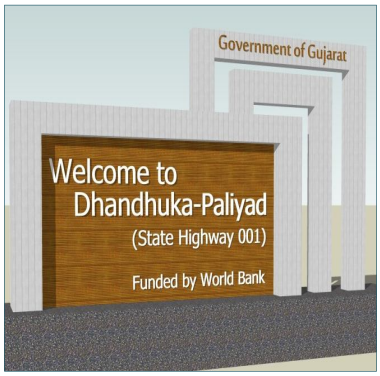

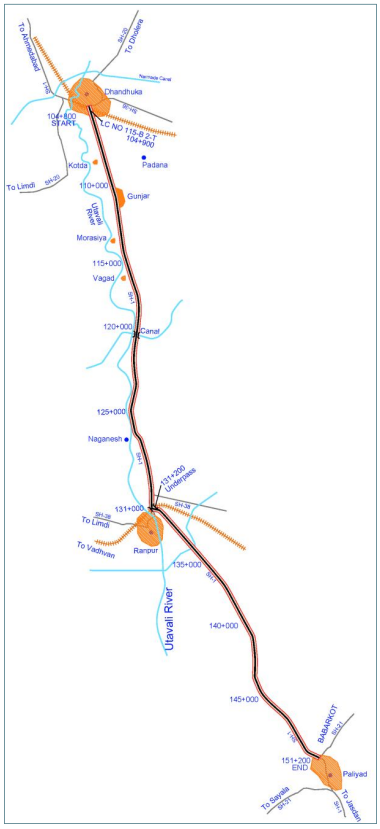

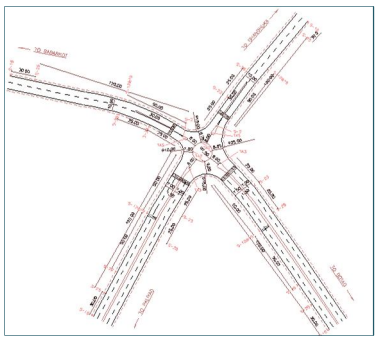

ROADS AND BUILDINGS DEPARTMENT

GOVERNMENT OF GUJARAT

Project Preparatory Works Consultancy Services for Gujarat State Highway Project - II

Volume-II (Part 1):

Environmental Management Plan

(DHANDHUKA – PALIYAD)

May 2013

LEA Associates South Asia Pvt. Ltd.

LEAdership in engineering & planning solutions

VOLUME-II [Part-1]
ENVIRONMENT MANAGEMENT PLAN

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List of Abbreviations

BOQ	Bill of Quantity
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
CoI	Corridor of Impact
CO	Carbon monoxide
CPR's	Common Property Resources
GPCB	Gujarat Pollution Control Board
GSHP-II	Gujarat State Highways Project – II
GoG	Government of Gujarat
LASA	LEA Associates South Asia Pvt. Ltd.
LHS	Left Hand Side
MoRTH	Ministry of Road Transport and Highways
NOC	No Objection Certificate
NO_X	Nitrates of Oxygen
NH_3	Ammonia
NGO	Non-Government Organisation
PIU	Project Implementation Unit
Pb	Lead
O_3	Ozone
R&BD	Roads and Buildings Department
RPF	Resettlement Policy Framework
RoW	Right of Way
RAP	Resettlement Action Plan
RPM	Respiratory Particle Matter
RHS	Right Hand Side
SC	Supervision consultant
SO_2	Sulfur di oxide
SPM	Suspended Particle Matter

1. INTRODUCTION

1.1 CONTEXT FOR THE EMP

1. This Environmental Management plan (EMP) has been prepared to guide the State Roads Project (SRP) division of the R&BD to address the limited environmental and social impacts likely due to the maintenance operations, at the various stages of project preparation, implementation and maintenance of the Dhandhuka – Paliyad maintenance corridor. The Environmental Management Plan (EMP) is prepared in-line with Environmental and Social Management Framework (ESMF).

1.2 PROJECT ROAD

2. The corridor (SH-01) starts from Dhandhuka at km 104+800 and ends at km 151+200 at Paliyad, which is 46km long. The corridor runs through plain terrain consisting of clayey soil. The carriageway (CW) width measures to be 6.1m between km 104+800 and km 131+000 while the same is 7.0m between km 131+000 and km 151+200. A small stretch of 3 km while approaching Paliyad limit, is 4 lane with median. The available Right of Way (RoW) is 30m.

