



Public Works Department (Building & Roads) Punjab

OPRC for Improvement, Rehabilitation, Resurfacing & Routine Maintenance Works of Roads of Sangrur-Mansa- Batinda Contract Area



Environmental Screening Report B8: Bathinda- Kotshamir-Talwandi Sabo (upto intersection with S4): (SH 17)

July 2013

PATTEL

Patel Infrastructure
Private Limited
Camp: Sangrur, Punjab



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Making Infrastructure Happen

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1 INTRODUCTION

1.1 About OPRC

Output and Performance based Road Contract is designed to increase the efficiency and effectiveness of road asset management and maintenance. It ensures that the physical condition of the roads under contract is adequate for the needs of road users, over the entire period of the contract which is normally several years. The OPRC as a model for road asset management is similar to Design, Build, Maintain, Operate and Transfer (DBMOT) model of contracts which addresses the issue of inadequate incentives. Minimum road conditions and Service Levels are defined through output and performance measures, and these are used under the OPRC to define and measure the desired performance of the Contractor. In the OPRC, the defined performance measures are thus the accepted minimum thresholds for the quality levels of the roads for which the Contractor is responsible and covers all aspects of the contract

1.2 Project Background

The Output and Performance based Road Contract (OPRC) for Improvement, Rehabilitation, Resurfacing & Routine Maintenance works has been undertaken by the PWD R&B, Govt. of Punjab for project roads in Sangrur-Mansa-Bathinda Contract Area. The area under contract falls in the jurisdiction of the Sangrur, Mansa & Bathinda districts in Punjab. The project road of B8- Bathinda- Kotshamir-Talwandi Sabo (upto intersection with S4): (SH 17) is one of the roads in the OPRC project.

The interventions proposed by OPRC for the Roads of Sangrur-Mansa-Bathinda Contract Area are

- Improvement Works including widening of 128.900 Km
- Rehabilitation works including the treatment across the full width of pavement, including shoulders, over a continuous length of at least 100 meters for a total 74.780 Km
- Resurfacing works which shall cover the entire 203.680 km length over the entire duration of the contract period

The intervention proposed for the project road is rehabilitation work.

1.3 Scope of Work

As defined in the Section VI Specifications – Environmental & Social Management, an ESMF Framework for the OPRC Project has already been prepared. The specifications lay down the requirement of Environmental Screening along with baseline data collection and mapping. It is also required to study the interventions proposed and the legal clearances that it attracts followed by Environmental & Social Impact Assessment which shall also formulate the EMP.

This report deals with environmental screening as envisaged for the project. The primary baseline data are being generated for air, water, noise & soil. A reconnaissance survey was conducted by the environmental team which has identified sensitive receptors in the project road.

1.4 Environmental Screening

Environmental screening study has been carried out to identify critical issues and areas that would be studied in detail for impact assessment, mitigation measures and management plan. Findings of the screening are presented in this report. Further details will be taken up during subsequent stages of the project preparation, if required. This report has been prepared based mainly on field survey and collection of secondary data.

In the screening stage, existing environmental set-up of the study corridor in general i.e., the Corridor of Impact (CoI) and the existing Right of Way (RoW) in particular were studied and is described in subsequent sections. The entire study was carried out within existing policy, legal and administrative framework considering the applicable environmental legislation, regulations and guidelines. The environmental screening report covers the following:

- Project Description
- Need & benefit of the project
- Legal Framework
- Baseline Environment
- Probable Environmental Impact
- Mitigation Measures

Project Road: B8- Bathinda- Kot shamir-Talwandi Sabo (up to intersection with S4): (SH 17)

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1.4.1 Methodology Adopted

Screening process consisted of the following types of activities:

1.4.1.1 Study of Background information

Study of Project Documents: the project documents are being studied to have the understanding of the project objectives, its main components, its boundaries etc.

Study of Laws and regulations: Laws and regulations enacted by Government of India and Punjab state relevant to road construction and environment were studied.

Study of Guidelines, Standards etc.: Various documents and publications of the Ministry of Environment and Forest (MoEF) and Indian Road Congress were studied for screening exercise.

1.4.1.2 Field Visit

A team of environmental and social experts jointly carried out field visit of the project road. Important environmental components including, water bodies, forests, public utilities, community resources, cultural sites etc. along the corridor of impact zone were identified. Discussions with local people and administrators were also held to obtain their opinion about the project.

