

CHAPTER – E : EXECUTIVE SUMMARY



TABLE OF CONTENTS

| | |
|---|------|
| EXECUTIVE SUMMARY | E-2 |
| E1.1 GENERAL | E-2 |
| E1.2 PROJECT DESCRIPTION | E-2 |
| E1.2.1 Characteristics of Road from km. 42.7 to Km. 220.5 | E-2 |
| E1.2.2 Characteristics of Zone – D Bypass (34.5 Km long) | E-3 |
| E1.2.3 Characteristics of Zone – C Bypass (13.7 Km long) | E-3 |
| E1.3 ENGINEERING SURVEYS | E-3 |
| E1.4 VALIDATION OF ENGINEERING DATA | E-4 |
| E1.5 INTEGRATED SCHEME | E-5 |
| E1.6 TRAFFIC SURVEYS | E-5 |
| E1.7 PAVEMENT EVALUATION AND DESIGN | E-6 |
| E1.7.1 Riding Quality | E-6 |
| E1.7.2 Pavement Composition | E-7 |
| E1.7.3 Design Parameters | E-7 |
| E1.7.4 Materials Surveys | E-8 |
| E1.7.5 Pavement Design Proposals | E-8 |
| E1.7.6 Pavement Thickness Design: Construction Stage-I | E-9 |
| E1.7.7 Post Construction Maintenance Strategy: | E-10 |
| E1.8 EIA RECOMMENDATION | E-10 |
| E1.9 SOCIAL IMPACT ASSESSMENT | E-11 |
| E1.10 COST ESTIMATES | E-11 |

परियोजना निदेशक / Project Director
भारतमार्ग, प.का.ई / NHAI PIU, Jaipur



EXECUTIVE SUMMARY

E1.1 GENERAL

The existing project passes through plane terrain of Haryana and Rajasthan. The existing project corridor starts at km. 42.7 and ends at km. 273 which includes the Jaipur bypass length of 48.2 km also. Project corridor has been taken up for 6 laning under NHDP phase V programme. The National Highways Authority of India (NHAI) is intended to widen the existing 4-Lane Gurgaon - Jaipur Section of NH-8 to 6-Lane through private entrepreneurs as DBFO project under NHDP Phase-V. The total length of the Project Corridor is Km 225.600.

E1.2 PROJECT DESCRIPTION

The existing corridor is four lane configurations with paved shoulder and earthen shoulder. Service road exists at urban locations. The project corridor can be divided into 3 major categories for the purpose of study i.e.

- From km. 42.700 to km. 220.500
- From Km. 220.500 (Km 34.500) to Km. to 0.000(Km 255.000) of "Jaipur Bypass Zone D"
- From Km. 255.000 (Km 0.000) to Km.13.703(273.000) "Jaipur Bypass Zone C)"

E1.2.1 Characteristics of Road from km. 42.7 to Km. 220.5

The major towns exist along the highway in the sub section are:

- Manesar
- Dharuhera
- Behror
- Kotputli
- Paota
- Shahpura
- Manoharpura

The project road passes through plain terrain on embankment except for a short stretch in cutting through hills. The Height of embankment varies from 1m to 8m and depth of cutting at isolated locations is in the range of 5m.

From Gurgaon to Manesar

Stretch is mostly built-up with industrial development on both sides. Fuel stations at very close interval. Two major crossings exist at Nakhrola and at IMT Manesar.

From Manesar to Dharuhera

Stretch is mostly built-up with industrial development on both sides. Isolated rural stretches at scattered locations. Fuel stations at very close interval. Three major crossings exist at Jamalpur, Pataudi and Bhiwadi. Toll Gate at Bilaspur Km 61.000.

From Dharuhera to Behror

Stretch is mostly built-up with industrial development on both sides. Isolated rural stretches at scattered locations with hotels and motels. Fuel stations at very close interval. Twelve major crossings exist at Dharuhera Market, Rewari, Jarthal, Morkasim,



Bawal, Nehchana, Shahjahanpur, Neemrana, EPIP Neemrana, Dudharia, Narnaul and Jagwas. One ROB exist at km. km. 97.95

From Behror to Kotputli

Stretch is mostly built-up with industrial development on both sides. Isolated rural stretches at scattered locations with hotels and motels. Fuel stations at very close interval. Six major crossings exist at Kankar, Kotputli Industrial area, Narnaul, Alwar, Kotputli Bus Stand and Sikar.

