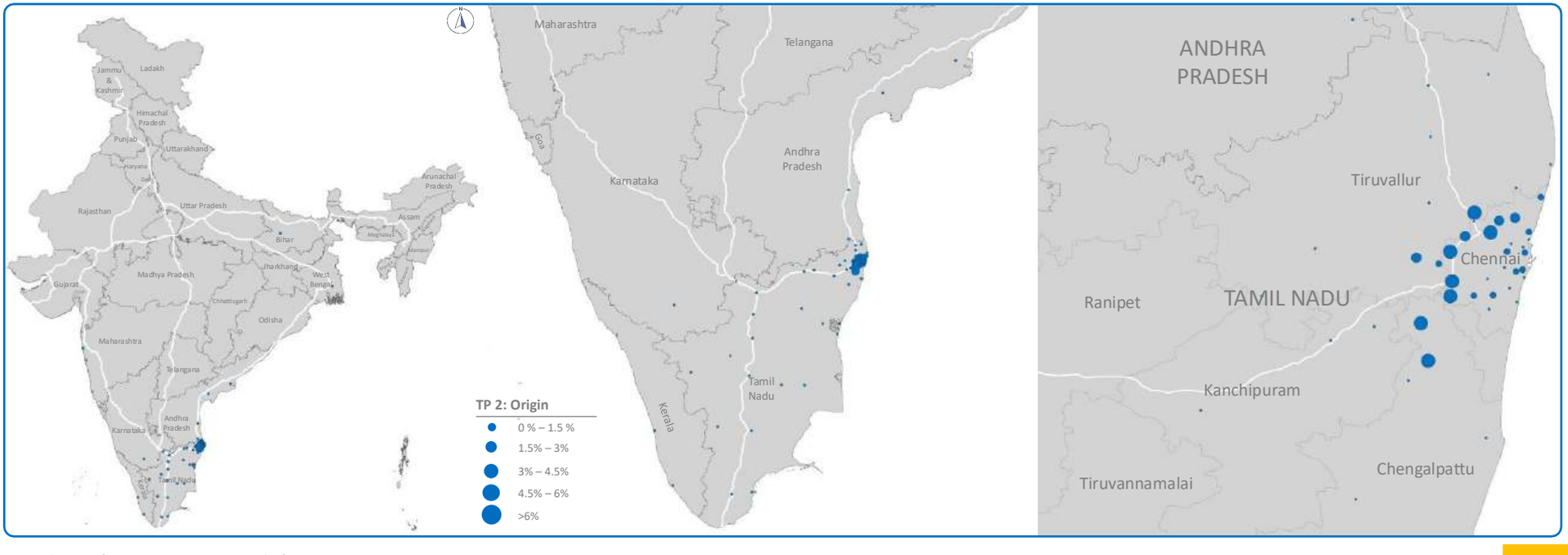
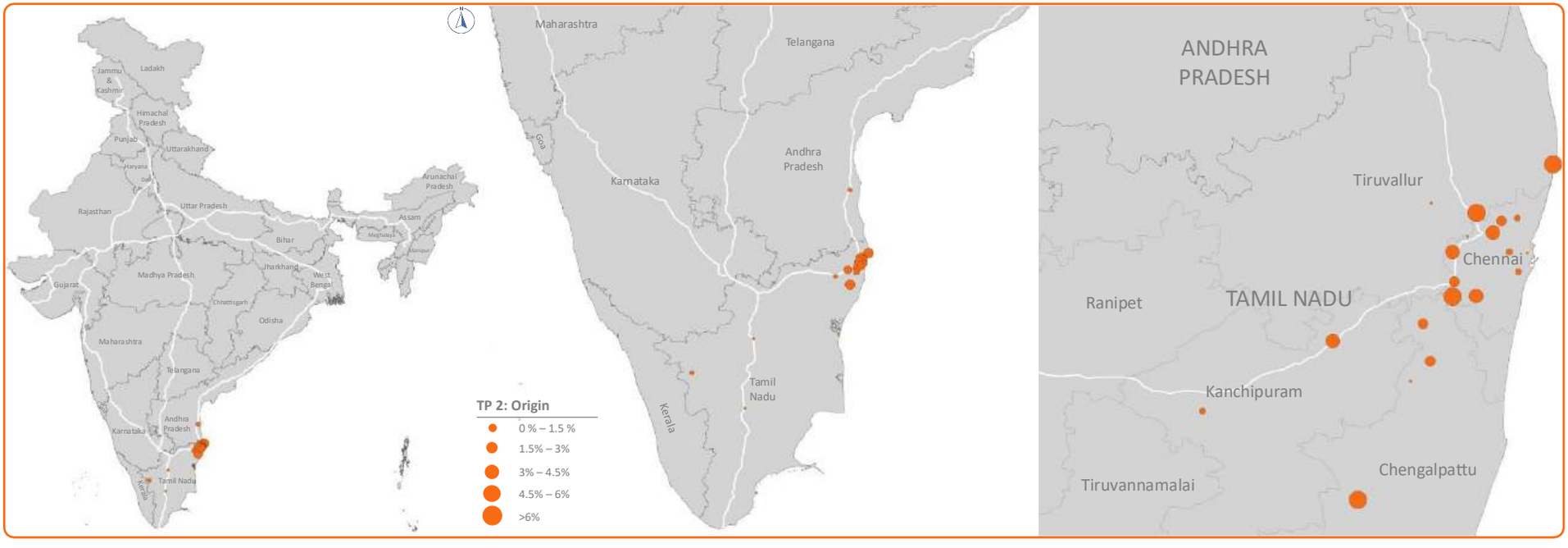


Source: TIC analysis (map not to scale)

Vehicle category-wise visual representation of OD (Bus): Surapattu TP

TRANSLINK® Infrastructure Consultants Pvt Ltd
Smart Consulting

Origin



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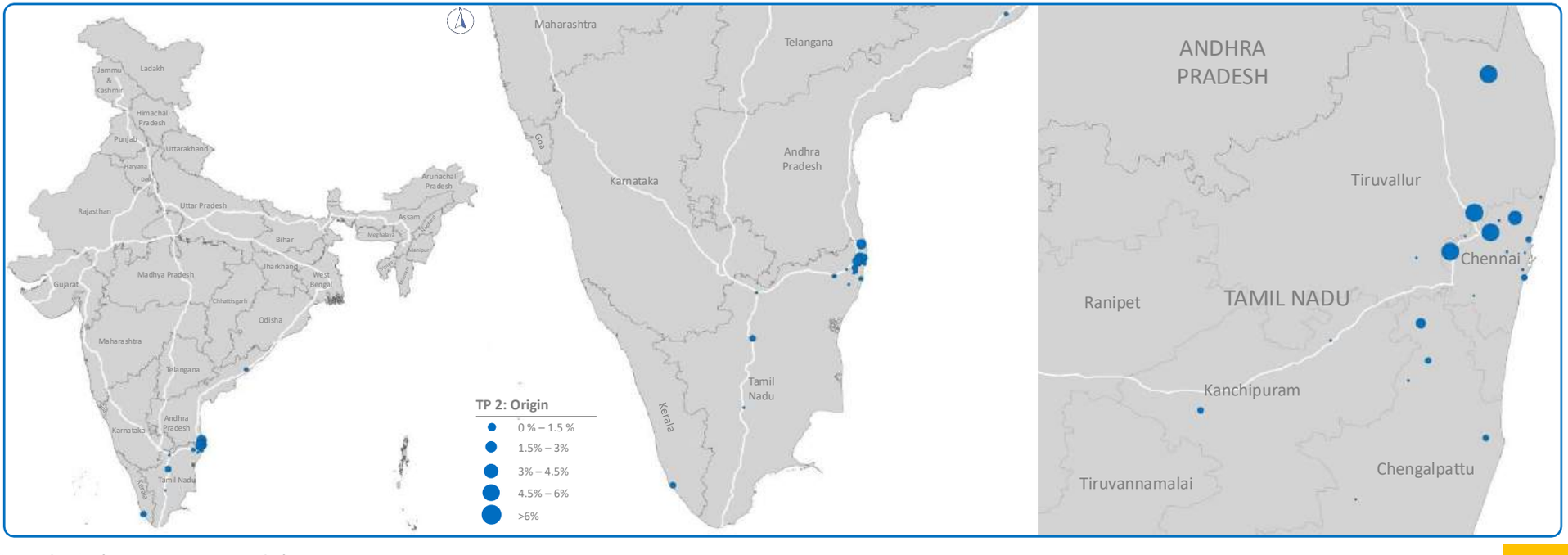
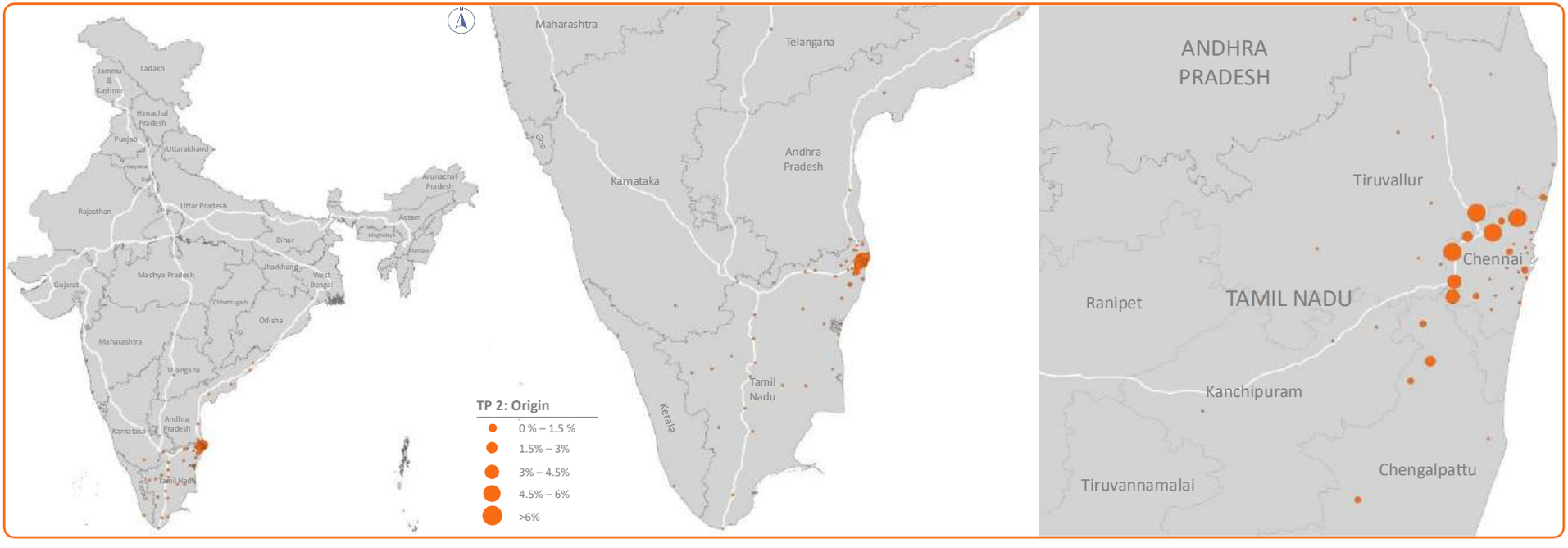


Source: TIC analysis (map not to scale)

Vehicle category-wise visual representation of OD (Mini LCV): Surapattu TP

TRANSLINK® Infrastructure Consultants Pvt Ltd
Smart Consulting

Origin



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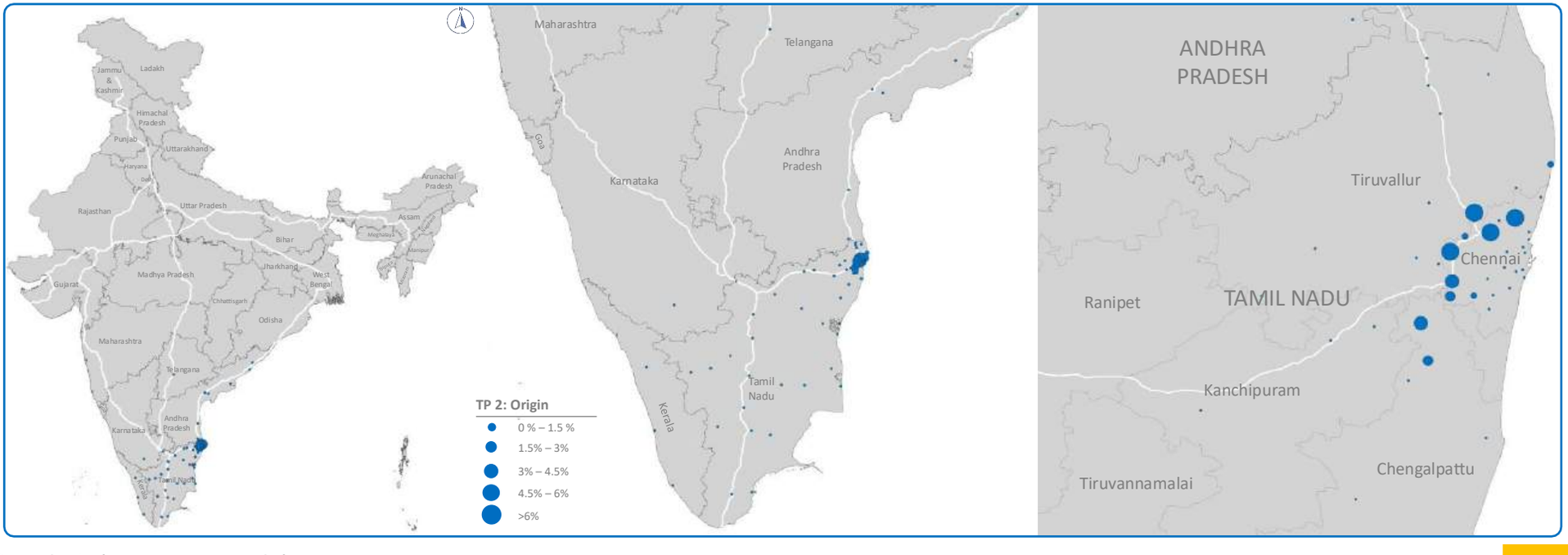
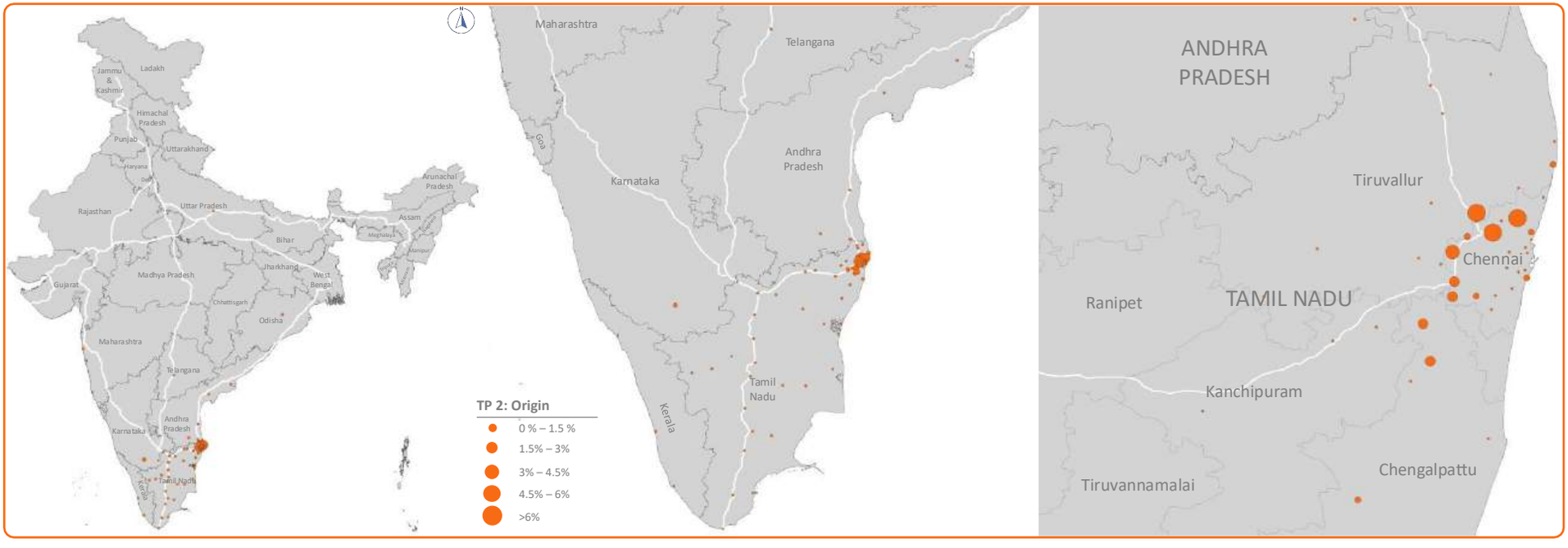


Source: TIC analysis (map not to scale)

Vehicle category-wise visual representation of OD (LCV): Surapattu TP

TRANSLINK® Infrastructure Consultants Pvt Ltd
Smart Consulting

Origin



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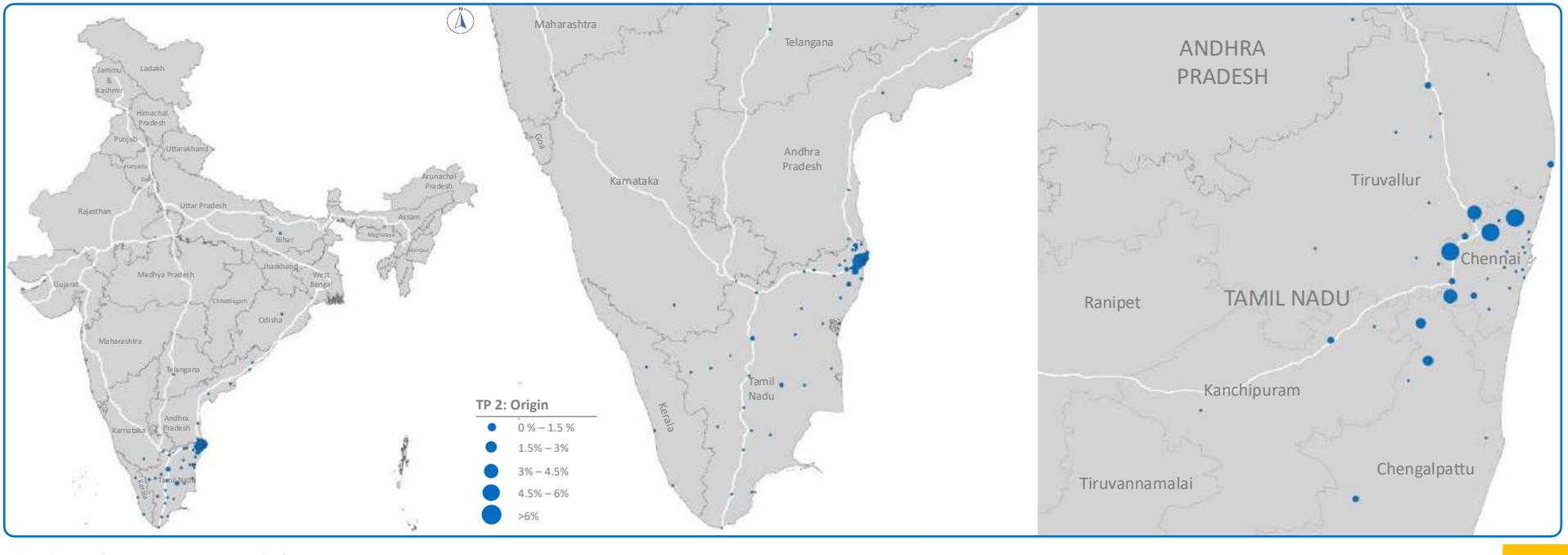
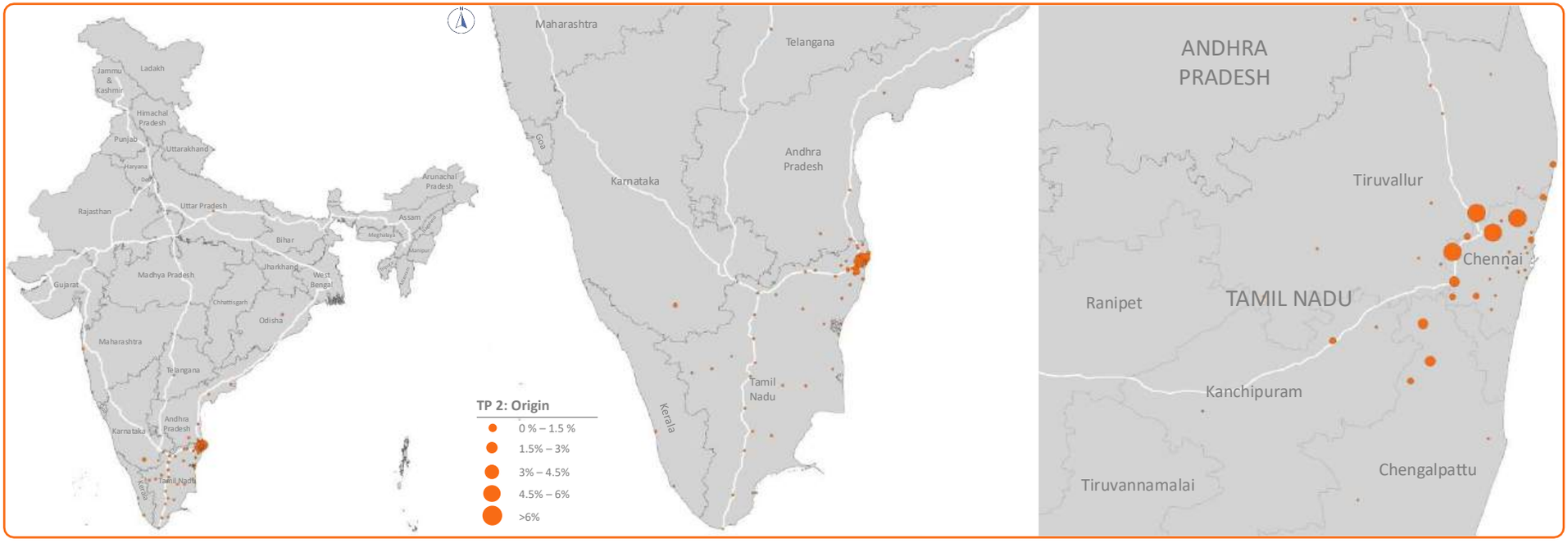


Source: TIC analysis (map not to scale)

Vehicle category-wise visual representation of OD (2A): Surapattu TP

TRANSLINK® Infrastructure Consultants Pvt Ltd
Smart Consulting

Origin



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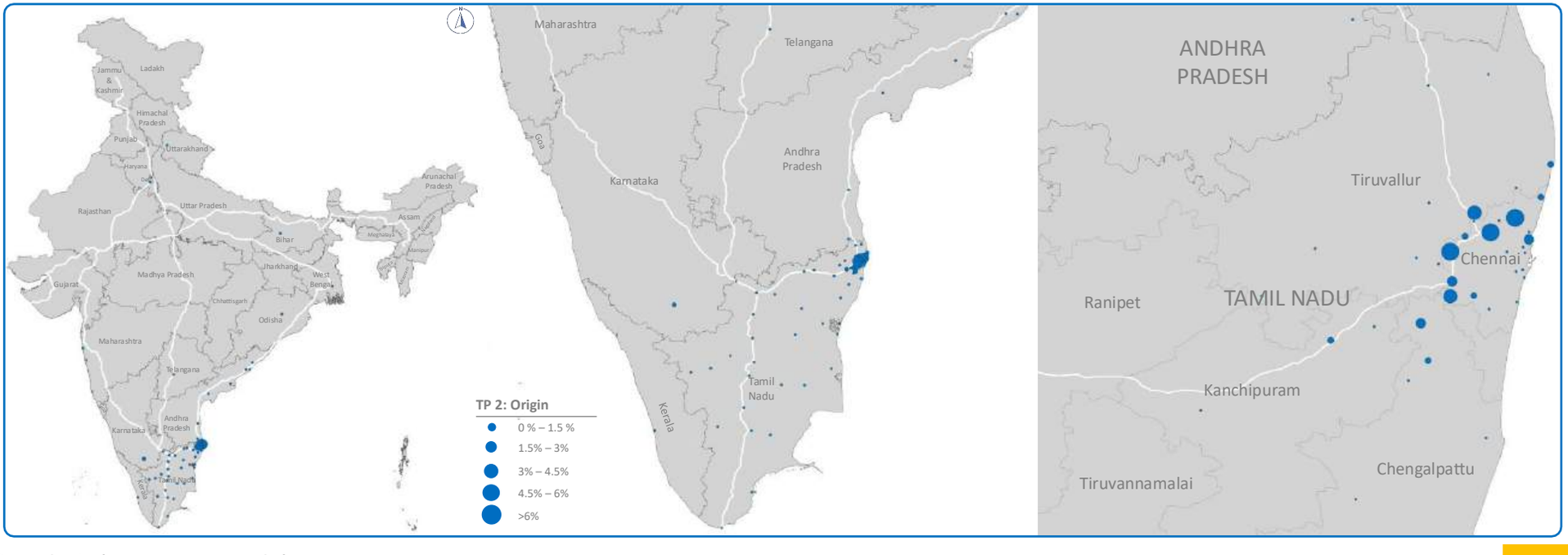
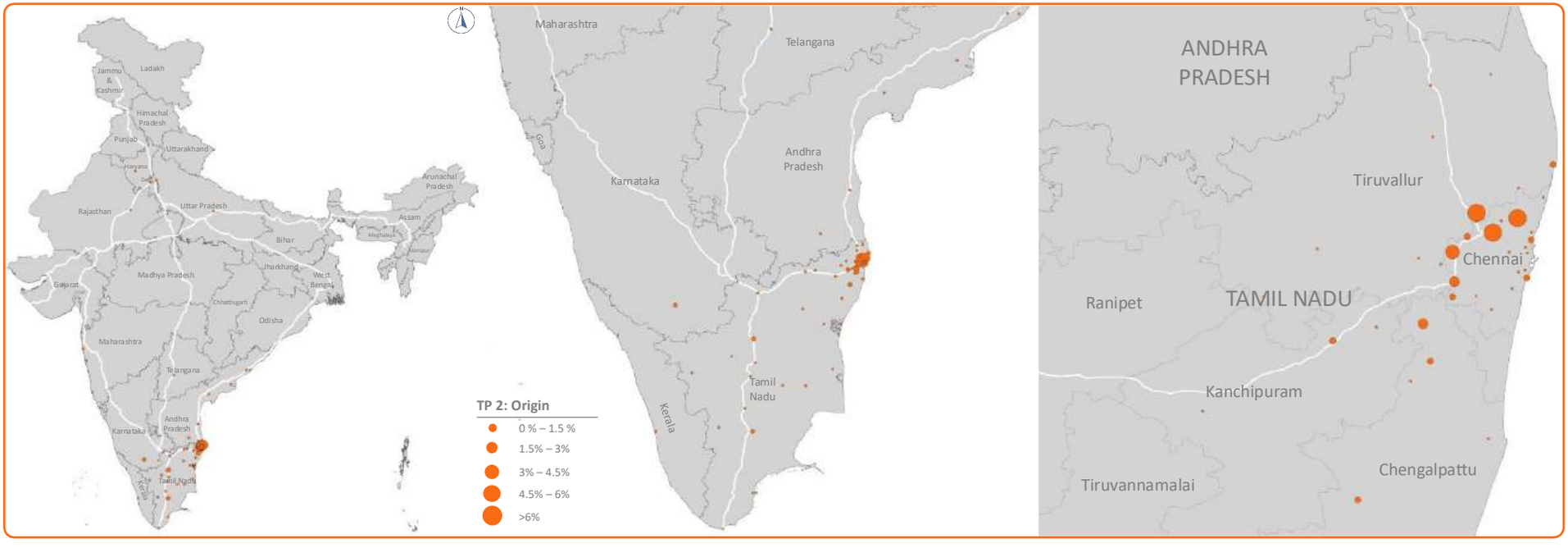


Source: TIC analysis (map not to scale)

Vehicle category-wise visual representation of OD (3A): Surapattu TP

TRANSLINK® Infrastructure Consultants Pvt Ltd
Smart Consulting

Origin



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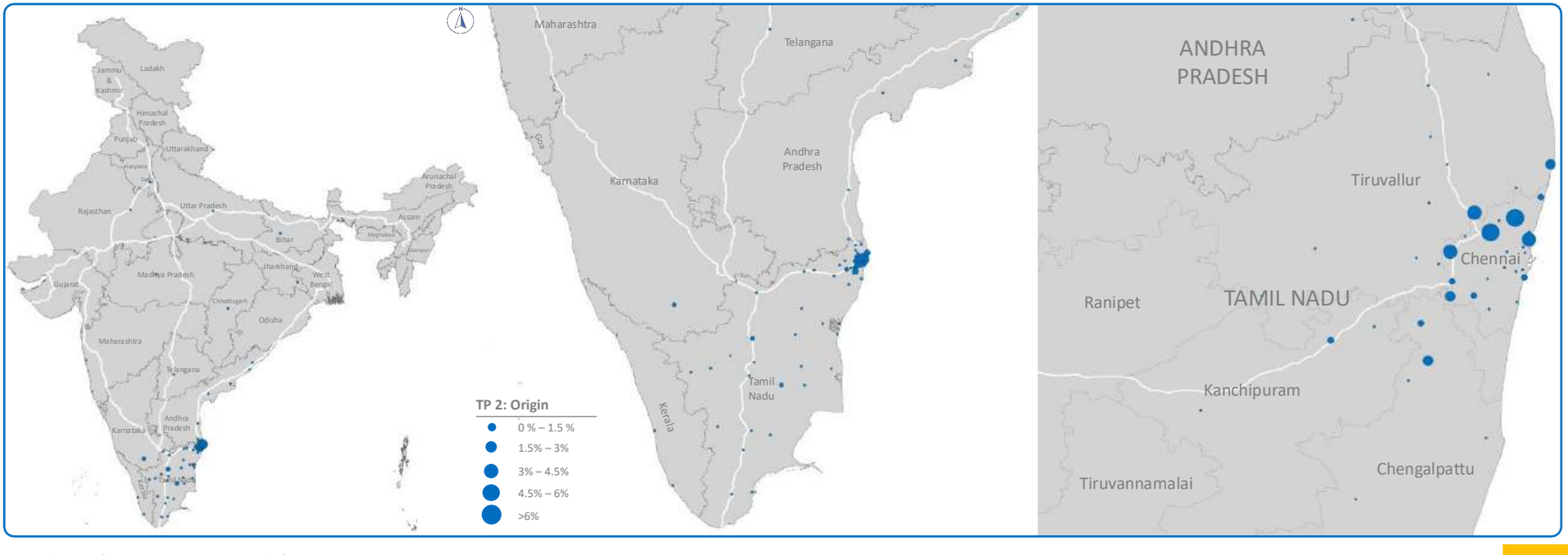
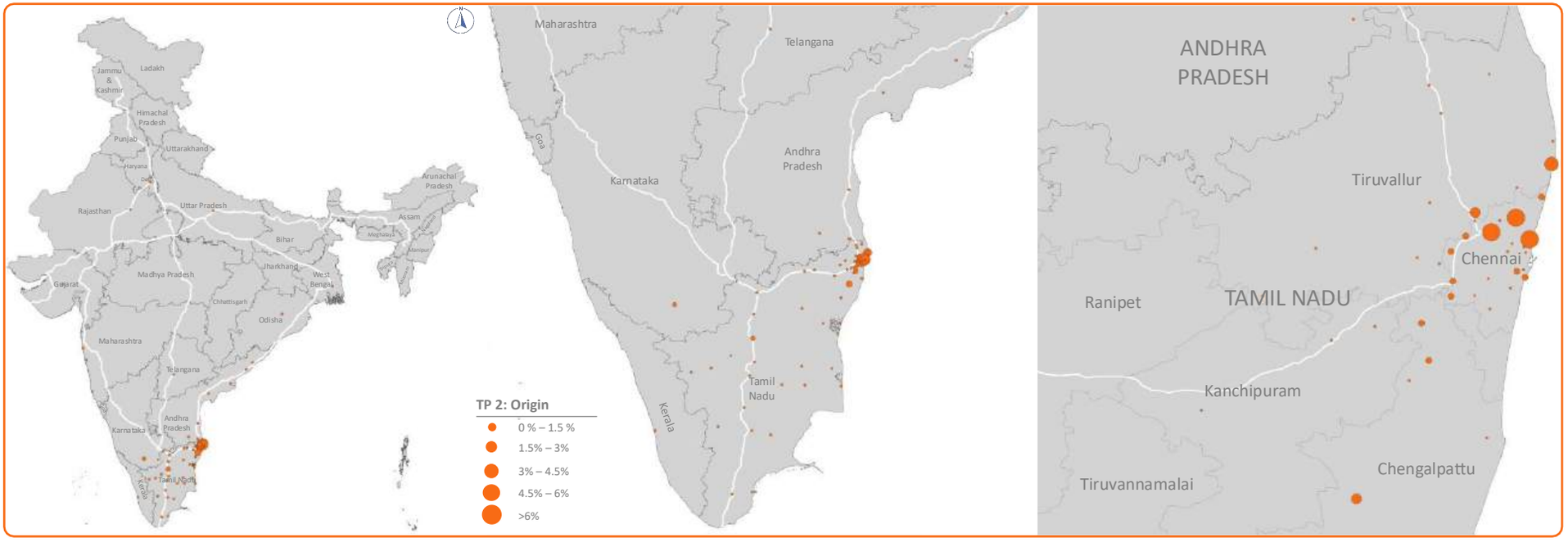


Source: TIC analysis (map not to scale)

Vehicle category-wise visual representation of OD (MAV): Surapattu TP

TRANSLINK® Infrastructure Consultants Pvt Ltd
Smart Consulting

Origin



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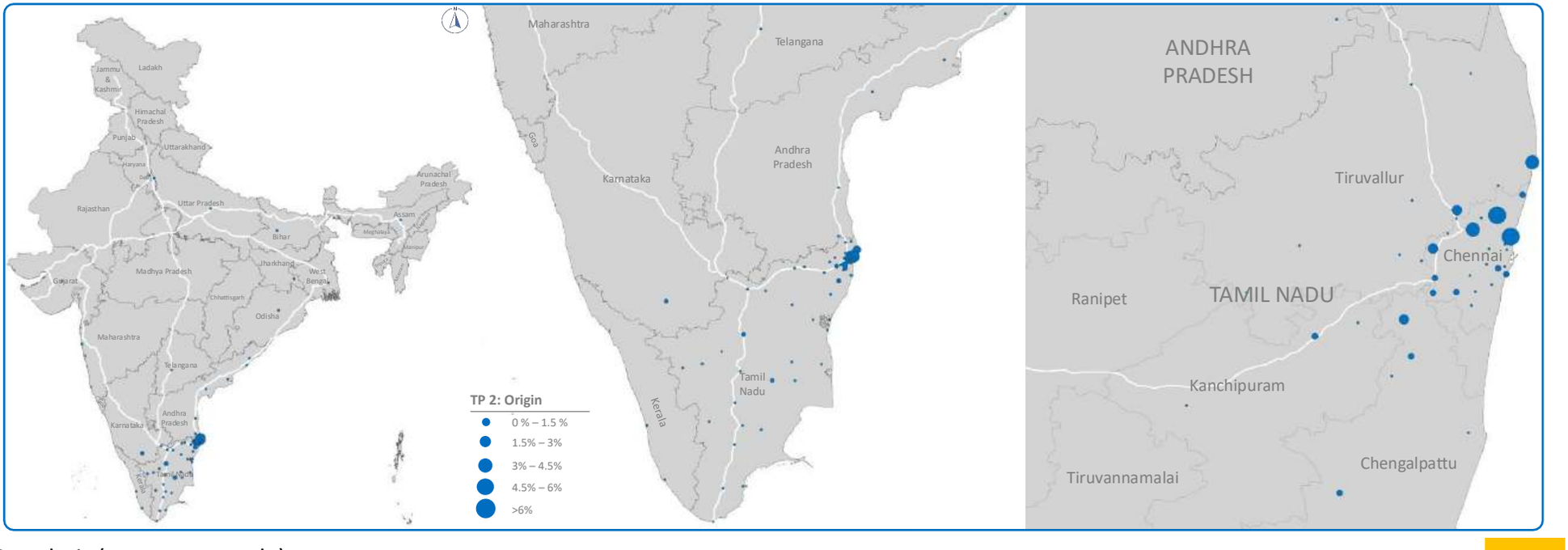

Source: TIC analysis (map not to scale)

Vehicle category-wise top OD pairs (1): Vanagaram TP

TRANSLINK® Infrastructure Consultants Pvt Ltd Smart Consulting

CJV

Sr. No.	Origin-Destination Pairs		Share
1	Tambaram	Ambattur	6%
2	Tambaram	Aminjikarai	4%
3	Tambaram	Porur	3%
4	Ambattur	Tambaram	3%
5	Tambaram	K. K. Nagar	3%
6	K. K. Nagar	Tambaram	2%
7	Porur	Tambaram	2%
8	Tambaram	Maduravoyal	1%
9	Red Hills	Tambaram	1%
10	Tambaram	Red Hills	1%

Mini LCV

Sr. No.	Origin-Destination Pairs		Share
1	Ambattur	Tambaram	3%
2	Tambaram	Ambattur	3%
3	Tambaram	K. K. Nagar	3%
4	Ambattur	Vandalur	2%
5	K. K. Nagar	Tambaram	2%
6	Tambaram	Aminjikarai	2%
7	Red Hills	Tambaram	2%
8	Maduravoyal	Tambaram	2%
9	Tambaram	Maduravoyal	2%
10	Tambaram	Madhavaram	1%

Bus

Sr. No.	Origin-Destination Pairs		Share
1	Vandalur	K. K. Nagar	4%
2	Ambattur	Tambaram	2%
3	Madhavaram	Tambaram	2%
4	Tambaram	Red Hills	2%
5	K. K. Nagar	Tambaram	2%
6	Madhavaram	Vandalur	2%
7	Tambaram	K. K. Nagar	2%
8	Tiruchirappalli	K. K. Nagar	2%
9	Vandalur	Madhavaram	2%
10	Red Hills	Vandalur	1%

LCV

Sr. No.	Origin-Destination Pairs		Share
1	Ambattur	Tambaram	3%
2	K. K. Nagar	Tambaram	3%
3	Tambaram	K. K. Nagar	3%
4	Ambattur	Vandalur	2%
5	K. K. Nagar	Chengalpattu	2%
6	Tambaram	Porur	2%
7	Maduravoyal	Tambaram	1%
8	Madhavaram	Tambaram	1%
9	Red Hills	Tambaram	1%
10	Ambattur	Chengalpattu	1%

Source: TIC analysis

Vehicle category-wise top OD pairs (2): Vanagaram TP

TRANSLINK® Infrastructure Consultants Pvt Ltd Smart Consulting

2A

Sr. No.	Origin-Destination Pairs		Share
1	Tambaram	K. K. Nagar	2%
2	Ambattur	Tambaram	2%
3	Tambaram	Maduravoyal	2%
4	Tambaram	Ambattur	2%
5	Ambattur	Chengalpattu	2%
6	Ambattur	Vandalur	2%
7	K. K. Nagar	Vandalur	1%
8	Chengalpattu	Ambattur	1%
9	Vandalur	Maduravoyal	1%
10	Tambaram	Madhavaram	1%

3A

Sr. No.	Origin-Destination Pairs		Share
1	K. K. Nagar	Tambaram	2%
2	Ambattur	Chengalpattu	1%
3	Red Hills	Tambaram	1%
4	Madhavaram	Tambaram	1%
5	Ambattur	Vandalur	1%
6	Tambaram	Madhavaram	1%
7	Vandalur	K. K. Nagar	1%
8	Tiruchirappalli	Madhavaram	1%
9	Madhavaram	Chengalpattu	1%
10	Red Hills	Vandalur	1%

MAV

Sr. No.	Origin-Destination Pairs		Share
1	Ambattur	Tambaram	2%
2	Red Hills	Tambaram	1%
3	Tambaram	K. K. Nagar	1%
4	Ambattur	Chengalpattu	1%
5	Harbour Port	Tambaram	1%
6	Madhavaram	Vandalur	1%
7	Tambaram	Red Hills	1%
8	Ambattur	Vandalur	1%
9	Manali	Chengalpattu	1%
10	Tambaram	Madhavaram	1%

Source: TIC analysis

Vehicle category-wise top OD pairs (1): Surapattu TP

TRANSLINK® Infrastructure Consultants Pvt Ltd Smart Consulting

CJV

Sr. No.	Origin-Destination Pairs		Share
1	Ambattur	Red Hills	1%
2	Porur	Madhavaram	1%
3	Porur	Red Hills	1%
4	Red Hills	Ambattur	1%
5	Red Hills	Porur	1%
6	Kundrathur	Mathur	1%
7	Kundrathur	Surapattu	1%
8	Ambattur	Madhavaram	1%
9	Tambaram	Surapattu	1%
10	Maduravoyal	Mathur	1%

Mini LCV

Sr. No.	Origin-Destination Pairs		Share
1	Manali	Ambattur	2%
2	Red Hills	Ambattur	2%
3	Ambattur	Manali	2%
4	Ambattur	Red Hills	2%
5	Manali	Maduravoyal	2%
6	Madhavaram	Ambattur	2%
7	Manali	Porur	2%
8	Manali	Kundrathur	1%
9	Madhavaram	Maduravoyal	1%
10	Red Hills	Porur	1%

Bus

Sr. No.	Origin-Destination Pairs		Share
1	Red Hills	Ambattur	5%
2	Madhavaram	Sriperumbudur	5%
3	Ambattur	Ennore Port	4%
4	Kerala_Southern	Mathur	4%
5	Salem	Red Hills	4%
6	Ambattur	Red Hills	4%
7	Red Hills	Porur	3%
8	Manali	Chengalpattu	3%
9	Kolur	Kanchipuram	3%
10	Madhavaram	K. K. Nagar	3%

LCV

Sr. No.	Origin-Destination Pairs		Share
1	Manali	Ambattur	2%
2	Ambattur	Madhavaram	2%
3	Ambattur	Red Hills	2%
4	Manali	Maduravoyal	2%
5	Ambattur	Manali	2%
6	Porur	Red Hills	1%
7	Manali	Kundrathur	1%
8	Porur	Madhavaram	1%
9	Tambaram	Madhavaram	1%
10	Manali	Tambaram	1%

Source: TIC analysis

Vehicle category-wise top OD pairs (2): Surapattu TP

TRANSLINK® Infrastructure Consultants Pvt Ltd Smart Consulting

2A

Sr. No.	Origin-Destination Pairs		Share
1	Manali	Ambattur	2%
2	Ambattur	Manali	2%
3	Ambattur	Red Hills	2%
4	Ambattur	Madhavaram	2%
5	Madhavaram	Maduravoyal	1%
6	Manali	Kundrathur	1%
7	Red Hills	Ambattur	1%
8	Porur	Manali	1%
9	Porur	Madhavaram	1%
10	Kundrathur	Madhavaram	1%

3A

Sr. No.	Origin-Destination Pairs		Share
1	Ambattur	Red Hills	2%
2	Manali	Ambattur	2%
3	Manali	Kundrathur	1%
4	Ambattur	Manali	1%
5	Ambattur	Madhavaram	1%
6	Madhavaram	Porur	1%
7	Madhavaram	Kundrathur	1%
8	Manali	Salem	1%
9	Madhavaram	Ambattur	1%
10	Porur	Red Hills	1%

MAV

Sr. No.	Origin-Destination Pairs		Share
1	Kundrathur	Harbour Port	1%
2	Ambattur	Manali	1%
3	Manali	Chengalpattu	1%
4	Ennore Port	Ambattur	1%
5	Ennore Port	Chengalpattu	1%
6	Ennore Port	Kundrathur	1%
7	Harbour Port	Hosur	1%
8	Porur	Madhavaram	1%
9	Kundrathur	Red Hills	1%
10	Ambattur	Madhavaram	1%

Source: TIC analysis

Appendix C:

- Detailed traffic and revenue forecast – most likely scenario without overloading

Vanagaram / Tiruneermalai TP (1): Traffic forecast (AADT)

TRANSLINK® Infrastructure Consultants Pvt Ltd Smart Consulting

Vanagaram / Tiruneermalai TP

Financial Year	CJV	Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	AADT	PCU
FY26	29,235	4,546	2,049	2,945	1,060	551	2,015	**42,400**	**59,587**
FY27	33,399	5,142	2,101	3,030	1,110	555	2,070	**47,407**	**65,092**
FY28	38,005	5,871	2,159	3,118	1,185	573	2,183	**53,094**	**71,566**
FY29	43,297	6,653	2,215	3,210	1,215	577	2,231	**59,398**	**78,317**
FY30	48,620	7,436	2,266	3,294	1,242	581	2,274	**65,712**	**85,036**
FY31	54,856	8,292	2,317	3,422	1,270	585	2,375	**73,119**	**93,147**
FY32	61,125	9,232	2,369	3,510	1,315	589	2,445	**80,586**	**1,01,157**
FY33	68,058	10,272	2,421	3,599	1,370	593	2,507	**88,820**	**1,09,930**
FY34	74,972	11,308	2,469	3,681	1,419	597	2,563	**97,009**	**1,18,609**
FY35	82,884	12,559	2,522	3,773	1,449	601	2,672	**1,06,461**	**1,28,721**
FY36	90,992	13,844	2,573	3,904	1,502	605	2,742	**1,16,162**	**1,39,066**
FY37	95,360	14,401	2,594	3,939	1,514	606	2,773	**1,21,187**	**1,44,309**
FY38	98,177	14,782	2,607	3,963	1,522	607	2,794	**1,24,452**	**1,47,718**
FY39	99,864	15,064	2,617	3,980	1,532	608	2,815	**1,26,480**	**1,49,880**
FY40	1,00,711	15,206	2,622	3,988	1,536	608	2,821	**1,27,492**	**1,50,942**
FY41	1,01,151	15,274	2,624	3,994	1,537	608	2,825	**1,28,014**	**1,51,494**

Source: TIC estimate

Vanagaram / Tiruneermalai TP (2): Traffic AADT growth rates

TRANSLINK® Infrastructure Consultants Pvt Ltd Smart Consulting

Vanagaram / Tiruneermalai TP

Financial Year	CJV	Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	AADT	PCU
FY26	-	-	-	-	-	-	-	**-**	**-**
FY27	14.2%	13.1%	2.5%	2.9%	4.7%	0.8%	2.7%	**11.8%**	**9.2%**
FY28	13.8%	14.2%	2.8%	2.9%	6.7%	3.1%	5.5%	**12.0%**	**9.9%**
FY29	13.9%	13.3%	2.6%	2.9%	2.5%	0.8%	2.2%	**11.9%**	**9.4%**
FY30	12.3%	11.8%	2.3%	2.6%	2.2%	0.7%	1.9%	**10.6%**	**8.6%**
FY31	12.8%	11.5%	2.3%	3.9%	2.3%	0.7%	4.5%	**11.3%**	**9.5%**
FY32	11.4%	11.3%	2.2%	2.6%	3.5%	0.7%	2.9%	**10.2%**	**8.6%**
FY33	11.3%	11.3%	2.2%	2.5%	4.1%	0.7%	2.5%	**10.2%**	**8.7%**
FY34	10.2%	10.1%	2.0%	2.3%	3.6%	0.6%	2.2%	**9.2%**	**7.9%**
FY35	10.6%	11.1%	2.2%	2.5%	2.1%	0.7%	4.3%	**9.7%**	**8.5%**
FY36	9.8%	10.2%	2.0%	3.5%	3.7%	0.6%	2.6%	**9.1%**	**8.0%**
FY37	4.8%	4.0%	0.8%	0.9%	0.8%	0.2%	1.1%	**4.3%**	**3.8%**
FY38	3.0%	2.7%	0.5%	0.6%	0.5%	0.2%	0.7%	**2.7%**	**2.4%**
FY39	1.7%	1.9%	0.4%	0.4%	0.7%	0.1%	0.7%	**1.6%**	**1.5%**
FY40	0.8%	0.9%	0.2%	0.2%	0.2%	0.1%	0.2%	**0.8%**	**0.7%**
FY41	0.4%	0.5%	0.1%	0.2%	0.1%	0.0%	0.1%	**0.4%**	**0.4%**

Source: TIC estimate

Vanagaram / Tiruneermalai TP (3): Revenue forecast (INR Crore)

TRANSLINK® Infrastructure Consultants Pvt Ltd
Smart Consulting

Vanagaram / Tiruneermalai TP

Financial Year	CJV	Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	Total
FY27	-	-	-	-	-	-	-	**96.6**
FY28	61.8	9.5	6.1	9.9	6.8	3.7	20.6	**118.4**
FY29	75.0	11.3	6.5	10.5	7.2	3.8	21.9	**136.2**
FY30	85.6	13.0	6.7	11.2	7.7	4.0	23.1	**151.4**
FY31	98.2	14.9	7.2	12.0	8.1	4.2	24.9	**169.4**
FY32	116.1	17.3	7.7	12.9	8.8	4.4	26.9	**194.0**
FY33	130.8	19.8	8.3	13.7	9.5	4.6	28.6	**215.2**
FY34	154.0	23.1	8.8	14.5	10.1	4.8	30.2	**245.4**
FY35	181.2	27.1	9.1	15.5	10.8	5.0	32.8	**281.5**
FY36	202.1	30.8	9.8	16.7	11.7	5.2	35.0	**311.2**
FY37	221.1	33.0	10.1	17.4	12.1	5.4	36.7	**335.8**
FY38	230.5	34.5	10.5	18.1	12.6	5.6	38.2	**350.2**
FY39	247.7	37.0	11.0	19.0	13.3	5.8	39.9	**373.7**
FY40	253.4	38.2	11.4	19.8	13.8	6.1	41.8	**384.5**
FY41	267.2	40.1	11.9	20.4	14.2	6.3	43.3	**403.4**

Source: TIC estimate

Vanagaram / Tiruneermalai TP (4): Revenue growth rates

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Vanagaram / Tiruneermalai TP

Financial Year	CJV	Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	Total
FY27	-	-	-	-	-	-	-	**-**
FY28	25.5%	27.7%	16.8%	16.5%	21.1%	15.0%	18.3%	**22.5%**
FY29	21.3%	19.8%	7.0%	5.9%	5.3%	4.6%	6.3%	**15.1%**
FY30	14.2%	14.7%	4.1%	6.9%	6.6%	4.2%	5.7%	**11.1%**
FY31	14.7%	14.4%	6.7%	6.9%	5.2%	4.5%	7.7%	**11.9%**
FY32	18.2%	16.3%	6.8%	7.7%	8.8%	5.3%	7.7%	**14.5%**
FY33	12.7%	14.1%	7.6%	6.1%	7.8%	4.6%	6.5%	**10.9%**
FY34	17.7%	16.9%	5.8%	5.7%	6.9%	4.0%	5.5%	**14.0%**
FY35	17.7%	17.5%	3.7%	6.8%	6.4%	4.6%	8.7%	**14.7%**
FY36	11.5%	13.3%	7.4%	8.0%	8.2%	4.7%	6.7%	**10.6%**
FY37	9.4%	7.2%	4.0%	3.9%	3.9%	4.1%	4.8%	**7.9%**
FY38	4.2%	4.7%	3.8%	4.4%	4.3%	3.6%	4.2%	**4.3%**
FY39	7.4%	7.1%	4.9%	4.7%	4.9%	3.5%	4.4%	**6.7%**
FY40	2.3%	3.4%	3.5%	4.0%	4.0%	4.9%	4.7%	**2.9%**
FY41	5.4%	4.9%	4.0%	3.3%	3.2%	3.3%	3.5%	**4.9%**

Source: TIC estimate

Surapattu TP (1): Traffic forecast (AADT)

TRANSLINK® Infrastructure Consultants Pvt Ltd Smart Consulting

Surapattu TP

Financial Year	CJV	Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	AADT	PCU
FY26	14,081	3,579	2,791	265	1,332	1,007	3,778	**26,833**	**46,659**
FY27	16,058	4,036	2,922	273	1,376	1,015	3,883	**29,564**	**49,943**
FY28	18,235	4,608	3,066	281	1,432	1,031	4,053	**32,705**	**53,908**
FY29	20,723	5,207	2,725	289	1,214	875	3,454	**34,487**	**52,696**
FY30	23,225	5,804	2,332	297	994	722	2,841	**36,215**	**51,349**
FY31	26,167	6,457	2,430	308	1,008	727	2,974	**40,070**	**55,780**
FY32	29,277	7,171	2,529	316	1,033	732	3,063	**44,122**	**60,269**
FY33	32,558	7,959	2,632	324	1,064	737	3,141	**48,415**	**64,975**
FY34	35,827	8,743	2,729	332	1,092	741	3,211	**52,674**	**69,606**
FY35	39,566	9,687	2,838	340	1,105	746	3,354	**57,636**	**75,177**
FY36	43,387	10,654	2,943	352	1,135	751	3,443	**62,665**	**80,663**
FY37	47,502	11,698	3,051	360	1,149	755	3,544	**68,059**	**86,516**
FY38	51,464	12,707	3,148	367	1,161	759	3,634	**73,242**	**92,111**
FY39	55,840	13,890	3,257	375	1,191	764	3,775	**79,091**	**98,591**
FY40	60,522	15,164	3,368	383	1,209	768	3,868	**85,282**	**1,05,224**
FY41	65,741	16,500	3,478	395	1,222	772	3,971	**92,080**	**1,12,496**

Source: TIC estimate

Surapattu TP (2): Traffic AADT growth rates

TRANSLINK® Infrastructure Consultants Pvt Ltd Smart Consulting

Surapattu TP

Financial Year	CJV	Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	AADT	PCU
FY26	-	-	-	-	-	-	-	**-**	**-**
FY27	14.0%	12.8%	4.7%	2.9%	3.3%	0.8%	2.8%	**10.2%**	**7.0%**
FY28	13.6%	14.2%	4.9%	2.9%	4.0%	1.6%	4.4%	**10.6%**	**7.9%**
FY29	13.6%	13.0%	(11.1%)	2.9%	(15.2%)	(15.1%)	(14.8%)	**5.4%**	**(2.2%)**
FY30	12.1%	11.5%	(14.4%)	2.6%	(18.1%)	(17.5%)	(17.8%)	**5.0%**	**(2.6%)**
FY31	12.7%	11.2%	4.2%	3.9%	1.4%	0.7%	4.7%	**10.6%**	**8.6%**
FY32	11.9%	11.1%	4.1%	2.6%	2.5%	0.7%	3.0%	**10.1%**	**8.0%**
FY33	11.2%	11.0%	4.1%	2.5%	2.9%	0.7%	2.6%	**9.7%**	**7.8%**
FY34	10.0%	9.8%	3.7%	2.3%	2.6%	0.6%	2.2%	**8.8%**	**7.1%**
FY35	10.4%	10.8%	4.0%	2.5%	1.3%	0.7%	4.5%	**9.4%**	**8.0%**
FY36	9.7%	10.0%	3.7%	3.5%	2.7%	0.6%	2.7%	**8.7%**	**7.3%**
FY37	9.5%	9.8%	3.6%	2.3%	1.2%	0.6%	2.9%	**8.6%**	**7.3%**
FY38	8.3%	8.6%	3.2%	2.0%	1.1%	0.5%	2.6%	**7.6%**	**6.5%**
FY39	8.5%	9.3%	3.5%	2.1%	2.5%	0.6%	3.9%	**8.0%**	**7.0%**
FY40	8.4%	9.2%	3.4%	2.1%	1.5%	0.6%	2.5%	**7.8%**	**6.7%**
FY41	8.6%	8.8%	3.3%	3.1%	1.0%	0.5%	2.7%	**8.0%**	**6.9%**

Source: TIC estimate

Surapattu TP (3): Revenue forecast (INR Crore)

TRANSLINK® Infrastructure Consultants Pvt Ltd Smart Consulting

Surapattu TP

Financial Year	CJV	Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	Total
FY27	-	-	-	-	-	-	-	**108.9**
FY28	38.2	10.9	11.6	1.2	11.3	8.7	52.8	**134.7**
FY29	44.2	12.5	10.6	1.3	9.9	7.7	46.9	**133.1**
FY30	52.4	14.6	9.5	1.4	8.4	6.6	39.9	**132.8**
FY31	59.6	16.6	10.2	1.5	8.9	6.8	43.4	**146.9**
FY32	70.5	19.3	11.1	1.6	9.5	7.2	46.6	**165.7**
FY33	82.1	22.4	11.8	1.7	10.1	7.5	49.5	**185.1**
FY34	91.2	25.1	12.7	1.8	10.7	7.9	52.3	**201.7**
FY35	105.5	29.0	13.9	1.9	11.3	8.2	56.8	**226.6**
FY36	121.4	33.2	15.0	2.1	12.1	8.6	60.6	**253.0**
FY37	139.3	38.5	16.0	2.2	12.7	8.9	64.9	**282.6**
FY38	157.2	43.3	17.3	2.4	13.3	9.3	68.9	**311.8**
FY39	171.9	48.1	18.5	2.5	14.1	9.8	74.5	**339.3**
FY40	195.5	55.2	19.8	2.6	14.9	10.2	79.1	**377.4**
FY41	219.9	62.1	21.2	2.8	15.6	10.6	84.1	**416.3**

Source: TIC estimate

Surapattu TP (4): Revenue growth rates

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Surapattu TP

Financial Year	CJV	Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	Total
FY27	-	-	-	-	-	-	-	**-**
FY28	32.6%	33.1%	21.1%	17.6%	18.9%	15.7%	19.3%	**23.7%**
FY29	15.7%	14.8%	(8.5%)	6.6%	(12.3%)	(11.6%)	(11.1%)	**(1.2%)**
FY30	18.5%	17.2%	(10.5%)	6.4%	(15.1%)	(14.3%)	(15.0%)	**(0.3%)**
FY31	13.8%	13.6%	7.3%	7.6%	5.0%	3.9%	8.7%	**10.7%**
FY32	18.2%	16.7%	8.8%	6.9%	6.8%	5.4%	7.4%	**12.8%**
FY33	16.5%	15.7%	6.7%	6.4%	6.9%	3.9%	6.2%	**11.7%**
FY34	11.0%	12.0%	7.7%	6.1%	6.3%	4.7%	5.7%	**9.0%**
FY35	15.8%	15.5%	9.5%	6.2%	4.8%	4.6%	8.5%	**12.3%**
FY36	15.0%	14.8%	7.7%	8.0%	7.2%	4.7%	6.8%	**11.6%**
FY37	14.8%	15.7%	7.0%	6.0%	5.0%	3.8%	7.1%	**11.7%**
FY38	12.9%	12.7%	8.0%	5.9%	5.0%	4.7%	6.1%	**10.3%**
FY39	9.3%	11.0%	6.8%	5.3%	5.6%	4.4%	8.1%	**8.8%**
FY40	13.7%	14.7%	6.9%	6.5%	5.9%	4.5%	6.3%	**11.2%**
FY41	12.4%	12.5%	7.3%	7.0%	4.9%	3.8%	6.2%	**10.3%**

Source: TIC estimate

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Chennai Tada section of NH16 in Tamil Nadu

Traffic Due Diligence – Final Report

National Highways Authority of India

January 2026

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Control information

Contract Reference: Letter of Commencement - FINDIV-16014(11)/1/2024-O/o CGM (Finance-II)/e-265207/116 dated 7th August 2025	**Identification & Traceability:** TIC/401/TF/TDD/R1-Final Report
Assignment Title: Traffic Due Diligence – Chennai Tada section of NH16 in Tamil Nadu	
Client	**National Highways Authority of India** Sector 10, Dwarka, New Delhi 110075
Consultant	**Translink Infrastructure Consultants Private Limited in association with Infra Brainiacs Private Limited** 1103, I Square Corporate Park Science City Road, Ahmedabad 380060

Issue and Revision Records

Date	Revisions	Originator	Checker	Approver	Description
09.01.2026	R1	Darshan Doshi Dhruv Panchal Rutvik Dhameliya	Rinku Kanani Karan Dave	Tejas Patel	Traffic Due Diligence – Final Report

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Appendices

Appendix A: Vehicle category-wise visual representation of origin-destination zones

Vehicle category-wise top origin-destination pairs

Appendix B: Detailed traffic and revenue forecast – most likely scenario without overloading

Abbreviations (1)

AADC	Annual Average Daily Collection
AADT	Annual Average Daily Traffic
ADB	Asian Development Bank
ADT	Average Daily Traffic
AL	Axle Load
AP	Andhra Pradesh
APC	Annual Potential Collection
BFSI	Banking, Financial Services, and Insurance
BOT	Build-Operate-Transfer
BPO	Business Process Outsourcing
CAGR	Compound Annual Growth Rate
CBIC	Chennai – Bengaluru Industrial Corridor
CFS	Container Freight Station
CJV	Car/ Jeep/ Van
CPI	Consumer Price Index
CPRR	Chennai Peripheral Ring Road
CTVC	Classified Traffic Volume Count
CUMTA	Chennai Unified Metropolitan Transport Authority
DBFOT	Design, Build, Finance, Operate, and Transfer
DPR	Detailed Project Report
DTA	Domestic Tariff Area
EPC	Engineering, Procurement and Construction
ETC	Electronic Toll Collection
EV	Electric Vehicle
FMCG	Fast Moving Consumer Goods

FY	Financial Year
GDP	Gross Domestic Product
GSDP	Gross State Domestic Product
GST	Goods and Services Tax
GVA	Gross Value Added
HAM	Hybrid Annuity Mode
HCV	Heavy Commercial Vehicle
HQ	Headquarter
IEA	International Energy Agency
IHMCL	Highways Management Company Limited
IMF	International Monetary Fund
INR	Indian Rupee
IRC	Indian Road Congress
ISRO	Indian Space Research Organisation
IT	Information technology
ITES	Information Technology Enabled Services
IWAI	Inland Waterways Authority of India
JV	Joint Venture
Km	Kilometer
LCV	Light Commercial Vehicle
LNG	Liquefied Natural Gas
LPG	Liquefied Petroleum Gas
MADT	Monthly Average Daily Traffic
MAV	Multi Axle Vehicle
MLFF	Multi Lane Free Flow

Abbreviations (2)

MMBT	Madhavaram Mofussil Bus Terminus
MMLP	Multimodal Logistics Park
MMTPA	Million Metric Tonnes Per Annum
MoFHW	Ministry of Health and Family Welfare
MoRTH	Ministry of Road Transport and Highways
MoSPI	Ministry of Statistics and Programme Implementation
MRF	Madras Rubber Factory
MRO	Maintenance, Repair, and Operations
MSME	Micro, Small, and Medium Enterprises
MT	Million Tonnes
MTPA	Million Tonnes Per Annum
NE	National Expressway
NH	National Highway
NHAI	National Highways Authority of India
NHIT	National Highways Infra Trust
NMP	National Monetisation Pipeline
NW	National Waterway
OD	Origin – Destination
OECD	Organisation for Economic Co-operation and Development
OSV	Oversized Vehicle
PCI	Per Capita Income
PCU	Passenger Car Unit
PIA	Project Influence Area
PIU	Project Implementation Unit
PPP	Public-Private Partnership
PSU	Public Sector Undertaking
QADT	Quarterly Average Daily Traffic
RBI	Reserve Bank of India
RO	Regional Office
RoS	Rest of State
RTO	Regional Transport Office
SaaS	Software as a Service
SCF	Seasonal Correction Factor
SEZ	Special Economic Zone
SH	State Highway
SIAM	Society of Indian Automobile Manufacturers
SIPCOT	State Industries Promotion Corporation of Tamil Nadu
TAZ	Traffic Analysis Zone
TIC	Translink Infrastructure Consultants Private Limited
TMT	Thermo-Mechanically Treated
TN	Tamil Nadu
TNRDC	Tamil Nadu Road Development Company Ltd
TOT	Toll, Operate, Transfer
TP	Toll Plaza
UNESCO	United Nations Educational, Scientific and Cultural Organization
VCIC	Vishakhapatnam – Chennai Industrial Corridor
WADT	Weekly Average Daily Traffic
WPI	Wholesale Price Index
2A	2 Axle
3A	3 Axle

Chapter 1: Introduction

- The assignment
- Objective and Scope of Work
- Approach and methodology
- Organisation of the report

This chapter outlines assignment background, scope of work, approach and methodology employed to ensure successful execution of the assignment.

Approach and methodology section highlights the structured approach which has been followed to gather data, conduct analysis, and make informed decisions throughout the project lifecycle. By employing a robust methodology, the consultant aims to ensure the accuracy, efficiency and reliability of the assignment's outcomes.

The assignment

Ministry of Road Transport and Highways (MoRTH) has entrusted **National Highways Authority of India** (hereinafter referred to as '**NHAI'** or '**client'**) for monetisation of public funded operational national highway projects under the framework of National Monetisation Pipeline (NMP).

In this context, NHAI has commissioned Translink Infrastructure Consultants Private Limited in association with Infra Brainiacs Private Limited (hereinafter referred to as '**TIC'** or '**consultant'**) to carry out traffic due diligence for following national highway section in Tamil Nadu (hereinafter referred to as '**project highway**').

Project highway under asset monetization programme

National highway section	Toll plaza	Concerned NHAI field office
Chennai Tada section of NH16	Nallur (Tiruvallur district) Durainallur (Tiruvallur district)*	Project Implementation Unit – Chennai 1 Regional Office – Chennai

Source: Client

* existing toll plaza at Nallur will be shifted to Durainallur from 1st October 2027 (H2 FY2028)

This document is the final report incorporating traffic data updates received up to October 2025 and confirmation from the client dated 15th December 2025 for recommended scenario. The report presents our understanding of the project highway, trend analysis of traffic and revenue, primary data analysis and traffic and revenue forecast for a concession period of 15 years.

Objective and Scope of Work

The principal objective of the study is to determine traffic and revenue forecast for 15 years. This assessment provides input to stakeholders to evaluate viable monetization options for the project highway.

The broad **scope of the work** of the assignment is as follows:

- Review of available historical traffic and revenue data and relevant document received from the client
- Carrying out traffic survey and analysis at the project highway :
  - 7 days continuous and direction-wise classified traffic volume count
  - 3 days origin-destination
  - 3 days axle load
  - Any other surveys on the project highway and alternate corridors as per the need
- Site visit and stakeholder consultation to understand traffic characteristics and network dynamics
- Review of observed growth trends of the project highway and corridor subject to availability of data
- Estimate vehicle category-wise traffic and revenue for the base year
- Determine future toll rates
- Assessing diversion due to competing transportation modes and routes, network development, future development plans in the region, etc.
- Vehicle category and ticket distribution-wise traffic and revenue forecast for concession period
- Scenario development: most likely, optimistic and pessimistic

Approach

The consultant adopted comprehensive approach to address the need of this assignment with key five focus areas as summarised in below figure.

Approach for the assignment

Expertise in motion	Forecasting forward flow	Economy drive highways	Data drives decisions; paves road to resilience	Trust in travel
Team with transportation engineering expertise and experience	Encapsulate all possible exogeneous impacts on traffic growth	Models integrating economic indicators for traffic growth projections	Using statistical techniques and tools for accurate insights and risk assessments	Maintain integrity, transparency, and ethical practices

Source: TIC

Methodology (1)

Methodology for the assignment

Key sections	Particulars
Project highway appreciation	▪ Assess the macro and micro road network, considering the overall road infrastructure and its specific sections ▪ Identify homogeneous/tollable sections with similar traffic patterns ▪ Evaluate any developments in the vicinity of the project highway that may impact economic growth and traffic volume ▪ Finalize survey locations and formats for data collection
Secondary data collection	▪ Gather relevant past detailed project report / traffic study report and draft concession agreement as per availability ▪ Collect historical monthly traffic data for the toll plazas of the project highway and neighbouring toll plazas on the corridor, both upstream and downstream ▪ Source vehicle category/mapper class wise electronic toll collection (ETC) data as most reliable dataset from Indian Highways Management Company Limited (IHMCL) through the client for toll plazas under study and on the corridor and alternate corridors as well as across the country (subject to receipt from the client or as per availability in the public domain) for understanding of the various trends of economy as well as modal / vehicle technology shift ▪ Gather economic indicators such as Consumer Price Index (CPI), Wholesale Price Index (WPI), per capita income, national, state and district Gross Domestic Product (GDP), employment rates and specific commodities related sales e.g., automobile, agriculture production etc. ▪ Gather demographic profiles and population data ▪ Collect secondary data related to alternative routes and modal shift developments if applicable
Primary data collection	▪ 7-day continuous videography-based classified traffic volume count survey to gather independent traffic volume data ▪ 3-day origin-destination and commodity survey to understand travel patterns, trip purposes, influence region, growth drivers etc. ▪ 3-day axle load survey to determine the load characteristics of vehicles ▪ 1-day vehicle registration number plate survey to estimate ticket segmentation of local commercial vehicle without national permit if required ▪ Stakeholder consultation through interviews and focused group discussions

Source: TIC

Methodology (2)

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Methodology for the assignment

Key sections	Particulars
Data analysis	▪ Review historical traffic and revenue data to understand growth trend, seasonality variation, elasticities for identified growth drivers through regression analysis subject to data availability and benchmark analysis of corridor ▪ Conduct data hygiene checks to identify errors, biases and inconsistencies in the collected data ▪ Analyse Weekly Average Daily Traffic (WADT) including peak hour, day and night traffic variances, as well as directional distribution of traffic for further input to various analysis ▪ Identify Traffic Analysis Zones (TAZ) and Primary Influence Areas (PIA) ▪ Determine vehicle category-wise origin-destination matrices, trip lengths and purposes ▪ Develop geographical distribution diagrams of traffic to visualize travel patterns ▪ Perform commodity and loading analysis ▪ Analyse historical journey tickets, including single, 24-hour return, daily multiple, monthly, local pass tickets and annual pass for passenger cars and understand the ground level situations for underlying patterns especially forced exemption if any in the case specific region and possibilities of reduction through proposed technological and administrative measures ▪ Estimate Annual Average Daily Traffic (QADT/AADT) for the base and future years as per case specific requirement ▪ Develop a traffic diversion model using IRC:SP:30 modality
Forecasting	▪ Utilize an econometric model based on IRC: 108-2015 guidelines to analyse the relationship between vehicle traffic/PIA and socio-economic parameters such as Per Capita Income (PCI), Gross Domestic Product (GDP) of district/state/national, population, specific economic activities etc. as relevant with the identified growth drivers ▪ Calculate growth rates for each vehicle category. Adjust the growth rates based on induced traffic and traffic diversion effects, if applicable ▪ Perform traffic forecasting for 15 years period - normal traffic followed by generated and diverted traffic due to network and developmental impacts ▪ Conduct capacity analysis to assess the adequacy of the project highway ▪ Forecast annual toll revenue for 15 years based on traffic and toll rates projections
Sensitivity and risk analysis	▪ Identify variables (macro-economic, growth drivers and relationships, scale and timeline of diversions, etc.) that significantly impact annual toll revenue and assess their sensitivity ▪ Develop scenarios for identified risks

Source: TIC

Organisation of the report

Report structure

Sr. No.	Chapter	Particulars
1	**Introduction**	Scope of the assignment, approach and methodology
2	**Project highway profile**	Characteristics of the project highway like network understanding, socio-economic background of the region and proposed infrastructure developments in the influence region and network
3	**Traffic analysis**	Past performance of the project highway based on historical traffic and revenue data, traffic survey data analysis
4	**Economic context and traffic growth**	Economic context of influence region, determination of traffic growth drivers and associated travel demand elasticities
5	**Baseline traffic and revenue forecast**	Elaborates method adopted for determining base year AADT, toll ticket distribution and revenue reconciliation
6	**Diversion analysis**	Impacts on the project highway due to proposed infrastructure developments in the influence region and network, assessment of induced traffic demand
7	**Final traffic and revenue forecast**	Traffic and revenue forecasts including diversions, scenario cases: most likely with and without overloading, optimistic and pessimistic

Source: TIC

Chapter 2: Project highway profile

- Location and key details
- Economic activities in the region
- Understanding of network and traffic corridors
- Proposed road network and infrastructure development in the influence region

This chapter exhibits our understanding of the project highway and key details, economic activities in the region and strategic network context based on site visit and stakeholder consultation. It covers list of infrastructure project development in the region and network which would have impact on the performance of the project highway.

Location of the project highway

Project highway location in national and state context

Source: TIC analysis (map not to scale)

- **Located at the southern end of the country's ~1,500 km east–coast corridor (NH16)**, this point serves as gateway to Chennai maritime and industrial clusters and observes traffic from states on eastern coast, northern and western part of the country. Chennai maritime cluster includes Chennai, Ennore (Kamarajar) and Kattupalli ports which contributes ~20% in container traffic of India, being second largest container traffic cluster western India.
- **Integral part of inter-state traffic** corridor connecting Tamil Nadu and Andhra Pradesh as neighbouring states. NH719B (old NH32/NH45) extends the connectivity to southern Tamil Nadu (Trichy, Madurai, Tuticorin).
- **~43 km section connecting Chennai maritime cluster and Gummidipoondi industrial area** as one of the key growth engine of the region and state being operational since 1980. This 43 km belt observed major logistics and warehousing hub.

Project snapshot (1)

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Key project details

Particulars	Chennai Tada section of NH16
Length	**Present length:** 43.400 km **Revised length:** 33.00 km for asset monetization proposal Initial section of km 11.000 to km 21.400 (10.400 km length, highlighted separately in map on earlier page) is to be de-notified and handed over to the state government in near future considering 4 lane configuration and urbanization along the section. Hence, this 10.400 km length to be excluded for asset monetization proposal.
Lane and pavement	6-lane divided carriageway, flexible pavement / rigid at toll plaza
Chainage	km 21.400 (NH16 interaction with Chennai Outer Ring Road) to km 54.400 (TN/AP Border)
History	▪ Chennai Tada section was under 4 to 6 lane DBFOT (Toll) concession from April 2009 by Larson & Toubro Limited for 15 years but terminated in 2016 due to land acquisition issues. ▪ Later SPL Infrastructure Private Limited completed 4 to 6 lane work in February 2022 for 33 km of length i.e., km 21.400 (NH16 interaction with Chennai Outer Ring Road) to km 54.400 (TN/AP Border). ▪ Post BOT concession termination, section was managed under public funded modality with short term toll contract.
Nos. of toll plaza and location	1 ETC enabled
Toll plaza locations	Nallur at km 21.625 **Nallur toll plaza will be shifted to Durainallur at km 34.180 from 1st October 2027** (H2 FY28) in context of development of Chennai Peripheral Ring Road
District	Physically located within Tiruvallur district – the northern most district of Tamil Nadu Socio-economic activities and traffic patterns are significantly influenced by Tiruvallur district and secondary influenced from districts under Chennai Unified Metropolitan Transport Authority (CUMTA) i.e., Chennai, Chengalpattu, Kancheepuram, Ranipet.
Tolling start date	3rd April 2009
Tolling length (km)	43.278 (after de-scoping 10.400 km)
Overloading penalty	No overloading penalty / fee is being levied at present based on understanding from site visit and PIU Chennai 1
Micro-diversions at present toll plaza location	Local CJV/Mini LCV vehicles uses internal village road located nearby toll plaza location but limited to residents residing within nearby villages. No such micro leakage is observed at Durainallur location.

Source: NHAI

Project snapshot (2)

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Key project details

Particulars	Chennai Tada section of NH16
Toll plaza locations	**Nallur TP**
ETC Traffic (FY26 till October 2025)	7 months ADT: 32,471 PCU corresponding 7 months ADT: 65,764
ETC Traffic composition (FY26 till October 2025)	55% CJV/Mini LCV 19% 2A/LCV 3% Bus 23% 3A/MAV
ETC Revenue	FY25: INR 163 Crore FY26 till Oct'25: INR 106 Crore
ETC Revenue composition (FY26 till October 2025)	22% CJV/Mini LCV 20% 2A/LCV 4% Bus 54% 3A/MAV
Present toll operator with Annual Potential Collection (APC) and quoted remittance	**M/s. Vinod Kumar Jain** **Duration** : May 2025 to April 2026 (1 Year) **Annual Potential Collection** : INR 166.24 Crore **Quoted remittance** : INR 163.83 Crore (FY25 tolling rates) Revised to INR 169.10 on 1st April 2025 with FY26 tolling rates
Previous tolling operator	**Skylark Infer Engineering Private Limited** **Duration** : Feb 2024 to Jan 2025 (1 Year); extended to May 2025 **Annual Potential Collection** : INR 149.79 Crore **Quoted remittance** : INR 159.13 Crore

Source: NHAI

Project snapshot (3)

Base Year FY26 traffic composition for Nallur TP and Durainallur TP

Source: TIC analysis (map not to scale)

Major variance in CJV category between Nallur and Durainallur locations is due to proximity to Chennai.