Table 1-1: Important Environmental Components

Sl. No.	Environmental Attributes	Environmental Components
1	Topography	Terrain
2	Land use	Agriculture, settlements, forest; industrial areas etc.
3	Water resources	Rivers, canals and ponds within COI
4	Forests & Wild Life	<ul style="list-style-type: none"> Designated Protected Areas like Biosphere Reserves, National Parks and Sanctuaries etc.) within 10 Km from the proposed project location boundary Presence of RF, PF other forests within COI
	Road side Plantations	Green Tunnels, Strip Plantation
5	Settlements	Towns and villages abutting the road corridor
6	Sensitive Receptors	Sensitive receptors such as educational and health facilities
7	Drinking water sources	Wells, hand pumps, community water points / taps etc.)
8	Religious Structures	Temples, shrines, mosque, church, gurudwara etc.
10	Cultural Properties	Protected / unprotected archaeological monuments)
11	Common Property Resources	Seating areas of the community; cremation / burial grounds etc.

Figure 1-1: Photographs of Consultations with Project Manager



1.4.1.3 Collection of Secondary Data

Data collection from the secondary sources has been done from various authentic and published sources. Following are some important information available from secondary sources.

- Project objectives, technical information on existing road features from Contract Document
- Inventory of road features like water bodies, community structures, environmentally sensitive locations areas, congested locations etc. from physical surveys
- Climatic condition & meteorological data from government websites & district groundwater brochure of CGWB & primary data collection
- Geology, seismicity, soil and topography from government websites & district groundwater brochure of CGWB

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- Land Use from Google Earth and observation during surveys
- Drainage pattern from district groundwater brochure of CPCB & field observation
- Borrow areas, quarries and other construction material source from Contractor's sources

1.4.1.4 Generation of Primary Data

Field study / monitoring are being carried out to generate and collect primary data in the study corridor, which involves:

- Water quality monitoring at identified ground water and surface water locations
- Air quality monitoring at identified locations
- Ambient noise level monitoring at identified locations
- Enumeration of roadside trees by Contractor



2 PROJECT DESCRIPTION

2.1 Project Road

The project road B8- Bathinda- Kotshamir-Talwandi Sabo (upto intersection with S4): (SH 17) is 28.65 Km long and starts from Km. 0.000 at Intersection of NH 64 at Bathinda and end at intersection of S4 at Talwandi Sabo of ODR 9 at Km 28.65. The proposed length of the project road is also 28.65 Km.

2.2 Project Influence Area

The project district is Bathinda district in Punjab State. The district is bounded by Haryana in the South, Barnala, Moga & Faridkot districts in the North, Mansa & Barnala districts in east and Muktsar & Faridkot districts in west. The existing Right of Way (RoW) is varies from 20.13 to 30.05 m as per records and Specifications of the contract. As only rehabilitation works is proposed on this project road, the proposed RoW is also varies from 20.13 to 30.05 m and the Corridor of Impact (Col) is thus varies from 25 to 35 m.

2.3 Project Proponent

The project proponent is PWD R&B, Government of Punjab.

2.4 Contractor

The Contractor for the project is Patel Infrastructure Pvt. Ltd. (Patel)

2.5 Need for the Project

- Provide easy access to commuters from Bathinda to Talwandi sabo (Intersection with S4 at ODR 9 to intersection of NH 64 of Bathinda –Jai Singhwala section).
- The road links NH 64 (Bathinda – Jai Singhwala section) with ODR 9 (Mansa - Talwandi Sabo section).
- Caters to the traffic growth pegged at 7.20% for Car, 4.00% for 2W, 3.20% for Bus, 5.77% for LCV, 2.61% for 2AT, 5.90 for 3AT & 7.76% for MAV Beyond 2022

2.6 Expected Benefits

The major benefits of the project are:

- Project Road would bring about all-round development activities in the region, such as movement of people and goods, agriculture, commerce, education, health and social welfare, or even maintenance of law and order and security
- The proposed road is beneficial to travellers commuting between Bathinda, Kotshamir, Talwandi sabo and beyond.

