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Traffic & Revenue assessment of Mukarba Chowk to Panipat Section (NH-44)

Client
NXT - Infra MCP Highways Private Limited

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Traffic Study Report

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1.1 Project Details and Overview

The Mukarba Chowk to Panipat Section Highway is an eight-lane route in the states of Delhi and Haryana. The initial concession agreement, signed in August 2015, involved the National Highways Authority of India (NHAI) and Mukarba Chowk – Panipat Toll Roads Limited (MCPTRL) with a concession period of 17 years.

MCPTRL, established in August 2015, is a special purpose vehicle (SPV), entirely owned by Essel Infraprojects Limited (EIL). EIL secured the contract for the eight-laning project, extending from the existing 6/8 lane of Mukarba Chowk (Km 15.5) to the Panipat section (Km 86.0) in the state of Haryana. This initiative falls under the National Highways Development Project (NHDP) phase IV, granted by the National Highways Authority of India. The project operates on a design, build, finance, operate, and transfer (DBFOT) toll basis, covering an approximate length of 70 kilometers (km).

The Concession Agreement was signed on 28th August 2015, but due to financial challenges faced by EIL/MCPTRL, the project could not be successfully completed. Consequently, in accordance with the NHAI's Substitution Agreement, Welspun Enterprises Ltd, operating through its SPV, Welspun Infra facility Pvt Ltd, was subsequently awarded the project on 8th June 2020.

The details of the sections is presented in **Table 1-1.**

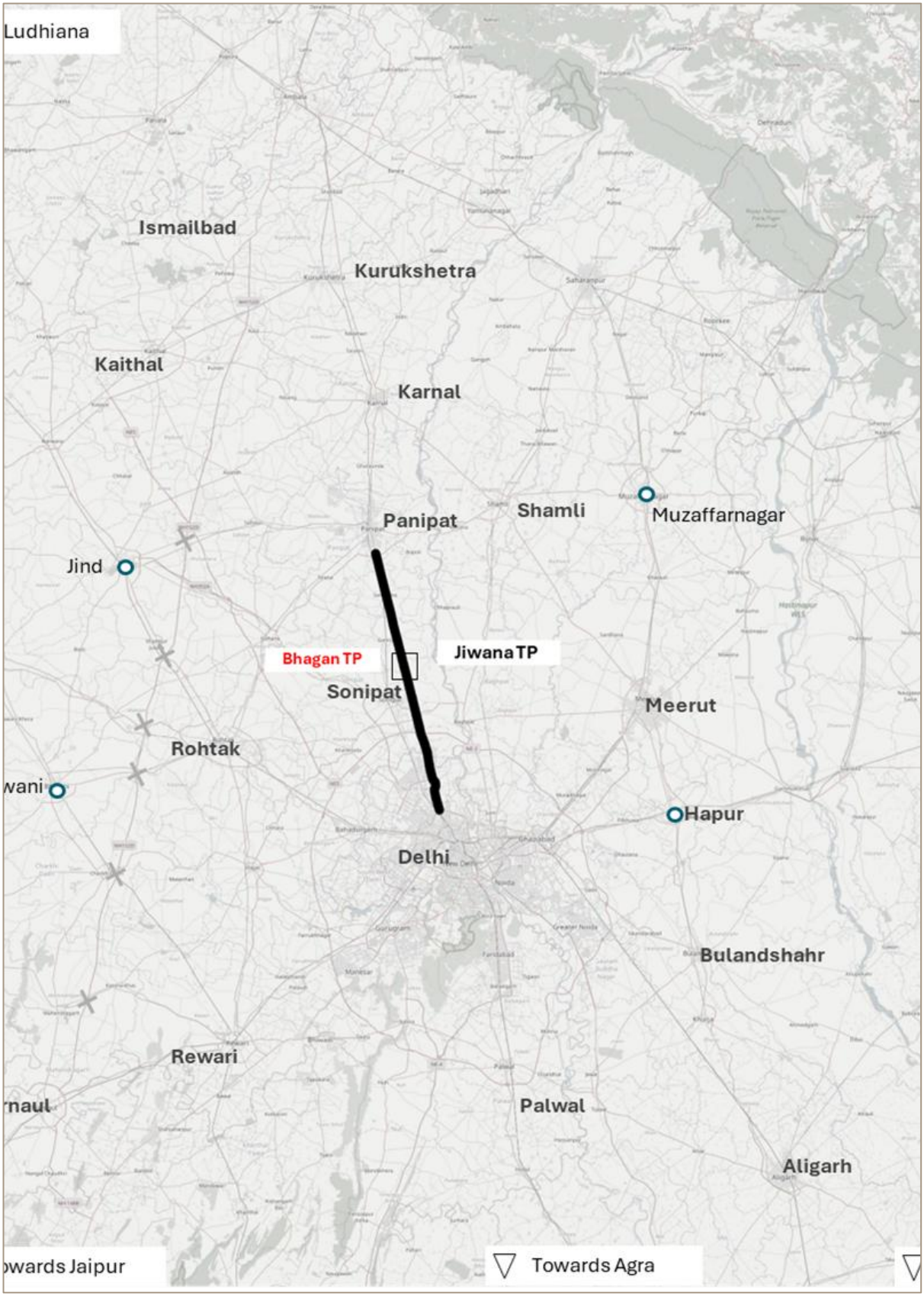
Table 1-1: Project Section Details

Aspect	Details
Section	Mukarba Chowk -Panipat section ofNH44
Length	71.389 km
Original concession period	17 years
End of concession	Feb-2034 + Extension
No of Toll Plaza	Bhagan TP

Source: Client data, Crisil Intelligence

The alignment of the project section is presented in **Figure 1-1**

Figure 1-1: Alignment of the Project Section



Source: Open street Map, Crisil Intelligence

1.2 Traffic Surveys

In order to understand the quantum of traffic and travel pattern of vehicles plying on each of the project sections, and one-day origin destination study conducted at toll plaza location. The schedule of the traffic surveys on the project section are given in **Table 1-2.**

Table 1-2: Survey Schedule

Location	Chainage	OD Survey
Bhagan Toll Plaza	53+600 km	29th January-2025

Source: Crisil Intelligence

1.3 Historical Traffic Data

The historical traffic and revenue data mode wise was made available by client from April-2022 till March 2025 and is presented in **Table 1-3.**

Table 1-3: Historical Traffic and Revenue data availability

S. No	Toll Plaza	Details
TP01	Bhagan TP	April-2022 to March 2025

Source: Client data, Crisil Intelligence

The summary of historic traffic data in terms of PCUs and revenue in million is presented in **Table 1-4.**

Table 1-4: Past Traffic in PCU and Revenue in millions

FY	PCU	Revenue (millions)
FY23	101,220	3,104.5
FY24	101,241	3,481.4
FY25	**102,131**	3,688.1

Source: Client data, Crisil Intelligence

1.4 Traffic Projections

The total traffic projected in terms of PCUs based on most likely growth rates and after impacts is presented in **Table 1-5.**

Table 1-5: Traffic Projection in PCUs

FY	PCU	Growth %
FY26P	110,179	
FY27P	116,672	5.9%
FY28P	123,431	5.8%

FY	PCU	Growth %
FY29P	130,455	5.7%
FY30P	135,512	3.9%
FY31P	140,246	3.4%
FY32P	145,137	3.4%
FY33P	150,101	3.4%
FY34P	156,991	4.6%
FY35P	164,098	4.5%
FY36P	171,176	4.3%
FY37P	178,447	4.2%
FY38P	185,907	4.2%

Source: Crisil Intelligence

Traffic projection in detail is presented in section 7.5

1.5 Revenue Projections

The total revenue in Rs millions across toll plazas is projected to grow at a CAGR of about 8.7 percent for the forecast period from FY25 to FY45 and is presented in **Table 1-6**

Table 1-6: Total Revenue Projections in millions

FY	Bhagan TP
FY26P	4,106.7
FY27P	4,546.4
FY28P	5,014.1
FY29P	5,571.3
FY30P	6,077.4
FY31P	6,630.3
FY32P	7,192.7
FY33P	7,834.0
FY34P	8,586.7
FY35P	9,388.6
FY36P	10,337.3
FY37P	11,285.6
FY38P (*)	6,082.1

Source: Crisil Intelligence (*) FY38 -Revenue estimates for 179 days

2. Introduction

2.1 Asset Overview

The Mukarba Chowk to Panipat Section Highway is an eight-lane route in the states of Delhi and Haryana. The initial concession agreement, signed in August 2015, involved the National Highways Authority of India (NHAI) and Mukarba Chowk – Panipat Toll Roads Limited (MCPTRL) with a concession period of 17 years.

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The Concession Agreement was signed on 28th August 2015, but due to financial challenges faced by EIL/MCPTRL, the project could not be successfully completed. Consequently, in accordance with the NHAI's Substitution Agreement, Welspun Enterprises Ltd, operating through its SPV, Welspun Infra facility Pvt Ltd, was subsequently awarded the project on 8th June 2020.

The project achieved provisional completion - I (PCOD-1) on 6th April 2022 and subsequently on 31st March 2023, PCOD-2 was achieved. The stretch has been operational since 5th April 2022. Final PCOD attained at February 2024.

The project road section details is presented in **Table 2-1**

Table 2-1: Project Section Details

Aspect	Details
Section	Mukarba Chowk -Panipat section ofNH44
Length	71.389 km
Original concession period	17 years
End of concession	Feb-2034 + Extension
No of Toll Plaza	Bhagan TP

Source: Client data, Crisil Intelligence

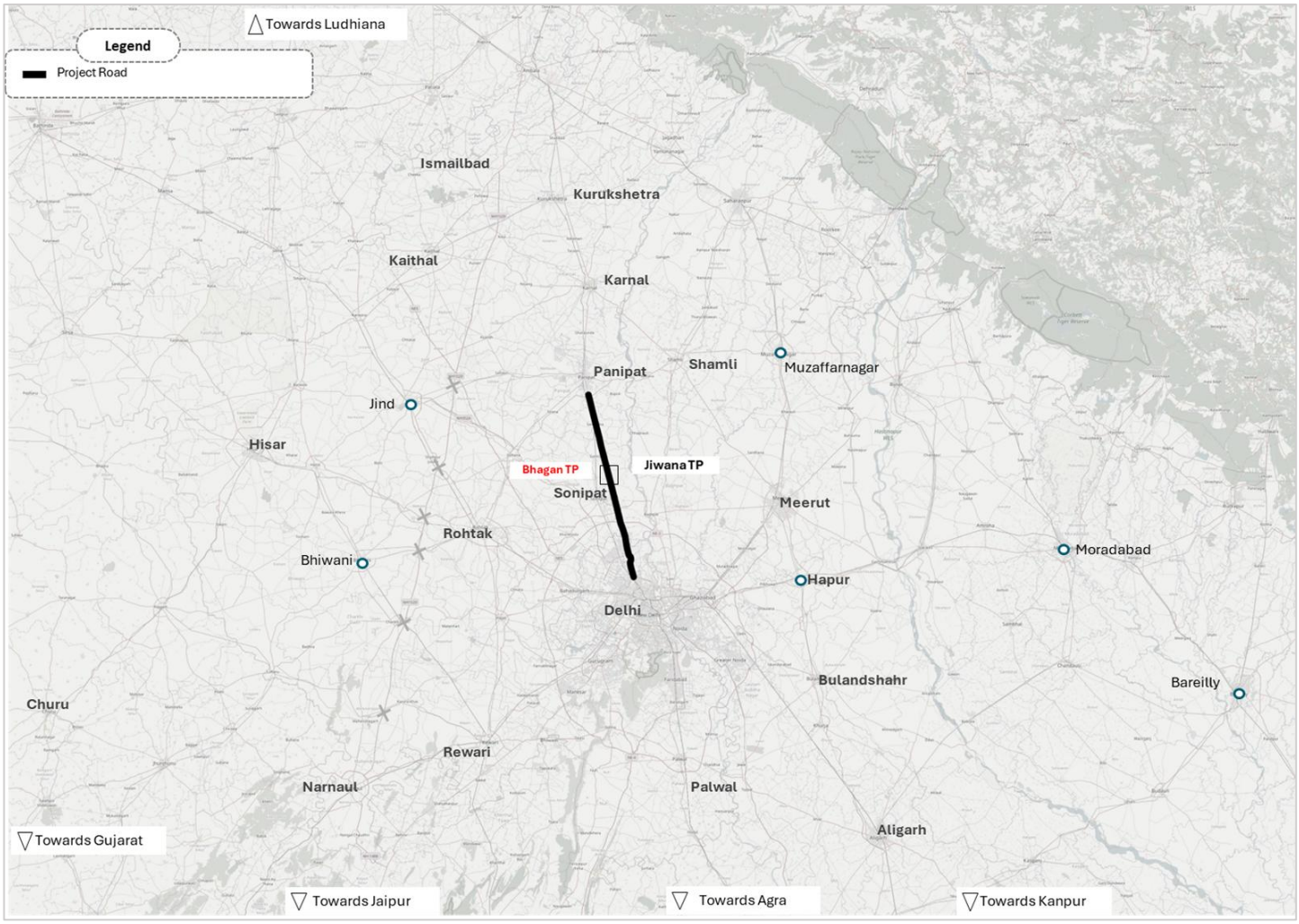
The project corridor is a part of the longest national highway in India. It passes through the Union Territory of Jammu and Kashmir, in addition to the states of Punjab, Haryana, Delhi, Uttar Pradesh, Rajasthan, Madhya Pradesh, Maharashtra, Telangana, Andhra Pradesh, Karnataka, and Tamil Nadu spanning a length of 3,745 kms.