Economic activities in influence region (1)

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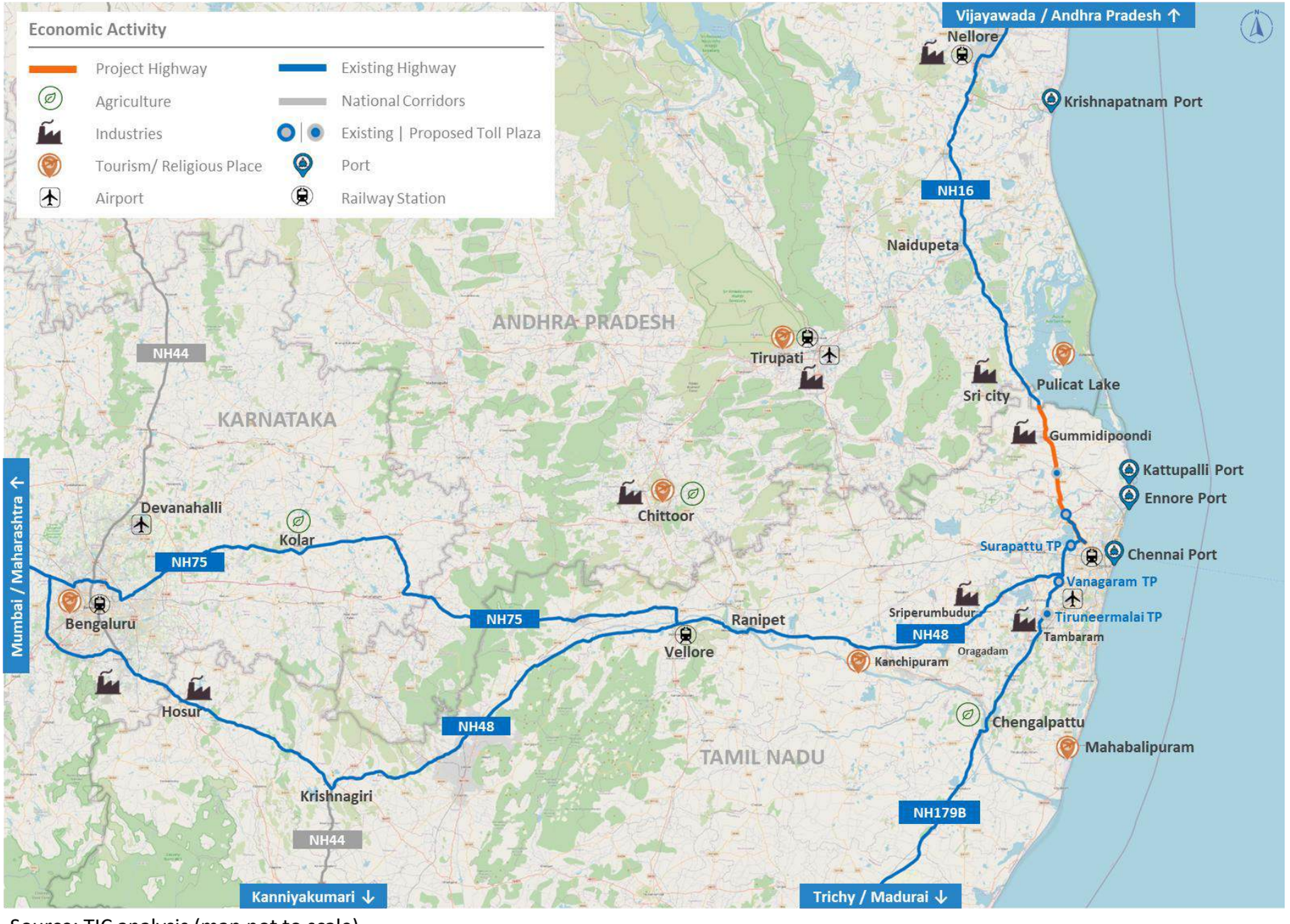
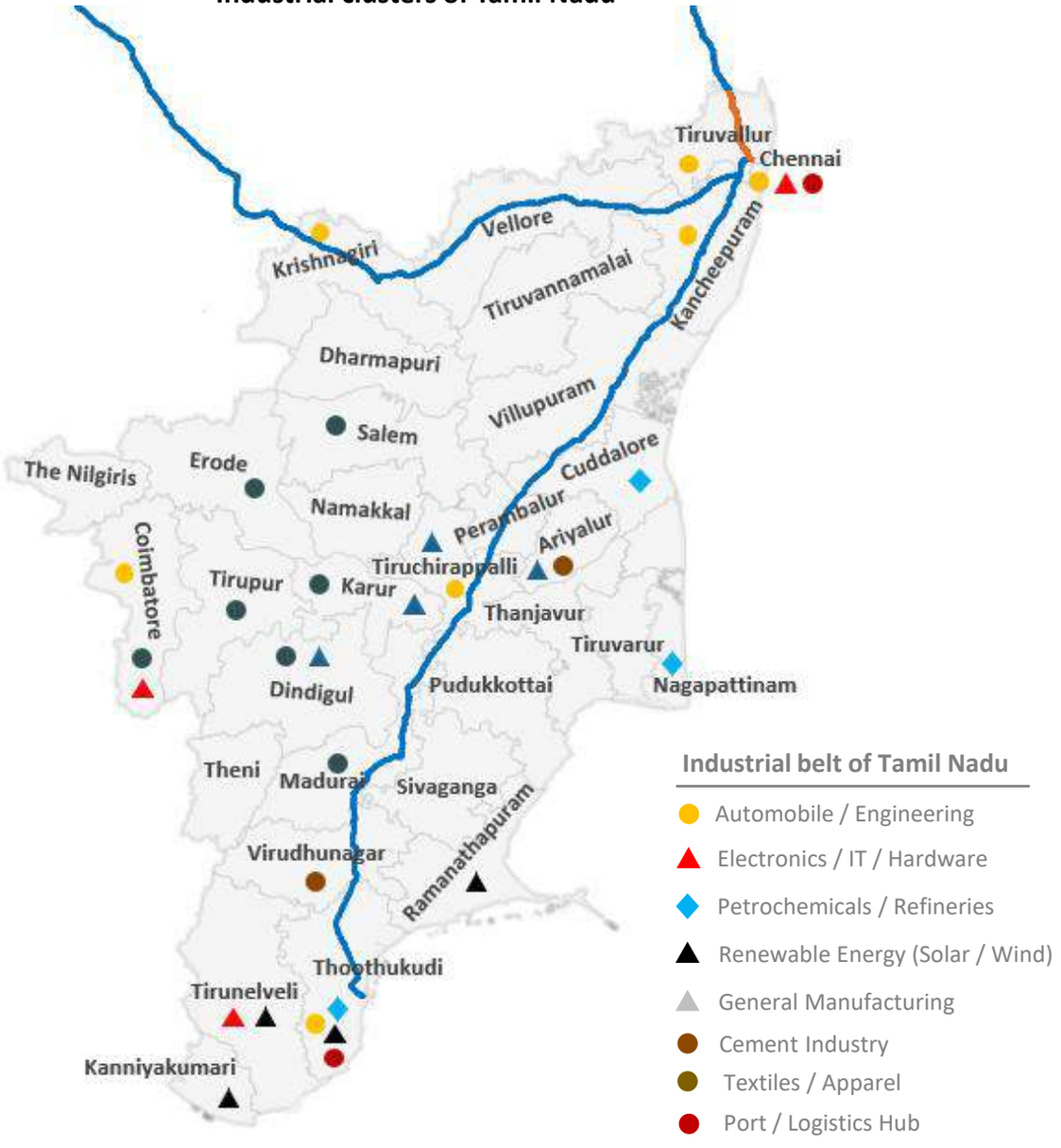
Economic activities in influence region



Source: TIC analysis (map not to scale)

Economic activities in influence region (2)

Industrial clusters of Tamil Nadu



Source: TIC analysis (map not to scale); illustrative reference

- Tamil Nadu is one of India's most industrialized state with a diversified economy driven by manufacturing, services and agriculture.
- The state's strategic coastal location along the bay of Bengal supports strong maritime trade through Chennai, Ennore, Kattupalli and Thoothukudi ports.
- Gummidipoondi industrial area, established on northern end of the project highway in 1980s, is home to one of Tamil Nadu's oldest SIPCOT industrial complexes.
- It has been a major center for steel manufacturing and power generation. Strategically located along NH-16, it offers excellent connectivity to Chennai, ports, and major markets, making it ideal for industrial growth.
- Along with Thervoy Kandigai SIPCOT and Manellore SIPCOT, Gummidipoondi is set to form a key industrial corridor in north Chennai, driving economic growth, employment and infrastructure development.
- Major cluster-wise industrial capabilities are:
  - **Chennai:** Automotive, Precision Manufacturing, Electronics, Warehousing
  - **Hosur:** Automobiles and MRO
  - **Salem:** Technical Textiles, Polymers, General Engineering
  - **Tiruchirappalli:** Fabrication, general Engineering
  - **Coimbatore:** General Engineering, Space Technology and Precision Manufacturing

Economic activities in influence region (3)

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1 Industries in and around Chennai

- **North Chennai cluster**
  - **Gummidipoondi industrial area:** industry and warehousing zone
  - **Manali:** home to chemical, general engineering, logistics and manufacturing units
  - **Ennore:** key port-related industries, auto (Ashok Leyland, MRF), Oil PSU – bottling/distribution terminals
  - **Redhills:** features Horizon Industrial Parks with plug-and-play facilities
  - **Outside Tamil Nadu:** Sri City – integrated multi-sector SEZ and DTA zones with residential and social facilities (part of Andhra Pradesh but situated on border of TN/AP). It has presence of manufacturing facilities of companies such as Pepsi, Mondelez, Panasonic, Foxconn etc.
- **South West cluster (Automotive and Electronic):**
  - **Sriperumbudur:** SIPCOT Industrial Park, includes areas like Pillaipakkam, Sunguvarchatram, and Araneri
  - **Oragadam:** huge auto hub with global names (BMW, Nissan), logistics, and energy sectors
  - **Irungattukottai:** significant cluster with modern infrastructure
- **West cluster: Ambattur** and **Puzhal** host engineering and small-scale industries
- **South cluster**
  - **Madras Export Processing Zone:** SEZ in Tambaram with presence of IT, ITES, electronics, logistics and manufacturing (leather and footwear, agro, pharma, plastics, textiles)
  - **Maraimalai Nagar:** home to automotive, pharmaceutical and chemicals
  - **Mahindra World City:** India's first integrated business and residential township having IT/ITeS, manufacturing (auto ancillaries, Electronics), and logistics, with major firms like BMW, Infosys, Pegatron, BASF, and TVS Group operating within its multi-sector SEZ and DTA zones
  - **Ariyalur Cement Manufacturing cluster** (near Trichy) supplies cement to Chennai and nearby region.
- **Sriperumbudur - Maduravoyal** stretch serves as a logistics and warehousing corridor, with multiple CFSs and distribution hubs supporting port-based trade.
- **Porur and Chennai Metropolitan Region periphery,** Rapidly growing commercial and service sectors, with rising movement of goods, construction materials, and workforce through the bypass.
- Chennai Bypass acts as a key industrial and logistics connector, integrating manufacturing, warehousing, and port operations within the Chennai Metropolitan Region.

Source: TIC secondary research

Economic activities in influence region (4)

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2

Chennai Maritime Cluster

- **Chennai Maritime Cluster** comprises three ports i.e., **Chennai, Ennore (Kamarajar) and Kattupalli**. Chennai maritime cluster is preferred choice for Far East origin/destinations for hinterland identified.
- **Hinterland served by Chennai Tada section of NH16:** Gummidipoondi industrial cluster including Thervoy Kandigai and Manellore SIPCOT Parks, Andhra Pradesh, Telangana
- **Major commodities handled:**
  - **Chennai Port:** mainly import cargo which includes **Container Cargo (~63%)**, Petroleum, Oil, Lubricants and LPG/LNG (~25%), Dry and Break Bulk Cargo (~10%)
  - **Ennore Port:** both export-import cargo which includes **Container Cargo (~25%)**, Petroleum, Oil, Lubricants and LPG/LNG (~12%), **Coal (~50% Thermal, Steam, Coking)**, Dry and Break Bulk Cargo (~10%)
  - **Kattupalli Port:** Container Cargo, Soda Ash (major contribution), Black Oil Products (including Bitumen)
- Gradual container cargo traffic from Krishnapatnam port was observed shifting to Chennai port cluster during 2021 to 2023 because of closure of container operations at Krishnapatnam port.
- **Capacity utilisation:** Chennai (36%) and Ennore (57%) in FY25 with designed capacity of 136 MMTPA and 97 MMTPA respectively.
- Port traffic especially container cargo is heavily dependent on road logistics.
- **Container cargo and petroleum products are major items observed at the project highway** as regular movement between hinterland and maritime cluster which is highly volatile in monthly trend.
- Area nearby port cluster (Manali, Ennore Port Road, Redhill) is hub of logistics facilities like Container Freight Stations, warehousing/container yards, truck terminals, lodging/boarding for truckers.
- Chennai Multimodal Logistics Park (MMLP) is under construction at Mappedu (accessible through NH48 and at west of Chennai). Phase 1 commercial operations is expected by start of FY27. This will improve freight efficiency, reduce last-mile delivery challenges, link ports (Chennai, Ennore, Kattupalli) with industries and boost economic growth.
- Well established container ecosystem of this cluster and planned capacity expansion of container berths will ensure the associated traffic from hinterland on the project highway.

Source: TIC secondary research

Economic activities in influence region (5)

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3 Agriculture and allied activities

- **Paddy (rice)** is the primary crop grown in Tiruvallur, Kanchipuram and Chengalpattu districts, supported by irrigation from Poondi and Chembarambakkam reservoirs, while groundnut, sugarcane, millets and pulses are major secondary crops contributing to local agri-based processing.
- **Horticulture** and **floriculture** including banana, tomato, brinjal, mango and jasmine are commercially cultivated, supplying fresh produce to Koyambedu Market and surrounding urban centers.
- Allied activities such as dairy, poultry, and inland aquaculture are prominent near Red Hills and Minjur, driven by high urban demand and proximity to the Chennai Metropolitan Region.
- **Koyambedu Wholesale Market Complex**, located along the Chennai Bypass, spans about 295 acres and houses over 3,000 shops. It is one of the largest hubs for perishable goods in India, handling thousands of tonnes of fruits, vegetables, and flowers every day. The market supplies produce to the entire region and attracts heavy volume of business travelers and vehicles daily. It draws traffic from all directions, including southern Tamil Nadu, areas north of Chennai/Andhra Pradesh, and as far as Kolar and western Karnataka for fruits and vegetables.
- Nelloer is known as 'Shrimp capital of India' with aquaculture influence in the region.

4 Tourism

- **Chennai** offers a mix of coastline, history, spirituality, and wildlife experiences for visitors which attracts a large volume of domestic and international tourists e.g., historic Fort St. George, cultural hubs like Kalakshetra, Kapaleeshwarar Temple, spiritual sites - Santhome Basilica and unique Madras Crocodile Bank.
- **Sri Venkateshwara Swami Vaari Temple at Tirupati** (richest temple in the world) attracts thousands of devotees from across India. IN addition to the same, Mypadu beach, Pulikat lake, ISRO center etc. are locate on the north of Chennai.
- **Kanchipuram**, known as the City of Thousand Temples, is a key spiritual and heritage destination, also famous for its traditional silk weaving.
- **Mahabalipuram**, a UNESCO World Heritage Site, promotes heritage and coastal tourism, collectively enhancing the region's religious, cultural, and leisure tourism along the Chennai Bypass corridor.

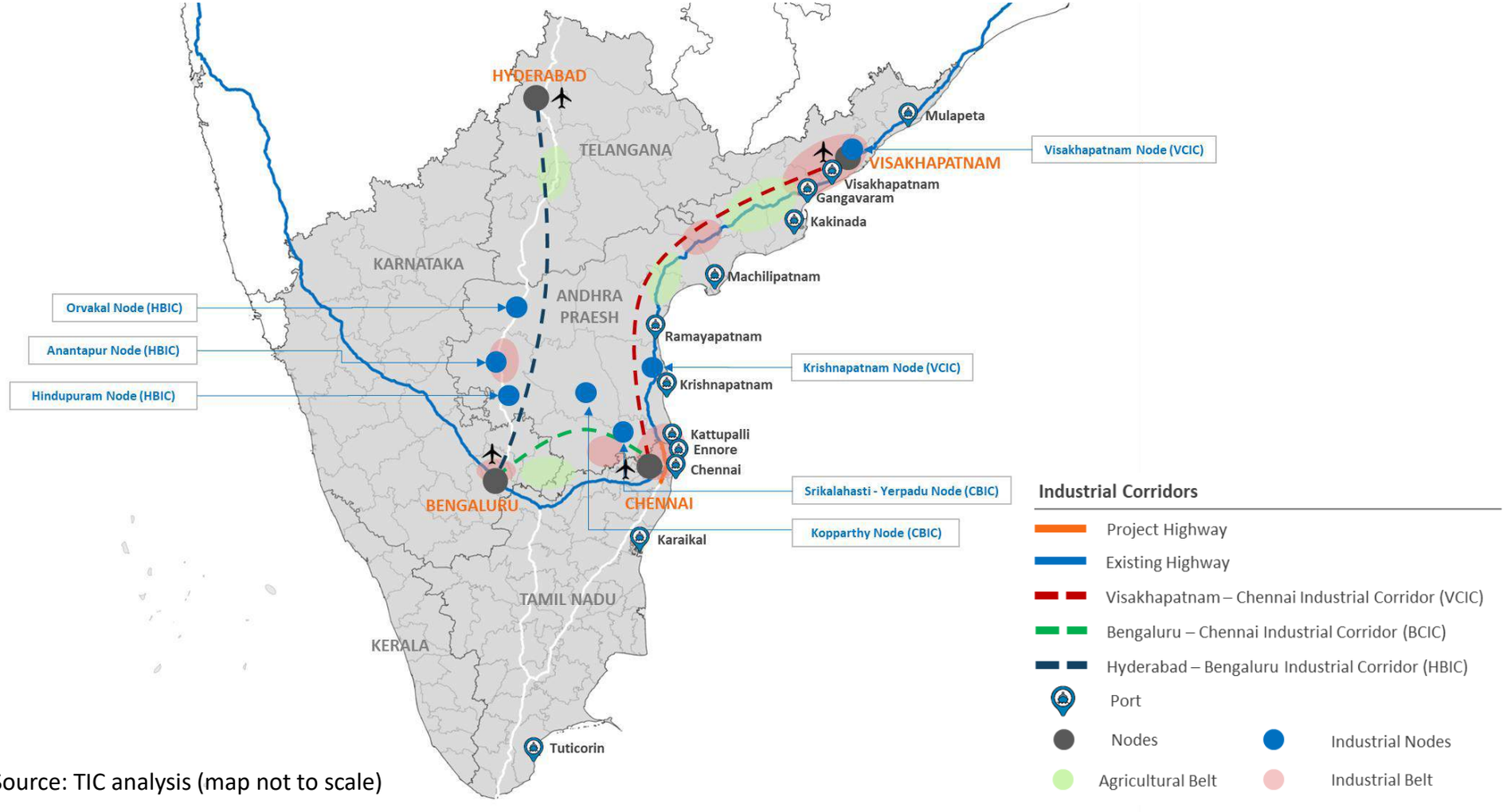
5 Social / Educational

- Towns/villages adjoining to the project highway are dependent on Chennai for their business and social needs. Madhavaram Mofussil Bus Terminus (MMBT) near end point facilitates regular bus services which ureses the project highway.

Source: TIC secondary research

Economic activities in influence region (6)

Industrial corridors under development



Source: TIC analysis (map not to scale)

- **Chennai – Bengaluru Industrial Corridor (CBIC)** and **Vishakhapatnam – Chennai Industrial Corridor (VCIC)** proposes high impact / market driven nodes at **Ponneri in Tamil Nadu (NH16), Krishnapatnam/Nellore in Andhra Pradesh (NH16) and Tumkur in Karnataka (NH48).**
- Industrial hubs and logistics with improved road/rail links, connecting Andhra Pradesh and Chennai through strategic locations like Nelloer/Krishnapatnam - leveraging proximity to Chennai Maritime Cluster for East Asia trade.

Our understanding of traffic corridor and road network (1)

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National corridor (long-distance traffic)

- Forms the southern terminal stretch of NH16 under the Golden Quadrilateral, providing east coast connectivity between Chennai, Andhra Pradesh, Odisha and West Bengal and further towards eastern and north-eastern India.
- Carries substantial long-haul passenger and freight traffic, linking Chennai with major cities such as Nellore, Ongole, Vijayawada, Rajahmundry, Visakhapatnam (Andhra Pradesh), Bhubaneswar, Puri, Balasore (Odisha) and Kharagpur, Kolkata/Dankuni (West Bengal).
- Handles significant port-oriented freight including containers, automobiles, petroleum products, coal and bulk cargo from the Chennai Port Cluster (Chennai, Kamarajar/Ennore and Kattupalli ports).
- The project highway acts as a key link in the Chennai–Kolkata and Chennai–Delhi freight corridors, supporting national-level trade and logistics.

Regional linkages (medium-distance traffic)

- Connects Chennai metropolitan region with Tirupati, Chittoor, Nellore, Kadapa, Anantapur, and Kurnool and other urban and industrial centres of southern Andhra Pradesh.
- Supports medium-distance movement of industrial goods, cement, construction materials, petroleum distribution and power-plant inputs serving the north Chennai–Manali–Ennore industrial belt and Nellore region.
- Facilitates regional access to Tirupati, Nellore and interior Andhra Pradesh through well-developed NH and SH linkages.

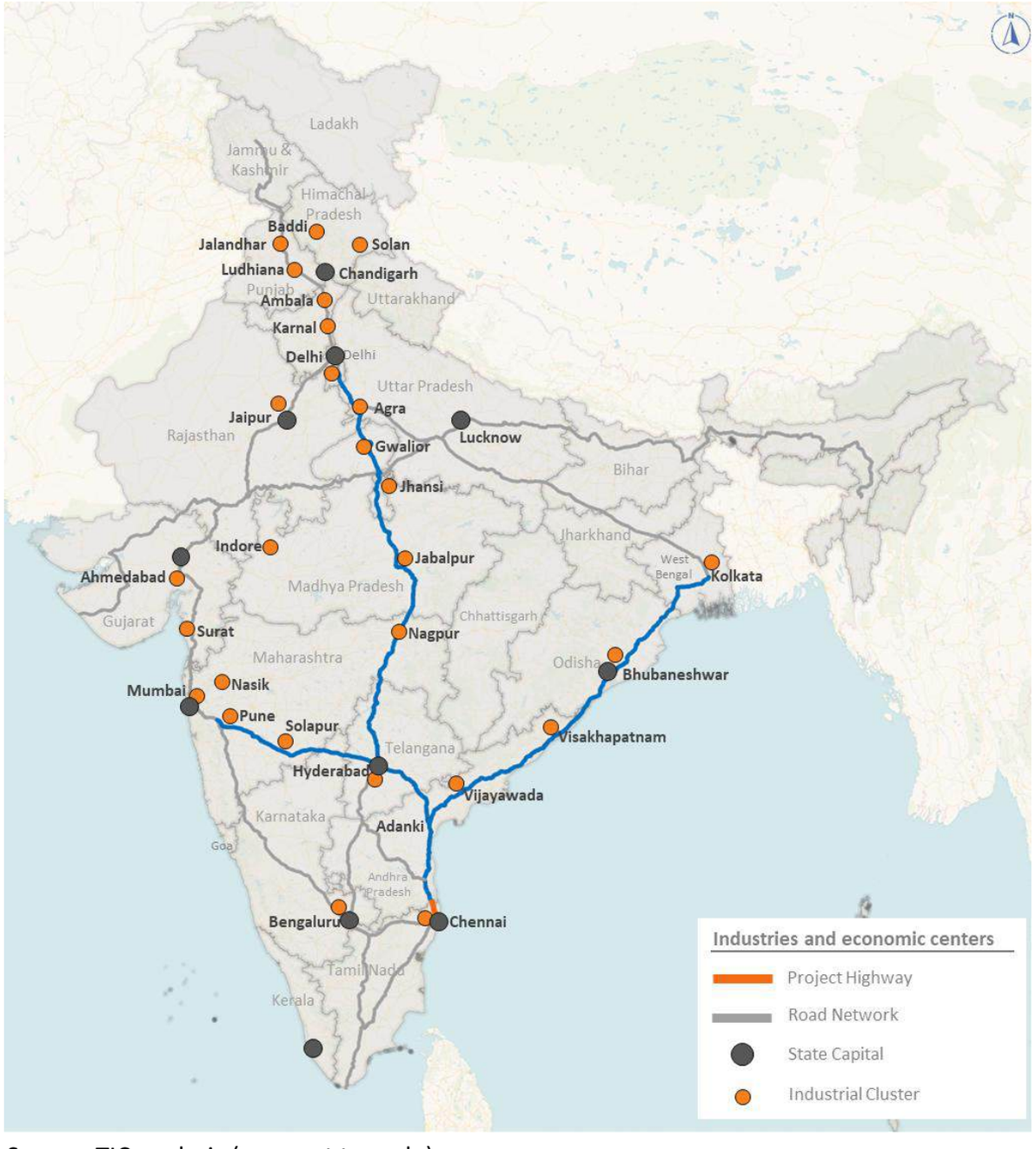
Local connectivity (short-distance traffic)

- Accommodates daily commuter and local commercial traffic between north Chennai suburbs, industrial areas like Gummidipoondi and nearby towns such as Tada and Sullurpeta.
- Supports frequent movement of industrial workforce, port-related services and local logistics vehicles.
- Plays a vital role in transporting perishable goods, construction materials and service traffic, supporting urban expansion and industrial activities along the northern fringe of Chennai.

Refer map on next page for traffic corridors for the project highway and their contribution.

Our understanding of traffic corridor and road network (2)

Traffic corridors and their contribution



Source: TIC analysis (map not to scale)

- **Adanki** acts as merging point for traffic from east-coast locations, northern and western India.
- ~65% traffic is from Tamil Nadu which includes ~50% is being generated from Gummidipoondi industrial and warehousing belt.
- Andhra Pradesh contributes ~20% traffic for the project highway.
- ~4% traffic is observed from Telangana and Kolkata each as regular trade relationship with Chennai.
- Balance ~7% is from northern and western India.
- Western India traffic is divided among three routes i.e., via NH48 Pune-Bengaluru, via NH65/SH3 Pune-Solapur-Hyderabad-Adanki and via NH65/NH716 via Pune-Solapur-Hyderabad-Kurnool-Tirupati. NH48 and NH16 routes have about equal contribution for Chennai bound traffic.

The noteworthy point is that ~85% traffic is of captive nature for the project highway which has sustainable longevity.

Corridor traffic summary (1)

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Kolkata Chennai corridor of NH16 and NH719B (old NH32/NH45)

Highway section	Concessionaire / Operator	Average PCU (approx.)
Dhankuni – Kharagpur	BOT (Toll) – Maple Highways	80,000
Kharagpur – Baleshwar	BOT (Toll) – IL&FS	18,000
Baleshwar – Bhadrak	Toll - Public Funded	32,000
Bhadrak – Chandikhole	Toll - Public Funded	35,000
Chandikhol – Bhubaneshwar	BOT (Toll) – Maple Highways	45,000
Bhubaneshwar – Sunakhala	Toll - Public Funded	25,000
Sunakhala – Puintola	Toll - Public Funded	25,000
Puintola – Icchapuram	TOT (Toll) – Safeway Concession/Macquire	21,000
Icchapuram – Nandigaon	TOT (Toll) – Safeway Concession/Macquire	20,000
Nandigama – Srikakulam	NHIT (Private InvIT Bundle 4)	28,000
Champavati/ Kopperla – Visakhapatnam	NHIT (Private InvIT Bundle 4)	32,000
Anakapall – Anandapuram	NHIT (Private InvIT Bundle 4)	25,000
Anandapuram – Tuni	Toll - Public Funded	44,000
Ankapalli – Tuni	Public Funded	44,000
Tuni – Diwancheruvu	Public Funded	40,000

Highway section	Concessionaire / Operator	Average PCU (approx.)
Gundugolanu – Devarapalli – Kovvuru	NHIT (Private InvIT 4)	33,000
Gundugolanu – Vijayawada	Public Funded – Under Monetization (Pvt InvIT 5)	50,000
Vijayawada – Chilakaluripet	Toll - Public Funded	60,000
Chilkaluripet – Nellore	BOT (Toll) – Interise (CPPIB)	30,000 / 50,000 / 45,000
Nellore – Tada	BOT (Toll) – Vertis (KKR)	52,000 / 33,000
Tada – Chennai	Toll - Public Funded	62,000
Chennai Bypass	Toll - Public Funded	45,000 / 52,000
Tambaram – Tindivanam	Public Funded	77,000 / 55,000
Tindivanam – Ulundurpet	BOT (Toll) – Vertis (KKR)	53,000
Ulundurpet – Padalur	BOT (Toll) – Abertis India	50,000
Padalur – Trichy	BOT (Toll) – Uniquest Infra Ventures	40,000
Trichy – Madurai	Public Funded	24,000
Madurai – Thoothukudi	Public Funded – TOT 19 (Under Bidding)	25,000

Source: TIC analysis

Corridor traffic summary (2)

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Traffic composition on the corridor: 7 months ADT of FY26 till October 2025

Source: TIC analysis (map not to scale)

Site photographs

Nallur Toll Plaza (km 21.625)

Modern Integrated Check Post

Cross section

Start Point

End Point

Industrial Belt

Source: TIC site visit

Proposed infrastructure development in the region (1)

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Network and infrastructure development in the influence region (refer map on Pg 33)

Particulars of the development	Authority / Mode of Development / Developer	Description / status / expected completion	Possible impact
Chennai Peripheral Ring Road (CPRR) (6 lane + PS with Service Road)	Tamil Nadu Road Development Corporation / EPC 5 Sections with multiple packages and developers	**Section 1:** Northern port access road (Ennore Port to Thatchur on NH16 (25.40 Km) Under construction; expected completion in FY28 **Section 2:** Thatchur on NH16 to start of Thiruvallur Bypass (26.10 Km) **Section 3:** Start of Thiruvallur Bypass to Sriperumbudur on NH48 (30.10 Km) Only Package 3: Start of Thiruvallur Bypass to Vengathur (10.40 Km) Under construction **Section 4:** Sriperumbudur NH48 to Singaperumalkoli on NH38/NH719B (23.80 Km) **Section 5:** Singaperumalkoli on NH38/NH719B to Mamallapuram (28.24 Km) Under bidding process	**Nil** CPRR Section 1 will provide last mile connectivity to Chennai Port Cluster. Nallur toll plaza will be shifted at Durainallur (outside boundary of CPRR)
Bengaluru Chennai Expressway (4 lane)	NHAI / HAM Multiple phases/packages and developers	**Phase 1 of NE7 (Karnataka):** operational **Phase 2 of NE7 (Andhra Pradesh):** Total 3 packages; under construction and expected to be operational by mid FY28 **Phase 3 of NE7 (Tamil Nadu):** Total 3 packages; under construction and expected to be operational by mid FY28 **Chittoor Thatchur section of NH716B:** Total 4 packages; under construction and expected to be operational by end of FY28	
Chittoor Thatchoor section NH716B (6 lane)	NHAI / HAM Multiple packages and developers	Total 4 packages; under construction and expected to be operational by end of FY28	

Source: TIC research and analysis

Proposed infrastructure development in the region (2)

Network and infrastructure development in the influence region (refer map on Pg 33)

Particulars of the development	Authority / Mode of Development / Developer	Status / expected completion	Possible impact
Chennai Port Maduravoyal elevated corridor (Double tier 4-lane elevated corridor)	NHAI / 4 EPC Packages J. Kumar Infra Projects Limited in JV with Azvirt LLC	Under construction Expected completion in FY29 ▪ NHAI is developing elevated corridor exclusively for Chennai Port (Maduravoyal to Chennai Port Gate No. 10) strengthen external evacuation infrastructure. ▪ Double tier 4-lane elevated corridor along the Coum River as part of NH48 and will land inside premise of Chennai Port. ▪ Further, Chennai Port is implementing strengthening program of internal roads for ease on movement between Gate No. 1 to 10 followed by internal elevated corridor as long-term solution to ease out internal congestion. ▪ This development will provide ease to port-bound traffic, improve freight access, and reduce congestion.	**Nil** Traffic needs to cross the plaza to use the proposed direct connectivity to Chennai Port.
Surat Nashik Chennai Expressway	NHAI / HAM Multiple packages and developers	▪ Key greenfield sections includes: – Surat – Nashik – Ahmednagar stretch in Gujarat and Maharashtra – Ahmednagar – Solapur – Akkalkot – MH/KA Border section – MH/KA Border – Mahabubnagar section – The remaining sections will involve upgrading existing two-lane roads into four-lane. ▪ Recently, MoRTH cancelled Surat – Nashik section of proposed development due to persistent challenges in securing environmental clearances. To address the intended connectivity objective, Maharashtra State Road Development Corporation (MSRDC) will develop greenfield expressway connecting Bharvir Khurd on Smruddhi Marg to Tawa village on NH48. ▪ Reference discussion with the client (field offices across corridor), the entire corridor is expected to be developed by FY31.	**Negative** Traffic movement between Solapur/west and Chennai/south Traffic movement between Hyderabad/north and Chennai/south

Source: TIC research and analysis

Proposed infrastructure development in the region (3)

TRANSLINK® Infrastructure Consultants Pvt Ltd *Smart Consulting*

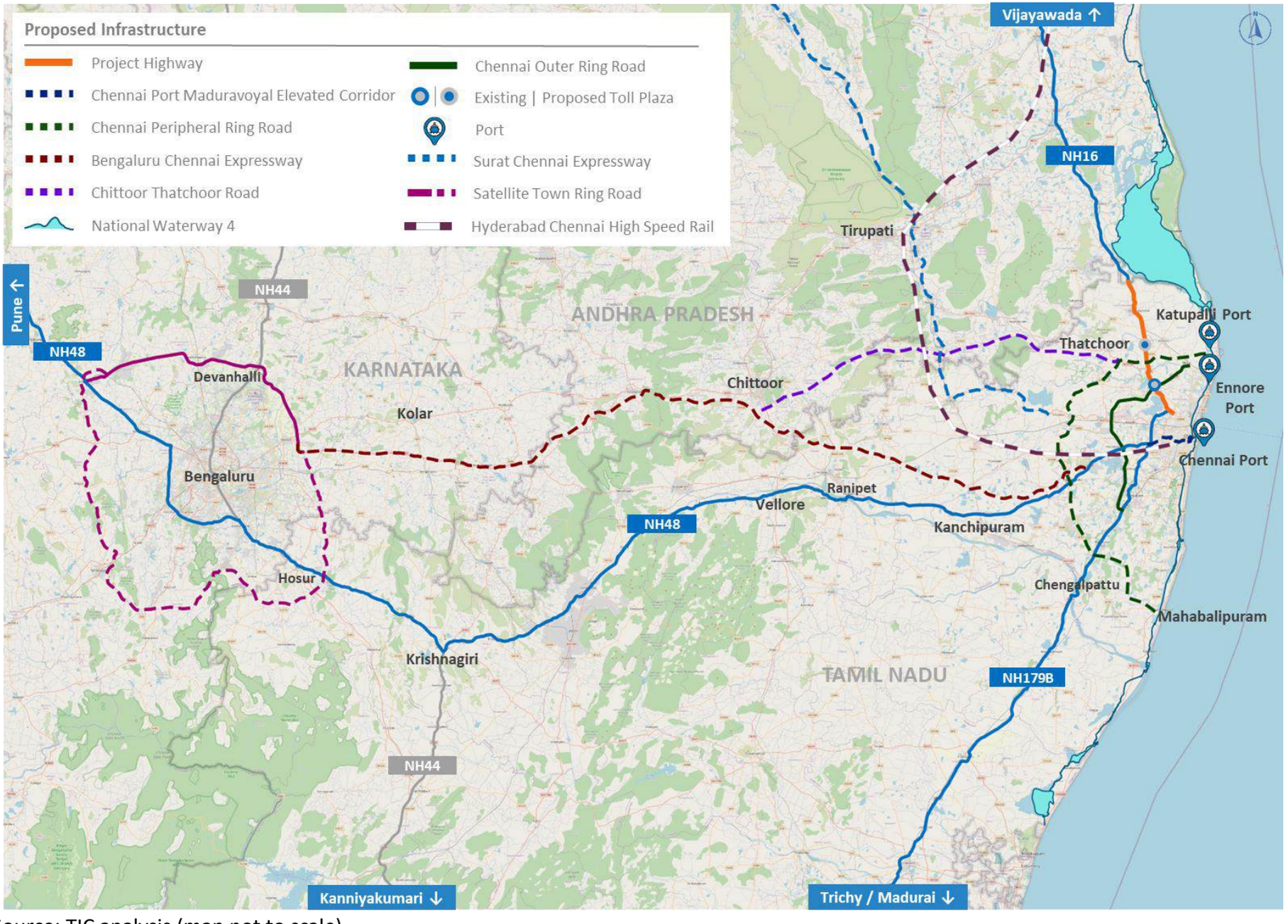
Network and infrastructure development in the influence region (refer map on Pg 33)

Particulars of the development	Authority / Mode of Development / Developer	Status / expected completion	Possible impact
Chennai Hyderabad high-speed rail	National High Speed Rail Corporation Limited in support with concerned state governments	South Central Railway submitted final alignment to be included in the detailed project report (DPR) to State Government of Tamil Nadu and requested approvals in November 2025 to keep the survey work on track. Expected to be operational in FY38	**Negative** Traffic movement from/ to Hyderabad, Vijayawada and Chennai
Bengaluru Vijayawada Expressway	NHAI / HAM Multiple packages and developers	**Brownfield section:** NH44 Bengaluru to Kodikonda (73 km) & NH16 Addanki to Vijayawada (113 km) **Greenfield section:** Kodikonda to Addanki (343 km) Likely expected to be completion in FY28	**Nil** Traffic diverted long-back to Bengaluru – Kolar – Chittor – Tirupati – Naidupeta (on NH16) route
National Waterway 4 (NW4)	Inland Waterway Authority of India (IWAI)	Kakinada to Puducherry through canal which is integrated with Bhadrachalam Rajahmundry section of Godavari River and Wazira Vijayawada section of Krishna River Additional reaches: Godavari River: Bhadrachalam to Nashik Krishna River: Wazirabad to Galagali Canal system to be strengthened in next 5 – 6 years to extend the reach up to Tamil Nadu	**Negative** Port connectivity parallel to NH16 and intermediate locations
Ramayapatnam Port	Andhra Pradesh Maritime Board through Ramayapatnam Port Development Corporation Limited	About 65% work of Phase-1 completed as of June 2025 including 4 km of dredging. Expected to be operational by end of FY27. Target traffic: exports of agricultural goods, granite and seafood and imports of coal and fertilizers.	**Minor negative** The same has been considered for forecast of Chennai Port Cluster as growth driver for freight traffic.

Source: TIC research and analysis

Proposed infrastructure development in the region (4)

Network and infrastructure development in the influence region



Source: TIC analysis (map not to scale)

Chapter 3: Traffic analysis

- Historical data sources
- Historical traffic and revenue trends
- Seasonality variation
- Historical ticket distribution
- Commodity analysis
- Zonal influence and trip distance

This chapter covers various datasets received from NHAI followed by assessment of historical performance of the project highway. This analysis helps to understand baseline traffic patterns comprising traffic and revenue growth rates, seasonality variations, trip factors, ticket distribution and overloading characteristics.

Survey analysis helps to validate traffic volume, commodity movement pattern, network understanding received from site visit, inputs for ticket distribution, overloading pattern based on independent survey exercise.

Historical datasets

- The project highway is currently being operated under the public-funded mode where toll is collected by third party tolling agencies through short-term contracts. Third party tolling agencies submit traffic and revenue report on monthly basis which is titled as Schedule V.
- The consultant observes that availability and accuracy of these reports are many times under question due to inadequate quality of technology interventions and record keeping during short term contracts by tolling agencies.
- Hence, availability followed by reliability of these datasets is essential to be addressed for historical analysis as well as further processing for base year and future traffic forecasts.
- ETC data is independently system generated and hence more reliable. The client sourced vehicle category-wise traffic data which doesn't include toll ticket distribution.
- Monthly reports submitted by contractors / tolling agencies to NHAI field offices (Schedule M/G/V) which is start point to validate the toll ticket distributing including cash components, violation/exemptions, overloading fee etc.

Summary of the historical traffic and revenue data available for Nallur Toll Plaza

Data sources	Duration of data	Observations
Schedule M/V - Part A & B (monthly)	FY10 : All months except Apr'09 FY11, FY12 : Full Year FY13 : All months except Nov'12 FY14 to FY19 : Full year FY20 : All months except Nov'12 except Oct'19 to Dec'19 FY21 : except Jun'20 to Aug'20 and Oct'20 to Jan'21 FY22 to FY25 : Full year FY26 : Apr-Oct'25 (7 months)	**Part A:** Vehicle category-wise total user fee collection **Part B:** Vehicle category and ticket distribution-wise traffic data No split between 3A and MAV for FY10 to FY20 Ticket distribution data: Yes Exemption/violation/ cash traffic data: Yes; for FY24
ETC Data (monthly)	FY23 to FY25 : Full year FY26 : Apr-Oct'25 (7 months)	Vehicle category-wise ETC transactions covering total traffic and user fee collection Ticket Distribution Details: No
Overloading Reports (weekly)	No overloading penalty / fee is being levied at present based on understanding from site visit and discussion with PIU Chennai 1	
Neighbouring highways	Historical traffic data to determine corridor growth trend	

Source: TIC compilation of data received from NHAI

ETC data was reviewed for historical analysis as it is reliable. Schedule M/V dataset observed intermittent anomalies but useful at broad level for analysing long-term growth trend.

Historical traffic analysis (1)

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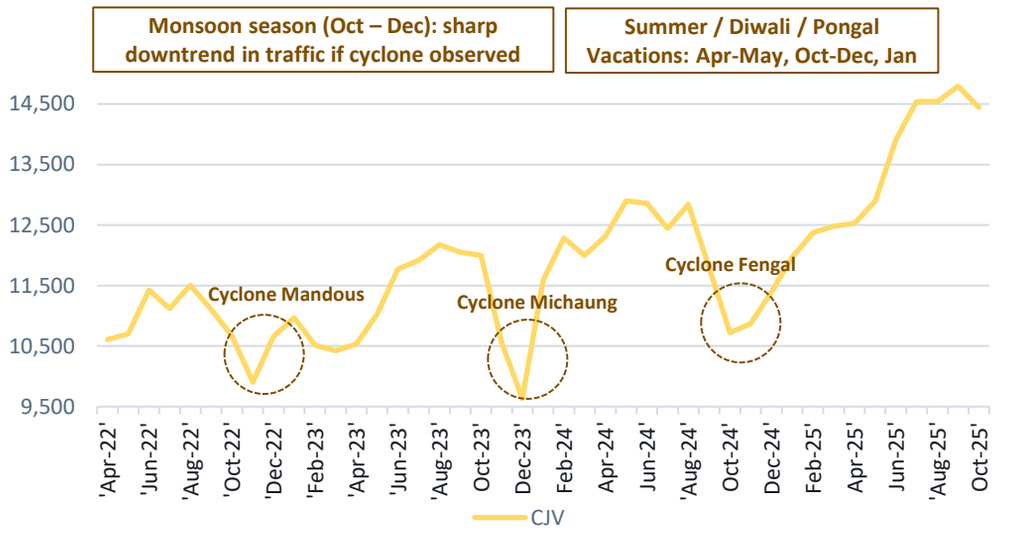
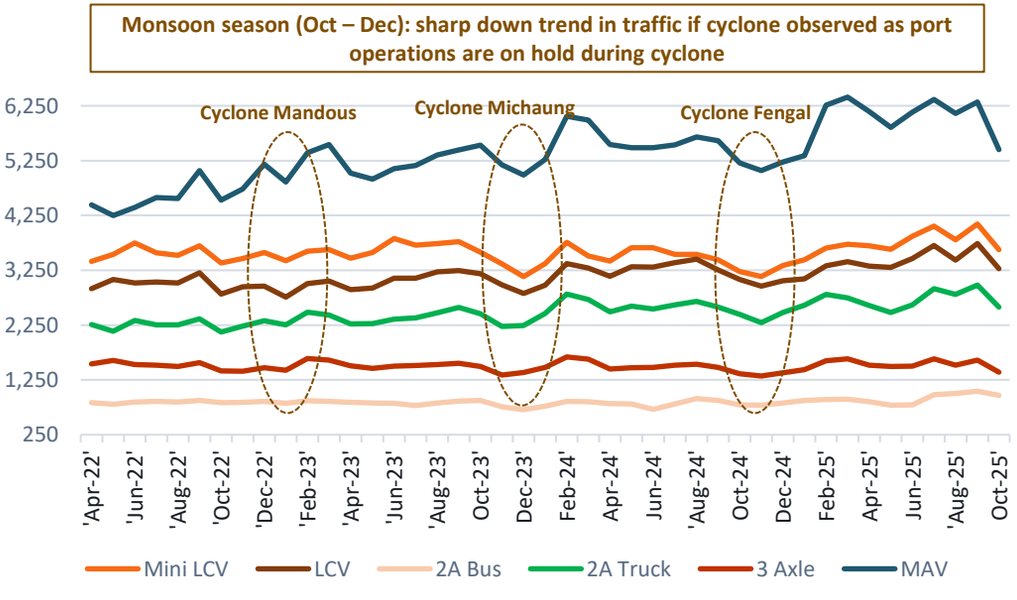
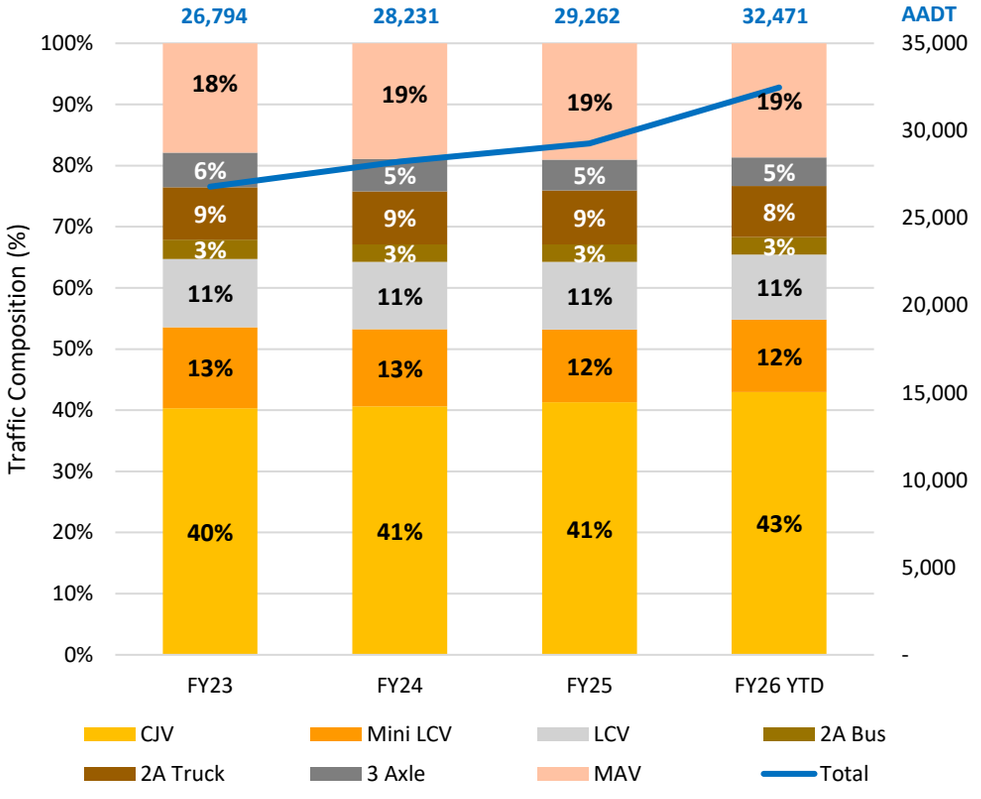
Vehicle category-wise monthly traffic trend - ETC





Source: TIC analysis

Vehicle category-wise yearly traffic composition - ETC



- Traffic has trended in the range of 30,000 – 32,000 AADT (65,000 PCUs) in recent past with CJVs (~40%) and MAV (~20%) as major contributors.
- High volume of CJVs is observed due to proximity to Chennai and regular business traffic between Gummidipoondi and Chennai. This higher volume will be decreased by ~45% on shifting of toll plaza to Durainallur.
- Approx. 45%+ of freight traffic is observed which is mainly contributed by port led development and industrial/logistics belt around Gummidipoondi.

Historical traffic analysis (2)

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Vehicle category-wise traffic growth trend - ETC

Vehicle Category	CJV	Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	Total	PCU
Annual Average Daily Traffic (AADT)									
FY23	10,803	3,546	2,984	846	2,287	1,518	4,810	**26,794**	**54,424**
FY24	11,461	3,566	3,094	816	2,437	1,504	5,352	**28,231**	**58,025**
FY25	12,079	3,481	3,233	835	2,574	1,471	5,589	**29,262**	**60,201**
FY26 till Oct'25	13,953	3,826	3,464	919	2,713	1,526	6,070	**32,471**	**65,764**
Growth trends									
FY24 vs FY23	6.1%	0.6%	3.7%	(3.5%)	6.6%	(0.9%)	11.3%	**5.4%**	**6.6%**
FY25 vs FY24	5.4%	(2.4%)	4.5%	2.3%	5.6%	(2.2%)	4.4%	**3.7%**	**3.7%**
FY26* vs FY25	13.7%	9.4%	5.7%	12.2%	5.7%	3.7%	9.8%	**10.4%**	**9.4%**
CAGR (FY23 – FY26 YTD)	10.8%	3.1%	6.1%	3.4%	7.1%	0.2%	9.8%	**8.0%**	**7.9%**

Source: TIC analysis * against FY25 for 7 months i.e., April-October

Corridor growth trends (project highway and neighbouring sections)

CAGR	CJV	Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	Total	PCU
Chennai Tada section of NH16 (Nallur TP)									
Long-term	~9% (CJV+Mini LCV)		~6%	~7% (Bus+2A Truck)		~9 %– 10% (3A+MAV)		**~14%**	**~12%**
Neighbouring highwyas									
Short-term	8.6%	11.4%	8.6%	2.5%	7.9%	(0.4%)	6.8%	**7.0%**	**6.3%**
Medium-term (Pre-Covid)	~6% (CJV+Mini LCV)		~5.5%	~10%	Overall goods ~5.5 – 6.0% **			**~5%**	**~4%**
Long-term	~7.5% (CJV+Mini LCV)		(~1%)	~5%	Overall goods ~3.5% **			**~4.5%**	**~5.5%**

Source: TIC analysis ** data is available in form of articulated and non-articulated freight traffic and hence lower growth is observed due to inter-category transfer over the period

Historical traffic analysis (3)

- Container cargo and petroleum products are major items observed at the project highway as regular movement between hinterland and maritime cluster which is highly volatile in monthly trend. Traffic gets affected as and when port operations are temporarily shutdown due to cyclone. Decrease in port traffic is visible on weekend compared to weekdays.
- Gradual container cargo traffic from Krishnapatnam port was observed shifting to Chennai port cluster during 2021 to 2023 because of closure of container operations at Krishnapatnam port.
- Cyclone has affected the traffic in past due to lower social/business movement as well as temporary shutdown of port operations.
  - **FY2025:** Cyclone Fengel in November-December 2024
  - **FY2024:** Cyclone Michaung in December 2023
  - **FY2023:** Cyclone Mandous in December 2022
  - **FY2021:** Cyclone Nivar in November 2020
  - **FY2019:** Cyclone Gaza in November 2018
  - **FY2017:** Cyclone Vardah in December 2016
  - **FY2016:** Tamil Nadu recorded an exceptionally heavy rainfall during November - December 2015 due to the north-east Monsoons. This unprecedented rainfall took place in four spells, and which has badly affected traffic across Tamil Nadu mainly Chennai and adjoining districts.
- Key characteristics for CJVs traffic are as follows in addition to discussed in last couple of pages:
  - Traffic observed on higher during festivity / school vacations / marriage seasons i.e., April-May, Jan-Feb, Oct-Nov.
  - Toll plaza observed forced exemption in CJV/Mini LCV categories during heavy congestion at toll plaza. Traffic police requests toll operating agency to open boom barrier for faster evacuation of traffic. This challenge will be eliminated on shifting of toll plaza to new location of Durainallur and hence improvement in forced exemption/violation is expected.
- Vegetable/Fruits traffic of Mini LCV / LCV / 2A from Andhra Pradesh is of captive nature in context of Koyambedu Wholesale Market.
- Across Tamil Nadu, all vehicle categories observes higher traffic during months of January and May due to Pongal and Jalikattu Festivity / vacations / marriage season (after 14th January) which leads to higher social travel of passenger vehicles. This also contributes to increase in consumption at urban centers.
- May observes higher real estate and construction material movement as pre-monsoon completion of work.

Historical revenue analysis

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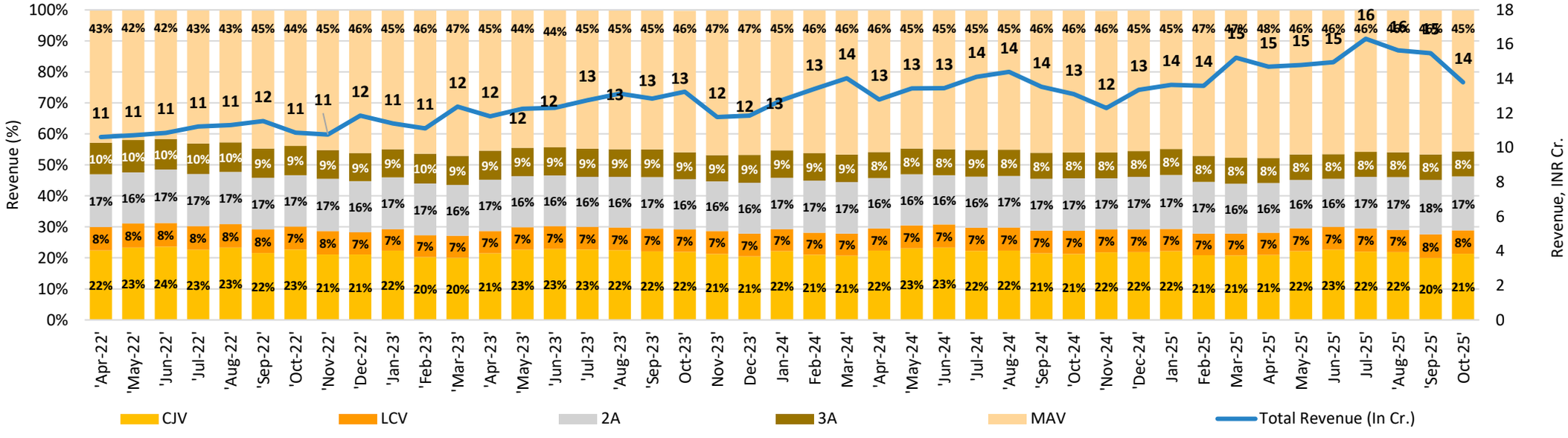
Vehicle category-wise monthly revenue composition and trend - ETC



Vehicle Category	CJV	Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	Total	AADC
Annual Revenue (in INR Crore) and Annual Average Daily Collection (in INR Lakh)									
FY23	22.6	7.0	10.0	5.5	17.0	12.9	59.6	**134.7**	**36.90**
FY24	25.6	7.6	11.0	5.7	19.3	13.6	69.4	**152.2**	**41.58**
FY25	28.0	7.8	11.9	6.0	21.0	13.7	74.6	**162.9**	**44.64**
FY26 till Oct'25	17.7	5.1	7.8	4.0	13.5	8.6	49.1	**105.7**	**49.40**
Growth trends									
FY24 vs FY23	13.1%	8.9%	10.8%	4.7%	13.0%	5.2%	16.3%	**13.0%**	**12.7%**
FY25 vs FY24	9.2%	2.6%	7.6%	5.1%	9.0%	0.7%	7.5%	**7.1%**	**7.4%**
FY26* vs FY25	7.1%	10.8%	11.3%	16.3%	10.5%	7.4%	13.9%	**11.5%**	**11.5%**

Source: TIC analysis

* against FY25 for 7 months i.e., April-October

Ticket distribution (1)

Schedule V (Part B) is a monthly statement presenting vehicle category and ticket distribution-wise traffic data including exemption, local concession / other discounted details.
Toll ticket distribution refers to share of total revenue with respect to various journey types and related discounts applicable. This distribution depends on vehicle category, trip lengths, trip frequency and percentage of local traffic.
As per Toll Plaza Gazette Notification and Toll Rate Revision Circular of FY26 for Kulgo TP, types of toll tickets are being issued are presented in the below table.

Ticket Category	Description
Single Ticket	One-way journey on the project highway is considered as single journey. For such journeys, users are required to pay the complete notified one-way fee.
Return Ticket	Two one-way journeys on the Project highway within 24 hours are covered under this category. For such journeys, users are required to pay one and half times of the fee payable for one-way journey.
Monthly Pass	Fifty one-way journeys on the Project highway within a month covered under this category. The concessionaire shall, upon request from any person, issue a monthly pass for fifty one-way journeys at a discounted rate equivalent to two-thirds of fifty one-way journeys.
Local Pass (Local Personal)	Road user who owns a mechanical vehicle registered for non-commercial purposes and resides within a distance of 20 km from the toll plaza can get local monthly pass.
Commercial vehicle registered within district of plaza (Local Commercial)	Commercial vehicles (excluding vehicles plying under national permit) registered in the district where the toll plaza is located. Fee shall be 50% prescribed rate for that category of vehicle provided no service road or alternative road is available for use of such commercial vehicles.
Exempted	This journey ticket category is for all users (like Police, Fire Brigade, Ambulance, Defence, etc.) which are exempted from paying toll as per NHAI Toll rules.
Annual Pass for private non-commercial CJV vehicles	On June 18, 2025, MoRTH introduced a FASTag-based annual pass to facilitate seamless highway travel. This pass is valid for non-commercial private vehicles such as cars, jeeps, and vans, and remains effective for one year from the date of activation or up to 200 trips—whichever comes first for INR 3,000. Trip counting method is as follows: Open Tolling: Each entry / exit counts as one trip Closed Tolling: One entry to exit trip counts as one

Source: DCA, NH Fee Rules 2008 and subsequent amendments and existing gazette notifications

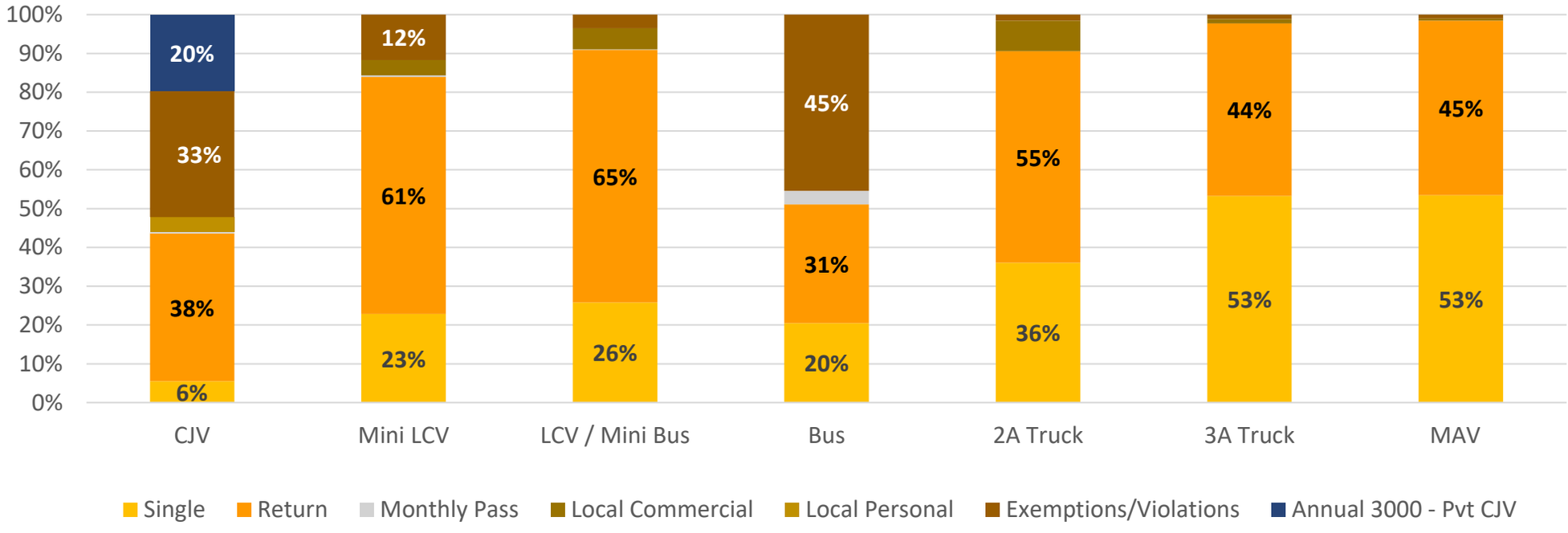
Ticket distribution (2)

Currently it is envisaged that annual passes will be issued directly by concerned authority and hence revenue from sale of annual passes will not accrue to the concessionaire. NHAI has issued advisory for reimbursement of loss of revenue due to annual pass usage to the concessionaire which is part of Draft Concession Agreement as Clause 27.1.5 and described below:

- The concessionaire acknowledges and agrees that any user owning a non-commercial vehicle and holding a valid and functional Fastag Pass in accordance with MoRTH Gazette Notification No. G.S.R. 388(E) dated 17th June 2025shall be entitled to use the project highway without any restrictions, except to the extent specified in any applicable law, applicable permit or the provisions of the draft concession agreement.
- In respect of such vehicle crossing the toll plaza(s), the concessionaire shall be entitled to receive compensation from the authority equivalent to the product of:
  - The number of non-commercial vehicles crossing the toll plaza(s) with such pass; and
  - 90% of the applicable fee for single journey of such vehicle.
- Provided, however, that for the purpose of computation of such compensation, the counting of any particular vehicle shall be limited 2 crossing per day, notwithstanding that such vehicle may cross the toll plaza(s) multiple times on that day.
- The compensation payable under this clause shall be due and payable in monthly instalments within 7 days of the close of the month.

Ticket distribution (3)

Nallur TP



Source: TIC analysis

- Ticketing patterns for CJVs, Mini LCVs and LCVs reflect urban characteristics of traffic due to proximity to Chennai, with the return ticket forming a higher share than single journey tickets indicating frequent short-distance trips.
- Annual Pass of INR 3,000 adoption among CJVs is around 20% as on 31st October 2025 and this proportion is expected to increase with awareness.
- Bus category experiences a notable quantum of exemptions/violations (45%) due to TNSTC government buses in Tamil Nadu, opting for monthly pass which is valid for 50 trips yet exceeding this limit as per benchmark cases. While approximately 31% of private/semi-private bus traffic uses return tickets, reflecting inter-district and inter-state movement.
- Goods vehicles (2A, 3A and MAV) show broadly similar ticketing pattern, with about 45% return tickets indicating substantial intra-state short/medium distance freight movement between Chennai port cluster and Gummidipoondi industrial belt.

Commodity analysis (1)

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Direction-wise Commodity Distribution

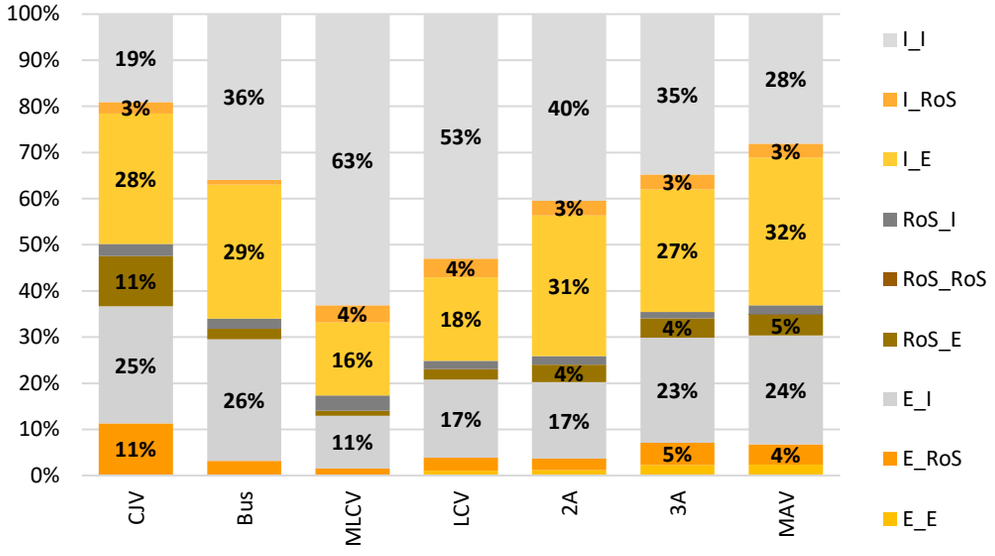
Commodity	MLCV		LCV		2A		3A		MAV	
	Chennai to Tada	Tada to Chennai	Chennai to Tada	Tada to Chennai	Chennai to Tada	Tada to Chennai	Chennai to Tada	Tada to Chennai	Chennai to Tada	Tada to Chennai
Agriculture / Animal Husbandry	0%	1%	1%	1%	1%	3%	1%	4%	2%	6%
Fruits and Vegetables	6%	1%	1%	4%	3%	3%	3%	3%	3%	5%
FMCG / Food Products	7%	11%	3%	6%	4%	4%	3%	5%	4%	4%
Building & Construction Material	0%	1%	2%	4%	2%	5%	2%	7%	4%	11%
Minerals & Minig Commodities	--	--	0%	0%	--	--	0%	0%	0%	0%
Coal	--	--	1%	--	1%	1%	1%	0%	4%	1%
Manufacturing	9%	13%	10%	9%	10%	7%	13%	7%	11%	8%
Automobile and Spares	1%	0%	1%	1%	4%	2%	3%	1%	5%	4%
Chemicals / Fertilisers	0%	1%	1%	2%	1%	1%	2%	1%	2%	2%
Steel / Metal Products	6%	6%	5%	6%	7%	9%	9%	8%	10%	12%
Petroleum Products	5%	3%	6%	5%	9%	8%	9%	10%	9%	9%
Parcel / E-commerce	10%	10%	16%	13%	11%	13%	15%	9%	6%	6%
Miscellaneous	0%	--	3%	2%	2%	3%	5%	1%	3%	3%
Empty	54%	53%	49%	46%	46%	41%	34%	43%	36%	30%

Source: TIC analysis *0% indicates value less than 1% and -- represents no presence of such commodity for the vehicle category

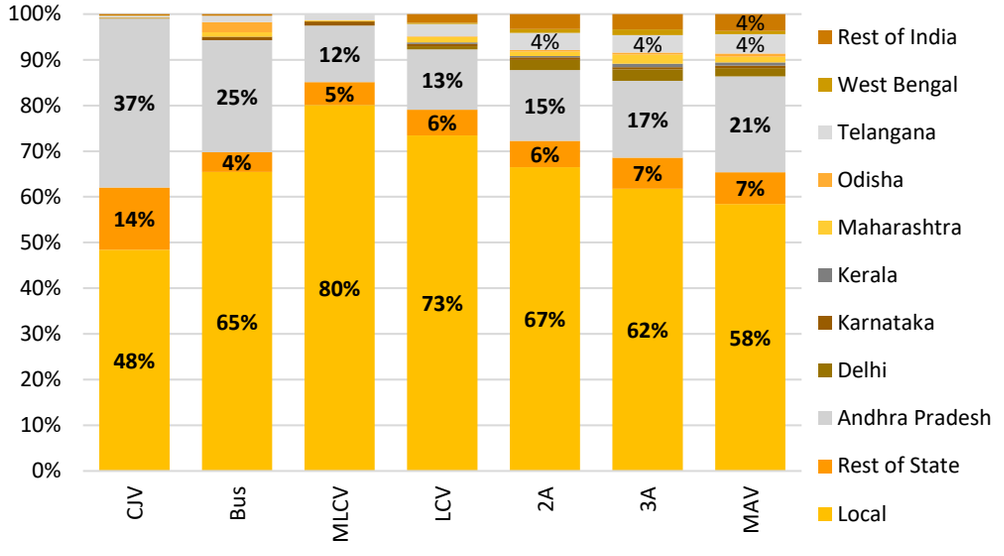
Commodity distribution exhibits characteristics that are in line with corridor and economic activities observed in the influence region.

Zonal influences and trip distances

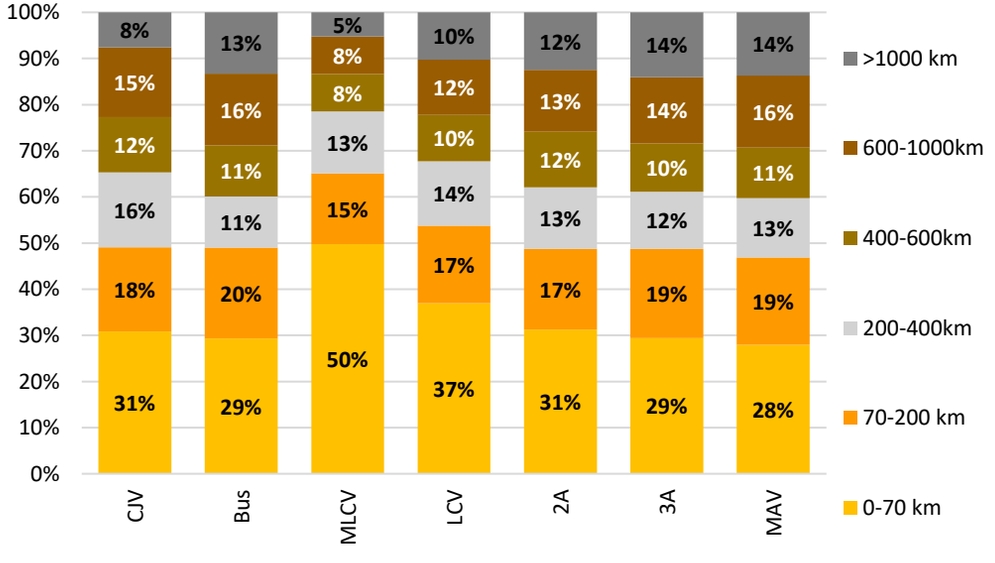
Vehicle category-wise zone characteristics



Vehicle category-wise project influence region



Vehicle category-wise trip lengths and average distances



Vehicle Category	Distances (in km)
CJV	362
Bus	416
Mini LCV	269
LCV	403
2A	461
3A	475
MAV	491

Vehicle category-wise visual representation of origin-destination zones and top pairs are provided in Appendix A.

Source: TIC analysis

Chapter 4: Economic context and traffic growth

- Economic context of influence region
- Determination of traffic growth drivers
- Estimation of demand elasticities
- Forecasts for growth drivers

IRC-108:2015 mentions that traffic growth is typically driven by a combination of macro-economic trends and industry/commodity specific factors, known as independent variables or traffic growth drivers.

These growth drivers have two critical characteristics:

1) the rate at which it increases i.e., forecasts of independent variable
2) the project highway's relationship with the growth driver to attract, capture and retain the traffic over the forecast horizon i.e., travel demand elasticity

Growth drivers are typically identified through analysis of origin–destination data, site visits and a detailed understanding of the highway.

Travel demand elasticity is influenced by socio-economic conditions both within the region served by the project highway and across the wider national area of influence.

This chapter explains the growth drivers and elasticity in context of economic snapshot of primary districts / state and their correlation with the country.

Beating the national curve: Tamil Nadu's growth story in numbers

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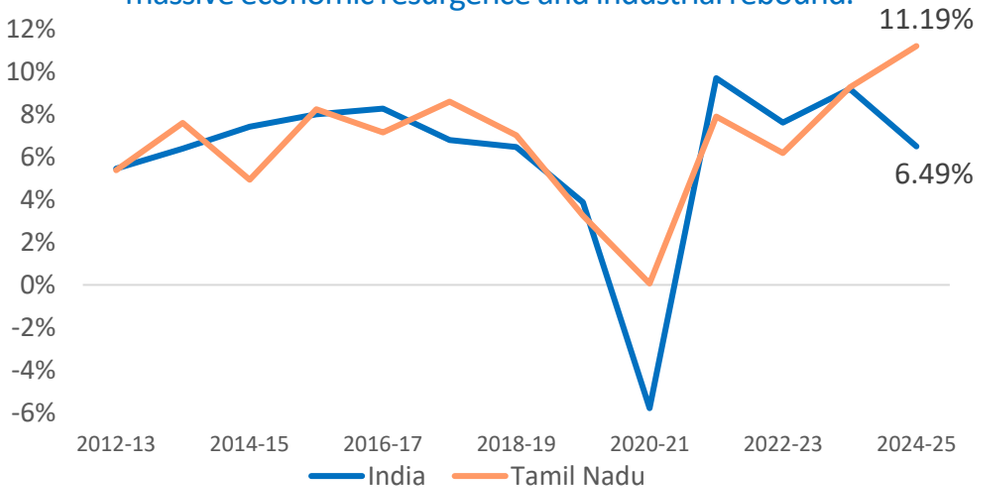
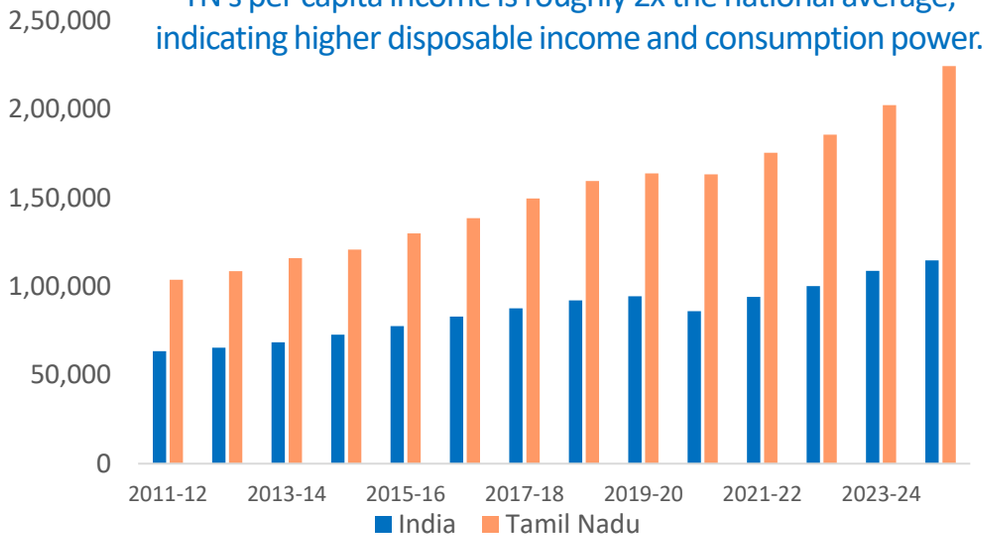
Real GDP growth rate: India vs Tamil Nadu

TN is2x faster than the national average in FY25, signaling a massive economic resurgence and industrial rebound.

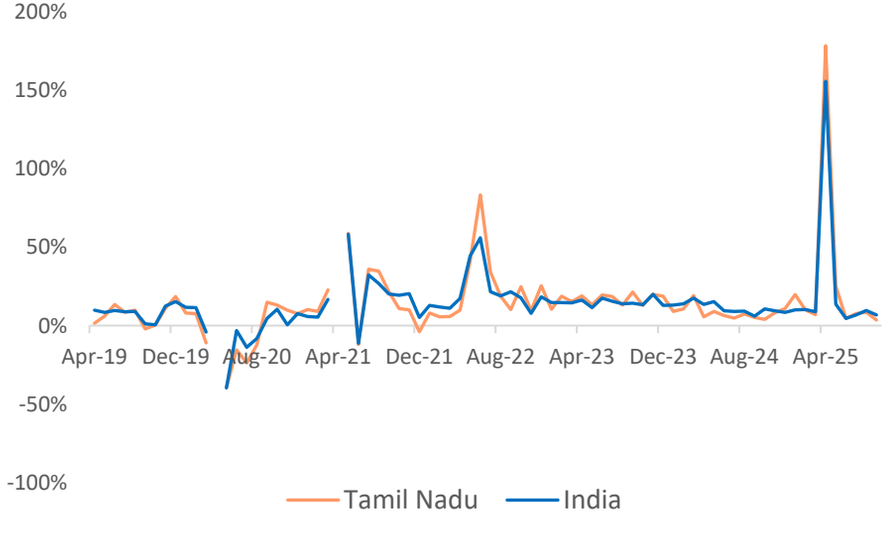


Per Capita Income (in INR): India vs Tamil Nadu

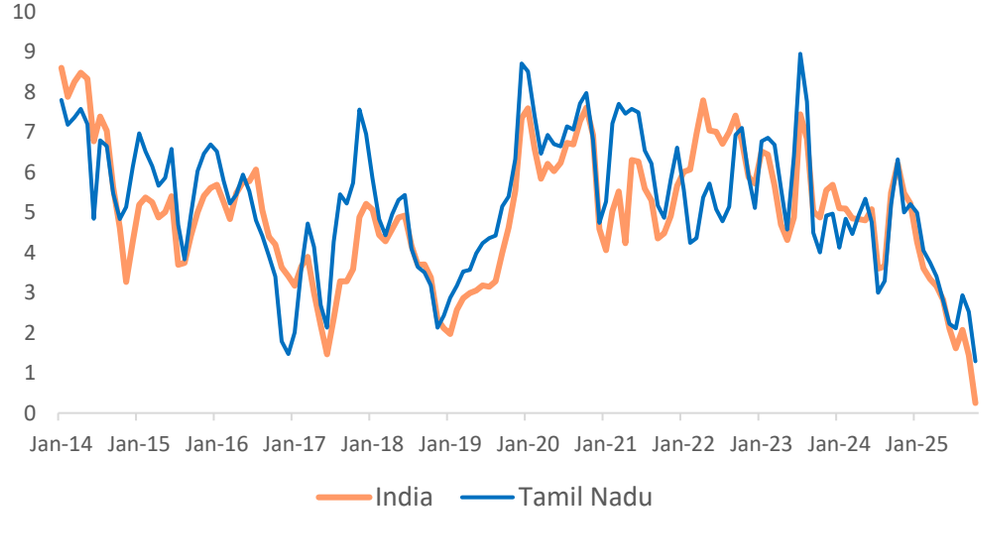
TN's per capita income is roughly 2x the national average, indicating higher disposable income and consumption power.



GST growth rate: India vs Tamil Nadu



Consumer Price Indiex: India vs. Tamil Nadu



Source: MoSPI, GST Council, TIC analysis

GST and CPI show that TN tracks all-India pattern very closely, confirming that state is tightly integrated with the national business cycle.

