



ASHOKA BAGEWADI SAUNDATTI ROAD LIMITED

Karnataka Road Development Corporation Limited

Design, Build, Finance, Operate, Maintain and Transfer (DBFOMT) of Existing State Highway Bagewadi (NH-4) - Bailhongal — Saundatti (WCP-1) in the state of Karnataka on DBFOMT Annuity Basis"

Environment Management Plan (EMP)

Package No. : *WCP: 1 - Bagewadi - Bailhongal - Saundatti*
Employer : *Karnataka Road Development Corporation Limited*
Concessionaire : *Ashoka Bagewadi Saundatti Road Limited*
Consultant : *LEA Associates South Asia Pvt. Limited.*
EPC Contractor : *Ashoka Buildcon 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 Aspect	Element of an organization activities or products or services that can interact with the environment.
Environmental Impact	Any change to the environment, weather 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



Quality, Health, Safety and Environmental Objectives

- To improve planning
- To reduce customer complaints
- To enhance motivation of employees
- To improve skills through training
- Complying with all the statutory rules and regulations
- Minimising Air, Land and Water Pollution and preventing injury and ill health.

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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.


Ashok Katariya
Chairman

Date: 30th July 2016

CHAPTER – 1

BRIEF INTRODUCTION OF PROJECT

The Concessionaire has prepared the report of Environmental Management Plan for effective implementation of remedial, compensation and mitigation measures during the project cycle of Pre – construction, Construction and Maintenance phase. The report addressed about the measures required to be taken for implementation of project in environmental friendly manner along the entire timelines and development period. The report covered the entire features, check-list for remedial actions and person(s) responsible for each covering links headed by the senior person.

The report confirm the fulfilment of all the requirements of conditions for environmental management covering the WP OP 4.01, principle guideline so as environmental Protection, Regulation, Acts, Policies applicable to sustainability and environmental Protection, Guidelines and norms related to road construction by Indian Road Congress that help for environmental protection include, IRC: 104-1988, IRC: 36-1974, IRC: 10-1961, IRC: 36-1970, IRC: 43-1972, IRC: 72-1978, IRC: 33-1982.

1.0 INTRODUCTION

1.1 PROJECT BACKGROUND

The World Bank is providing assistance to improve the above identified 3411kms of State Highways and MDRs. A part of this loan component, i.e., US\$ 67.26 Million is being provided to KRDCL 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 passes through four State Highways viz., SH 31 – 24 Km, SH 1 and SH 73 – 14.2 Km and SH 30 –25.8 Km and which starts from Bagewadi (NH 4 Jn.) and ends at Saundatti road at Karikatti cross on SH 30 Jn. The total length of the project stretch is 64 km. The project stretch passes through Belgaum District and mainly passes through Bagevadi, Bailhongal, Anigol, Belavadi, Udikeri and ends at Saundatti road at Karikatti cross on SH-30. The existing carriageway width observed for entire stretch from 3.75m to 5.5m wide carriageway with earthen shoulder. The existing pavement throughout the project stretch is flexible pavement. Cracks, potholes, patches were observed on pavement.

1.2.1 BRIDGES & CULVERTS

S. No	Structure	Link 20C	Link 20D	Total
1	Bridge Proposed for New/ Reconstruction	5	7	12
2	Bridge Proposed for Widening	2	0	2
3	Bridges retained with repairs	0	2	2
4	Box Culvert Proposed for New/ Reconstruction	8	5	13

BSRP

Environment Management Plan

KRDCL – WCP-01

5	Pipe Culvert Proposed for New/ Reconstruction	19	25	44
6	Pipe Culvert to be Widened	9	11	20
7	Pipe Culverts retained with repairs	3	4	7

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. from 12.800 to 15.625 (20C), from 14.150 to 14.250 (20D) and from 14.350 to 14.450 (20D) length is 3.025 km.

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

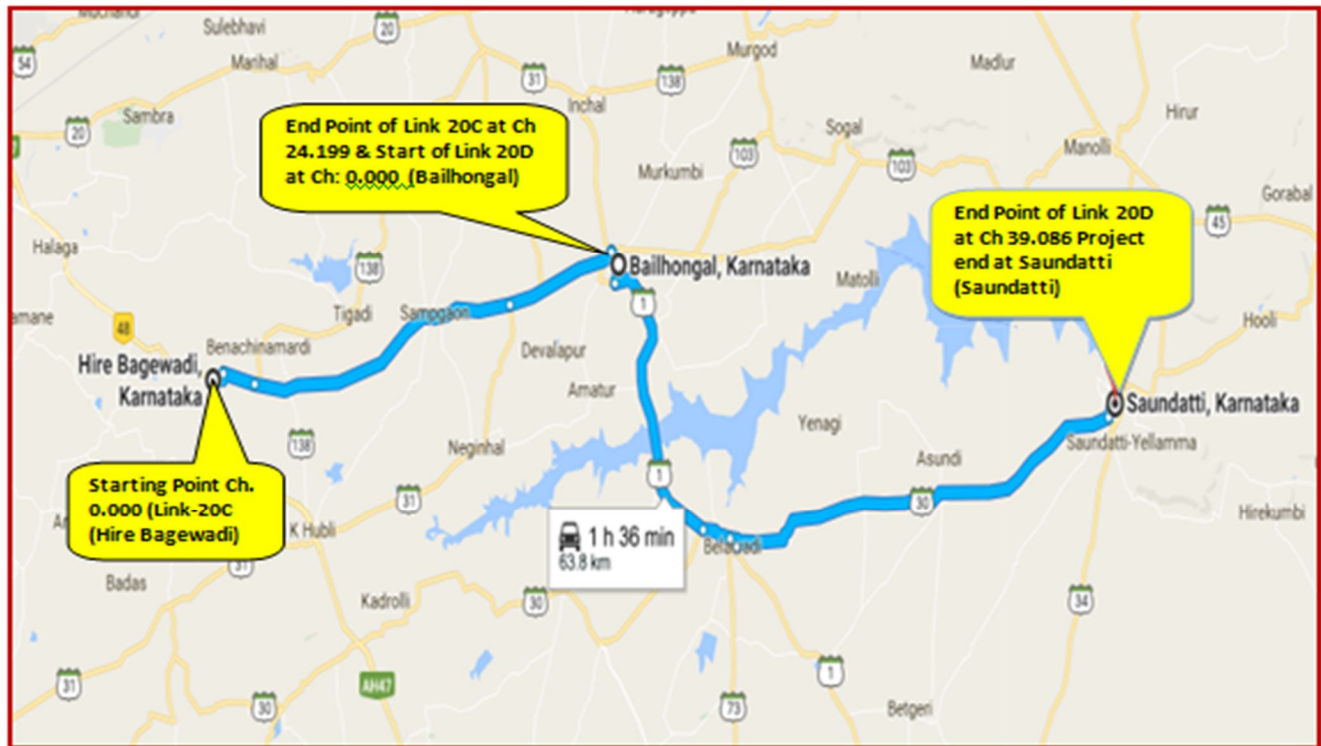


Fig 1.1: Road Project Map

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:37-212			
	Bituminous layers	Non-Bituminous layers		BC	DBM	WMM	GSB
Bagiwadti (NH-4)- Bailhongal	3.67	6.41	10	40	50	250	170
Bailhongal - Saundatti	1.14	1.99	10	40	50	225	150

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

The Concessionaire shall take responsible for 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 BSRP 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 BSRP

The Concessionaire is responsible during the 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 BSRP. They include providing roadside drainage provision of cross drainage structures and Toe wall etc.

1.3.3 Operational Stage

The Concessionaire commit to regular monitoring of environment conditions (Air, Water, Noise & Soil etc) will be carried out through an approved pollution monitoring agency.

1.4 BASELINE & ENVIRONMENTAL IMPACT SUMMARY

The EIA preparation led to identification of potential environmental impacts and their feasible remedial measures (including avoidance, mitigation and enhancements). Public consultations were conducted for both the Environmental and Social aspects and are reported in the EIA and SIA Report.

In the widening project construction works are to be confined within the proposed COI varies from 18m to 26m depending on the typical road cross-section applied. However, in toll plaza locations it goes up to 99 m (approx.). In isolated instances where the embankment heights are significant, a wider COI to accommodate the full width of embankment is necessary. Hence, the environmental impacts would be observed during the construction period. Thus in depth of analysis for this scope of work is limited and no significant adverse impacts are anticipated except in some areas in the project road. The various environmental impacts envisaged during the proposed widening works are summarized in Table 4-7.

4.1 PHYSICAL ENVIRONMENT

The project corridor traverses mainly through plain terrain of land. The entire stretch runs through fertile agriculture land and plantation along the project road. The abutting land uses along the project road are agricultural, barren revenue and settlement lands.

4.1.1 Land

The project involves widening of the existing road. Approximately 82 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 road side Avenue Plantation

4.1.2 Water**Water Resources**

Ground Water resources can be categorised on basis of their occurrence as shallow aquifers such as wells, hand pumps and deep aquifers such as tube wells or bore wells. The location of these resources is the prime determinant of the impacts. Along the project road section 10 wells, 18 hand-pumps, 17 tanks and 9 over head tanks are located. These are the mainly sources of potable water. Out of these water utilities 23 utilities likely to affected by the project.