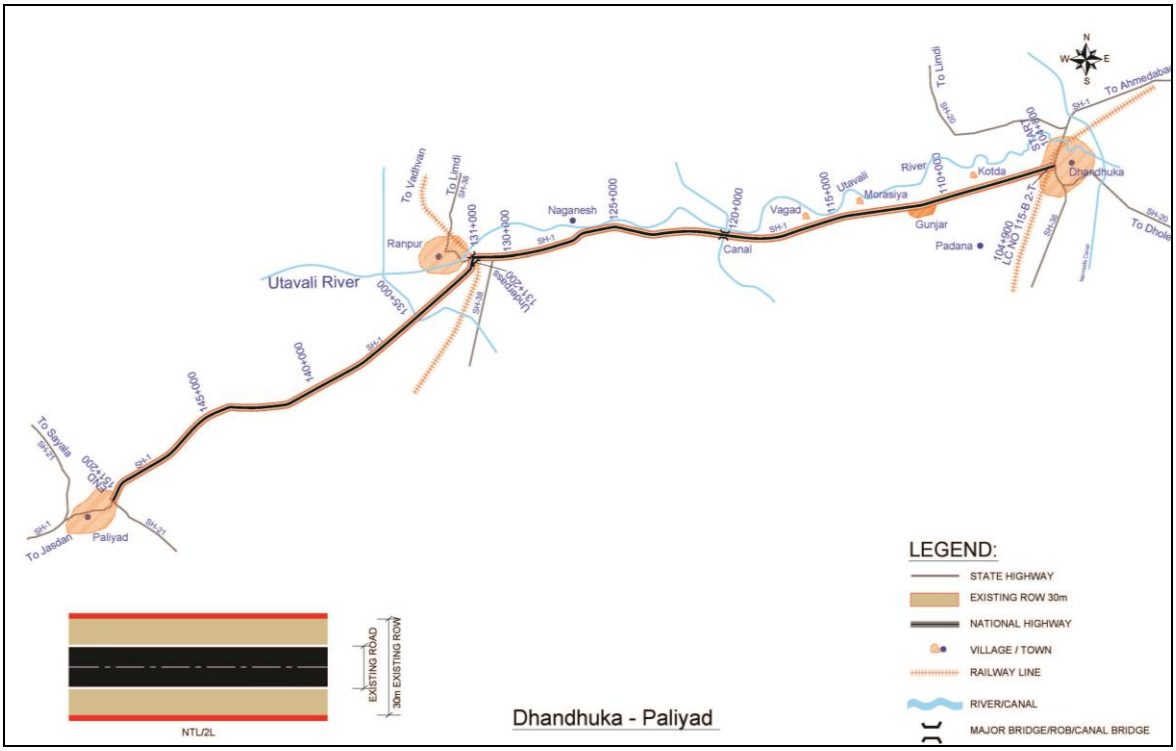


Figure 1-1: Dhandhuka – Paliyad (SH-01) Corridor Map

1.3 CLEARANCE REQUIREMENTS

3. The clearances to be obtained are presented in the Table 1.1.

Table 1.1: Applicable Clearances – Dhandhuka - Paliyad

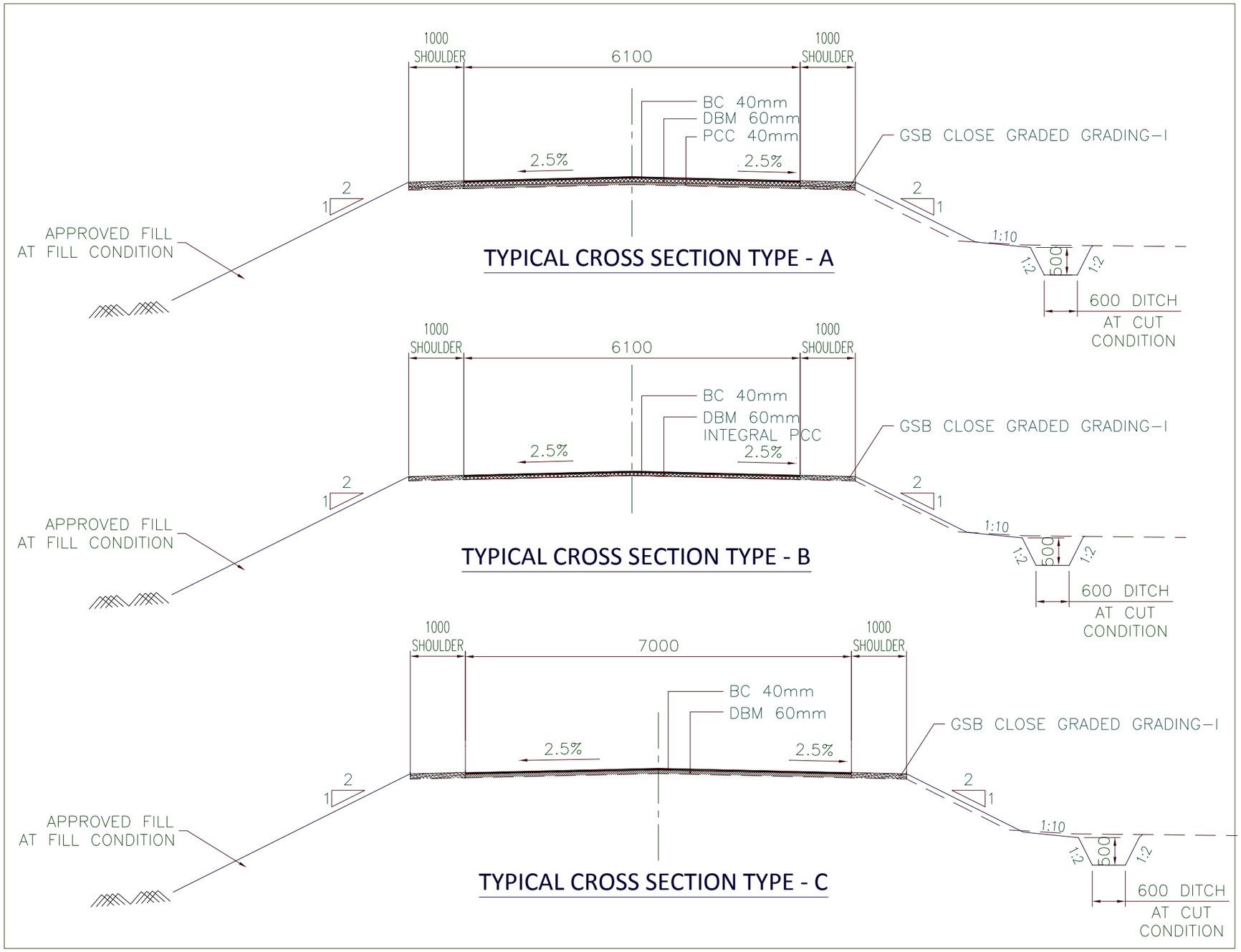
Sl. No	Clearances	Acts	Approving Agency	Applicability to the Project	[1]Indicative Time Frame	Responsibility	
						Execution	Supervision
PROJECT PREPARATION STAGE							
1	No Objection Certificate (NOC)/ Consent to Establish	Water (Prevention and Control of Pollution) Act 1974, Air (Prevention and Control of Pollution) Act 1981	Gujarat Pollution Control Board	Applicable	3-6 months	EE, SRP Division	
PROJECT IMPLEMENTATION STAGE							
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 the surface water)	3 months	Contractor	EE, SRP Division
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	EE, SRP Division
4	Hot mix plant, Crushers, Cement Batching Plant	Air (Prevention and Control of Pollution) Act. 1981	Gujarat Pollution Control Board	Applicable	3 months	Contractor	EE, SRP Division
5	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	EE, SRP Division
6	Disposal of Hazardous Waste	Hazardous Waste (Management and Handling) Rules 1989	Gujarat Pollution Control Board	Applicable	2 months	Contractor	EE, SRP Division
7	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	EE, SRP Division
8	Certificate of Pollution Under Control	Central Motor Vehicles Act 1988	Transport Department (GoG)	Applicable	1 Month	Contractor	EE, SRP Division
9	Employing the Labour	Executing Agency of Building and other construction act, 1996	Labour& Employment Department, GoG	Applicable	1 Week	Contractor	EE, SRP Division
10	Registration of Workers	Labour welfare Acts.	Labour& Employment Department, GoG	Applicable	1 Month	Contractor	EE, SRP Division

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

1.4 PROPOSED IMPROVEMENTS FOR MAINTENANCE

1. The maintenance of the project corridor focuses primarily on thin resurfacing, shape correction, shoulder repairs and drainage, with some potential for inclusion of modest structural overlay. The proposed cross sections for various stretches along the project corridor are presented in the Figure 1.2. provided in Volume III.

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


1000
SHOULDER
6100
1000
SHOULDER
BC 40mm
DBM 60mm
PCC 40mm
GSB CLOSE GRADED GRADING–I
2.5%
2.5%
2
1
2
1
APPROVED FILL
AT FILL CONDITION
1:10
1:1
500
1:2
600 DITCH
AT CUT
CONDITION
TYPICAL CROSS SECTION TYPE - A
1000
SHOULDER
6100
1000
SHOULDER
BC 40mm
DBM 60mm
INTEGRAL PCC
GSB CLOSE GRADED GRADING–I
2.5%
2.5%
2
1
2
1
APPROVED FILL
AT FILL CONDITION
1:10
1:1
500
1:2
600 DITCH
AT CUT
CONDITION
TYPICAL CROSS SECTION TYPE - B
1000
SHOULDER
7000
1000
SHOULDER
BC 40mm
DBM 60mm
GSB CLOSE GRADED GRADING–I
2.5%
2.5%
2
1
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APPROVED FILL
AT FILL CONDITION
1:10
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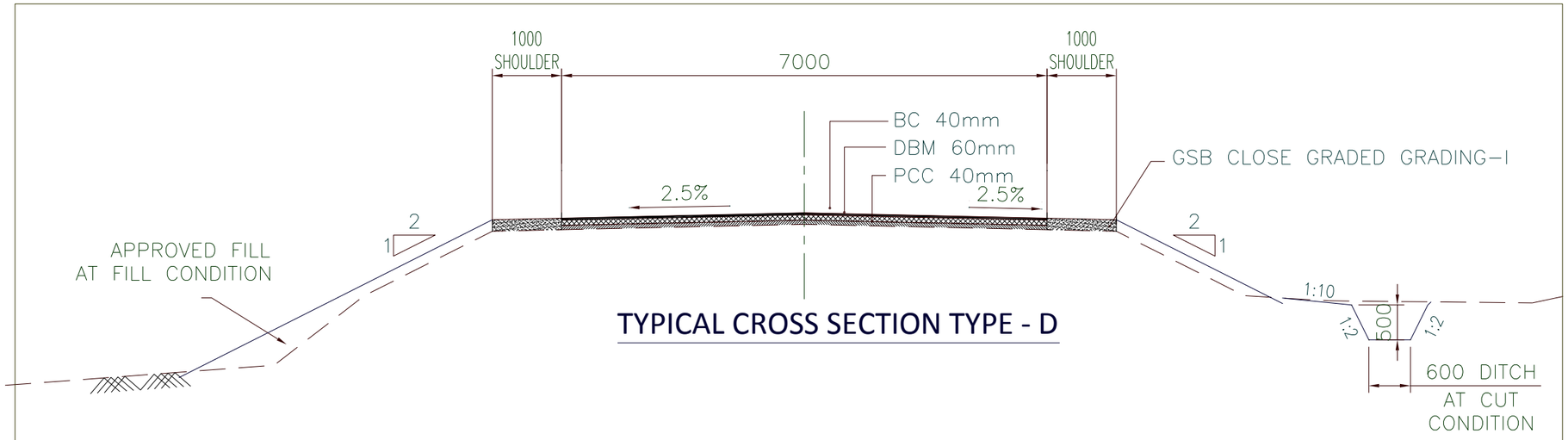
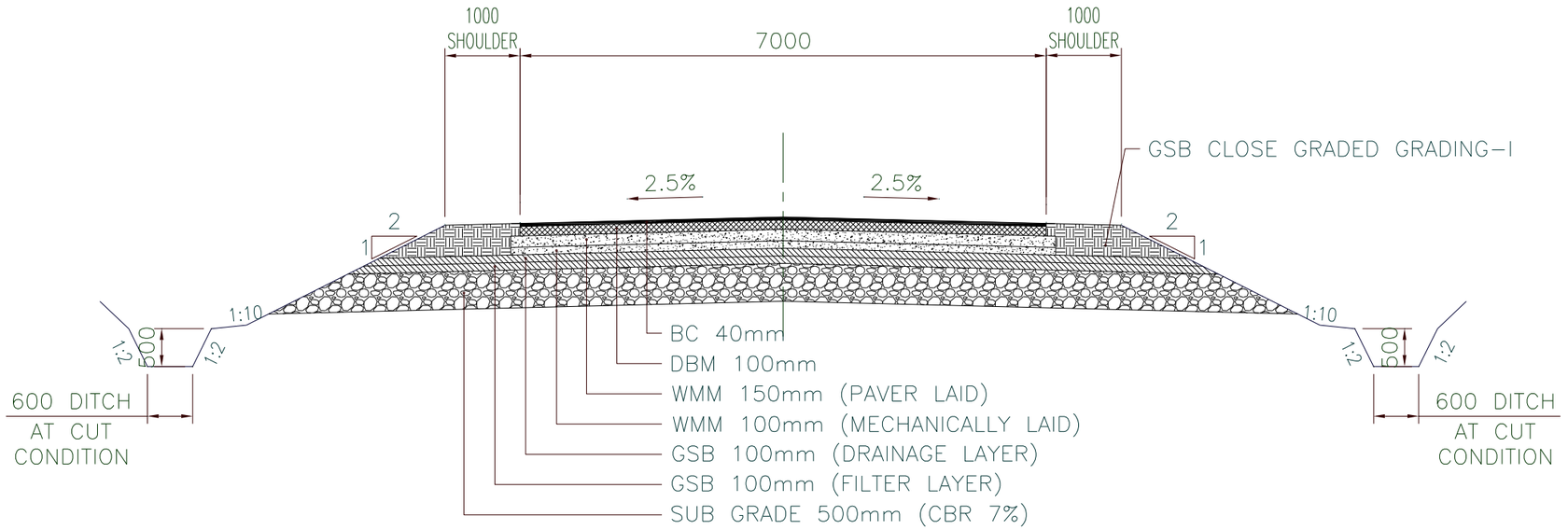
1:2
600 DITCH
AT CUT
CONDITION
TYPICAL CROSS SECTION TYPE - C