Sectoral contribution to Tamil Nadu's economic output

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Tamil Nadu's GVA split

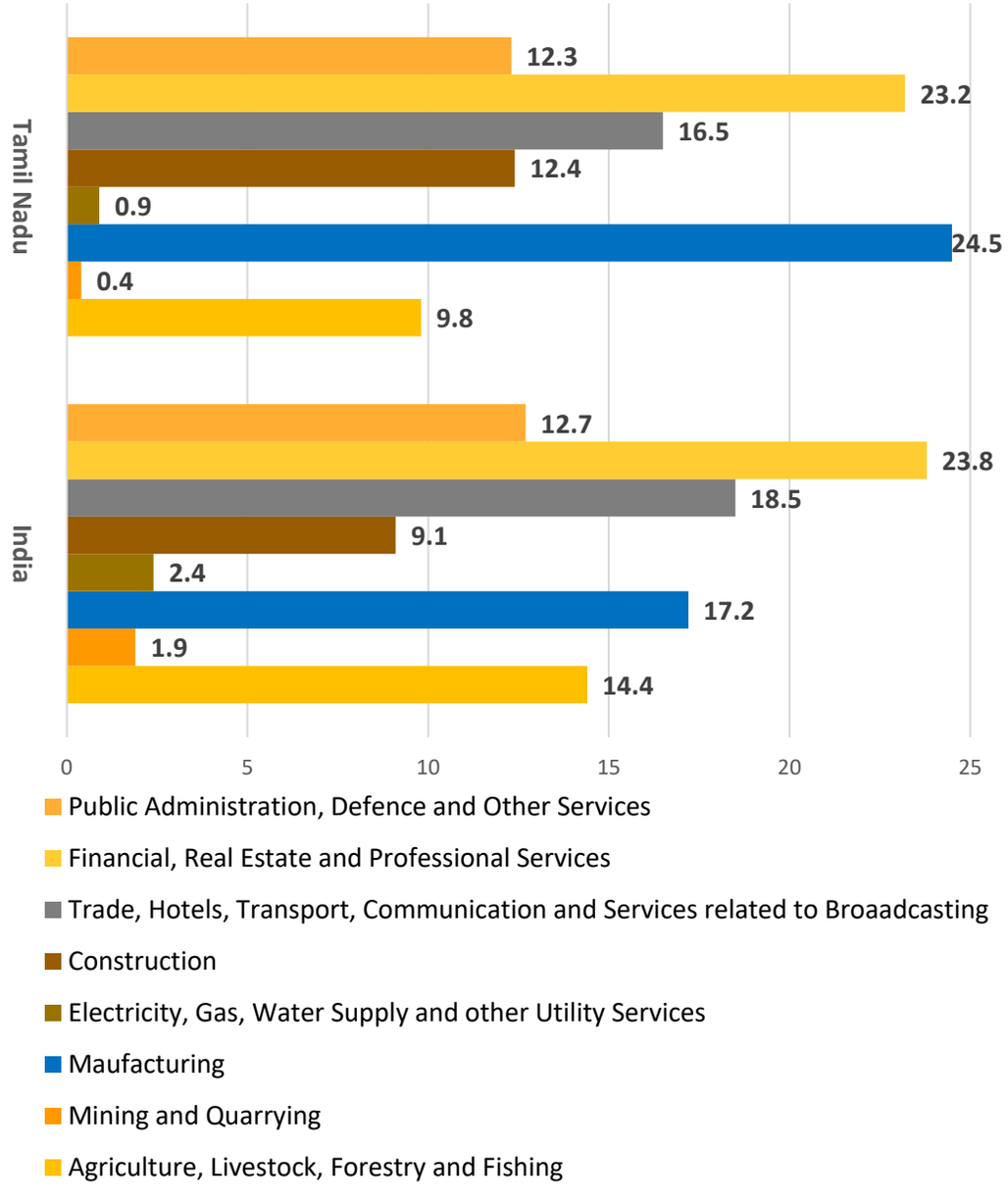
	2017-18	2024-25	CAGR	Share of GVA(2024-25)
Agriculture, forestry and fishing	111,270.61	151,804	4.5	9.8
Mining and quarrying	4,859.62	6,914	5.2	0.4
Manufacturing	248,985	376,911	6.1	24.5
Electricity, gas, water supply & other utility services	9,514.42	14,622	6.3	0.9
Construction	117,806	190,591	7.1	12.4
Trade, repair, hotels and restaurants	118,017.44	173,287	5.6	11.2
Transport, storage, communication & services related to broadcasting	66,365.54	80,649	2.8	5.2
Financial services	63,873.07	88,346	4.7	5.7
Real estate, ownership of dwelling & professional services	167,515.67	269,279	7	17.5
Public administration	29,428.67	40,030	4.5	2.6
Other services	76,854.7	149,119	9.9	9.7
TOTAL GSVA at basic prices	1,014,491	1,541,551	6.2	100

Source: MoSPI and TIC analysis

- 'Manufacturing, Real Estate Ownership and professional Services' and 'Construction' contribute more than 50% of the total state GVA.
- 'Manufacturing industries' contributing to the GVA includes Manufacturing of Motor Vehicles, Machinery and Equipment, Textiles, Wearing Apparels and Food Products.

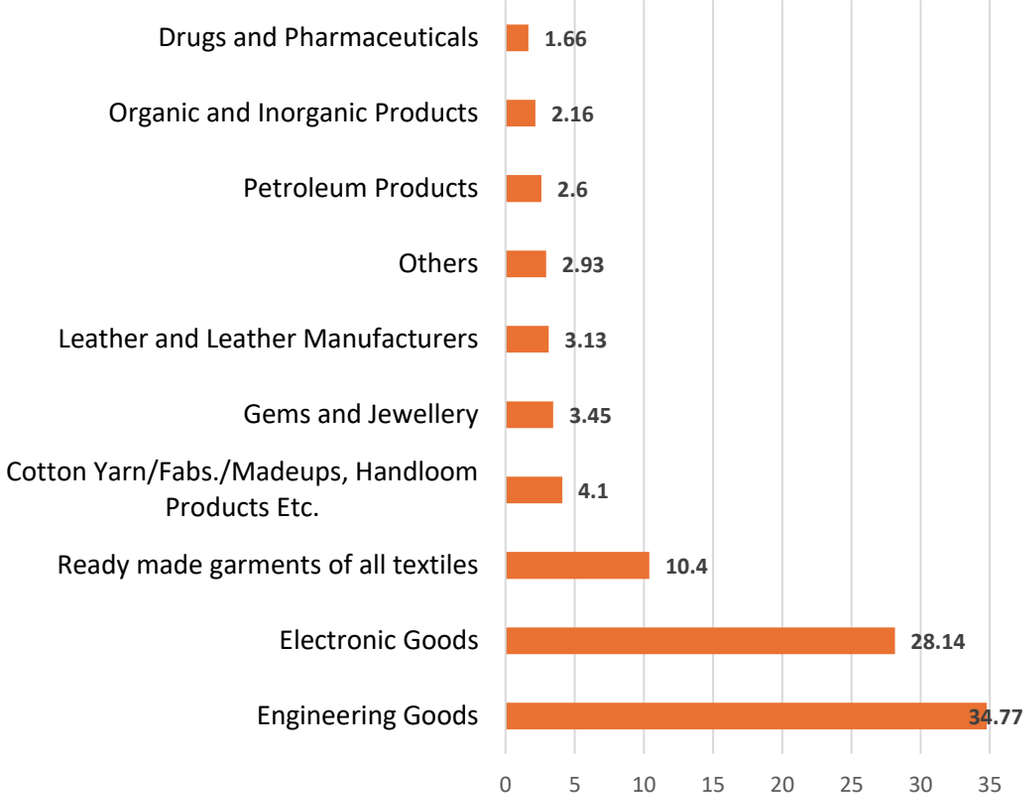
Tamil Nadu's industrial base and export performance

Share of GVA across sectors: India vs Tamil Nadu



Source: MoSPI, TIC analysis

% share in Tamil Nadu's export



Source: MoSPI, TIC Analysis

- TN has a **significantly higher industrial base** (Secondary Sector) of 37.7% than the national average of 28.7% , driven by manufacturing and construction.
- TN earned Exports worth US$52.07Bn, **11.9% of Total Indian Exports** in FY25.
- **Engineering Goods, Electronic Goods and Ready-made garments were the top exported commodities.**

Tamil Nadu is a major player in key manufacturing

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Tamil Nadu's Manufacturing Sector: Output and National Share

Industry group	All India output (INR Crore)	Tamil Nadu output (INR Crore)	TN share in India
Basic metals	21,53,243	66,446	3.09%
Coke and refined petroleum products	20,30,771	91,117	4.49%
Food products	17,90,378	1,38,749	7.75%
Chemicals and chemical products	13,15,603	62,573	4.76%
Motor vehicles, trailers and semi-trailers	11,32,869	2,69,415	23.78%

Source: Annual Survey of Industries –Tamil Nadu, 2022-23, TIC analysis

- TN is a major player in key manufacturing sectors such as leather products, engineering goods, automotive components, castings, pumps and readymade garments.
- The State is also emerging as a hub for many sunrise sectors like Electric Vehicles and Startups in the areas of FinTech and Software as a Service (SaaS).

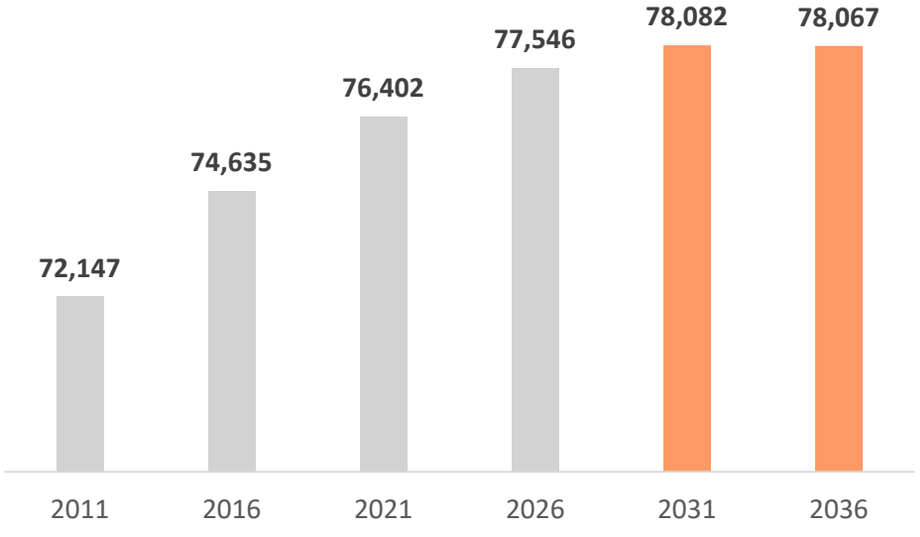
Summary of Tamil Nadu's economic performance

Parameter	Key evidence (data-backed)	Interpretation / Implication
Manufacturing-led state (vs India)	Manufacturing share: **24.5% (TN)** vs **17.2% (India)**; Agriculture: **9.8% (TN)** vs **14.4% (India)**	Tamil Nadu is structurally **industrial and value-added**, not primary-sector dependent; reflects mature manufacturing base and productivity-led growth.
Strong construction and industrial ecosystem	Construction share: **12.4% (TN)** vs **9.1% (India)**; Manufacturing + Construction = **36.9% of GVA**	Indicates sustained **capex, urbanisation and infrastructure build-out**, supporting industrial expansion, employment, and logistics demand.
Production-linked services dominance	Financial, real estate & professional services: **23.2% (TN)** vs **23.8% (India)**	Services depth comparable to India, but **less consumption-heavy** and more **manufacturing- and asset-linked**, reinforcing industrial supply chains.
High-value export basket	Engineering goods **34.8%** + Electronics **28.1%** = **~62.9% of exports**	Export profile is **technology- and capital-goods driven**, with strong global integration; textiles, leather, gems add diversification but are secondary.
Trade- and freight-intensive growth model	Manufacturing-heavy GVA + engineering/electronics exports	Structural drivers point to **high freight intensity**, supporting strong demand for **container traffic, ports, industrial corridors, and highway logistics**.

Source: MoSPI, TIC analysis

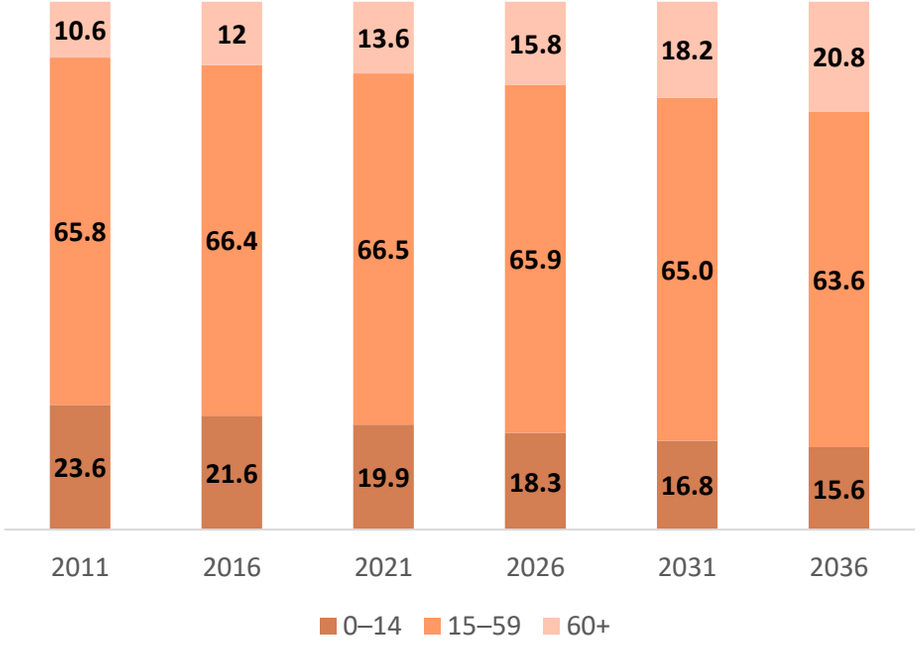
Demographics

Population growth ('000s)



Source: MoFHW, TIC analysis

Population share (%)



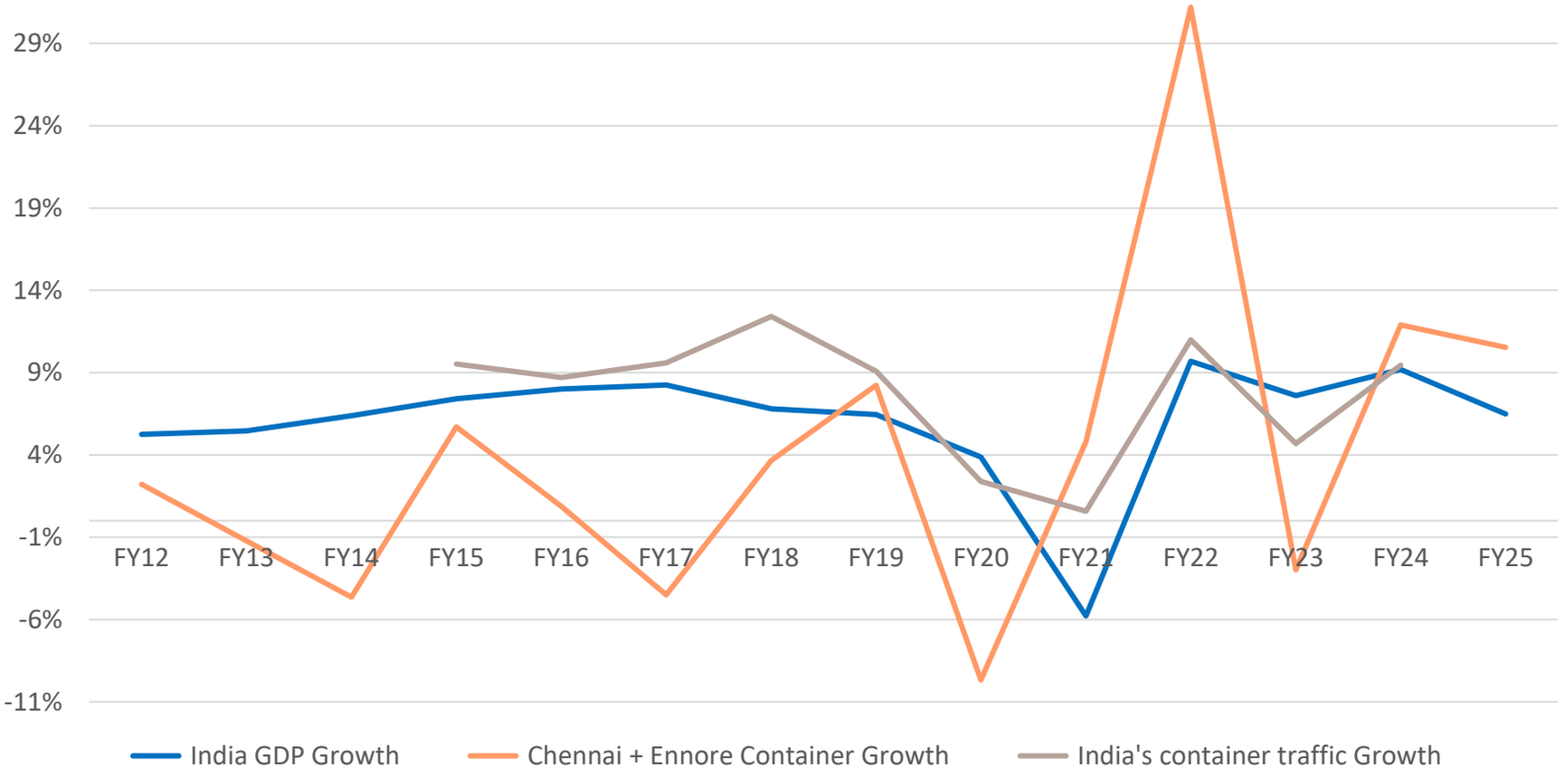
Implication for Toll Traffic

Parameter	Impact	Target plaza	Direction	Evidence
Population	Increased state liability Shift to agrarian economy for 60+ age group after two decades Moderate decrease in consumption base	Nallur (NH16) Surapattu and Vanagram (Chennai Bypass)	Moderate in longer run of 20 years	Tamil Nadu's population grew at CAGR 0.48% between 2026 and 2011 as per MoFHW estimates, lower than India's population at 1.1% in the same period. The trend also shows that Tamil Nadu has high aging population (60+) of 15.8%, much higher than India estimates of 11.4%.

Source: TIC analysis

Chennai maritime cluster – container traffic

Container traffic trend at Chennai maritime cluster (Chennai and Ennore Port)



Source: Indian Port Association, TIC analysis

Implication for Toll Traffic

Parameter	Impact	Target plaza	Direction	Evidence
Port throughput	Causes MAV traffic swings	Nallur (NH16) Surapattu (Chennai Bypass)	Volatile	Linked to seasonal shipping & EXIM cycles

Source: TIC analysis

Economic variables and impact on toll traffic

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Economic variables and impact on toll traffic

Economic Indicator (Tamil Nadu)	Latest Data/Trend	Implication for Toll Traffic
IIP – Manufacturing (Index of Industrial Production)	Index **157** (Apr-Jun 2025), up from 153.9 a year prior (~**2%** increase)	**Steady goods traffic:** Manufacturing index shows modest 2% growth. Manufacturing growth supports current LCV/Truck volumes. Observed traffic (average growth rate of ~10%) exceeds manufacturing growth, indicating other factors (urbanization, services) also drive traffic.
IIP – Electricity (power generation index)	Index **163.68** (Apr-Jun 2025), down from 179.9 a year prior (**-8,9%** YoY)	**↓ Decline, followed by modest rise in heavy freight:** YoY decline of 8.9% but June 2025 showed +16.7% MoM recovery. Coal transport to power plants affects Ennore Port Cargo and Surapattu TP commercial traffic.
GSDP growth (Real)	**+11.9%** Real GDP growth rate in FY25 > national GDP (6.49%)	**↑ Overall traffic:** Strong economic growth drives higher travel demand – more freight shipments and passenger trips on toll roads.
Manufacturing GVA & growth	Manufacturing output **₹3.769 lakh Cr** (2024–25), **14.7%** growth; Industry ~24.5% o GVA (Industry ~37.7% share)	**↑ Goods traffic, primarily intra-district:** 14.7% manufacturing growth drives commercial vehicles.
Road infrastructure expansion	State and National Highway length **6,805 km** as per 2024–25 report	**↑ Traffic capacity:** New/expanded roads improve connectivity, inducing more traffic. Added NH mileage encourages inter-district travel and freight movement, raising toll road usage.
Agriculture trends (Agri GVA, Horticulture)	Agri GVA growth **~2.5%** (2024–25); Tamil Nadu **exported 1.34 lakh tonnes of fish products**, generating ₹6,854 crore in foreign exchange in 2023-24.	**↑ Seasonal freight:** Steady agri growth and high horticultural produce volume drive produce shipments (e.g., vegetables to markets). Expect more **LCV/2A truck traffic** during harvest peaks (perishables to cities).
Exports contribution	Exports grew by ~20% in FY25 to US$52.07 led by electronic goods, engineering goods, ready made garments	**↑ Long-haul trucks:** 20% export growth generates outbound freight to Chennai/Ennore ports. This is also visible in Chennai Container growth rate of 10.5% in FY25 despite high base of 11.9% in FY24.
MSME base	**58.13 lakh** MSME units registered in Tamil – vibrant small industry ecosystem	**↑ Local distribution:** A large MSME sector implies dispersed production and consumption, leading to more **LCV and small-truck trips** ferrying raw materials and finished goods between industrial estates, warehouses, and markets.
Port throughput volatility	Causes MAV traffic swings	Linked to seasonal shipping & EXIM cycles

Source: MoSPI, Directorate of Economics and Statistics, TIC analysis

District-Level growth and manufacturing focus

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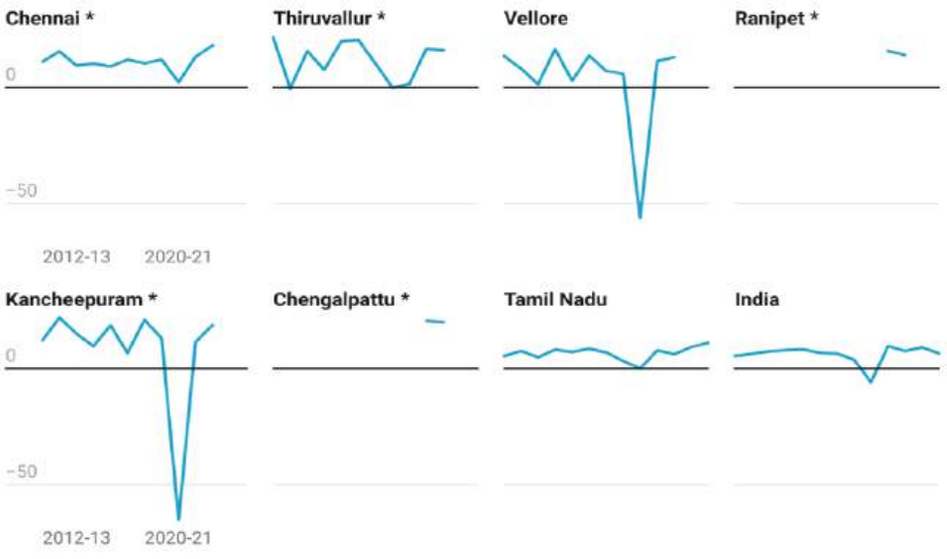
District level economic snapshot

District	GDP (INR Crore)	Growth Rate (FY22-23)	Share in State GDP	PCI (INR)	Growth focus	Strategic Role
Chennai*	1,78,898	18.20%	12.30%	5,85,501	Services, finance, IT hub (77% services in District GVA)	Gateway for port-linked services, financial center, and IT/BPO employment
Thiruvallur*	1,05,781	16.10%	7.30%	4,30,950	Balanced manufacturing-services; fastest growing district	Heavy engineering hub (INR 51,952 Crore fixed capital), auto components, SIPCOT estates with spillover from Chennai
Vellore	24,700	13.10%	1.70%	1,43,808	Educational hub with emerging manufacturing	Functions as educational hub (VIT) supporting skilled labour needs; 388 factories, INR 564 Crore fixed capital
Kancheepuram*	59,514	18.80%	4.10%	7,44,980	Manufacturing powerhouse; automotive & electronics leader	Contributes ~20% of Tamil Nadu's fixed capital and ~24% of industrial output; hosts Hyundai, Renault-Nissan, Samsung, Foxconn
Chengalpattu*	1,30,965	20.10%	9.00%	7,46,994	Manufacturing-services mix; IT corridor + industrial zones	IT/ITES hub (Siruseri), automotive suppliers, balanced industrial growth with highest PCI in region
Ranipet*	18,439	14.00%	1.30%	2,40,069	Chemical & pharmaceutical manufacturing base	Specialty chemicals, pharmaceutical exporters, transitioning from traditional industries
Districts part of Chennai Metropolitan Area	**4,93,598**	**17.40%**	**34.00%**	**5,49,699**	**Diversified manufacturing-services engine**	**State's economic powerhouse; balances high-end services with advanced manufacturing**
Tamil Nadu	**14,51,929**		**100.00%**		**Service-led (52%) with strong industrial base (37.7%)**	**2x national GDP growth; 11.9% of India's exports; 2x national PCI**

Source: Statistical Handbook of Tamil Nadu (2022-23), TIC analysis

District-Level growth and manufacturing focus

GDP growth rate: district vs State/India



- Since FY24, Tamil Nadu's real growth has been above the India average, and within the focus districts Thiruvallur is the fastest growing at around 13%, driven by large SIPCOT Gummidipoondi Industrial Estates, auto and electronics manufacturing and strong spill overs from Chennai.
- **The Six focus districts contribute ~36% to Tamil Nadu's GDP** FY23. ~44% of total Manufacturing GDP and ~56% of Financial Services of Tamil Nadu comes from this region. Chennai has the highest contribution of 12.32%, due to high Financial service industry base and Port infrastructure

Source: Statistical Handbook of Tamil Nadu (2022-23), TIC analysis

* The expanded Chennai Metropolitan Area (CMA)MA falls in five Districts of Tamil Nadu State, viz. Chennai District, parts of Thiruvallur District, Kancheepuram District, Chengalpattu District, and part of Arakkonam Taluk of Ranipet District.

* Kancheepuram district was split to create Chengalpattu district, which was formed in 2019; Vellore district was split into three districts: Vellore, Ranipet, and Tirupattur, in August 2019

Six districts drive ~35% of state GDP through an integrated industrial corridor spanning services, manufacturing, and export excellence

Service & Knowledge Core

Chennai & Chengalpattu lead as the financial capital and tech hub, anchoring SaaS, BFSI, and R&D sectors across the state

Manufacturing Powerhouse

Kancheepuram & Thiruvallur form Asia's auto corridor, hosting global OEMs and generating the highest industrial output at ₹3.34 lakh crore

Export & Engineering Belt

Ranipet & Vellore provide specialised manufacturing clusters and workforce infrastructure, pivoting towards future mobility and EV production

District-wise risks and opportunities

District	Key opportunities	Key risks
Chennai	▪ Port-led trade growth supported by expressway and metro expansion ▪ Strong BFSI, IT and corporate services base ▪ Improved regional connectivity via metro expansion and proposed Parandur airport, strengthening talent access	▪ Urban flooding and monsoon vulnerability in low-lying areas ▪ Severe inner-city congestion near port zones until de-bottlenecking is completed ▪ Rising cybersecurity and data-governance compliance risks for BFSI and tech firms
Thiruvallur	▪ Western industrial cluster (Sriperumbudur–Oragadam) driving auto, FMCG and 3PL demand ▪ Strong growth in Grade-A warehousing and logistics ▪ Strategic positioning along key industrial corridors	▪ Rapid land price escalation affecting project viability ▪ High exposure to global automotive demand cycles ▪ Freight bottlenecks until corridor upgrades are fully operational
Kancheepuram	▪ Core auto, EV and electronics manufacturing hub (Oragadam–Sriperumbudur) ▪ Large-format industrial and warehouse parks ▪ Corridor extensions improving hinterland connectivity	▪ Infrastructure strain from heavy truck movement ▪ Cyclical risks linked to automotive exports ▪ Increasing environmental and regulatory compliance requirements
Chengalpattu	▪ Engineering, textiles, apparel and precision manufacturing growth ▪ Rising 3PL and FMCG warehousing demand ▪ Proximity to ports and proposed airport enhances logistics attractiveness	▪ Peak-hour congestion along GST Road ▪ Land-use pressure from rapid urbanisation ▪ Competition with Kancheepuram for large industrial projects
Ranipet	▪ Expanding industrial–logistics corridor linking Chennai to western Tamil Nadu ▪ Established engineering and legacy manufacturing base ▪ Relatively lower land costs enable scalable industrial expansion	▪ Environmental compliance challenges in legacy industries ▪ Lower skilled-labour density compared to Chennai core ▪ Growth dependent on timely completion of corridor infrastructure

Source: TIC analysis

PESTEL Analysis

Factor	State-level insight	District-level implication
Political / Policy	▪ **Corridor development:** The state is advancing industrial corridors like Chennai-Bengaluru Industrial Corridor (CBIC) to integrate manufacturing hubs ▪ **Governance and stability**: Tamil Nadu is recognized for "Good Governance" and maintaining peaceful labour relations, a key attractor for FDI ▪ **Proactive policy:** Specific policies for sunrise sectors (EV, FinTech) and a target to become a $1 Trillion economy	▪ **Ranipet/Vellore:** These districts are critical nodes on the industrial corridor, benefiting from infrastructure upgrades. ▪ **Greater Chennai:** Policy stability supports the massive long-term capital commitments in this region (e.g., INR 32,861 Crore in Oragadam)
Economic	▪ **Hyper-urbanization:** The state has a high industrial density with 31,859 factories (Rank 1 in India) ▪ **Growth engines:** A dual-engine economy driven by Services (53.63% of GVA) and Industry (33.37% of GVA) ▪ **Capital investment:** High fixed capital investment, particularly in heavy engineering and auto sectors	▪ **Chennai:** The service & financial capital with the highest GDDP contribution (12.30%) ▪ **Thiruvallur:** The heavy industry hub with massive fixed capital investment (INR 51,952 Crore) ▪ **Kancheepuram:** The manufacturing leader with the highest total output (INR 3.34 Lakh Crore)
Social	▪ **Urban workforce:** High urbanization rate (~49%) supports a deep pool of skilled labour for services and industry ▪ **Human development:** High rankings in Human Development Index (HDI) and literacy ensure a steady supply of "employable" talent	▪ **Chengalpattu:** High concentration of knowledge workers for the IT corridor ▪ **Vellore**: Functions as an educational hub (VIT) supporting the skilled labour needs of the Ranipet industrial belt
Technological	▪ **Electronics hardware:** A strategic shift from assembly to high-value component manufacturing (e.g., Foxconn, Dell) ▪ **Future mobility:** Rapid growth in Electric Vehicle (EV) technology and manufacturing ▪ **SaaS & IT**: Chennai and Chengalpattu are established global hubs for SaaS/ITeS	▪ **Kancheepuram (Sriperumbudur):** The "Electronics Corridor" hosting major mobile and hardware OEMs ▪ **Chengalpattu (Siruseri):** The tech R&D hub with the largest IT park (407 acres allotted) ▪ Implementation support to MLFF from state
Environmental	▪ **Sustainable mobility:** Push for EV manufacturing aligns with green energy goals ▪ **Climate resilience:** Coastal industrial zones require robust planning against climate risks ▪ **Resource management:** Focus on water supply and waste management within SIPCOT parks	▪ **Thiruvallur/Chennai:** As coastal districts, infrastructure resilience is key for long-term sustainability ▪ **Ranipet:** Transitioning from traditional tanning (high pollution risk) to cleaner engineering and non-leather footwear industries
Legal / Regulatory	▪ **Land Acquisition:** SIPCOT plays a central role in acquiring land (over 33,000 acres acquired state-wide) to provide legally clear titles to industries ▪ **Regulatory Ease:** Single-window clearances and transparent regulatory frameworks facilitate ease of doing business	▪ **All focus districts:** SIPCOT has developed specific industrial complexes (e.g., Oragadam, Ranipet SEZ, Gummidipoondi,) to handle land and zoning legally, shielding investors from acquisition hurdles

Source: TIC analysis

Determination of growth drivers and elasticity (1)

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Potential socio-economic indicators as growth drivers in context of IRC: 108-2015 and benchmark studies

Socio-economic indicators	Observations for availability/reliability of historical and forecast data
Vehicle registration / Automobile Sales	Sourcing vehicle registration data from concerned Regional Transport Office (RTO) within influence region is herculean task. In addition, it is not mandatory that Project Influence Area (PIA) matches with vehicle registration cases at ground level so not useful. Society of Indian Automobile Manufacturers (SIAM) publishes automobile sales at region level but not at granular level. Can be used as proxy data to validate specific trends. The consultant includes regional dealers' association of freight vehicles (if any) and local financing agencies to understand and validate specific trends observed in traffic.
Per Capita Income	Can be used as proxy data which reflects demand composition but not specific to commodities / vehicle category. Underlying forces are complex and changing at every strata of administrative structure i.e., districts, state, national. Historical data at state / national level available in public domain but not for district level. Further, availability of forecast data is major constraint in India.
Population	Population data are compiled on a decennial basis, with the latest census conducted in 2011, and do not provide a robust annual time series suitable for econometric modelling. In addition, migration trends across socio-economic segments and income-based geographies are highly volatile and difficult to forecast with confidence. Accordingly, population growth has not been adopted as a driver for forecasting future travel demand on the project highway.
GDP / GSDP / GDDP	Dataset from national and international publications and government agencies which are highly reliable in context of forecast e.g., Focus Economics, RBI / RBI's Survey of Professional Forecasters (96th Round), SBI Research, CII, multilateral banks (ADB, World Bank etc.), IMF, OECD, Oxford etc. The consultant typically uses Focus Economics monthly subscription and in-house/empaneled economists for correlation for state and district level GDP and industry specific aspects. The client provides views on the consultant's draft and recommends the final forecast.

Source: TIC research and analysis

Determination of growth drivers and elasticity (2)

TRANSLINK® Infrastructure Consultants Pvt Ltd Smart Consulting

- For any potential indicator (economic, commodity, or industry-related) to be used as a traffic growth driver, availability and reliability of both historical data and credible forecasts are critical success factors.
- Among the key socio-economic indicators discussed above, Gross Domestic Product (GDP) at the national level and Gross State Domestic Product (GSDP) at the state level are the only indicators for which robust historical data and reliable forecasts are consistently available. Accordingly, GDP/GSDP have been adopted as the primary growth drivers for traffic forecasting.
- In addition, port traffic (general and container traffic) have been incorporated as project-specific growth drivers.
- The consultant held discussions with regional dealers' associations of freight vehicles, agricultural wholesale yards (popularly known as mandis), pilgrimage trusts where tourist footfall data are well organised, and inter-city bus terminals in the immediate influence region to validate specific traffic trends such as seasonality and growth patterns.
- In many cases, historical data show varying traffic trends due to various external events in the economy and region. In addition, variations in data recording by third-party tolling agencies and the presence of historical data gaps, as observed in this business case, necessitated further validation.
- Accordingly, validation of the historical data was carried out using traffic data from neighbouring toll plazas on the corridor and benchmark highway sections.
- Traffic growth may not be uniform during the forecasting period, considering factors such as increasing total traffic volumes relative to the capacity of the corridor and the project highway, technological advancements in the automotive industry, cost–tonnage ratios of specific commodity–vehicle combinations, and overloading trends versus strict government enforcement in the region.
- In India, the freight vehicle mix has been changing over the last decade, favouring multi-axle vehicles (MAVs) over 2-axle and 3-axle vehicles for long-distance traffic, given the operational efficiencies achievable with larger vehicles. At the same time, Mini LCVs and LCVs have become more popular for short-distance traffic and more localised supply movements compared to 2-axle vehicles.
- Considering ongoing technological advancements in the automotive industry, standard 2-axle and 3-axle trucks have been increasingly replaced by 6-tyre LCVs over the last couple of years, a trend that is expected to continue.
- The projected elasticity values are typically assumed to remain constant over the concession period in the Indian context; however, they may vary over time due to factors such as increasing traffic volumes relative to corridor capacity, technological advancements in the automotive industry, changes in cost–tonnage ratios of specific commodity–vehicle combinations, overloading trends versus enforcement intensity, and correction of regional imbalances.
- Considering all these aspects, vehicle category-wise elasticities have been estimated.

Determination of growth drivers and elasticity (3)

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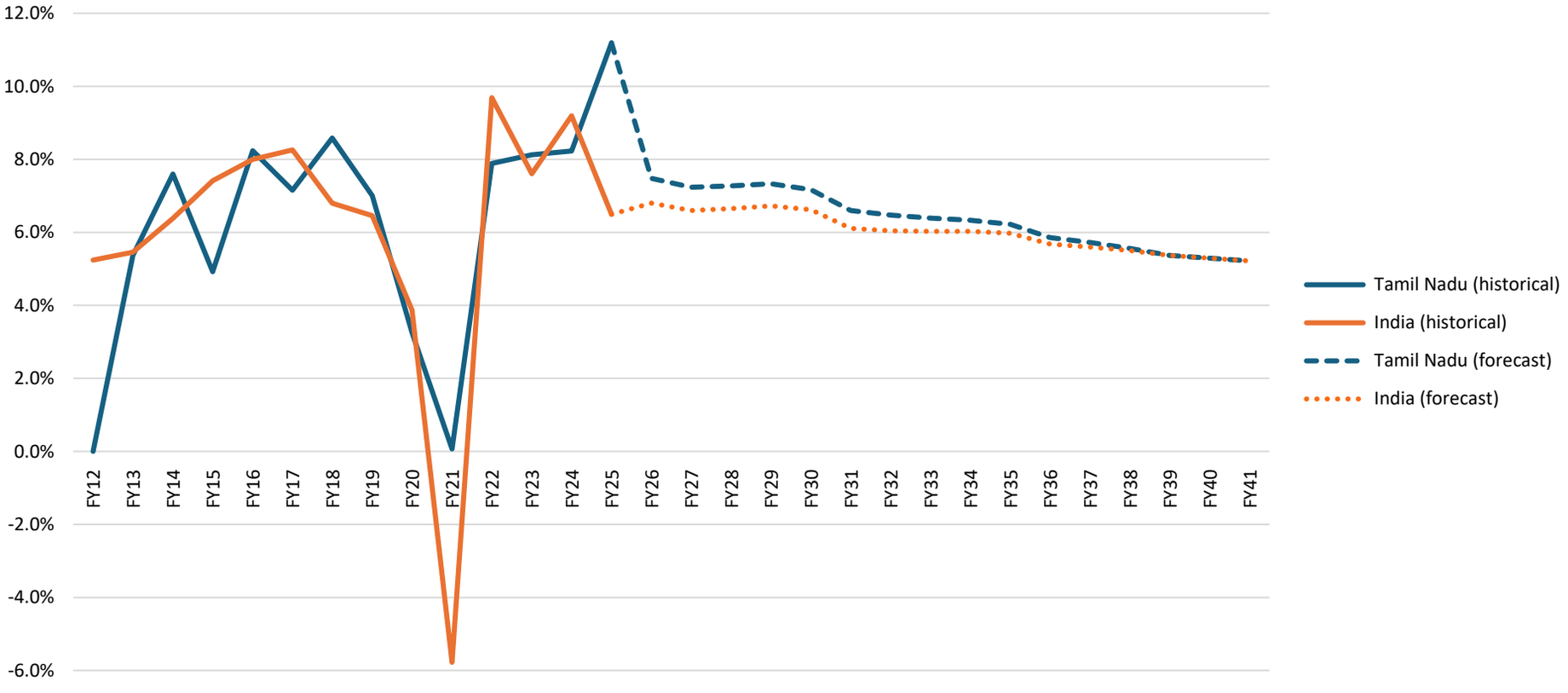
Vehicle category-wise adopted elasticity

Vehicle Category	Nallur TP (old location)	Durainallur TP (new location)	Independent variable
CJV	1.10	1.05 – 1.10	Weighted average of GSDP of Tamil Nadu, Andhra Pradesh
Mini LCV	0.70	0.60 – 0.65	Weighted average of GSDP of Tamil Nadu, Andhra Pradesh
Bus	0.40	0.40	Weighted average of GSDP of Tamil Nadu, Andhra Pradesh
LCV / Mini Bus	0.60 – 0.65	0.60 – 0.65	Weighted average of GSDP of Tamil Nadu, Andhra Pradesh
2 Axle	0.75 – 1.00	0.75 – 1.00	Weighted average of GDP, GSDP of Tamil Nadu, Andhra Pradesh and Chennai port cluster – container and general traffic
3 Axle	0.30	0.30	
MAV	0.85 – 1.15	0.85 – 1.15	

Source: TIC estimate using historical traffic data for the project highway and benchmark references of up-stream /downstream toll plazas

Forecasts for growth drivers (1)

GDP and GSDP forecast



Source: Client input and TIC estimates

- Tamil Nadu's growth is **institution-led, not personality-led**, which sharply limits political downside risk to economic momentum.
- Even when political leadership changes, **industrial approvals, land allotments, port expansion, and corridor projects continue largely uninterrupted**. This is *critical* for long-gestation assets like highways, toll roads, ports, and logistics parks.
- Tamil Nadu politics is often described as "populist", but **this has not translated into anti-growth outcomes**. Welfare-heavy politics **boosts passenger traffic** (buses, 2W/4W), while industry policy continuity sustains **freight traffic**.
- WPI will be 3.24% throughout the concession period except 0.25% for FY27 to revise toll rates as provided by the Client.

Forecasts for growth drivers (2)

Chennai maritime cluster – container and general traffic

- In context of Chennai Port Cluster discussion in earlier sections (Pg 22) and Chennai Port Authority Comprehensive Master Plan 2047 (February 2023), the consultant believes that Chennai Port's cargo is projected to rise steadily from ~49 MT in FY22 to ~76 MT by FY35, driven by 3.3%–3.5% CAGR anchored to the Port's Master Plan forecasts. Ennore Port resembles the similar growth trajectory.
- The growth trajectory reflects ongoing capacity upgrades and improved evacuation infrastructure outlined in the Master Plan.
- Container traffic is expected to grow at ~5% - 6% CAGR with volatile nature like trend discussed in earlier sections (Pg 51) as linked to seasonal shipping and EXIM cycles for Chennai maritime cluster (Chennai, Ennore and Kattupalli ports).

Chapter 5: Baseline traffic and revenue forecast

- Base year AADT (FY26)
- Toll ticket distribution
- Revenue reconciliation

This chapter presents our approach to reach baseline forecast. The consultant estimated base year AADT and toll ticket distribution to reconcile base year traffic and revenue.

Base year AADT estimate

- The consultant reviewed H1 FY26 ETC traffic data received from the client. Based on which traffic profiling for balance half of FY26 has been estimated using seasonality correction factors followed by estimation of FY26 AADT.
- An independent CTVC survey was undertaken to validate the ETC reported traffic data. The variance between CTVC and ETC data is comparatively higher for Car/Jeep/Van, Mini LCV, and Bus categories. For CJV/Mini LCV, this is attributed to local vehicles from nearby urban centre of Chennai and villages in surrounding area like Red hills, Puzhal, Koyambedu and T.Nagar at Nallur toll plaza. For Bus, higher forced exemption was observed across the corridor in Tamil Nadu. Conversely, the variance for LCV, Truck 2A, Truck 3A, and MAV categories remains marginal and within acceptable industry standards.
- Hence, the consultant multiplied variance factor with ETC AADT to determine the corrected FY26 AADT.
- Traffic surveys at the Durainallur Toll Plaza were conducted during October 2025. The base year traffic for the plaza has been estimated by applying the appropriate Seasonal Correction Factor, corresponding to the survey month, to the Weekly Average Daily Traffic (WADT).

Base Year AADT (FY26)

Particulars	ETC AADT	Variance factor	Corrected Base Year AADT (Nallur TP)	Base Year AADT (Durainallur TP)
Car/Jeep/Van	13,408	1.3204	17,704	10,246
Mini LCV	3,787	1.1134	4,216	2,526
Mini Bus/LCV	3,462	1.0537	3,648	3,359
Bus	887	2.0854	1,850	1,048
2A Truck	2,767	1.0152	2,809	2,638
3A Truck	1,525	1.0131	1,545	1,394
MAV	6,137	1.0094	6,195	6,099
OSV	25	1.0000	25	18
Total AADT	**31,999**		**37,992**	**27,329**
Total PCU	**65,656**		**73,994**	**60,578**

Source: TIC estimate

Ticket distribution

Nallur TP

Vehicle categories		Car/Jeep/Van	MLCV	Bus	LCV	2A	3A	MAV
Ticket types	FY26	FY27 – FY28 H1	From FY26 – FY28 H1					
Single	5.5%	3.8%	22.9%	20.5%	25.8%	36.1%	53.3%	53.5%
Return	38.0%	29.3%	61.1%	30.7%	65.1%	54.5%	44.5%	45.0%
Monthly Pass	0.4%	0.4%	0.4%	3.5%	0.1%	-	-	-
Local Commercial	-	-	4.0%	-	5.5%	7.9%	1.1%	0.6%
Local Personal	3.9%	3.9%	-	-	-	-	-	-
Exemptions/Violations	32.5%	32.5%	11.7%	45.4%	3.5%	1.5%	1.1%	1.0%
Annual Pass - Pvt CJV	19.6%	30.2%	-	-	-	-	-	-

Durainallur TP

Vehicle categories	Car/Jeep/Van	MLCV	Bus	LCV	2A	3A	MAV
Ticket types	FY28 H2 onwards	FY28 H2 onwards					
Single	3.8%	22.9%	20.5%	25.8%	36.1%	53.3%	53.5%
Return	29.3%	61.1%	30.7%	65.1%	54.5%	44.5%	45.0%
Monthly Pass	0.4%	0.4%	3.5%	0.1%	-	-	-
Local Commercial	-	5.7%	-	5.5%	7.9%	1.1%	0.6%
Local Personal	3.9%	-	-	-	-	-	-
Exemptions/Violations	32.5%	10.0%	45.4%	3.5%	1.5%	1.1%	1.0%
Annual Pass - Pvt CJV	30.2%	-	-	-	-	-	-

Source: TIC estimate

- ~19% of CJV traffic is being observed using Annual Pass of INR 3,000 as on 31st October 2025 which is expected to increase by ~1.5 times in future through gradual awareness among road users.
- The consultant did not consider penetration of annual pass from estimated exemption/violation in future.
- For all vehicle categories, prevailing exemption/violation has considered for future. As per discussion with the client, prevailing forced exemption is likely to reduce post-implementation of Multi Lane Free Flow (MLFF) tolling system.

Validation of base year traffic and revenue

- The Consultant calculated base year revenue by multiplying traffic AADT with prevailing toll rates in accordance with estimated toll ticket distribution.
- Comparison summary with quoted remittance by tolling agency is presented in the below table.
- Quoted daily remittance should be lower than estimated revenue by approx. 5%-10% considering profit margins of tolling agencies.

Traffic and revenue reconciliation for base year (all values are estimated with FY26 toll rate with old linking factor)

Toll Plaza	Base year revenue estimate by the Consultant (INR Crore)	Annual Potential Collection estimate by NHAI (INR Crore)	FY26 estimate vs NHAI APC	Quoted remittance By tolling agency (INR Crore)	Consultant estimate vs Quoted remittance
Nallur	182.16	171.59	6.1%	163.83	11.2%

Source: TIC estimate

Chapter 6: Diversion analysis

- Surat – Nashik – Chennai Expressway
- Chennai Hyderabad highspeed rail
- National Waterway 4

This chapter elaborates impacts of proposed infrastructure developments in the project influence and network in form of positive/negative diversion to/from the project highway. Analysis has been exercised using IRC: 108-2015 and IRC: SP: 30-2019.

Surat – Nashik – Chennai Expressway (1)

- Surat Nashik Chennai Expressway is ~1200 km long 6-lane, partially access-controlled highway being developed by NHAI through HAM.
- The corridor will connect Surat in Gujarat with Chennai in Tamil Nadu, passing through major cities such as Nashik, Ahmednagar, Solapur, Kalaburagi, Kurnool, Kadapa, and Tirupati, spanning four states Gujarat, Maharashtra, Telangana, and Tamil Nadu. This will enhance connectivity between western ports and southern industrial regions to promote seamless freight movement.
- The project is part of two major economic corridors i.e., 513 km Surat – Nashik – Ahmednagar – Solapur corridor and 707 km. Solapur – Kurnool – Chennai corridor integrating both greenfield and brownfield stretches.
- Key greenfield sections includes:
  - Surat – Nashik – Ahmednagar stretch in Gujarat and Maharashtra
  - Ahmednagar – Solapur – Akkalkot – MH/KA Border section
  - MH/KA Border – Mahabubnagar section
  - The remaining sections will involve upgrading existing two-lane roads into four-lane.
- Recently, MoRTH cancelled Surat – Nashik section of proposed development due to persistent challenges in securing environmental clearances. To address the intended connectivity objective, Maharashtra State Road Development Corporation (MSRDC) will develop greenfield expressway connecting Bharvir Khurd on Smruddhi Marg to Tawa village on NH48.
- Reference discussion with the client (field offices across corridor), the entire corridor is expected to be developed by FY31.

Diversion due to Surat – Nashik – Chennai Expressway

Diversion	Affected traffic movement	Timeline	Toll Plaza	Diversion as % of Base Year AADT					
				CJV	Mini LCV	LCV	2A Trucks	3A Trucks	MAV
Negative diversion	Traffic movement between Solapur/west and Chennai/south	FY31 (50%) FY32 (100%) onwards	Nallur / Durainallur	(0.25%)	-	(1.77%)	(2.23%)	(3.05%)	(2.59%)
	Traffic movement between Hyderabad/north and Chennai/south	FY31 (40%) FY32 (80%) FY33 (100%) onwards	Nallur / Durainallur	(0.55%)	-	(1.56%)	(2.47%)	(2.79%)	(2.93%)

Source: TIC estimate

Surat – Nashik – Chennai Expressway (2)

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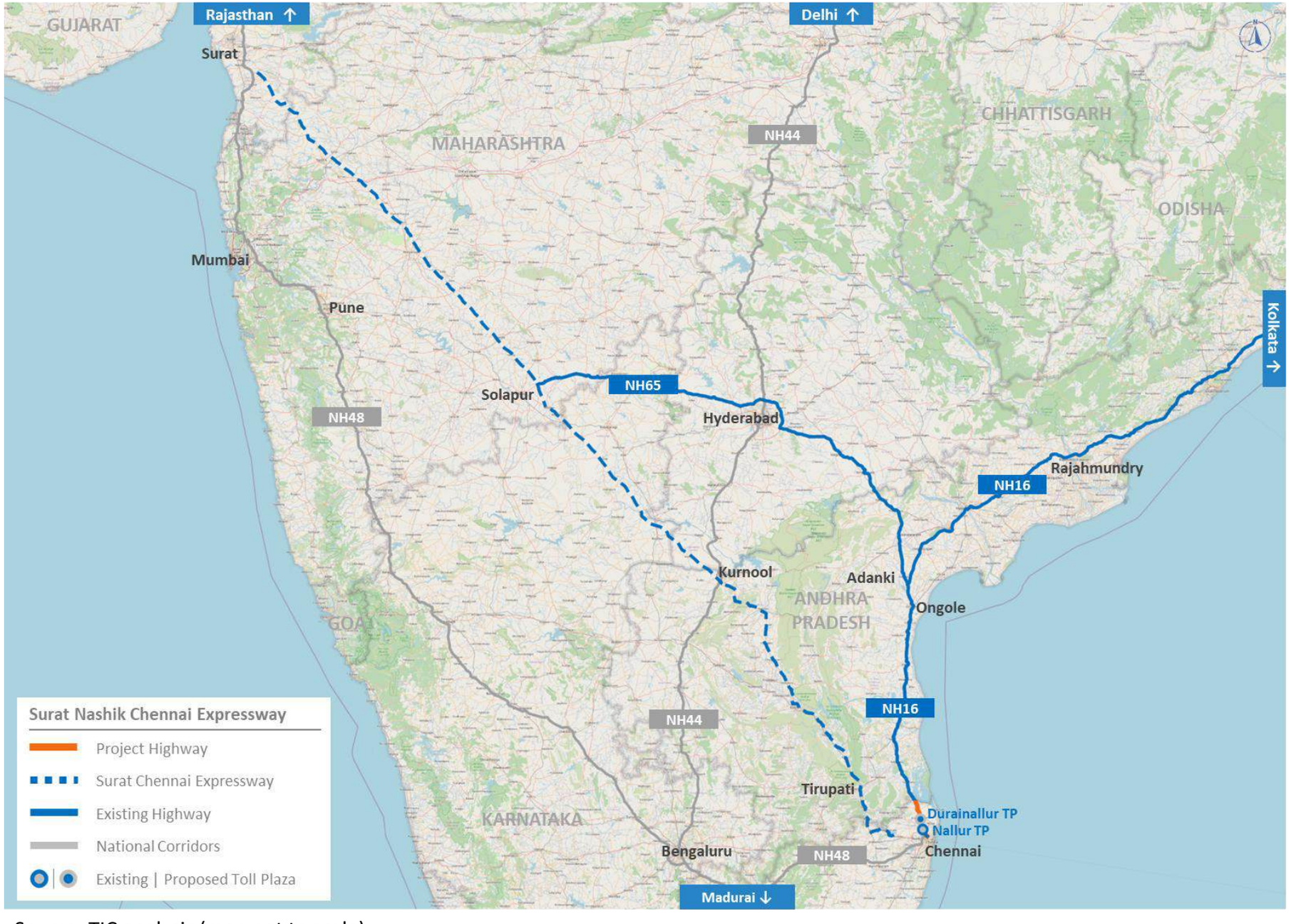
Surat Nashik Chennai Expressway alignment and project highway context



Source: TIC analysis (map not to scale)

Chennai Hyderabad high-speed rail (1)

- Chennai–Hyderabad High Speed Rail Corridor is a proposed 778 km high-speed rail link connecting Chennai Central, Minjur (on Chennai Ring Road), Tirupati, Amaravati/Vijayawada, and Hyderabad across Tamil Nadu, Andhra Pradesh and Telangana.
- Proposed development will transform regional connectivity, boosts trade, tourism, and economic growth, becoming a key part of India's high-speed network.
- Upon completion, it is expected to reduce the current Chennai–Hyderabad travel time from approximately 12 hours to about ~3 hours.
- South Central Railway submitted final alignment to be included in the detailed project report (DPR) to State Government of Tamil Nadu and requested approvals in November 2025 to keep the survey work on track.
- Latest media reports suggest that:
  - Chennai Unified Metropolitan Transport Authority (CUMTA) confirmed that DPR for the highspeed rail corridor will be finalized within a month after the state government grants its approval as the alignment had been revised to include a station at Tirupati, replacing the earlier plan to pass through Gudur.
  - In a letter to the state transport department earlier this week, the South Central Railway sought early finalization of the alignment and station locations, in-principle approval for the acquisition of land, and incorporation of the rail corridor into Tamil Nadu's long-term infrastructure master plan.
- The consultant considered that proposed development will be operational in FY38 with benchmark case of Ahmedabad Mumbai high-speed rail and present political leadership at Telangana, Andhra Pradesh and Tamil Nadu.

Diversion due to Chennai Hyderabad high-speed rail

Diversion	Affected traffic movement	Timeline	Toll Plaza	Diversion as % of Base Year AADT					
				CJV	LCV	Bus	2A Trucks	3A Trucks	MAV
Negative diversion	Traffic movement from Chennai to Hyderabad / Vijayawada / interim locations on route	FY38 (70%) FY39 (100%) onwards	Nallur / Durainallur	(2.22%)	-	(1.46%)	-	-	-

Source: TIC estimate

Chennai Hyderabad high-speed rail (2)

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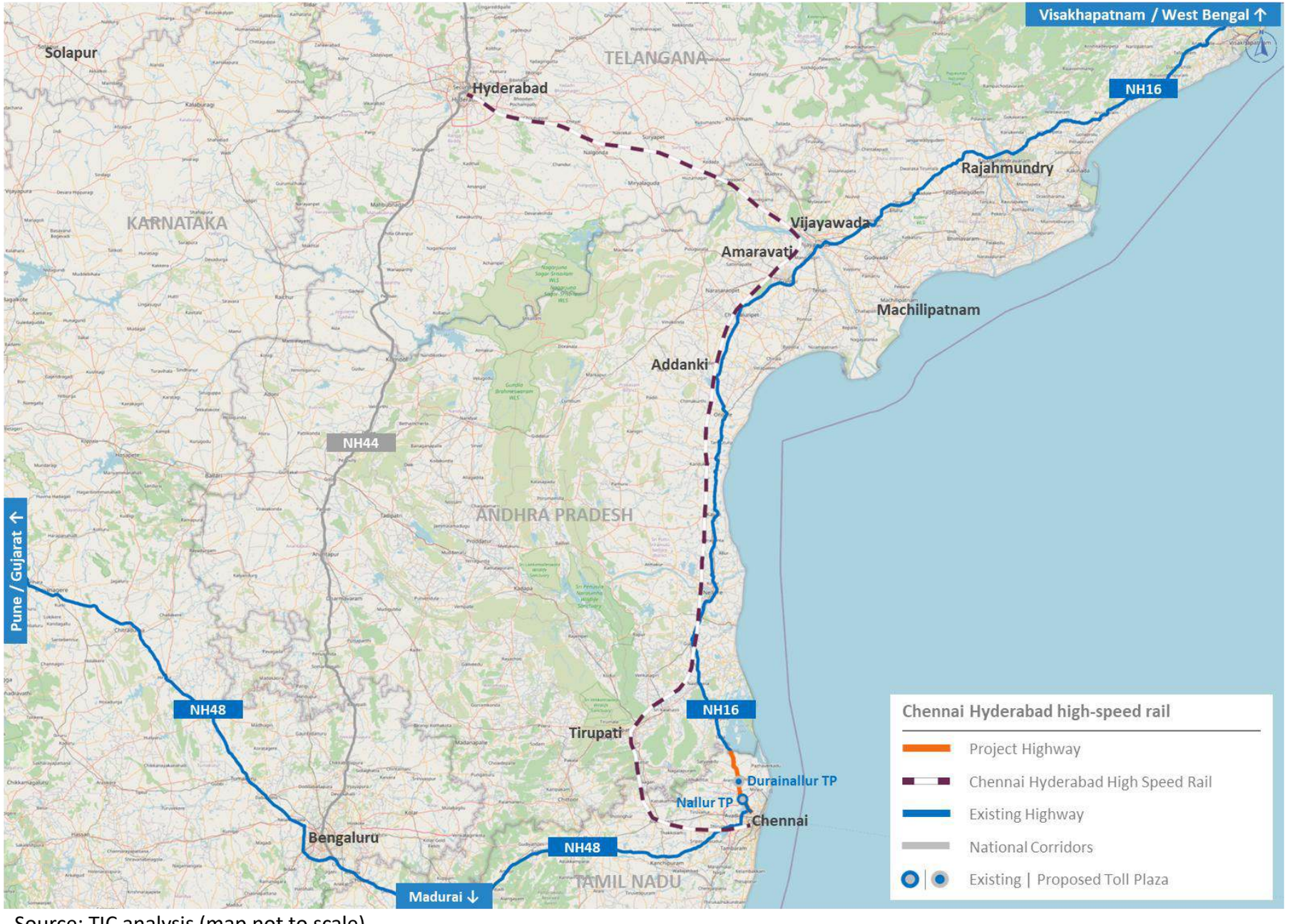
Chennai Hyderabad high-speed rail alignment and project highway context



Source: TIC analysis (map not to scale)

National Waterway 4 (1)

- National Waterway 4 (NW4) is a major plan to use rivers and canals as a large transportation route in South India. It connects the states of Andhra Pradesh, Tamil Nadu, Telangana, and the territory of Puducherry.
- Alignment follows several important waterways, including parts of the Godavari and Krishna rivers, as well as several man-made canals. In total, the planned route is nearly 2,900 kilometers long.
- Inland Waterways Authority of India (IWAI), is currently working on the first sections, making rivers deeper and building docks for loading and unloading goods. The aim is to create a cheaper and more environmentally friendly way to move heavy cargo like coal, cement, and food, reducing traffic from roads and railways.
- NW 4 is a plan to build a large canal water transport system connecting South Indian states for moving goods efficiently.

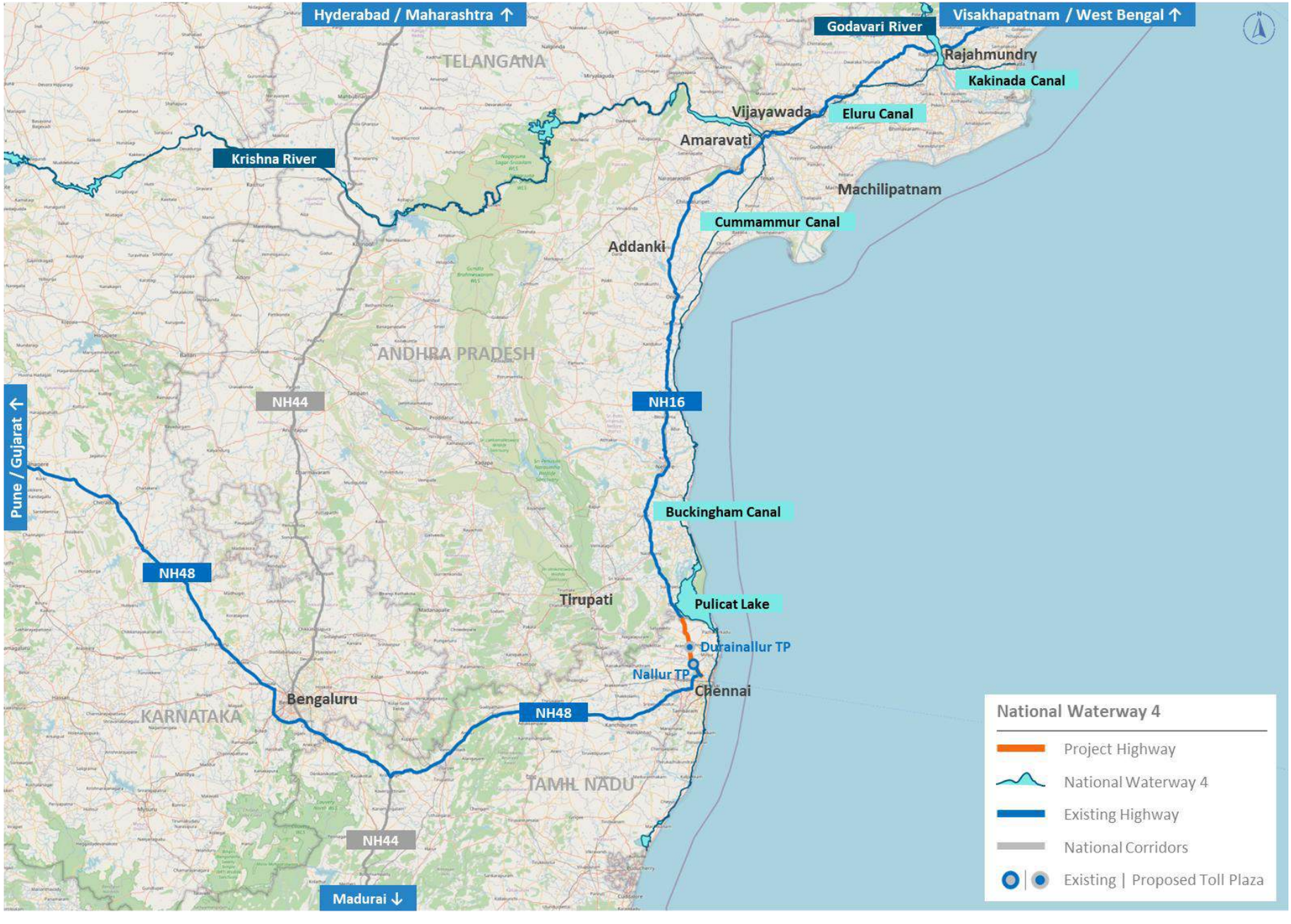
Diversion due to National Waterway 4

Diversion	Affected traffic movement	Timeline	Toll Plaza	Diversion as % of Base Year AADT					
				CJV	LCV	Bus	2A Trucks	3A Trucks	MAV
Negative diversion	Port connectivity parallel to NH16 and intermediate locations	FY33 (50%) FY34 (75%) FY35 (100%) onwards	Nallur / Durainallur	-	-	-	-	(0.40%)	(0.57%)

Source: TIC estimate

National Waterway 4 (2)

National Waterway 4 alignment and project highway context



Source: TIC analysis (map not to scale)

Chapter 7: Final traffic and revenue forecast

- Traffic growth forecast
- Traffic and revenue forecast
- Scenario development

Following pre-diversion traffic forecast and diversion analysis, this chapter presents final traffic and revenue forecast for various scenarios: most likely with and without overloading, pessimistic and optimistic.

Transactional Support Agreement and FY27 revenue estimate

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- The project highway is proposed to be included in NHAI's Public InvIT.
- A Transactional Support Agreement will be executed between NHAI and the Public InvIT for the management of toll plaza operations for FY27.
- Tolling operations during FY27 will be undertaken by NHAI under the prevailing short-term contract modality.
- Accordingly, FY27 revenue has been estimated based on historical bidding trends for tolling contracts and is assumed to be 5%–10% lower than the estimated actual revenue.
- Consistent with this arrangement, manpower-related expenses for tolling operations have been excluded from O&M costs as confirmed by the client.

Traffic and revenue forecast: Nallur TP / Durainallur TP (1)

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Pre-diversion growth rate

Vehicle Category	FY26 FY27	FY27 FY28	FY28 FY29	FY29 FY30	FY30 FY31	FY26 FY31	FY31 FY36	FY36 FY41	FY27 FY41
CJV	8.1%	7.8%	7.6%	7.1%	7.2%	7.4%	6.7%	5.7%	6.5%
Mini LCV	5.1%	5.2%	4.6%	4.2%	4.1%	4.4%	4.1%	3.6%	4.0%
LCV	4.7%	4.5%	4.6%	4.3%	4.3%	4.5%	4.0%	3.4%	3.9%
Bus	3.0%	3.0%	3.0%	2.8%	2.7%	2.9%	2.6%	2.2%	2.5%
2A Truck	6.2%	6.3%	6.5%	6.0%	5.8%	6.2%	5.7%	4.9%	5.5%
3A Truck	2.0%	1.9%	1.8%	1.7%	1.2%	1.7%	0.8%	0.6%	1.0%
MAV	7.2%	7.3%	7.9%	7.4%	6.6%	7.3%	6.4%	5.5%	6.3%
AADT	**6.6%**	**6.5%**	**6.5%**	**6.1%**	**5.9%**	**6.2%**	**5.7%**	**4.9%**	**5.5%**
PCU	**6.3%**	**6.3%**	**6.6%**	**6.2%**	**5.8%**	**6.2%**	**5.7%**	**4.9%**	**5.5%**

Post-diversion growth rate

Vehicle Category	FY26 FY27	FY27 FY28	FY28 FY29	FY29 FY30	FY30 FY31	FY26 FY31	FY31 FY36	FY36 FY41	FY27 FY41
CJV	8.1%	7.8%	7.6%	7.1%	6.8%	7.4%	6.6%	5.2%	6.3%
Mini LCV	5.1%	5.2%	4.6%	4.2%	4.1%	4.4%	4.1%	3.6%	4.0%
LCV	4.7%	4.5%	4.6%	4.3%	2.7%	4.2%	3.7%	3.4%	3.7%
Bus	3.0%	3.0%	3.0%	2.8%	2.7%	2.9%	2.6%	1.9%	2.4%
2A Truck	6.2%	6.3%	6.5%	6.0%	3.5%	5.7%	5.1%	4.9%	5.2%
3A Truck	2.0%	1.9%	1.8%	1.7%	(1.5%)	1.2%	0.0%	0.6%	0.5%
MAV	7.2%	7.3%	7.9%	7.4%	3.9%	6.7%	5.6%	5.5%	5.8%
AADT	**6.6%**	**6.5%**	**6.5%**	**6.1%**	**4.6%**	**6.0%**	**5.3%**	**4.7%**	**5.3%**
PCU	**6.3%**	**6.3%**	**6.6%**	**6.2%**	**3.9%**	**5.9%**	**5.1%**	**4.8%**	**5.2%**

Source: TIC estimate

Traffic and revenue forecast: Nallur TP / Durainallur TP (2)

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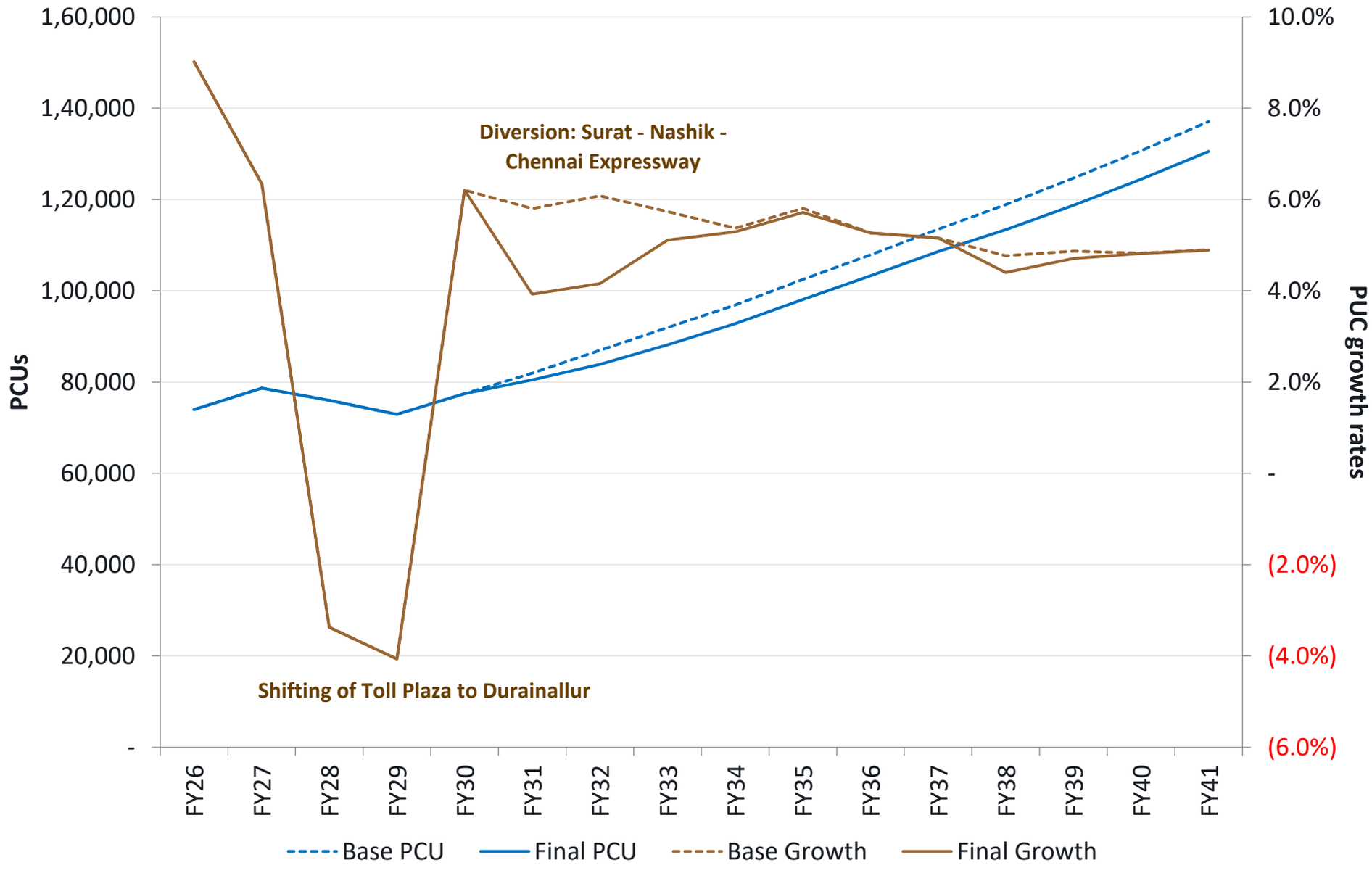
Pre- and Post-diversion growth rate snapshot



Source: TIC estimate

Nallur TP: till H1 FY28 and Durainallur TP: H2 FY28 till end of concession period

Traffic and revenue forecast: Nallur TP / Durainallur TP (2)

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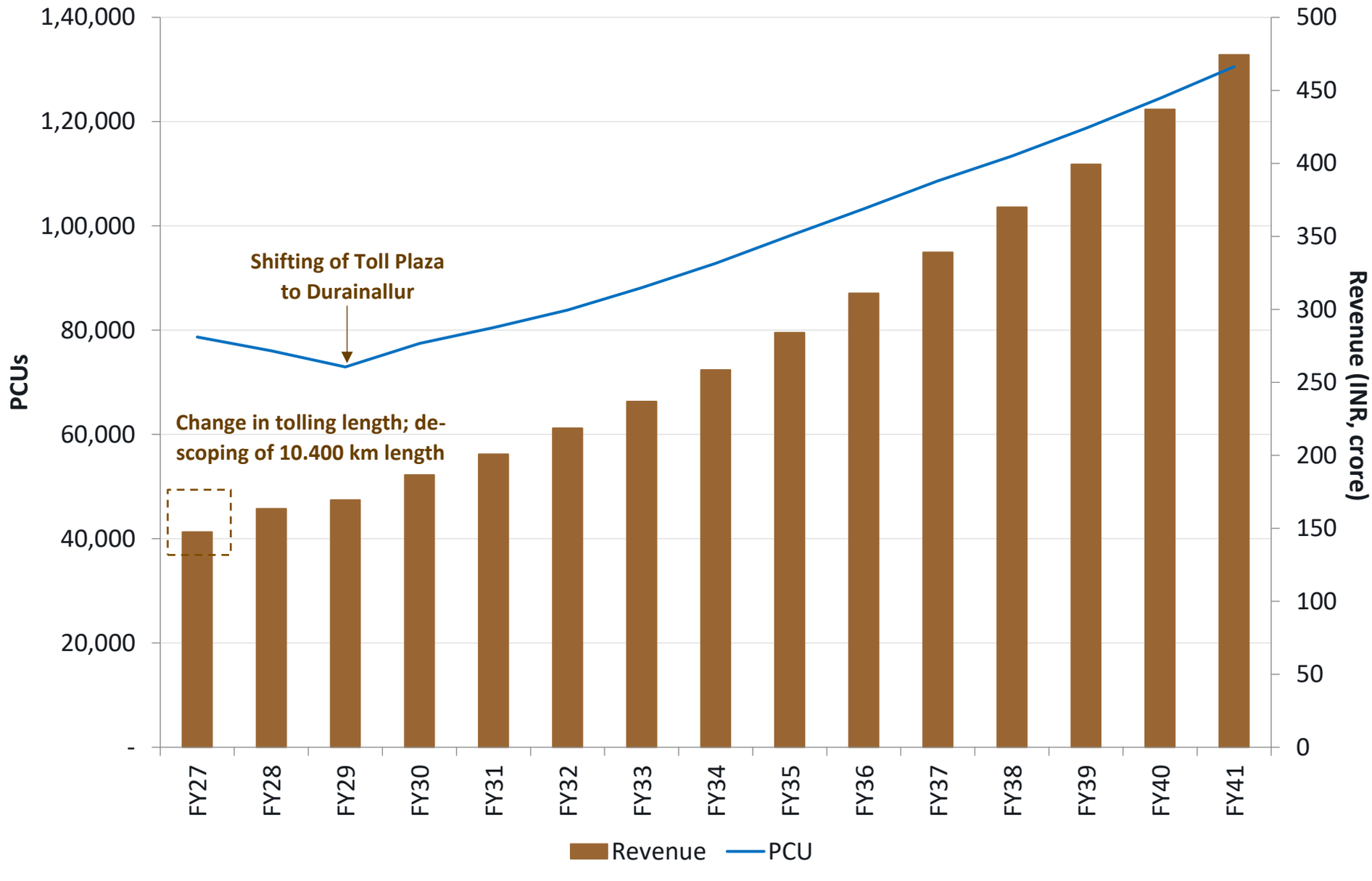
Revenue and PCU snapshot



Source: TIC estimate Nallur TP: till H1 FY28 and Durainallur TP: H2 FY28 till end of concession period

Scenario development definition

Most Likely Scenario without overloading

- No overloading penalty/fees is considered at present based on understanding from site visit. In context of present ground situation and possibility of diversion in case of collecting overloading fees, the consultant did not consider overloading fee collection in most likely scenario.

Most Likely Scenario with overloading

The consultant considered following changes from the most likely (with overloading) case to determine most likely (with overloading) scenario:

- Overloading penalty/fees will be levied in future as per the overloading characteristics observed in axle load survey.

Optimistic Scenario

The consultant considered following changes from the most likely (with overloading) case to determine optimistic scenario:

- GDP: increase (addition) of 0.25% from FY27 to FY35
- Overloading penalty/fees will be levied in future as per the overloading characteristics observed in axle load survey
- Delayed the impact due to Surat Chennai expressway and Chennai Hyderabad High Speed Rail by 1 and 2 years respectively

Pessimistic Scenario

The consultant considered following changes from the most likely (with overloading) case to determine pessimistic scenario:

- GDP: decrease (subtraction) of 0.25% from FY27 to FY35
- No overloading penalty/fees is being levied
- Prompt the impact due to Surat Chennai expressway and Chennai Hyderabad High Speed Rail by 1 and 2 years respectively

Detailed traffic and revenue forecast for ‘Most likely scenario without overloading’ is exhibited in Appendix B.