1 River Malprabha, 1 irrigation canal and 7 water bodies are present along the project road section. However, as per the design no partial / complete loss of water body will take place. Hence no loss in volumetric capacity of water resources is envisaged. Impact on surface & ground water resources has been tabulated in table 4.1 & 4.2.

Table 1.4-1: Surface Water Resources along the Road

Sl. No	Chainage (Km)		Distance From EC/L (m)	Feature Name	Settlement	Side	Volumetric Capacity Loss
	Exiting	Proposed					
1	-	20.250	8	Water Body Dry	Udikevi	LHS	NO
2	-	9.000	0	River Malprabha	-	Cross	NO
3	-	4.570	20	Water Body	Bilengal	LHS	NO
4	-	6.520	10	Water Body	-	LHS	NO
5	-	18.470	10	Water Body	Sanikapp	LHS	NO
6	-	15.700	20	Water Body	Sampgaon	RHS	NO
7	-	14.250	20	Water Body	Sarpargaon	RHS	NO
8	-	11.650	0	Canal	Sampgaon	Cross	NO
9	-	6.350	5	Water Body	Chick Bhage Atiori	RHS	NO

Table 1.4-2: Ground/ Drinking Water Resources

Road Number	Affected features	Nos
1	Drinking and Ground water sources	20

Water Quality

One representative ground water sample from Saundatti and 1 surface water sample from Renuka sugar Bailhongal were drawn and analyzed to establish the baseline water quality of the project area. By and large, the ground water quality is satisfactory and the major physical and chemical parameters are within limits set by the Bureau of Indian Standards for drinking water. However, some of the parameters fall in extended limits as per standards IS: 10500:2012 except total alkalinity (as CaCO₃). Surface water parameters meet IS: 2296 Class-C criteria. 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.

The impacts on water quality will be of greater concern during the construction stage. Increased sediment load during preparation of the site is the most likely adverse impact. The contamination by fuel and oil from construction vehicles or bitumen from hot-mix plants is less likely and in any case expected to be localised. Discharge from labour camps and vehicle parking areas may contaminate watercourses if discharged untreated. During the operation stage the leakage or spillage from vehicles damaged, overturned or just badly maintained may also lead to contamination of water bodies.

1.4.1.3 Air Quality

There will be rise in PM levels during the construction activities, which shall again be within prescribed limit after the construction activities are over. To establish the baseline scenario 2 sampling stations were selected at Bailhongal & Saundatti. All of the pollutants are well under stipulated standard of CPCB. 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, which shall be localised and mitigation

measures to reduce such pollutions shall be adopted therefore, air quality impacts are not very significant. Measures required for avoiding the air quality impacts are presented in the Table 4.1:

Environmental Management Plan.

1.4.1.4 Noise

The baseline noise levels monitored at various locations along the project road indicates the baseline levels are within the permissible limits of CPCB. Thus, noise is not a major concern in this area. However, a number of sensitive receptors (schools, colleges and hospitals) have been identified to be quite close to the road. The impacts on noise due to the project will be of significance in both the construction as well as the operation stages. 23 Noise Sensitive receptors are located along the project road. Whereas 11 Educational institutes/Schools and 1 hospitals along the project road are anticipated receptors which may exposed to noise due to proposed widening. It is envisaged that, these receptors are likely to get exposed to higher noise level due to more vehicular movement and suggested mitigation measures during construction and operations has been recommended in Table-4.A.1.

Table 1.4-3: Sensitive Receptors – Impacts

Sl. No	Chainage (Km)		Distance From EC/L (m)	Structure	Settlement	Side	Anticipated Impact Due to Noise
	Existing	Proposed					
1	202.650	38.200	35	Govt. Degree College	Saudatti	LHS	No
2	211.870	29.000	10	Govt. School	Karikatti	RHS	Yes
3	212.000	28.850	8	Primary School	Karikatti	RHS	Yes
4	222.000	19.650	35	Primary Govt. School	Udikeri	RHS	No
5	222.000	19.370	15	Primary Govt. School	Udikeri	RHS	Yes
6	224.520	17.100	15	Primary School	Belavadi	LHS	Yes
7	224.600	17.000	15	Govt. Hospital	Belavadi	LHS	Yes
8	225.150	16.550	40	Adarsh kids School	Belavadi	RHS	No
9	194.100	16.100	150	Veer Rani School	Belavadi	LHS	No
10	416.200	4.920	10	Govt. School	Anigol	LHS	Yes
11	419.500	1.650	20	Govt. School	Bilengal	LHS	No
12	419.700	1.450	10	Primary School	Bailhongal	LHS	Yes
13	420.000	1.170	15	Boys Hostel	Bailhongal	RHS	Yes
14	59.000	0.300	50	SGV medical college	Bilengal	RHS	No
15	154.100	23.310	250	GG Arts College	Bilengal	RHS	No

16	160.780	16.700	15	Primary & Govt. High School	Sanikapp	RHS	Yes
17	162.600	14.350	15	Govt. PUC College	Sampgaon	RHS	No-Bypass Proposed
18	162.000	14.150	15	RES High School	Sampgaon	RHS	No-Bypass Proposed
19	163.350	13.750	5	Govt. High School	Sampgaon	RHS	No-Bypass Proposed
20		10.650	20	School	Galikoppa	LHS	No
21	171.900	5.250	8	Primary School	Chick Bhage Atiori	RHS	Yes
22	175.250	1.800	10	Govt. Primary & Inter College	Hire Bagh Wali	LHS	Yes
23	175.960	1.240	15	Pvt School	Bagewadi	RHS	Yes

4.2 BIOLOGICAL ENVIRONMENT**4.2.1 National Park / Sanctuary / Biosphere Reserve / Notified Animal Corridor.**

No National Park or Wildlife Sanctuary is located within 1.0 km aerial distance from the project road. Also, there is no notified animal corridor/migration route is present in the project area.

4.2.2 Forest Areas

No Protected / Reserve Forest are located along the project road.

4.2.3 Flora

The main species are Ficus species, Tamarind, Babul (*Prosopis juliflora*), Neem (*Azadirachta indica*), Gulmohar (*Delonix regia*), Ipomea sp., Acacia nilotica, Mango (*Mangifera indica*), Eucalyptus, *Pongamia pinnata* & Tamarind are the major floral species noticed along the project road. Roadside plantations including the above mentioned species will need to be cleared for the project. Chainage wise details of the trees that are affected shall be provided in Form B. About 1162 Trees are likely to be getting affected in this road section. Felling shall start only after obtaining all the necessary clearances & permissions from the Forest Dept.

4.2.4 Fauna

No impacts on fauna are anticipated for the project except loss of habitats where the trees are felled or trimmed.

4.2.5 Aquatic Ecology

The repair and up gradation of minor bridges will cause some contamination of the river / canal water due to spillage of construction material, sediment loading & increased turbidity downstream of the bridge location. This change shall have some impact on the flora and fauna species and change the nature of the substratum resulting in decline in the number and diversity of plants and thus the food web. However, at different locations of structure where construction/maintenance is proposed, necessary mitigation measures have been recommended in Table 4.1.

4.3 SOCIAL IMPACTS

Since the construction activities involves widening of the project road, some private and or community asset will be impacted during the execution of the project. 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. SIA Report furnishes the extent of Loss of properties and details of Project Affected Families.

4.3.1 Cultural Properties

The project road section traverses through 24 settlements and there are some religious and cultural properties which though not of archaeological significance are nevertheless, significant to the community. There are 9 religious structures and 2aralikatte (chabutra) 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. Cultural properties will be subjected to varying degree of impact depending upon their placement in the ROW. Structures, which are close to the proposed CW, are likely to need relocation. The impact on Cultural Assets shall be furnished in SIA Report.

4.3.2 Socio-Economic Profile

The distribution of PAFs and Affected CPR details are tabulated below. The details of are presented in the Social Impact Assessment Report and necessary action plan given in RAP.