From Kotputli to Paota

Stretch is mostly rural on both sides with hotels and motels, villages are located on either side along the road. Fuel stations at very close interval. Three major crossings exist at Ajitpura, Pragpura and Paota Market.

From Paota to Shahpura

Stretch is mostly rural with villages on either side at close intervals, with hotels and motels. Fuel stations at very close interval. Five major crossings exist at Jaisingpur, Jahanpura, Alwar, Shahpura Industrial area and Shahpura Market.

From Shahpura to Chandwaji

Stretch is mostly rural / semi-urban and alignment passes through congested Manoharpura town with shop on either sides. With hotels and motels on both sides. Fuel stations at very close interval. Two major crossings exist i.e. at Ghasipura and Manoharpura. One Toll plaza exist at Km 211.000, Manoharpur.

E1.2.2 Characteristics of Zone – D Bypass (34.5 Km long)

11 underpasses/ subways in Zone – D, 2 Major Flyover at Chandwaji and at Harmara, all structures are 6-Lane with 6-Lane approaches, service road mostly on one side with isolated stretches having both sides service road, RE wall approaches for Chandwaji Flyover, RCC Retaining Wall for approaches to major structures which changes to RRM masonry retaining walls whenever height of embankment is generally < 3m, stone pitching with chute drains on both sides, mostly on embankment. One Toll paza exists at Km 241.000, Daulatpur.

E1.2.3 Characteristics of Zone – C Bypass (13.7 Km long)

8 underpasses/ subways in Zone – C, 2 ROB's, Service road on either sides, RE Wall approaches for ROB's, RRM masonry retaining wall on approaches to all the major structures, stone pitching with chute drains on both sides, mostly on embankment.

E1.3 ENGINEERING SURVEYS

Various engineering surveys were conducted during the study period

- Traffic Survey
- Classified Traffic volume count - 7 day continuous traffic volume count completed at four locations: Bilaspur, Shahjahanpur, Manoharpura and Daulatpura toll plaza
- Origin Destination (O.D.) survey - completed at four locations: Bilaspur, Shahjahanpur, Manoharpura and Daulatpura toll plaza.
- Turning traffic volume survey – completed at 16 major intersections.
- Pedestrian / Animal crossing survey – completed at four locations.
- Speed and Delay survey – completed for entire length during peak and off peak hours.

परियोजना निदेशक / Project Director
भारतवासी, प.का.इ. / NHA P.O., Jaipur



- Truck terminal survey – completed, interview of truck drivers taken to identify the desired location of truck terminals.
- Road condition survey – completed for entire length
- Topographic survey – completed for KM 70.000 covering urban congested sections and major intersections. completed
- Axle load survey – Completed at two locations for continuous 24 hours.
- Benkelman beam deflection survey – completed for both carriageways for entire length.
- Test pit for validation – completed along entire length.
- Sub soil exploration – completed
- Bridge inventory – completed.
- Social survey – public consultation including community and stake holders completed.
- Environmental survey – identification of reserve forest and protected forest adjoining highway identified. Impact assessment report completed.

E1.4 VALIDATION OF ENGINEERING DATA

The Topographic surveys were carried out at all the urban stretches in order to cater the required details in retrofitting the integrated six lane scheme over the existing 4-lane carriageway along the project corridor. In addition to this, topographic surveys were conducted at all major junctions to obtain the existing ground data, which is incorporated while finalizing the structure GAD's to the extent possible with regards to the importance of the surrounding land use pattern. For some sections, only Centre line bearings have been surveyed and validated after comparing the survey data with bearings written on as built drawings.

The as built drawings were also updated manually by visiting at the site. The missing features have been accumulated and are being incorporated in the as-built drawings. The features as such are given below.