TYPICAL CROSS SECTION TYPE - D



TYPICAL CROSS SECTION WITH NEW PAVEMENT TYPE -E

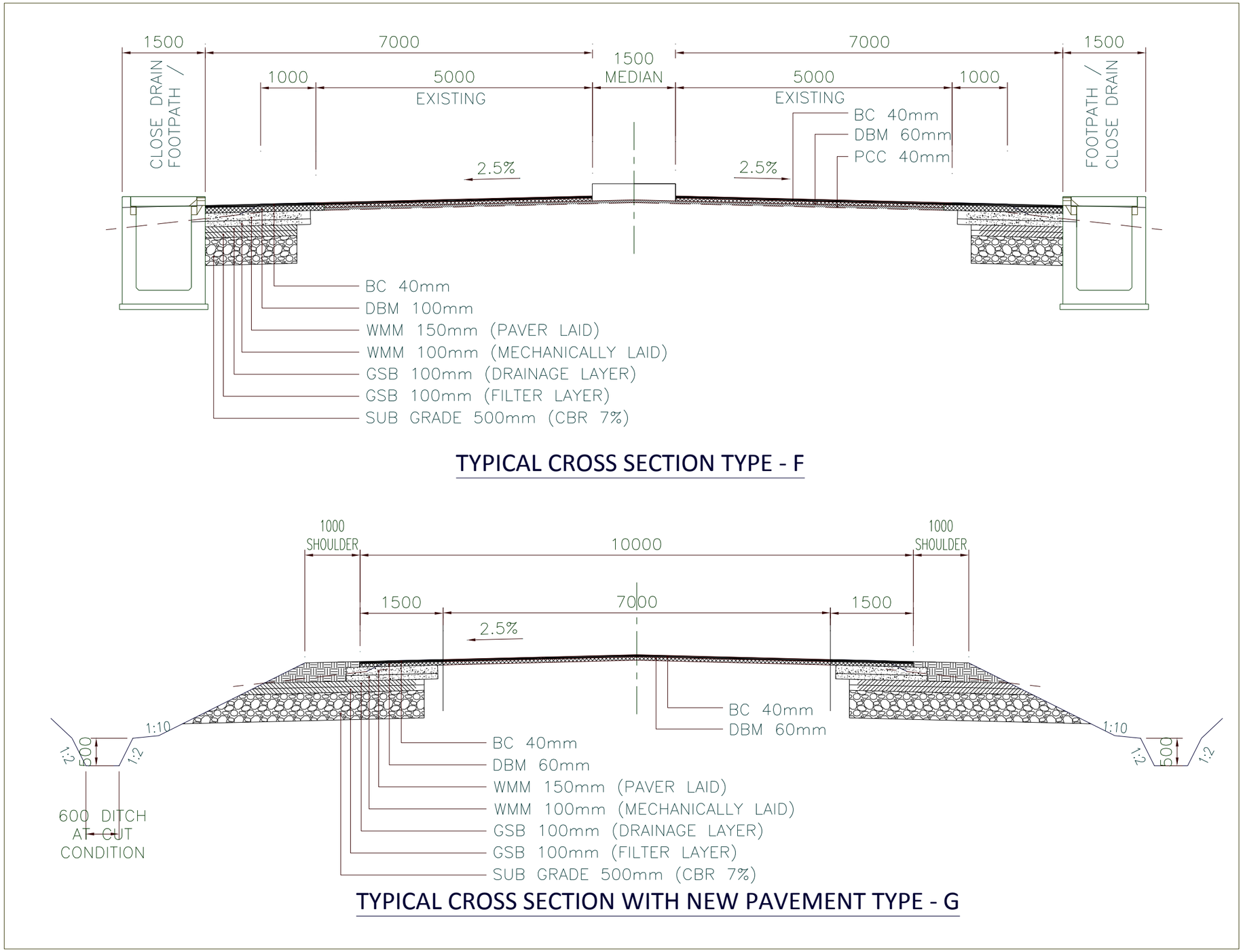


Figure 1.2: Typical Cross Section

1.5 ROAD FURNITURES AND SAFETY MEASURES

1.5.1 Pavement Marking

4. Provision for centre line and edge marking. Lining at junctions and bump marking etc, using hot applied thermoplastic road marking compound has been included in the project.

1.5.2 Road Signs

5. The missing road sign boards, repainting/refurbishment of existing kilometre stone, 200 m stone and new road sign boards have been proposed in this programme.

1.5.3 Street lights

6. Standalone solar street lights at urban stretches and junctions are proposed.

1.5.4 Pedestrian Crossing

7. Pedestrian Crossings by marking Zebra crossing using hot applied Thermoplastic road marking compound is proposed at the locations presented in **Table 1.2**.

Table 1.2: Pedestrian Crossing

Sr. No.	Chainage (km)	Village Name/Location
1	107+950	Kotda
2	113+400	Morachiya
3	115+600	Vagad
4	115+900	Vagad
5	120+300	Patna
6	126+500	Nagnesh
7	129+800	Polytechnic College
8	129+825	Village
9	139+100	Alampur
10	142+100	Umrala
11	145+150	Bodi
12	145+350	Bodi
13	147+700	Sankardi
14	147+850	Sankardi School
15	151+200	Paliyad

1.5.5 Rumble Strip

8. At locations wherever the village exists on both sides of the corridor, rumble strips are provided. The location details are presented in **Table 1.3**.

Table 1.3: Rumble Strip location

Sr. No.	Chainage
1	110+850
2	111+150
3	145+250
4	145+700

1.5.6 Crash Barrier

9. Crash barrier is proposed at various locations where the curves are very sharp. The chainage with length of crash barrier to be provided is presented in **Table 1.4**.

Table 1.4: Crash Barrier

Sr. No.	Chainage		Length (km)	Side
	From (km)	To (km)		
1	110+950	111+000	0.05	LHS

Sr. No.	Chainage		Length (km)	Side
	From (km)	To (km)		
2	114+500	114+550	0.05	RHS
3	117+550	117+600	0.05	RHS & LHS
4	123+080	123+180	0.10	RHS & LHS
5	124+600	124+750	0.15	RHS & LHS
6	126+100	126+180	0.08	RHS & LHS
7	131+400	131+500	0.10	RHS & LHS
8	141+700	141+800	0.10	RHS & LHS
9	144+000	144+050	0.05	RHS & LHS
10	148+100	148+500	0.40	RHS & LHS
11	150+180	150+300	0.12	RHS & LHS

1.5.7 Tree Guard

10. Tree guard rails are proposed at locations where the tree is near to edge of the corridor (within 0.1m to 1.5m).

1.5.8 IMPROVEMENT PROPOSAL FOR STRUCTURES

11. **Table 1.5** summarizes the improvement proposals for structures in the project.

Table 1.5: Abstract of Improvement Proposal

Type of Structure	Retain	Repair	Additional Culvert	Replaced By New Construction				Total
				Pipe	Slab.	Box	Minor Bridge	
Pipe	0	6	2	1	0	0	0	9
Slab	0	5		0	0	15	0	20
Minor Bridge	3	3		0	0	0	21	27

2. CORRIDOR CHARACTERISTICS

12. The corridor traverses through 2 districts of Ahmedabad and Bhavnagar covering Dhandhuka, Ranpur and Botad Taluka. For the entire length of 46 km, 17 census villages and 1 town Dhandhuka abuts the project corridor. Total population of these villages and town as per census 2001 was 80,009. The villages along the corridor are Sakardi, Paliyad, Ranpur, Umrad and Paliyad. The salient features of the corridor are presented in **Table 2.1**.