Figure 2-1: Photographs of Project Road



Project Road: B8- Bathinda- Kot shamir-Talwandi Sabo (up to intersection with S4): (SH 17)

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2.7 Existing Features

2.7.1 Alignment

- The project highway presently is an intermediate lane carriageway for 28.65 Km
- Earthen shoulder of 1.0 to 1.5 m width is observed on both sides along the project, paved shoulder is non existent
- The entire project road is of Flexible pavement
- Average embankment height varies from 0.5 m to 1.0 m
- There are approximately 15 left hand and 18 right hand Horizontal curves

Table 2-1: Existing Cross Section details

Carriageway Width (m)	Earthen Shoulder Width (m)	Embankment Height (m)
10-14.5	1.0	0.5 – 1.0

2.7.2 Right of way

The present right of way along the project stretch is varies from 20.13 to 30.05 m.

2.7.3 Road inventory

The road has 5 major intersections & 68 minor intersections. The road inventory details are given in Engineering Report.

Table 2-2: Existing Road Inventory

Major Intersection	Minor intersection	Major bridges	Minor bridges	PUP	Level Crossing	Flyovers	Culverts		ROB / RUB	
							Box / slab	Pipe	ROB	RUB
5	68	1	3	-	-	-	23	9	-	-

Source: Primary Road Inventory Survey

2.7.4 Traffic

The project road section had been divided into 1 homogenous section. The traffic was counted in 1 location all along the project road. The average daily traffic along the project road is 4231 PCUs. The traffic is mainly mixed traffic.

2.8 Proposed Features

2.8.1 Alignment Proposal

- The length of the project road is 28.65 m

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- Rehabilitation work across the full width 10 m, 14 m and 14.5 m carriage way with 1-1.5 m hard shoulder in settlement areas and 1m earthen shoulder on both sides in rural areas
- 3 Typical Cross Sections (C1 ,C2 & D) for rehabilitation of the project road has been proposed as per Specifications and Contract Works of the project
- Both side directional cross-fall of 2.5% proposed for the pavement and paved shoulders. For earthen shoulders it will be minimum 3.0%

2.8.2 Right of Way

- Proposed RoW is varies in general from 20.13m to 30.05 m.
- No Land acquisition is proposed

2.8.3 Pavement

- Rehabilitation work for flexible pavements are proposed for all throughout the road

2.8.4 Geometric Design Aspects

- No improvement in geometrics is proposed. Only rehabilitation of the carriageway is proposed

2.8.5 Bypasses and Realignments

- The project doesn't propose any bypasses and realignments.

2.8.6 Service roads

- No Service roads are proposed in the project road

2.8.7 Cross Drainage Structures

- The project road has proposed 32 culverts, 3 minor bridges and 1 major bridge..

Table 2-3: Proposed Cross Drainage Structures

Major bridges	Minor bridges	Box / Slab Culverts	Pipe Culverts	Total
1	3	23	9	36

2.8.8 Other Structures

- No underpasses, overpasses & flyovers proposed

2.8.9 Drainage

- Drains have been provided on both the sides for the entire length of the road
- The length of unlined drains is 3.635 Km while lined drains is 5.510 Km.

2.8.10 Design of Intersections

All junctions have been studied thoroughly with respect to traffic volume and geometric design. The important junctions leading to settlements have been identified and proper junction layouts (including road marking, and traffic signs) shall be applied as per IRC-SP: 41-1994.

2.8.11 Traffic Control and Road Safety Features

Traffic control devices and road safety features, including Traffic Signs, Road Markings, Road lighting & Crash Barriers are proposed and designed as per relevant IRC codes and standards.



3 LEGAL FRAMEWORK

This section elaborates on the various clearance requirements for the project from the State Government and MoEF, GoI.

3.1 Environmental legislations and their implications / application

The Government of India has formulated various policy guidelines; acts and regulations aimed at protection and enhancement of environmental resources. The following table surmise the existing legislations pertaining to the project, the various clearances required for the project and the status as on date.

