सत्यमेव जयते

Roads and Buildings Department

Government of Gujarat

Second Gujarat State Highway Project

(GSHP-II)

Dhoridungri - Garasiyawada (VR/MDR) and Lunawada – Garasiyawada (SH 69)

Environmental Management Plan (EMP)

May, 2019

LEA Associates South Asia Pvt. Ltd., India

TABLE OF CONTENTS

List of Tables

List of Figures

List of Abbreviations

AAGR	-	Average Annual Growth Rate
AIDS	-	Acquired Immune Deficiency Syndrome
BPL	-	Below Poverty Line
CoI	-	Corridor of Impact
ESMU	-	Environmental and Social Management Unit
FGD	-	Focused Group Discussion
GoG	-	Government of Gujarat
GSACS	-	Gujarat State Aids Control Society
GSHP	-	Gujarat State Highways Project
GWSSB	-	Gujarat Water Supply and Sewerage Board
Ha	-	Hectare
HH	-	Household
HIV	-	Human Immunodeficiency Virus
HPP	-	HIV/AIDS Prevention Plan
Km	-	Kilometer
LA	-	Land Acquisition
LASA	-	LEA Associates South Asia Pvt. Ltd.
LHS	-	Left Hand Side
MDR	-	Major District Road
M&E	-	Monitoring and Evaluation
NGO	-	Non-Governmental Organization
NRRP	-	National Rehabilitation and Resettlement Policy
OBC	-	Other Backward Classes
OP	-	Operational Policy
PAF	-	Project Affected Family
PAP	-	Project Affected Person
PIU	-	Project Implementation Unit
R&BD	-	Roads and Buildings Department
R&R	-	Resettlement and Rehabilitation
RAP	-	Resettlement Action Plan
RHS	-	Right Hand Side
RoW	-	Right of Way
RPF	-	Resettlement Policy Framework
SC	-	Scheduled Caste
SH	-	State Highway
SIA	-	Social Impact Assessment
sq.m	-	Square Meter
ST	-	Scheduled Tribe
WHH	-	Woman Headed Household
WPR	-	Workforce Participation Rate

1 INTRODUCTION

1.1 BACKGROUND

1. The Roads and Buildings Department (R&BD), Government of Gujarat (GoG) took up the work of preparation of the Second Gujarat State Highway Project (GSHP-II) covering up-gradation, maintenance and improvement of identified core road network for the purpose of loan appraisal by the World Bank (IBRD[1]). R&BD appointed M/S LEA Associates South Asia Pvt Ltd. (LASA) as Project Preparatory Work Consultants (PPWCSC) to prepare plans for the widening and up- gradation of highways as well as for carrying out the assessment of Environmental and Social impacts which are pre-requisite for loan appraisal., World Bank and R&BD-GoG selected nine corridors for preparation of detailed designs. The details of those selected corridors are given in **Table 1-1** below.

Table 1-1: List of GSHP-II DPR Corridors

Sl. No.	Work Type	Link Name	Corridor No	Length km
1.	Two Laning / Wide Two Laning	Dabhoi – Bodeli	SH-11	38.60
2.		Dhanduka – Dholera	SH-20	27.00
3.		Atkot-Gondal	SH-01	35.55
4.	Four laning	Mehsana – Himatnagar	SH-55	66.15
5.	Two Laning / Wide Two Laning	Umreth- Vasad (including Kapadvanj-Ladvel)	SH-83,SH-188, SH-151	35.45
6.		**Bayad – Lunawada**	**SH-69,SH-63**	**44.56**
7.		Dhansura – Meghraj	SH-145, SH-146	46.65
8.		Lunawada – Khedapa	SH-02, SH-152	56.70
9.	Rehabilitation/ maintenance	Paliyad-Dhanduka	SH-01	46.00

Source: R&BD

1.1.1 Splitting Bayad Lunawada into two parts

2. Stage I (In-Principal approval) and Stage II (Formal Approval) of Forest Clearances (FCA) from Ministry of Environment and Forest and Climate Change (MoEF & CC, GoI); comprising road side Notified Protected Forest (NPF) along the project corridor and Reserve Forest (RF) patches in certain pockets along the road was obtained for the entire length of 44.5 km. Bayad to Lunawada back in the year 2013-14.

3. Land Acquisition was however involved in this particular corridor, especially in Dhoridungri to Garasiyada to Lunawada section of MDR and SH 63, In the meantime newly enacted Land Acquisition Act – Right for Fair Compensation and Transparency in Land Acquisition and Resettlement and Rehabilitation (RoFC & T in LA R R Act 2013) which came into force from 1st January 2014 was also to be complied.

4. The state government took a decision to split the Bayad Lunawada section having total length 44.56 km. and comprising sections of SH 69, MDR and SH 63 into two parts as:

- Part I. Bayad to Dhoridungri from km. 0.000 to km. 17.500 of SH 69 (No Land Acquisition)
- Part II. Dhoridungri to Garasiyada from km. 0 to km. 11 of MDR and Garasiyawada to Lunawada from km. 14 to km. 00 of SH 63 (With Land Acquisition)

[1] IBRD International Bank for Reconstruction and Development (IBRD) i.e. The World Bank

5. With the Forest Clearance in place and no land acquisition involved, Part I Bayad to Dhoridungri was executed (as NCB 02A) as per schedule. Meanwhile state government initiated the land acquisition process in accordance with the new Land Acquisition Act 2013 (RtFC & T in LAR & R Act 2013) to enable execution of e part II. Since 80 % of the land acquisition process is nearing completion (as per new land acquisition act) execution of the balance part II (NCB 02B) can now be initiated.

1.1.2 Context for the EMP

6. As part of the project preparation, an Environmental Impact Assessment (EIA) has been undertaken for the proposed roads. Detailed Environmental Impact Assessment (EIA) was carried out during the years 2011-12-13. EMP prepared for the Bayad to Lunawada (SH-69, VR/MDR and SH-63) corridor was based on the findings of the EIA. It also details the effective implementation of the environmental management measures required for addressing the potential environmental impacts in the project. This Environmental Management Plan assists the project proponent and the contractor to implement the environmental management measures suggested as an outcome of the EIA.

7. Based on the EIA findings, detailed Environmental Management Plan (EMP) was prepared for the whole Bayad to Lunawada corridor during 2012-13, which caters the purpose of execution of EMP at site by the contractor for Part I i.e NCB 02A, Bayad to Dhorigundri.

8. At present, the part II (NCB 02B) i.e. Dhorigunri to Garasiyada to Lunawada is at bidding stage. EMP for the whole Bayad Lunawada was prepared and finalised 6 years back in 2013. And Hence, to bridge the gap between these years, to update the changes with respect to site cleareance, topographical changes, changes with respect to environmental and social safeguards, changes in numbers of cultural and community properties, it is required to update the EMP, that will form part of contract bid documents for NCB 02B.

1.1.3 Brief Description of the Project Road

9. The project corridor has two sections; first section (on VR/MDR) starts near Dhoridungri at Chainage km. 0+000 of VR/MDR and ends at Ch. Km. 11+800, while second section (on SH-63) starts at ch km. 0+000 at Lunawada town and ends at 14+200 (reverse chainage). The total length of the corridor is 26 km. (11.8 km on VR/MDR & 14.2 on SH 63). A map showing the project corridor is shown in Figure 1.1.

10. The sections of the project corridor on Dhoridungri to Garasiyawada (VR/MDR section) and Garasiyawada to Lunawada (SH-63) traverses through plain to rolling terrain and plain terrain, respectively. The project corridor is characterized by clayey, gravel and silty clay soil.

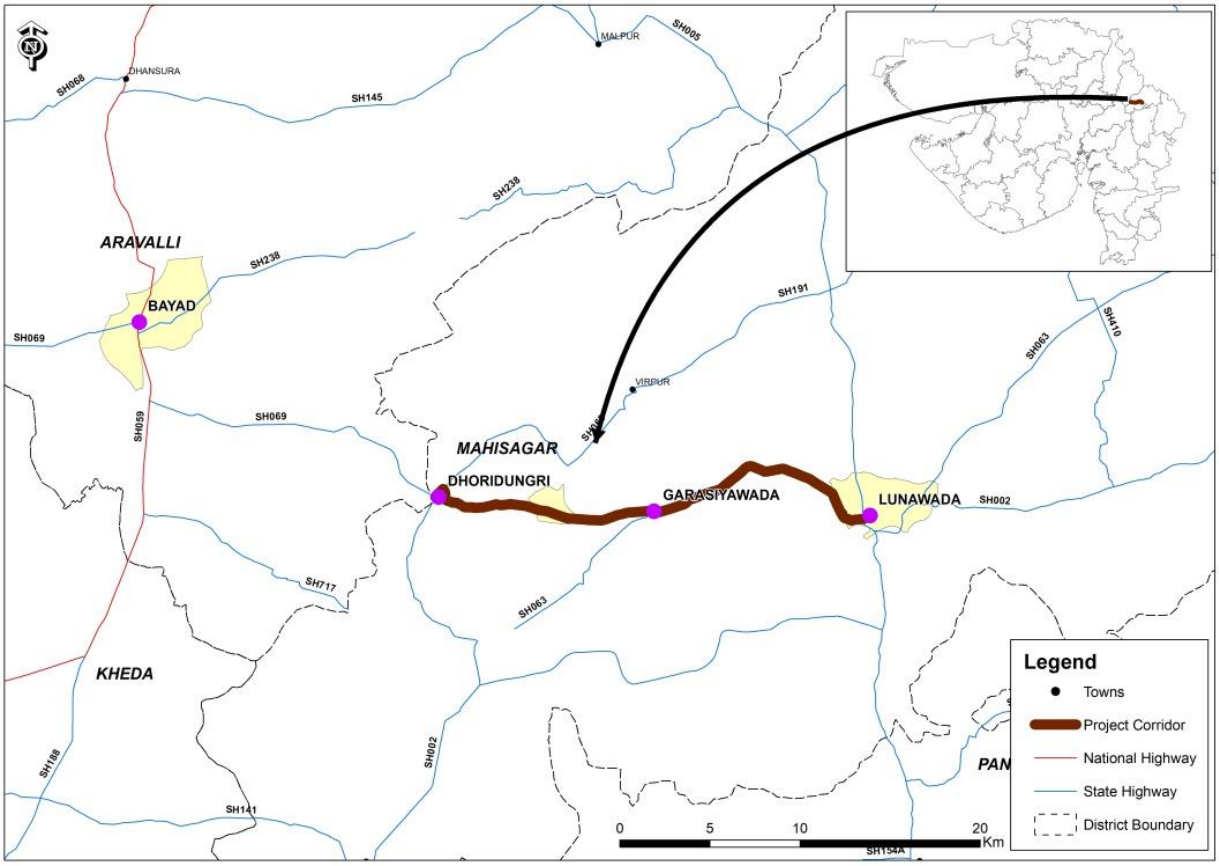
11. The sections between Dhoridungari to Garasiyawada (VR/MDR) and Garasiyawada to Lunawada (and SH-63), the corridor has two lane with hard shoulder with an average carriage way width of 7 m (between Dhoridungari to Garasiyawada) and 10 m (Garasiyawada to Lunawada). The proposed configuration of the entire corridor is two lane with hard shoulder (2L+HS). The available RoW is 18 m for SH-63 and SH-69 sections and 12 m for VR/MDR section (**Error! Reference source not found.**). The pavement condition in the entire corridor is fair to poor.

Table 1-2: Details of Project Corridor sections

SH. No	Corridor Sections	District	Chainage		Length (km)	RoW	C/W Width (m)	Terrain	Soil character
			From	To					
VR / MDR	Dhori Dungari - Dhamod (VR/MDR)	Kheda	0+000	0+925	0.925	12	7	Plain	Gravel
VR / MDR	Dhamod - Garasiyawada (VR/MDR)	Panchmahal	0+925	11+800	10.87	12[2]	7	Plain and Rolling	Gravel
SH-63	Garasiyawada - Lunawada (SH-63)	Panchmahal	0+000	14+200	14.20	18	7	Plain	Silty clay

Source: LASA

12. The project corridor passes through Bayad taluka of Sabarkanta district, Virpur taluka of Kheda district and Lunawada taluka of Panchmahal district, comprising of 28 villages and one town (Lunawada). Settlements along the corridor are Dhamod, Sadhakpur, Lalsar (VR/MDR), Nana Karva and Lunawada town (SH-63).



[2]Proposed RoW 24 m.

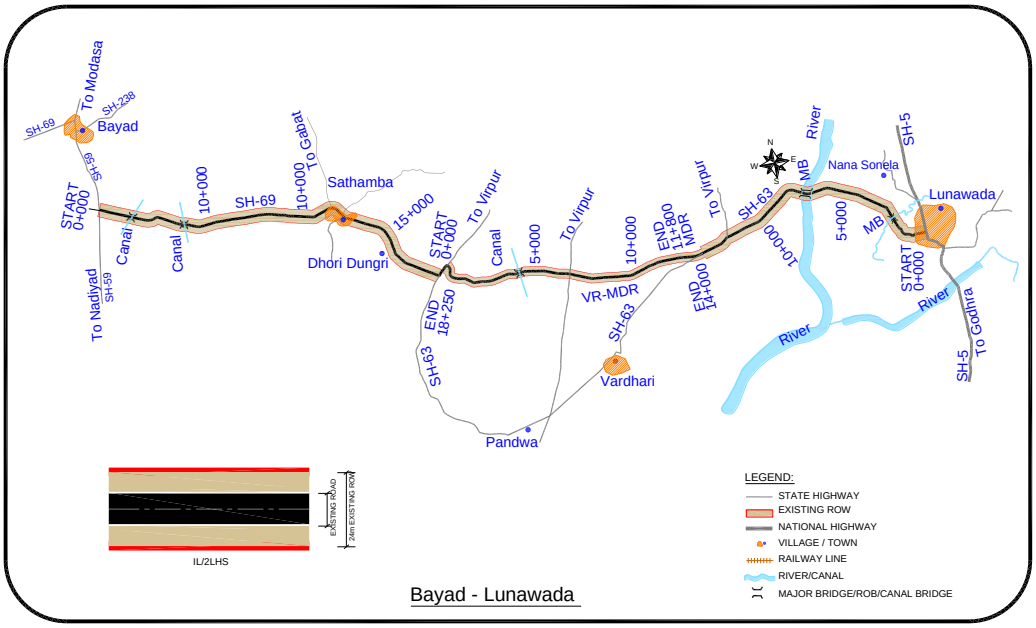


Figure 1.1: Dhoridungri-Garasiyawada-Dhamod-Untadi Lunawada Corridor Key Map (Section of VR/MDR and SH-63)

1.2 CLEARANCE REQUIREMENTS

13. ***Environmental Clearance***: As per the amendment of EIA notification 2006, dated 4th April, 2011, environmental clearance has been made mandatory only for new state highways. Hence, the widening / strengthening and improvement works on existing State Highways are not covered under the ambit of the notification and are not categorized either as Category A or Category B. However, the project shall require obtaining consent from competent authorities such as the Gujarat Pollution Control Board (GPCB), for obtaining the '***Consent to Establish***' by submitting an online Common Application (as per Schedule-I), under Water (Prevention and Control of Pollution) Act, 1974, Air (Prevention and Control of Pollution) Act, 1981) and authorization under Hazardous Wastes (Management and Handling) Rules, 1989, as amended.

14. ***Forest Clearance:*** The proposed project corridor necessitates two separate forest clearances, each under (i) Protected Forest and (ii) Reserved Forest (Table 1-3).

15. (i) ***Protected Forest Clearance***: As per the Gujarat Government Gazette dated 5th July 1973, of the three sections of the project corridor, Bayad-Dhori Dungari (SH-69) section and Garasiyawada-Lunawada (SH-63) sections have been declared as, Notified Protected Forest (PF), under Forest (conservation) Act 1980.

16. As per the directions of the forest department, the corridors which had been declared as State Highways before 1980 will have 9.75m width (Black top and shoulder) as road way width and corridors that are declared after 1980 as State Highways will have the actual (existing) width of the black top and shoulder as road way width; beyond this, if there is any requirement, it necessitates submission of forest land diversion proposal. Adopting this criterion, the project corridor had been declared as state highways after 1980 and hence the existing width of 7m of SH-69 and 8.5mof SH-63 (Black top and shoulder) requires forest clearance to be obtained for upgradation beyond the available width.

17. The proposed widening and strengthening is designed to be executed within 16 m CoI. Hence there is a need for diversion of protected forest area for the purpose of corridor improvement. Based on the detailed assessment and as per proposed design, the diversion area of Notified Protected Forest land is estimated to be 13.38 ha for Bayad to Dhori Dungari section (SH-69) and 11.04ha for Garasiyawada to Lunawada section (SH-63).

18. (ii) ***Reserved Forest Clearance***: Apart from the protected forest, the project corridor requires diversion of parcels of reserve forest area within the CoI at various stretches. The joint inspection carried out with the forest officials reveals that for Dhori Dungari –Dhamod section in then Kheda district, the diversion of reserved forest area for the new alignment has been estimated based on the available width say up to 24m width whereas in case of Dhamod-Garasiyawada-Lunawada sections, black top width varies due to the consideration of curve improvements / realignments at small stretches. The estimated RF area that requires to be diverted for the proposed improvement is 0.54 ha. for Dhori Dungari to Dhamod (VR/MDR) section and 4.83 ha for Dhamod-Garasiyawada-Lunawada sections (MDR/VR and SH-63).

Table 1-3: Particulars of Forest land diversion (PF and RF)

Sl. No.	Project corridor - sections	SH No.	Type of Forest	Area (ha)	District
1	Bayad-Dhori Dungari	SH-69	PF	13.38	Sabarkanta
2	Dhori Dungari-Dhamod	VR/MDR	RF	0.54	Kheda
3	Dhamod-Garasiyawada-Lunawada	VR/MDR and SH-63	RF	4.83	Panchmahal
4	Garasiyawada-Lunawada	SH-63	PF	11.04	Panchmahal

19. As per the Forest Act 1980, Form 'A' (for the diversion of the forest land) had been filled separately for Reserved and Protected forest district wise and submitted along with the necessary enclosures to the District Forest Officer (DFO), Social Forestry Division and Normal division through State Road Project (SRP) Division, Vadodara for further action.

20. 29.79 ha. of protected (PF) and reserve forest (RF) land along sections of SH 69; MDR / VR and SH 63 from Bayad – Dhoridungri – Dhamod – Untadi- Lunawada road has already been diverted in the name of the Executive Engineer, R & BD., Govt. of Gujarat. In-Principle approved (State I Clearance) was obtained for this entire stretch during the year 2013 (September 6th, 2013) followed by formal approval, a year later. Tree cutting was initiated from there on for 1324 nos. of species; along the entire project corridor.

21. ***Other Clearances***: Implementation of the project works would require clearances from the other line agencies. These would have to be obtained by the contractor before commencement of civil works in the project area. The clearances to be obtained are presented in Table 1-4.

Table 1-4: Applicable Laws and Regulations

Sl. No.	Clearances	Acts	Approving Agency	Applicability to the Project	[3]Indicative Time Frame	Responsibility	
						Execution	Supervision
PROJECT PREPARATION STAGE							
1	No Objection Certificate (NOC)	Water (Prevention and Control of Pollution) Act 1974, Air (Prevention and Control of Pollution) Act 1981	Gujarat Pollution Control Board	Applicable	3-6 months	PIU	-
2	Diversion of forest land for Non-forest use	Forest Conservation Act (1980) Forest Conservation Rules (2003) and Guidelines issued to date	Regional Office Western Zone, MoEF & CC, Bhopal	Applicable	9-12 months	PIU	-

[3] The right of permission vests with the Competent Authority

Sl. No.	Clearances	Acts	Approving Agency	Applicability to the Project	[3]Indicative Time Frame	Responsibility	
						Execution	Supervision
3	Permission for removal of avenue tree within the PROW	Forest Conservation Act (1980) Forest Conservation Rules (2003) and Guidelines issued to date	Forest Department, GoG	Applicable	3 -6 month for each workout area	PIU	-
PROJECT IMPLEMENTATION STAGE							
4	Permission for Withdrawal of Surface Water from Rivers, Nala, Water harvesting structure/ Reservoirs/ Ponds/ Irrigation canals	Gujarat Water Supply and Sewerage Board Act, 1978	Gujarat Water Supply and Sewerage Board	Applicable (If the contractor is extracting surface water)	3 months	Contractor	Engineer
5	Permission for Sand Mining from river bed	Mines and Minerals (Development and Regulation) Act, 1957	Commissioner of geology and mining, GoG	Applicable	2 month	Contractor	Engineer
6	Permission for Opening of New Quarry	Mines and Minerals (Development and Regulation) Act, 1957	Commissioner of geology and mining, GoG	Applicable	2 month	Contractor	Engineer
7	Hot mix plant, Crushers, Cement Batching Plant	Air (Prevention and Control of Pollution) Act. 1981	Gujarat Pollution Control Board	Applicable	3 months	Contractor	Engineer
8	Storage of Hazardous Chemicals	Hazardous Waste (Management and Handling) Rules 1989 and Manufacturing Storage and Import of Hazardous Chemicals Rules 1989	Gujarat Pollution Control Board	Applicable	3 months	Contractor	Engineer
9	Disposal of Hazardous Waste	Hazardous Waste (Management and Handling) Rules 1989	Gujarat Pollution Control Board	Applicable	2 months	Contractor	Engineer
10	Disposal of Construction Waste and liquid effluent from Labour camps	Water (Prevention and Control of Pollution) Act 1974	Gujarat Pollution Control Board	Applicable	2 months	Contractor	Engineer
11	Pollution Under Control Certificate	Central Motor Vehicles Act 1988	Transport Department (GoG)	Applicable	1 Month	Contractor	Engineer
12	Employing Labour	Executing Agency of Building and other construction act, 1996	Labour& Employment Department, GoG	Applicable	1 Week	Contractor	Engineer
13	Registration of Workers	Labour welfare Acts.	Labour& Employment Department, GoG	Applicable	1 Month	Contractor	Engineer

Source: Acts, Rules and Regulation from Central and State Government

1.3 STRUCTURE OF THE REPORT

22. This report is structured to be a standalone document suitable for handing over to the contractor for enabling him to implement the suggested environmental management measures which has resulted due to EIA. Further to the introduction, this chapter also provides a summary of the environmental impacts and the necessary mitigation measures are detailed in Chapter 2. **Environmental Management Plan is presented in Chapter 3,** while the **implementation arrangements** for implementing the EMP are presented in the **Chapter 4. Chapter 5 provides the necessary budget for implementing the EMP.**

2 ENVIRONMENTAL ISSUES

2.1 SUMMARY OF IMPACT

23. Environmental Impact Assessment was carried out for the project corridor and the impacts that are likely to arise from the implementation of the project are detailed along with suitable design measures in the Table 2-1.

Table 2-1: Summary of Environmental Impacts and Design Measures

Sl. No.	Environmental and Social Impact	Design Measures
1.	29.79 ha. of protected (PF) and reserve forest (RF) land along sections of SH 69; MDR / VR and SH 63 from Bayad – Dhoridungri – Dhamod – Untadi- Lunawada road has already been diverted in the name of EE, R & BD., Govt. of Gujarat. *In-Principle approved* (State I Clearance) was obtained for this entire stretch during the year 2013 (September 6th, 2013) followed by *formal approval*, a year later. Tree cutting was initiated from there on for 1324 nos. of species; along the entire project corridor.	At the time of detailed study and preparation of DPR (during the year 2012-13), 8.79 ha of reserve forest (RF) area and 40.12 ha of protected forest land was required to be diverted. However, by adopting the CoI approach, the initial estimation of 8.79 ha. of RF area and 40.12 ha. of PF land diversion got reduced to 5.37 ha. of RF area and 24.42 ha. of PF area; respectively. As a compensatory measure, the conditions for the diversion of forest land as laid down by the forest department also followed.
2.	Now, about 400 small tree species[4] in the form of bushes, road side small tress and isolated big tress are being impacted.	This impact can be further minimized by adopting the CoI approach and the reduction of the formation width at Green Tunnel stretch (Ch 10+000 to 14+000). This can result in the preservation good no. of trees from the impacts. As a management measure compensatory afforestation, as directed by the forest department has already been carried out.
3.	Impact on cultural and community assets: There are few cultural (temples and shrines) and community assets (school, handpumps, wells) that are affected by adopting standard cross section.	The impact on the community and cultural assets are avoided / minimized by adopting design modifications like shifting of alignment and reduction of CoI / formation width.
4.	Impact on topography / Soil	The excavated material and scarified bitumen that are likely to be generated from the project corridor is estimated to be 39,500 and 34,360 cum respectively. Disposal of the debris will have impact on the local topography, hence as a resource recovery approach, the excavated waste shall be tested for the CBR values and if found suitable will be used as subgrade materials, for strengthening the embankment (or) as a strengthening layer for village and approach roads.
5.	Impact on water bodies (surface and ground water) Rivers: Mahisagar (7+125), River Veri at 1+700; SH-63 Ponds: Ch. 9+600, 4+100 and 1+050 (SH-63) Sujalam Suphalam canal at Ch.3+200 (MDR/VR) Open wells: 10 wells along MDR/VR section	Shifting of alignment has been adopted to prevent impact on ponds and open wells that are located within the RoW. However, at the river and canal crossings, the impact to the water quality is inevitable during construction. Hence, mitigation measures like provision of Silt traps and Oil interceptors are suggested at the location of surface water (rivers/canals/drains) bodies.
6.	Surface and ground water quality	With exemption to suspended solids, the surface quality is found to be within permissible limits of prescribed drinking water standards and found suitable for construction and domestic purpose. The concentration of few physicochemical parameters; trace elements like Lead (Pb) and Copper (Cu) are observed

[4]Re-estimation through road survey and inventory (during 2018-19). Forest Clearance is already been obtained back in the year 2013-14, and all the trees exists then have been cut down.

Sl. No.	Environmental and Social Impact	Design Measures
		to be marginally high than the drinking water standards in case of groundwater quality. Hence, the contractor shall provide measures for the treatment system of water prior to its utilisation. The extraction of the groundwater shall be done after obtaining clearance from the groundwater board, GoG, since the project corridor is located in the semi critical zone as identified by Ground Water Resource Development Centre (GWRDC) and it is found to be relatively safe.
7.	**Air quality impact at the habitations / settlements; Noise (Level) Pollution at settlements and sensitive receptors** • **Settlements:** VR/MDR: ○ Dhamod (3+700) ○ Lalsar cross road (6+475) ○ Vakhatapur (7+900)	Air pollution due to construction yard will be particularly ground-based with localised effect during the construction period. It is suggested that the construction yard shall be located away from the settlement, all construction machineries (Crushers, Hot-mix Plants & Batching Plants) should be kept / stationed 1000 m away from the settlements.
8.	○ Garasiywada & Untadi (12+400) SH-63: ○ Lunawada town (0+000) ○ Khantana Bhensavada (7+000) ○ Charangam (11+500) • **Sensitive locations :** VR/MDR: ○ Govt. Panchvati General Hospital (6+600) SH-63: ○ Salvada PTC college (10+475) ○ Bright Primary and High school (2+625) ○ Adarsh Nivasi School (0+825) • **Sensitive Receptors:** Reserved Forest locations VR/MDR: ○ Ch: 0+700 to 0+925 ○ Ch: 0+925 to 3+175 SH-63: ○ Ch: 5+850 to 6+050, 6+400 to 6+875.	Noisy construction activities (such as crushing, concrete mixing, batching etc.) within 150 m of the nearest habitation / educational institutes / health centres (silence zones) shall be stopped during the night time between 9.00 pm to 6.00 am. Contractor shall provide noise barriers at the suggested locations at the identified locations viz., schools / Temples / health centres prior to commencement of work.

2.2 SPECIFIC MEASURES

24. As part of the Environmental Assessment, consultations were held in the project corridor at various locations and the outcome of the consultations was noted and for the discussed impacts, specific mitigation measures were suggested in Table 2-2.

Table 2-2: Environmental and Social Specific Measures

Sl. No.	Impact	Mitigation Measures
1.	Impact on residential / commercial structures and land acquisition Issues	• 16 m CoI approach has been adopted for SH-63 and 24 m CoI has been adopted for MDR/VR for the purpose of minimising the social impacts associated with the residential / commercial and land acquisition issues. • For instances where unavoidable impact on land and structures are anticipated, compensation and assistance will be provided in line with the Resettlement Policy Framework (RPF) adopted for the project.
2.	Reserved Forest	• Patches of Reserved Forest areas are located along the corridor at various stretches. Detailed assessment and consultation with the forest officials reveals that the forest area is devoid of major wild faunal populace. However, local deer species like Nilgai (commonly seen in rural and urban areas) and common Indian fox are reported in the vicinity of the project area. The presence of small night dwelling fauna (snakes, mongoose) is sighted due to the proximity of Reserved Forests especially along VR/MDR section. Nevertheless, no endangered faunal species are recorded in the forest area till

Sl. No.	Impact	Mitigation Measures
		date. Hence, it can be concluded that the construction and operation phase of the project does not pose any threat to the faunal population in the project area. Therefore, no negative impacts are anticipated due to the proposed improvement.
3.	Upgradation of the existing drains (bridges and culverts)	• All the existing bridges, culverts and irrigation canals are proposed to be upgraded. The flood data collected from the irrigation department is used as a source for designing the drain provision. Additional drain facility is also suggested at locations where water logging problem prevails.
4.	Safety issues need to be addressed in the proposed design	• Road safety audit had been performed for the corridor and the outcome of the report and the public consultation has been taken as a base to provide road safety measures in the design. The safety measures includes provision of safety measures near settlements, Junction improvements, street lights etc. Due care has been taken at the social sensitive locations like schools and temples. • Road design has been done as suggested by the local communities. Illustration of the design is depicted in the following figures.

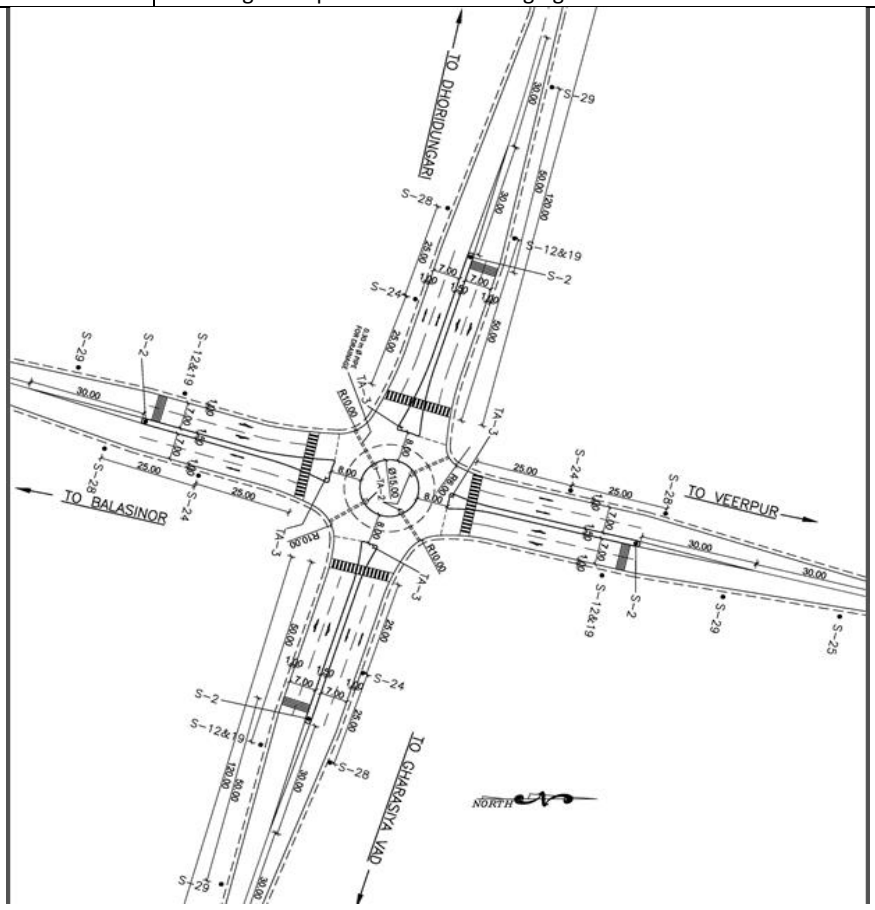


Figure 2.1: Junction Design at Lunawada

Major Junctions / Interactions at :

Sr. No	Section	Design Chainage	Type	Arms	Villages
1	VR-MDR (Dhoridungri - Garasiyawada)	0+000	Cross	4 arm	Dhoridungri
2	VR-MDR (Dhoridungri - Garasiyawada)	6+475	Cross	4 arm	Lalsar chokdi
3	VR-MDR (Dhoridungri - Garasiyawada)	12+275	RHS	3 arm	Garasiyawada
4	SH-63 (Lunawada to Garasiyawada)	0+000	Cross	3 arm	Lunawada

5.	Pedestrian Safety	• To reduce the speed and subsequently to increase the pedestrian safety, rumble strips and raised pedestrian crossings are proposed at major intersections / junctions and at entry & exit of settlements. **Location wise Provision of Variable width Rumble Strips at Major Junction** VR-MDR (Dhoridungri - Garasiyawada)

<table>
<tr><th>Sl. No.</th><th>Impact</th><th>Mitigation Measures</th></tr>
<tr><td></td><td></td><td>
<table>
<tr><th>LOCATION</th><th>Nos.</th><th>Length of marked rumble strip</th><th>Side roads (15 mm bar marking)</th></tr>
<tr><td>Dhoridungri junction</td><td>4</td><td>200 m</td><td>10</td></tr>
<tr><td>Lalsar junction</td><td>4</td><td>100 m</td><td>5</td></tr>
<tr><td>Garasiyawada junction</td><td>3</td><td>200 m</td><td>10</td></tr>
<tr><td>Hadod bridge approaches</td><td>2</td><td>200 m</td><td>10</td></tr>
<tr><td>Total</td><td>13</td><td>-</td><td>35</td></tr>
<tr><td>50 m rumble strips length =</td><td>14</td><td></td><td>0</td></tr>
<tr><td>100 m rumble strips length =</td><td>25.2</td><td>4</td><td>100.8</td></tr>
<tr><td>200 m rumble strips length =</td><td>50</td><td>9</td><td>450</td></tr>
<tr><td></td><td></td><td></td><td>550.8</td></tr>
</table>
Earlier, the locations of Rumble strips were also proposed at:
(i) VR (Dhori Dungari - Garasiyawada)
• Dhamod: 3+680, 3+855
• Undra:11+045, 11+170
(ii) SH-63 (Garasiyawada - Lunawada)
• Lunawada:0+220, 0+485, 0+655, 0+870, 1+170,1+290
• Bright school: 2+520, 2+620
• Hardashpura bus stop:4+175
• Gohilna muvada bus stop:4+550,
• Charangam bus stop:11+395,11+485
• The locations of Raised pedestrian crossings are at:
(i)VR (Dhori Dungari-Garasiyawada)
• Dhamod:3+765
(ii) SH-63 (Garasiyawada-Lunawada)
• Lunawada:0+120
• Bright school Lunawada:0+275
• Lunawada:0+385
• Adarsh school:0+820
• Bright school:2+570
</td></tr>
<tr><td>6.</td><td>Crash Barrier</td><td>
Provision of Crash Barrier in both the sections at :
<table>
<tr><th colspan="4">LHS</th><th colspan="4">RHS</th></tr>
<tr><th>LOCATION</th><th>FROM</th><th>TO</th><th>Length</th><th>LOCATION</th><th>FROM</th><th>TO</th><th>Length</th></tr>
<tr><td colspan="8">Dhoridungri to Garasiyawada Section</td></tr>
<tr><td>At Sharp curve</td><td>1800</td><td>2200</td><td>400</td><td>TREES</td><td>725</td><td>750</td><td>25</td></tr>
<tr><td>Trees</td><td>2575</td><td>2600</td><td>25</td><td>TREES</td><td>900</td><td>945</td><td>45</td></tr>
<tr><td>WELL</td><td>4110</td><td>4120</td><td>10</td><td>At Sharp curve</td><td>1800</td><td>2200</td><td>400</td></tr>
<tr><td>Trees</td><td>4175</td><td>4275</td><td>100</td><td>At Sharp curve</td><td>3900</td><td>4150</td><td>250</td></tr>
<tr><td>WELL & Trees</td><td>4350</td><td>4420</td><td>70</td><td>WELL</td><td>4185</td><td>4195</td><td>10</td></tr>
<tr><td>WELL & Trees</td><td>5150</td><td>5210</td><td>60</td><td>TREES</td><td>4600</td><td>4900</td><td>300</td></tr>
<tr><td>Trees</td><td>5710</td><td>5750</td><td>40</td><td>TUBEWELL</td><td>5040</td><td>5050</td><td>10</td></tr>
<tr><td>Trees</td><td>6075</td><td>6150</td><td>75</td><td>TREES</td><td>5275</td><td>5325</td><td>50</td></tr>
<tr><td>Trees</td><td>6275</td><td>6325</td><td>50</td><td>TREES</td><td>6475</td><td>6525</td><td>50</td></tr>
<tr><td>WELL</td><td>9310</td><td>9320</td><td>10</td><td>TREES</td><td>7100</td><td>7200</td><td>100</td></tr>
<tr><td>Trees</td><td>9450</td><td>9525</td><td>75</td><td>At Sharp curve</td><td>7700</td><td>8000</td><td>300</td></tr>
<tr><td>Trees</td><td>10400</td><td>10550</td><td>150</td><td>WELL</td><td>9180</td><td>9190</td><td>10</td></tr>
<tr><td>Trees</td><td>10900</td><td>11000</td><td>100</td><td>TREES</td><td>9275</td><td>9325</td><td>50</td></tr>
<tr><td>Trees</td><td>11400</td><td>11500</td><td>100</td><td>TREES</td><td>10300</td><td>10350</td><td>50</td></tr>
<tr><td></td><td></td><td></td><td></td><td>TUBE WELL</td><td>10935</td><td>10945</td><td>10</td></tr>
<tr><td></td><td></td><td></td><td></td><td>TREES</td><td>12100</td><td>12150</td><td>50</td></tr>
<tr><td colspan="8">LUNAWADA TO GARASIYAWADA Section</td></tr>
<tr><td>Near Pond</td><td>1100</td><td>1250</td><td>150</td><td>TREES</td><td>2750</td><td>2800</td><td>50</td></tr>
<tr><td>WELL</td><td>3355</td><td>3365</td><td>10</td><td>TREES</td><td>5700</td><td>5725</td><td>25</td></tr>
<tr><td>WELL</td><td>6245</td><td>6255</td><td>10</td><td>At Sharp curve</td><td>11500</td><td>11700</td><td>200</td></tr>
<tr><td>At Sharp curve</td><td>9700</td><td>9900</td><td>200</td><td></td><td></td><td></td><td></td></tr>
<tr><td>At Sharp curve</td><td>11800</td><td>12100</td><td>300</td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="3">Grand Total (LHS) m.</td><td>1935</td><td colspan="3">Grand Total (RHS) m.</td><td>1960</td></tr>
</table>
Provision of crash barrier at Bridge Approaches (Bridge sections)
</td></tr>
</table>

Sl. No.	Impact	Mitigation Measures

LHS			RHS		
FROM	TO	Length	FROM	TO	Length
Dhoridungri-Garasiyawada					
3000	3200	200	3250	3450	200
LUNAWADA TO GARASIYAWADA					
1300	1500	200	1300	1500	200
1600	1800	200	1600	1800	200
6700	7100	400	6700	7100	400
7400	7700	300	7400	8300	900
Total RHS, m.		**1300**	**Total LHS, m.**		**1900**

7. Other road safety provisions / measures :

Blinkers :

Sr. No	Section	Description	Side	Location	Nos.
1	Dhoridungri-Garasiyawada	06+500	Both side	Lalsar junction	2
2	Lunawada to Garasiyawada	1+250	Both side	At sharp curve	2
Total					**4**

Coloured Pavement Marking :

Location	Nos	Length	Area (sq. m.)	Total Area (sq. m.)
In each Bus bays	32	-	52.5	1680
Considering four sign per km	4	26	0.785	81.64
			Total area (sq. m.)	**1762**

Delineators :

LHS				RHS				Total length (m)	Nos. of delineators
LOCATION	FROM	TO	Length	LOCATION	FROM	TO	Length		
Dhoridungri-Garasiyawada									
Sharp curve	1800	2200	400	Sharp curve	1800	2200	400	800	41
				Sharp curve	3900	4150	250	250	13.5
				Sharp curve	7700	8000	300	300	16
Lunawada to Garasiyawada									
Sharp curve	9700	9900	200	Sharp curve	11500	11700	200	400	21
Sharp curve	11800	12100	300					300	16
								Total Nos. of Delineators	**108**

Considered 20 m c/c distance for radius of 200 m.

