



Karnataka Road Development Corporation Limited

(A Government of Karnataka Enterprise)

Design, Build, Finance, Operate, Maintain and Transfer (DBFOMT) of Existing State Highway Hungund – Muddebihal – Talikot in the state of Karnataka on DBFOMT Hybrid Annuity Basis (WCP-7)

Environment Management Plan (EMP)

Package No. : Road No. 7 - Hungund - Muddebihal -Talikota
Employer : Karnataka Road Development Corporation Limited
Concessionaire : Ashoka Hungund Talikot Road Limited
Consultant : EGIS India Consulting Engineers Pvt.Ltd.
EPC Contractor : Ashoka Hungund Talikot Road Limited

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Glossary

Abbreviations

KRDCL	-	Karnataka Road Development Corporation Limited
CPCB	-	Central Pollution Control Board
PPP	-	Public-Private Participation
EHS	-	Environment, Health and Safety
CPR	-	Common Property Resources
COI	-	Corridor of Impact
ROW	-	Right of Way
KSPCB	-	Karnataka State Pollution Control Board
MoEF	-	Ministry of Environment and Forest
SEIAA	-	State Environmental Impact Assessment Authority
IE	-	Independent Engineer
CA	-	Concession Agreement
PAP/Fs	-	Project affected peoples / Families
EIA	-	Environment Impact Assessment

Definitions of Terms

Term	Definition
Corrective Action	Action to eliminate cause of a detected nonconformity
Environment	Surroundings in which an organization operates, including air, water, land, natural resources, flora, fauna, and their interrelation
Environmental Audit	An assessment of the extent to which an organization is observing practices which minimize harm to the environment
Environmental Aspect	Element of an organization activities or products or services that can interact with the environment.
Environmental Impact	Any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization aspects
Hazard	Source, situation, or act with a potential for harm in terms of human injury or ill health, or combination of these
Hazard identification	The process of recognizing a hazard in existence and defining its characteristics
Incident	Work-related events in which an injury or ill health or fatality occurred. Or could have occurred
Interested Parties	Person or group, inside or outside the workplace, concerned with or affected by the Integrated management system of an organization
Non conformance	Non-fulfillment of a requirement as per IMS standards, Applicable Rules & Regulations & Client requirements
Ill Health	Identifiable, adverse physical or mental condition arising from and/or made worse by a work activity and/or work-related situation
Risk	Combination of the likelihood of an occurrence of a hazardous event or exposures and the severity of injury or ill health that can be caused by the event or exposures
Risk Assessment	The process of evaluating the risks arising from a hazards, taking into account the adequacy of any existing controls, and deciding whether or not the risks is acceptable
Occupational health and Safety	The condition and factors that affect or could affect the health and safety of employees or other workers (including temporary workers and contractor personnel), visitors or any person in the workplace
Preventive Action	The action to eliminate the cause of a potential nonconformity or other undesirable potential situation



QHSE Policy

We, at **ASHOKA BUILDCON LTD.** are committed to become an icon in infrastructure development, through innovation, professionalism, active leadership in product quality and sustained growth by delivering value to our customers.

We, shall conduct our operations in a manner so that we protect people, property and the environment by identifying, controlling and reducing all associated risks to a level As Low As Reasonably Practicable.

This will be achieved by:-

1. Our commitment to continual improvement of quality, environmental, occupational health & safety management system performance.
2. Commitment to prevention of pollution, injury and ill health
3. Complying with all applicable legal and contractual requirements.
4. Adopting state of art technology available.
5. Communicating and consulting all associated stakeholders for establishing organizational objectives.

A handwritten signature in black ink, appearing to read "Ashok Katariya", is written over a horizontal line.

Ashok Katariya
Chairman

Date : 1st August 2013

CHAPTER – 1

BRIEF INTRODUCTION OF PROJECT

1.0 INTRODUCTION

1.1 PROJECT BACKGROUND

The World Bank is providing assistance to improve the 3411kms of State Highways and MDRs. A part of this loan component, i.e., US\$ 67.26 Million is being provided to KRDC for implementing the development of selected priority State Highways (about 452kms) under the concept of co-financing with private financial institutions. The works involves improving existing State Highways which includes geometric improvements and realignments to 2-lane standards with 7m carriageway, 1.5m paved/soft shoulders and generally wider in built-up areas including separated dual carriageways.

1.2 PROJECT DESCRIPTION

The Project road comprises of two State Highways viz. SH 41 – 1 Km and SH 60 – 54.537 Km and which starts from NH-13 Junction at Hungund and ends at Talikoti Junction on SH-61. The total length of the project stretch is 56.987 KM (Design length). The project stretch passes through Bagalkot and Bijapur District and mainly passes through Hungund, Dannur Cross, Tangadagi, Lebageri, Muddebihal, Kuntoji, Mukihal and ends at Minajagi. The total length of project stretch from Mundargi to Harapanahalli consists of the two State Highways, SH-60 and SH-41.

1.2.1. BRIDGES & CULVERTS

Structures	Link 12-A	Link 12-B	Total
Major Bridge	1 – New / Reconstruction	1 – New / Reconstruction	2
Minor Bridge	2-Proposed for Widening 4- Retained with repairs	1-Proposed for Widening 2 - Retained with repairs	9
Culverts	11 – New / Reconstruction 31 - To be widened 6- Retained with repair	21- To be widened 1-Retained with repair	70

1.2.2 PROPOSED ROAD FEATURES

1.2.2.1 Typical road section

Following two types of configuration are proposed for the project road widening.

- Two Lane with 1.5m Paved shoulder and 1.0m earthen shoulder
- Two lane with paved shoulder (Varies) and RCC box Drain/Footpath of 1.5m

1.2.2.2 Alignment

Proposed road is being constructed on same alignment except minor shifting at three locations i.e. 10+250 to 10+450 (12-A), 19+700 to 19+850 (12-B) and 24+800 to 24+900 (12-B). Total length is 450 m.

1.2.2.3 Right of Way/CoI

The proposed Right of way (PRoW) varies from 18m to 26m in general depending on the typical road cross-section applied. However, in toll plaza locations it goes up to 99m (approx.). In isolated instances

where the embankment heights are significant, a wider COI to accommodate the full width of embankment is necessary.

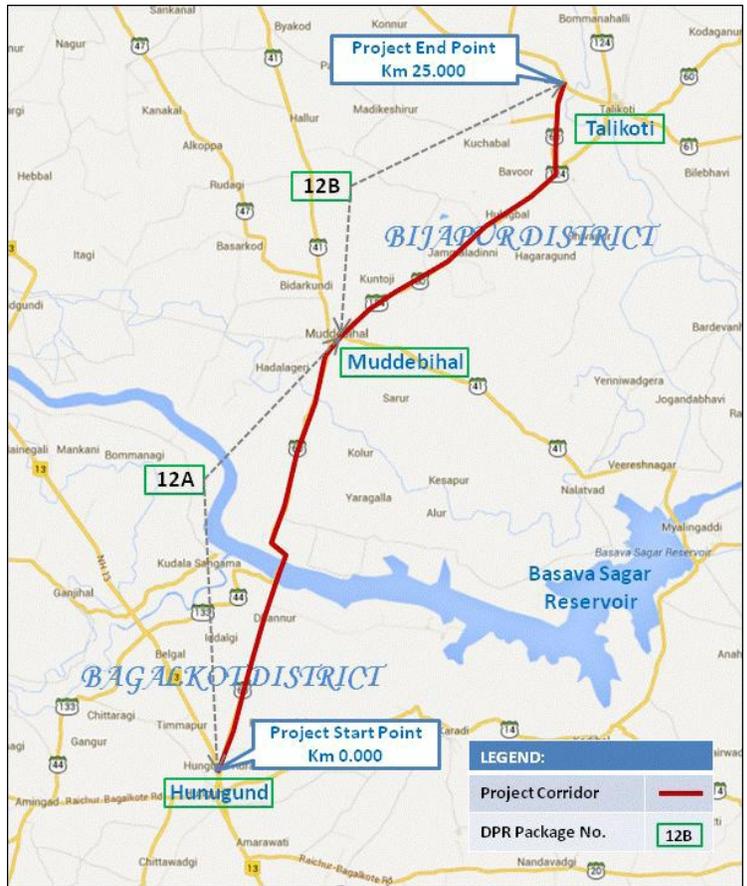


Figure 1.1: Road Project Map

1.2.2.3 Pavement

Flexible pavements are proposed throughout the road

Proposed Pavement specifications

Section	Design MSA		Effective Design CBR, %	Pavement Composition (mm) As per IRC:37-2012			
	Bituminous layers	Non-Bituminous layers		BC	DBM	WMM	GSB
Hungund – Muddebihal	2.84	5.04	10	40	50	250	200
Muddebihal - Talikoti	2.51	4.41	10	40	50	250	200

1.2.3.4 Geometric Design Aspects

- Minor improvements in geometrics is proposed along with widening of the existing road to 2 lane with paved shoulder status
- Design speed at urban is minimum 60 kmph and in rural is minimum 80 kmph & maximum 100 kmph

1.3. ACTIVITIES INVOLVED IN THE PROJECT

1.3.1 Pre-Construction Stage

Pre-construction activities

Pre-construction stage involves mobilization of the project requirement, planning of logistics and site preparation necessary for commencing construction activities. The activities include:

- Joint field verification of EMP with the Environment Specialist IE and of the AHTRL Environmental Officer
- Identification and selection of material sources (quarry and borrow material, water, sand etc.).
- Procurement of construction equipment / machinery such as hot mix plants, batching plants and other construction equipment and machinery.
- Selection, design and layout of construction areas, hot mix and batching plants, labour camps etc.
- Apply for and obtain all the necessary clearances from the agencies concerned.
- Planning traffic diversions and detours including arrangements for temporary land if required.
- Monitoring environmental conditions (Baseline data) through approved monitoring agency

1.3. 2 Construction Stage

1.3.2.1 Construction activities by the AHTRL

Construction stage is the most crucial stage in terms of activities that require careful management to avoid environmental impacts. Environmental impact mitigation measures as per CA will be taken to control the impact on environment. There are several other environmental issues that have been addressed as part of good engineering practices by AHTRL. They include providing roadside drainage provision of cross drainage structures and Toe wall etc.

1.3.3 Operational Stage

Regular monitoring of environment conditions (Air, Water, Noise etc) will be carried out through an approved pollution monitoring agency. During operation stage IE and KRDCCL will be responsible for Monitoring of operational performance of the various mitigation/enhancement measures carried out by the Concessionaire.

1.4 BASELINE & ENVIRONMENTAL IMPACT SUMMARY

The EIA report has been prepared by DPR consultant considering that AHTRL prepared Aspect and Impact matrix for the implementation of EMP and to take EMP mitigation measures as per the contract specifications.

The EIA report has been providing an idea for identification of potential environmental impacts and their feasible remedial measures (including avoidance, mitigation and enhancements).

1.4.1 PHYSICAL ENVIRONMENT

The project corridor traverses entirely through plain terrain. The predominant land use along the project road comprises of Agricultural followed by Built-up and Forest.

1.4.1.1 Land

The project involves widening of the existing road. Approximately 40 acres of land (including Govt. and Private both) shall be acquired to accommodate proposed project. During the construction of the proposed project, the topography will change due to excavation of borrow areas, cuts and fills for project road and construction of project related structures etc.

Provision of construction yard for material handling will also alter the existing topography.

- Loss of productive lands in the direct impact zone;
- Erosion of the soil from the embankment land;
- Inappropriate disposal of wastes from the site;
- Indirect impacts at quarry and borrow area locations during and after the period of construction;
- Loss of Plantation Land

1.4.1.2 Water

Water Resources

Ground Water resources are categorized on basis of their occurrence as shallow aquifers such as wells, hand pumps and deep aquifers such as tube wells or bore wells. Precautions will be taken while working near to the water resources.

Along the project road section 2 wells, 6 hand-pumps, 9 tanks, 5 over head tanks and 1 other structure are located. These are the mainly sources of potable water. Out of these water utilities 7 utilities likely to be affected by the project. 1 Rivers, 1 Nala and 4 Water bodies are present along the Project Road section. However, as per the design no partial / complete loss of water body will take place. Impact on Surface & Ground Water Resources has been tabulated in Table 1.4-1 & 1.4-2.

Table 1.4-1: Surface Water Resources along the Road

S. No.	Chainage (Km)		Distance From EC/L (m)	Feature Name	Settlement	Side (Current)	Volumetric capacity loss
	Exiting	Proposed					
1	6.300	4.720	20	Water Body	Hungund	RHS	No
2	16.050	14.450	0	Krishna River	Dhunnur	Cross	No
3	53.600	20.450	0	Nala	Mukihal darga	cross	No
4	58.000	24.800	30	Water Body	Minojigh	LHS	No
5	58.000	24.800	30	Water Body	Minojigh	LHS	No
6	58.000	24.800	20	Water Body	Minojigh	RHS	No

Table 1.4-2: Ground/ Drinking Water Resources

Road Number	Affected features	Nos.
1	Drinking and Ground water sources	7

Water Quality

Water sources including flowing and stagnant water sources are likely to be contaminated due to activities such as setting up workers camp near water sources or transportation of construction material such as sand, borrow material etc. without covering it. Contamination of groundwater is another likely

impact of road construction and allied activities. The groundwater recharge areas may be reduced due to an increase in impervious layers due to the construction. The contamination of the groundwater resources due to the project is likely at the following locations:

- Along construction sites, camps involving moving of construction equipments and machinery.
- At the various community water bodies and sources of water supply such as hand pumps etc
- Along the entire length of the corridor especially around urban areas and productive lands.

Care should be taken to prevent the Discharge of labour camps and vehicle parking areas which can contaminate watercourses. During the operation stage the leakage or spillage from vehicles damaged, overturned or just badly maintained may also lead to contamination of water bodies, therefore preventive actions will be taken.

1.4.1.3 Air Quality

Rise in PM levels during the construction activities will be controlled through sprinkling of water and will be ensure that it will remain within prescribed limit after the construction activities are over. The congestion in urban areas and intersections contributes to air pollution to some extent. The setting up of camp including hot mix plant, up-gradation works etc. shall involve generation of dust and release of other pollutants leading to the degradation of air quality and it will be control though proper air pollution control measures.

1.4.1.4 Noise

Number of sensitive receptors (schools, colleges and hospitals) has been identified to be quite close to the road. There are 11 Noise Sensitive receptors are located (9 educational institutes & 2 Health Facilities) along the project road. The details of Noise Sensitive Receptors located along project Road are furnished in below table.

Table 1.4.1.4: Sensitive Receptors – Impacts

Sl. No	Chainage (Km)		Distance from EC/L (m)	Structure	Settlement	Side	Anticipated Impact due to Noise
	Exiting	Proposed					
1	13.900	12.300	20	School	Dhunnur	RHS	No
2	14.240	12.650	25	College PU	Dhunnur	LHS	No
3	18.700	17.150	20	Hospital Primary	Tangadgi	LHS	No
4	31.900	30.370	7	School/Hostel	Muddebihal	LHS	Yes
5		0.550	120	VBC High School	Muddebihal	LHS	No
6		0.980	50	School	Muddebihal	RHS	No
7	36.110	5.050	20	School	Kuntogi	RHS	No
8	50.200	19.010	60	Primary School	Mukhial	RHS	No
9	50.220	19.050	20	Primary Health Center	Mukhial Darga	LHS	No
10	57.200	24.000	12	High School	Minajagi	RHS	Yes
11	57.400	24.250	120	Gov.School	Minajagi village	LHS	No

1.4.2 BIOLOGICAL ENVIRONMENT

1.4.2.1 National Park / Sanctuary / Biosphere Reserve / Notified Animal Corridor

No Protected Area like National Park/ Sanctuary/ Biosphere Reserve is located within 1.0 Km aerial Distance from Project Road Section. Also, there is no notified animal corridor/migration route is present in the project area.

1.4.2.2 Forest Areas

Approx. 0.039 Ha of forest department's plantation carried out by Forest Dept. in non-forest land on Sy. No. 100 in Devarhulagabal Village is likely to be affected due to this project. To avoid diversion of Forest land, a Toe Wall has been proposed in forest area. The below table depicts the initial requirement of Forest Land.