Table 2.1: Dhandhuka – Paliyad Corridor Profile

<table>
<tr><td>1</td><td>Name of Road</td><td>:</td><td>Dhandhuka - Paliyad , SH - 01</td></tr>
<tr><td>2</td><td>District</td><td>:</td><td>Ahmedabad</td></tr>
<tr><td>3</td><td>Corridor Length</td><td>:</td><td>46.40 km (Ch. 104+800 to 151+200)</td></tr>
<tr><td>4</td><td>Terrain</td><td>:</td><td>Plain</td></tr>
<tr><td rowspan="3">5</td><td>RoW</td><td></td><td></td></tr>
<tr><td>Existing</td><td>:</td><td>30 m</td></tr>
<tr><td>Proposed</td><td>:</td><td>30 m</td></tr>
<tr><td rowspan="3">6</td><td>CW Configuration</td><td></td><td></td></tr>
<tr><td>Existing</td><td>:</td><td>Two Lane</td></tr>
<tr><td>Proposed</td><td>:</td><td>Maintenance (MN)</td></tr>
<tr><td>7</td><td>CD Structures</td><td></td><td></td></tr>
<tr><td></td><td>Bridges</td><td>:</td><td>
<table>
<tr><td>Particulars</td><td>Major Bridges</td><td>Minor Bridges</td></tr>
<tr><td>No. of existing Bridges</td><td>0</td><td>26</td></tr>
</table>
</td></tr>
<tr><td></td><td>Culverts</td><td>:</td><td>
<table>
<tr><td>Particulars</td><td>Slab</td><td>HP</td><td>Box</td><td>Others</td><td>Total</td></tr>
<tr><td>No. of existing culverts</td><td>20</td><td>-</td><td>1</td><td>7</td><td>28</td></tr>
</table>
</td></tr>
<tr><td>8</td><td>Forests / environmentally sensitive areas</td><td>:</td><td>NPF area within RoW</td></tr>
</table>




3. PROJECT CORRIDOR - BASELINE

3.1 ENVIRONMENTAL AND SOCIAL INVENTORY

13. Formats for collecting baseline environmental and social information were prepared and the inventory survey was carried out. The formats were framed to capture various key environmental features like (i) land use across the corridor (ii) Avenue trees (iii) Water bodies (including ponds, wells, river crossing, canal crossing, irrigation tanks, lakes etc.) (iv) Forest land (including sanctuaries, national parks, reserve forest and protected forests), (v) archeologically important locations/ structures.

14. The formats were framed to capture various key social features like (i) Religious – temple /dargah/ church and its importance (including festival seasons and other functions) (ii) Shrines within RoW and its importance (iii) Market areas (including type of market, nature of goods sold, volume of visitors, any issues, related to parking, wastes etc.), (iv) Educational institutions (including number of students, any safety issues), (v) Health institutions (including capacity for treatment), (vi) Crematorium / burial ground etc.

15. The filled in formats of the project corridor are enclosed in the Appendix– 1. The analysis from the collected information is summarized in the following Table 3.1.

Table 3.1: Dhandhuka – Paliyad Corridor Environmental and Social Inventory

Sl.no	Environmental and Social Features		Observations from the Inventory
1	Trees within existing RoW		Approximately 600 avenue trees, all the trees within RoW are saved.
2	Religious Structures Within RoW	:	1 Temple 3 Dargah 11 Shrines
3	River crossings	:	River crossings –0 Canal crossings – 1 Drains – 45
4	Water bodies / ponds	:	1 Pond (115+600)
5	Sensitive receptors	:	1 School within RoW
6	Transshipment areas/truck parking locations	:	2 Truck Parking areas at Dhandhuka (104+800), Nagnesh (LHS) and Bodiya (RHS) 126+600
7	Other features / issues if any	:	Quarry site (127+800), Gas Pipe Line (107+800), Industrial area at: Village Kotda (106+800 to 107+600), Village Nagnesh, Bodiya (127+200 to 129+800)

16. Being a maintenance corridor, the proposed project interventions do not have any impact on the social structures/ communities. However, the view from the public with respect to the project has been documented during the stakeholder consultations. The outcome of the consultation also provides key input to the project for various sensitive issues like road safety, providing additional drains for low-lying areas, raising road levels / embankments etc.

3.2 STAKEHOLDER CONSULTATIONS

17. As part of the Environmental Impact Assessment, consultations were held along the project corridor. The issues discussed and outcome of the consultations is summarized in Table 3.2.

Table 3.2: Stakeholders Consultations (Focus Group Discussion)

Location	Key Outcomes	Integration into Project Design and Action Plan
Catholic Church School (km 105+500) Date: 16th Nov 2011 Number of Persons: 6 Stakeholders (school staff and villagers)	• Road safety measures should be provided near the school • Noise barriers should be provided to reduce the noise levels near the school. • Water logging reported during monsoon season alongside the school. Proper drainage should be provided to drain out storm water.	• Warning signboards will be given near the school location • The monitoring results for the noise levels indicates that the noise barriers near the school is not necessary • Provision of drains included in the road design.
FulpeerDargah (km 110+900) Date: 16th Nov 2011 No. of Persons: 16 Participants (local villagers)	• Inadequate drainage system leading to water logging problem near Dargah location • Road safety measures should be provided at the curve location near to Dargah. • Road safety measures should be provided near primary-school location.	• Provision of drains included in the road design. • Speed restriction measure adopted in whole village to provide safety to road users • Cautionary sign boards will be provided near school and curve locations.
Ambaji temple (km 131+000) Date: 16th Nov 2011 No. of Persons: 7 Participants (local villagers)	• Road safety measures should be provided near the Temple, near the Railway under Bridge (RUB) and also near the educational institution (Polytechnic Institute).	• Cautionary signboards will be provided at respective locations. • Zebra Crossing included as road safety measure for pedestrian traffic
Bodi village Junction (km 145+300) Date: 16th Nov 2011 No. of Persons:10 Participants (local villagers)	• Road safety measures should be provided along the residential settlements on both sides and near primary school.	• Speed limit signs will be provided near respective locations. • Zebra Crossing included as road safety measure for pedestrian traffic

Safety measures integrated into the design	Location
Pedestrian Crossing	Kotda (107+950), Morachiya(113+400), Vagad (115+600), Vagad (115+900), Patna (120+300), Nagnesh (126+500), Polytechnic College (129+800), Alampur (139+100), Umrala (142+100), Bodi (145+150), Bodi (145+350), Sankardi (147+700), Sankardi School (147+850) and Paliyad (151+200)
Rumble Strip	Ch 110+850, 111+150, 145+250 and 145+700

4. ENVIRONMENTAL MANAGEMENT PLAN

18. A description of the various management measures during various stages of the project is provided in Table 4.1.

Table 4.1: Environmental Management Plan

Sl. No.	Environmental Issue	Activity	Mitigation Measures	Location	Implementing Agency	Supervising & Monitoring Agency
Pre-Construction Phase						
PC.1	Statutory clearance	Utility Relocation & Consent to Establish	• Obtain NoC from the concerned agencies for shifting utilities. • Obtain Consent from competent authorities (Gujarat Pollution Control Board (GPCB)), for 'Consent to Establish' under Water (Prevention and Control of Pollution) Act, 1974, Air (Prevention and Control of Pollution) Act, 1981). • If any conditions are laid down by the concerned /competent authority, the same shall be integrated in the Bid Document.	Corridor of Impact	EE, SRP	-
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 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 • **<u>Other measures to be factored in selection of location</u>** • 1.0 km away from settlement, school, hospital on downwind directions • 300m from any archaeological site • 10 km from environmental sensitive areas i.e. national park, sanctuary • 500m from water bodies (rivers, streams, lakes and ponds) • away from agricultural land • preference to barren land	Settlements location: Dhandhulka (104+000) Gunjar (110+800), Ranpur (131+200), Bodi (145+600) Sensitive locations Schools (105+200, 111+000, 147+400) 3 Darga (110+800, 120+400, 121+200) Hospital (115+800) College (129+800)	Contractor	EE, SRP &Third party TA&QA
		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	EE, SRP &Third party TA&QA
		Storage of	• Proper stockpiling and sprinkling of water as necessary.		Contractor	EE, SRP

Sl. No.	Environmental Issue	Activity	Mitigation Measures	Location	Implementing Agency	Supervising & Monitoring Agency
		maintenance materials				&Third party TA&QA
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[2].	Surface water sources/ drains/ Nalahs/ Ponds etc. at 108+020, 108+850, 109+350, 111+850, 115+300, 116+500, 117+200, 118+150, 119+700, 121+200, 125+550, 130+005, 131+100, 131+500, 132+600, 134+350, 134+600, 136+400, 138+500, 139+100, 139+600, 140+100, 140+500, 143+500, 146+500, 148+250, 149+800. Pond at Ch115+600	Contractor	EE, SRP &Third party TA&QA
		Construction vehicles	• Avoiding cleaning / washing of construction vehicle in any water body		Contractor	EE, SRP &Third party TA&QA
		Construction camp and workers' camp	• Minimum distance of 500m 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		Contractor	EE, SRP &Third party TA&QA

[2]Designated areas are to be identified and finalized by Contractor in consultation with EE, SRP.