Table 4-4: Distribution of PAFs

Sl. No	Type	Residential	Commercial	Residential cum Commercial	Vacant Plot	Industrial Plot
1	Owner	58	8	1	7	1
2	Tenant	3	20	0	1	0
3	Encroacher	0	1	0	0	0
4	Squatter	0	0	0	0	0
5	Others	0	0	0	0	0
	Total	61	29	1	8	1

Table 4-5: Details of CPRs Affected across Road

Type of the CPR	School buildings	Village Pond	Cremation Ground	Place of Worship	Grazing Land	Play ground	Govt. Building	Market Shed	Community toilet	Water Structure	Bus Stand	Others	Total
R-1	0	0	0	0	0	0	1	0	1	2	5	1	10

1.4.4 KEY ENVIRONMENTAL FEATURES

The entire link roads under this package Road No. 7, KRDCL 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 4.6: 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 4.7: 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 (Utilities)	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/Air Pollution
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 Site	Generation noise & dust	Noise and Air pollution
9.	Drilling /Cutting	Air, Sound pollution	Noise Pollution
10.	Welding, Gas Cutting	Generation of Fumes/UV Radiations	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.	Consumption of Water for Drinking Purpose (drivers & helpers)	Water leakage	Water pollution/Contamination
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
23.	Cement & silica	Water consumption , co2 emission	Air& water pollution prevention
24.	Foam sprinkler on aggregates	Water consumption	Control air pollution
25.	Natural sand (Consumption of Usage)	Reduced natural resources	consumption natural resource
26.	Wasted food, clothe & tobacco in surrounding labor room	Infection/ disease	Air & land contamination/pollution

Sr. No.	Activity	Environmental aspect	Environment impact
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/Wastage	Resource depletion
38.	Electricity consumption	Usage of power	Resource depletion
39.	Usage of Diesel Generator (DG)	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 ash 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.	Use of admixtures	Generation of empty barrels of admixture	Land contamination
46.	Use of cement bags	Generation of waste cement bags	Land contamination
47.	Manufacturing of RMC - washing of RMC plant	Generation of waste water	Water pollution
48.	Labour camp management	Generation of waste	Land Contamination
49.	Quarry Operation	Generation of Dust	Air Pollution / Land Contamination
Operation & Maintenance Phase			
50.	Maintenance work	Wastage of after the maintenance such as oil soak cotton waste, engine oil container	Land contamination
51.	Maintenance work	Waste oil generation	Land contamination
52.	Patrolling Work	Usage of Diesel	Depletion of Natural Resources
53.	Repair Work	Generation of Debris	Land Contamination
54.	Use of Machinery / Vehicles	Generation of Noise	Noise Pollution

CHAPTER:2

STATUTORY AND REGULATORY REQUIREMENTS

2.1 Legal Compliance

The M/s. Ashoka Bagewadi-Saundatti Road Project 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 WCP 01, KRDCL. 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 Bagewadi-Saundatti Road Project commits that not contravene any legislation and obtain all licenses, NOC, Permits as per legal and statutory requirements under the laws and acts governed in India for this Contract package, WCP 01, KRDCL, on or before the appointed date.

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 are 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 In charge / Sr. General Manager are responsible for the overall implementation of the project. The Project In charge / SGM are 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, KRDCL, 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 CONTRACTOR /SUBCONTRACTORS

Execution of works will be the responsibility of the EPC Contractor.

The Concessionaire may himself be the executioner of the project or might decide to outsource or hire contractor for highways and structures, who may in turn sublet some part of their work to petty contractors. In case the Concessionaire decides to execute the work by himself then the responsibilities of the EO as given in Box 6.1 shall also be performed by the EO of the Concessionaire. 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 sitting 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 by EPC /SPV and training will be imparted to EPC project personnel, SPVS and sub-contractor engaged for the project activities. Specific training will be imparted to undertake the required ESMP management actions and monitoring activities.

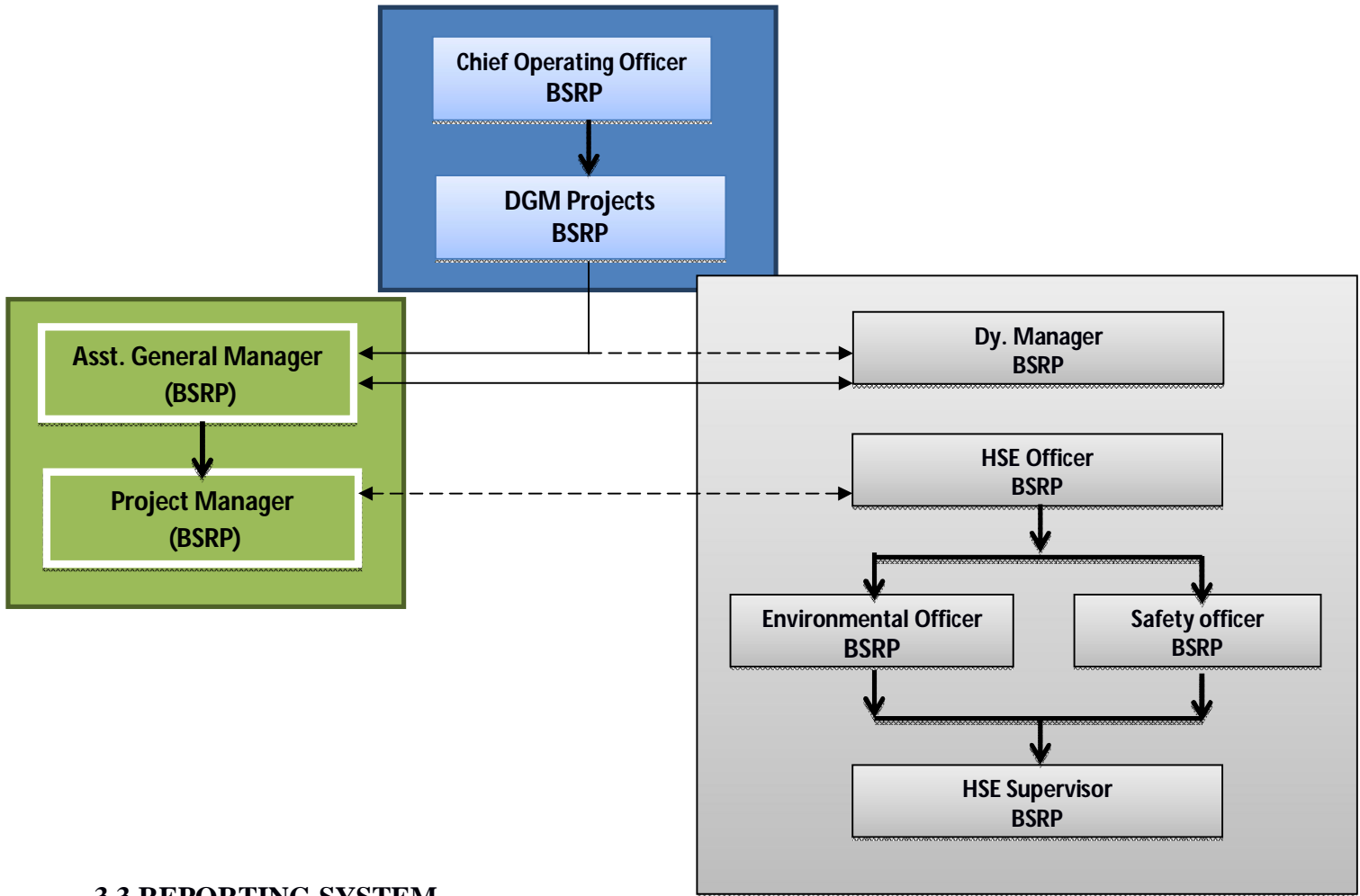
The project will ensure that all concerned team members assigned for implementation of EMP and project specific ESMP understand the following aspects through the training programme :-

- ❖ Purpose and Importance of EMP & ESMP 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.

Table.3.1 Suggested training module matrix for EPC, SPV and Sub-contractor for better implementing is as below

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

3.2 Project Site HSE Organization Chart:



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 Chief operation officer to 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 KRDCL. 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.

3.4 RELEVANT ENVIRONMENTAL LEGISLATIONS

The Central and State Level Environmental Laws and Regulations pertaining to the Project that has been framed by the Government of India or State Government of Karnataka are provided in Table 3-1.

Table 3-1.1: Relevant Environmental Laws & Regulations

Sl.No	Law/Regulation/Guidelines	Relevance	Applicable Yes/No	Reason for Application	Implementing Responsible Agency
1	The Environmental (Protection) Act. 1986, and the Environmental (Protection) Rules, 1987-2002 (Various amendments)	Umbrella Act Protection and improvement of the environment. Establishes the standards for emission of noise in the atmosphere.	Yes	All environmental notifications, rules and schedules are issued under the act	MoEF, State Department of Environment & Forest, CPCB and SPCB
2	The EIA Notification, 14th September 2006 & amendments	All new state highway projects & SH expansion projects in hilly terrain (above 1000 MSL) and or ecological sensitive areas (item 7 (f) of schedule) as one of the projects requiring prior environmental clearance.	No	Project road is neither a new state highway nor a SH expansion projects in hilly terrain (above 1000 MSL) or in ecological sensitive areas	MoEF/SEIAA
		Opening of Borrow Area (if required)	Yes	Opening of new Borrow Area	SEIAA
3	Notification for use of Fly ash, 3rd November 2009	Reuse fly ash discharged from Thermal Power Station to minimise land use for disposal and minimise borrow area material. The onus shall lie with the implementing authority to use fly ash unless it is not feasible as per IRC	No	Absence of Thermal Power Plants	MoEF, SPCB
4	The Water (Prevention and Control of Pollution) Act, 1974	Central and State Pollution Control Board to establish/enforce water quality and effluent standards, monitor water quality, prosecute offenders, and issue licenses for construction/operation of certain facilities	Yes	Consent required for not polluting ground and surface water during construction	State Pollution Control Board