This highway, formed through the amalgamation of seven national highways, spans various regions. It begins with the Jammu-Srinagar National Highway (formerly NH 1A) from Srinagar in Jammu and Kashmir. From there, it extends through the former NH 1 in Punjab and Haryana, reaching Delhi. It incorporates parts of the former NH 2 from Delhi to Agra, including the former NH 3 (popularly known as Agra-Bombay National Highway) from Agra to Gwalior.

Additionally, the highway comprises former NH 75 and former NH 26 to Jhansi, and former NH 7 via various cities such as Lakhnadon, Seoni, Nagpur, Adilabad, Nirmal, Hyderabad, Kurnool, Anantapur, Chikkaballapur, Bengaluru, Hosur, Krishnagiri, Dharmapuri, Salem, Namakkal, Karur, Dindigul, Madurai, Virudhunagar, and Tirunelveli. Finally,

it terminates at Kanyakumari. This roadway accommodates both commercial and private vehicular traffic, serving as a diverse and crucial road for trade and commerce. The Alignment of the project section under study long with its network context is presented below.

Figure 2-1: Alignment of the Project Section



Source: Open Street Map, Crisil Intelligence

2.2 Overview of Key Influence Area

The project road entirely falls in the state of Haryana. A brief description of key influencing district around the project section is presented below.

Delhi district Profile

Delhi is in the northern part of the country and was made a Union Territory in 1956. With the enactment of the National Capital Territory Act, 1991, it got a Legislative Assembly. Delhi is the capital of India and a major metropolitan city. It is the center of international politics and trade in India. At current prices, the advance estimate of the Gross State Domestic Product (GSDP) of Delhi stood at Rs 10.4 trillion in fiscal 2023 registering a growth of over 15% compared to fiscal 2022.

In terms of economic composition, Delhi's predominant sector is the Service Sector, contributing significantly to the Gross State Value Added (at current prices) with a substantial share of 84.8% in the fiscal year 2022-23. The bulk of Delhi's population is engaged in trade, finance, public administration, and professional services. Following this, the Secondary Sector contributed 12.5%, and the Primary Sector contributed 2.6%. This distribution underscores the city's reliance on the service-oriented aspects of its economy.

Delhi's Per Capita Income, calculated at current prices for the year 2022-23, stands at ₹444,768, reflecting a noteworthy growth of 14.2% compared to the previous fiscal year (2021-22) when it was ₹389,529. It is worth noting that Delhi's Per Capita Income consistently maintains a ratio of approximately 2.6 times higher than the national average, both at current and constant prices. This consistent margin underscores the city's economic prosperity in comparison to the broader national context.

National capital region (NCR) Profile

The National Capital Region (NCR) is a unique example of inter-state regional planning and development for a region with Delhi, the national capital, as its core. The NCR at present includes NCT-Delhi and a few districts from three adjoining states - 14 districts of Haryana, eight districts of Uttar Pradesh and two districts of Rajasthan. The NCR is the largest dry-port and largest logistics hub for the entire North India, which is largely landlocked. The region is the principal international gateway for three Union Territories (Delhi, J&K and Ladakh) and five states (UP, Rajasthan, HP, Punjab and Haryana). The NCR contributes a substantial about 8% to the national GDP. This is the only region in the country and among the few in the world, where Metro rail, rapid rail and several expressways are available for mass mobility serving the regional economy.

- ***Gautam Budha Nagar:*** Gautam Buddha Nagar holds the crown of both largest and wealthiest district in Uttar Pradesh. In the fiscal year 2023 (FY23), its gross district domestic product (GDDP) reached Rs 1 trillion, contributing to 10% of the state's GDP.The district's economic engine continues to be driven by the manufacturing sector, which holds a commanding 45% share of the GDDP in FY23. Following closely behind is the construction sector, contributing a solid 22%. Gautam Buddha Nagar district has an area of 1,442 sq km and a population of 1.6 million. The district has East Delhi in the north, the Bulandshahr district in east, the Aligarh District south and the Faridabad district in the west. The district lies between the two main rivers of India, the Ganga and Yamuna. The district has three revenue divisions — Sadar, Dadri, and Jewar. There are 423 villages, 102-gram panchayats and six municipalities (Dadri, Bilaspur, Dankaur, Jahangirpur, Jewar and Rabupura).
- ***Ghaziabad:*** Ghaziabad contributes 2.5% to 3.0% to Uttar Pradesh's GDP. It is the eighth largest district in the state. The manufacturing sector constituted ~31% of district GDP, followed by real estate, ownership of dwellings and professional services (~16% collectively). Spanning 1,034 sq km, Ghaziabad is home to 3.4 million people. It has Meerut and Bhagpat in the north, Gautam Buddha Nagar and Bulandshahr in the south, Hapur in the east, and River Yamuna in the west. The district has three revenue divisions — Loni, Modi Nagar and Ghaziabad. It has 266 villages.

Panipat District Profile

Panipat, situated in the northern region of India, is one of the 21 districts in Haryana. The historic town of Panipat serves as the administrative headquarters for the district, which spans an area of 1,268 km². Established on November 1, 1989, Panipat District was carved out from the former Karnal district. The district is organized into two sub-divisions, namely Panipat and Samalkha, each further segmented into three tehsils: Panipat, Samalkha, and Israna. The district is represented in the legislative assembly through four Vidhan Sabha constituencies: Panipat Rural, Panipat City, Israna, and Samalkha.

Panipat, renowned in India as the "City of Weavers" and "Textile City," holds the additional distinction of being labeled the "cast-off capital" for its global prominence in recycling textiles. The city boasts a thriving textile and carpet industry, positioning itself as the largest hub for quality blankets and carpets in India, with a notable presence of hand loom weaving. Notably, Panipat stands as the world's primary center for "shoddy yarn" production, underlining its global significance in this textile category. In addition to its textile prowess, Panipat is recognized for the Samalkha subdivision, which has gained prominence for its foundry of agricultural instruments.

Tourism influence

In addition, The Haryana Tourism Corporation (HTC) has set up 43 tourist complexes named after birds along the highways that pass through the state. These are extremely popular among tourists. Some of the complexes adjoin heritage sites, lakes, bird sanctuaries and golf courses.

HTC has created 21 tourism hubs. They are in Ambala, Bhiwani Faridabad, Fatehabad, Gurgaon, Hisar, Jhajjar, Jind, Kaithal, Karnal, Kurukshetra, Panchkula, Sirsa, Sonipat, Panipat, Rewari, Rohtak, Yamunanagar, Palwal and Mahendergarh. Haryana is part of the planned Mahabharata and Krishna tourism development circuit by the central and state governments

3. Primary Data Collection & Analysis

3.1 General

Primary traffic surveys, i.e. Origin Destination surveys, were collected on the project road to understand the traffic and travel pattern of vehicles plying on the project road.

For the present study one day destination survey conducted at the toll plaza's location on the project road. The schedule of the traffic surveys carried out as part of the study on the project road are given in **Table 3-1.**

Table 3-1: Type of Survey & Schedule

Location	Chainage	OD Survey
Bhagan Toll Plaza	53+600 km	29th January-2025

Source: Crisil Intelligence

The vehicle classification and their PCU values as suggested in IRC: 64-1990 are presented in **Table 3-2.**

Table 3-2: PCU Factors-IRC:64-1990

Mode	PCU
Car/Jeep	1.0
Two-Wheeler	0.5
Three-Wheeler	1.0
Minibus/School Bus	1.5
Bus (Govt/Pvt)	3.0
Mini LCV	1.0
LCV	1.5
2-Axle	3.0
3-Axle	3.0
MAV (4-6 Axles)	4.5
HME/OSV	4.5
Agricultural Tractor	1.5
Agricultural Tractor with Trailer	4.5
Cycle	0.5
Cycle Rickshaw	2.0
Animal Drawn Crat	6.0

Source: IRC:64-1990

3.2 Origin-Destination (OD) and Commodity Analysis

Origin-Destination survey was carried out at the toll plaza location, by roadside interview method as described in IRC: 102-1988. A random sampling approach was employed to interview both passenger and freight vehicles

traversing the project road at the toll plaza locations. The survey aimed to gather information on various aspects, including origin, destination, frequency of trips, purpose of travel and freight vehicles, and the type of commodity being transported.

The sample size captured at all three-toll plaza's location during the O-D survey exercise on a random sample basis is presented in **Table 3-3.**

Table 3-3: Sample Size

Particulars	CJV	Bus	LCV/2A	3A	MAV	Total
Sample	14,888	2,080	5,981	1,578	3,239	27,766
MIS Data (OD day)	52,535	2,087	8,264	1,642	4,759	69,287
Percentage (%)	**28.3%**	**99.7%**	**72.4%**	**96.1%**	**68.1%**	**40.1%**

Source: Primary survey, Crisil Intelligence

The regional distribution of tollable vehicles at the toll plaza locations has been estimated based on OD matrices is presented **below. The** project influencing states will provide an overview of the factors likely to influence the pattern of economic development and hence the flows and volumes of traffic on the project road**.**

Table 3-4: Regional Distribution in %

States	CJV	LCV	Bus	2A	3A	MAV
Haryana	66.5%	63.3%	60.3%	63.8%	63.4%	60.4%
Uttar Pradesh	3.3%	3.9%	3.8%	4.6%	3.7%	3.5%
Delhi	21.2%	21.7%	26.1%	19.6%	18.7%	16.6%
Punjab	3.6%	4.7%	3.5%	4.7%	4.7%	5.3%
Jammu & Kashmir	0.5%	1.1%	0.5%	1.0%	1.2%	1.2%
Himachal Pradesh	2.0%	2.2%	2.2%	2.5%	2.1%	2.3%
Rajasthan	1.5%	1.5%	1.2%	1.0%	1.4%	1.5%
Madhya Pradesh	1.3%	1.7%	2.3%	2.1%	2.7%	2.3%
Gujarat	0.0%	0.0%	0.1%	0.4%	0.4%	0.5%
Maharashtra	0.0%	0.0%	0.0%	0.2%	1.0%	1.3%
Rest of India	0.0%	0.0%	0.0%	0.0%	0.8%	5.2%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: Primary survey, Crisil Intelligence

Passenger Traffic

- ***CJV Traffic Contribution:***
    - **Haryana** is a major contributor, accounting for 66.5 percent followed by Delhi which accounts to 21.2 percent.

- In addition, Punjab and Uttar Pradesh also accounts to about 3.6 percent and 3.3 percent respectively

- ***Bus Traffic Contribution:***
  - **Similar to CJV traffic. In case of Buses, Haryana** is a major contributor, accounting for 66.5 percent followed by Delhi which accounts to 21.2 percent. In addition, Punjab and Uttar Pradesh also accounts to about 3.6 percent and 3.3 percent respectively
- ***Key Origin-Destination (OD) Pairs for Car and Bus Traffic:***
  - **CJV:** Panipat to Sonipat accounting for 12 percent of total trips followed by Panipat to North Delhi accounting to 6 percent of total trips.
  - **Buses**: Panipat to Sonipat and Panipat to North Delhi account to about 8 percent each. Followed by Panipat to West Delhi accounted to about 4 percent.

Freight Traffic

- ***2-Axle (2A) Freight Traffic Contribution:***
  - **Haryana** is a major contributor, accounting for 63.8 percent followed by Delhi which accounts to 19.6 percent.
  - In addition, Punjab and Uttar Pradesh also accounts to about 4.7 percent and 4.6 percent respectively. Followed by Himachal which accounts for 2.7 percent.
- ***3-Axle (3A) and MAV Freight Traffic Contribution:***
  - **State influence share for 3A is similar to 2Axle trucks.**
  - **In case for MAV, Haryana** is a major contributor, accounting for 60.4 percent followed by Delhi which accounts to 16.6 percent.
  - In addition, Punjab and Uttar Pradesh also accounts to about 5.3 percent and 3.5 percent respectively. Followed by Himachal which accounts for 2.3 percent.
- ***Key Origin-Destination (OD) Pairs for 3A and MAV***
  - **3A:** Panipat to Sonipat accounting for 11 percent of total trips followed by Panipat to North Delhi accounting to 5 percent of total trips.
  - **MAV:** Panipat to Sonipat accounting for 9 percent of total trips followed by Panipat to North Delhi accounting to 6 percent of total trips.

Mode wise TOP OD pairs for all the toll plazas is presented in Annexure.

3.3 Commodity Analysis & Distribution

Analysis was carried out to understand the various freight vehicles being used to transport different commodities.

- The analysis of freight movement across the toll plazas reveals that the major commodities being transported include Agri produce, consumer foods & products, courier & parcels, iron & steel products, construction materials and automobiles.
- In addition, significant portion of vehicles, specifically 20 percent of two axle trucks, about 22 percent of three axle trucks and around 17 percent of MAV (4-6) trucks are engaged in the transportation of Agri produce. Especially rice, wheat and vegetables across the vehicle categories. It is to be noted that Azadpur mandi is close proximity to the project road section which influences these commodity movement for the demand and consumption centers across the project influence area.
- A significant portion of vehicles, specifically 3 percent of two axle trucks, about 5 percent of three axle trucks and around 6 percent of MAV (4-6) trucks are engaged in the transportation of automobile (new cars and bikes) and automobile parts across the toll plaza.
- In addition, about 10 percent of two axle trucks, around 7 percent of three axle trucks and around 11 percent of MAV (4-6) trucks at the toll plaza location are found to carry couriers and parcels which can be attributed to increasing e-commerce demand and close proximity to Delhi NCR region.
- Moreover, significant share of MAV (4-6) trucks around 12 percent at toll plaza location are engaged in transporting iron and steel products. This is linked to the presence of an iron and steel manufacturing plant at Koppal. The distribution of these commodities underscores the industrial and commercial linkages between the regions served by this toll plaza.
- Three axle and MAV (4-6) trucks accounting to about 7.2 percent and 5,1 percent respectively were found to be transporting construction material at the toll plaza location. This construction material largely constitutes marble, granite and stones which are for real state and commercial development across the project influence areas.
- Also, across all modes accounting 8-10 percent are found to be transporting consumer goods and products at the toll plaza locations.

