PROJECT NOTE

Project Road from Design km 0+000 to Design km 78+837 (Jind - Gohana - Sonipat section in the State of Haryana. Project Road traversing Jind and Sonipat District. Project Road divided into two Packages-I (from km 0+000 to km 40+601) and Package-II (from km 40+601 to km 78+837) therefore package wise note is presented into two sections. Project Road falls under Jurisdiction of Forest Division Jind (from Design km 0+000 to km 24+480) and Forest Division Sonipat (from Design km 24+480 to km 78+837). Proposed 4-laning of Project Road will divert 32.903ha. PF land on Roads/ canal/ Railway line/ Drain side strip declared as Protected Forest land.

Project Notes - Package-I

EXECUTIVE SUMMARY

1 INTRODUCTION

The Detailed Project Report has been prepared for the project of Feasibility Study cum Detailed Project Preparation for Redesigning, Rehabilitation and Up-gradation to 4-Lane Configuration of New NH-352A Jind-Gohana Road in the State of Haryana. The Executive Summary brings out in brief the details of the various chapters of the report. It mainly covers the Existing Features of Project Road, Traffic Surveys, Analysis and Forecasts, Improvement proposals and Detailed Cost Estimates for the improvements proposed for the project. The details are presented in each of the relevant sections.

2 PROJECT ROAD DESCRIPTION - EXISTING FEATURES

Jind-Gohana section is proposed as Greenfield alignment for the entire length. The alignment starts from the Jind bypass road forming a junction with 90 degrees. The start point is located 590 m towards the southern direction from the intersection point of Proposed Jind bypass and Jind-Safidon road (SH-14).

The alignment section passes from the outskirts of villages namely Brah Khurd, Barah, Kharak Ramji, Chabri, Birtana, LalitKhera, Bham Bhewa, Butana, Bichpari, Khandrai in Jind and Sonepat district. The alignment ends at existing Panipat-Rohtak Road NH-709 (New) on the North side of Gohana town.

The length of project road (Green Field alignment) is 40.601 km.

The project alignment crosses railway lines enroute at two locations as described in the table below:

Table 2-1 Railway line Crossing (Jind – Gohana Section)

Sr. No.	Existing/ Design Chainage	Railway Line	Type of Gauge and Track
1	3+988	Jind - Panipat Section	Northern Railway - At-Grade Track Crossing - Broad Gauge Single Track (Between Railway km 11/9 and km 12/0)
2	39+022	Rohtak - Gohana - Panipat Section	Northern Railway - At-Grade Track Crossing - Broad Gauge Single Track (Between Railway km 34/4 and km 34/5)

The project alignment also crosses few major canals namely Butana canal, Sundar canal enroute.

The terrain of the alignment section is classified as plain terrain. The land use is primarily agriculture land throughout the alignment section.

3 IMPROVEMENT PROPOSALS

Various improvement proposals by way of construction of New 4 laned Road conforming to geometric standards of 4 laning manual, construction of new bridges and cross-drainage structures, improvements to junctions, proposal of road markings, road signs and traffic lights, provision of ROBs, facilities such as Truck lay byeshave been recommended.

3.1 Project Road Section

The Project road is proposed to be developed as presented below:

Description	Design Length (km)
Jind-Gohana section (Green Field Alignment)	40.601

3.2 Proposed ROW

The proposed ROW is 60 meters. The additional land is proposed to be acquired at Interchanges, Toll Plaza and LVUP locations.

The summary of Proposed Cross sections is presented below

Table 3-1 Application of Typical Cross sections

Sr. No.	TCS Type	TCS Description	Application Type	Length (m)
1	TCS - 1	4 Lane Divided Highway without Service Road and with Raised Median	Greenfield road	33460.00
2	TCS - 2	4 Lane Divided Highway with Connecting Road and with Raised Median	At LVUP/ SVUP Approaches	1805.00
3	TCS - 3	4 Lane Divided Highway with Service Road cum Slip Road and with Raised Median	At Interchange Approaches	476.00
4	TCS - 4	4 Lane Divided Highway without Service Road and with Raised Median	At ROB Approaches	2130.00
5	TCS - 5	4 Lane Divided Highway with Connecting Road on both sides and with Raised Median	Greenfield road	1575.00
6	TCS - 6	4 Lane Divided Highway with Entry/ Exit Ramp and with Raised Median	At Interchange Approaches	480.00
7	TCS - 7	4 Lane Divided Highway with Connecting Road on RHS and Raised Median		175.00
8		Toll Plaza		500.00
			Total Length (m)	**40601.00**