Sl.No	Law/Regulation/Guidelines	Relevance	Applicable Yes/No	Reason for Application	Implementing Responsible Agency
5	The Air (Prevention and Control of Pollution) Act. 1981	Empowers SPCB to set and monitor air quality standards and to prosecute offenders, excluding vehicular air and noise emission	Yes	Consent required for establishing and operation of plants	State Pollution Control Board
6	Noise Pollution (Regulation And Control) Act. 1981	Standards for noise emission for various land uses	Yes	Construction machineries and vehicles to conform to the standards for construction	State Pollution Control Board
7	Forest (Conservation) Act. 1991	Conservation and definition of forest areas. Diversion of forest land follows the process as laid by the act	No	No Forest land involved	State Forest Department, MoEF
8	Coastal Regulatory Zone Notification, 1991	Protect and manage coastal areas	No	The project area is not within designated coastal zone	MoEF, State Department of Environment
9	Wild Life Protection Act. 1972	Protection of wild life in sanctuaries and National Park (Protected Area)	No	No Wildlife sanctuary/National Park/Biosphere Reserve is located within 1.0 km from the project road	State/National Wildlife board (NBWL/SBWL) & Chief wild life warden
10	Ancient Monuments and Archaeological sites and Remains Act. 1958	To protect and conserve cultural sanctuaries and National Park (Protected Area)	No	No Archaeological monument along the project road	Archaeological Survey of India, State Dept. of Archaeology

Sl.No	Law/Regulation/Guidelines	Relevance	Applicable Yes/No	Reason for Application	Implementing Responsible Agency
11	The Motor Vehicle Act. 1988	Empower State Transport Authority to enforce standards for vehicular pollution. From August 1997 the "Pollution Under Control Certificate is issued to reduce vehicular emissions	Yes	All vehicles used for construction will need to comply with the provisions of this act	State Motor Vehicle Department
12	The Explosive Act (& Rules) 1884 (1983)	Sets out the regulations as to regards the use of explosive and precautionary measures while blasting & quarrying	No	Material will be procured from already approved quarries	Chief Controller of Explosives
13	Public Liability And Insurance Act. 1991	Protection to the general public from accidents due to hazardous materials	Yes	Hazardous materials like Bitumen shall be used for road construction	State Pollution Control Board
14	Hazardous Waste (Management and Handling) Rules, 1989	Protection to the general public against improper handling and disposal of hazardous waste	Yes	Hazardous waste shall be generated due to maintenance & vehicles repair works	State Pollution Control Board
15	Chemical Accidents (Emergency, Preparedness and Response) Rules. 1996	Protection against chemical accident while handling any hazardous chemicals	Yes	Handling of hazardous (flammable, toxic and explosive) chemicals during road construction	District & Local Crisis Group headed by the DM and SDM
16	Mines and Minerals (Regulation and Development) Act. 1957 as amended in 1972	Permission of Mining of aggregates and sand from river bed & aggregates from New Quarry	No	These materials shall be procured from approved quarries	State Department of Mining
17	The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) BOCW Act. 1996	Employing Labour/Workers	Yes	Employment of labourers	District Labour Commissioner

Table 3-2. Summary of Clearances & NOCs Applicable						
Sl. No	Type of Clearance	Statutory Authority	Applicability	Project Stage	Time Required	Responsibility
1	Environmental Clearance	SEIAA	Opening of New Borrow Area (if any)	Pre - construction	9 Months	Concessionaire/Contractor
2	Tree felling permission	Forest Department	Felling of trees	Pre - construction	2-3 Months	Concessionaire/Contractor
3	NOC and Consents Under Air, Water, EP Acts & Noise rules of SPCB (CFE)	Karnataka State Pollution Control Board	For establishment of Plants & equipment	Pre - construction	2-3 Months	Concessionaire/Contractor
4	NOC and Consents Under Air, Water, EP Acts & Noise rules of SPCB (CFO)	Karnataka State Pollution Control Board	For operating hot mix plants & batching plants	Pre - construction	2-3 Months	Concessionaire/Contractor
5	Permission to store Hazardous Materials	Karnataka State Pollution Control Board	Storage and transportation of hazardous materials & explosives	Pre - construction	2-3 Months	Concessionaire/Contractor
6	PUC Certificate for use of vehicles for construction	Department of Transport	For all Construction Vehicles	Pre - construction	1-2 Months	Concessionaire/Contractor
7	NOC for water extraction for construction & allied works	Ground Water Authority	Ground Water Extraction	Pre - construction	2-3 Months	Concessionaire/Contractor

Apart from the above following approvals from the IE and respective Traffic Police officer are also required

* Approval for Traffic Management Plan

* Approval for Safety & Health Plan

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 ABSRP 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 ABSRP commits to acts for sound management construction during the all stages of project covers as details in the preceding sections of environmental management plan.

Sl. No.	Environmental Issue	Location / sources	Mitigation Measures	Implementing Agency	Supervising & Monitoring Agency
Pre-Construction Phase					
Pre-construction activities by KRDCL, Karnataka					
P.1	Clearances & approvals	For construction works	Secure the following clearances & NOCs prior to start of construction activity Type of Clearance The Concessionaire, M/S Bagewadi Saundatti Road Project shall take all 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 The Concessionaire, M/S Bagewadi Saundatti Road Project will be responsible For establishment of construction camp For operating construction plant, batching plant etc. For storing fuel oil, lubricants, diesel etc. Engagement of Labour	Concessionaire/ Contractor IE, KRDCL
P.2	Ecologically Sensitive areas (Protected/Reserve forests etc.)	Diversion of Forest land	1) No Forest land involved for Acquisition	KRDCL duly assisted by Concessionaire	KRDCL and Forest Dept.
		Plantation along project road	1) Tree felling to be carried out after obtaining prior permission from the Deputy Conservatory of Forest (DCF)	Concessionaire/ Contractor	KRDCL and Forest Dept.
P.3	Land Acquisition	ROW	1) 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	KRDCL	KRDCL and Land Acquisition dept.
P.4	Clearance of	ROW	1) Advance notice shall be given to the encroachers & squatters present, who need to	KRDCL duly assisted by	KRDCL and

Sl. No.	Environmental Issue	Location / sources	Mitigation Measures	Implementing Agency	Supervising & Monitoring Agency
	Encroachment / Squatters		be relocated as per RAP. All R&R activities will be completed prior to initiation of civil works.	Concessionaire	local Admin. dept.
P.5	Tree Cutting	ROW	<ol style="list-style-type: none"> 1) Design modifications done to reduce the number of trees to be felled 2) Trees within the proposed widening area shall be felled along with some which pose potential safety hazard 3) Tree felling only after obtaining clearances from the Forest Dept. 4) 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	KRDCL
P.7	Relocation of Community Utilities & Common Property Resources	Along the Project Road	<ol style="list-style-type: none"> 1) The Concessionaire M/S Begawadi Saundatti Road Project shall take care of all community utilities & properties i.e., hand pumps, open wells, water supply lines, sewer lines, telephone cables, buildings & health centers will be relocated before construction starts on the project road. All possible measures will be taken to minimize inconvenience to public. 2) All conservation and protection measures will be taken up as per design. Access to such properties from the road shall be maintained clear and clean. 	Concessionaire/ Contractor	KRDCL
P.8	Relocation of affected Cultural & Religious Properties	Along the Project Road	<ol style="list-style-type: none"> 1) Religious property resources such as shrines, temples & mosques will be preferably relocated beyond the RoW if affected 2) 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	KRDCL
P.9	Implementation Information Meeting & Disclosure of Information	Project road	<p>The Concessionaire, M/S Bagewadi Saundatti Road Project commit for implementation as below</p> <ol style="list-style-type: none"> 1) 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 2) 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 IE/KRDCL 	Concessionaire/ Contractor	IE, KRDCL
P10	Orientation of Implementing Agency & Contractors		The Concessionaire / Contractor M/S Bagewadi Saundatti Road Project 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	Concessionaire/ Contractor	IE, KRDCL

Sl. No.	Environmental Issue	Location / sources	Mitigation Measures	Implementing Agency	Supervising & Monitoring Agency
			& IE involved in the implementation of EMP		
P 11 : Field Verification and Modification of the Contract Documents					
P11.1	Joint Field Verification Assessment		The Manager-Environment KRDCL, Environmental Specialist of IE, and the Concessionaire/Contractor M/S Bagewadi Saundatti Road Project shall 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 Changes/ Revisions/ Additions in the Project Work		The Concessionaire, M/S Bagewadi Saundatti Road Project in consultation with Environmental Specialist of IE shall identify and assess potential adverse environmental impacts due to changes proposed by him, and prepare the Environmental management measures and submit to the IE/authority for review before implementing the same.	Concessionaire / Contractor	IE, KRDCL
P.11.3	Procurement of Hot-mix plants & Batching Plants, other Construction Vehicles, Equipment & Machinery	For construction works	The Concessionaire, M/S Bagewadi Saundatti Road Project shall follow the 1) 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 2) All discharge standards promulgated under the Environmental protection Act – 1986 shall be strictly adhere to. All vehicles, equipment, and machinery used for construction shall confirm to the relevant Indian Standard.	Concessionaire/ Contractor	IE, KRDCL
P.11.4	Setting up of Hot mix Plants & Batching Plant	For construction works	The Concessionaire/Contractor M/S Bagewadi Saundatti Road Project shall obtain 1) The consent to establish and consent to operate the plants from the Karnataka State Pollution Control Board and submit a copy to the IE & KRDCL. 2) Hot mix plants and batching plants shall be located at least 1000m away in downwind direction from the nearest habitation. 3) The exhaust gases shall be complying with the requirements of the relevant current emission control legislation. All operation at plants shall be undertaken in accordance with all current rules and regulations protecting the environment.	Concessionaire/ Contractor	IE, KRDCL
P 12	Labour Requirements	Camp Site	The concessionaire / contractor M/S Bagewadi Saundatti Road Project preferably will use unskilled labour drawn from local communities to give the maximum benefit to the local community.	Concessionaire/ Contractor	IE, KRDCL
P 13	Construction on Camp Locations Selection, Design & Lay-out		The Concessionaire M/S Bagewadi Saundatti Road Project shall approvals 1) 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.	Concessionaire/ Contractor	Environmental Specialist of IE , KRDCL