Sl. No.	Environmental Issue	Activity	Mitigation Measures	Location	Implementing Agency	Supervising & Monitoring Agency
			purpose, metallic drums should be used.			
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 150m of the nearest habitation/ education institutes/health centres (silence zones) shall be stopped during the night time 9.00pm to 6.00pm.	Construction site/camp and Sensitive locations: Schools (105+200, 111+000, 147+400) Hospital (115+800) College (129+800)	Contractor	EE, SRP &Third party TA&QA
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	EE, SRP &Third party TA&QA
		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	EE, SRP &Third party TA&QA
		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 30m 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	EE, SRP &Third party TA&QA
C.5	Occupational health and safety	Exposure to high noise level and	• Water supply, sanitation, drainage and medical health facilities at campsite	Construction site/camp	Contractor	EE, SRP &Third party

Sl. No.	Environmental Issue	Activity	Mitigation Measures	Location	Implementing Agency	Supervising & Monitoring Agency
	of workers	inadequate facilities including supply of potable water and sanitation facilities	• Providing and using PPEs(Personal Protective Equipments) • Using working reverse horn for all construction equipment and vehicles • Providing earth link circuit breaker (ELCB) for all electrical connections • Maintaining first aid at construction sites			TA&QA
C.6	Accidents and safety	Arrangement of traffic during construction	• Providing and maintaining traffic management comprising diversion; warning, guiding and regulatory signage; channelisers and delineators; lighting, flagmen; dust control system etc. as specified in the contract	Dhandhuka, km 104+800 (Intersection) Ranpur, km 131+000 (Y Junction) Paliyad, km 151+200 (Intersection)	Contractor	EE, SRP &Third party TA&QA
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, engineers and consultants) on HIV/AIDS/STDs within two months 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 at established truck parking locations; • (iv) install condom vending machines at the labour camps, including replenishment of supplies.	Construction & labor camps	Contractor	Contractor under the supervision of the EE, SRP

5. IMPLEMENTATION ARRANGEMENTS

5.1 INSTITUTIONAL SETUP

19. During implementation of project EE, SRP Division and Contractor will be responsible for ensuring that the environmental commitments made to regulatory agencies, lending agencies and other stakeholders during the EIA process are met. The responsibility mechanism is presented in Table 5.1.

Table 5.1: Institutional Responsibilities

System	Designation	Responsibilities
Implementing/ Monitoring Agency	EE, SRP Division	• Overall responsible for EMP implementation • Reporting to various stakeholders (World Bank, Regulatory bodies) on status of EMP implementation • Responsible for obtaining Regulatory Clearances (if any) • Review of the progress made by contractors • Conducting periodic field inspection of EMP implementation • Maintaining progress reports on EMP implementation
	Environmental and R&R Specialist, PIU	• Assist the SRP division in the implementation of the EMP provisions • Provide guidance to the SRP division on implementation of EMP provisions • Carry out periodic field visits and ensure compliance with the EMP provisions • Assist the SRP division in the compilation of the monitoring reports and progress reports on EMP implementation
Contractor	Environmental Engineer of Contractor	• Responsible for ensuring the implementation of EMP as per provision in the document. • Reporting to Implementing / monitoring agency • Discussing various environmental/social issues and environmental/social mitigation and monitoring actions with all concerned directly or indirectly • Conducting periodic environmental and safety training for contractor's engineers, supervisors and workers along with sensitization on social issues that may be arising during the construction stage of the project • To carry out environmental monitoring and control activities including pollution monitoring; and • Conducting awareness campaign for all construction personnel (including labourers, supervisors and engineers) about HIV/AIDS/STDs in the construction and labour camps. • Facilitating the medical testing/ routine check-up for labours as suggested in the EMP • Preparing and submitting monthly reports to Implementing agency (EE, SRP Division) on status of implementation safeguard measures
TA/QA consultants	Environment and Social expert	• Carry out periodic audit of the effective implementation of EMP provisions • Provide course correction / improvement measures to the SRP division on enhancing the implementation effectiveness of EMP provisions • Carry out capacity building of the SRP division officers on the EMP implementation.

5.2 ENVIRONEMTNAL MONITORING PLAN

20. The environmental monitoring plan is prepared based on the environmental monitoring indicators as shown in Table 5.2.

Table 5.2: 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 shall be as per the Monitoring Plan prepared **(Refer Table 5.3)**	Pre-Construction	Contractor under the supervision of EE,SRP & TA&QA
			Post Construction (DLP)	
			End of Maintenance period	
2	Noise Levels		Pre-Construction	Contractor under the supervision of EE,SRP & TA&QA
			Post Construction (DLP)	
			End of Maintenance period	
B	**Environmental Management Indicators and Monitoring Plan**			
1	Construction Camps	Occupational health & Safety of workers and construction camp management (including pollution control at construction camp)	Pre-construction	Contractor under the supervision of EE,SRP & TA&QA
2	Borrow Areas	Identification of borrow area in accordance with permission from the landowners, sensitivity etc.	Pre-construction	Contractor under the supervision of EE,SRP & TA&QA
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 EE,SRP & TA&QA
4	Rehabilitation of Borrow Areas	Engineer will undertake site visits to determine how many borrow areas have been rehabilitated in line with the landowner's request and to their full satisfaction.	Construction	Contractor under the supervision of EE,SRP & TA&QA

21. For each of the environmental monitoring 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 the environmental condition indicators of the project in construction and operation stages are presented in Table 5.3.

Table 5.3: Environmental Monitoring Plan

Attribute	Project Stage	Parameter	Special Guidance	Standards	Frequency	Duration	Location	Implementation
Air	Pre-Construction	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	One season (before monsoon)	24 hours Sampling	As suggested by the Engineer	Contractor under the supervision of EE,SRP & TA&QA
	Post Construction (DLP)							
	End of Maintenance period							
Noise	Pre-Construction	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	MoEF Noise Rules, 2000	One season (before monsoon)	Leq in dB(A) of day time and night time	As suggested by the Engineer	
	Post Construction (DLP)							
	End of Maintenance							
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 the Engineer/ EMU
		IEC materials distribution			Quarterly			
		Condom Distribution			Once a month			

5.3 REPORTING SYSTEM

22. The contractor will operate the reporting system for environmental condition and environmental management indicators (Table 5.2). The Contractor will report to the EE, SRP Division on the progress of the implementation of environmental conditions and management measures as per the EMP. The reporting formats are in the Appendix -2 and Contractor's Checklist is enclosed in the Appendix-3. The summary of reporting is given in the Table 5.4.

Table 5.4: Summary details of Reporting

Format No.	Item	Stage	Contractor	EE, SRP Division & TA&QA
			Implementation & Reporting to EE, SRP Division	**Oversee / Field Compliance Monitoring**
EM 1	Identification of Disposal Locations	Pre-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
EC 1	Pollution Monitoring	Pre-Construction	As Per Monitoring Plan	Quarterly
		Post Construction (DLP)		
		End of Maintenance		

23. 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 resulting from pollution, noise or other causes arising as a consequence of his methods of operation.

5.3.1 Clause for Nonconformity to EMP - Protection of the Environment

24. The Contractor shall implement all mitigation measures for which responsibility is assigned to him as stipulated in the EMP Report. Any lapse in implementing the same will attract the damage clause as detailed below:

1. All lapse in obtaining clearances / permissions under statutory regulations and violations of any regulations with regard to 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 CSC, R & BD or with the GoG and communicated to the Contractor, which is not properly addressed within the time period intimated by the CSC / R & BD, GoG shall be treated as a major lapse.

3. Non-conformity to any of the mitigation measures stipulated in the EMP Report (other than stated above) shall be considered as a minor lapse.

4. On observing any lapses, CSC shall issue a notice to the Contractor, to rectify the same.

5. Any minor lapse for which notice was issued and not rectified, first and second reminders shall be given after ten days from the original notice date and first reminder date respectively. Any minor lapse, which is not rectified, shall be treated as a major lapse from the date of issuing the second reminder.

6. If a major lapse is not rectified upon receiving the notice CSC shall invoke reduction, in the subsequent interim payment certificate.

7. For major lapses, 10% of the interim payment certificate will be withheld, subject to a maximum limit of about 0.5% of the contract value.

8. If the lapse is not rectified within one month after withholding the payment, the amount withheld shall be forfeited.

5.4 ENVIRONMENTAL MANAGEMENT BUDGET

25. 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 and the environmental monitoring costs. Budgetary provisions for the project are presented in Table 5.5. The Bill of quantities is given in Appendix-4.