High mast:

Location	No.
At Lalsar junction	1
At Garasiyawada junction	1
Total	**2**

Footpath (on both sides)

Chainage; Km.		Name of village	Length (m)	Width of Footpath (m)	Quantity of Kerb (Rmt.)	Quantity of Paver Block (sq.m.)
From	To					
Dhoridungri-Garasiyawada						
03+675	03+900	DHAMOD	450	1.25	900	562.5
Lunawada-Garasiyawada						
02+525	02+620	BRIGHT SCHOOL	190	1.25	380	237.5
10+500	10+700	Salawada PTC College	400	1.25	800	500
		Total	**640**	-	**2080**	**1300**

Location of RCC Drain with footpath

From	To	Village / Town	LHS	RHS
Lunawada-Garasiyawada				
6	1200	Lunawada	1194	1194
13787	13937	Garasiyawada	150	150

Sl. No.	Impact	Mitigation Measures

Dhoridungri-Garasiyawada				
0	100	Dhoridungri	100	100
6400	6650	Lalsar	250	250
12239	12339	Garasiyawada	100	100
Total Length (LHS)			**1794**	**1794**

8. **Bus stops:**
Details of Existing and Proposed Bus stops are identified on either sides of the corridor and the locations are (as detailed out in below table):

2.3 BUS STAND

Details of Existing Bus stop				Details of Proposed new bus stand + Bus byes				
Chainage	Village	Side	Remarks	Sr. No	Chainage	Village	Side	Remarks
Dhoridungri - Garasiyawada								
NO EXISTING BUS STOP				1	0+050	DHORIDUNGRI	RHS	Bus stop with bays
3+675	DHAMOD	RHS	To be demolish	2	3+804	DHAMOD	RHS	Bus stop with bays
				3	3+730	DHAMOD	LHS	Bus stop with bays
5+100	SADHAKPUR	RHS	To be demolish	4	5+071	SADHAKPUR	RHS	Bus stop with bays
NO EXISTING BUS STOP				5	5+171	SADHAKPUR	LHS	Bus stop with bays
6+500	LALSAR	RHS	To be demolish	6	6+428	LALSAR	RHS	Bus stop with bays
				7	6+527	LALSAR	LHS	Bus stop with bays
7+670	KIDIA	RHS	To be demolish	8	7+635	KIDIA	RHS	Bus stop with bays
8+175	VAKHATPUR	RHS	To be demolish	9	8+120	VAKHATPUR	RHS	Bus stop with bays
				10	8+256	VAKHATPUR	LHS	Bus stop with bays
10+210	UCHARPI	RHS	To be demolish	11	10+228	UCHARPI	RHS	Bus stop with bays
NO EXISTING BUS STOP				12	10+328	UCHARPI	LHS	Bus stop with bays
11+120	UNDRA	LHS	USE EXISTING	13	11+100	UNDRA	LHS	Bus stop with bays
NO EXISTING BUS STOP				14	11+150	UNDRA	RHS	Bus stop with bays
12+300	GARASIYAWADA	RHS	To be demolish	15	12+315	GARASIYAWADA	LHS	Bus stop with bays
NO EXISTING BUS STOP				16	12+415	GARASIYAWADA	RHS	Bus stop with bays
Lunawada-Garasiyawada								
0+340	BAROTVADA	LHS	USE EXISTING	17	0+340	BAROTVADA	LHS	New bus stop only
NO EXISTING BUS STOP				18	2+188	NAVA KARVA	RHS	New bus stop only
2+940	MALIYA	LHS	To be demolish	19	2+983	MALIYA	LHS	New bus stop only
3+690	PAVAPUR	RHS	USE EXISTING	20	3+665	PAVAPUR	RHS	New bus stop only
4+260	HARDASPURA	LHS	USE EXISTING	21	4+235	HARDASPURA	LHS	New bus stop only
4+500	GOHIL NA MUVADA	RHS	USE EXISTING	22	4+475	GOHIL NA MUVADA	RHS	New bus stop only
6+220	KHANTA NA BHENSAWADA	RHS	To be demolish	23	6+187	KHANTA NA BHENSAWADA	RHS	New bus stop only
				24	6+277	KHANTA NA BHENSAWADA	LHS	New bus stop only
7+775	HADOD/KOLVAN	RHS	USE EXISTING	25	7+775	HADOD/KOLVAN	RHS	New bus stop only
8+495	CHATKI	RHS	USE EXISTING	26	8+515	CHATKI	RHS	New bus stop only
				27	8+458	CHATKI	LHS	New bus stop only
9+705	CHARIYA	RHS	USE EXISTING	28	9+700	CHARIYA	RHS	New bus stop only
10+555	SALWAD	LHS	USE EXISTING	29	10+590	SALWAD	LHS	New bus stop only
11+455	CHARANGAM	RHS	USE EXISTING	30	11+436	CHARANGAM	RHS	New bus stop only
12+730	SONAVADA	LHS	To be demolish	31	12+766	SONAVADA	LHS	New bus stop only
13+265	MALNA MUVADA	LHS	USE EXISTING	32	13+267	MALNA MUVADA	LHS	New bus stop only

2.4 ENHANCEMENT MEASURES

25. There are several cultural and community properties that are identified along the project corridor. Wells, Solid Waste Management Measures, Oil Interceptors and Silt trap are chosen as an environmental enhancement measure along VR/MDR and SH-63 (Dhori Dungari - Lunawada) section.

These have been chosen for the purpose of providing some basic amenities; the selection is based on the consultation held with the communities. Details of the suggested amenities / enhancement are provided in the table 1.1, table 1.2 and table 3-3 in chapter 3 of this EMP. Budget estimation for enhancement measures is given in the EMP Budget.

26. ***Rain water Harvesting***: Open wells located along the corridor are suggested to enhance as rainwater harvesting pits to serve the local community such that it can meet their water requirement as well as act as a source of groundwater recharge.

Table 2-3: Open wells suggested for Rainwater Harvesting

Corridor	Chainage	Direction	Water body	Distance from CL (m)
Bayad-Lunawada	4+100	LHS	Open Well	8.0
	4+325	LHS	Open Well	8.0
	9+150	RHS	Open Well	7.0
	11+730	RHS	Open Well	15.0

Source: Detailed Assessment

27. Storm water runoff flows into the oil interceptor/ grease trap through inlet and semi treated water is discharged on to the sloping side through the outlet from the interceptor; the water is then further treated by silt fencing. The fully treated water is finally discharged into the existing roadside groundwater recharge wells.

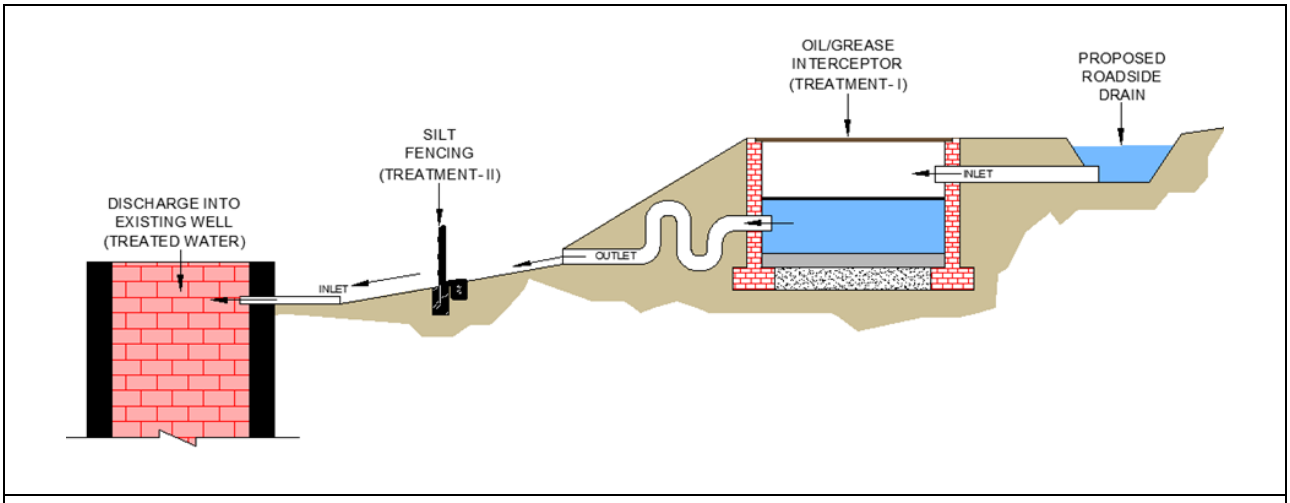


Figure 2.2: Schematic sketch of Storm water Management/ Rainwater Harvesting Pit

28. The project corridor does not have any incidental spaces. Hence development of parking area in the incidental space is not envisaged.

3 ENVIRONMENTAL MANAGEMENT PLAN

29. A description of the various management measures during various stages of the project are provided in **Table 3-1**.

3.1 PRE-CONSTRUCTION STAGE

3.1.1 Pre-Construction Activities by PIU

30. Prior to the contractor mobilization, the PIU will ensure that an encumbrance free CoI is handed over to enable the start of construction. The RoW clearance involves the following activities:

- Clearance of the RoW includes removal of trees, and
- Relocation of common property resources impacted, including cultural properties as temples and community assets as hand pumps and other utilities

3.1.2 By Contractor/Engineer

31. The pre-construction stage involves mobilization of the contractor, the activities undertaken by the contractor pertaining to the planning of logistics and site preparation necessary for commencing construction activities. The activities include:

- Modification (if any) of the contract documents by the Engineer
- Procurement of construction equipment / machinery such as crushers, hot mix plants, batching plants and other construction equipment and machinery
- Identification and selection of material sources (quarry and borrow material, water, sand etc.)
- Selection, design and layout of construction areas, hot mix and batching plants, labour camps etc.
- Planning traffic diversions and detours, including arrangements for temporary land acquisition.

CONSTRUCTION STAGE

3.1.3 Construction stage activities by the contractor

32. Construction stage activities require careful management to avoid environmental impacts. Activities that trigger the need for environmental measures to be followed include:

- Imbibing environmental principles at all stages of construction as good engineering practices
- Implementation of site-specific mitigation/management measures suggested
- Monitoring the quality of environment along the construction sites (as air, noise, water and soil)

33. There are several other environmental issues that have been addressed as part of good engineering practices, the costs for which have been accounted in the engineering costs. They include improvement of roadside drainage, provision of additional cross drainage structures or raising the road height in low-lying stretches and reconstruction and improvement of bunds of the affected water bodies.

3.2 OPERATION STAGE

34. Monitoring the environmental attributes during the initial years of operation of the road shall be carried out by the Contractor as laid down in the monitoring plan, under the supervision of the Engineer.

Mitigation Measures to be adopted by the Contractor as a part of comprehensive Environmental Management Plan (EMP) implementation for Dhoridungri to Garasiyawada and Lunawada to Garasiyawada Project Corridor

Table 3-1: Environmental Management Plan (EMP)

Sl. No.	Environmental Issue	Activity	Mitigation Measures	Location	Implementing Agency	Supervising & Monitoring Agency
Pre-Construction Phase						
PC.1	Statutory clearance	Consent to Establish (CTE); Consent to Operate (CTO) & Borrow area Clearance	• Obtain Consent from competent authorities (Gujarat Pollution Control Board (GPCB)), for Consent to Establish '(CTE)' and Consent to Operate '(CTO)' under Water (Prevention and Control of Pollution) Act, 1974, Air (Prevention and Control of Pollution) Act, 1981). • Obtain the Borrow area clearance from Competent Authorities - State Department of Mines and Geology / State level EIA Authority (SEIAA) • If any conditions are laid down by the concerned /competent authority, the same shall be applied.	Corridor of Impact	Contractor	EE, SRP / Authority's Engineer
Construction Phase						
C.1	Air Pollution	Construction plants, equipment and vehicles	• All vehicles used by the Contractor shall have copies of currently valid Pollution under Control (PUC) Certificates as per the requirement of the Gujarat Motor Vehicles Department for the duration of the Contract. • The Contractor shall obtain Consent-to-Operate (CTO) under Air and Water Acts from the Gujarat Pollution Control (GPCB) and follow the conditions stipulated in the NoC (Consent to Establish and Operate) by the GPCB • **Other measures to be factored in selection of location** • 1.0 km away from settlement, school, hospital on downwind directions • 300 m from any archaeological site • 10 km from environmental sensitive areas i.e. national park, sanctuary • Minimum 500 m (preferably 1000 m) from water bodies (rivers, streams, lakes and ponds) • away from agricultural land • preference to barren land	Major Settlements locations but not limited to mentioned below are: VR/MDR: • Dhamod (3+700) • Lalsar cross road (6+475) • Vakhatapur (7+900) • Garasiywada & Untadi (12+400) SH-63: • Lunawada town (0+000) • Khantana Bhensavada (7+000) • Charangam (11+500) Sensitive locations : VR/MDR: • Govt. Panchvati General Hospital (6+600) SH-63: • Salvada PTC college (10+475) • Bright Primary and High school (2+625) • Adarsh Nivasi School (0+825) Sensitive habitations: Reserved Forest locations VR/MDR: • Ch: 0+700 to 0+925 • Ch: 0+925 to 3+175	Contractor	Authority's Engineer
		Dust during earth works or from spoil dumps	• Maintaining adequate moisture at surface of any earthwork layer completed or non-completed to avoid dust emission.		Contractor	Authority's Engineer
		Storage of maintenance materials	• Proper stockpiling and sprinkling of water as necessary.		Contractor	Authority's Engineer

Sl. No.	Environmental Issue	Activity	Mitigation Measures	Location	Implementing Agency	Supervising & Monitoring Agency
				SH-63: Ch: 5+850 to 6+050, 6+400 to 6+875.		
C.2	Water Pollution	Clearing of waterways of cross drainage works including bridges and clearing of longitudinal side drains	• Clearance of waterway will be undertaken before onset of monsoon. • Debris generated due to clearing of longitudinal side drains and waterways of cross drainage will be stored above high flood level and away from waterway, and reused on embankment slope or disposed at designated areas[5].	Surface water sources / drains/ Nalahs/ Ponds etc. at following locations but not limited to: **Pond/Lake** on km 5+000 (RHS) **River crossings:** Mahi 7+300 **Canal:** Sujalam Suphalam canal at Ch.3+200 (VR/MDR), 4+010 (SH-63)	Contractor	Authority's Engineer
		Construction vehicles	• Avoiding cleaning / washing of construction vehicle in any water body		Contractor	Authority's Engineer
		Construction camp and workers' camp	• Minimum distance of 500 m (preferably 1000 m) from water bodies (river, stream, lake and ponds) • Locate facilities in areas not affected by flooding and clear of any natural or storm water courses. • The ground should have gentle slope to allow free drainage of the site. • Vehicle parking areas, warehouses and work shop locations must have impervious flooring to prevent seepage of any leaked oil & grease into the ground. The area should be covered with a roof to prevent the entry of rainwater. • Degreasing can also be carried out using mechanical spray type degreaser, with complete recycle using an enclosure with nozzles and two sieves, coarse above and fine below, may be used. • All the waste oil collected, from skimming of the oil trap as well as from the drip pans, or the mechanical degreaser shall be stored in accordance with the Environment Protection (Storage and Disposal of Hazardous Wastes) Rules, 1989. For this purpose, metallic drums should be used.		Contractor	Authority's Engineer
C.3	Noise Pollution and Vibration	Vehicles and Construction machinery	• All plants and equipment used in construction shall strictly conform to the CPCB noise standards • Noisy construction activities (such as crushing, concrete mixing, batching etc.) within 1000 m of the nearest habitation/ education institutes/health centres (silence zones) shall be stopped during the night time 9.00 pm to 6.00 pm.	Construction site/camp and **major Settlements** locations but not limited to mentioned below are: VR/MDR: • Dhamod (3+700) • Lalsar cross road (6+475) • Vakhatapur (7+900) • Garasiywada & Untadi (12+400) SH-63: • Lunawada town (0+000) • Khantana Bhensavada (7+000) • Charangam (11+500) Sensitive locations :	Contractor	Authority's Engineer

[5]Designated areas are to be identified and finalized by Contractor in consultation with the Authority's Engineer - EE, SRP Dn. Roads and Building Dept., Govt. of Gujarat and their representatives.

Sl. No.	Environmental Issue	Activity	Mitigation Measures	Location	Implementing Agency	Supervising & Monitoring Agency
				VR/MDR: • Govt. Panchvati General Hospital (6+600) SH-63: • Salvada PTC college (10+475) • Bright Primary and High school (2+625) • Adarsh Nivasi School (0+825) Sensitive habitations: Reserved Forest locations VR/MDR: • Ch: 0+700 to 0+925 • Ch: 0+925 to 3+175 SH-63: Ch: 5+850 to 6+050, 6+400 to 6+875.		
C.4	Land Pollution	Spillage from plant and equipment at construction camp	• Providing impervious platform and oil & grease trap for collection of spillage from construction equipment vehicle maintenance platform • Collection of oil and lubes drips in container during repairing construction equipment vehicles • Providing impervious platform and collection tank for spillage of liquid fuel and lubes at storage area • Providing impervious base at bitumen and emulsion storage area and regular clearing of any bitumen spillage for controlled disposal	Construction site / camp	Contractor	Authority's Engineer
		Soil quality monitoring	• As mentioned.	Construction site / camp and other locations along project road as directed by Authority's Engineer	Contractor	Authority's Engineer
		Domestic solid waste and liquid waste generated at camp	• Collecting organic waste at separate bins and disposing of in a pit at designated area/s • Collecting inorganic wastes in separate bins and storing them in a secure area within the camp location, and disposal of the same in the nearest municipal solid waste site.	Construction & labour camps	Contractor	Authority's Engineer
		Temporary use of lands, including construction sites, construction camps, and borrow areas.	• Identify and finalize all lands to be temporarily used in the project in consultation with the EE SRP after entering into a written agreement with the land owners for rehabilitation of the land parcel prior to handing over. • Avoid locating borrow area close to any road (maintain at least 30 m distance from CoI and 10 m from toe of embankment, whichever is more); • Rehabilitation within agreed timeframe before handing over to the landowner	Construction sites / camps / borrow areas	Contractor	Authority's Engineer
C.5	Occupational health and safety of	Exposure to high noise level and inadequate facilities including	• Water supply, sanitation, drainage and medical health facilities at campsite • Providing and using PPEs(Personal Protective Equipments) • Using working reverse horn for all construction equipment and vehicles	Construction site / camp	Contractor	Authority's Engineer

Sl. No.	Environmental Issue	Activity	Mitigation Measures	Location	Implementing Agency	Supervising & Monitoring Agency
	workers	supply of potable water and sanitation facilities	• Providing earth link circuit breaker (ELCB) for all electrical connections • Maintaining first aid at construction sites			
C.6	Accidents and safety	Arrangement of traffic during construction	• Providing and maintaining traffic management comprising diversion; warning, guiding and regulatory signage; channelizes and delineators; lighting, flagmen; dust control system etc. **as specified in IRC-SP-55.**	All along the project corridor.	Contractor	Authority's Engineer
C.7	HIV/ AIDS Prevention Measures		• The Contractor shall implement the following measures towards ensuring HIV/AIDS prevention during the entire contract period • (i) conduct awareness campaign including dissemination of IEC materials on HIV/AIDS for all construction personnel (including labourers, supervisors, Authority's Engineers and consultants) on HIV/AIDS/STDs within two month of mobilization and once a year subsequently during the contract period; • (ii) conduct semi-annual health check-up of all construction personnel including testing for STDs; • (iii) erect and maintain hoardings/ information signages on HIV/AIDS prevention at the construction sites, labour camps and truck parking locations; • (iv) install condom vending machines at the labour camps, including replenishment of supplies. Note -The Condom Vending Machine, Signage's and Hoardings etc. procured shall be the property of the Authority. The Contractor shall maintain a proper record, store them properly and hand them over to the Authority at the end of the project.	Construction & labor camps	Contractor	Contractor under the supervision of the Authority's Engineer
C.8	Enhancement Measures	Environmental Enhancement Measures at identified locations	Following enhancement to be carried out on project corridor as a part of mitigation measures, details are provided in table 1.3. • Fencing and iron gate • Plantation with Brick Fencing • Providing Shoe Rack (Temples, Mosque, Identified Religious Properties / CPRs) • Providing Benches / Seating Arrangement (Concrete / Wooden / Metal) at identified locations, nos. as decided by the Authority's Engineer or his representative • Providing Paver Blocks at identified locations • Providing Community Bins (Waste Bins –Dustbins Big Size, 1100 Litre), as well as small 240 litre size Waste Bins (Littre Bins), Nos. as decided by the Authority's Engineer or his representative • Cleaning of Pucca Drain, Cleaning, C& G of Earthen / Lined drain • Recharge Pits-Between each on LHS and RHS (Within RoW as directed by Authority's Engineer) Note: Responsibility lies with the Contractor to protect and preserve all the environmental enhancement items at the locations listed above until the end of the defect liability period / Maintenance period. In the event of the theft / loss / damage to any of the items, Contractor to replace the same at no additional cost.	At suitable locations along the project road: Table 1.3 for enhancement measures may please be referred.	Contractor	Contractor under the supervision of : Authority's Engineer

Table 3-2: Description of the Additional Environmental Management Measures for effective implementation of Environmental Management Plan during various stages of the project for Dhoridungri to Garasiyawada and Lunawada to Garasiyawada Project Corridor

Environmental Issues				Ref: Clauses	Mitigation Measures to be Adopted by the Contractor	Location[6]	Responsibility
1	PRE-CONSTRUCTION STAGE						
	1.1	Pre-construction activities by Authority					
		1.1.1	Utility Relocation and Common Property Resources (CPRs)	Clause 110 of MoRTH	• Authority, concerned line departments and Contractor shall take necessary precautions, and shall provide barricades/delineation of such sites to prevent accidents including accidental fall into bore holes, pits, drains both during demolition and construction/ relocation of such facilities. Standard safety practices shall be adopted for all such works.	Corridor of Impact.	Contractor under the supervision of the Authority's Engineer / Authority
	1.2	Pre-construction activities by the Contractor/Authority's Engineer					
		1.2.1	Joint Field Verification		• The Authority's Engineer and Contractor shall ascertain the feasibility of implementing the Environmental Management Plan (EMP) through Joint field verification. • Any observations / modification required in updating EMP shall be done by the Authority's Engineer and a copy of the modified EMP shall be submitted to the Authority for review and approval.	Along the project corridor	Contractor under the supervision of the Authority's Engineer
		1.2.2	Procurement of Machinery				
		1.2.2.1	Crushers, Hot-mix Plants & Batching Plants	(i) Emission control legislations of CPCB/ GPCB for air, noise etc. (ii) Clause 111.5 of MoRTH (Pollution from Plants and Batching Plants)	• The Contractor shall follow all stipulated conditions for pollution control as suggested by the GPCB in the consent/ NoC for establishing and operating the Hot-mix and Batching Plant. • No such installation by the Contractor shall be allowed till all the required legal clearances are obtained from the competent authority and the same is submitted to the Authority. • The location of the Crusher, hot-mix and batching plant shall be at least (i) 1000 m away from any of the settlements (that exists along and / or in the vicinity of the project corridor) and shall be placed in the downwind direction and (ii) 10 km aerial distance away from the protected areas (sanctuary, national parks etc.). • Locations for settlements referred to herein EMP are indicative only. The Contractor shall submit the detailed layout plan for approval to the Authority's Engineer before getting into formal agreement with landowners for setting up of such site.	All construction machineries (Crushers, Hot-mix Plants & Batching Plants) should be kept / stationed 1000 m away from any of the settlements : Some of the major settlements / town along the project corridors; but not limited to as mentioned below are : VR/MDR: • Dhamod (3+700) • Lalsar cross road (6+475) • Vakhatapur (7+900) • Garasiywada & Untadi (12+400) SH-63: • Lunawada town (0+000) • Khantana Bhensavada (7+000) • Charangam (11+500)	Contractor under the supervision of the Authority's Engineer
		1.2.2.2.	Other Construction Vehicles, Equipment and Machinery	Discharge standards and Noise limits as per Environment Protection	• Equipment's conforming to the latest noise and emission control measures shall be used. • Pollution under Control (PUC) certificates for all vehicles and machinery	Along the project corridor	Contractor under the supervision of the Authority's Engineer

[6] All locations are referred to design chainages.

Environmental Issues				Ref: Clauses	Mitigation Measures to be Adopted by the Contractor	Location[6]	Responsibility
				Act, 1986 (EPA) Emission standards as per Bureau of Indian Standard (BIS) preferably Bharat IV emission norms	shall be made available to the Authority's Engineer and Authority for verification whenever required.		
		1.2.3	Identification & Selection of Material Sources				
		1.2.3.1.	Borrow Areas	Clause 305.2.2 of MoRTH Clause 111.2 (Borrow Pits for Embankment Construction)	• Clearance and / or permission of the Borrow Area from the appropriate authority to be undertaken by the Contractor; prior to use of any of the borrow areas. • The Authority's Engineer shall inspect every borrow area location prior to issuing environmental approval for use of such sites. • Care shall be taken to avoid agriculture areas for planning haul roads for accessing borrow materials. In case of damage, the Contractor shall be solely responsible and shall rehabilitate it, as approved by Authority's Engineer. • All borrow areas shall be restored either to the original condition or as per the approved rehabilitation plan by the Authority's Engineer, immediately upon completion of the use of such a source.	• Nathusinghna Muvada (7+000 : VR/MDR) • Kidiya (7+900 : VR/MDR)	Contractor under the supervision of the Authority's Engineer
		1.2.3.2.	Quarries	Clause 111.3 of MoRTH (Quarry Operations)	• No quarry and/or crusher units shall be established, which is within 1000 m from the residential/ settlement locations, forest boundary, wildlife movement path, breeding and nesting habitats and national parks/sanctuaries. • Locations for settlements referred to herein EMP are indicative only. • Contractor shall work out haul road network to be used for transport of quarry materials and report to Authority's Engineer who shall inspect and approve the same.	Potential quarries and stone crushers identified at reasonable distances from the project corridor These quarries / stone crushers are : 1) Antroli (Harsol): 70 km from Dhoridungri 2) Vadagam: 50 km from Dhoridungri 3) Dhansura (Simli); 50 km from Dhoridungri 4) Bayad: 30 km from Dhoridungri 5) Sathamba: 15 km from Dhoridungri. For new quarry area, it is necessary that it is located 1000 m away from the settlements / following locations: <u>VR/MDR:</u> • Dhamod (3+700) • Lalsar cross road (6+475) • Vakhatapur (7+900) • Garasiywada & Untadi (12+400) <u>SH-63:</u>	Contractor under the supervision of the Authority's Engineer

Environmental Issues				Ref: Clauses	Mitigation Measures to be Adopted by the Contractor	Location[6]	Responsibility
						• Lunawada town (0+000) • Khantana Bhensavada (7+000) • Charangam (11+500)	
		1.2.3.3.	Arrangement for Construction Water		• The Contractor shall source the requirement of water preferably from surface water bodies, rivers, canals and tanks in the project area. • To avoid disruption/disturbance to other water users, the Contractor shall extract water from fixed locations. The Contractor shall consult the local people before finalizing the locations. • Only at locations where surface water sources are not available, the Contractor can contemplate extraction of ground water, after intimation and consent from the Authority's Engineer. • The Contractor shall comply with the requirements of Gujarat Groundwater Authority and seek their approval for extraction of ground water.	All rivers / surface water bodies that can be utilized within the project area at the following locations : **Pond/Lake** on km 5+000 (RHS) **River crossings:** Mahi 7+300	Contractor under the supervision of the Authority's Engineer
		1.2.3.4.	Sand (all river and stream beds used directly or indirectly for the project)	Clause 111.3 of MoRTH (Quarry Operations)	• In case of selection of new sites for sand quarrying, the Contractor shall obtain prior approval and concurrence from Competent District Authority. • To avoid accidents and caving in of sand banks at quarry sites, sand shall be removed layer by layer. Digging deeper than the permissible limit (0.9 metres) shall not be allowed. Such quarry shall be barricaded 10m away from the periphery on all sides except the entry point, so as to prevent accidental fall of domestic cattle, wildlife and human beings.	Nearest sand quarries locations (Indicative). Rivers: Meshwo (Palundra), Vatrak..	Contractor under the supervision of the Authority's Engineer
		1.2.4	Setting up construction sites				
		1.2.4.1	Construction Camp Locations – Selection, Design & Layout		Construction camps shall not be proposed: (i) Within 10000 m of ecologically sensitive areas (if any) (ii) Within 1000 m from any of the nearest habitations to avoid conflicts and stress over the infrastructure facilities, with the local community Locations for habitation and settlements referred to herein EMP are indicative only. Contractor's Construction Camp Setup and Plant Site Location has to be at least 1000 m away from any of the nearest settlement and habitation.	Sensitive areas : Reserved Forest locations VR/MDR: • Ch: 0+700 to 0+925 • Ch: 0+925 to 3+175 SH-63: • Ch: 5+850 to 6+050, • Ch: 6+400 to 6+875 Nearest Habitations (Indicative only) and not limited to as mentioned below: <u>VR/MDR:</u> • Dhamod (3+700) • Lalsar cross road (6+475) • Vakhatapur (7+900) • Garasiywada & Untadi (12+400) <u>SH-63:</u> • Lunawada town (0+000)	Contractor under the supervision of the Authority's Engineer

Environmental Issues				Ref: Clauses	Mitigation Measures to be Adopted by the Contractor	Location[6]	Responsibility
						• Khantana Bhensavada (7+000) • Charangam (11+500)	
		1.2.4.2.	Arrangements for Temporary Land Requirement	Clause 108.3. of MoRTH	• The Authority's Engineer shall ensure that the temporary site is cleared prior to handing over to the owner (after construction or completion of the activity) and it is included in the contract	Areas temporarily acquired for construction sites / hot mix plants / borrow areas / diversions / detours	Contractor under the supervision of the Authority's Engineer
		1.2.4.3.	Stock-yards		• The Contractor shall identify the location for stockyards for construction materials at least 1000 m from water courses. • Separate enclosures shall be planned for storing construction materials containing fine particles such that sediment-laden water does not drain into nearby storm water drains	Stockyards shall not be established within 1000 m from water course : **Nearest water body locations are but not limited to at**[7] : **Pond:** Ch 9+600, 1+050, 4+100 (SH-63) Open Wells: Ch 3+300, 4+115, 4+200, 4+250, 4+300, 4+400, 5+200, 5+275, 8+000, 9+175 in the VR/MDR section **River:** Ch 7+125, 1+700 (SH-63) **Canal**: Sujalam Suphalam canal at Ch.3+200 (VR/MDR), 4+010 (SH-63) Appropriate underground water resources.	Contractor under the supervision of the Authority's Engineer
		1.2.4.4.	Fuel storage and refuelling areas	Clause 2.1.1.6 of EMP hereunder (Stripping of Soil) Clause 2.1.4.1.2 of EMP (Water Pollution from Fuel, Lubricants and Chemicals)	• The Contractor shall ensure that all construction vehicle parking locations, fuel/lubricants storage sites, vehicle, machinery and equipment maintenance and refuelling sites are located at least 500 m from rivers and irrigation canal/ponds.	Canals, water bodies and ponds locations are but not limited to as mentioned above in para of the attribute setting of construction camp - stockyards.	Contractor under the supervision of the Authority's Engineer
			Labour Camp Management				
		1.2.5.1	Location of Construction labour camps: Accommodation	Factories Act, 1948 and Building & other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996 (construction & maintenance of labor camp)	• The Contractor shall provide, if required, erect and maintain necessary (temporary) living accommodation and ancillary facilities for labourers, to standards approved by the Authority's Engineer. • Labour camps shall not be located within 1000 m from the nearest habitation to avoid conflicts and stress over the infrastructure facilities, with the local community. The location, layout and basic facility provision of labour camps shall be submitted to Authority's Engineer for approval prior to construction.	Along the project corridor at the location of construction labor camps	Contractor under the supervision of the Authority's Engineer
		1.2.5.2	Potable Water	The Contract Labour (Regulation and	• The Contractor shall supply portable water through municipal/ panchayat sources. In case of groundwater it shall be treated prior to	Construction labor camps	Contractor under the supervision of the

[7] Numbers in the bracket are Chainages on State Highway 41 from Sidhpur to Palanpur

Environmental Issues				Ref: Clauses	Mitigation Measures to be Adopted by the Contractor	Location[6]	Responsibility
				Abolition) Act, 1970 and Factories Act, 1948	supply.		Authority's Engineer
		1.2.5.3	Sanitation facilities	Factories Act, 1948 for sanitation	• The sanitation facilities for the camp shall be designed, built and operated in such a fashion that no health hazards occurs and no pollution to the air, ground water or adjacent water courses take place.	Construction labor camps	Contractor under the supervision of the Authority's Engineer
		1.2.5.4	Waste Disposal	Municipal Solid Waste (Management and Handling) Rules – 2000 for effective waste disposal	• The Contractor shall provide garbage bins in the camps and ensure that these are regularly emptied and disposed off in a hygienic manner	Construction labor camps	Contractor under the supervision of the Authority's Engineer
		1.2.5.5	HIV/ AIDS Prevention Measures		• The Contractor shall implement the following measures towards ensuring HIV/AIDS prevention during the entire contract period (i) conduct awareness campaign including dissemination of IEC materials on HIV/AIDS for all construction personnel (including labourers, supervisors, Authority's Engineers and consultants) on HIV/AIDS/STDs within 3 months of mobilization and once a year subsequently during the contract period; (ii) carry out screening of construction personnel for HIV/ AIDS, within the 3 month of mobilisation (iii) conduct semi-annual health check-up of all construction personnel including testing for STDs; (iv) erect and maintain hoardings/ information signages on HIV/AIDS prevention at the construction sites, labour camps and truck parking locations; (v) install condom vending machines at the labour camps, including replenishment of supplies.	Construction & labor camps	Contractor under the supervision of the Authority's Engineer
2	**CONSTRUCTION STAGE**						
	2.1.	Construction Stage Activities by Contractor					
		2.1.1	**Site Clearance**				
		2.1.1.1.	Clearing and Grubbing	Clause 201 of MoRTH (Clearing and Grubbing)	• All works shall be carried out in a manner such that the damage or disruption to flora is minimal. Only ground cover/shrubs that impinge directly on the permanent works or necessary temporary works shall be removed with prior approval from the Authority's Engineer. • Trees shall be saved from cutting wherever it possible.	Along the project corridor at construction sites	Contractor under the supervision of the Authority's Engineer
		2.1.1.2.	Dismantling of Bridge work / Culverts	Clause 202 of MoRTH (Dismantling Culverts, Bridges and other structures / pavements)	• The Contractor shall follow all necessary measures (including safety) especially while working close to cross drainage channels to prevent earthwork, stonework, materials and appendages from impeding cross drainage at rivers, streams, water canals and existing irrigation and drainage systems.	At locations where Cross Drainage works are proposed.	Contractor under the supervision of the Authority's Engineer
		2.1.1.3.	Generation & disposal of Debris	Clause 202.5 of MoRTH. (Disposal of materials)	• Disposal of unutilized non-toxic debris shall be either through filling up of borrow areas or at pre-designated disposal sites, subject to the approval of the Authority's Engineer.	Throughout Project Corridor.	Contractor under the supervision of the Authority's Engineer

Environmental Issues				Ref: Clauses	Mitigation Measures to be Adopted by the Contractor	Location[6]	Responsibility
					• At locations identified for the disposal of residual bituminous wastes, the disposal shall be carried out on top of a 60 mm thick layer of rammed clay so as to eliminate the possibility of leaching of wastes into the ground water. • Debris generated due to the driving of piles or other construction activities along the rivers, streams and drainage channels shall be carefully disposed in such a manner that it does not flow into the surface water bodies or form puddles in the area. • The pre-designated disposal locations shall be part of **Comprehensive Solid Waste Management Plan** that has to be prepared by the Contractor in consultation and with approval of Authority's Engineer.		
		2.1.1.4.	Non-bituminous construction wastes disposal	Clause 202.5 of MoRTH. (Disposal of materials)	• The Contractor shall finalise the location of disposal sites based on the following. ○ not located within designated forest area ○ does not impact natural drainage courses ○ No endangered/rare flora is impacted by such dumping. ○ Settlements are located at least 1000 m away from the site. The Authority's Engineer shall approve disposal sites after conformation.	Disposal site locations.	Contractor under the supervision of the Authority's Engineer
		2.1.1.5.	Bituminous wastes disposal	Clause 202.5 of MoRTH	• The disposal of residual bituminous wastes shall be done by the Contractor at secure land fill sites, with the requisite approvals for the same from the concerned government agencies.	Disposal site locations.	Contractor under the supervision of the Authority's Engineer
		2.1.1.6.	Stripping, stacking and preservation of top soil	Clause 301.3.2 of MoRTH (Stripping and storing topsoil) Clause 305.3.3 of MoRTH (Stripping and Storing Topsoil) Clause 301.7 of MoRTH (Finishing operations)	• Contractor shall strip the topsoil at all locations that has been opened up for construction, including temporarily acquired land for traffic detours, storage, materials handling or any other construction related or incidental activities.	At all construction sites	Contractor under the supervision of the Authority's Engineer
		2.1.1.7.	Accessibility		• The Contractor shall provide safe and convenient passage for vehicles; pedestrians and livestock to and from roadsides and property accesses by providing temporary connecting road, as necessary. • Construction activities that shall affect the use of side roads and existing accesses to individual properties, whether public or private, shall not be undertaken without providing adequate provisions to ensure uninterrupted access, as approved by the Authority's Engineer. • The Contractor shall take care that the cross roads are constructed in such a sequence that construction work over the adjacent cross roads are taken up in a manner that traffic movement in any given area does not get affected.	Throughout Project Corridor	Contractor under the supervision of the Authority's Engineer
		2.1.1.8.	Planning for Traffic Diversions and Detours	Clause 112 of MoRTH (Arrangement for traffic	• Detailed traffic control plans shall be prepared by the Contractor and the same shall be submitted to the Authority's Engineer.	All along the project corridor.	Contractor under the supervision of the

Environmental Issues				Ref: Clauses	Mitigation Measures to be Adopted by the Contractor	Location[6]	Responsibility
				during construction)	• The Contractor shall provide specific measures for safety of pedestrians and workers as a part of traffic control plans. The Contractor shall ensure that the diversion/detour is always maintained in running condition, particularly during the monsoon to avoid disruption to traffic flow. • The Contractor shall inform local community of changes in traffic routes and pedestrian access arrangements with assistance from Authority's Engineer and Authority.		Authority's Engineer
		2.1.2	**Construction Materials**				
		2.1.2.1.	Earth from Borrow Areas for Construction	IRC-010 (procurement of earth materials)		All along the project corridor, all access roads, temporarily acquired sites & all borrow areas.	Contractor under the supervision of the Authority's Engineer
		2.1.2.2.	Quarries	Clause 111.3 of MoRTH (Quarry Operations)		Potential quarries and stone crushers identified at reasonable distances from the project corridor These quarries / stone crushers are : 1) Antroli (Harsol): 70 km from Dhoridungri 2) Vadagam: 50 km from Dhoridungri 3) Dhansura (Simli); 50 km from Dhoridungri 4) Bayad: 30 km from Dhoridungri 5) Sathamba: 15 km from Dhoridungri.	Contractor under the supervision of the Authority's Engineer
		2.1.2.3.	Blasting	Clause of 302 Of MoRTH (Blasting operations)		All blasting and Pre-splitting Sites.	Contractor under the supervision of the Authority's Engineer
		2.1.2.4.	Transporting Construction Materials	Clause 111.8.1 & Clause 111.11 of MoRTH	• All vehicles that are delivering materials to the site shall be covered to avoid spillage of materials. • The unloading of materials at construction sites close to settlements shall be restricted to daytime only.	All along the Project corridor and all haul roads	Contractor under the supervision of the Authority's Engineer
		2.1.3	**Construction work**				
		2.1.3.1.	Disruption to other users of Water	Clause 2 Water Quality of Annexure "A" to Clause 501 of MoRTH (Protection of the Environment)	• In case of diversion of water bodies, the Contractor shall take prior approval from the Irrigation Department and Authority's Engineer for any such activity. The Authority shall ensure that Contractor has served a notice to the downstream users of water, well in advance, where such diversion of the flow is likely to affect the downstream population subject to the condition that under no circumstances the downstream flow shall be stopped.		Contractor under the supervision of the Authority's Engineer
		2.1.3.2.	Drainage and Flood	Clause 202 of MoRTH	• Contractor shall ensure that construction materials like earth, stone,	Silt fencing at - Surface water	Contractor under the

Environmental Issues				Ref: Clauses	Mitigation Measures to be Adopted by the Contractor	Location[6]	Responsibility
			Control	(Dismantling Culverts, Bridges and other structures / pavements)	ash or appendages disposed off does not block the flow of water of any water course and cross drainage channels. • Where necessary, adequate mechanical devices to bailout accumulated water from construction sites, camp sites, storage yard, excavation areas are to be arranged well in advance before the rainy season besides providing temporary cross drainage systems. • The Contractor shall take all adequate precautions to ensure that construction materials and excavated materials are enclosed in such a manner that erosion or run-off of sediments is controlled. Silt fencing shall be installed prior to the onset of the monsoon at all the required locations, as directed by Authority's Engineer and Authority. • The Contractor shall ensure that no material blocks the natural flow of water in any water course or cross drainage channel. Prior to monsoon, the Contractor shall provide either permanent or temporary drains to prevent water logging.	sources / water bodies / drains/ Nalahs/ Ponds / canals etc. - List of some of the locations, but not limited to as mentioned above in para of the attribute setting of construction camp - stockyards.	supervision of the Authority's Engineer
		2.1.3.3.	Siltation of Water Bodies and Degradation of Water Quality	Clause 306 of MoRTH (Soil erosion and Sedimentation control)		Silt fencing at - Surface water sources / water bodies / drains/ Nalahs/ Ponds / canals etc. - List of some of the locations, but not limited to as mentioned above in para of the attribute setting of construction camp - stockyards.	Contractor under the supervision of the Authority's Engineer
		2.1.3.4.	Slope Protection and Control of Soil Erosion	Clause 306 of MoRTH (Soil erosion and Sedimentation control) Clause 307 of MoRTH (Turfing with sods) Clause 308 of MoRTH (Seeding and Mulching)	• The Contractor shall construct slope protection as per the design and / or as directed by the Authority's Engineer	High raise embankments and surface water bodies locations shall be carried out by adopting stone pitching method. At cross drainage works, nearby surface water bodies, ponds etc. as per decision of Authority's Engineer.	Contractor under the supervision of the Authority's Engineer
		2.1.4	**Pollution Control**				
		2.1.4.1.	Water Pollution				
		2.1.4.1.1.	Water Pollution from Construction Wastes	Schedule VI - General Standards for Discharge of Environmental Pollutants (Liquid Waste Disposal) - CPCB The Environment (Protection) Rules, 1986 and Water Act, 1974	• The Contractor shall take all precautionary measures to prevent the generated wastewater from entering into streams, water bodies or the irrigation channels arising due to construction activity. • Contractor shall avoid construction works close to the streams or water bodies during monsoon. • Monitoring to check water pollution shall be conducted as per the "Environmental Monitoring Plan Programme Table" and results shall be used to identify any additional pollution control measures those are required to be adopted.	Surface water sources / drains / Nalahs / Ponds/ Canal etc. - at locations, but not limited to are: **Pond:** Ch 9+600, 1+050, 4+100 (SH-63) **Open Wells:** Ch 3+300, 4+115, 4+200, 4+250, 4+300, 4+400, 5+200, 5+275, 8+000, 9+175 in the VR/MDR section **River:** Ch 7+125, 1+700 (SH-63) **Canal:** Sujalam Suphalam canal at	Contractor under the supervision of the Authority's Engineer