Sl. No.	Environmental Issue	Location / sources	Mitigation Measures	Implementing Agency	Supervising & Monitoring Agency
			2) The sewage and solid waste for the camp will be designed, built and operated so that no order is generated. Labour camp should be in compliance with the Factory Act, The building and other construction workers (regulation of employment and conditions of service) Act, 1996 and all other relevant legislation shall be strictly adhere to.		
P 14	Arrangements for Temporary Land Requirement		The Concessionaire / Contractor M/S Bagewadi Saundatti Road Project shall follow 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, KRDCL
P15	Environmental Conditions	Project road vicinity	1) The Concessionaire M/S Bagewadi Saundatti Road Project shall undertake seasonal monitoring of air, water, and noise and soil quality through an approved monitoring agency. 2) 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 , KRDCL
Construction / Maintenance Phase					
C1 : Site Clearance					
C.1.1	Clearing & Grubbing	Within ROW	The Concessionaire M/S Bagewadi Saundatti Road Project shall take all measures for the protection of ecosystem and environment under the direction of the IE. 1) 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. 2) Only ground cover/shrubs that impinge on the permanent work or necessary temporary work will be removed. 3) 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 from the forest department & after that the receipt of KRDCL's written confirmation in this regard. 4) Vegetation only with girth of over 30 cm will be considered as trees.	Concessionaire/ Contractor	IE, Regulatory Authorities, KRDCL
C.1.2	Disposal of debris from dismantling structures & excavation of the existing road surface & pavements	Within ROW	The Concessionaire M/S Bagewadi Saundatti Road Project responsible for 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: 1) The sub-grade of the existing pavement may be used as embankment fill material. 2) The existing sub base material may be recycled as sub base of any haul road or access road. 3) 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. 4) 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. 5) All arrangement for transportation during construction including provision,	Concessionaire/ Contractor	IE Regulatory Authorities, KRDCL

Sl. No.	Environmental Issue	Location / sources	Mitigation Measures	Implementing Agency	Supervising & Monitoring Agency
			<p>maintenance, dismantling & clearing debris, will be considered incidental to the works & will be planned & implemented by the Contractor.</p> <p>6) 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.</p>		
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 M/S Bagewadi Saundatti Road Project in consultation and with approval of Environmental Specialist of IE. Any non-compliance shall be made good by the concessionaire at his own cost.</p> <p>1) 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>2) The Environmental Specialist of IE will approve these disposal sites after conducting a joint inspection on the site with the Contractor.</p> <p>3) 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>4) 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>5) 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>6) 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, KRDCL
C.1.4	Stripping, stocking and preservation of top soil	Camp site and Borrow Area	<p>In agricultural areas or in any other productive soil areas as directed by the engineer. 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 of height not exceeding 2m.</p> <p>A portion of the temporarily acquired area and/or Right of Way will be earmarked for storing topsoil. The Concessionaire shall identify the locations for stock piling will be pre-identified in consultation and with approval of Environmental Specialist of IE. Any non-compliance shall be made good by the concessionaire at his own cost.</p> <p>The concessionaire shall following precautionary measures will be taken to preserve them till they are used:</p> <p>1) 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>	Concessionaire/ Contractor	IE , KRDCL

Sl. No.	Environmental Issue	Location / sources	Mitigation Measures	Implementing Agency	Supervising & Monitoring Agency
			<p>2) 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>3) 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> <p>1) Covering all disturbed areas including borrow areas, only in a case where there are to be rehabilitation</p> <p>2) Dressing of slopes of road embankment</p> <p>3) Agricultural fields of farmers acquired temporarily land.</p>		
C.1.5	Accessibility	Project road	<p>1) 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.</p> <p>2) The contractor will also ensure that the existing accesses will not be undertaken without providing adequate provisions to the prior satisfaction of the IE.</p> <p>3) 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 , KRDCL
C.1.6	Planning for Traffic Diversions & Detours	Project road	<p>Any temporary traffic diversions need to be constructed after approval from the Employer & under the supervision of the IE.</p> <p>1) 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.</p> <p>2) 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 shall occur.</p> <p>3) The Concessionaire will also inform local community of changes to traffic routes, conditions & pedestrian access arrangements with assistance from the Local Admin & Executive Engineer of KRDCL.</p> <p>4) 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> <p>Safety of Children Entering or Exiting Schools:-</p>	Concessionaire/ Contractor	IE, KRDCL

Sl. No.	Environmental Issue	Location / sources	Mitigation Measures	Implementing Agency	Supervising & Monitoring Agency
			<p>The Concessionaire shall take all necessary measures for the safety of children.</p> <p>1) Where the work site is within 500m of a school entrance, the concessionaire / contractor shall provide a specific traffic management plan that clearly demonstrates the extra steps to mitigate risk for school children passing through the work site.</p>		
C 2: Procurement of Construction Material					
C.2.1	Borrow Areas	Borrow area used for project road	<p>Borrowing within the RoW is prohibited – under this contract.</p> <p>1) 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 Concessionaire M/S BSRP.</p> <p>2) The Concessionaire / Contractor BSRP shall 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.</p> <p>3) The BSRP shall 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.</p> <p>4) The BSRP will finalizing soil borrowing earth and all logistic arrangements as well as compliance to environmental requirements, in respect of excavation and borrow areas as stipulated, from time to time MoEF and the local bodies, as applicable, shall be the sole responsibility of the Concessionaire.</p> <p>5) The Concessionaire shall facilitate inspection of all borrow areas to the Environmental Specialist of IE for the Environmental compliance.</p> <p>6) Any non – compliance shall be made good by the concessionaire at his own cost.</p>	Concessionaire/ Contractor	IE, KRDCL
		Degradation of Borrow Areas	<p>1) The BSRP shall not be dug borrow pits continually. The location, shape and size of the borrow area shall be as approved by the Engineer. No borrow area shall be opened without permission of the Engineer.</p> <p>2) If borrow pits along the road the Concessionaire shall take permitted by the Engineer, these shall not be dug continuously and shall confirm to MoRT&H specifications.</p> <p>3) The Concessionaire committee Borrow pits shall be re-developed as per MoEF guidelines.</p>		
C.2.2	Quarry	Establishment of Quarry site	<p>The Concessionaire shall obtain materials from approved quarries only after consent of the DoM or other concerned authorities, as per the state mining rules.</p> <p>1) 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 KRDCL through the IE.</p> <p>2) The Concessionaire / Contractor shall also work out haul road network & report these details to the Project Manager who will inspect & in turn report to IE/ KRDCL before approval.</p>	Concessionaire/ Contractor	IE, KRDCL

Sl. No.	Environmental Issue	Location / sources	Mitigation Measures	Implementing Agency	Supervising & Monitoring Agency
C.2.3	Arrangement for Construction Water	Construction camp & Project road	<ol style="list-style-type: none"> 1) The Concessionaire / Contractor shall use ground / surface water as a source of water for the construction & where necessary set up own bore well facility for construction work. 2) The Concessionaire shall avoid disruption/disturbance to other water users, the Contractor will extract water from fixed locations & consult with the IE/Project Manager before finalising the locations. 3) The Concessionaire / Contractor shall provide a list of locations & type of sources from where water for construction will be extracted. 4) 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, IE & the KRDCL. 	Concessionaire/ Contractor	IE, KRDCL
C.2.4	Sand	Riverbeds	<ol style="list-style-type: none"> 1) The Concessionaire shall commit the sand will be procured from identified approved sand mines or vendors 2) The Concessionaire / Contractor shall obtain copy of the Lease agreement of the supplier & submit this to IE & the Executive Engineer-KRDCL before procuring the sand. 	Concessionaire/ Contractor	IE, KRDCL
C.3 Pollution					
C.3.1	Air Pollution	Construction plants, equipment & vehicles	<ol style="list-style-type: none"> 1) The Concessionaire BSRP 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. 2) The Concessionaire BSRP shall procure the construction plants and machinery, which shall conform to the pollution control norms specified by MoEF/CPCB/KSPCB. 3) The 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. 4) The Concessionaire ensure that 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. 5) The Concessionaire shall submit all vehicles, machineries and equipment PUC certificates to the IE 6) The Concessionaire shall take responsible for setting up the Construction plant site following points must be considered & maintained. <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 7) The Concessionaire shall obtaining Consent-for-Establishment (CFE) & Obtaining Consent-for-Operation (CFO) under Air & Water Acts from the Karnataka State Pollution Control (KSPCB). <ul style="list-style-type: none"> - Ensure adequate stack height for HMP as may be stipulated in CFE - Install emission control devices such as bag house filters, cyclone separators, water 	Concessionaire /Contractor	IE, KRDCL