Table: 4.2.2: Initial requirement of Forest land

Village	Forest	Sy. No	Chainage				Area (Ha)
			Existing km		Proposed km		
Devarhulagabal Village	Forest Dept. Plantation (LHS)	100	45.200	45.550	14.100	14.480	0.039
Total Forest Area Proposed for Diversion							0.039

1.4.2.3 Flora

All works will be carried out such that the damage or disruption to flora other than those identified for cutting is minimised. Only ground cover/shrubs that impinge on the permanent work or necessary temporary work will be removed. The Contractor under any circumstances will not cut or damage trees outside of the construction zone.

1.4.2.4 Fauna

Extreme care will be taken if any impact on fauna is expected during construction.

1.4.2.5 Aquatic Ecology

Precautions will be taken while repair and upgradation of bridges which may cause contamination of the river / canal water due to spillage of construction material, sediment loading & increased turbidity downstream of the bridge location. Impact on the flora and faunal species and change the nature of the substratum resulting in decline in the number and diversity of plants and thus the food web.

1.4.3 SOCIAL IMPACTS

During widening of the project road, some private and or community asset will be impacted. Care shall be taken that activities are carried out in such a way so that no community or private assets or structures are impacted accidentally. The traffic movement will be within the constricted width available and the traffic shall be managed as per the Traffic management Plan. All public utilities like electricity lines, telephone

lines, hand pumps or water pipelines which are likely to be impacted shall be replaced before the start of work.

1.4.3.1 Cultural Properties

The project road section traverses through 19 settlements and there are some religious and cultural properties which though not of archaeological significance are nevertheless, significant to the community. There are 10 Temples and 1 Dargah are located along the road section. Clearing of the site during movement of road construction machinery is likely to require a belt of about 4-5m from the edge of the carriageway, which is likely to adversely impact cultural properties. Appropriate permissions, approval from concerned authority will be taken prior to any activity near the locations.

1.4.3.2 Socio-Economic Profile

The distribution of PAPs and Affected CPR details are tabulated below.

Table 1.4.3.2-1: Distribution of PAPs

Sl. No.	Type	Residential	Commercial	Residential cum Commercial	Vacant Plot	Industrial Plot
1	Owner	23	77	0	1	0
2	Tenant	2	4	7	0	0
3	Encroacher	0	0	0	0	0
4	Squatter	0	0	0	0	0
5	Others	1	0	0	0	0
	Total	26	81	7	1	0

Table 1.4.3.2-2: Details of CPRs Affected Across Road

Type of the CPR	School building	Village Pond	Cremation Ground	Place of Worship	Grazing Land	Play ground	Govt. Building	Market Shed	Community toilet	Water Structure	Bus Stand	Others	Total
R-6	0	0	0	0	0	0	0	0	0	1	4	0	5

1.4.4 KEY ENVIRONMENTAL FEATURES

The entire link roads under this package Road No. 7, KRDC are passing through the flat rolling terrain to gently undulating terrain with residual hills.

The identified significant impacts due to project are summarized in following impacts due to project are summarized in the impacts matrix given in Table – 1.4.1

Table 1.4 : Environmental Impact Matrix for Road Project

Sl. No.	Activity	Magnitude	Reversible	Irreversible	Nature		Positive	Negative	Direct	Indirect
					Long Term	Short Term				
Pre-Construction Phase										
1	Land Acquisition	Low		√	√			√	√	
2	Relocation of Common Utilities and Common Property Resources	Medium		√	√			√	√	
3	Construction Camps and Storage Areas	Medium	√			√		√	√	
4	Disposal Locations	Medium	√			√		√	√	
5	Borrow Areas	Medium	√			√		√	√	
6	Quarries	Medium	√			√		√	√	
7	Hot Mix / Cement Batching Plant	Medium	√			√		√	√	
8	Temporary arrangement of land for construction purpose	Low	√	√		√		√	√	√
9	Arrangement for Construction Water	Low	√			√		√	√	√
10	Arrangement of Labour	Medium				√	√		√	√
Construction Phase										
1	Clearing of Site	Low	√	√		√	√	√	√	√
2	Felling of Trees	High	√		√			√	√	√
3	Disposal of Debris	Low	√			√		√	√	
4	Stripping , Stacking and Preservation of Top Soil	Low			√		√		√	
5	Borrow Areas operation	Medium	√			√		√	√	
6	Quarry Area Operation	Medium	√			√		√		
7	Traffic Management During Construction	Medium				√	√		√	
8	Operation of Hot Mix Plant/ Cement Batching Plant	Medium	√			√		√	√	
9	Labour Camp	Medium	√			√		√	√	√
10	Construction of Road	Low	√		√	√	√	√	√	√
11	Maintenance of Cross Drainage and Longitudinal Drains	Low			√		√		√	
12	Use of Construction Water	Low	√			√		√	√	
13	Rehabilitation of Borrow Areas/ Quarry/ Disposal location	Medium			√		√		√	√
14	Clean up Operation, Restoration and Rehabilitation of Sites	Medium			√		√		√	√
15	Plantation	Medium			√		√		√	√

Note: Categorizing of Low / Medium / High has been done on recommendation of EIA Report

Table 1.4.2 : Aspect Impact Matrix For project activities is as follows

Sr. No.	Activity	Environmental aspect	Environment impact
Pre-Construction Phase			
1.	Tree Cutting	Tree Cutting / Generation of waste	Depletion of Natural Resources
2.	Relocation of Communities	Generation of waste	Land Pollution
3.	Usage of electricity	Wastage of electrical power	Resource depletion
4.	Setting of Plants / Relocation	Disturbance to land pattern	Land Contamination / Soil Pollution
5.	Transportation of vehicle/ material mobilization	Use of Diesel	Depletion of Natural Resources
Construction Phase			
6.	Disposal of debris/ waste from dismantling structure & excavation of existing road	Generation of debris	Land contamination
7.	Borrow Area operation	Top soil wastage, generation of dust	Air Pollution , Soil contamination
8.	Material Transportation at construction	Generation noise & dust	Noise and Air pollution
9.	Drilling /Cutting	Air, Sound pollution	Noise Pollution
10.	Welding, Gas Cutting	Air Pollution	Air pollution
11.	Preventive maintenance	Usage of oil, diesel	Land contamination
12.	Running of RMC plant : loading of aggregate to feeding point by dozers	Generation of dust and noise	Noise and Air pollution
13.	Crusher Plant operation	Generation of noise and dust	Noise and Air pollution
14.	WMM Plant operation	Generation of noise and dust	Noise and Air pollution
15.	HMP Plant Operation	Generation of noise and dust	Noise and Air pollution
16.	Running of conveyor belt	Generation of dust	Air pollution
17.	Recycling plant	Generation of cement slurry	Land pollution
18.	Plant & skip area gate open	Dust generation	Air pollution
19.	Drinking water area (drivers &helpers)	Water leakage	Water pollution
20.	Concrete pump (installed diff. Type silencer)	Generation of noise	Noise pollution
21.	Sampling of concrete	Generation of waste concrete	Land pollution
22.	Curing water for concrete cubes	Generation of (waste water) fungus, algae	Water pollution

Sr. No.	Activity	Environmental aspect	Environment impact
23.	Cement & silica	Water consumption , co2 emission	Air& water pollution prevention
24.	Foam sprinkler on aggregates	Water consumption	Control air pollution
25.	Natural sand	Reduced natural recourses	consumption natural resource
26.	Wasted food, clothe & tobacco in surrounding labor room	Infection/ disease	Air & land contamination/pollution
27.	Handling of admixture usage	Generation of spillage	Land contamination/pollution
28.	Cleaning of curing tank during discharge water	Generation of logging water	Water pollution
29.	Testing of cube	Generation of waste cube which are tested	Land pollution
30.	Storage of chemicals	Leakages, spillages	Land contamination
31.	Transportation	Use of natural resource	Depletion of Natural Resources
32.	Storage of diesel	Spillage of diesel	Air, land contamination
33.	Cement loading/unloading	Cement	Air, land contamination
34.	Diesel distribution	Leakages, spillages	Land contamination
35.	Storage of LPG cylinders	Cylinder explosion	Air pollution
36.	Diesel storage	Diesel spillage and improper storage	Land contamination
37.	Usage of paper	Improper & unplanned paper consumption	Resource depletion
38.	Electricity consumption	Usage of power	Resource depletion
39.	Usage of electricity	Wastage of electrical power	Resource depletion
40.	Operating matching change oil	Waste oil spillage	Air, land contamination
41.	Connection of bulker rubber pipe while feeding cement or fly ash	Dust generation (high amount of fly or cement can be leak)	Air pollution
42.	Admitter drum area below conveyer belt	Admixture leakage spillage	land contamination
43.	Aggregates 10mm,20mm & sand	Wastage of aggregates & dust generation	Land pollution
44.	Manufacturing of RMC - transportation of aggregate by dumper & conveyor	Generation of dust	Air pollution
45.	Usage of electricity	Wastage of electrical power	Resource depletion
46.	Use of admixtures	Generation of empty barrels of admixture	Land contamination
47.	Use of cement bags	Generation of waste cement bags	Land contamination
48.	Manufacturing of RMC - washing of RMC plant	Generation of waste water	Water pollution
49.	Labour camp management	Generation of waste	Land Contamination

Sr. No.	Activity	Environmental aspect	Environment impact
50.	Quarry Operation	Generation of Dust	Air Pollution / Land Contamination
Operation & Maintenance Phase			
51.	Maintenance work	Wastage of after the maintenance such as oil soak cotton waste, engine oil container	Land contamination
52.	Maintenance work	Waste oil generation	Land contamination
53.	Patrolling Work	Usage of Diesel	Depletion of Natural Resources
54.	Repair Work	Generation of Debris	Land Contamination
55.	Use of Machinery / Vehicles	Generation of Noise	Noise Pollution

CHAPTER – 2

STATUTORY AND REGULATORY REQUIREMENTS

2.1 Legal Compliance

The *M/s. Ashoka Hungund Talikot Road Limited* commits to attend all the environmental stipulated conditions over which obtained permission, NOC and license for compliance of legal and statutory requirements from the concerned authority for the execution of project, Package Road No. 7- KRDC. We shall conduct our operations in such a manner so that we protect the property, health of public and prevent damage to natural ecosystem and environment at the entire location on and off the project sites.

This will be achieved by the incorporation of following:

1. Organization set-up for responsibility of EHS management System
2. Sound Management planning in execution of works
3. Strong Commitment for remedial actions on Environmental Management Plan
4. High degree Commitments on Pollution Prevention and Abatement
5. Prompt actions for the safeguards of natural ecosystem and environment
6. Commitment for continuous monitoring and reporting on environmental aspects
7. Occupational, Health and Safety for staffs and workers
8. Prompt actions on the safety for road –users and Personnel safety for workers
9. Addressing grievances redress and approach
10. Training and participation

Further, *M/s. Ashoka Hungund Talikot Road Limited* commits that not contravene any legislation and obtain all licenses, NOC, Permits as per applicable statutory requirements under the laws and acts governed in India. The details are given in the following head

2.2 Applicable Permits

2.2.1 The Concessionaire shall obtain, as required under the applicable laws, the following Applicable Permits on or before the Appointed Date, save and except to the extent of a waiver granted by the Authority in accordance with Clause 4.1.3 of the Agreement:

- a) Permission for new quarries from Department of Mines and Geology, State Pollution Control Board, land conversion from State Revenue Department and District Administration. If mining area comes under forest land, permission from State Forest Department;
- b) Permission of Village *Panchayat* and Pollution Control Board for and installation of crushers (as per the recent guidelines from Supreme Court);
- c) License for use of explosive from the office of Explosives controller;
- d) Permission for drawing water from bore well / pond / river from village *Panchayat* / Irrigation Department as applicable;
- e) License from Inspector of factories or other competent authority for setting up Batching Plant;
- f) Consent for Establishment and Operation of Asphalt Plant, WMM Plant and Concrete Batching Plant from State Pollution Control Board;

- g) Borrow Earth:
 - i) Permission required from Village Panchayat and owner of the land in case of private land;
 - ii) Permission from Local Municipalities and Development Authorities;
- h) Permission of State Forest Department for cutting of trees, if any;
- i) Ministry of Finance / RBI:
 - i) Approval for foreign investment and foreign loans, if required;
 - ii) Approval for import of equipment and machinery for construction and operation, if required;
 - iii) Exemption of Excise Duty on construction materials, if required;
- j) Department of Telecommunication:
 - i) Permission / clearance for setting up of wireless system, if required;
 - ii) Clearance / permission for the use of optical fiber cables of Department of Telecommunication, if required;
- k) Electricity:
 - i) Permission required from State Electricity Board (SEB) and Consent from State Pollution Control Board for installation of Diesel Generator (DG);
 - ii) Permission for electrical connection, if power source is available;
- l) Sewage Lines and Water Mains:
 - i) Permission from local Municipalities and Development Authorities; and
- m) Any other permits or clearances required under Applicable Laws

As per the clause 32.4 Concessionaire will take out and maintain the following insurance policies in the specified sums and with the specified deductibles as set out below:

- (a) Cargo Insurance During Transport: Equipment/ Machinery Invoice value.
- (b) Installation All Risks Insurance: Total Project Cost
- (c) Third Party Liability Insurance: Minimum Rs 20,00,000/- per occurrence, with the number of occurrences unlimited.
- (d) Professional Liability Insurance: Minimum Rs 10 Crores per occurrence, with the number of occurrences unlimited.
- (e) Automobile Liability Insurance: Value at market rates of vehicles
- (f) Worker's Compensation: In accordance with the requirements of the Applicable Law of India
- (g) Authority's Liability: In accordance with the requirements of the Applicable Law of India

CHAPTER – 03

INSTITUTIONAL ARRANGEMENT

3.0 INSTITUTIONAL ARRANGMENT

3.1 PROJECT SITE ARRANGEMENTS

The responsibility of implementation of the Environmental, Safety & Social Management Plan rests with the following personnel involved in the implementation of the project.

3.1.1 CHIEF OPERATING OFFICER (COO) /PROJECT DIRECTOR

The COO/ Project Director is responsible for the overall implementation of the project. In the present case, the ABL contractors are also members of the ABL, VHPL, and hence the Project Director is responsible for undertaking the engineering, procurement and construction of the project.

- Guiding the formation of Policy & its Approval
- Giving the guideline for the Budget & its Approval
- Review of the safety & Environment Procedure & its Approval
- To provide guideline for All legal aspect of project & comply all environment legal rules & regulation.
- To provide guidance for the implementation of OHSAS & EMS System

3.1.2 PROJECT INCHARGE / SR. GENERAL MANGER

The Project Incharge / Sr. General Manager are responsible for the overall implementation of the project. The Project Incharge / SGM is responsible for undertaking the engineering, procurement and construction of the project. The SGM shall oversee the implementation of the EMP by assigning the necessary resources and periodically review the effective use of the EMP on site.

3.1.3 RESIDENT ENGINEER (RE) - ROAD AND BRIDGE WORKS

The Project Engineer - Road Works shall be responsible for implementation of the EMP during the construction of the road works. He being responsible for day to day operations with regards to road works shall supervise and oversee construction activities such as site clearances, stripping of top soil, excavations. Filling and laying material etc. which necessitates the operation of construction equipment and machinery at the site.

These activities would have environmental effects in terms of impairment to noise and air quality, tree cutting and severances and hence shall be responsible for implementing the EMP in the day to day activities of road construction. The Project Engineer – Bridge Works shall be responsible for implementation of the EMP during the construction of bridge works. These activities would necessitate diversion of roads, cutting of trees and diversion to natural drainage paths which would have a bearing on the environmental quality of the area. The RE (bridge works) shall be responsible for implementation of EMP with respect to environmental aspects during bridge construction.

3.1.4 ENVIRONMENTAL OFFICER

For effective implementation and management of the EMP, the Concessionaire has established a Safety, Health and Environment (SHE) Cell headed by an Environment Officer to deal with the environmental issues of the project. This officer shall interact with the EPC Contractor, KRDC, IE and other line departments to ensure that the mitigation and enhancement measures mentioned in the EMP are adhered. The Environmental officer of the Concessionaire shall be the interface between the Environmental Specialist of IE and the Environmental Officer of the contractor. His prime responsibility shall be to apprise the Sr. Environmental Specialist of the IE about the ground conditions. He shall also procure the requisite clearances and the NOCs for the project and shall also strictly supervise that the Contractor adheres to the EMP. The environmental officer can also look after the additional charges of safety and health.