Scenario summary: Nallur TP / Durainallur TP (1)

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	Most likely without overloading			Most likely with overloading			Optimistic scenario			Pessimistic scenario		
FY	**PCU**	**PCU growth**	**Revenue (INR Cr)**	**PCU**	**PCU growth**	**Revenue (INR Cr)**	**PCU**	**PCU growth**	**Revenue (INR Cr)**	**PCU**	**PCU growth**	**Revenue (INR Cr)**
FY27	78,689	6.3%	147	78,790	6.3%	147	79,374	6.6%	147	78,511	6.1%	147
FY28 H1	83,664	6.3%	87	83,772	6.3%	95	84,585	6.6%	88	83,287	6.1%	86
FY28 H2*	68,410	-	77	68,515	-	85	69,246	-	78	68,105	-	76
FY29	72,944	6.6%	169	73,058	6.6%	188	74,013	6.9%	172	72,449	6.4%	168
FY30	77,472	6.2%	187	77,593	6.2%	207	78,298	5.8%	209	75,414	4.1%	181
FY31	80,515	3.9%	201	80,691	4.0%	222	83,083	6.1%	228	78,171	3.7%	195
FY32	83,864	4.2%	219	84,205	4.4%	235	86,944	4.6%	243	82,358	5.4%	215
FY33	88,152	5.1%	237	88,567	5.2%	252	90,396	4.0%	257	86,746	5.3%	233
FY34	92,817	5.3%	258	93,314	5.4%	272	95,033	5.1%	277	91,137	5.1%	254
FY35	98,126	5.7%	284	98,716	5.8%	296	1,00,775	6.0%	302	96,120	5.5%	278
FY36	1,03,294	5.3%	311	1,03,982	5.3%	321	1,06,160	5.3%	327	1,00,824	4.9%	304
FY37	1,08,619	5.2%	339	1,09,414	5.2%	346	1,11,715	5.2%	353	1,05,853	5.0%	331
FY38	1,13,399	4.4%	370	1,14,234	4.4%	377	1,17,052	4.8%	386	1,10,888	4.8%	362
FY39	1,18,739	4.7%	399	1,19,617	4.7%	407	1,22,763	4.9%	418	1,16,276	4.9%	391
FY40	1,24,460	4.8%	437	1,25,383	4.8%	446	1,28,241	4.5%	456	1,21,869	4.8%	428
FY41	1,30,545	4.9%	474	1,31,519	4.9%	484	1,34,323	4.7%	494	1,27,819	4.9%	464
Total (FY27-FY46)			**4,196**			**4,382**			**4,437**			**4,114**

Source: TIC estimate * Shifting of toll plaza to Durainallur

Benchmark cases:
Gujarat: Ahmedabad Mumbai Corridor (Mandva Toll) – 1,45,000 PCU
Gujarat: Ahmedabad Mumbai Corridor (Choryasi Toll) – 1,22,000 PCU
Haryana: Delhi Panipat Corridor (Bhagan Toll) – 1,07,000 PCU

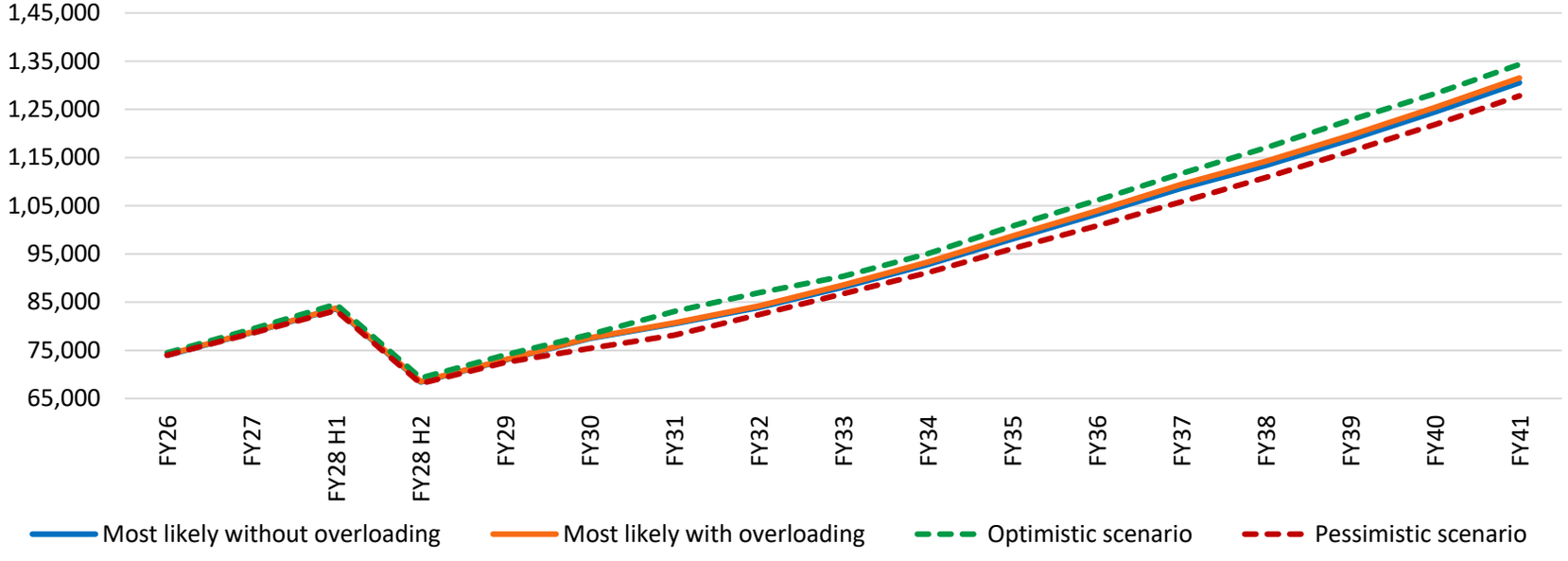
Reaches LOS B of 6-Laning 60,000 PCU/day

Reaches LOS C and D

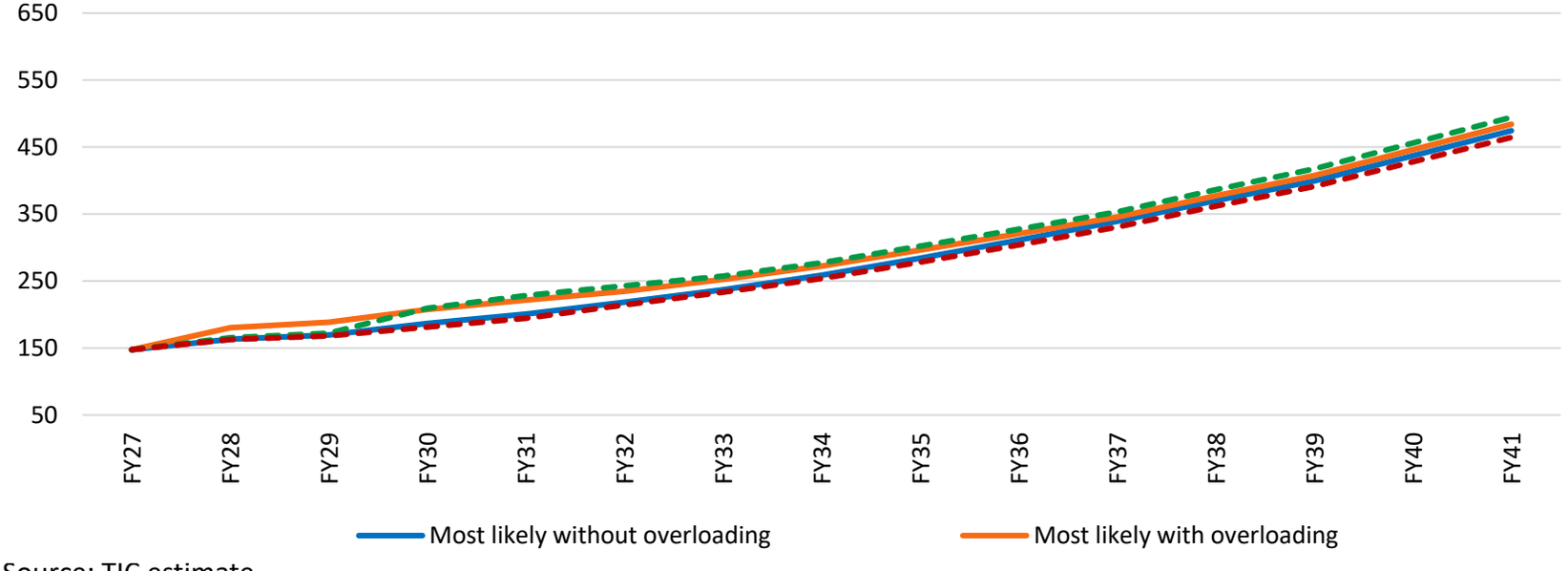
Design capacity for 6-lane National Highway is determined as per as per IRC: 106 and IRC: SP 87 and standard industry practice for determining Level of Service C/D/E.

Scenario summary: Nallur TP / Durainallur TP (2)

PCU comparison



Revenue comparison



Source: TIC estimate

List of Appendices

Appendix A: Vehicle category-wise visual representation of origin-destination zones and top origin-destination pairs

Appendix B: Detailed traffic and revenue forecast – most likely scenario without overloading

Appendix A:

- Vehicle category-wise visual representation of origin-destination zones
- Vehicle category-wise top origin-destination pairs

Vehicle category-wise visual representation of OD (1)

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	Origin	Destination
CJV		
Mini LCV		

Source: TIC analysis (map not to scale)

Vehicle category-wise visual representation of OD (2)

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	Origin	Destination
LCV		
2A		

Source: TIC analysis (map not to scale)

Vehicle category-wise visual representation of OD (3)

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	Origin	Destination
3A		
MAV		

Source: TIC analysis (map not to scale)

Vehicle category-wise visual representation of OD (4)

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Origin | **Destination**

Bus

Vehicle category-wise top OD pairs (1)

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CJV

Sr. No.	Origin-Destination Pairs		Share
1	YSR	Adyar	2%
2	YSR	Chennai	1%
3	Adyar	YSR	1%
4	Chennai	YSR	1%
5	YSR	Kanchipuram	1%
6	Kanchipuram	YSR	1%
7	Srikalahasti	Adyar	1%
8	Adyar	Srikalahasti	1%
9	Kanchipuram	Srikalahasti	1%
10	Chennai	Kadapa	1%

Mini LCV

Sr. No.	Origin-Destination Pairs		Share
1	Colony Allimedu	Alinjivakkam	4%
2	Alinjivakkam	Colony Allimedu	3%
3	Anna Nagar	Colony Allimedu	2%
4	Gummidipoondi	Anna Nagar	2%
5	Alinjivakkam	Gummidipoondi	2%
6	Anna Nagar	Gummidipoondi	2%
7	Assisi Nagar	Gummidipoondi	2%
8	Gummidipoondi	Alinjivakkam	2%
9	Periyapalayam	Ambattur	1%
10	Gummidipoondi	Ambattur	1%

Bus

Sr. No.	Origin-Destination Pairs		Share
1	Tirupati	Anna Nagar	1%
2	Alinjivakkam	Gummidipoondi	1%
3	Nellore	Anna Nagar	1%
4	Alinjivakkam	Periyapalayam	1%
5	Anna Nagar	Gudur	1%
6	Kadirvedu	Bandikavanoor	1%
7	Periyapalayam	Alinjivakkam	1%
8	Tada	Anna Nagar	1%
9	Assisi Nagar	Nellore	1%
10	Anna Nagar	Sricity	1%

LCV

Sr. No.	Origin-Destination Pairs		Share
1	Ambattur	Gummidipoondi	3%
2	Gummidipoondi	Assisi Nagar	2%
3	Colony Allimedu	Alinjivakkam	2%
4	Anna Nagar	Gummidipoondi	2%
5	Alinjivakkam	Gummidipoondi	2%
6	Gummidipoondi	Alinjivakkam	2%
7	Assisi Nagar	Gummidipoondi	1%
8	Colony Allimedu	Anna Nagar	1%
9	Gummidipoondi	Ambattur	1%
10	Gummidipoondi	Anna Nagar	1%

Source: TIC analysis

Vehicle category-wise top OD pairs (2)

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2A

Sr. No.	Origin-Destination Pairs		Share
1	Gummidipoondi	Assisi Nagar	2%
2	Assisi Nagar	Gummidipoondi	2%
3	Gummidipoondi	Anna Nagar	2%
4	Anna Nagar	Gummidipoondi	1%
5	Ambattur	Gummidipoondi	1%
6	Alinjivakkam	Gummidipoondi	1%
7	Gummidipoondi	Alinjivakkam	1%
8	Tada	Alinjivakkam	1%
9	Delhi	Assisi Nagar	1%
10	Gummidipoondi	Ambattur	1%

3A

Sr. No.	Origin-Destination Pairs		Share
1	Gummidipoondi	Assisi Nagar	3%
2	Assisi Nagar	Gummidipoondi	2%
3	Gummidipoondi	Alinjivakkam	2%
4	Hyderabad	Assisi Nagar	1%
5	Alinjivakkam	Gummidipoondi	1%
6	Anna Nagar	Gummidipoondi	1%
7	Ambattur	Gummidipoondi	1%
8	Assisi Nagar	Colony Allimedu	1%
9	Anna Nagar	Tada	1%
10	Vijayawada	Assisi Nagar	1%

MAV

Sr. No.	Origin-Destination Pairs		Share
1	Ennore Port	Gummidipoondi	2%
2	Gummidipoondi	Ennore Port	1%
3	Gummidipoondi	Assisi Nagar	1%
4	Tada	Alinjivakkam	1%
5	Alinjivakkam	Nellore	1%
6	Assisi Nagar	Gummidipoondi	1%
7	Gummidipoondi	Alinjivakkam	1%
8	Nellore	Assisi Nagar	1%
9	Nellore	Alinjivakkam	1%
10	Anna Nagar	Nellore	1%

Source: TIC analysis

Appendix B:

- Detailed traffic and revenue forecast – most likely scenario without overloading

Nallur TP / Durainallur TP (1): Traffic forecast (AADT)

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Financial Year	CJV	Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	AADT	PCU
FY26	17,704	4,216	3,648	1,850	2,809	1,545	6,220	**37,992**	**73,994**
FY27	19,130	4,433	3,819	1,905	2,985	1,577	6,667	**40,514**	**78,689**
FY28 H1	20,618	4,661	3,991	1,961	3,172	1,607	7,150	**43,161**	**83,664**
FY28 H2	11,870	2,758	3,675	1,111	2,979	1,450	7,033	**30,876**	**68,410**
FY29	12,778	2,884	3,845	1,145	3,171	1,477	7,585	**32,886**	**72,944**
FY30	13,685	3,007	4,009	1,178	3,363	1,502	8,142	**34,885**	**77,472**
FY31	14,613	3,130	4,119	1,210	3,482	1,480	8,462	**36,496**	**80,515**
FY32	15,587	3,264	4,228	1,242	3,610	1,454	8,834	**38,219**	**83,864**
FY33	16,650	3,401	4,391	1,276	3,803	1,453	9,316	**40,290**	**88,152**
FY34	17,737	3,536	4,563	1,307	4,012	1,462	9,857	**42,474**	**92,817**
FY35	18,933	3,680	4,748	1,341	4,241	1,471	10,496	**44,910**	**98,126**
FY36	20,134	3,822	4,929	1,373	4,468	1,481	11,105	**47,314**	**1,03,294**
FY37	21,360	3,966	5,110	1,406	4,703	1,492	11,739	**49,776**	**1,08,619**
FY38	22,205	4,104	5,282	1,422	4,930	1,501	12,357	**51,802**	**1,13,399**
FY39	23,309	4,249	5,463	1,448	5,171	1,511	13,022	**54,173**	**1,18,739**
FY40	24,619	4,400	5,648	1,479	5,420	1,520	13,713	**56,800**	**1,24,460**
FY41	25,951	4,551	5,832	1,510	5,669	1,530	14,482	**59,524**	**1,30,545**

Source: TIC estimate

Nallur TP / Durainallur TP (2): Traffic AADT growth rates

Financial Year	CJV	Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	AADT	PCU
FY26	-	-	-	-	-	-	-	-	-
FY27	8.1%	5.1%	4.7%	3.0%	6.2%	2.0%	7.2%	6.6%	6.3%
FY28 H1	7.8%	5.2%	4.5%	3.0%	6.3%	1.9%	7.3%	6.5%	6.3%
FY28 H2	-	-	-	-	-	-	-	-	-
FY29	7.6%	4.6%	4.6%	3.0%	6.5%	1.8%	7.9%	6.5%	6.6%
FY30	7.1%	4.2%	4.3%	2.8%	6.0%	1.7%	7.4%	6.1%	6.2%
FY31	6.8%	4.1%	2.7%	2.7%	3.5%	(1.5%)	3.9%	4.6%	3.9%
FY32	6.7%	4.3%	2.6%	2.7%	3.7%	(1.8%)	4.4%	4.7%	4.2%
FY33	6.8%	4.2%	3.8%	2.7%	5.4%	(0.0%)	5.5%	5.4%	5.1%
FY34	6.5%	4.0%	3.9%	2.5%	5.5%	0.6%	5.8%	5.4%	5.3%
FY35	6.7%	4.1%	4.1%	2.6%	5.7%	0.6%	6.5%	5.7%	5.7%
FY36	6.3%	3.8%	3.8%	2.4%	5.4%	0.7%	5.8%	5.4%	5.3%
FY37	6.1%	3.8%	3.7%	2.4%	5.2%	0.7%	5.7%	5.2%	5.2%
FY38	4.0%	3.5%	3.4%	1.1%	4.8%	0.6%	5.3%	4.1%	4.4%
FY39	5.0%	3.5%	3.4%	1.8%	4.9%	0.6%	5.4%	4.6%	4.7%
FY40	5.6%	3.6%	3.4%	2.2%	4.8%	0.6%	5.3%	4.8%	4.8%
FY41	5.4%	3.4%	3.2%	2.1%	4.6%	0.6%	5.6%	4.8%	4.9%

Source: TIC estimate

Nallur TP / Durainallur TP (3): Revenue forecast (INR Crore)

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Financial Year	CJV	Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	Total
FY27	-	-	-	-	-	-	-	**147.5**
FY28 H1	14.0	4.1	6.2	3.8	10.8	6.4	41.3	**86.5**
FY28 H2	10.0	2.4	5.7	2.1	10.1	5.8	40.6	**76.8**
FY29	21.9	5.3	12.4	4.6	22.3	12.2	90.7	**169.4**
FY30	24.9	5.8	13.4	4.8	24.4	12.9	100.3	**186.6**
FY31	27.1	6.3	14.2	5.2	26.3	13.2	108.5	**200.8**
FY32	30.6	6.9	15.1	5.5	28.4	13.5	118.5	**218.5**
FY33	33.2	7.3	16.4	5.9	31.0	13.9	129.3	**236.9**
FY34	36.6	7.8	17.6	6.2	33.9	14.6	141.7	**258.4**
FY35	41.1	8.5	19.1	6.7	37.4	15.2	156.2	**284.1**
FY36	44.5	9.0	20.7	7.1	41.0	15.9	172.8	**311.0**
FY37	49.3	9.7	22.2	7.5	44.4	16.6	189.2	**339.0**
FY38	54.3	10.8	23.9	7.9	48.6	17.4	207.0	**369.9**
FY39	57.9	11.4	25.7	8.4	52.8	18.1	225.2	**399.4**
FY40	63.9	12.3	27.2	8.9	57.8	19.0	247.9	**437.0**
FY41	69.9	13.1	29.3	9.4	62.6	19.7	270.3	**474.5**

Source: TIC estimate

Nallur TP / Durainallur TP (4): Revenue growth rates

Financial Year	CJV	Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	Total
FY27	-	-	-	-	-	-	-	**-**
FY28	2.4%	(9.1%)	10.2%	(10.6%)	14.2%	7.1%	17.4%	**10.7%**
FY29	(8.6%)	(19.0%)	3.5%	(23.0%)	6.6%	0.2%	10.9%	**3.7%**
FY30	13.6%	9.8%	8.1%	6.2%	9.5%	5.6%	10.6%	**10.1%**
FY31	8.8%	7.7%	6.4%	6.9%	7.8%	2.2%	8.1%	**7.6%**
FY32	13.0%	9.7%	6.4%	7.0%	8.0%	2.0%	9.2%	**8.9%**
FY33	8.4%	6.7%	8.4%	6.2%	9.0%	3.1%	9.1%	**8.4%**
FY34	10.4%	6.0%	7.2%	6.2%	9.3%	5.4%	9.6%	**9.1%**
FY35	12.2%	9.2%	8.5%	7.0%	10.2%	4.3%	10.2%	**9.9%**
FY36	8.3%	6.7%	8.3%	6.7%	9.8%	4.1%	10.7%	**9.5%**
FY37	10.8%	7.8%	7.5%	5.4%	8.3%	4.7%	9.5%	**9.0%**
FY38	10.2%	10.4%	7.6%	5.6%	9.4%	4.8%	9.4%	**9.1%**
FY39	6.5%	5.7%	7.5%	5.4%	8.7%	3.8%	8.8%	**8.0%**
FY40	10.4%	8.0%	6.0%	6.6%	9.3%	5.1%	10.1%	**9.4%**
FY41	9.4%	6.8%	7.7%	5.8%	8.3%	4.0%	9.0%	**8.6%**

Source: TIC estimate

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Nelamangala Tumakuru section of NH48 in Karnataka

Traffic Due Diligence – Final Report

National Highways Authority of India

January 2026

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Control information

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Assignment Title: Traffic Due Diligence – Nelamangala Tumakuru section of NH48 in Karnataka	
Client	**National Highways Authority of India** Sector 10, Dwarka, New Delhi 110075
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Issue and Revision Records

Date	Revisions	Originator	Checker	Approver	Description
09.01.2026	R1	Darshan Doshi Gaurav Chotaliya Dhruv Panchal Rutvik Dhameliya	Rinku Kanani Yagnesh Dave	Tejas Patel	Traffic Due Diligence – Final Report

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Appendices

Appendix A: Vehicle category-wise visual representation of origin-destination zones and top origin-destination pairs

Appendix B: Origin-Destination Survey Analysis for proposed toll plaza locations

Appendix C: Detailed traffic and revenue forecast – most likely scenario without overloading

Abbreviations (1)

AADC	Annual Average Daily Collection
AADT	Annual Average Daily Traffic
ADB	Asian Development Bank
ADT	Average Daily Traffic
AL	Axle Load
APC	Annual Potential Collection
BFSI	Banking, Financial Services, and Insurance
BOT	Build-Operate-Transfer
BPO	Business Process Outsourcing
CAGR	Compound Annual Growth Rate
CBIC	Chennai – Bengaluru Industrial Corridor
CJV	Car/ Jeep/ Van
CP	Check Plaza
CPI	Consumer Price Index
CTVC	Classified Traffic Volume Count
DBFOT	Design, Build, Finance, Operate, and Transfer
DPR	Detailed Project Report
EoDB	Ease of Doing Business
EPC	Engineering, Procurement and Construction
ETC	Electronic Toll Collection
EV	Electric Vehicle
FMCG	Fast Moving Consumer Goods
FY	Financial Year
GDP	Gross Domestic Product
GSDP	Gross State Domestic Product
GST	Goods and Services Tax
GVA	Gross Value Added
HAM	Hybrid Annuity Mode
HCV	Heavy Commercial Vehicle
HQ	Headquarter
ICD	Inland Container Depot
IHMCL	Highways Management Company Limited
INR	Indian Rupee
IRC	Indian Road Congress
IT	Information technology
ITES	Information Technology Enabled Services
KIADB	Karnataka Industrial Areas Development Board
Km	Kilometer
KWIN	Knowledge, Wellbeing, Innovation
LCV	Light Commercial Vehicle
LOS	Level of Service
MADT	Monthly Average Daily Traffic
MAV	Multi Axle Vehicle
MCW	Main Carriageway
MLFF	Multi Lane Free Flow
MMLP	Multimodal Logistics Park
MoRTH	Ministry of Road Transport and Highways
MoSPI	Ministry of Statistics and Programme Implementation

Abbreviations (2)

MSME	Micro, Small, and Medium Enterprises
MT	Million Tonnes
MTPA	Million Tonnes Per Annum
NE	National Expressway
NH	National Highway
NHAI	National Highways Authority of India
NHIT	National Highways Infra Trust
NMP	National Monetisation Pipeline
OD	Origin – Destination
OECD	Organisation for Economic Co-operation and Development
OSV	Oversized Vehicle
PCI	Per Capita Income
PCU	Passenger Car Unit
PIA	Project Influence Area
PIU	Project Implementation Unit
PPP	Public-Private Partnership
QADT	Quarterly Average Daily Traffic

RBI	Reserve Bank of India
RO	Regional Office
RoS	Rest of State
RTO	Regional Transport Office
SCF	Seasonal Correction Factor
SH	State Highway
SIAM	Society of Indian Automobile Manufacturers
STRR	Satellite Town Ring Road
TAZ	Traffic Analysis Zone
TIC	Translink Infrastructure Consultants Private Limited
TOT	Toll, Operate, Transfer
TP	Toll Plaza
WADT	Weekly Average Daily Traffic
WPI	Wholesale Price Index
2A	2 Axle
3A	3 Axle
3PL	Third-Party Logistics

Chapter 1: Introduction

- The assignment
- Objective and Scope of Work
- Approach and methodology
- Organisation of the report

This chapter outlines assignment background, scope of work, approach and methodology employed to ensure successful execution of the assignment.

Approach and methodology section highlights the structured approach which has been followed to gather data, conduct analysis, and make informed decisions throughout the project lifecycle. By employing a robust methodology, the consultant aims to ensure the accuracy, efficiency and reliability of the assignment's outcomes.

The assignment

Ministry of Road Transport and Highways (MoRTH) has entrusted **National Highways Authority of India** (hereinafter referred to as '**NHAI'** or '**client'**) for monetisation of public funded operational national highway projects under the framework of National Monetisation Pipeline (NMP).

In this context, NHAI has commissioned Translink Infrastructure Consultants Private Limited in association with Infra Brainiacs Private Limited (hereinafter referred to as '**TIC'** or '**consultant'**) to carry out traffic due diligence for following national highway section in Tamil Nadu. (hereinafter referred to as '**project highway**').

Project highway under asset monetization programme

Highway section	Toll plaza	Concerned NHAI field office
Nelamangala Tumakuru section of NH48	Kulumepalya (Bengaluru Rural district) Chokkenahalli (Tumakuru district) Halenijagal (Tumakuru district) Bharathipura and Honnenahalli - Check Plazas (Bengaluru Rural district) Dobbaspet and Halenijagal - Check Plazas (Tumakuru district)	Project Implementation Unit – Tumakuru Regional Office – Bengaluru

Source: Client

This document is the final report incorporating traffic data updates received up to October 2025 and confirmation from the client dated 6th January 2026 for recommended scenario. The report presents our understanding of the project highway, trend analysis of traffic and revenue, primary data analysis and traffic and revenue forecast for a concession period of 15 years.

Objective and Scope of Work

The principal objective of the study is to determine traffic and revenue forecast for 15 years. This assessment provides input to stakeholders to evaluate viable monetization options for the project highway.

The broad **scope of the work** of the assignment is as follows:

- Review of available historical traffic and revenue data and relevant document received from the client
- Carrying out traffic survey and analysis at the project highway :
  - 7 days continuous and direction-wise classified traffic volume count
  - 3 days origin-destination
  - 3 days axle load
  - Any other surveys on the project highway and alternate corridors as per the need
- Site visit and stakeholder consultation to understand traffic characteristics and network dynamics
- Review of observed growth trends of the project highway and corridor subject to availability of data
- Estimate vehicle category-wise traffic and revenue for the base year
- Determine future toll rates
- Assessing diversion due to competing transportation modes and routes, network development, future development plans in the region, etc.
- Vehicle category and ticket distribution-wise traffic and revenue forecast for concession period
- Scenario development: most likely, optimistic and pessimistic

Approach

The consultant adopted comprehensive approach to address the need of this assignment with key five focus areas as summarised in below figure.

Approach for the assignment

Expertise in motion	Forecasting forward flow	Economy drive highways	Data drives decisions; paves road to resilience	Trust in travel
Team with transportation engineering expertise and experience	Encapsulate all possible exogeneous impacts on traffic growth	Models integrating economic indicators for traffic growth projections	Using statistical techniques and tools for accurate insights and risk assessments	Maintain integrity, transparency, and ethical practices

Source: TIC

Methodology (1)

Methodology for the assignment

Key sections	Particulars
Project highway appreciation	▪ Assess the macro and micro road network, considering the overall road infrastructure and its specific sections ▪ Identify homogeneous/tollable sections with similar traffic patterns ▪ Evaluate any developments in the vicinity of the project highway that may impact economic growth and traffic volume ▪ Finalize survey locations and formats for data collection
Secondary data collection	▪ Gather relevant past detailed project report / traffic study report and draft concession agreement as per availability ▪ Collect historical monthly traffic data for the toll plazas of the project highway and neighbouring toll plazas on the corridor, both upstream and downstream ▪ Source vehicle category/mapper class wise electronic toll collection (ETC) data as most reliable dataset from Indian Highways Management Company Limited (IHMCL) through the client for toll plazas under study and on the corridor and alternate corridors as well as across the country (subject to receipt from the client or as per availability in the public domain) for understanding of the various trends of economy as well as modal / vehicle technology shift ▪ Gather economic indicators such as Consumer Price Index (CPI), Wholesale Price Index (WPI), per capita income, national, state and district Gross Domestic Product (GDP), employment rates and specific commodities related sales e.g., automobile, agriculture production etc. ▪ Gather demographic profiles and population data ▪ Collect secondary data related to alternative routes and modal shift developments if applicable
Primary data collection	▪ 7-day continuous videography-based classified traffic volume count survey to gather independent traffic volume data ▪ 3-day origin-destination and commodity survey to understand travel patterns, trip purposes, influence region, growth drivers etc. ▪ 3-day axle load survey to determine the load characteristics of vehicles ▪ 1-day vehicle registration number plate survey to estimate ticket segmentation of local commercial vehicle without national permit if required ▪ Stakeholder consultation through interviews and focused group discussions

Source: TIC

Methodology (2)

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Methodology for the assignment

Key sections	Particulars
Data analysis	▪ Review historical traffic and revenue data to understand growth trend, seasonality variation, elasticities for identified growth drivers through regression analysis subject to data availability and benchmark analysis of corridor ▪ Conduct data hygiene checks to identify errors, biases and inconsistencies in the collected data ▪ Analyse Weekly Average Daily Traffic (WADT) including peak hour, day and night traffic variances, as well as directional distribution of traffic for further input to various analysis ▪ Identify Traffic Analysis Zones (TAZ) and Primary Influence Areas (PIA) ▪ Determine vehicle category-wise origin-destination matrices, trip lengths and purposes ▪ Develop geographical distribution diagrams of traffic to visualize travel patterns ▪ Perform commodity and loading analysis ▪ Analyse historical journey tickets, including single, 24-hour return, daily multiple, monthly, local pass tickets and annual pass for passenger cars and understand the ground level situations for underlying patterns especially forced exemption if any in the case specific region and possibilities of reduction through proposed technological and administrative measures ▪ Estimate Annual Average Daily Traffic (QADT/AADT) for the base and future years as per case specific requirement ▪ Develop a traffic diversion model using IRC:SP:30 modality
Forecasting	▪ Utilize an econometric model based on IRC: 108-2015 guidelines to analyse the relationship between vehicle traffic/PIA and socio-economic parameters such as Per Capita Income (PCI), Gross Domestic Product (GDP) of district/state/national, population, specific economic activities etc. as relevant with the identified growth drivers ▪ Calculate growth rates for each vehicle category. Adjust the growth rates based on induced traffic and traffic diversion effects, if applicable ▪ Perform traffic forecasting for 15 years period - normal traffic followed by generated and diverted traffic due to network and developmental impacts ▪ Conduct capacity analysis to assess the adequacy of the project highway ▪ Forecast annual toll revenue for 15 years based on traffic and toll rates projections
Sensitivity and risk analysis	▪ Identify variables (macro-economic, growth drivers and relationships, scale and timeline of diversions, etc.) that significantly impact annual toll revenue and assess their sensitivity ▪ Develop scenarios for identified risks

Source: TIC

Organisation of the report

Report structure

Sr. No.	Chapter	Particulars
1	**Introduction**	Scope of the assignment, approach and methodology
2	**Project highway profile**	Characteristics of the project highway like network understanding, socio-economic background of the region and proposed infrastructure developments in the influence region and network
3	**Traffic analysis**	Past performance of the project highway based on historical traffic and revenue data, traffic survey data analysis
4	**Economic context and traffic growth**	Economic context of influence region, determination of traffic growth drivers and associated travel demand elasticities
5	**Baseline traffic and revenue forecast**	Elaborates method adopted for determining base year AADT, toll ticket distribution and revenue reconciliation
6	**Diversion analysis**	Impacts on the project highway due to proposed infrastructure developments in the influence region and network, assessment of induced traffic demand
7	**Final traffic and revenue forecast**	Traffic and revenue forecasts including diversions, scenario cases: most likely with and without overloading, optimistic and pessimistic

Source: TIC

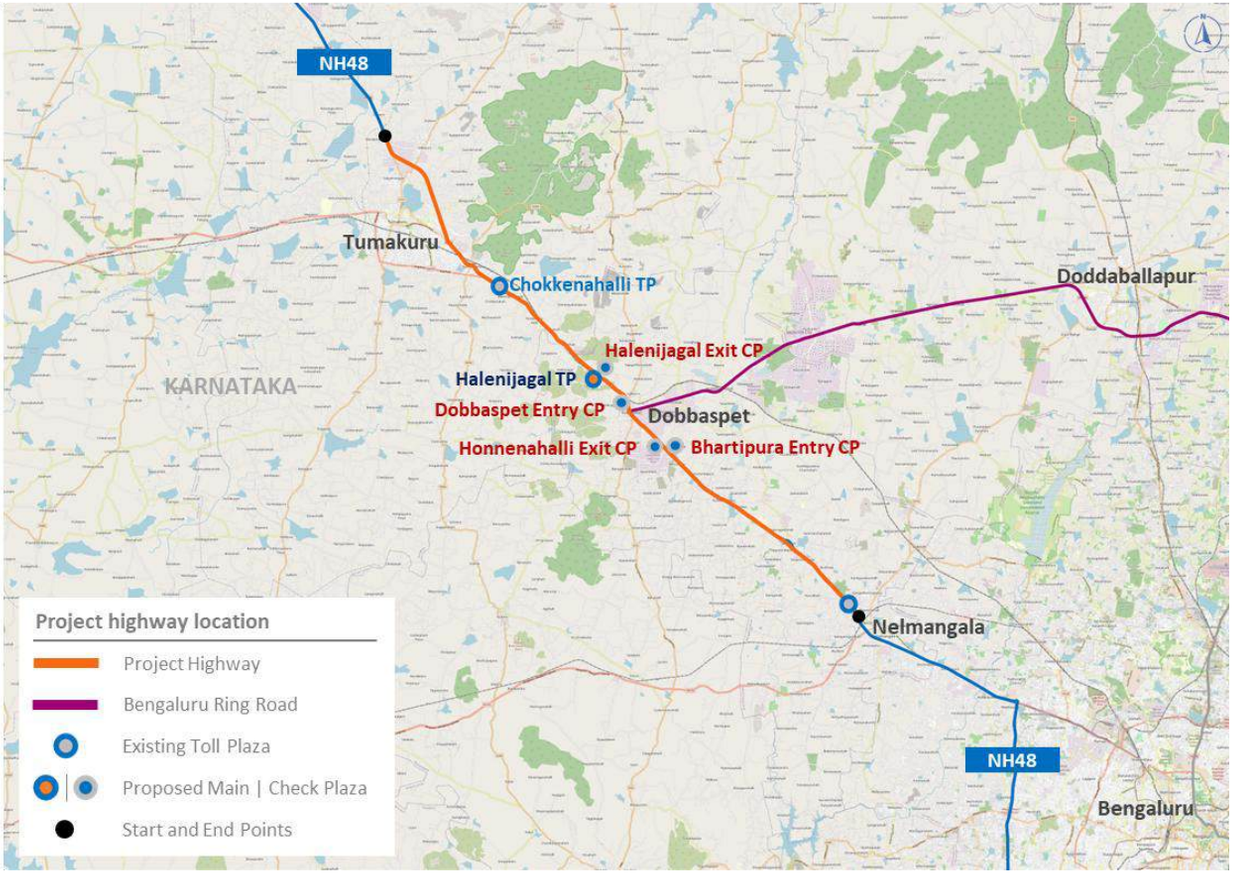
Chapter 2: Project highway profile

- Location and key details
- Economic activities in the region
- Understanding of network and traffic corridors
- Proposed road network and infrastructure development in the influence region

This chapter exhibits our understanding of the project highway and key details, economic activities in the region and strategic network context based on site visit and stakeholder consultation. It covers list of infrastructure project development in the region and network which would have impact on the performance of the project highway.

Location of the project highway

Project highway location in national and state context



Source: TIC analysis (map not to scale)

- **Located at the southern end of golden quadrilateral's ~1,000 km Mumbai – Bengaluru corridor (NH48)**, this point serves as gateway to Bengaluru and handles high volume of freight traffic moving towards western and northern India and neighbouring state of Tamil Nadu, supporting inter-state trade movement.
- The project highway **extends intra-state reach to Hassan/Mangaluru and Mysuru** of western Karnataka, through NH73/NH75 and NH984A/275 respectively, helping regional economy to grow with support of state capital.
- **~30 km section connecting Nelmangala (outskirts of Bengaluru) and Tumakuru,** increasingly seen as interconnected urban centers. The state government proposals aiming to develop Tumakuru as an extension or "Greater Bengaluru" through infrastructure like industrial corridors, smart city projects, and potential metro links, aiming to decongest Bengaluru and foster growth in the satellite town, creating a twin-city dynamic for economic and residential expansion.

Project snapshot (1)

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Key project details

Particulars	Nelamangala Tumakuru section of NH48
Length (km)	**Present length:** 32.500 km **Revised length:** 44.668 km for asset monetization proposal Tolling of Tumakuru Bypass* (km 62.000 to km 74.168, length 12.168 km) is currently being exercised at adjacent Karjeevanahalli toll plaza (under BOT concession) and reimbursed to NHAI by BOT concessionaire. This section will be added for this monetization bundle. Hence, this 12.168 km length to be added for asset monetization proposal.
Lane and pavement	4-lane divided carriageway, flexible pavement / rigid at toll plaza (4 to 6 lane widening is under implementation)
Chainage	km 29.500 (Nelmangala) to km 74.168 (Tumakuru Bypass end)
History	▪ Nelamangala Tumakuru section was under 2 to 4 lane DBFOT (Toll) concession from June 2002 by JAS Toll Road Company Limited for 19 years. Concessionaire invoked arbitration in May 2017 in respect of various claims and finally the concession got terminated in April 2022. ▪ Post DBFOT concession termination, section was managed under public funded modality with short term toll contract **with NH Fee Rule 1997 which was revised to NH Fee Rules 2008 from 25th August 2025.** ▪ H G Infra Engineering Limited has been awarded 4 to 6 lane work in May 2022 under EPC mode for full length of 44.668 km (km 29.500 to km 74.168). Out of which km 49.900 to km 61.520 (11.62 km length) of section was de-scoped from EPC Contract and bid invited for revision in DPR. – **Nelmangala to Dobbaspet:** 4 to 6 lane widening construction ongoing; expected completion by March 2027 – **Dobbaspet to Tumakuru:** bid invited for revision in 4 to 6 lane widening DPR; expected completion by September 2028 – **Tumakuru to Tumakuru Bypass End:** 4 to 6 lane widening construction ongoing; expected completion by March 2027
Present tolling modality	2 ETC enabled toll plazas ▪ **Kulumepalya** (km 30.000): for tollable section between Nelmangala (km 29.500) to Dobbaspet (km 50.000) ▪ **Chokkenahalli** (km 61.500): for tollable section between Dobbaspet (km 50.000) to Tumakuru (km 62.000) ▪ Tolling of Tumakuru Bypass (km 62.000 to km 74.168, length 12.168 km) is currently being exercised at adjacent Karjeevanahalli toll plaza (under BOT concession) and reimbursed to NHAI by BOT concessionaire.

Source: PIU Tumakuru and NHAI HQ

* Tumakuru Bypass is only a name and does not meet the characteristics of a bypass for determining the tolling length i.e., 1.5 times of linear length rule is not applicable

Project snapshot (2)

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Key project details

Particulars	Nelamangala Tumakuru section of NH48		
Tollable sections	**Nelmangala to Dobbaspet**	**Dobbaspet to Tumakuru**	**Tumakuru Bypass***
Toll plaza locations	**Kulumepalya** (km 30.000)	**Chokkenahalli** (km 61.500)	Toll being exercised at adjacent Karjeevanahalli toll plaza (km 105+530) as interim arrangement.
District	Bengaluru Rural	Tumakuru	Tumakuru
Tolling start date	10th February 2004	10th February 2004	20th January 2015
Length (km)	20.500	12.000	12.168
Present tolling length (km)	22.444	13.350	12.848
ETC Traffic (FY26 till October 2025)	7 months ADT: 39,367 PCU corresponding 7 months ADT: 74,707	7 months ADT: 34,778 PCU corresponding 7 months ADT: 70,612	Toll being collected for traffic of Karjeevanahalli toll plaza and tolling length of Tumakuru Bypass. FY26 till 22nd Jun'25: INR 11.79 Crore received by NHAI INR 12.15 Crore collection by concessionaire
ETC Traffic composition (FY26 till October 2025)	55% CJV/Mini LCV 20% 2A/LCV 9% Bus 16% 3A/MAV	52% CJV/Mini LCV 19% 2A/LCV 10% Bus 19% 3A/MAV	
ETC Revenue	FY25 : INR 62 Crore FY26 till Oct'25 : INR 39 Crore	FY25 : INR 58 Crore FY26 till Oct'25 : INR 35 Crore	
ETC Revenue composition (FY26 till October 2025)	29% CJV/Mini LCV 24% 2A/LCV 16% Bus 32% 3A/MAV	26% CJV/Mini LCV 23% 2A/LCV 16% Bus 35% 3A/MAV	
Micro-diversions at toll plaza location	Nil	Nil	Nil
Overloading penalty	No overloading penalty / fee is being levied at present based on understanding from site visit and discussion with PIU Tumakuru / toll operators		

Source: PIU Tumakuru and NHAI HQ

* Tumakuru Bypass is only a name and does not meet the characteristics of a bypass for determining the tolling length i.e., 1.5 times of linear length rule is not applicable

Project snapshot (3)

Key project details

Particulars	Nelamangala Tumakuru section of NH48		
Tollable sections	**Nelmangala to Dobbaspet**	**Dobbaspet to Tumakuru**	**Tumakuru Bypass***
Toll plaza locations	**Kulumepalya** (km 30.000)	**Chokkenahalli** (km 61.500)	Toll being exercised at adjacent Karjeevanahalli toll plaza (km 105+530) as interim arrangement.
Present toll operator with Annual Potential Collection (APC) and quoted remittance	Toll contract is awarded at project level which includes both toll plazas of Kulumepalya and Chokkenahalli **Sri Sai Enterprise** **Duration** : November 2025 to November 2026 (1 Year) **Annual Potential Collection** : INR 121.17 Crore **Quoted remittance** : INR 123.67 (FY26 tolling rates)		--
Previous tolling operator with Annual Potential Collection (APC) and Quoted Remittance	**Prakash Asphalts & Toll Highways (India) Limited** **Duration** : October 2024 to October 2025 (1 Year) **Annual Potential Collection** : INR 122.60 Crore (NH Fee Rules 1997) **Quoted remittance** : INR 118.12 (FY25 tolling rates)		--

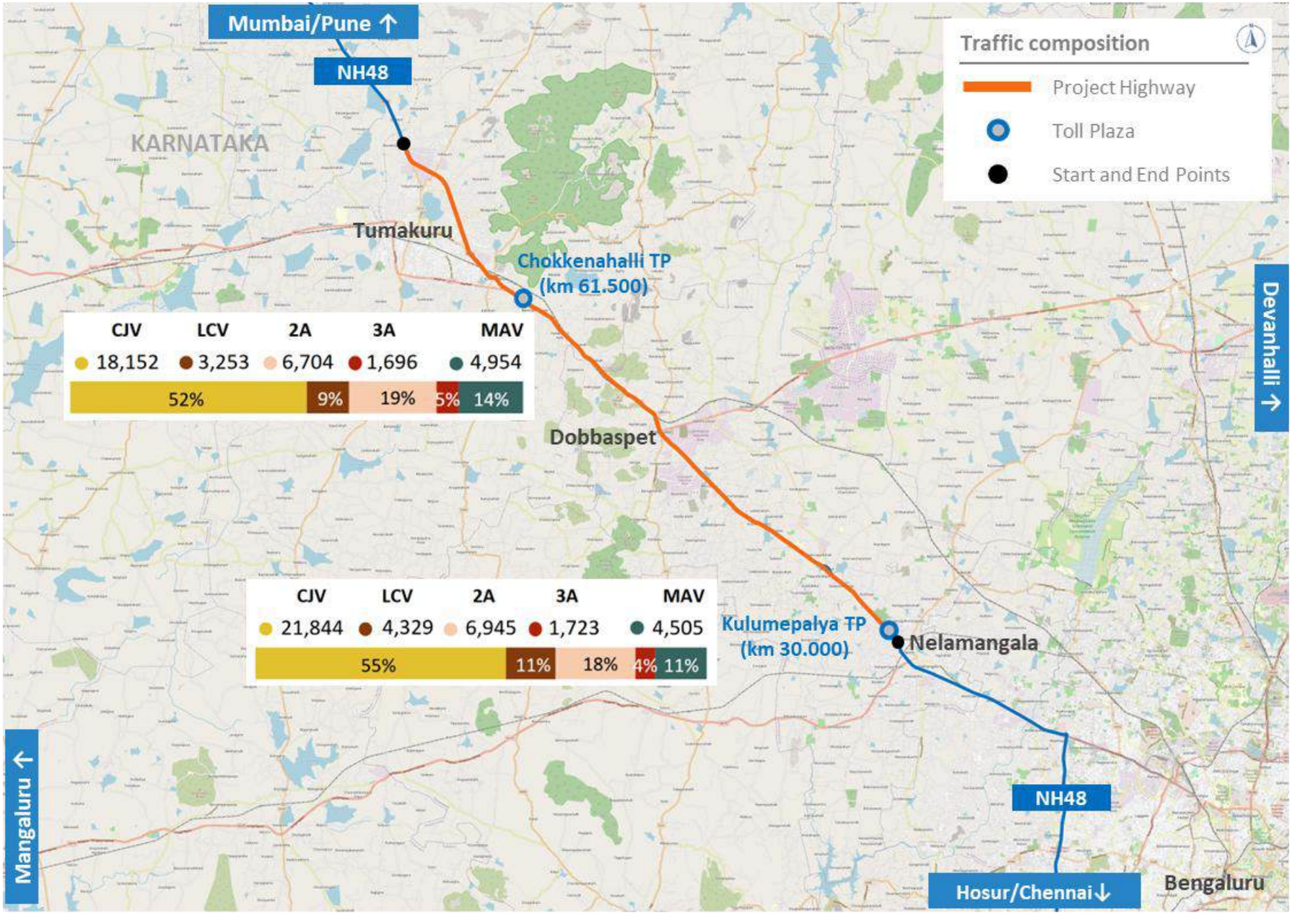
Source: PIU Tumakuru and NHAI HQ

* Tumakuru Bypass is only a name and does not meet the characteristics of a bypass for determining the tolling length i.e., 1.5 times of linear length rule is not applicable

- Post 4 to 6 lane completion of all tollable sections, the project highway (km 29.500 Nelmangala to km 74.168 Tumakuru Bypass end) will be **access-controlled with service road on both side and limited entry/exit on main carriage way** as conceptualised by the client during 4 to 6 lane approval.
- Future tolling modality post completion of 4 to 6 lane widening is explained on Pg 20.

Project snapshot (4)

ETC Traffic composition of FY26 till October 2025



Source: TIC analysis (map not to scale)

Future tolling modality post completion of 4 to 6 lane widening (1)

Post 4 to 6 lane completion of all tollable sections, the project highway (km 29.500 Nelmangala to km 74.168 Tumakuru Bypass end) will be **access-controlled with service road on both side with limited entry/exit on main carriage way** as conceptualised by the client during 4 to 6 lane approval.

- **Existing toll plazas: Kulumepalya (km 30.000) and Chokkenahalli (km 61.500)** will be dismantled on completion of 4 to 6 lane widening.
- **New Single Mainline Plaza:** Instead of two mainline plazas within 60 km of distance at present, there will be single mainline plaza at **Halenijagal (km 53.100)** where toll will be collected for entire project highway.
- In context of present and future road network development, Dobbaspet will be major junction where traffic will have options to choose the further routes for entering/exiting Bengaluru Ring Road (north ring) and Satellite Town Ring Road (STRR, south ring).
- Road users belong to Dobbaspet, and nearby Sompura Industrial Area will enter/exit at Dobbaspet form either side i.e. Nelmangala or Tumakuru.
- For road users availing facility between Dobbaspet and either side i.e. Nelmangala or Tumakuru, the client has **proposed two Entry/Exit Check Plazas for each direction of travel considering Dobbaspet as junction.**
  - **Two Entry/Exit Check Plazas for traffic movement between Tumakuru/west and Dobbaspet/north-west/south-east i.e. Dobbaspet Entry CP (km 49.900) and Halenijagal Exit CP (km 53.100)**
  - **Two Entry/Exit Check Plazas for traffic movement between Nelmangala/east and Dobbaspet/north-west/south-east i.e. Bharathipura Entry CP (km 46.375) and Honnenahalli Exit CP (km 47.425)**
- Timeline of commencement / closure of mentioned toll plazas / check plazas are as follows:
  - **Kulumepalya (km 30.000):** will be terminated on 31st March 2027 (FY27) on completion of 4 to 6 laning of Nelmangala to Dobbaspet section
  - **Halenijagal (km 53.100):** will be operational from 1st April 2027 (FY28)
  - **Bharathipura Entry CP (km 46.375) and Honnenahalli Exit CP (km 47.425):** will be operational from 1st April 2027 (FY28) along with Halenijagal TP for Nelamangala to Dobbaspet section
  - **Chokkenahalli (km 61.500):** will be terminated on 30th September 2028 (H1 FY29) on completion of 4 to 6 laning of Dobbaspet to Tumakuru and entire project highway length will be charged at Halenijagal TP
  - **Dobbaspet Entry CP (km 49.900) and Halenijagal Exit CP (km 53.100):** will be operational from 1st October 2028 (H2 FY29)

Future tolling modality post completion of 4 to 6 lane widening (2)

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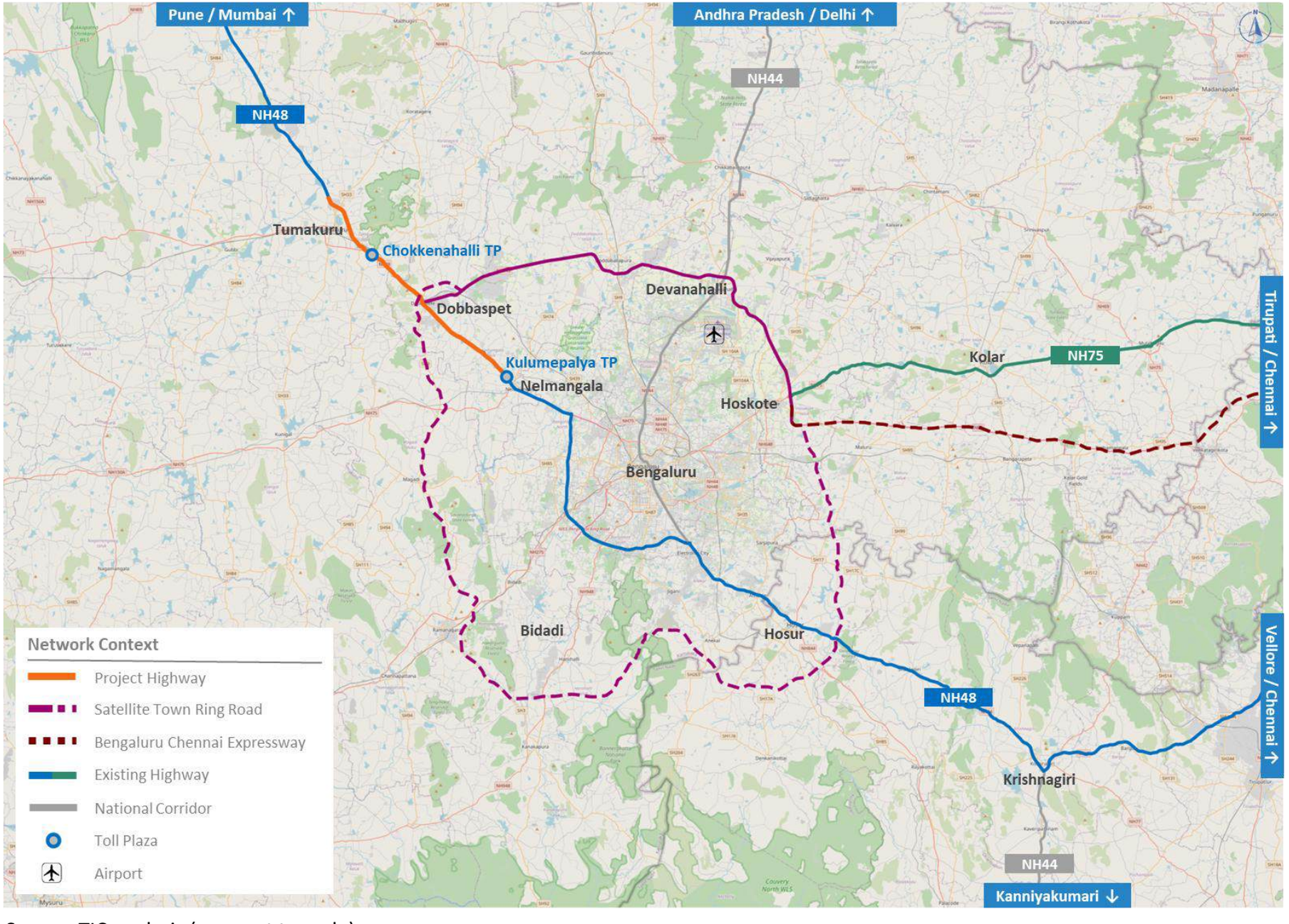
Future road network development and Dobbaspet as critical junction



Source: TIC analysis (map not to scale)

Future tolling modality post completion of 4 to 6 lane widening (3)

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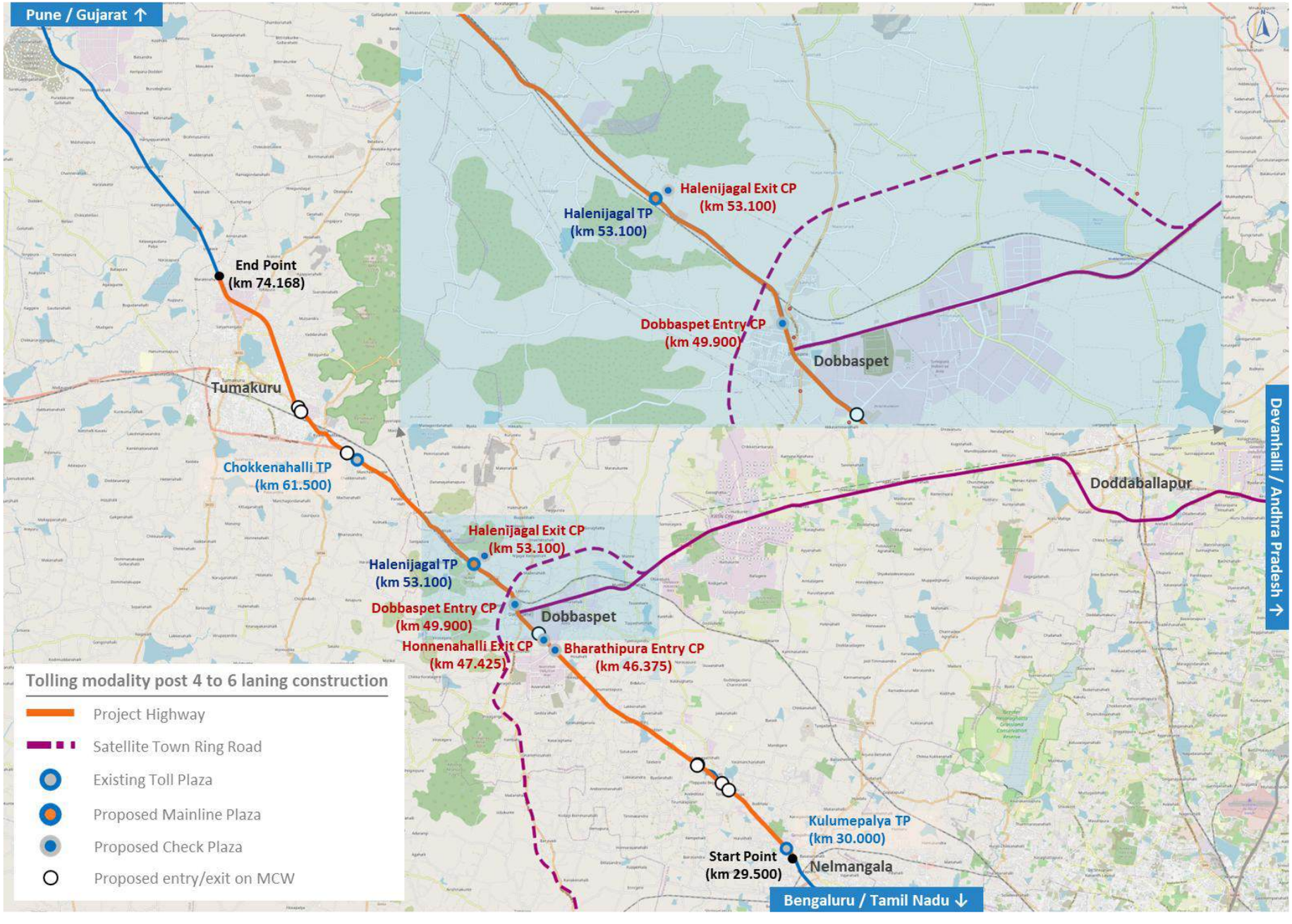
Future tolling modality post completion of 4 to 6 lane widening: 1 Mainline Plaza and 4 Check Plazas



Source: TIC analysis (map not to scale)

Economic activities in influence region (1)

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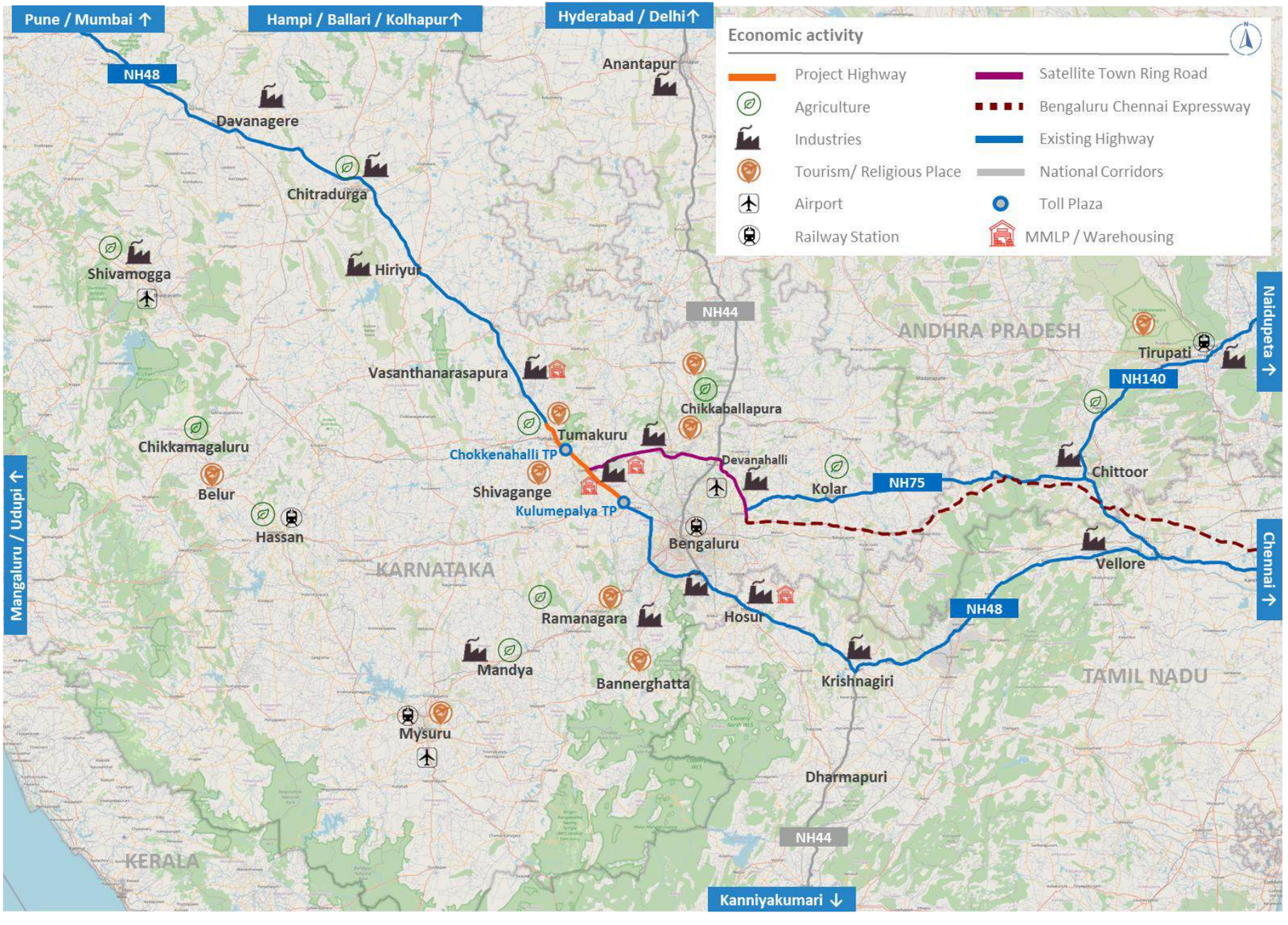
Economic activities in influence region



Source: TIC analysis (map not to scale)

Economic activities in influence region (2)

1 **Industry in the region**

- **Nelamangala–Dobbaspet–Tumakuru** section serves as a vital industrial and logistics backbone along the Bengaluru–Pune–Mumbai corridor, carrying steady freight traffic generated by automobile components, engineering goods, steel, cement and organised logistics operations.
- Industrial clusters at **Dobbaspet and Vasanthanarasapura** host major automobile, machinery, fabrication, and food-processing units, generating regular inbound raw material and outbound finished goods movement, primarily oriented toward Bengaluru and northern markets.
- A wide base of **ancillary industries and MSMEs** along the corridor supplies parts and services to Bengaluru-based manufacturers, resulting in frequent short- and medium-distance goods movement.
- Section supports heavy movement of construction materials such as **cement, steel** and **aggregates,** driven by industrial expansion, real estate growth and ongoing infrastructure projects in Tumakuru and the Bengaluru periphery. Cement and Steel is being supplied from **Chitradurga/Ballari** and surroundings region.
- The corridor provides **first- and last-mile connectivity** for industrial units, linking factories, warehouses, ICDs, and logistics parks on NH48 for onward movement to ports and consumption centres.
- With the growth of **e-commerce, third-party logistics (3PL)** and **organised warehousing sector,** the section increasingly caters time-sensitive freight traffic, resulting in higher usage by LCVs and MAVs.
- Karnataka Industrial Areas Development Board (KIADB) is in-process of development of industrial area across Bengaluru Ring Road i.e., **Dobbaspet – Doddaballapur – Hoskote belt**. Projects like **KWIN City (Knowledge, Wellbeing, Innovation City), Multimodal Logistics Park** etc. Proposed Foxconn Manufacturing Facility is in the same belt.
- KWIN City is envisioned as a futuristic 5,800-acre hub with focused areas as life sciences and healthcare, future mobility (EV manufacturing), semiconductors and advanced materials, aerospace technology.
- **Hosur industrial area:** Though part of Tamil Nadu in context of state administration but important part of Bengaluru industrial ecosystem. Strong presence of **automobiles, electronics and manufacturing** and home to giants like Ashok Leyland, TVS Motors, Titan etc.

Overall, Nelamangala–Tumakuru stretch acts as a dependable industrial lifeline, enabling smooth logistics flow, supporting employment and sustaining long-term industrial growth across central Karnataka.

Source: TIC secondary research

Economic activities in influence region (3)

TRANSLINK® Infrastructure Consultants Pvt Ltd Smart Consulting

2 Agriculture and allied activities

- Section forms agricultural hinterland, with regular movement of grains, pulses and millets, commercial crops, fruits and vegetables, towards Bengaluru's wholesale markets, mandis and food processing centers.
- **Grains, pulses and millets:**
  - **Ragi:** Hassan, Chikkamagaluru
  - **Jowar and maize:** common in northern, arid zones like Bijapur (Vijayapura), Belagavi
  - **Rice:** cultivated across many areas, though yield varies
  - **Wheat:** majorly in Belagavi, Vijayapura, Dharwad
- **Commercial crops:**
  - **Coffee and Black Pepper:** Hassan, Chikkamagaluru, Kodagu (Coorg)
  - **Sugarcane:** high production in drought-prone northern areas, including Belagavi
  - **Cotton:** significant in districts like Yadgir, Kalaburagi
  - **Groundnut and Sunflower**: Major oilseeds grown throughout the state
- **Horticulture**-driven traffic is prominent along the corridor, as **mango, banana, tomato, supari** and **coconut** are transported daily in LCVs to Bengaluru, Tumakuru and nearby agro-processing units. Kolar has Agricultural producers' Marketing committee, which is known for one of the largest supply place of Tomato.
- Section supports significant input supply traffic, including **fertilizers, seeds, pesticides** and **farm machinery** moving from Bengaluru and Tumakuru to rural production clusters.
- **Sericulture-related** movements generate steady short- and medium-haul traffic, with **raw silk cocoons** transported to reeling units and finished silk products moving toward textile markets.
- **Floriculture** activities in surrounding villages contribute to time-sensitive, early-morning vehicle movement, especially toward Bengaluru's flower markets, reflecting the corridor's role in perishable goods transport.
- Presence of **cold storage units,** collection centers and small agro-processing facilities along the stretch adds to consistent two-way freight movement, particularly by LCVs.
- Seasonal harvest cycles result in peaks in agricultural freight traffic, reinforcing the importance of this corridor in supporting rural livelihoods and linking farms (western Karnataka) with urban consumption centers like Bengaluru and surroundings.

Source: TIC secondary research

Economic activities in influence region (4)

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3 Tourism

- The project highway connects Bengaluru to Chitradurga which serves as a tourist belt. **Hampi** which is a UN designated protected site, and a major tourist destination attracts visitors across the world.
- **Bengaluru,** serves as a major tourism hub with attractions like Lalbagh, Cubbon Park, Vidhana Soudha, and Bengaluru Palace, drawing both leisure and business visitors.
- **Tumakuru** is known for Shree Siddaganga Mutt, Devarayanadurga Hills, and Namada Chilume, making it a key center for religious and eco-tourism.
- **Nelmangala Dobbaspet** section provides access to nearby hill temples and scenic spots, promoting short-distance and weekend tourism from Bengaluru.
- **Shivagange Hills**, a popular trekking and pilgrimage site, further strengthens the corridor's spiritual and recreational tourism potential.

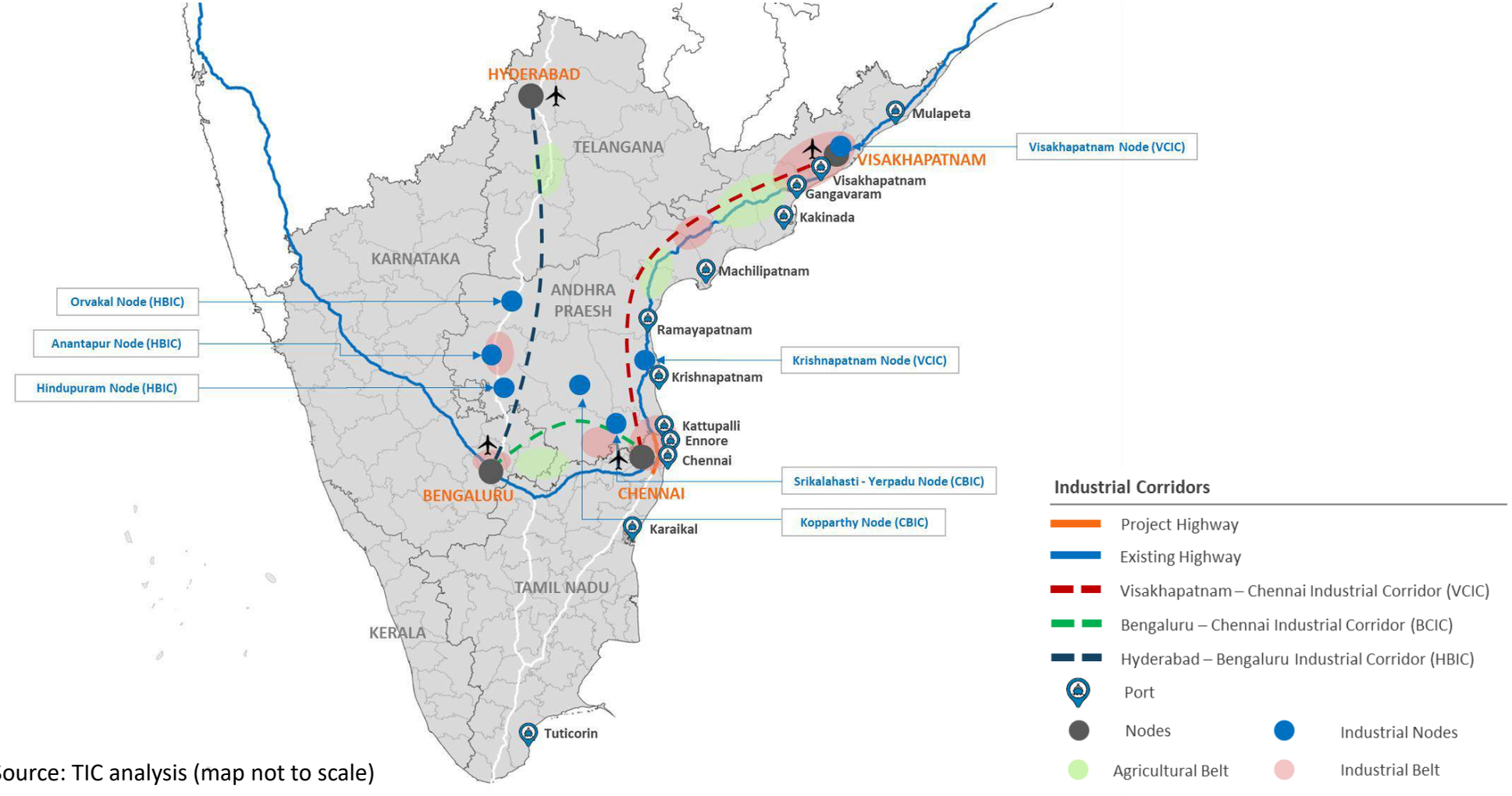
4 Social / Educational / Recreational

- Thousands of people travel daily between Tumakuru and Bengaluru for business and social need, relying heavily on road transport. Tumakuru is famous for religious and educational institutes.
- Tumakuru and Bengaluru are not formally designated as **'twin cities'**; however, they exhibit increasing economic and transport interdependence. This is driven by Bengaluru's rapid metropolitan expansion and Tumakuru's emergence as an industrial hub and potential satellite city, resulting in growing commuter movement, freight traffic, and shared transport infrastructure.
- Recognizing these trends, the government has proposal for integrating the two urban regions to support coordinated transport planning, improve regional connectivity, optimize corridor development, and ensure efficient movement of people and goods.
- A new **international cricket stadium** is proposed near the Vasanthanarasapura Industrial Township in Tumakuru. The foundation stone was laid by the Hon'ble Chief Minister of Karnataka on 3 December 2024, and completion is expected within two years. This will add the passenger traffic as and when any event will be realized at the venue.

Source: TIC secondary research

Economic activities in influence region (5)

Industrial corridors under development



Source: TIC analysis (map not to scale)

- **Chennai – Bengaluru Industrial Corridor (CBIC)** proposes high impact / market driven nodes at **Tumkur in Karnataka (NH48), Ponneri in Tamil Nadu (NH16), Krishnapatnam/Nellore in Andhra Pradesh (NH16).**
- **Tumakuru Industrial Node** under Chennai–Bengaluru Industrial Corridor (CBIC) is rapidly emerging as a major manufacturing and warehousing hub, with investments in electronics, defence manufacturing, food processing and renewable energy, significantly increasing multi-axle and container traffic on the project highway.

Our understanding of traffic corridor and road network (1)

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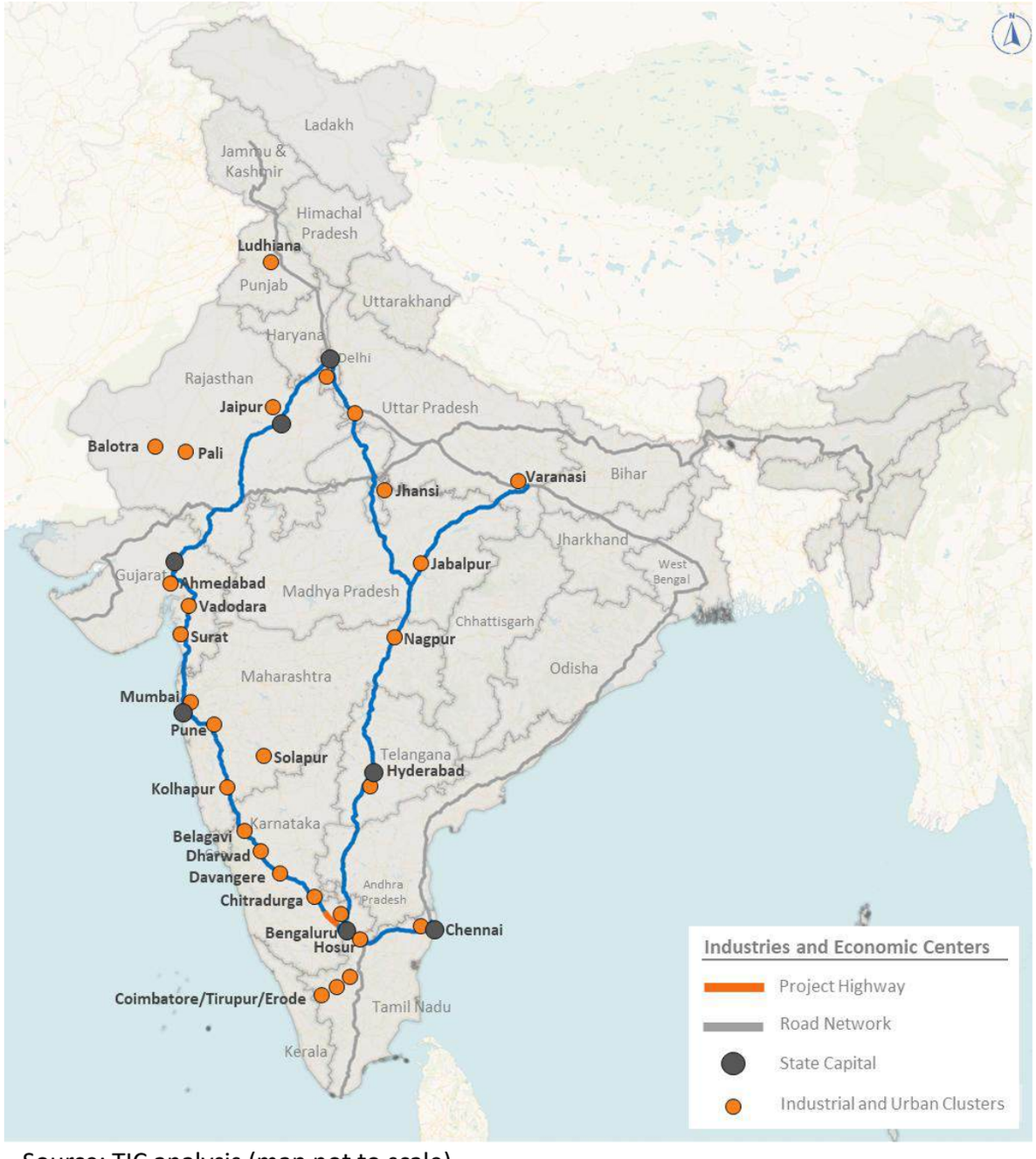
Traffic corridors and their contribution



Source: TIC analysis (map not to scale)

National corridor (long-distance traffic)

The project highway forms a part of Golden Quadrilateral NH48 and establishes link among states of Rajasthan, Gujarat, Maharashtra, Karnataka, Goa and Tamil Nadu and acts as a national connector.

Major industrial and commercial centers:

- Gujarat: Ahmedabad, Vadodara, Surat
- Maharashtra: Mumbai, Pune
- Karnataka: Belgavi, Hubli, Dharwad, Davangere, Bengaluru
- Tamil Nadu: Hosur, Vellore, Chennai

Linking textile clusters across NH48:

- Rajasthan: Balotra, Pali
- Gujarat: Ahmedabad, Surat
- Maharashtra: Kolhapur/Gandhinagar, Ichalkaranji, Bhiwandi
- Tamil Nadu: Coimbatore, Erode, Tirupur
- Significant volumes of textile-related freight traffic therefore traverse the project highway.

Transport and logistics hub: Ahmedabad, Mumbai (Bhiwandi), Pune, Kolhapur, Hubli, Nelmangala (Bengaluru), Chennai are well established logistics zones on this network.

Our understanding of traffic corridor and road network (2)

Mumbai/Pune – Chennai corridor

- Western India traffic destined/originated from Chennai region is divided among three routes i.e.,
  - **Route 1:** via NH48 Pune-Bengaluru-Chennai (the project highway)
  - **Route 2:** via NH65/SH3 Pune-Solapur-Hyderabad-Adanki-Chennai
  - **Route 3:** via NH65/NH716 via Pune-Solapur-Hyderabad-Kurnool-Tirupati-Chennai
- Historically, Mumbai/Pune – Chennai traffic movement was using only NH48 Golden Quadrilateral route via Mumbai-Belgaum-Bengaluru-Chennai for west - south movements.
- Due to ongoing 4 to 6 lane construction activities at Kagal-Satara section and Hubli-Chitradurga section of NH48 in last two years, traffic has diverted to Route 2. Route 3 was least preferred due to ongoing construction activities as part of Surat Chennai Expressway development.
- For Route 1 (the project highway), another network change was observed when **Bengaluru Ring Road (north ring) was commenced around June'24.** Hence, Kolar / Chennai bound traffic opted for Bengaluru Ring Road (north ring).

Regional linkages (medium and short-distance traffic)

- The project highway, being a part of NH48, acts as a spinal cord for Karnataka which includes Belagavi, Dharwad, Haveri, Davangere, Chitradurga, Tumakuru, Bengaluru Urban and Rural districts. District's trade relations and economy are aligned with state capital of Bengaluru.
- NH48 regional network and the project highway together establishes important regional connectivity between Karnataka and neighbouring states i.e., Maharashtra, Goa and Tamil Nadu. This facilitates the movement of goods and raw materials between Pune, Belagavi, Hubballi, Bengaluru and Hosur, supporting inter-state industrial supply chains and distribution networks.
- Connects key industrial and logistics hubs, such as Dobbaspet Industrial Area and the Tumakuru Industrial Node (under the Chennai–Bengaluru Industrial Corridor), boosting regional manufacturing and export activity.
- Provides strong local connectivity between Bengaluru's western outskirts, Nelamangala, Dobbaspet, and Tumakuru, acting as a major conduit for goods from local industries to larger markets as well as passenger and employee commute along the Bengaluru–Tumakuru growth corridor.

With the ongoing industrial expansion and suburban development, the section has evolved into a dual-function corridor, efficiently balancing long-distance freight movement with regional commuter and industrial traffic. Enhances access to local markets, warehousing zones, and small-scale industries, strengthening rural-urban linkages and last-mile freight distribution.