- Oil Outlets
- Metal Crash Barrier
- OFC Cables
- Cross Road
- Toe wall
- Side Drain
- Bus Lay bye
- Truck Lay bye
- Dhabas, shops etc.

The pavement crust details have also been validated by conducting test pits at selected locations along the project corridor. The procedure adopted for test pits is given in Chapter No. 5" Pavement evaluation and preliminary design. Apart from this the soaked CBR were determined from the soil samples collected. Through this the data have been validated and the results are given in Chapter No. 5.



E1.5 INTEGRATED SCHEME

To enhance the safety of traffic and operational efficiency of the highway, to fulfil the access needs of the local population and to provide the constructible option for the project, six typical type of cross sections are developed to retro fix the 6 laning over existing 4 lane configuration depending upon the land use pattern and desires traffic segregation method. To meet the above mentioned objectives, following salient features are proposed

- Continuous service roads on both sides of the carriageway are provided except at the locations of major bridges and at ROB locations
- 53 grade separators are proposed at different locations which include vehicular and pedestrian crossings. Grade separators function as U turns also.
- Elevated corridor of only 270m is proposed at kotputli.
- 21 new U turn locations are provided with safe U turn facility
- Exit and entry way provided to serve the locals population in the vicinity and also to provide the through traffic an opportunity to exit to service road and proceed to desired destination.
- Average distance between two grade separators in rural locations is kept as 4 km to 5 km and in urban section as 1.5 to 2.5 km.
- Widening of minor bridges proposed and some bridges are proposed for reconstruction.
- Few bridges are retained with their present lane configuration and only rehabilitation is proposed for them.

The working of the whole scheme is explained in detail in chapter no. 7

E1.6 TRAFFIC SURVEYS

Direction wise classified traffic counts for 7 consequent days and 24 hour roadside O-D surveys were conducted during the month of October 2006 at the four toll plazas located along the 225.6 km study section as indicated below:

- Bilaspur Toll Plaza at km 61.000
- Shahjahanpur Interstate Check post at km 111.000
- Manoharpur Toll Plaza at km 211.000
- Daulatpur Toll Plaza at Km 241.000 on Jaipur Bypass

In addition, classified counts of entry and exit traffic from major cross roads was conducted for over 4 hours during the morning and evening peak traffic period at 17 locations. Pedestrians and animals crossing the NH8 were counted for 4 hours in the morning and evening period within Paota, Shahpura, Kotputli and Behror towns. Travel time and delay surveys were conducted along the entire stretch of the study section. Truck drivers were interviewed at wayside dhabas and rest areas to obtain information about their requirements for wayside amenities and terminals.

Results of these surveys and the salient conclusions have been highlighted in the following sections.

परियोजना निदेशक / Project Director
भारतीय, ई.का.ई. / NHAI PIU, Jaipur



| Location | ADT (Vehicles) In October 2006 | ADT (PCU) In October 2006 |
|-----------------------|--------------------------------|---------------------------|
| Bilaspur (km 61) | 41264 | 78667 |
| Shahjahanpur (km 111) | 19915 | 43474 |
| Manoharpur (km 211) | 23460 | 45311 |
| Daulatpur (km 241) | 9885 | 24745 |

ADT is highest (41000 vehicles per day) on the section between Gurgaon and Bawal. It is the lowest (9900 vehicles) on the Jaipur Bypass. Between Bawal and the beginning of the Jaipur Bypass at Chandwaji, ADT is fairly uniform at around 20,000 vehicles per day. It would appear that the study stretch could therefore be divided into the following three homogenous sections:

1. Gurgaon (km 42.70) to Bawal (km 103)
2. Bawal (km 103) to Chandwaji (km 220.50) (Beginning of Jaipur Bypass); and
3. Jaipur Bypass (km 220.500 to km 273.00)


E1.7 PAVEMENT EVALUATION AND DESIGN

The pavement evaluation and design have been carried out to meet the rehabilitation / upgrading of the existing 4-lane road to 6-lane carriageway configuration.