Roles & Responsibilities

- He / She shall be reporting directly to the Chief Project Manager of the Concessionaire.
- Primarily responsible for implementation of the EMP on site and ensuring that the environmental quality is meeting the standards laid down by Central Pollution Control Board and other related authority.
- The EO shall implement the EMP by assigning the necessary resources (manpower, money and machinery) and attend such meetings as are required for the effective implementation of the EMP on site.
- He shall maintain a "Complain Register" to record any grievances from public.
- He shall maintain a register of all road side trees planted and present within ROW.
- The EO shall be the interface of the Concessionaire with the client and the IE.

3.1.5 SITE ENGINEERS/SUPERVISORS

The site engineers/supervisors report to the RE and are responsible for day to day operations of construction works in their respective areas. They supervise and oversee the construction activities and hence shall be made responsible for ground the EMP and minimize the impacts during construction. Some of the key aspects that shall be taken up by the site engineers/ supervisors shall include periodic sprinkling of water in inhabited areas during transportation of material and operation of construction machinery.

3.1.6 SUBCONTRACTORS/ PETTY CONTRACTORS

Execution of works will be the responsibility of the subContractor.

The contractor shall be responsible for both the jobs done by the petty contractor (if Sublet) as well by him. In both the cases the Concessionaire will implement the environmental measures (either through the contractors or themselves). This has been done with a view to ensure that road construction and environmental management goes together.

Roles & Responsibilities

- The Environmental Officer shall report directly to the Resident Construction Manager / Project Manager so that the pertinent environmental issues that he raises are promptly dealt with.
- He shall also have a direct interaction with the Environmental Specialist and the Environmental Officer of the IE and the Concessionaire respectively.
- Monitor / implement measures laid out in the EMP and or as directed by the IE for the work executed both by petty contractors and the contractor.
- Provide key inputs in the development of the Contractors' implementation plan for all construction activities, including haulage of material to site, adhering to the requirements of the EMP and getting approval of concessionaire and the IE on the same before start of works.
- Ensure that the regulatory permissions required for the construction equipment, vehicles and machinery (given in the EMP) have been obtained and are valid at all times during the execution of the project.
- Prepare / fill up the environmental and safety related compliances monthly/Qtr. given in the EMP
- Prepare Safety Plans, Emergency Response Plans and Quarry Management and other safety, health and environment related Plans for approval of the IE and the Concessionaire.
- Identify locations for siting construction camps and other plants, machinery, vehicles and equipment, as well as locations for storage and disposal of wastes, both from the construction camps and from the site and obtain approval for the same from the concessionaire and the IE.
- Detail out site-specific environmental mitigation and enhancement measures and obtain approval of concessionaire and the IE for the same
- Carry out the measurements of environmental mitigation and / or enhancement works and prepares bills for the same for approval and payment through the Concessionaire's Environmental Officer
- Ensure that the safety of the workers and other site users is not compromised during construction
- Ensure that adequate monitoring facilities are available for collecting samples of all discharges from the Contractor's plants, equipment and camps
- Verify the extent of environmental compliance at sites from where the Contractor is procuring the material – Borrow Area, Quarries, Crushers or even sand and suggest appropriate mitigation measures, if required
- Responsible for implementation of safety and health regulations if also acting as safety officer
- The environmental officer shall have a small environmental, health and safety team to help him in implementing the EMP. These team members may / may not report to him / her directly but shall apprise him of all the incidents and mark a formal report of any incident having an impact on the Health, Environment and Safety issues.

3.2) Training Programs:-

HSE induction training and job specific training needs will identified and training will be imparted to project personnel, sub-contractor / petty contractors engaged for the project activities. Specific training will be imparted to undertake the required EMP management actions and monitoring activities. The project will ensure that all concerned team members assigned for implementation of EMP and project specific EMP understand the following aspects through the training programme :-

- ❖ Purpose and Importance of EMP for Various project activities ;
- ❖ Requirements of the mitigation measures under the management plan and specific action plans ;
- ❖ Understanding of the sensitive environmental and social features within and surrounding the project area ;
- ❖ Aware of the potential risks from the project activities.

Suggested training module matrix

Sr. no	Training Topic	Designation						Frequency
		Project Management (GM, DGM, Sr. Manager and Manager)	Engineers / Departmental Heads	Supervisor	Operators	Driver	Labour /Workers	
1.	E H S Induction		√	√	√	√	√	Six Monthly
2.	Emergency Preparedness and Response Plan	√	√	√	√	√		Quarterly
3.	Environment Management Plan	√	√	√	√			Quarterly
4.	Borrow Area Management		√	√	√		√	Six Monthly
5.	Site Excavation, dismantle and disposal		√	√	√		√	Six Monthly
6.	Dust Control measures (site and plant)		√	√	√		√	Six Monthly
7.	General Safety Rule		√	√	√	√	√	Six Monthly
8.	Fire Fighting			√	√		√	Six Monthly
9.	Hazardous Material (MSDS)		√	√	√		√	Six Monthly
10.	Road Safety & Road Barricading			√	√	√	√	Quarterly
11.	First Aid Box & its use	√	√	√	√	√	√	Six Monthly
12.	Accident prevention at road project site and HMP, WMM, RMC Plant	√	√	√	√		√	Six Monthly
13.	Working at Height		√	√	√		√	Six Monthly
14.	Material Handling		√	√	√		√	Six Monthly
15.	Electrical Safety	√	√	√	√		√	Quarterly
16.	Defensive Driving	√	√	√	√	√	√	Six Monthly

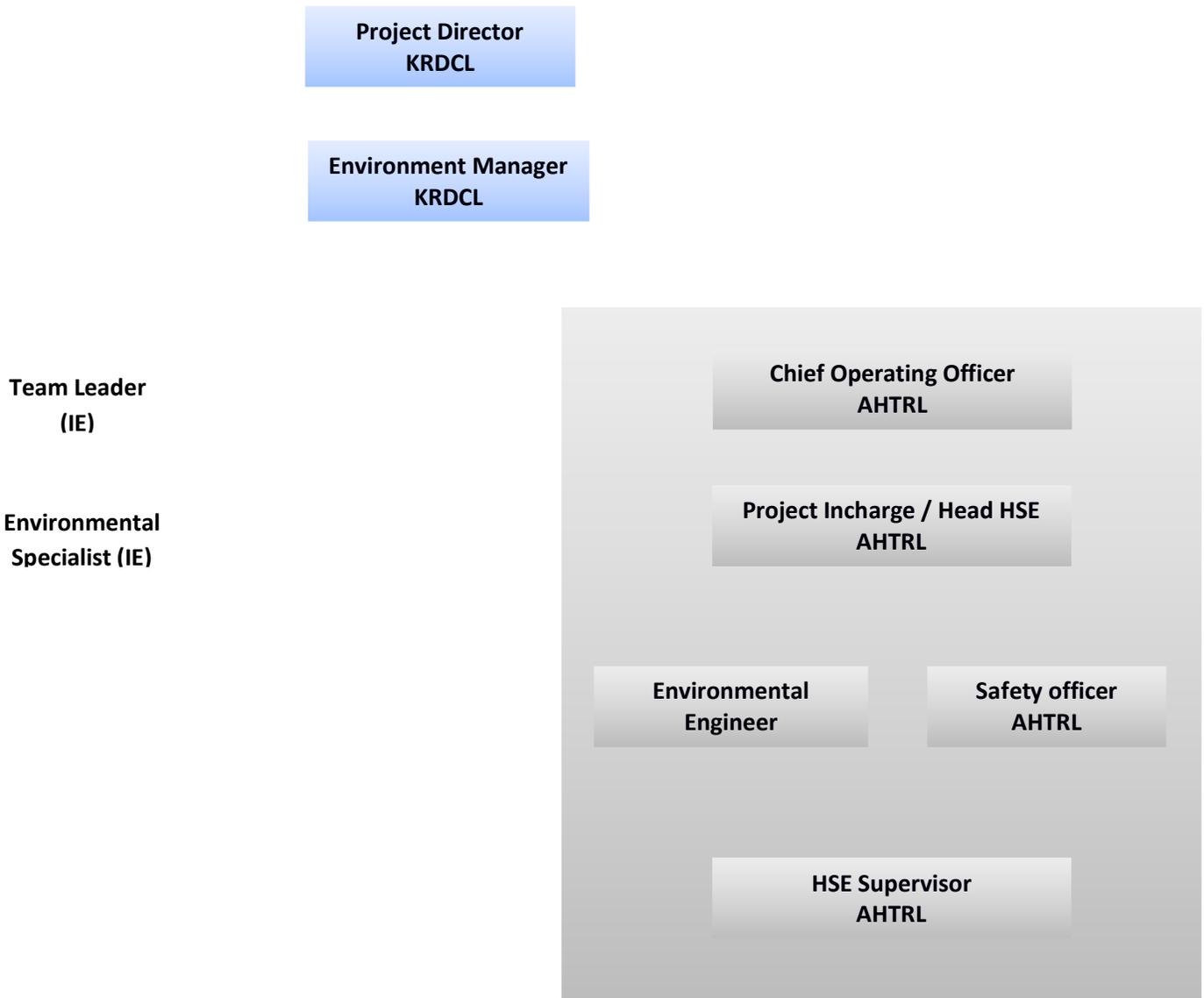
3.3 REPORTING SYSTEM

Reporting system provides necessary feedback for project management to ensure quality of the works and that the program is on schedule. The rationale for a reporting system is based on accountability to ensure that the measures proposed as part of the Environmental Management Plan get implemented in the project. Reporting system for the suggested monitoring program operates at two levels as:

- Reporting for environmental condition indicators and environmental management indicators
- Reporting for operational performance indicators at the KRDCCL site level.

The reporting system will operate linearly – contractor who is at the lowest rung of the implementation system reporting to the Concessionaire, who in turn shall report to IE and the KRDCCL. All reporting by the Concessionaire shall be on a monthly/Quarterly basis, while the reporting time of the contractor shall be decided upon by the Concessionaire.

3.2 Project Site HSE Organization Chart:



CHAPTER-4

ENVIRONMENTAL MANAGEMENT PLAN AND REVIEW FRAMEWORK

4.1 Environmental Management Measures

Environmental Management Measures deals with the management measures and implementation procedure of the guidelines along with enhancement measures recommended to avoid, minimize and mitigate foreseen environmental impacts of the project.

The AHTRL will extend their resource and support for environmental management and provide all inputs of manpower for environmental benefits so that work should be carried –out in the sincerity of environmental concern to up- keep the health, safety and environment at standard and acceptable level.

Proposed preventive measures which are required for mitigation and minimization of impacts during the project implementation are listed in below table. The AHTRL commits to acts for sound management construction during the all stages of project covers as details in the preceding sections of environmental management plan.

Table -4.1 ENVIRONMENTAL MANAGEMENT MEASURES

Sl. No.	Environmental Issue	Location / sources	Mitigation Measures	Implementing Agency	Supervising & Monitoring Agency	
Pre-Construction Phase						
Pre-construction activities by KRDC, Karnataka						
P.1	Clearances & approvals	For construction works	Secure the following clearances & NOCs prior to start of construction activity		Concessionaire/ Contractor	IE, KRDC
			Type of Clearance NOC and consents under Air, Water & Environment Act and noise rules from KSPCB NOC and consents under Air, Water & Environment Act and noise rules from KSPCB Explosive License from Chief Controller of Explosives Labour license from labour commissioner office	Applicability For establishment of construction camp For operating construction plant, batching plant etc. For storing fuel oil, lubricants, diesel etc. Engagement of Labour		
P.2	Ecologically Sensitive areas (Protected/Reserve forests etc.)	Diversion of Forest land	- No Forest land involved for Acquisition - Design modifications done to reduce the area of forest to be diverted		KRDC duly assisted by Concessionaire	KRDC and Forest Dept.
		Plantation along project road	- Tree felling to be carried out after obtaining prior permission from the Deputy Conservatory of Forest (DCF)		Concessionaire/ Contractor	IE, KRDC and Forest Dept.
P.3	Land Acquisition	ROW	- To correct some inherent deficiencies LA involved in all the project roads at few locations. Land acquisition shall be as per procedure laid down by the Govt. of Karnataka & State Govt. R&R Policy		KRDC	KRDC and Land Acquisition dept.
P.4	Clearance of Encroachment / Squatters	ROW	Advance notice shall be given to the encroachers & squatters present, who need to be relocated as per RAP. All R&R activities will be completed prior to initiation of civil works.		KRDC duly assisted by Concessionaire	KRDC and local Admin. dept.

Sl. No.	Environmental Issue	Location / sources	Mitigation Measures	Implementing Agency	Supervising & Monitoring Agency
P.5	Tree Cutting	ROW	<ul style="list-style-type: none"> - Design modifications done to reduce the number of trees to be felled - Trees within the proposed widening area shall be felled along with some which pose potential safety hazard - Tree felling only after obtaining clearances from the Forest Dept. - Felling of only those trees which are absolutely important for road safety and Stacking, transport & storage of the wood will be done as per Karnataka State forest guidelines. 	Concessionaire/ Contractor	KRDCL and Forest Dept.
P.6	Preservation of Trees	ROW	- No tree will be cut beyond the proposed toe line. All efforts will be made to preserve trees	Concessionaire/ Contractor	IE, KRDCL
P.7	Relocation of Community Utilities & Common Property Resources	Along the Project Road	- All community utilities & properties i.e., hand pumps, open wells, water supply lines, sewer lines, telephone cables, buildings & health centres will be relocated before construction starts on the project road. All possible measures will be taken to minimise inconvenience to public.	Concessionaire/ Contractor	IE, KRDCL
P.8	Relocation of affected Cultural & Religious Properties	Along the Project Road	<ul style="list-style-type: none"> - Religious property resources such as shrines, temples & mosques will be preferably relocated beyond the RoW if affected - Cultural properties affected to be relocated as per SIA and RAP. KRDCL / NGO with help of local admin will finalise the shifting of CPR 	Concessionaire/ NGO / KRDCL	IE, KRDCL
P.9	Implementation Information Meeting & Disclosure of Information	Project road	<ul style="list-style-type: none"> - Organise implementation information meeting in the vicinity of project site for general public to consult & inform people about plans covering overall construction schedule, safety, use of local resources, traffic safety & management plan of debris disposal, drainage protection, pollution abatement & other plans, measures to minimise disruptions, damage & inconvenience to roadside users & people along the road - Locally relevant information such as Traffic Safety & Management Plan, Environment Management Measures, Enhancement Details, Enhancement Drawings, List of Common Property Resources, Complaints & Suggestion Book, Name & Address of the contact person, typical design cross-sections, etc. shall be disclosed by the Concessionaire/Contractor through KRDCL 	Concessionaire/ Contractor	IE, KRDCL
P10	Implementing Agency & Contractors		- The Concessionaire / Contractor & KRDCL shall organize orientation sessions & regular training sessions during all stages of the Project. This shall include on-site training (general as well as in the specific context of a sub-project). These sessions shall involve all staff of KRDCL, Concessionaire / Contractor & IE involved in the implementation of EMP	Concessionaire/ Contractor	IE, KRDCL
P 11 : Field Verification and Modification of the Contract Documents					
P11.1	Joint Field Verification Assessment of		The Manager-Environment KRDCL, Environmental Specialist of IE, and the Concessionaire/Contractor will carry out joint field verification to ascertain any possibilities of saving trees, environmental and community resources, if these activities are to be taken up by the construction Contractor.	Concessionaire / Contractor	IE, KRDCL
P11.2	Impacts due to		The Concessionaire in consultation with Environmental Specialist of IE shall identify and	Concessionaire /	IE, KRDCL