Environmental Issues				Ref: Clauses	Mitigation Measures to be Adopted by the Contractor	Location[6]	Responsibility
						Ch.3+200 (VR/MDR), 4+010 (SH-63)	
		2.1.4.1.2.	Water Pollution from Fuel, Lubricants and Chemicals	Petroleum Act and Rules and Environment (Protection) Rules, 1986 (Standards for Emission or Discharge of Environmental Pollutants Schedule – I) for Liquid Waste Disposal Clause 111 of MoRTH (Precaution and Safeguarding the Environment) Clause 2 Water Quality of Annexure "A" to Clause 501 of MoRTH (Protection of the Environment) Clause 301.3.2 of MoRTH (Stripping and storing topsoil) Annex-8 (Environmental Monitoring Program) of IRC-SP-108.	• Oil interceptors shall be provided at vehicle parking locations, wash down and refuelling areas. • When fuel storage and refuelling areas are located on agricultural land or areas supporting vegetation, the top soil shall be stripped, stockpiled and returned after cessation of such storage. • Monitoring to check water pollution shall be conducted as per the **"Environmental Monitoring Plan Programme Table"** and results shall be used to identify any additional pollution control measures those are required to be adopted.	Surface water sources / drains / Nalahs / Ponds/ Canal etc. - at locations, but not limited to are: **Pond:** Ch 9+600, 1+050, 4+100 (SH-63) **Open Wells:** Ch 3+300, 4+115, 4+200, 4+250, 4+300, 4+400, 5+200, 5+275, 8+000, 9+175 in the VR/MDR section **River:** Ch 7+125, 1+700 (SH-63) **Canal:** Sujalam Suphalam canal at Ch.3+200 (VR/MDR), 4+010 (SH-63)	Contractor under the supervision of the Authority's Engineer
		2.1.4.2.	Air Pollution				
		2.1.4.2.1.	Dust Pollution	Clause 3 Air Quality of Annexure "A" to Clause 501 of MoRTH (Protection of the Environment) Clause 111.5 of MoRTH (Pollution from Plants and Batching Plants) Annex-8 (Environmental Monitoring Program) of IRC-SP-108.	• The conditions for pollution control given in **the NoC (consent for establish and operate)** by the GPCB shall strictly be followed. • Air pollution monitoring shall be conducted as per the Environmental Monitoring Plan and results shall be used to identify any additional pollution control measures that requires to be adopted.	Construction area / site, Construction camps, material loading / unloading facilities. Settlements location, receptors: Below mentioned list is indicative only. VR/MDR: • Govt. Panchvati General Hospital (6+600) SH-63: • Salvada PTC college (10+475) • Bright Primary and High school (2+625) • Adarsh Nivasi School (0+825)	Contractor under the supervision of the Authority's Engineer

Environmental Issues				Ref: Clauses	Mitigation Measures to be Adopted by the Contractor	Location[6]	Responsibility
						Sensitive habitations: Reserved Forest locations VR/MDR: • Ch: 0+700 to 0+925 • Ch: 0+925 to 3+175 SH-63: Ch: 5+850 to 6+050, 6+400 to 6+875.	
		2.1.4.2.2.	Emission from Construction Vehicles, Equipment and Machineries	Schedule-I: Standards for Emission suggested by CPCB/ GPCB	• Certificates issued for such contrivances that were obtained from designated/approved authority shall be submitted along with the specified reporting format to the Authority's Engineer. • The Contractor shall maintain a separate file and submit PUC certificates for all vehicles/equipment/machinery that are being used for the project. Monitoring results shall be submitted to Authority's Engineer and Authority.	Construction camps, material loading / unloading facilities	Contractor under the supervision of the Authority's Engineer
		2.1.4.3.	Noise Pollution				
		2.1.4.3.1.	Noise Pollution: Noise from Vehicles, Plants and Equipments	Noise Limits for vehicles (Environment (Protection) Amendment Rules, 2000) and Part 'E', Schedule – VI of Environment (Protection) Rules, 1986. Clause 5A The Noise Pollution (Regulation and Control) Rules, 2000 (sound emitting construction equipments) Annex-8 (Environmental Monitoring Program) of IRC-SP-108.	• All plants and equipment used in construction shall strictly conform to the MoEF & CC; GoI / CPCB noise standards. • Noisy construction activities (such as crushing, concrete mixing, batching etc.) within 150m of the nearest habitation/ educational institutes/health centres (silence zones) shall be stopped during the night time between 9.00 pm to 6.00 am. • Contractor shall provide noise barriers to the suggested locations of identified schools/ Temples/health centres prior to commencement of work. • Monitoring shall be carried out at the construction sites as per the monitoring schedule and results shall be submitted to Authority's Engineer. Based on the monitoring results, the Authority's Engineer, if required, shall recommend any additional noise mitigation measures required to be implemented by the Contractor.	Sensitive receptors: Construction site / camp and sensitive locations : Below mentioned list is indicative only. VR/MDR: • Govt. Panchvati General Hospital (6+600) SH-63: • Salvada PTC college (10+475) • Bright Primary and High school (2+625) • Adarsh Nivasi School (0+825) Sensitive habitations: Reserved Forest locations VR/MDR: • Ch: 0+700 to 0+925 • Ch: 0+925 to 3+175 SH-63: Ch: 5+850 to 6+050, 6+400 to 6+875.	Contractor under the supervision of the Authority's Engineer
		2.1.4.4.	Safety				
		2.1.4.4.1	Safety Procedures		The Contractor shall: • Comply with all applicable safety regulations,	All construction sites	Contractor under the supervision of the

Environmental Issues				Ref: Clauses	Mitigation Measures to be Adopted by the Contractor	Location[6]	Responsibility
					• Take care of the safety of all personnel who are entitled to be on the Site, • Use reasonable efforts to keep the site and works clear of unnecessary obstructions so as to avoid danger to personnel, • Fencing, lighting, guarding and supervision of the works shall be carried out and provided until completion and taking over. It is necessary to provide any temporary works (including roadways, footways, guards and fences) as necessary, since the execution of these works, shall not raise a concern for the purpose of use and protection of the public and of owners as well as occupiers of adjacent land • A construction safety checklist has been included (Appendix 1 Form EM-7)		Authority's Engineer
		2.1.4.4.2	Care and supply of Documents		• The Contractor shall prepare, submit and obtain approval from the Authority's Engineer for construction of the Safety Management Plan, and the same shall be prepared 14 days prior to commencement of construction works at site.		Contractor under the supervision of the Authority's Engineer
		2.1.4.4.3	Contractors general obligations		• All design calculations and fabrication drawings for temporary works (such as form-work, staging, centring, scaffolding, specialized construction, handling and launching equipment and the like) material lists for structural fabrication as well as detailed drawings for templates, and anchorage and temporary support details for pre stressing cables as well as bar bending and cutting schedules for reinforcement, etc shall be prepared by the Contractor at his own cost and forwarded to the Authority's Engineer at least six weeks in advance of the actual constructional requirements. The Authority's Engineer will check the same for the Contractor's use with amendments.		Contractor under the supervision of the Authority's Engineer
		2.1.4.4.4	Personal Safety Measures for Labour, Material handling , Painting etc.	Factory Act, 1948, Factories (Amendment) Act, 1987 (Chapter -5 Safety) Building and Other Construction Workers (Regulation of Employment and Conditions of Services) Act, 1996	Construction Safety Plan shall be prepared by the Contractor during mobilization and approved by Authority's Engineer and shall be adhered to by the Contractor throughout the construction period, and shall include provision of: • Protective footwear and protective goggles to all workers employed in mixing asphalt materials, cement, and lime mortars, concrete etc. • Welders protective eye-shields to the workers engaged in welding works • Protective goggles and clothing to workers engaged in stone breaking activities and workers shall be seated at sufficiently safe intervals • The Contractor shall comply with all regulations regarding safe scaffolding, ladders, working platforms, gangway, stairwells, excavations, trenches and safe means of entry and egress. • The Contractor shall ensure that no paint containing lead or lead products is used except in the form of paste or readymade paint. • Contractor shall provide facemasks to the workers when paint is applied	All construction sites	Contractor under the supervision of the Authority's Engineer

Environmental Issues				Ref: Clauses	Mitigation Measures to be Adopted by the Contractor	Location[6]	Responsibility
					in the form of spray or a surface having dry lead paint when it is rubbed and scrapped. • The Contractor shall mark 'hard hat' and 'no smoking' and other 'high risk' areas and enforce non-compliance of use of PPE with zero tolerance.		
		2.1.4.4.5	Health and Safety		• The Contractor shall at all times take all reasonable precautions to maintain the health and safety of the Contractor's personnel. In collaboration with local health authorities, the Contractor shall ensure that medical staff, first aid facilities, sick bay and ambulance service are available at all times at the site. • The Contractor shall appoint an accident prevention officer at the site, responsible for maintaining safety and protection against accidents. This person shall be qualified for this responsibility, and shall have the authority to issue instructions and take protective measures to prevent accidents. Throughout the execution of the works, the Contractor shall provide whatever is required by this person to exercise this responsibility and authority. • The Contractor shall send, to the Authority's Engineer, details of any accident as soon as practicable after its occurrence. • The Contractor shall maintain records and make reports concerning health, safety and welfare of persons, and damage to property, as the Authority's Engineer may reasonably require.	All construction sites and labour camps	Contractor under the supervision of the Authority's Engineer
		2.1.4.4.6	Traffic Safety & Pedestrian Safety	Clause 112. of MoRTH (Arrangement for traffic during construction)	• Pedestrian Safety shall be ensured. Pedestrian circulation shall be demarcated prior to start & unsafe areas shall be cordoned off.	All along the project corridor	Contractor under the supervision of the Authority's Engineer
		2.1.4.4.7	Risk from Electrical Equipment(s)	Factory Act, 1948 – Chapter -5 (Safety) and Factories (Amendment) Act, 1987	• No material shall be so stacked or placed as to cause danger or inconvenience to any person or the public. • All machines to be used in the construction shall conform to the relevant Indian Standards (IS) codes, shall be free from patent defect, shall be kept in good working order, shall be regularly inspected and properly maintained as per IS provision and to the satisfaction of the Authority's Engineer	All construction equipment	Contractor under the supervision of the Authority's Engineer
		2.1.4.4.8	Safety during Road Works	Clause 112.4 of MoRTH (Traffic safety and control) Clause 112.5 of MoRTH (Maintenance of Diversions and traffic control devices) IRC-SP-55 (Traffic Management in work	• The Contractor shall provide adequate signage and markings as per the instruction of the Authority's Engineer in the construction zones **as per IRC-SP-55.**	All along the project corridor and all haul roads	Contractor under the supervision of the Authority's Engineer

Environmental Issues				Ref: Clauses	Mitigation Measures to be Adopted by the Contractor	Location[6]	Responsibility
				zones)			
		2.1.4.4.9	First Aid	Section 36 (First Aid) of Building and the other Construction Workers(Regulation of Employment and Conditions of Service) Act, 1996	• First aid measures shall be provided in the construction zones and labour camps.	All construction sites and labour camps	Contractor under the supervision of the Authority's Engineer
		2.1.4.5.	Cultural Property				
		2.1.4.5.1.	Chance Found Archaeological Property	Ancient Monuments and Archaeological Sites and Remains Rules 1959 Ancient Monuments and Archaeological Sites and Remains (Amendment and Validation) Act 2010	• All fossils, coins, articles of value of antiquity, structures and other remains or things of geological or archaeological interest discovered on the site are the property of the Government and shall be dealt as per provisions of the relevant legislation. • The Contractor shall take reasonable precautions to prevent his workmen or any other persons from removing and damaging any such article or thing.	Along the project corridor	Contractor under the supervision of the Authority's Engineer
		2.2.	Environmental enhancement and special issues				
		2.2.1.	Enhancement measures		• Landscaping at junctions to improve aesthetics etc. • Rehabilitation of cultural and community properties	At suitable locations along the project road: **Table 1.3 for** enhancement measures may please be referred.	Contractor under the supervision of the Authority's Engineer
		2.2.2.	Environmental Enhancement of Community Properties / Rehabilitation / Restoration of Cultural and Religious Properties	Physical Cultural Resources (WB OP/BP 4.11)	• The architectural elements of the structure shall be conserved/reflected/translated into the design of new structures/ enhancements in accordance with wishes of the community. • One or more of the following enhancement to be carried out at **Dhoridungri to Garasiyawada and Lunawada to Garasiyawada project corridor** as a part of mitigation measures. Details of identified locations, where environmental enhancement are require to be carried out, are provided in Table 1.3. • Providing Big Community Bins - Dustbins, • Waste bin – Litter bins. • Plantation with Brick Fencing / Metal Fencing • Providing Benches / Seating Arrangement (Concrete / Wooden / Metal) at identified locations, nos. as decided by the Authority's Engineer or his representative • Providing Paver Blocks at identified locations • Fencing and iron gate • Providing Shoe Rack (Temples, Mosque, Identified Religious Properties / CPRs) • Cleaning of Pucca Drain, Cleaning, C& G of Earthen / Lined drain • Providing Rainwater Harvesting Structures, Oil Interceptors and Silt	At suitable locations along the project road: **Table 1.3 for** enhancement measures may please be referred.	

Environmental Issues				Ref: Clauses	Mitigation Measures to be Adopted by the Contractor	Location[6]	Responsibility
					Traps at Drain outlet leading to nearby Water resources. • Nos. as decided by the Authority's Engineer or his representative **Note:** Responsibility lies with the Contractor to protect and preserve all the environmental enhancement items at the locations listed above until the end of the defect liability period / Maintenance period. In the event of the theft / loss / damage to any of the items, Contractor to replace the same at no additional cost.		
		2.2.3.	Flora and Chance found Fauna		• The Contractor shall take reasonable precaution to prevent his workmen or any other persons from removing and damaging any flora (plant/vegetation) and fauna (animal) including fishing in any water body and hunting of any animal. • If any wild animal is found near the construction site at any point of time, the Contractor shall acquaint the Authority's Engineer and execute the Authority's Engineer's instructions for dealing with the same. • The Authority's Engineer shall report to the nearby forest office (range office) and shall take appropriate steps/ measures in consultation with the forest officials.	Along the project road / forest	Contractor under the supervision of the Authority's Engineer
		2.3.	Contractor Demobilization				
		2.3.1.	Clearing of Construction of Camps & Restoration		• Contractor to prepare site restoration plans for approval by the Authority's Engineer. The plan shall be implemented by the Contractor prior to demobilization. • On completion of the works, all temporary structures shall be cleared, all rubbish burnt, excreta or other disposal pits or trenches filled in and effectively sealed off and the site left clean and tidy, at the Contractor's expense, to the entire satisfaction of the Authority's Engineer. • The topsoil removed and conserved earlier shall be spread over the restoration area as per the direction of the Authority's Engineer to facilitate the growth of vegetation. • Residual topsoil shall be distributed on adjoining/proximate barren/rocky areas as identified by the Authority's Engineer in a layer of thickness of 75mm – 150mm.	All Construction Workers Camps	Contractor under the supervision of the Authority's Engineer
		2.3.2.	Redevelopment of Borrow Areas		• Redevelopment of borrow areas shall be taken up in accordance with the plans approved by the Authority's Engineer	At all borrow area locations suggested, identified and approved for the project corridors.	Contractor under the supervision of the Authority's Engineer
3.	MAINTENANCE STAGE / DLP STAGE i.e. Post construction (Activities to be Carried Out by the Contractor/R&BD/Authority)						
	3.1.		Monitoring and Evaluation of Operational Performance of Environmental Mitigation Measures		• The Authority shall monitor the operational performance of the various mitigation/ enhancement measures carried out as part of the project. Monitoring and performance indicators have been indicated in **Environmental Monitoring Plan Table.**	All along the project corridor	Contractor under the supervision of the Authority's Engineer
	3.2.		Maintenance of Drainage		• Authority shall ensure that all drains (side drains and all cross drainages)	At locations where bridge works	Contractor under the

Environmental Issues				Ref: Clauses	Mitigation Measures to be Adopted by the Contractor	Location[6]	Responsibility
					are periodically cleared especially before monsoon season to facilitate the quick passage of rainwater and avoid flooding without damaging the spurs and check dams erected to stabilize the course and flow of all such drainage channels. • Authority shall ensure that all the sediment / oil and grease traps set up at the water bodies are cleared once in every three months. • **Rainwater harvesting structures all along the road in addition to** nearby water resources and natural water sources. • **Also to ensure that** proposed Rain Water Harvesting structures **are periodically cleared especially before monsoon.**	and culverts are proposed.	supervision of the Authority's Engineer
	3.3.		Pollution Monitoring	IRC-SP-108, Standards and method prescribed and set by Central Pollution Control Board (CPCB), Ministry of Environmental and Forest (MoEF & CC), Govt. of India	• The periodic monitoring of the ambient air quality, noise level, water (both ground and surface water) quality, soil pollution/contamination are to be continued at pre-designated locations as identified in the Environmental Monitoring Plan Table and if necessary, at additional locations for comparative study of pre and post operation data in order to ensure further improvement/modification in similar future works.	All along the project corridor	Contractor under the supervision of the Authority's Engineer
	3.4.		Atmospheric Pollution	IRC-SP-108, Standards and method prescribed and set by Central Pollution Control Board (CPCB), Ministry of Environment Forest and Climate Change (MoEF & CC), Govt. of India	• Ambient air concentrations of various pollutants shall be monitored as envisaged in the Environmental Monitoring Plan at pre designated locations to compare the levels with the pre-construction data. • Additional data at other location may be collected as per any site specific requirement.	All along the project corridor	Contractor under the supervision of the Authority's Engineer
	3.5.		Noise Pollution	IRC-SP-108, Standards and method prescribed and set by Central Pollution Control Board (CPCB), Ministry of Environment Forest and Climate Change (MoEF & CC), Govt. of India	• Noise pollution shall be monitored as per Environmental Monitoring Plan at sensitive locations where pre-construction noise data were collected. The functioning of the noise barriers shall be supervised and monitored for further improvement/replication at other affected points if necessary. • Signage near sensitive locations shall be maintained and kept clean. Monitoring the effectiveness of the pollution attenuation measures shall be taken up as per Environmental Monitoring Plan Table.	All along the project corridor	Contractor under the supervision of the Authority's Engineer
	3.6.		Water Pollution	Indian Standards Drinking Water Specifications (IS : 10500)	• Water Quality shall be monitored as per Environmental Monitoring Plan Program at sensitive locations where pre-construction and construction stage water samples (Both, surface water and ground water samples) were collected. • Monitoring the effectiveness of the pollution attenuation measures shall be taken up as per Environmental Monitoring Plan Program Table.		
	3.7.		Soil Erosion and Monitoring of Borrow Areas	IRC-SP-108, Standards and method prescribed and set by Central	• Visual monitoring and inspection of soil erosion at borrow areas, quarries (if closed and rehabilitated), embankments and other places	Identified and approved borrow areas	Contractor under the supervision of the Authority's Engineer

Environmental Issues				Ref: Clauses	Mitigation Measures to be Adopted by the Contractor	Location[6]	Responsibility
				Pollution Control Board (CPCB), Ministry of Environment Forest and Climate Change (MoEF & CC), Govt. of India	expected to be affected, shall be carried to record and monitor the effectiveness of such structures after the completion of project, so as to evaluate the beneficial effects of each type of activity together with the cost involved.		
	3.8.		Road Safety and Maintenance of Assets		• No advertisement/hoardings shall be allowed within the Right of Way limits of the project road. • Regular maintenance and cleaning of assets such as sign boards, bus stops, drains etc. shall be undertaken. • Regular maintenance of Cautionary signage.	All along the project corridor	Contractor under the supervision of the Authority's Engineer

Table 3-3: Environmental Enhancement Measures at Identified Locations along: Dhoridungri to Garasiyawada and Lunawada to Garasiyawada Project Corridor

Sl. No.	Name of Amenity/Feature	Type / Objective	Minimum Enhancement measures require at
1.	Well	Ground Water Asset	Wells: ➢ **VR/MDR section on LHS : 4+115, 4+355, 4+405, 5+200, 9+315 and on RHS 4+190, 9+185;** ➢ **SH-63 section on RHS: 3+360 and 6+250** • Providing rainwater collection pit so that rain water without debris collected in to the well; • To raise height of a Well (at-least 1.5 m from GL); • Well shall be covered with iron grill (safety); • Plantation (native species) around well; • Tree seating including preservation of existing tress around Well.
2.	Solid Waste Management	Collection & Disposal of municipal / panchayat	The Contractor shall implement SWM on the project highway. Smart waste collecting bins/ dust bins shall be provided at identified littering location and maintained on both sides at start and end of the following locations or as directed by the Authority's Engineer. VR/MDR: • Dhamod (3+700) • Lalsar cross road (6+475) SH-63: • Lunawada town (0+000) The responsibility of collection and disposal of waste from these bins shall remain with the concerned municipalities/ panchayat.
3.	Oil interceptor	Filtration of surface water	The Contractor shall provide oil interceptors at vehicle parking area, vehicle repair area, workshops, refuelling area and nearby water bodies to the construction camps. The Contractor shall also provide oil interceptors at drain outlet to the water bodies.
4.	Silt trap	To prevent sediments	Mahi River at 7+125.

4 IMPLEMENTATION ARRANGEMENTS

4.1 ENVIRONMENTAL MONITORING PLAN

35. The monitoring programme is devised to ensure that the envisaged purpose of the project is achieved and results in the desired benefit to the target population. To ensure the effective implementation of the EMP, it is essential that an effective monitoring programme be designed and carried out.

36. Broad objectives of the monitoring programme are:

- To evaluate the performance of mitigation measures proposed in the EMP;
- To suggest improvements in the management plans, if required;
- To satisfy the statutory and community obligations; and,
- To provide feedback on adequacy of Environmental Impact Assessment

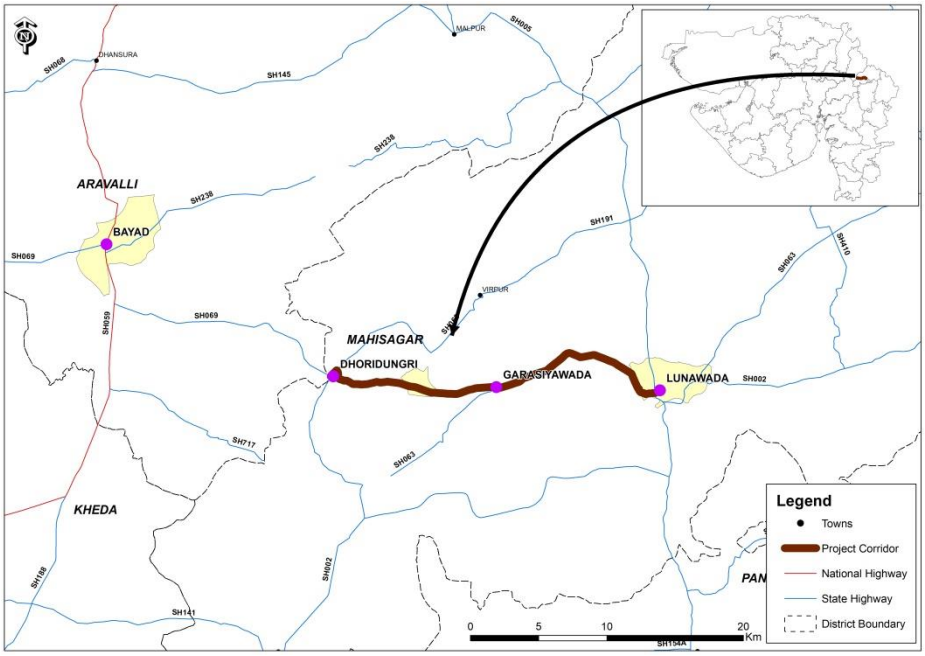
4.2 MONITORING INDICATORS

37. The monitoring programme contains monitoring plan for all performance indicators. Physical, biological and environmental management components identified as of particular significance in affecting the environment at critical locations have been suggested as Performance Indicators (PIs).

Table 4-1: Environmental Monitoring Indicators

Sr. No.	Indicator	Details	Stage	Responsibility
A	**Environmental Condition Indicators and Monitoring Plan**			
1	Air Quality	The parameters to be monitored, frequency and duration of monitoring as well as the locations to be monitored will be as per the Monitoring Plan prepared **(Refer** Table **3**)	Pre-Construction; Construction Post Construction (DL Period)	Contractor under the supervision of Authority's Engineer / EE-SRP / ESMU-PIU / Authority.
2	Noise Levels		Pre-Construction; Construction Post Construction (DL Period)	Contractor under the supervision of Authority's Engineer / EE-SRP / ESMU-PIU / Authority.
3	Water Quality		- -	-
4	Soil Quality		- -	-
B	**Environmental Management Indicators and Monitoring Plan**			
1	Construction Camps	Location of construction camps have to be identified and parameters indicative of environment in the area has to be reported.	Pre-construction	Contractor under the supervision of Authority's Engineer / EE-SRP / ESMU-PIU / Authority.
2	Borrow Areas	Location of borrow areas have to be identified and parameters indicative of environment in the area has to be reported.	Pre-construction	Contractor under the supervision of Authority's Engineer / EE-SRP / ESMU-PIU / Authority.
3	Construction and Labour Camps	Infrastructure provisions at camps, provision of PPE to workers, health facilities at camps including implementation of HIV/ AIDS Prevention Measures	Construction	Contractor under the supervision of Authority's Engineer / EE-SRP / ESMU-PIU / Authority.
4	Rehabilitation of Borrow Areas	Authority's Engineer will undertake site visits to verify that all borrow areas have been rehabilitated in line with the landowner's request and to their full satisfaction.	Construction	Contractor under the supervision of Authority's Engineer / EE-SRP / ESMU-PIU / Authority.

38. For each of the environmental condition indicator, the monitoring plan specifies the parameters to be monitored, location of the monitoring sites, frequency and duration of monitoring. The monitoring plan also specifies the applicable standards, implementation and supervising responsibilities. The monitoring plan for environmental condition indicators of the project in construction and maintenance stages is presented in Table 3.



Dhoridungri to Garasiyawada and Lunawada to Garasiyawada Corridor Map (Design Chainage)

39. Locations of Monitoring various environmental paramters, to check air quality and noise levels shall be as desired by the Authority's Engineers. However, indicative sensitive locations / receptors along Dhoridungri to Garasiyawada and Lunawada to Garasiyawada to Check and Monitor Air Quality and Noise Levels for Environment Monitoring are as under :

Indicative Sensitive locations / Receptors for Environment Monitoring :

Air quality and Noise level:

- **Settlements:**

  VR/MDR:
  - Dhamod (3+700)
  - Lalsar cross road (6+475)
  - Vakhatapur (7+900)
  - Garasiywada & Untadi (12+400)

  SH-63:
  - Lunawada town (0+000)
  - Khantana Bhensavada (7+000)
  - Charangam (11+500)

- **Sensitive locations :**

  VR/MDR:
  - Govt. Panchvati General Hospital (6+600)

SH-63:

- Salvada PTC college (10+475)
- Bright Primary and High school (2+625)
- Adarsh Nivasi School (0+825)

- **Sensitive Receptors:**

  Reserved Forest locations

  VR/MDR:

  - Ch: 0+700 to 0+925
  - Ch: 0+925 to 3+175

  SH-63:

  - Ch: 5+850 to 6+050, 6+400 to 6+875.

The below mentioned environmental monitoring plan program shall be in confirmation with the *IRC : SP : 108; Air, Water, Soil and Noise Standards by CPCB, periodic and subsequent notifications issued by MoEF & CC, GoI on parameter to measure environmental monitoring

Table 4-2: Environmental Monitoring Plan (Program)

Attribute	Project Stage	Parameter	Special Guidance	Standards	Frequency	Duration	Location	Implementation (Monitoring, Supervision)
Air	Pre-Construction; Construction Post Construction (Maintenance/DLP) End of Maintenance period	SO_2, NO_x, PM_{10}, $PM_{2.5}$, CO	High volume sampler to be located 50m from the road in the Downwind direction. Use method specified by CPCB for analysis	Air (prevention and Control of Pollution) Rules, CPCB, 2009 and subsequent amendments, if any thereafter; MoEF & CC, GoI Guidelines.	Three seasons per year (excluding monsoon)	24 hours Sampling	As suggested by the Authority's Engineer	Contractor under the supervision of Authority's Engineer / EE-SRP / ESMU-PIU / Authority.
Noise	Pre-Construction; Construction Post Construction (Maintenance/DLP) End of Maintenance	Noise levels on dB (A) scale	Equivalent noise levels using an integrated noise level meter kept at a distance of 15 from edge of pavement Equivalent noise levels using an integrated noise level meter kept at a distance of 15 from edge of pavement	Noise Rules, 2000; MoEF & CC, GoI Guidelines; and subsequent amendments, if any thereafter;	Three seasons per year (excluding monsoon)	Leq in dB (A) of day time and night time	As suggested by the Authority's Engineer	
Water	Construction	All essential characteristics and some of desirable characteristics as decided by the Environmental Specialist at ESMU-Authority.	Grab sample collected from source and Analyse as per Standard Methods for Examination of Water and Wastewater. Environmental monitoring shall be conducted by NABL aggregated laboratory.	Indian Standards for Inland Surface Waters (IS: 2296, 1982; MoEF & CC, GoI Guidelines; and subsequent amendments, if any thereafter;	Not required.	-	As suggested by the Authority's Engineer	
Soil	Construction	Monitoring of Pb, SAR and Oil & Grease	Sample of soil collected to acidified and analysed using absorption Spectrophotometer. Environmental monitoring shall be conducted by NABL aggregated laboratory.	Threshold for each contaminant set by IRIS database of USEPA until national standards are promulgated	Not required.	-	As suggested by the Authority's Engineer	
Borrow area	Construction	As per Guidelines	Visual Observation	-	Once in a month	-	Borrow area location	
HIV/ AIDS Prevention Measures	Construction	Awareness campaign	-	-	Annual	-	Construction and Labour Camp sites	Contractor under the supervision of Authority's Engineer / EE-SRP / ESMU-PIU / Authority.
		IEC materials distribution			Quarterly			
		Condom Distribution			Once a month			

** Annex - 8 (Environmental Monitoring Program) of IRC: SP: 108 shall be referred.*

4.3 REPORTING SYSTEM

40. The Contractor will operate the reporting system for environmental condition and environmental management indicators **Table 2**. The Contractor will report to the Authority's Engineer / EE-SRP on the progress of the implementation of environmental conditions and management measures as per the EMP.

41. Tree cutting shall be carried out by the Contractor as per plan approved by the Forest Department. The Tree Cutting Plan (including tree saving plan) shall be prepared by the Contractor as per the directions of the Authority's Engineer as acceptable to the Forest Department. However, maximum efforts shall be made by the Ccontractor to save the trees. The Contractor shall also to submit Tree Saving Plan. The Contractor is require to adhere to this Tree Saving Plan during execution.

42. The reporting formats are enclosed in the **Appendix 1 & Appendix 2** and the summary of reporting is given in the Table 4-3.

Table 4-3: Summary details of Reporting

Format No.	Item	Stage	Contractor	EE, SRP Division
			Implementation & Reporting to EE, SRP Division/Authority's Engineer	Oversee/Field Compliance Monitoring
EM 1	Identification of Disposal Locations	Pre-Construction; Construction	One Time	One Time
EM 2	Setting up of Construction Camp	Pre-Construction	One Time	One Time
EM 3	Borrow Area Identification	Pre-Construction	One Time	One Time
EM 4	Top Soil Monitoring	Construction	Quarterly	Quarterly
EM 5	Status Regarding Rehabilitation of Borrow Areas	Construction	-	Half Yearly
EM 6	Trees felling	Pre-Construction; Construction	Monthly	Monthly
EM 6A	Tree Saving (Preserved)	Pre-Construction; Construction	Monthly	Monthly
EM 7	Construction Safety	Construction	Quarterly	Quarterly
EC 1	Pollution Monitoring	Pre-Construction; Construction	As Per Monitoring Plan	Quarterly
OP 1	Pollution Monitoring	Post Construction (Maintenance/DLP)	As Per Monitoring Plan	Quarterly
OP 2	Survival Rate of Trees	Post Construction (Maintenance/DLP)	As Per Monitoring Plan	Quarterly

Clearance Requirements of Government of Gujarat

Sr. No.	Clearances	Acts	Approving Agency	Applicability to the Project	Time Required	Responsibility	
						Execution	Monitoring (Supervision)
PROJECT IMPLEMENTATION STAGE							
1.	Consent to Establish (CTE) and Consent to Operate (CTO)	Water (Prevention and Control of Pollution) Act 1974, Air (Prevention and Control of Pollution) Act 1981	Gujarat Pollution Control Board (G.P.C.B.)	Applicable	3-6 months	Contractor	Authority's Engineer
2.	Permission for Withdrawal of Surface Water from Rivers, Nala, Water harvesting structure/ Reservoirs/ Ponds/ Irrigation canals	Gujarat Water Supply and Sewerage Board Act, 1978	Gujarat Water Supply and Sewerage Board	Applicable (If the Contractor is extracting surface water)	3 months	Contractor	Authority's Engineer
3.	Permission for Sand Mining from river bed	Mines and Minerals (Development and Regulation) Act, 1957	Commissioner of geology and mining, GoG	Applicable	2 month	Contractor	Authority's Engineer

Sr. No.	Clearances	Acts	Approving Agency	Applicability to the Project	Time Required	Responsibility	
						Execution	Monitoring (Supervision)
4.	Borrow Area Clearance	MoEF and CC, GoI / Mines and Minerals (Development and Regulation) Act, 1957	DEIAA/ SEIAA; Commissioner of Geology and Mining, GoG	Applicable	2 months	Contractor	Authority's Engineer
5.	Permission for Opening of New Quarry	Mines and Minerals (Development and Regulation) Act, 1957	Commissioner of geology and mining, GoG	Applicable	2 month	Contractor	Authority's Engineer
6.	Hot mix plant, Crushers, Cement Batching Plant	Air (Prevention and Control of Pollution) Act. 1981	Gujarat Pollution Control Board	Applicable	3 months	Contractor	Authority's Engineer
7.	Storage of Hazardous Chemicals	Hazardous Waste (Management and Handling) Rules 1989 and Manufacturing Storage and Import of Hazardous Chemicals Rules 1989	Gujarat Pollution Control Board	Applicable	3 months	Contractor	Authority's Engineer
8.	Disposal of Hazardous Waste	Hazardous Waste (Management and Handling) Rules 1989	Gujarat Pollution Control Board	Applicable	2 months	Contractor	Authority's Engineer
9.	Disposal of Construction Waste and liquid effluent from Labour camps	Water (Prevention and Control of Pollution) Act 1974	Gujarat Pollution Control Board	Applicable	2 months	Contractor	Authority's Engineer
10.	Pollution Under Control Certificate	Central Motor Vehicles Act 1988	Transport Department (GoG)	Applicable	1 Month	Contractor	Authority's Engineer
11.	Employing Labour	Executing Agency of Building and other construction act, 1996	Labour& Employment Department, GoG	Applicable	1 Week	Contractor	Authority's Engineer
12.	Registration of Workers	Labour welfare Acts.	Labour& Employment Department, GoG	Applicable	1 Month	Contractor	Authority's Engineer

Guidelines for Environmental Management / EMP Implementation

43. Comprehensive guidelines for environmental management/EMP implementation has been prepared and presented in the Appendix 3. The purpose of the guideline is to guide the Contractor and the project proponent to mitigate the environmental issues that are likely to arise during the Contract Period. The list of guidelines is tabulated here below.

ESGP No.	Environmental and Social Guidelines for Practice (ESGP)
ESGP01	Site Preparation
ESGP02	Construction and Labour Camps
ESGP03	Borrow Areas
ESGP04	Topsoil Salvage, Storage and Replacement
ESGP05	Quarry Management
ESGP06	Water For Construction
ESGP07	Slope Stability and Erosion Control
ESGP08	Waste Management and Debris Disposal
ESGP09	Water Bodies
ESGP10	Drainage
ESGP11	Construction Plants & Equipment Management
ESGP12	Labour and Worker's Health and Safety
ESGP13	Cultural Properties
ESGP14	Tree Cutting and Afforestation
ESGP15	Forests and Other Natural Habitats
ESGP16	Air and Noise Pollution
ESGP17	R&R Planning and Rap Framework
ESGP18	Local Traffic Management During Construction
ESGP19	Prior Information and Disclosure to the Public
ESGP20	General Workmanship
ESGP21	Onsite Concrete Preparation

ESGP No.	Environmental and Social Guidelines for Practice (ESGP)
ESGP22	Grievance management
ESGP23	E&S Regulatory Compliance
ESGP24	Guidance Note on Management of Labor Influx

44. These guidelines are guidance document for effective implementation of EMP. In case of any conflict between the Guidelines and Environmental Management Plan (EMP), the provisions made in the EMP shall be prevailed.

5 ENVIRONMENTAL MANAGEMENT BUDGET

45. Budgetary estimates for environmental management in the project include all items envisaged as part of the EMP. The environment budget includes provisions for various environmental management measures (other than measures considered under good engineering practices) and the environmental monitoring costs. Budgetary provisions for the project are presented in Table 5.1. Bill of Quantities is given in Appendix5.

Table 5.1: Budgetary Provisions for Environmental Management Measures

Sr. No.	Item	Unit	Rate (in INR)	Quantity	Cost (in INR)
A	**CONSTRUCTION PHASE**				
1	***Site Clearance***				
1.1	Disposal of unserviceable as well serviceable material with all leads and lifts beyond the ROW	Cum	Bill No. 2, Item No. 2.02		Included in the Civil Cost
1.2	The 30 cm top layer of disposal pit shall be provided with good earth, suitable for development of vegetation/plantation. All work shall be carried out as per specifications 301.3.2 of MoRTH and approval of the Engineer in Charge	Cum	Provision shall be made by the Contractor		Included in the Civil Cost
1.3	Regular water sprinkling (at least 4 times) per day at all construction sites for suppression of visible dust levels. *Note: This item is to be operated after the completion of earthwork to suppress the visible dust levels. Cost of watering during compaction of earthwork is deemed to be already covered under civil works.*	Km	Provision shall be made by the Contractor		Included in the Civil Cost
2	***Construction near Water bodies***				
2.1	Construction of silt traps at the discharge points of channels into to fresh water bodies across the project road as indicated in the Clause 111.4 and 111.18	m	Provision shall be made by the Contractor		Included in the Civil Cost
2.2	Providing Oil Interceptors at the fuel/oil storage camps or Construction camps.	Nos.	Provision shall be made by the Contractor		Included in the Civil Cost
2.3	Providing and Construction of Rain water Harvesting complete as per drawings and Technical Specification section 300, 1300, 1500, 1700 or as directed by the Engineer.	Nos.	Bill No.8, Item 8.25		Included in the Civil Cost
3	***Worker Safety***				
3.1	Providing Personal Protective Equipment to the labours during the construction phase of the project	Nos.	Provision shall be made by the Contractor		Included in the Civil Cost
4	***Monitoring of Environmental Attributes during Construction Activity***				
4.1	Air Quality *				
4.1.1	Monitoring of Air Quality * at Critical Locations including near Hot mix plants	Nos. of Samples	10700	82.0	8,77,400.00
4.2	Noise Levels				
4.2.1	Monitoring of Noise Levels at Critical Locations including at Equipment Yards	Nos. of Samples	4280	82.0	3,50,960.00

Sr. No.	Item	Unit	Rate (in INR)	Quantity	Cost (in INR)
4.3	Water Quality	Nos. of Samples	6420	40.0	2,56,800.00
4.4	Soil Quality	Nos. of Samples	10700	22.0	2,35,400.00
5	***Enhancement Measures***				
5.1	Solid Waste Management – Large Community Bins / Smart Bins	Nos.	37450	24.00	8,98,800.00
5.2	Solid Waste Management – Dust Bins	Nos.	3210	50.00	1,60,500.00
5.3	Enhancement of well	Nos.	535000	9.00	48,15,000.00
5.4	Tree Plantation	Plant / Species	1284.00	200.00	2,56,800.00
5.5	Half brick circular tree guard	Nos.	2140.00	100.00	2,14,000.00
5.6	Steel (Metal) circular tree guard	Nos.	2140.00	100.00	2,14,000.00
5.7	Concrete Seating Benches,	Nos.	3210.00	30.00	96,300.00
6	***HIV/ AIDS Prevention measures***				
6.1	IEC materials - printing, publishing	LS	5350	15	80,250.00
6.2	Healthcare clinic	Nos.	42800	15	6,42,000.00
0.3	Condom vending machines	Nos.	16050	2	32,100.00
6.4	Condom supplies	Months	5350	36	1,92,600.00
6.5	Testing	Persons	3210	675	21,66,750.00
6.6	Signages and hoardings	LS	16050	12	1,92,600.00
7.	**Restoration and Rehabilitation**				
7.1	Restoration and Rehabilitation of Construction Camp and Planst Site	Nos.	1070000	2	2140000.00
7.2	Redevelopment of borrow area	Nos.	321000	10	3210000.00
8	Construction of Recharge pits / Rain Water Harvesting Structures	Nos.	107000	24.00	25,68,000.00
9	Oil Interceptors at the fuel/oil storage camps	Nos.	80250	5.00	4,01,250.00
10	Silt Trap	Nos.	80250	5.00	4,01,250.00
	Environmental Budget including Construction & Operation Phase				**2,04,02,760.00**
	Grand Total INR. (Environmental Budget +3% contingency)				**2,10,14,843.00**

APPENDICES

Appendix 1: Environmental Monitoring Formats

Format EM1: Selection of disposal site locations

From _____ To _____

(Give chainage and nearest settlements from both ends)

Criteria on which information for each site is to be collected	Site 1	Site 2	Site 3	Site 4
Area covered (m^2)				
Total Material that can be dumped within the site (m^3)				
Depth to which disposal is feasible (m)				
Distance of nearest watercourse (m)				
Nearest Settlement (m)				
Date/s of Community Consultation/s				
Whether the community is agreeable to siting of dumping site (Y/N)				
Date of Permission from Village Council President(VCP)				
Proposed future use of the Site				

Selected Site (tick any one column only)
Certified that the above information is correct to the best of my knowledge and belief.