Sl. No.	Environmental Issue	Location / sources	Mitigation Measures	Implementing Agency	Supervising & Monitoring Agency
			scrubbers etc. - Greenbelt along the periphery of plant site 8) All existing highways and roads –used by vehicles of the Concessionaire or any of his joint-venture or supplies of materials or plant and similarly roads which are part of the work shall be kept clean and clear of all dust/mud or other extraneous materials dropped by such vehicles or their tyres.		
		Dust during earth works or from spoil dumps	9) All earth – work shall be carried out keeping in view for minimization of dust fumes confirming to the CPCB norms and acceptable to the engineer. 10) The Concessionaire shall maintain adequate moisture at surface of any earthwork layer completed or non-completed to avoid dust emission. 11) The Concessionaire shall ensure stockpiling spoil at designated areas & at least 5 m away from traffic lane.	Concessionaire/Contractor	IE, KRDCL
		Storage of maintenance materials	The Concessionaire shall take Proper stockpiling & sprinkling of water as necessary	Concessionaire/Contractor	IE, KRDCL
C.3.2	Water Pollution	Clearing of water ways of cross drainage works including bridges & clearing of longitudinal side drains	All necessary measures shall be taken to prevent earthwork, stonework, materials and appendage as well as the method of operation from impending cross – drainage at rivers, streams, water canals and existing irrigation and drainage system. 1) The Concessionaire shall Clearance of waterway will be undertaken before onset of monsoon i.e. early in the month of June. 2) 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. Flooding: 1) The Concessionaire shall take all measure and as directed by the Environmental Specialist of IE to prevent temporary or permanent flooding of the site or any adjacent area. 2) The scope for prevention of flooding includes prevention of loss of use, loss of access any land or property thereon resulting from flowing or stagnate water as direct/indirect impact of construction Construction Waste: 1) All measures will be taken to prevent the wastewater, produce in construction camp, entering directly into streams, water bodies or the irrigation system and all precaution shall be taken as directed by the Environmental Specialist of IE. 2) The discharge standards promulgated under the Environmental Protection Act, 1986 shall be strictly adhere to. All waste arising from the project is to be disposed off in a manner that is acceptable to the State Pollution Control Board (SPCB) and the Engineer.	Concessionaire/Contractor	IE, KRDCL
		Construction vehicles	1) The Concessionaire shall Avoiding cleaning / washing of construction vehicle in any water body.	Concessionaire/Contractor	IE, KRDCL

Sl. No.	Environmental Issue	Location / sources	Mitigation Measures	Implementing Agency	Supervising & Monitoring Agency
			<p>2) The work shall be carried out in such a manner that pollution of natural watercourse, ponds, tanks and reservoirs is avoided.</p> <p>3) The Concessionaire shall arrange for collection, storing and disposal of oily wastes to the pre-identified disposal sites. Approval taken by Environmental Specialist of IE. All spills and collected petroleum wastes shall be disposed off in accordance with petroleum rules and PCB guidelines.</p>		
C.3.3	Noise Pollution & Vibration	Construction camp & workers camp	<p>1) The Concessionaire shall take Minimum distance of 1.5 km from river, stream & lake & 500 m from ponds.</p> <p>2) Locate facilities in areas not affected by flooding & clear of any natural or storm water courses.</p> <p>3) The ground should have gentle slope to allow free drainage of the site.</p> <p>4) 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.</p> <p>5) 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</p> <p>6) A separate vehicle washing ramp shall be constructed adjacent to the workshop for washing vehicles, including truck mounted concrete mixers, if any.</p> <p>Sanitation into water bodies:</p> <p>1) Sanitation of soil into the water bodies will be prevent as far as possible. The Concessionary shall take all reasonable measures.</p> <p>2) The Concessionaire shall take all necessary precaution and construct temporary/permanent devises to prevent water pollution (due to sanitation and increase of turbidity).</p>	Concessionaire/Contractor	IE, KRDCL
		Throughout Project Corridor, Construction Vehicles, Plants & Equipment	<p>1) 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.</p> <p>Site Controls:</p> <p>1) The Concessionaire shall take 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.</p> <p>2) The Concessionaire shall carried out 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.</p> <p>Scheduling of Project Activities:</p> <p>1) 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.</p> <p>Protection devices:</p>		IE, KRDCL

Sl. No.	Environmental Issue	Location / sources	Mitigation Measures	Implementing Agency	Supervising & Monitoring Agency
			<ol style="list-style-type: none"> 1) The Concessionaire shall be provided to the workers operating in the vicinity of high noise generating machines (ear plugs or ear muffs). 2) Construction equipment & machinery will be fitted with exhaust silencers. During routine servicing operations, the effectiveness of exhaust silencers shall be checked and if found to defective shall be replaced. Notwithstanding any other conditions of contract, noise level from any item of plant (s) must comply with the relevant legislation for levels of sound emission. Non-complaint plant shall be removed from the site. 4) Maintenance vehicles, equipments and machinery shall be regular and proper, to the satisfaction of the Engineer, to keep nice from these at a minimum. Source-control through proper maintenance of all equipment. 5) Use of properly designed engine enclosures & intake silencers. 6) Vehicles & equipment used will confirm to the prescribed noise pollution norms. 7) Movements of heavy construction vehicles & equipment near public properties will be restricted. 		
C.3.4	Land Pollution	Spillage from plant & equipment at construction camps	<ol style="list-style-type: none"> 1) The Concessionaire shall providing impervious platform & oil & grease trap for collection of spillage from construction equipment vehicle maintenance platform. 2) Collection oil & lubes drips in container during repairing construction equipment vehicles. 3) The Concessionaire shall providing impervious platform & collection tank for spillage of liquid fuel & lubes at storage area. 4) The Concessionaire shall providing bulk bituminous storage tank instead of drums for storage of bitumen & bitumen emulsion. 5) The Concessionaire shall providing impervious base at bitumen & emulsion storage area & regular clearing of any bitumen spillage for controlled disposal & Reusing of bitumen spillage if any. 6) The Concessionaire shall carried out 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. 7) The Concessionaire shall carried out all the waste oil collected, from skimming of the oil trap as well as from the drip pans, or the mechanical degreaser shall be stored in accordance with the Environment Protection (Storage & Disposal of Hazardous Wastes) Rules, 1989. 8) All waste material shall be completely disposed as desire and the site shall be fully cleaned before handing over. The Environmental Specialist of IE will certify in this regard. <p>If dumping of waste is envisaged and any claim arising out of disposal shall be made good by the concessionaire at his own cost.</p>	Concessionaire/Contractor	IE, KRDCCL
		Domestic solid waste & liquid waste generated at camps	<ol style="list-style-type: none"> 1) The Concessionaire shall carried out collecting kitchen waste at separate bins & disposing of in a pit at designated area. 2) The Concessionaire shall carried out collecting plastics in separate bins & disposing in deep trench at designated area/s covering with soil. 	Concessionaire/Contractor	IE, KRDCCL

Sl. No.	Environmental Issue	Location / sources	Mitigation Measures	Implementing Agency	Supervising & Monitoring Agency
C.3.5	Drainage	Within ROW	<p>1) The Concessionaire 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.</p> <p>2) The Concessionaire shall 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.</p>	Concessionaire/Contractor	IE, KRDCL
C.3.6	Siltation of Water Bodies & Degradation of Water Quality	Borrowing of earth for embankment construction	<p>1) The Concessionaire shall not excavate beds of any stream/canals/ any other water body for borrowing earth for embankment construction.</p> <p>2) 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.</p> <p>3) The Concessionaire shall 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.</p>	Concessionaire/Contractor	IE, KRDCL
C.4	Accidents	Project road	<p>1) The Concessionaire shall provide, erect & maintain barricades, including sign boards, road marking, traffic lights for night traffic & flagmen as required by the Environmental Engineer of IE for the information and protection of traffic approaching or passing through the section of the highways under improvement.</p> <p>2) All signs, barricade, pavement marking shall be as per MoRT&H specification. Before taking up construction on any section of the highway, a traffic control plan shall be devised to the satisfaction of the Environmental Specialist of IE.</p>	Concessionaire/Contractor	IE, KRDCL
C.5	Public Health & Safety	Project road	<p>1) The Concessionaire shall carried out debris generated will be disposed to the satisfaction of Environmental Specialist of IE and KRDCL.</p> <p>2) The Concessionaire shall carried out Monitoring of air, water, noise & land during construction & operational phase.</p>	Concessionaire/Contractor	IE, KRDCL
C.6	Risk from Operations	Project road	<p>1) The Concessionaire 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.</p> <p>2) The Concessionaire shall supply all necessary safety appliances such as safety goggles, helmets, masks, etc. to the workers & staff.</p> <p>3) The Concessionaire shall comply with all regulation regarding safe scaffolding, ladders, working platforms, gangway, stairwells, excavations, trenches & safe means of entry & egress.</p> <p>Minimise significant hazards, where elimination & isolation are both impractical No child labour shall be utilized in the project.</p>	Concessionaire/Contractor	IE, KRDCL
C.7	Risk caused by Force' Majure	Project road	<p>1) The Concessionaire shall take all reasonable precaution will be taken to prevent danger of the workers & the public from fire, flood, drowning, etc.</p> <p>2) The Concessionaire shall take all necessary steps will be taken for prompt first aid treatment of all injuries likely to be sustained during the course of work.</p>	Concessionaire/Contractor	IE, KRDCL