| S. No. | Direction | From (km) | To (km) | Length (km) | Functional Evaluation Category |
|--------|----------------|-----------|---------|-------------|--------------------------------|
| 1 | Up Direction | 42.70 | 82 | 40 | Good |
| 2 | | 82 | 102 | 20 | Very Good |
| 3 | | 102 | 132 | 30 | Good |
| 4 | | 132 | 153 | 21 | Good |
| 5 | | 153 | 162 | 9 | Good |
| 6 | | 162 | 207 | 45 | |
| 7 | | 207 | 220 | 13 | Fair |
| 8 | | 220 | 252 | 32 | Good |
| 9 | | 252 | 268 | 16 | Good |
| 1 | Down Direction | 42 | 53 | 11 | Failed |
| 2 | | 53 | 98 | 45 | Fair |
| 3 | | 98 | 128 | 30 | Very Good |
| 4 | | 128 | 148 | 20 | Good |
| 5 | | 148 | 153 | 5 | Poor |
| 6 | | 153 | 162 | 9 | |
| 7 | | 162 | 220 | 58 | |
| 8 | | 220 | 273.00 | 48 | Good |

E1.7.1 Riding Quality

Many of the existing pavements have high roughness values and outer lane is much more damaged than the inner lane.

 / Project Director
 30/09/2006 / NHAI PIU, Jaipur



| Average Roughness (IRI) | | | | | |
|---------------------------|-----------|---------|---------------------------|-----------|---------|
| Direction: Delhi - Jaipur | | | Direction: Jaipur - Delhi | | |
| Fast Lane | Slow Lane | Average | Fast Lane | Slow Lane | Average |
| 4.1 | 4.3 | 4.2 | 4.4 | 4.7 | 4.5 |

The outer pavements lanes are weak which is further confirmed by the observation of high Benkelman Deflection values observed for the road sections.

| Homogeneous Section (LHS) : Delhi – Jaipur Section of NH-8 | | | | |
|--|----------|-----|-------------|-----------------|
| Homogeneous Section | Chainage | | Length (km) | Deflection (mm) |
| | From | To | | |
| HS-1 | 42 | 82 | 40 | 0.852 |
| HS-2 | 82 | 102 | 20 | 1.382 |
| HS-3 | 102 | 132 | 30 | 0.931 |
| HS-4 | 132 | 207 | 75 | 1.470 |
| HS-5 | 207 | 252 | 45 | 0.865 |
| HS-6 | 252 | 268 | 16 | 1.787 |
| Total (km) | | | 226 | |
| Homogeneous Section (RHS) : Delhi – Jaipur Section of NH-8 | | | | |
| Homogeneous Section | Chainage | | Length (km) | Deflection (mm) |
| | From | To | | |
| HS-1 | 42 | 53 | 11 | 0.601 |
| HS-2 | 53 | 98 | 45 | 0.415 |
| HS-3 | 98 | 128 | 30 | 0.995 |
| HS-4 | 128 | 148 | 20 | 1.614 |
| HS-5 | 148 | 223 | 75 | 0.704 |
| HS-6 | 223 | 268 | 45 | 1.215 |
| Total (km) | | | 226 | |

E1.7.2 Pavement Composition

Test pits investigations at each 10th-kilometer interval for in-situ testing of subgrade materials and pavement composition. Average thickness of the project road pavement crust is given below.

| Direction | Bituminous | WMM | GSB | Total |
|--------------|------------|---------|----------|---------|
| Delhi-Jaipur | 100-240 | 100-300 | 240-300 | 600-840 |
| Jaipur-Delhi | 100-240 | 150-300 | 0 to 400 | 360-840 |

It can be seen that 85th percentile value of Lab-CBR value for Up and Down direction carriageways are 17% and 20% (min. value 12%). And average compaction of subgrade has been observed to be 92% of MDD.

E1.7.3 Design Parameters

Main design input from project alignment soil for road works is design CBR for widening/new pavement and overlay design on existing pavement and design minimum CBR for



reconstruction on existing pavement has been adopted as 10 percent uniformly for each carriageway sections considering variability of various test results.