Table 3-5 presents the commodity distribution at Bhagan toll plaza

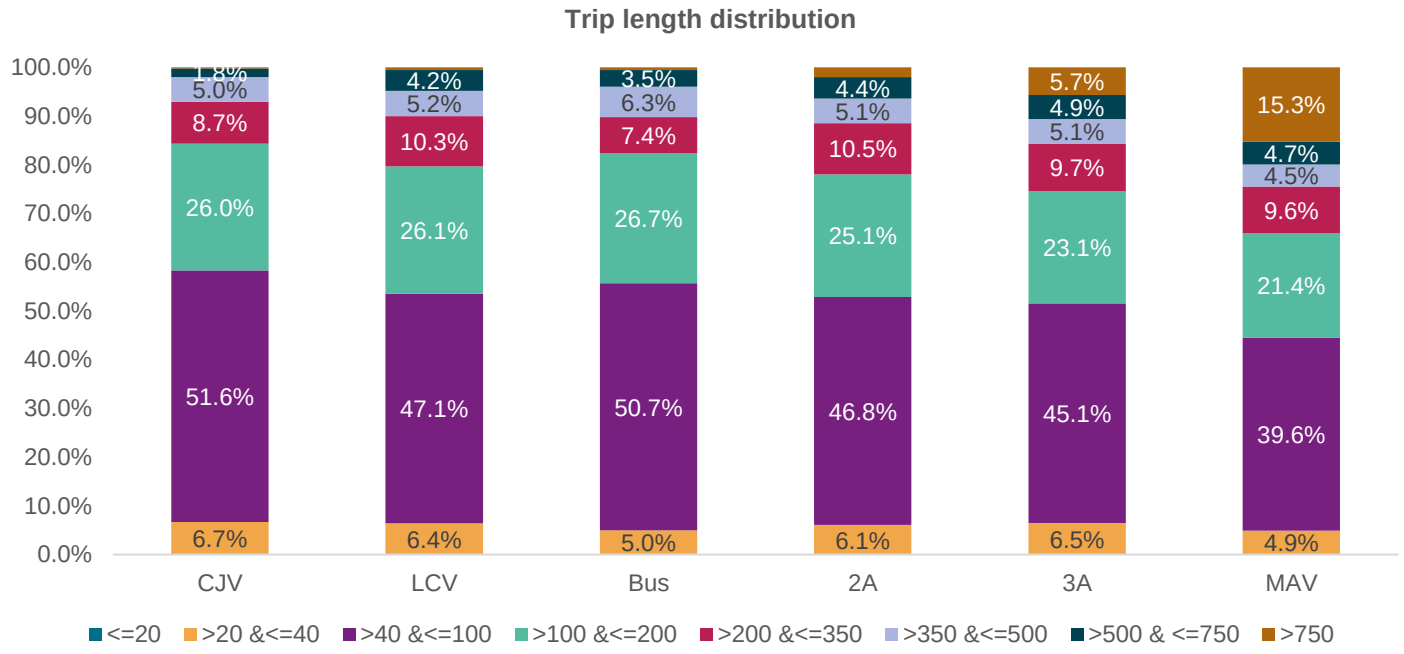
Table 3-5: Commodity Distribution (in %) at Bhagan TP

Commodity	LCV	2-Axle	3-Axle	MAV	LCV	2-Axle	3-Axle	MAV	LCV	2-Axle	3-Axle	MAV
Direction	Both Direction				Panipat-Delhi				Delhi-Panipat			
Agri Produce	19.2%	19.8%	22.3%	16.9%	19.4%	19.4%	23.3%	17.3%	18.9%	20.3%	21.3%	16.6%
Automobiles	0.8%	2.8%	4.8%	5.7%	0.8%	3.3%	4.4%	5.3%	0.9%	2.3%	5.1%	6.0%
Chemical products	1.1%	3.2%	3.8%	4.5%	1.2%	2.8%	4.5%	3.5%	0.9%	3.6%	3.1%	5.6%
Coal	0.1%	0.0%	0.0%	0.3%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.6%
Construction materials	4.4%	3.9%	7.2%	5.1%	4.5%	3.8%	7.1%	5.2%	4.3%	4.1%	7.4%	5.0%
Consumer Foods	11.5%	9.4%	7.4%	7.3%	11.3%	8.5%	8.0%	7.4%	11.8%	10.3%	6.7%	7.1%
Consumer Products	2.0%	1.1%	0.0%	0.0%	2.2%	1.2%	0.0%	0.0%	1.8%	1.1%	0.0%	0.0%
Container	0.8%	2.7%	2.5%	1.9%	0.9%	2.6%	2.2%	1.6%	0.6%	2.8%	2.7%	2.2%
Courier & parcel	15.9%	10.7%	6.9%	11.0%	15.5%	11.7%	6.8%	10.6%	16.4%	9.8%	7.0%	11.3%
Iron & Steel Products	8.9%	7.9%	11.5%	12.0%	9.0%	7.3%	11.7%	12.0%	8.7%	8.6%	11.2%	11.9%
Machinery	2.6%	3.8%	3.5%	4.9%	3.0%	4.5%	3.7%	4.7%	2.2%	3.1%	3.4%	5.1%
Milk & Animal Food	1.0%	1.1%	0.4%	0.2%	0.7%	1.3%	0.3%	0.1%	1.3%	0.9%	0.5%	0.3%
Others	4.1%	5.6%	5.1%	6.5%	4.0%	5.5%	5.0%	7.4%	4.1%	5.7%	5.1%	5.6%
Paper products	0.9%	1.2%	1.1%	1.0%	0.7%	1.1%	0.9%	1.0%	1.1%	1.3%	1.2%	0.9%
Petroleum Products	0.9%	3.9%	3.4%	4.5%	0.8%	4.2%	3.6%	3.7%	1.0%	3.5%	3.1%	5.3%
Pharmaceuticals	0.7%	1.5%	1.3%	2.0%	0.6%	1.4%	0.8%	2.0%	0.9%	1.6%	1.7%	2.0%
Plastic products	4.7%	5.4%	4.3%	4.8%	4.8%	5.6%	4.6%	4.7%	4.6%	5.3%	4.0%	5.0%
Plywood & Timber	1.2%	1.7%	2.4%	2.1%	1.3%	2.1%	2.3%	2.1%	1.1%	1.3%	2.5%	2.0%
Rubber products	1.1%	1.4%	0.0%	1.0%	1.3%	1.4%	0.0%	0.9%	0.9%	1.4%	0.0%	1.0%
Textile & Footwear	4.5%	4.4%	2.7%	2.1%	4.4%	4.4%	2.8%	2.2%	4.6%	4.4%	2.5%	1.9%
Tiles & Ceramic	1.4%	0.0%	2.5%	1.6%	1.4%	0.0%	2.1%	1.2%	1.3%	0.0%	2.9%	2.0%
Empty	12.3%	8.4%	7.2%	4.7%	11.8%	7.9%	5.8%	6.9%	12.8%	8.9%	8.5%	2.4%
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

3.4 Trip length distribution

Analysis was carried out to understand the trip lengths for all vehicle categories. **Figure 3-1** presents the trip length distribution for all the toll plaza locations.

Figure 3-1: Trip length distribution



Source: Primary survey, Crisil Intelligence

- In case of passenger traffic, CJV and Buses about 50 percent of the trips are between 40 to 100 km which mostly travelling between the towns Kurukshetra, Panipat to Delhi, Gurgaon. In addition, about 9 percent of trips are travelling longer distances between 200 to 300 km range.
- However, in case of MAV both short and long-distance traffic are observed. About 40 percent of the trips between 40 to 100 km and about 16 percent of trips are greater than 750 kms. These short distance trips are catered to industrial and warehouses located along the project section corridor.

4. Review of Historical Traffic & Revenue

4.1 General

This section summarizes the historical performance of the project section in order to understand baseline traffic patterns comprising of historical traffic and revenue growth, traffic and revenue composition, trip distribution, trip factors, seasonality and trend of traffic over the available data set.

The historical traffic and revenue data mode wise was made available by client from April-2022 till March 2025 and is presented in **Table 4-1.**

Table 4-1: Historical Traffic and Revenue data availability

S. No	Toll Plaza	Details
TP01	Bhagan TP	April-2022 to March 2025

Source: Crisil Intelligence

The summary of historic traffic data in terms of PCUs and revenue in millions is presented in **Table 4-2.**

Table 4-2: Past Traffic in PCU and Revenue in millions

FY	PCU	Revenue (millions)
FY23	101,220	3,104.5
FY24	101,241	3,481.4
FY25	**102,131**	3,688.1

Source: MIS data, Crisil Intelligence

4.2 Historical Traffic Analysis

Mode wise historical traffic and composition is presented in **Table 4-3.**

Table 4-3: Historical mode wise traffic and growth

FY	CJV	LCV	Bus	2A	3A	MAV	OSV	PCU
FY23	51,343	3,458	1,865	4,278	1,807	4,621	10	101,220
FY24	53,303	3,186	1,976	4,233	1,584	4,391	4	101,241
FY25	53,922	3,292	2,149	4,351	1,515	4,269	3	102,131
Growth %								
FY 24 vs FY 23	3.8%	-7.9%	6.0%	-1.0%	-12.4%	-5.0%		0.0%
FY 25 vs FY24	1.2%	3.3%	8.7%	2.8%	-4.3%	-2.8%		0.9%

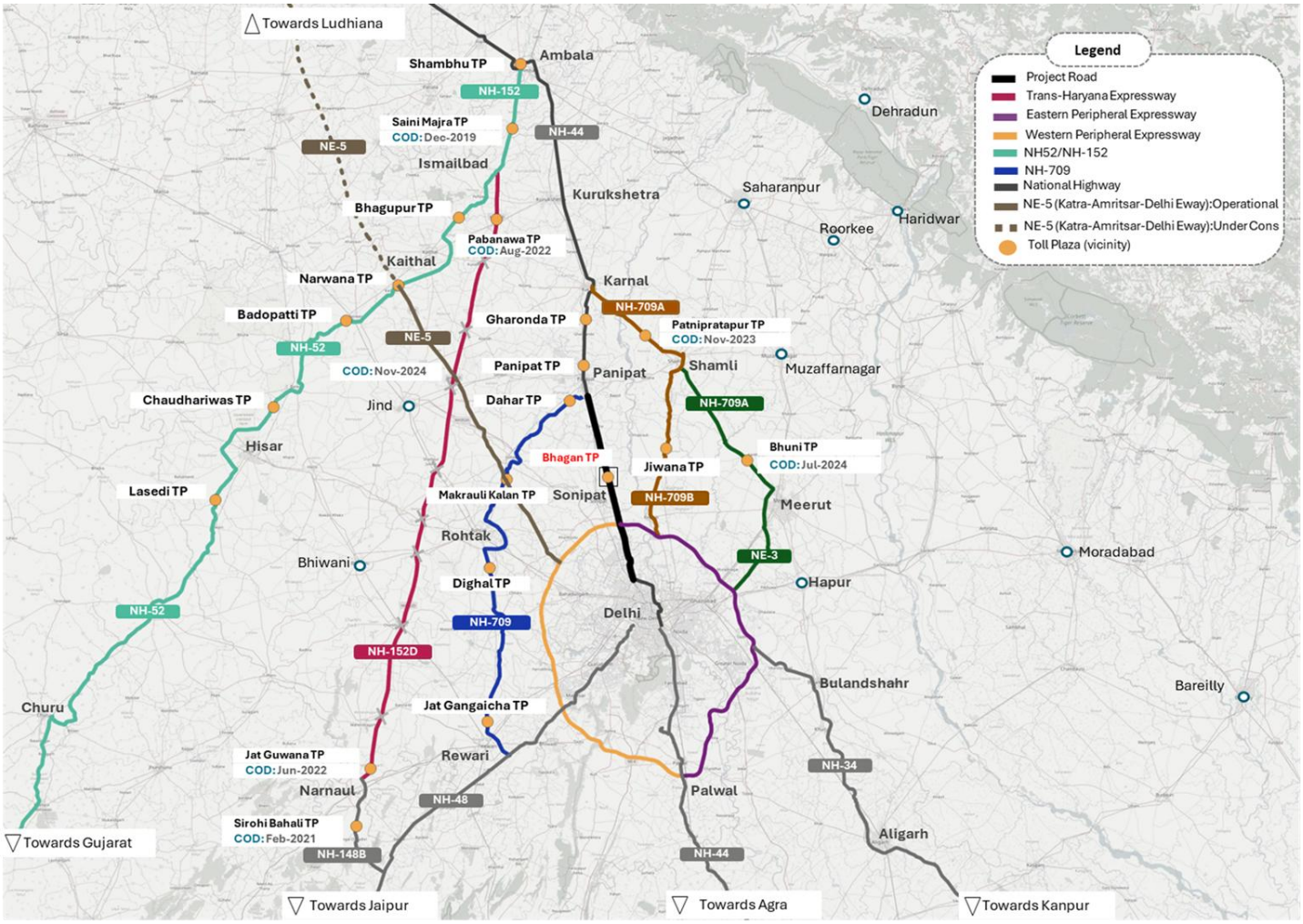
Source: MIS data, Crisil Intelligence

An analysis of traffic trends along the project corridor reveals a marginal overall growth of approximately 0.9% in Passenger Car Units (PCUs) between FY25 and FY24 and almost no growth for the period FY24 vs FY23. This subdued growth is largely attributable to the impact of several major network developments in the surrounding region, which have influenced travel behavior and diverted traffic away from the project road. Notable network development as follows:

- Trans-Haryana Eway (NH-152D)
- Upgradation of Karnal-Shamli-Meerut (NH-709A)
- Shambhu Border diversion (Farmer protest)
- NE-5 opened for traffic
- Reduction of Toll rate for the Rohtak-Panipat section

A schematic representation of these network developments within the project influence area is presented in

Figure 4-1: Network development around the project influence area



Source: Open street map, Crisil Intelligence

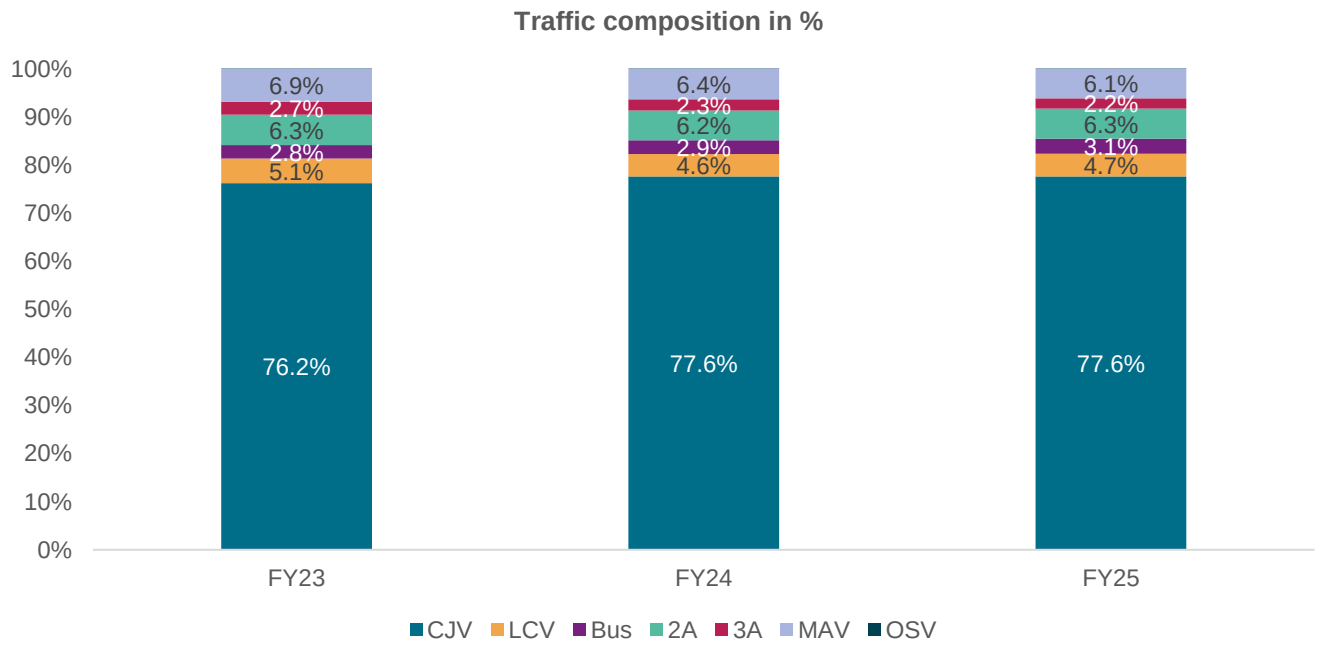
- **Trans-Haryana Expressway (NH-152D)**: Commissioned in August 2022, the Trans-Haryana Expressway has emerged as a crucial alternate route, significantly affecting traffic volumes on the project corridor. The expressway provides a faster and more direct connection for vehicles traveling between Ambala–Ludhiana and onward to Gurugram, Rajasthan, and other southern destinations. By offering improved travel efficiency and reduced congestion, this corridor has diverted a considerable portion of long-distance through traffic away from the project road.
- **Upgradation of Karnal–Shamli Stretch (NH-703A):** The improvement of this stretch Patnipratapur toll plaza (Nov-2023) and Bhuni toll plaza (Jul-2024) have improved travel comfort and reduced travel time, encouraging traffic—especially to/from Karnal and beyond from/to Aligarh/Bulandshahr and beyond
- **Shambhu Border Diversions Due to Farmer Protests**: Periodic protests and associated roadblocks near the Shambhu Border caused traffic diversions, affecting traffic patterns.
- **NE-5: The** completion of the Haryana section of NE-5 in November 2024, in conjunction with the Transharyana expressway, has significantly altered regional connectivity. The upgraded corridor now provides a seamless high-speed route connecting Ambala/ Ludhiana and further north to Gurgaon/Delhi, thereby drawing both passenger and commercial traffic away from the project road.

Overall, these developments have enhanced regional connectivity and travel efficiency but have concurrently reduced the traffic load on the project corridor. The redistribution of long-distance and through-traffic to these newly developed or upgraded roads has suppressed traffic growth on the existing alignment.

4.3 Traffic composition

The traffic composition of the tollable modes as per the MIS data is presented in

Figure 4-2: Traffic Composition Share (%)



Source: MIS data, Crisil Intelligence

4.4 Traffic Segmentation %

Mode wise traffic ticket segmentation in % for full FY24 and FY25 is presented in **Table 4-4.**

Table 4-4: Historical mode wise traffic segmentation in %

Mode	CJV	LCV	Bus	2A	3A	MAV	OSV
FY25							
Single	34.0%	36.5%	14.5%	60.1%	67.2%	62.0%	93.0%
Return	49.4%	60.9%	81.5%	38.8%	32.1%	37.0%	5.9%
Local Commercial	0.2%	0.6%	3.5%	0.1%	0.5%	0.7%	0.0%
Local Personal	9.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Monthly Pass	0.1%	1.2%	0.1%	0.1%	0.0%	0.0%	0.0%
Exempt	6.8%	0.9%	0.3%	0.9%	0.2%	0.3%	1.1%
Violation	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
FY24							
Single	33.5%	37.1%	15.1%	59.3%	67.4%	61.2%	80.8%
Return	49.9%	60.0%	84.1%	39.5%	32.1%	37.4%	18.9%
Local Commercial	0.2%	0.5%	0.1%	0.1%	0.4%	1.0%	0.0%
Local Personal	9.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Monthly Pass	0.1%	1.4%	0.4%	0.2%	0.0%	0.1%	0.0%
Exempt	6.9%	1.0%	0.3%	0.8%	0.2%	0.3%	0.2%
Violation	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: MIS data, Crisil Intelligence

- Over the past year, segmentation has remained stable across all vehicle categories. Return trips are particularly prevalent among passenger vehicles, with buses showing the highest numbers.
- The CJV segment features a significant number of return and local personal trips, along with 7% exempted traffic due to its local nature.
- For the goods vehicle categories, single trips are the most common accounting to about 62-65 percent.
- Since the segmentation remains consistent across the financial years. FY25 segmentation is considered for base and for outlook estimation across the vehicle categories.

4.5 Seasonality variations

Mode wise seasonal (monthly) variations analysed for FY25, FY24 & FY23 based on data made available by client and is presented in **Table 4-5**

Table 4-5: Seasonal Variations across vehicle categories

Mode	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
FY25												
CJV	1.01	1.02	0.93	1.08	1.08	1.11	1.03	0.89	0.98	1.00	0.93	0.97
LCV	1.06	0.99	0.96	0.98	1.05	0.98	0.93	1.01	0.99	1.02	1.02	1.04
Bus	1.01	0.95	0.97	1.02	1.09	1.05	1.01	0.93	1.01	1.01	0.97	0.99
2-Axle	1.09	1.03	1.00	0.95	0.98	0.92	0.89	0.99	1.00	1.06	1.06	1.09
3-Axle	1.03	1.01	1.02	1.02	1.02	0.94	0.91	0.97	0.99	1.03	1.02	1.05
MAV (4-6)	1.06	1.06	1.07	1.04	1.09	1.07	0.83	0.83	0.93	1.02	1.02	1.08
FY24												
CJV	1.00	1.00	0.90	1.16	1.07	1.04	0.98	0.91	0.90	0.99	1.12	1.01
LCV	1.01	1.00	0.96	1.02	1.04	0.97	0.90	0.99	0.99	1.06	1.07	1.03
Bus	1.01	0.95	0.93	1.04	1.08	1.05	0.88	0.99	0.95	0.95	1.21	1.05
2-Axle	1.05	1.06	1.04	0.99	1.00	0.94	0.88	0.95	0.92	1.06	1.10	1.06
3-Axle	0.98	0.99	1.01	0.98	1.02	0.97	0.90	0.96	0.97	1.09	1.12	1.05
MAV (4-6)	1.10	1.11	1.11	1.04	1.05	0.96	0.80	0.82	0.88	1.09	1.11	1.09
FY23												
CJV	1.00	0.99	0.95	1.08	1.06	1.13	1.03	0.97	0.93	0.98	0.93	0.98
LCV	0.94	0.94	0.94	0.95	1.02	0.97	1.04	0.96	1.02	1.11	1.06	1.10
Bus	1.02	0.93	0.98	1.02	1.09	1.08	1.02	0.92	0.98	0.99	0.99	1.00
2-Axle	1.09	1.10	1.04	0.96	0.97	0.90	0.96	0.90	0.94	1.10	1.06	1.07
3-Axle	0.98	1.00	1.01	0.99	1.01	0.95	0.94	0.91	1.00	1.13	1.03	1.09
MAV (4-6)	1.04	1.05	1.00	1.01	1.07	1.07	1.01	0.80	0.93	1.02	1.01	1.08

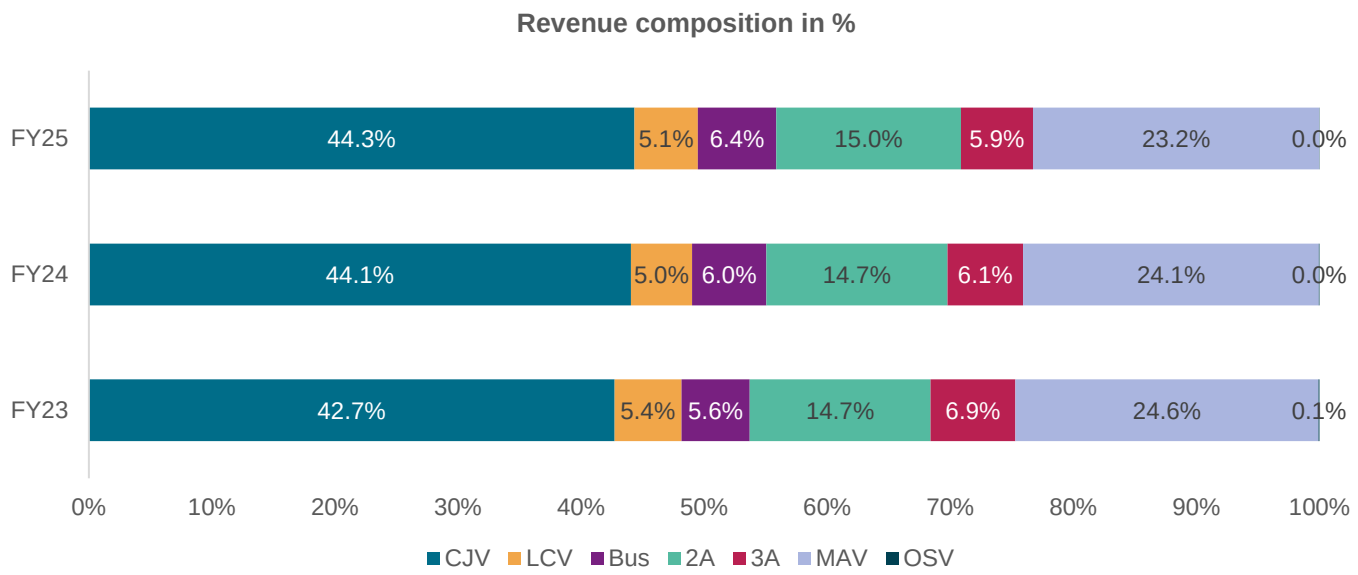
Source: MIS data, Crisil Intelligence

- Passenger traffic, especially CJV, are higher in the month of May at the toll plaza owing to vacation period. And also, during November and December due to major festivals across the nation.
- July, August and September are lower across all categories of vehicles due to monsoon season at the toll plaza location.
- In the case of freight vehicles (2A,3A and MAV) highest traffic were observed during the period October/November to December at the toll plaza location.
- Also, it is to be noted that the network development across the three financial years might have an impact on seasonality variation as presented above.

4.6 Revenue Composition Share in %

The highest revenue is generated from CJV accounting to about 44 percent followed by MAV accounts to about 24 percent. In addition, 2A and 3Axle combined also accounts to about 20 percent of the total revenue on the project section.

Figure 4-3: Revenue Composition Share (%) at toll plaza



Source: MIS data, Crisil Intelligence

4.7 Historical Total Revenue

Table 4-6: Historical Revenue in Million

FY	Revenue (millions)
FY23	3,104.5
FY24	3,481.4
FY25	3,688.1

Source: MIS data, Crisil Intelligence

FY25 total project section revenue accounts to about to about 3,688.1.