Corridor traffic summary (1)

Pune-Bengaluru corridor of NH48

Highway section	Concessionaire / Operator	Average PCU (approx.)
Katraj – Satara	BOT (Toll) – Cube Highways	66,000 / 51,000
Satara – Kagal	BOT (Toll) – Adani Group	46,000 / 38,000
MH/KA Border – Belgaum	NHIT (Private InvIT Bundle 1)	28,000 / 31,000
Belgaum – Dharwad	BOT (Toll) – Maple Highways	27,000
Hubbali – Haveri – Davangere – Chitradurga	NHIT (Private InvIT Bundle 3)	27,000
Chitradurga – Tumakuru	BOT (Toll) – IRB Infrastructure	57,000 / 63,000
Tumakuru – Nelmangala	Toll - Public Funded	68,000 / 72,000
Nelmangala – Bengaluru	Toll - Public Funded	1,20,000

Source: TIC analysis

Pune-Chitradurga corridor of NH65/NH52

Highway section	Concessionaire / Operator	Average PCU (approx.)
Pune – Solapur	BOT (Toll) – IRB Infrastructure	46,000
Solapur – Bijapur	BOT (Toll) – IJM (India) Infrastructure Limited	25,000
Bijapur – Hungund	BOT (Toll) – Interise (CPPIB	34,000 / 29,000
Hungund – Hospet	BOT (Toll) – Oriental Structure Engineering (OSE)	39,000 / 50,000
Hospet – Chitradurga	BOT (Toll) - TRIL	32,000

Corridor traffic summary (2)

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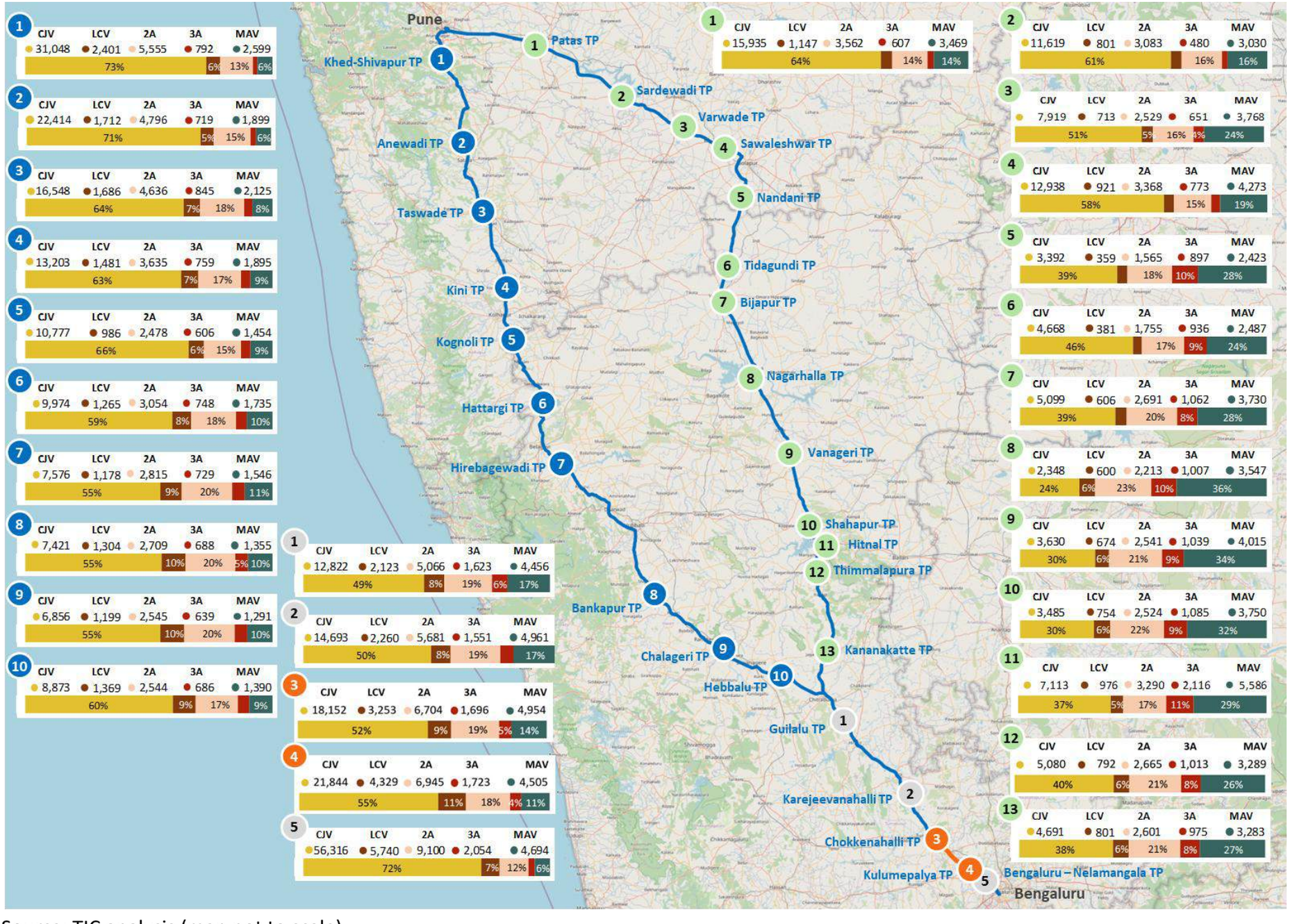
Traffic composition on the corridor: AADT of FY26 till October 2025



Source: TIC analysis (map not to scale)

Site photographs

Start Point (km 29.500)

Kulumepalya Toll Plaza (km 30.000)

Nelmangala to Dobbaspet – Ongoing Construction Activity (6 lanning)

Betel nut (Supari) Cultivation

Chokkenahalli Toll Plaza (km 61.470)

Tumakuru Bypass – ongoing 4 to 6 lane construction activities

Source: TIC site visit

Proposed infrastructure development in the region (1)

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Network and infrastructure development in the influence region (refer map on Pg 36)

Particulars of the development	Authority / Mode of Development / Developer	Status / expected completion	Possible impact
NH66 Upgradation	NHAI Upgradation of multiple sections to 6 lane	Under construction FY28 for Kerala stretches connecting till Belagavi	**Negative** Traffic movement between Kagal/north and Kochi / south Only hazardous cargo traffic like propane gas and other chemical and petroleum products traffic using NH48 as safety precautions.
Satellite Town Ring Road / Bengaluru Ring Road (North and South Ring)	NHAI / HAM Multiple packages and developers	**North Ring:** Dobbaspet – Hoskote: Operational Hoskote – Hosur: Expected completion by FY28 **South Ring:** Dobbaspet – Ramanagara – Hosur: Expected completion by FY30	**Negative** **North Ring of STRR / Bengaluru Ring Road** Traffic movement between Dobbaspet/north-west and Hosur/south-east **South Ring of STRR** Traffic movement between Dobbaspet/north and Mysuru/north Kerala
Surat – Nashik – Chennai Expressway	NHAI / HAM Multiple packages and developers	Expected completion by FY30	**Negative** Traffic movement between Solapur/west and Chennai/ south Traffic movement between Hyderabad/north and Chennai/ south
Pune Bengaluru Expressway	NHAI	No development since last year post discussion on initial alignment options.	**Nil** Indicatively not moving ahead considering various constraints as per guidelines form line ministry to the client.
Bengaluru Tumakuru Metro line	Bangalore Metro Rail Corporation Limited (BMRCL)	Feasibility stage approval received and DPR is expected to start. Expected commencement of operations is in FY32.	**Negative** Traffic movement between Bengaluru and Tumakuru

Source: TIC research and analysis

Proposed infrastructure development in the region (1)

TRANSLINK® Infrastructure Consultants Pvt Ltd Smart Consulting

Network and infrastructure development in the influence region (refer map on Pg 36)

Particulars of the development	Authority / Mode of Development / Developer	Status / expected completion	Possible impact
Bengaluru Chennai Expressway (4 lane) **Chittoor Thatchoor section of NH716B**	NHAI / HAM Multiple phases/packages and developers	**Phase 1 of NE7 (Karnataka):** operational **Phase 2 of NE7 (Andhra Pradesh):** Total 3 packages; under construction and expected to be operational by mid FY28 **Phase 3 of NE7 (Tamil Nadu):** Total 3 packages; under construction and expected to be operational by mid FY28 **Chittoor Thatchoor section of NH716B:** Total 4 packages; under construction and expected to be operational by end of FY28	**Nil** These development will further enhance Bengaluru-Chennai corridor as well as last mile connectivity to Chennai Port Cluster. Part of diversion due to Satellite Town Ring Road / Bengaluru Ring Road (North and South Ring). No separate impact expected.
Shivamogga / Tumakuru Bypass	NHAI / HAM Multiple packages	Under construction Expected completion in FY28/FY29	**Nil** Proposed access-controlled with open tolling modality and mainline plaza at Halenijagal (km 53.100) will eliminate any diversion possibility. This alternate route will help in future during congestion on the concerned tollable sections.

Source: TIC research and analysis

Proposed infrastructure development in the region (1)

TRANSLINK® Infrastructure Consultants Pvt Ltd *Smart Consulting*

Network and infrastructure development in the influence region (refer map on Pg 36)

Particulars of the development	Authority / Mode of Development / Developer	Status / expected completion	Possible impact
Bengaluru Business Corridor	State Government / Multiple or Single Package Mode of development is not yet decided but tolling will be exercised.	**Peripheral Ring Road (PRR), proposed nearly 20 years ago, is now rebranded as Bengaluru Business Corridor.** The proposed development will be likely of mirror semi-circle to NICE Road with ~117 km length, starting from junction of NH48/NICE Road to Electronic City via Yelahanka/Whitefield. Land acquisition under progress Expected to take minimum 6-8 years to complete in case.	**Nil** The consultant did not consider any impact of this development in line with discussion with client. ▪ Uncertainty for implementation viability/timeline base on historical events and challenges associated with land acquisition ▪ Objective for this development is to provide alternate option for city traffic and to decongest exiting trunk line ▪ Alternate option for NICE road considering challenges associated with NICE Road ▪ Expected to be operational after 6 years with optimistic timeline. BY that time, STRR/Bengaluru Ring Road will be operational, and which will be far better option for through traffic to avoid city congestion. Both option will have toll. Even if gets developed, it will have positive impact on the project highway as total potential divertible traffic of STRR/Bengaluru Ring Road will not get diverted. Hence, it will be upside and not consider as part of central case considering uncertainty associated with proposed development and being conservative in such business case.

Source: TIC research and analysis

Proposed infrastructure development in the region (1)

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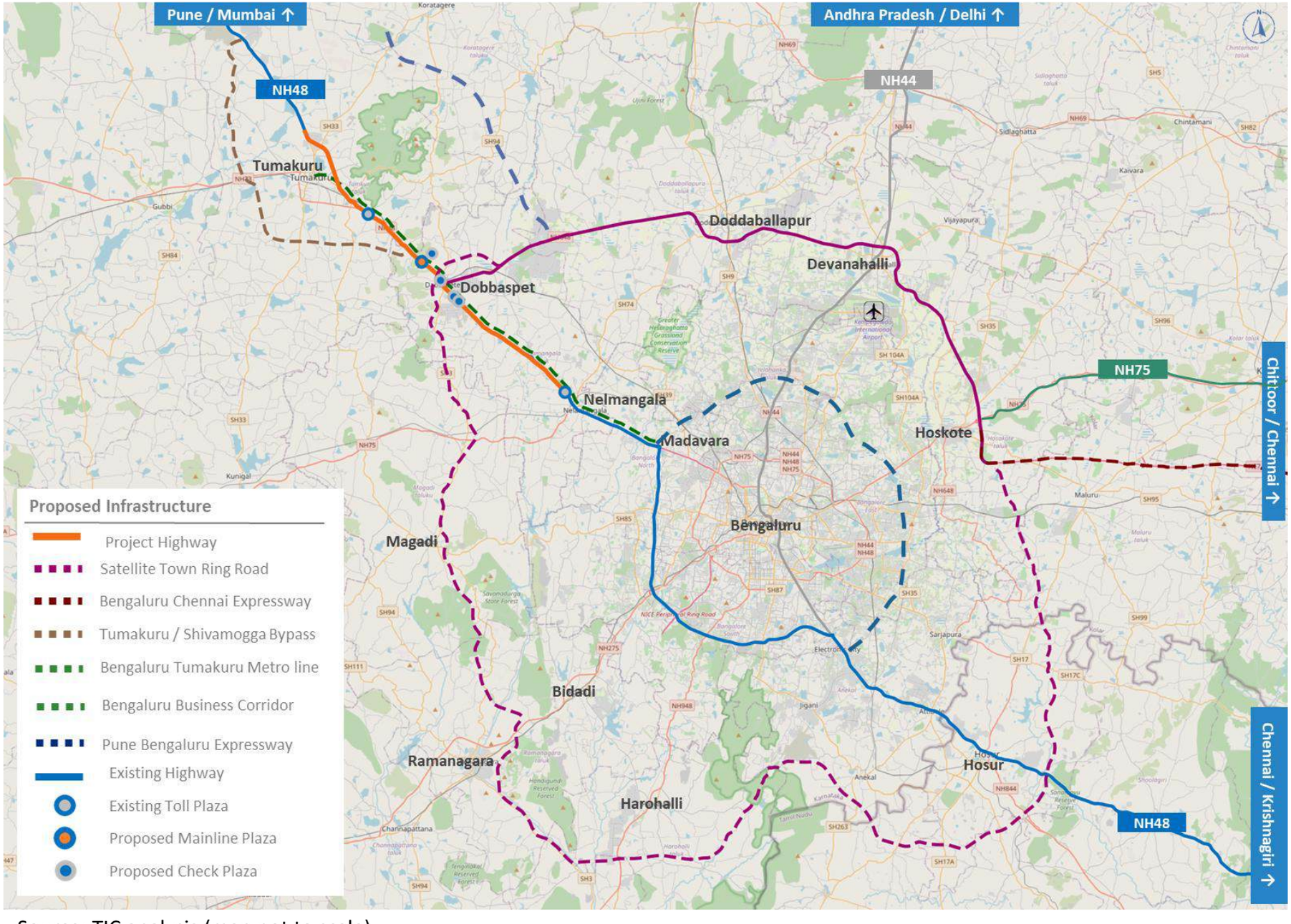
Proposed infrastructure development



Source: TIC analysis (map not to scale)

Chapter 3: Traffic analysis

- Historical data sources
- Historical traffic and revenue trends
- Seasonality variation
- Historical ticket distribution
- Commodity analysis
- Zonal influence and trip distance

This chapter covers various datasets received from NHAI followed by assessment of historical performance of the project highway. This analysis helps to understand baseline traffic patterns comprising of traffic and revenue growth rates, seasonality variations, trip factors, ticket distribution and overloading characteristics if any.

Survey analysis helps to understand and validate traffic volume, commodity movement pattern, network understanding received from site visit, inputs for ticket distribution, overloading pattern based on independent survey exercise.

Historical datasets (1)

- The project highway is currently being operated under the public-funded mode where toll is collected by third party tolling agencies through short-term contracts. Third party tolling agencies submit traffic and revenue report on monthly basis which is titled as Schedule V.
- The consultant observes that availability and accuracy of these reports are many times under question due to inadequate quality of technology interventions and record keeping during short term contracts by tolling agencies.
- Hence, availability followed by reliability of these datasets is essential to be addressed for historical analysis as well as further processing for base year and future traffic forecasts.
- ETC data is independently system generated and hence more reliable. The client sourced vehicle category-wise traffic data which doesn't include toll ticket distribution.
- Monthly reports submitted by contractors / tolling agencies to NHAI field offices (Schedule M/G/V) which is start point to validate the toll ticket distributing including cash components, violation/exemptions, overloading fee etc.
- Summary of historical traffic and revenue data received form the client is presented on next page with possible application.

Historical datasets (2)

Summary of the historical traffic and revenue data available for Kulumepalya and Chokkenahalli Toll Plazas

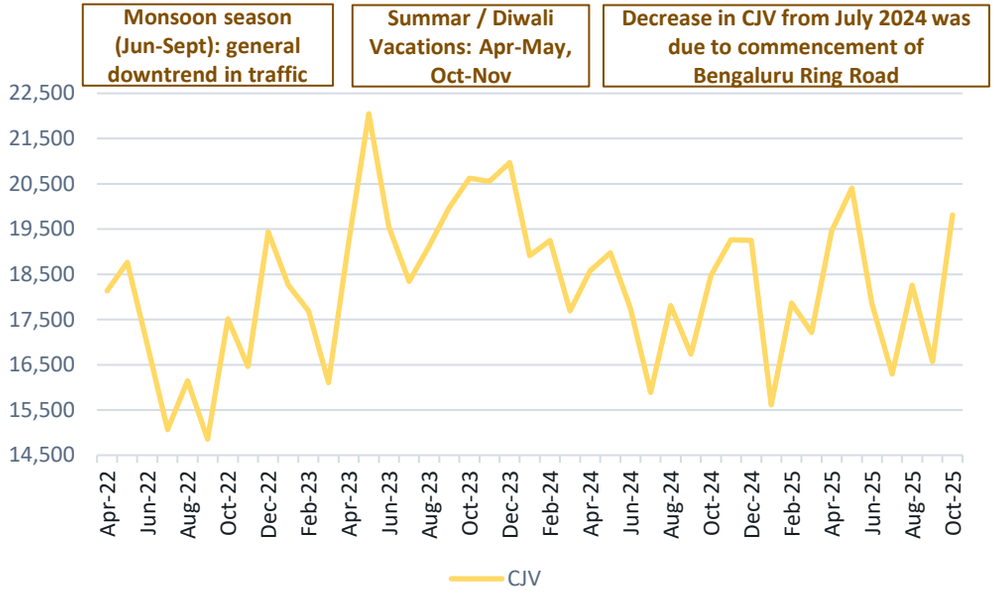
Data sources	Duration of data	Observations
Schedule M (monthly)	**H2 FY14 to H1 FY21** (BOT Concession)	▪ Total 7 years of traffic data in form of total of two toll plazas and traffic recorded under **three vehicle categories only: CJV, LCV, Bus/Trucks** ▪ **Individual toll plaza-wise traffic data is not available** ▪ Ticket distribution data: No ▪ Exemption/violation/ cash traffic data: No ▪ Useful for broad long-term trend analysis for three categories only
	H2 FY21 to H1 FY23 (BOT Concession)	▪ Traffic data is in form of total of two toll plazas and traffic recorded under **four vehicle categories: CJV, LCV, 2A Bus/Trucks, 3A Bus/Trucks** ▪ **Individual toll plaza-wise traffic data is not available** ▪ Ticket distribution data: No ▪ Exemption/violation/ cash traffic data: No ▪ Useful for broad long-term trend analysis for three categories only
Schedule V - Part A & B (monthly)	H2 FY23 onwards public funded **H2 FY23:** months except Oct'22 **FY24:** months except Jun -Nov'23 **FY25:** months except Jun -Sep'24 **FY26:** Apr-Oct'25 (7 months)	▪ Available with intermittent anomalies ▪ **Toll rates revised from NH Fee Rules, 1997 to NH Fee Rules, 2008 from 25th August 2025** ▪ Only Sept-Oct'25 monthly dataset is useful for ticket distribution analysis ▪ Exemption/violation/ cash traffic data: Yes; Sept-Oct'25
ETC Data (monthly)	FY23: Full year FY24: Full year FY25: Full year FY26: Apr-Oct'25 (7 months)	▪ Vehicle category-wise ETC transactions covering total traffic and user fee collection ▪ Ticket distribution data: No
Overloading Reports (weekly)	No overloading penalty / fee is being levied at present based on understanding from site visit and discussion with PIU/toll operators	
Neighbouring highways	Historical traffic data to determine corridor growth trend	

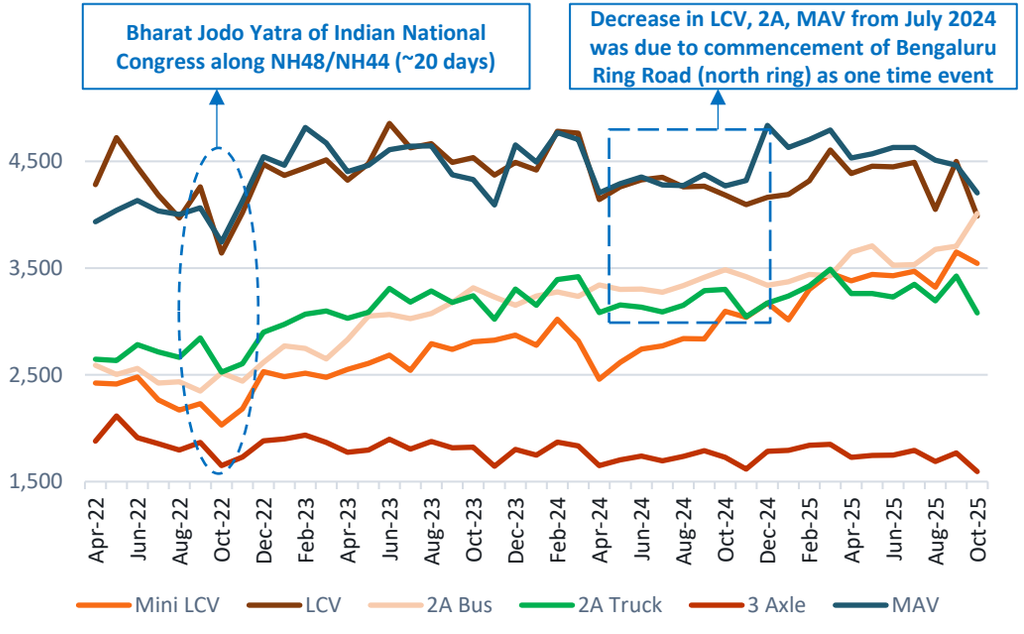
Source: TIC compilation of data received from NHAI

ETC data was reviewed for historical analysis, as it is considered reliable. Schedule M dataset showed intermittent anomalies, but it remains useful for broad long-term trend analysis for three categories only CJV, LCV, 2A Bus/Trucks, 3A Bus/Trucks.

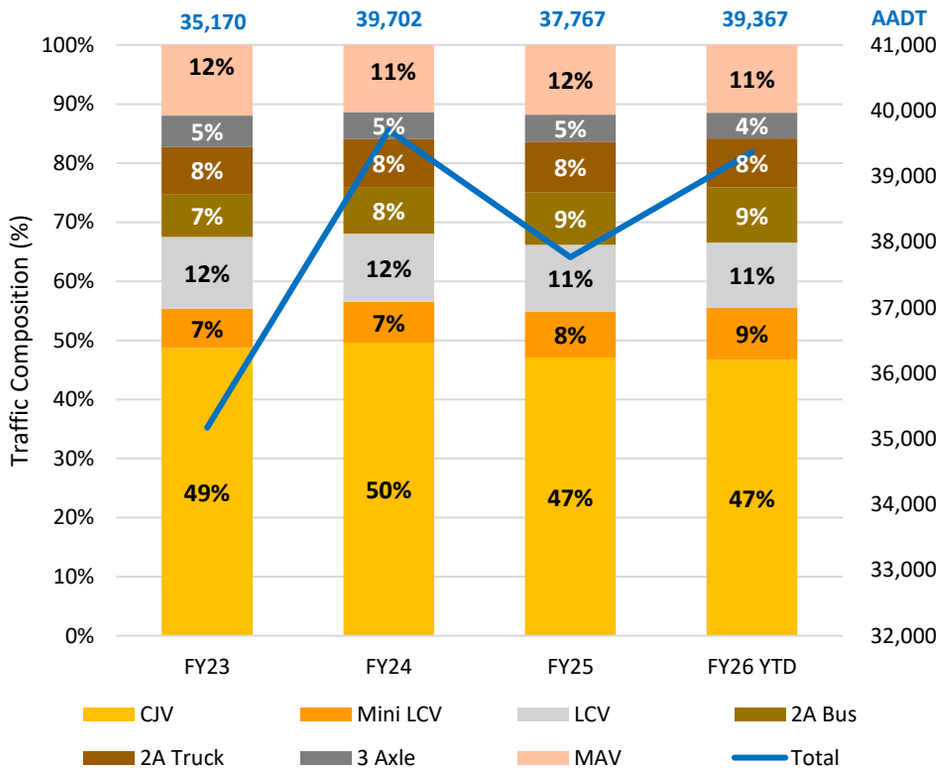
Historical traffic analysis (1): Kulumepalya TP

Vehicle category-wise monthly traffic trend - ETC





Vehicle category-wise annual traffic composition - ETC



- Traffic has trended in the range of 36,000 – 38,000 AADT (50,000 PCUs) in recent past with ~55% contribution of passenger vehicles (CJV and Bus) while balance ~45% is of freight vehicles.
- High volume of CJVs is observed due to proximity to Bengaluru and regular business/social traffic between Tumakuru/Dobbaspet and Bengaluru city.
- High volume and growth of bus traffic is in line with observed characteristics on Pune – Bengaluru corridor. Overnight and premium bus services is popular among business and leisure travelers.

Source: TIC analysis

Historical traffic analysis (2): Kulumepalya TP

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Vehicle category-wise traffic growth trend

Vehicle Category	CJV	Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	Total	PCU
Annual Average Daily Traffic (AADT)									
FY23	17,117	2,349	4,276	2,549	2,787	1,865	4,227	**35,170**	**66,506**
FY24	19,685	2,752	4,566	3,139	3,217	1,807	4,536	**39,702**	**74,187**
FY25	17,780	2,944	4,264	3,371	3,206	1,743	4,459	**37,767**	**72,145**
FY26 till Oct'25	18,382	3,462	4,329	3,688	3,257	1,723	4,525	**39,367**	**74,707**
Growth trends									
FY24 vs FY23	15.0%	17.2%	6.8%	23.1%	15.5%	(3.1%)	7.2%	**12.9%**	**11.5%**
FY25 vs FY24	(9.7%)	6.9%	(6.6%)	7.4%	(0.3%)	(3.5%)	(1.6%)	**(4.9%)**	**(2.8%)**
FY26* vs FY25	3.6%	25.1%	1.7%	10.1%	2.7%	0.2%	5.0%	**5.5%**	**5.2%**
CAGR (FY23 – FY26 YTD)	2.9%	16.8%	0.5%	15.9%	6.4%	(3.1%)	2.8%	**4.6%**	**4.8%**

Source: TIC analysis * against FY25 for 7 months i.e., April-October

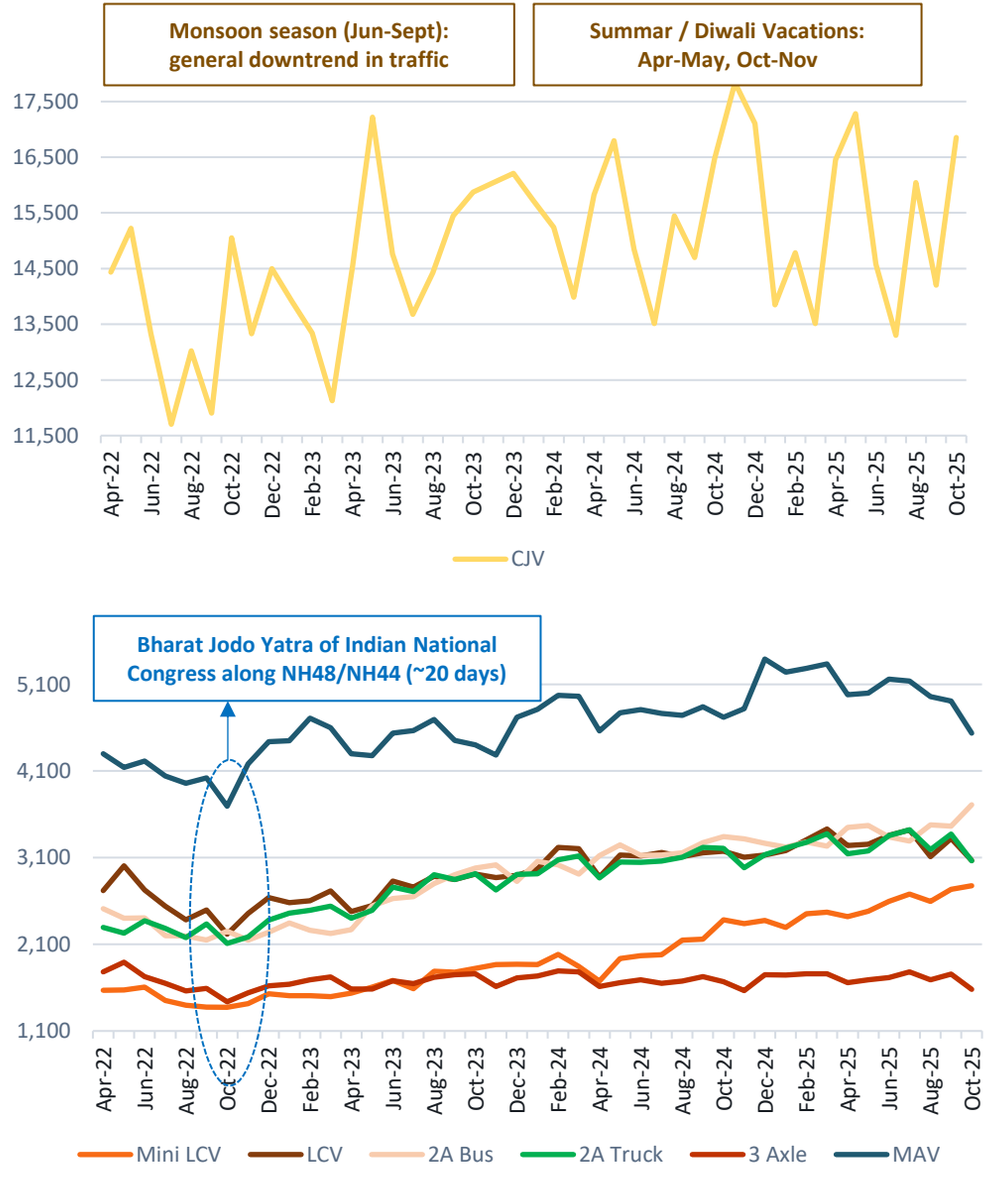
Corridor growth trends (project highway and neighbouring sections)

CAGR	CJV + Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	Total	PCU
Project highway: Nelmangala - Tumakuru section of NH48								
Long-term (FY15 – FY22)	18.0%	11.1%	9.5% (Bus+2A+3A+MAV)				**13.8%**	--
Long-term (FY15 – FY19)	5.3%	7.3%	8.1% (Bus+2A+3A+MAV)				**6.8%**	--
Neighbouring highway sections								
Short-term (FY23 – FY26)*	6.7%	11.6%	3.3%	12.4%	7.0%	(3.1%)	2.3%	**5.7%**	**4.8%**
Short-term (FY22 – FY25)^	11.2% (CJV + Mini LCV)		3.3%	21.1%	12.4%	3.2% (3A + MAV)		**9.4%**	**6.6%**

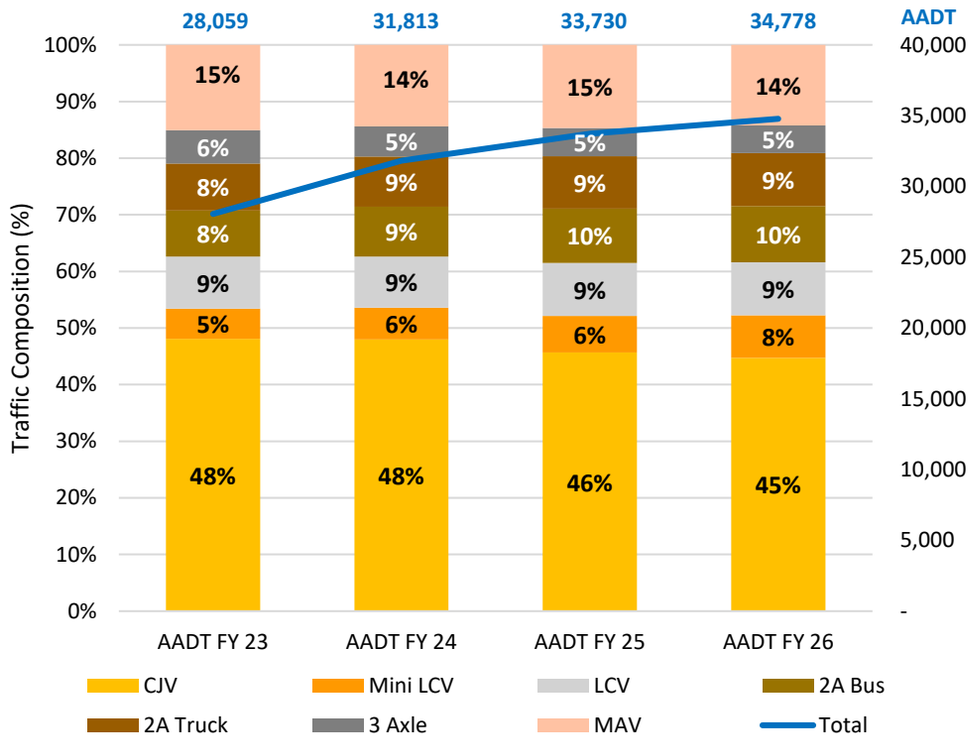
Source: TIC analysis * ETC ^available in public domain

Historical traffic analysis (3): Chokkenahalli TP

Vehicle category-wise monthly traffic trend - ETC



Vehicle category-wise annual traffic composition - ETC



- Chokkenahalli TP observed lower volume of CJV (~15% of Kulumepalya TP) and Mini LCV/LCV (~25% of Kulumepalya TP) which is due to difference in traffic characteristics between tollable sections.
- CJVs are due to proximity to city and Mini LCV / LCV is due to last mile connectivity to city from warehousing belt between Dobbaspet to Nelamangala.
- Warehousing belt of Nelmangala to Dobbaspet sustains contribution of Mini LCV, LCV, 2A for e-commerce and courier/parcel.

Source: TIC analysis

Historical traffic analysis (4): Chokkenahalli TP

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Vehicle category-wise traffic growth trend

Vehicle Category	CJV	Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	Total	PCU
Annual Average Daily Traffic (AADT)									
FY23	13,492	1,483	2,590	2,278	2,321	1,654	4,240	**28,059**	**56,701**
FY24	15,262	1,769	2,868	2,801	2,814	1,696	4,604	**31,813**	**63,981**
FY25	15,393	2,181	3,157	3,226	3,128	1,689	4,956	**33,730**	**68,739**
FY26 till Oct'25	15,538	2,613	3,253	3,458	3,246	1,696	4,974	**34,778**	**70,612**
Growth trends									
FY24 vs FY23	13.1%	19.3%	10.7%	23.0%	21.2%	2.6%	8.4%	**13.4%**	**12.8%**
FY25 vs FY24	0.9%	23.3%	10.1%	15.2%	11.2%	(0.4%)	7.8%	**6.0%**	**7.4%**
FY26* vs FY25	1.1%	28.3%	4.7%	8.1%	5.4%	1.6%	4.4%	**4.7%**	**4.9%**
CAGR (FY23 – FY26 YTD)	5.8%	25.4%	9.5%	18.2%	14.4%	1.0%	6.6%	**9.0%**	**9.2%**

Source: TIC analysis * against FY25 for 7 months i.e., April-October

Corridor growth trends (project highway and neighbouring sections)

CAGR	CJV + Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	Total	PCU
Project highway: Nelmangala - Tumakuru section of NH48								
Long-term (FY15 – FY22)	18.0%	11.1%	9.5% (Bus+2A+3A+MAV)				**13.8%**	--
Long-term (FY15 – FY19)	5.3%	7.3%	8.1% (Bus+2A+3A+MAV)				**6.8%**	--
Neighbouring highway sections								
Short-term (FY23 – FY26)*	6.7%	11.6%	3.3%	12.4%	7.0%	(3.1%)	2.3%	**5.7%**	**4.8%**
Short-term (FY22 – FY25)^	11.2% (CJV + Mini LCV)		3.3%	21.1%	12.4%	3.2% (3A + MAV)		**9.4%**	**6.6%**

Source: TIC analysis * ETC ^available in public domain

Historical traffic analysis (5)

- The decline in 3A traffic indicates a structural shift in freight vehicle composition, as operators increasingly replace 3A vehicles with 2A and MAV configurations, driven by the higher payload capacity and lower cost per tonne-kilometre of MAVs.
- Conversely, the increase in 2A volumes is supported by revisions in legally permissible axle loads, which have enhanced their operational efficiency, as well as by their suitability for e-commerce and express logistics involving high-value, low-volume consignments over medium to long haul distances.
- Findings from consultations with transporters and OEMs across multiple regions corroborate this trend, indicating a clear preference for 2A and MAV (especially 5A vehicle) categories based on superior unit economics and operational flexibility.

Historical revenue analysis (1): Kulumepalya TP

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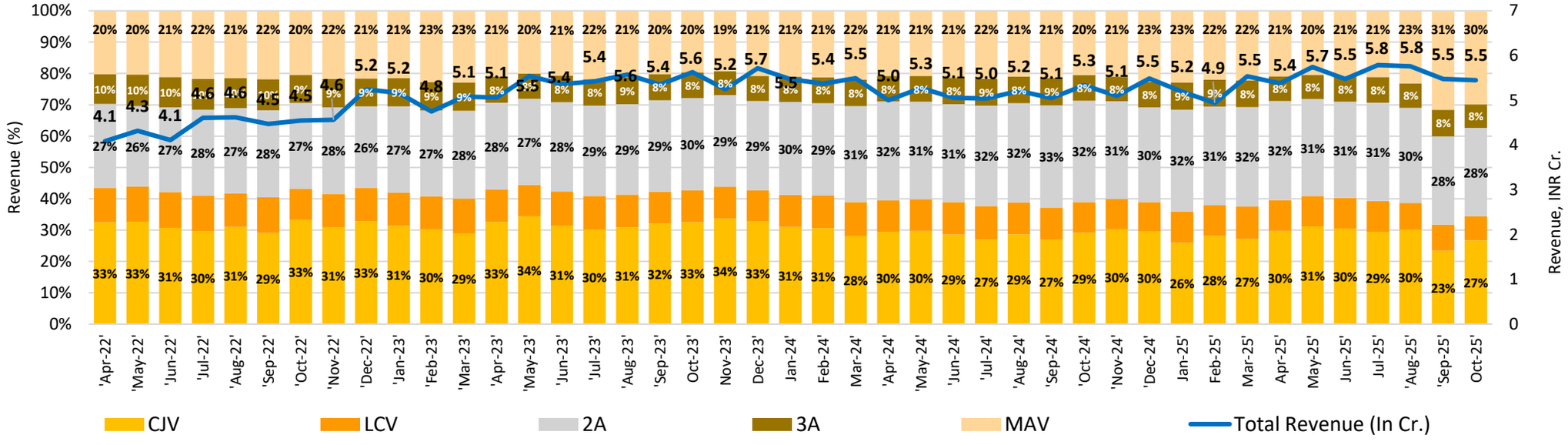
Vehicle category-wise monthly revenue composition and trend - ETC



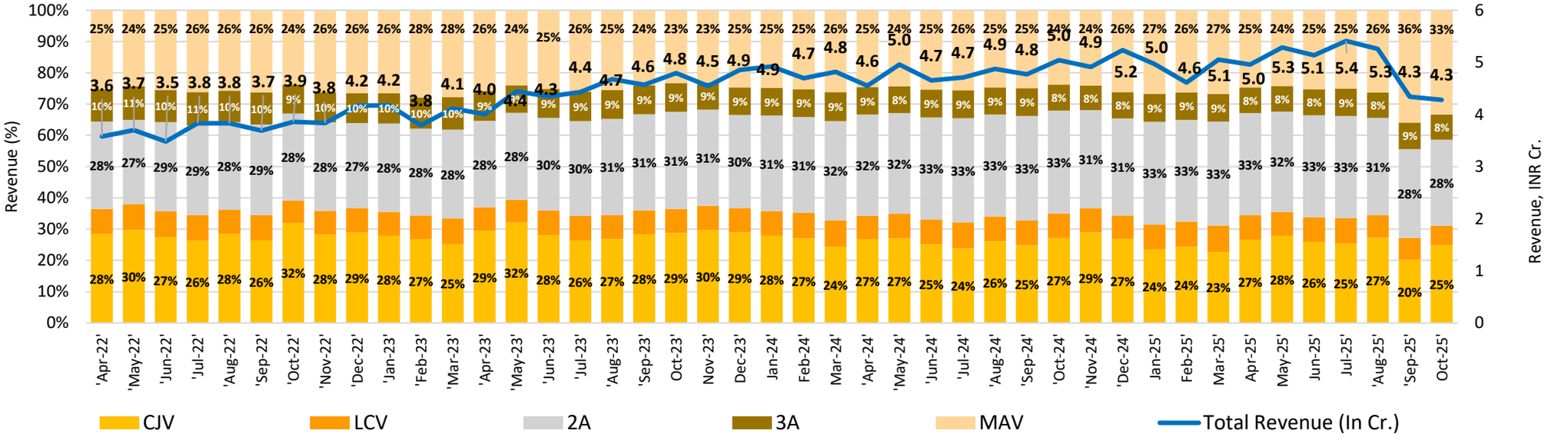
Vehicle Category	CJV	Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	Total	AADC
Annual Revenue (in INR Crore) and Annual Average Daily Collection (in INR Lakh)									
FY23	14.0	3.3	6.0	7.2	7.9	5.2	12.0	**55.6**	**15.22**
FY24	16.7	3.9	6.8	9.3	9.6	5.4	13.5	**65.2**	**17.82**
FY25	15.1	2.5	6.2	10.1	9.6	5.2	13.4	**65.2**	**17.04**
FY26 till Oct'25	9.0	2.2	3.5	6.1	5.7	3.1	9.4	**39.1**	**18.26**
Growth trends									
FY24 vs FY23	19.7%	18.8%	12.0%	29.3%	21.5%	3.1%	13.2%	**17.4%**	**17.1%**
FY25 vs FY24	(9.5%)	(35.3%)	(7.9%)	8.2%	0.2%	(3.0%)	(0.9%)	**(4.6%)**	**(4.4%)**
FY26* vs FY25	1.5%	60.0%	(2.6%)	4.1%	2.3%	2.9%	23.5%	**8.7%**	**8.7%**

Source: TIC analysis * against FY25 for 7 months i.e., April-October

Historical revenue analysis (2): Chokkenahalli TP

TRANSLINK® Infrastructure Consultants Pvt Ltd *Smart Consulting*

Vehicle category-wise monthly revenue composition and trend - ETC



Vehicle Category	CJV	Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	Total	AADC
Annual Revenue (in INR Crore) and Annual Average Daily Collection (in INR Lakh)									
FY23	10.8	2.1	3.6	6.4	6.5	4.6	12.0	**46.1**	**12.62**
FY24	13.0	2.5	4.3	8.3	8.4	5.0	13.7	**55.1**	**15.05**
FY25	13.1	1.9	4.6	9.7	9.3	5.0	14.8	**58.3**	**15.98**
FY26 till Oct'25	7.3	1.6	2.6	5.4	5.4	2.9	9.5	**34.7**	**16.20**
Growth trends									
FY24 vs FY23	20.2%	21.4%	18.0%	29.4%	28.0%	7.9%	14.1%	**19.6%**	**19.3%**
FY25 vs FY24	0.8%	(26.1%)	7.7%	16.8%	11.5%	0.6%	7.8%	**5.9%**	**6.1%**
FY26* vs FY25	(5.3%)	59.5%	(3.3%)	(3.0%)	(0.3%)	(1.4%)	14.7%	**3.3%**	**3.3%**

Source: TIC analysis * against FY25 for 7 months i.e., April-October

Ticket distribution (1)

Schedule V (Part B) is a monthly statement presenting vehicle category and ticket distribution -wise traffic data including exemption, local concession / other discounted details.
Toll ticket distribution refers to share of total revenue with respect to various journey types and related discounts applicable. This distribution depends on vehicle category, trip lengths, trip frequency and percentage of local traffic.
As per Toll Plaza Gazette Notification and Toll Rate Revision Circular of FY26 for Kulgo TP, types of toll tickets are being issued are presented in the below table.

Ticket Category	Description
Single Ticket	One-way journey on the project highway is considered as single journey. For such journeys, users are required to pay the complete notified one-way fee.
Return Ticket	Two one-way journeys on the Project highway within 24 hours are covered under this category. For such journeys, users are required to pay one and half times of the fee payable for one-way journey.
Monthly Pass	Fifty one-way journeys on the Project highway within a month covered under this category. The concessionaire shall, upon request from any person, issue a monthly pass for fifty one-way journeys at a discounted rate equivalent to two-thirds of fifty one-way journeys.
Local Pass (Local Personal)	Road user who owns a mechanical vehicle registered for non-commercial purposes and resides within a distance of 20 km from the toll plaza can get local monthly pass.
Commercial vehicle registered within district of plaza (Local Commercial)	Commercial vehicles (excluding vehicles plying under national permit) registered in the district where the toll plaza is located. Fee shall be 50% prescribed rate for that category of vehicle provided no service road or alternative road is available for use of such commercial vehicles.
Exempted	This journey ticket category is for all users (like Police, Fire Brigade, Ambulance, Defence, etc.) which are exempted from paying toll as per NHAI Toll rules.
Annual Pass for private non-commercial CJV vehicles	On June 18, 2025, MoRTH introduced a FASTag-based annual pass to facilitate seamless highway travel. This pass is valid for non-commercial private vehicles such as cars, jeeps, and vans, and remains effective for one year from the date of activation or up to 200 trips—whichever comes first for INR 3,000. Trip counting method is as follows: Open Tolling: Each entry / exit counts as one trip Closed Tolling: One entry to exit trip counts as one

Source: DCA, NH Fee Rules 2008 and subsequent amendments and existing gazette notifications

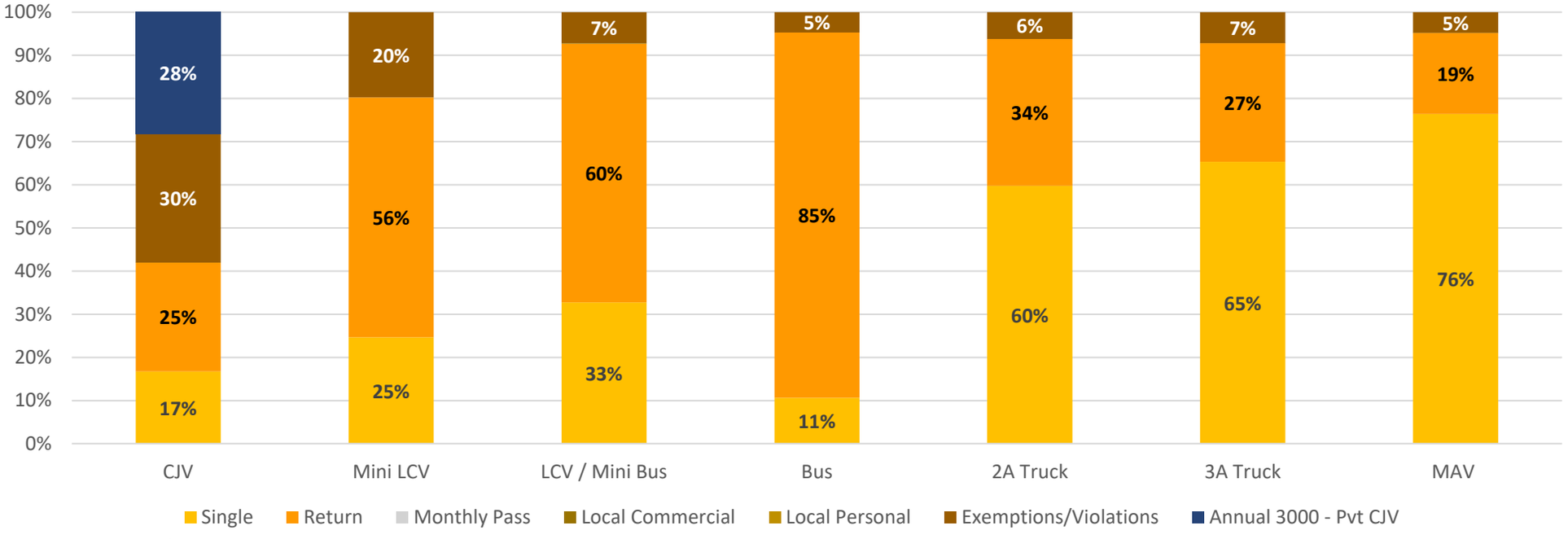
Ticket distribution (2)

Currently it is envisaged that annual passes will be issued directly by concerned authority and hence revenue from sale of annual passes will not accrue to the concessionaire. NHAI has issued advisory for reimbursement of loss of revenue due to annual pass usage to the concessionaire which is part of Draft Concession Agreement as Clause 27.1.5 and described below:

- The concessionaire acknowledges and agrees that any user owning a non-commercial vehicle and holding a valid and functional Fastag Pass in accordance with MoRTH Gazette Notification No. G.S.R. 388(E) dated 17th June 2025shall be entitled to use the project highway without any restrictions, except to the extent specified in any applicable law, applicable permit or the provisions of the draft concession agreement.
- In respect of such vehicle crossing the toll plaza(s), the concessionaire shall be entitled to receive compensation from the authority equivalent to the product of:
  - The number of non-commercial vehicles crossing the toll plaza(s) with such pass; and
  - 90% of the applicable fee for single journey of such vehicle.
- Provided, however, that for the purpose of computation of such compensation, the counting of any particular vehicle shall be limited 2 crossing per day, notwithstanding that such vehicle may cross the toll plaza(s) multiple times on that day.
- The compensation payable under this clause shall be due and payable in monthly instalments within 7 days of the close of the month.

Ticket distribution (3): Kulumepalya TP

Ticket distribution

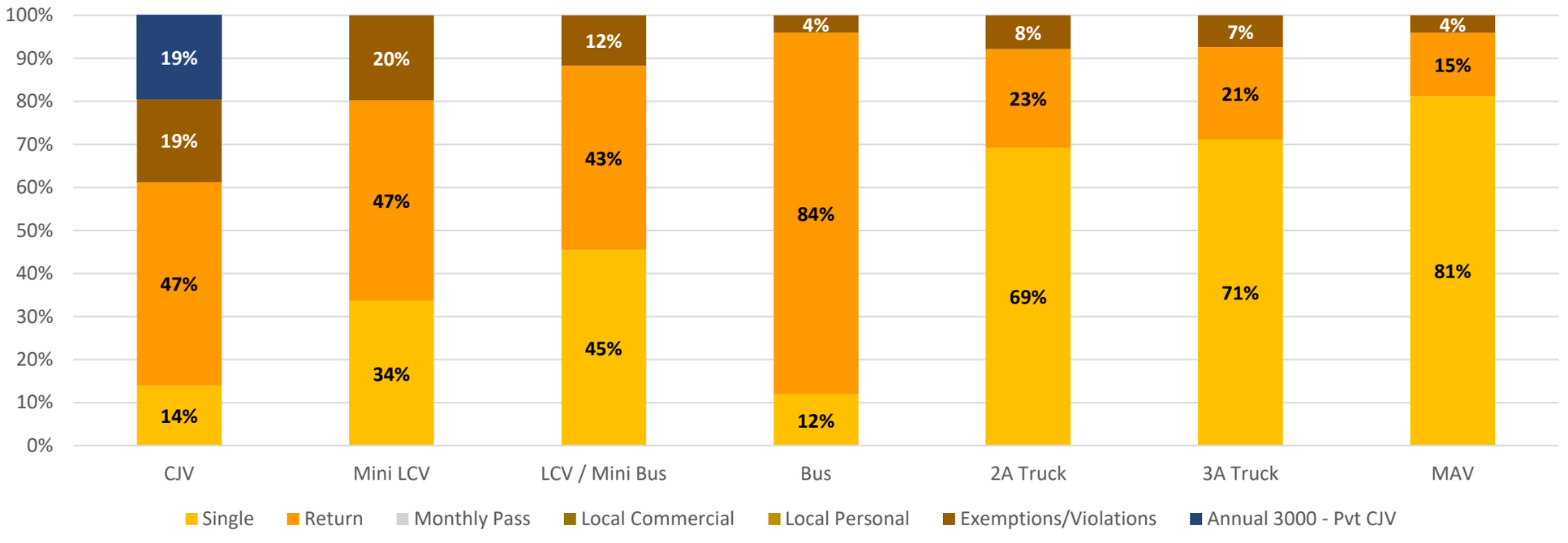


Source: TIC analysis

- CJV traffic on the project highway is largely local in nature with return tickets (~25%) and exemptions/violations (~30%) together forming a substantial share and indicating dominant short-distance movements.
- Notable annual pass usage (~28%) reflects the inter-urban travel pattern.
- Goods vehicles (2A, 3A, and MAV) show a strong inclination toward single journeys which highlights long-haul freight movements to industrial hubs at Nelmangala, Dobbaspet and Tumakuru.
- Relatively higher proportion of local traffic between Tumakuru – Dobbaspet – Bengaluru leads to exemptions and violations of ~25% in Mini LCV categories.

Ticket distribution (4): Chokkenahalli TP

Ticket distribution



Source: TIC analysis

- CJV movement is mainly short-range, as seen from the high share of return tickets (~47%) and exemptions/violations (~19%). About 19% of CJV users have opted for the Annual Pass of INR 3,000 as on 31st October 2025 and is expected to increase further with awareness and adoption.
- Freight traffic across 2A, 3A, and MAV categories is dominated by single-journey tickets (~69% for 2A, ~71% for 3A, and ~81% for MAV), underscoring sustained long-distance goods movement linked to the industrial clusters of Nelmangala, Dobbaspet, and Tumakuru.
- Relatively higher proportion of local traffic between Tumakuru – Dobbaspet – Bengaluru leads to exemptions and violations of ~20% in Mini LCV categories

Commodity analysis (1) : Kulumepalya TP

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Direction-wise Commodity Distribution

Commodity	MLCV		LCV		2A		3A		MAV	
	Nelamangala to Tumakuru	Tumakuru to Nelamanagala	Nelamangala to Tumakuru	Tumakuru to Nelamanagala	Nelamangala to Tumakuru	Tumakuru to Nelamanagala	Nelamangala to Tumakuru	Tumakuru to Nelamanagala	Nelamangala to Tumakuru	Tumakuru to Nelamanagala
Agriculture / Animal Husbandry	4%	4%	3%	4%	2%	4%	5%	7%	5%	8%
Fruit and Vegetables	5%	10%	3%	5%	2%	5%	4%	3%	3%	3%
FMCG / Food Products	7%	7%	9%	9%	5%	8%	8%	10%	6%	7%
Building & Construction Material	1%	0%	1%	2%	1%	1%	2%	0%	2%	3%
Cement	1%	0%	1%	1%	0%	0%	2%	1%	3%	2%
Sand	--	0%	0%	0%	0%	1%	2%	3%	0%	1%
Aggregates / Stone	--	--	0%	0%	--	1%	0%	1%	--	1%
Minerals & Minig Commodities	0%	--	0%	0%	0%	0%	0%	--	0%	0%
Iron Ore / Products	1%	--	0%	0%	1%	1%	2%	1%	3%	1%
Manufacturing	20%	11%	16%	14%	20%	13%	14%	13%	15%	12%
Automobile and Spares	1%	1%	3%	3%	6%	5%	7%	5%	15%	18%
Chemicals / Fertilisers	1%	2%	1%	2%	2%	1%	3%	4%	5%	5%
Steel / Metal Products	4%	4%	7%	6%	6%	6%	7%	7%	7%	8%
Petroleum Products	1%	3%	1%	1%	2%	4%	2%	2%	4%	3%
Parcel / E-commerce	11%	18%	18%	29%	24%	29%	21%	27%	10%	19%
Miscellaneous	7%	1%	4%	2%	3%	2%	2%	2%	3%	1%
Empty	37%	37%	32%	19%	26%	20%	20%	13%	21%	6%

Source: TIC analysis *0% indicates value less than 1% and -- represents no presence of such commodity for the vehicle category

Commodity distribution exhibits characteristics that are in line with corridor and economic activities observed in the influence region.

Commodity analysis (2) : Chokkenahalli TP

TRANSLINK® Infrastructure Consultants Pvt Ltd Smart Consulting

Direction-wise Commodity Distribution

Commodity	MLCV		LCV		2A		3A		MAV	
	Nelamangala to Tumakuru	Tumakuru to Nelamanagala	Nelamangala to Tumakuru	Tumakuru to Nelamanagala	Nelamangala to Tumakuru	Tumakuru to Nelamanagala	Nelamangala to Tumakuru	Tumakuru to Nelamanagala	Nelamangala to Tumakuru	Tumakuru to Nelamanagala
Agriculture / Animal Husbandry	2%	4%	3%	5%	4%	5%	5%	6%	6%	10%
Fruit and Vegetables	11%	26%	6%	7%	4%	5%	5%	4%	4%	5%
FMCG / Food Products	12%	5%	10%	7%	6%	8%	8%	9%	5%	6%
Building & Construction Material	1%	0%	2%	1%	1%	1%	2%	3%	3%	6%
Cement	1%	1%	1%	1%	1%	1%	2%	1%	3%	3%
Sand	--	0%	--	0%	0%	0%	4%	1%	1%	0%
Aggregates / Stone	0%	0%	1%	0%	0%	1%	0%	0%	0%	0%
Minerals & Minig Commodities	0%	--	0%	0%	0%	--	0%	--	0%	0%
Iron Ore / Products	1%	1%	1%	1%	1%	0%	2%	2%	3%	3%
Manufacturing	13%	6%	15%	12%	17%	11%	13%	11%	14%	11%
Automobile and Spares	3%	1%	3%	2%	8%	4%	5%	3%	9%	8%
Chemicals / Fertilisers	1%	1%	1%	1%	1%	0%	2%	2%	3%	3%
Steel / Metal	2%	2%	5%	4%	4%	5%	5%	5%	5%	9%
Petroleum Products	1%	2%	3%	3%	3%	3%	5%	4%	6%	5%
Parcel / E-commerce	10%	14%	18%	31%	26%	37%	21%	35%	12%	23%
Miscellaneous	2%	1%	2%	1%	2%	2%	2%	2%	2%	1%
Empty	38%	35%	30%	24%	21%	18%	18%	14%	25%	9%

Source: TIC analysis *0% indicates value less than 1% and -- represents no presence of such commodity for the vehicle category

Commodity distribution exhibits characteristics that are in line with corridor and economic activities observed in the influence region.

Zonal influences and trip distances (1): Kulumepalya TP

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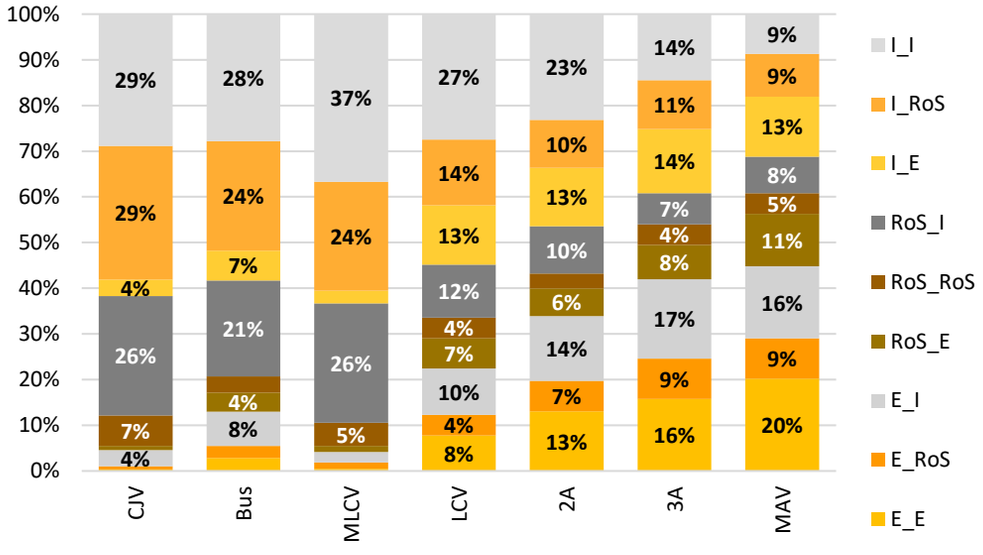
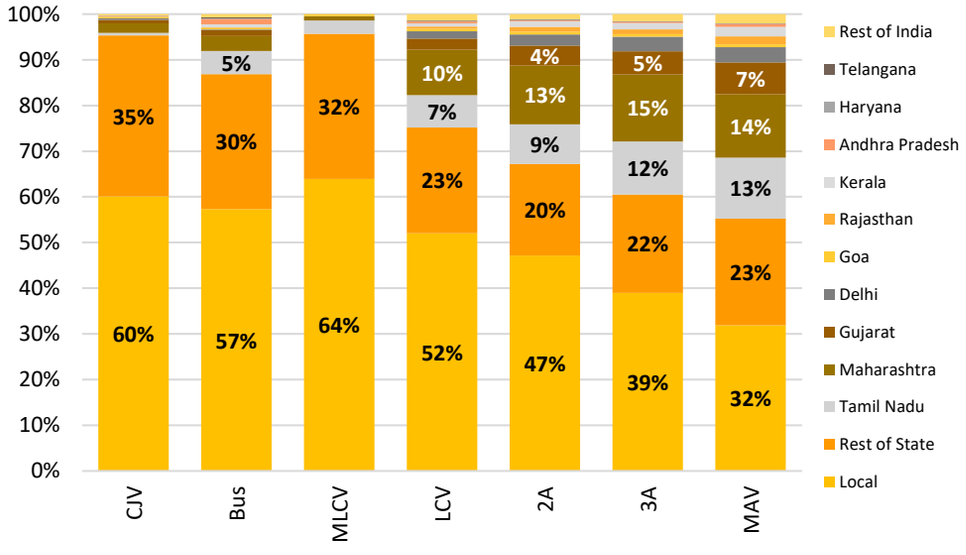
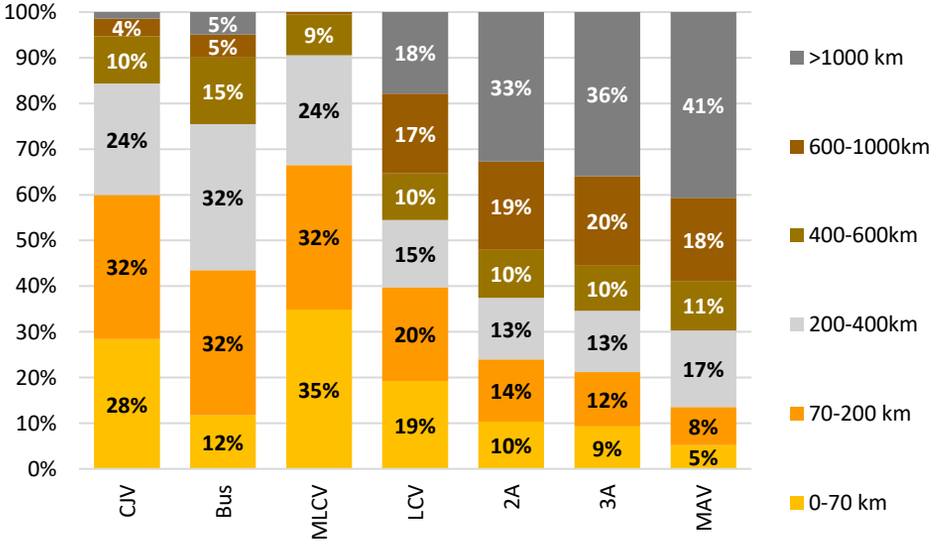
Vehicle category-wise zone characteristics



Vehicle category-wise project influence region



Vehicle category-wise trip lengths and average distance



Vehicle Category	Distance (in km)
CJV	261
Bus	451
Mini LCV	231
LCV	584
2A	731
3A	860
MAV	987

Vehicle category-wise visual representation of origin-destination zones and top pairs are exhibited in Appendix A.

Source: TIC analysis

Zonal influences and trip distances (2) : Chokkenahalli TP

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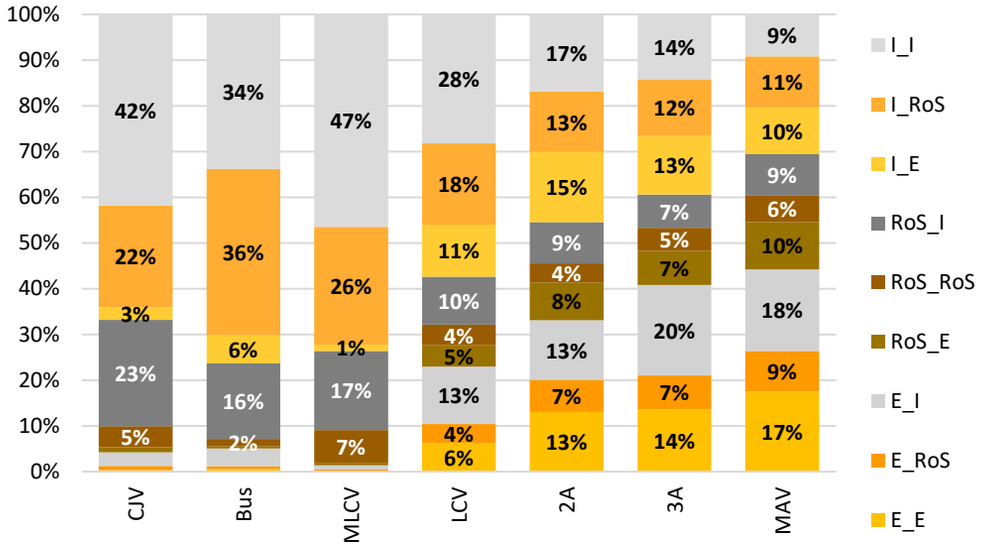
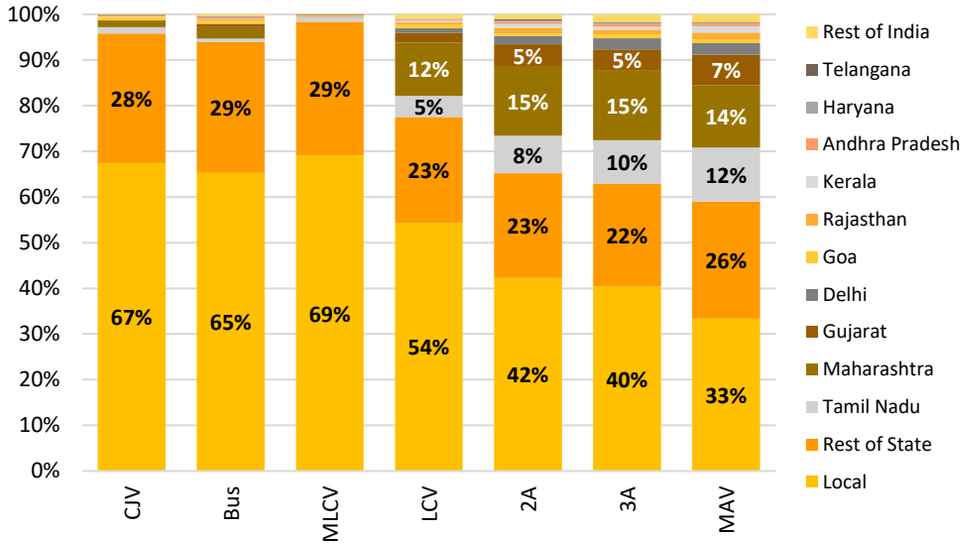
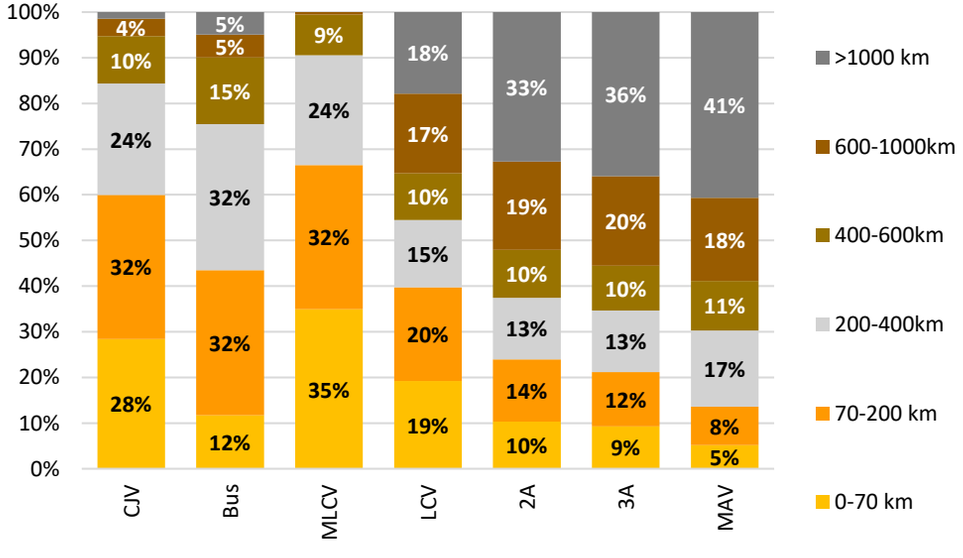
Vehicle category-wise zone characteristics



Vehicle category-wise project influence region



Vehicle category-wise trip lengths and average distance



Vehicle Category	Distance (in km)
CJV	222
Bus	295
Mini LCV	167
LCV	544
2A	789
3A	824
MAV	926

Vehicle category-wise visual representation of origin-destination zones and top pairs are exhibited in Appendix A.

Source: TIC analysis

Chapter 4: Economic context and traffic growth

- Economic context of influence region
- Determination of traffic growth drivers
- Estimation of demand elasticities
- Forecasts for growth drivers

IRC-108:2015 mentions that traffic growth is typically driven by a combination of macro-economic trends and industry/commodity specific factors, known as independent variables or traffic growth drivers.

These growth drivers have two critical characteristics:

1) the rate at which it increases i.e., forecasts of independent variable
2) the project highway's relationship with the growth driver to attract, capture and retain the traffic over the forecast horizon i.e., travel demand elasticity

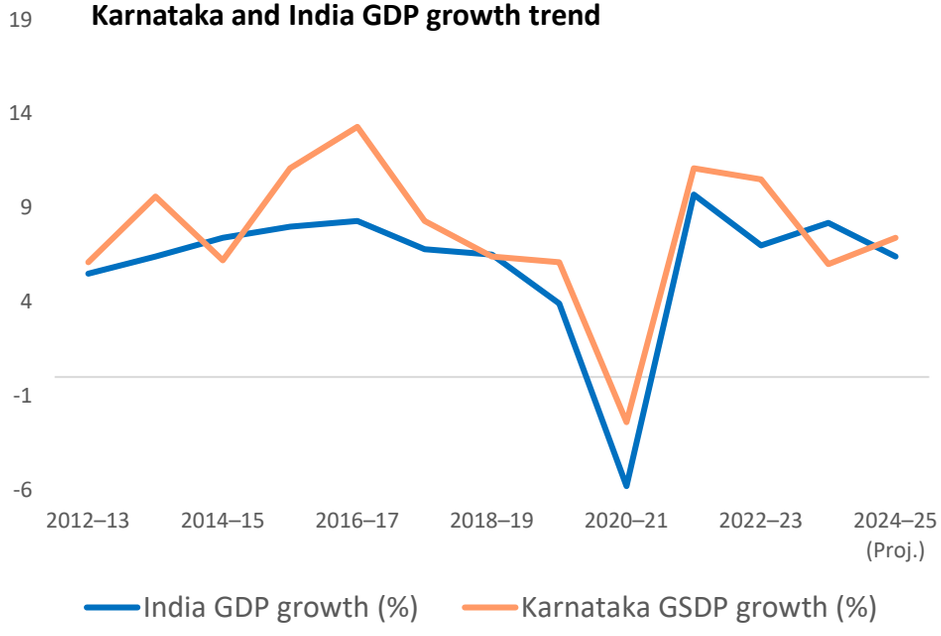
Growth drivers are typically identified through analysis of origin–destination data, site visits and a detailed understanding of the highway.

Travel demand elasticity is influenced by socio-economic conditions both within the region served by the project highway and across the wider national area of influence.

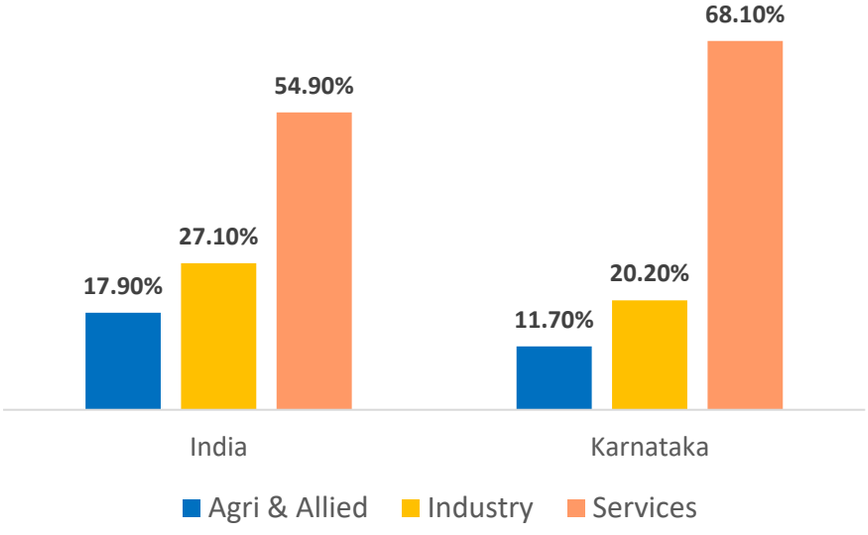
This chapter explains the growth drivers and elasticity in context of economic snapshot of primary districts / state and their correlation with the country.

Karnataka: Outperforming growth with differentiated sectoral base

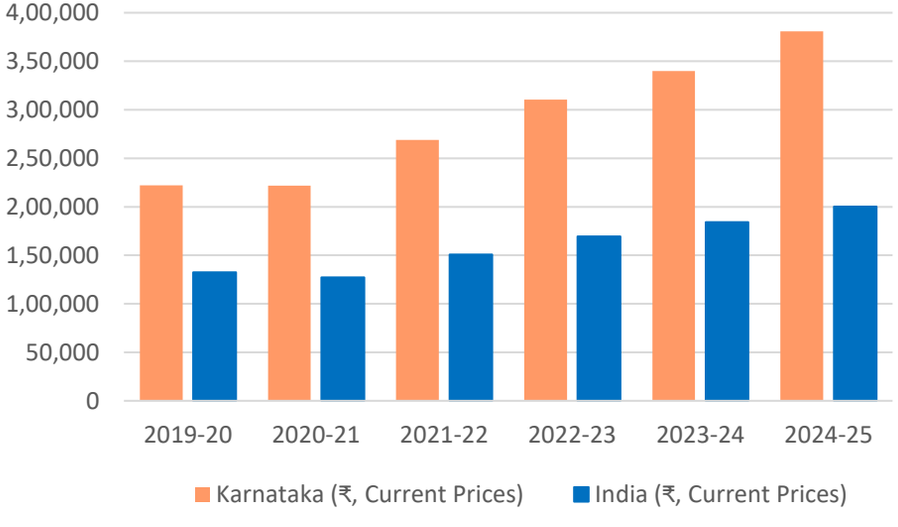
Karnataka and India GDP growth trend



Sectoral composition shift: India vs Karnataka



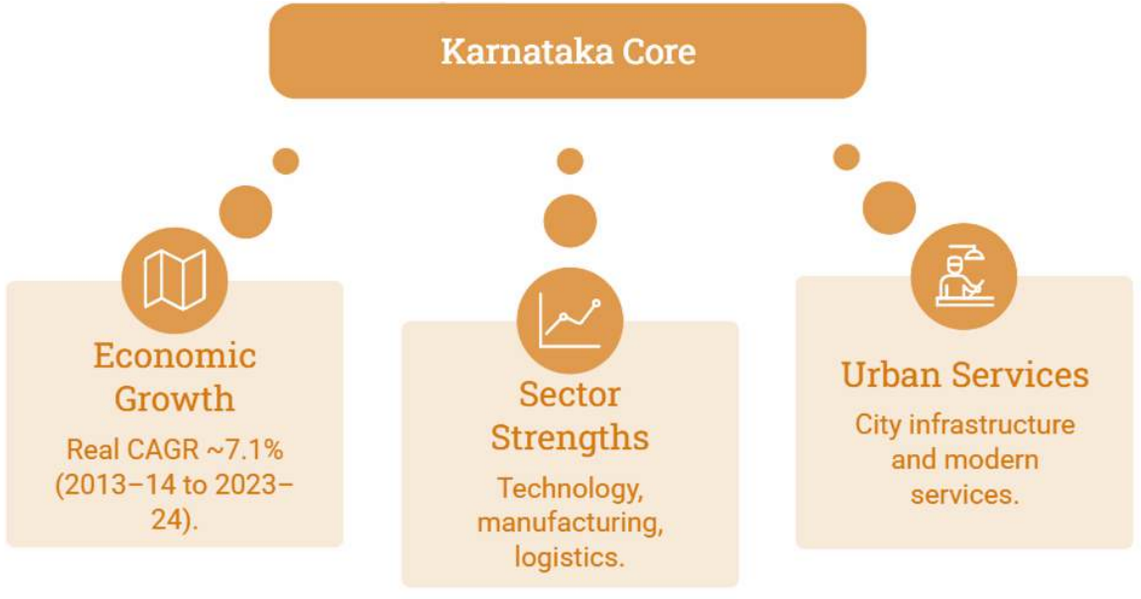
Per Capita Income (in INR): India vs Karnataka



- Karnataka's growth outperformance is driven by a **structurally higher services share**, reflecting stronger productivity and value-added economic activity than India.
- This sectoral advantage has **translated into faster per-capita income growth** and a widening income gap with the national average over the past five years.
- While services anchored Bengaluru drove resilience, **Tumakuru's emerging industrial base will power the next leg of growth.**

Source: MoSPI, Directorate of Economics & Statistics Karnataka, TIC analysis

The Service Engine: driving 68% of Karnataka's economy



Karnataka's economy is overwhelmingly services-driven. Within services, real estate and professional services contribute ~39 % of GSVA, computer services and R&D about 30 %. On the industry side, about 18% of the 20% comes from manufacturing and construction sector

Bengaluru Region = Services at core (Urban: Tech & Services) + Industry at periphery (Rural/Tumakuru: manufacturing and logistics)

Bengaluru Rural

Transitioning toward an **industrial–logistics belt**, driven by warehousing clusters (Nelamangala–Dobbaspet), airport-linked manufacturing, and textile/garment units.

Tumakuru

A **mixed industrial–agrarian district**, now accelerating due to HAL's helicopter plant, machine-tool clusters, Japan Industrial Park, and the Tumakuru Industrial Township.