Contractor

Signed: Date:
Name & Designation:

Recommendation on the suitability of the site

Decision Taken (tick one): Approved / Not Approved

Executive Engineer, SRP Division

Signed: Date:
Name and Designation of Deciding Authority

Enclosures
(Tick as appropriate)

1 Maps of each location
2 Photographs
a Each disposal location
b Each community consultation
3 Photocopies of permissions from VCPs

Format EM2: Construction Camp and Storage Area

Construction Stage: Report - Date____ Month_____ Year_____
(Site Layout of Construction camp and working drawings of dwelling units with allied facilities to be attached with format)
Format to be submitted before target date (decided by Authority) of establishing camps
Location of Camp (km_____)

Sl. No	Item	Unit	Details	Remarks
1	**Detail of item camp**			
a	Size of Camp	mxm		
b	Area of Camp	sq.m		
c	Distance from Nearest Settlement			
d	Distance from Nearest Water Source	Type/Size/Capacity/Present Use/Ownership		
e	Date of camp being operational dd/mm/yy			
f	Present land use			
g	No other trees with girth > 0.3m.			
h	Details of Storage area(Availability of impervious surface)	mxm		
i	Availability of separate waste disposal from storage area	Cum		
2	**Details of top soil stacking**			
a	Quantity of top soil removed	Cum		
b	Detail of storage of topsoil	Describe stacking arrangement		
3	**Details of workforce**			
a	Total No of Labourers	nos		
b	Total no of Male Workers	nos		
c	No of Male Workers below 18 years of age	nos		
d	Total No of Female Workers	nos		
e	No of Female workers below 18 years of age	nos		
f	No of children	nos		
4	**Details of dwelling units**			
a	No of dwellings/huts	nos		
b	Minimum Size of Dwelling	mxm		
c	No of openings per dwelling	nos		
d	Minimum size of opening	mxm		
e	Walls	specifications		
f	Roofing	specifications		
g	Flooring	specifications		
h	Drinking Water Tank	specifications		
i	Capacity of Drinking water Tank	cum		
j	Size of Drinking Water Tank	mxmxm		
k	Total no of WC	nos		
l	No of Wcs for female workers	nos		
m	Minimum Size of WC	mxm		
n	Total No of Bathrooms for female workers	nos		
o	Size of septic tank for WC/Baths	mxmxm		
p	Capacity of Water Tank for WCs/ Bathrooms and general purpose			
q	Fencing around camp	Y/N		
5	**Details of facilities**			
a	Availability of security guard 24 hrs a day	Yes/No		
b	Details of First Aid Facility	Yes/No		
c	Availability of Day Care Centre	Yes/No		
d	Availability of dust bins (capacity 60 ltr)	nos		

Certified that the furnished information is correct the quality of work is as per god practice and all relevant information as required is attached

Contractor

Authority's Engineer

Format EM3: Reporting for Borrow Areas

Applied for Clearance from : DEIAA / SEIAA / Competent Authority: Date ____ Month ____ Year _____
Clearance obtained from : DEIAA / SEIAA / Competent Authority: Date ____ Month ____Year _____
Construction Stage Report: Date ____ Month_____ Year_____
Site Layout of Borrow Area and Proposed Borrow Area Redevelopment Plan to be attached with format
Format to be submitted before target date as (decided by Authority) for establishing Borrow Areas
Borrow Area No. BA_____; Location of Borrow Area (Km_____)

Sl. No	Item	Unit	Details	Remarks by CSC, if any
1	**Details of Borrow Area**			
a	Date of Borrow Area becoming operational dd/mm/yy			
b	Current Land use			
c	Distance from Nearest Settlement	Km		
d	No of settlements within 200m of Haul Road	No.		
e	No of settlements within 500m of Borrow Area	No.		
f	Total Capacity	cum		
g	No of Trees with girth more than 0.3 m	No.		
h	Length of Haul Road	km		
i	Width of Haul road	m		
j	Type of Haul Road	metal/dirt		
k	Size of Borrow Area	sqkm		
l	Area of Borrow Area	km x km		
m	Quantity Available	cum		
n	Distance of Nearest Water Source	Type/Size/Capacity/Present Use/Ownership		
o	Quantity of top soil removed	cum		
p	Detail of storage of topsoil			
q	Daily/occasional use of the Borrow Area by the community, if any	-		
r	Probable reuse of Borrow pit-ask community	-		
s	Drainage channels/slope/characteristics of the area	-		
2	**Enhancement Elements**			
a	Quantity of top soil removed	sq.m		
b	Detail of storage of topsoil	sq.m		
c	Adjoining land use/Natural elements			
d	Nearby catchment for storing water			
e	Erosion Control Programme			
f	Preventive measures for			
i	Leaching			
ii	Mosquito Breeding			
iii	Water run-off/contamination			
iv	Any other environmental degradation			
3	**Details of workforce**			
a	Total No of Labourers	No.		
b	Total no of Male Workers	No.		
c	No of Male Workers below 18 years of age	No.		
d	Total No of Female Workers	No.		
e	No of Female workers below 18 years of age	No.		
4	**Details of redevelopment, Plan to be enclosed**			

Certified that the furnished information is correct the quality of work is as per good practice and all relevant information as required is attached

Contractor

Authority's Engineer

EM 4 Topsoil Conservation Monitoring

Contract _____

Report No. _____ Date_____

Location (Chainage)	Original Use of Topsoil removed	Measures for preventing spillage of topsoil on Haul Roads(Earthen/ Metalled)	Present Method of Storage	Anticipated period of Storage (Months)	Distance of nearest Water course (m)	Present Slope of Pile (V: H)	Whether silt fencing provided?	Is any other covering / measure provided? If yes, what is it?	Improvements required	Extent of Compliance as on date of report

Certified that the above is true.

Signed_____

Contractor

Verified

Signed_____

Authority's Engineer

EM 5 Redevelopment of Borrow Area

Clearance obtained from : DEIAA / SEIAA / Competent Authority: Date ____ Month ____Year _____

Maintenance Stage: Report: Date ____ Month_____ Year_____

To be monitored by Authority.

Details of remarks to be appended wherever necessary.

Sl. No	Activity	Particulars	Drawbacks Identified			Improvements Required		
			Construction	Financial	Others (Ask Community)	Technical	Financial	Remarks/ Suggestions
1	Details of Borrow area and Surrounding Land use							
2	End use of the borrow area							
3	Whether rehabilitation has been carried out in line with owners request							
4	Erosion Control Measures							
5	Number of trees planted							
6	Reuse of topsoil							
7	Preventive measures taken for -Mosquito Breeding -Water runoff/ contamination -Other Environmental Degradation							
8	Any problems faced by owner							
9	Any problems faced by the local community							
10	If it has been developed as a fish pond,							
a	Details of available catchment for storing water							
b	Economic Benefits/Utility							
11	If it has been developed as an orchard							
a	Details of suitability of soil and water.							
B	Type of Plantation							
c	Economic Benefits/Utility							
12	Any Other End use							
a	Particulars							
b	Economic Benefits/Utility							

Contractor

Authority's Engineer

EM 6 Checklist for Trees felling

S. No	Links	Physical Target				Completion Target		Reason for Delay if any
		Total	Target	Target Achieved	% of task completed	Target Date	Date of Completion if task completed	
		Unit						
1		nos						
2		nos						
3		nos						
4		nos						

Contractor

Authority's Engineer

EM 6A Tree Savings

Checklist for Tree Saving

Checklist for Trees, that saved within Right of Way (ROW)

Sr. No.	Tree Species	Distance from the existing pavement	Distance from proposed (designed centerline)	Reasons for Savings	Remarks / Methodology adopted to save	Authority's Approval / Date to save the tree/s.
1						
2						
3						
4						
5						

Contractor

Authority's Engineer

EM 7 Checklist for Construction Safety

Sl. No.	Safety Issues	Yes	No	Non compliance	Corrective Action	Remarks
1	Appointment of qualified Construction safety officers					
2	Approval for Construction Safety Management Plan by the Authority's Engineer.					
3	Approval for Traffic Management/control Plan in accordance with IRC: SP: 55.					
4	Maintenance of the existing road stretches handed over to the Contractor.					
5	Provision of Temporary Traffic Barriers/Barricades/caution tapes in construction zones					
6	Provision of traffic sign boards					
7	Provision for flags and warning lights					
8	Provision of metal drum /empty bitumen drum delineator, painted in circumferential strips of alternate black and white 100mm wide 2 coats fitted with reflectors 3 Nos. of 7.5cm diameter					
9	Providing plastic crash barrier					
10	Provision of adequate staging, form work and access (ladders with handrail) for works at a height of more than 3.0 m					
11	Provision of adequate shoring / bracing / barricading / lighting for all deep excavations of more than 3.0 m depth.					
12	Demarcations (fencing, guarding and watching) at construction sites					
13	Provision for sufficient lighting especially for night time work					
14	Arrangements for controlled access and entry to Construction zones					
15	Safety arrangements for Road users / Pedestrians					
16	Arrangements for detouring traffic to alternate facilities					
17	Regular Inspection of Work Zone Traffic Control Devices by authorized Contractor personnel					
18	Construction Workers safety - Provision of personnel protective equipments					
19	A. Helmets					

Sl. No.	Safety Issues	Yes	No	Non compliance	Corrective Action	Remarks
	B. Safety Shoe					
	C. Dust masks					
	D. Hand Gloves					
	E. Safety Belts					
	F. Reflective Jackets					
	G. Earplugs for labour					
20	Workers employed on bituminous works, stone crushers, concrete batching plants etc. provided with protective goggles, gloves, gumboots etc.					
21	Workers engaged in welding work shall be provided with welder protective shields					
22	All vehicles are provided with reverse horns.					
23	All scaffolds, ladders and other safety devices shall be maintained in as safe and sound condition					
24	Regular health check-up for labour / Contractor's personnel					
25	Ensuring the sanitary conditions and all waste disposal procedures & methods in the camps.					
26	The Contractor shall provide adequate circuit for traffic flow around construction areas, control speed of construction vehicles through road safety and training of drivers, provide adequate signage, barriers and flag persons for traffic control.					
27	Provision for insurance coverage to the Contractor's personnel					

Contractor

Authority's Engineer

Format EC 1: Target Sheet for Pollution Monitoring

Construction Stage: Report - Date_____ Month_____ Year_____

(Locations at which monitoring to be conducted as per EMP)

Sl. No	Chainage	Details of Location	Duration of Monitoring	Instruments Used	Completion Target		Reason for Delay if any
					Target Date	Date of Completion if task completed	
Air Monitoring							
1							
2							
3							
Noise Monitoring							
1							
2							
3							
Water Monitoring							
1							
2							
3							
Soil Monitoring							
1							
2							
3							

Certified that the Pollution Monitoring has been conducted

Contractor

Authority's Engineer

Format OP 1: Target Sheet for Pollution Monitoring

Maintenance Stage: Report - Date_____ Month_____ Year_____

(Locations at which monitoring to be conducted as per EMP)

Sl. No	Chainage	Details of Location	Duration of Monitoring	Instruments Used	Completion Target		Reason for Delay if any
					Target Date	Date of Completion if task completed	
Air Monitoring							
1							
2							
3							
4							
5							
Noise Monitoring							
1							
2							
3							
4							
5							
Water Monitoring							
1							
2							
3							
4							
5							

Certified that the Pollution Monitoring has been conducted

Contractor

Authority's Engineer

Format OP 2: Survival Rate of Trees

Maintenance Stage: Report - Date_____ Month_____ Year_____

S. No.	Landscape Section	Roadside Trees			Landscaping at Junctions			Turfing on Embankment		
	Km-Km	Total Trees Planted	Total Surviving	% Survival	Total Shrubs Planted	Total Surviving	% Survival	Total Area Turfed	Total Turfed Area Surviving	% Survival
		Nos.	Nos.	%	Nos.	Nos.	%	Sqm.	Sqm.	%

Certified that the above information is correct

Contractor

Authority's Engineer

Appendix 2

Contractor's Checklist on Environmental and Social Issues

Project Name: _____ Contract /Road No._____

Contractor Details: _____ Project Description:_____

	Questions	Response (see note at the end of the checklist)
Activities		
1.	List the activities you will be undertaking during the works such as rock breaking, blasting, laying asphalt, establishing camp and plants etc.	
Responsibilities		
2.	Do you have any qualified/experienced person on environmental management? If not, how are you going to manage the environment and Social aspects?	
Materials		
3.	What base materials will you transport to the site such as stone, soil, diesel, lubricant?	
4.	Where will you source these materials from (non-manufactured material such as sand, soil and stone)?	
5.	Where will you store these materials?	
6.	How will you ensure materials brought to site will be stored and handled with care to avoid contamination of soil and water, reduce dust, and minimize disruption of traffic, not impairing public safety?	
Emissions to water, soil and air (Pollutants)		
7.	How will you ensure that any construction materials and works will: • Not restrict access to properties and carriageways. • Not damage existing trees. • Be protected from rain to reduce the loss of soil and materials washing down roads and entering drains and waterways. • Be stored to reduce leaks (such as Diesel) into the soil or waterways. • Not generate dust or cause nuisance air emissions.	
8.	How will you ensure proper drainage from the works so that water does not pond and become a hazard to health?	
9.	How will you reduce sediment from the construction activities?	
Fauna and Flora		
10.	No trees shall be felled as part of Construction/ Maintenance activity. How will you protect existing trees from construction activities?	
Waste Management		
11.	How do you plan to store and dispose of: • Construction debris? • Workers refuse and effluent?	

	Questions	Response (see note at the end of the checklist)
	• General litter?	
Noise and Vibration		
14.	Will you be using any noisy equipment that may cause nuisance?	
15.	Are your works close to a school, or hospital or other place where people may be affected by noise?	
16.	What will you do to reduce noise and vibration impacts?	
17.	What will be your working hours?	
Construction Camp / Workers' Camp		
18.	Where you are planning to set up construction and workers camp?	
19.	Does it meet the stipulated siting criteria?	
20.	How you are going to control pollution from contraction plan and equipment?	
21.	What facilities you will provide at camp for workers?	
Community, Awareness, Consultation, Co-ordination		
22.	How will you keep owners and occupants of shops and residences and other people of the adjoining villages and road users, who are affected, informed about the works?	
23.	How will you ensure all the sub-Contractors, supervisor and others on the site, are aware of these environmental and social aspects?	
24.	How will you co-ordinate with utility works (such as electricity, telephone, cable)?	
25.	Can you satisfy the special regulations or environmental conditions identified in the contract for this project?	
26.	Have you attended any training course on environment, health and safety for similar construction project?	
Safety		
27.	What activities could cause harm to people or property?	
28.	How will you reduce the risk of impact on people or their property?	
29.	How will you reduce potential injury to your workers and subcontractors?	

Prepared by: _____ Date _____, Approved by: _____ Date _____

Agreed Comments: _____

Note:

- The Contractor shall fill this Checklist section-wise based on ESMF and Contract stipulation.
- This checklist shall serve as Contractor's road specific Environmental Management Plan and serves as basis for subsequent implementation of the safeguard measures by the Contractor and monitoring the same by the Authority's Engineer / EE, SRP Division.
- This checklist should be filled up during initial road inventory by the Contractor i.e. before any physical works start.

Appendix 3: Guidelines for Environmental Management

These Environmental and Social guidelines practices are part of the Environmental Management Plan (EMP), mandatory in nature to follow by the civil works construction agency (i.e. Contractor) at GSHP II and Contractor is bound adhered to each of the specifications provided there in for the protection of the environment and safeguarding the environment. Any deviation from here will attract penalties or contract covenant actions against the contractor as mentioned in EMPs.

Wherever word "Engineer" is used in below mentioned guidelines, it shall be considered as "Authority's Engineer" as and where applicable.

ESGP-01: SITE PREPARATION

1. GENERAL

The preparation of site for construction involves: (i) clearing of land required for construction; and (ii) management of activities such as traffic during construction. These activities have been detailed out for road construction activities separately.

2. ROAD CONSTRUCTION

2.2 Site Preparation Activities

After obtaining the consent of the community on the alignment, the Project Implementation Unit (PIU) of the Divisional Office shall be responsible to stake out the alignment by establishing working benchmarks on ground. It shall be the responsibility of the PIU to take over the possession of the proposed RoW and hand over the land width required clear of all encumbrances to the Contractor. Activities pertaining to the clearance of land and relocation of utilities need to be initiated by the PIU well in advance to avoid any delays in handing over of site to the Contractor. Assistance of the Revenue Department shall be sought in accomplishing the task. To summarize, the PIU's responsibilities before handing over the site to the contractor include:

- Clearance of encroachments within proposed RoW;
- Initiation of process for legal transfer of land title;
- Alignment modification or Relocation of utilities in consultation with the various government departments; and
- Obtain clearances required from government agencies for cutting of trees and diversion of forest land.

2.2 Site Preparation Activities by the Contractor

Site preparation shall involve formation of the road base wherein it is ready for construction of protective/drainage works, carriageway, shoulders, parapets and other road furniture. The PIU shall transfer the land for civil works to the Contractor after peg marking of the alignment.

The Contractor shall verify the benchmarks soon after taking possession of the site. The Contractor, prior to initiation of site preparation activities, shall highlight any deviations/discrepancies in these benchmarks to the Engineer in writing. The contractor shall submit the schedules and methods of operations for various items during the construction operations to the Authority's Engineer for approval. The Contractor shall commence operations at site only after the approval of the schedules by the Authority's Engineer.

The activities to be undertaken by the contractor during the clearing and grubbing of the site are as follows:
The clearance of site shall involve the removal of all materials such as trees, bushes, shrubs, stumps,

roots, grass, weeds, part of topsoil and rubbish. Towards this end, the Contractor shall adopt the following measures: (i) Limiting the surface area of erodible earth material exposed by clearing and grubbing; (ii) Conservation of top soil and stock piling as per the measures suggested as part of **ESGP-04**, "Top Soil Salvage Storage and Replacement"; and (iii) Carry out necessary backfilling of pits resulting from uprooting of trees and stumps with excavated or approved materials to the required compaction conforming to the surrounding area.

To minimize the adverse impact on vegetation, only ground cover/shrubs that impinge directly on the permanent works shall be removed. Cutting of trees and vegetation outside the working area shall be avoided under all circumstances. In case the alignment passes through forest areas, The Forest Ranger shall be consulted for identification of presence of any rare/endangered species within the proposed road way. Protection of such species if found shall be as per the directions of the Forest Department.

The locations for disposal of grubbing waste shall be finalized prior to the start of the works on any particular section of the road. The selection of the site shall be approved by the Authority's Engineer. The criteria for disposal of wastes shall be in accordance with the measures given in Guideline on, "Waste Management and Debris Disposal" (**ESGP-08**).

In locations where erosion or sedimentation is likely to be a problem, clearing and grubbing operations should be so scheduled and performed that grading operations and permanent erosion and sedimentation control features can follow immediately, if the project conditions permit.

Dismantling of CD structures and culverts shall be carried out in a manner as not to damage the remaining required portion of structures and other surrounding properties. The disposal of wastes shall be in accordance with the provisions given in **ESGP-08**, "Waste Management and Debris Disposal". The following precautions shall be adopted: (i) The waste generated shall not be disposed off in watercourses, to avoid hindrance to the flow, and (ii) All necessary measures shall be taken while working close to cross drainage channels to prevent earthwork, stonework as well as the method of operation from impeding cross drainage at rivers, streams, water canals and existing irrigation and drainage systems.

The designated sites duly approved by Implementing Agency shall be cleared of its existing cover for setting up of the construction sites, camps and related infrastructure facilities, borrow areas and other locations identified for temporary use during construction. The contractor shall comply with all safety requirements in consideration as specified in the **ESGP-12** on, "Labour & Worker's Health and Safety". Before initiation of site preparation activities along these lands to be used temporarily during construction, it shall be the responsibility of the Contractor to submit and obtain approval of the site redevelopment plan from the implementing agency. The letter/contract agreement between the owner(s) of the land parcel for temporary usage shall include site redevelopment to its original status. The guidelines for the same are furnished in the Guideline on, "Construction Plants & Equipment Management"; guideline, "Construction and Labour Camps"; and "Borrow areas".

2.2 Traffic management during construction

Traffic management during construction is an activity specific to the contractors. Contractors must ensure a reasonably smooth flow of traffic during construction. The following are the general principles to be followed for traffic management during construction:

- Partial pavement construction **over long lengths will not be permitted.** The contractor should concentrate his activities over sections such that he can complete continuous fronts of up to a maximum of 1 km before starting the adjacent front. The contractor may open more than one continuous 1 km front provided that he has the separate resources to do so. The resources working

on a 1 km front may not be shifted to another front until no longer required on that front.

- The construction activities should be staggered over sub-sections to the extent that the use of plant and equipment is optimized to maximum efficiency and to avoid idling. For road widening operations, excavation **adjacent to the existing road shall not be permitted on both titles simultaneously.** Earthworks must be completed to the level of the existing road before excavation work on the opposite side will be permitted.
- The construction operations taking place on a particular front must be managed efficiently such that delays between successive pavement layers are minimized.
- Before the start of the monsoon season (June) the contractor shall ensure that the pavement over any front is complete, full width, at least upto Dense Bituminous Macadam, DBM level, but preferably with Asphaltic Concrete, AC wearing course. The contractor **should not start any sections of pavement that he cannot complete by the start of the monsoon season.**
- In the absence of permanent facilities, temporary drainage and erosion control measures, as required by the Specifications, are to be implemented prior to the onset of the monsoon.

In cases where separate traffic diversions are not essential or cost effective the construction methodology should be in accordance with the guidelines following:

On a 1km section, the pavement construction (except new alignments) should be limited to 500m sub-sections with a minimum of 1 to 1.5 km between successive sub-sections to ease traffic management and safety issues. The earthworks in the widening portions are not limited in, this respect. Excavation on both sides of the existing, road over the same sub-section simultaneously shall not be permitted for reasons of safety to the traffic, particularly at night.

Sub-Sections longer than 500 m may be authorized by the Engineer, if two-way traffic flow can be comfortably managed and the Contractor **can demonstrate his ability to maintain dust control, proper road edge delineation, proper signage and traffic control.** Where single file traffic is permitted ('only applicable to final wearing course operations), the sub-sections shall be reduced to a maximum length whereby safe traffic regulation can be physically managed. Single file traffic may not be permitted at certain locations or times of the day when traffic volumes are such that excessive congestion shall occur.

ESGP-02: CONSTRUCTION AND LABOUR CAMPS

1. INTRODUCTION

The scope of this guideline pertains to the siting, development, management and restoration of construction and labour camps to avoid or mitigate impacts on the environment. The area requirement for the construction camp shall depend upon the size of contract, number of labourers employed and the extent of machinery deployed. The following sections describe the siting, construction, maintenance, provision of facilities in the camps and finally rehabilitation of the construction and labour camps. These are described in three stages, pre-construction, construction and post-construction stage. The issues related to construction camps are similar in the case of road construction and hence have been taken together.

2. PRE-CONSTRUCTION STAGE

Identification of site for construction and labour camps is the first task. The Contractor shall identify the site for construction camp in consultation with the individual owners in case of private lands and the concerned department in case of Government lands. The suitable sites shall be selected and finalized in consultation with the Authority's Engineer. **Table 2-1** gives the lands that could be avoided for construction camps and conversely those that could be preferred.

Table 2-1: Selection Criterion for Construction Camps.

Avoid the following …	Prefer the following …
• Lands close to habitations. • Irrigated agricultural lands. • Lands belonging to small farmers. • Lands under village forests. Lands within 100m of community water bodies and water sources as rivers. • Lands within 100m of watercourses. • Low lying lands. • Lands supporting dense vegetation. • Grazing lands and lands with tenure rights. • Lands where there is no willingness of the landowner to permit its use.	• Waste lands. • Waste Lands belonging to owners who look upon the temporary use as a source of income. • Community lands or government land not used for beneficial purposes. • Private non-irrigated lands where the owner is willing. • Lands with an existing access road.

The contractor will work out arrangements for setting up his facilities during the duration of construction with the land owner/concerned department. These arrangements shall be in the form of written agreement between the contractor and the land owner (private/government) that would specify:

a) photograph of the proposed camp site in original condition;
b) activities to be carried out in the site;
c) environmental mitigation measures to be undertaken to prevent land, air, water and noise pollution;
d) detailed layout plan for development of the construction and labour camp that shall indicate the various structures to be constructed in the camp including temporary, drainage and other facilities (**Figure Z** gives a layout plan for a construction camp); and
e) Restoration plan of camp site to previous camp conditions.

The arrangements will be verified by the Authority's Engineer to enable redressal of grievances at a later stage of the project.

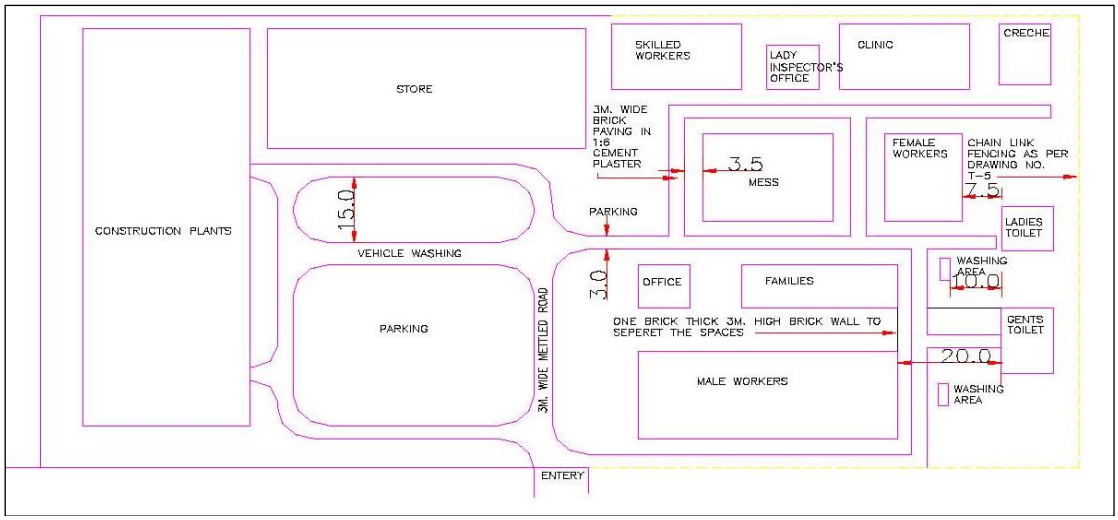


Figure 2: Layout Plan for Construction Camp

2.2 Setting up of labour camp

The contractor shall provide, free of cost in the camp site, temporary living accommodation to all the migrant workers employed by him for complete construction/maintenance work is in progress. A minimum area of 6 SQM per person shall be provided. The rooms of labour shall be well lighted and ventilated. The facilities to be provided for the labour are discussed below:

a) Drinking Water

Towards the provision and storage of drinking water at the construction camp, the contractor shall ensure the following provisions

- The contractor shall provide for a continuous and sufficient supply of potable water in the camps, in earthen pots or any other suitable containers.
- The contractor shall identify suitable community water sources for drinking. Only in the event of non-availability of other sources of potable water, the Contractor shall obtain water from an unprotected source only after the testing for its portability. Where water has to be drawn from an existing open well, the well shall be properly chlorinated before water is drawn from it for drinking. All such wells shall be entirely closed in and be provided with dust proof trap door.
- Every water supply or storage shall be at a distance of not less than 15m from any wastewater / sewage drain or other source of pollution. Water sources within 15m proximity of toilet, drain or any source of pollution will not be used as a source of drinking water in the project.
- A pump shall be fitted to covered well used as drinking water source, the trap door shall be kept locked and opened only for cleaning or inspection, which shall be done at least once a month.

b) Washing and Bathing Facilities

In every site, adequate and suitable facilities for washing clothes and utensils shall be provided and maintained for the use of contract labor employed therein. Separate and adequate bathing shall be provided for the use of male and female workers. Such facilities shall be conveniently accessible and shall be kept in clean and hygienic conditions.

c) Toilets Facilities

Sanitary arrangements, latrines and urinals shall be provided in every work place separately for male and female workers. The arrangements shall include:

- A latrine for every 15 females or part thereof (where female workers are employed).
- A latrine for every 10 males.
- Every latrine shall be under cover and so partitioned as to secure privacy, and shall have a proper door and fastenings.
- Where workers of both sexes are employed, there shall be displayed outside each block of latrine and urinal, a notice in the language understood by the majority of the workers “For Men Only” or “For Women Only” as the case may be.
- The latrines and urinals shall be adequately lighted and shall be maintained in a clean sanitary condition at all times and should have a proper drainage system;
- Water shall be provided in or near the latrines and urinals by storage in suitable containers.

d) Waste Disposal

- Disposal of sanitary wastes and excreta shall be into septic tanks.
- Kitchen waste water shall be disposed into soak pits/kitchen sump located preferably at least 15 meters from any water body. Sump capacity should be at least 1.3 times the maximum volume of wastewater discharged per day. The bottom of the pit should be filled with coarse gravel and the sides shored up with board, etc. to prevent erosion and collapse of the pit. New soak pits shall be made ready as soon as the earlier one is filled.
- Solid wastes generated in the kitchen shall be reused if recyclable or disposed off in land fill sites.

e) Medical and First Aid Facilities

Medical facilities shall be provided to the labour at the construction camp. Visits of doctor shall be arranged twice a month wherein routine checkups would be conducted for women and children. A separate room for medical checkups and keeping of first aid facilities should be built. The site medical room should display awareness posters on safety facilitation hygiene and HIV/AIDS awareness.

- First Aid Box will be provided at every construction campsite and under the charge of a responsible person who shall always be readily available during working hours. He shall be adequately trained in administering first aid-treatment. Formal arrangement shall be prescribed to carry injured person or person suddenly taken ill to the nearest hospital. The first aid box shall contain the following.

- 6 small sterilized dressings
- 3 medium size sterilized dressings
- 3 large size sterilized dressings
- 3 large sterilized burns dressings
- 1 (30 ml) bottle containing 2 % alcoholic solution of iodine
- 1 (30 ml) bottle containing salvolatile
- 1 snakebite lancet
- 1 (30 gms) bottle of potassium permanganate crystals
- 1 pair scissors
- Ointment for burns
- A bottle of suitable surgical antiseptic solution

In case, the number of labour exceeds 50, the items in the first aid box shall be doubled.

f) Provision of Shelter during Rest

The work place shall provide four suitable sheds, two for meals and two for rest (separately for men and women). The height of the shelter shall not be less than 3.0m from the floor level to the lowest part of the roof. These shall be kept clean.

g) Crèches

In case 20 or more women workers are employed, there shall be a room of reasonable size for use of children under the age of six years. The room should have adequate light and realization. A caretaker is to be appointed to look after the children. The use of the room shall be restricted to children, their mothers and the caretaker.

2.2 Storage of Construction Material in Construction Camps

For storage of Petrol/Oil/Lubricants, brick on edge flooring or sand flooring will be provided at the storage places of Petrol/Oil/Lubricants to avoid soil and water contamination due to spillage. These should be kept away from labour residential areas. The storage of cement shall be at Damp-proof flooring, as per IS codes. All materials shall be stored in a barricaded area. In case of electrical equipments, danger signs shall be posted. The batch mix plant is to be located away from the residential area and not in the wind direction. Separate parking areas for vehicles and also workshop areas need to be provided.

2.2 Fire fighting arrangement

- The following precautions need to be taken:
- Demarcation of area susceptible to fires with cautionary signage;
- Portable fire extinguishers and/or sand baskets shall be provided at easily accessible locations in the event of fire;
- Contractor shall educate the workers on usage of these equipments.

2.2 Interactions with host communities

To ensure that there is no conflict of the migrant labor with the host communities, the contractor shall issue identity cards to labourers and residents of construction camps.

3. CONSTRUCTION STAGE

Construction camps shall be maintained free from litter and in hygienic condition. It should be kept free from spillage of oil, grease or bitumen. Any spillage should be cleaned immediately to avoid pollution of soil, water stored or adjacent water bodies. The following precautions need to be taken in construction camps.

- Measures to ensure that no leaching of oil and grease into water bodies or underground water takes place.

- Wastewater should not be disposed into water bodies.
- Regular collection of solid wastes should be undertaken and should be disposed off safely.
- All consumables as the first aid equipment, cleaning equipment for maintaining hygiene and sanitation should be recouped immediately.
- The debris/scrap generated during construction should be kept in a designated and barricaded area.

The Authority's Engineer will monitor the cleanliness of construction campsites and ensure that the sites are properly maintained throughout the period of the contract.

4. POST CONSTRUCTION STAGE

At the completion of construction, all construction camp facilities shall be dismantled and removed from the site. The site shall be restored to a condition in no way inferior to the condition prior to commencement of the works. Various activities to be carried out for site rehabilitation include:

- Oil and fuel contaminated soil shall be removed and transported and buried in waste disposal areas.
- Soak pits, septic tanks shall be covered and effectively sealed off.
- Debris (rejected material) should be disposed off suitably (Refer ESGP-10 on "Waste Management and Debris Disposal").
- Ramps created should be levelled.
- Underground water tank in a barren/non-agricultural land can be covered. However, in an agricultural land, the tank shall be removed.
- If the construction camp site is on an agricultural land, top soil can be spread so as to aid faster rejuvenation.
- Proper documentation of rehabilitation site is necessary. This shall include the following: –Photograph of rehabilitated site;
- Land owner consent letter for satisfaction in measures taken for rehabilitation of site;
- Undertaking from contractor; and
- Certification from Authority's Engineer.

In cases, where the construction camps site is located on a private land holding, the contractor would still have to restore the campsite as per this guideline. Also, he would have to obtain a certificate for satisfaction from the landowner.

ESGP-03: BORROW AREAS

1. INTRODUCTION

Embankment fill material is to be procured from borrow areas designated for the purpose. Borrow areas cause significant adverse environmental impacts if appropriate mitigation measures are not taken. The scope of this guideline includes measures that are required during project planning and design stage, pre-construction, construction stage and post construction stage. Borrow areas are related only to road construction activities.

2. PROJECT PLANNING AND DESIGN STAGE

Design measures for reduction in the quantity of the earthwork will have to be undertaken to reduce the quantity of material extracted and consequently decrease the borrow area requirement. Borrow area siting should be in compliance with IRC: 10-1961. The DPR shall contain (i) Guidelines for locating site of borrow areas and borrow material specifications.

3. PRE-CONSTRUCTION STAGE

The contractor shall identify the borrow area locations in consultation with the individual owners in case of private lands and the concerned department in case of government lands, after assessing suitability of material. The suitable sites shall be selected and finalized in consultation with the Authority's Engineer.

Borrowing to be avoided on the following areas:

- Lands close to toe line.
- Irrigated agricultural lands (In case of necessity for borrowing from such lands, the topsoil shall be preserved in stockpiles. The subsequent Guidelines discuss in detail the conservation of topsoil.
- Grazing land.
- Lands within 0.8 km of settlements.
- Environmentally sensitive areas such as Reserve Forests, Protected Forests, Sanctuary, wetlands. Also, a distance of 1000 m should be maintained from such areas.
- Designated protected areas/forests.
- Unstable side-hills.
- Water-bodies.
- Streams and seepage areas.
- Areas supporting rare plant/animal species;
- Ensure unsuitable soft rock is not prominent within the proposed depth of excavation which will render rehabilitation difficult.

3.1 Arrangements for Borrow Area

The Contractor will work out arrangements for borrowing with the land owner/concerned department. The arrangements will include the redevelopment after completion of borrowing. The arrangements will be verified by the Authority's Engineer to enable redressal of grievances at a later stage of the project. The Authority's Engineer shall approve the borrow area after inspection of the site to verify the reclamation plan and its suitability with the contractor and landowner. The contractor shall commence borrowing soil only after the approval by the Authority's Engineer. The contractor shall submit to the Authority's Engineer the following before beginning work on the borrow areas.

- Written No-objection certificate of the owner/cultivator;
- Estimate extent of earth requires;
- Extent of land required and duration of the agreement;
- Photograph of the site in original condition; and
- Site redevelopment plan after completion.

The depth of excavation should be decided based on natural ground level of theland and the surroundings, and rehabilitation plan. In case higher depth of excavation is agreed with backfilling by unsuitable excavated soil (from roadway), then filling should be adequately compacted except topsoil, which is to be spread on the top most layer (for at least 20m thick). The guidelines for location, depth, size and shape of the borrow areas are available in the following:

- Clause 305.2.2.2 of MoRTH specification for roads and bridge works;
- IRC SP 108-2015: Guidelines on EMP
- IRC SP 93-2011: Guidelines on Requirement for EC for Road Projects
- IRC: 10-1961-Recommended practice for borrow pits for road embankments constructed by manual operations, as revised in 1989;
- IRC SP: 58-2001 guideline for use of fly ash in road construction;
- EIA Guidance Manual for Highways prepared by Administrative Staff College of India, February 2010
- Fly Ash Notification 2009 and its amendment on 25th January 2016

3.2 Documentation of Borrow Pit

The contractor must ensure that following data base must be documented for each identified borrow

areas that provide the basis of the redevelopment plan.

- Chainage along with offset distance;
- Area (Sq.m);
- Photograph of the pit from all sides;
- Type of access/width/kutcha/pucca etc from the carriageway;
- Soil type;
- Slope/drainage characteristics;
- Water table of the area or identify from the nearest well, etc;
- Existing landuse, for example barren/agricultural/grazing land;
- Location/name/population of the nearest settlement from borrow area;
- Present usage of borrow area; and
- Community facility in the vicinity of borrow pit.

3.3 Redevelopment Plans for Borrow Pits

The following checklist provides guidelines in order to ensure that redevelopment of borrow areas must comply with MoRTH, clause 305.2.2.2 and EMP requirement. Borrow areas can be developed as:

- Ponds (various types) (eg: Drinking Water only; Washing and for other Domestic Chores; Only for Cattle; Mixed Uses etc.) (a large pond can be divided into two parts - each having a defined use)
- Farmland submission
- Water Recharging Zones
- Pastureland
- Fish Ponds (pissiculture)
- Waste disposal Sites (depending upon the location, distance from settlements, pollution risks, safety, associated environmental risks and hazards, regulations/ permissions of appropriate authority and other such factors)
- Plantation Zones
- Recreational Zones (depending upon location, size, potential of the site, willingness of the local bodies to develop it)
- Wildlife Refuge and Drinking Area (applicable only in case of sensitive environs with appropriate planning and understanding including regulation of depth for safety of animals etc.)

The rehabilitation measures for the borrow areas shall be dependent on the following factors:

- Land use objectives and agreed post-borrowing activities;
- Physical aspects (landform stability, erosion, re-establishment of drainage);
- Biological aspects (species richness, plant density,) for areas of native re vegetation;
- Water quality and soil standards; and
- Public safety issues.

Rehabilitation should be simple and maintenance free. Depending on the choice of the individual land owner/community, the contractor shall prepare redevelopment plans for the borrow areas. The options can be: (i) Restoring the productive use of the land (ii) Development of detention ponds in barren areas.

Option I: Suitable in locations with high rainfall and productive areas

Topsoil must be placed, seeded, and mulched within 30 days of final grading if it is within a current growing season or within 30 days of the start of the next growing season. Vegetative material used in reclamation must consist of grasses, legumes, herbaceous, or woody plants or a combination thereof, useful to the community for the fuel and fodder needs.

Plants must be planted during the first growing season following the reclamation phase.

Selection and use of vegetative cover must take into account soil and site characteristics such as drainage, pH, nutrient availability, and climate to ensure permanent growth. The vegetative cover is acceptable if within one growing season of seeding, the planting of trees and shrubs results in a permanent stand, or regeneration and succession rate, sufficient to assure a 75% survival rate.

Option II: In barren land, the borrow areas can be redeveloped into detention ponds.
These will be doubled up as water bodies and also for removal of sediment from runoff flowing through the ponds. Design of the detention basin depends upon the particle size, settling characteristics, residence time and land area. A minimum of 0.02 mm size particle with a settling velocity of 0.02 cm/sec (assuming specific gravity of solids 2.65) can be settled in the detention basin.

Following parameters are to be observed while setting up a detention pond:

- Pond should be located at the lowest point in the catchment area. Care should be taken that the horizontal velocity should be less then settling velocity to prevent suspension or erosion of deposited materials.
- Minimum Effective Flow Path: 5 times the effective width
- Minimum Free Board: 0.15 m
- Minimum Free Settling Depth: 0.5 m
- Minimum Sediments Storage Depth: 0.5 m
- Maximum interior slope: 2H : 1V
- Maximum exterior slope: 3H : 1V
- The inlet structure should be such that incoming flow should distribute across the width of the pond. A pre-treatment sump with a screen should provide to remove coarse sediments. Settled sediment should be removed after each storm event or when the sediment capacity has exceeded 33% of design sediment storage volume. Accumulated sediment must be disposed of in a manner, which will prevent its re-entry into the site drainage system, or into any watercourse.

4. CONSTRUCTION STAGE

No borrow area shall be operated without permission of the Authority's Engineer. The procurement of borrow material should be in conformity to the guidelines laid down in IRC: 10-1961. In addition, the contractor should adopt precautionary measures to minimise any adverse impacts on the environment. Checklists for monitoring borrow areas operation and management has been prepared (**Table 3-1**).

Table 3-1: Checklist for Monitoring Borrow Area Operation and Management

Attributes	Requirements
Access Road	Access road shall be used for hauling only after approved
Top soil preservation	To soil, if any, shall be stripped and stored at corners of the area before the start of excavation for material collection; Top soil should be reused / re-laid as per agreed plan; In case of riverside, borrow pit should be located not less than 15m from the toe of the bank, distance depending on the magnitude and duration of flood to be withstood. In no case shall be borrow pit be within 1.5m from the Toe line of the proposed embankment.
Depth of excavation	For agricultural land, the total depth of excavation should be limited to 150cm including top 30 cm for top soil preservation; For river side borrow area, the depth of excavation shall be regulated so that the inner edge of any borrow pit, should not be less than 15m from the toe of the bank and bottom of the pit should not cut the imaginary line of 1:4 projected from the edge of the final section of the embankment. To avoid any embankment slippage, the borrow areas will not be dug continuously, and the size and shape of borrow pits will be decided by the Authority's Engineer.
Damage to surrounding land	Movement of man and machinery should be regulated to avoid damage to surrounding land. To prevent damages to adjacent properties, the Contractor shall ensure that an undisturbed buffer zone exists between the distributed borrow areas and adjacent land. Buffer zone shall be 3 m wide or equal to the depth of excavation whichever is greater.
Drainage control	The Contractor shall maintain erosion and drainage control in the vicinity of all borrow pits and make sure that surface drains do not affect the adjacent land or future reclamation. This needs to be rechecked by the Authority's Engineer.