Table 3-1: Relevant Environmental Laws & Regulations

Sl. No.	Law / Regulation / Guidelines	Relevance	Applicable Yes / No	Reason for Application	Implementing / Responsible Agency
1	The Environmental (Protection) Act, 1986, and the Environmental (Protection) Rules, 1987-2002 (various amendments)	Umbrella Act. Protection and improvement of the environment. Establishes the standards for emission of noise in the atmosphere.	Yes	All environmental notifications, rules and schedules are issued under the act	MoEF, State Department of Environment & Forest, CPCB and SPCB
2	The EIA Notification, 14th September 2006 & subsequent amendments	Identifies expansion of National highways greater than 30 Km involving additional ROW greater than 20m involving Land Acquisition and all new state highway projects & SH expansion projects in hilly terrain (above 1000 MSL) and or ecological sensitive areas (item 7 (f) of schedule) as one of the projects requiring prior clearance.	No	Project road is existing SH and neither a new state highway nor a SH expansion projects in hilly terrain (above 1000 MSL) and or ecological sensitive areas	MoEF / SEIAA
3	Notification for use of Fly ash, 3rd November 2009	Reuse fly ash discharged from Thermal Power Station to minimise land use for dispersal and minimise borrow area material. The onus shall lie with the implementing authority to use fly ash unless it is not feasible as per IRC	No	No utilisation of borrow earth material	MoEF, SPCB
4	The Water (Prevention and Control of Pollution) Act, 1974	Central and State Pollution Control Board to establish/enforce water quality and effluent standards, monitor water quality, prosecute offenders, and issue licenses for construction/operation of certain facilities.	Yes	Consent required for not polluting ground and surface water during construction	State Pollution Control Board
5	The Air (Prevention and Control of Pollution) Act, 1981	Empowers SPCB to set and monitor air quality standards and to prosecute offenders, excluding vehicular air and noise emission.	Yes	Consent required for establishing and operation of plants	State Pollution Control Board
6	Noise Pollution (Regulation And Control) Act, 1990	Standards for noise emission for various land uses	Yes	Construction machineries and vehicles to conform to the standards for construction	State Pollution Control Board
7	Forest (Conservation) Act, 1980	Conservation and definition of forest areas. Diversion of forest land follows the process as laid by the act	No	No involvement of forest land diversion for the project	State Forest Department, MoEF
8	Coastal Regulatory Zone Notification,	Protect and manage coastal areas	No	The project area is not within	MoEF, State Department of

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Sl. No.	Law / Regulation / Guidelines	Relevance	Applicable Yes / No	Reason for Application	Implementing / Responsible Agency
	1991			designated coastal zone	Environment
9	Wild Protection Life Act, 1972	Protection of wild life in sanctuaries and National Park	No	No wildlife sanctuaries are present within 10 km radius.	State Forest Department, MoEF
10	Ancient Monuments and Archaeological sites and Remains Act 1958	To protect and conserve cultural and historical remains found.	No	No Archaeological monument along the project road	Archaeological Survey of India, State Dept. of Archaeology
11	The Motor Vehicle Act. 1988	Empowers State Transport Authority to enforce standards for vehicular pollution. From August 1997 the "Pollution Under Control Certificate is issued to reduce vehicular emissions.	Yes	All vehicles used for construction will need to comply with the provisions of this act.	State Motor Vehicles Department
12	The Explosives Act (& Rules) 1884 (1983)	Sets out the regulations as to regards the use of explosives and precautionary measures while blasting & quarrying.	No	No new quarrying operation to be started by the contractor	Chief Controller of Explosives
13	Public Liability And Insurance Act, 1991	Protection to the general public from accidents due to hazardous materials	Yes	Hazardous materials like Bitumen shall be used for road construction	State Pollution Control Board
14	Hazardous Wastes (Management and Handling) Rules, 1989	Protection to the general public against improper handling and disposal of hazardous wastes	Yes	Hazardous wastes shall be generated due to activities like of maintenance and repair work on vehicles	State Pollution Control Board
15	Chemical Accidents (Emergency Planning, Preparedness and Response) Rules, 1996	Protection against chemical accident while handling any hazardous chemicals resulting	Yes	Handling of hazardous (flammable, toxic and explosive) chemicals during road construction	District & Local Crisis Group headed by the DM and SDM

3.2 Environmental Categorisation

This project doesn't falls either under Category 'A' or 'B' project as far Prior Environmental Clearance is concerned, as this project doesn't satisfies all the criteria laid under the purview of the EIA Notification of September 2006 and its subsequent amendments. The project road is an existing state highway and neither a new state highway nor a SH expansion projects in hilly terrain (above 1000 MSL) and or ecological sensitive areas.

Hence Prior Environmental Clearance is not required from State Environmental Impact Assessment Authority or MoEF. Thus a formal EIA is also not required as per the EIA Notification of September 2006 and its subsequent amendments.