E1.7.4 Materials Surveys

The quality of locally available borrow materials is very good. Crushed materials for the different road sections can be served from the local quarries, generally the quality of materials available is good. The aggregates for Bituminous/Non-Bituminous material need to achieve good mechanical interlock, therefore, it is proposed to go for quarried materials rather than natural occurring riverbed coarse aggregate.

E1.7.5 Pavement Design Proposals

Average Daily Traffic of commercial vehicles

For the purpose of ready reference, base year (2006) commercial vehicle has been listed as below.

| Average Daily Traffic of commercial vehicles only (No. of Vehicles) | | | | | | | |
|---|------|---------|-----------|-----------------|--------|-------------------|-------|
| Base Year | Bus | Tractor | Tempo/LCV | Ordinary Trucks | | Multi Axle Trucks | Total |
| | | | | 2 Axle | 3 Axle | | |
| GURGAON-BAWAL SECTION | | | | | | | |
| 2006 | 2247 | 489 | 5211 | 6245 | 5122 | 2689 | 22003 |
| BAWAL-CHANDWAJI SECTION | | | | | | | |
| 2006 | 848 | 511 | 1876 | 3999 | 4251 | 1472 | 12958 |
| JAIPUR BYPASS SECTION | | | | | | | |
| 2006 | 24 | 68 | 649 | 1961 | 2685 | 1607 | 6993 |

Traffic Volume Growth Factor

The mode-wise percentage growth factor is reproduced as below.

| Period | Growth Factors for Goods Vehicles | | | | | |
|-------------------------|-----------------------------------|---------|-----------|-----------------|--------|-------------------|
| | Bus | Tractor | Tempo/LCV | Ordinary Trucks | | Multi Axle Trucks |
| | | | | 2 Axle | 3 Axle | |
| GURGAON-BAWAL SECTION | | | | | | |
| 2006-11 | 9.375 | 7.5 | 7.5 | 7.5 | 7.5 | 7.5 |
| 2016-25 | 7.5 | 6 | 6 | 6 | 6 | 6 |
| 2026-35 | 5.625 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| BAWAL-CHANDWAJI SECTION | | | | | | |
| 2006-11 | 9.375 | 7.5 | 7.5 | 7.5 | 7.5 | 7.5 |
| 2016-25 | 7.5 | 6 | 6 | 6 | 6 | 6 |
| 2026-35 | 5.625 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| JAIPUR BYPASS SECTION | | | | | | |
| 2006-11 | 9.375 | 7.5 | 7.5 | 7.5 | 7.5 | 7.5 |
| 2016-25 | 7.5 | 6 | 6 | 6 | 6 | 6 |
| 2026-35 | 5.625 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |

परियोजना निदेशक / Project Director
भारतसम्राट्, २०२५ / NHAI PILL
[Signature]

Vehicle Damage Factor

The numbers of equivalent 8.16 t standard axles for the different categories of commercial vehicles have been determined on the basis of the axle load surveys carried out at Daultapur. The value of vehicle damage factors, VDF, considered is reproduced as below.

| Vehicle Category | Vehicle Damage Factor Considered for Goods Vehicles | | | | | |
|------------------|---|---------|-----------|-----------------|--------|-------------------|
| | Bus | Tractor | Tempo/LCV | Ordinary Trucks | | Multi Axle Trucks |
| | | | | 2 Axle | 3 Axle | |
| VDF | 0.7 | 2.99 | 0.22 | 2.99 | 5.74 | 7.15 |

E1.7.6 Pavement Thickness Design: Construction Stage-I

The following Table gives the details of various layer thicknesses applicable for new pavement and rehabilitation / overlays for each road design section.