Attributes	Requirements
Dust Suppression	Water should be sprayed on kutcha haul road twice a day or as may be required to avoid dust generation during transportation of material; Depending on moisture content, 0.5 to 1.5% water may be added to excavated soil before loading during dry weather to avoid fugitive dust emission.
Covering material for transport material	Material transport shall be provided with tarpaulin cover
Personal Protective Equipment	Workers should be provided with helmet, gumboots and air mask and their use should be strictly enforced.
Redevelopment	The area should be redeveloped within agreed timeframe on completion of material collection as per agreed rehabilitation plan.

5. POST CONSTRUCTION STAGE

All reclamation shall begin within one month of abandonment of borrow area, in accordance with the redevelopment plan. The site shall be inspected by the Authority's Engineer after implementation of the reclamation plan. Certificate of Completion of Reclamation is to be obtained by the Contractor from the landowner that "the land is restored to his satisfaction". The final payment shall be made after the verification by Authority's Engineer.

6. CHECKLIST FOR INSPECTION OF REHABILITATION AREA

Inspection needs to be carried out by the Authority's Engineer for overseeing the redevelopment of borrow areas as per the plan. The checklist for the inspection by the Authority's Engineer is given below.

- Compliance of post-borrowing activities and land use with the restoration plan;
- Drainage measures taken for inflow and outflow in case borrow pit is developed as a detention pond;
- Leveling of the bottom of the borrow areas;
- In case the borrow area is on private property, the contractor shall procure written letter from landowner for satisfaction on rehabilitation. In case of no rehabilitation is desired by the landowner, the letter should include statement "no responsibility of R&BD on contractor in the event of accident.
- Condition of the reclaimed area in comparison with the pre-borrowing conditions.

ESGP-04: TOPSOIL SALVAGE, STORAGE AND REPLACEMENT

1. INTRODUCTION

Loss of topsoil is a long term impact along roads due to (i) site clearance and widening for road formation (ii) development of borrow areas (iii) temporary construction activities such as construction camps, material storage locations, diversion routes etc. The environmental measures for both these activities during all stages of construction activity are discussed in the subsequent sections.

2. PROJECT PLANNING & DESIGN STAGE

At the project preparation stage, the following shall be estimated: (i) Extent of loss of top soil due to widening and siting of construction activities (ii) Estimates of borrow area requirements and (iii) Area requirement for topsoil conservation. The bid document shall include provisions that necessitate the removal and conservation of topsoil at all locations opened up for construction by the Contractor.

3. PRE-CONSTRUCTION STAGE

The arrangements for temporary usage of land, borrowing of earth and materials by the Contractor with the land owner/concerned department shall include the conservation / preservation of topsoil.

4. CONSTRUCTION STAGE

It shall be the responsibility of the Contractor to strip the topsoil at all locations opened up for construction. The stripped topsoil should be carefully stockpiled at suitable accessible locations approved by the Authority's Engineer. At least 10% of the temporarily acquired area shall be earmarked

for storing topsoil. In case of hilly and desert areas, topsoil with humus wherever encountered while opening up the site for construction shall be stripped and stockpiled. The stockpiles shall be located at:

- Areas away from Grade, Subsoil & Overburden materials;
- Areas away from pit activities and day-to-day operations;
- Areas that do not interfere with future pit expansion; and
- Areas away from drainage paths and uphill of sediment barriers.

The stockpiles for storing the topsoil shall be designed such that the slope should not be less than 1:2 (Vertical to horizontal), and the height of the pile is restricted to 2m. A minimum distance of 1m is required between stockpiles of different materials.

In cases where the topsoil has to be preserved for more than a month, the stockpile is to be stabilised within 7 days of forming. The stabilization shall be carried out through temporary seeding. It consists of planting rapid-growing annual grasses or small grains, to provide initial, temporary cover for erosion control.

After spreading the topsoil on disturbed areas, it must be ensured that topsoil is seeded, and mulched within 30 days of final grading. During construction, if erosion occurs from stockpiles due to their location in small drainage paths, the sediment-laden runoff should be prevented from entering nearby watercourses. The Contractor shall preserve the stockpile material for later use on slopes or shoulders as instructed by the Authority's Engineer.

Vegetative material for stockpile stabilisation…

Must consist of grasses, legumes, herbaceous, or woody plants or a mixture thereof • Selection & use of vegetative cover to take into account soil and site characteristics such as drainage, pH, nutrient availability, and climate to ensure permanent growth

Vegetative material for stockpile stabilisation…

Stockpiles will not be surcharged or otherwise loaded and multiple handling will be kept to a minimum to ensure that no compaction will occur.

Divert runoff around stockpiles unavoidably located in drainage paths using a perimeter bank uphill.

The stockpiles shall be covered with gunny bags or tarpaulin immediately in case they are not stored for periods longer than 1 month

5. POST CONSTRUCTION STAGE

The topsoil shall be re-laid on the area after taking the borrow earth to maintain fertility of the agricultural field, finishing it to the required levels and satisfaction of the farmer. The area to be covered with vegetation shall be prepared to the required levels and slope as detailed in the DPR. The stockpile material shall be spread evenly to a depth of 5-15cm to the designed slopes and watering the same as required. The growth of the vegetation shall be monitored at frequent intervals. All temporary arrangements made for stockpile preservation and erosion control are to be removed after reusing the stockpile material. The top soil can also be used for the following purposes:

a. Covering the borrow areas;
b. Embankment and turfing;
c. Median; and
d. Rehabilitation of construction and labour camp.

ESGP-05: QUARRY MANAGEMENT

1. INTRODUCTION

This guideline pertains to the measures to be taken to address environmental concerns in quarry areas. The general practice adopted is to procure materials from existing quarries operating with the requisite permits. The measures to be taken for operation and management for quarries during all stages of construction have been discussed in this Guideline.

2. PROJECT PLANNING AND DESIGN STAGE

The PIU shall provide in the DPR/bid document, a list of licensed quarries operating within the district and adjoining districts. In addition, the DPR shall contain the following: (i) Quantity of materials available in quarries (ii) Lead from the various existing quarries and (iii) Adequacy of materials for the project in these quarries. **Table 5-1** and **5-2** give the format for preparing a list of quarries.

Table 5-1 Details of Sand Quarry

Sample No.	Source of Sand	Name of quarry area	Site Identification/ Location			Approximate Quantity (cum)	Approximate basic cost of the material (Rs.)	Remarks
			Nearest Chainage (Km.)	Left/Right	Offset from nearest chainage (km)			

Table 5-2 Details of Quarry Area for Aggregates

Sample No.	Chainages (Km.)	Left/ Right	Name of Quarry Area	Name of Crusher	Lead from nearest chainage (Km.)	Basic cost of the material (Rs.)	Available land/ terrain	Surrounding land Terrain	Remarks

Only in the event of non-availability of existing quarries, the Contractor shall open a new quarry in accordance with Mines and Minerals (Development & Regulation) Act, 1957. The bid document shall include the exhaust quarry reclaim plan per needs of the landowner / community.

3. PRE-CONSTRUCTION STAGE

The Contractor shall select an existing licensed quarry identified in DPR for procuring materials. The Contractor shall establish a new quarry with the prior consent of the Engineer only in cases when: (i) Lead from existing quarries is uneconomical and (ii) Alternative material sources are not available. The Contractor shall prepare a Redevelopment Plan for the quarry site and get it approved by the Authority's Engineer.

The construction schedule and operations plans to be submitted to the Authority's Engineer prior to commencement of work shall contain a detailed work plan for procuring materials that includes procurement, transportation and storage of quarry materials.

4. CONSTRUCTION STAGE

4.1 Development of Quarry Area

To minimize the adverse impact during excavation of material following measures are need to be undertaken:

- Adequate drainage system shall be provided to prevent the flooding of the excavated area
- At the stockpiling locations, the Contractor shall construct sediment barriers to prevent the erosion of excavated material due to runoff.
- Construction of offices, laboratory, workshop and rest places shall be done in the up-wind of the plant to minimize the adverse impact due to dust and noise.
- The access road to the plant shall be constructed taking into consideration location of units and also slope of the ground to regulate the vehicle movement within the plant.
- In case of storage of blasting material, all precautions shall be taken as per The Explosive Rules, 1983 and its amendments.

4.2 Setting up of Crushers and other equipments

The following measures shall be undertaken for setting up of crushers are other equipments.

- The contractor shall obtain "No Objection Certificate (NoC)" from the Gujarat State Pollution Control Board.
- All vehicles must possess Pollution Under Control (PUC) Certificate and shall be renewed accordingly
- All machinery, equipments, and vehicles shall comply with existing CPCB noise and emission norms.
- The Authority's Engineer must ensure that contractor shall submit the copy of NoC and PUC Certificate before the start of work.

4.3 Quarry operations

The followings precautions shall be undertaken during quarry operations. vii) Overburden shall be removed and disposed as per **ESGP 08** "Waste Management and Debris Disposal".

- During excavation slopes shall be flatter than 20 degrees Guideline 8 on to prevent their sliding
- In case of blasting, the procedure and safety measures shall be taken as per Explosives Act, 1884and its amendments and Rules, 1983 and its amendments.
- The Contractor shall ensure that all workers related safety measures shall be done as per measures for, "Labour & Workers Health & Safety" (**ESGP 12**).
- The Contractor shall ensure maintenance of crushers regularly as per manufacturer's recommendation.
- Stockpiling of the excavated material shall be done as per stockpiling of topsoil explained in **ESGP 04**, "Topsoil Salvage, Storage & Replacement."
- During transportation of the material, measures shall be taken as per **ESGP 11** "Construction Plants and Equipment Management" to minimize the generation of dust and to prevent accidents
- The Engineer and the concerned authority shall review the quarry site for the management measures during quarry operation, including the compliance to pollution norms.

5. POST CONSTRUCTION STAGE

A quarry redevelopment plan shall be prepared by the Contractor. All haul roads constructed for transporting the material from the quarries to construction site shall be restored to their original state.
The Engineer and the concerned authority shall be entrusted the responsibility of reviewing the quarry site for the progress of implementation of Redevelopment Plan.
The plan shall include:

- Photograph of the quarry site prior to commencement
- The quarry boundaries as well as location of the materials deposits, working equipments, stockpiling, access roads and final shape of the pit.
- Drainage and erosion control measures at site
- Safety measures during quarry operation
- Design for redevelopment of exhaust site.

Two options for redevelopment of quarry areas are given below:

Option A: Vegetating the quarry to merge with surrounding landscape. This is done by conserving and reapplying the topsoil for the vegetative growth.

Option B: Developing exhausted quarries as water bodies. The pit shall be reshaped and developed into pond, for harvesting rainwater. This option shall only be considered where the location of quarry is at the lowest point, i.e. surrounding areas/ natural drainage slopes towards it.

ESGP-06: WATER FOR CONSTRUCTION

1. INTRODUCTION

The scope of this guideline includes the procurement of water required for construction of roads. Except bituminous works, water is required during all stages of road construction such as Embankment Sub-Grade; Granular sub-base (GSB) and Water Bound Macadam (WBM). Management of water in various stages of construction is given in the following sections.

2. PROJECT PLANNING & DESIGN STAGE

- The Detailed Project Report for both road constructions shall contain the following information:
- Estimate of water requirement during different seasons based on construction schedule of various stages of construction.
- Identification of potential sources of water for construction,
- Arrangements to be worked out by the contractor with individual owners, when water is obtained

from private sources, and

- Whether scarcity of water would have any impact on schedule of construction.

In water-scarce regions, provide the following additional information in Project Reports…
• Exploring possibilities for use of existing perennial sources, through interactions with water user groups as the villagers, relevant Government Departments, keeping in view that the water extraction does not infringe upon the usufruct rights of the existing water users. • Identification of potable water source for domestic use of workers and for use in cement - based construction such as cement concrete roads, culverts and other cross drainage works. • Identification of alternate water sources, water-harvesting techniques will be explored to avoid water extraction from the existing community sources.

In water scarce regions, if water-harvesting structures are to be constructed, suitable locations and mechanism for siting these structures will be identified. These are envisaged to be permanent water tanks for collection of stream water. Detailed drawings of water harvesting structures based on site conditions will need to be worked out and presented in the DPR. No extra payment shall be generally made for these works and the Contractor has to include the cost of these items in his offer while quoting his tendered rate.

Scheduling Construction in Water Scarce Areas: As part of the project preparation, the Authority's Engineer shall conduct an assessment of water requirement and availability in water scarce regions. As far as possible, schedule for construction in these water scarce areas shall be prepared such that earthwork for embankment is carried out just before monsoon, so that water requirement for subsequent construction works such as granular sub-base and water bound macadam are met in monsoon and post monsoon season. Carrying out these activities even during the monsoon is possible as the rainfall may not be high enough to disrupt construction.

3. PRE-CONSTRUCTION STAGE

Prior to commencement of extraction of water for construction, the contractor shall work out arrangements as specified in the DPR.

In water-scarce regions, provide the following additional information in Project Reports…
• Exploring possibilities for use of existing perennial sources, through interactions with water user groups as the villagers, relevant Government Departments, keeping in view that the water extraction does not infringe upon the usufruct rights of the existing water users. • Identification of potable water source for domestic use of workers and for use in cement - based construction such as cement concrete roads, culverts and other cross drainage works. • Identification of alternate water sources, water-harvesting techniques will be explored to avoid water extraction from the existing community sources.

CONSTRUCTION STAGE

During construction, the Contractor shall be responsible to monitor the following:

- The arrangements worked out with the Panchayat/individual land owners for water extraction is adhered to;
- Extraction of water is restricted to construction requirement and domestic use of construction workers;
- Water requirement for curing of concrete shall be minimized by pooling of water over the concrete or by covering with wet gunny bags; and
- The potable water used for drinking purposes of construction workers shall be as per the Indian Standard for Drinking Water IS: 10500, 1991.

from any septic tank/soak pit or other source of pollution.

- **In case of water harvesting structures** (if required), the Contractor shall in consultation with the residents, identify suitable locations for siting the structure and construct the same.
- **In case of perennial sources,** the Contractor shall adhere to all administrative procedures pertaining to procurement of water from such sources.

ESGP-07: SLOPE STABILITY AND EROSION CONTROL

1. INTRODUCTION

Stability of slopes is a major concern in locations of high embankment. In cases of high embankment, water retention at the embankment base initially causes toe failure and subsequently failure of the whole embankment. Soil erosion is consequent to high runoff on hill slopes. Embankments made up of silty and sandy soils get eroded, in the absence of vegetative cover, when the slopes are steep say more than 20 Degree.

The scope of this guideline includes measures to minimize the adverse environmental impacts due to slope instability and soil erosion. The adverse environmental impact can be: (i) Damage to adjacent land, (ii) Silting of ponds and lakes disturbing the aquatic habitat (iii) Erosion of rich and top fertile top layer of soil (iv) Contamination of surface water bodies and (v) Reduction in road formation width due to erosion of shoulders/berms.

2. PROJECT PLANNING AND DESIGN STAGE

During the detailed project preparation phase, the following investigations shall be carried out prior to finalization of alignment.

- Topographical;
- Hydrological;
- Geo-technical; and
- Geological Investigation (in case of roads in hill areas and areas of high seismic activity)

In addition to the slope stability analysis the alignment should be such that (i) steep as well as heavy cuts are avoided, (ii) Flora and fauna of the area are not disturbed and (iii) Natural drainage pattern is not obstructed.
For high embankments, geo-technical investigations (determination of C, ϕ, density etc.) of the available material need to be done to check its suitability as fill material.

In case of the CD structures, measures for preventing siltation and scouring shall be undertaken as per Guideline on, “Drainage”.

Following guidelines shall be followed in desert areas while using cohesion-less soils for embankment construction.

- The alignment should follow the natural ground level to the extent possible and the embankment shall be restricted to minimum to achieve ruling grades.
- Slope of the embankment should be 3 (H): 1(V) or flatter.
- The corners of the embankment should be rounded for better aerodynamic performance.

3. PRE-CONSTRUCTION STAGE

Interceptor ditches are constructed along hilly slopes or areas with high rainfall to protect the road bench and hillside slope from erosion due to heavy rainfall and runoff. Interceptor ditches are very

effective in the areas of high intensity rainfall and where the slopes are exposed. These are the structures designed to intercept and carry surface run-off away from erodible areas and slopes, thus reducing the potential surface erosion. The Authority's Engineer must ensure that the layout and siting of ditches is as per specifications.

4. CONSTRUCTION STAGE

When alternative material such as fly ash is used for embankment formation, it needs to be ensured that sufficient filter bed is provided along with the top cap. All tests as per IS: 2720 (Parts: 4, 5, 8 & 40) and IRC: SP: 20-2002 are to be conducted on the embankment to keep a check on the compaction achieved. Slope stabilization techniques and erosion control measures such as vettiver grass, stone pitching, use of geotectile and turfing.

Box-1: Detailed specifications for Vegetative cover

Description:

The vegetative cover should be planted in the region where the soil has the capacity to support the plantation and at locations where meteorological conditions favours vegetative growth.

Site Preparation:

- To prevent the seeds from being washed away subsequent to sowing, the area should be protected with surface roughening and diversions.
- Soil samples should be taken from the site and analysed for fertiliser and lime requirements.

Seed Application:

- The seed should be sown uniformly as soon as preparation of the seedbed has been completed.
- No seed should be sown during windy weather. The best time for needing would be during monsoon.

Maintenance:

During first six weeks, the planting should be inspected by the PIC, to check if the growth is uniform and dense. Appropriate moisture levels shall be maintained. There may be requirement of watering the plantings regularly during the dry seasons.

5. POST CONSTRUCTION STAGE

All the exposed slopes shall preferably be covered with vegetation using grasses, brushes etc. Locally available species possessing the properties of (i) good growth (ii) dense ground cover and (iii) deep root shall be used for stabilization.

In case of steep and barren slopes, in order to retain the seedling to the ground asphalt mulch treatment shall be given. Seedling are covered with asphalt emulsion and spread into a thin layer. The asphalt film gradually disintegrates and a carpet of green vegetation and deep-rooted species of grass and clovers, takes its place. Anchoring shall be carried out as per IRC: SP: 48-1998.

Regular inspection of check dams and repositioning/replacement of dislodged or stolen stones need to be carried out.

Repair and maintenance of eroded side drain inverts is to be done in order to arrest retrogation of levels in side drains. Slopes of high embankment can give a fertile base for growth of vegetative cover / sodding.

In arid areas, in order to avoid the deposition of sand over or near the road surface, shrubs are to be planted at an appropriate distance from the formation. The shrubs should not be abutting the road and the distance for carrying out plantation shall be determined based on prevalent wind speeds as well as quantity of sand being carried amongst various other factors. There should be a clear gap between the roadway and shrubs to allow the wind to pick up its velocity and carry along with it any sand that is deposited.

ESGP-08: WASTE MANAGEMENT AND DEBRIS DISPOSAL

1. INTRODUCTION

This guidance describes procedures for handling, reuse and disposal of waste materials during road construction. The Guideline describes waste management measures in all stages of construction. Also, the Guideline discusses the measures to be taken for debris disposal.

2. PROJECT PLANNING AND DESIGN STAGE

As part of DPR preparation, the Authority's Engineer shall carry out the following measures

- Finalize road design and alignment to minimize waste generation through balancing of cut and fill operations and minimizing excess cuts requiring disposal.
- Identify the type of wastes as well as sources of waste during construction and suggest options for possible reuse
- Provide guidelines to the contractor for locating waste disposal sites for non-toxic wastes
- Identify existing landfill sites if available for disposal of toxic materials.
- Incase no existing landfill sites are available, identification of landfill site as well as identification of the clearance requirements.
- Identify sites of disposal of debris.

3. PRE-CONSTRUCTION STAGE

The contractor shall identify the activities during construction, that have the potential to generate waste and work out measures for reducing, reusing and proper disposing of the generated waste in the construction schedule to be submitted to the Authority's Engineer. A sequential listing of the activities during road construction and the nature of wastes together with the possible options for reuse are specified in **Table 8-1**. For the disposal of excess cut and unsuitable (non-toxic) materials, the contractor shall identify the location for disposal in consultation with the community / concerned department. Any toxic materials shall be disposed in existing landfill sites that comply with legislative requirements. Prior to disposal of wastes onto private/community land, it shall be the responsibility of the Contractor to obtain a No-objection Certificate (NOC) from the land owner/community. The NOC shall be submitted to the Authority's Engineer prior to commencement of disposal.

The Contractor shall educate his workforce on issues related to disposal of waste, the location of disposal site as well as the specific requirement for the management of these sites.

Practices to avoid – waste disposal …
•Tipping of waste into stream channels, water bodies, forests and vegetated slopes
•Non-cleaning of wastes after day's work
•Leaching of wastes
•Littering in construction camps / sites
•Storing wastes on private land

4. CONSTRUCTION STAGE

The contractor shall either reuse or dispose the waste generated during construction for roads depending upon the nature of waste, as specified in **Table 8-1**. The reuse of waste shall be carried out by the contractor only after carrying out the specific tests and ascertaining the quality of the waste materials used, and getting the same approved by the Authority's Engineer. Wastes that were not reused shall be disposed off safely by the contractor. The contractor shall adopt the following precautions while disposing wastes:

- Bituminous wastes shall be disposed off in 60mm thick clay lined pits and covered with 30cm good earth at top, so as to facilitate growth of vegetation in long run.
- In case of filling of low-lying areas with wastes, it needs to be ensured that the level matches with the surrounding areas. In this case care should be taken that these low lying areas are not used for rainwater storage
- In case oil and grease are trapped for reuse in a lined pit, care shall be taken to ensure that the pit should be located at the lowest end of the site and away from the residential areas.

The waste management practices adopted by the Contractor, including the management of wastes at construction camps etc shall be reviewed by the Authority's Engineer and the Pollution Control Board (PCB) during the progress of construction.

5. POST CONSTRUCTION STAGE

On decommissioning of construction sites, the Contractor shall hand over the site free of all debris/wastes to the satisfaction of Authority's Engineer. In case of any temporary disposal of wastes on private land, certificate of Completion of Reclamation is to be obtained by the Contractor from the landowner that "the land is restored to his satisfaction". The same is to be submitted to the Authority's Engineer before final payment is claimed.

Table 8-1: Type of wastes and scope for reuse- road construction

S. No	Activity	Type of waste	Scope for possible reuse	Disposal of waste
I	**CONSTRUCTION WASTES**			
1.	Site Clearance and grubbing	Vegetative cover and top soil	Vegetating embankment slopes	
		Unsuitable material in embankment foundation	Embankment Fill	Low lying areas Land fill sites
2.	Earthworks			
a)	Overburden of borrow areas	Vegetative cover and soil	Vegetating embankment slopes	
b)	Overburden of quarries	Vegetative cover and soil	Vegetating embankment slopes	
		Granular material	Embankment Fill, Pitching	
c)	Accidental spillages during handling	Dust		
d)	Embankment construction	Soil and Granular Material	Embankment Fill	
e)	Construction of earthen drains	Soil	Embankment Fill	
3.	Concrete structures Dust			
a)	Storage of material	Dust, Cement, Sand	Constructing temporary structure, embankment fill	
		Metal Scrap		Scrap Yard
b)	Handling of materials	Dust		
c)	Residual wastes	Organic matter	Manure, Revegetation	
		Cement, sand	Constructing temporary structure, embankment fill	
		Metal scrap	Diversion sign, Guard Rail	
4	Reconstruction works			
a)	Dismantling of existing pavement	Bitumen Mix, granular material	sub-base	
		Concrete	Road Sub-base, reuse in concrete, fill material and as rip rap on roads	
		Guard rail sign post, guard stone	Reuse for same	
b)	Dismantling of cross drainage structures	Granular material & bricks	Constructing temporary structure, embankment fill	
		Metal scrap	Diversion sign, Guard Rail Culvert	
		Pipes	Culvert	
5	Decommissioning of sites			
a)	Dismantling of temporary structures	Granular material and bricks	Constructing temporary structure, embankment fill	
6	Maintenance operation			
a)	Desilting of side drains	Organic matter and soil	Revegetation	
II	**OIL AND FLUIDS**			
1	Construction machinery – maintenance and refueling	Oil and Grease	Incineration, Cooking, Illumination	

S. No	Activity	Type of waste	Scope for possible reuse	Disposal of waste
2	Bituminous works			
a)	Storage	Bitumen	Low Grade Bitumen Mix	
b)	Mixing and handling	Bitumen	Low Grade Bitumen Mix	
		Bitumen Mix	Sub-base, Paving access & cross roads	
c)	Rejected bituminous mix	Bitumen Mix	Sub-base, Paving access & cross roads	
III	**DOMESTIC WASTES**			
1	Construction camps	Organic waste,	Manure	
		Plastic and metal scrap		Scrap Yard
		Domestic effluent	Irrigation	

6. Disposal of Debris

For the purpose of disposal of debris, dumping sites need to be selected. The criteria for selection of dumping sites include:

- No residential areas are located downwind side of these locations;
- Dumping sites are located at least 1000 m away from sensitive locations;
- Dumping sites do not contaminate any water sources, rivers etc; and
- Dumping sites have adequate capacity equal to the amount of debris generated;
- Public perception about the location of debris disposal site has to be obtained before finalizing the location;
- Permission from the Village Panchayat is to be obtained for the dumping site selected;
- Productive lands are avoided; and
- Available waste lands shall be given preference

ESGP-09: WATER BODIES

1. INTRODUCTION

Water bodies may be impacted when the road construction is adjacent to it or the runoff to the water body is affected by change of drainage pattern due to construction of embankment. The following activities are likely to have an adverse impact on the ecology of the area:

- Earth moving;
- Removal of vegetation;
- Vehicle/Machine operation and maintenance;
- Handling and laying of asphalt; and
- Waste disposal from construction camps.

Impacts on water bodies impairs …

- Change in Catchment area of the water body
- Drainage system
- Flood level and water logging
- Flora and fauna dependant on the water body
- Ground water recharging
- Animal husbandry as water bodies are used by animals
- Water quality &
- Runoff (increase/decrease)

2. PROJECT PLANNING AND DESIGN STAGE

All efforts are to be taken to avoid the alignments passing adjacent or close to water bodies. Where possible, it should be realigned away from the water body without cutting its embankment, decreasing the storage area or impairing the catchment area. Adequate drainage arrangements as per IRC guidelines have to be provided. Stream bank characteristics and hydrology of the area are to be studied before finalizing the alignment, the profile and cross-drainage structures.

Complete filling of water body with soil is not contemplated in the project. The DPR and its cost estimates have to accommodate costs of rehabilitation (to be estimated as lump sum at DPR stage) of water bodies impacted by the project. Water body rehabilitation shall be as per the Rehabilitation Plan prepared by the Contractor which should have approval of the Authority's Engineer. Details of the tasks to be performed as per the sequence of activities during the project planning and design are as follows:

- Consultations with the people regarding alternate routes that were devised to avoid the pond. If

alternate routes are not available, consent of the villagers is to be sought for affecting the pond and also the measures that would be taken to mitigate the impacts.

- Final design is to be prepared indicating the pond location in the alignment drawings.
- If impacting the pond, the extent of impact is to be clearly indicated on a separate drawing showing blown up portion of the pond. The drawing should aid the contractor in setting up exact lines for cutting the pond.
- All necessary measures for mitigation of impacts and precautionary measures while working close to the water body are to be incorporated into the DPR and cost estimates. The measures to be incorporated shall be as per this guideline.

PRE-CONSTRUCTION STAGE

The Contractor after an assessment of the likely impacts on the water body and review of the provisions of this guideline shall prepare a detailed work plan at the pre-construction stage. The Contractor shall prepare a Rehabilitation Plan for rectifying the likely impact to be caused and approval of Authority's Engineer shall be sought prior to commencement of work. The Rehabilitation Plan should include:

- Locations of erosion protection works and silt fencing to prevent sediment laden runoff entering the water body;
- Location of side drains (temporary or otherwise) to collect runoff from the embankment before entering the water body in accordance with IRC guidelines;
- Work program in relation to the anticipated season of flooding/overflowing of the water body;
- Obstructions likely to cause temporary flooding and information to seek clearance to remove the obstruction; and
- Drawings in Rehabilitation Plan should indicate the landscape details along with species to be planted in the surrounding environs of the water body.

The rehabilitation of water body should be with the objective of restoring it to its original state or to a better state with necessary enhancement of its environs. Rehabilitation Plan shall include:

- Reconstruction and stabilization of embankment in case it is impacted;
- If storage area is lost, then the water body is to be deepened to regain an equivalent volume;
- Further enhancement of the water body as a focal point with place for seating and provision of shade; and
- Costs of rehabilitation

Concurrence of the community has to be sought on the Rehabilitation Plan prepared by the Contractor. Concerns of the community have to be incorporated into the plan before submitting it for approval of the Authority's Engineer.

The Authority's Engineer shall scrutinize the Rehabilitation Plan, verify the implementation on site and finally approve the plan. The Rehabilitation Plan should be implemented by the Contractor immediately after completion of construction at the stretch near the water body.

Working near Water Bodies – Precautions

- Avoid locating roads on pond embankment
- Collect road runoff before entering the water bodies
- Runoff to be filtered of sediments before letting into water bodies
- Avoid debris disposal into water bodies
- Avoid disposal of oil/grease/other contaminants into water bodies

When there is interruption to regular activities of villagers near water body due to construction or rehabilitation work, following are the Contractor's responsibilities:

- Restriction on use of water, if any, should be intimated to the community in advance;
- Alternate access to the water body is to be provided in case there is interruption to use of exiting access. The access provided should be convenient for use of all the existing users whether community or cattle; and
- If the water body affected is a drinking water source for a habitation, alternate sources of water are to be provided to the users during the period for which its use is affected.

3. CONSTRUCTION STAGE

It should be ensured by the contractor that the runoff entering the water body is free from sediments
Silt fencing and/or brush barrier shall be installed in the drainage channels for collecting the sediments before letting them into the water bodySilt/sediment should be collected and stockpiled for possible reuse as surfacing of slopes where they have to be revegetated.Cutting of embankment reduces the water retention capacity and also weakens it, hence:

- The contractor should ensure that the decrease in water retention should not lead to flooding of the construction site and surroundings causing submergence and interruption to construction activities.
- Any perceived risks of embankment failure and consequent loss/damage to the property shall be assessed and the contractor should undertake necessary precautions as provision of toe protection, erosion protection, sealing of cracks in embankments. Failure to do so and consequences arising out of embankment failure shall be the responsibility of the contractor. The Authority's Engineer shall monitor regularly whether safe construction practices near water bodies are being followed.

Alternate drain inlets and outlets shall be provided in the event of closure of existing drainage channels of the water body. Movement of machinery and workforce shall be restricted around the water body, and no waste from construction camps or sites shall be disposed into it.

4. POST CONSTRUCTION STAGE

With the completion of construction, the Authority's Engineer has to ensure implementation of rehabilitation/restoration plan for the water body, as indicated by the Contractor in the bid submission. The precincts of the water body have to be left clean and tidy with the completion of construction. Drainage channels of adequate capacity shall be provided for the water body impacted.

ESGP-10: DRAINAGE

1. INTRODUCTION

Inadequate and faulty drainage arrangements during road construction result in obstruction to natural drainage pattern. The problem is further aggravated in the low-lying areas and flood plains receiving high intensity rainfall, which can lead to the instability of embankment, damage to pavement, sinking of foundation, soil erosion, safety hazards and disruption in traffic. Provision of cross-drainage and longitudinal drainage increases the life of the road and consequently reduces water logging and related environmental impacts. The functioning of the drainage system is therefore a vital condition for a satisfactory road.
However, construction or upgradation of CD structures and longitudinal drains is likely to increase sediments, scour the banks, change water level and flow, and also affect the ecology of the surrounding area. The guideline shall address the environmental concerns related to drainage aspects during different stages of the project execution.

2. PROJECT PLANNING AND DESIGN

Drainage shall be broadly divided as (i) Cross-Drainage and (ii) Longitudinal Drainage both surface & sub-surface drainage. The alignment shall be routed such that minimum drainage crossings are encountered. Also the geometric design criteria as per IRC 73, guidelines for effective surface drainage should be ensured.

All drains crossing the alignment shall be identified on site and marked on map while undertaking transect walk. Basic information on the width of channel, frequency of traffic holdup and flow would provide inputs into screening of alternate alignments as well as fixing the alignment. Consultations with the community shall provide information on the HFL in the area.

In areas of high and medium intensity rainfall (>400 mm/year), flood prone areas and hilly areas,

detailed hydrological studies will need to be conducted. The studies shall be conducted as per IRC: SP-13: 1973 "Guidelines for the Design of Small Bridges & Culverts" and IRC: SP-33:1989 "Guidelines on Supplemental Measures for Design, Detailing & Durability of Important Bridge Structures".

Design of cross-drainage structures shall be based on the inputs from the hydrological studies as per clause 12.2.3 and in other areas, the C-D structure design shall be as per IRC: SP-13. Design of C-D structure shall be such that:

- Normal alignment of the road is followed even if it results in a skew construction of culverts and stream bank protections are incorporated.
- Afflux generated is limited to 30 cm in plains with flat land slopes.
- It is fish friendly – fish passage is not interrupted either in upstream or downstream direction.
- Adequate scour protection measures for stream bank, roadway fill as head walls, wing walls and aprons are included.
- Reinforced road bed (of concrete or rock) for protection against overflow in case of low water crossing (floods/causeways) is included.
- The design of C-D structure (minor and major bridge) should have stairs leading to the bed of the drainage channel, for regular inspection of the sub-structure.
- Schedule of construction of C-D structures should be confined to dry months to avoid contamination of streams.

Longitudinal drains are to be designed to drain runoff from highest anticipated rainfall as per rainfall data for the past 20 years or 50 years as per hydrological analysis in high rainfall areas (annual rainfall > 1000 mm) and hill areas. For design of longitudinal drains in other areas, the design shall be as per IRC: SP-20:2002.
Outfall of the roadside drains shall be into the nearby stream or culvert. The outfall should be at such a level that there would be no backflow into the roadside drain. Wherein pond/low lying areas exist in the vicinity, the flow may be diverted into them after removal of sediment for possible ground water recharge.

In case of high embankment (>1.0m) or bridge approaches, lined channels shall be provided to drain the surface runoff, prevent erosion from the slopes and avoid damage to shoulders and berms. Detailed specifications shall be as per IRC: SP-20:2002. The type of drains that can be constructed include bricklined, pucca with RCC, covered drain with RCC slabs and piped drain.

3. PRE-CONSTRUCTION STAGE

Following measures are to be undertaken by the contractor prior to the commencement of CD/Bridge construction:

- The downstream as well as upstream user shall be informed one month in advance
- The contractor shall schedule the activities based on the nature of flow in the stream.
- The contractor should inform the concerned departments about the scheduling of work. This shall form part of the overall scheduling of the civil works to be approved by Authority's Engineer.
- Erosion and sediment control devises are to be installed prior to the start of the civil works.
- Interceptor drains to be dug prior to slope cutting to avoid high runoff from slopes entering construction sites in case of hill roads
- Runoff from temporary drains and interceptor drains to be directed into natural drains in hill roads
- In case of up-gradation of the existing CD Structures, temporary route / traffic control shall be made for the safe passage of the traffic, depending upon the nature of the stream
- All the safety/warning signs are to be installed by the contractor before start of construction

In case of utilization of water from the stream, for the construction of the CD structures, the contractor has to take the consent from the concerned department (refer Guideline on "Water for Construction")

4. CONSTRUCTION PHASE

Drainage structures at construction site shall be provided at the earliest to ensure proper compaction at the bridge approach and at the junction of bridge span and bridge approach. Velocity of runoff to be controlled to avoid formation of rills/gullies as per guideline, "Slope stability & erosion control"
While working on drainage channels, sediment control measures shall be provided. Silt fencing (as per the detailed specifications of guideline, "Slope Stability & Erosion Control") shall be provided across the stream that carries sediment.

The sediments collected behind the bunds shall be removed and after drying, can either be reused or disposed off as per guideline, "Waste Management and Debris Disposal". Safety devises and flood warning signs to be erected while working over streams and canals.

5. POST CONSTRUCTION

Inspection and cleaning of drain shall be done regularly to remove any debris or vegetative growth that may interrupt the flow. HFL should be marked as per hydrological data on all drainage structure. Temporary structure constructed during construction shall be removed before handing over to ensure free flow through the channels. The piers and abutments should be examined for excessive scour and make good the same if required. The upstream and downstream areas should be cleared of all CD works.

In case of Causeway following aspect shall be taken into consideration:

- Dislocation of stones in stone set pavements, scouring of filler material due to eddy currents.
- Floating debris block the vents. Incase of large amount of floating material, debris arrestor shall be provided in upstream side.
- Damage to guide stones, information board shall be inspected and replaced accordingly.

Schedule of Inspection shall be drawnup for checking cracks, settlements and unusual backpressures. It must be ensured that all the rectification shall be undertaken as and when required. Following are broadly the items to be checked:

- Settlement of piers/abutments & settlement of approach slabs have to be checked;
- Cracks in C-D structures or RCC slabs;
- Drainage from shoulders to be ensured;
- Ditches & drains to be kept clean of debris or vegetation growth; and
- Repairs to parapet of culverts whenever required are to be undertaken.

ESGP-11: CONSTRUCTION PLANTS & EQUIPMENT MANAGEMENT

1. GENERAL

During execution of the project, construction equipments, machinery and plants are likely to cause adverse impact on the environment. The impact can be due to the emissions, dust, noise and oil spills that concern the safety and health of the workers, surrounding settlements and environment as a whole. This guideline describes the activities during the project stages where pollution control measures are required.

2. PROJECT PLANNING AND DESIGN STAGE

Selection criteria for setting up a plant area and parking lot for equipments and vehicles shall be done as per siting criteria for construction camp specified in Guideline on "Construction and Labour Camps".

3. PRE-CONSTRUCTION STAGE

The Contractor must educate the workers to undertake safety precaution while working at the plant / site as well as around heavy equipments. Before setting up the crusher, hot-mix plant and generator, the Contractor shall acquire "No Objection Certificate (NOC)" from the GujaratState Pollution Control Board for the same. The Contractor shall ensure all vehicles must possess Pollution under Control (PUC) Certificate, which and shall be renewed regularly. The Contractor must ensure that all machinery,

equipments, and vehicles shall comply with the existing Central Pollution Control Board (CPCB) noise and emission norms. The Authority's Engineer must ensure that the Contractor shall submit a copy of the NOC and PUC Certificates before the start of work. The Contractor shall design the service road with protection measures as black topping at vulnerable points as in low lying areas.

4. CONSTRUCTION STAGE

The Contractor shall undertake measures as per **Table 11-1** to minimize -the dust generation, emissions, noise, oil spills, residual waste and accidents at the plant site as well as during transportation of material to construction site.

Table 11-1: Measures at Plant Site

Concern	Causes	Measures
Dust Generation	Vehicle Movement	•Water sprinkling •Fine Materials shall be Transported in Bags or Covered by Tarpaulin during Transportation •Tail board shall be properly closed and sealed to be spill proof
	Crushers	• Regular Water Sprinkling to keep the dust below visibility level
	Concrete-Mix Plant	• Educate the workers to follow/adopt good engineering practices while material handling
Emissions	Hot-Mix Plant	•Site Selection as per Clause 6.5.2, Section 6.5, IRC's Manual for Construction & Supervision of Bitumen Work •Regular maintenance of Dust Collector as per manufacture's recommendations
	Vehicles	• Regular maintenance as per manufacture's recommendation
	Generators	• Exhaust vent of long length and emission to confirm to PCB norms.
	Heavy Load Vehicles	• Exhaust silencer, Regular maintenance as per manufacture schedule
Noise	Crushers	• Siting as per guideline, "Construction and Labour Camps"
	Generators	• All generators should have mandatorily acoustic enclosures and confirms to PCB norms.
Oil Spills	Storage and Handling	• Good practice, guideline, "Waste Management and Debris Disposal"
Residual waste	Dust Collector and Pits	• Guideline , "Waste Management and Debris Disposal"
Concrete waste	Concrete-Mix plant	• Guideline, "Waste Management and Debris Disposal"
Bitumen and bitumen mix	Hot-mix Plant	• Guideline, "Waste Management and Debris Disposal"
Stone chips	Crushers	• Guideline, "Waste Management and Debris Disposal"
Safety	Trajectory of Equipments	• No worker shall be present in the vicinity of the equipments
	Movable Parts of Equipments	• Caution Sign, awareness among workers
	Plant Area / Site	• Caution Sign, Safety Equipments
	Accidents / Health	•First Aid Box, Periodic Medical Checkup Break down of
	Break down of vehicles	• Arrangement for towing and bringing it to the workshop

During site clearance, all cut and grubbed materials shall be kept at a secured location so that it does not raise any safety concerns. During excavation, water sprinkling shall be done to minimize dust generation. Frequent water sprinkling shall be done on the haul roads to minimize dust generation. In case of loose soils, compaction shall be done prior to water sprinkling. Cautionary and informatory sign shall be provided at all locations specifying the type of operation in progress. The contractor must ensure that there is minimum generation of dust and waste while unloading the materials from trucks. The construction waste generated shall be disposed as per Guideline on, "Waste Management and Debris Disposal". The equipments, which are required to move forward and backward, shall be equipped with alarm for backward movement. It shall be ensure that the workers shall remain away from the working areas at such times. Also, equipments at construction camp should be barricaded and kept away from residential quarters of workers.

Safety Measures During Bitumen Construction Work…

- The Contractor shall ensure that bitumen storing, handling as well as mixing shall be done at hot-mix plant or designated areas[1] to prevent contamination of soil and ground water.
- Skilled labour shall be used while hand placing the pre-mixed bitumen material. The hand placing of pre-mixed bituminous material shall be done only in following circumstances:
  - For laying profile corrective courses of irregular shape and varying thickness
  - In confined spaces where it is impracticable for a paver to operate and
  - For filling potholes
- The Contractor shall provide safety equipments i.e. gumboots and gloves to the workers while handling bitumen.
- While applying Tack Coat, spraying of bitumen shall be done in the wind direction. The labour shall wear jacket while spraying the bitumen.
- All the bituminous work shall be done as per IRC's Manual for Construction and Supervision of Bituminous Works.

The Authority's Engineer shall carry out periodic inspections to ensure that all the pollution control systems are appropriately installed and comply with existing emission and noise norms.