Table 5.5: Budgetary Provisions for Environmental Management Measures

S. No.	Item	Unit	Rate (in INR)	Quantity	Cost (in INR)
A	**PRE CONSTRUCTION**				
1	*Air Quality*				
1.1	Monitoring of Air Quality at Sensitive Locations	No. of Samples	7500	5	37,500.00
1.2	*Noise Levels*				
1.2.1	Monitoring of Noise Levels at Sensitive Locations	No. of Samples	3000	5	15,000.00
B	**CONSTRUCTION**				
1	HIV/ AIDS Prevention measures				
1.1	IEC materials - printing, publishing		3000	12	36,000.00
1.2	Healthcare clinic		30000	4	120000.00
1.3	Condom vending machines		15000	1	15000.00
1.4	condom supplies		3000	12	36000.00
1.5	Signages and hoardings		15000	5	75000.00
C	**POST CONSTRUCTION (During DL Period)**				
1	*Air Quality*				
1.1	Monitoring of Air Quality at Sensitive Locations	No. of Samples	7500	5	37,500.00
2	*Noise Levels*				
2.1	Monitoring of Noise Levels at Sensitive Locations	No. of Samples	3000	5	15,000.00
C	**END OF MAINTENANCE PERIOD (During Maintenance Period)**				
1	Monitoring of Air Quality at Sensitive Locations	No. of Samples	7500	5	37,500.00
2	Monitoring of Noise Levels at Sensitive Locations	No. of Samples	3000	5	15,000.00
Total					**439,500.00**
Grand Total INR. (with 3% contingency)					**452,685.00**

Appendix – 1: Inventory of Environmental and Social Features[1]

Corridor name: Dhandhuka – Paliyad (SH-1) Corridor

Sr. No	Chainage (Km)	Urban (U) /Rural (R)	Location (Left/Right)	Name of Property	Distance from center of Carriage Way		Area (approx.) in sq.m	Remarks : Age of Structure/ Whether any annual fairs/ Students strength
					BW	Structure		
1	104+800	U	R	Truck Parking		10		
3	105+500	U	L	School	18	22	2200	Student strength- 505
4	107+500	U	L	Shrine		8.5	0.6	3 years
5	108+800	R	R	Shrine		11.5	0.4	5 years
6	110+800	U	R	Dargah	5	6	75.0	20 years
7	111+00	R	L	Shrine		6	0.9	
8	111+100	R	L	Gunjar School		17	1050	student strength- 260
9	115+600	R	R	Pond		9.5		Length along the road - 95m
10	115+600	R	R	Shrine		6.2	0.6	
11	115+900	R	R	Hospital Govt.	17.3	25		
13	120+500	R	L	Dargah	20	25		30 years
14	121+300	R	R	Dargah	9	16	2000	12 years
15	126+600	R	R	Truck Parking				
16	127+400	R	L	Shrine		8	0.64	
17	129+800	R	L	School	25	50	1800	
18	129+800	R	L	College (Polytechnic)	19	21	1800	Student strength- 2000
20	130+900	R	R	Temple (Ambaji)	20	27	2200	15 years old structure, nearly 1,300 people gathers in the month of november -december.
21	131+100	U	R	Muslim Graveyard	16			
24	135+700	R	R	Shrine		4.8	1	
25	138+900	R	R	Shrine		10.5	0.36	
26	140+600	R	R	Shrine		13	0.36	
27	141+200	R	L	Shrine		6	0.64	
28	145+700	R	R	Temple (Sitaram Mah)	6	8	144	16 years old structure, nearly 10,000 people gathers in the month of february for annual fairs
29	145+700	R	R	Shrine		6		
30	147+100	R	L	Shakardi Primary School		13		Student strength-120
31	147+500	R	L	Gitanjali School	10	50		Student strength- 200
32	149+100	R	L	Cattle crossing				
33	149+600	R	L	Shrine		6.5	0.16	7 years
34	149+700	R	L	Dargah	7		4	10 years

[1] *Inventory of social and environment features comprises the details of structures, water bodies, ponds etc. within RoW*

Inventory of Landuse and Trees

Corridor name: Dhandhuka – Paliyad (SH-1) Corridor

LandUse[1]		Left Side						Chainage		Right Side						
Left	Right	Grith (m) (Avg dia)	Spacing (m)	Dist. of 3rd row from C/L (m)(above 7.5 m)	Dist. of 2nd row from C/L (m) (4.5-7.5 m)	Dist. Of 1st row from C/L (m) 4.5	No. of Rows	From	To	No. of Rows	Dist. Of 1st row from C/L (m) 4.5	Dist. Of 2 nd row from C/L (m) 4.5-7.5	Dist. Of 3rd row from C/L (m) above 7.5 m	Spacing (m)	Grith (m) (Avg dia)	Name of tree species along the corridor
3	6						1	104+800	105+000							
3	2	0.9	40	9			1	105+000	115+200	1		7	8	30	0.9	
4	2							115+200	105+400							
8	2	0.9	22	8			1	105+400	105+600							Ch 104.8-Ch106.8- Peepul, Baad
8	4	0.9	24	12			1	105+600	105+800	1			12	40	0.6	
2	2	0.6	35	10			1	105+800	106+000	1		7		25	0.6	
1	1	0.9	30	9			1	106+000	106+200	1			9	25	0.9	
1	1	1.2	20	8			1	106+200	106+400	1		7		20	1.2	
5	1	1.3	30		6		1	106+400	106+600	1			9	30	4	
1	1							106+600	106+800							
1,5	1		20		7		1	106+800	107+000							
5	5							107+000	107+200							
5	5	0.9	60	8			1	107+200	107+400	1			8	80	0.9	
5	5	0.9	80	9			1	107+400	107+600	1			8	80	0.6	Ch 106.8-Ch108.8- Peepul, Neem
1	1	0.9	80	9			1	107+600	107+800	1			9	100	0.6	
1	1							107+800	108+000							
1	2							108+000	108+200							
1	4							108+200	108+400							
1	1							108+400	108+600	1			8	140	0.6	
1	1							108+600	108+800							
1	1							108+800	109+000	1			8	100	0.9	
1	1							109+000	109+200							
1	1							109+200	109+400							
3	1							109+400	109+600							Ch 108.8-Ch110.8 - Neem, Khijda
1	1	0.6	80	8			1	109+600	109+800							
1	1	0.6	50	9			1	109+800	110+000	1			10	40	0.9	
1	1	0.6	30	9			1	110+000	110+200							
1	1	0.6	40	8			1	110+200	110+400							
1	1							110+400	110+600							
2	2	0.6	80	9			1	110+600	110+800	1			14	40	0.9	

LandUse[1]		Left Side						Chainage		Right Side						
Left	Right	Grith (m) (Avg dia)	Spacing (m)	Dist. of 3rd row from C/L (m)(above 7.5 m)	Dist. of 2nd row from C/L (m) (4.5-7.5 m)	Dist. Of 1st row from C/L (m) 4.5	No. of Rows	From	To	No. of Rows	Dist. Of 1st row from C/L (m) 4.5	Dist. Of 2 nd row from C/L (m) 4.5-7.5	Dist. Of 3rd row from C/L (m) above 7.5 m	Spacing (m)	Grith (m) (Avg dia)	Name of tree species along the corridor
4	2	0.6	100	10			1	110+800	111+000	1			8	25	1.2	
2	1							111+000	111+200							
4	1							111+200	111+400							
1	1							111+400	111+600							Ch 110.8-Ch112.8-Neem, Peepul, Khijda
1	1							111+600	111+800							
1	1	0.9	30	9			1	111+800	112+000	1			9	30	0.9	
1	1	0.6	70	11			1	112+000	112+200	1			9	35	0.9	
1	1						1	112+200	112+400							
1	1	0.3	30	9			1	112+400	112+600	1			8	20	0.3	
1	1	0.3	40	9			1	112+600	112+800	1			8	30	0.6	
1	1	0.6	35	9			1	112+800	113+000							
1	1	0.6	100	8			1	113+000	113+200	1			8	100	0.3	
1	1	0.9	40	9			1	113+200	113+400	1			8	50	0.3	
1	1	0.6	40	10			1	113+400	113+600	1			9	80	0.3	Ch 112.8-Ch114.8-Neem, Khijda
1	1	.	70	10			1	113+600	113+800	1			12	100	0.3	
1	1	0.6	40	10			1	113+800	114+000	1			10	50	0.3	
1	1							114+000	114+200							
1	1	0.3	50	11			1	114+200	114+400	1			8	70	0.3	
1	1	0.6	40				1	114+400	114+600	1			9	50	0.3	
1	1							114+600	114+800							
1	1	0.3	100	8			1	114+800	115+000							
3	1							115+000	115+200							
1	2							115+200	115+400							
3	1							115+400	115+600							
1	2							115+600	115+800	1			10	50	0.6	Ch 114.8-Ch 116.8-Khijda
1	2							115+800	116+000							
1	1							116+000	116+200							
1	1	0.3	60	9			1	116+200	116+400	1		7		65	0.6	
1	1							116+400	116+600							
1	1	0.3	60	9			1	116+600	116+800	1		6		60	0.6	
1	1	0.6	60	10			1	116+800	117+000	1			8	50	0.6	Ch 116.8-Ch 118.8-Babul, Khijda
1	1	0.3	50		6		1	117+000	117+200	1		6		50	0.3	
1	1	0.6	40	9			1	117+200	117+400	1			9	40	0.3	
1	1	0.3	65	9			1	117+400	117+600	1		7		70	0.3	