- The **dual-track model** ensures broad-based economic resilience even when national or global conditions soften.
- Going forward, **strategic infrastructure (NH48 upgradation, CBIC node, MMLP Dobbaspet), industrial townships, defence manufacturing, and digital services** will shape Karnataka's sustained high-growth trajectory.
- While services anchored Bengaluru drove resilience, **Tumakuru's emerging industrial base will power the next leg of growth.**

Districts in immediate influence region (1)

Sectoral contribution in district and state GDP (FY2024)

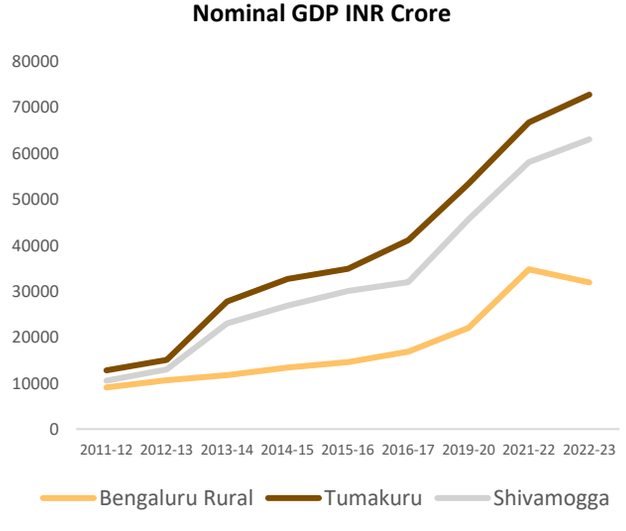
District	Agriculture and Mining (Primary)	Industry (Secondary)	Services (Tertiary)
Bangalore Urban	0.5%	15.1%	84.4%
Tumakuru	19.1%	30.4%	50.6%
Shivamogga	22.3%	23.2%	54.5%
Bangalore Rural	33.7%	22.9%	43.4%
Kolar	19.2%	25.5%	55.4%
Ramanagara	16.6%	31.6%	51.9%
Chikkaballapur	25.1%	21.0%	53.9%

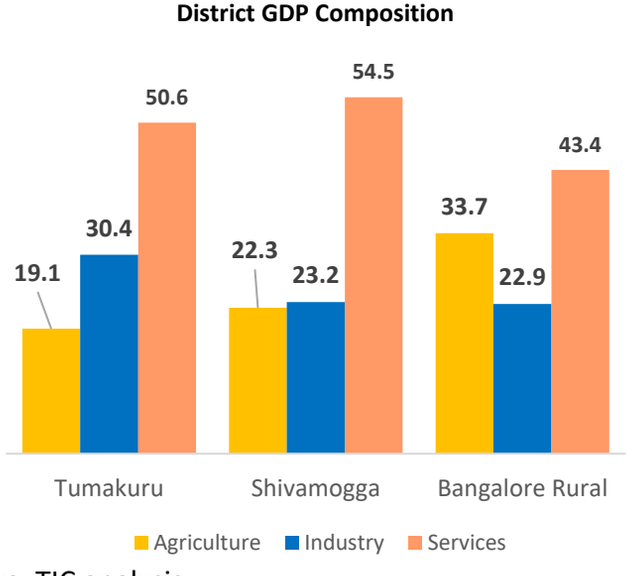
Contribution in state GDP

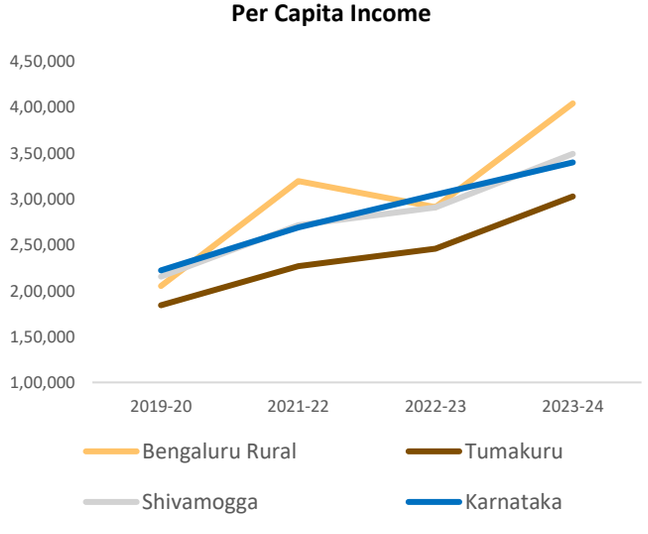
District	Contribution in State GDP	Per Capita Income
Bangalore Urban	39.1%	7,38,910
Bangalore Rural	1.9%	4,04,138
Tumakuru	3.6%	3,02,707

Economic scale is concentrated in Bengaluru Urban, while income outcomes across surrounding districts are primarily shaped by population dynamics and spillover effects rather than output alone.

Bengaluru–Tumakuru–Shivamogga corridor strengthens as an emerging consumption–industrial belt







Source: Department of Economic Survey of Karnataka, TIC analysis

Tumakuru's overall economic output is larger than Bengaluru Rural (due to higher industries, manufacturing and agriculture). However, PCI is lower because Tumakuru has a much larger population base than Bengaluru Rural.

Districts in immediate influence region (2)

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District level economic snapshot

District	Bangalore Urban	Bangalore Rural	Tumakuru	Shivamogga
Economic profile	Karnataka's primary **services-led growth engine**; dominant IT-ITeS, startups, BFSI, real estate, and corporate services; Accounts for a disproportionate share of state GSDP and capital inflows.	**Peri-urban spillover economy**; closely integrated with Bengaluru's logistics, warehousing, MSMEs, and real estate-led industrial activity.	**Industrial expansion frontier** of the Bengaluru region; diversified economy with manufacturing, food processing, textiles, electronics; emerging satellite industrial hub along NH48.	**Resource-linked regional economy**; agriculture, forestry, hydropower, and trading services form the base; limited large-scale industrialization.
GVA / sector structure	**Services-dominant** (IT, professional services, finance, real estate); high-value manufacturing (electronics, precision) with minimal agriculture.	**Industry-leaning** district; manufacturing, logistics, and agriculture together form the core; services expanding via urban spillovers.	**Balanced structure** with rising industry share; manufacturing & construction lead growth alongside services; agriculture still meaningful but declining.	**Agri-services led** mix; agriculture & allied and public services dominate; small industrial base with agro-processing and power.
Income position	**Highest per-capita income in Karnataka**; reflects high productivity services and skilled workforce concentration.	**High per-capita income relative to size**; benefits from proximity to Bengaluru with lower population pressure.	**Mid-range per-capita income**; large population base keeps PCI lower despite higher absolute output.	**Lower-middle income district**; income levels tied to primary sector volatility and limited industrial depth.
Growth profile	**Structurally strong but maturing growth**; cyclical moderation offset by digital economy, global services demand, and steady capital inflows.	**Fast-growing spillover district**; growth driven by infrastructure build-out, housing, logistics parks, MSME expansion, and urban decentralisation.	**High growth optionality**; next-decade acceleration driven by CBIC node, industrial townships, defence manufacturing, NH48 and MMLP-led logistics.	**Steady, moderate growth**; dependent on agriculture cycles, hydropower capacity, and incremental industrial development.

Source: TIC analysis

Districts in immediate influence region (3)

District-wise summary of risk and opportunities

Parameter	Bengaluru Urban	Bengaluru Rural	Tumakuru	Shivamogga
Primary driver	High-value services economy driven by IT-ITeS, BFSI, startups, corporate HQs, and real estate.	Spillover-led growth from Bengaluru: logistics, warehousing, MSMEs, real estate, and peri-urban industry.	Manufacturing-led expansion along NH48; emerging industrial and logistics hub for Bengaluru.	Agriculture, hydropower, forestry, and regional trade-services driven economy.
Key resource	Skilled human capital, global connectivity, innovation ecosystem, capital inflows.	Strategic location, land availability, connectivity to Bengaluru and industrial corridors.	Land availability, industrial estates, NH48 connectivity, labour base.	Natural resources (water, forests), hydropower capacity, agricultural base.
Major risk	Infrastructure saturation, congestion, high costs, urban stress limiting marginal productivity gains.	Dependence on Bengaluru's growth cycle; limited independent demand drivers.	Execution risk of industrial projects; slower ecosystem development compared to core metros.	High dependence on monsoon and primary sectors; limited private capex inflow.
Growth opportunity	Continued dominance in R&D, AI, digital, fintech, GCCs, high-end services despite maturity.	Rapid peri-urbanisation, logistics parks, housing, MSME clusters, and supply-chain decentralisation.	Industrial corridor-led growth (manufacturing, logistics, defence, warehousing).	Value-added agro-processing, renewable energy, regional consumption-led growth.
Predicted strong growth segment	IT-ITeS, global capability centres, fintech, real estate and professional services.	Logistics, warehousing, light manufacturing, housing & construction.	Manufacturing, industrial logistics, construction, freight movement.	Agro-processing, power, trade & transport services.
Conclusion	**Mature but resilient growth engine; high productivity offsets infrastructure constraints.**	**High-growth spillover district with strong income potential despite smaller economic base.**	**Medium-term high-growth district; key beneficiary of industrial decentralisation.**	**Stable but moderate growth district; needs diversification beyond primary sectors.**
Profile & metrics (GVA share / growth)	~39–40% of Karnataka GDDP; highest PCI and productivity.	~2% of GDDP but high PCI due to low population base and spillovers.	~3–4% of GDDP; larger output than Bengaluru Rural but lower PCI.	~2–3% of GDDP; slower growth, lower PCI.
Toll traffic implication	**High commuter traffic; service-led passenger and commercial vehicle movement.**	**Rising freight + commuter traffic due to logistics parks, industrial expansion and housing expansion across Bengaluru Ring Road.**	**Strong freight traffic growth driven by manufacturing and NH48 industrial flows.**	**Moderate, seasonal freight traffic linked to agriculture output and regional trade.**

Source: TIC analysis

Baseline vs Conservative growth scenarios – traffic impact

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Baseline vs Conservative growth scenarios – traffic impact

Key Driver	Baseline Scenario (Optimistic)	Conservative Scenario (Lower Growth)	Expected traffic impact
Industrial Output (IIP)	**+5%** manufacturing growth (robust factory activity)	**+2%** growth (sluggish manufacturing)	**Baseline:** Strong freight demand → **LCV ↑**, **MLCV ↑**, **MAV ↑**. **Conservative:** Only essential freight moves → **LCV ↔** (moderate), **MAV/MLCV ↔** (flat)
Agriculture GVA	**+4%** (normal monsoon, good harvest)	**+2%** (weak agriculture growth)	Good harvest boosts produce transport → **LCV ↑** (farm-to-market) Low agriculture growth → **LCV ↔** (minimal change in produce truck volumes)
Infrastructure Spending	**High ↑** (e.g., Government capital outlay +15%)	**Reduced ↓** (e.g., capex +5% only)	Big projects drive construction freight → **MAV ↑**, **3A trucks ↑** (cement, steel, aggregates loads) Slower spend → **MAV ↔** (fewer new projects = fewer heavy loads)
Export Demand	**Strong** (global demand, exports +8%)	**Soft** (exports +2% or flat)	Export surge → **MLCV/MAV ↑** (more long-haul/container trucks) Weak exports → **MAV ↔/↓** (idle capacity if factories export less)
Overall GDP / Services	**Fast growth** (~7–8% GDP; services booming)	**Modest growth** (~5% GDP; services slow)	High incomes → **CJV ↑**, **Bus ↑** (more travel, commuting); freight also grows with consumption Slower economy → **CJV ↔**, **Bus ↔** (travel demand plateaus; freight limited by lower spending)

Source: TIC analysis

PESTLE Analysis

Dimension	Key Strengths / Drivers	Constraints / Risks	Implication for Industrial Growth
Political	▪ Stable policy continuity across governments ▪ Pro-industry reforms: Industrial Policy 2020–25, Land Reform amendments ▪ Single-window clearance, one of the top achiever in EoDB ▪ Support for mega infrastructure: CBIC, suburban rail ▪ Regional incentives for backward areas (Kalyana Karnataka)	▪ Policy uncertainty in SEZ/textile sector changes at times ▪ **Upcoming elections → possible incentives re-prioritization**	**Positive**: Strong governance enables manufacturing shift beyond Bengaluru; policy certainty attracts global investors (e.g., Japan, EV, Aerospace).
Economic	▪ High GSDP growth, resilient macro fundamentals ▪ Large urban consumer base drives demand (Autos, Housing, FMCG, Electronics) ▪ High FDI & PLI leverage: electronics, EV, aerospace ▪ Surplus power availability supports heavy industry	▪ Logistics bottlenecks in Bengaluru (congestion) ▪ Land + water costs rising near capital	**Strong tailwind**: Manufacturing expansion likely in Tumakuru, Kolar, Mysuru due to lower costs + infra connectivity.
Social	▪ Young, skilled talent pool (200+ engineering colleges) ▪ Cosmopolitan culture suits expats + high-skill labour ▪ Higher urbanization (~40%) supports services + consumption	▪ Large regional inequality (Bengaluru vs North Karnataka) ▪ Periodic linguistic/regional protests	**High workforce readiness** supports advanced manufacturing & R&D; labor reforms enable 24×7 operations.
Technological	▪ India's tech capital: 40% of unicorns, strong R&D ecosystem ▪ Advanced supply chain for aerospace, machine tools ▪ Industry 4.0 readiness: IoT, automation adoption ▪ Semiconductor & EV ecosystem building	▪ Skill gaps in non-metro districts need ongoing upskilling	**Major driver**: Enables high-value production — defence, precision tools, electronics, ESDM, med-tech.
Legal	▪ Streamlined approvals (Udyog Mitra authority) ▪ Commercial courts reduce dispute timelines ▪ Land Bank with >45,000 acres via KIADB ▪ Flexible labour laws (fixed-term employment etc.)	▪ Environmental approvals slow in Tier-2 eco-sensitive zones	**Stable + Efficient** regulatory environment → low friction entry and faster industrial setup.
Environmental	▪ 25+ GW renewable capacity (Solar+Wind), RE-centric grid ▪ ESG-friendly for global firms ▪ Green industrial parks & EV policy in place	▪ Water scarcity in multiple districts (Kolar, Bengaluru outskirts) ▪ Pollution & waste stress in Bengaluru	**Dual-edge**: Green energy attracts clean industry; resource constraints must be solved (integrated water manangement + ZLD norms).

Source: TIC analysis

Determination of growth drivers and elasticity (1)

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Potential socio-economic indicators as growth drivers in context of IRC: 108-2015 and benchmark studies

Socio-economic indicators	Observations for availability/reliability of historical and forecast data
Vehicle registration / Automobile Sales	Sourcing vehicle registration data from concerned Regional Transport Office (RTO) within influence region is herculean task. In addition, it is not mandatory that Project Influence Area (PIA) matches with vehicle registration cases at ground level so not useful. Society of Indian Automobile Manufacturers (SIAM) publishes automobile sales at region level but not at granular level. Can be used as proxy data to validate specific trends. The consultant includes regional dealers' association of freight vehicles (if any) and local financing agencies to understand and validate specific trends observed in traffic.
Per Capita Income	Can be used as proxy data which reflects demand composition but not specific to commodities / vehicle category. Underlying forces are complex and changing at every strata of administrative structure i.e., districts, state, national. Historical data at state / national level available in public domain but not for district level. Further, availability of forecast data is major constraint in India.
Population	Population data are compiled on a decennial basis, with the latest census conducted in 2011, and do not provide a robust annual time series suitable for econometric modelling. In addition, migration trends across socio-economic segments and income-based geographies are highly volatile and difficult to forecast with confidence. Accordingly, population growth has not been adopted as a driver for forecasting future travel demand on the project highway.
GDP / GSDP / GDDP	Dataset from national and international publications and government agencies which are highly reliable in context of forecast e.g., Focus Economics, RBI / RBI's Survey of Professional Forecasters (96th Round), SBI Research, CII, multilateral banks (ADB, World Bank etc.), IMF, OECD, Oxford etc. The consultant typically uses Focus Economics monthly subscription and in-house/empaneled economists for correlation for state and district level GDP and industry specific aspects. The client provides views on the consultant's draft and recommends the final forecast.

Source: TIC research and analysis

Determination of growth drivers and elasticity (2)

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- For any potential indicator (economic, commodity, or industry-related) to be used as a traffic growth driver, availability and reliability of both historical data and credible forecasts are critical success factors.
- Among the key socio-economic indicators discussed above, Gross Domestic Product (GDP) at the national level and Gross State Domestic Product (GSDP) and Gross District Domestic Product (GSDP) are the only indicators for which robust historical data and reliable forecasts are consistently available. Accordingly, GDP/GSDP/GDDP have been adopted as the primary growth drivers for traffic forecasting.
- The consultant held discussions with regional dealers' associations of freight vehicles, agricultural wholesale yards (popularly known as mandis), inter-city bus terminals and port trusts/logistics facility providers in the immediate influence region to validate specific traffic trends such as seasonality and growth patterns.
- In many cases, historical data show varying traffic trends due to various external events in the economy and region. In addition, variations in data recording by third-party tolling agencies and the presence of historical data gaps, as observed in this business case, necessitated further validation.
- Accordingly, validation of the historical data was carried out using traffic data from neighbouring toll plazas on the corridor and benchmark highway sections.
- Traffic growth may not be uniform during the forecasting period, considering factors such as increasing total traffic volumes relative to the capacity of the corridor and the project highway, technological advancements in the automotive industry, cost–tonnage ratios of specific commodity–vehicle combinations, and overloading trends versus strict government enforcement in the region.
- In India, the freight vehicle mix has been changing over the last decade, favouring multi-axle vehicles (MAVs) over 2-axle and 3-axle vehicles for long-distance traffic, given the operational efficiencies achievable with larger vehicles. At the same time, Mini LCVs and LCVs have become more popular for short-distance traffic and more localised supply movements compared to 2-axle vehicles.
- Considering ongoing technological advancements in the automotive industry, standard 2-axle and 3-axle trucks have been increasingly replaced by 6-tyre LCVs over the last couple of years, a trend that is expected to continue.
- The projected elasticity values are typically assumed to remain constant over the concession period in the Indian context; however, they may vary over time due to factors such as increasing traffic volumes relative to corridor capacity, technological advancements in the automotive industry, changes in cost–tonnage ratios of specific commodity–vehicle combinations, overloading trends versus enforcement intensity, and correction of regional imbalances.
- Considering all these aspects, vehicle category-wise elasticities have been estimated.

Determination of growth drivers and elasticity (3)

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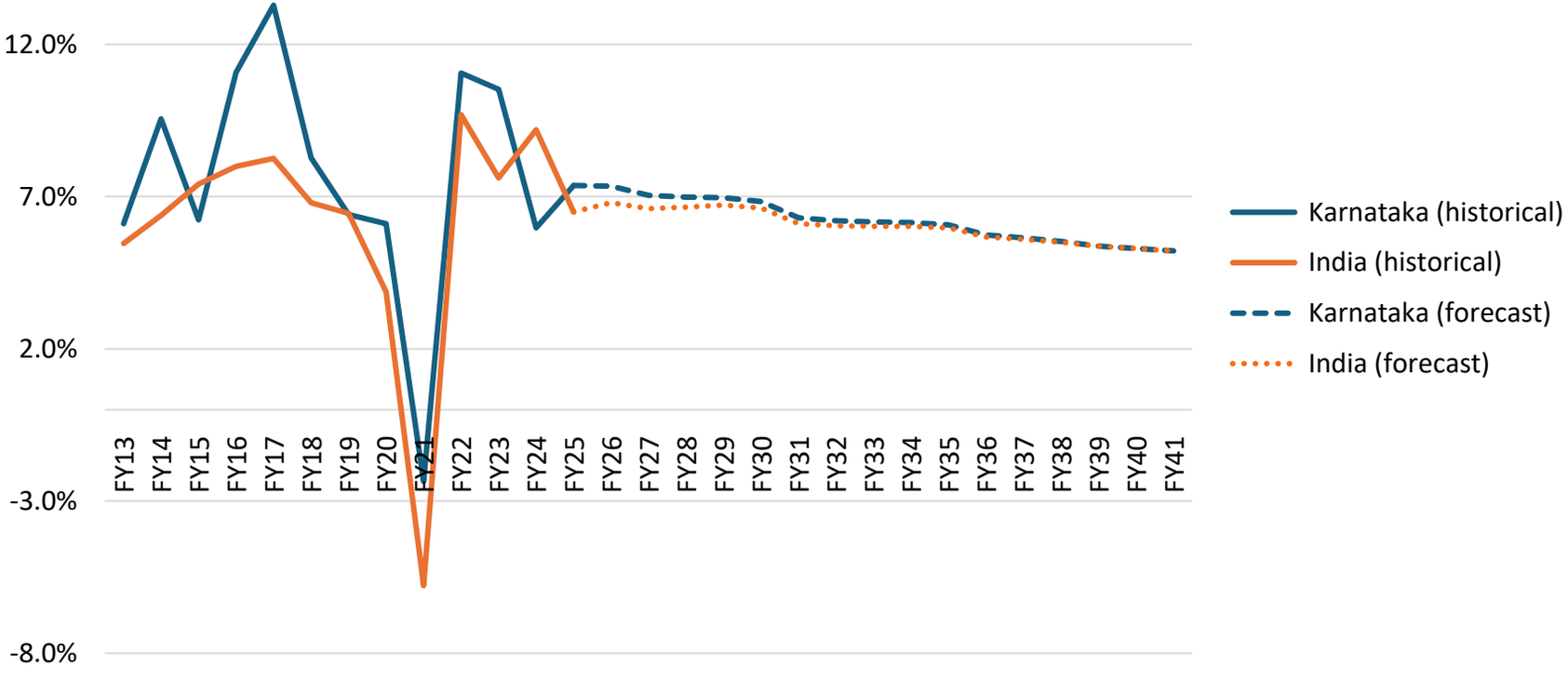
Vehicle category-wise adopted elasticity

Vehicle Category	Kulumepalya TP	Chokkenahalli TP	Halenijagal TP (Mainline Plaza)	Bharathipura & Honnenahalli (Check Plaza)	Dobbaspet & Halenijagal (Check Plaza)	Independent variable
CJV	1.02	1.00	1.00	0.70	0.65	GSDP Karnataka
Mini LCV	0.80	0.75	0.75	0.50	0.50	
Bus	0.50	0.50	0.50	0.15	0.15	
LCV / Mini Bus	0.50 – 0.57	0.80	0.70 – 0.80	0.35 – 0.40	0.70	Weighted average of GDP, GSDP of Karnataka and Tamil Nadu
2 Axle	0.90 – 0.95	0.90 – 0.95	0.90 – 0.95	0.50	0.80	
3 Axle	0.20	0.30	0.25	0.15	0.15	
MAV	1.02	1.00 – 1.05	0.95	0.35	0.75	
OSV	0.50	0.50	0.50	0.50	0.50	GDP

Source: TIC estimate using historical traffic data for the project highway and benchmark references of up-stream / downstream toll plazas

Forecasts for growth drivers (1)

GDP and GSDP forecast



Source: Client input and TIC estimates

- The **dual-track model** of Karnataka ensures broad-based economic resilience even when national or global conditions soften.
- Going forward, **strategic infrastructure (NH48 upgradation, CBIC node, MMLP Dobbaspet), industrial townships, defence manufacturing, and digital services** will shape Karnataka's sustained high-growth trajectory.
- While services anchored Bengaluru drove resilience, **Tumakuru's emerging industrial base will power the next leg of growth.**
- WPI will be 3.24% throughout the concession period except 0.25% for FY27 to revise toll rates as provided by the Client.

Chapter 5: Baseline traffic and revenue forecast

- Base year AADT (FY26)
- Toll ticket distribution
- Revenue reconciliation

This chapter presents our approach to reach baseline forecast. The consultant estimated base year AADT and toll ticket distribution to reconcile base year traffic and revenue.

Base year AADT estimate (1)

- The consultant reviewed H1 FY26 ETC traffic data received from the client. Based on which traffic profiling for balance half of FY26 has been estimated using seasonality correction factors followed by estimation of FY26 AADT.
- An independent CTVC survey was undertaken to validate the ETC reported traffic data. The variance between CTVC and ETC data is comparatively higher for Car/Jeep/Van, Mini LCV, and Bus categories.
- For CJV/Mini LCV, this is attributed to local vehicles from nearby urban centres. Variance for Bus, LCV, Truck 2A, Truck 3A, and MAV categories are also on higher side compared to country's benchmark. This can be attributed to toll plaza's proximity to major transport and warehousing zone and language issue while running toll operations through short term contracts.
- Hence, the consultant multiplied variance factor with ETC AADT to determine the corrected FY26 AADT.

Base Year AADT (FY26)

Particulars	Kulumepalya TP			Chokkenahalli TP		
	ETC AADT	Variance factor	Corrected Base Year AADT	ETC AADT	Variance factor	Corrected Base Year AADT
Car/Jeep/Van	18,974	1.3817	26,217	15,988	1.2558	20,078
Mini LCV	3,091	1.2908	3,990	2,293	1.2935	2,966
Mini Bus/LCV	4,358	1.0904	4,725	3,321	1.1476	3,811
Bus	3,667	1.0499	3,850	3,466	1.0415	3,610
2A Truck	3,416	1.0725	3664	3,331	1.0936	3,642
3A Truck	1,733	1.0812	1,874	1,712	1.0856	1,859
MAV	4,714	1.0479	4,940	5,175	1.0414	5,389
OSV	25	1.0000	25	23	1.0000	23
Total AADT	**39,979**		**49,312**	**35,308**		**41,378**
Total PCU	**76,376**		**87,839**	**72,180**		**80,448**

Source: TIC estimate

Base year AADT estimate (2)

- For proposed new mainline toll plaza at Halenijagal TP, the consultant determined 2-weeks ADT through 14-days independent count and multiplied by seasonal correction factors.
- While in case of 4 Check Plazas, 7-days of turning movement count (all movements which will use proposed check plazas on either side for Tumakuru and Bengaluru) at Dobbaspet junction and Sompura Industrial junction along with 3-days OD surveys have been carried out.
- From OD survey data of all directions including Sompura Industrial Junctions, the traffic have been split in two categories – either intended to use main carriageway or service road separately considering dynamics like level of service, toll charges, last mile connectivity etc.
- Based on these survey data and analysis, 7-days ADT determined for all 4 entry/exit check plazas followed by application of benchmark seasonality correction factors to determine AADT for FY26 individually for all four check plazas.
- The derived volume has been validated with neighbouring toll plazas and through OD surveys carried out at three mainline plazas.

Base Year AADT (FY26)

Particulars	Kulumepalya TP	Chokkenahalli TP	Halenijagal TP (Mainline Plaza)	Bharathipura and Honnenahalli CP (Check Plaza)	Dobbaspet and Halenijagal CP (Check Plaza)
Car/Jeep/Van	26,217	20,078	24,551	7,933	4,936
Mini LCV	3,990	2,966	4,609	1,956	822
Mini Bus/LCV	4,752	3,811	4,221	1,552	842
Bus	3,850	3,610	3,709	630	214
2A Truck	3,664	3,642	4,217	1,137	1,174
3A Truck	1,874	1,859	1,920	779	437
MAV	4,940	5,389	5,342	1,120	1,395
OSV	25	23	11	2	1
Total AADT	**49,312**	**41,378**	**48,579**	**15,110**	**9,820**
Total PCU	**87,839**	**80,448**	**89,116**	**24,909**	**18,777**

Source: TIC estimate

Ticket Distribution (1)

Kulumepalya TP

Vehicle categories	Car/Jeep/Van		MLCV	Bus	LCV	2A	3A	MAV
Ticket types	FY26	FY27	FY26 onwards					
Single	16.7%	8.6%	24.6%	10.6%	32.7%	59.8%	65.3%	76.4%
Return	25.3%	22.4%	55.6%	84.7%	60.0%	34.0%	27.5%	18.8%
Monthly Pass	-	-	-	-	-	-	-	-
Local Commercial	-	-	-	-	0.1%	-	0.0%	0.0%
Local Personal	0.0%	0.0%	-	-	-	-	-	-
Exemptions/Violations	29.8%	29.8%	19.8%	4.7%	7.2%	6.2%	7.2%	4.8%
Annual Pass - Pvt CJV	28.2%	39.2%	-	-	-	-	-	-

Source: TIC estimate

Chokkenahalli TP

Vehicle categories	Car/Jeep/Van		MLCV	Bus	LCV	2A	3A	MAV
Ticket types	FY26	FY27	FY26 onwards					
Single	13.9%	2.3%	33.6%	11.9%	45.5%	69.2%	71.2%	81.2%
Return	47.4%	44.4%	46.7%	84.1%	42.9%	22.9%	21.5%	14.7%
Monthly Pass	-	-	-	-	-	-	-	-
Local Commercial	-	-	-	-	-	-	-	-
Local Personal	0.0%	0.0%	-	-	-	-	-	-
Exemptions/Violations	19.2%	19.2%	19.7%	4.0%	11.6%	7.9%	7.3%	4.1%
Annual Pass - Pvt CJV	19.5%	34.1%	-	-	-	-	-	-

Source: TIC estimate

- At Kulumepalya TP, ~30% of CJV traffic is being observed using Annual Pass of INR 3,000 as on 31st October 2025 which is expected to increase to ~40% in future through gradual awareness among road users.
- Similarly, at Chokkenahalli TP, ~20% of CJV traffic is being observed using Annual Pass of INR 3,000 as on 31st October 2025 which is expected to increase to ~35% in future through gradual awareness among road users.
- The consultant did not consider penetration of annual pass from estimated exemption/violation in future.
- For all vehicle categories, prevailing exemption/violation has considered for future.
- As per discussion with the client, prevailing forced exemption is likely to reduce post-implementation of Multi Lane Free Flow (MLFF) tolling system.

Ticket Distribution (2)

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Halenijagal TP

Vehicle categories	Car/Jeep/Van	MLCV	Bus	LCV	2A	3A	MAV
Ticket types	**FY28 Onwards**						
Single	2.3%	33.6%	11.9%	45.5%	69.2%	71.2%	81.2%
Return	44.4%	46.7%	84.1%	42.9%	22.9%	21.5%	14.7%
Monthly Pass	-	-	-	-	-	-	-
Local Commercial	-	-	-	-	-	-	-
Local Personal	0.0%	-	-	-	-	-	-
Exemptions/Violations	19.2%	19.7%	4.0%	11.6%	7.9%	7.3%	4.1%
Annual Pass - Pvt CJV	34.1%	-	-	-	-	-	-

Source: TIC estimate

Bharathipura and Honnenahalli Check Plazas

Vehicle categories	Car/Jeep/Van	MLCV	Bus	LCV	2A	3A	MAV
Ticket types	**FY28 Onwards**						
Single	16.7%	24.6%	10.6%	40.5%	53.3%	57.1%	68.1%
Return	25.3%	55.6%	74.7%	55.9%	43.6%	38.1%	29.2%
Monthly Pass	-	-	10.0%	-	-	-	-
Local Commercial	-	-	-	0.1%	-	0.0%	0.0%
Local Personal	11.8%	-	-	-	-	-	-
Exemptions/Violations	6.2%	19.8%	4.7%	3.5%	3.1%	4.8%	2.7%
Annual Pass - Pvt CJV	40.0%	-	-	-	-	-	-

Source: TIC estimate

Ticket Distribution (3)

Dobbaspet and Halenijagal (Check Plaza) TP

Vehicle categories	Car/Jeep/Van	MLCV	Bus	LCV	2A	3A	MAV
Ticket types	FY29 H2 Onwards						
Single	2.3%	33.6%	11.9%	45.5%	69.2%	71.2%	81.2%
Return	44.4%	46.7%	84.1%	42.9%	22.9%	21.5%	14.7%
Monthly Pass	-	-	-	-	-	-	-
Local Commercial	-	-	-	-	-	-	-
Local Personal	0.0%	-	-	-	-	-	-
Exemptions/Violations	19.2%	19.7%	4.0%	11.6%	7.9%	7.3%	4.1%
Annual Pass - Pvt CJV	34.1%	-	-	-	-	-	-

Source: TIC estimate

Validation of base year traffic and revenue

- The Consultant calculated base year revenue by multiplying traffic AADT with prevailing toll rates in accordance with estimated toll ticket distribution.
- Comparison summary with quoted remittance by tolling agency is presented in the below table.
- Quoted daily remittance should be lower than estimated revenue by approx. 5%-10% considering profit margins of tolling agencies.

Traffic and revenue reconciliation for base year (all values are estimated with FY26 toll rate with old linking factor)

Toll Plaza	Base year revenue estimate by the Consultant (INR Crore)*	Annual Potential Collection estimate by NHAI (INR Crore)	FY26 estimate vs NHAI APC	Quoted remittance By tolling agency (INR Crore)	Consultant estimate vs Quoted remittance
Project highway as a whole (Kulumepalya and Chokkenahalli)	123.77	121.17	2.1%	123.66	0.08%

Source: TIC estimate

Chapter 6: Diversion analysis

- Upgradation of NH66
- Satellite Town Ring Road / Bengaluru Ring Road
- Surat Nashik Chennai Expressway
- Bengaluru Tumakuru Metro line
- Diversion of local traffic to Service Road on implementation of access-controlled
- Diversion of Dobbaspet and Halenijagal (Check Plaza) traffic

This chapter elaborates impacts of proposed infrastructure developments in the project influence and network in form of positive/negative diversion to/from the project highway. Analysis has been exercised using IRC: 108 - 2015 and IRC: SP: 30 - 2019.

Upgradation of NH66 (1)

- NH66 upgradation is envisioned to decongest the existing corridor, strengthen regional and inter-state connectivity, and serve as a strong catalyst for economic growth, logistics efficiency, and tourism development along the western coastline.
- Project is under implementation since long with various set of construction related challenges and is targeted for completion by March 2027.
- Mumbai Goa section is nearing completion, and once fully operational, it is expected to substantially reduce travel time and improve the reliability of long-distance trips. In Kerala, although considerable progress has been achieved, execution is being carried out in phases due to land acquisition challenges and dense urban development. Several upgraded stretches are, however, expected to open to traffic by early 2028.
- Hazardous cargo traffic has been diverted to NH48 (movement between Kochi and Mumbai/Surat) due to ongoing construction activities on NH66. This mainly include traffic carrying propane gas and other chemical and petroleum products. Once the under construction NH66 sections become operational, the diverted traffic is expected to return to shortest route, thereby having a negative diversion from the project highway.

Diversion due to Upgradation of NH66

Diversion	Affected traffic movement	Timeline	Toll Plaza	Diversion as % of Base Year AADT					
				CJV	Mini LCV	LCV	2A Trucks	3A Trucks	MAV
Negative diversion	Traffic movement between Kagal/north and Kochi / south	FY28 (50%) FY29 (100%) onwards	Kulumepalya	-	-	-	(0.22%)	(0.42%)	(0.97%)
			Chokkenahalli	-	-	-	(0.23%)	(0.46%)	(0.92%)
			Halenijagal	-	-	-	(0.23%)	(0.46%)	(0.92%)
			Bharathipura / Honnenahalli (Check Plazas)	-	-	-	-	-	-
			Dobbaspet / Halenijagal (Check Plazas)	-	-	-	-	-	-

Source: TIC estimate

Upgradation of NH66 (2)

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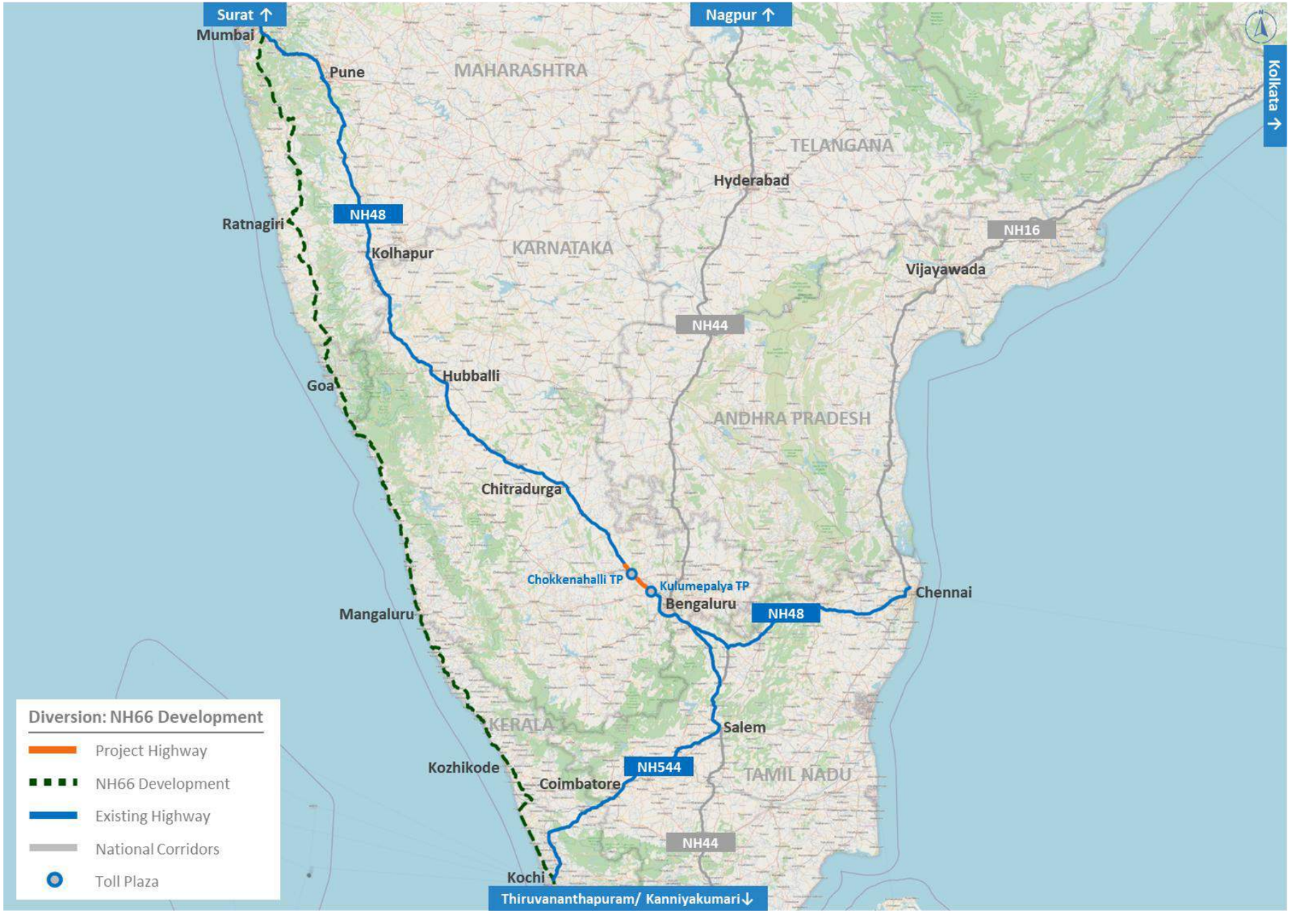
Upgradation of NH66 and project highway context



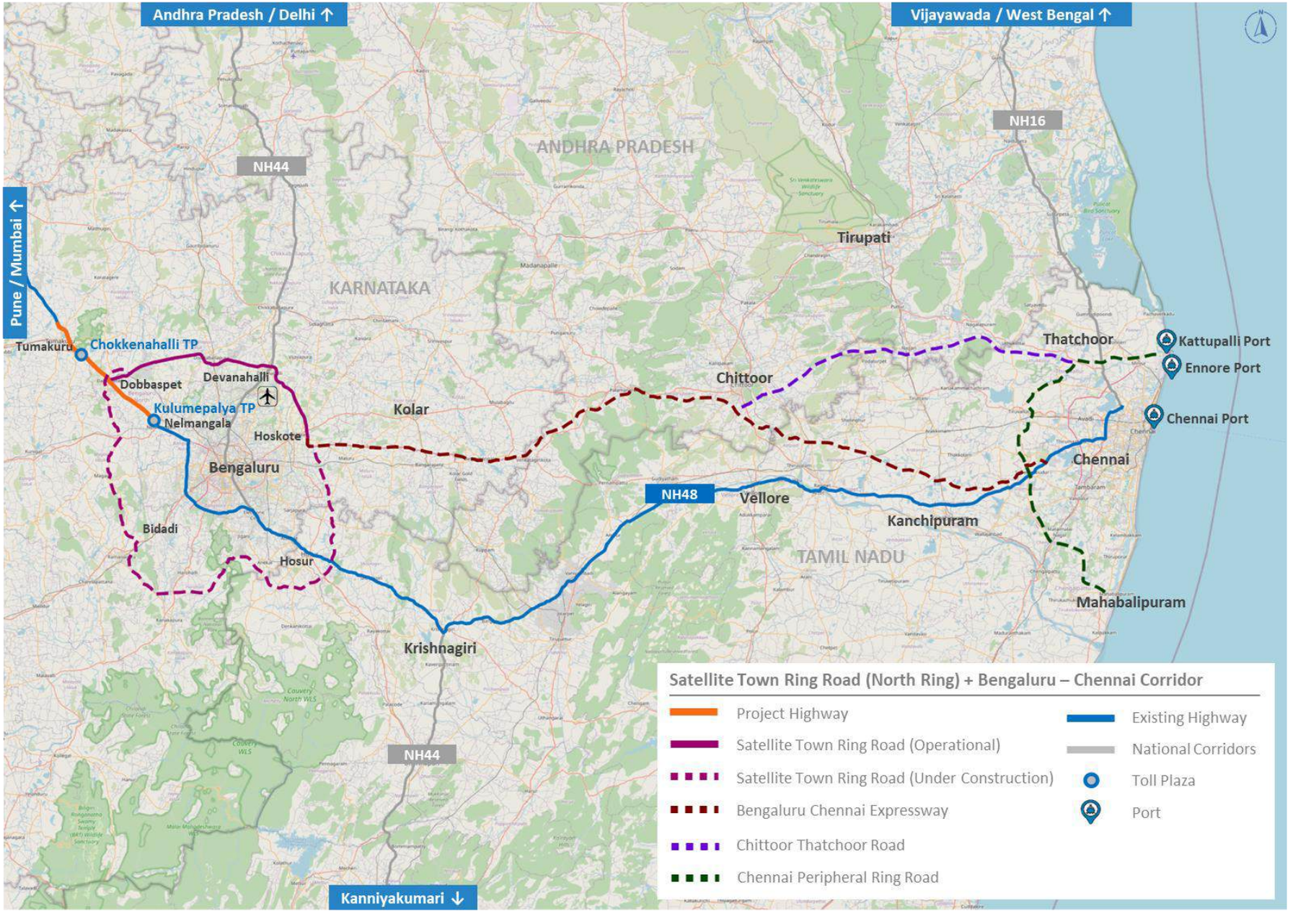
Source: TIC analysis (map not to scale)

Satellite Town Ring Road (1)

- Satellite Town Ring Road (STRR), officially designated as NH948A and partly as NH648, is a greenfield expressway project being developed by NHAI. Planned as a 4–6 lane, access-controlled corridor, the STRR is envisioned as an orbital road around Bengaluru, to ease the pressure on the city's congested road network.
- Primary objective of the STRR is to create a regional transportation framework by connecting 12 satellite towns surrounding Bengaluru, while allowing through traffic to bypass the congested core city area.
- In addition to easing traffic, the corridor is also expected to stimulate economic development, encourage industrial growth in peripheral areas, and support more balanced urban expansion.
- STRR is being implemented in multiple phases. A major milestone was achieved with the completion of the northeastern arc, from Dobbaspet to Hoskote via Doddaballapur and Devanahalli, which was inaugurated in March 2024. The partially operational north ring is also known as Bengaluru Ring Road.
- This operational section has already begun to demonstrate its benefits by facilitating smoother freight movement and improving connectivity to the Kempegowda International Airport, Agriculture Produce Market Committee at Kolar and nearby industrial hubs.
- However, the project is still a work in progress. Hoskote Hosur section is currently under construction and is expected to play a critical role in connectivity toward Tamil Nadu once completed along with Bengaluru Chennai Expressway and Chittor Thatchoor section in Tamil Nadu or either of them in FY29.
- Southwestern arc of the STRR is also being built in phases, with the overall project expected to be completed by the end of 2030. Once this section becomes operational, it will provide a smoother bypass around Bengaluru for vehicles coming from Mysuru and the northern districts of Kerala, reducing travel time and congestion on existing highways.

Satellite Town Ring Road (2)

Satellite Town Ring Road/Bengaluru Ring Road alignment and project highway context – macro view



Source: TIC analysis (map not to scale)

Satellite Town Ring Road (3)

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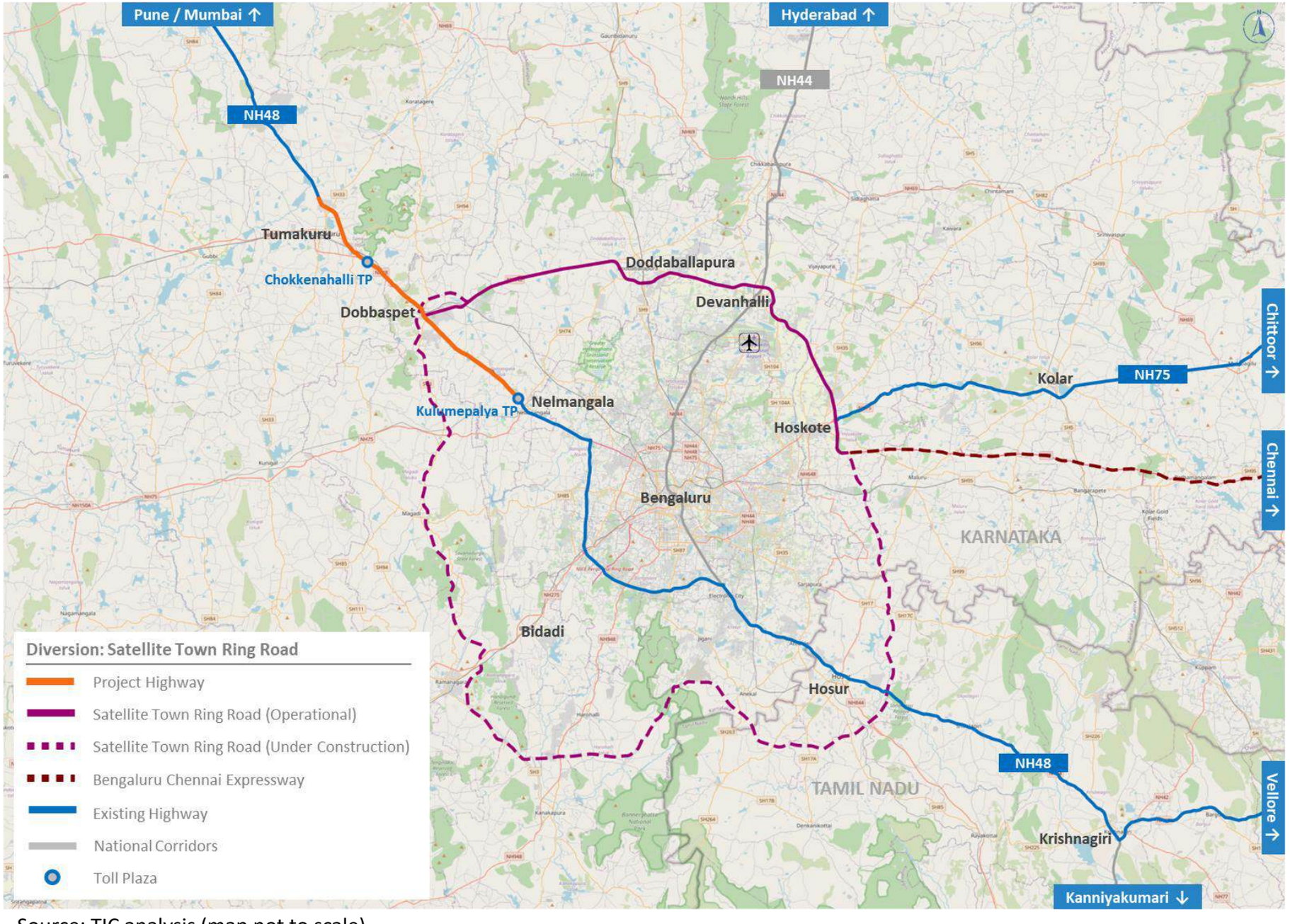
Satellite Town Ring Road/Bengaluru Ring Road alignment and project highway context – micro view



Source: TIC analysis (map not to scale)

Satellite Town Ring Road (4)

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Diversion due to Satellite Town Ring Road / Bengaluru Ring Road

Diversion	Affected traffic movement	Timeline	Toll Plaza	Diversion as % of Base Year AADT					
				CJV	Mini LCV	LCV	2A Trucks	3A Trucks	MAV
Negative diversion	**North Ring of STRR / Bengaluru Ring Road**								
	North Ring of STRR / Bengaluru Ring Road Traffic movement between Dobbaspet/north-west and Hosur/south-east	FY29 (50%) FY30 (100%) onwards	Kulumepalya	Will be terminated on 31st March 2027 (FY27)					
			Chokkenahalli	-	-	-	-	-	-
			Halenijagal	(4.62%)	(4.35%)	(16.60%)	(18.89%)	(31.07%)	(37.35%)
			Bharathipura / Honnenahalli (Check Plaza)	(8.70%)	-	-	(10.74%)	(7.82%)	(16.42%)
	South Ring of STRR								
	South Ring of STRR Traffic movement between Dobbaspet/north and Mysuru/north Kerala	FY31 (50%) FY32 (100%) onwards	Kulumepalya	Will be terminated on 31st March 2027 (FY27)					
			Halenijagal	(3.37%)	(0.62%)	(1.80%)	(1.85%)	(3.02%)	(2.07%)
			Bharathipura / Honnenahalli (Check Plaza)	(3.04%)	-	-	(2.89%)	(1.96%)	(2.74%)
Positive diversion*	Traffic movement between Dobbaspet/north-west and Hosur/south-east	FY29 (50%) FY30 (100%) onwards	Dobbaspet / Halenijagal (Check Plaza)	22.27%	-	41.43%	70.02%	139.22%	144.69%
	Traffic movement between Dobbaspet/north and Mysuru/north Kerala	FY31 (50%) FY32 (100%) onwards	Dobbaspet / Halenijagal (Check Plaza)	18.43%	-	6.09%	8.06%	14.85%	10.49%

Source: TIC estimate

*Diversion from Halenijagal Main Plaza will be gain for Bharathipura / Honnenahalli (Check Plaza). Base year traffic volume at Check Plazas is very low compared to expected gain on start of access-controlled / check plazas.

Surat – Nashik – Chennai Expressway (1)

- Surat Chennai Expressway is ~1200 km long 6-lane, partially access-controlled highway being developed by NHAI through HAM.
- The corridor will connect Surat in Gujarat with Chennai in Tamil Nadu, passing through major cities such as Nashik, Ahmednagar, Solapur, Kalaburagi, Kurnool, Kadapa, and Tirupati, spanning four states Gujarat, Maharashtra, Telangana, and Tamil Nadu. This will enhance connectivity between western ports and southern industrial regions to promote seamless freight movement.
- The project is part of two major economic corridors i.e., 513 km Surat – Nashik – Ahmednagar – Solapur corridor and 707 km. Solapur – Kurnool – Chennai corridor integrating both greenfield and brownfield stretches.
- Key greenfield sections includes:
  - Surat – Nashik – Ahmednagar stretch in Gujarat and Maharashtra
  - Ahmednagar – Solapur – Akkalkot – MH/KA Border section
  - MH/KA Border – Mahabubnagar section
  - The remaining sections will involve upgrading existing two-lane roads into four-lane.
- Recently, MoRTH cancelled Surat – Nashik section of proposed development due to persistent challenges in securing environmental clearances. To address the intended connectivity objective, Maharashtra State Road Development Corporation (MSRDC) will develop greenfield expressway connecting Bharvir Khurd on Smruddhi Marg to Tawa village on NH48.
- Reference discussion with the client (field offices across corridor), the entire corridor is expected to be developed by FY31.
- The consultant analysed potential diversion for two markets interacting with Chennai/south:
  - Solapur/west
  - Hyderabad/north

Surat – Nashik – Chennai Expressway (2)

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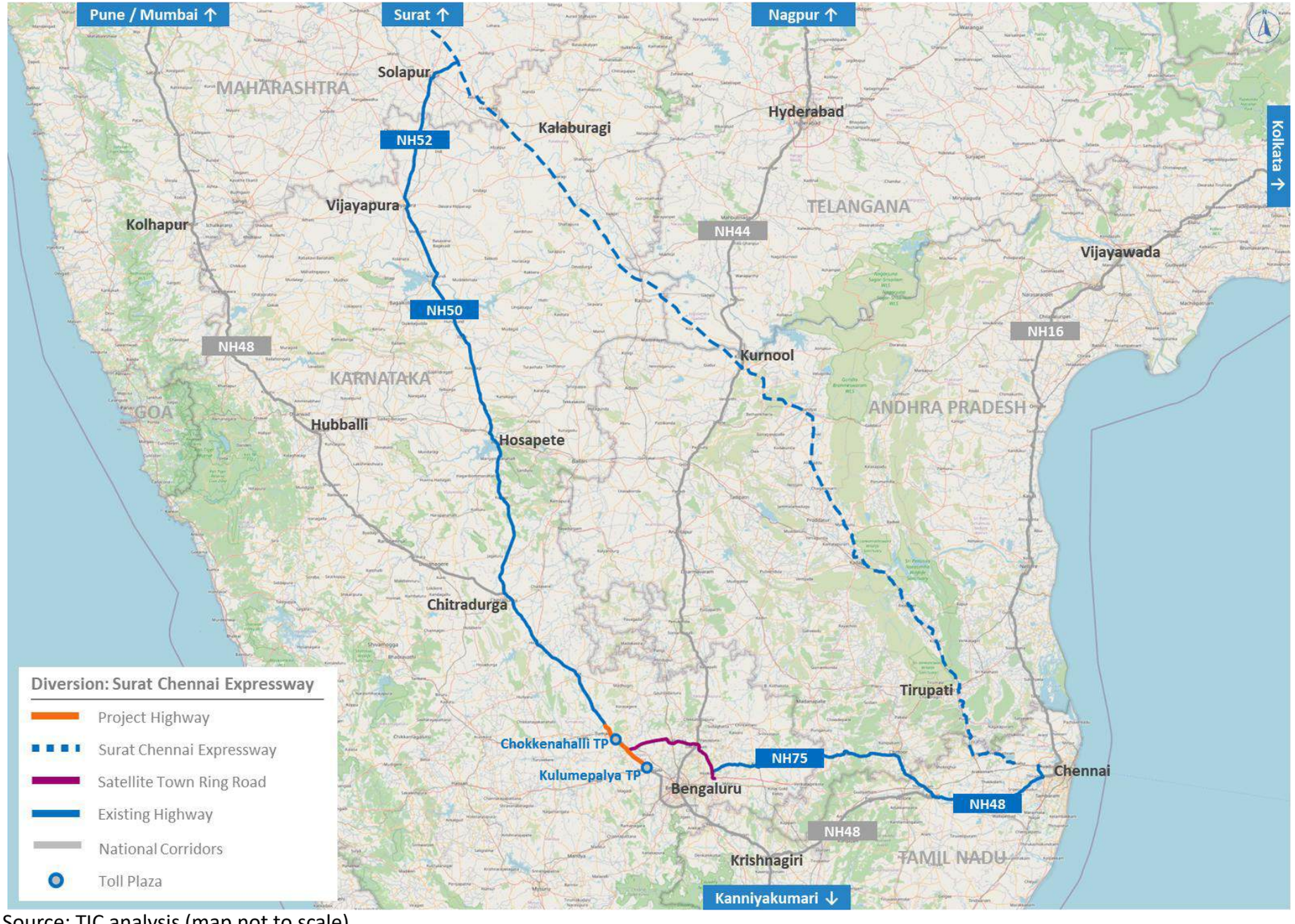
Surat Nashik Chennai Expressway alignment and project highway context



Source: TIC analysis (map not to scale)

Surat – Nashik – Chennai Expressway (3)

Diversion due to Surat – Nashik – Chennai Expressway

Diversion	Affected traffic movement	Timeline	Toll Plaza	Diversion as % of Base Year AADT					
				CJV	Mini LCV	LCV	2A Trucks	3A Trucks	MAV
Negative diversion	Traffic movement between Solapur/west and Chennai/ south Traffic movement between Hyderabad/north and Chennai/ south	FY31 (40%) FY32 (80%) FY33 (100%) Onwards	Kulumepalya	Will be terminated on 31st March 2027 (FY27)					
			Chokkenahalli	Will be terminated on 30th September 2028 (H1 FY29)					
			Halenijagal	(0.09%)	-	(0.67%)	(2.78%)	(3.61%)	(4.42%)
			Bharathipura / Honnenahalli (Check Plaza)	-	-	-	-	-	-
			Dobbaspet and Halenijagal (Check Plaza)	(0.06%)	-	-	(3.21%)	(3.21%)	(4.11%)

Source: TIC estimate

Bengaluru Tumakuru Metro line (1)

- The proposed extension of the Namma Metro along the north-western corridor aims to connect Bengaluru with Tumakuru, marking Karnataka's first inter-city metro corridor and a major step towards Bengaluru – Tumakuru twin city planning.
- Corridor is planned to span approximately 59.6 km, extending from Madavara (terminal station of the Green Line) to Tumakuru, thereby linking the Bengaluru metropolitan area with an important industrial and educational hub of the state via Dobbaspet.
- As per the feasibility assessment, the metro line is proposed as a fully elevated corridor with around 25 stations, providing convenient access to intermediate towns, industrial clusters and developing suburban areas along the alignment.
- The plan also includes two metro depots, one proposed near Nelamangala to serve the suburban and industrial belt, and another near Tumakuru to support terminal operations and maintenance requirements.
- Feasibility stage approval received and DPR is expected to start. Expected commencement of operations is in FY32.

Diversion due to Bengaluru Tumakuru Metro line

Diversion	Affected traffic movement	Timeline	Toll Plaza	Diversion as % of Base Year AADT					
				CJV	Bus	LCV	2A Trucks	3A Trucks	MAV
Bengaluru Tumakuru Metro line									
Negative diversion	Traffic movement between Bengaluru and Tumakuru	FY32 (40%) FY33 (100%) Onwards	Kulumepalya	(10.08%)	(4.44%)	-	-	-	-
			Chokkenahalli	(9.77%)	(4.44%)	-	-	-	-
			Halenijagal	(9.77%)	(4.44%)	-	-	-	-
			Bharathipura/ Honnenahalli (Check Plaza)	(10.08%)	(4.44%)	-	-	-	-
			Dobbaspet/ Halenijagal (Check Plaza)	(3.26%)	(1.48%)	-	-	-	-

Source: TIC estimate

Bengaluru Tumakuru Metro line (2)

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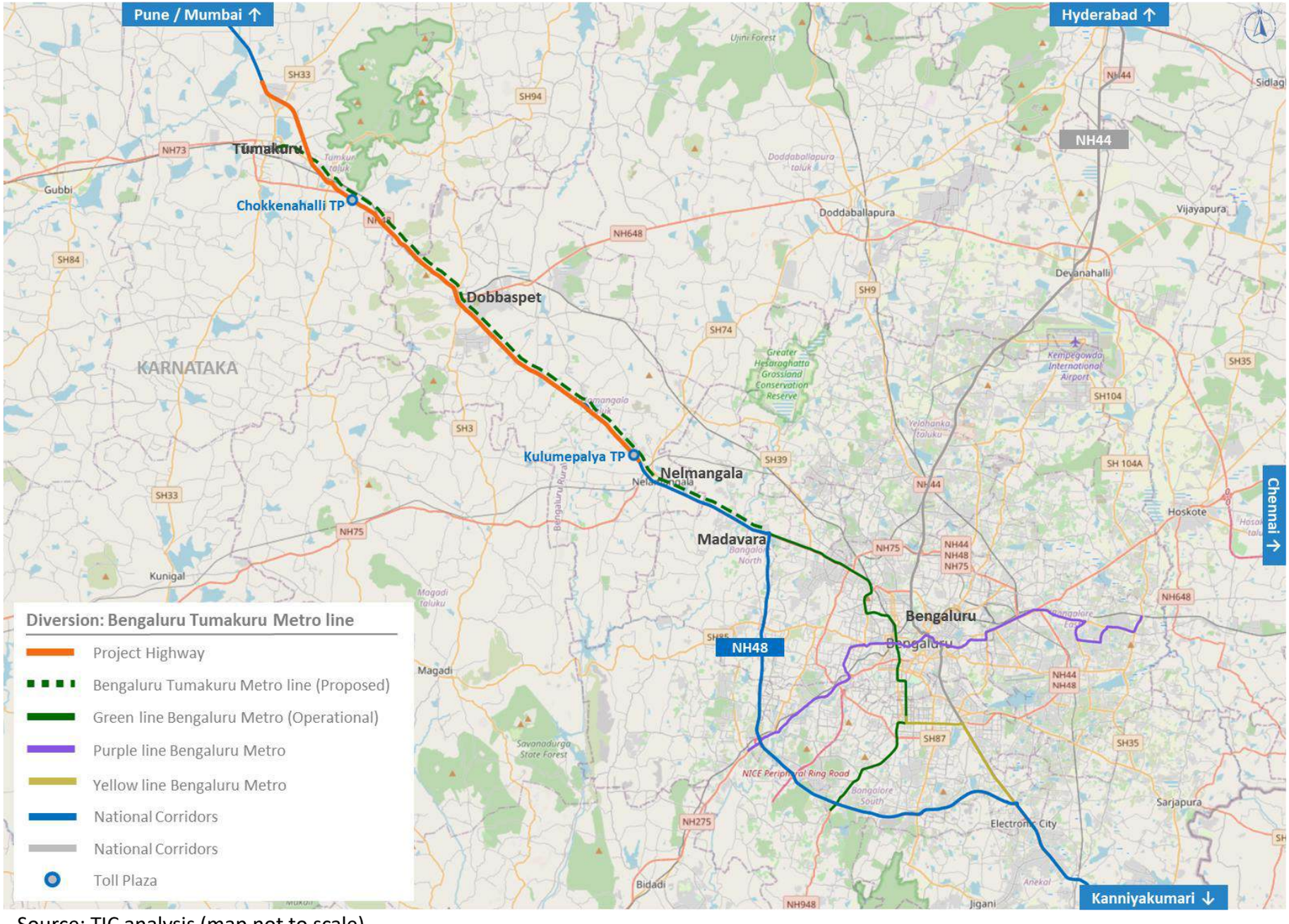
Bengaluru Tumakuru Metro line alignment and project highway context



Source: TIC analysis (map not to scale)

Diversion of local traffic to Service Road on implementation of access-controlled

Proposed access-controlled modality will be implemented on completion of 4 to 6 lane widening of entire stretch i.e. start of H2 FY29. In context of local traffic movement especially between Dobbaspet and Tumkur as well as intermediate locations, service road option will be available.

Diversion of local traffic to Service Road on implementation of access-controlled

Diversion	Affected traffic movement	Years of impact	Toll Plaza	Diversion as % of Base Year AADT						
				CJV	Mini LCV	Bus	LCV	2A Trucks	3A Trucks	MAV
Negative diversion	Local traffic movement between Dobbaspet and Tumakuru	H2 FY29 (100%) Onwards	Kulumepalya	Will be terminated on 31st March 2027 (FY27)						
			Chokkenahalli	Will be terminated on 30th September 2028 (H1 FY29)						
			Halenijagal	(3.89%)	(4.82%)	(6.51%)	(0.89%)	(1.66%)	(1.21%)	(0.76%)
			Bharathipura / Honnenahalli (Check Plaza)	-	-	-	-	-	-	-
			Dobbaspet / Halenijagal (Check Plaza)	-	-	-	-	-	-	-

Source: TIC estimate

Diversion due to Dobbaspet and Halenijagal (Check Plaza) traffic

Dobbaspet and Halenijagal (Check Plaza) will be implemented in mid FY29 and because of which traffic movement between Tumkur/north and Dobbaspet/further towards north-east ring and south-west ring of Bengaluru / Satellite Town Ring Road will use proposed check plazas as Entry/Exit. Hence, the same will be eliminated from the main carriage way.

Diversion due to Dobbaspet and Halenijagal (Check Plaza) traffic

Diversion	Affected traffic movement	Timeline	Toll Plaza	Diversion as % of Base Year AADT							
				CJV	Mini LCV	Bus	LCV	2A Trucks	3A Trucks	MAV	OSV
Negative diversion	Traffic movement between Dobbaspet and Tumakuru	FY29 (100%) Onwards	Kulumepalya	Will be terminated on 31st March 2027 (FY27)							
			Chokkenahalli	Will be terminated on 30th September 2028 (H1 FY29)							
			Halenijagal	(20.10%)	(17.83%)	(19.94%)	(5.77%)	(27.85%)	(22.78%)	(26.11%)	(7.08%)
			Bharathipura / Honnenahalli (Check Plaza)	-	-	-	-	-	-	-	-
			Dobbaspet / Halenijagal (Check Plaza)	-	-	-	-	-	-	-	-

Source: TIC estimate

Chapter 7: Final traffic and revenue forecast

- Traffic growth forecast
- Traffic and revenue forecast
- Scenario development

Following baseline traffic forecast and diversion analysis, this chapter presents method for revision of toll fee followed by final traffic and revenue forecast for various scenarios: most likely with and without overloading, pessimistic and optimistic.

Capacity analysis (1)

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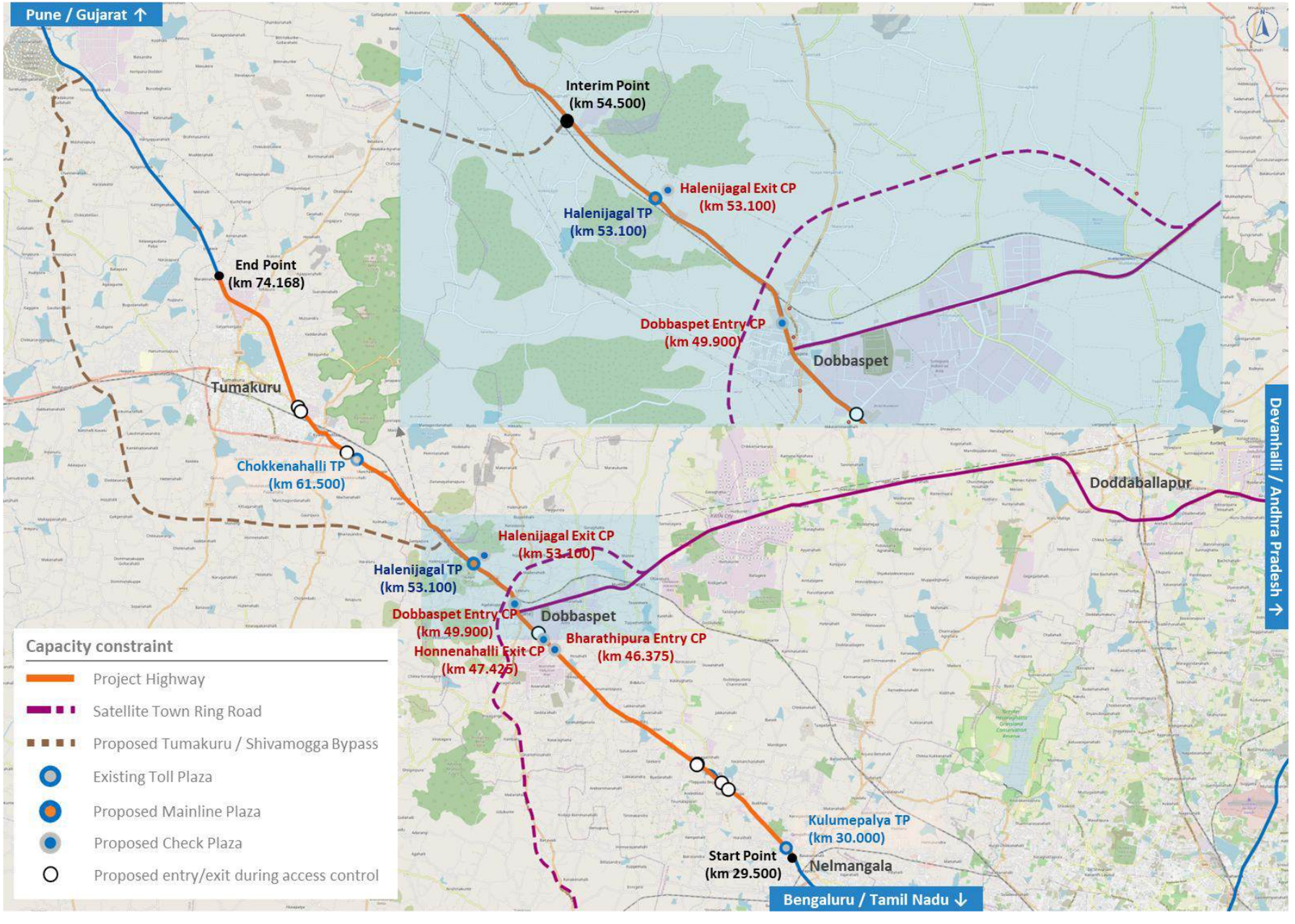
Capacity analysis context



Source: TIC analysis (map not to scale)

Capacity analysis (2)

Assumption for design capacity determination and tollable section-wise capacity analysis

Tollable sections	Nelmangala - Dobbaspet (Bharathipura and Honnenahalli CP)	Dobbaspet - Tumakuru (Halenijagal TP / Dobbaspet and Halenijagal CP)
Lane configuration	6 Lane	6 Lane
Level of Service B	60,000	60,000
Level of Service C	84,000	84,000
Level of Service D	1,34,000	1,34,000
Level of Service E	2,41,000	2,41,000
PCU (FY41)*	1,16,872	1,43,306
Capacity Saturation (LOS B)	**Yes**	**Yes**
Capacity Saturation (LOS C)	**Yes**	**Yes**
Capacity Saturation (LOS D)	**No**	**Yes**
Capacity Saturation (LOS E)	**No**	**No**
Capacity Saturation (LOS F)	**No**	**No**

Source: TIC estimate * post capacity restrictions on growth
Design capacity for 6-lane National Highway is determined as per as per IRC: 106 and IRC: SP 87 and standard industry practice for determining Level of Service C/D/E

Benchmark cases:
Gujarat: Ahmedabad Mumbai Corridor (Mandva Toll) – 1,45,000 PCU
Gujarat: Ahmedabad Mumbai Corridor (Choryasi Toll) – 1,22,000 PCU
Haryana: Delhi Panipat Corridor (Bhagan Toll) – 1,07,000 PCU

Capacity analysis (3)

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Nelmangala – Dobbaspet section (Bharathipura and Honnenahalli CP)

- Nelmangala – Dobbaspet section will cater through traffic from Halenijagal TP in addition to merging/leaving traffic from proposed entry/exit check plazas (Bharathipura and Honnenahalli) during access-controlled modality.
- Nelmangala – Dobbaspet section will observe traffic of 1,28,533 PCUs in FY41 which is closed to LoS D for 6 lane highway.
- This section will have options of service road for local traffic and further likely to have marginal possibilities of redistribution of traffic and/or readjustment of peak hours considering socio-economic strata of the region.
- Hence, in context of 6-lane main carriage way (MCW) and service road configuration, ease of travel can be expected up to LOS D.
- Nos. of tolling lanes at proposed entry/exit check plazas (Bharathipura and Honnenahalli) and design of check plaza's connectivity with slip/service road is critical aspect to be considered during implementation of ongoing 4 to 6 lane widening. NHAI field offices during 4 to 6 lane construction will ensure implementation of the solution to achieve desired outcome in future as per discussion with the client.

Dobbaspet – Tumakuru (Halenijagal TP / Dobbaspet and Halenijagal CP)

- Dobbaspet – Tumakuru section will cross LOS D in FY37 with 1,37,156 PCU and 1,62,203 PCU in FY41 even after allocation of reasonable local traffic to service road.
- This section will have minimal probability of redistribution of traffic and/or readjustment of peak hours considering socio-economic strata of the region.
- Overall, the section will have effect of capacity constraint on the traffic. Hence, the consultant has considered capacity constraints and growth of traffic would be gradually restricted from FY37 to FY41 with assumption of any alternate route/mode will be proposed by that time.
- In addition to this, nos. of tolling lanes at Halenijagal TP / Dobbaspet and Halenijagal CP to be dynamically adjusted as per traffic diversion to Satellite Town Rind Road / Bengaluru Ring Road in future. Design of check plaza's connectivity with slip/service road and further with proposed Satellite Town Rind Road are critical aspect to be considered. The same will be taken care by NHAI field offices during 4 to 6 lane construction as per discussion with the client.

Transactional Support Agreement and FY27 revenue estimate

- The project highway is proposed to be included in NHAI's Public InvIT.
- A Transactional Support Agreement will be executed between NHAI and the Public InvIT for the management of toll plaza operations for FY27.
- Tolling operations during FY27 will be undertaken by NHAI under the prevailing short-term contract modality.
- Accordingly, FY27 revenue has been estimated based on historical bidding trends for tolling contracts and is assumed to be 5%–10% lower than the estimated actual revenue.
- Consistent with this arrangement, manpower-related expenses for tolling operations have been excluded from O&M costs as confirmed by the client.