5. POST-CONSTRUCTION STAGE

The Authority's Engineer shall ensure that all the haul roads are restored to their original state. In case any inner village road is damaged while transporting the procured material; the contractor shall restore the road to its original condition. The Authority's Engineer must ensure that the decommissioning of plant shall be done in environmentally sound fashion and the area to bring its original state.

Designated area refers to paved surfaces and barren parcels of land, with adequate drainage and disposal system. It must be ensure that these are away from agriculture land, water body and other sensitive areas.

ESGP-12: LABOUR AND WORKER'S HEALTH AND SAFETY

1. INTRODUCTION

The safety and health concerns of the workers and the community are impacted due to the hazards created during the construction of road. **Box: 1** gives the safety concerns during construction. This Guideline describes the hazards and measures that need to be taken to mitigate the impacts.

2. PROJECT PLANNING AND DESIGN STAGE

To address health and safety concerns, the DPR shall contain selection criteria for setting up:

- Construction Camps (as per guideline);
- Borrow Areas (as per guideline); and
- In case of opening new quarry areas (as per guideline).

To address the safety concerns to road user during operational phase, the DPR shall contain the following:

- Selection and location of regulatory as well as informatory signs as per IRC: 67-2001, depending upon the geometry of the road.
-

Box 1: Safety Concerns during Construction

Community due to:

- Improper scheduling of construction activities especially near the settlements and sensitive areas;
- Parking of equipments and vehicles at the end of the day likely to cause accidents to the general public especially during night hours;
- Transportation of uncovered loose material or spillage of material increases the chances of accidents to road users and surrounding settlements.

Workers due to:

- Improper handling of materials like bitumen, oil and other flammable material at construction sites, likely to cause safety concerns to the workers;
- Lack of safety measures such as alarm, awareness and safety equipment result in accidents, especially working with or around heavy machinery / equipments.

PRE-CONSTRUCTION STAGE

In order to incorporate public health and safety concerns, the Authority's Engineer and the Contractor shall disseminate the following information to the community:

- Location of construction camps, borrow areas and new quarry areas;
- Extent of work;
- Time of construction;
- Diversions, if any;
- Precaution measures in sensitive areas;
- Involvement of local labours in the road construction;
- Health issues - water stagnation, exposure to dust, communicable disease; and
- Mechanism for grievances.

The information dissemination could be through the local newspaper, billboards, panchayats meetings, etc.

Health Concerns are adversely impacted…….

Public due to:

- Unhygienic conditions due to water logging (improper drainage of waste water), either by improper decommissioning of Construction Camps and parking lots, or improper disposal of construction wastes, leading to the breeding of vectors that are likely to impact the health of the general public
- Interaction between workers and host community is likely to increase the risk of spread of communicable diseases.

Workers due to:

- Low quality drinking water as well as inappropriate storage of drinking water likely to cause water borne diseases among workers.
- Absence of proper sanitary facility likely to act as a breeding ground for vectors raising health concerns among workers.

The Contractor must educate the workers to undertake the health and safety precautions. The contractor shall educate the workers regarding:

- Awareness on HIV/AIDS awareness and usage of safety measures such as condoms;
- Awareness on hygienic sanitary practices;
- Personal safety measures and location of safety devices;
- Interaction with the host community;
- Protection of environment with respect to:
- Trampling of vegetation and cutting of trees for cooking;
- Restriction of activities in forest areas and also on hunting;
- Water bodies protection;
- Storage and handling of materials;
- Disposal of construction waste.

3. CONSTRUCTION STAGE

During the progress of work, following are the safety requirements that need to be undertaken by the contractor at the construction site:

- Personal Protective Equipments (PPE) for the workers. **Table 12-1** gives the safety gear to be used by the workers during each of the construction activities.
- All measures as per bidding document shall be strictly followed.

FIRST AID FACILITIES

- First Aid Kit, distinctly marked with Red Cross on white back ground and shall contain minimum of following:
  - 6 small-sterilized dressings
  - 3 medium and large sterilized dressings
  - 1 (30 ml.) bottles containing 2 % alcoholic solution of iodine
  - 1(30 ml) bottle containing salvolatile
  - 1 snakebite lancet
  - 1 pair sterilized scissors
  - 1 copy of first-aid leaflet issued by the Director General, Factory Service & Labour Institute, Government of India
  - 100 tablets of aspirin
  - Ointment for burns
  - A suitable surgical antiseptic solution
- Adequate arrangement shall be made for immediate recoupment of the equipments, whenever necessary.
- A trained personnel incharge of first aid treatment to be readily available during working hours at construction site
- Suitable transport to the nearest approachable hospital should be made available.
- Tetanus injection must be made compulsory for all workers every 6 months.

- Additional provisions need to be undertaken for safety at site:
- Adequate lighting arrangement;
- Adequate drainage system to avoid any stagnation of water;
- Lined surface with slope 1:40 (V:H) and provision of lined pit at the bottom, at the storage and handling area of bitumen and oil, as well as at the location of generator (grease trap); and
- Facilities for administering first aid.

Table 12-1: Worker Safety Measures

Sl. no.	Activity	Safety Requirement
1.	Setting out and levelling	• Luminous jackets; • Helmets; • Boots for protection against insect bite; and Dust Mask
2.	Tree cutting	• Helmet Boots • Luminous safety jackets
3	Reinforced yard/ carpentry/ reinforcement cutting/ bending work.	• Hand gloves
4.	Shuttering work	• Goggles Hand gloves
5.	Plant and Machinery	• Hand gloves • Boots • Helmets • Dust Mask
6.	Material handling	• Hand gloves • Dust mask
7.	Batching plant	• Goggles • Hand gloves • Dust mask
8.	Weeding	• Goggles
9.	Binding reinforcement	• Safety belt • Boots
10.	Manual concrete laying	• Gum boots • Hand gloves • Helmet
11.	Piling	• Helmet • Hand gloves, gumboots.

The following measures need to be adopted by the contractor to address public safety concerns:

- The Contractor shall schedule the construction activities taking into consideration factors such as:
- Sowing of crops;
- Harvesting;
- Local hindrances such as festivals etc.; and
- Availability of labour during particular periods.
- All the cautionary signs as per IRC: 67-2001 and traffic control devices (such as barricades, etc) shall be placed as soon as construction activity get started and shall remain in place till the activities get completed.
- Following case specific measures need to be followed during the progress of the activity:
- In case of blasting, the Contractor must follow The Explosives Rules, 1983.
- In case of construction activity adjoining the water bodies, measures shall be taken as per measures suggested in Guideline on “Water Body”.
- If construction of road is within the settlement, the contractor must ensure that there shall not be any unauthorized parking as well as storage of material, adjacent to road.

- Approved chemicals should be sprayed to prevent breeding of mosquitoes and other disease-causing organisms, at all the water logging areas

The Authority's Engineer shall carry out periodic inspections in order to ensure that all the measures are being undertaken as per the guideline.

4. POST-CONSTRUCTION STAGE

During this stage a major concern is on road user safety. Following are the measures that need to be undertaken by the Authority's Engineer to ensure safer roads:

- Inspection and maintenance of installed regulatory and informatory signs.
- Ensure that the location of signage does not obstruct the visibility
- In case of hill roads, maintenance of parapet wall as well as of overtaking zones.

The Authority's Engineer must ensure that during the maintenance operation of road, road materials are stored at a location such that they shall not create any risk to road users.
The construction site shall be cleaned of all debris, scrap materials and machinery on completion of construction for the safety of public and road users, as per the measures given in Guideline on "Construction and labour Camp" and "Waste Management and Debris Disposal."

ESGP-13: CULTURAL PROPERTIES

1. INTRODUCTION

The cultural properties located close to the road are likely to be impacted by the road construction. Most of the properties are avoided in general during finalization of alignment. This Guideline discusses the mitigation measures for cultural properties.

2. PROJECT PLANNING AND DESIGN STAGE

Measures for mitigation of impacts on cultural properties during project preparation shall be as per the following steps:

- Identification of locally significant cultural properties should be done;
- Assessment of likely impacts on each cultural property due to project implementation;
- The extent of impact on the identified culture property should be assessed and possible measures for avoidance should be devised based on the site investigation. Incase impact is not avoidable, identification of alternative routes or possibility of relocation of the culture property shall be assessed in consultation with the local public, based on the economic feasibility.

Information to be collected…
• Location
• Direction (North/ South/East/West) With Respect to Road
• Distance of the structure from existing centerline of the road
• Type of Property eg: temple/mosque/shrine/dargah etc
• Plan of the structure
• Importance of the structure – historical/social/archeological
• Ownership of the property
• Probable loss to the property
• Specific periods/durations in which large congregations as festivals/mela take place causing hindrance to vehicular movement
• Choice of community, issue of relocation

In case of relocation, relocated site should be suggested by the local people and the size of relocated structure should at least be equal to the original structure. A written consent letter is to be obtained from the community regarding the relocation site of the cultural property in the form of resolution on the letter pad of the sarpanch/gram panchayat or with the signatures of community members.

A detailed design for the enhancement structure and its site plan along with the necessary items shall be

prepared by the contractor and it must be approved by the Authority's Engineer. The relocation and other avoidance measures should be carried out before to start the road work.

3. CONSTRUCTION STAGE

Major impacts on the properties during this stage are mainly due to movement of construction machinery as well as due to construction activity in the vicinity of the cultural property. Following are precautionary measures that need to be undertaken by the contractor while working near these structures:

- Restrict movement of heavy machinery near the structure
- Avoid disposal or tipping of earth near the structure
- Access to these properties shall be kept clear from dirt and grit

During earth excavation, if any property is unearthed and seems to be culturally significant or likely to have archeological significance, the same shall be intimated to the Authority's Engineer. Work shall be suspended until further orders from Authority's Engineer. The State Archeological Department shall be intimated of the chance find and the Authority's Engineer shall carry out a joint inspection with the department. Actions as appropriate shall be intimated to the Contractor along with the probable date for resuming the work.

The Authority's Engineer must ensure that the contractor implements the precautionary measures as suggested. Also, the Authority's Engineer must conduct monitoring for the cultural property.

ESGP-14: TREE CUTTING AND AFFORESTATION

This Guideline discusses the issue of tree cutting and afforestation. Loss of trees creates adverse environmental impacts. In order to mitigate there impacts, suitable measures have been suggested as part of this Guideline. These measures have been given for each of the stages of the road construction activities.

1. PROJECT PLANNING AND DESIGN STAGE

During alignment finalization, due consideration shall be given to minimise the loss of existing tree cover, encroachment of forest areas / protected areas etc as specified in guideline on**,** "Site preparation". Tree felling, if unavoidable, shall be done only after compensatory plantation of at least three saplings for every tree cut is done.

The plantation/afforestation would be carried out by the forest department. It should be ensured that plantation is carried out only in areas where water can be made available during dry seasons and the plant can be protected during the initial stages of their growth. The species shall be identified giving due importance to local flora (suggested in **Table 14-1**). It is recommended to plant mixed species in case of both avenue or cluster plantation.

The plantation strategy shall suggest the planting of fruit bearing trees and other suitable trees. Development of cluster plantations will be encouraged in the community lands, at locations desired by the community. The choice of species will be based on the preferences of the community. The Authority's Engineer shall oversee the plantation to check the following:

- Whether trees are obstructing live of right at junctions;
- Whether trees are at the inside of the junctions;
- Whether trees are within 5 mts of the proposed centerline.

2. POST-CONSTRUCTION STAGE

The maintenance of the saplings (including activities much as weeding, watering, planting of replacement saplings, etc application of manure etc) shall be the responsibility of the forest department.

The Authority's Engineer shall ensure the following:

- Shoulder of roads to be kept clear of weeds/undesirable undergrowth; and
- Branches of trees do not obstruct clear view of the informatory and cautions signs.

Table 14-1: Endemic Species of Gujarat

Sl.no	Tree Species Endemic species)	Sl.no	Tree Species Endemic species)
1	*Tectonagrandis*	9	*Brideliasquamosa*
2	*Anogeissuspendula*	10	*Emblicaofficinallis*
3	*Boswelliaserratta*	11	*Buteamonosperma*
4	*Acacia nilotica*	12	*Diospyrosmelanoxylon*
5	*Euphorbia caducifolia*	13	*Anogeissuslatifoia*
6	*Flacourtiaindica*	14	*Lanneacoromandelica*
7	*Helicteresisora*	15	*Sterculiaurens*
8	*Holarrhenaantidysentrica*	16	*Mitragynaparviflora*

ESGP-15: FORESTS AND OTHER NATURAL HABITATS

1. INTRODUCTION

This guideline envisages measures to be undertaken during blacktopping / widening of road sections passing through natural habitats. These measures shall be undertaken in addition to the measures laid down in the other Guidelines.

Natural Habitats means…
• National Park
• Reserve Forest
• Sanctuaries
• Notified Wetlands
• Fisheries and Aquatic Habitats

Conservation of natural habitats is essential for long-term sustainable development. A precautionary approach to natural resource management to ensure opportunities for environmentally sustainable development has been adopted for the project.

2. PROJECT PLANNING AND DESIGN

To minimize the adverse impact on the ecology of the natural habitats, selection of alignment should be as per guideline. An officer of at least the rank of a forest ranger shall be deputed for detailed inventory of ecological features along the road. The nature and type of impact on natural habitats due to road construction shall be identified. Magnitude of the impact to the extent feasible on the ecological features shall also be assessed.

Ecological Features…	Adverse Impacts…
• Area of natural habitat; • Type and number of endangered species of flora and fauna; • Stream and water bodies; • Breeding ground and seasons; • Migration season of bird species; and • Animal crossing.	• Diversion of forest land; • Cutting of trees; • Trampling of vegetation; • Contamination of water due to the usage of water from the source within the natural habitat; • Loss of breeding grounds; and • Interruption to animal crossings during the construction.

Impacts identified on the natural habitats shall be minimized to the extent required. Minimization shall be through precautionary measures or through appropriate mitigation measures. Following are the measures should be undertaken along the road passing through natural habitats:

- Constricting the road width to 6.0 m and embankment height to 0.5 m to minimize the extent of diversion of forest land and cutting of trees
- Drainage Structures shall be designed strictly in accordance with guideline on "Drainage".
- Rumble strips shall be provided at every kilometer along the length of the natural habitat and invariably at the start and end of the natural habitat
- Signage (viz. speed limit, animal crossing, switch of headlight etc) shall be provided as per IRC: 67-2001 Code of Practice for road sign (first revision)

In addition to the above measures, specific impacts identified on site shall be mitigated as per the recommendation of the forest department / officer in charge of the identified natural habitat.
In case proposed alignment falls within the catchments of a water body or a stream, a flush causeway shall be constructed without impacting the drainage system. The length of the causeway shall be as per the existing water spread. The causeway shall be strictly in compliance with IRC:SP-20:2002. In no circumstances a water body within the natural habitat shall be cut across or filled for the purpose of laying the road.

3. PRE-CONSTRUCTION STAGE

No Construction Camps, Stockyards, Concrete Batching or Hot Mix Plants shall be located within the natural habitat or within 500m from its boundary.
Contractor in consultation with forest ranger or any other concerned authority shall prepare a schedule of construction within the natural habitat. Due consideration shall be given to the time of migration, time of crossing, breeding habits and any other special phenomena taking place in the area for the concerned flora or fauna.

4. CONSTRUCTION STAGE

Procurement of any kind of construction material (as quarry or borrow material) from within the natural habitat shall be strictly prohibited. No water resources within the natural habitat shall be tapped for road construction. Use of mechanized equipment shall be kept minimum within the natural habitat. Contractor must ensure that there will be no parking of vehicles machine and equipment within the natural habitat. Disposal of construction waste within the natural habitat shall be strictly prohibited and as far as possible reuse shall be undertaken as per **Table 8-1** type of waste of guideline, "Waste Management and Debris Disposal".

5. POST CONSTRUCTION STAGE

The road passing through the natural habitat shall be declared as a silence zone. Compensatory tree plantation within the available Right of Way shall be done in accordance with guideline, on "Tree Cutting and Afforestation". The Authority's Engineer must ensure maintenance of drainage structure shall be undertaken as per guideline, "Drainage"

ESGP-16: AIR AND NOISE POLLUTION

1. INTRODUCTION

This guideline deals with the mitigation of adverse impacts due to air and noise pollution. Both of these have been discussed in the subsequent sections respectively.

2. AIR POLLUTION

The types of air pollution due to construction activities might include generation of dust, emission from hot mix plants and batching plants, odour from construction labour camps, emission from construction machinery/vehicles etc. The measures for mitigation of impacts from each of these are given below.

Generation of Dust

- All vehicles delivering materials to the site shall be covered to avoid spillage of materials.
- The Contractor shall take every precaution to reduce the level of dust emission from the hot mix plants and the batching plants up to the satisfaction of the Authority's Engineer in accordance with

the relevant emission norms.

- All existing highways and roads used by vehicles of the contractor, or any of his sub-contractor or supplies of materials or plant and similarly roads which are part of the works shall be kept clean and clear of all dust/mud or other extraneous materials dropped by such vehicles or their tyres.
- Spillage shall be cleared immediately by manual sweeping and removal of debris or if so directed by the Authority's Engineer, by mechanical sweeping and clearing equipment, and all dust, mud and other debris shall be removed completely. Additionally, if so directed by the Authority's Engineer, the road surfaces shall be hosed or watered using necessary equipments.
- Plants, machinery and equipment shall be so handled (including dismantling) so as to minimize generation dust.
- All earthwork shall be protected in a manner acceptable to the Authority's Engineer to minimise generation of dust.
- The hot mix plant is sited at least 1000m from the nearest habitation. The hot mix plants shall be fitted with dust extraction units in order that the exhausts comply with the requirements of the relevant current emission control legislation.
- Generation of dust should be suppressed during unloading of construction material and also during storage of the construction material.

Emission from Hot-Mix Plants and Batching Plants

- Hot mix plants and batching plants shall be located sufficiently away from habitation, agricultural operations or industrial establishments. Where possible such plants will be located at least 1000m away from the nearest habitation.
- The exhaust gases shall comply with the requirements of the relevant current emission control legislation. All operations at plants shall be undertaken in accordance with all current rules and regulations protecting the environment.

Odour from Construction Labour camps

- Construction labourers camp shall be located at least 500 m away from the nearest habitation.
- The waste disposal and sewerage system for the camp shall be properly designed, built and operated so that no odour is generated. Compliance with the Factory Act, the construction workers (regulation of employment and conditions of service) Act, 1996 and all other relevant legislation shall be strictly adhered to.

Emission from Construction Vehicles, Equipment and Machinery

- The discharge standards promulgated under the Environment Protection Act, 1986 shall be strictly adhered to. All vehicles, equipment and machinery used for construction shall conform to the relevant Indian Standard (IS) norms.
- All vehicles, equipment and machinery used for construction shall be regularly maintained to ensure that pollution emission levels\comply with the relevant requirements of SPCB & the Engineer.

Pollution from Crusher

- All crushers used in construction shall confirm to relevant dust emissions control as legislated. Clearance for siting shall be obtained from the SPCB. Alternatively, only crushers already licensed by the SPCB shall be used.
- Dust screening vegetation will be planted on the edge of RoW for all existing roadside crushers.
- If crusher owned by contractor, the suspended particulate matter contribution value at a distance of 40m from a controlled isolated as well as from a unit located in a cluster should be less than 600 ug/Nm^3. The monitoring is to be conducted at least twice a month for all the 12 months in a year during the crushing operation for the project.

3. NOISE POLLUTION

Noise from Vehicles, Plants and Equipment

- The plants and equipment used in construction (including the aggregate crushing plant) shall strictly

conform to the GoI noise standards.

- All vehicles and equipment used in construction shall be fitted with exhaust silences. During routine servicing operations, the effectiveness of exhaust silencers shall be checked and if found to be defective shall be replaced. Notwithstanding any other conditions of contract, noise level from any item of plant(s) must comply with the relevant legislation for levels of sound emission. Non-compliant plant shall be removed from site.
- Noise limits for construction equipment used in this project (measured at one meter from the edge of the equipment in free field) such as compactors, rollers, front loaders, concrete mixers, cranes (moveable), vibrators and saws shall not exceed 75 dB(A), as specified in the Environment (Protection) Rules, 1986.
- Maintenance of vehicles, equipment and machinery shall be regular and proper, to the satisfaction of the Authority's Engineer, to keep noise from these at a minimum.
- In construction sites within 150 m of the nearest habitation, noisy construction work such as crushing, concrete mixing and batching, mechanical compaction, etc., will be stopped between 2200 hours to 0600 hours. In silence zone (areas up to 100 m around such premises as hospitals, educational institutional and courts) no hot-mix, batching or aggregate crushing plant will be allowed. No construction shall take place within 100m around hospitals between 21.00 hours to 06.00 hours.
- Workers in vicinity of strong noise, and workers working with or in crushing, compaction, batching or concrete mixing operations shall wear earplugs.

Noise from Blasting (or) Pre splitting Operations

- Blasting shall be carried out only with permission of the Authority's Engineer. All the statutory laws, regulators, rules, etc., pertaining to acquisition, transport, storage, handling and use of explosives shall be strictly followed.

Blasting shall be carried out during fixed hours (preferably during mid-day), as permitted by the Authority's Engineer. The timing should be made known to all the people within 500m (200m for pre-splitting) from the blasting site in all directions. People, except those who actually light the fuse shall be excluded from the area of 200m (50m for pre-splitting) from the blasting site in all directions at least 10m minutes before the blasting.

ESGP 17: R&R PLANNING AND RAP FRAMEWORK

Brief Description of Activity

This code relates to identification and verification of project affected people, assets and CPRs and a framework for resettlement and rehabilitation of affected people. the entitlement matrix as per the Gujarat State Highway Project II (GSHP II) guidelines is also provided for better understanding of the type of losses and the corresponding compensation that needs to be paid to the PAFs.

Environmental Health Safety & Social (EHS&S) Issues

EHS&S issues that need to be addressed while undertaking R&R measures include the following:

- Inadequate/improper identification of entitled people
- Inadequate or nonpayment of entitlements
- Forceful evacuation of RoW

The Entitlement matrix

The following entitlement matrix is only for the non-titleholder category. For detailed matrix covering titleholders as well the link provided at the end may be visit Policy, Legal and Administrative Framework. The basic principles that guide this Social Management Framework (SMF) are: Avoidance socially sensitive areas while planning project activities; Minimisation of impacts when project activities occur in socially sensitive areas; Mitigation of any unavoidable negative impacts arising out of its projects; Optimization of

land requirement; and Greater transparency through involvement of community and other stake holders. The policy frame work and entitlements for the project are based on the national law The Right to Fair Compensation and Transference in Land Acquisition, Rehabilitation and Resettlement Act, 2013, (LARR 2013).

A. Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act (RFCT in LARR), 2013.

The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013 (RFCT in LARR Act - 2013) has been effective from January 1, 2014 after receiving the assent of the President of Republic of India. This Act extends to the whole of India except the state of Jammu and Kashmir. The Act replaced the Land Acquisition Act, 1894. 70. The aims and objectives of the Act include: (i) to ensure, in consultation with institutions of local self-government and Gram Sabhas established under the constitution of India, a humane, participative, informed and transparent process for land acquisition for industrialization, development of essential infrastructural facilities and urbanization with the least disturbance to the owners of the land and other affected families; (ii) provide just and fair compensation to the affected families whose land has been acquired or proposed to be acquired or are affected by such acquisition; (iii) make adequate provisions for such affected persons for their rehabilitation and resettlement; (iv) ensure that the cumulative outcome of compulsory acquisition should be that affected persons become partners in development leading to an improvement in their post acquisition social and economic status and for matters connected therewith or incidental thereto.

Section 27 of the Act defines the method by which market value of the land shall be computed under the proposed law. Schedule I outlines the proposed minimum compensation based on a multiple of market value. Schedule II through VI outline the resettlement and rehabilitation entitlements to land owners and livelihood losers, which shall be in addition to the minimum compensation per Schedule I.

The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement (Amendment) Second Ordinance, 2015: With an intention to overcome the procedural difficulties in land acquisition for important national projects, President of India has issued an amendment ordinance on 30th May 2015. Three main features of the ordinance among others are as following:

I. The Chapter II and III of the RFCT in LARR Act - 2013 regarding determination of social impact assessment and public purpose and special provision to safeguard food security shall not apply to the project such as (a) vital to national security or defence of India and every part thereof, including preparation for defence or defence production; (b) rural infrastructure including electrification; (c) affordable housing and housing for the poor people; (d) industrial corridors ; and (e) 24 infrastructure and social infrastructure projects including projects under public private partnership where the ownership of land continues to vest with the Government.
II. The five year period set by the principal Act in Section 24 under sub-section (2), for lapse of 1894 Act shall exclude the cases where acquisition process is held up on account of any stay or injunction issued by any court or the period specified in the award of a Tribunal for taking possession.
III. The five year period set by the principal Act for any land acquired and unused is now will be a period specified for the setting up of any project or five years, whichever is later.

ENTITLEMENTS, ASSISTANCE AND BENEFITS

A. Introduction

The project will have three types of displaced persons i.e., (i) persons with formal legal rights to land lost in its entirety or in part; (ii) persons who lost the land they occupy in its entirety or in part who have no formal legal rights to such land, but who have claims to such lands that are recognized or recognizable under national laws; and (iii) persons who lost the land they occupy in its entirety or in part who have neither formal legal rights nor recognized or recognizable claims to such land. The involuntary

resettlement requirements apply to all three types of displaced persons and the RP describes provision for all type of DPs and accordingly formulated the entitlement matrix.

B. Cut-off-Date for Entitlement

- In the cases of land acquisition affecting land holders the cut-off date would be the last date of publishing Notification for land acquisition u/s 11 (1) of RTFCTLARR Act, 2013 in the local newspaper. Those without any valid pass, the cut-off date would be the start date of the Census and Socio-Economic survey which is 4th & 5th July 2017. DPs who settle in the affected areas after the cut-off date will not be eligible for compensation. The cut-off date for non-titleholders will be officially declared by the EA along with the disclosure of RP and notified in the project area through newspaper and other methods to ensure people who are illiterate are made aware. They, however, will be given sufficient advance notice, requested to vacate premises and dismantle affected structures prior to project implementation. Their dismantled structures materials will not be confiscated and they will not pay any fine or suffer any sanction.

C. Project Entitlement

In accordance with the R&R measures outlined in the previous chapter, all displaced households and persons will be entitled to a combination of compensation packages and resettlement assistance depending on the nature of ownership rights on lost assets and scope of the impacts including socio-economic vulnerability of the displaced persons and measures to support livelihood restoration if livelihood impacts are envisaged. The displaced persons will be entitled to the following five types of compensation and assistance packages:

a) Compensation for the loss of land, crops/ trees at their replacement cost;
b) Compensation for structures (residential/ commercial) and other immovable assets at their replacement cost;
c) Assistance in lieu of the loss of business/ wage income and income restoration assistance;
d) Assistance for shifting and provision for the relocation site (if required), and
e) Rebuilding and/ or restoration of community resources/facilities.

Draft Entitlement Matrix
Compensation for Land and Value of Assets attached to Land and Building
(The First Schedule)

S. No.	Component of Compensation Package in respect of land acquired under RFCT-LARR Act, 2013	Determination Procedure	Eligible Category	Explanatory Remarks
(1)	(2)	(3)	(4)	(5)
1	Market value of land	Compensation to be determined as provided u/s 26 of the RFCT-LARR Act, 2013 and spelled out in Note A.	a. Land owners– whose land to be acquired and have verifiable claims to ownership as u/s 3 of RFCTLARR Act, 2013. b. Registered 'lessees', 'tenants' or 'share croppers" will get an apportionment of the compensation as determined by the Appropriate Government payable under law. c. In case of land occupiers such as occupiers of assigned lands or tribes occupying forest with claims/rights	**A. Compensation for Structures** (a) Cash compensation for the building and assets at market value determined u/s 29 of RFCT-LARR, 2013 and Note B. In case of partial impact making unimpaired use of the structure difficult such as where more than 25% of the structure area is affected, full compensation shall be paid u/s 94 of RFCT-LARR Act, 2013. (b) In case of partial impact, 25% additional amount to be paid on compensation award for the affected part of the structure to enable damage repair where the owner/occupier is of his/her own will interested to retain the remaining part of the structure, provided that unimpaired continuous use of such structure is
2	Factor by which the market value is to be multiplied in the case of rural areas.	Vide a GO of GoG the multiplied factor is being considered as per Notification issued by GoG *(No. LAQ 22-2014 / 179 / GH, dated10/11/2016*). Govt. of Gujarat has finalised the demarcation of rural area and multiplying **factor 2.00 (two)** for rural areas to be considered.		
3	Factor by which the market value is to be multiplied in the case of urban areas.	Vide a GO of GoG the multiplied factor is being considered as per Notification issued by GoG *(No. LAQ 22-2014 / 179 / GH, dated10/11/2016*). Govt. of Gujarat has finalised the demarcation of urban area and multiplying **factor 1.00 (one)** for urban areas to be considered.		

S. No.	Component of Compensation Package in respect of land acquired under RFCT-LARR Act, 2013	Determination Procedure	Eligible Category	Explanatory Remarks
(1)	(2)	(3)	(4)	(5)
			recognised under state/central laws covered u/s 3 (c) point no. iii and v of RFCTLARR Act, 2013 will get compensation with solatium at par with titleholders.	possible without hazards. (c) Right to salvage material from the affected structures. (d) Three months' advance notice to vacate structures. **B. Partial impact on land**: In case only a part of any land plot is affected and its owner desires that the whole plot be acquired on the grounds that the plot has been rendered uneconomic or has been severed due to LA (u/s 94 RFCT-LARR Act, 2013 and Note C), the competent authority can award compensation for the remaining part of the plot; or award 25% of actual value of remaining land holding as additional compensation allowing the owner to retain the remaining land plot, if agreeable to the land loser. **C. Compensation for trees/crops etc**. a. Cash compensation as estimated u/s 29 (3), RFCT-LARR Act, 2013 by: i. Forest Department for timber trees ii. State Agriculture Extension Department for crops iii. Horticulture Department for horticulture, perennial trees iv. Cash assistance to title holders and non-squatters for loss of trees, crops and perennials at market value. b. Three months' advance notice to affected parties to harvest fruits, crops. In case standing crops, the affected parties shall receive three months' advance notice to salvage crops, or compensation in lieu thereof as determined above. **D. Alternative Compensation packages** In case where a State Government through any Act or Gazette Notification or as approved by any authority of State Government (duly authorized for the purpose) as per their approved procedure has fixed a rate for compensation of land, the same may be adopted by the Competent Authority in determining the compensation for land in lieu of package available under the First Schedule.
4	Value of assets attached to land or building	To be determined as provided under section 29 In determining the amount of compensation to be awarded for land acquired under this Act. The Collector shall take into consideration- the damage (if any) sustained by the person interested, at the time of the Collector's taking possession of the land, by reason of the acquisition injuriously affecting his other property, movable or immovable, in any other manner, or his earnings. Compensation determination shall take place under Section 29 (i) for building/properties, (ii) for Tree and (iii) for crops of RFCTLARR Act 2013.		
5	Solatium	Equivalent to one hundred percent of the market value of land mentioned against serial number 1 multiplied by the factor specified against serial number 2 for rural areas or serial number 3 for urban areas plus value of assets attached to land or building against serial number 4 under column (2).		
6	Final Award in Rural areas	Market value of land mentioned against serial number 1 multiplied by the factor specified against serial number 2 plus value of assets attached to land or building mentioned against serial number 4 under column (2) plus solatium mentioned against serial number 5 under column (2).		
7	Final Award in Urban areas	Market value of land mentioned against serial number 1 multiplied by the factor specified against serial number 3 plus value of assets attached to land or building mentioned against serial number 4 under column (2) plus solatium mentioned against serial number 5 under column (2).		
8	Other component if any to be included	Interest on compensation payable to the affected families as notified by the concerned State Government or at the rate of 12% per annum from the date of LA notification u/s 11 applicable as per section 30 (3) of RFCT-LARR Act, 2013 and explained in Note A (6).		

Resettlement and Rehabilitation Assistance for project affected families (The Second Schedule)

S. No.	Component of Compensation Package in respect of land acquired under RFCT-LARR Act, 2013 and Gujarat Amendment Act, 2016	Eligible Category	Entitlement	Explanatory Remarks
(1)	(2)	(3)	(4)	(5)
1	**Resettlement and Rehabilitation cost**	Each affected family owning land and assets in the acquired area.	Compensation to be determined and provided u/s 31A of the Gujarat Amendment Act 2016. Each affected family shall be given a one-time "Resettlement and Rehabilitation cost" of such lump sum amount equal to fifty percent (50%) of the amount of compensation (as determined under section 27 of central Act) to the affected families.	**The lump-sum amount R&R cost shall not be less than the amount payable according to the second schedule of the RFCTLAR&R Act 2013.**
2	**Provision of Housing units in case of displacements**	a. All affected families defined u/s 3 c of RFCT-LARR Act, 2013 required to relocate due to the project for which land is being acquired including land owners, customary dwellers and occupiers whose livelihood is primarily dependent on the affected land. b. This benefits shall also be extended to any affected family which is without homestead land and which has been residing in the area continuously for a period of not less than three years preceding the date of notification of the affected area and which has been involuntarily displaced from such area u/s 1 (2) of Second Schedule of RFCT-LARR Act, 2013.	a. Rural areas: A constructed house as per Indira Awas Yojana specifications, or cash assistance in lieu thereof as determined by the concerned State Government under its own resettlement policy or rules, provided that such cash assistance shall not be less than Rs. 60, 000. b. Urban areas: A constructed house of minimum 50 sqmts in plinth area or cash assistance in lieu thereof as determined by the concerned State Government under its own resettlement policy or rules, provided that such cash assistance shall not be less than Rs. 1,50,000.	a. This cash assistance in lieu of the provision of alternative house shall be provided to all displaced families without discrimination, including resident owners, occupant land assignees, and long-term lessees. b. This assistance shall be extendable to mixed-use structures fulfilling residential and commercial purposes in owner as well as un-titled categories.
3	**Land for Land**	In the case of irrigation project, as far as possible and in lieu of compensation to be paid for land acquired, each affected family owning agricultural land in the affected area and whose land has been acquired or lost, or who has, as a consequence of the acquisition or loss of land, been reduced to the status of a marginal farmer or landless, shall be allotted, in the name of each person included in the records of rights with regard to the affected family, a minimum of one acre of land in the command area of the project for which the land is acquired. Provided that in every project those persons losing land and		This provision is not applicable to the GSHP II project corridors which are linear in nature.

S. No.	Component of Compensation Package in respect of land acquired under RFCT-LARR Act, 2013 and Gujarat Amendment Act, 2016	Eligible Category	Entitlement	Explanatory Remarks
(1)	(2)	(3)	(4)	(5)
		belonging to the Scheduled Castes or the Scheduled Tribes will be provided a land equivalent to land acquired or two and a one half acres, which is lower. (*Item 2 of Second Schedule-RFCT-LARR Act, 2013*)		
4	**Offer for Developed Land**	In case the land is acquired for urbanisation purposes, twenty per cent of the developed land will be reserved and offered to land owning project affected families, in proportion to the area of their land acquired and at a price equal to the cost of acquisition and the cost of development: Provided that in case the land owning project affected family wishes to avail of this offer, an equivalent amount will be deducted from the land acquisition compensation package payable to it. (*Item 3 of Second Schedule-RFCT-LARR Act, 2013*)		This provision is not applicable to the GSHP II road projects; however this provision may apply in case if project involving land developments are undertaken by R&BD in future.
5	**Choice of Annuity of Employment**	Affected families defined u/s 3 (c) of RFCTLAR&R Act 2013.	The appropriate Government shall ensure that the affected families are provided with the following options: a. Where jobs are created through the project, after providing suitable training and **skill development** in the required field, make provision of employment at a rate not lower than the minimum wages provided for in any other law for the time being in force, to at least one member per affected family in the project or arrange for a job in such other project as may be required; or b. onetime payment of five lakhs rupees per affected family; or c. Annuity policies that shall pay not less than two thousand rupees per month per family for twenty years, with appropriate indexation to the Consumer Price Index for agricultural labourers.	Suitable provisions will be made and disclosed in line with the extent Law/Rules as obtaining in the concerned Govt. at the time of acquisition.
6	**Subsistence grant for**	Each affected family (losing	a. Subsistence allowance	**The affected family will have the**

S. No.	Component of Compensation Package in respect of land acquired under RFCT-LARR Act, 2013 and Gujarat Amendment Act, 2016	Eligible Category	Entitlement	Explanatory Remarks
(1)	(2)	(3)	(4)	(5)
	displaced families for a period of one year.	residential or commercial structures) defined u/s 3 of RFCTLARR, Act 2013, displaced by the project.	equivalent to **three thousand rupees** per month for a period of one year. b. In addition to this amount, the Scheduled Castes and the Scheduled Tribes displaced from scheduled areas shall receive an amount of Rs. 50,000 on onetime basis.	**option to opt for onetime payment of subsistence allowance payable over a year.** **In case of displacement from the Scheduled Areas, as far as possible, the affected families shall be relocated in a similar ecological zone, so as to preserve the economic opportunities language, culture and community life of the tribal communities.** **One time subsistence allowance of Rs. 50,000 will be provided to the displaced squatters, provided that they are below poverty line and women headed households or without an assured source of income, or if their livelihood is lost due to displacement.**
7	**Transportation cost for displaced families**	**Each displaced family defined in u/s 3 of RFCTLARR Act, 2013**	One-time financial assistance of Rs. 50000/- as transportation cost for shifting of the family, building materials, belongings and cattle.	All displaced families will receive three months advance notice to vacate.
8	**Each affected Cattle Shed or Petty shop**	**Each displaced family (defined in u/s 3 of RFCTLARR Act, 2013) having cattle shed or petting shop**	One-time financial assistance of such amount as the appropriate Government may, by notification, specify subject to a minimum of Rs, **25000/-** for construction of cattle shed or petty shop as the case may be.	Small shops will include commercial kiosks, venders where business is carried out. Kiosks and vendors receiving this cash assistance under the small shop category shall not be entitled to any other rehabilitation assistance under second schedule. Cattle shed shall mean any permanent, semi-permanent structure or makeshift shed erected on long term basis for keeping cattle.
9	**One-time grant to artisan, small traders and certain others**	**Each displaced family of an artisan, small trader or self-employed person or an affected family which owned non-agricultural land or commercial, industrial or institutional structure in the affected area, and which has been involuntarily displaced from the affected area due to land acquisition.**	One-time financial assistance of such amount as the appropriate Government may, by notification, specify subject to a minimum of Rs. 25,000/-.	The affected families eligible for this assistance may be from title holder or non-title holder categories as defined u/s 3 © of RFCT-LARR Act, 2013 The actual person losing income in this category shall be eligible for this category shall be eligible for this financial assistance without discrimination on the basis of gender.
10	**Fishing rights**	**In cases of irrigation or hydel projects, the affected families may be allowed fishing rights in the reservoirs, in such manner as may be prescribed by the appropriate Government.**		This provision is not applicable to the GSHP II Road projects.
11	**One-time Resettlement Allowance**	**Each displaced family (defined in u/s 3 of RFCTLARR Act, 2013)**	One-time "Resettlement Allowance" of Rs. 50000/-	a. The affected families eligible for this assistance may be from title holder or non-titleholder categories as defined us/3 c of RFCT-LARR Act, 2013. b. The actual person losing income

S. No.	Component of Compensation Package in respect of land acquired under RFCT-LARR Act, 2013 and Gujarat Amendment Act, 2016	Eligible Category	Entitlement	Explanatory Remarks
(1)	(2)	(3)	(4)	(5)
				in this category shall be eligible for this financial assistance without discrimination on the basis of gender.
12	**Stamp duty and registration fee**	**Each displaced family**	Reimbursement of stamp duty and fees for purchase and registration of alternative property.	Purchase of alternative property including land, residence, or shop to replace the lost and assets in the name of self or and in the name of the spouse within one year from receipt of compensation.
13	**Provisions of Resettlement Sites**	**Groups of affected families relocated by the project in block in resettlement sites established for the purpose**	Appropriate permanent housing with minimum specified floor area at resettlement sites with providing basic services and other provisions as spelt out in the Third Schedule of RFCT-LARR Act, 2013 where resettlement sites are established for the displaced families.	a. This may not be applicable in most cases; however, wherever such an option is planned, R&BD shall include these in the Resettlement Action Plan (RAP) and implement the same. b. The RAP shall spell out services to be provided, key conditions for allowing occupancy and indicators for withdrawal of post-resettlement support once the people are adequately settled.
14	**Loss of community Infrastructure and Common Property Resources**	**Affected communities and groups**	Reconstruction of community structure and common property resources.	The reconstruction of community structures and replacement of common property resources shall be done in consultation with the community.
15	**Mitigation of Temporary Impacts on Lands and Assets**	**Affected owners of land and assets**	Compensation for temporary impact during construction like disruption of normal traffic, damage to adjacent parcel of land/assets due to the movement of heavy machinery and plant sites.	The contractor shall bear the compensation cost of any impact on structure or land due to movement of machinery during construction or establishment of construction plant. All temporary use of lands outside proposed RoW to be through written approval of the landowner and contractor. Location of construction camps by contractors in consultation with R&BD.

Notes to Entitlement Matrix

Note A:

1. Compensation would be determined by Competent Authority as per provisions in RFCT-LARR Act, 2013 section 26, which specifies the following criterion for assessing and determining market value of the land.
    a. The market value, if any, specified in the Indian Stamp Act, 1899 for the registration of sale deeds or agreements to sell, as the case may be in the area where the land is situated or
    b. The average sale price for similar type of land situated in the nearest village or nearest vicinity, ascertained from not less than 50% of the sale deeds registered during three years.

    Whichever is higher.

    The date for determination of market value shall be the date on which the notification has been issued under section 11.

    Explanation 1: The average sale price referred to in clause (b) shall be determined taking into account the sale deeds or the agreements to sell registered for similar type of area in the near village or near vicinity area during immediately preceding three years of the year in which such acquisition of land is proposed to be made.

    Explanation 2: For determining the average sale price referred to in Explanation 1, one half of the total number of sale deeds of the agreements to sell in which the highest sale price has been mentioned shall be taken into account.

    Explanation 3: While determining the market value under this section and the average sale price referred to in Explanation 1 or 2 any price paid as compensation for land acquired under the provisions of this Act on an earlier occasion in the district shall not be taken into consideration.