Sl. No.	Environmental Issue	Location / sources	Mitigation Measures	Implementing Agency	Supervising & Monitoring Agency
C.8	First Aid & Public Health	Project roads, construction camps & site offices etc.	<ol style="list-style-type: none"> 1) The Concessionaire shall provide 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. 2) The Concessionaire shall provide 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. 3) The Concessionaire must have MOU with the nearest Hospitals for emergency treatment of injured or ill person(s). 4) Provision for first health check-up shall be carried out prior to induction of the personnel into the construction work site. 5) The Concessionaire committee for periodic Training programmes for engineers/workers regarding health and safety during construction shall be provided at site level. 	Concessionaire/Contractor	IE, KRDCCL
C.9	Safety Measures During Construction	Project road, construction site etc.	<ol style="list-style-type: none"> 1) 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. 2) The Concessionaire committee for adequate safety measures for workers during handling of materials at site will be taken up. 3) The Concessionaire shall maintain 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. 	Concessionaire /Contractor	IE, KRDCCL
C.9.1	Traffic Management and Safety	Project Road	<ol style="list-style-type: none"> 1) 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. 2) 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. 3) 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.10	Hygiene	Camp site	<ol style="list-style-type: none"> 1) The Concessionaire committee for all temporary accommodation must be constructed & maintained in such a fashion that uncontaminated water is available for drinking, cooking & washing. The construction camp shall have a clean hygienic environment and adequate health care shall be provided for the work force. 2) The Concessionaire committee for Latrines shall be provided with septic tank for the workers & labours inside the camps. 3) The Concessionaire shall provide garbage bins must be in the camps & regularly 	Concessionaire/Contractor	IE, KRDCCL

Sl. No.	Environmental Issue	Location / sources	Mitigation Measures	Implementing Agency	Supervising & Monitoring Agency
			emptied & the garbage disposed off in a hygienic manner. 4) The Concessionaire committee for 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. 5) The Concessionaire has responsible 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.		
C.11	Transmission of Diseases & HIV/ AIDS prevention & control	Workers/ labourers Camp along the project	1) The Concessionaire shall carried out awareness among workers to prevent transmission of diseases between the local inhabitants & the labourers engaged for the works, including sexually transmitted diseases. 2) The Concessionaire shall engage a professional agency an NGO for implementing the guidelines laid down in the World Bank policy & communicate to KRDCL project office. 3) The Concessionaire shall extend necessary support to the appointed agency by deputing the workmen to attend the awareness creation programmes.	Concessionaire/Contractor	IE, KRDCL
C.12	Prevention of Mosquito Breeding	Workers/ labourers Camp along the project	1) The Concessionaire shall be taken measures to prevent breeding at site. The measures to be taken shall include: a) Empty cans, oil drums & other receptacles, which may retain water shall be deposited at a central point & shall be removed from the site regularly. b) Still waters shall be treated at least once every week with oil in order to prevent mosquito breeding. c) 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. d) Water storage tanks shall be provided. e) Posters in Hindi, Kannada & English which draw attention to the dangers of permitting mosquito breeding shall be displayed prominently on the site. f) Contractor at periodic interval shall arrange to prevent mosquito breeding by fumigation / spraying of insecticides	Concessionaire/Contractor	IE, KRDCL
C.14 Contractor's Demobilization					
C.13.1	Environmental Conditions		1) During construction, 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 will be as per the Monitoring Plan prepared and further approval of IE. National Standard of Air, Noise and Water given in the report. 2) Frequency of Environmental Monitoring at construction establishments and other specified locations shall be at least three times per year for two years/construction period whichever is more.	Concessionaire/Contractor	IE, KRDCL
C.13.2	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, KRDCL
C.13.3	Clean-up		• The Concessionaire shall prepare site restoration plans, which will be approved by the	Concessionaire/ Contractor	IE, KRDCL

Sl. No.	Environmental Issue	Location / sources	Mitigation Measures	Implementing Agency	Supervising & Monitoring Agency
	Operations, Restoration & Rehabilitation		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.		
Operation Stage					
O.1	Monitoring Operation Performance		<ul style="list-style-type: none"> The Concessionaire shall 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, KRDCL
O.2	Maintenance of Drainage		<ul style="list-style-type: none"> The Concessionaire shall 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, KRDCL
O.3	Pollution Monitoring		<ul style="list-style-type: none"> 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, KRDCL
O.4	Soil Erosion & Monitoring of Borrow Areas		<ul style="list-style-type: none"> The Concessionaire shall committee 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, KRDCL
O.5	Changes in Land Use Pattern		<ul style="list-style-type: none"> 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, KRDCL
O.6	Removal of Dead Animals		<ul style="list-style-type: none"> The Concessionaire should remove dead animals lying on the road and buried away from the nearby residences. 	Concessionaire	IE, KRDCL
O.7	Public awareness on Noise levels and Health Affects		<ul style="list-style-type: none"> 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 Concessionaire shall carried out public awareness is necessary regarding the human health through the newspapers and consultations and distribution of pamphlets during the operation stage. 	Concessionaire	IE, KRDCL
O.8	Public Health Check-up	Project site office and camps	<ol style="list-style-type: none"> Provision for last health check-up the Concessionaire shall be carried at least a month before the discharge of the personnel from the construction site The Concessionaire committee for Periodic Training programmes for engineers/workers regarding health and safety during construction shall be provided at site level. 	Concessionaire/Contractor	IE, KRDCL

EHS	Health & Safety	Project Road, At Work sites, camp sites and other allied sites.	<ul style="list-style-type: none"> • The Concessionaire shall comply with the requirements of the Environmental, Health, and Safety (EHS), Guidelines of the World Bank Group, April 2007 and the statutory norms of safety during construction. The relevant ones are general guidelines available on the internet. 	Concessionaire/Contractor	IE, KRDCL
			<ul style="list-style-type: none"> • The Concessionaire shall carry out adequate drainage, and waste disposal will be provided at workplaces. 	Concessionaire/Contractor	IE, KRDCL
			<ul style="list-style-type: none"> • The Concessionaire shall be maintained proper drainage around sites to avoid water logging leading to various diseases. 	Concessionaire/Contractor	IE, KRDCL
			<ul style="list-style-type: none"> • The Concessionaire shall provide adequate sanitation and waste disposal facilities will be provided at construction camps by means of septic tanks, soakage pits etc. 	Concessionaire/Contractor	IE, KRDCL
			<ul style="list-style-type: none"> • The Concessionaire shall carry out a health care system will be maintained at construction camp for routine checkup of workers and avoidance of spread of any communicable disease. 	Concessionaire/Contractor	IE, KRDCL
			<ul style="list-style-type: none"> • Safety of workers undertaking various operations during construction will be ensured by the Concessionaire shall be providing appropriate Personnel Protective Equipments (PPEs) such as helmets, masks, safety goggles, safety belts, ear plugs etc. 	Concessionaire/Contractor	IE, KRDCL
			<ul style="list-style-type: none"> • The Concessionaire responsible for the electrical equipment will be checked regularly. 	Concessionaire/Contractor	IE, KRDCL
			<ul style="list-style-type: none"> • The Concessionaire shall commits to provide 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. 	Concessionaire/Contractor	IE, KRDCL
			<ul style="list-style-type: none"> • The Concessionaire shall organize awareness program on HIV aids and Sexually transmitted diseases (STDs) for workers on periodic basis. 	Concessionaire/Contractor	IE, KRDCL
			<ul style="list-style-type: none"> • Tool Box meeting shall be held at least once a week in order to brief workers about safety, do's and don't during construction • Toolbox safety meetings are on the job meetings and shall keep employees alert to work related accidents and illness. • A toolbox meeting helps alert employees to workplace hazards, and by preventing accidents, illness and on the job injuries. • The meeting should involve group of people who work together and face same sort of injury risks. • Toolbox meeting improve workplace safety and health, provide information and instructions, improve consultation and help identify hazards and deciding what action needs to be taken to reduce this risks. 		