LandUse[1]		Left Side						Chainage		Right Side						
Left	Right	Grith (m) (Avg dia)	Spacing (m)	Dist. of 3rd row from C/L (m)(above 7.5 m)	Dist. of 2nd row from C/L (m) (4.5-7.5 m)	Dist. Of 1st row from C/L (m) 4.5	No. of Rows	From	To	No. of Rows	Dist. Of 1st row from C/L (m) 4.5	Dist. Of 2 nd row from C/L (m) 4.5-7.5	Dist. Of 3rd row from C/L (m) above 7.5 m	Spacing (m)	Grith (m) (Avg dia)	Name of tree species along the corridor
1	1	0.3	30		6		1	117+600	117+800	1		7		30	0.3	
1	1	0.6	30		7		1	117+800	118+000	1			9	35	0.6	
1	1	0.3	60	8			1	118+000	118+200	1		7		50	0.3	
1	1	0.6	40	8			2	118+200	118+400							
1	1							118+400	118+600							
1	1	0.3	60	8			1	118+600	118+800	1		5.5		60	0.3	
1	1	0.6	70	9			1	118+800	119+000	1		5.5		80	0.6	
1	1	0.6	50				1	119+000	119+200	1	4.5			50	0.6	
1	1	0.3	100		7		1	119+200	119+400							
1	1							119+400	119+600	1	4.5			200	0.6	Ch 118.8-Ch 120.8-Babul, Khijda
1	1							119+600	119+800							
1	2							119+800	120+000							
1	2							120+000	120+200							
1	1							120+200	120+400							
1	1							120+400	120+600							
1	1							120+600	120+800							
1	1							120+800	121+000							
1	1							121+000	121+200							
1	1							121+200	121+400	1			9	30	0.9	
1	1							121+400	121+600							Ch 120.8-Ch122.8-Babul, Khijda, Neem
1	1							121+600	121+800							
1	1							121+800	122+000							
1	1	0.3	65	8			1	122+000	122+200							
1	1	0.3	40	8			1	122+200	122+400	1			9	60	0.3	
1	1	0.3	35	8			1	122+400	122+600	1			9	65	0.3	
1	1	0.9	40	8			1	122+600	122+800							
1	1	0.2	30				1	122+800	123+000	1		6		40	0.6	
1	1	1	50				1	123+000	123+200	1		6		60	0.6	
1	1	1.2	40				1	123+200	123+400	1	4.5			40	1.2	Ch 122.8-Ch 124.8-Imli, Khijda
1	1	1.2	40				1	123+400	123+600	1	4.5			60	1.2	
1	1	0.9	50				1	123+600	123+800	1	4.5			60	0.9	
1	1	0.9	60				1	123+800	124+000	1	4.5			6	0.9	
1	1	0.9	60		6		1	124+000	124+200	1	5			70	0.9	
1	1							124+200	124+400	1	4			70	0.6	

LandUse[1]		Left Side						Chainage		Right Side						
Left	Right	Grith (m) (Avg dia)	Spacing (m)	Dist. of 3rd row from C/L (m)(above 7.5 m)	Dist. of 2nd row from C/L (m) (4.5-7.5 m)	Dist. Of 1st row from C/L (m) 4.5	No. of Rows	From	To	No. of Rows	Dist. Of 1st row from C/L (m) 4.5	Dist. Of 2 nd row from C/L (m) 4.5-7.5	Dist. Of 3rd row from C/L (m) above 7.5 m	Spacing (m)	Grith (m) (Avg dia)	Name of tree species along the corridor
1	1							124+400	124+600							
1	1	0.6	45		6		1	124+600	124+800	1	5			40	1.2	
1	1							124+800	125+000	1	5			60	0.9	
1	1	0.6	60		7		1	125+000	125+200	1	4.5			45	0.6	
1	1	0.3	60	9			1	125+200	125+400	1	4.5			50	0.6	
1	1	0.1	40	10			1	125+400	125+600							
1	1	0.2	40	10			1	125+600	125+800							Ch 124.8-Ch 126.8- Imli, Neem
1	1	0.3	50		7		1	125+800	126+000	1	5			40	0.6	
1	1	0.3	80	12			1	126+000	126+200	1	5			60	0.9	
1	1							126+200	126+400	1	5.5			50	0.6	
1	1							126+400	126+600	1			8	65	0.6	
1	1	0.6	90	8			1	126+600	126+800	1			9	90	0.6	
3	6							126+800	127+000							
1	5							127+000	127+200	1		7		80	0.9	
1	5							127+200	127+400							
5	5							127+400	127+600							
1	5						1	127+600	127+800							Ch 126.8-Ch 128.8- Peepul
1	5	0.6	30		6		1	127+800	128+000	1			8	35	0.6	
1	5	0.6	40				1	128+000	128+200							
1	5	0.6	50				1	128+200	128+400	1	4.5			80	0.6	
1	5	0.6	70		6		1	128+400	128+600							
1	5							128+600	128+800							
2	5							128+800	129+000							
1	5							129+000	129+200	1	4.5			80	0.9	
1	5	0.3	65				1	129+200	129+400							
1	5	0.6	60	8			1	129+400	129+600							
1	5							129+600	129+800							Ch 128.8-Ch 130.8- Peepul, Imli
2	6							129+800	130+000							
5	6							130+000	130+200							
3	3	0.6	80		6		1	130+200	130+400							
1	4							130+400	130+600							
3	2							130+600	130+800							
6	6							130+800	131+000							Ch 130.8-Ch 132.8-
3	6							131+000	131+200							

LandUse[1]		Left Side						Chainage		Right Side						
Left	Right	Grith (m) (Avg dia)	Spacing (m)	Dist. of 3rd row from C/L (m)(above 7.5 m)	Dist. of 2nd row from C/L (m) (4.5-7.5 m)	Dist. Of 1st row from C/L (m) 4.5	No. of Rows	From	To	No. of Rows	Dist. Of 1st row from C/L (m) 4.5	Dist. Of 2 nd row from C/L (m) 4.5-7.5	Dist. Of 3rd row from C/L (m) above 7.5 m	Spacing (m)	Grith (m) (Avg dia)	Name of tree species along the corridor
6	6							131+200	131+400							Neem, Peepul
5	3							131+400	131+600							
1	1							131+600	131+800							
1	1							131+800	132+000	1		7		60	0.3	
1	1							132+000	132+200							
1	1	0.6	35		7.5		1	132+200	132+400	1		6		30	0.6	
1	1							132+400	132+600	1		6		60	0.6	
1	1							132+600	132+800							
1	1	0.6	35	8			1	132+800	133+000	1			8	20	0.6	
1	1	0.6	30	8			1	133+000	133+200	1			8	25	0.3	
1	1	0.9	20	9			1	133+200	133+400	1		7		35	0.6	
1	1	0.6	30	10			1	133+400	133+600	1		6		25	0.9	
1	1	0.6	35	8			1	133+600	133+800	1		6		30	0.9	Ch 132.8-Ch 134.8-Peepul
1	1	0.6	60	8			1	133+800	134+000	1		6		100	0.6	
1	1	0.3	35		7		1	134+000	134+200	1		5.5		20	0.9	
1	1							134+200	134+400							
1	6							134+400	134+600							
1	6							134+600	134+800							
1	1							134+800	135+000							
6	6							135+000	135+200							
1	1							135+200	135+400							
1	1							135+400	135+600							
1	1	0.6	80		6.5		1	135+600	135+800							Ch 134.8-Ch 136.8-Peepul. Babul
1	1	0.3	80	9			1	135+800	136+000							
1	1							136+000	136+200							
1	1	0.3	100	9			1	136+200	136+400							
1	1							136+400	136+600							
1	1							136+600	136+800							
1	1							136+800	137+000							
1	1							137+000	137+200							
1	1							137+200	137+400							Ch 136.8-Ch 138.8-Neem, Babul
1	1							137+400	137+600							
1	1							137+600	137+800							
1	1							137+800	138+000							

LandUse[1]		Left Side						Chainage		Right Side						
Left	Right	Grith (m) (Avg dia)	Spacing (m)	Dist. of 3rd row from C/L (m)(above 7.5 m)	Dist. of 2nd row from C/L (m) (4.5-7.5 m)	Dist. Of 1st row from C/L (m) 4.5	No. of Rows	From	To	No. of Rows	Dist. Of 1st row from C/L (m) 4.5	Dist. Of 2 nd row from C/L (m) 4.5-7.5	Dist. Of 3rd row from C/L (m) above 7.5 m	Spacing (m)	Grith (m) (Avg dia)	Name of tree species along the corridor
1	1							138+000	138+200							
1	1							138+200	138+400							
1	1							138+400	138+600							
1	1							138+600	138+800							
1	1							138+800	139+000							
1	1							139+000	139+200							
1	1							139+200	139+400							
1	1							139+400	139+600							
1	1							139+600	139+800							
1	1							139+800	140+000							
1	1							140+000	140+200							
6	6							140+200	140+400							
6	6							140+400	140+600							
6	6							140+600	140+800							
1	1							140+800	141+000							
5	5							141+000	141+200							
5	3							141+200	141+400							
1	1							141+400	141+600							
1	1							141+600	141+800							
1	1							141+800	142+000							
1	1							142+000	142+200							
1	1							142+200	142+400							
1	1							142+400	142+600							
1	1							142+600	142+800							
1	1							142+800	143+000							
1	1							143+000	143+200							
1	1							143+200	143+400							
1	1							143+400	143+600							
1	1							143+600	143+800							
1	1							143+800	144+000							
1	1							144+000	144+200	1			8	60	0.3	
1	1							144+200	144+400							
1	1							144+400	144+600							
1	1							144+600	144+800							