Explanation 4: While determining the market value under this section and the average sale price referred to in Explanation 1 or 2 any price paid, which in the opinion of the Collector is not indicative of actual prevailing market value may be discounted for the purposes of calculating market value.

2. The market value calculated as per said (1) above shall be multiplied by a factor of one or two based on the distance from urban area as may be notified by the appropriate Government.
3. Where the market value as per 1 or 2 above cannot be determined for the reason that:
   a. The land is situated in such area where the transaction in land are restricted by or under any other law for the time being in force in that area; or
   b. The registered sale deeds or agreements to sell as mentioned in clause (a) of sub-section (1) for similar land are not available for the immediately preceding three years or;
   c. The market value has not been specified under the Indian Stamp Act, 1899 by the appropriate authority.
   d. The State Government concerned shall specify the floor price or minimum price per unit area of the said land based on the price calculated in the manner specified in sub-section (1) irrespective of similar types of land situated in the immediate adjoining areas;
4. In determining the amount of compensation to be awarded for land acquired under RFCT-LARR Act, 2013 the provisions under section 28 of the Act shall be taken into consideration.
5. Those occupying village common lands/abadi lands prior to 1961 shall be eligible to be treated as "regularized land holders" as permitted by law and shall be provided with alternative land or site allowance equivalent to land compensation.
6. In addition to the market value of the land awarded, in every case the competent authority will award an amount at the rate of 12% per annum on such market value for the period commending on and from the publication of the notification u/s 11 till the date of award or the date of taking possession, whichever is earlier.

Note B:

The compensation for houses, buildings and other immovable properties will be determined on the basis of current market value by referring to relevant Schedule of Rates (SoR) as on date without depreciation. While evaluating structure value, services of competent engineer, or any other specialist shall be hired. While considering the SoR, an independent evaluator registered with the Government hired for the purpose will use the latest SoR for the residential and commercial structures in the urban and rural areas of the region, and in consultation with the owners.

Note C:

In case only a part of any land plot is affected and its owner desires that the whole plot be acquired, the competent authority any make additional award as per section 94 of RFCT-LARR Act, 2013 for the remaining part of land without initiating the land acquisition process afresh.

Terms and Definitions

a. Administrator: means an officer appointed for the purpose of rehabilitation and resettlement of affected families under sub-section (1) of section 43;
b. Affected area: means such area as may be notified by the appropriate Government for the purposes of land acquisition;
c. Affected Family: (i) a family whose land or other immovable property has been acquired
   (ii) a family which does not own any land but a member or members of such family may be agricultural labourers, tenants including any form of tenancy of holding of usufruct right, share-croppers or artisans or who may be working in the affected area for three years prior to the acquisition of the land, whose primary source of livelihood stand affected by the acquisition of land;
   (iii) the scheduled tribes and other traditional forest dwellers who have lost any of their forest rights recognised under the scheduled tribes and other traditional forest dwellers (recognition of forest rights) Act 2006 due to acquisition of land;
   (iv) family whose primary source of livelihood for three years prior to the acquisition of the land is dependent on forest or water bodies and includes gatherers of forest produce, hunters, fisher folk and boatmen and such livelihood is affected due to acquisition of land;
   (v) a member of the family who has been assigned land by the State Government of the Central Government under any of its schemes and such land in under acquisition;
   (vi) a family residing on any land in the urban areas for preceding three years or more prior to the acquisition of the land or whose primary source or livelihood for three years prior to the acquisition of the land is affected by the acquisition of such land;
d. Agricultural land means land being used for the purpose of: (i) agriculture or horticulture; (ii) dairy farming, poultry farming, pisciculture, sericulture, seed forming breeding of livestock or nursery growing medicinal herbs; (iii) raising of crops, trees, grass or garden produce; and (iii) land used by an agriculturist for the grazing of cattle, but does not include land used for cutting of wood only;
e. Authority: means the Land Acquisition and Rehabilitation and Resettlement Authority established under section 51;
f. Commissioner: means the Commissioner for Rehabilitation and Resettlement appointed under sub-section (1) of section 44.
g. Cost of acquisition: includes-

(i) Amount of compensation which includes solatium, any enhanced compensation ordered by the Land Acquisition and Rehabilitation and Resettlement Authority or the Court and interest payable thereon and any other amount determined as payable to the affected families by such Authority or court;
(ii) Demurrage to be paid for damages caused to the land and standing crops in the process of acquisition;
(iii) Cost of acquisition of land and building for settlement of displaced or adversely affected families;
(iv) Cost of development of infrastructure and amenities at the resettlement areas;
(v) Cost of rehabilitation and resettlement as determined in accordance with the provisions of this Act;

h. Cut-off Date: The cut-off date for identifying the affected families including land owners, those having title claims recognized under other state and central laws, and squatters/encroachers shall be the date of first land acquisition notification issued under section 11 (1) Notification of RFCT-LARR Act, 2013.
i. Displaced Family: means any family, who on account of acquisition of land has to be relocated and resettled from the affected area to the resettlement area.
j. Family includes a person, his or her spouse, minor children, minor brothers, minor sisters dependent on him: Provided that widows, divorcees and women deserted by families shall be considered separate families. Explanation-An adult of either gender with or without spouse or children or dependents shall be considered as a separate family for the purposes of this Act.
k. Holding of land : means the total land held by a person as an owner, occupant or tenant or otherwise;
l. Infrastructure project: this shall include any one or more of the items specified in clause (b) of sub-section (1) of section 2.
m. Land: includes benefits to arise out of land and things attached to the earth or permanently fastened to anything attached to the earth;
n. Land less: means such persons or class of persons who may be: (i) considered or specified as such under any State law for the time being in force; or (ii) in a case of land less not being specified under sub-clause (i) as my be specified by the appropriate Government.
o. Land owner: includes any person; (i) whose name is recorded as the owner of the land or building or part thereof, in the records of the authority concerned; or (ii) any person who is granted forest rights under the Schedule Tribes and other traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 or under any other law for the time being in force; or (iii) who is entitled to be granted Patta rights on the land under any law of the State including assigned lands; or (iv) any person who has been declared as such by an order of the court or Authority.
p. Government refers to the Government of Gujarat.
q. Land acquisition means acquisition of land under the RFCTLARR Act, 2013 (since 1 Januray 2014) and subsequent amendments of the Act.
r. Marginal farmer means a cultivator with an unirrigated land holding up to one hectare or irrigated land holding up to one-half hectare;
s. Market value: means the value of land determined in accordance with section 26 of new LA & RR Act 2013.
t. Non-Perennial Crop: Any plant species, either grown naturally or through cultivation that lives for a season and perishes with harvesting of its yields has been considered as a non-perennial crop in the project. For example, paddy, sugarcane, groundnut, etc.
u. Notification means a notification published in the Gazette of India, or as the case may be, the Gazette of State and the expression “notify” shall be construed accordingly ;
v. Perennial Crop: Any plant species that live for years and yields its products after a certain age of maturity is a perennial crop. Generally trees, either grown naturally or by horticultural and yield fruits or timber have been considered as perennial crop in the project. For example, tamarind, coconut, mango, etc. are perennial crops.
w. Person interested: means (i) all persons claiming an interest in compensation to be made on account of the acquisition of land under this Act; (ii) the Scheduled Tribes and other traditional forest dwellers, who have lost any forest rights recognised under the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006; (iii) a person interested in an easement affecting the land; (iv) persons having tendancy rights under the relevant State laws including share-croppers by whatever name they may be called; and (v) any person whose primary source of livelihood is likely to be adversely affected;
x. Project Affected Household (PAH): A social unit consisting of a family and/or non-family members living together, and is affected by the project adversely and/or positively.
y. Project Affected Persons (PAPs), any persons who have economic interests or residence within the project impact corridor and who may be adversely affected directly by the project. PAP include those losing commercial or residential structures in whole or part, those losing agricultural land or homestead land in whole or part, and those losing income sources as a result of project action. PAPs would be of two broad categories, ‘PAPs with Major Impact’ and ‘PAPs with Minor Impact’.

Major Impact: those properties where the major part of the structure/land is affected and becomes untenable and the affected party is unable to live/do business in the unaffected portion of the property, OR, 25% or more portion of the property is affected.

Minor Impact: all other impacts other than major impact will be treated as minor impacts, OR, those properties where a part of the structure/land is acquired and the remaining portion is intact and the affected party can continue to live/do business in the unaffected portion of the property.

z. Replacement Cost of the acquired assets and property is the amount required for the affected household to replace/reconstruct the lost assets through purchase in the open market. Replacement cost will be calculated at R&BD current Schedule of Rates without depreciation. Replacement cost shall be in line with the provisos of the Entitlement Matrix of the project.

aa. Resettlement Area: means area where the affected families who have been displaced as a result of land acquisition are resettled by the appropriate Government;

bb. Scheduled Areas: means the Scheduled Areas as defined in section 2 of the Provisions of the Panchayats (extension to the Scheduled Areas) Act, 1996;

cc. Small farmer means a cultivator with an un-irrigated land holding upto two hectares or with an irrigated land holding upto one hectare, but more than the holding of a marginal farmer.

dd. Squatter means a person/family that has settled on the public land without permission or has been occupying public building without authority prior to cut-off date and is depending for his or her shelter or livelihood and has no other source of shelter or livelihood.

ee. Encroacher: A person/family, who transgresses into the public land (prior to the cut of date), adjacent to his/her own land or other immovable assets and derives his/her additional source of shelter/livelihood.

ff. Tenants are those persons having bonafide tenancy agreements, written or unwritten, with a private property owner with clear property titles, to occupy a structure or land for residence, business or other purposes.

gg. Vulnerable Persons: persons who are physically challenged, widows, persons above sixty years of age, below-poverty line households and woman-headed household.

hh. Woman-Headed Household: A household that is headed by a woman who is the major bread-earner of the household. This woman may be a widow, separated or deserted person.

ESGP 18: LOCAL TRAFFIC MANAGEMENT DURING CONSTRUCTION

Brief Description & Scope of Activity

This code relates to making arrangements for maintaining traffic movement along part of the existing carriageway under improvement, rehabilitation, up-gradation and or routine maintenance works or making arrangements for traffic movement along a temporary diversion.

Environmental Health Safety & Social (EHS&S) Issues

EHS&S issues that are anticipated during the activity include the following:

- Fugitive dust emission
- Traffic congestion and incessant traffic snarls
- Traffic induced high noise levels
- Pedestrians and public transport commuters exposed to hazardous conditions/safety risks
- Hazardous conditions for night time traffic movement

If traffic is diverted along newly constructed diversion roads, following additional issues will have to be addressed while selecting the alignment at design/ preparation phase:

- Surrounding land use such as residential area, industrial or commercial areas
- Presence of sensitive receptors such as schools, hospitals, educational institutes, religious sites, prayer halls etc.
- Duration of diversion road in operation and reinstatement of land after dismantling Safe pedestrian and commuter movement

ESGP 19 for prior information and disclosure to the public shall also be referred and construed along with this ESGP

Policy and Legal requirements, if any

There are no policies to be complied during execution of the activity. In an urban area, any change to traffic scheme has to be effected after consultation and approval from city traffic police department. In rural areas, the concerned R&B Dept, office shall be consulted for undertaking such diversions or change to normal traffic scheme. Besides, Clause 112 of MoRT&H specifications and IRC SP 55 2014 govern this activity.

Recommended Environmental Practice/ Management Measures

Traffic Management Plan: Contractor shall be responsible for analysing viable options for local traffic management and a final traffic management plan after having discussions with Traffic Police Department/ local PWD officials or other appropriate stakeholders such as Mandi Board and local community.

The plan shall be assessed from environmental perspective. The plan shall include methods and procedures to be adopted to control: fugitive dust emission, traffic congestion, traffic induced high noise levels, pedestrian & commuter movement, and night-time driving safety. The items that will be required to implement the plan shall be included in the contract price of the intended work and budgeted.

Traffic Police / R&B Dept, Approval: The Contractor as part of his work programme submission to Authority's Engineer, R&B Dept, shall include final traffic management plan. Contractor shall develop the plan based on stakeholder consultations and intended work schedule. The environmental and safety issues referred earlier shall be included in the final plan and methodology for their management shall be presented in detail. Contractor's traffic management plan shall comply with minimum provisions of MoRT&H clause 112. The detailed traffic management plan after review by Authority's Engineer, R&B Dept, shall be submitted to concerned Traffic Police department/ local PWD office, for review and approval. Only after receiving such approval, the work shall start.

Traffic along temporary diversion: In case the traffic needs to be diverted along a temporary diversion, the Contractor will be responsible for: identifying such diversion route alignments; conducting stakeholder consultation; addressing environment, health and safety issues along diversion alignment; propose traffic management plan including recommendation for managing construction stage environmental issues; Plan shall be reviewed and approved by Authority's Engineer, R&B Dept,. The plan shall meet the minimum provisions of Clause 112.3 of MoRT&H Specification.

Traffic Management Plan Implementation: During implementation, the road users shall be informed of traffic plan suitably by placing information/sign boards at appropriate locations as identified in the plan. In case of temporary diversion of traffic off the project area, the plan shall be communicated prior through advertisements in local newspapers and placing sign boards. The sign boards and other devices shall be maintained throughout construction stage or till such required time as per Clause 112.5 of MoRT&H.

Traffic safety and control: The provisions of Clause 112 of MoRT&H shall be included in the intended work scheduled by Contractor. The contractor shall adhere to the provision of Clause 112 of MoRT&H Specification to ensure traffic safety and control in addition to the practices recommended by traffic police/ local PWD office in their approval letter.

Construction Equipments Movement: Whenever construction machinery, equipments and vehicles movement is expected to occur, the following practices shall be adopted to the extent possible:

- Planning the movement during non-peak hours or during clear traffic flow through the road.
- Slow moving equipments and machinery shall be escorted by at least three men at front, rear and side respectively to guide the traffic and driver & the Construction machinery.
- The escorting men shall wave red flags in day time or red lanterns in night to warn the traffic on the road about the movement.

Construction vehicles and lorries: The vehicles such as lorries, vans and other fast moving construction vehicles shall be maintained in good operational condition. Headlamps, turning indicators, parking rights, and other such accessories shall be maintained in operational condition. The drivers of the vehicle shall be trained for traffic safety rules, sober driving and need to maintain cool head at all times.

Vehicle movement if significant in numbers from or to construction site such as debris removal, construction material supply, Hot Mix/RMC delivery etc. shall be preferred during non-peak hours. During peak hours and night time, the vehicle movement shall be guided by red flag/red lantern holding helpers on the road to avoid traffic congestion, if needed.

The entire stretch where traffic is allowed on part of existing carriageway or through temporary diversion, a 7m wide strip (for a 2-lane traffic) shall be maintained free of hawkers, 3- wheeler/taxi or private vehicles parking and any other obstruction to free flow of traffic. In this regard the traffic police/local police help shall be sought.

Special provisions and arrangements shall be provided for public transport commuters in consultation with Public Transport Authorities and local Traffic Police/ Police. In a constricted carriageway, the commuter shall be provided with temporary bus bays and a safe walking strip of at least 0.5 m width off the road edge to avoid accidents. Shifting existing bus stations (stops) to nearest convenient points or providing speed breakers (humps) on either side of bus stops to aid commuters cross the road etc can be some of the measures that can be implemented.

Near residential, commercial and industrial areas where pedestrian movement could be in large numbers, provision for safe movement along constricted carriageway and access to areas/properties shall be planned and provided

References and Recommended further reading

Clause 112 of MoRT&H specifications for road and bridge works, 2013

ESGP 19: PRIOR INFORMATION AND DISCLOSURE TO THE PUBLIC

Brief Description of Activity

This code relates to informing the general public as well as PAPs in advance, about any activity related to road up gradation or maintenance to be undertaken by the contractor so as to minimise inconvenience that may be caused due to the activities to be undertaken

Environmental, Health and Safety (EHS&S) Issues

EHS&S issues that are addressed by prior information and disclosure include:

- Public inconvenience and nuisance
- Reduced damages to public and private property
- Disclosure about R&R activities
- Participation in resettlement planning

Policy and Legal requirements, if any

There is no legal requirement for any prior information or disclosure to local community about any activity under the OPR contract, except for undertaking R&R activities or blasting operations, if required. However, as a good practice and in long term interest of the project, the contractor should undertake the following recommended measures.

Recommended Measures

Any intervention under the OPR contract, for up-gradation or general maintenance works will lead to temporary detouring of the traffic and chances of damages to private property and CPRs. Therefore, it will cause certain level of inconvenience to general public and road users depending on the duration of activities.

The contractor and its team shall therefore, inform the local community about their entry and range of activities they would undertake. The contractor shall also inform the local community about the measure s/he will adopt in order to reduce the inconvenience including presence of his team to ease the traffic. This prior information will also allow the local community in helping the contractor avoid any damages to private property or CPRs. The local community will get time to relocate their assets as well.

In addition, the prior information and disclosure to public in cases of major road work involving more than 2 days of work on site and thus diversion of traffic etc, shall be by way of display of information at

prominent places so that the intended audience gets the information. Also the information about grievance redressal system shall be made to general public and local community along with introducing the team of LO/CRM (refer ESGP 22 for Grievance Management)

In cases other than where emergency services are required, the contractor shall visit the site at least three days in advance and inform the local community about the planned intervention/ maintenance two days later.

ESGP 20: GENERAL WORKMANSHIP

Brief Description of Activity

This code of practice relates to general workmanship that is to be followed during execution of road and bridge works. This practice specifically covers the following works:

- Providing and laying interlocking concrete blocks in footpath and medians
- Providing and fixing chequered tiles in traffic island
- Road markings - Providing and laying hot applied thermoplastic road marking compound for centre/edge line, pedestrians, chevrons, directional arrows etc marking
- Traffic signs and road furniture
- Providing and applying one coat of zinc-rich epoxy primer and coal tar epoxy on cement surfaces
- Providing and applying epoxy Phenolic primer and epoxy Phenolic coating
- Providing and compacting sand in footpath and median
- Landscaping and other vegetation works
- Onsite bitumen Hot Mix/concrete mixing plant operations

Environmental Health Safety & Social (EHS&S) Issues

EHS&S issues could arise during execution of various activities listed above. Some of the issues which need to be considered include the following:

- Good workmanship
- Location of stockpiles of sand and other material
- Removal of excess material
- Health and safety of workers
- Clearing and cleaning work site after work is completed

Policy and Legal requirements, if any

There are no policy or legal requirements to be complied during execution of this practice. The general workmanship expected of and recommended in various clauses of MoRT&H specifications shall however be applicable and specifically the following:

Good Workmanship: Good quality of work as expected/specified in contract documents, concerned MoRT&H specifications etc. shall be achieved in each of the works carried out by the contractor. Good workmanship greatly enhances aesthetic value of the project. Contract Manager or his site incharge shall be responsible to approve completion of activities after field staff achieves minimum required workmanship as specified in project specifications and concerned MoRT&H clauses.

Location of Material Stockpiles: Location of material stockpiles, temporary tents, labour resting areas shall be in such a way that health and safety of workers as well as traffic is not compromised. Stockpiles shall be periodically checked for integrity and any slump towards carriageway shall be corrected immediately. Sand and other fine material stocks shall not be located near drainage channels or drain openings. Stockpiles shall not cause any obstruction to traffic flow or pedestrian/commuter movement. All the activities shall be executed within the time allowed and if delayed for some reasons by more than three months, the stockpiles shall be removed from the site. Contract Manager or his site incharge shall

be responsible for periodically supervising such minor activities at least once in three days and instruct the field staff.

Excess Material: Any excess material or any material that has been brought to site and has not been used shall be removed and disposed off immediately. Materials should be removed, howsoever, small or meagre quantity is left at site. Contract Manager or his site incharge shall thoroughly inspect the project site and get cleared all the excess material found within RoW and outside RoW. The areas where stockpiles were located or any spill on carriageway shall be cleaned by brooming or other appropriate methods. Similarly, while erecting traffic signs, light poles or any other information boards etc, excavated earth from pits shall be stored, collected, transported and disposed as per ESGP 20. If poles are grouted using cement mortar or concrete, practices as per recommended guidelines. Contract Manager or his site incharge shall check each location where poles have been erected for compliance to this measure before approving the work. A layer of sand or other fine earth material on carriageway is a traffic hazard.

The project site shall be taken over by Contract Manager or his site incharge after getting every inch of space cleared and cleaned by field staff. Especially the following works, after completion shall be cleared off all debris and excess material:

- Providing and laying interlocking concrete blocks
- Providing and laying interlocking concrete blocks in footpath and medians
- Providing and fixing chequered tiles in traffic island
- Road markings - Providing and laying hot applied thermoplastic road marking compound for centre/edge line, pedestrians, chevrons, directional arrows etc marking
- Traffic signs and Road furniture
- Providing and applying one coat of zinc-rich epoxy primer and coal tar epoxy on cement surfaces
- Providing and applying epoxy Phenolic primer and epoxy Phenolic coating
- Providing and compacting sand in footpath and median
- Landscaping and vegetation works
- Routine maintenance works involving patchwork or potholes filling on pavement; road embankment strengthening; storm drain cleaning; and shoulder repair and strengthening etc.

Health and Safety of workers: All the activities listed in this ESGP shall be carried out with due care and attention to health and safety of workers. Many of the activities listed under this ESGP may be scheduled for execution after opening new carriageway or infrastructure to traffic. Small segments of road area shall be taken up at a time for execution of various activities. The work area shall be adequately barricaded as per Clause 112.4 of MoRT&H Specification. One experienced worker or supervisor shall be deployed to oversee workers straying outside barricaded region and onto traffic carriageway.

References and Recommended further reading

Specifications for Road and Bridge Works, 5th Revision, MoRT&H, 2013

ESGP 21: ONSITE CONCRETE PREPARATION

Brief Description of Activity

This activity relates to concrete preparation at site either manually or using mechanical mixers which are diesel engine driven and tyre mounted. Scope of this practice covers the procedures to be followed during execution of the activity.

Environmental Health Safety & Social (EHS&S) Issues

EHS&S issues that are anticipated during execution of the activity include the following:

- Noise pollution form mechanical mixers
- Air emission form diesel engine
- Wash water discharge

- Location of material stockpiles
- Spillage of concrete while transport
- Oil, fuel and lubricant leakage
- Impact on soil environment
- Debris and other waste concrete
- Reinstatement of land area used for onsite concrete preparation

Policy and Legal requirements, if any

Air Pollutant Emissions

Air pollutant emissions from non-road construction equipments, engines and vehicles are yet to be regulated and as of now there are no legal or statutory regulations.

Noise Emissions

Under Environment (Protection) Rules, 1986 (*Schedule VI, Part E*) the noise generation standards applicable for construction equipments, machinery and vehicles at the manufacturing stage are presented below:

Noise Limits for Automobiles (Free Field distance at 7.5 metre in dB (A) at the Manufacturing Stage)

Recommended Mitigation Measures

Noise Emission: Noise generation is expected form diesel engine driven mechanical mixers. The following measures shall be practised to the extent possible

- Orientation of mixer in such a way to reduce noise nuisance to nearest sensitive receptor.
- Locating Stockpiles to act as noise barrier
- Operating and maintaining the mixer in good condition to reduce noise generation
- Checking vibration induce noise and rectifying the same
- Operating the engine with factory recommended silencers

Air Emission: Air pollutant emitted from engine driven mechanical mixer is not a significant problem. However in an urban area, it is better to follow good O & M practices. Any dark, thick smoke emitted from engine which is persistent lasting more than 10 seconds in air shall be checked. Fugitive emissions from fuel tank shall be controlled by maintaining leak proof tank and cover.

Wash water discharge: Mechanical mixer will have to be washed with large amount of water after every production cycle is complete. Wash water will have cement and grit in large quantities and hence indiscriminate throwing of the same in nearby areas shall be prohibited. The wash water can be stored in a tank or a pit dug on ground. After about 30-90 minutes of setting, the clear water can be reused for cement preparation, washing, dust control sprinkling or even in curing newly cost concrete members. Throwing wash water on nearby land will form an impermeable layer due to cement content. Repeatedly throwing was water at one location may result in formation of hard, crusty, cement concrete layer, the crusty hard layer shall be removed after the work is complete and disposed off along with other debris.

Location of stockpiles: Stockpiles shall be located without obstructing any public activity in the area. Slumping towards carriageway or drainage channels/nallahs shall be prevented or rectified. Location of stockpiles shall be near to concrete preparation site to prevent material spillage on the way. Other stockpile related problems such as wind-borne and water-borne erosion shall be prevented by following appropriate preventive measures. Cement bags storage and its handling shall not be result in dust generation.

Spillage of Concrete: Concrete shall be prepared close to work site where concrete is to be place to avoid spillage on the way. After the concrete work is completed, any spillage on the way shall be cleaned and cleared.

Oil, Fuel or Lubricant Spill/Leak: In a mechanical mixer, any spill or leak of oil, fuel or lubricant shall be avoided by following good O & M practices. Refuelling diesel engines, applying oil or lubricants to various mechanical parts of the mixer shall be carried out using appropriate tools and equipments. If unavoidable spreading a jute bag or other such cover on the ground below when refuelling or lubricating can prevent spillage onto ground.

Soil Environment: Soil environment especially the topsoi*l environment will be adversely impacted during onsite concrete preparation. The impact can be* significant if manual mixing of concrete or cement mortar is made on ground. Besides stockpile area, wash water disposal on ground, waste concrete or excess concrete/mortar disposal on ground, spillage of concrete, oil, fuel spill etc may also have adverse impacts on top soil environment. These impacts can be mitigated to some extent by following the measures recommended in this ESGP and proper reinstatement of the area after completing all concreting activities at the site.

Debris Disposal: Debris generated from stockpile area, waste/reject concrete/mortar, excess quantity of concrete/mortar, hard crusty soil surface formed due to manual mixing on ground etc. shall be disposed off as debris as per ESGP 8.

Reinstatement: The entire area used for concrete/mortar preparation shall be reinstated to pre- use or pre-construction status. All of the following areas shall be cleared:

- Stockpile area
- Concrete mixer area
- Manual mixing area
- Wash water disposal point, if any

In case of private land being used, a satisfaction certificate will be secured form the landowner upon handing back the land. This certificate as well as photographs of restored land shall be kept as a document of proof and shall be provided to Employer during any inspection.

References and Recommended further reading

Schedule VI, Part E, Environment (Protection) Rules, 1986

ESGP 22: GRIEVANCE MANAGEMENT

Brief Description of Activity

This code relates management of grievances due to any project activity, routine or emergency during the entire project period.

Environmental Health Safety & Social (EHS&S) Issues

EHS&S issues that are encountered by grievance management include:

- Public inconvenience and nuisance due to maintenance activities
- Public grievances due to damages to private property or CPRs
- Grievances due to labour camps and labour interaction with local community
- Grievances due to improper use of contractor's vehicles and construction machinery
- Excessive fugitive dust and noise emission
- Repeated grievances/ residual impacts after mitigation measures taken
- Contamination of local land resources, water bodies etc due to operation of project machinery

Policy and Legal requirements, if any

There is legal requirement for grievance management under the OPR contract. However, a World Bank funded project is required to maintain minimum standards of good practice in social, labour and environmental issues and achieving operational excellence. Grievance management not only helps in

managing issues of potential risks to the project but also helps in maintaining a good relationship with the local community and thus helps in garnering over all support in favour of the project.

The following measures are recommended forest abolishing and managing a good grievance handling mechanism. The contractor shall undertake the following measures.

Grievance Redress Mechanism

The project proposes to establish a Grievance Redress Committee (GRC) to hear the complaints of project affected persons and resolve the same. The process will promote settlement of disputes and reduce litigation. GRC will be set up at the district level with District Collector as head. The following persons will be the members of GRC:

- District Collector or his designated representative of at least the rank of Assistant District Collector (preference would be given to women officers);
- The District Development Officer of the Department of Revenue;
- The Executive Engineer, PIU; and
- Representative from Social Sector/Local NGO (not involved with implementation) /Person conversant with similar issues and he/she should be widely respected and having problem solving skills (to be selected by DM / Collector).

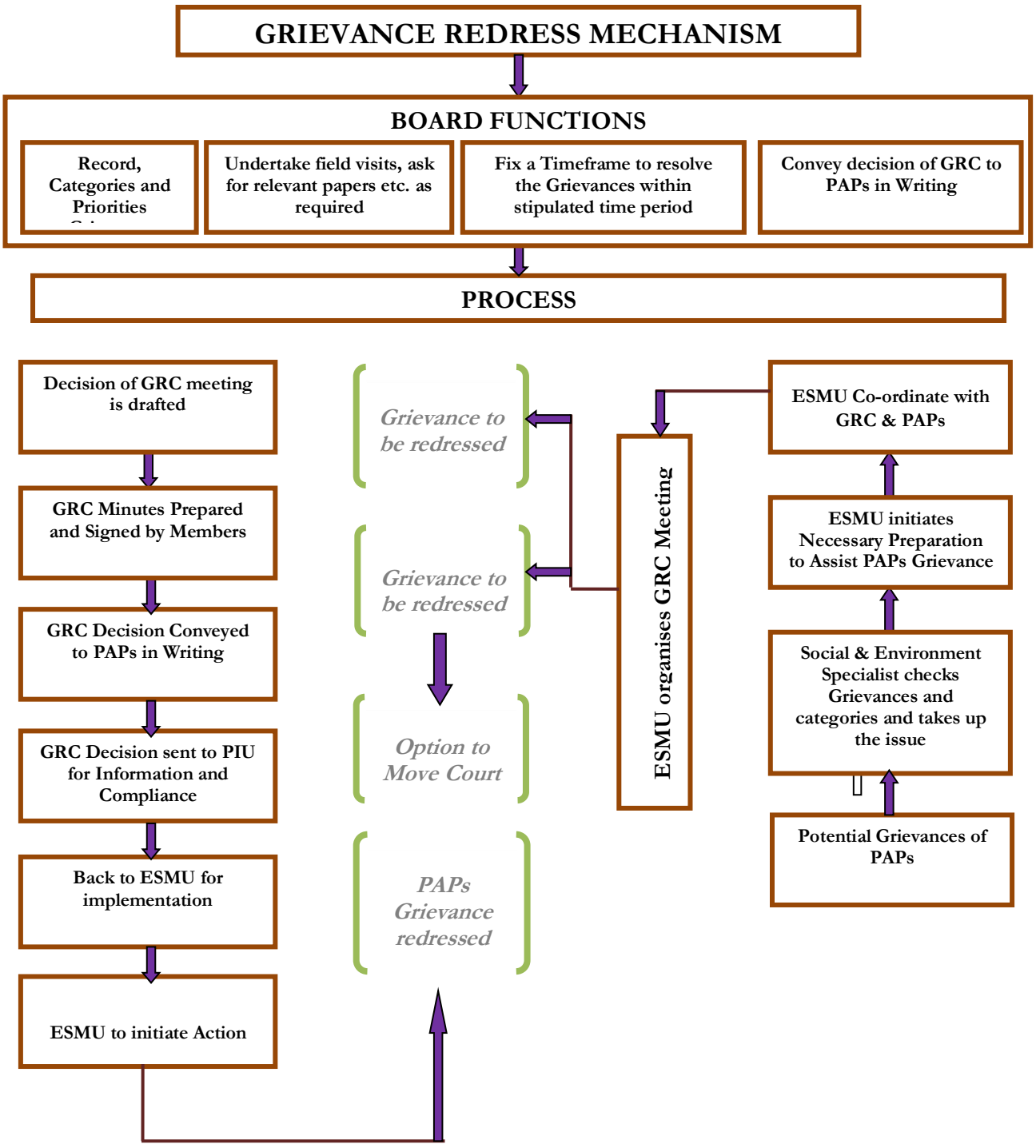
GRC will be responsible for the following:

(i) Support PAPs in resolving issues related to Environment and R&R;
(ii) Record grievance and resolve them within stipulated time; and
(iii) Inform PIU about any serious cases. ESMU will provide all necessary help to PAPs in presenting his/her case before the GRC. The GRC will respond to the grievance within 15 days.

The GRC will normally meet once in a month but may meet more frequently, if the situation so demands. A time period of 45 days will be available for readressing the grievance of EPs. The decision of the GRC will not be binding to PAPs. The PAPs has the option of taking resource to the court of law, is he she so desires. Broad function of GRC as under:

- Record the grievances of PAPs, categorise and prioritize them and provide solution to their grievances related to environment loss and damage.
- The GRC may undertake site visit, ask for relevant information from project authority and other government and non government agencies, etc in order to resolve the grievances of PAPs.
- Fix a time frame within the stipulated time period of 45 days for resolving the grievances.
- Inform PAPs through ESMU about the status of their case and their decision to PAPs for compliance.

The GRC will be constituted within three months by an executive order from GoG from the date of mobilization of Contractor and RAP implementing NGO.



ESGP 23: E&S Regulatory Compliance

Brief Description & Scope

This code relates to systems and procedures that need to be adopted by OPR Contract or to ensure sustained policy and regulatory compliance through the OPR Contract tenure.

Environmental Health Safety &Social (EHS&S) Issues

The issues anticipated during OPR Contract tenure include the following:

- Regulatory compliance in a sustained manner through contract period.
- Negative media coverage upon OPR Contractor's regulatory non-complaint activities.
- Legal ramifications, risks and liabilities to OPR Contractor as well R&B Dept, as an employer.
- Non-governmental organisations, civil society movements and local community groups precipitate issues against OPR Contract or for non-compliance against any policy and regulations.
- People complaining to the World Bank and other State /Central Government Departments against OPR Contractor on regulatory issues.

Policy and Legal requirements, if any

The policy and legal framework applicable on the EPC Project is highlighted below for reference and review. Contractor may do well under take a thorough review of regulations applicable on the project as part of the Environmental Management Framework processes recommended in the Contract.

Policy Framework Relevant to the Project

- National Environment Policy–2006 (Ref : http://moef.gov.in/mef/policy.htm)
- National Conservation Strategy and Policy Statement on Environment and Development, June1992
- Policy Statement for Abatement of Pollution,1992
- National Forest Policy,1988
- Wildlife Conservation Strategy 2002
- National Water Policy, 2002
- Gujarat State Water Policy
- R&R Policy for GSHP II

Regulatory Framework applicable on the Project: Environmental Regulations

- Environment (Protection) Act, 1986
- EIA Notification, 2006 and amendment thereof.
- Air (Prevention & Control of Pollution) Act, 1981
- Water (Prevention & Control of Pollution) Act,1974
- CPCB Notification for National Ambient Air Quality Standards, 18th November 2009
- Noise Pollution (Regulation and Control) Rules, 2000 and subsequent amendments
- The Plastics (Manufacture, Usage and Waste Management) Rules, 2009
- Hazardous and Other Wastes (Management and Trans-boundary Movement) Rules, 2016
- The Batteries (Management and Handling)Rules,2001
- The Solid Waste Management Rules,2016
- Construction and Demolition Waste Management Rule, 2016
- The Manufacture, Storage and import of Hazardous Chemical Rules,1989 & amended 2000
- The Bio-Medical Waste Management Rules,2016
- Fly Ash Notification, January 2015
- Eco-sensitive zones specified in any of the Project or project related foot print are as
- Forest(Conservation)Act,1980anditsamendments;
- Forest(Conservation)Rules,2003anditsamendments;
- Forest (Conservation)Act,1980
- Wildlife(Protection)Act,1972;

- Wildlife(Protection)AmendmentAct,2002;
- TheAncientMonumentsandArchaeologicalSitesandRemainsAct,1958;
- TheMotorVehiclesAct,1988andCentralMotorVehicleRules,1989;

Other guidelines

- EIA Guidance Manual for Highways prepared by Administrative Staff College of India, February 2010
- IRC SP 93-2011: Guidelines on Requirement for EC for Road Projects
- IRC SP 108-2015: Guidelines on EMP
- IS Codes & CPCB Guidelines for monitoring & analysis of air, water, soil etc;
- The World Bank Operational Policies (http://go.worldbank.org/4D2JSWFIW0)

Health and Safety related regulations

- The Factories Act, 1948
- Explosives Act, 1884 and The Explosives Rules, 1983
- The Petroleum Act, 1934
- The Petroleum Rules, 2002
- The Gas Cylinder Rules, 2004.
- The Building and other Construction Workers (Regulation of Employment and Conditions of Service)Act,1996andCentralRules,1998

Social and labour regulations

- The Trade Unions Act,1926
- The Industrial Employment (Standing Orders) Act, 1946 and Rules, 1946
- The Industrial DisputesAct,1947
- The Payment of Wages Act,1936 and Rules,1937
- TheMinimumWagesAct,1948and(Central)Rules,1950
- The Minimum Wages (Gujarat) Rules 1961
- The Payment of Bonus Act, 1965 and Rules, 1975
- The Factories Act, 1948
- The Plantation Labour Act, 1951
- The MinesAct,1952
- The Motor Transport Workers Act,1961
- The Contract Labour (Regulation & Abolition) Act, 1970
- TheInter-StateMigrantWorkmen(RegulationofEmploymentandConditionsof
- Service)Act,1979
- The Interstate Migrant Workers (Gujarat) Rules 1981
- The Shops and Establishments Act
- The Building & Other Construction Workers (Regulation of Employment & Conditions of Service) Act, 1996
- The Gujarat (Amendment) Act, 2015)
- The Maternity Benefit Act, 1961 and amended 2016
- TheEqualRemunerationAct,1976
- The Bonded Labour System (Abolition) Act, 1976
- The Child Labour (Prohibition & Regulation) Act, 1986 & Gujarat Rules 1994
- The Contract Labour (Regulation & Abolition) Act, 1970 & The Contract Labour (P & R)(Gujarat) Rules 1972
- The Workmen's Compensation Act, 1923
- The Employees' State Insurance Act, 1948
- The Employees' Provident Fund & Miscellaneous Provisions Act, 1952
- The Payment of Gratuity Act, 1972
- The Employment of Manual Scavengers and Construction of Dry latrines Prohibition Act, 1993
- The Fatal Accidents Act, 1855

- The Weekly Holiday Act,1942
- The National and Festival Holidays Act
- The Personal Injuries (Emergency) Provisions Act, 1962
- The Personal Injuries (Compensation Insurance) Act, 1963
- The Labour Laws (Exemption from Furnishing Returns and Maintaining Register by Certain Establishments) Act, 1988
- The Public Liability Insurance Act, 1991

The Contractor shall be aware of the following clearances (list is not exhaustive and final) that are specific to the operation of the project network including any subsequent amendments:

- Forest Clearance for felling and branches trimming of trees from RoW of existing roads from the Forest and Environment Department, Government of Gujarat;
- Permission for withdrawal of ground water for construction from Central Ground Water Board, West Central Region (WCR), Ahmadabad;
- Permission for withdrawal of surface water from rivers and canals from Water Resource Department, Government of Gujarat;
- Permission for locating and operating borrow area pits from Local Administration/ Panchayats;
- Installation and operation of Hot Mix plants, Concrete batching plants and Crushers require Consent from Gujarat Pollution Control Board under Water and Air Acts;
- Authorization for Storage, handling, transport and disposal of hazardous materials from Gujarat Pollution Control Board under Hazardous and Other Wastes (Management and Trans-boundary Movement) Rules, 2016;
- Consent for discharge of air/water pollutants from workers camp, DG set installations, equipment and storage yards from Gujarat Pollution Control Board under Air, Water Acts and HWM Rules;
- License for Quarries (in case of opening of new quarries) from Department of Mining, Govt of Gujarat;
- Permission for sand mining from river bed from Department of Mining, Govt of Gujarat;
- Authorization for disposal of bituminous wastes, if any from Gujarat Pollution Control Board under Hazardous and Other Wastes (Management and Trans-boundary Movement) Rules, 2016;
- All Construction vehicles and off-road equipments are to be registered with Regional Transport Office as required under Central Motor Vehicles Act and possess appropriate PUC certificate;
- Traffic Police clearance to divert traffic or change traffic scheme within an urban area; and
- Licenses and certificates as per labour legislations.

List of International conventions and treaties to which India is a signatory given below to this code for reference and review.

- Ramsar Convention on Wetlands of International Importance - Provides the intergovernmental framework for international co-operation for the conservation and wise use of wetland habitat and species.
- Convention Concerning the Protection of the World Cultural and Natural Heritage (Paris, 12 November 1972) - Protect cultural monuments and natural sites within their territory that are recognised to be of such outstanding universal value that safeguarding them concern humanity as a whole.
- Convention on International Trade in Endangered Species in Wild Fauna and Flora (Washington, 3 March 1973) - To ensure, through international co operation, that the international trade in specimens of species of wild fauna and flora does not threaten the conservation status of the species concerned.
- Bonn Convention on the Conservation of Migratory Species of Wild Animals (Bonn, 23 June 1979) - To conserve migratory species by Parties restricting harvests, conserving habitat and controlling other adverse factors. Sustainable utilisation is an implicit goal.
- The International Tropical Timber Agreement (Geneva, 18 November 1983) - To promote the management of tropical forests on a sustainable basis and to provide a framework for co-operation between production and consuming member states in the tropical timber industry.

- International Undertaking on Plant Genetic Resources (Rome, 23 November 1983) as supplemented - To ensure that plant genetic resources are preserved, particularly cultivated varieties of plants, plants or varieties which have been in cultivation in the past, primitive versions of cultivated plants, wild relatives of such plants and certain special genetic stocks and restrict destructive impact of development activities to conserve plant varieties which are threatened with extinction as a result of deforestation (especially in tropical areas) or changes in agricultural practices
- Vienna Convention for the Protection of the Ozone Layer (Vienna, 22 March 1988) and Montreal Protocol on Substances that Deplete the Ozone Layer (Montreal, 16 September 1987) - To protect the ozone layer by taking precautionary measures to control equitably total global emissions of substances that deplete it, with the ultimate objective of their elimination on the basis of developments in scientific knowledge, taking into account technical and economic considerations and bearing in mind the developmental needs of developing countries.
- The Convention concerning Protection against Hazards of Poisoning Arising from Benzene (ILO Convention 136, Geneva, 23 June 1971) (hereafter, Benzene Convention, 1971); It contains 13 substantive articles providing, inter-alia, that whenever harmless or less harmful substitute products are available, ratifying States should use such substitutes instead of benzene.
- The International Convention on Civil Liability for Oil Pollution Damage, Brussels 1969 (CLC) - To portion the liability of oil pollution on the owner of oil tanker.
- The International Convention on the Establishment of an International Fund for Compensation of Oil Pollution Damage, Brussels 1971 (Fund Convention);

Provide for a compensation system in order to ensure full compensation to victims; and (b) to distribute the economic burden between shipping and cargo interests.