3.3 World Bank Operational Policies

The Operational Policies of the Bank, both triggered and not triggered, the details and the applicability to the project road are provided in the table below. The World Bank environment assessment (EA) requirements are based on a three-part classification system such as Category A, Category B and Category C as defined by the World Bank OP 4.01. A project designated as Category A, requires a full environmental assessment (EA) Category B projects require a lesser level of environmental investigation. Category C projects require no environmental analysis beyond that determination. **The project shall have minimal or no adverse environmental impacts as per screening and no further EA action is required for the project.**

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Table 3-2: World Bank Safeguard Policies

Sl. No.	Safeguard Policy	Subject Category	Triggered	Triggered By	Mitigation Measures	Documentation
1.	OP 4.01	Environment Assessment	No	Sensitive areas and impacts on environmental and social components	Not Applicable	Not Applicable
2.	OP 4.04	Natural Habitats	No	Diversion of forest areas	Not Applicable	Not Applicable
3.	OP 4.09	Pest Management	No	Not applicable	Not applicable	Not Applicable
4.	OP 4.11	Physical Cultural Resources	No	Risk to cultural properties	Not Applicable	Not Applicable
5.	OP 4.36	Forestry	No	Diversion of forest land	Not Applicable	Not Applicable
6.	OP 4.37	Safety of Dams	No	Not Applicable	Not Applicable	Not Applicable
7.	OP 7.50	International Waterways	No	Not Applicable	Not Applicable	Not Applicable
8.	OP 7.60	Disputed Area	No	Not Applicable	Not Applicable	Not Applicable

3.4 Environmental Permits / Approvals Required

The summary table showing time requirements for agency responsible for obtaining clearance and a stage at which clearance will be required is given below:

Table 3-3: Summary of Clearances & NOCs Applicable

Sl. No	Type of clearance	Statutory Authority	Applicability	Project stage	Time required
1	Tree felling permission	State Department of Environment and Forest	Felling of trees	Pre construction	1-2 months
2	NOC And Consents Under Air, Water, EP Acts & Noise rules of SPCB	State Pollution Control Board	For establishing plants	Construction (Prior to work initiation)	2-3 months
3	NOC And Consents Under Air, Water, EP Acts & Noise rules of SPCB	State Pollution Control Board	For operating Hot mix plants and batching plants	Construction (Prior to work initiation)	1-2 months
4	Permission to store Hazardous Materials	State Pollution Control Board	Storage and Transportation of Hazardous Materials and Explosives	Construction (Prior to work initiation)	2-3 months
5	PUC certificate for use of vehicles for construction	Department of Transport	For all construction vehicles	Construction (Prior to work initiation)	1-2 months
6	NOC for water extraction for construction and allied works	Ground Water Authority	Ground water extraction	Construction (Prior to work initiation)	2-3 months

Table 3-4: Summary of Clearances & NOCs Not Applicable

Sl. No	Type of clearance	Statutory Authority	Reason
1	Prior Environmental Clearance	MoEF / SEIAA	Not a category A / B project
2	Permission for Activities near archaeological protected area	Archaeological survey of India / the state department of Archaeology	No Archaeological structures in the project road
3	Diversion of Sanctuary land / Permission for road construction	Chief Wild Life Warden	No wildlife sanctuary present within 10 Km. radius of the project road
4	Forest Clearance	State Department of Environment and Forest and MoEF	No diversion of forest land

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4 BASELINE ENVIRONMENT

4.1 Physical Environment

4.1.1 Climate and Meteorology

The general climate has temperatures ranging from 3°C in winter to highs of 47°C in summer (June). The average annual rainfall is approximately 408 mm, with much of this occurring during the monsoon season which typically extends over the months of July, August and September. Dust storms can be a regular feature in summer season.

4.1.2 Topography

The project road is situated in Malwa region which is the area south of River Sutlej. The topography of Punjab can be divided into the upper portion of the sub-Shivalik area and the rest of Punjab (where this network is located). The Shivalik area at an altitude of 400 to 700 metres above sea level is made up of fluvial deposits of conglomerates, clays and silts-all. The low Shivalik Hills demarcates the Himalayas from the plains.

4.1.3 Air Quality

Monitoring of air quality have been establishing the exact scenario and have also been help to assess the potential impact of the project on them. To establish the baseline air quality scenario representative ambient air quality-monitoring stations have been established within the study corridor and sampling and analysis of air samples have been conducted as per established standard methods and procedure.