Sl. No.	Environmental Issue	Location / sources	Mitigation Measures	Implementing Agency	Supervising & Monitoring Agency
	Changes/ Revisions/ Additions in the Project Work		assess potential adverse environmental impacts due to changes proposed by him, and prepare the Environmental management measures and submit to the authority for review before implementing the same.	Contractor	
P.11.3	Procurement of Hot-mix plants & Batching Plants, other Construction Vehicles, Equipment & Machinery	For construction works	- Specifications of hot mix plants & batching plants, other construction vehicles, equipment & machinery to be procured will comply to the relevant Bureau of Indian Standard (BIS) norms & with the requirements of the relevant current emission control legislations defined by CPCB/State pollution control board	Concessionaire/ Contractor	IE, KRDCCL
P.11.4	Setting up of Hot mix Plants & Batching Plant	For construction works	- Hot mix plants and batching plants shall be located at least 1000m away in downwind direction from the nearest habitation. The Concessionaire/Contractor shall obtain the consent to establish and consent to operate the plants from the Karnataka State Pollution Control Board and submit a copy to the IE & KRDCCL.	Concessionaire/ Contractor	IE, KRDCCL
P 12	Labour Requirements	Camp Site	- The concessionaire / contractor preferably will use unskilled labour drawn from local communities to give the maximum benefit to the local community.	Concessionaire/ Contractor	IE, KRDCCL
P 13	Construction on Camp Locations Selection, Design & Lay-out		Layout of construction camp will be as per approval of IE Resident Engineer and environmental Specialist. Construction camps will not be proposed within 500 m from the nearest settlements to avoid conflicts and stress over the infrastructure facilities with the local community. Location for stockyards for construction materials will be identified at least 1000 m from water courses. The sewage and solid waste for the camp will be designed, built and operated.	Concessionaire/ Contractor	Environmental Specialist of IE and KRDCCL
P 14	Arrangements for Temporary Land Requirement		The Concessionaire / Contractor as per prevalent rules will carry out negotiations with the landowners for obtaining their consent for temporary use of lands for construction camp /construction/ borrow areas etc	Concessionaire/ Contractor	Environment Specialist of IE and KRDCCL
P15	Environmental Conditions	Project road vicinity	The Concessionaire shall undertake seasonal monitoring of air, water, and noise and soil quality through an approved monitoring agency. The parameters to be monitored, frequency and duration of monitoring as well as the locations to be monitored shall be as per the Monitoring Plan finalized with Environmental Specialist of IE.	Concessionaire/ Contractor	Environment Specialist of IE and KRDCCL
Construction / Maintenance Phase					
C1 : Site Clearance					
C.1.1	Clearing & Grubbing	Within ROW	- Vegetation will be removed, if required before commencement of construction. All works will be carried out such that the damage or disruption to flora other than those identified for cutting is minimized. - Only ground cover/shrubs that impinge on the permanent work or necessary temporary work will be removed. - The Contractor under any circumstances will not cut or damage trees outside of the construction zone. Trees identified for removal will be cut only after receiving clearance	Concessionaire/ Contractor	IE and KRDCCL, Regulatory Authorities

Sl. No.	Environmental Issue	Location / sources	Mitigation Measures	Implementing Agency	Supervising & Monitoring Agency
			<p>from the forest department & after that the receipt of KRDC's written confirmation in this regard.</p> <ul style="list-style-type: none"> - Vegetation only with girth of over 30 cm will be considered as trees. 		
C.1.2	Disposal of debris from dismantling structures & excavation of the existing road surface & pavements	Within ROW	<p>Debris generated due to the excavation of the existing road will be suitably reused in the proposed construction, subject to the suitability of the materials & approval from the IE as follows:</p> <ul style="list-style-type: none"> - The sub-grade of the existing pavement may be used as embankment fill material. - The existing sub base material may be recycled as sub base of any haul road or access road. - The existing bitumen surface may be utilised for the paving of access roads & paving works in construction sites & campus, temporary traffic diversions, haulage routes etc. - The Contractor shall identify disposal sites and will report to the Project Manager. This location will be checked on site & accordingly approved prior to any disposal of waste materials. - All arrangement for transportation during construction including provision, maintenance, dismantling & clearing debris, will be considered incidental to the works & will be planned & implemented by the Contractor. - Debris generated from other construction activities shall be disposed such that it does not flow into the surface water bodies or form mud puddles in the area. No debris will be staged on the road or culvert/bridges locations. 	Concessionaire/ Contractor	IE and KRDC, Regulatory Authorities
C.1.3	Other Construction Wastes Disposal	Along the Project Road and Camp site	<p>The pre-identified disposal locations will be part of Comprehensive Waste Disposal Solid Waste Management Plan to be prepared by the Concessionaire / Contractor in consultation and with approval of Environmental Specialist of IE. Location of disposal sites will be finalized prior to initiation of the works on any particular section of the road, if disposal is envisaged.</p> <p>The Environmental Specialist of IE will approve these disposal sites after conducting a joint inspection on the site with the Contractor.</p> <p>Contractor will ensure that any spoils or material unsuitable for embankment fill will not be disposed off near any water course or agricultural land. Such spoils from excavation can be used to reclaim borrow pits and low-lying areas located in barren lands along the project road (if is so desired by the owner/community and approved by the Environmental Specialist of IE).</p> <p>Non-bituminous wastes will be dumped in borrow pits covered with a layer of the soil to ensure that borrow pit is restored to original use. No new disposal site shall be created as part of the project, except with prior approval of the Environmental Specialist of IE.</p> <p>All waste materials will be completely disposed and the site will be fully cleaned and certified by Environmental Specialist of IE before handing over.</p> <p>The contractor at its cost shall resolve any claim, arising out of waste disposal or any noncompliance that may arise on account of lack of action on his part.</p>	Concessionaire/ Contractor	Environmental Specialist of IE, KRDC
C.1.4	Stripping, stocking and preservation of top soil	Camp site and Borrow Area	<p>The top soil from all areas of cutting and all areas to be permanently covered will be stripped to a specified depth of 150 mm and stored in stockpiles. A portion of the temporarily acquired area and/or Right of Way will be earmarked for storing topsoil. The locations for stock piling will be pre-identified in consultation and with approval of</p>	Concessionaire/ Contractor	IE and KRDC,

Sl. No.	Environmental Issue	Location / sources	Mitigation Measures	Implementing Agency	Supervising & Monitoring Agency
			<p>Environmental Specialist of IE. The following precautionary measures will be taken to preserve them till they are used:</p> <p>a) Stockpile will be designed such that the slope does not exceed 1:2 (vertical to horizontal), and height of the pile is restricted to 2 m. To retain soil and to allow percolation of water, the edges of the pile will be protected by silt fencing.</p> <p>b) Stockpiles will not be surcharged or otherwise loaded and multiple handling will be kept to a minimum to ensure that no compaction will occur. The stockpiles shall be covered with gunny bags or vegetation.</p> <p>c) It will be ensured by the Contractor that the top soil will not be unnecessarily trafficked either before stripping or when in stockpiles.</p> <p>Such stockpiled topsoil will be utilized for -</p> <ul style="list-style-type: none"> - Covering all disturbed areas including borrow areas, only in a case where there are to be rehabilitation - Dressing of slopes of road embankment - Agricultural fields of farmers acquired temporarily land. 		
C.1.5	Accessibility	Project road	<p>The concessionaire / contractor will provide safe and convenient passage for vehicles, pedestrians and livestock to and from roadsides and property accesses connecting the project road, providing temporary connecting road. The contractor will also ensure that the existing accesses will not be undertaken without providing adequate provisions.</p> <p>The concessionaire / contractor will take care that the cross roads are constructed in such a sequence that construction work on the adjacent cross roads are taken up one after one so that traffic movement in any given area not get affected much.</p>	Concessionaire/ Contractor	IE and KRDCCL,
C.1.6	Planning for Traffic Diversions & Detours	Project road	<ul style="list-style-type: none"> - Any temporary traffic diversions need to be constructed after approval from the Employer & under the supervision of the IE. - Detailed Traffic Control Plans will be prepared by the contractor & approved by the IE seven days prior to commencement of works on any section of road. The traffic control plans shall contain details of temporary diversions, traffic safety arrangements for construction under traffic, details of traffic arrangement after cessation of work each day, safety measures for night time traffic & precaution for transportation of hazardous materials & arrangement of flagmen. - The concessionaire / contractor will provide specific measures for safety of pedestrians, school children's (close to project road) & workers at night as part of traffic control plans & ensure that the diversion/detours are always maintained in usable condition, particularly during the monsoon to avoid disruption to traffic flow. - The Contractor will also inform local community of changes to traffic routes, conditions & pedestrian access arrangements with assistance from the Local Admin & Executive Engineer of KRDCCL. The temporary traffic detours will be kept free of dust by sprinkling of water at a sufficient frequency & as required under specific conditions (depending on weather conditions, construction in the settlement areas & volume of traffic). <p>Safety of Children Entering or Exiting Schools</p> <ul style="list-style-type: none"> - Where the work site is within 500m of a school entrance, the concessionaire / contractor 	Concessionaire/ Contractor	IE, KRDCCL and Traffic Police

Sl. No.	Environmental Issue	Location / sources	Mitigation Measures	Implementing Agency	Supervising & Monitoring Agency
			shall provide a specific traffic management plan that clearly demonstrates the extra steps to mitigate risk for school children passing through the work site.		
C.2: Procurement of Construction Material					
C.2.1	Borrow Areas	Borrow area used for project road	<ul style="list-style-type: none"> - Finalizing borrow areas for borrowing earth & all logistic arrangements as well as compliance to environmental requirements, as applicable, will be the sole responsibility of the Contractor. - Concessionaire / Contractor will not start borrowing of earth from any borrow area until the formal agreement is signed between landowner & Contractor & same is to be approved from the Karnataka State Environmental Appraisal Committee (SEAC) the copy of agreement shall be submitted to the IE. - Planning of haul roads for accessing borrows areas will be undertaken during this stage. The haul roads shall be routed to avoid agricultural areas as far as possible & will use the existing village roads wherever available. - Finalizing soil borrowing earth and all logistic arrangements as well as compliance to environmental requirements, as applicable, shall be the sole responsibility of the Concessionaire. 	Concessionaire/ Contractor	IE, KRDCCL and Regulatory Authorities
C.2.2	Quarry	Establishment of Quarry site	<ul style="list-style-type: none"> - No quarrying activity is envisaged for the project. However if required, Contractor will procure all necessary permissions for procurement of material from the Mining Department, District Administration & State Pollution Control Board & shall submit a copy of the approval & the rehabilitation plan to KRDCCL through the IE. - The Concessionaire / Contractor will also work out haul road network & report these details to the Project Manager who will inspect & in turn report to KRDCCL before approval. 	Concessionaire/ Contractor	IE, KRDCCL and Regulatory
C.2.3	Arrangement for Construction Water	Construction camp & Project road	<ul style="list-style-type: none"> - The Concessionaire / Contractor will use ground / surface water as a source of water for the construction & where necessary set up own bore well facility for construction work. - To avoid disruption/disturbance to other water users, the Contractor will extract water from fixed locations & consult with the Project Manager before finalising the locations. - The Concessionaire / Contractor will provide a list of locations & type of sources from where water for construction will be extracted. - The Concessionaire / Contractor will need to comply with the requirements of the State Ground Water Department for the extraction & seek their approval for doing so & submit copies of the permission to the Project Manager & the KRDCCL. 	Concessionaire/ Contractor	IE, KRDCCL, Regulatory Authorities
C.2.4	Sand	Riverbeds	<ul style="list-style-type: none"> - The sand will be procured from identified approved sand mines or vendors - The Concessionaire / Contractor will obtain copy of the Lease agreement of the supplier & submit this to the Executive Engineer-KRDCCL before procuring the sand. 	Concessionaire/ Contractor	IE, KRDCCL, Regulatory Authorities
C.3 Pollution					
C.3.1	Air Pollution	Construction plants, equipment & vehicles	<ul style="list-style-type: none"> - The Concessionaire shall take every precaution to reduce the level of dust from construction plants, construction sites involving earthwork by sprinkling of water, encapsulation of dust source. 	Concessionaire /Contractor	IE, KRDCCL

Sl. No.	Environmental Issue	Location / sources	Mitigation Measures	Implementing Agency	Supervising & Monitoring Agency
			<ul style="list-style-type: none"> - The Concessionaire shall procure the construction plants and machinery, which shall conform to the pollution control norms specified by MoEF/CPCB/KSPCB. - Concessionaire shall ensure that all vehicles, equipment and machinery used for construction are regularly maintained and confirm that pollution emission levels comply with the relevant statutory requirements of CPCB and/Motor Vehicles Rules. - All vehicles used at project road shall have valid Pollution under Control (PUC) Certificates displayed as per the requirement of the Motor Vehicles Department for duration of the Contract. <p>For setting up the Construction plant site following points must be considered & maintained by the concessionaire:</p> <ul style="list-style-type: none"> - 1.5 km away from settlement, school, hospital on downwind directions - 1.5 km from any archaeological site - 1.5 km from ecologically sensitive areas i.e. forest, national park, sanctuary - 1.5 Km from rivers, streams & lakes 500 m from ponds - 500 m from National Highway, 250 m from State Highway, 100 m from District roads & other roads - Obtaining Consent-for-Establishment (CFE) & Obtaining Consent-for-Operation (CFO) under Air & Water Acts from the Karnataka State Pollution Control (KSPCB). - Ensure adequate stack height for HMP as may be stipulated in CFE - Install emission control devices such as bag house filters, cyclone separators, water scrubbers etc. - Greenbelt along the periphery of plant site 		
C.3.2	Water Pollution	Dust during earth works or from spoil dumps	<ul style="list-style-type: none"> - To maintain adequate moisture at surface of any earthwork layer completed or non-completed to avoid dust emission. - Stockpiling spoil at designated areas & at least 5 m away from traffic lane. 	Concessionaire/Contractor	IE, KRDC
		Storage of maintenance materials	<ul style="list-style-type: none"> - Proper stockpiling & sprinkling of water as necessary 	Concessionaire/Contractor	IE, KRDC
		Clearing of water ways of cross drainage works including bridges & clearing of longitudinal side drains	<ul style="list-style-type: none"> - Clearance of waterway will be undertaken before onset of monsoon i.e. early in the month of June. - Debris generated due to clearing of longitudinal side drains & waterways of cross drainage will be stored above high flood level & away from waterway, & reused on embankment slope or disposed at designated areas. 	Concessionaire/Contractor	IE, KRDC
C.3.3	Noise Pollution & Vibration	Construction vehicles	Avoiding cleaning / washing of construction vehicle in any water body	Concessionaire/Contractor	IE, KRDC
	Construction camp & workers camp	Throughout Project Corridor,	<ul style="list-style-type: none"> - Minimum distance of 1.5 km from river, stream & lake & 500 m from ponds. - Locate facilities in areas not affected by flooding & clear of any natural or storm water courses. 	Concessionaire/Contractor	IE, KRDC

Sl. No.	Environmental Issue	Location / sources	Mitigation Measures	Implementing Agency	Supervising & Monitoring Agency
		Construction Vehicles, Plants & Equipment	<ul style="list-style-type: none"> - The ground should have gentle slope to allow free drainage of the site. - The camp 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 & two sieves, coarse above & fine below, may be used - A separate vehicle washing ramp shall be constructed adjacent to the workshop for washing vehicles, including truck mounted concrete mixers, if any. - At the construction sites within 150 m of the nearest habitation, noisy construction work such as crushing, operation of DG sets, use of high noise generation equipment shall be stopped during the night time between 10.00 pm to 6.00 am. Working hours of the construction activities shall be restricted around educational institutions/Health Centers (silent zones) up to a distance of 100 m from the sensitive receptors i.e., School, Health Centers and Hospitals etc. - Site Controls: All vehicles & equipment will be fitted with silencers &/or mufflers which will be serviced regularly to maintain them in good working condition & conforming to the standard of 75dB (A) at 1m from surface of enclosure. - Noise standard at processing sites, e.g. Aggregate crushing plants, batching plant, hot mix plant will be strictly monitored to prevent exceeding of noise standards. - Scheduling of Project Activities: Operations will be scheduled to coincide with period when people would least likely to be affected. Construction activities generating noise level more than 75 dB (A) will be avoided between 10 P.M. & 6 A.M. near residential areas. - Protection devices: (ear plugs or ear muffs) will be provided to the workers operating in the vicinity of high noise generating machines. - Construction equipment & machinery will be fitted with silencers & maintained properly. - Source-control through proper maintenance of all equipment. - Use of properly designed engine enclosures & intake silencers. - Vehicles & equipment used will conform to the prescribed noise pollution norms. - Movements of heavy construction vehicles & equipment near public properties will be restricted. 		
C.3.4	Land Pollution	Spillage from plant & equipment at construction camps	<ul style="list-style-type: none"> - Providing impervious platform & oil & grease trap for collection of spillage from construction equipment vehicle maintenance platform. - Collection oil & lubes drips in container during repairing construction equipment vehicles. - Providing impervious platform & collection tank for spillage of liquid fuel & lubes at storage area. - Providing bulk bituminous storage tank instead of drums for storage of bitumen & bitumen emulsion. - Providing impervious base at bitumen & emulsion storage area & regular clearing of any bitumen spillage for controlled disposal & Reusing of bitumen spillage if any. - Disposing non-usable bitumen spills in a deep trench providing clay lining of 300 mm at the bottom & filled with soil at the top (for at least 0.5 m) to encourage vegetation growth. - All the waste oil collected, from skimming of the oil trap as well as from the drip pans, or 	Concessionaire/Contractor	IE, KRDCCL