3.3 Proposed Bypass

Not Applicable

3.4 Proposed Interchange

Interchanges are proposed as per table below:

Sr. No.	Existing Chainage	Design Chainage	Type of Interchange to be provided	Remark
1	NA	0+000	Trumpet Interchange (3 Nos. of 2 Ramps and 1 no. of Loop as per drawing)	Junction of Jind Bypass Road and NH-352 A Greenfield road
2	NA	40+601	Trumpet Interchange (3 Nos. of 2 and 1 no. of Loop Lane Ramps as per drawing)	Junction of NH-352 A Greenfield road and NH-709 (New)

3.5 Proposed Pavement

Pavement design has been carried out for both types, i.e. flexible and rigid pavement. New flexible pavement has been designed for design life of 15 years while rigid pavement has been designed for design life of 30 years. Vehicle Damage Factor has been derived from Axle Load survey data. The AADT has been derived from Classified Traffic Volume survey.

Flexible pavement has been proposed for the construction of Project road including slip road / Service roads.

Rigid Pavement is proposed at Toll Plaza location including taper portion.

Table 3-2 Design Inputs for Flexible Pavement

Homogeneous Section	Design Life	Design Traffic in MSA	Lane Distribution Factor	Directional Distribution Factor
Km 0+000 to 40+601	15 yrs.	40	0.75	0.5

Table 3-3 Pavement Composition for Flexible Pavement

Homogeneous Section	Traffic in MSA	Pavement Crust Composition (mm)			
		BC	DBM	WMM	GSB
Km 0+000 to 40+601	40	40	95	250	200
Connecting Road	10	40	60	250	200

Table 3-4 Overlay Composition for Existing Road

Section	Length	Design Traffic	BC	DBM
	(km)	(MSA)	(mm)	(mm)
NA				

Table 3-5 Pavement Composition for Rigid Pavement

Sr. No.	Description	Design Life (Years)	Minimum Pavement thickness (mm)		
			PQC	DLC	GSB
Jind - Gohana (NH-352A)					
1	Toll Plaza	30	250	150	150

3.6 Proposed Structures

Based on the site conditions, crossings of canals & streams, railway crossings and road crossings, new construction proposals have been recommended for Major and Minor Bridges and other structures.

Table 3-6 Summary of Proposed Structures

Structure Type	No. of structures (New)
HP Culvert	-
Slab Culvert	-
RCC Box Culvert	53
Major Bridge	1
Minor Bridge	7
ROB	2
RUB	-
VUP / LVUP / SVUP	0 / 22 / 3
PUP	4
Flyover	2

3.7 Project Facilities

Project facilities like Toll Plaza, Truck lay byes have been proposed along the project road.

Toll Plaza		
Sr. No.	Existing Chainage (km)	Design Chainage (km)
1	NA	Km 13+000

Truck Lay Bye			
Section	**Design Chainage (km)**	**Side**	**Name/ Village/ City**
Jind-Gohana	23+650	Both Side	Near Ishapur Kheri Village

For ensuring a high standard of road safety, road furniture and safety features as per relevant IRC codes have been recommended such as road signs and marking which will be suitably sited and designed as per latest state-of-art retro-reflectivity standards.

4 TRAFFIC SURVEYS AND ANALYSIS

Traffic Surveys such as Classified Traffic Volume Count survey at mid-block, Origin and Destination survey, Speed and Delay survey and Pedestrian crossing count survey, were conducted at various locations along the project road.