The concentration of PM₁₀ is observed higher than the standards (as per NAAQS 2009) during the monitoring period (March-May 2013). It might be due to the dust generated from thrashing of Wheat crop in the agricultural field in addition to plying of heavy traffic such as trucks and other combustion engine vehicles in nearby roads. The concentrations of other parameters such as PM_{2.5}, SO₂, NO_x and CO are found well below the standards as per National Ambient Air Quality Standards 2009.

4.1.4 Water Availability and Quality

There are a total of 29 Hand pumps, 18 water bodies (8 ponds, 8 canals and 2 drainages) along the project corridor. The project area falls under over exploited zones as per CGWB. The pre monsoon ground water table varies from 3.67m-15.86mbgl and the post monsoon ground water table varies from 4.17m-16.76mbgl in Bathinda district.

For generating data on surface water quality as well as ground water quality parameters and drawing up the baseline scenario in the study corridor, representative surface water and ground water quality monitoring stations have been selected for the purpose of assessing the quality of surface and ground water. Samples collected have been analysed for physical, chemical and bacteriological parameters as per established standard methods and procedures.

Figure 4-1: Photographs of Water Resources





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4.1.5 Noise Quality

Ambient noise level monitoring using suitable sound level meter have been carried out to assess the background noise levels and characterise the noise environment in the study corridor. An analysis of the different Leq data obtained during the study period has been made. Variation was noted during the day-time as well as night-time.

4.1.6 Drainage conditions

Presently drains are almost existent along the project corridor. There is no issue of drainage.

4.1.7 Soil Monitoring

To assess the impacts of the developmental activities of the project on the soil in the area, the physiochemical characteristics of soils within the study corridor have been examined by obtaining soil samples from selected areas and analysing the same for establishing the baseline data.

4.2 Biological Environment

4.2.1 Protected Natural & Wildlife Habitats

The project road does not fall within 10 Km radius of any Protected Natural Habitats (Biosphere Reserves, National Parks and Sanctuaries).

4.2.2 Forest Area

The entire avenue plantation area along the project road has been declared protected forest as per information made available by the Contractor. The proposed project shall not require any land from the forest department.

4.2.3 Flora

The dominant flora along the project road is *Pongomia pinnata*, *Acacia nilotica*, *Ficus benghalensis*, *Terminalia arjuna* & *Eucalyptus* sp. There are some trees along the project road which might be needed to fell as these can cause safety hazard. **No vulnerable, threatened, endangered species of flora and fauna are reported.**

4.3 Socio-economic Environment

4.3.1 Settlement

There are a total of 9 settlements varying in size and populations along the project corridor.

4.3.2 Land-use

The highway passes through plain terrain along the entire stretch. The abutting land use along the project road are forest land, barren & revenue, agricultural and settlement lands.

4.3.3 Cultural / Religious resources

There are no archaeological heritage, local built heritage and art forms along the project road. There are 7 gurudwaras, 2 dargah, 1 Dharmshala & 1 Ashram along the project road.

Figure 4-2: Photographs of Cultural / Religious Resources





Noise Sensitive Receptors

There are a total of 7 educational institutes (4 schools, 2 colleges and 1 university) along the project corridor. These receptors are outside the ROW

Figure 4-3: Photographs of Noise Sensitive Receptors





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5 POTENTIAL ENVIRONMENTAL IMPACTS

This section provides the potential impacts likely on the various environmental components along the project corridor based on the field visits and the primary surveys. Most of the impacts on the various environmental components shall be perceived during construction and operation phase. The key environmental, health, safety and social issues that were identified to have a major impact due to the various proposed interventions are as below:

- Air quality
- Water pollution, drinking water sources, water scarcity in non-monsoon months and construction water requirements
- Roadside trees, tree plantation
- Employment opportunity during civil works

The table below shows the general impact on the environmental components due to the project.