Sl. No.	Environmental Issue	Location / sources	Mitigation Measures	Implementing Agency	Supervising & Monitoring Agency
			the mechanical degreaser shall be stored in accordance with the Environment Protection (Storage & Disposal of Hazardous Wastes) Rules, 1989.		
		Domestic solid waste & liquid waste generated at camps	<ul style="list-style-type: none"> - Collecting kitchen waste at separate bins & disposing of in a pit at designated area. - Collecting plastics in separate bins & disposing in deep trench at designated area/s covering with soil 	Concessionaire/Contractor	IE, KRDCCL
C.3.5	Drainage	Within ROW	<ul style="list-style-type: none"> - The Contractor shall ensure that no construction materials like earth, stone, or similar is disposed off in a manner that may block the flow of water of any water course & cross drainage channels. - The Contractor will take all necessary measures to prevent any blockage to the water flow. In addition to the design requirements, Contractor will take all required measures as directed by the Project Manager to prevent temporary or permanent flooding of any site or any adjacent area. 	Concessionaire/Contractor	IE, KRDCCL
C.3.6	Siltation of Water Bodies & Degradation of Water Quality	Borrowing of earth for embankment construction	<ul style="list-style-type: none"> - The Contractor will not excavate beds of any stream/canals/ any other water body for borrowing earth for embankment construction. - If required Contractor will construct silt fencing at the base of the embankment construction where these are adjacent to water bodies & around the stockpiles at the construction sites close to water bodies. The fencing will be provided prior to commencement of earthwork & maintained in an effective state until the stabilisation of the embankment slopes has occurred. - The Contractor will ensure that construction materials containing fine particles are stored in a suitable enclosure such that sediment-laden water does not drain into any nearby watercourse. 	Concessionaire/Contractor	IE, KRDCCL
C.4	Accidents	Project road	The Contractor will provide, erect & maintain barricades, including sign boards, road marking, traffic lights for night traffic & flagmen as required by the Executive Engineer of KRDCCL	Concessionaire/Contractor	IE, KRDCCL
C.5	Public Health & Safety	Project road	Debris generated will be disposed to the satisfaction of Environmental Specialist of IE and KRDCCL. Monitoring of air, water, noise & land during construction & operational phase.	Concessionaire/Contractor	IE, KRDCCL
C.6	Health & Safety	Project Road, At Work sites, camp sites and other allied sites	<ul style="list-style-type: none"> - The Contractor will comply with the requirements of the Environmental, Health, and Safety (EHS), Guidelines of the World Bank Group, April 20072 and the statutory norms of safety during construction. The relevant ones are general guidelines available on the internet. - Adequate drainage, and waste disposal will be provided at workplaces. - Proper drainage will be maintained around sites to avoid water logging leading to various diseases. - Adequate sanitation and waste disposal facilities will be provided at construction camps 	Concessionaire/Contractor	IE, KRDCCL

Sl. No.	Environmental Issue	Location / sources	Mitigation Measures	Implementing Agency	Supervising & Monitoring Agency
			<ul style="list-style-type: none"> by means of septic tanks, soakage pits etc. - A health care system will be maintained at construction camp for routine checkup of workers and avoidance of spread of any communicable disease - Safety of workers undertaking various operations during construction will be ensured by providing appropriate Personnel Protective Equipments (PPEs) such as helmets, masks, safety goggles, safety belts, ear plugs etc - The electrical equipment will be checked regularly - At every work place, a readily available first aid unit including an adequate supply of dressing materials, a mode of transport (ambulance), nursing staff and an attending doctor will be provided. - The Contractor will organize awareness program on HIV aids and Sexually transmitted diseases (STDs) for workers on periodic basis. 		
C.7	Risk from Operations	Project road	<ul style="list-style-type: none"> - Contractor shall comply with all the precautions as required for the safety of the workmen as per the International Labour Organisation (ILO) Convention No. 62 as far as those are applicable to this contract. - Contractor shall supply all necessary safety appliances such as safety goggles, helmets, masks, etc. to the workers & staff. - Contractor shall comply with all regulation regarding safe scaffolding, ladders, working platforms, gangway, stairwells, excavations, trenches & safe means of entry & egress. - Minimise significant hazards, where elimination & isolation are both impractical - No child labour shall be utilized in the project 	Concessionaire/Contractor	IE, KRDC & Regulatory Authorities
C.8	Risk caused by Force' Majure	Project road	<ul style="list-style-type: none"> - All reasonable precaution will be taken to prevent danger of the workers & the public from fire, flood, drowning, etc. - All necessary steps will be taken for prompt first aid treatment of all injuries likely to be sustained during the course of work. 	Concessionaire/Contractor	IE, KRDC
C.9	First Aid & Public Health	Project roads, construction camps & site offices etc.	<ul style="list-style-type: none"> - At every workplace, a readily available first aid unit including an adequate supply of sterilised dressing material & appliances will be provided as per the BOCW Rules and Acts 1996. - Workplaces, remote & far away from regular hospitals will have indoor health units with one bed for every 250 workers. Suitable transport (Emergency Ambulance) will be provided to facilitate take injured or ill person(s) to the nearest applicable hospital. At every workplace & construction camp, equipment & nursing staff shall be provided. - Contractor must have MOU with the nearest Hospitals for emergency treatment of injured or ill person(s). - Provision for first health check-up shall be carried out prior to induction of the personnel into the construction work site. - Periodic Training programmes for engineers/workers regarding health and safety during construction shall be provided at site level. 	Concessionaire/Contractor	IE, KRDC
C.9.1	Safety Measures	Project road,		Concessionaire	IE, KRDC

Sl. No.	Environmental Issue	Location / sources	Mitigation Measures	Implementing Agency	Supervising & Monitoring Agency
	During Construction	construction site etc.	<ul style="list-style-type: none"> - All relevant provisions of the Factories Act, 1948 & The Building & other Construction Workers (regulation of Employment & Conditions of Service) Act, 1996 will be adhered at site. - Adequate safety measures for workers during handling of materials at site will be taken up. - The register will include the trade name, physical properties & characteristics, chemical ingredients, health & safety hazard information, safe handling & storage procedures, emergency & first aid procedures for the product. 	/Contractor	
C.10	Traffic Management and Safety	Project Road	<ul style="list-style-type: none"> - The Concessionaire shall ensure that temporary bridges constructed for diversion of traffic are as per norms and safe and approved by Environmental Specialist of IE. - The Concessionaire shall take all necessary measures for the safety of traffic during construction and provide, erect and maintain such barricades, including sign, markings, flags, lights, warning boards and flagmen as proposed in the Traffic Control/Management Plan/Drawings and as required by the Environmental Specialist of IE for the information and protection of traffic approaching or passing the bridge/structure under construction or through the temporary diversion. - The Concessionaire shall ensure that all signs, barricades markings are provided as per the standards & specifications. Before taking up of construction on any bridge site, a Traffic Control Plan shall be devised and implemented to the satisfaction of the Environmental Specialist of IE. 	Concessionaire/ Contractor	IE, KRDCCL
C.11	Hygiene	Camp site	<ul style="list-style-type: none"> - All temporary accommodation must be constructed & maintained in such a fashion that uncontaminated water is available for drinking, cooking & washing. - Latrines shall be provided with septic tank for the workers & labours inside the camps. - Garbage bins must be provided in the camps & regularly emptied & the garbage disposed off in a hygienic manner. - Adequate health care is to be provided for the work force. Unless otherwise arranged for by the local sanitary authority, the local medical health or municipal authorities. - On completion of the works, all such temporary structures shall be cleared away, all rubbish burnt, septic tank & other disposal pits filled in & effectively sealed off & the outline site left clean & tidy, at Contractor's expense, to the entire satisfaction of Employer. 	Concessionaire/Contractor	IE, KRDCCL
C.12	Transmission of Diseases & HIV/ AIDS prevention & control	Workers/ labourers Camp along the project	<ul style="list-style-type: none"> - Contractor will create awareness among workers to prevent transmission of diseases between the local inhabitants & the labourers engaged for the works, including sexually transmitted diseases. - Concessionaire will engage a professional agency an NGO for implementing the guidelines laid down in the World Bank policy & communicate to KRDCCL project office. - Contractor shall extend necessary support to the appointed agency by deputing the workmen to attend the awareness creation programmes. 	Concessionaire/Contractor	IE, KRDCCL
C.13	Prevention of Mosquito Breeding	Workers/ labourers Camp along the project	<ul style="list-style-type: none"> - Measures shall be taken to prevent breeding at site. The measures to be taken shall include: - Empty cans, oil drums & other receptacles, which may retain water shall be deposited at a 	Concessionaire/Contractor	IE, KRDCCL

Sl. No.	Environmental Issue	Location / sources	Mitigation Measures	Implementing Agency	Supervising & Monitoring Agency
			<p>central point & shall be removed from the site regularly.</p> <ul style="list-style-type: none"> - Still waters shall be treated at least once every week with oil in order to prevent mosquito breeding. - Contractor equipment & other items on the site, which may retain water, shall be stored, covered or treated in such a manner that water could not be retained. - Water storage tanks shall be provided. - Posters in Hindi, Kannada & English which draw attention to the dangers of permitting mosquito breeding shall be displayed prominently on the site. - Contractor at periodic interval shall arrange to prevent mosquito breeding by fumigation / spraying of insecticides 		
C.14 Contractor's Demobilization					
C.14.1	Environmental Conditions		During construction, Concessionaire will undertake seasonal monitoring of air, water, and noise and soil quality through an approved monitoring agency. 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 and further approval of World Bank and IE. National Standard of Air, Noise and Water given in the report.	Concessionaire/Contractor	IE, KRDC
C.14.2	Continuous Community Participation		The Environmental Specialist of IE and Environmental officer of Concessionaire will have continuous interactions with local people around the project area to ensure that the construction activities are not causing undue inconvenience to the locals residing in the vicinity of project site under construction due to noise, dust or disposal of debris etc.	Environmental Specialist of IE and EO of Concessionaire	IE, KRDC
C.14.3	Clean-up Operations, Restoration & Rehabilitation		Concessionaire will prepare site restoration plans, which will be approved by the Environmental Specialist of IE. The clean-up and restoration operations are to be implemented by the Concessionaire prior to demobilization. The Concessionaire will clear all temporary structures; dispose all garbage, night soils and POL (Petroleum, Oil and Lubricants) wastes as per Comprehensive Waste Management Plan and as approved by IE. All disposal pits or trenches will be filled in and effectively sealed off. Residual topsoil, if any will be distributed on adjoining/ proximate barren land or areas identified by the Concessionaire and approved by the Environmental Specialist of IE in a layer of thickness of 75 mm-150 mm. At the end of bridge/structure sites shall be left clean and tidy at the Concessionaire's expense to the satisfaction to the Environmental Specialist of IE.	Concessionaire/ Contractor	IE, KRDC
Operation Stage					
O.1	Monitoring Operation Performance		The KRDC will monitor the operational performance of the various mitigation/ enhancement measures carried out as a part of the project. The indicators selected for monitoring include the survival rate of trees; utility of enhancement provision made under the project; status of rehabilitation of borrow areas; and effectiveness of noise barriers.	Concessionaire	IE, KRDC
O.2	Maintenance of Drainage		KRDC will ensure that all drains (side drains, median drain and all cross drainages) are periodically cleared especially before monsoon season to facilitate the quick passage of rainwater and avoid flooding.	Concessionaire	IE, KRDC
O.3	Pollution Monitoring		The periodic monitoring of the ambient air quality, noise level, water (both ground and surface water) quality, soil quality in the selected locations as suggested in pollution monitoring plan through approved monitoring agency.	Concessionaire	IE, KRDC
O.4	Soil Erosion & Monitoring of Borrow Areas		Visual monitoring and inspection of soil erosion at borrow areas, quarries (if closed and rehabilitated), embankments and other places expected to be affected, will be carried out once in every three months as suggested in monitoring plan.	Concessionaire	IE, KRDC

Sl. No.	Environmental Issue	Location / sources	Mitigation Measures	Implementing Agency	Supervising & Monitoring Agency
O.5	Changes in Land Use Pattern		Necessary hoardings will be erected indicating the availability of ROW and legal charges for encroachment of RoW. Budgetary provisions are to be made to control the ribbon development along project road.	Concessionaire	IE, KRDCCL
O.6	Removal of Dead Animals		Dead animals lying on the road should be removed and buried away from the nearby residences.	Concessionaire	IE, KRDCCL
O.7	Public awareness on Noise levels and Health Affects		Public will be advised to construct the noise barriers such as walls, double glazed windows and tree plantation between the roads and their property The public awareness is necessary regarding the human health through the newspapers and consultations and distribution of pamphlets during the operation stage.	Concessionaire	IE, KRDCCL
O.8	Public Health Check-up	Project site office and camps	- Provision for last health check-up shall be carried at least a month before the discharge of the personnel from the construction site - Periodic Training programmes for engineers/workers regarding health and safety during construction shall be provided at site level.	Concessionaire/Contractor	IE, KRDCCL

4.2 Common Property Resources (CPRs) and other Utilities

All, fully or partially affected Common property resources has already been shifted by employer however during implementation of project if any CPRs needs to be taken care shall be carried out as per below mitigation measures with the assistance of employer.

Problems	Mitigation measures	Applicability	Responsibility
Avoidance of CPRs	<ul style="list-style-type: none"> • Realignment near all CPRs wherever it is technically feasible. 	Near CPRs	Project In-charge, Site Engineer/ Site Supervisor, Subcontractor
Shifting of community properties	<ul style="list-style-type: none"> • Geometric adjustment while finalizing the alignment to minimize the loss to any such facilities. • Relocation of wells, hand pumps at suitable locations in consultation with community 	Throughout the corridor	Project In-charge, Site Engineer/ Site Supervisor, Subcontractor
Utilities	<ul style="list-style-type: none"> • All telephone and electrical poles/wires and underground cables should be shifted to avoid any such hazard 	Throughout the corridor	Project In-charge, Site Engineer/ Site Supervisor, Subcontractor
Environmental enhancement along the corridor	<ul style="list-style-type: none"> • Enhancement of Ponds, tree plantations near likely to be relocated community structures/ landscaping etc. • Enhancement/rehabilitation of borrow areas etc. • Construction of check dams/other water harvesting structures 		Project In-charge, Site Engineer/ Site Supervisor, Subcontractor

Chapter-05

Environmental Management System

5.0 PRECAUTIONS FOR SAFEGUARDING THE ENVIRONMENT

5.1 Borrow-pits for Embankment Construction

Borrow pits shall not be dug within the Right-of-Way of the road. Arable lands will not be used for earth borrowing. The Concessionaire will ensure that proper excavation techniques are used to improve stability and safety of the borrow area. The excavation shall be carried out in such a way that the area does not inundate during monsoons or generate cesspools of water to become mosquito-breeding sites.

5.2 Quarry Operations

The Concessionaire shall obtain material from licensed quarries only after the consent of the forest department or other concerned authorities. The quarry operation shall be undertaken within the purview of the rules and regulations in force. The Concessionaire shall ensure scheduling the movement of transport carrying material to and from the site during non-peak hours. The trucks carrying all the dusty material, red earth, moorum and fly ash/ pond, ash shall be covered with a tarpaulin and provided with adequate free board to prevent spillage. End boards shall be provided in loaders to prevent spillage. Stockpiling of material shall be properly planned so as to ensure that no traffic jam takes place on the highway.