5. Network and Industrial Development in the Region

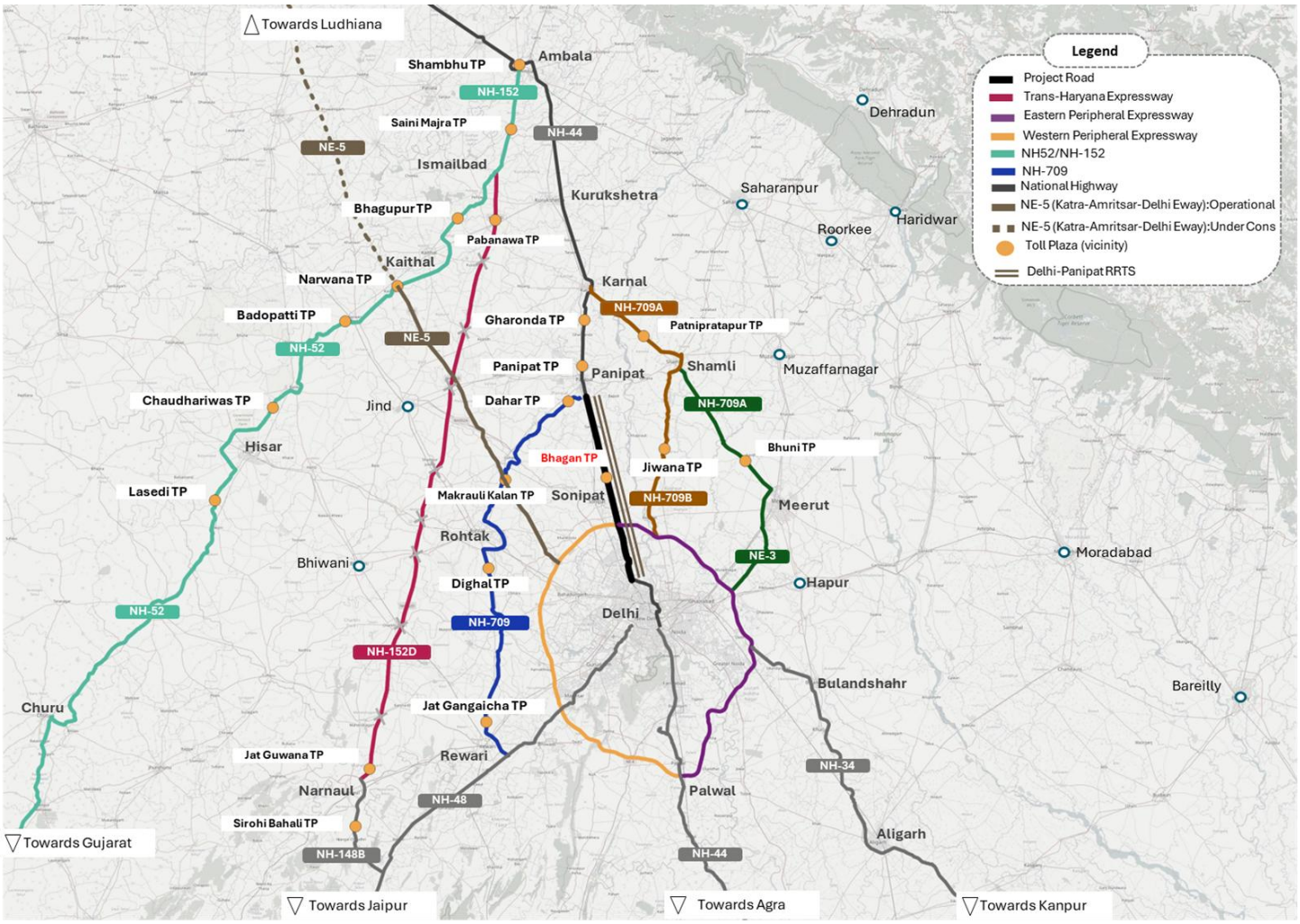
5.1 Network Development

In the case of the project road, there are no short distance alternate routes available that will impact the traffic on the project road. However, two new network developments in the project influence area may impact on the traffic on the project section:

- NE-5: Delhi-Amritsar- Katra Expressway
- Delhi -Panipat RRTS

In addition to above developments, Impact of Sambhu border opening is also envisaged.

Figure 5-1: Network development in the region



Source: Open street map, Crisil Intelligence

The details of the development in term of milestone, expected completion date and possible impact to project road traffic is presented in **Table 5-1**

Table 5-1: Details of Network Development and Possible impact

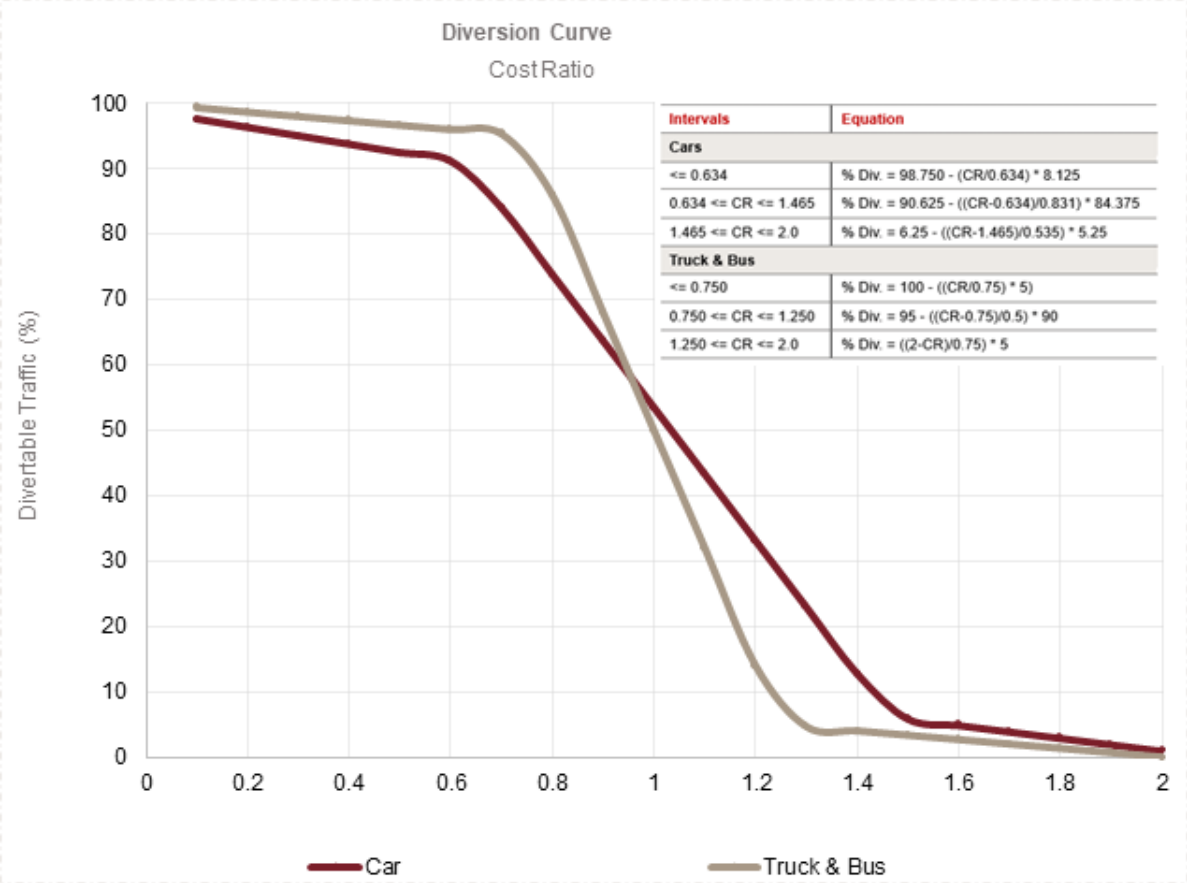
S. No	Details of Development	Milestone/Completion	Possible Impact
1	**Delhi-Amritsar-Katra Eway** • 650 km long • 4 Lane brownfield/greenfield access-controlled passes through the state of Haryana, Punjab and Jammu • NHAI, under Bharatmala Pariyojana Phase-2	**Haryana section:** The section traversing through Haryana (NE-5) is operational from November-2024 **Punjab section:** Punjab section facing land acquisition issue due to farmers protest and some portion in under construction Jammu section: The section under Jammu is under construction and nearing completion.	The full section operational is expected by 2026 as per information available in public domain. However, the section falling under Haryana opened for traffic from November 2024 which will be impacting the traffic on the project section. The traffic will be impacted for the pair travelling to/from Punjab & beyond to Gurgaon & beyond. It is to be noted that the traffic as mentioned has already shifted to Transharyana Eway. On account of that only the residual traffic will get redistributed during FY26 onwards and will be negative for the project section
2	**Delhi-Panipat RRTS** The project has been approved by the Haryana government and is waiting for the approval of the central government. Initially the project was envisaged from Sarai Kale Khan in Delhi to Panipat, but the Haryana government decided to extend the line to Karnal adding 25 kms to the total length of the project to the 103 km line.	Delhi – Panipat RRTS' DPR (Detailed Project Report) was approved by Haryana Government's Cabinet in December 2020, and is currently awaiting approval from the Delhi and Central governments Completion: Expected operational from FY30	Passenger traffic, i.e. CJV and Buses that are either originating or destined between Delhi and Panipat have been considered as a part of the estimation of impact. RRTS will have negative impact on the project section

Source: CRISIL MI&A Consulting

5.2 Approach and Methodology for Diversion Analysis

The assessment of traffic diversion if any away from the project road has been done using cost ratio analysis. The road user cost is estimated based on the vehicle operating cost (VOC) and Value of time (VOT) as mentioned in IRC: SP30-2019. Using the generalized cost (VOC+VOT+Toll rates) for the project road and alternate/proposed route cost ratio is estimated using the diversion curve using the binary logit method, which computes the expected diversion percentage based on the perceived cost on the existing and alternate/proposed facility. The diversion percentages are then applied on the in-scope traffic derived from the OD analysis to estimate the traffic that would shift to/from the project road. Diversion curve (equation) mentioned in IRC:108-2015 and is presented in **Figure 5-2**

Figure 5-2: Diversion curve as per IRC:108-2015



Intervals	Equation
Cars	
<= 0.634	% Div. = 98.750 - (CR/0.634) * 8.125
0.634 <= CR <= 1.465	% Div. = 90.625 - ((CR-0.634)/0.831) * 84.375
1.465 <= CR <= 2.0	% Div. = 6.25 - ((CR-1.465)/0.535) * 5.25
Truck & Bus	
<= 0.750	% Div. = 100 - ((CR/0.75) * 5)
0.750 <= CR <= 1.250	% Div. = 95 - ((CR-0.75)/0.5) * 90
1.250 <= CR <= 2.0	% Div. = ((2-CR)/0.75) * 5

Source: IRC :SP30-2019, Crisil Intelligence

5.3 Impact of Delhi-Amritsar-Katra Expressway

The Delhi–Amritsar–Katra Expressway is an approved infrastructure project spanning 670 km (420 mi) with a 4-lane configuration, expandable to 8 lanes. This controlled-access expressway will connect the Bahadurgarh border near Delhi to Katra in Jammu and Kashmir, traversing through Haryana and Punjab. Additionally, a spur section will link Nakodar to the Sri Guru Ram Das Ji International Airport in Amritsar.