Table 5-1: General Impacts on Environment in B 8 Road

Env. Component Affected	Construction Phase				Road Operation	Indirect effects of Operation or Induced Development
	Project Activity					
	Removal of trees and Vegetation	Earth works	Laying of Pavement	Vehicle & Machine Operation	Vehicle operation	-
Air	Air pollution, Hotter, drier microclimate	Dust generation	Asphalt odour	Dust pollution		Air pollution due to increase in vehicle
Land	Contamination of land		Contamination of land -	Contamination by fuel & lubricants compaction	Spill from accidents	-
Water	Siltation	Alteration of drainage	-	Contamination by fuel & lubricants compaction	Spill Contamination by fuel & lubricants &	Increased contamination of ground water
Noise	Noise pollution					
Flora	Felling of trees & trimming of branches of some trees that might cause safety hazard	-	-	-	Impact of pollution on vegetation	-
Fauna	Disturbance due to habitat loss	Disturbance	-	Disturbance	Collision with traffic	Distorted habitat
People and community	Loss of shade and community trees, loss of fuel wood and fodder, loss of income	Dust Nuisance	Noise & air pollution	Odour and dust	Noise pollution, Risk of accidents	Induced pollution
Cultural assets	Displacement of structures from Row	Loss of sacred trees (if any)	-	Noise vibration may cause structural damage	Damage from vibration and air pollution	-
Labour's health & safety	Increase of stagnant water and diseases			Asphalt odour and dust	-	-



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6 MITIGATION AND ENHANCEMENT MEASURES

6.1 General

The negative impacts of road projects can be reduced or minimised only if proper safeguards are put in place during the design and construction stage itself. These can include reducing pollutant discharge from the harmful activities at source or protecting the sensitive receptor. An effective mitigation strategy will utilise a combination of both options to arrive at practically implementable measures. Conscious efforts shall be worked out to minimise any adverse impacts on the various environmental and social components. Where the impacts on various environmental components shall be unavoidable, suitable mitigation designs shall be worked out.

6.2 Construction Related Activities

Most of the direct impacts of a road project occur during the construction stage. This stage is also important since the people living near the sites are inconvenienced without the collateral benefits of a functional road. Moreover, construction related activities are confined within an identifiable boundary and so is the affected population. It is also the stage of the project when Patel Infra, can exercise maximum control to ensure that the environmental impacts are minimised. Good engineering practices and Corporate Social Responsibility like employing local population, self help groups & NGOs for various work activities shall not only ensure taking care of the environmental concerns but also engage the community and create goodwill with the early in the project.

6.3 Land Acquisition- Mitigation Measures

No land acquisition is proposed

6.4 Safety

The project takes care of safety measures for road users including pedestrians as per IRC guidelines. Advance warning signboards, flagmen are proposed during the construction period. Care shall be taken during construction with habitation areas and especially near Schools. All the signboards giving caution and barricades for diverting the traffic shall be as per IRC & PWD R&B specifications. Some trees might need to be felled / branches trimmed since these might become potential safety hazards due to their existing locations. However care shall be taken to save as many trees as possible from felling.

6.5 Environmental Enhancement

It is planned to enhance the environment in 3 areas:

- Enhancement of 8 water bodies at Km 15+730 LHS at Kotshamir, Km 20+800 LHS at Jeewan Singhwala, Km. 25+410 LHS at Bhagi Wandar, Km. 26+500 LHS at Bhagi Wander, Km. 27+000 LHS at Bhagi Wander , Km. 27+200 RHS at Bhagi Wander, Km. 27+750 LHS at Bhagi Wander, Km. 36+340 LHS at Nawan pind as per design, drawings and direction of the Environmental Specialist
- Enhancement of 11 cultural properties including seating arrangements where ever guided by the Project Manager.
- Enhancement of boundary walls of Civil Hospital, Bhagi Wander at Km. 27+000 RHS, Mount Litera School at Km. 12+900 LHS, Government secondary school at 15+340 LHS, Sudesh Vatika convent school at Km. 26+200 LHS, Sri D. S. S. School at Km. 30+300 RHS, Guru Govind Singh College at Km. 32+900 RHS, Guru Govind Singh Poly. College at 36+360 RHS, Guru Kashi Univ. at Km. 36+400 RHS by planting of creepers on the exterior wall and planting of 1 row of flowering, shade, medicinal, ornamental & fruit bearing trees inside the boundary at a distance of 3m c/c and as per directions of the Environmental Specialist .