5.3 Control of Soil Erosion, Sedimentation and Water Pollution

The Concessionaire shall carry out the works in such a manner that soil erosion is fully controlled, and sedimentation and pollution of natural water courses, ponds, tanks and reservoirs is avoided.

5.4. Precautions against Dust

The Concessionaire shall take all reasonable steps to minimize dust nuisance during the construction of the works. All existing highways and roads used by vehicles of the Concessionaire or any of his sub-contractors or suppliers of materials or plant, and similarly any new roads which are part of the works and which are being used by traffic shall be kept clean and clear of all dust / mud or other extraneous material dropped by the said vehicles or their tyres. Similarly, all dust / or mud or other extraneous material from the works spreading on these highways shall be immediately cleared by the Concessionaire. Clearance shall be effected immediately by manual sweeping and removal of debris, or, if so directed by the Independent Engineer, by mechanical sweeping and clearing equipment, and all dust, mud and other debris shall be removed entirely from the road surface. Additionally, the road surface including haul road from Quarries and Plants shall be hosed or watered using suitable equipment to avoid dust pollution. Special care shall be taken to combat dust problem originating from use of fly ash/pond ash.

5.5 Pollution from Hot Mix Plant, WMM Plant, Batching Plant & Crusher and Other Construction Machinery

The Concessionaire shall ensure the use of a relatively new, well maintained hot mix plant (batch type) so that any emission conforms to the CPCB norms and be fitted with a dust extraction unit to avoid prolonged engine powered equipment illness. Hot Mix Plant, WMM plant, Batching Plant, Generator set & Crusher shall be located more than 500 m from any community or residence. The Concessionaire has to obtain necessary consent/clearance from State Pollution Control Board to operate Hot Mix Plant, WMM plant, Batching Plant & Crusher before commencement of works.

All vehicles, equipment and machinery needed for construction will be regularly maintained to ensure that pollution emission levels conform to CPCB norms. All vehicles should be fitted with silencers. Construction vehicles, machinery & equipment will move or be stationed in designated areas to avoid compaction of soil to ensure the preservation of the top soil for agriculture.

5.6 Road Safety

The Concessionaire 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. If there are traffic jams during construction, measures shall be taken to relieve the congestion with the assistance of traffic police. Safety of workers undertaking various operations during construction will be ensured by providing helmets, masks, safety goggles, etc. One Qualified Safety Officer and one Safety Supervisor must be available in the Concessionaire's working team for the entire construction period.

5.7 Sanitation & Waste Disposal in Construction Camp

The Concessionaire shall ensure that construction camps are located at a distance of minimum 200m from water sources. Special attention shall be paid to the sanitary conditions of the camps. The Concessionaire shall ensure that sufficient measures are taken i.e. provision for safe disposal of garbage and sanitation facilities. Waste in septic tanks shall be cleaned periodically. Garbage shall be collected in four collection pits at each construction site and disposed of daily. The Concessionaire shall provide adequate measures for the health care of workers and arrange their regular medical check-up to ensure that they do not suffer from any communicable disease. At every workplace, good & sufficient water supply will be maintained to avoid waterborne / water related diseases. If any pits are dug at construction / camp sites which are not filled and then may turn into mosquito breeding sites during monsoons, either these shall be filled up properly to avoid water stagnation and also sprayed frequently with pesticides to prevent mosquito breeding. In addition the following care may be taken:

- Avoid usage of Plastic materials like carry bags etc at the Labour camps
- Provision of first aid facilities at the Labour camps
- Facilities for proper disposal of sewage at the Labour camps
- Provide fire extinguishers at storage facilities of fuel and lubricants
- Use of LPG should be encouraged instead of fire wood for cooking at the labour camp
- Small incinerators should be provided for burning waste oil, grease materials etc
- Dedicated service stations with oil & grease interceptors to be provided
- Store Yard for storing used tires, scrap materials/ released materials etc
- Tree plantations on the periphery of Crusher Plant, Construction Plant and labour camp etc

5.8 Substance Hazardous to Health

The Concessionaire shall not use or generate any material in the works, which is hazardous to the health of persons, animals or vegetation. Where it is necessary to use some such substance which can cause injury to the health of the workers, the Concessionaire shall provide suitable protective clothing or appliances to his workers, viz. earplugs, helmets or dust masks.

5.9 Damage to Existing road/CD Structures

Any structural damage caused to the existing roads/structures to be retained as per Concession Agreement by the Concessionaire's construction equipment shall be made good without any extra cost.

5.10 Use of Nuclear Gauges

Nuclear gauges shall be used in consultation with the Independent Engineer. The Concessionaire shall provide the Independent Engineer with a copy of the regulations governing the safe use of nuclear gauges he intends to employ and shall abide by such regulations. Without written approval, no such equipment shall be used at any level of the work.

5.11 Environmental Monitoring

In order to carry out periodic checks, environmental monitoring will be carried out by the Concessionaire as per schedule and if any parameter is found above the acceptable standards, mitigation measures / control measures shall be adopted in consultation with the Independent Engineer.

5.12 Protection of Existing Trees

Some of the existing trees within the right of way are likely to be cut down by the Authority prior to handing over of the site to the Concessionaire.

The Concessionaire shall take all necessary measures to ensure safety and protection of the remaining trees from any action whatsoever relating to his construction operations in the adjoining areas.

5.13 Disposal of Materials outside Work Site

Notwithstanding other relevant provisions in the Agreement, the excess material generated by dismantling, excavation, waste material and lubricants, used oil, gasoline and other such substance etc., shall be removed from site outside the right of way at regular intervals and site shall kept clean from all such disposable materials. Grease, cotton and other waste construction materials shall be disposed off in shallow soakage wells constructed at each construction site. Also safety measures should taken in to account for safe disposal/handling of Hazardous materials such as explosive, fuels etc Such intervals shall not exceed one month under any circumstances. The selection of the disposal site in consultation with Independent Engineer shall be the responsibility of the Concessionaire and he shall ensure that the selected site does not result in any claim for damages to the Authority or violation of any existing laws.

5.14.1 Disposal of Unserviceable Materials

The locations of Disposal sites have to be selected such that:

- Locating the disposal sites is the sole responsibility of the Concessionaire with the approval of Independent Engineer.
- Joint inspection of all disposal sites shall be done by Independent Engineer and Concessionaire prior to approval.
- No residential area are located downwind side of these locations,
- Disposal sites are located at least 1000 m away from sensitive locations like Settlements, Water body notified forest areas, Sanctuaries or any other sensitive locations.
- Disposal sites do not contaminate any water sources, rivers etc for this site should be located away from water body and disposal site should be lined properly to prevent infiltration of water.
- Public perception about the location of debris disposal site has to be obtained before finalizing the location.
- Permission from the Village/local community is to be obtained for the Disposal site selected.
- Concessionaire will resolve all claims arising out of waste disposal at his own cost.
- Concessionaire shall utilize the suitable burrow areas, abandoned quarries and other waste land for the debris disposal.

Concessionaire needs to plan the disposal in the following way:

- Identify the disposal area.
- Prepare a Concessionaires debris disposal plan with design drawings for each identified area and get it

approved by the Independent Engineer.

- Need to photograph the present land use and condition of the area.
- Construct all required structures (e.g. retaining wall).
- The dumpsites filled only up to the ground level with compaction of the debris materials in layers after disposal.
- The 30 cm top layer of disposal pit shall be provided with good earth suitable for development of vegetation/plantation.
- After leveling, the site could be suitably rehabilitated by planting local species of grass (turfing), shrubs and other plants as decided by the Independent Engineer.

5.14.2. Construction of Water Recharge Pits

Storm water recharge pits shall be located such that it should be in the valley of the surface layout nearby cross drainage structures and other water bodies along the project road. Water recharge pits shall be located at an height of 3 m. above the ground water table of the area as per the Central Ground Water Board norms.

Recharge pits are constructed by the side of the guiding drains such that all the storm water shall be directed to the recharge pit. Any proposal for change in number and location recharge pits by the Concessionaire shall be checked and approved by the Independent Engineer.

Pits, trenches, abandoned dug wells, recharge wells or abandoned bore wells shall be connected by the rain water harvesting system with the consent of the respective owner or as approved by the Independent Engineer.

5.14.3. Construction of Silt Traps

Silt fences shall be planned such that each recharge pit will have one silt fence to prevent silt from entering the nearest water bodies and also prevent choking of recharge pit by the silt coming from runoff water and increase the life of recharge pits. Silt fence are mounted in guiding drains at a distance of 3 to 5 M in the upstream direction depending on the gradient of the guiding drains. However any proposal for change in number and location silt fences by the Concessionaire shall be checked and approved by the Independent Engineer. Sand / silt removal facilities such as sand traps, silt traps and sediment basins should be provided to remove sand / silt particles from run-off.

5.14.4. Scarified Bitumen Disposal Pits

Scarified bitumen generated out of scarification of existing pavement is used for approach roads by mixing it with fresh bitumen or other granular materials to achieve the required strength followed by profiling and compaction.

The left out portion of the scarified bitumen is disposed safely in a clay lined pit. or as directed and approved by the Independent Engineer. A typical clay lined bitumen disposal pit with standard dimensions has been worked out. The dimension of the bitumen disposal pit may change provided the clay lining of required thickness is adhered to.

The selection of sites for disposal of scarified bitumen is made on following lines:

- Locating the bitumen disposal sites is the sole responsibility of the Concessionaire with the approval of Independent Engineer.
- Selection of bitumen disposal site is avoided in the quarry regions. If the disposal site has to be located in the abandoned quarry, region is suitably treated to seal the fractures and fissures.
- Joint inspection of all disposal sites shall be done by Independent Engineer and Concessionaire prior to approval.
- Disposal sites shall be located at least 1000 m away from sensitive locations like Settlements, Water body notified forest areas, Sanctuaries or any other sensitive locations.

- Disposal sites do not contaminate any water sources, rivers etc for this, site should be located away from water body and disposal site should be lined properly to prevent infiltration of water.
- Public perception about the location of bitumen disposal site has to be obtained before finalizing the location.
- Permission from the Village/local community is to be obtained for the Disposal site selected.
- Concessionaire will resolve all claims arising out of waste disposal at his own cost.

Concessionaire needs to plan the bitumen disposal in the following way:

- Identify the disposal area.
- Prepare a Concessionaires bitumen disposal plan with design drawings for each identified area and get it approved by the Independent Engineer.
- Need to photograph the land use and condition of the area during pre, during, post project implementation stages.
- Construct all required structures (e.g. retaining wall) along with clay lining and measures to prevent the seepage of bitumen leechate.
- The dumpsites filled only up to the ground level with compaction of the materials in layers after disposal.
- The 30 cm top layer of disposal pit shall be provided with good earth suitable for development of vegetation/plantation.
- After leveling, the site could be suitably rehabilitated by planting local species of grass (Turfing), shrubs and other plants as decided by the Independent Engineer.

5.14.5. Provision of Oil Interceptors

Location of Oil Interceptors shall be considered such that each construction camp having refueling stations, oil and lubricants storage places will have one oil interceptor to stop & separate the floating oils. However the number of interceptors shall be increased as the situation demands or during the accidental spillages with the consent of the Independent Engineer.

5.14.6. Environmental Monitoring

Environmental Monitoring of Air, Noise, Water and Soil parameters shall be carried by the Concessionaire as per the consents and latest environmental norms, guidelines and policies of national and state level environmental authorities. The Concessionaire shall comply by all obligations and make sure that there are no deviations from them or from the Agreement. Environmental standards for Air, Noise and Water are

CHAPTER-06

ENVIRONMENTAL STIPULATION FROM THE COMPETENT AUTHORITY SEIAA, MoEF&CC, SPCB, FOREST DEPARTMENT AND CHECK LISTS OF ENVIRONMENTAL REMIDIAL MEASURES

Based on the findings during the EIA study the following can be safely deduced and focus on the potential impacts due to the proposed project and to propose mitigation measures through an appropriate EMP for the project.

- The project is a neither a new state highway nor a SH expansion projects in hilly terrain (above 1000 MSL) and nor located in any notified ecologically sensitive areas. Thus the project doesn't qualify as a category A / B project as per EIA notification of 14th Sept. 2006 and its subsequent amendments. Hence no Prior Environmental Clearance required from MoEF/SEAC.
- However, due to widening and realignment, land acquisition (LA) involved at some of the locations where insufficient ROW. The Land shall be acquired as per Karnataka State High way Act 1964 laid down by the Karnataka State Govt. under LAP and R&R policy and Compensation will be given as per LARR 2013 Act.
- Similarly, the avenue plantations along the project road have been identified at different locations and since the existing road is going to be widened the trees coming under the widening works need to be felled. Thus tree cutting permission is required from Forest Department. The Project Proponent need to apply for tree cutting permission.
- The project road doesn't lie within 1.0 km radius from the protected area (like Sanctuary, National Park, Biosphere Reserve etc). Thus NOC from Wild life board is not required for this road.
- No presence and impact on Archaeological features. Thus no archaeological clearances / permissions to be obtained.
- Based on the above conclusions and the EIA study, it is found that the projects is an improvement and widening project and involve acquisition of Agricultural land and felling of trees along the road which shall have some environmental impacts as per EIA study. Thus the project falls under Category 'B' as per WB Operational Policy 4.01 of World bank and Environmental analysis is required beyond environmental screening for the project.

Chapter-07

ENVIRONMENT MONITORING PLAN

To mitigate the potential negative impacts of the proposed project, an Environmental Monitoring Plan and Performance Monitoring are developed typically to identify the mitigation measures to be undertaken during construction, and operation stages. The formulation of an appropriate environmental monitoring plan and its diligent implementation are keys to overall success for the project. Environmental monitoring of Air, Noise, Water and Soil shall be conducted during Pre-construction, construction and operational phase in conformity to the Environmental Protection Act, 1986. The AHTRL will appoint the Environmental Testing Laboratory approved from Ministry of Environment, Forest and Climate Change (MoEF&CC).

7.1 Environmental Monitoring Plan

The Environmental Monitoring Plan is given in table 7.1 below.

Environmental Component	Monitoring						Institutional Responsibility	
	Parameters	Special Guidance	Standards	Location	Frequency	Duration	Implementation	Supervision
Pre-construction and Construction Stage								
Air	As per CPCB Standard procedures in direction of Environment specialist of IE	Sampler to be located in the down wind direction. Use method specified by CPCB for analysis	Air (Prevention and Control of Pollution) Rules, CPCB, 1994	At 4 location near construction stretch and labour camp covering location of baseline monitoring as per EIA	Three seasons (Except rainy season) annually for construction period	As per MoEF notification on Ambient Air Standard dated 16 th November 2009 or its subsequent amendments	Concessionaire/ Contractor through approved agency	KRDCL, Project Manager
Water Quality	pH, Turbidity, TSS, TDS, COD, BOD, DO, Chlorides, Hardness, Oil & Grease, TSS, TDS, Total Coliform, Iron, Fluorides, Nitrates, E. coli, Total coliform, faecal coliform etc. as per IS 10500:2012	Grab sample collected from source and analyse as per Standard Methods for Examination of Water and Wastewater	Water quality standards by CPCB	4 locations around the construction stretch and camp covering location of baseline monitoring as per EIA	Once during pre-monsoon season	Grab Sampling		
Noise levels	Noise levels on dB (A) scale	Equivalent Noise levels using an integrated noise level meter	Noise standards by CPCB	6 locations near construction stretch, Noise barrier locations, and camp covering location of baseline monitoring as per EI	Once during season for three seasons annually for construction period	24 hourly monitoring		

Environmental Component	Monitoring						Institutional Responsibility	
	Parameters	Special Guidance	Standards	Location	Frequency	Duration	Implementation	Supervision
Soil Quality	pH, Conductivity, Texture, Bulk Density, Porosity, Organic Matter, Sulphate, Moisture, Sodium Sulphate, NPK, etc.	Composite sampling at different depth need to be done	ICAR criteria of soil fertility	4 location in and around the camp area covering location of baseline monitoring as per EIA	Pre-monsoon and Post-monsoon season	Composite sampling		
Construction Sites and Construction Camps	Monitoring of: Storage Area Drainage arrangements Sanitation in Construction Camps	The parameters mentioned are further elaborated in the reporting formats. These are to be checked for adequacy.	To the satisfaction of the employer and the standards	Storage and camps area	Quarterly in the construction stage		Concessionaire/ Contractor	
Operation Stage								
Air	As per CPCB Standard procedures in direction of Environment specialist of IE	Sampler to be located in the downwind direction. Use method specified by CPCB for analysis	Air (Prevention and Control of Pollution) Rules, CPCB, 1994	At 2 location along the road stretch as per recommendation of IE and WB	Three seasons (Except rainy season) annually for construction period	As per MoEF notification on Ambient Air Standard dated 16th November 2009 or its subsequent amendments		
Water Quality	pH, Turbidity, TSS, TDS, COD, BOD, DO, Chlorides, Hardness, Oil & Grease, TSS, TDS, Total Coliform, Iron, Fluorides, Nitrates, E. coli, Total coliform, faecal coliform etc. as per IS 10500:1991	Grab sample collected from source and analyse as per Standard Methods for Examination of Water and Waste water	Water quality standards by CPCB	2 locations along the road stretch as per Recommendation of IE and WB	Once during pre-monsoon season	Grab Sampling	Concessionaire/ Contractor through approved agency	KRDCL, Project Water Quality Manager
Noise Levels	Noise levels on dB (A) scale	Equivalent Noise levels using an integrated noise level meter	Noise standards by CPCB	2 location along the road stretch as per recommendation of IE and WB	Once / Annum	24 hourly monitoring		
Soil Quality	pH, Conductivity, Texture, Bulk Density, Porosity, Organic Matter, Sulphate, Moisture, Sodium Sulphate, NPK, etc.	Composite sampling at different depth need to be done	ICAR criteria of soil fertility	2 location in and around the camp area covering location of baseline monitoring as per EIA	Once / Annum	Composite sampling		

Chapter 08

HEALTH AND SAFETY

AHTRL will take care of Construction workers and management staff by providing training and personnel protective equipment as per work criteria.