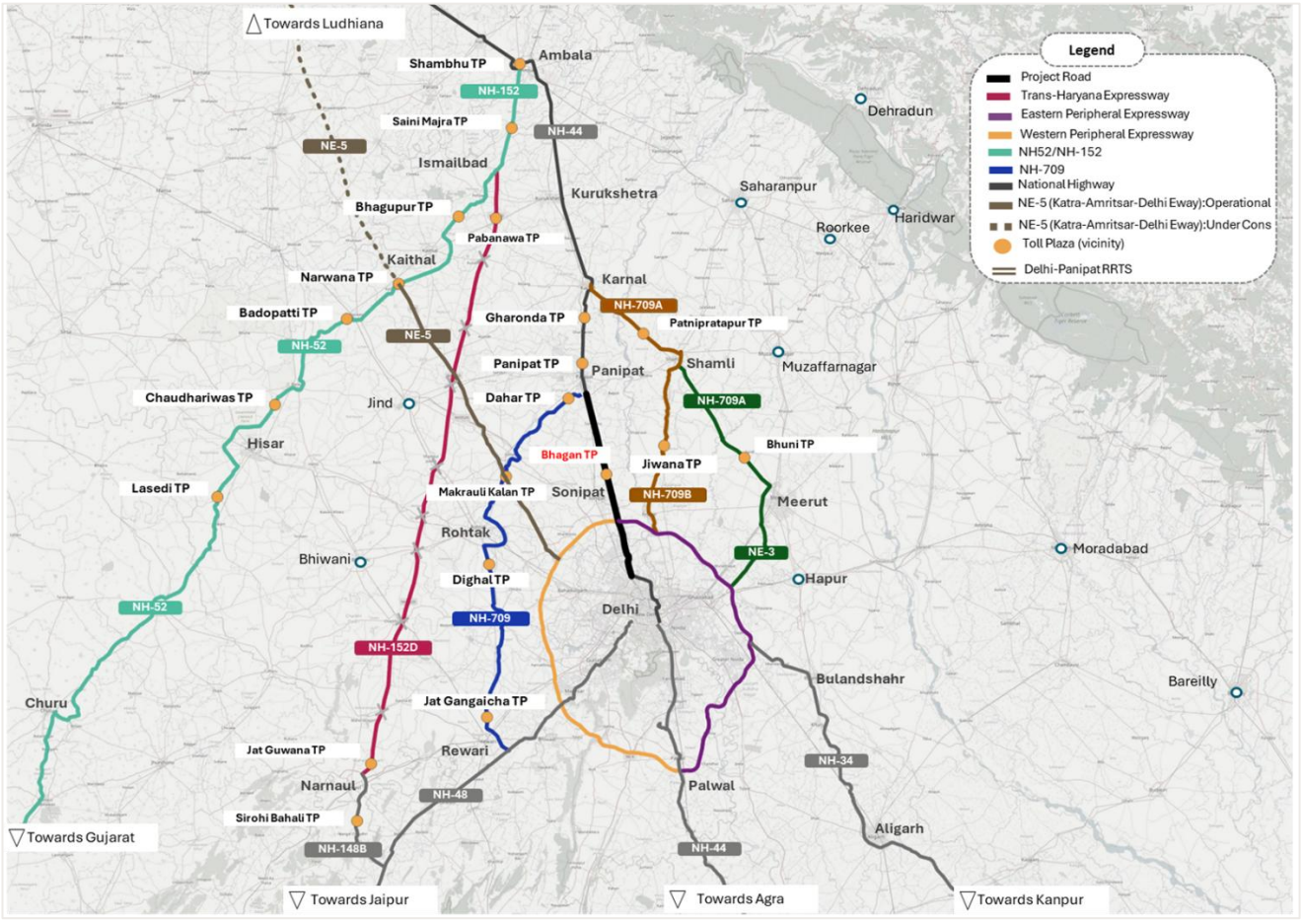
The expressway comprises two main sections: the 397.7 km (247.1 mi) Delhi–Katra segment, designated as National Expressway 5 (NE-5), and the 99 km (62 mi) Nakodar-Amritsar segment, designated as National Expressway 5A (NE-5A). Upon completion, the expressway will significantly reduce the travel distance between Delhi and Katra from 727 km (452 mi) to 588 km (365 mi), and the travel time from 14 hours to 6 hours. Similarly, the distance between Delhi and Amritsar will be reduced to 405 km (252 mi), with travel time decreasing from 8 hours to 4 hours.

This project integrates both greenfield and brownfield segments, passing through key regions in Haryana, Punjab, Jammu and Kashmir. It originates from the Kundli Manesar Palwal (KMP) Expressway near Nilauthi village in Jhajjar district and aims to alleviate traffic congestion on the Grand Trunk Road.

The National Highways Authority of India (NHAI) has divided the construction into two phases, comprising a total of 21 packages. Phase 1 involves the construction of a 397.7 km greenfield expressway from Delhi to Gurdaspur, including a 99 km spur to Amritsar. Phase 2 will extend from Gurdaspur to Katra, involving the brownfield expansion of the existing NH-54 and NH-44 highways.

The alignment of the expressway and the project section is presented in **Figure 5-3.**

Figure 5-3: Alignment of Delhi-Amritsar-Katra Eway and Project Road



Source: Open Street Map, Crisil Intelligence

The completion of the full section of the expressway is expected to impact traffic travelling between Ambala/Ludhiana and beyond and Gurgaon/Rajasthan & beyond. However, it is important to note that a significant portion of this potential traffic has already begun using the Trans-Haryana Expressway (NH-152D) since August 2022.

To understand this shift, an assessment was conducted using origin-destination (OD) data available at the time the expressway had recently opened. This analysis was based on a cost-based approach to evaluate the potential traffic likely to divert to the new corridor.

In the current study, this analysis has been updated by comparing the earlier projected potential traffic with the present potential traffic captured during recent surveys (2025). The objective was to assess the extent of diversion that has already occurred and identify any residual impact yet to materialize.

The findings indicate that a significant portion of the potential traffic identified in the earlier OD-based assessment has already shifted to the Trans-Haryana Expressway. This is particularly evident in categories such as Cars, Buses, and Two-Axle Trucks (2A) and Three-Axle Trucks, where the diversion has largely stabilized.

However, for Light Commercial Vehicles (LCVs) and Multi-Axle Vehicles (MAVs), a residual impact is still anticipated. These vehicle categories show marginal shortfalls or further potential for diversion, suggesting that the full impact on these segments is likely to be realized upon the partial opening (November 2024) of NE-5 in the Haryana section.
The assessment of diversion from the project road is presented in **Table 5-2**

Table 5-2: Diverted Traffic-Delhi-Amritsar-Katra Expressway

Particulars	LCV	MAV (4-6)
Diverted Traffic	2.1%	1.5%

Source: Crisil Intelligence

The residual impact has been considered from FY26 onwards.

5.4 Impact of Delhi-Panipat RRTS

The envisaged Delhi-Panipat Regional Rapid Transit System (RRTS) Line spans 103 km, proposing a semi-high-speed rail connection from Delhi to Sonipat and Panipat, employing tunnels and elevated viaducts. This route links Sarai Kale Khan in Delhi to Panipat, passing through NH44 and connecting key points like Sonipat, Ganaur, and Samalkha in Haryana.

Having secured approval from the state government in December 2020, the Detailed Project Report awaits endorsement from the Delhi and Central governments. The implementation of this project is expected to significantly reduce both distance and travel time for local trips with endpoints falling within the 80 km range. It specifically benefits passenger traffic currently utilizing the existing infrastructure.

In January 2020, the Haryana government planned to extend the line from Panipat to Karnal, approximately 25 km from the Panipat Depot Station. However, the approval for the Detailed Project Report (DPR) is still pending. The OD

zones that have been considered to be impacted due to the commissioning of RRTS are Gurugram, Karnal, Noida, Delhi, Panipat and Sonipat.

Impact assessment is done through the modal split of demand before and after the implementation of the RRTS, along with induced demand from the DPR, is utilized to calculate the traffic shift from the project road to the RRTS. Occupancy factors and the potential traffic between Delhi and Panipat are derived from the OD data. By analyzing the expected percentage shift to the RRTS from our assets and the occupancy factors obtained from the DPR and OD data, the impact is assessed. Also, while estimating the impact for buses careful attention has been given on the nature of buses such as pvt and govt, flexibility, fare and accessibility as compared to RRTS.

Table 5-3: Diverted Traffic-Delhi-Panipat RRTS

Particulars	Car	Bus
Diverted Traffic	6.2%	11.1%

Source: Crisil Intelligence

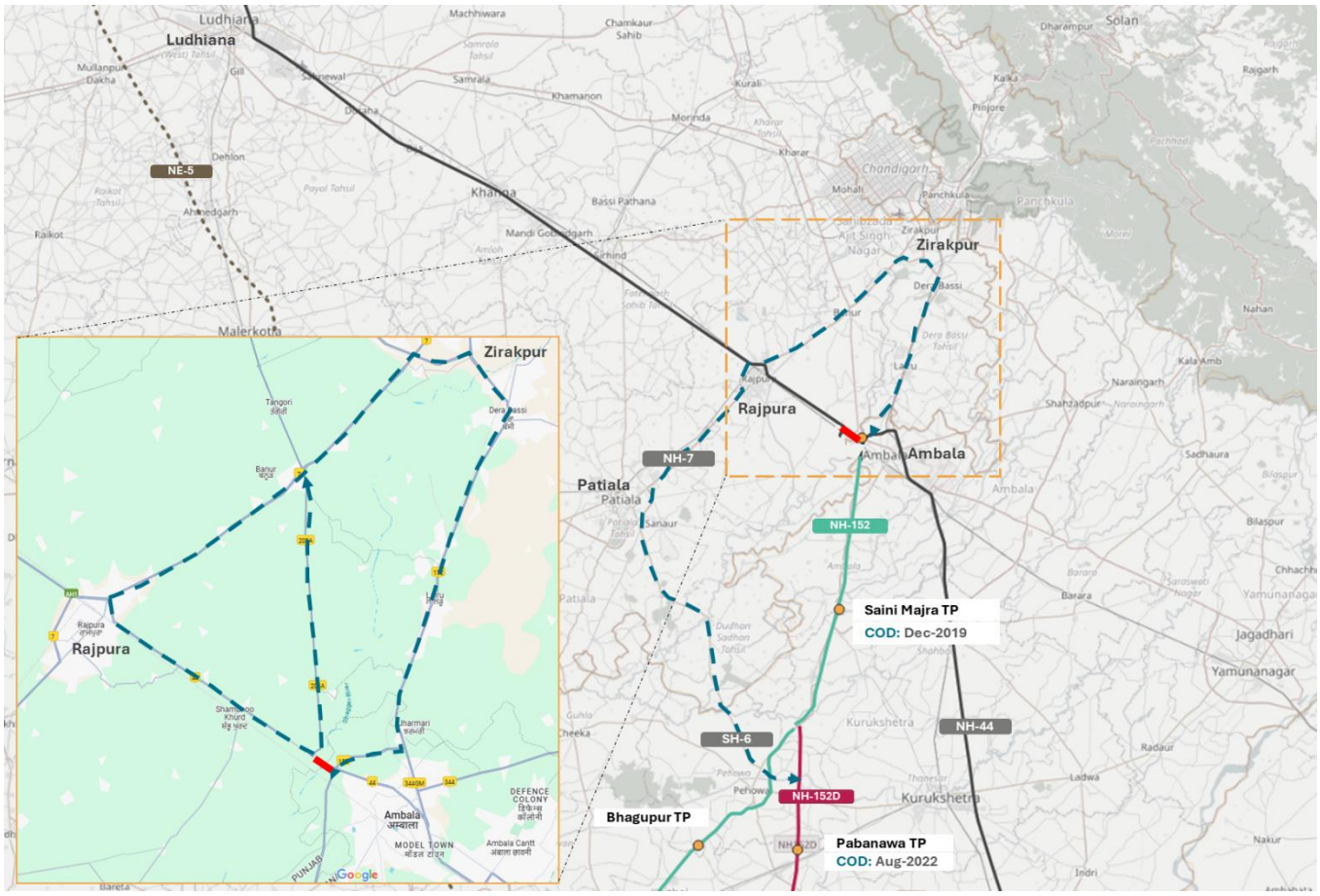
The operation of Delhi-Panipat RRTS may result in a loss of about 6.2 percent of Cars and about 11.1 percent of buses. The diverted traffic has been grown appropriately till FY30 and considered from FY30 in a base case at the toll plaza in a phased manner -25 percent in FY30, 50 percent in FY31, 75 percent in FY32 and 100 percent in FY33.

5.5 Impact of Sambhu border opening

The Shambhu Border, situated on NH-44 near the Punjab-Haryana boundary, has long served as a vital arterial link for traffic connecting Delhi/NCR and Haryana to key urban centers in Punjab such as Ludhiana and Amritsar. During the prolonged period of farmer protests, this border point was completely closed (February 2024) to vehicular movement. The full-scale closure of this critical junction disrupted the seamless flow of traffic on NH-44, resulting in widespread diversion, especially for long-haul and inter-state travel.

In the absence of access through Shambhu, a significant portion of through traffic, including passenger vehicles and commercial freight, rerouted through alternative corridors. Among these, the Trans-Haryana Expressway (NH-152D) and other state highways served as preferred alternatives. Additionally, the Zirakpur corridor, already a heavily trafficked arterial road, witnessed a substantial uptick in traffic volumes as diverted vehicles sought alternate ingress into Punjab.

Figure 5-4: Traffic diversion due Punjab/Haryana border closer



Source: Crisil Intelligence

This situation persisted until 21 March 2025, post which the Shambhu Border was fully reopened, reinstating direct and unhindered traffic flow along NH-44. Following the reopening, a notable reversion of traffic patterns began to emerge, especially in favor of NH-44, given its historically preferred alignment for regional and inter-state passenger traffic.

To objectively assess the impact of this development, the consultant evaluated traffic patterns using two key methods:

1. Day-to-day traffic trend data shared by the client for the post-reopening period; and
2. Origin-Destination (OD) pair comparison, contrasting findings from earlier surveys conducted during the closure phase with those from the current study.

This triangulated analysis reveals that the primary beneficiary of the reopened route is for Car traffic, with an anticipated gain of approximately 4.4% in the project road attributable solely by this category.

It is pertinent to note that under normal operating conditions—had the Shambhu Border remained open throughout FY25—the incremental traffic, particularly in the Car segment, would have been reflected in the actual volumes for that year. To ensure a more accurate representation of FY25, traffic volumes have been appropriately adjusted to account for this deferred yet attributable movement. And this incremental traffic should be closely monitored.

6. Base Traffic Estimation

6.1 Base Traffic Estimation

Traffic volumes on roads varies throughout the year, influenced by socio-economic activities in the surrounding regions. To accurately estimate the Annual Average Daily Traffic (AADT) for the road, it is crucial to account for these seasonal variations.

Traffic data from April 2022 to March 2025 was made available by the client and forms the basis for base year analysis.