Source: http://envfor.nic.in/divisions/iass/eia/Annex3.htm

Recommended Practice /Measures

Policy and Regulatory Review: A scan be inferred from the above list of applicable policies, regulations and guidelines, it is clear that a host of regulations are to be complied in a sustained manner during the EPC contract tenure.

Contractor as part of the EMF processes recommended in the contract shall undertake a review of Policy and Regulatory framework that would be applicable on the project. This review shall be repeated at least once every 6 monthly to re-assess and re-establish the applicable frame work to integrate and take on-board any changes in policy and legal environment in the future. In the interim between wore views, a regulatory register as mentioned below shall be maintained to keep track of applicable regulations.

Regulatory Register: Based on the regulatory review, formulating and maintaining a regulatory register applicable to project will prove useful to Contractor.

The regulatory register should shortlist policies, acts, rule and standards; those are applicable and relevant to the project activities. The register should enlist all required permit sand consents that are required by the Contractor to do project activities and through the contract period and the competent authority details who issue such permit and consents. The register should highlight the periodicity of individual permit sand consents and renewal of same.

The register can be made in a user friendly format with appropriate trigger points for timely renewal of permits and licenses.

The register shall be reviewed and updated at least once in a year either through in-house staff or using external resources. This will help in updating the register to prevailing policy and legal environment and integrate regulatory changes as applicable to the project.

Timely Renewal and Update of Regulatory Documents: As stated above, it is imperative on the part of EPC Contract or to set in systems that will enable him to renew and or update licenses, consents and

permits upon expiry of the current ones. EPC Contract or will be held responsible for all regulatory compliance issues and his performance in this regard will be measured as part of the Environmental Performance Indicator.

Co-ordination with Regulatory Authorities: Contractor shall establish firm relationship and credible contact points at each of the regulatory authority to have a smooth functioning of the project. This co-ordination will help in getting timely updates of any upcoming regulations; clear and unambiguous clarifications on the law provisions; smooth applicatory process including prior knowledge of appropriate supporting document requirements etc. Contractor as part of his routine training and capacity building program of his field staff especially the management staff, can organise and conduct regulatory training sessions to understand the regulations; clearance procedures; penal procedures for contravening the law etc. The key contact personnel in each of the regulatory authorities can be sourced as training faculty in a periodic manner.

References and Recommended further reading:

Most of the regulations and policies are uploaded on the following web links which can be referred and reviewed:

- http://moef.nic.in/index.php; http://cgwb.gov.in/
- http://cpcb.nic.in/# ; http://www.moef.gov.in/mef/regional_offices.pdf

http://go.worldbank.org/4D2JSWFIW0

ESGP 24: Managing the risks of adverse impacts on communities from temporary project induced labor influx.

The guidance note on managing the risks of adverse impacts on communities from temporary project induced labor influx is available at World Bank's web site as public documents. Its electronic is http://pubdocs.worldbank.org/en/497851495202591233/Managing-Risk-of-Adverse-impact-from-project-labor-influx.pdf

Crux of the labour influx management is as below:

The construction period of the corridor is 18 months and the expected skilled and semiskilled labourer would be required for construction of civil works for the project corridor during the construction phase. The source of labour should be preferably from local areas, however skilled labour required for road construction primarily from migrant labours from nearby or outside the state of Gujarat mostly the contractor will deploy the labour from Rajasthan, Madhya Pradesh and Bihar. If labourer would be employed from outside the region, it is necessary to provide better accommodation facilities within the project area. For Project corridor, it is expected and required labour would be 200 to 250 approx. (including local and migrant labourer). This could result in some stress on local disruption in community relations.

Labour camp should be selected and finalised by the contractor according to the guidelines provided in the EMP (ESGP-02) and in prior approval of Authority Engineer to avoid the local disruption in nearby settlements and proximity of sensitive ecosystems.

Discussions and interactions with the industrial unit operators and NGO personnel at the project corridor reveals that more than 40 percent of the migrant workers are 'single-male-migrants'. Most of the workers engage for an average period of 8 months in a year depending upon the seasonal requirement of the employment in cotton & ginning units etc.,

Analysis of labour influx information from previous projects indicates that that most of the labour (around 80 percent) engaged from local source and 20 percent were migrant labour form nearby states Rajasthan, Madhya Pradesh and Bihar. Labour camp facilities were provided for migrant or outstation labourers. Only few women labourers were noticed at the construction site on daily basis and deployed the contractor from local source. Out of total local source, 15 per cent of women labourers were deployed on daily basis by the contractor.

The proposed road development is expected to open up new economic opportunities for women to upgrade their skills and also better accessibility to educational and health facilities. A separate Gender (Development) Action Plan has been developed and propose in the EIA / SIA and RAP documents under GSHP II. This is require to be taken into consideration by the contractor while executing the project.

The following issues related with labour influx are likely to happen during the construction period:

- Conflict amongst workers, and between workers and local community, based on cultural, religious or behavioral practices.
- Displeasure amongst local community on engagement of outsiders.
- Minor epidemics of certain infectious diseases due to interactions between the local and migrant populations. The most common of these are respiratory (TB), vector borne (Malaria, Dengue), water borne (Stomach infections, typhoid) and sexually transmitted diseases (HIV, Syphilis and Hepatitis).
- Security issues to local women from migrant workforce. Influx of labour may worsen the risk of Gender Based Violence in a project area[8]. Women and girls are more commonly affected by gender-based violence due to the lower status of women in many societies, discrimination against them and their higher vulnerabilities to violence. Gender-based violence takes many forms, including sexual, physical, and psychological abuse.
- Use of community facilities such as health centers, temples, transport facility etc. by migrant labour may lead to discontent with local community.
- In case contractors bring in unskilled migrant labour, there stands the risk of exploitation of a laborer. This can happen in the form of hiring young laborers, low and unequal wage payments, forced labour and discrimination on basis of the caste, religion or society.
- Impacts due to cumulative labour at site are mainly stress on local resources, disruption of community relations and movement of laborers.
- The other impacts could be worker utilize the local transport for commuting nearby areas thereby increasing risk of accidents, increased traffic generated by the project etc.,
- There could be increase in stress on medical or recreational facilities prevailing nearby residential areas if appropriate services are not provisioned in the project area.
- Such adverse impacts are usually amplified by local-level low capacity to manage and absorb the incoming labour force, and specifically when civil works are carried out in, or near, vulnerable communities and in other high-risk situations.

A Labour Influx Management Plan addresses specific activities that will be undertaken to minimize the impact on the local community, including elements such as worker codes of conduct, training programs on HIV/AIDS, etc. A workers' Camp Management Plan addresses specific aspects of the establishment

[8] Gender-based violence is an umbrella term for any harmful act that is perpetrated against a person's will, and that is caused by differences in power between people of different genders, i.e., between males and females and people of other gender and sexual identities.

and operation of workers' camps. The detailed study was carried out to understand the prevalence of HIV/AIDS along the project corridor was assessed and prepared a strategic plan for prevention of HIV/AIDS at the project corridor (refer HIV/AIDS Prevention Plan for GSHP II).

Objective of the labour influx management plan is:

i. to demonstrate the potential impacts associated with labour influx on the host population that can be minimized
ii. to provide the safe and healthy working situation and a comfortable environment for migrant laborers and
iii. to ensure compliance with the World Bank guidelines and national labour laws.

Table below provides the labour management plan to assess and manage the risks of adverse impacts on communities that may result from temporary project induced labour influx.

Labour Influx Management Plan

Sl. No.	Category of Impacts	Mitigation Measures	Responsibility
1	Labour influx and stress on local environment	• The contractor shall, wherever possible, locally recruit the • available workforce or priority given for employment of labour, those impacted due to the project. • Project should include a code of conduct relating to the Environment, social health and safety (ESHS) to be signed with the contract document, the Contractor shall be required to implement the agreed code of conduct till the end of contract period. • Contractor shall provide appropriate and requisite on job and ESHS training as necessary including required awareness campaigns and health checkups (Prevention of HIV/AIDS) etc., • No gender discrimination shall be followed by the Contractor with respect to recruitment, wages and benefits. • The Contractor ensure and followed the activities under the national labour and employment laws • A complaint handling mechanism for workers shall be put in place to inform and to raise workplace concerns.	Contractor under the approval of Authority's Engineer
2	Accommodation Facilities at the labour camp	• Guidance note on workers accommodation should be referred (provided in the bid document on Setting up of Construction and Labour camps-ESGP02) • The work force shall be sensitized to the local cultural behaviour, Labour behaviour in the accommodation facilities to be kept in place and strictly enforced.	Contractor under the approval of Authority's Engineer
3	Environment Health and safety/security issues	• All the guidance notes related Environment, health and safety provided in the bid documents should be referred and followed by the Contractor. • The contractor shall put in place the following security measures to ensure the safety of the workers. • Adequate measures will be undertaken to safeguard gender issues in the project area and the labour camp by the contractor (as per Gender Action Plan-GAP)	Contractor under the approval of Authority's Engineer
4	Regular inspection and monitoring of labour camp	• The procedure developed should include regular inspection of the camp sites, maintaining information pertaining to labors sourced by sub-contractors. • Campsite shall be inspected at frequent intervals to ensure that the facilities are well organized and maintained to acceptable and appropriate standards by the contractor.	Contractor under the approval of Authority's Engineer

Such adverse impacts are usually amplified by local-level low capacity to manage and absorb the incoming labour force, and specifically when civil works are carried out in, or near, vulnerable communities and in other high-risk situations.

Crux of the Gender Based Violence (GBV) is as below:

Women working at the construction site and staying in the labour camps may have the following risks:

- Gender Based Violence has physical, sexual, psychological and economic dimensions:
- Physical violence may occur in the workplace, or in the communities around the workplace; particularly in construction, agriculture, textiles and education. It is used to maintain situations of forced labor and to deprive workers of their rights.
- Sexual violence occurs in partner and non-partner situations. Job insecurities and power imbalances may exacerbate the risk of GBV.
- Psychological violence can take the form of threats, harassment, mobbing etc in order to preserve exploitative work environments.
- The roles and characteristics assigned to different genders have not evolved in isolation; they are a product of the complex tapestry of social, cultural, traditional, religious, and spiritual aspects of the societies in which people and communities live. Disadvantage and vulnerability derive from them or are exacerbated by them.

The following recommended actions to address the project induced GBV risk at the construction site and staying in the labour camps in accordance with the Sexual Harassment of Women at the Workplace (Prevention, Prohibition and Redressal) Act, 2013, the following mechanism will be enforced through the code of conduct are:

- Sensitize the important of addressing GBV on the project by setting up of internal complaints committee
- As part of project awareness campaigns shall be informed about GBV and identify the risks
- Identify the corresponding mitigation measures accordingly
- Monitor the mitigation measures and adopt as appropriate
- Provided essential services for survivors
- Report case through CHM/GRM as appropriate, keeping survival information confidential and anonymous

The detailed action plan for implementation of gender issues are provided in the table below.

Gender Action Plan

Activity	Target/Indicators	Responsibility
Pre-Construction Activities		
Ensure that the road design integrate addressing the needs of women, differently abled and children/students	Design standards (including bus stops/bus shelters along with basic amenities such as toilets and water facilities, pedestrian facilities for safe and comfortable movement/crossing) meet the needs of women and physically disabled persons are assessed and reflected in the road design.	Authority
Ensure that GAP is appropriately disseminated to the women community (of migrant and on host community) and include suggestions and views received	Carryout focused consultations with women community (of migrant and host community) shall be framed to gather information on GBV and shall be appropriately included/updated in the gender action plan	Authority, Authority's Engineer and Contractor
	Gather information on (i) number of likely migrant labor (labor influx) in the project site during the pre-construction and construction stages, (ii) distance of proposed labor camps from villages, (iii) absorption capacity of host community, (iv) gender perspective study of safety provisions provided in road design and road-user facilities	
During Construction Activities		
Develop material and conduct awareness campaigns to improve attitude and behaviours and creating	Information on safety measures provided along the road, generate awareness on sexual harassment laws, help line numbers and encourage women to report harassment and	Contractor under the approval of Authority's Engineer

Activity	Target/Indicators	Responsibility
women and disabled friendly environment along the road and at construction/labour camp	encourage to bystanders to assist women and girls along the road and at labour camp included in awareness programs to be aired through information boards.	
Promote appropriate employment opportunities and wages for all gender equally during the project construction and operation period.	Employment opportunities for women with a minimum target of women engagement	Contractor under the approval of Authority's Engineer
Develop and enhance infrastructure design for pedestrian facilities to provide safe and comfortable mobility for women, students and disabled persons	Multipurpose path with sanitation facilities for all genders along with bus shelter and basic amenities including landscape all along the corridor shall be provided by the Contractor according to the design standards	Contractor under the approval of Authority's Engineer
Take measures to curb instances of sexual harassment	Constitution of Internal Complaints Committee - in accordance with the Sexual Harassment of Women at the Workplace (Prevention, Prohibition and Redressal) Act, 2013	Contractor under the approval of Authority's Engineer
	Awareness campaign on Gender issues	

When integrated into contract bid documents, these notes (as given in EMP) shall be read in conjunction with bid documents. The provisions of these notes shall apply mutatis mutandis to the works undertaken by the Contractor under the specified contract.

Appendix 4: Environmental, Social, Health and Safety (ESHS)

Metrics for Progress Reports

Metrics for regular reporting:

a. *environmental incidents or non-compliances with contract requirements, including contamination, pollution or damage to ground or water supplies;*
a. *health and safety incidents, accidents, injuries and all fatalities that require treatment;*
b. *interactions with regulators: identify agency, dates, subjects, outcomes (report the negative if none);*
c. *status of all permits and agreements:*
   i. work permits: number required, number received, actions taken for those not received;
   ii. status of permits and consents:
      - *list areas/facilities with permits required (quarries, asphalt & batch plants), dates of application, dates issued (actions to follow up if not issued), dates submitted to resident engineer (or equivalent), status of area (waiting for permits, working, abandoned without reclamation, decommissioning plan being implemented, etc.);*
      - *list areas with landowner agreements required (borrow and spoil areas, camp sites), dates of agreements, dates submitted to resident engineer (or equivalent);*
      - *identify major activities undertaken in each area in the reporting period and highlights of environmental and social protection (land clearing, boundary marking, topsoil salvage, traffic management, decommissioning planning, decommissioning implementation);*
      - *for quarries: status of relocation and compensation (completed, or details of activities and current status in the reporting period).*
d. *health and safety supervision:*
   i. safety officer: number days worked, number of full inspections & partial inspections, reports to construction/project management;
   ii. number of workers, work hours, metric of PPE use (percentage of workers with full personal protection equipment (PPE), partial, etc.), worker violations observed (by type of violation, PPE or otherwise), warnings given, repeat warnings given, follow-up actions taken (if any);
e. *worker accommodations:*
   i. number of expats housed in accommodations, number of locals;
   ii. date of last inspection, and highlights of inspection including status of accommodations' compliance with national and local law and good practice, including sanitation, space, etc.;
   iii. actions taken to recommend/require improved conditions, or to improve conditions.
f. *HIV/AIDS: provider of health services, information and/or training, location of clinic, number of non-safety disease or illness treatments and diagnoses (no names to be provided);*
g. *gender (for expats and locals separately): number of female workers, percentage of workforce, gender issues raised and dealt with (cross-reference grievances or other sections as needed);*
h. *training:*
   i. number of new workers, number receiving induction training, dates of induction training;

ii. number and dates of toolbox talks, number of workers receiving Occupational Health and Safety (OHS), environmental and social training;
iii. number and dates of HIV/AIDS sensitization and/or training, no. workers receiving training (in the reporting period and in the past); same questions for gender sensitization, flag person training.
iv. number and date of GBV /SEA sensitization and/or training, number of workers receiving training on code of conduct (in the reporting period and in the past), etc.

i. environmental and social supervision:

i. environmentalist: days worked, areas inspected and numbers of inspections of each (road section, work camp, accommodations, quarries, borrow areas, spoil areas, swamps, forest crossings, etc.), highlights of activities/findings (including violations of environmental and/or social best practices, actions taken), reports to environmental and/or social specialist/construction/site management;
ii. sociologist: days worked, number of partial and full site inspections (by area: road section, work camp, accommodations, quarries, borrow areas, spoil areas, clinic, HIV/AIDS center, community centers, etc.), highlights of activities (including violations of environmental and/or social requirements observed, actions taken), reports to environmental and/or social specialist/construction/site management; and
iii. community liaison person(s): days worked (hours community center open), number of people met, highlights of activities (issues raised, etc.), reports to environmental and/or social specialist /construction/site management.

j. Grievances: list new grievances (e.g allegations of GBV / SEA) received in the reporting period and unresolved past grievances by date received, complainant, how received, to whom referred to for action, resolution and date (if completed), data resolution reported to complainant, any required follow-up (Cross-reference other sections as needed):

i. Worker grievances;
ii. Community grievances

k. Traffic and vehicles/equipment:

i. traffic accidents involving project vehicles & equipment: provide date, location, damage, cause, follow-up;
ii. accidents involving non-project vehicles or property (also reported under immediate metrics): provide date, location, damage, cause, follow-up;
iii. overall condition of vehicles/equipment (subjective judgment by environmentalist); non-routine repairs and maintenance needed to improve safety and/or environmental performance (to control smoke, etc.).

l. Environmental mitigations and issues (what has been done):

i. dust: number of working bowsers, number of waterings/day, number of complaints, warnings given by environmentalist, actions taken to resolve; highlights of quarry dust control (covers, sprays, operational status); % of rock/ spoil lorries with covers, actions taken for uncovered vehicles;

ii. erosion control: controls implemented by location, status of water crossings, environmentalist inspections and results, actions taken to resolve issues, emergency repairs needed to control erosion/sedimentation;
iii. quarries, borrow areas, spoil areas, asphalt plants, batch plants: identify major activities undertaken *in the reporting period* at each, and highlights of environmental and social protection: land clearing, boundary marking, topsoil salvage, traffic management, decommissioning planning, decommissioning implementation;
iv. blasting: number of blasts (and locations), status of implementation of blasting plan (including notices, evacuations, etc.), incidents of off-site damage or complaints (cross-reference other sections as needed);
v. spill cleanups, if any: material spilled, location, amount, actions taken, material disposal (report all spills that result in water or soil contamination;
vi. waste management: types and quantities generated and managed, including amount taken offsite (and by whom) or reused/recycled/disposed on-site;
vii. details of tree plantings and other mitigations required undertaken *in the reporting period*;
viii. details of water and swamp protection mitigations required undertaken *in the reporting period*.

m. compliance:

i. compliance status for conditions of all relevant consents/permits, for the Work, including quarries, etc.): statement of compliance or listing of issues and actions taken (or to be taken) to reach compliance;
ii. compliance status of C-ESMP/ESIP requirements: statement of compliance or listing of issues and actions taken (or to be taken) to reach compliance
iii. compliance status of GBV/SEA prevention and response action plan: statement of compliance or listing of issues and actions taken (or to be taken) to reach compliance
iv. compliance status of Health and Safety Management Plan re: statement of compliance or listing of issues and actions taken (or to be taken) to reach compliance
v. other unresolved issues from previous reporting periods related to environmental and social: continued violations, continued failure of equipment, continued lack of vehicle covers, spills not dealt with, continued compensation or blasting issues, etc. Cross-reference other sections as needed.

Appendix 5

Environmental Protection Clause
And
Compliance with Labour (Laws) Regulations / ESHS Code of Conduct/ Clauses To be Integrated into Contract Bid Documents

ENVIRONMENTAL MANAGEMENT PLAN (EMP)

GSHP has prepared an Environmental Management Plan to be implemented to mitigate any possible environmental impact due to the implementation of the project.

GSHP would like the contractor to prepare a detailed schedule for implementation of the recommendations in EMP report and implement the same during execution of the project.

The Contractor shall implement the Environmental Management Plan and its attachment specified below as part of his Work.

The Environmental Management Plan (EMP) forms part of the Bid Document. The aspects given in EMP are mandatory in nature and thus, the Contractor is contractually bound to abide by the same.

It is deemed that the costs associated with carrying out the requirements of the EMP are, unless separate items are included in the quoted bid price, incidental to the works. No excuse towards non-compliance during construction shall therefore be entertained. All these clauses are applicable to the sub-contractors as well. However, the main Contractor shall be held responsible in case of any non-compliance on part his sub-contractors. The Engineer and the Authority shall regularly monitor the compliance of EMP by the Contractor. The Contractor shall regularly monitor the compliance of EMP by themselves and / or by their Sub-contractors. The Contractor shall submit Monthly, Quartely and additional environmental reports in the format prescribed/desired by the Engineer / Authority. The Contractor shall implement all mitigation measures for which responsibility is assigned to him as stipulated in the EMP. Any lapse in implementing the same shall attract penalties.

The Contractor shall take all reasonable steps to protect the environment on and off the site; and to avoid damage or nuisance to persons or to property of the public or others including any living entity resulting from pollution, noise or any other causes arising as a consequence of his methods of execution.

The Contractor shall follow the Environmental Management Plan as specified. The Engineer shall maintain record of compliance or non-compliance of Environmental Management Plan. On observing any non-compliance, the Engineer shall issue a notice to the Contractor, to rectify the same. **In case of any failure to rectify the non-compliance within the specified / stipulated timeframe in implementing the EMP, the Contractor shall be liable for the penalties as mentioned below:**

1. All lapses in obtaining clearances / permissions under statutory regulations and violations of any regulations including eco-sensitive areas shall be treated as a **major lapse**.
2. Any complaints of public, within the scope of the Contractor, formally registered with the Authority's Engineer, Authority or with the GoG and communicated to the Contractor, which is not properly

addressed within the time period intimated by the Authority's Engineer / Authority shall be treated as a **major lapse**.

3. Non-conformity to any of the mitigation measures stipulated in the EMP (other than stated above) shall be considered as a **minor lapse**.
4. On observing any lapses (i.e. major & minor), the Authority's Engineer shall issue a notice to the Contractor, to rectify the same.
5. Any minor lapse, which is not rectified and/or complied within fifteen days from the notice issued by the Authority's Engineer, shall be treated as a **major lapse**.
6. If a major lapse is not rectified upon receiving the notice the Authority's Engineer shall invoke deduction, in the subsequent Interim Payment Certificate.
7. **For major lapses**, 0.15% of the Contract Price shall be withheld for each notified lapse.
8. If the lapse is not rectified within one month after withholding the payment, **the amount withheld shall be forfeited**. Aggregate forfeited amount shall not exceed 3% of the Contract Price.

The Contractor achieving the compliance to EMP will be appreciated through:

a) Certificate of appreciation from Authority / R&BD-GoG with regard to compliance to EMP provisions;
b) The Contractors' environmental performance will be disclosed in the GSHP-II website for their compliance in achieving the EMP.

Compliance with Labour Regulations:

During continuance of the contract, the Contractor and his sub-contractors shall abide at all times by all existing labour enactments and rules made thereunder, regulations, notifications and bye laws of the State or Central Government or local authority and any other labour law (including rules), regulations, bye laws that may be passed or notification that may be issued under any labour law in future either by the State or the Central Government or the local authority. Salient features of some of the major labour laws that are applicable to construction industry are given below. The Contractor shall keep the Authority indemnified in case any action is taken against the Authority by the competent authority on account of contravention of any of the provisions of any Act or rules made thereunder, regulations or notifications including amendments. If the Authority is caused to pay or reimburse, such amounts as may be necessary to cause or observe, or for non-observance of the provisions stipulated in the notifications/bye laws/Acts/ Rules/regulations including amendments, if any, on the part of the Contractor, the Authority's Engineer/Authority shall have the right to deduct any money due to the Contractor including his amount of performance security. The Authority/Authority's Engineer shall also have right to recover from the Contractor any sum required or estimated to be required for making good the loss or damage suffered by the Authority.

The employees of the Contractor and the Sub-Contractor in no case shall be treated as the employees of the Authority at any point of time.

Salient features of some of the major laws that are applicable are given below. The list is illustrative and not exhaustive. Bidders and Contractors are responsible for checking the correctness and completeness of the list. The law as current on the date of bid opening will apply.

(a) Employees Compensation Act 1923: The Act provides for compensation in case of injury, disease or death arising out of and during the course of employment.

(b) Payment of Gratuity Act 1972: gratuity is payable to an employee under the Act on satisfaction of certain conditions on separation if an employee has completed 5 years' service or more or on death at the rate of 15 days wages for every completed year of service. The Act is applicable to all establishments employing 10 or more employees.

(c) Employees P.F. and Miscellaneous Provision Act 1952 (since amended): The Act provides for monthly contribution by the Authority plus workers @ 10% or 8.33%. The benefits payable under the Act are:
   (i) Pension or family pension on retirement or death, as the case may be.
   (ii) Deposit linked insurance on the death in harness of the worker.
   (iii) Payment of P.F. accumulation on retirement/death etc.

(d) Maternity Benefit Act 1961: The Act provides for leave and some other benefits to women employees in case of confinement or miscarriage etc.

(e) Sexual Harassment of Women at the Workplace (Prevention, Prohibition and Redressal) Act, 2013: This Act defines sexual harassment in the workplace, provides for an enquiry procedure in case of complaints and mandates the setting up of an Internal Complaints Committee or a Local Complaints Committee

(f) Contract Labour (Regulation & Abolition) Act 1970: The Act provides for certain welfare measures to be provided by the Contractor to contract labour and in case the Contractor fails to provide, the same are required to be provided, by the Principal Authority by law. The Principal Authority is required to take Certificate of Registration and the Contractor is required to take license from the designated Officer. The Act is applicable to the establishments or Contractor of Principal Authority if they employ 20 or more contract labour.

(g) Minimum Wages Act 1948: The Authority is supposed to pay not less than the Minimum Wages fixed by appropriate Government as per provisions of the Act if the employment is a scheduled employment. Construction of Buildings, Roads, Runways are scheduled employments.

(h) Payment of Wages Act 1936: It lays down the mode, manner and by what date the wages are to be paid, what deductions can be made from the wages of the workers.

(i) Equal Remuneration Act 1976: The Act provides for payment of equal wages for work of equal nature to male and female workers and for not making discrimination against Female employees in the matters of transfers, training and promotions etc.

(j) Payment of Bonus Act 1965: The Act is applicable to all establishments employing 20 or more employees. Some of the State Governments have reduced this requirement from 20 to 10. The Act provides for payments of annual bonus subject to a minimum of 8.33% of the wages drawn in the relevant year. It applies to skilled or unskilled manual, supervisory, managerial, administrative, technical or clerical work for hire or reward to employees who draw a salary of Rs. 10,000/- per month or less. To be eligible for bonus, the employee should have worked in the establishment for not less than 30 working days in the relevant year. The Act does not apply to certain establishments.

(k) Industrial Disputes Act 1947: the Act lays down the machinery and procedure for resolution of Industrial disputes, in what situations, a strike or lock-out becomes illegal and what are the requirements for laying off or retrenching the employees or closing down the establishment.

(l) Trade Unions Act 1926: The Act lays down the procedure for registration of trade unions of workmen and Authoritys. The Trade Unions registered under the Act have been given certain immunities from civil and criminal liabilities.

(m) Child Labour (Prohibition & Regulation) Act 1986: The Act prohibits employment of children below 14 years of age in certain occupations and processes and provides for regulation of employment of children in all other occupations and processes. Employment of Child Labour is prohibited in the Building and Construction Industry.

(n) Inter-State Migrant workmen's (Regulation of Employment & Conditions of Service) Act 1979: The Act is applicable to an establishment which employs 5 or more inter-state migrant workmen through an intermediary (who has recruited workmen in one state for employment in the establishment situated in another state). The Inter-State migrant workmen, in an establishment to which this Act becomes applicable, are required to be provided certain facilities such as housing, medical aid, traveling expenses from home upto the establishment and back, etc.

(o) The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act 1996 and the Building and Other Construction Workers Welfare Cess Act, 1996 (BOCWW Cess Act): All the establishments who carry on any building or other construction work and employ 10 or more workers are covered under these Acts. All such establishments are required to pay cess at the rate not exceeding 2% of the cost of construction as may be notified by the Government. The Authority of the establishment is required to provide safety measures at the building or construction work and other welfare measures, such as Canteens, First – Aid facilities, Ambulance, Housing accommodations for workers near the work place etc. The Authority to whom the Act applies has to obtain a registration certificate from the Registering Officer appointed by the Government.

(p) Factories Act 1948: the Act lays down the procedure for approval of plans before setting up a factory engaged in manufacturing processes, health and safety provisions, welfare provisions, working hours, annual earned leave and rendering information regarding accidents or dangerous occurrences to designated authorities. It is applicable to premises employing 10 persons or more with aid of power or 20 or more persons without the aid of power.

(q) Weekly Holidays Act -1942

(r) Bonded Labour System (Abolition) Act, 1976: The Act provides for the abolition of bonded labour system with a view to preventing the economic and physical exploitation of weaker sections of society. Bonded labour covers all forms of forced labour, including that arising out of a loan, debt or advance.

(s) Employer's Liability Act, 1938: This Act protects workmen who bring suits for damages against Authoritys in case of injuries endured in the course of employment. Such injuries could be on account of negligence on the part of the Authority or persons employed by them in maintenance of all machinery, equipment etc. in healthy and sound condition.

(t) Employees State Insurance Act 1948: The Act provides for certain benefits to insured employees and their families in case of sickness, maternity and disablement arising out of an employment injury. The Act applies to all employees in factories (as defined) or establishments which may be so notified by the appropriate Government. The Act provides for the setting up of an Employees' State Insurance Fund, which is to be administered by the Employees State Insurance Corporation. Contributions to the Fund are paid by the Authority and the employee at rates as prescribed by

the Central Government. The Act also provides for benefits to dependents of insured persons in case of death as a result of an employment injury.

(u) The Personal Injuries (Compensation Insurance) Act, 1963: This Act provides for the Authority's liability and responsibility to pay compensation to employees where workmen sustain personal injuries in the course of employment.

(v) Industrial Employment (Standing Order) Act 1946: It is applicable to all establishments employing 100 or more workmen (employment size reduced by some of the States and Central Government to 50). The Act provides for laying down rules governing the conditions of employment by the Authority on matters provided in the Act and get the same certified by the designated Authority.

Environmental, Social, Health and Safety (ESHS) Code of Conduct:

The Contractor shall submit the following additional documents:

1) **Code of Conduct (ESHS)** - The Contractor shall submit its Code of Conduct that will apply to its employees and subcontractors, to ensure compliance with Environmental, Social, Health and Safety (ESHS) obligations under the contract. It should cover comprehensively all required details, complete in all respects and include the risks to be addressed by the Code in accordance with Section VII, e.g. Risks associated with: labour influx, spread of communicable diseases, sexual harassment, gender based violence, illicit behaviour and crime, and maintaining a safe environment etc.

   In addition, the Contractor shall detail how this Code of Conduct shall be implemented. This shall include: how it will be introduced in the conditions of employment/engagement, what type and kind of training will be provided, how it will be monitored and how the Contractor proposes to deal with any breaches. The Contractor shall be required to implement the agreed Code of Conduct till end of contract period.

2) **Management Strategies and Implementation Plans (MSIP)** - The Contractor shall submit Management Strategies and Implementation Plans (MSIP) to manage the following key Environmental, Social, Health and Safety (ESHS) risks.
   - Traffic Management Plan to ensure safety of local communities from construction traffic.
   - Water Resource Protection Plan to prevent contamination of drinking water;
   - HIV Prevention Plan;
   - Boundary Marking and Protection Strategy for mobilization and construction to prevent offsite adverse impacts;
   - Strategy for obtaining Consents/Permits prior to start of relevant works such as opening a quarry or borrow pit.
   - Gender based violence and sexual exploitation and abuse (GBV/SEA) prevention and response action plan (RAP).

The Contractor shall be required to submit for the Authority's Engineer approval and subsequently implement the Contractor's Environment and Social Management Plan (C-ESMP) in accordance with Section VII that includes the agreed Management Strategies and Implementation Plans described herein under.

The extent and scope of these requirements should reflect the significant ESHS risks or requirements set out in Section VII as advised by the Environmental / Social Specialist(s). The key risks to be addressed by

the Contractor should be identified by Environmental / Social Specialist(s), for example, from the Environmental and Social Impact Assessment (ESIA), Environmental and Social Management Plan (ESMP), Resettlement Action Plan (RAP), and/or Consent Conditions (regulatory authority conditions attached to any permits or approvals for the project), up to a maximum of four. The risks may arise during mobilization, construction, or maintenance services and may include construction traffic impacts on the community, pollution of drinking water, depositing on private land and impacts on rare species etc. The management strategies and/or implementation plans to address these could include, as appropriate: mobilization strategy, strategy for obtaining consents / permits, traffic management plan, water resource protection plan, bio-diversity protection plan and a strategy for marking and respecting work site boundaries etc.

Environmental, Social, Health and Safety requirements:

Environmental Social Health and Safety (ESHS) Policy of GSHP

GSHP endeavours to set an example on Environmental Social Health and Safety (ESHS) requirements in the Government Sector of Gujarat by ensuring the highest degree of compliance and management measures. GSHP aims to comply with all the relevant legislation and adhere to the principles of ESHS requirements as per international norms and laws. The ESHS policy of GSHP can be broadly classified into Environmental Policy, Social Policy and Health & Safety Policy.

Environment Policy

GSHP is committed to protecting the environment and in conducting all the road development works in a safe and responsible manner. GSHP recognizes and accepts its responsibility in ensuring sustainable development along with awareness of the environmental, economic and social needs and expectations of stakeholders. This commitment is embodied in the following statements of the environmental policy which would be adhered to and acted upon throughout the life of the project.

- Apply good international industry practice to protect and conserve the natural environment and to minimize unavoidable impacts
- Integrate good environmental practices, social equity and economic viability into the road development works.
- Provide staff with the resources to make environmentally sound decisions.
- Assess the potential environmental impacts of all the activities and propose mitigation, where appropriate.
- Conduct the work in a manner intended to prevent pollution, conserve resources and deal responsibly with all environmental issues.
- Protect the air, water and land in the project area by minimizing pollution and by preventing erosion and run-off in the course of development of the roads.
- Use appropriate technology for the conservation of energy.
- Minimise the use of non-sustainable natural resources.
- Conserve resources by employing 3R methods and resort to sustainable management of natural resources.
- Ensure preparedness with an effective emergency response program.

- Promote innovative thinking in the development and implementation of new ideas relating to the environmental integrity.
- Measure the environmental performance using comprehensive audits.
- Establish environmental targets and objectives to improve the performance.

Social Policy

GSHP is committed to conducting its works in a manner that respects the environment, culture and customs of the people involved in the project as well as the local communities within the area of direct influence of the project. The commitments are based on the following principles:

- Conduct all activities with high standards for personal integrity and ethical behaviour.
- Protect the health and safety of local communities and users, with particular concern for those who are disabled, elderly, or otherwise vulnerable.
- The terms of employment and working conditions of all workers engaged in the road work meet the requirements of the ILO labour conventions
- Intolerant of illegal activities and enforce disciplinary measures for any such activity.
- Intolerant of Gender Based Violence (GBV), inhumane treatment, sexual activity with children, sexual exploitation and abuse (SEA), etc. and enforce disciplinary measures for such activities
- Intolerant of bias in terms of gender, state of domicile, social status, vulnerable people (including those with disabilities) etc. and enforce disciplinary measures for such activities
- Intolerant of child labour where *the term "child" / "children" means any person(s) under the age of 18 years* and enforce disciplinary measures if child labour is employed.
- Incorporate gender perspective in all aspects of the project and provide an enabling environment where women and men have equal opportunity to participate in, and benefit from, planning and development of the project
- Ensure total absence of discrimination of any type such as caste, religion, language, regional or any other discriminatory
- Work co-operatively, including with end users of the road development project, relevant authorities, contractors and local communities
- Engage with and listen to affected persons and organisations and be responsive to their concerns, with special regard for vulnerable, disabled, and elderly people
- Provide an environment that fosters the exchange of information, views, and ideas that is free of any fear of retaliation, and protects whistleblowers
- Minimise the risk of HIV transmission and to mitigate the effects of HIV/AIDS associated with the execution of the Works;
- Respect the beliefs and values of local communities.
- Respect the commitments in international labour and human rights conventions.
- Maintain clearly defined and open lines of communications with affected communities, residents, or other stakeholders throughout the life of the project
- Communicate expectations regarding community relations to all our employees and contractors.

Health and Safety Policy

The health and safety of each and every employee involved in the project including staff and labour (contractor, consultant or GSHP) is of primary importance. GSHP is committed to maintaining a safe and

conducive working environment. Necessary safeguards, programs, and equipment required to reduce the potential for incidents and injuries would be insisted upon for all the projects. An accident-free workplace and excellence in health and safety are proposed through the following practices.

- Conduct the works in a manner that protects the health and safety of the employees, the public and the surrounding communities.
- Require employees from all levels of the project implementation to participate in the Health and Safety Program and both individually and collectively take responsibility to work safely.
- Provide the employees with the required job-related training and safety-related education.
- Seek compliance with all applicable legal and regulatory requirements.
- Investigate incidents and accidents to determine root cause.
- Employ regular audits to enhance successful accident prevention programs as well as to identify, if possible, areas for further improvement.
- Implement measures to minimize or eliminate all identified hazards in all activities related to the works.
- Maintain safety statistics for both employees and contractors to track improvement.
- Periodically review the overall Health and Safety measures to ensure its on-going effectiveness.
- Ensure all workers, whether contractors or employees, are aware of their right to refuse work that they determine to be unsafe.
- Inform employees and contractors of potential safety hazards on a continual basis.
- Encourage all workers to report immediately and, where appropriate, remediate any unsafe work conditions or activities.
- Openly communicate hazards and emergency response plans throughout the project personnel and to affected communities and other stakeholders.
- Conduct general safety meetings and job-specific safety meetings as required.

Code of Conduct

The Bidder shall submit the Code of Conduct that will apply to the Contractor's employees and subcontractors as required by ITB 11.2 (h) of the Bid Data Sheet. The Code of Conduct shall ensure compliance with the ESHS provisions of the contract, including those as may be more fully described in the Works Requirements in Section VII. A sample code of conduct which is the minimum required by the successful bidder is given in Annexure II

In addition, the Bidder shall submit an outline of how this Code of Conduct will be implemented. This will include: how it will be introduced into conditions of employment/engagement, what training will be provided, how it will be monitored and how the Contractor proposes to deal with any breaches.

A satisfactory code of conduct will contain obligations on all Contractor's personnel (including sub-contractors and day workers) that are suitable to address the following issues, as a minimum. Additional obligations may be added to respond to particular concerns of the region, the location and the project sector or to specific project requirements. The code of conduct shall contain a statement that the term "child" / "children" means any person(s) under the age of 18 years.

The issues to be addressed include:

1. Compliance with applicable laws, rules, and regulations

2. Compliance with applicable health and safety requirements to protect the local community (including vulnerable and disadvantaged groups), the Authority's and Authority Engineer's personnel, and the Contractor's personnel, including sub-contractors and day workers, (including wearing prescribed personal protective equipment, preventing avoidable accidents and a duty to report conditions or practices that pose a safety hazard or threaten the environment)
3. The use of illegal substances
4. Non-Discrimination in dealing with the local community (including vulnerable and disadvantaged groups), the Authority's and Authority Engineer's personnel, and the Contractor's personnel, including sub-contractors and day workers (for example on the basis of family status, ethnicity, race, gender, religion, language, marital status, age, disability (physical and mental), sexual orientation, gender identity, political conviction or social, civic, or health status)
5. Interactions with the local community(ies), members of the local community (ies), and any affected person(s) (for example to convey an attitude of respect, including to their culture and traditions)
6. Sexual harassment (for example to prohibit use of language or behavior, in particular towards women and/or children, that is inappropriate, harassing, abusive, sexually provocative, demeaning or culturally inappropriate)
7. Violence including sexual and/or gender based violence (for example acts that inflict physical, mental or sexual harm or suffering, threats of such acts, coercion, and deprivation of liberty
8. Exploitation including sexual exploitation and abuse (for example the prohibition of the exchange of money, employment, goods, or services for sex, including sexual favors or other forms of humiliating, degrading behavior, exploitative behavior or abuse of power)
9. Protection of children (including prohibitions against sexual activity or abuse, or otherwise unacceptable behavior towards children, limiting interactions with children, and ensuring their safety in project areas)
10. Sanitation requirements (for example, to ensure workers use specified sanitary facilities provided by their Authority and not open areas)
11. Avoidance of conflicts of interest (such that benefits, contracts, or employment, or any sort of preferential treatment or favors, are not provided to any person with whom there is a financial, family, or personal connection)
12. Respecting reasonable work instructions (including regarding environmental and social norms)
13. Protection and proper use of property (for example, to prohibit theft, carelessness or waste)
14. Duty to report violations of this Code
15. Non retaliation against workers who report violations of the Code, if that report is made in good faith.

The Code of Conduct should be written in plain language and signed by each worker to indicate that they have:

- received a copy of the code;
- had the code explained to them;
- acknowledged that adherence to this Code of Conduct is a condition of employment; and
- understood that violations of the Code can result in serious consequences, up to and including dismissal, or referral to legal authorities.

A copy of the code shall be displayed in a location easily accessible to the community and project affected people. It shall be provided in languages comprehensible to the local community, Contractor's personnel (including sub-contractors and day workers), Authority's and Authority Engineer's personnel, and affected persons.

PAYMENT FOR ESHS REQUIREMENTS

The contractor shall provide all such measures as are stated in the ESHS Activity Schedule Given in Annexure III over and above EMP. Failure to provide any of these measures entails liability on the Contractor to endure penalty in the form of deduction from each bill, recover from ESHS performance security or both; by the Authority on a certification by the Authority's Engineer and Environmental Engineer of the Authority as specified in the BDS 44.1 & 44.2 and Clause 7.3 of Article 7. The deduction in bill amount due to non-compliance of ESHS requirements shall be as follows: as per Schedule H; other works, item xiii; 5% of the bill amount is set aside for ESHS requirements; from which deduction shall be made in proportion to the ESHS Activity Schedule in Annexure III.

Payment for the delivery of ESHS requirements is a subsidiary obligation of the Contractor and is covered within the quoted EPC prices. Contractors obligations under the ESHS requirements should accordingly be required to be complied with before release of Interim/ Stage Payments.