8.1. Environment, Health and Safety guiding principles

- Safety Requirements aim at reduction in injuries, loss of life and damage to property resulting from accidents on the Project Highway, irrespective of the person(s) at fault.
- Users of the Project Highway include motorized and non-motorized vehicles as well as pedestrians and animals involved in, or associated with accidents. Vulnerable Road Users (VRU) include pedestrians as well as riders of motorized two-wheelers, bicycles and other vehicles which do not provide adequate occupant protection.
- Safety Requirements apply to all phases of construction, operation and maintenance with emphasis on identification of factors associated with injuries, consideration of the same, and implementation of appropriate preventive measures.
- Safety Requirements include measures associated with traffic management and regulation such as road signs, pavement marking, traffic control devices, roadside furniture, highway design elements, enforcement and emergency response.
- Environmental Requirements to be applied to the Development, Construction and Operation of the Project Highway are for reducing to acceptable levels, the potential to harm the bio-physical environment in the areas near where project activities, including those inside and outside the RoW are carried out by the Concessionaire.
- Environmental Requirements include the preventive, mitigation and enhancement measures that are to be implemented by the Concessionaire to comply with the conditions of EIA & Road Specific EMPs.

8.2 The Summary of safety concerns during Road and Bridge construction is as follows:

Sr. No.	Aspects	Safety Measures
S 1.1	Personnel Safety Measures for Labour	Concessionaire shall provide: --Protective footwear, protective goggles and nose masks to the workers employed in asphalt works, concrete works, crusher etc. --Welder's protective eye-shields to workers who are engaged in welding works. --The Concessionaire shall comply with all regulations regarding safe scaffolding, ladders, working platforms, gangway, stairwells, excavations, trenches and safe means of entry and egress. The Concessionaire shall comply with all the precautions as required for ensuring the safety of the workmen as per the International Labour Organization (ILO) Convention No. 62 as far as those are applicable to this Agreement. The Concessionaire shall make sure that during the construction work all relevant provisions of Building and other Construction Workers (regulation of Employment and Conditions of Services) Act, 1996 are adhered to. The Concessionaire shall not employ any person below the age of 14 years for any work and no woman shall be employed on the work of

Sr. No.	Aspects	Safety Measures
		<p>painting with products containing lead in any form. The Concessionaire shall also ensure that paint containing lead or lead products is used except in the form of paste or readymade paint. All buildings, rooms and equipment and the grounds surrounding them shall be maintained in a clean and operable condition and be protected from rubbish accumulation. Each structure made available for occupancy shall be of sound construction, shall assure adequate protection against weather, and shall include essential facilities to permit maintenance in a clean and operable condition. Adequate heating, lighting, ventilation or insulation when necessary to reduce excessive heat shall provide for comfort and safety of occupants. Each structure made available for occupancy shall comply with the requirements of the Uniform Building Code. This shall not apply to tent campus.</p>
S 1.2	Traffic and Safety	<p>Before taking up of construction on any section of the existing lanes of the highway, a Work Zone Safety Checklist shall be devised by the Concessionaire and approved by the IE. During construction, the Concessionaire shall ensure that all aspects of the Traffic Management Plan prepared by the Authority are well implemented and maintained throughout the construction period.</p>
S 1.3	Risk from electrical Equipments	<p>The Concessionaire shall take all required precautions to prevent danger from electrical equipment and ensure that - No material shall be so stacked or placed as to cause danger or inconvenience to any person or the public. - All necessary fencing and lights shall be provided to protect the public in construction zones. 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 Environmental Expert of IE.</p>
S 1.4	Risk force measure	<p>Concessionaire shall take all reasonable precautions to prevent danger to the workers and public from fire, flood etc. resulting due to construction activities. Concessionaire shall make required arrangements so that in case of any mishap all necessary steps can be taken for prompt first aid treatment. Construction Safety Plan prepared by the Concessionaire shall identify necessary actions in the event of an emergency.</p>
S 1.5	First Aid	<p>The Concessionaire shall arrange for – A readily available first aid unit including an adequate supply of sterilized dressing materials and appliances as per the Factories Rules in every work zone. Availability of suitable transport at all times to take injured or sick person(s) to the nearest hospital. Equipment and trained nursing staff at construction camp.</p>
S 1.6	Informatory Signs and Hoardings	<p>The Concessionaire shall provide, erect and maintain informatory/safety signs, hoardings written in English and local language (Kannada), wherever required or as suggested by the Environmental Specialist of IE.</p>

8.3 PPE Matrix

PPE Matrix for Road & Bridge Construction Worker

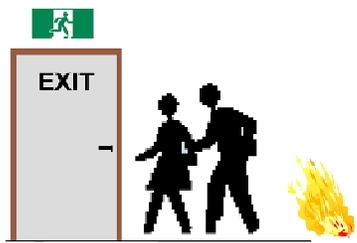
Personal Protective Equipment	Working Location details	Life of PPE	IS Code	Approx Prices in Rs
Safety Helmet 	Is compulsory for all working activities	One & half year	IS:2925-1984	200- 350
Safety Shoes 	Is compulsory for all working activities	One & half year	IS 1989 –1 986 (Pt.2)	350- 750
Reflective Vest 	Is compulsory for all working activities	Three Months		150- 300
Dust Mask 	Is compulsory for Crusher, WMM, HMP, CRMB and RMC Workers and employees	Ten Days	IS 9473 – 2002	15- 65
Ear Plug 	Is compulsory for Crusher, WMM, and HMP, CRMB, RMC and DG Set Workers and employees	Ten Days	IS 9167 – 1979	10-70
Ear Muff 	is compulsory if Noise Level is high greater than 85 dB	Two Year	IS 9167 – 1979	350- 1250
Safety goggle 	Is compulsory for Crusher, WMM, and HMP, CRMB, RMC and DG Set Workers and employees	Six Months	IS 8940 – 1978 / IS 1179 – 1967	150 - 350
Cotton Coverall / Dungaree 	Petrol pump operator and fuelling operator	One year	IS 8519 – 1977	350 - 500
Hand Gloves 	Store Person- Cotton Hand Gloves	Ten Days	IS 4770 – 1968 / IS 2573 – 1986/ IS 6994 – 1973 part I	10 – 25
	for Bitumen & Concrete laying – Rubber Hand gloves	Six Months		30 – 60
	For Electrical work – Shock proof Hand gloves	One Year		150- 450
	For Welding Work – Heat proof	One Year		100- 200
Gumboot (Thermal Proof) 	Is compulsory for Bitumen & Concrete laying (Gumboot -Heat proof activity and Concreting activity Rubber-gumboot)	Six Months		300 - 500
Welding Glass 	Is compulsory for all welding and cutting activity	One year	IS 8940 – 1978 / IS 1179 – 1967	150- 300
Full Body Harness 	Is compulsory for working at height above 1.8 M Should be compulsory for Bridge workers who are working at height.	Two Years	IS 3521 – 1999	750 – 1250

Note: - After Issuing the PPE to worker/staff, Self declaration letter should taken from worker/Staff. If Employee/staff/worker found without PPE'S at work zone area or during the working, He will be penalised and warning letter will be issued immediatelv. Warning letter format is enclosed herewith

8.4 Emergency Preparedness Plan

The Emergency Response plan is necessary as a moral and legal obligation of management to protect the safety people, property and environment. The objective of this “Emergency Response Plan” is to provide the organizational guidelines and directions to ensure fast and effective response in any emergency situation in order to save life, property and environment.

We have formed our Emergency Response Team in Base Camp to combat with the Emergency situations.

EMERGENCY PROCEDURES	
<p>REMOVE</p> <p>Anyone in immediate danger</p>	<p>ONLY IF SAFE TO DO SO!</p>
<p>ALERT</p> <p>Others in immediate area</p> <p>Fire Wardens</p> <p>Activate Whistle, Air Horn, Bell, Siren etc. 3 times for 30 sec.</p> <p>Other Tenants and Adjacent Neighbours</p>	 
<p>RING THE EMERGENCY SERVICES</p> <p>1. Fire Brigade, Police or Ambulance.</p> <p><i>Advise Site:</i></p> <p><i>Advise address:</i></p> <p><i>Advise nearest cross street:</i></p> <p><i>Provide your Name & phone number.....</i></p> <p><i>Provide details of incident.....</i></p> <p>DO NOT HANG UP UNTIL THE ADDRESS HAS BEEN REPEATED</p>	
<p>CONTAIN THE FIRE</p> <p>Use correct Fire Extinguisher or Fire Hose Reel</p> <p>Turn OFF Electricity, Air Conditioning</p> <p>Close doors and windows to contain fire</p> <p>ALL IF ONLY IF SAFE TO DO SO!</p>	  
<p>EVACUATE</p> <p>Proceed to the nearest exit.</p> <p>Gather together at Exit, if safe to do so, <i>then</i></p> <p>Evacuate via exit and proceed to the Assembly Area</p>	

Incident Controller M. Kotresh 90717747 12		
Fire Fighting Team Leader SajithKumar G 90717747 21	Rescue Team Leader Somnath Panda 9071411075	First Aid Team Leader Rohit Jagtap 90717747 17
Fire Chief Girisha B. 90717747 22	Rescue Chief Murali Krisha 90717747 19	First Aid Chief Prashant 90717747 18
Nitin S. Pitale 7996169598	Chandrashekhhar Hiremat 90717747 15	N. Senthil 90717747 14
Madhu Shetty 9513843983	Vijay kumar 9538720392	Kannan 9944145011
Ritish Jha 90717747 13	Ajay Jagtap 90717747	Devarajan 90717747 11
Milan 8390372374		
Vehicle Co-Ordinator Amit Pande -9071774716		
Electrical Co-Ordinator Jagdish Donawar - 9071411072		

Emergency Contact Number

List of Emergency contact number will be prepare and display at suitable locations so that in case of emergency all employees can use the numbers. The Emergency number includes

Sr. No.	Description	Contact Number
1.	Fire Brigade / Stations	101 22971500 / 22971550
2.	Ambulance	102 /108
3.	Police	100, Muddebihal City – 08356220333
4.	Crane / Hydra	Amit Pande - 9071774716
5.	Hospitals	Utkarsh Hospital , Muddhebihal- 08356222008 Sanjivani Hospital, Muddebihal – 09449819395
6.	Security	Ambresh 9071411073

CHAPTER 09

ENVIRONMENTAL REPORTING AND FREQUENCY

AHTRL will maintain the reporting system for environmental management indicators and report to the Independent Engineer as per the monitoring plan.

The formats for reporting and monitoring of environmental aspects during the entire project cycle on a regular basis are given in table 8.1.

Table 9.1: Reporting Format

Format No.	Environmental Attributes	Project Stage	Frequency
1	Construction site and Service Area Details	Construction	Monthly
2	Borrow Area Management	Construction	Monthly
3	Ambient Air Quality	Construction	Monthly
4	Noise Level Monitoring	Construction	Monthly
5	Prevention and control of Water Pollution	Construction	Monthly
6	Solid Waste Management	Construction	Monthly
7	Erosion and Sediment Control Measures at construction site	Construction	Monthly
8	Prevention and control of oil and chemical spills	Construction	Monthly
9	Traffic Management and Safety	Construction	Monthly
10	Construction Worker Camps	Construction	Monthly
11	Community grievance/ Problems during construction	Construction	Monthly

**KARNATAKA ROAD DEVELOPMENT CORPORATION LTD.
Environmental Supervision and Monitoring Schedule- Construction Phase**

Construction site and Service Area Details

Independent Engineer:

Concessionaire:

Contract Package:

Road section:

Location:

Chainage: Km _____ to Km _____

Environmental Features of the Location

Terrain: Flat/Undulating/Rolling

Wind Direction:

Land use in adjoining area:

Name and Distance of settlements in a 2 km radius of the site

Mitigation Measures Employed	Chainage	Construction Site			
		Site 1 (Chainage)	Site 2 (Chainage)	Site 3 (Chainage)	Site 4 (Chainage)
Dust Control Measures employed					
Traffic Management					
Storage Site					
Maintenance Shed and service area					

Furnish details of public consultation held with the local populace.

Supervised and Checked by

(Name and Signature with Date)

Concessionaire's Site Engineer:

Environmental Engineer, IE:

KARNATAKA ROAD DEVELOPMENT CORPORATION LTD.
Environmental Supervision and Monitoring Schedule- Construction Phase

Borrow Area Management

Employer:

Independent Engineer:

Concessionaire: Contract Package:

Road section:

Location:

Chainage: Km _____ to Km _____

Environmental Features of the Location

Terrain: Flat/Undulating/Rolling

Wind Direction:

Name and Distance of settlements in a 2km radius of the site

1	Location of Borrow area	Distance from Construction site	Capacity of Borrow Area	Total quantity of Earth excavated (in Cu.m)	Quantity of Top Soil excavated (in Cu.m)	Location where Top soil has been stored

2	Location where Top soil re-laid/used	Distance from storage site	Quantity re-laid/used	Total quantity of Earth excavated (in Cu.m)

3	Quantity of Earth obtained from excavation of Existing Highway	Quantity reused	Details of disposal of unused earth	Location and details of area where unused borrow material is disposed

Enclose a Sketch maps of borrow area locations and photographs indicating implementation of mitigation measures and borrow area management. Furnish details of consultation held with landowners, farmers and lessors.