| S. No. | Direction | From (km) | To (km) | Length (km) | Average Deflection (mm) | Traffic Loading (msa) | | Overlay Thickness (mm) | | | Remarks | Design CBR | New Pavement Thickness (mm) | | | | |
|--------|----------------|-----------|---------|-------------|-------------------------|-----------------------|---------|------------------------|-----|-------|------------|------------|-----------------------------|-----|-----|-----|-------|
| | | | | | | Stage-1 | Stage-2 | BC | DBM | Total | | | BC | DBM | WMM | GSB | Total |
| 1 | Up Direction | 42.7 | 82 | 40 | 0.852 | 148 | 235 | 40 | 50 | 90 | | 10% | 40 | 150 | 250 | 200 | 640 |
| 2 | | 82 | 102 | 20 | 1.382 | | | 40 | 75 | 115 | Oundhi | | 40 | 150 | 250 | 200 | 640 |
| 3 | | 102 | 132 | 30 | 0.931 | | | 40 | 50 | 90 | Behror | | 40 | 150 | 250 | 200 | 640 |
| 4 | | 132 | 153 | 21 | 1.488 | | | 40 | 90 | 130 | Manoharpur | | 40 | 150 | 250 | 200 | 640 |
| | | 153 | 162 | 9 | 1.565 | 102 | 162 | 40 | 90 | 130 | | | 40 | 150 | 250 | 200 | 640 |
| | | 162 | 207 | 45 | 1.432 | | | 40 | 90 | 130 | | | 40 | 130 | 250 | 200 | 620 |
| 5 | | 207 | 220 | 13 | 0.865 | | | 40 | 75 | 115 | Harmara | | 40 | 130 | 250 | 200 | 620 |
| | | 220 | 252 | 32 | 0.811 | | | 40 | 50 | 90 | Bypass | | 40 | 120 | 250 | 200 | 610 |
| 6 | | 252 | 268 | 16 | 1.787 | 68 | 108 | 40 | 100 | 140 | | | 40 | 120 | 250 | 200 | 610 |
| 1 | Down Direction | 42 | 53 | 11 | 0.601 | 148 | 235 | 40 | 75 | 115 | Jamalpur | 10% | 40 | 150 | 250 | 200 | 640 |
| 2 | | 53 | 98 | 45 | 0.415 | | | 40 | 75 | 115 | Bawal | | 40 | 150 | 250 | 200 | 640 |
| 3 | | 98 | 128 | 30 | 0.995 | | | 40 | 90 | 130 | Neemrana | | 40 | 150 | 250 | 200 | 640 |
| 4 | | 128 | 148 | 20 | 1.614 | | | 40 | 105 | 145 | | | 40 | 150 | 250 | 200 | 640 |
| 5 | | 148 | 153 | 5 | 0.866 | 102 | 162 | 40 | 50 | 90 | Kotputli | | 40 | 150 | 250 | 200 | 640 |
| | | 153 | 162 | 9 | 0.691 | | | 40 | 50 | 90 | | | 40 | 150 | 250 | 200 | 640 |
| | | 162 | 220 | 58 | 0.708 | | | 40 | 50 | 90 | Chandwaji | | 40 | 130 | 250 | 200 | 620 |
| 6 | | 220 | 273 | 48 | 1.215 | 68 | 108 | 40 | 65 | 105 | | | 40 | 120 | 250 | 200 | 610 |

परियोजना निदेशक / Project Director:
भारतमार्ग, प.क.ई / NHAI PIU, Jaipur

**E1.7.7 Post Construction Maintenance Strategy:****Construction Stage-II**

As evident from earlier discussion, the design traffic loading for first section (from Gurgaon upto Kotputli) of the road is of very high volume, therefore requires periodic structural overlay at less than 10 years period for full design life.

The pavement composition for other two road sections (under Construction Stage-II) would require structural overlay in the year 2021. It is proposed that the pavement rehabilitation would consist of asphalt overlays only as given below:

| Section | Structural Overlay | | Year of Application |
|-------------------------|--------------------|-----|---------------------|
| | BC | DBM | |
| km 42.700 to km 153.000 | 40 | 115 | 2018 and 2024 |
| km 153.00 to km 220.500 | 40 | 110 | 2021 |
| km 220.500 to km 273.00 | 40 | 100 | |

It will be pertinent to provide functional overlay at suitable interval (preferably after 5 years) as per the need.