6.6 Environmental Management Plan

Environmental impacts could be positive or negative, direct or indirect, local or regional and also reversible or irreversible. The impacts generated during construction and operational phase of the roads along with management plan for these impacts has been discussed in Environmental Management Plan. Environmental management considerations in the form of EMP have been designed for project activities based on sample EMP and the Codes of practices. The EMP shall provide guidelines & help Patel Infra in implementing and incorporating environmental management practices to reduce negative environmental impacts of the project. The plan outlines existing and potential problems that may impact the environment and recommends corrective measures where required. Enhancement measures are also proposed in order to provide good environmental practices and improve the aesthetics. The EMP for the project road is being submitted separately.

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6.7 Environmental Budget

The environmental budget for the various environmental management measures proposed in the EMP is detailed in table below. The rates adopted for the budget has been worked out on the basis of market rates.

Table 6-1: Environmental Budget

Item No.	Component	Description	Cost in Crores
1	Mitigation / Enhancement Cost		
1.1	Construction Stage		
1.1	Air	Dust Management with sprinkling of water, covers for vehicles transporting construction material	0.076
1.2	Environmental Enhancements	Enhancement of 8 water bodies at locations and chainages as per design, drawings and direction of the Environmental Engineer / Environmental Specialist of the Engineer.	0.200
1.3		Enhancement of cultural properties including seating arrangements.	0.110
1.4		Enhancement of boundary walls of 7 educational institutes and 1 hospital by planting of creepers on the exterior wall and planting of 1 row of flowering, shade, medicinal, ornamental & fruit bearing trees inside the boundary at a distance of 3m c/c and as per directions of the Engineer	0.080
	Total Mitigation / Enhancement Cost		0.466
2	Monitoring Cost		
2.1.1	Air	Sampling, monitoring & analysis of ambient Air Quality and gaseous pollutants as per CPCB Standard Procedures at as per direction by Environmental Specialist as per CPCB guidelines	0.016
2.1.2	Water	Sampling, monitoring & analysis of water Quality as per Standard Procedures at as per direction by Environmental Specialist as per CPCB guidelines	0.013
2.1.3	Noise	Monitoring Noise level as per directions of Environmental Specialist as per CPCB guidelines	0.008
2.1.4	Transportation Cost	Transportation cost for monitoring	0.003
	Total Monitoring Cost		0.04
3	Miscellaneous Cost		
3.1	Training	Training	0.025
3.2	Advocacy and Policy Making	Holding meetings for policy planning and subsequent review meetings with Revenue Department, Forest Department, local representatives, NGOs, etc. regarding development controls.	0.014
3.3	Administrative Charges including logistics	Maintenance of vehicle with the Environment Cell, Data processing, administrative support, stationery etc.	0.042
3.4	Miscellaneous Items	Digital Camera for the Environment Cell	0.001
	Total Miscellaneous Cost		0.082
	Total Cost		0.588
	Contingency @ 5% on Total Environmental Cost		0.029
	Grand Total		0.617

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7 CONCLUSION

The screening process has primarily tried to focus on the potential impacts due to the proposed project and to propose mitigation measures through an appropriate EMP for the project. Based on the findings during the screening study the following can be safely deduced:

- The project is an existing State Highway and neither a new state highway nor a SH expansion projects in hilly terrain (above 1000 MSL) and or ecological sensitive areas. Thus the project doesn't qualify as a category A / B project as per EIA notification of Sept 2006 and its subsequent amendments. **Hence no Prior Environmental Clearance is required**
- The OPRC intervention in the project has rehabilitation work and doesn't involve widening of the existing road. **Thus no Land Acquisitions involved.**
- **No Diversion of Forest Land is involved in this project. Thus Forest Clearance is not required for diversion of forest land**

However a few trees needed to be felled as these are potential safety hazard. **Permissions to be obtained from Forest Authorities before felling.**

- The project road does not fall within 10 Km radius of any Protected Natural Habitats (Biosphere Reserves, National Parks and Sanctuaries). **Thus no Wild life Clearance / Permission required**
- No presence and impact on Archaeological features. **Thus no archaeological clearances / permissions to be obtained**
- Based on the above conclusions and the screening study, it is found that the project is a rehabilitation project with no land acquisition and negligible tree felling and shall have minimal or no adverse environmental impacts. **Thus the project falls under Category C as per Operation Policy 4.01 of World bank and as per WB guidelines no further EA action is required beyond environmental screening for the project**
- Environmental considerations in the form of EMP designed for project activities based on sample EMP and the Codes of practices. Separate EMP for the project road to be submitted
- Some squatters shall be affected due to the project and their rehabilitation shall be taken up as per Social Screening



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