While FY25 traffic data is fully available, it has been adjusted to account for temporary disruption, most notably the closure of the Shambhu Border—which are discussed in detail in the preceding section (5.5). Adjustments were made to reflect latent effect, particularly in Car traffic, ensuring that the FY25 base is representative of normalised conditions. All future projections are built upon adjusted FY25 base. The AADT for FY25 is presented **Table 6-1**

Table 6-1: AADT -FY25

Particulars	CJV	LCV	Bus	2-Axle	3-Axle	MAV (4-6)	OSV	PCU
PCUs	*1*	*1.5*	*3*	*3*	*3*	*4.5*	*4.5*	
FY 25 - AADT	53,922	3,292	2,149	4,351	1,515	4,269	3	102,131
FY 25 – AADT (Adjusted)	56,283	3,292	2,149	4,351	1,515	4,269	3	104,492

Source: MIS data, Crisil Intelligence

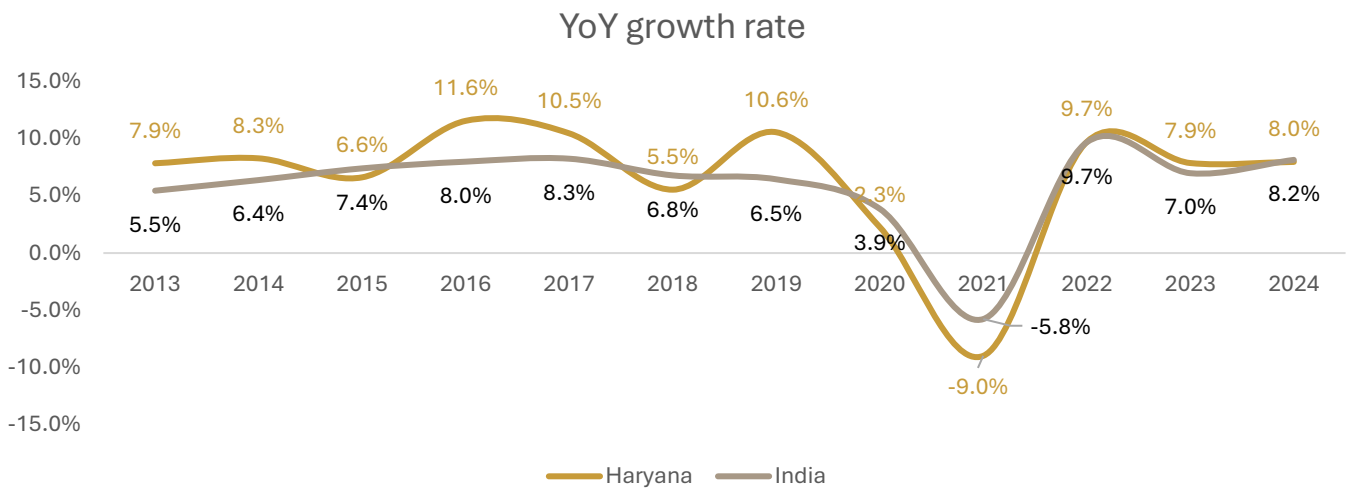
7. Traffic Growth Estimation & Traffic Forecast

7.1 Haryana State Profile

Project section falls entirely in the state of Haryana. A brief socio-economic profile of Haryana is presented in this sub section.

Haryana, with a GSDP of ₹13,263.2 billion in 2022-23, has consistently demonstrated robust economic growth, achieving a compounded annual growth rate (CAGR) of 7.5% from 2011-12 to 2022-23. After experiencing a 2.3% decline in FY21 due to the COVID-19 pandemic, the state's economy rebounded with a 9.8% growth in FY22, underscoring its resilience. The state's per capita income has also shown steady growth, with a CAGR of 6.6% from 2011-12 to 2022-23.

Figure 7-1: YoY Growth Rate of Haryana and India GSDP/GDP at constant price



Source: MoSP, GoI, Crisil Intelligence

The tertiary sector dominates Haryana economy, contributing 44.8% to the GSDP in 2023-24, followed by the secondary sector at 29.2%, and agriculture and allied activities at 14.4%. Sectoral historical performance is presented in **Table 7-3**

Table 7-1: Sectoral Growth-Haryana

Sector	2013-2019	2019-2023	2013-2023
Primary	4.8%	1.8%	3.4%
Secondary	8.7%	3.5%	6.3%
Tertiary	9.0%	4.5%	6.9%

Source: MoSP, GoI, Crisil Intelligence

Primary sectors, which includes agriculture, forestry and fishing, exhibited a steady growth of 4.8 percent during 2013-2019. This growth accelerates to 1.8 percent in the subsequent period of 2019-2024. Over the longer term from 2013-2024, the primary sector CAGR is 3.4 percent.

The secondary sector, comprising industries such as manufacturing, construction and utilities, experienced strong growth of 8.7 percent during 2013-2019. However, this saw a substantial slowdown, with growth dropping to 3.5 percent in the period 2019-2024 reflecting the effect due to covid-19 pandemic.

The subsector indicator growth is presented in **Table 7-2**

Table 7-2: Sub-Sectoral Growth-Haryana

Sub Sector	2013-2019	2019-2023	2013-2023
Crops	8.9%	6.2%	3.5%
Manufacturing	11.2%	6.9%	2.9%
Construction	3.6%	4.4%	5.1%

Source: MoSP, GoI, Crisil Intelligence

Haryana has emerged as a key contributor to India's economic growth, with strong performance across sectors such as automobile manufacturing, agricultural production, textiles, and IT services. The state has witnessed a significant rise in vehicle ownership, industrial output, and infrastructure development, reflecting improved income levels and economic resilience.

The districts of Gurugram, Faridabad, and Panipat are central to Haryana's industrial and economic framework. Gurugram has rapidly transformed into a major IT and financial services hub, hosting multinational corporations and fostering employment opportunities. Faridabad continues to be an important center for manufacturing, while Panipat is well known for its textile exports and petrochemical industries. Additionally, districts such as Hisar and Sonipat are key contributors to Haryana's growing steel, textile, and agricultural machinery exports, enhancing the state's export portfolio.

Tourism in Haryana has also grown steadily, supported by historic and cultural sites such as Kurukshetra, known for its mythological significance, and heritage locations in Pinjore and Panchkula. The state's wellness tourism, golf tourism, and religious circuits have contributed to rising domestic and international footfall, generating local employment and complementing the broader economy.

Haryana's economic landscape is further enriched by its strategic location and seamless connectivity through national highways and freight corridors, especially due to its proximity to the National Capital Region (NCR), which enhances trade and investment potential. The synergy between industrial, agricultural, and service sectors has bolstered inclusive growth across the state. In addition, Haryana attracted substantial foreign direct investment (FDI), further fueling economic expansion and positioning it as a preferred destination for global investors.

7.2 Commodity Overview

As mentioned in section 3.3 The analysis of freight movement across the toll plazas reveals that the major commodities being transported include Agri produce, consumer foods & products, courier & parcels and iron & steel products.

Courier and parcels

Courier/Parcel traffic on the project section form a significant proportion of the commercial traffic and is majorly for the purpose of consumption in domestic market in the urban and semi urban regions of Panipat, Ambala, Sonipat, Karnal, Chandigarh and nearby regions of the catchment. Traffic on the project stretch originates from Panipat, Karnal and northern part of the state. Courier/Parcel traffic is destined for National capital region and longer distances.

India has been becoming a significant domestic shipment market, with significant companies entering and expanding networks in the market. The industry was flush with early-stage and venture capital funding that led to growing e-commerce penetration in different retail product segments. Apart from primary growth drivers such as increasing internet penetration, higher disposable incomes, and rising urbanisation, factors such as user-friendly interface of portals offered by players, ease of shopping, increasing awareness, relatively higher pricing discounts (in comparison with brick-and-mortar stores), and easy delivery and innovation, have propelled growth. Pandemics have brought about a shift in buying behavior with more and more people taking the online route.

High domestic consumption of e-commerce goods is expected to lead to export growth. Going forward it is expected that the demand will remain high along with the pick-up in domestic consumption.

Agri Produce

Another major contributing commodity on the stretch is Agri produce, which largely consists of vegetables Wheat Rice and vegetables

Agri produce is one of the major goods carried in the project corridor since the districts though which the project corridor passes are largely agrarian in nature. The key commodities in the region are grown in surrounding districts such as Karnal, Ambala, Ludhiana, Amritsar, etc.

Food grain production in Haryana and Punjab has been growing at a healthy pace in recent years due to sufficient rainfall coupled with increasing acreage. Haryana and Punjab is highly dependent on rainfall for Agri production. Hence the production of food grains which are water dependent such as paddy are highly influenced by the vagaries of nature. Going forward, the production of food grains is expected to grow at a consistent pace, however, rainfall quantity and spread and the timing will also be a key monitorable. Horticulture crops which can't be stored for longer durations such as fruits and vegetables are expected to grow faster as they need to be consumed faster. Also, seasonal crops can produce higher income.

CRISIL's methodology considers the growth of the Agri produce commodity at the regional level to derive the traffic growth of each vehicle category. Growth in Agri produce is highly volatile as it depends on the positive outcome of the monsoon season. Hence on the long period, it grows at a low rate compared to the aggregate GDP. Given the

high proportion of Agri produce on the stretch, it's imperative to assess it at a regional and commodity level, compared to a macroeconomic level. This is evident, considering only the macro level growth. The India GVA (constant prices) from agriculture, forestry & fishing has grown at a CAGR of 3.5% over FY12-22 while the GDP growth of India during the same period has been 5.4% CAGR. For this reason, CRISIL's method is more appropriate for the project road section.

Consumer foods & products

The fast-moving consumer goods (FMCG) industry or consumer packaged goods (CPG) industry is mainly responsible for producing, distributing, and marketing fast-moving consumer goods. Fast-moving consumer goods (FMCG) sector is India's fourth-largest sector and has been expanding at a healthy rate over the years because of rising disposable income, a rising youth population, and rising brand awareness among consumers.

Changing food habits and consumption patterns post the pandemic, rising demand for healthy products, increasing appetite for discretionary spends on processed foods and increasing focus on health and sanitation, shift in demand from loose to branded packaging to support growth. Demand is also expected to be supported by new product launches, rising distribution network with players catering to multiple segments.

Iron and Steel Products

Punjab and Haryana are significant players in India's iron and steel industry, contributing notably to the nation's production capacity. Punjab, with its industrial hubs like Ludhiana, is home to several major steel plants and manufacturers, including Hero Steels Limited and Avon Ispat and Power Limited. These companies are pivotal in producing a wide range of steel products, from rolled products to alloy steel.

Haryana, on the other hand, has a robust steel industry supported by its strategic location and industrial infrastructure. The state hosts numerous steel manufacturing units that cater to various sectors, including automotive, construction, and engineering. The presence of major industrial areas and the availability of raw materials make Haryana a key contributor to the steel industry.

In FY24, India's crude steel production reached 143.6 million tonnes, with Punjab and Haryana playing essential roles in this output. The demand for steel across India is projected to grow by 6.0%, driven by infrastructure development, the automotive sector, and urbanization. Both states are expected to benefit from this increasing demand, with ongoing investments and expansions in their steel industries.

Despite global economic uncertainties, the steel industries in Punjab and Haryana remain resilient due to robust domestic demand and favorable policies. These states are well-positioned to continue their significant contributions to India's steel production and consumption goals.

7.3 Commodity Outlook

Crisil Intelligence has forecasted the freight traffic growth till FY38 based on the growth in relevant sectors influencing traffic in the region. Industry growth has been analysed and forecasted based on our proprietary database of industries for the surrounding regions that impact traffic on project road as well as our internal assessment on a relevant set of sectors at the pan India level.

Package wise forecast incorporates the regional dynamics including, but not limited to, investments, commodity trends, district output (GDDP) profile (primary/secondary, construction/manufacturing) etc.

The traffic for the coming years is projected by factoring in the impact of these parameters on commodity wise growth rates and is presented in **Table 7-3.**

Table 7-3: Commodity Outlook for the Project Section

Commodity	FY 26-30P	FY 31-35P	FY 36-38P	FY 26-38P
Agri Produce	1.7%	1.5%	1.4%	1.5%
Automobiles	5.7%	5.2%	4.8%	5.3%
Chemical products	3.5%	3.1%	2.8%	3.2%
Coal	2.1%	1.9%	1.8%	2.0%
Construction materials	4.9%	4.3%	4.0%	4.5%
Consumer Foods	3.0%	2.4%	2.2%	2.6%
Consumer Products	3.0%	2.4%	2.2%	2.6%
Container	3.8%	3.4%	3.1%	3.5%
Courier & parcel	8.0%	7.2%	6.7%	7.4%
Iron & Steel Products	4.9%	4.3%	4.0%	4.5%
Machinery	3.8%	3.4%	3.1%	3.5%
Milk & Animal Food	1.6%	1.4%	1.3%	1.5%
Others	4.6%	3.8%	3.6%	4.0%
Paper products	3.6%	2.9%	2.7%	3.1%
Petroleum Products	2.5%	1.9%	1.8%	2.1%
Pharmaceuticals	3.2%	2.9%	2.7%	2.9%
Plastic products	3.1%	2.4%	2.2%	2.6%
Plywood & Timber	3.1%	2.4%	2.2%	2.6%
Rubber products	3.2%	2.9%	2.7%	3.0%
Textile & Footwear	3.5%	2.9%	2.7%	3.1%
Tiles & Ceramic	3.5%	2.9%	2.7%	3.1%

Source: Industry, Crisil Intelligence

7.4 Implied Growth Rate for the Project Section

Mode wise implied growth rate adopted for the project road section is presented in **Table 7-4**

Table 7-4: Implied Growth Rate for the Project Section

Mode/FY	FY 26-FY 30	FY 30-FY 34	FY 26-FY 38
Car	6.6%	4.2%	5.5%
LCV	3.4%	3.0%	3.0%
Bus	2.2%	0.0%	1.6%
Truck	3.7%	3.3%	3.4%
3A	1.6%	1.3%	1.4%
MAV	4.5%	4.2%	4.2%
OSV	4.5%	4.2%	4.3%
PCU	5.3%	3.7%	4.5%

Source: Crisil Intelligence

In terms of PCU the project road traffic in terms of PCU is expected to grow at 4.5 percent for the period FY26 to FY38.