E1.8 EIA RECOMMENDATION

On the basis of discussions with the project sponsors, project team, NGOs, local people, various governmental officials and field visits over the entire length of the project road, it has been concluded that

- All elements of the projects will be beneficial;
- All negative impacts, during and post construction, including those deemed "significant" can be properly mitigated; and
- No comprehensive, broad, diverse or irreversible adverse impacts have been identified.

For widening and strengthening of existing four lanes road into six lanes will required felling of large number of trees. The total number of existing trees within the 15 m Right of Way (ROW) from the edge of carriageway on either side is 49,362 (On left 17,457 and on right side 31,905). Entire linear plantation along the road (within ROW) is notified as protected forest and the requirement of clearance from the concerned Forest Department is mandatory. At few locations project road passes along the Reserve Forest viz. km 226.4 to 226.9, 227.9 to 228.3 and 245.4 to 245.8, but no land acquisition is proposed at these locations.

For all works, the PIU/NHAI will have to obtain clearances from the Forest Department for tree felling and have to take Consent from the Rajasthan and Haryana Pollution Control Board under Air and Water Prevention and Control of Pollution Act.

A wide range of short-term negative impacts are, however, envisaged during construction - these include: disturbance to wildlife and settlements; localized dust pollution; small-scale erosion; and health hazards amongst construction workers and those residing in nearby settlements. However, most of these can be adequately mitigated through environmental Friendly Road Construction techniques; proper location of construction camps; and equipping construction sites with adequate medical facilities.

**E1.9 SOCIAL IMPACT ASSESSMENT**

The proposed six laning of Delhi –Jaipur highway (from Km 42.700 to km 273.000 km.) including Jaipur Bypass, which starts from Km 220.500 and meet NH-11 of Jaipur –Ajmer road at Harmara village about 12 km away from Jaipur city, is an important road and unable to meet the demand of heavy traffic

The initial social assessment for the project, as a part of feasibility study, is based on Rapid Social Survey and Public Consultation with potential affected population and others stakeholders. The finding of the social assessment suggests that likely adverse social impacts due to widening of project road appear to be very significant. The land acquisition and impact on structures and property is immense and may affect the life and livelihood of the significant number of people (PAPs) along the project road. The area, which include Manesar (47.000-50.500), Bilaspur (59.700-60.500), Dharuhera (68.000-72.200), Behror (134.00-135.00), Kotputli (152.500-156.700), Paota (174.500-175.600), Shahpura (203.000-205.500), Manoharpur (212.000-213.600) are considered as area of concern (hot spot), where large number of structures being used as commercial purpose are likely to be impacted.

The implementation of the project will not only affect the structures/ properties being used as commercial purpose but also livelihood for many a persons. Widening of existing four lanes road in to six lanes will require land acquisition almost through out the project corridor except at few locations, where reserved forest is involved. Generally the structures in the left side of the project road have severe impact and likely to be dismantled

During project planning and design, conscious efforts were made to minimize displacement with the intention to avoid, reduce or mitigate rehabilitation requirements and other adverse social impacts. Despite these efforts, land acquisition requirements for the widening work will still affect to varying degrees - approximately 282 hectares of land all along the project road along with 3744 structures, comprising of 3661 households (excluding the number of Land holders) and 13561 PAPs of different categories.

Amid the affected properties, 46 are temples and 1 are mosque in which 23 are facing threat of dismantling, need creature handling by the PIU in close consultation with the affected people and community.

E1.10 COST ESTIMATES

Quantities of various components of road strengthening and widening works (including service road) as well as bridge widening and proposed structure works are computed in accordance with the proposed scheme. Basic schedule of rates for road and bridge works for National highways issued in March 2006 by Superintending engineer, PWD, National highway, circle-Jaipur are used for preparing the estimate.

The approximate estimated cost of road and bridge works is 10661.22 million rupees and 4510 million rupees respectively. However the cost of land acquisition, rehabilitation, utility relocation and environmental costs are not considered. The total cost per kilometer is 67.3 million rupees.

परियोजना निदेशक / Project Director
भारत सरकार, प.का.ई. / NHAI PIU, Jaipur