Traffic and revenue forecast: Halenijagal TP (1)

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Pre-diversion growth rate

Vehicle Category	FY26 FY27	FY27 FY28	FY28 FY29	FY29 FY30	FY30 FY31	FY26 FY31	FY31 FY36	FY36 FY41	FY27 FY41
CJV	6.8%	7.0%	7.7%	6.8%	6.9%	7.0%	6.3%	1.2%	4.7%
Mini LCV	5.8%	5.8%	5.2%	5.6%	4.7%	5.4%	4.6%	0.9%	3.5%
LCV	5.5%	5.5%	5.5%	5.4%	5.0%	5.4%	4.8%	4.3%	4.8%
Bus	3.5%	3.5%	3.1%	3.4%	3.1%	3.3%	3.0%	0.8%	2.3%
2A Truck	6.5%	6.5%	6.5%	6.4%	5.9%	6.4%	5.7%	5.1%	5.7%
3A Truck	0.7%	1.7%	1.7%	1.7%	1.6%	1.5%	1.3%	0.3%	1.0%
MAV	6.1%	6.5%	6.5%	6.7%	5.9%	6.3%	5.7%	1.6%	4.4%
AADT	**6.0%**	**6.2%**	**6.5%**	**6.1%**	**5.9%**	**6.1%**	**5.6%**	**1.8%**	**4.4%**
PCU	**5.6%**	**5.9%**	**6.0%**	**5.9%**	**5.5%**	**5.8%**	**5.3%**	**2.0%**	**4.3%**

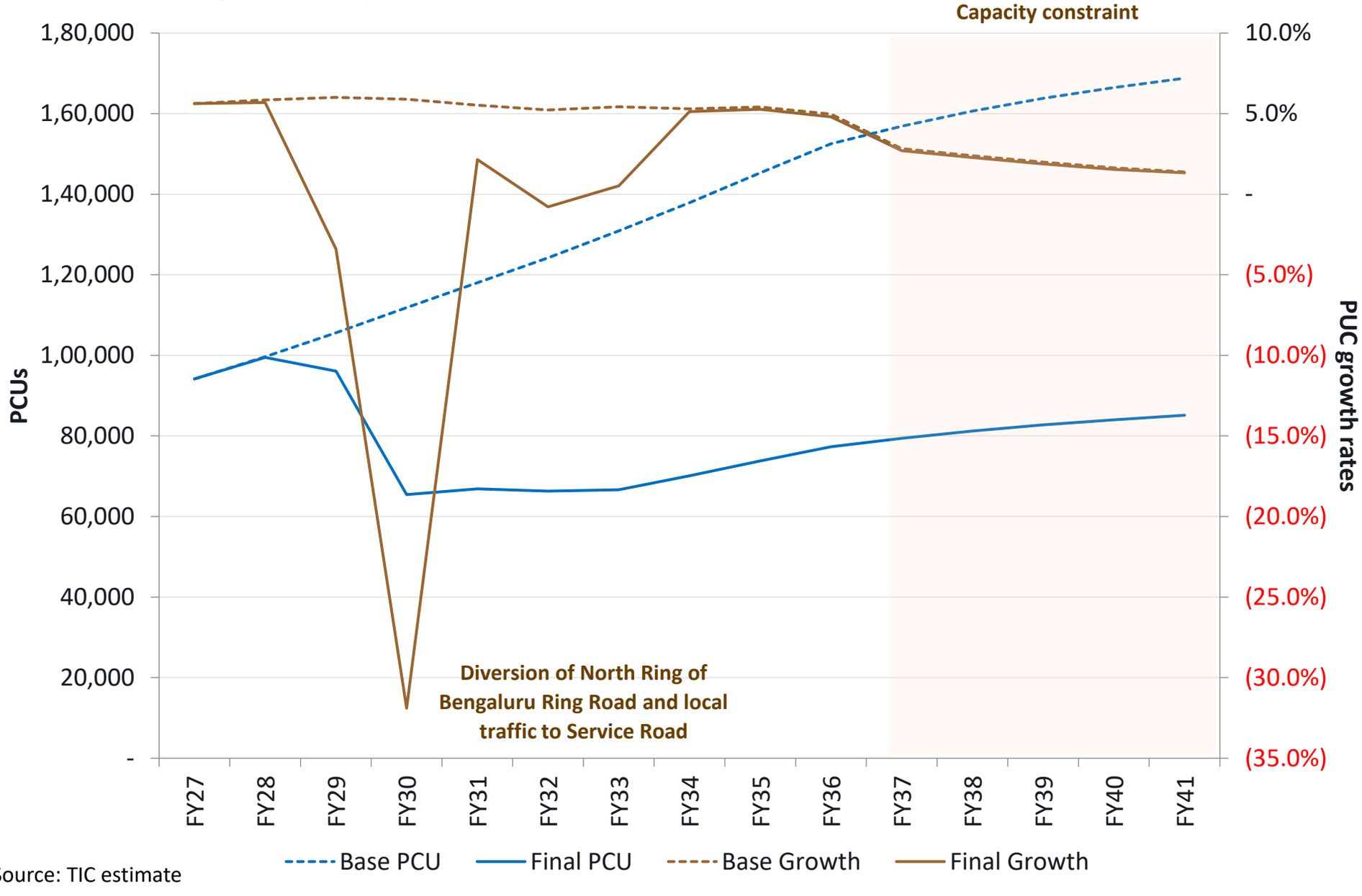
Post-diversion growth rate

Vehicle Category	FY26 FY27	FY27 FY28	FY28 FY29	FY29 FY30	FY30 FY31	FY26 FY31	FY31 FY36	FY36 FY41	FY27 FY41
CJV	6.8%	7.0%	5.2%	(21.9%)	4.4%	(0.4%)	2.5%	1.2%	0.7%
Mini LCV	5.8%	5.8%	2.9%	(21.2%)	4.3%	(1.1%)	4.6%	0.9%	1.1%
LCV	5.5%	5.5%	(3.2%)	(34.5%)	2.8%	(6.2%)	4.3%	4.3%	0.3%
Bus	3.5%	3.5%	3.1%	(3.5%)	3.1%	1.9%	2.0%	0.8%	1.4%
2A Truck	6.5%	6.4%	(3.7%)	(39.5%)	1.7%	(7.7%)	4.6%	5.1%	0.1%
3A Truck	0.7%	1.5%	(14.3%)	(46.1%)	(5.2%)	(14.9%)	(0.6%)	0.3%	(5.7%)
MAV	6.1%	6.0%	(14.0%)	(53.7%)	(2.6%)	(15.3%)	3.2%	1.6%	(4.6%)
AADT	**6.0%**	**6.1%**	**0.5%**	**(26.7%)**	**3.3%**	**(3.1%)**	**3.0%**	**1.7%**	**0.1%**
PCU	**5.6%**	**5.7%**	**(3.4%)**	**(31.9%)**	**2.1%**	**(5.6%)**	**3.0%**	**1.9%**	**(0.7%)**

Source: TIC estimate

Traffic and revenue forecast: Halenijagal TP (2)

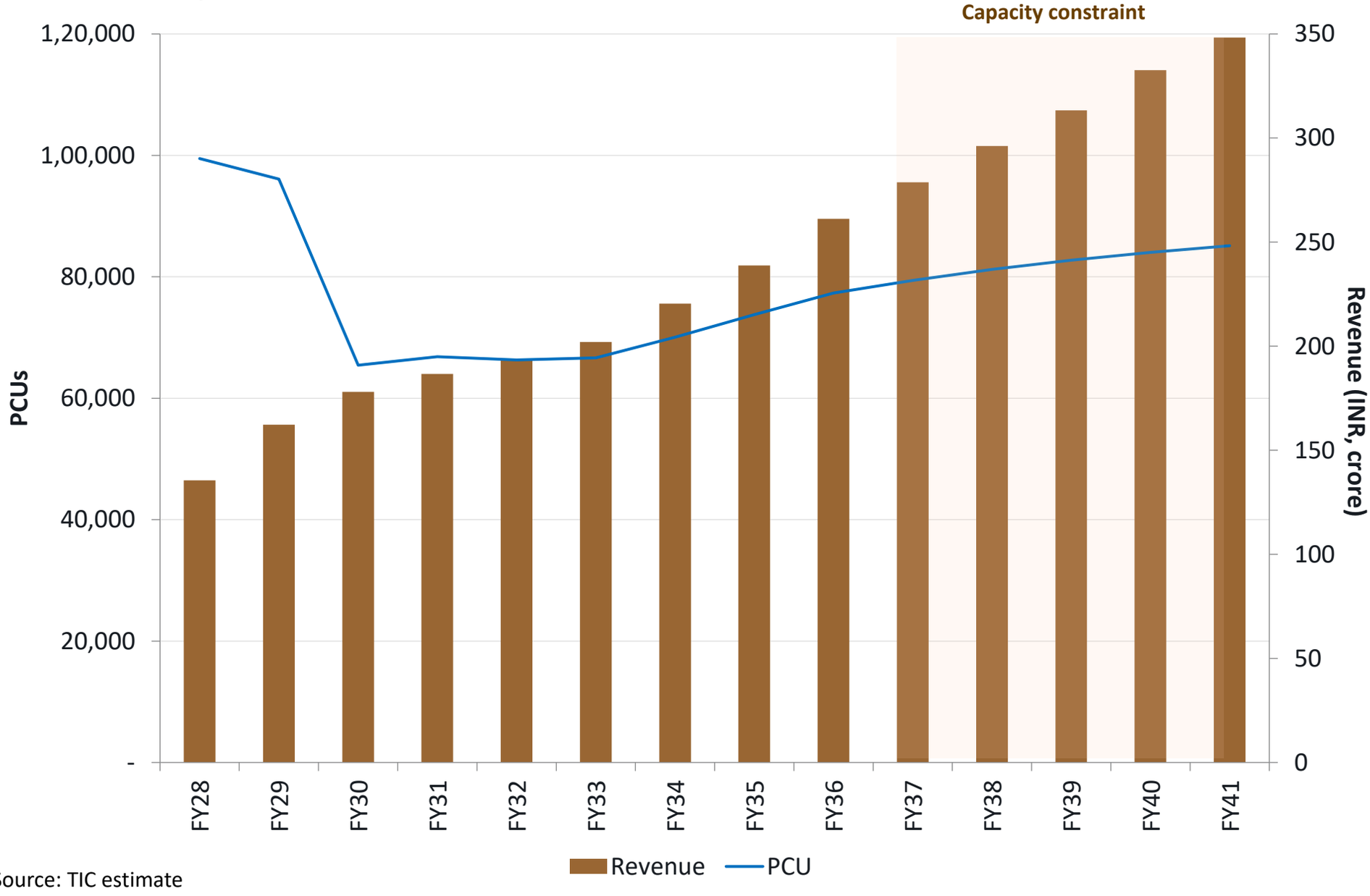
Pre- and Post-diversion growth rate snapshot



Source: TIC estimate

Traffic and revenue forecast: Halenijagal TP (3)

Revenue and PCU snapshot



Source: TIC estimate

Traffic and revenue forecast: Dobbaspet and Halenijagal CP (1)

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Pre-diversion growth rate

Vehicle Category	FY26 FY27	FY27 FY28	FY28 FY29	FY29 FY30	FY30 FY31	FY26 FY31	FY31 FY36	FY36 FY41	FY27 FY41
CJV	4.4%	4.5%	5.0%	4.4%	4.5%	4.6%	4.1%	1.3%	3.2%
Mini LCV	3.5%	3.5%	3.5%	3.4%	3.1%	3.4%	3.0%	0.9%	2.4%
LCV	4.9%	4.9%	4.9%	4.8%	4.4%	4.7%	4.2%	1.6%	3.4%
Bus	1.1%	1.0%	1.0%	1.0%	0.9%	1.0%	0.9%	0.3%	0.7%
2A Truck	5.5%	5.5%	5.5%	5.4%	5.0%	5.4%	4.8%	1.9%	3.9%
3A Truck	0.4%	1.0%	1.0%	1.0%	0.9%	0.9%	0.8%	0.1%	0.6%
MAV	4.8%	5.1%	5.1%	5.3%	4.7%	5.0%	4.5%	1.8%	3.7%
AADT	**4.4%**	**4.5%**	**4.7%**	**4.5%**	**4.3%**	**4.5%**	**4.0%**	**1.4%**	**3.2%**
PCU	**4.4%**	**4.6%**	**4.7%**	**4.6%**	**4.3%**	**4.5%**	**4.1%**	**1.5%**	**3.3%**

Post-diversion growth rate

Vehicle Category	FY26 FY27	FY27 FY28	FY28 FY29	FY29 FY30	FY30 FY31	FY26 FY31	FY31 FY36	FY36 FY41	FY27 FY41
CJV	4.4%	4.5%	16.7%	14.9%	12.4%	10.5%	5.0%	1.3%	5.6%
Mini LCV	3.5%	3.5%	3.5%	3.4%	3.1%	3.4%	3.0%	0.9%	2.4%
LCV	4.9%	4.9%	26.6%	22.7%	6.6%	12.7%	4.7%	1.6%	6.3%
Bus	1.1%	1.0%	1.0%	1.0%	0.9%	1.0%	0.6%	0.3%	0.6%
2A Truck	5.5%	5.5%	42.5%	32.8%	6.7%	17.6%	5.1%	1.9%	8.2%
3A Truck	0.4%	1.0%	71.4%	42.5%	3.5%	20.7%	1.2%	0.1%	7.4%
MAV	4.8%	5.1%	81.2%	49.5%	6.2%	26.0%	4.7%	1.8%	10.7%
AADT	**4.4%**	**4.5%**	**31.1%**	**25.6%**	**8.5%**	**14.3%**	**4.6%**	**1.4%**	**6.8%**
PCU	**4.4%**	**4.6%**	**47.3%**	**35.0%**	**7.1%**	**18.4%**	**4.5%**	**1.6%**	**8.2%**

Source: TIC estimate

Traffic and revenue forecast: Dobbaspet and Halenijagal CP (2)

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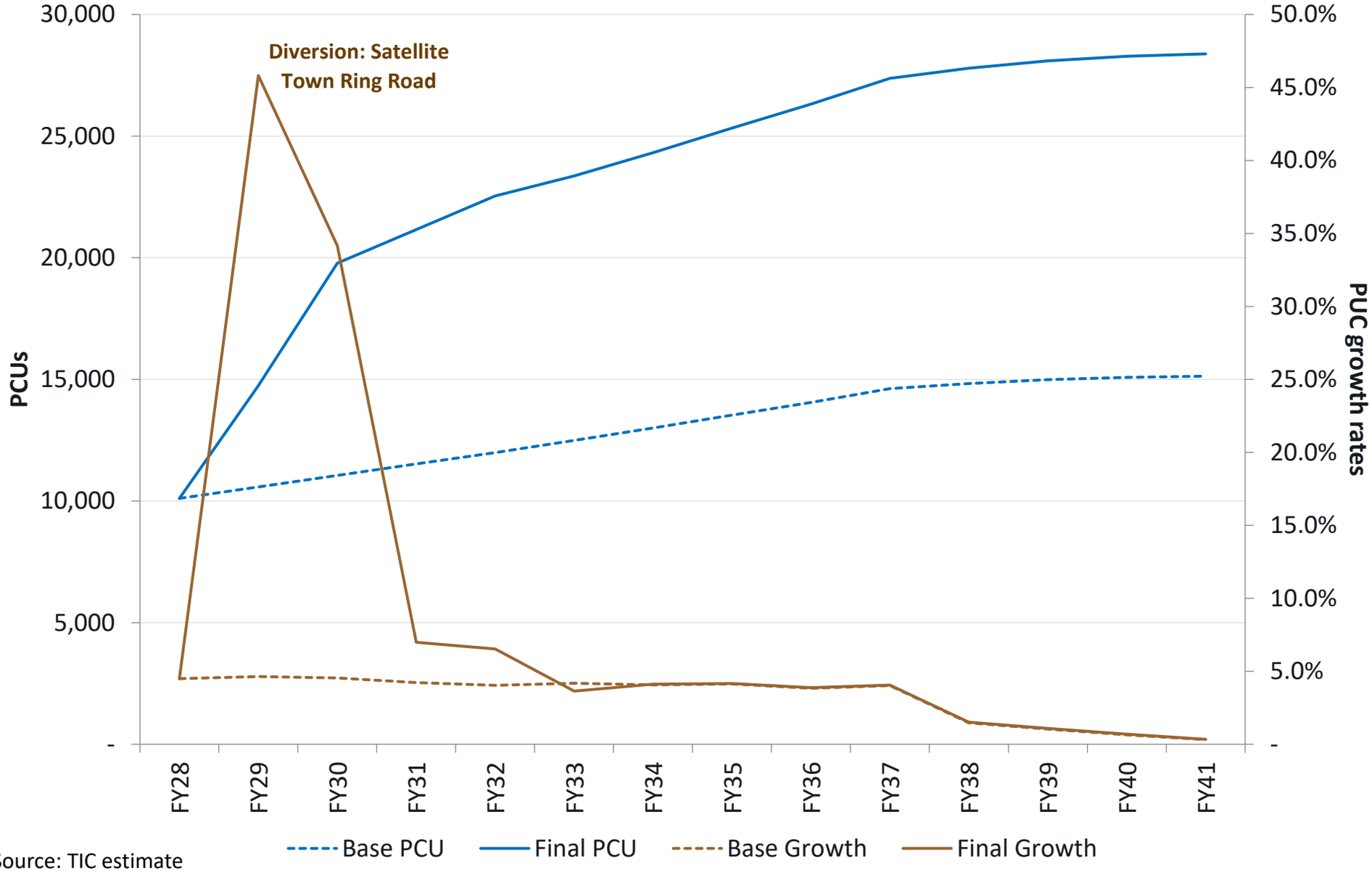
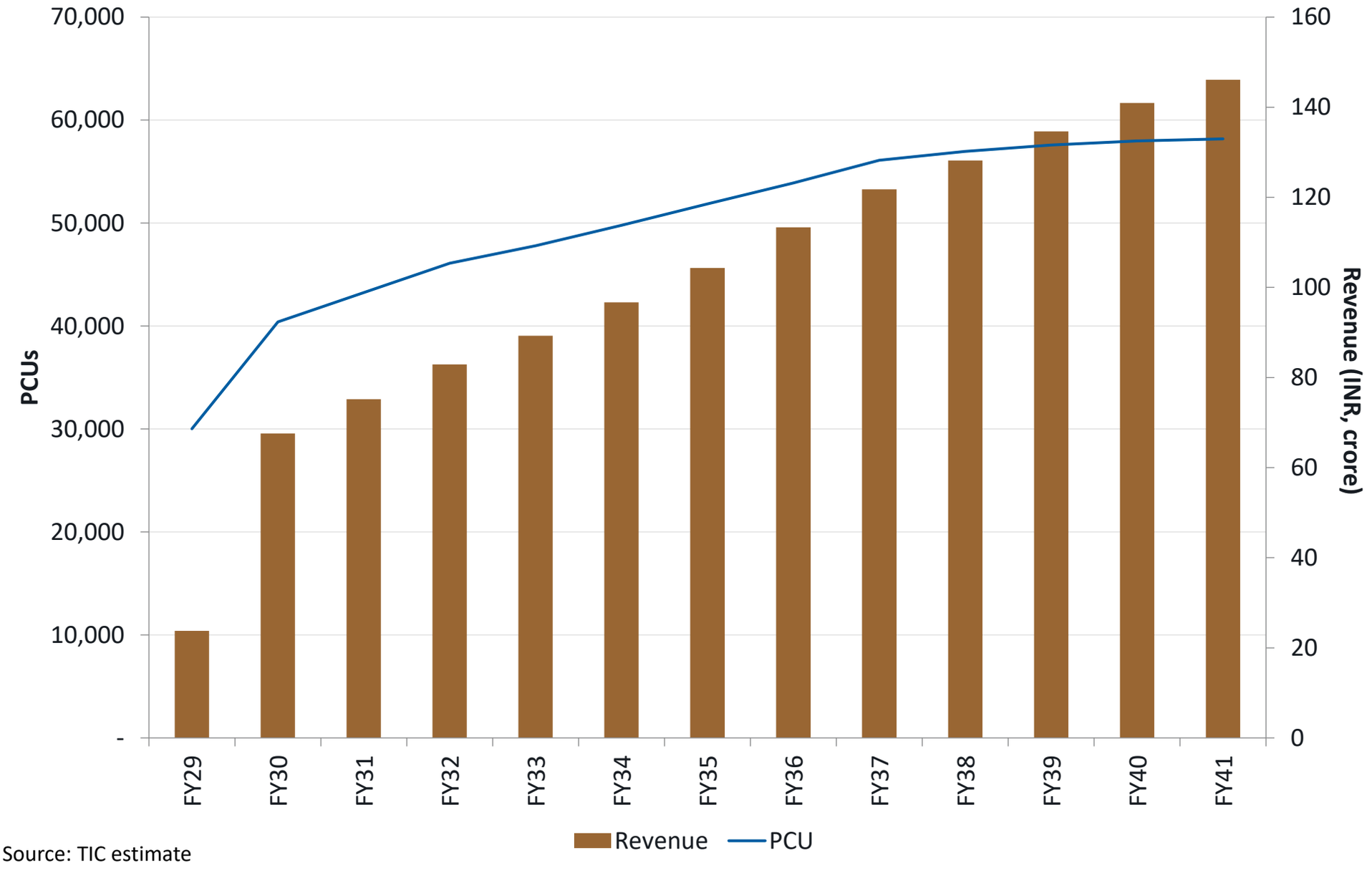
Pre- and Post-diversion growth rate snapshot



Source: TIC estimate

Traffic and revenue forecast: Dobbaspet and Halenijagal CP (3)

Revenue and PCU snapshot



Source: TIC estimate

Traffic and revenue forecast: Bhartipura and Honnenahalli CP (1)

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Pre-diversion growth rate

Vehicle Category	FY26 FY27	FY27 FY28	FY28 FY29	FY29 FY30	FY30 FY31	FY26 FY31	FY31 FY36	FY36 FY41	FY27 FY41
CJV	4.9%	4.9%	5.4%	4.8%	4.9%	5.0%	4.4%	3.9%	4.4%
Mini LCV	3.5%	3.5%	3.5%	3.4%	3.1%	3.4%	3.0%	2.7%	3.0%
LCV	2.5%	2.5%	2.5%	2.4%	2.2%	2.4%	2.2%	1.9%	2.2%
Bus	1.1%	1.0%	0.9%	1.0%	0.9%	1.0%	0.9%	0.8%	0.9%
2A Truck	3.5%	3.5%	3.5%	3.4%	3.2%	3.4%	3.0%	2.7%	3.0%
3A Truck	0.5%	1.1%	1.1%	1.0%	1.0%	0.9%	0.8%	0.7%	0.8%
MAV	1.9%	2.0%	2.3%	2.4%	2.2%	2.2%	2.1%	1.9%	2.1%
AADT	**3.8%**	**3.8%**	**4.1%**	**3.8%**	**3.8%**	**3.9%**	**3.5%**	**3.2%**	**3.5%**
PCU	**3.1%**	**3.2%**	**3.4%**	**3.2%**	**3.1%**	**3.2%**	**3.0%**	**2.7%**	**3.0%**

Post-diversion growth rate

Vehicle Category	FY26 FY27	FY27 FY28	FY28 FY29	FY29 FY30	FY30 FY31	FY26 FY31	FY31 FY36	FY36 FY41	FY27 FY41
CJV	4.9%	4.9%	0.8%	0.0%	3.1%	2.7%	1.6%	3.9%	2.6%
Mini LCV	3.5%	3.5%	3.5%	3.4%	3.1%	3.4%	3.0%	2.7%	3.0%
LCV	2.5%	2.5%	2.5%	2.4%	2.2%	2.4%	2.2%	1.9%	2.2%
Bus	1.1%	1.0%	0.9%	1.0%	0.9%	1.0%	(0.0%)	0.8%	0.6%
2A Truck	3.5%	3.5%	(2.1%)	(2.4%)	1.5%	0.8%	2.7%	2.7%	2.0%
3A Truck	0.5%	1.1%	(2.9%)	(3.1%)	(0.1%)	(0.9%)	0.6%	0.7%	0.1%
MAV	1.9%	2.0%	(6.1%)	(6.7%)	0.5%	(1.8%)	1.8%	1.9%	0.5%
AADT	**3.8%**	**3.8%**	**0.4%**	**0.0%**	**2.5%**	**2.1%**	**1.8%**	**3.1%**	**2.2%**
PCU	**3.1%**	**3.2%**	**(0.9%)**	**(1.2%)**	**1.9%**	**1.2%**	**1.8%**	**2.7%**	**1.8%**

Source: TIC estimate

Traffic and revenue forecast: Bhartipura and Honnenahalli CP (2)

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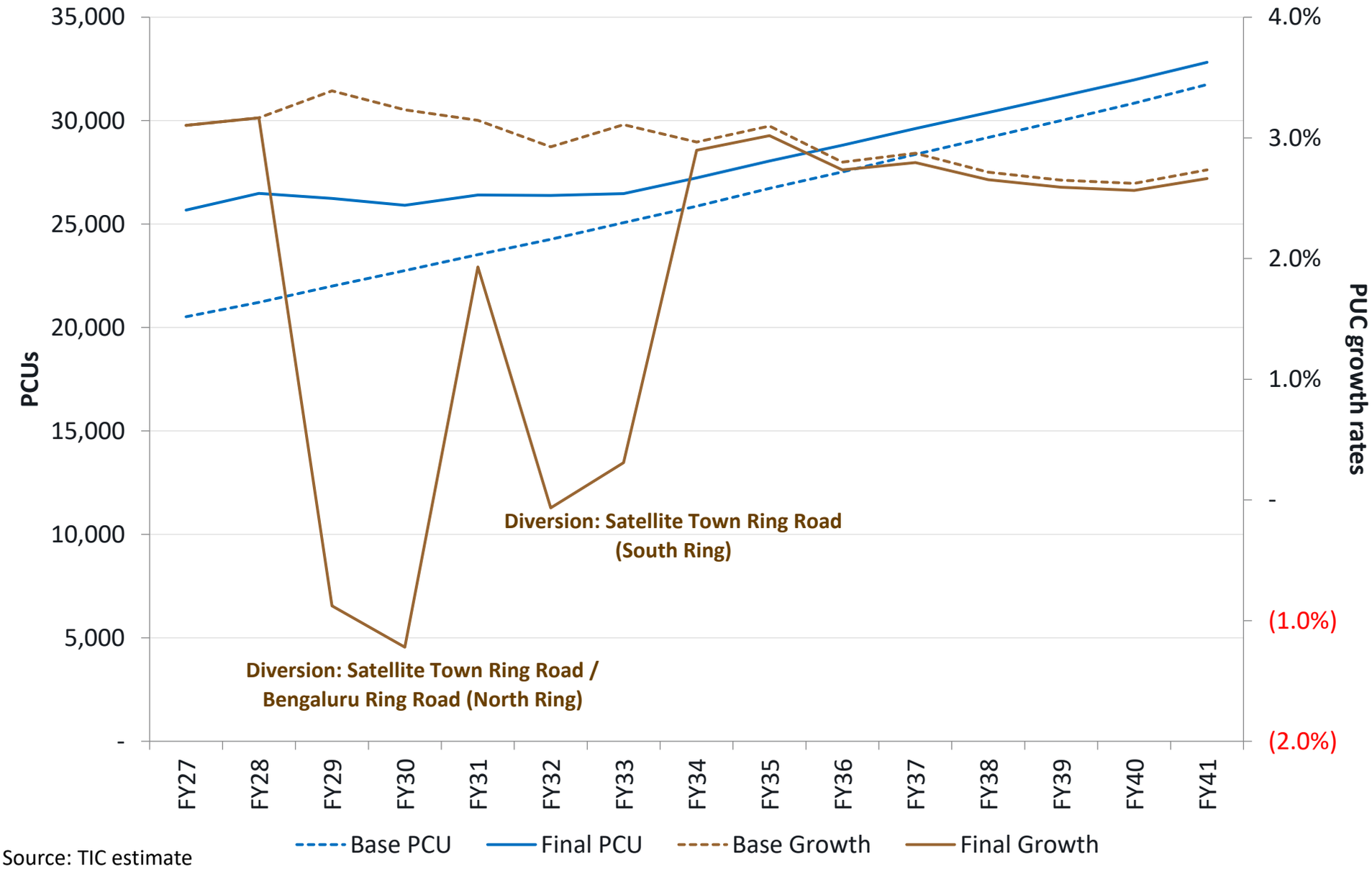
Pre- and Post-diversion growth rate snapshot

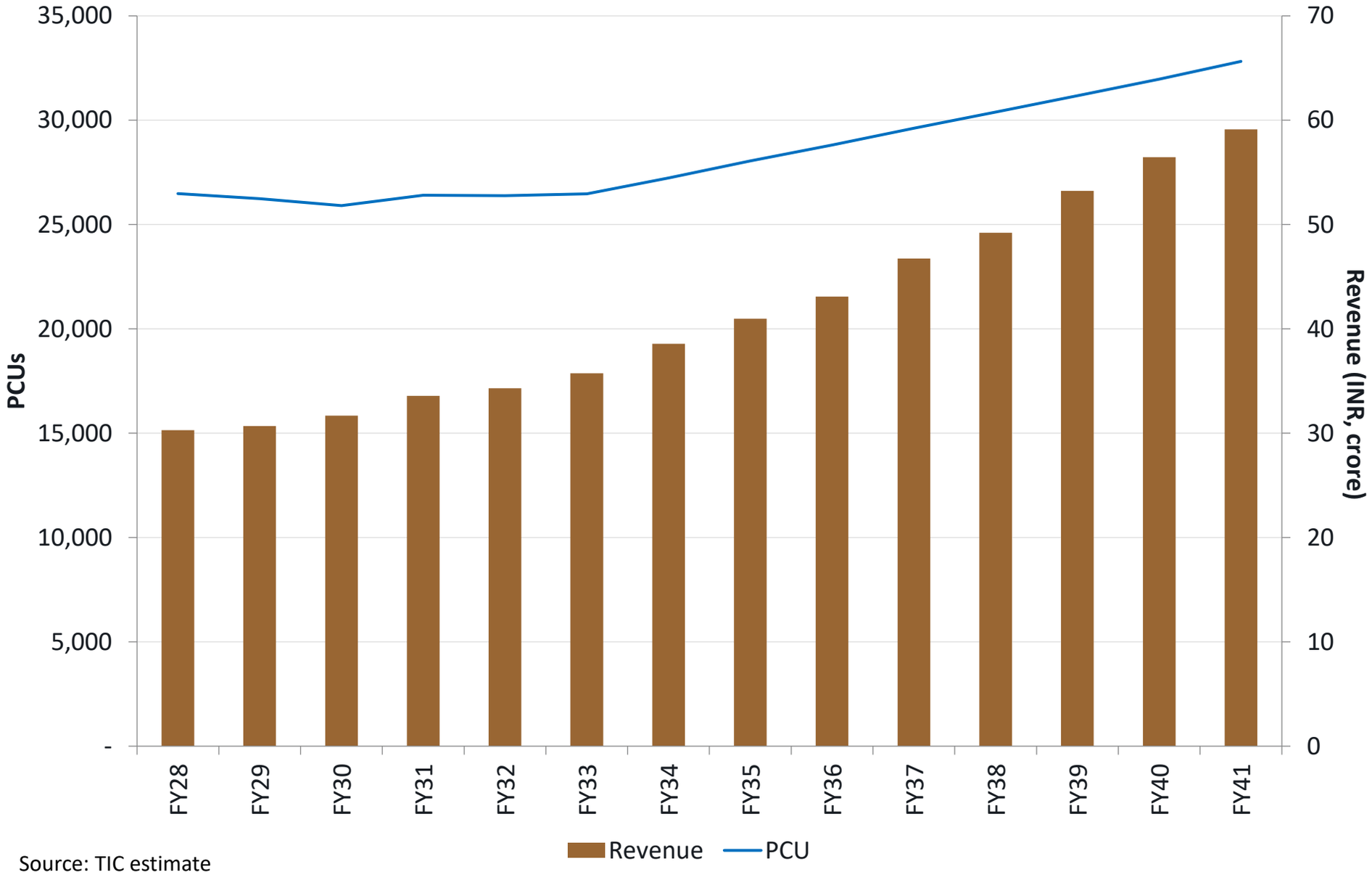


Source: TIC estimate

Traffic and revenue forecast: Bhartipura and Honnenahalli CP (3)

TRANSLINK® Infrastructure Consultants Pvt Ltd Smart Consulting

Revenue and PCU snapshot



Source: TIC estimate

Scenario development definition

Most Likely Scenario without overloading

- No overloading penalty/fees is considered at present based on understanding from site visit. In context of present ground situation and possibility of diversion in case of collecting overloading fees, the consultant did not consider overloading fee collection in most likely scenario.
- The consultant has considered no reduction in toll rates during capacity augmentation implementation i.e., 4 to 6 lane construction of Nelmangala to Dobbaspet section (FY26 H2 – FY27 H2) & Dobbaspet Tumakuru section (FY28 H1 – FY29 H1).
- Concession Agreement mentions that if the concessionaire incurs any financial loss due to modification in toll rates during capacity augmentation which is initiated post-handover of the project highway to the concessionaire, the authority (NHAI) shall pay the difference amount to the concessionaire on a quarterly basis considering no toll reduction during capacity augmentation and traffic census as per Article 19.

Most Likely Scenario with overloading

The consultant considered following changes from the most likely (with overloading) case to determine most likely (with overloading) scenario:

- Overloading penalty/fees will be levied in future as per the overloading characteristics observed in axle load survey.

Optimistic Scenario

The consultant considered following changes from the most likely (with overloading) case to determine optimistic scenario:

- GDP: increase (addition) of 0.25% from FY27 to FY35
- Overloading penalty/fees will be levied in future as per the overloading characteristics observed in axle load survey
- Delayed the impact due to Surat Chennai expressway and Bengaluru Tumakuru metro Rail by 1 and 2 years respectively

Pessimistic Scenario

The consultant considered following changes from the most likely (with overloading) case to determine pessimistic scenario:

- GDP: decrease (subtraction) of 0.25% from FY27 to FY35
- No overloading penalty/fees is being levied
- Preponement of the impact due to Surat Chennai expressway by a year

Detailed traffic and revenue forecast for ‘Most likely scenario without overloading’ is exhibited in Appendix B.

Scenario summary: Halenijagal TP (1)

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	Most likely without overloading			Most likely with overloading			Optimistic			Pessimistic		
FY	**PCU**	**PCU growth**	**Revenue (INR Cr)**	**PCU**	**PCU growth**	**Revenue (INR Cr)**	**PCU**	**PCU growth**	**Revenue (INR Cr)**	**PCU**	**PCU growth**	**Revenue (INR Cr)**
FY26	89,116	-	-	89,331	-	-	89,331	-	-	89,116	-	-
FY27	94,128	5.6%	-	94,354	5.6%	-	94,544	5.8%	-	93,938	5.4%	-
FY28 H1	99,485	5.7%	67.8	99,723	5.7%	73.8	1,00,133	5.9%	74.1	99,077	5.5%	67.5
FY28 H2	99,485	5.7%	67.8	99,723	5.7%	73.8	1,00,133	5.9%	74.1	99,077	5.5%	67.5
FY29 H1	96,090	(3.4%)	66.8	96,311	(3.4%)	73.4	96,912	(3.2%)	73.9	95,493	(3.6%)	66.4
FY29 H2	71,101	(28.5%)	95.4	71,252	(28.6%)	101.2	71,691	(28.4%)	101.8	95,493	(3.6%)	66.1
FY30	65,440	(31.9%)	178.1	65,504	(32.0%)	205.9	66,043	(31.9%)	207.6	64,065	(32.9%)	173.8
FY31	66,845	2.1%	186.6	66,933	2.2%	214.2	68,533	3.8%	219.6	65,274	1.9%	181.6
FY32	66,316	(0.8%)	193.1	66,479	(0.7%)	213.5	69,956	2.1%	223.7	65,039	(0.4%)	189.1
FY33	66,657	0.5%	202.0	66,853	0.6%	220.8	72,840	4.1%	237.2	65,706	1.0%	199.2
FY34	70,076	5.1%	220.4	70,310	5.2%	237.1	74,345	2.1%	248.5	68,933	4.9%	216.9
FY35	73,765	5.3%	238.8	74,040	5.3%	252.8	75,428	1.5%	257.5	72,405	5.0%	234.4
FY36	77,307	4.8%	261.2	77,626	4.8%	272.0	79,086	4.8%	277.0	75,878	4.8%	256.4
FY37	79,400	2.7%	278.8	79,758	2.7%	285.3	81,261	2.7%	290.6	77,930	2.7%	273.7
FY38	81,210	2.3%	296.2	81,576	2.3%	303.1	83,115	2.3%	308.7	79,705	2.3%	290.8
FY39	82,740	1.9%	313.3	83,111	1.9%	320.6	84,680	1.9%	326.6	81,205	1.9%	307.6
FY40	84,016	1.5%	332.6	84,391	1.5%	340.3	85,985	1.5%	346.6	82,457	1.5%	326.5
FY41	85,126	1.3%	348.3	85,504	1.3%	356.2	87,120	1.3%	362.9	83,546	1.3%	341.9
Total (FY27 – FY41)			**3,347**			**3,544**			**3,630**			**3,259**

Source: TIC estimate

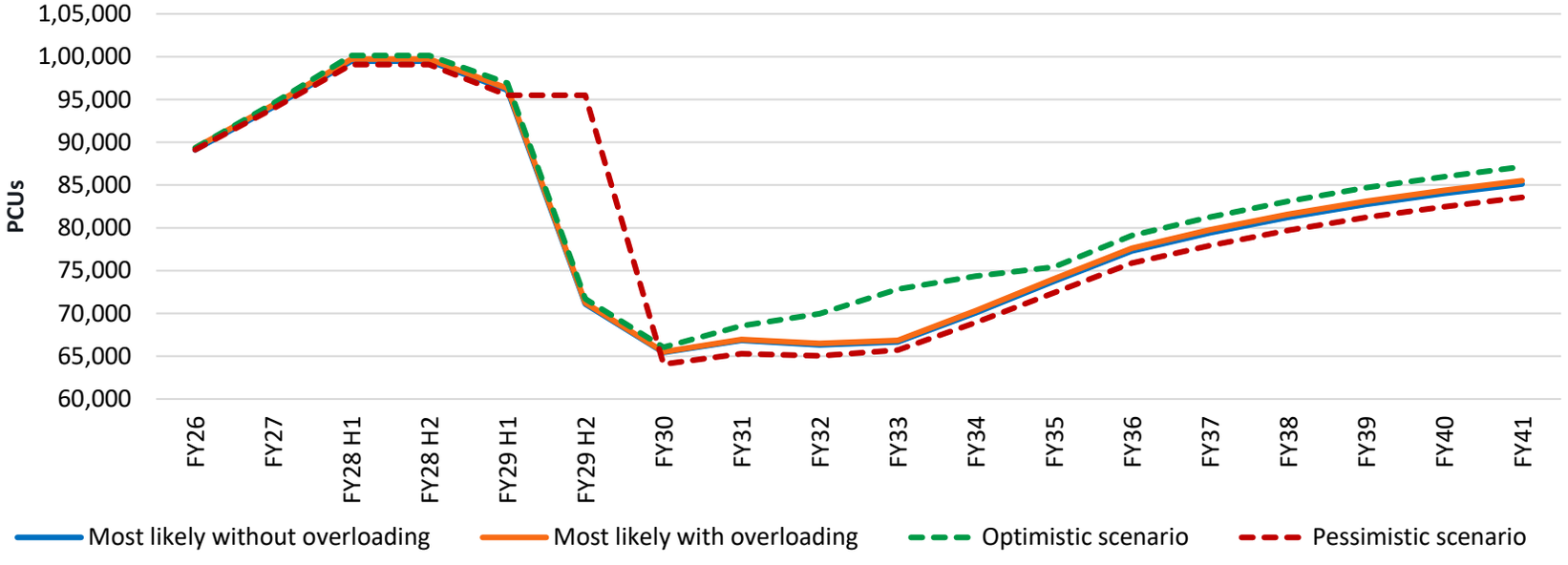
Note for LOS representation by highlighting cells:
Capacity analysis for LOS B/C/D is carried out for tollable section and not at toll plaza level for which traffic of Mainline Plaza and Dobbaspet & Halenijagal CP are added above.

Reaches LOS B of 6-Laning 60,000 PCU/day Reaches LOS C and D

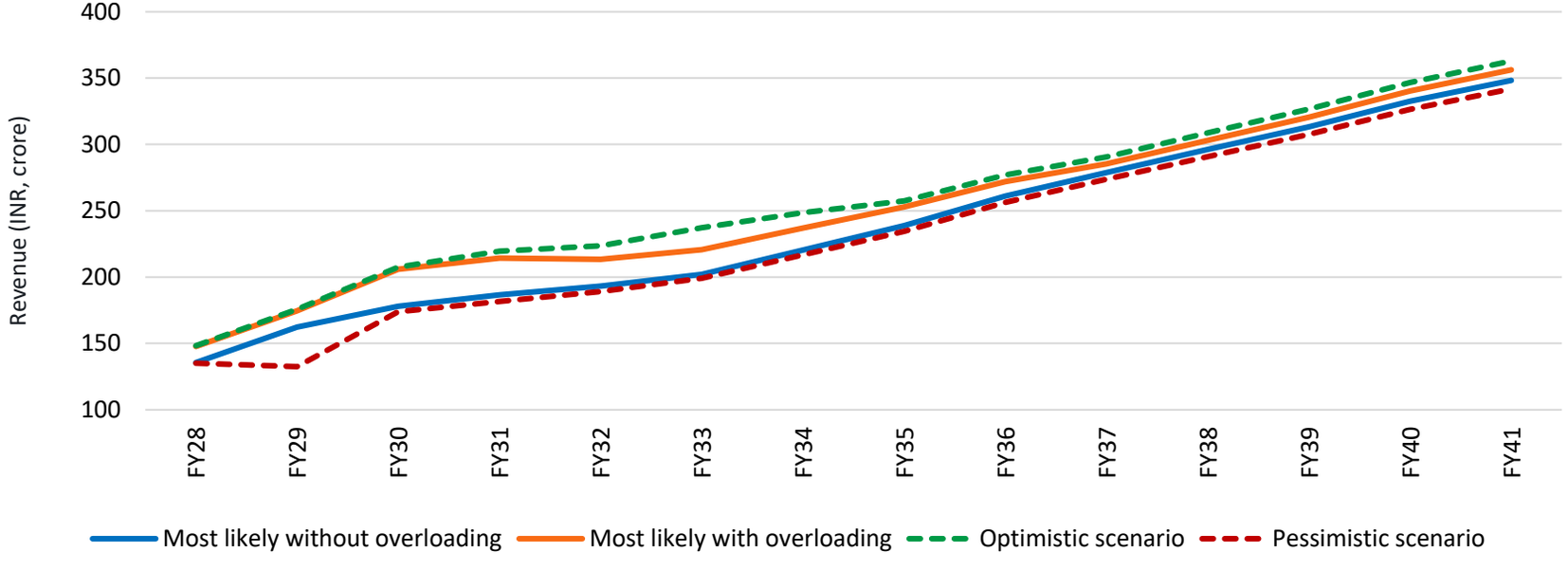
Benchmark cases:
Gujarat: Ahmedabad Mumbai Corridor (Mandva Toll) – 1,45,000 PCU
Gujarat: Ahmedabad Mumbai Corridor (Choryasi Toll) – 1,22,000 PCU
Haryana: Delhi Panipat Corridor (Bhagan Toll) – 1,07,000 PCU

Scenario summary: Halenijagal TP (1)

PCU comparison



Revenue comparison



Source: TIC estimate

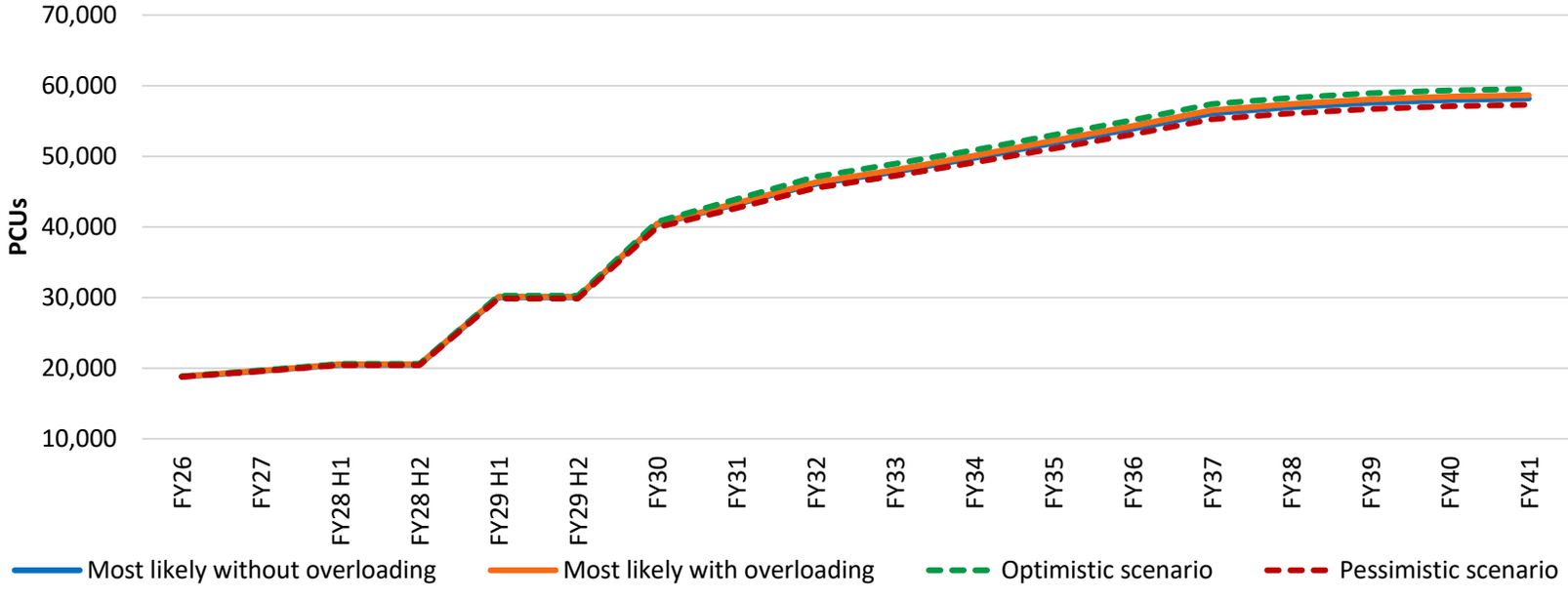
Scenario summary: Dobbaspet & Halenijagal CP (1)

	Most likely without overloading			Most likely with overloading			Optimistic			Pessimistic		
FY	**PCU**	**PCU growth**	**Revenue (INR Cr)**	**PCU**	**PCU growth**	**Revenue (INR Cr)**	**PCU**	**PCU growth**	**Revenue (INR Cr)**	**PCU**	**PCU growth**	**Revenue (INR Cr)**
FY26	18,777	-	-	18,831	-	-	18,831	-	-	18,777	-	-
FY27	19,595	4.4%	-	19,651	4.4%	-	19,682	4.6%	-	19,564	4.2%	-
FY28 H1	20,484	4.6%	-	20,543	4.6%	-	20,609	4.8%	-	20,418	4.4%	-
FY28 H2	20,484	4.6%	-	20,543	4.6%	-	20,609	4.8%	-	20,418	4.4%	-
FY29 H1	30,019	47.3%	-	30,118	47.3%	-	30,266	47.5%	-	29,872	47.0%	-
FY29 H2	30,019	47.3%	23.8	30,118	47.3%	23.9	30,266	47.5%	24.0	29,872	47.0%	-
FY30	40,398	35.0%	67.5	40,468	34.8%	70.3	40,737	35.0%	70.8	39,932	34.1%	66.7
FY31	43,243	7.1%	75.2	43,348	7.2%	78.0	43,922	7.9%	79.0	42,677	6.9%	74.2
FY32	46,093	6.6%	82.9	46,299	6.9%	85.2	47,074	7.2%	86.6	45,527	6.7%	81.9
FY33	47,792	3.7%	89.3	48,039	3.8%	91.4	48,951	4.0%	93.1	47,236	3.8%	88.2
FY34	49,777	4.2%	96.7	50,068	4.3%	98.8	50,886	4.0%	100.3	49,115	4.0%	95.4
FY35	51,864	4.2%	104.3	52,204	4.3%	106.2	52,997	4.2%	107.8	51,087	4.1%	102.7
FY36	53,893	3.9%	113.3	54,283	4.0%	115.1	55,110	4.0%	116.8	53,083	3.9%	111.6
FY37	56,098	4.1%	121.8	56,543	4.2%	123.3	57,407	4.2%	125.2	55,254	4.1%	119.9
FY38	56,955	1.5%	128.2	57,407	1.5%	129.8	58,285	1.5%	131.7	56,096	1.5%	126.2
FY39	57,579	1.1%	134.6	58,037	1.1%	136.3	58,925	1.1%	138.4	56,711	1.1%	132.6
FY40	57,980	0.7%	141.0	58,441	0.7%	142.7	59,336	0.7%	144.9	57,105	0.7%	138.8
FY41	58,179	0.3%	146.1	58,641	0.3%	147.9	59,540	0.3%	150.2	57,301	0.3%	143.9
Total (FY27 – FY41)			**1,325**			**1,349**			**1,369**			**1,282**

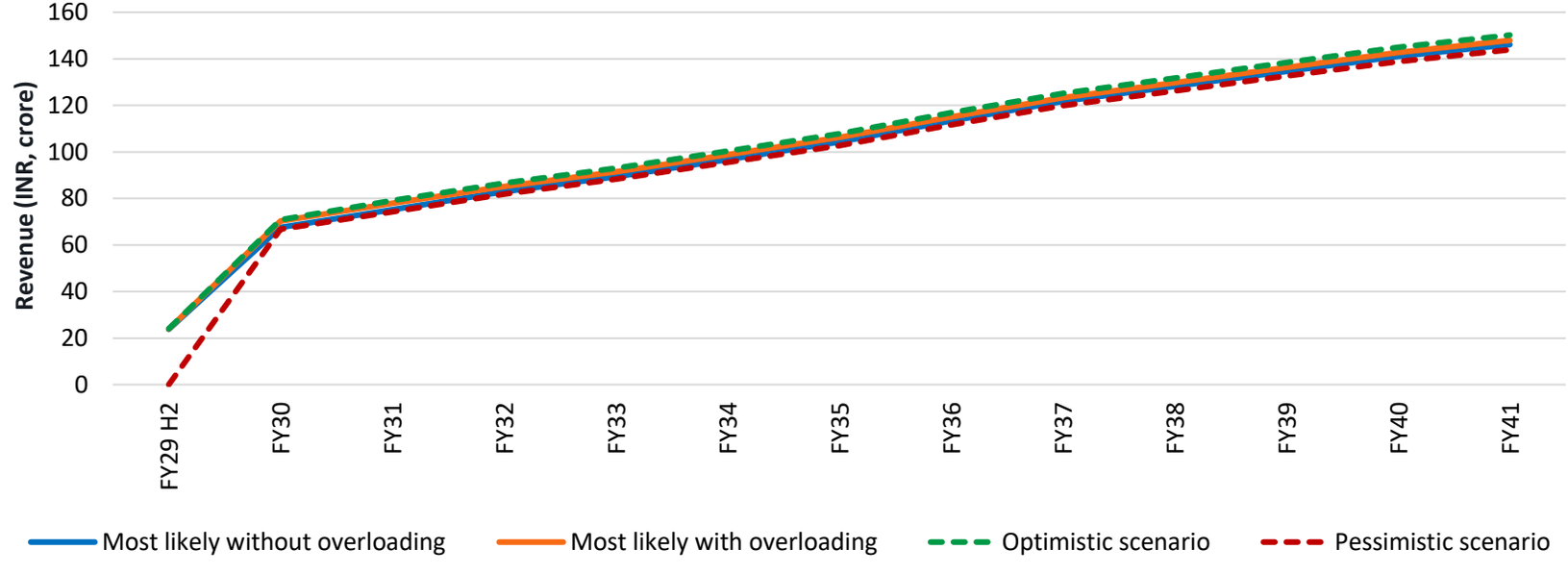
Source: TIC estimate

Scenario summary: Dobbaspet & Halenijagal CP (2)

PCU comparison



Revenue comparison



Source: TIC estimate

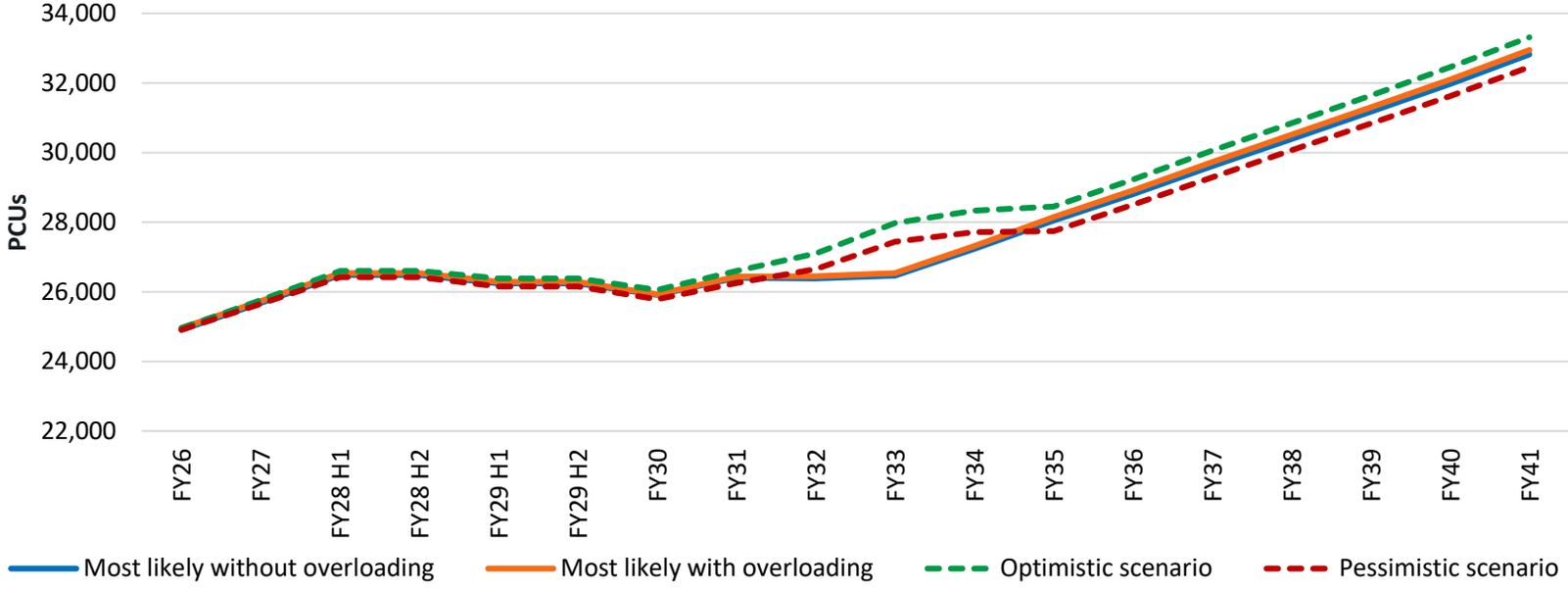
Scenario summary: Bhartipura & Honnenahalli CP (1)

	Most likely without overloading			Most likely with overloading			Optimistic			Pessimistic		
FY	PCU	PCU growth	Revenue (INR Cr)	PCU	PCU growth	Revenue (INR Cr)	PCU	PCU growth	Revenue (INR Cr)	PCU	PCU growth	Revenue (INR Cr)
FY26	24,909	-	-	24,960	-	-	24,960	-	-	24,909	-	-
FY27	25,678	3.1%	-	25,729	3.1%	-	25,758	3.2%	-	25,649	3.0%	-
FY28 H1	26,485	3.2%	15.1	26,537	3.2%	15.9	26,598	3.3%	15.9	26,425	3.0%	15.1
FY28 H2	26,485	3.2%	15.1	26,537	3.2%	15.9	26,598	3.3%	15.9	26,425	3.0%	15.1
FY29 H1	26,241	(0.9%)	15.4	26,290	(0.9%)	16.2	26,383	(0.8%)	16.2	26,149	(1.0%)	15.3
FY29 H2	26,241	(0.9%)	15.3	26,290	(0.9%)	16.1	26,383	(0.8%)	16.1	26,149	(1.0%)	15.3
FY30	25,909	(1.2%)	31.7	25,932	(1.3%)	33.3	26,055	(1.2%)	33.4	25,787	(1.3%)	31.5
FY31	26,404	1.9%	33.6	26,437	2.0%	35.2	26,595	2.1%	35.4	26,247	1.8%	33.4
FY32	26,386	(0.1%)	34.3	26,448	0.0%	35.5	27,102	1.9%	36.2	26,655	1.6%	34.6
FY33	26,467	0.3%	35.8	26,541	0.3%	36.8	27,979	3.3%	38.5	27,439	3.0%	36.8
FY34	27,231	2.9%	38.6	27,315	2.9%	39.5	28,337	1.3%	40.8	27,715	1.0%	39.1
FY35	28,048	3.0%	41.0	28,144	3.1%	41.8	28,448	0.4%	42.2	27,748	0.1%	40.6
FY36	28,812	2.7%	43.1	28,920	2.8%	43.7	29,233	2.8%	44.2	28,502	2.7%	42.6
FY37	29,613	2.8%	46.7	29,733	2.8%	47.2	30,057	2.8%	47.7	29,293	2.8%	46.3
FY38	30,395	2.7%	49.2	30,517	2.7%	49.7	30,852	2.7%	50.2	30,066	2.6%	48.7
FY39	31,179	2.6%	53.2	31,303	2.6%	53.7	31,647	2.6%	54.3	30,840	2.6%	52.7
FY40	31,975	2.6%	56.4	32,101	2.6%	57.0	32,455	2.6%	57.6	31,625	2.6%	55.9
FY41	32,822	2.7%	59.1	32,950	2.7%	59.7	33,316	2.7%	60.3	32,462	2.7%	58.5
Total (FY27 –FY41)			**584**			**597**			**605**			**582**

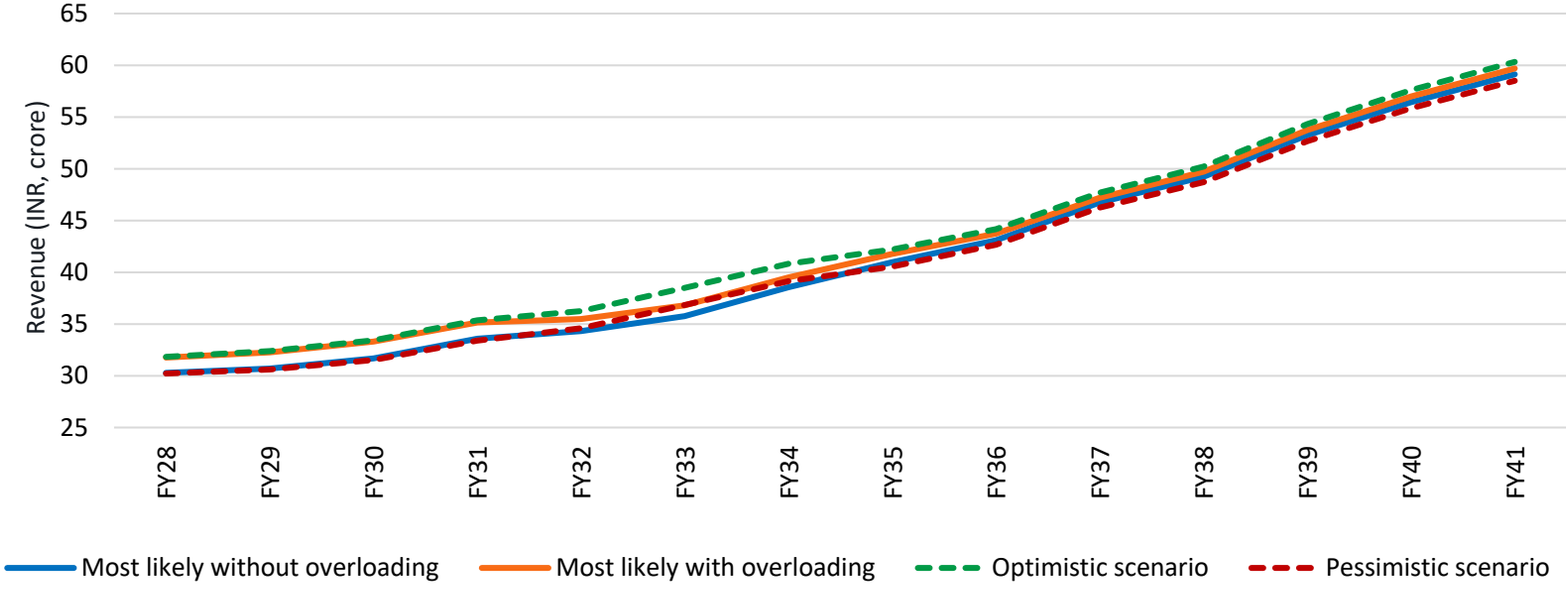
Source: TIC estimate

Scenario summary: Bhartipura & Honnenahalli CP (2)

PCU comparison



Revenue comparison



Source: TIC estimate

Revenue summary

TRANSLINK® Infrastructure Consultants Pvt Ltd
Smart Consulting

Most likely without overloading (Revenue (INR Cr)

FY	Kulumepalya TP	Chokkenahalli TP	Halenijagal TP	Bharathipura & Honnenahalli TP (Two Check Plaza)	Dobbaspet & Halenijagal TP (Two Check Plaza)	Total
FY27	90	102	-	-	-	**192**
FY28	-	120	136	30	-	**286**
FY29	-	65	162	31	24	**282**
FY30	-	-	178	32	68	**277**
FY31	-	-	187	34	75	**295**
FY32	-	-	193	34	83	**310**
FY33	-	-	202	36	89	**327**
FY34	-	-	220	39	97	**356**
FY35	-	-	239	41	104	**384**
FY36	-	-	261	43	113	**418**
FY37	-	-	279	47	122	**447**
FY38	-	-	296	49	128	**474**
FY39	-	-	313	53	135	**501**
FY40	-	-	333	56	141	**530**
FY41	-	-	348	59	146	**553**
Total (FY27 - FY41)	**90**	**288**	**3,347**	**584**	**1,325**	**5,633**

Source: TIC estimate

List of Appendices

Appendix A: Vehicle category-wise visual representation of origin-destination zones and top origin-destination pairs

Appendix B: Origin-Destination Survey Analysis for proposed toll plaza locations

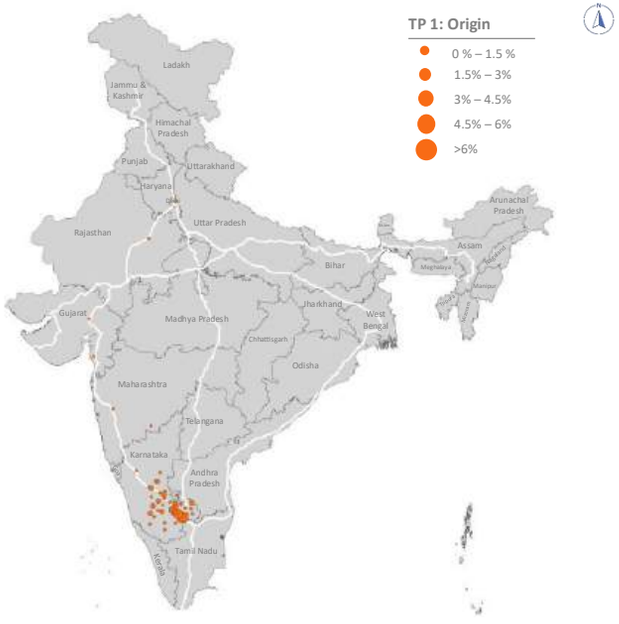
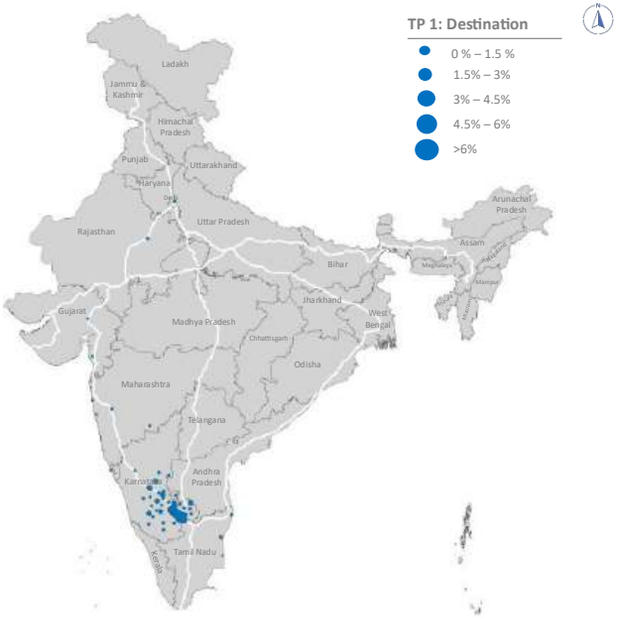
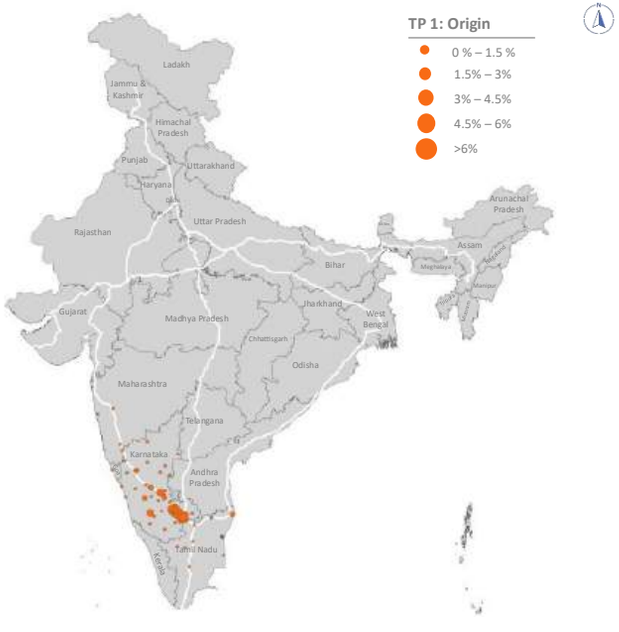
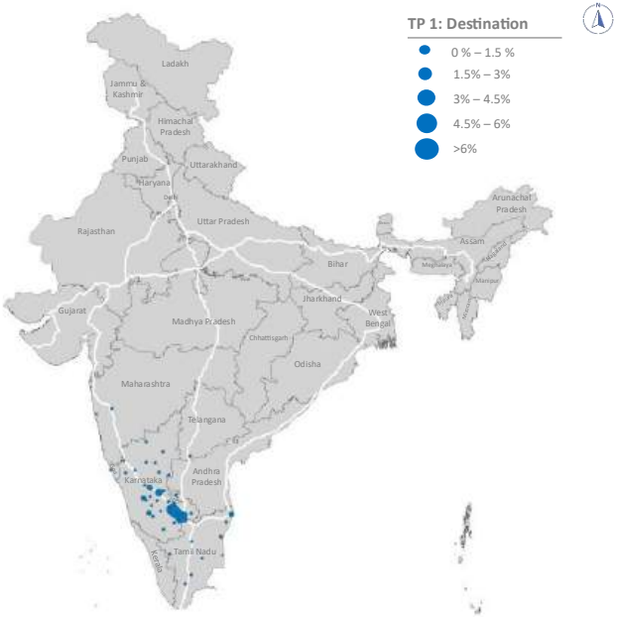
Appendix C: Detailed traffic and revenue forecast – most likely scenario without overloading

Appendix A:

- Vehicle category-wise visual representation of origin-destination zones
- Vehicle category-wise top origin-destination pairs

Vehicle category-wise visual representation of OD (1) : Kulumepalya TP

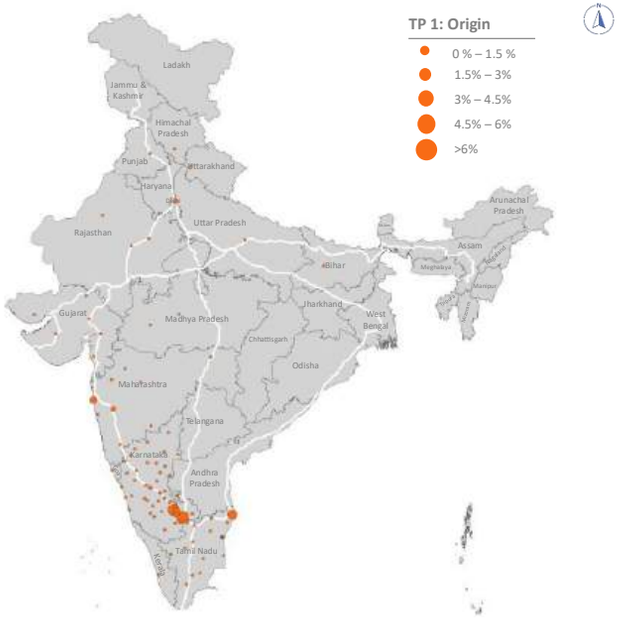
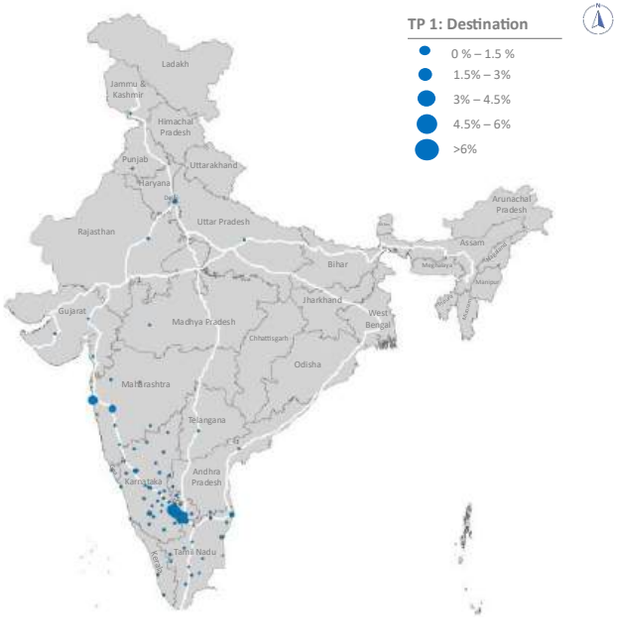
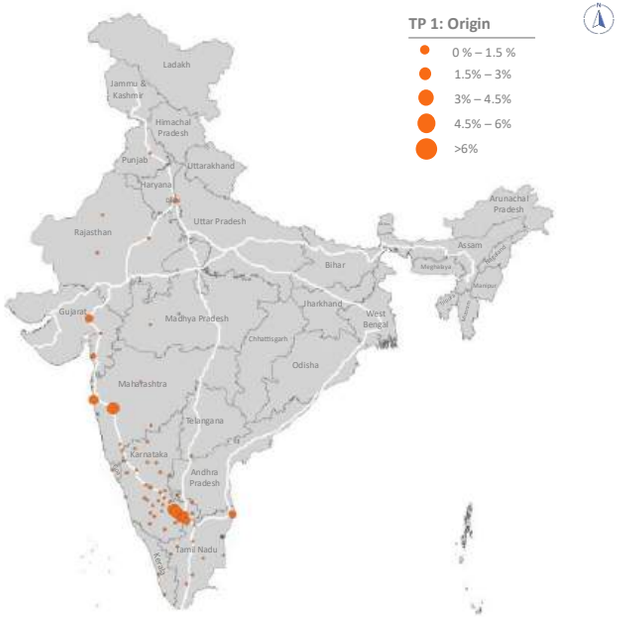
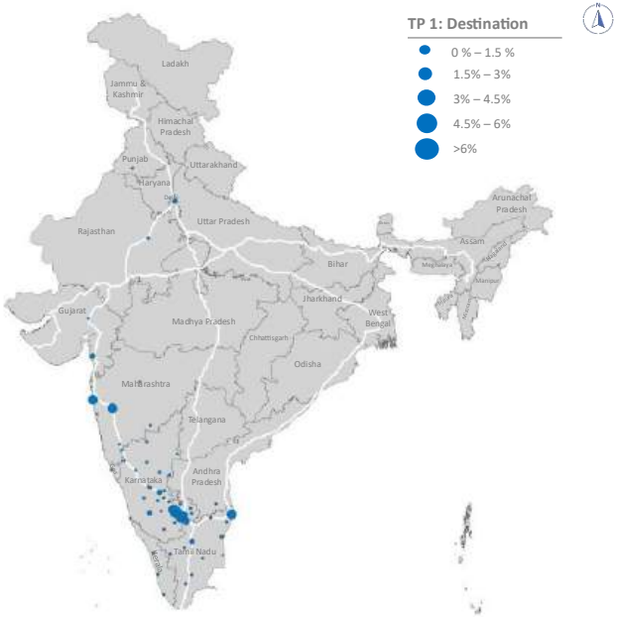
TRANSLINK® Infrastructure Consultants Pvt Ltd
Smart Consulting

	Origin	Destination
CJV		
Mini LCV		

Source: TIC analysis (map not to scale)

Vehicle category-wise visual representation of OD (2) : Kulumepalya TP

TRANSLINK® Infrastructure Consultants Pvt Ltd
Smart Consulting

	Origin	Destination
LCV		
2A		

Source: TIC analysis (map not to scale)

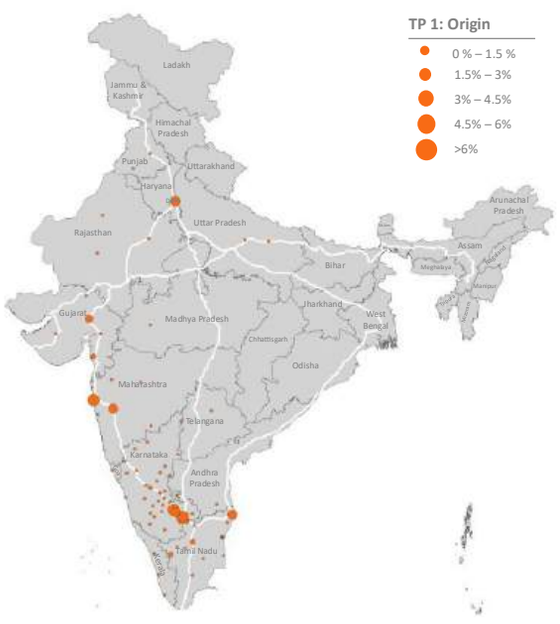
Vehicle category-wise visual representation of OD (3) : Kulumepalya TP

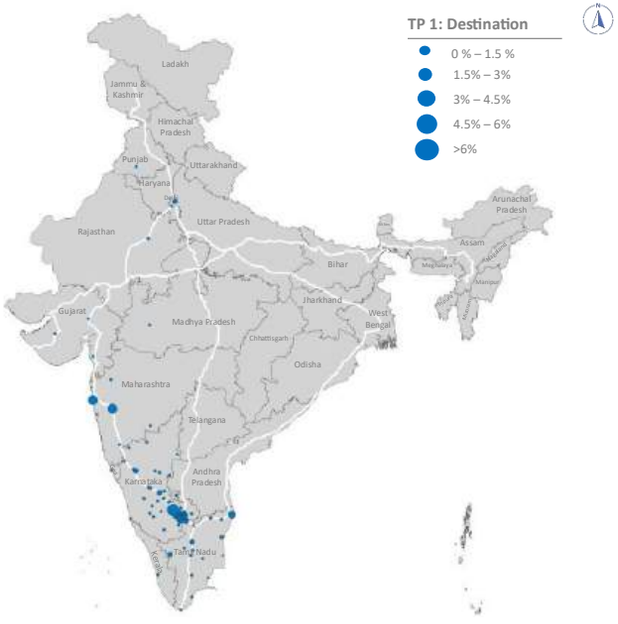
TRANSLINK® Infrastructure Consultants Pvt Ltd
Smart Consulting

Origin

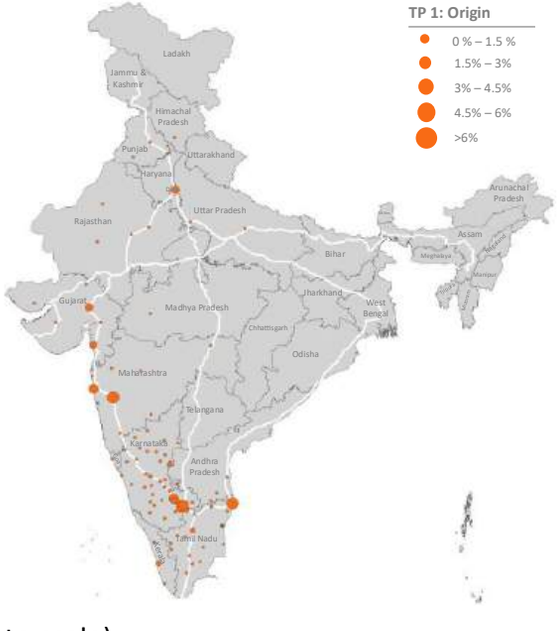
Destination

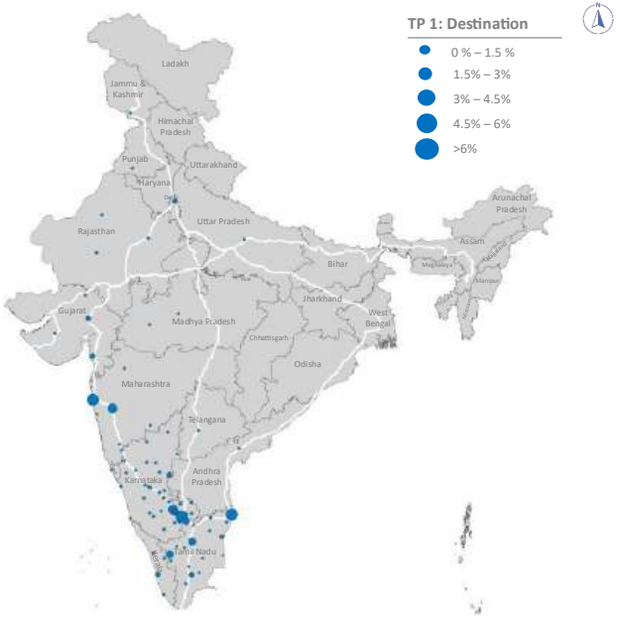
3A





MAV





Source: TIC analysis (map not to scale)

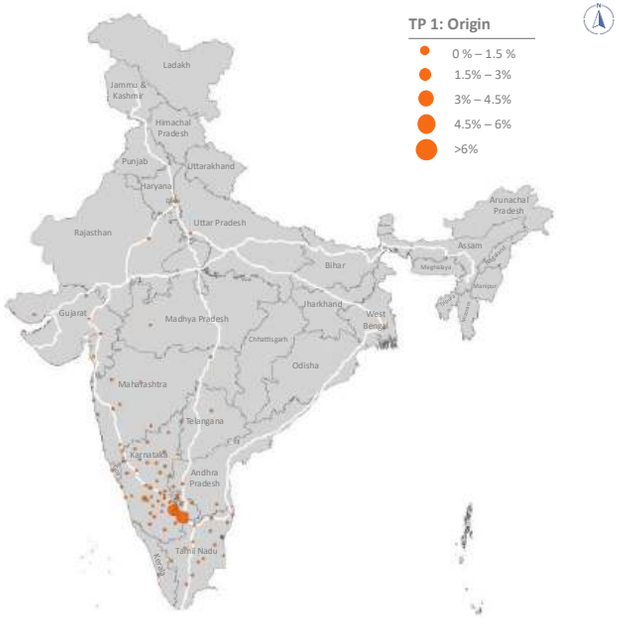
Vehicle category-wise visual representation of OD (4) : Kulumepalya TP

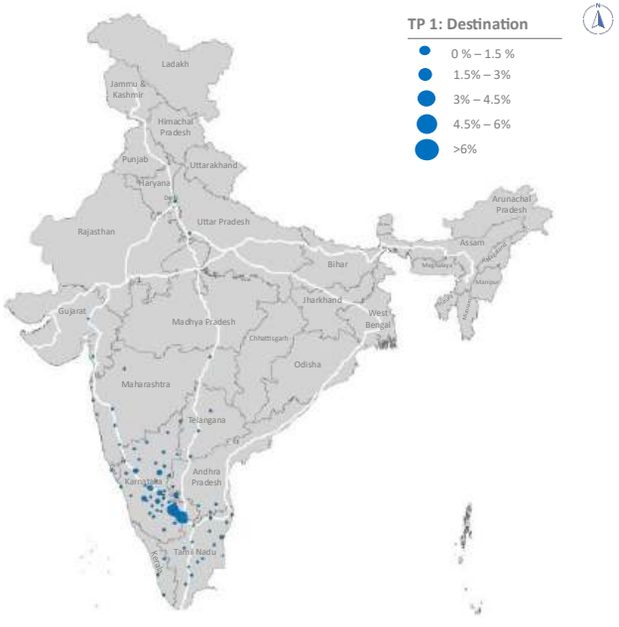
TRANSLINK® Infrastructure Consultants Pvt Ltd
Smart Consulting

Origin

Destination

Bus

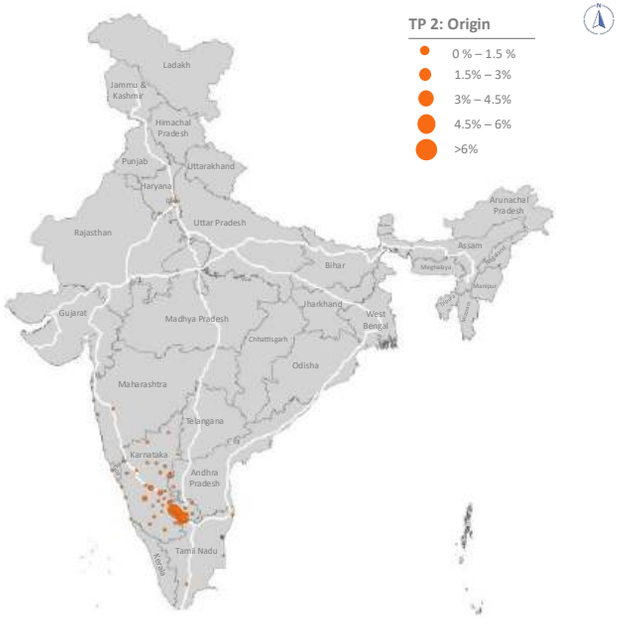
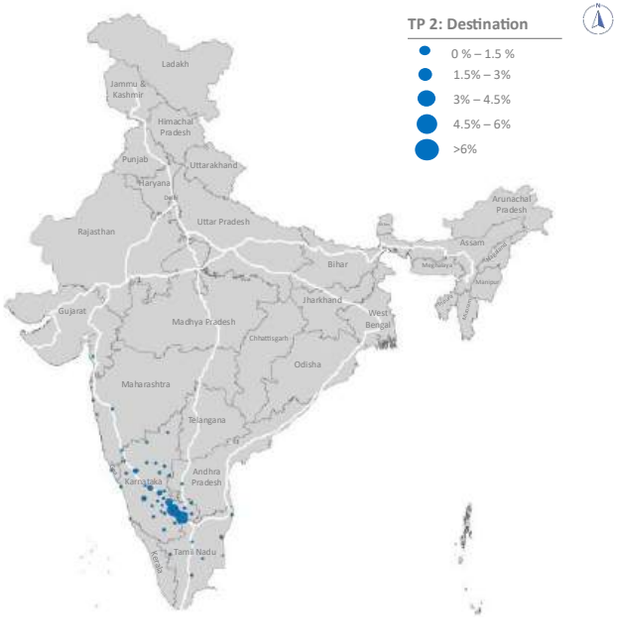
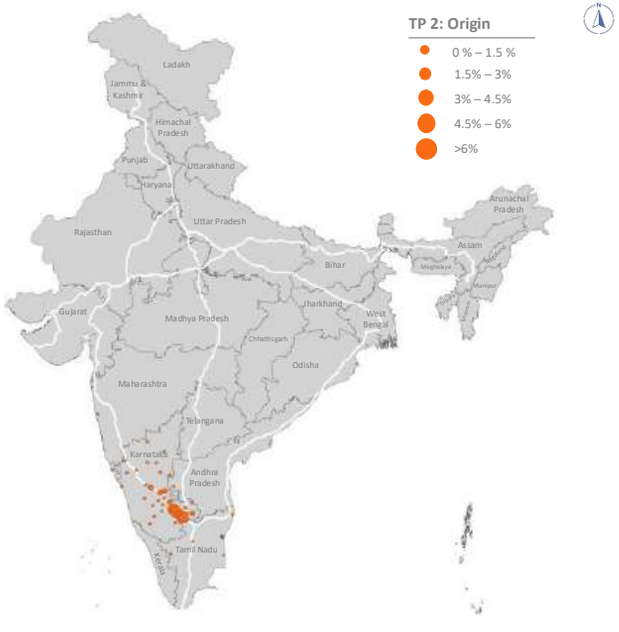
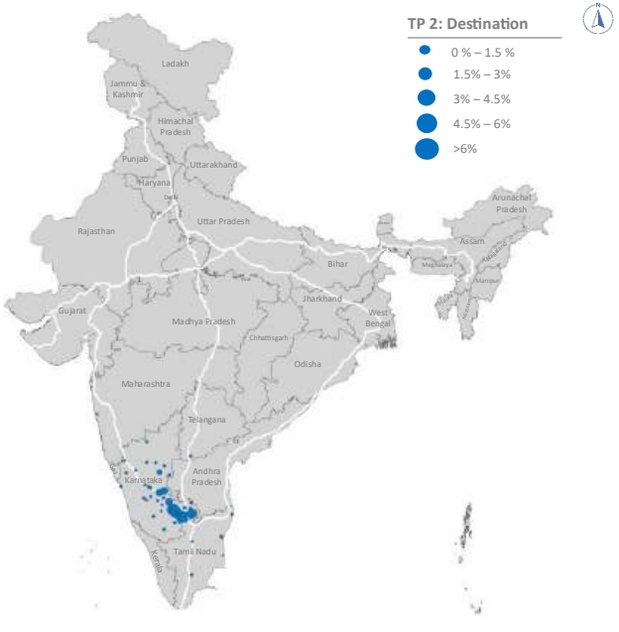