Ch 138.8-Ch 140.8-Babul

Ch 140.8-Ch 42.8-Babul, Neem

Ch 142.8-Ch 144.8-Imli

LandUse[1]		Left Side						Chainage		Right Side						
Left	Right	Grith (m) (Avg dia)	Spacing (m)	Dist. of 3rd row from C/L (m)(above 7.5 m)	Dist. of 2nd row from C/L (m) (4.5-7.5 m)	Dist. Of 1st row from C/L (m) 4.5	No. of Rows	From	To	No. of Rows	Dist. Of 1st row from C/L (m) 4.5	Dist. Of 2 nd row from C/L (m) 4.5-7.5	Dist. Of 3rd row from C/L (m) above 7.5 m	Spacing (m)	Grith (m) (Avg dia)	Name of tree species along the corridor
2	2							144+800	145+000							Ch 144.8-Ch146.8-Babul, Imli, Peepul
2	2							145+000	145+200							
2	2							145+200	145+400							
2	2							145+400	145+600							
3	1							145+600	145+800							
1	1							145+800	146+000							
1	1							146+000	146+200							
1	1							146+200	146+400							
1	1							146+400	146+600							
1	1							146+600	146+800							
1	1							146+800	147+000							
1	1							147+000	147+200							
1	1							147+200	147+400							
1	1							147+400	147+600							No Trees
1	1							147+600	147+800							No Trees
1	6							147+800	148+000							No Trees
1	6							148+000	148+200							No Trees
1	6							148+200	148+400							No Trees
1	6							148+400	148+600							No Trees
1	6							148+600	148+800							No Trees
1	1							148+800	149+000							No Trees
1	6							149+000	149+200							No Trees
6	6							149+200	149+400							No Trees
6	6							149+400	149+600							No Trees
1	1							149+600	149+800							No Trees
1	1							149+800	150+000							No Trees
1	6							150+000	150+200							No Trees
6	6							150+200	150+400							No Trees
2	1							150+400	150+600							No Trees
1	1							150+600	150+800							No Trees
3	3							150+800	151+000							No Trees
3	3							151+000	151+200							No Trees
3	3							151+200	151+400							No Trees
3	3							151+400	151+600							No Trees

LandUse[1]		Left Side						Chainage		Right Side						
Left	Right	Grith (m) (Avg dia)	Spacing (m)	Dist. of 3rd row from C/L (m)(above 7.5 m)	Dist. of 2nd row from C/L (m) (4.5-7.5 m)	Dist. Of 1st row from C/L (m) 4.5	No. of Rows	From	To	No. of Rows	Dist. Of 1st row from C/L (m) 4.5	Dist. Of 2 nd row from C/L (m) 4.5-7.5	Dist. Of 3rd row from C/L (m) above 7.5 m	Spacing (m)	Grith (m) (Avg dia)	Name of tree species along the corridor
3	3							151+600	151+800							No Trees
3	3							151+800	152+000							No Trees
3	3							152+000	152+200							No Trees
																No Trees
																No Trees
																No Trees

LandUse:1. Agriculture 2. Residential 3. Commercial 4. Residential and commercial 5. Industrial 6. Barren 7. Plantation 8. Other - specify

Water Body: P-Pond; L- Lake; R-River; S-Stream

Forest: RF-Reserve Forest, PF-Protected Forest

Inventory of Common property resources

Corridor name: Dhandhuka – Paliyad (SH-1) Corridor

Structure ID	Chainage (Km)	Location (Left/Right)	Name of Property	Distance from center of CW (m)		Area (apporx) in meter	Remarks
				BW	Structure		Age of Structure, Whether any annual fairs
1	104+800	L	Commercial encroachment		10	25.0	25m long , Total 7 Shops
2	104+800	R	Water pipe		6		
3	105+100	R	Water pipe		7		
4	105+200	R	Water pipe		7		
5	107+800	L	Gas Pipeline		9		
6	107+900	R	Bus Stop		12	15.0	
7	107+900	L	Bus Stop		10	20.0	
9	109+800	R	Well		15		Parapet wall length 5m
10	110+500	R	Commercial encroachment		5		18m long , Total 3 Shops
11	113+300	R	Bus Stop		10	27.0	
12	115+500	R	Bus Stop		9	27.0	
13	117+900	R	Well		5.5		Parapet wall length 2m
14	126+600	R	Bus Stop		9	66.5	
17	130+600	R	Bus Stop		14	31.5	
19	132+500	L	Sewage Tank	15			In use by Local People, Length- 10
20	132+600	L	Water pipe	15			
21	134+900	R	Bus Stop		9	24.0	
22	142+100	R	Bus Stop		9	22.5	
23	143+100	L	Well	15			Parapet wall length 2m
24	145+200	R	Bus Stop		15	38.5	
25	145+200	L	Urinal structure (P.A)		9		
26	145+800	R	Urinal structure (P.A)		11		
27	147+200	R	Bus Stop		10	27.0	
28	147+800	R	Well		8		Parapet wall length 2m
29	151+200	L	Urinal structure (P.A)		10		
Water body – pond, lake etc. what is the water body, what is the use, whether community use them,							
Canal /river crossing – what canal / river							
Religious – temple /dargah/ church – what is the church, age of the structure, any special festivals							
Shrines – record shirines within the RoW							
Market – weekly markets, nature of goods sold, volume of visitors, any issues, related to parking, wastes etc.							
Educational institutions – number of students, any issues of safety							
Health institutions – no of beds, any issues							
Crematorium / burial ground							

Appendix – 2: Environmental Monitoring Formats

Format EM 1: 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)				
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

EE, 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

Format EM 2: 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 PIU) 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		
j	Quantity of Topsoil removed	cum		
k	Detail of storage of topsoil			
2	**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		
3	**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		
4	**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

EE, SRP Division

Format EM 3: Reporting for Borrow Areas

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 PIU) 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 Landuse			
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

EE, SRP Division

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_____

(EE, SRP Division)

Format EM 5: Redevelopment of Borrow Areas

Construction Stage: Report: Date ____ Month_____ Year_____
To be monitored by EE, SRP Division during construction period
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							
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

EE, SRP Division

Format EC1: Target Sheet for Pollution Monitoring for Pre-Construction/ Post Construction (DLP)/ End of Maintenance Period

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							
4							
5							
Noise Monitoring							
1							
2							
3							
4							
5							

Certified that the Pollution Monitoring has been conducted

Contractor

EE, SRP Division

Appendix – 3: 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.	

	Questions	Response (see note at the end of the checklist)
	• 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? • 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?	

Questions		Response (see note at the end of the checklist)
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 road-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 EE, SRP Division.
- This checklist should be filled up during initial road inventory by the Contractor i.e. before any physical works start.

APPENDIX - 4: Bill of Quantities (BoQ)

10.00	**Implementation of Environmental Management Action Plan to be executed under Civil Works Contract**			**Estimated Quantity**	**Unit Rate (Rs.)**	**Amount (Rs.)**
10.10	Periodic air quality monitoring during construction stage at construction camp sites, bitumen hot mix plants, crusher plants (if specifically established for Project), at major settlement areas along project road. The parameters to be monitored are PM_{10}, $PM_{2.5}$, SO_2, NO_x and CO, Lead. Each monitoring schedule shall be over a duration of 24 hours (in 8 hour shifts) for three seasons per year. (as per the Environmental monitoring plan refered in the EMP)	Nr	Pre Construction	5	7500	37,500.00
			Post Construction	5	7500	37,500.00
			End of Maintenance	5	7500	37,500.00
10.13	Noise quality monitoring at specified silent receptors along Project Road, at construction camp sites, bitumen hot mix plants, crusher plants(if specifically established for Project), and at major settlement areas along project road. – Each monitoring schedule shall be over a duration of 12hours (6Am to 6PM) for three seasons per year. (as per the Environmental monitoring plan refered in the EMP)The monitoring shall be carried out in accordance with CPCB norms at locations given .	Nr	Pre Construction	5	3000	15,000.00
			Post Construction	5	3000	15,000.00
			End of Maintenance	5	3000	15,000.00
10.19	HIV/ AIDS Prevention measures					
	IEC materials - printing, publishing			12	3000	36000
	Healthcare clinic			4	30000	120000
	Condom vending machines			1	15000	15000
	condom supplies			12	3000	36000
	Signages and hoardings			5	15000	75000
	Total Implementation of Environmental Management Action Plan to be executed under Civil Works Contract carried to Grand Summary					4,39,500.00
	Grand Total INR. (Environmental Budget Exclusive of Cost of Measures Included Under Good Engineering Practices, with 3% contingency)					**4,52,685.00**