7.5 Traffic Projections

The total traffic projected in terms of PCUs based on most likely growth rates and after impacts is presented in **Table 7-5.**

Table 7-5: Traffic Projections in terms of PCUs

FY	PCU	Growth %
FY26P	110,179	
FY27P	116,672	5.9%
FY28P	123,431	5.8%
FY29P	130,455	5.7%
FY30P	135,512	3.9%
FY31P	140,246	3.5%
FY32P	145,137	3.5%
FY33P	150,101	3.4%
FY34P	156,991	4.6%
FY35P	164,098	4.5%
FY36P	171,176	4.3%
FY37P	178,447	4.2%
FY38P	185,907	4.2%

Source: Crisil Intelligence

Also, mode wise projection for all the toll plaza is presented in

Table 7-6: Projection by Mode

FY	CJV	LCV	Bus	2-Axle	3-Axle	MAV	OSV	PCU
PCU	*1*	*1.5*	*3*	*3*	*3*	*4.5*	*4.5*	
FY26P	60,493	3,343	2,218	4,522	1,542	4,402	3	110,179
FY27P	65,018	3,465	2,287	4,700	1,571	4,615	3	116,672
FY28P	69,810	3,585	2,357	4,877	1,598	4,829	4	123,431
FY29P	74,878	3,703	2,426	5,052	1,622	5,046	4	130,455
FY30P	78,257	3,815	2,423	5,220	1,643	5,257	4	135,512
FY31P	81,248	3,933	2,413	5,396	1,664	5,481	4	140,246
FY32P	84,332	4,055	2,396	5,580	1,686	5,715	4	145,137
FY33P	87,510	4,176	2,375	5,762	1,707	5,950	4	150,101
FY34P	92,311	4,302	2,428	5,953	1,727	6,196	5	156,991
FY35P	97,279	4,430	2,480	6,147	1,748	6,450	5	164,098
FY36P	102,169	4,561	2,532	6,346	1,768	6,712	5	171,176
FY37P	107,203	4,694	2,585	6,549	1,787	6,981	5	178,447
FY38P	112,379	4,829	2,637	6,756	1,806	7,258	5	185,907

Source: Crisil Intelligence

In terms of PCU the FY26 traffic is estimated to be 110,179. The highest contribution of it will account from CJV traffic which is estimated to be 60,493 for the same period.

8. Revenue forecast

8.1 General

At present the project section is under “open tolling system” which enables the concessionaire to collect tolls from long distance as well as short distance traffic joining the project from adjoining highways.

8.2 User Fee Schedule

As per Gazette notification dated 05.12.2008, under National Highways Fee (Determination of Rates and Collection) Rules 2008 [GSR 838 (E) and concession agreement the per km toll rates applicable from 2007/08 for normal tolling length and permanent structure, the revision basis and concessions are provided.

The concessions of traffic have been provided under the categories/ toll tickets as presented in **Table 8-1.**

Table 8-1: Tolling Tickets

Ticket	Maximum number of one-way journeys allowed	Period of validity
Single/Normal	Single	-
Daily/Return	Two	24 hours
Monthly Pass	Fifty	One month from the date of payment
Local Personal	Multiple	One month from the date of payment

Source: NHAI-Determination of Rates and Collection Rule 2008

It may be noted that, for local personnel, vehicles should be registered for non-commercial purposes, and residing with a distance of 20 km from the toll plaza.

8.3 Traffic Segmentation

As mentioned in section 4.1 historical toll data for all the three toll plazas were made available by client. The traffic tolling segmentation in (%) adopted for the present study for FY25 is presented in **Table 8-2.**

Table 8-2: Traffic Segmentation in % - FY25

Particulars	CJV	LCV	Bus	2-Axle	3-Axle	MAV	OSV
Single	34.0	36.5	14.5	60.1	67.2	62.0	93.0
Return	49.4	60.9	81.5	38.8	32.1	37.0	5.9
Monthly	0.1	1.2	0.1	0.1	0.0	0.0	0.0
Local personal	9.3	0.0	0.0	0.0	0.0	0.0	0.0
Local commercial	0.2	0.6	3.5	0.1	0.5	0.7	0.0
Exempt	7.0	0.9	0.3	0.9	0.2	0.3	1.1
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Source: Historical toll data, Crisil Intelligence

8.4 Tolling lengths

The tollable lengths for the project section is presented in **Table 8-3.**

Table 8-3: Tolling Lengths

Description	Bhagan TP
Normal	70.599
Bypass	0.000
Structure	7.896
Tolling Length	**78.495**

Source: Concession Agreement, Crisil Intelligence

8.5 Toll Rates Estimation

The toll rates that are likely to be applicable on the project section during the project study are in accordance with the National Highways Fee (Determination of Rates and Collection) Rules 2008 [GSR 838 (E),2008 and article 27 of the concession agreement.

The toll rates (Rs/km) for the base year 2007-08 for different vehicle categories are as per fee rule/concession agreement mentioned above and are presented in **Table 8-4.**

Table 8-4: Base Rate in Rs/km

Mode	Car	LCV	Bus/Truck	3-Axle	MAV	OSV
Rs/km	0.65	1.05	2.20	3.30	3.45	4.20

Source: NHAI-Determination of Rates and Collection Rule 2008, Concession Agreement

As per toll notification, the per/km rates mentioned in above table shall be increased without compounding by three percent each year with effect from April-2008 and such increase shall be deemed to be base rate for the subsequent years. In addition, the applicable base rates shall be revised annually with effect from April each year to reflect the increase in wholesale price index for the month of December of the immediate preceding year, and such revision shall be restricted for 40 percent of the increase in wholesale price index.

8.6 Revenue Reconciliation

In order to estimate future revenue accurately, a revenue reconciliation has been undertaken to ensure that the traffic segmentation, trip rates and traffic are correctly accounted for. This process is crucial for validating that all relevant factors have been appropriately considered, thereby providing a reliable basis for projecting future revenues.

To achieve this, the revenue reconciliation for FY25 is estimated considering the Annual Average Daily Traffic (AADT), traffic segmentation (April-24 to March-25) as presented in section 4.4 and specific trip factors-namely a factor of 2 for returns trips and an assumption of 1.67 for monthly passes.

Revenue reconciliation for FY25 findings is presented in **Table 8-5.**

Table 8-5: Revenue Reconciliation for FY25

Details	Bhagan TP
FY25 Actual Revenue^ (Rs crore)	368.8
FY25 Estimated Revenue (Rs crore)	366.7
% Difference (Actual vs Estimated)	**-0.5%**

Actual Revenue^: Without penalty

Source: Client MIS data, Crisil Intelligence

The overall difference in revenue for the project section is - 0.5 percent of the actual revenue for FY25. The variance is inherently due to the approximations such as application of annualized segmentation and trip factors.

8.7 Review and Outlook of Whole-Sale price index (WPI)

The whole sale price index published by Office of Economic Advisor, GoI, considering base year as 2011-2012, and NHAI policy guideline pertaining to linking factor, WPI growth for the base toll rate for FY26 is 2.57% i.e. 478.56. For the balance concession period till FY38, WPI growth rate is assumed to be 5 percent annually as per client input. Past and outlook WPI growth is presented in **Table 8-6**

Table 8-6: Past and Outlook of Wholesale price index (WPI)

Applicable FY	WPI	% Increase
FY22	385.4	2.0%
FY23	437.7	13.6%
FY24	462.6	5.7%
FY25	466.6	0.86%
FY26	478.6	2.37%
FY27P	502.5	5.0%
FY28P	527.6	5.0%
FY29P	554.0	5.0%
FY30P	581.7	5.0%
FY31P	610.8	5.0%
FY32P	641.3	5.0%
FY33P	673.4	5.0%
FY34P	707.0	5.0%
FY35P	742.4	5.0%
FY36P	779.5	5.0%
FY37P	818.5	5.0%
FY38P	859.4	5.0%

Source: Office of Economic Advisor, GOI, Client Input

8.8 Revenue Estimates

The revenue projections for the project road have been presented till FY38 and is presented in **Table 8-7**

Table 8-7: Revenue in Rs Million for the Project Section

FY	Bhagan TP
FY26P	4,106.7
FY27P	4,546.4
FY28P	5,014.1
FY29P	5,571.3
FY30P	6,077.4
FY31P	6,630.3
FY32P	7,192.7
FY33P	7,834.0
FY34P	8,586.7
FY35P	9,388.6
FY36P	10,337.3
FY37P	11,285.6
FY38P (*)	6,082.1

Source: Crisil Intelligence, (*) FY38 -Revenue estimates for 179 days

- Total revenue is estimated to grow at 9.6 percent for the period FY26 to FY37.
- Maximum revenue will be generated from the CJV categories accounting to about 45 percent of the total revenue.

The revenue by mode for Bhagan TP is presented in **Table 8-8.**

Table 8-8: Revenue (Rs million) by Mode

FY	CJV	LCV	Bus	2-Axle	3-Axle	MAV	OSV	Total
FY26P	1,914.1	197.2	253.1	596.2	226.7	918.4	0.9	4,106.7
FY27P	2,158.3	212.6	274.0	650.3	241.9	1,008.3	1.0	4,546.4
FY28P	2,400.0	231.5	298.5	710.2	259.8	1,113.0	1.1	5,014.1
FY29P	2,730.1	252.2	320.7	772.2	276.4	1,218.5	1.2	5,571.3
FY30P	3,010.1	271.5	335.8	833.8	293.8	1,331.1	1.3	6,077.4
FY31P	3,301.9	294.0	352.4	906.8	313.9	1,459.7	1.4	6,630.3
FY32P	3,567.9	321.4	369.3	993.1	335.9	1,603.6	1.5	7,192.7
FY33P	3,922.6	347.9	382.9	1,070.7	356.1	1,752.1	1.7	7,834.0
FY34P	4,339.1	374.0	412.0	1,164.2	378.3	1,917.4	1.8	8,586.7
FY35P	4,768.9	406.6	443.8	1,264.6	402.9	2,099.8	2.0	9,388.6
FY36P	5,292.4	442.3	478.7	1,380.5	429.6	2,311.6	2.2	10,337.3
FY37P	5,821.0	476.7	511.8	1,494.3	456.5	2,522.8	2.4	11,285.6
FY38P (*)	3,173.0	253.4	269.4	794.4	238.1	1,352.5	1.3	6,082.1

Source: Crisil Intelligence, (*) FY38 -Revenue estimates for 179 days

9. Annexure

9.1 Top OD Pair

The Top ten OD pair mode wise for the project section is presented in **Table 9-1**

Table 9-1: Mode wise Top ten OD pairs at Bhagan TP

S. No	Origin	Destination	% Trips	S. No	Origin	Destination	% Trips
Car				**Bus**			
1	Panipat	Sonipat	12%	1	Panipat	Sonipat	8%
2	Panipat	North Delhi	6%	2	Panipat	North Delhi	8%
3	Samalkha	Sonipat	4%	3	Panipat	West Delhi	4%
4	Karnal	Sonipat	4%	4	Karnal	Sonipat	4%
5	Panipat	West Delhi	3%	5	Samalkha	Sonipat	4%
6	Panipat	South Delhi	3%	6	Panipat	South Delhi	4%
7	Murthal	Panipat	3%	7	Panipat	East Delhi	4%
8	Samalkha	North Delhi	3%	8	Samalkha	North Delhi	3%
9	Panipat	East Delhi	3%	9	Panipat	Central Delhi	3%
10	Panipat	Central Delhi	2%	10	Karnal	North Delhi	3%

S. No	Origin	Destination	% Trips	S. No	Origin	Destination	% Trips
LCV				**2 Axle Trucks**			
1	Panipat	Sonipat	11%	1	Panipat	Sonipat	11%
2	Panipat	North Delhi	6%	2	Panipat	North Delhi	6%
3	Samalkha	Sonipat	4%	3	Karnal	Sonipat	5%
4	Karnal	Sonipat	4%	4	Samalkha	Sonipat	5%
5	Murthal	Panipat	3%	5	Murthal	Panipat	3%
6	Panipat	South Delhi	3%	6	Samalkha	North Delhi	3%
7	Panipat	West Delhi	3%	7	Panipat	West Delhi	3%
8	Samalkha	North Delhi	2%	8	Karnal	North Delhi	3%
9	Panipat	East Delhi	2%	9	Panipat	South Delhi	3%
10	Karnal	North Delhi	2%	10	Panipat	Central Delhi	2%

S. No	Origin	Destination	% Trips
3 Axle Trucks			
1	Panipat	Sonipat	11%
2	Panipat	North Delhi	5%
3	Samalkha	Sonipat	4%
4	Karnal	Sonipat	4%
5	Murthal	Panipat	3%
6	Samalkha	North Delhi	3%
7	Panipat	South Delhi	3%
8	Karnal	North Delhi	2%
9	Panipat	West Delhi	2%
10	Panipat	Central Delhi	2%

S. No	Origin	Destination	% Trips
MAV (4-6)			
1	Panipat	Sonipat	9%
2	Panipat	North Delhi	6%
3	Karnal	Sonipat	4%
4	Samalkha	Sonipat	3%
5	Samalkha	North Delhi	2%
6	Panipat	South Delhi	2%
7	Karnal	North Delhi	2%
8	Panipat	West Delhi	2%
9	Panipat	East Delhi	2%
10	Murthal	Panipat	2%

Source: Primary survey, Crisil Intelligence

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