Source: TIC analysis (map not to scale)

Vehicle category-wise visual representation of OD (1) : Chokkenahalli TP

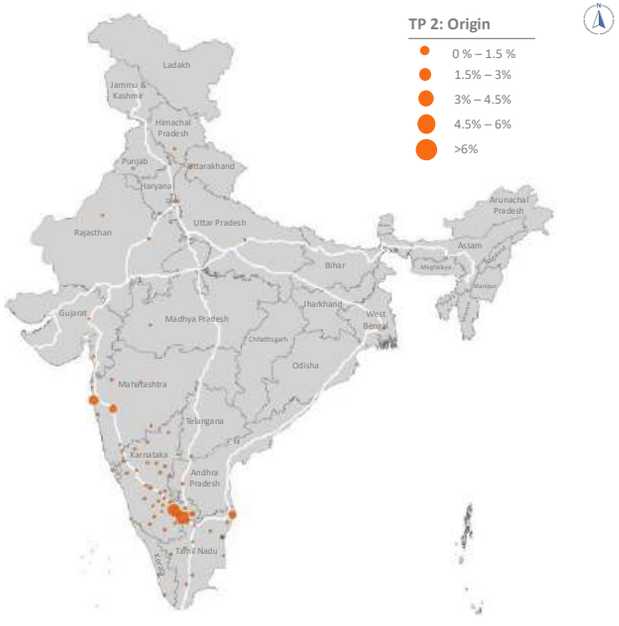
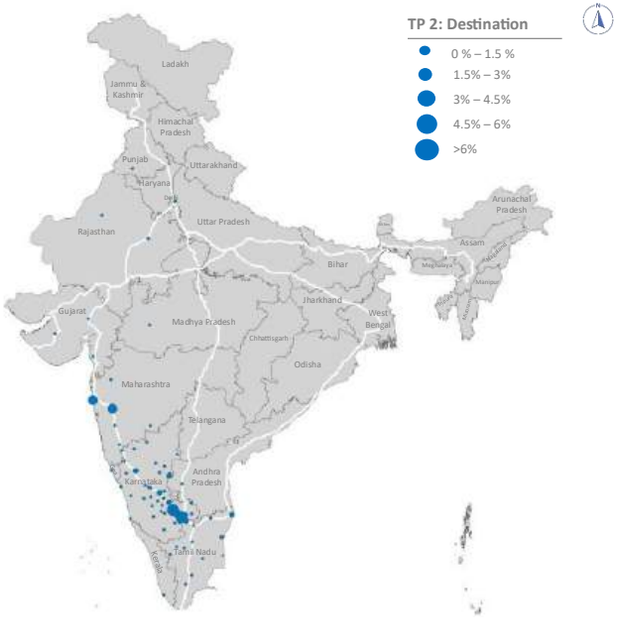
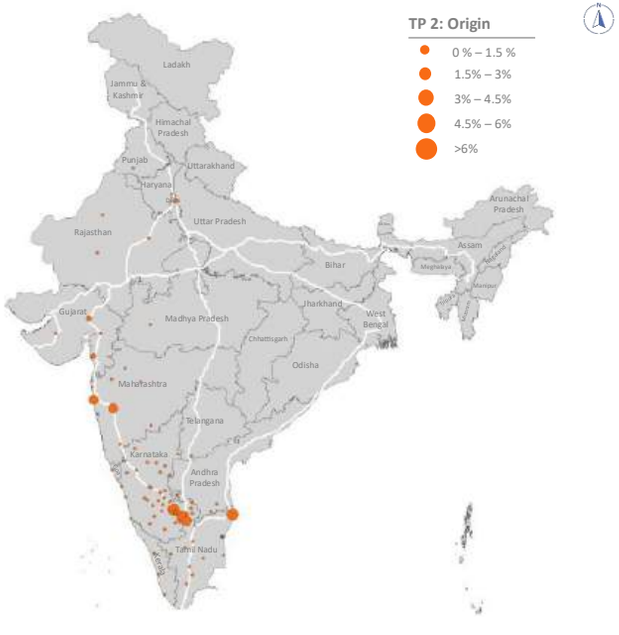
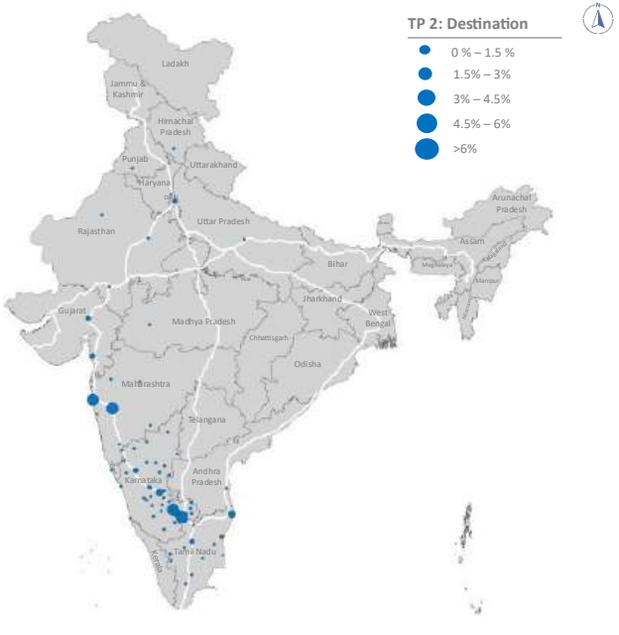
TRANSLINK® Infrastructure Consultants Pvt Ltd
Smart Consulting

	Origin	Destination
CJV		
Mini LCV		

Source: TIC analysis (map not to scale)

Vehicle category-wise visual representation of OD (2) : Chokkenahalli TP

TRANSLINK® Infrastructure Consultants Pvt Ltd
Smart Consulting

	Origin	Destination
LCV		
2A		

Source: TIC analysis (map not to scale)

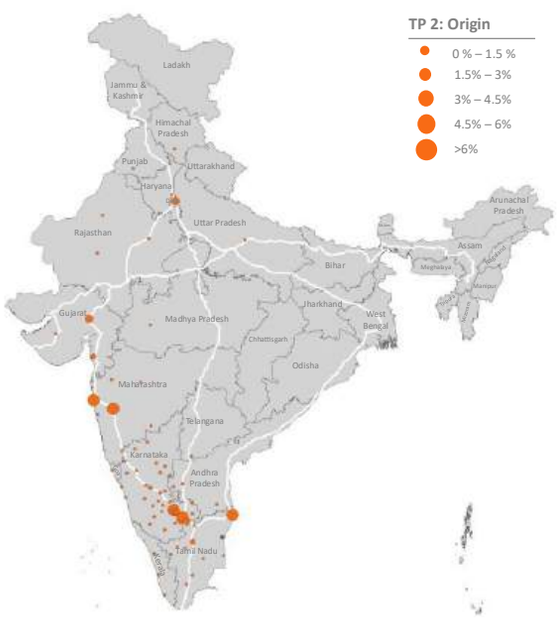
Vehicle category-wise visual representation of OD (3) : Chokkenahalli TP

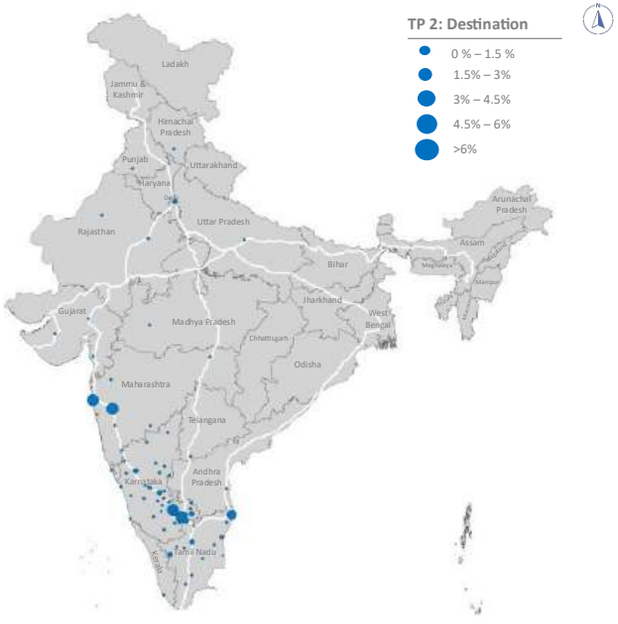
TRANSLINK® Infrastructure Consultants Pvt Ltd
Smart Consulting

Origin

Destination

3A





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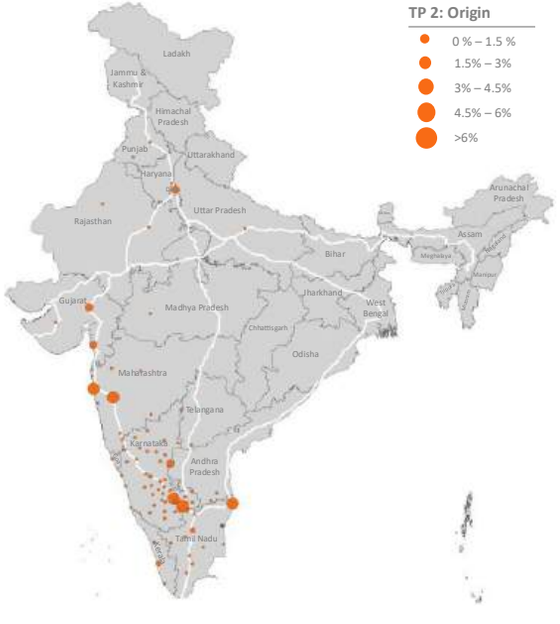
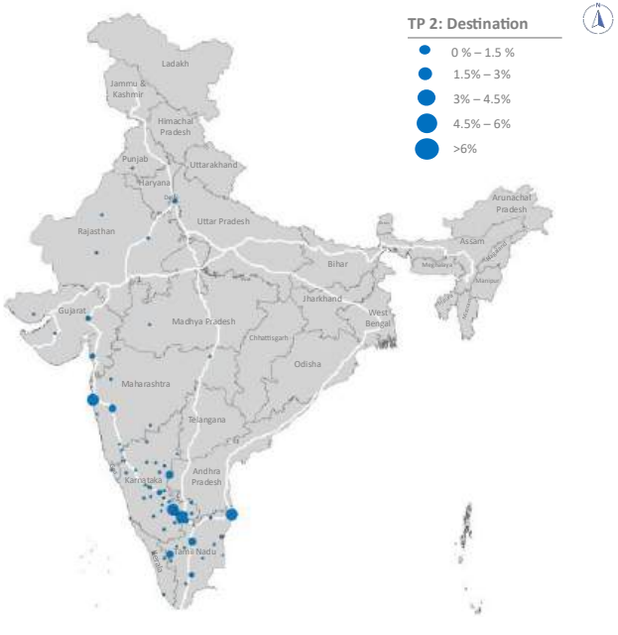




Source: TIC analysis (map not to scale)

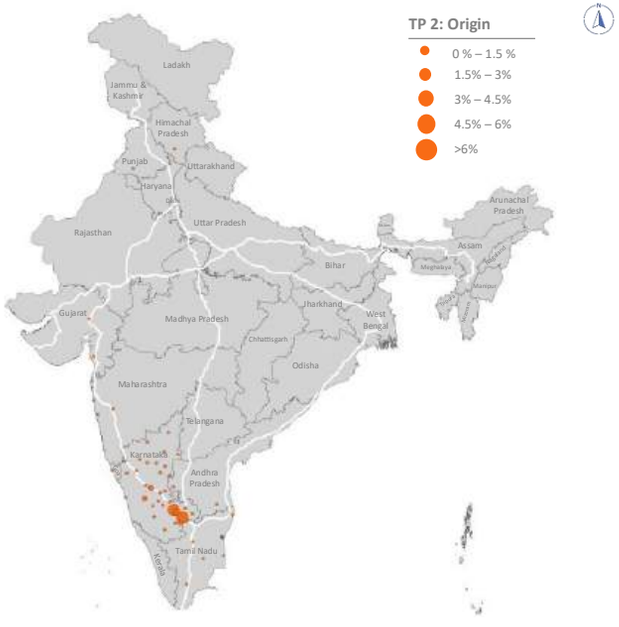
Vehicle category-wise visual representation of OD (4) : Chokkenahalli TP

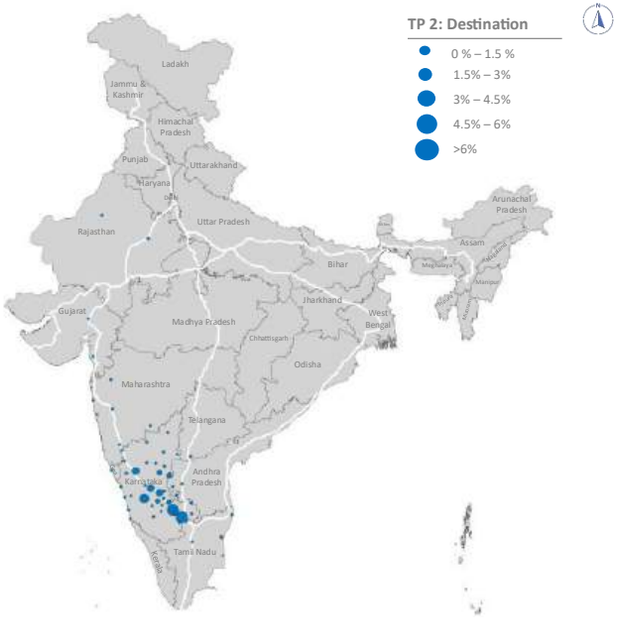
TRANSLINK® Infrastructure Consultants Pvt Ltd
Smart Consulting

Origin

Destination

Bus





Source: TIC analysis (map not to scale)

Vehicle category-wise top OD pairs (1) : Kulumepalya TP

TRANSLINK® Infrastructure Consultants Pvt Ltd Smart Consulting

CJV

Sr. No.	OD Pair		Share
1	Bengaluru	Tumakuru	5%
2	Bengaluru	Budihal	4%
3	Tumakuru	Bengaluru	4%
4	Dobbaspet	Bengaluru	4%
5	Budihal	Bengaluru	4%
6	Bengaluru	Dobbaspet	3%
7	Bengaluru	Madhugiri	2%
8	Bengaluru	Bengaluru	2%
9	Bengaluru	Kotturu	2%
10	Bengaluru	Tiptur	2%

Mini LCV

Sr. No.	OD Pair		Share
1	Tumakuru	Bengaluru	10%
2	Dobbaspet	Bengaluru	10%
3	Bengaluru	Dobbaspet	8%
4	Bengaluru	Tumakuru	6%
5	Belur	Bengaluru	4%
6	Bengaluru	Chitradurga	3%
7	Chitradurga	Bengaluru	3%
8	Bengaluru	Shivamogga	2%
9	Bengaluru	Davanagere	2%
10	Shivamogga	Bengaluru	2%

Bus

Sr. No.	OD Pair		Share
1	Tumakuru	Bengaluru	10%
2	Bengaluru	Tumakuru	7%
3	Bengaluru	Dobbaspet	4%
4	Dobbaspet	Bengaluru	3%
5	Bengaluru	Shivamogga	2%
6	Shivamogga	Bengaluru	2%
7	Bengaluru	Chitradurga	2%
8	Bengaluru	Hubballi	2%
9	Bengaluru	Pavagada	2%
10	Bengaluru	Hosadurga	1%

LCV

Sr. No.	OD Pair		Share
1	Bengaluru	Tumakuru	8%
2	Bengaluru	Dobbaspet	6%
3	Tumakuru	Bengaluru	6%
4	Dobbaspet	Bengaluru	4%
5	Bengaluru	Mumbai	3%
6	Bengaluru	Pune	2%
7	Bengaluru	Belur	2%
8	Mumbai	Bengaluru	2%
9	Pune	Bengaluru	2%
10	Bengaluru	Hubballi	1%

Source: TIC analysis

Vehicle category-wise top OD pairs (2) : Kulumepalya TP

TRANSLINK® Infrastructure Consultants Pvt Ltd Smart Consulting

2A

Sr. No.	OD Pair		Share
1	Tumakuru	Bengaluru	7%
2	Bengaluru	Dobbaspet	5%
3	Bengaluru	Tumakuru	5%
4	Dobbaspet	Bengaluru	5%
5	Pune	Bengaluru	3%
6	Mumbai	Bengaluru	3%
7	Bengaluru	Mumbai	3%
8	Bengaluru	Pune	2%
9	Ahmedabad	Bengaluru	2%
10	Delhi	Bengaluru	2%

3A

Sr. No.	OD Pair		Share
1	Mumbai	Bengaluru	4%
2	Tumakuru	Bengaluru	4%
3	Dobbaspet	Bengaluru	4%
4	Bengaluru	Mumbai	3%
5	Bengaluru	Tumakuru	3%
6	Bengaluru	Dobbaspet	3%
7	Bengaluru	Pune	3%
8	Delhi	Bengaluru	3%
9	Pune	Bengaluru	2%
10	Ahmedabad	Bengaluru	2%

MAV

Sr. No.	OD Pair		Share
1	Pune	Bengaluru	3%
2	Bengaluru	Dobbaspet	3%
3	Bengaluru	Mumbai	3%
4	Bengaluru	Tumakuru	2%
5	Mumbai	Bengaluru	2%
6	Bengaluru	Pune	2%
7	Tumakuru	Bengaluru	2%
8	Delhi	Bengaluru	2%
9	Ahmedabad	Bengaluru	2%
10	Chennai	Mumbai	2%

Source: TIC analysis

Vehicle category-wise top OD pairs (1) : Chokkenahalli TP

TRANSLINK® Infrastructure Consultants Pvt Ltd Smart Consulting

CJV

Sr. No.	OD Pair		Share
1	Bengaluru	Tumakuru	17%
2	Tumakuru	Bengaluru	13%
3	Dobbaspet	Tumakuru	6%
4	Tumakuru	Dobbaspet	3%
5	Bengaluru	Sira	3%
6	Harohalli	Tumakuru	3%
7	Bengaluru	Chitradurga	2%
8	Bengaluru	Davanagere	2%
9	Bengaluru	Shivamogga	2%
10	Sira	Bengaluru	2%

Mini LCV

Sr. No.	OD Pair		Share
1	Bengaluru	Tumakuru	18%
2	Tumakuru	Bengaluru	15%
3	Tumakuru	Dobbaspet	8%
4	Dobbaspet	Tumakuru	5%
5	Bengaluru	Chitradurga	3%
6	Bengaluru	Sira	3%
7	Bengaluru	Hosapete	2%
8	Challakere	Kolar	1%
9	Bengaluru	Challakere	1%
10	Davanagere	Bengaluru	1%

Bus

Sr. No.	OD Pair		Share
1	Bengaluru	Tumakuru	18%
2	Tumakuru	Bengaluru	8%
3	Bengaluru	Shivamogga	5%
4	Bengaluru	Chitradurga	4%
5	Bengaluru	Davanagere	4%
6	Bengaluru	Hubballi	3%
7	Dobbaspet	Tumakuru	3%
8	Bengaluru	Ballari	3%
9	Bengaluru	Hosadurga	2%
10	Bengaluru	Sira	2%

LCV

Sr. No.	OD Pair		Share
1	Bengaluru	Tumakuru	13%
2	Tumakuru	Bengaluru	8%
3	Bengaluru	Pune	4%
4	Bengaluru	Mumbai	3%
5	Dobbaspet	Tumakuru	3%
6	Tumakuru	Dobbaspet	3%
7	Mumbai	Bengaluru	3%
8	Bengaluru	Chitradurga	2%
9	Bengaluru	Sira	2%
10	Pune	Bengaluru	2%

Source: TIC analysis

Vehicle category-wise top OD pairs (2) : Chokkenahalli TP

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2A

Sr. No.	OD Pair		Share
1	Bengaluru	Tumakuru	7%
2	Tumakuru	Bengaluru	5%
3	Bengaluru	Mumbai	4%
4	Bengaluru	Pune	3%
5	Bengaluru	Chitradurga	3%
6	Mumbai	Bengaluru	3%
7	Tumakuru	Dobbaspet	3%
8	Pune	Bengaluru	2%
9	Chennai	Pune	2%
10	Bengaluru	South Gujarat	2%

3A

Sr. No.	OD Pair		Share
1	Bengaluru	Tumakuru	5%
2	Tumakuru	Bengaluru	5%
3	Mumbai	Bengaluru	4%
4	Bengaluru	Mumbai	3%
5	Bengaluru	Pune	2%
6	Pune	Bengaluru	2%
7	Delhi	Bengaluru	2%
8	Bengaluru	Chitradurga	2%
9	Chennai	Mumbai	2%
10	Chennai	Pune	2%

MAV

Sr. No.	OD Pair		Share
1	Bengaluru	Tumakuru	5%
2	Tumakuru	Bengaluru	3%
3	Pune	Bengaluru	3%
4	Bengaluru	Ballari	2%
5	Chennai	Mumbai	2%
6	Mumbai	Bengaluru	2%
7	Bengaluru	Pune	2%
8	Ballari	Bengaluru	2%
9	South Gujarat	Bengaluru	2%
10	Bengaluru	Mumbai	2%

Source: TIC analysis

Appendix B:

- Origin-Destination Survey Analysis for proposed toll plaza locations

Commodity analysis (1): Halenijagal TP

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Direction-wise Commodity Distribution

Commodity	MLCV		LCV		2A		3A		MAV	
	Nelamangala to Tumakuru	Tumakuru to Nelamangala	Nelamangala to Tumakuru	Tumakuru to Nelamangala	Nelamangala to Tumakuru	Tumakuru to Nelamangala	Nelamangala to Tumakuru	Tumakuru to Nelamangala	Nelamangala to Tumakuru	Tumakuru to Nelamangala
Agriculture / Animal Husbandry	5%	8%	5%	5%	5%	5%	6%	5%	5%	8%
Fruits and Vegetables	14%	29%	8%	14%	16%	6%	6%	6%	7%	6%
FMCG / Food Products	1%	4%	2%	5%	5%	2%	3%	5%	2%	4%
Building & Construction Material	1%	0%	4%	0%	2%	0%	2%	1%	4%	2%
Cement	3%	0%	2%	2%	1%	1%	1%	1%	3%	2%
Sand	--	1%	0%	1%	0%	0%	1%	2%	0%	0%
Aggregates / Stone	--	--	--	0%	--	0%	0%	--	0%	0%
Minerals & Minig Commodities	--	--	0%	--	--	0%	1%	0%	0%	0%
Iron Ore / Products	8%	3%	5%	5%	10%	9%	9%	11%	11%	9%
Manufacturing	9%	9%	13%	11%	14%	16%	16%	11%	12%	13%
Automobile and Spares	3%	1%	5%	2%	4%	2%	4%	2%	8%	10%
Chemicals / Fertilisers	1%	--	0%	0%	0%	0%	1%	1%	0%	1%
Steel / Metal	3%	2%	4%	2%	3%	2%	5%	4%	5%	6%
Petroleum Products	1%	1%	1%	3%	2%	7%	4%	7%	3%	4%
Miscellenaeous	3%	1%	0%	0%	2%	0%	2%	1%	1%	0%
Parcel / E-commerce	10%	17%	18%	21%	16%	27%	26%	22%	17%	19%
Empty	39%	25%	34%	28%	20%	21%	19%	24%	20%	15%

Source: TIC analysis

*0% indicates value less than 1% and -- represents no presence of such commodity for the vehicle category

Commodity analysis (2): Dobbaspet & Halenijagal CP – Slip road

TRANSLINK® Infrastructure Consultants Pvt Ltd Smart Consulting

Direction-wise Commodity Distribution

Commodity	MLCV		LCV		2A		3A		MAV	
	Nelamangala to Tumakuru	Tumakuru to Nelamangala	Nelamangala to Tumakuru	Tumakuru to Nelamangala	Nelamangala to Tumakuru	Tumakuru to Nelamangala	Nelamangala to Tumakuru	Tumakuru to Nelamangala	Nelamangala to Tumakuru	Tumakuru to Nelamangala
Agriculture / Animal Husbandry	6%	3%	0%	1%	2%	2%	1%	2%	2%	2%
Fruits and Vegetables	28%	18%	8%	4%	6%	3%	5%	1%	10%	2%
FMCG / Food Products	2%	1%	2%	1%	1%	2%	3%	1%	4%	4%
Building & Construction Material	0%	0%	0%	0%	0%	0%	1%	0%	1%	1%
Cement	1%	0%	0%	0%	2%	2%	5%	2%	10%	3%
Sand	--	0%	0%	2%	2%	4%	4%	10%	1%	1%
Aggregates / Stone	--	--	0%	--	--	0%	0%	1%	0%	1%
Minerals & Minig Commodities	--	--	--	0%	--	--	--	0%	1%	0%
Iron Ore / Products	3%	3%	6%	4%	11%	9%	4%	4%	7%	6%
Manufacturing	6%	11%	14%	9%	7%	16%	12%	13%	7%	13%
Automobile and Spares	0%	1%	6%	6%	4%	3%	13%	17%	14%	18%
Chemicals / Fertilisers	1%	0%	1%	0%	2%	3%	0%	1%	1%	2%
Steel / Metal	4%	1%	3%	3%	3%	1%	4%	3%	1%	4%
Petroleum Products	2%	5%	2%	8%	7%	4%	7%	4%	2%	2%
Miscellenaeous	3%	2%	3%	2%	2%	0%	1%	0%	9%	1%
Parcel / E-commerce	16%	8%	23%	1%	22%	21%	19%	11%	15%	7%
Empty	29%	46%	31%	61%	30%	30%	22%	29%	17%	35%

Source: TIC analysis

*0% indicates value less than 1% and -- represents no presence of such commodity for the vehicle category

Commodity analysis (3): Bharathipura and Honnenahalli CP – Slip road

TRANSLINK® Infrastructure Consultants Pvt Ltd Smart Consulting

Direction-wise Commodity Distribution

Commodity	MLCV		LCV		2A		3A		MAV	
	Nelamangala to Tumakuru	Tumakuru to Nelamangala	Nelamangala to Tumakuru	Tumakuru to Nelamangala	Nelamangala to Tumakuru	Tumakuru to Nelamangala	Nelamangala to Tumakuru	Tumakuru to Nelamangala	Nelamangala to Tumakuru	Tumakuru to Nelamangala
Agriculture / Animal Husbandry	8%	4%	1%	2%	1%	0%	1%	1%	1%	2%
Fruits and Vegetables	6%	27%	3%	9%	1%	4%	1%	4%	2%	1%
FMCG / Food Products	4%	3%	3%	4%	3%	3%	2%	5%	2%	1%
Building & Construction Material	0%	1%	1%	1%	2%	0%	4%	3%	1%	1%
Cement	1%	1%	4%	1%	2%	0%	4%	1%	4%	3%
Sand	1%	0%	2%	4%	4%	8%	10%	23%	2%	12%
Aggregates / Stone	1%	0%	0%	0%	1%	0%	0%	2%	0%	4%
Minerals & Minig Commodities	--	--	0%	--	0%	1%	1%	1%	0%	1%
Iron Ore / Products	3%	1%	6%	2%	14%	4%	4%	2%	4%	2%
Manufacturing	16%	7%	15%	11%	17%	4%	12%	8%	11%	8%
Automobile and Spares	0%	0%	0%	5%	1%	0%	1%	1%	25%	21%
Chemicals / Fertilisers	0%	0%	0%	1%	1%	1%	0%	1%	1%	2%
Steel / Metal	0%	0%	2%	1%	1%	0%	1%	1%	1%	0%
Petroleum Products	0%	1%	0%	3%	6%	2%	5%	3%	5%	2%
Miscellenaeous	0%	1%	0%	1%	1%	0%	1%	2%	0%	2%
Parcel / E-commerce	18%	14%	24%	38%	16%	23%	15%	29%	7%	14%
Empty	40%	41%	39%	17%	32%	48%	39%	14%	34%	24%

Source: TIC analysis

*0% indicates value less than 1% and -- represents no presence of such commodity for the vehicle category

Commodity analysis (4): Bharathipura and Honnenahalli CP - Sompura Junction

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Direction-wise Commodity Distribution

Commodity	MLCV		LCV		2A		3A		MAV	
	Sompura to NH-48	NH-48 to Sompura	Sompura to NH-48	NH-48 to Sompura	Sompura to NH-48	NH-48 to Sompura	Sompura to NH-48	NH-48 to Sompura	Sompura to NH-48	NH-48 to Sompura
Agriculture / Animal Husbandry	1%	0%	1%	1%	2%	0%	1%	2%	1%	0%
Fruits and Vegetables	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%
FMCG / Food Products	3%	3%	2%	1%	1%	2%	1%	0%	0%	1%
Building & Construction Material	1%	0%	1%	0%	0%	0%	1%	0%	0%	0%
Cement	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Sand	--	0%	1%	1%	0%	0%	0%	0%	0%	0%
Aggregates / Stone	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%
Minerals & Minig Commodities	1%	7%	2%	3%	0%	12%	2%	4%	1%	3%
Iron Ore / Products	5%	7%	5%	6%	6%	5%	5%	17%	4%	3%
Manufacturing	15%	18%	21%	14%	18%	20%	18%	17%	14%	3%
Automobile and Spares	1%	1%	1%	3%	1%	7%	1%	9%	35%	34%
Chemicals / Fertilisers	2%	0%	2%	2%	2%	2%	2%	7%	0%	1%
Steel / Metal	4%	11%	5%	11%	4%	12%	5%	10%	1%	5%
Petroleum Products	5%	1%	5%	3%	3%	0%	1%	2%	0%	1%
Miscellenaeous	2%	4%	6%	1%	4%	3%	3%	2%	3%	2%
Parcel / E-commerce	1%	8%	2%	4%	2%	8%	0%	3%	3%	1%
Empty	58%	40%	45%	50%	57%	30%	59%	26%	36%	46%

Source: TIC analysis

*0% indicates value less than 1% and -- represents no presence of such commodity for the vehicle category

Zonal influences and trip distances (1): Halenijagal TP

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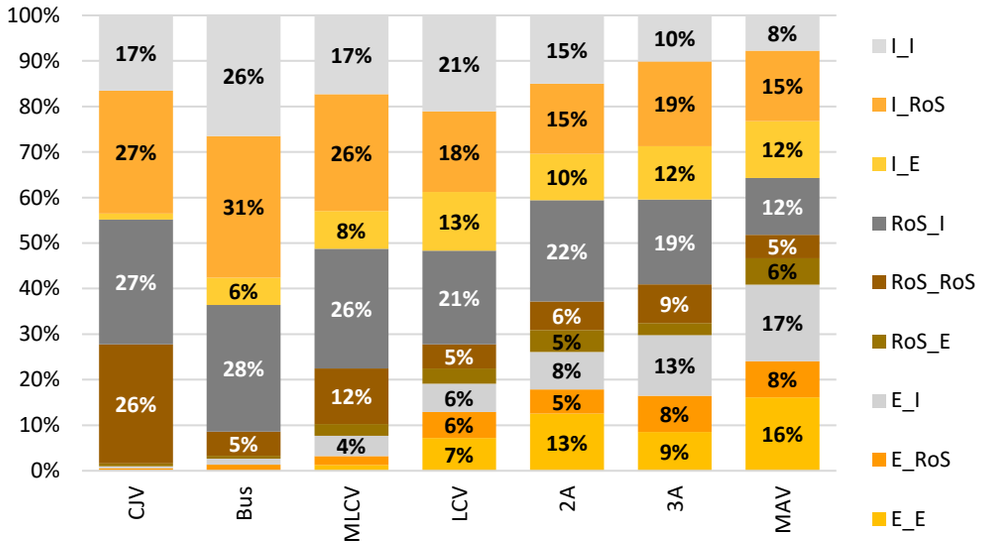
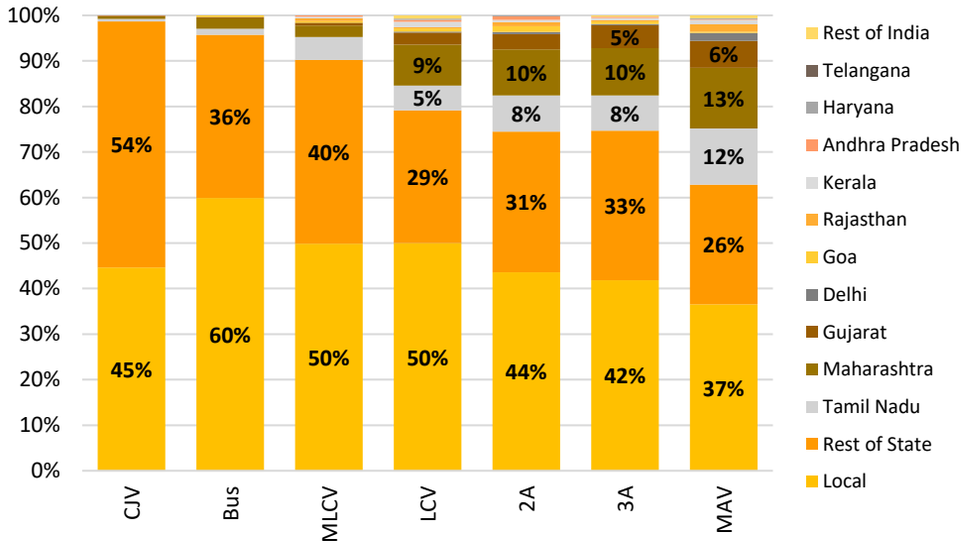
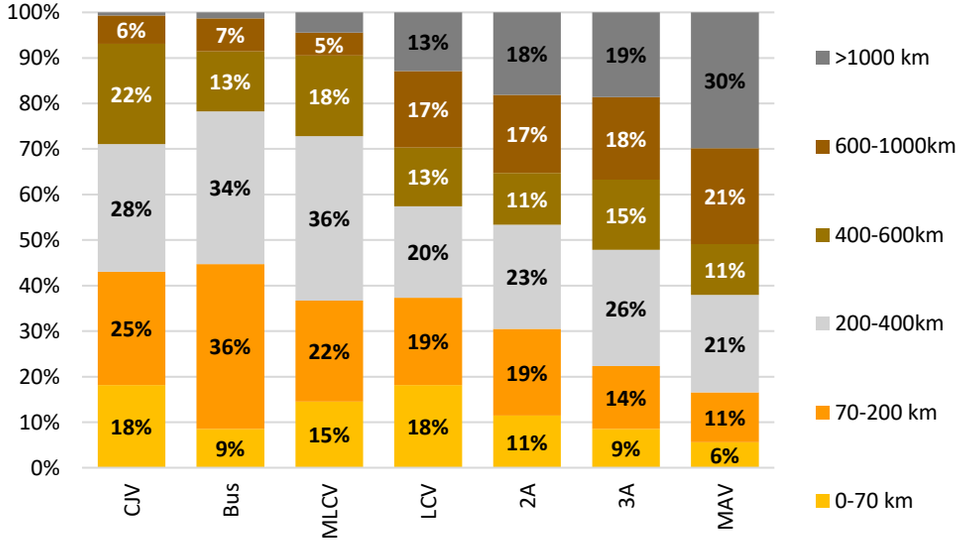
Vehicle category-wise zone characteristics



Vehicle category-wise project influence region



Vehicle category-wise trip lengths and average distance



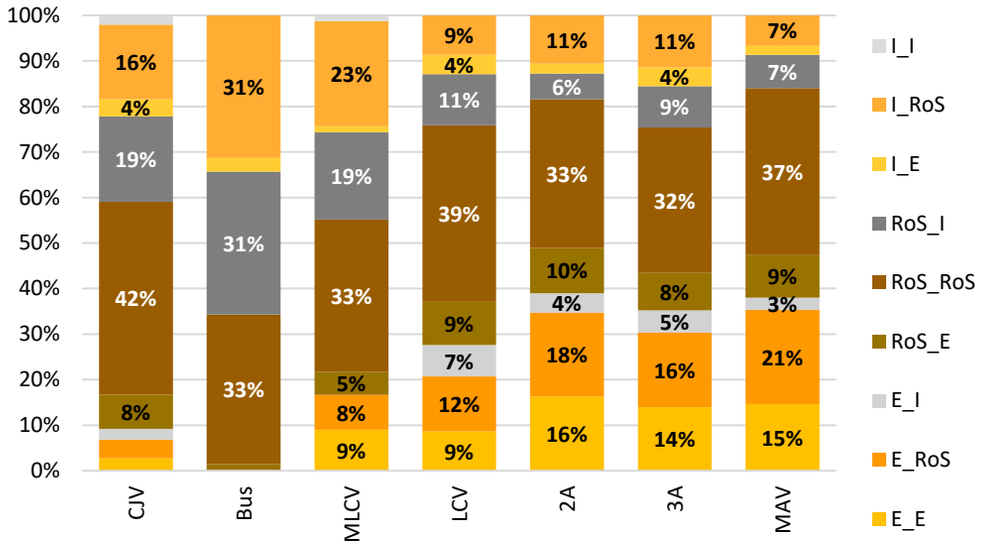
Vehicle Category	Distance (in km)
CJV	287
Bus	796
Mini LCV	342
LCV	492
2A	576
3A	603
MAV	789

Source: TIC analysis

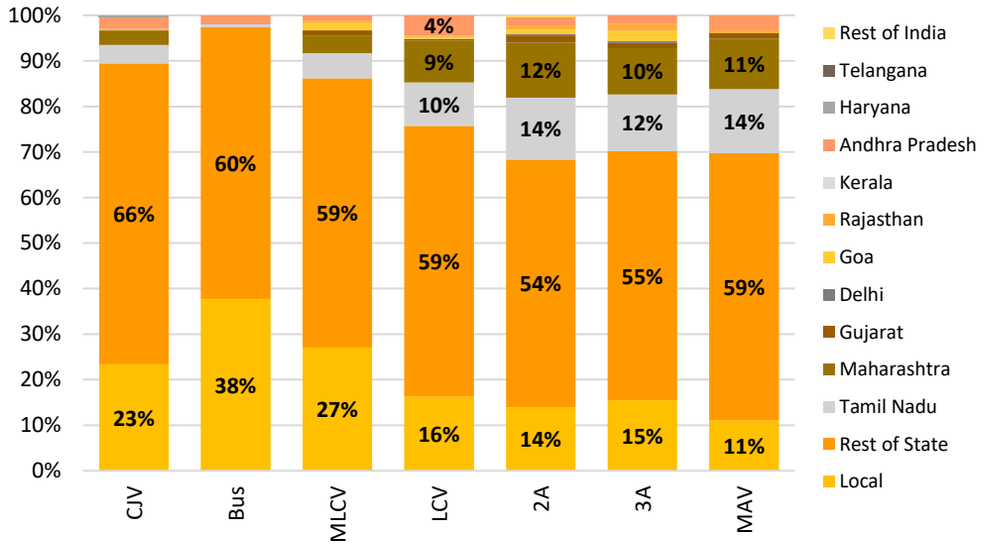
Zonal influences and trip distances (2): Dobbaspet & Halenijagal CP – Slip road

TRANSLINK® Infrastructure Consultants Pvt Ltd *Smart Consulting*

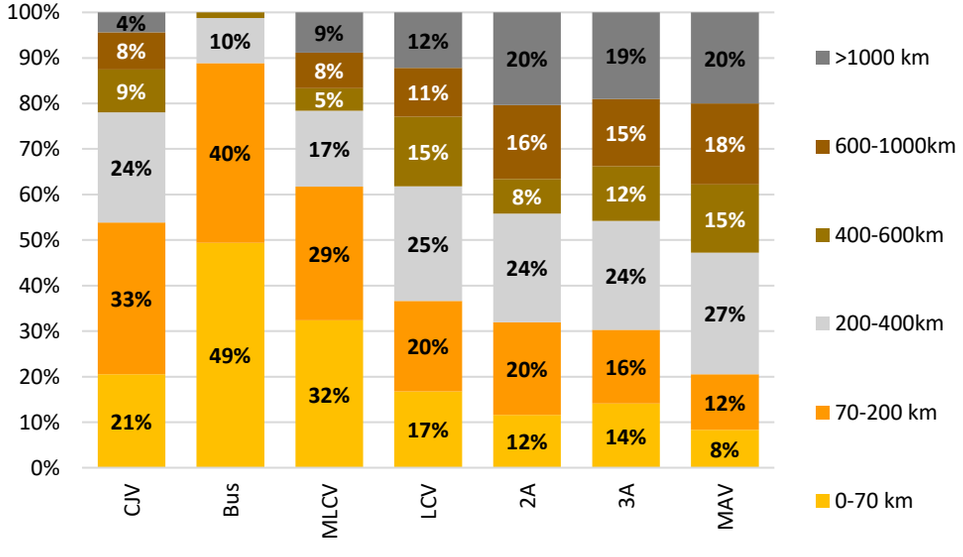
Vehicle category-wise zone characteristics



Vehicle category-wise project influence region



Vehicle category-wise trip lengths and average distance



Vehicle Category	Distance (in km)
CJV	295
Bus	360
Mini LCV	301
LCV	429
2A	567
3A	575
MAV	581

Source: TIC analysis

Zonal influences and trip distances (3): Bharathipura and Honnenahalli CP – Slip road

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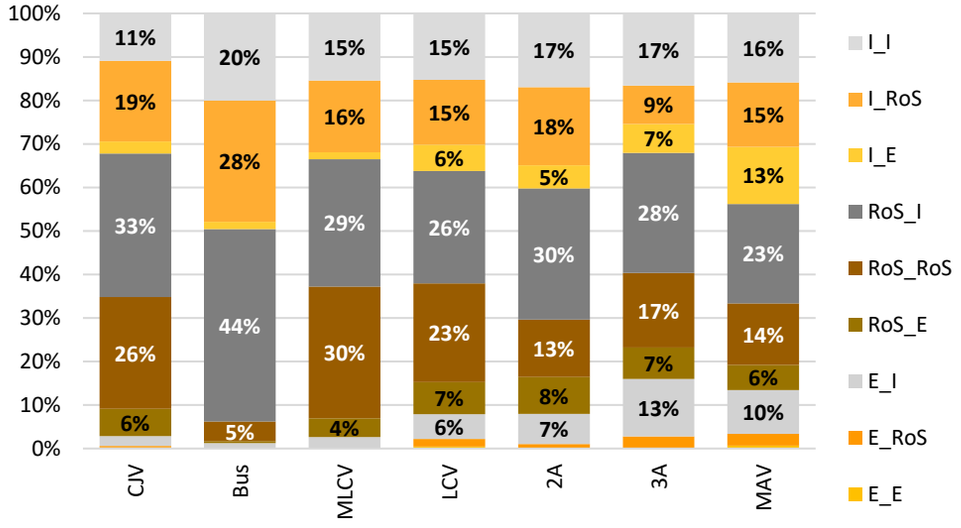
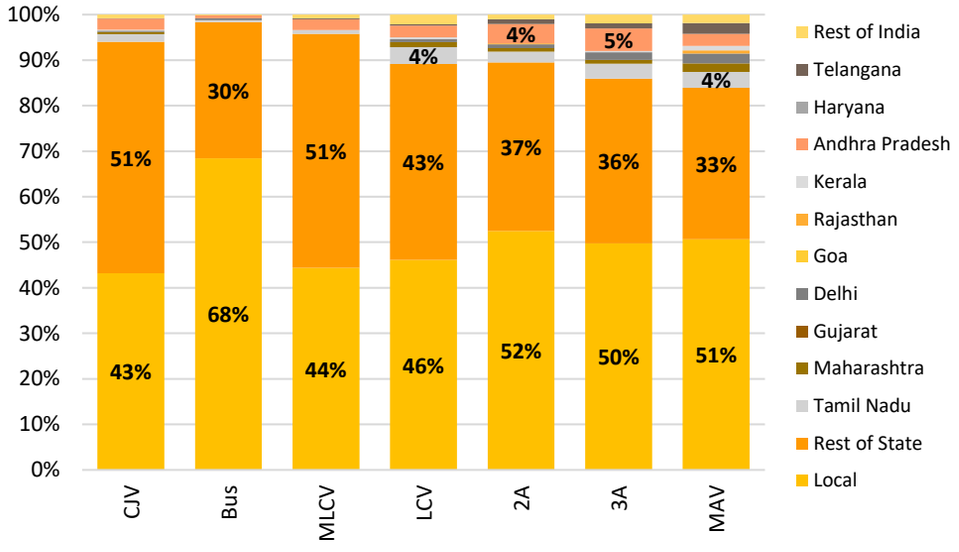
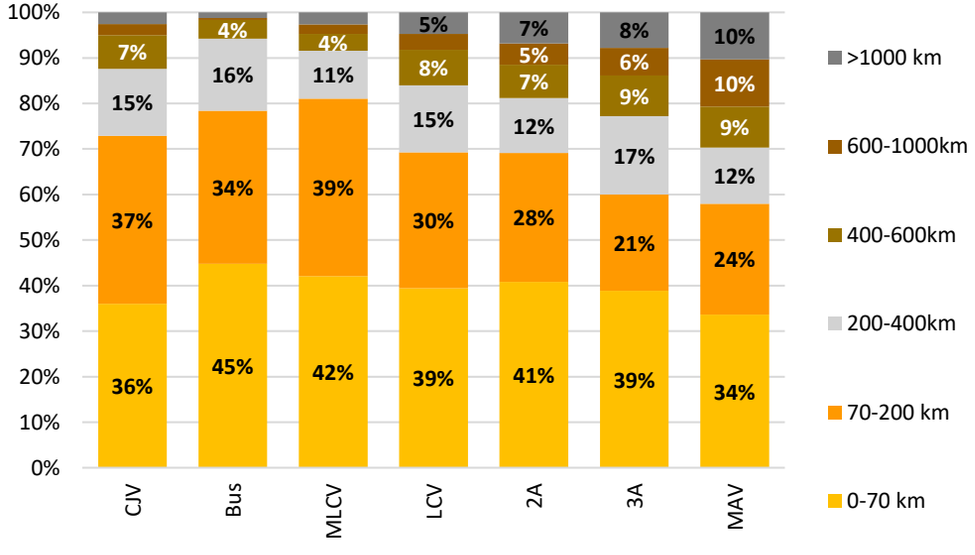
Vehicle category-wise zone characteristics



Vehicle category-wise project influence region



Vehicle category-wise trip lengths and average distance



Vehicle Category	Distance (in km)
CJV	204
Bus	459
Mini LCV	182
LCV	261
2A	271
3A	340
MAV	398

Source: TIC analysis

Zonal influences and trip distances (4): Bharathipura and Honnenahalli – Sompura Junction

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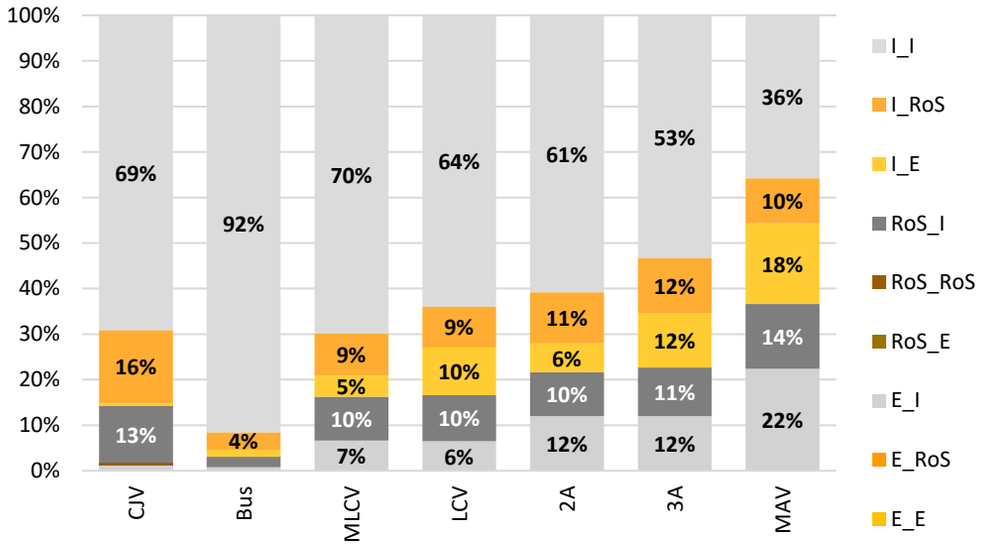
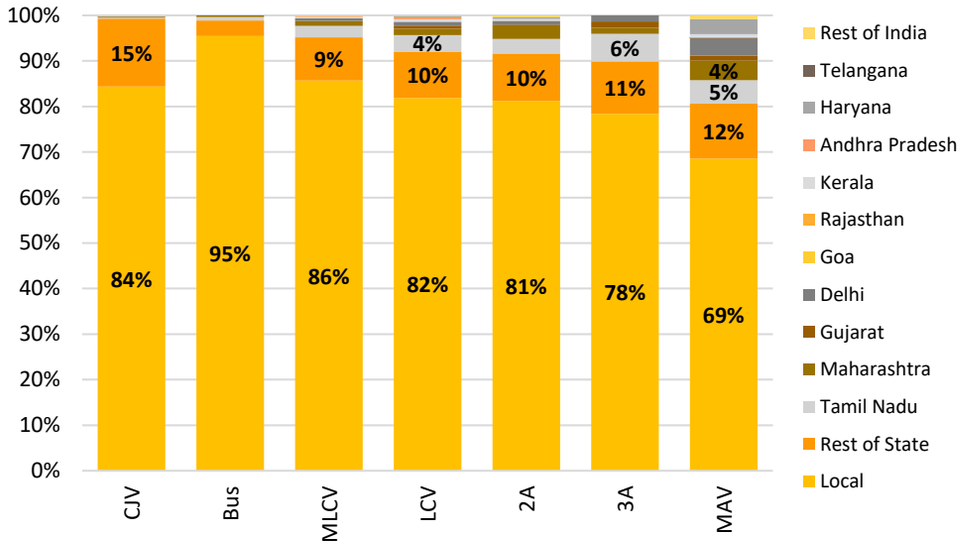
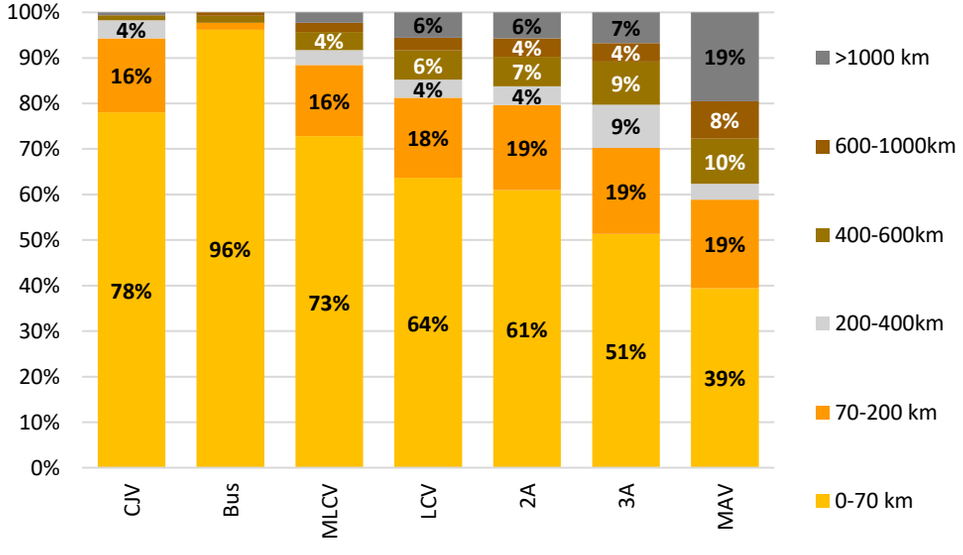
Vehicle category-wise zone characteristics



Vehicle category-wise project influence region



Vehicle category-wise trip lengths and average distance



Vehicle Category	Distance (in km)
CJV	64
Bus	111
Mini LCV	70
LCV	125
2A	234
3A	228
MAV	518

Source: TIC analysis

Appendix C:

- Detailed traffic and revenue forecast – most likely scenario without overloading

Kulumepalya TP: Traffic and revenue forecast

TRANSLINK® Infrastructure Consultants Pvt Ltd
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Traffic forecast (AADT)

Financial Year	CJV	Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	AADT	PCU
FY26	26,217	3,990	4,752	3,850	3,664	1,874	4,964	**49,312**	**87,839**
FY27	28,100	4,237	4,935	3,986	3,898	1,887	5,308	**52,351**	**92,939**

Traffic AADT growth rate

Financial Year	CJV	Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	AADT	PCU
FY26	-	-	-	-	-	-	-	**-**	**-**
FY27	7.2%	6.2%	3.9%	3.5%	6.4%	0.7%	6.9%	**6.2%**	**5.8%**

Revenue forecast (INR Crore)

Financial Year	CJV	Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	Total
FY27	-	-	-	-	-	-	-	**89.9**

Source: TIC estimate

Chokkenahalli TP: Traffic and revenue forecast

TRANSLINK® Infrastructure Consultants Pvt Ltd
Smart Consulting

Traffic forecast (AADT)

Financial Year	CJV	Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	AADT	PCU
FY26	20,078	2,966	3,811	3,610	3,642	1,859	5,412	**41,378**	**80,448**
FY27	21,449	3,123	4,023	3,737	3,879	1,874	5,768	**43,853**	**85,035**
FY28	22,947	3,286	4,246	3,868	4,126	1,908	6,145	**46,526**	**89,960**
FY29	24,706	3,458	4,482	3,989	4,389	1,943	6,547	**49,515**	**95,316**

Traffic AADT growth rate

Financial Year	CJV	Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	AADT	PCU
FY26	-	-	-	-	-	-	-	**-**	**-**
FY27	6.8%	5.3%	5.6%	3.5%	6.5%	0.8%	6.6%	**6.0%**	**5.7%**
FY28	7.0%	5.2%	5.5%	3.5%	6.4%	1.8%	6.5%	**6.1%**	**5.8%**
FY29	7.7%	5.2%	5.6%	3.1%	6.4%	1.8%	6.5%	**6.4%**	**6.0%**

Revenue forecast (INR Crore)

Financial Year	CJV	Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	Total
FY26	-	-	-	-	-	-	-	**-**
FY27	-	-	-	-	-	-	-	**101.7**
FY28	22.3	3.3	7.9	14.9	18.3	9.1	44.7	**120.5**
H1 FY29	12.0	1.7	4.4	7.8	9.8	4.8	24.8	**65.4**

Source: TIC estimate

Halenijagal TP (1): Traffic forecast (AADT)

TRANSLINK® Infrastructure Consultants Pvt Ltd
Smart Consulting

Halenijagal TP

Financial Year	CJV	Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	AADT	PCU
FY26	24,551	4,609	4,221	3,709	4,217	1,920	5,353	**48,579**	**89,116**
FY27	26,227	4,876	4,455	3,839	4,491	1,933	5,678	**51,500**	**94,128**
FY28 H1	28,060	5,157	4,701	3,973	4,777	1,962	6,018	**54,648**	**99,485**
FY28 H2	28,060	5,157	4,701	3,973	4,777	1,962	6,018	**54,648**	**99,485**
FY29 H1	29,513	5,309	4,548	4,098	4,601	1,680	5,180	**54,929**	**96,090**
FY29 H2	22,264	4,080	3,236	3,825	3,098	1,201	3,452	**41,155**	**71,101**
FY30	23,042	4,185	2,977	3,956	2,784	905	2,403	**40,252**	**65,440**
FY31	24,045	4,364	3,062	4,080	2,831	858	2,341	**41,582**	**66,845**
FY32	23,475	4,548	3,145	4,127	2,872	800	2,262	**41,229**	**66,316**
FY33	22,766	4,759	3,291	4,118	3,002	797	2,321	**41,054**	**66,657**
FY34	24,165	5,000	3,451	4,245	3,175	809	2,455	**43,300**	**70,076**
FY35	25,779	5,228	3,618	4,374	3,356	822	2,595	**45,771**	**73,765**
FY36	27,260	5,453	3,783	4,499	3,538	833	2,735	**48,102**	**77,307**
FY37	27,938	5,545	3,953	4,556	3,726	835	2,808	**49,361**	**79,400**
FY38	28,401	5,621	4,126	4,607	3,919	839	2,867	**50,381**	**81,210**
FY39	28,706	5,666	4,302	4,644	4,118	843	2,911	**51,190**	**82,740**
FY40	28,858	5,689	4,483	4,668	4,323	845	2,941	**51,808**	**84,016**
FY41	28,933	5,700	4,669	4,681	4,536	846	2,956	**52,321**	**85,126**

Source: TIC estimate

Halenijagal TP (2): Traffic AADT growth rates

TRANSLINK® Infrastructure Consultants Pvt Ltd
Smart Consulting

Halenijagal TP

Financial Year	CJV	Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	AADT	PCU
FY26	-	-	-	-	-	-	-	**-**	**-**
FY27	6.8%	5.8%	5.5%	3.5%	6.5%	0.7%	6.1%	**6.0%**	**5.6%**
FY28 H1	7.0%	5.8%	5.5%	3.5%	6.4%	1.5%	6.0%	**6.1%**	**5.7%**
FY28 H2	7.0%	5.8%	5.5%	3.5%	6.4%	1.5%	6.0%	**6.1%**	**5.7%**
FY29 H1	5.2%	2.9%	(3.2%)	3.1%	(3.7%)	(14.3%)	(14.0%)	**0.5%**	**(3.4%)**
FY29 H2	(24.6%)	(23.2%)	(28.8%)	(6.7%)	(32.7%)	(28.5%)	(33.4%)	**(24.7%)**	**(28.5%)**
FY30	(21.9%)	(21.2%)	(34.5%)	(3.5%)	(39.5%)	(46.1%)	(53.7%)	**(26.7%)**	**(31.9%)**
FY31	4.4%	4.3%	2.8%	3.1%	1.7%	(5.2%)	(2.6%)	**3.3%**	**2.1%**
FY32	(2.4%)	4.2%	2.7%	1.1%	1.4%	(6.8%)	(3.4%)	**(0.8%)**	**(0.8%)**
FY33	(3.0%)	4.6%	4.6%	(0.2%)	4.5%	(0.4%)	2.6%	**(0.4%)**	**0.5%**
FY34	6.1%	5.1%	4.9%	3.1%	5.8%	1.5%	5.8%	**5.5%**	**5.1%**
FY35	6.7%	4.6%	4.8%	3.0%	5.7%	1.5%	5.7%	**5.7%**	**5.3%**
FY36	5.7%	4.3%	4.6%	2.9%	5.4%	1.4%	5.4%	**5.1%**	**4.8%**
FY37	2.5%	1.7%	4.5%	1.3%	5.3%	0.2%	2.7%	**2.6%**	**2.7%**
FY38	1.7%	1.4%	4.4%	1.1%	5.2%	0.6%	2.1%	**2.1%**	**2.3%**
FY39	1.1%	0.8%	4.3%	0.8%	5.1%	0.4%	1.5%	**1.6%**	**1.9%**
FY40	0.5%	0.4%	4.2%	0.5%	5.0%	0.3%	1.0%	**1.2%**	**1.5%**
FY41	0.3%	0.2%	4.1%	0.3%	4.9%	0.1%	0.5%	**1.0%**	**1.3%**

Source: TIC estimate

Halenijagal TP (3): Revenue forecast (INR Crore)

TRANSLINK® Infrastructure Consultants Pvt Ltd Smart Consulting

Halenijagal TP

Financial Year	CJV	Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	Total
FY26	-	-	-	-	-	-	-	**-**
FY27	-	-	-	-	-	-	-	**-**
FY28	28.4	5.4	9.3	15.4	21.8	9.7	45.6	**135.6**
FY29	38.9	7.3	10.9	23.4	25.0	10.3	46.5	**162.3**
FY30	50.2	9.4	12.2	32.5	26.3	9.4	38.1	**178.1**
FY31	53.4	10.0	13.0	34.6	27.7	9.3	38.7	**186.6**
FY32	54.6	10.9	13.8	36.6	29.5	9.0	38.6	**193.1**
FY33	55.1	11.9	14.9	37.9	31.8	9.3	41.1	**202.0**
FY34	60.9	13.0	16.2	40.3	35.0	9.8	45.1	**220.4**
FY35	66.1	13.9	17.9	43.1	38.1	10.3	49.5	**238.8**
FY36	72.8	15.1	19.3	46.5	42.0	10.9	54.6	**261.2**
FY37	78.4	16.1	20.8	48.6	45.8	11.3	57.8	**278.8**
FY38	82.5	16.9	22.7	50.9	50.0	11.8	61.4	**296.2**
FY39	86.3	17.6	24.4	53.4	54.6	12.3	64.8	**313.3**
FY40	91.1	18.6	26.6	55.9	59.5	12.8	68.1	**332.6**
FY41	94.0	19.1	28.5	58.0	64.5	13.3	70.8	**348.3**

Source: TIC estimate

Halenijagal TP (4): Revenue growth rates

TRANSLINK® Infrastructure Consultants Pvt Ltd Smart Consulting

Halenijagal TP

Financial Year	CJV	Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	Total
FY26	-	-	-	-	-	-	-	**-**
FY27	-	-	-	-	-	-	-	**-**
FY28	-	-	-	-	-	-	-	**-**
FY29	37.0%	35.5%	16.2%	52.5%	14.9%	6.2%	2.0%	**19.7%**
FY30	29.1%	28.9%	12.1%	38.7%	5.4%	(8.9%)	(18.1%)	**9.7%**
FY31	6.3%	6.3%	6.9%	6.6%	5.1%	(0.9%)	1.5%	**4.8%**
FY32	2.3%	9.2%	6.0%	5.9%	6.5%	(3.6%)	(0.0%)	**3.5%**
FY33	0.9%	8.9%	8.2%	3.5%	7.7%	3.5%	6.4%	**4.6%**
FY34	10.6%	9.4%	8.6%	6.4%	10.2%	5.6%	9.8%	**9.1%**
FY35	8.4%	6.3%	10.3%	6.8%	8.9%	5.4%	9.6%	**8.3%**
FY36	10.2%	8.7%	8.3%	7.9%	10.2%	5.7%	10.3%	**9.4%**
FY37	7.6%	6.8%	7.5%	4.6%	9.1%	3.5%	5.9%	**6.7%**
FY38	5.3%	5.0%	9.2%	4.6%	9.2%	4.2%	6.2%	**6.2%**
FY39	4.6%	4.3%	7.3%	4.9%	9.0%	4.8%	5.5%	**5.8%**
FY40	5.5%	5.4%	9.0%	4.7%	9.1%	4.0%	5.2%	**6.2%**
FY41	3.2%	3.1%	7.4%	3.7%	8.3%	3.9%	3.9%	**4.7%**

Source: TIC estimate

Bhartipura & Honnenahalli TP (1): Traffic forecast (AADT)

TRANSLINK® Infrastructure Consultants Pvt Ltd
Smart Consulting

Bhartipura & Honnenahalli TP

Financial Year	CJV	Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	AADT	PCU
FY26	7,933	1,956	1,552	630	1,137	779	1,123	**15,110**	**24,909**
FY27	8,324	2,024	1,591	637	1,178	784	1,144	**15,682**	**25,678**
FY28 H1	8,731	2,095	1,631	643	1,219	792	1,167	**16,278**	**26,485**
FY28 H2	8,731	2,095	1,631	643	1,219	792	1,167	**16,278**	**26,485**
FY29 H1	8,799	2,168	1,671	650	1,194	769	1,096	**16,346**	**26,241**
FY29 H2	8,799	2,168	1,671	650	1,194	769	1,096	**16,346**	**26,241**
FY30	8,801	2,242	1,712	656	1,165	745	1,022	**16,344**	**25,909**
FY31	9,075	2,313	1,750	662	1,182	744	1,028	**16,755**	**26,404**
FY32	8,884	2,385	1,789	657	1,199	740	1,033	**16,686**	**26,386**
FY33	8,637	2,458	1,829	644	1,236	747	1,055	**16,606**	**26,467**
FY34	9,009	2,534	1,869	650	1,274	754	1,078	**17,167**	**27,231**
FY35	9,430	2,611	1,909	656	1,313	761	1,101	**17,781**	**28,048**
FY36	9,809	2,686	1,948	662	1,351	767	1,123	**18,346**	**28,812**
FY37	10,236	2,762	1,987	667	1,389	770	1,146	**18,957**	**29,613**
FY38	10,632	2,838	2,027	672	1,428	777	1,168	**19,541**	**30,395**
FY39	11,031	2,914	2,065	678	1,466	783	1,190	**20,128**	**31,179**
FY40	11,440	2,991	2,104	683	1,505	789	1,212	**20,725**	**31,975**
FY41	11,900	3,069	2,143	688	1,544	796	1,235	**21,374**	**32,822**

Source: TIC estimate

Bhartipura & Honnenahalli TP (2): Traffic AADT growth rates

TRANSLINK® Infrastructure Consultants Pvt Ltd Smart Consulting

Bhartipura & Honnenahalli TP

Financial Year	CJV	Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	AADT	PCU
FY26	-	-	-	-	-	-	-	**-**	**-**
FY27	4.9%	3.5%	2.5%	1.1%	3.5%	0.5%	1.9%	**3.8%**	**3.1%**
FY28 H1	4.9%	3.5%	2.5%	1.0%	3.5%	1.1%	2.0%	**3.8%**	**3.2%**
FY28 H2	4.9%	3.5%	2.5%	1.0%	3.5%	1.1%	2.0%	**3.8%**	**3.2%**
FY29 H1	0.8%	3.5%	2.5%	0.9%	(2.1%)	(2.9%)	(6.1%)	**0.4%**	**(0.9%)**
FY29 H2	0.8%	3.5%	2.5%	0.9%	(2.1%)	(2.9%)	(6.1%)	**0.4%**	**(0.9%)**
FY30	0.0%	3.4%	2.4%	1.0%	(2.4%)	(3.1%)	(6.7%)	**0.0%**	**(1.2%)**
FY31	3.1%	3.1%	2.2%	0.9%	1.5%	(0.1%)	0.5%	**2.5%**	**1.9%**
FY32	(2.1%)	3.1%	2.2%	(0.9%)	1.4%	(0.6%)	0.5%	**(0.4%)**	**(0.1%)**
FY33	(2.8%)	3.1%	2.2%	(1.9%)	3.1%	0.9%	2.2%	**(0.5%)**	**0.3%**
FY34	4.3%	3.1%	2.2%	0.9%	3.1%	0.9%	2.2%	**3.4%**	**2.9%**
FY35	4.7%	3.0%	2.2%	0.9%	3.0%	0.9%	2.1%	**3.6%**	**3.0%**
FY36	4.0%	2.9%	2.0%	0.9%	2.9%	0.9%	2.0%	**3.2%**	**2.7%**
FY37	4.3%	2.8%	2.0%	0.8%	2.8%	0.4%	2.0%	**3.3%**	**2.8%**
FY38	3.9%	2.8%	2.0%	0.8%	2.8%	0.8%	1.9%	**3.1%**	**2.7%**
FY39	3.8%	2.7%	1.9%	0.8%	2.7%	0.8%	1.9%	**3.0%**	**2.6%**
FY40	3.7%	2.6%	1.9%	0.8%	2.7%	0.8%	1.9%	**3.0%**	**2.6%**
FY41	4.0%	2.6%	1.9%	0.7%	2.6%	0.8%	1.8%	**3.1%**	**2.7%**

Source: TIC estimate

Bhartipura & Honnenahalli TP (3): Revenue forecast (INR Crore)

TRANSLINK® Infrastructure Consultants Pvt Ltd *Smart Consulting*

Bhartipura & Honnenahalli TP

Financial Year	CJV	Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	Total
FY26	-	-	-	-	-	-	-	**-**
FY27	-	-	-	-	-	-	-	**-**
FY28	8.7	1.8	2.7	2.1	4.6	3.2	7.1	**30.3**
FY29	8.7	1.9	3.0	2.1	4.7	3.2	7.0	**30.7**
FY30	9.6	2.1	3.1	2.2	4.7	3.3	6.7	**31.7**
FY31	10.1	2.2	3.4	2.4	5.0	3.4	7.1	**33.6**
FY32	10.0	2.3	3.6	2.4	5.2	3.5	7.3	**34.3**
FY33	9.9	2.5	3.9	2.5	5.6	3.6	7.8	**35.8**
FY34	11.2	2.7	3.9	2.6	6.0	3.8	8.3	**38.6**
FY35	12.0	2.9	4.3	2.7	6.4	4.0	8.7	**41.0**
FY36	12.5	3.0	4.5	2.8	6.8	4.2	9.3	**43.1**
FY37	14.3	3.3	4.8	3.0	7.2	4.3	9.8	**46.7**
FY38	14.9	3.4	5.0	3.1	7.8	4.6	10.4	**49.2**
FY39	16.8	3.8	5.3	3.3	8.3	4.8	11.0	**53.2**
FY40	17.8	4.1	5.7	3.4	8.8	5.1	11.6	**56.4**
FY41	18.5	4.2	5.9	3.6	9.4	5.2	12.4	**59.1**

Source: TIC estimate

Bhartipura & Honnenahalli TP (4): Revenue growth rates

TRANSLINK® Infrastructure Consultants Pvt Ltd Smart Consulting

Bhartipura & Honnenahalli TP

Financial Year	CJV	Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	Total
FY26	-	-	-	-	-	-	-	**-**
FY27	-	-	-	-	-	-	-	**-**
FY28	-	-	-	-	-	-	-	**-**
FY29	0.8%	3.2%	9.8%	3.8%	1.2%	0.1%	(1.7%)	**1.4%**
FY30	10.0%	8.7%	2.4%	4.1%	1.0%	0.9%	(4.1%)	**3.2%**
FY31	5.5%	8.9%	9.3%	5.9%	5.9%	3.8%	5.6%	**6.0%**
FY32	(1.6%)	3.4%	5.2%	2.2%	5.0%	2.7%	3.4%	**2.1%**
FY33	(0.8%)	8.2%	8.3%	2.3%	7.0%	4.4%	6.2%	**4.2%**
FY34	13.3%	7.6%	2.2%	5.4%	7.1%	4.5%	6.7%	**7.9%**
FY35	6.9%	7.9%	8.2%	3.5%	6.0%	6.5%	4.9%	**6.3%**
FY36	4.5%	3.2%	4.7%	5.3%	6.9%	3.8%	6.2%	**5.2%**
FY37	14.1%	11.3%	7.3%	4.5%	6.2%	3.3%	5.8%	**8.5%**
FY38	4.1%	2.8%	4.1%	5.1%	8.2%	6.4%	5.9%	**5.3%**
FY39	12.9%	10.8%	7.1%	4.5%	6.0%	3.8%	5.7%	**8.1%**
FY40	5.8%	6.9%	7.1%	4.7%	6.2%	5.7%	6.1%	**6.0%**
FY41	4.0%	2.3%	3.5%	4.3%	7.1%	3.2%	6.4%	**4.7%**

Source: TIC estimate

Dobbaspet & Halenijagal TP (1): Traffic forecast (AADT)

TRANSLINK® Infrastructure Consultants Pvt Ltd Smart Consulting

Dobbaspet & Halenijagal TP

Financial Year	CJV	Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	AADT	PCU
FY26	4,936	822	842	214	1,174	437	1,396	**9,820**	**18,777**
FY27	5,155	851	883	216	1,239	439	1,463	**10,245**	**19,595**
FY28 H1	5,389	880	926	219	1,307	444	1,537	**10,702**	**20,484**
FY28 H2	5,389	880	926	219	1,307	444	1,537	**10,702**	**20,484**
FY29 H1	6,287	911	1,172	221	1,863	760	2,785	**13,998**	**30,019**
FY29 H2	6,287	911	1,172	221	1,863	760	2,785	**13,998**	**30,019**
FY30	7,224	942	1,438	223	2,473	1,083	4,164	**17,548**	**40,398**
FY31	8,118	972	1,534	225	2,639	1,121	4,422	**19,030**	**43,243**
FY32	8,952	1,002	1,634	226	2,813	1,152	4,692	**20,471**	**46,093**
FY33	9,215	1,033	1,704	226	2,940	1,160	4,891	**21,169**	**47,792**
FY34	9,583	1,065	1,777	228	3,084	1,170	5,115	**22,022**	**49,777**
FY35	9,999	1,097	1,853	230	3,233	1,181	5,346	**22,939**	**51,864**
FY36	10,373	1,129	1,927	232	3,382	1,191	5,575	**23,808**	**53,893**
FY37	10,792	1,160	2,007	234	3,545	1,193	5,826	**24,758**	**56,098**
FY38	10,919	1,170	2,040	235	3,612	1,194	5,930	**25,100**	**56,955**
FY39	11,003	1,176	2,064	236	3,661	1,195	6,006	**25,342**	**57,579**
FY40	11,045	1,179	2,080	236	3,695	1,196	6,057	**25,488**	**57,980**
FY41	11,066	1,181	2,088	236	3,711	1,196	6,083	**25,560**	**58,179**

Source: TIC estimate

Dobbaspet & Halenijagal TP (2): Traffic AADT growth rates

TRANSLINK® Infrastructure Consultants Pvt Ltd Smart Consulting

Dobbaspet & Halenijagal TP

Financial Year	CJV	Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	AADT	PCU
FY26	-	-	-	-	-	-	-	**-**	**-**
FY27	4.4%	3.5%	4.9%	1.1%	5.5%	0.4%	4.8%	**4.4%**	**4.4%**
FY28 H1	4.5%	3.5%	4.9%	1.0%	5.5%	1.0%	5.1%	**4.5%**	**4.6%**
FY28 H2	4.5%	3.5%	4.9%	1.0%	5.5%	1.0%	5.1%	**4.5%**	**4.6%**
FY29 H1	16.7%	3.5%	26.6%	1.0%	42.5%	71.4%	81.2%	**31.1%**	**47.3%**
FY29 H2	16.7%	3.5%	26.6%	1.0%	42.5%	71.4%	81.2%	**31.1%**	**47.3%**
FY30	14.9%	3.4%	22.7%	1.0%	32.8%	42.5%	49.5%	**25.6%**	**35.0%**
FY31	12.4%	3.1%	6.6%	0.9%	6.7%	3.5%	6.2%	**8.5%**	**7.1%**
FY32	10.3%	3.1%	6.5%	0.3%	6.6%	2.7%	6.1%	**7.7%**	**6.6%**
FY33	2.9%	3.1%	4.3%	0.0%	4.5%	0.7%	4.2%	**3.4%**	**3.7%**
FY34	4.0%	3.1%	4.3%	0.9%	4.9%	0.9%	4.6%	**4.1%**	**4.2%**
FY35	4.3%	3.0%	4.2%	0.9%	4.8%	0.9%	4.5%	**4.2%**	**4.2%**
FY36	3.7%	2.9%	4.0%	0.9%	4.6%	0.9%	4.3%	**3.8%**	**3.9%**
FY37	4.0%	2.8%	4.1%	0.8%	4.8%	0.2%	4.5%	**4.0%**	**4.1%**
FY38	1.2%	0.8%	1.6%	0.3%	1.9%	0.1%	1.8%	**1.4%**	**1.5%**
FY39	0.8%	0.5%	1.2%	0.2%	1.4%	0.1%	1.3%	**1.0%**	**1.1%**
FY40	0.4%	0.3%	0.8%	0.2%	0.9%	0.0%	0.8%	**0.6%**	**0.7%**
FY41	0.2%	0.1%	0.4%	0.1%	0.4%	0.0%	0.4%	**0.3%**	**0.3%**

Source: TIC estimate

Dobbaspet & Halenijagal TP (3): Revenue forecast (INR Crore)

TRANSLINK® Infrastructure Consultants Pvt Ltd Smart Consulting

Dobbaspet & Halenijagal TP

Financial Year	CJV	Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	Total
FY26	-	-	-	-	-	-	-	**-**
FY27	-	-	-	-	-	-	-	**-**
FY28	-	-	-	-	-	-	-	**-**
FY29	3.6	0.5	1.2	0.5	4.5	2.0	11.4	**23.8**
FY30	8.3	1.1	3.1	1.0	12.5	6.1	35.6	**67.5**
FY31	9.9	1.2	3.5	1.0	13.9	6.5	39.3	**75.2**
FY32	11.2	1.3	3.8	1.1	15.4	6.9	43.4	**82.9**
FY33	11.8	1.4	4.1	1.1	16.8	7.2	46.8	**89.3**
FY34	12.8	1.5	4.5	1.2	18.2	7.6	51.0	**96.7**
FY35	13.8	1.6	4.9	1.2	19.8	7.8	55.2	**104.3**
FY36	15.1	1.7	5.3	1.3	21.6	8.3	60.0	**113.3**
FY37	16.3	1.8	5.7	1.3	23.4	8.7	64.6	**121.8**
FY38	17.2	1.9	5.9	1.4	24.5	9.0	68.2	**128.2**
FY39	17.6	1.9	6.3	1.4	25.9	9.3	72.1	**134.6**
FY40	18.6	2.0	6.6	1.5	27.4	9.7	75.1	**141.0**
FY41	19.0	2.1	6.9	1.6	28.3	10.0	78.2	**146.1**

Source: TIC estimate

Dobbaspet & Halenijagal TP (4): Revenue growth rates

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Dobbaspet & Halenijagal TP

Financial Year	CJV	Mini LCV	LCV	Bus	2A Truck	3A Truck	MAV/OSV	Total
FY26	-	-	-	-	-	-	-	**-**
FY27	-	-	-	-	-	-	-	**-**
FY28	-	-	-	-	-	-	-	**-**
FY29	-	-	-	-	-	-	-	**-**
FY30	130.5%	107.4%	148.4%	111.0%	175.4%	197.8%	212.1%	**184.0%**
FY31	19.4%	9.4%	12.7%	5.2%	11.5%	6.7%	10.3%	**11.3%**
FY32	13.2%	6.2%	10.6%	4.5%	10.3%	6.2%	10.4%	**10.3%**
FY33	6.0%	6.2%	7.7%	3.0%	9.7%	5.4%	7.8%	**7.6%**
FY34	8.2%	6.8%	9.5%	4.5%	8.0%	4.6%	9.1%	**8.3%**
FY35	8.1%	7.3%	7.5%	4.6%	8.9%	3.7%	8.1%	**7.8%**
FY36	9.4%	8.3%	9.2%	5.4%	9.0%	5.8%	8.8%	**8.7%**
FY37	7.3%	6.2%	7.0%	4.7%	8.5%	4.4%	7.6%	**7.4%**
FY38	6.0%	5.4%	4.5%	4.0%	4.6%	3.3%	5.7%	**5.3%**
FY39	2.0%	2.0%	6.1%	3.6%	5.8%	4.3%	5.7%	**5.1%**
FY40	5.8%	5.5%	5.1%	4.2%	5.5%	4.3%	4.1%	**4.7%**
FY41	2.3%	2.3%	4.0%	3.9%	3.6%	2.8%	4.1%	**3.7%**

Source: TIC estimate

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