Supervised and Checked by
 (Name and Signature with Date)

Concessionaire's Site Engineer:
Environmental Engineer, IE:

KARNATAKA ROAD DEVELOPMENT CORPORATION LTD.
Environmental Supervision and Monitoring Schedule- Construction Phase

Ambient Air Quality

Employer:

Independent Engineer:

Concessionaire: Contract Package:

Road section:

Location:

Chainage: Km _____ to Km _____

Environmental Features of the Location

Terrain: Flat/Undulating/Rolling

Wind Direction:

Name and Distance of settlements in a 2km radius of the site

Sl. No.	Plant Details	Location (to nearby settlements and Prevailing Wind Direction)	Chainage	Installed Capacity of the AMP and Crushers
1	Details of AMPs and Crusher Plants			
	AMP-1			
	AMP-2			
	Crusher-1			
	Crusher-2			

2	Mitigation Measures employed	AMP-1	AMP-2	Crusher-1	Crusher-2
	A) Air pollution Control measures adopted at the HMP				
	B) Quantity of Water used for sprinkling (lt/day)				

3	Details of Ambient Air Quality Monitoring carried out at site. (Enclose Monitoring Report as Annexure)	Location	Chainage	Date and frequency of Monitoring
	AQ-1			
	AQ-2			

4	Details of Heavy Vehicles and Construction Machinery by types at each location	Total Number	Operational	Vehicles in Repair
	Trucks/Dumpers			
	Tractors			
	Pavers			
	Rollers			
	Excavators			
	Graders			

Enclose Photographs and Monitoring Reports

Supervised and Checked by
 (Name and Signature with Date)

Concessionaire's Site Engineer:
Environmental Engineer, IE:

KARNATAKA ROAD DEVELOPMENT CORPORATION LTD.
Environmental Supervision and Monitoring Schedule- Construction Phase

Noise Level Monitoring

Independent Engineer:

Concessionaire: Contract Package:

Road section:

Location:

Chainage: Km _____ to Km _____

Environmental Features of the Location

Terrain: Flat/Undulating/Rolling

Wind Direction:

Land use in adjoining area:

Name and Distance of settlements in a 2km radius of the site

1	Details of Heavy vehicles and constructions Machinery by types at each location	Total Number	No of Vehicles in Repair	Day in week for periodic maintenance	Frequency of complete overhauling and servicing
	Trucks /Dumpers				
	Tractors				
	Pavers				
	Rollers				
	Excavators				
	Graders				

2	Mitigation Measures employed	AMP-1	AMP-2	Crusher-1	Crusher-2
	A) Noise pollution Control measures adopted at the HMP and Crusher Plants				

3	Details of safety equipment earplug etc, provided to workers at construction site	Total workers at site	No of Ear Plugs provided
	Construction Site-1		
	Construction Site-2		

Noise level Monitoring carried out at site (Enclose Monitoring Report as annexure)

4	Noise level Monitoring carried out at site (Enclose Monitoring Report as annexure)	Location	Chainage	Date & Frequency of Monitoring
	NQ-1			
	NQ-2			

Supervised and Checked by

(Name and signature with Date)
Concessionaire 'site Engineer

Environmental Engineer,IE

KARNATAKA ROAD DEVELOPMENT CORPORATION LTD.
Environmental Supervision and Monitoring Schedule- Construction Phase
Prevention and control of Water Pollution

Independent Engineer:

Concessionaire: Contract Package:

Road section:

Location:

Chainage: Km _____ to Km _____

Environmental Features of the Location

Terrain: Flat/Undulating/Rolling

Wind Direction:

Land use in adjoining area:

Name and Distance of settlements in a 2km radius of the site

1	Site Details	Measures adopted to prevent runoff and contamination of nearby water bodies.	Location	Chainage
Construction site Service Area-1				
Construction site Service Area-2				
Construction Workers Camp-1				
Construction Workers Camp-2				

2	Drainage details at site and Construction Workers' camp	Location	Chainage	Sanitary Facilities and Water availability in the camp
Construction site Service Area-1				
Construction site Service Area-2				
Construction Workers Camp-1				
Construction Workers Camp-2				

3	Details of Water Quality Monitoring carried out at site (Enclose Monitoring Report as annexure)	Location	Chainage	Date and frequency of Monitoring
WQ-1				
WQ-2				
WQ-3				

Supervised and Checked by
(Name and Signature with Date)

Concessionaire's Site Engineer:

Environmental Engineer, IE:

KARNATAKA ROAD DEVELOPMENT CORPORATION LTD.
Environmental Supervision and Monitoring Schedule- Construction Phase

Solid Waste Management

Independent Engineer:

Concessionaire: Contract Package:

Road section:

Location:

Chainage: Km _____ to Km _____

Environmental Features of the Location

Terrain: Flat/Undulating/Rolling

Wind Direction:

Land use in adjoining area:

Name and Distance of settlements in a 2km radius of the site

Location	Chainage	Method of collection	Storage (Possibility of any re-use)	If reused, mention area where utilized	Method of Disposal (Details of area where disposed)
Construction Site-1					
Construction Site-2					

Supervised and Checked by

(Name and Signature with Date)

Concessionaire's Site Engineer:

Environmental Engineer, IE:

KARNATAKA ROAD DEVELOPMENT CORPORATION LTD.
Environmental Supervision and Monitoring Schedule- Construction Phase

Erosion and Sediment Control Measures at construction site

Independent Engineer:

Concessionaire: Contract Package:

Road section:

Location:

Chainage: Km _____ to Km _____

Environmental Features of the Location

Terrain: Flat/Undulating/Rolling

Wind Direction:

Land use in adjoining area:

Location	Chainage	Control Measures implemented as suggested in Contract	Extent of other Protection measures completed at site

Enclose Photographs

Supervised and Checked by

(Name and Signature with Date)

Concessionaire's Site Engineer:

Environmental Engineer, IE:

KARNATAKA ROAD DEVELOPMENT CORPORATION LTD.
Environmental Supervision and Monitoring Schedule- Construction Phase

Prevention and control of oil and chemical spills

Independent Engineer:

Concessionaire: Contract Package:

Road section:

Location:

Chainage: Km _____ to Km _____

Environmental Features of the Location

Terrain: Flat/Undulating/Rolling

Construction Site	Chainage	Precaution Measures adopted in Field	Method employed for storage, disbursement and disposal of oily wastes	Storage and Disposal of used hazardous material and other solid wastes

Furnish detailed information on disposal and enclose photographs

Supervised and Checked by

(Name and Signature with Date)

Concessionaire's Site Engineer:

Environmental Engineer, IE:

KARNATAKA ROAD DEVELOPMENT CORPORATION LTD.
Environmental Supervision and Monitoring Schedule- Construction Phase
Traffic Management and Safety

(Details of Traffic diversions, Safety Signage, Traffic supervision, Safety equipment provided to the construction workers)

Independent Engineer:

Concessionaire: Contract Package:

Road section:

Location:

Chainage: Km _____ to Km _____

Environmental Features of the Location

Terrain: Flat/Undulating/Rolling

Wind Direction:

Land use in adjoining area:

Location	Chainage from Km _____ to Km _____	Details of Traffic diversions	Safety Measures employed

Furnish details of consultation held with local populace prior to initiation of civil works.

Supervised and Checked by

(Name and Signature with Date)

Concessionaire's Site Engineer:

Environmental Engineer, IE:

KARNATAKA ROAD DEVELOPMENT CORPORATION LTD.
Environmental Supervision and Monitoring Schedule- Construction Phase

Construction Worker Camps

Independent Engineer:

Concessionaire: Contract Package:

Road section:

Location:

Chainage: Km _____ to Km _____

Land use in adjoining area:

Construction Workers Camp	Details
Details of its location with Chainage	
Proximity to any water source,	
Amenities like provision of drinking water and sanitary facilities,	
Solid waste Disposal system, waste water treatment and disposal system	
Availability of fuel wood/fire wood	
Health Checkups for workers and its frequency	
Nearest Town/ settlement with Medical facilities and Distance from Construction site	

Enclose Photographs and location sketches

Supervised and Checked by

(Name and Signature with Date)

Concessionaire's Site Engineer:

Environmental Engineer, IE:

KARNATAKA ROAD DEVELOPMENT CORPORATION LTD.

Environmental Supervision and Monitoring Schedule-Post Construction Compliance Report

Community grievance/ Problems during construction

Contract Package:

Road section:

Location:

Chainage: Km _____ to Km _____

- A. If any grievance/ problems expressed by the community during construction? Yes/No. If Yes give details
- B. Has there been any post construction erosion or damage to the roadway? Ys/No. If yes, state mitigation measures employed
- C. Was there any spillage of chemicals/bitumen? Yes/No
- D. Status of reclamation and restoration of Borrow pits / roadsides.
- E. Status of Debris clearance from site
- F. Status of the construction camp sites dismantling and restoration of the original state of land after clearance of the debris and construction material
- G. Photographs of Post Construction Compliance

Supervised and Checked by

(Name and Signature with Date)

Concessionaire's Site Engineer:

Environmental Engineer, IE:

Check list for Environment, Health & Safety Management measures

A. Checklist for Environmental issues at Construction establishments

1. Checklist for Construction camp/ plant site selection and management

- a. Arrangements with the land owner including the restoration aspects
- b. Site layout plan of the construction camp
- c. Establishment and maintenance of demarcated and levelled different areas within the camp as per the approved layout plan
- d. Number of trees (to be) removed, if any, along with compensation measures.
- e. Proposed top soil management
- f. Activities planned in the construction camp
- g. Machinery & equipment to be used on site
- h. Site drainage provisions
- i. Copy of the consents to establish and operate and conditions laid down there in the consent/ clearance/ licenses and plans
- j. Access road condition and proposed maintenance
- k. Safety provision such as fire protection equipment and personal protective measure
- l. Closure/ completion plan

2. Checklist for Labour camp site selection and management

- a. Arrangements with the land owner including the restoration aspects
- b. Site layout plan of the labour camp
- c. Establishment and maintenance of demarcated and levelled different areas within the camp as per the approved layout plan
- d. Number of trees (to be) removed, if any, along with compensation measures
- e. Proposed top soil management
- f. Site drainage provisions
- g. Copy of the consents to establish and operate and conditions laid down there in the consent/ clearance/ licenses and plans
- h. Access road condition and proposed maintenance
- i. Safety provision such as fire protection equipment and other labour camp facilities onsite.
- j. Sanitation and health facilities
- k. Staff strength and details such as contractor staff v/s subcontractors, women labour, migrant v/s local labour and skilled & unskilled labour
- l. Closure/ completion plan

3. Checklist for Borrow Area Management

- a. Environmental Clearance from MoEF/SEIAA for opening of new borrow area
- b. Consent of concerned Gram Sabha to be obtained
- c. Name of the land owner, arrangement with the owner including restoration aspect
- d. Area (length and width in meters) involved, proposed depth of excavation in meters, quantity to be excavated in Cum and type of material proposed to be taken
- e. Land use (before opening) of borrow area and area surrounding the proposed borrow area
- f. A map / drawing showing the dimension of the borrow areas, access roads and features of surrounding area
- g. Number of trees to be removed, if any along with the compensation measure
- h. soil management if required

- i. Access road condition and proposed maintenance
- j. Details of top soil Quantity excavated in Cum & Where it was used
- k. Closure/Completion plan
 - I. Initial access road condition and final access road condition
 - II. Photographs depicting the original condition, during the operation, top soil management and after closure
 - III. Land use after rehabilitation: Details should be submitted if the final land use changed from the original land use
 - IV. Satisfaction certificate from the owner

4. Checklist for disposal site Management

- a. Contractor's debris disposal plan with design drawings approved by the Environmental Engineer for each identified area
- b. Name of the land owner, arrangement with the owner including restoration aspects.
- c. Location of the disposal site, existing land use and area covered (Sq. m)
- d. Whether the community is agreeable to siting of dumping site (Y/N)
- e. Written permission from Village Panchayath/ Local community
- f. Proposed future use of the site
- g. Whether existing canal and drains within and adjacent to the site are safe and free from any debris
- h. Effective water sprays during the delivery and handling of materials when dust is likely to be created and dampen stored materials during dry and windy weather
- i. For materials having the potential to produce dust shall not be loaded to a level higher than the side and tail boards and shall be covered with a tarpaulin during transportation
- j. Obstruction to natural watercourses, destruction to agricultural land and crops and soil erosion if any

5. Checklist for Quarry site management

- a. Prior consent of the IE to establish a new quarry exclusively for the project (If lead from existing quarries is uneconomical and alternative material sources are not available)
- b. The construction schedule and operation plans containing a detailed work plan for procuring materials, transportation and storage of quarry materials
- c. Environmental clearances / consents and other permits (CFE & CFO) for the existing / new quarries being used for the project
- d. Adequate steps to control and check natural drainage flow, soil erosion, debris flow etc. at quarry site
- e. Safety measures during quarry operation
- f. Mining operations with respect to provisions of various Acts and Rules in force
- g. Design for redevelopment of exhaust quarry site

6. Checklist for Crusher establishments

- a. Location of crusher units with respect to the "Safe Zones" as per the recent direction by Supreme Court
- b. Registration certificates from the Department of Mines and Geology and Department of Industries
- c. Environmental clearances / consents and other permits (CFE & CFO) for the existing / new quarries being used for the project
- d. Pollution abatement measures to control emission of suspended particulate matters into the air
- e. Provision of Personnel Protective Equipments for the workers
- f. Regular environmental quality monitoring of air and noise in the vicinity of the crusher as per the prescribed norms/conditions of pollution Control Board

7. Checklist for Hot Mix Plant Management

- a. Distance of Hot mix plants from human settlements (shall be at least 500 m) and whether located on leeward side of most dominant wind direction with respect to human establishments
- b. Consent/permits to establish and operate obtained from State Pollution Control Board and implementation / compliance of all permit conditions
- c. The hot mix plants shall be set up on barren/waste lands and conversion of agricultural/cultivable lands for this purpose shall not be allowed under any circumstances.
- d. Provision of paved surfaces at all operational areas like storage, handling, loading, unloading areas and provisions for separate storm water collection system with facility for separation of oil/lubricants prior to discharge.
- e. Provision of adequate water supply to hot mix plants.
- f. Provisions made for control of dust and air pollutants.
- g. Hot mix plant restoration plan after completion of construction works, to restore to its previous state by undertaking cleanup operations.
- h. Provisions for mitigation of noise pollution conforming to regulatory limits of State Pollution Control Board.

8. Checklist for Equipments / vehicles deployed for Construction works

- a. Regular maintenance of all diesel run equipments/vehicles deployed for construction activities for smooth operation and contribution to reduction in air quality and noise.
- b. Valid periodical Pollution Under Control certificates for vehicles/equipments being used in the construction activities.
- c. Spill proofing of all vehicles deployed for material movement.

B. Checklist for Safety aspects during project implementation

1. Safety considerations during Pre-construction Stage

- a. Consideration of road geometrics & safety provisions during design
 - I. Sight Distances
 - II. Horizontal Curvature
 - III. Transition Curves and Super-elevation
 - IV. Vertical Curves
 - V. Road Signs
 - VI. Road Markings
 - VII. Raised Reflective Pavement Markers (RPM)
 - VIII. Road Delineators, Object Markers and Chevron Signs
 - IX. Guard posts and Crash Barriers
 - X. Footpath and Median Barriers
 - XI. Road Humps and Rumble Strips
- b. Consideration of speed restricted zones such as schools and built up areas
- c. Junction improvements
- d. Consideration of safety provisions as per IRC Specifications
- e. Evaluation of Qualification Criteria

2. Safety during Construction Stage

- a. Appointment of qualified safety officers/in-charge as per qualification criteria
- b. Compliance with IRC Specification, and procedures
- c. Preparation of Traffic Control Plans
 - I. Provision of Temporary Traffic Barriers/Barricades
 - II. Provision of suitable sign boards
 - III. Provision for flags and warning lights

- IV. Demarcations (fencing, guarding and watching) at construction sites
- V. Provision for sufficient lighting especially for night time work
- d. planning and implementation of approved Traffic Control Plans
- e. Arrangements for controlled access and entry to Construction zones
- f. Safety arrangements for Road users / Pedestrians
- g. Arrangements for detouring traffic to alternate facilities
- h. Regular Inspection of Work Zone Traffic Control Devices by authorized contractor personnel
- i. Construction Workers safety - Provision of personnel protective gears
 - I. Helmets
 - II. Safety Shoe
 - III. Ear Plugs
 - IV. Nose masks
 - V. Hand Gloves
 - VI. Protective Goggles
 - VII. Safety Belts
 - VIII. Reflective Jackets
 - IX. Gum boots
- j. Training/Certification programs for workers and personnel in charge of Safety
- k. Training on safe use of safety & construction equipments
- l. Regular Road Safety Auditing
- m. Compliance with existing Safety standards and guidelines
- n. Compliance to all Labour laws applicable to contractor's personnel
- o. Routine preventive/healthcare measures for Contractor's personnel
- p. Facilities for any emergency situation like fire, explosion, etc.
- q. Occupational safety procedures/practices at Quarries, Crushing units, Batching plants & construction camps.
- r. Traffic Safety Management
- s. Regular inspection of safety arrangements
- t. Provision for insurance coverage to the contractor's personnel

3. Safety during Post-construction/Operation Stage

- a. Public awareness and education programs designed to sensitize highway users
- b. Road & Traffic safety awareness