Volume Count Survey analysis gave the Average Daily Traffic (ADT), and Annual Average Daily Traffic (AADT). After reconnaissance surveys and detailed study, the volume count location was fixed at km 16 (Ludana) of existing Jind - Gohana Section.The AADT from surveys were 10840 PCUs for this section;

O-D surveys was carried out for 24 hrs periods at Km 16. Around 94% of the passenger traffic is found to have the origin and destination within Haryana, the rest 5% from Delhi and Punjab. Similarly 85% of truck traffic is originating from Haryana and about 10% from Delhi.

Axle-load surveys conducted shows that heavy trucks are used for long haul assignment in the corridor.

Speed and Delay Survey was conducted using the moving car observer method to understand the speed and delay characteristics and to arrive at the existing level of service provided by the road. The average journey speed was studied in 2 sections, wherein each section was sub divided into further sections to understand the variation of speeds near towns as well. The Average speed along the different stretches of the corridor was found to vary between 46 kmph to 53 kmph.

Traffic on Jind- Gohana Greenfield Section: The divertible traffic to the greenfield section is estimated from OD surveys and traffic data of other alternate routes for the project corridor. The estimated AADT for the Greenfield section is given below.

Vehicle Type	**Jind- Gohana(Greenfield) AADT**
Car/Taxi	3889
Mini Bus	0
Bus	2
LCV	617
2 Axle Truck	284

3 Axle Truck	242
MAV	354
Two Wheeler	1140
Auto- 3 Seater	77
Auto-6 Seater	16
Tractor with Trailer	222
Tractor without Trailer	53
Cycle	0
Animal Drawn	0
Others	0
Total AADT (Veh.)	**6896**
Total AADT (PCU)	**10097**

5 TRAFFIC FORECASTS

Three different forecasting methods, i.e., Trend Based Analysis, Econometric Model and Trip-End Factor Model have been used to forecast the traffic. In the first method, past traffic data and vehicle registration data in the influence region was collected and analysed up to 2015. The study of this data revealed that there was an overall growth of cars and trucks of 15.2% and 7.68 % respectively.

The second method where the Econometric Model was used, the trends in the growth of economy (GDP) was studied. The studies revealed that a relationship could be established between the traffic level in the corridor and the vehicle registration growth with the GDP. By this method the growth rate for cars is 14.6 % and 8.6 % for trucks respectively.

The third method used was the Trip-End Factor Model, which is based on regional economy based parameters. It showed that socio-economic parameters and temporal trends in the growth of economy have a good correlation with the growth of traffic in the region. Various socio-economic indicators collected were analysed and used to forecast horizon years to relate the temporal growth in the economy. The weighted Economy based parameters of the contributing states are regressed with weighted number of vehicles. The growth rate emerging from this method showed an increase of 14.4% in cars, and 7.4% in trucks respectively.

Based on the above three methods the base year growth rates were selected as 6% for Cars, 6% for Trucks and 6% for Buses. It is forecast that the level of traffic using the project road will continue to increase due to the growth in the socio-economic factors and the new development taking place within the influence area.

A tolling strategy was adopted based on the new Model Concession Agreement using the projected tollable traffic and the revenues were generated for the Toll Plaza.

6 DETAILED COST ESTIMATE

Detailed Cost for the Project improvement proposals was estimated for the year 2017-18 and summary of Civil cost estimated is given below.

Section	Civil cost
Jind- Gohana Section (Green Field Alignment)	Rs. 548.05 Crores

7 RECOMMENDATIONS

At present, the traffic divertible to Jind- Gohana Greenfield alignment is 10097 PCUs. The project influencing area including the state of Haryana has recorded a high growth of vehicles due to the presence of industries such as manufacturing, pharma and automobiles. A number of planned developments in terms of industry, Dedicated Freight Corridors, Proposed DMIC and related developments are under implementation in the PIA which is promising to the project stretch and expected to attract more traffic. Keeping in mind the current traffic, future developments in PIA, need of increased road safety, as an immediate improvement, the entire project road can be considered for construction of Four lane configuration. In view of this, and considering the results of the economic viability analysis the whole project corridor is recommended to be upgraded to 4 lane configuration under EPC/ Hybrid Annuity mode.