1 <http://www.ifc.org/wps/wcm/connect/554e8d80488658e4b76at76a6515bb18/Final%2B-2BGeneral%2BEHS%2BGuidelines.pdf?MOD=AJPERES>

<http://www.ifc.org/wps/wcm/connect/7e4c7f80488554d5b45cf66a6515bb18/Final%2B-%2BToll%2BRoads.pdf?MOD=AJPERES&id=1323162564158>

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 nears 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

4.0 (A) ENVIRONMENTAL MITIGATION AND ENHANCEMENT

The anticipated impacts, even though limited, will be mitigated following the guidance provided in this chapter. It is expected that the construction stage activities will broadly follow the sequence of Table 4 -1. During the post-construction stage, demobilization and operation shall follow the Concessionaire / Contractor's plan. Since most of the activities that have noticeable adverse environmental impacts are to occur during construction period, the focus of this plan is mainly during the same period. Details of various mitigation measures to be implemented during pre-construction, construction and operation stage are presented in Table 4-1. The table also gives the details of those responsible for the implementation, supervision and monitoring of the project.

As part of the Good Environmental Practices, all affirmative actions are deliberated. Based on project specific mitigation and enhancement measures are proposed. These mitigation and enhancement measures shall lead to generating good will among the various stakeholders and road users and go a long way in making the project success.

4. A.1 MITIGATION MEASURES

As part of project it has been endeavored to mitigate all negative impacts of the project on the physical, biological and social environment. The RAP details out the mitigation measures adopted to minimise the social impacts. The mitigation measures to minimise the impacts on physical and environment have been dealt in details in the EIA report. The EMP table also provides the mitigation measures along with the responsibility and locations in details. Budgetary provisions have been made to capture the mitigation measures. Some of the mitigation measures on major parameters are summarised below:

4. A.2 Land

- Land acquisition minimised & shall only be limited to locations which require geometric correction
- Soil Erosion mitigated through Stone pitching & Turfing
- Oil Interceptor will be provided for accidental spill of oil and diesel
- Septic tank will be constructed for waste disposal
- Quarry & Borrow Area Operation & Management Plans drawn

4. A.3 Water

- Relocation of ground water sources
- Silt fencing to be provided for surface water source
- Rain water harvesting structure & water harvesting structures for storage of water especially during summer and also for the use of local populace
- Regular monitoring of water quality
- Compliance with statutory regulatory requirements
- Provision of oil interceptors & septic tanks at camp sites

4. A.4 Air Quality

There will be rise in PM levels during the construction activities, which shall again be within prescribed limit after the

- Sprinkling of Water

Avenue plantation of broad leaf trees

- Fine materials to be completely covered, during transport and stocking
- Plants to be installed in down wind direction from nearby settlement
- Compliance with statutory regulatory requirements
- All vehicles, equipment and machinery used for construction will be regularly maintained to ensure that the pollution emission levels conforms to regulatory requirements
- Provisions of PPE to the workers
- Regular monitoring of ambient air quality

4. A.5 Noise

- No Horn Zone sign Post
- Provision of noise barriers
- Machinery to be checked and complied with noise pollution regulations
- Camps to be setup away from the settlements, in the down wind direction
- Provisions of PPE to the workers & prevent prolonged exposure to noise levels of more than 90 dB (A) per 8 hour shift
- All vehicles, equipment and machinery used for construction will be regularly maintained to ensure that the pollution levels conforms to regulatory requirements
- Compliance with statutory regulatory requirements
- Regular monitoring of ambient noise quality
- Provision of Noise barriers at locations are given in table below.

Table 4.A1: Noise Barrier Locations

Table 4.A1: Noise Barrier Locations								
Sl. No	Chainage (Km)		Distance from ECL (m)	Structure	Settlement	Side	Length of Noise Barrier (m)	Mitigation
	Exiting	Proposed						
1	211.870	29..000	10	Govt. School	Karikatti	RHS	80	B/W shall be reconstructed as N/B
2	212.000	28.850	8	Primary School	Karikatti	RHS	60	
3	222.000	19.370	15	Primary Govt. School	Udikeri	RHS	30	
4	224.520	17.100	15	Primary School	Belavadi	LHS	40	
5	224.600	17.000	15	Govt. Hospital	Belavadi	LHS	100	
6	416.200	4.920	10	Govt. School	Anigol	LHS	30	New Noise Barrier Proposed
7	419.700	1.450	10	Primary School	Bailhongal	LHS	25	

8	420.000	1.170	15	Boys Hostel	Bailhongal	RHS	100	B/W shall be reconstructed as N/B
9	160.780	16.700	15	Primary & Govt High School	Sanikapp	RHS	115	
10	171.900	5.250	8	Primary School	Chick Bhage Atiori	RHS	100	
11	175.250	1.800	10	Govt. Primary & Inter College	Hire Bagh Wali	LHS	45	
12	175.960	1.240	15	Pvt. School	Bagewadi	RHS	15	New Noise Barrier Proposed
Total length (m)							740	

It may be noted that the EMP budget has taken into consideration the entire length of noise barriers proposed irrespective of whether the receptor is private or government owned. KRDCL has stated in a meeting that noise barriers shall be proposed only for government owned structure as per its policy. The final length of the noise barriers shall be decided by the IE in consultation with KRDCL & the Concessionaire.

4. A.6 National Park / Sanctuary / Bio-sphere Reserve / Notified Animal Corridor

No National Park or Wildlife Sanctuary is located within 10 km radius from the project road. Also, there are no notified animal corridor/migration route is present in the project area.

4. A.7 Forest Areas

No Protected / Reserve Forest are likely to be affected by the project.

4. A.8 Flora and Fauna

- Avenue plantation along corridor, where ever possible given to compensate the loss of trees due to felling
- Tree Plantation Strategy prepared which stresses on plantation of native broad leafed indigenous trees species
- Construction workers shall be instructed to protect natural resources and fauna, including wild animals and aquatic life.
- Hunting and unauthorised fishing shall be prohibited

4. A.9 ENVIRONMENTAL ENHANCEMENT MEASURES

Environmental Enhancements refer to the positive actions to be taken up during the implementation of the Project for the benefit of the road users and the communities living close to Project road and are in addition to the mitigation measures proposed. The objectives of environment enhancement are:

- To improve visual qualities of highway by providing aesthetically pleasing landscape features
- To integrate the road corridor with surrounding views and landforms.
- To improve the environment setting along the road
- To improve the condition of neglected Archaeological / Communities sites, if any
- Reduce pollution load
- To integrate local communities with the project by development community properties along the road.
- Provide facilities to Highway user.

KRDCL conveyed in a meeting that all enhancement measures especially those related to water bodies shall be taken up by KRDCL separately. However a lump sum cost for enhancement of water bodies, cultural properties including seating arrangement & landscaping of junctions and at other locations has been captured in the EMP budget. The locations of the enhancement sites shall be decided in consultation and joint verification by the IE and KRDCL.

4. A.10 ENVIRONMENTAL MANAGEMENT PLAN (EMP)

Environmental impacts could be positive or negative, direct or indirect, local or regional and also reversible or irreversible. The impacts generated during construction and operational phase of the roads along with management plan for these impacts has been discussed in Environmental Management Plan. Environmental management considerations in the form of EMP have been designed for project activities based on sample EMP and the Codes of practices. The EMP shall provide guidelines & help IE and Concessionaire in implementing and incorporating environmental management practices to reduce negative environmental impacts of the project. The plan outlines existing and potential problems that may impact the environment and recommends corrective measures where required. Enhancement measures are also proposed in order to provide good environmental practices and improve the aesthetics. The enhancement of water body shall be finalised by IE and Concessionaire in consultation with the local community and Project Proponent. However, the lump sum cost for enhancement of water body covered in EMP Budget. The other key issues that require special attention along with the mitigations and enhancement measures to be implemented have been detailed in Table 4.1

4. A.11 GRIEVANCE REDRESSAL MECHANISM:

A Grievance Redressal Cell (GRC) to be established at the project office. The cell has representation from company, Ashoka Bagewadi Saundatti Road Project (ABSRP), Sub-Contractor, local administration and concerned stockholders. The company facilitator will look into complaints and concerns about ownerships disputes historic structures, religious structures, public utilities, distribution of compensation among heirs, missing affected assets and persons in the census etc. the procedure will not replace existing legal processes. Company will forward the grievance to the concerned authority.

4. A.12 ONGOING REPORTING TO THE PAC (PROJECT AFFECTED COMMUNITIES):

Company/ ABSRL facilitator will play pro-active role in mitigation measures mentioned infeasibility report and suggested by Client and same will be reported to the Client

Chapter-05

Environmental Management System

5.0 PRECAUTIONS FOR SAFEGUARDING THE ENVIRONMENT

5.1 Borrow-pits for Embankment Construction

The Concessionaire M/S Bagewadi Saundatti Road Project shall not be dug Borrow pits 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. The depth of the pits shall be so regulated that the sides of the excavation will have a slope not steeper than 1 vertical to 4 horizontal, from the edge of the final section of the bank.

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. In borrow pits, the depth of the pits shall be so regulated that the sides of the excavation will have a slope not steeper than 1 vertical to 4 horizontal, from the edge of the final section of the bank.

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 affected 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:

- 1) Avoid usage of Plastic materials like carry bags etc at the Labour camps
- 2) Provision of first aid facilities at the Labour camps
- 3) Facilities for proper disposal of sewage at the Labour camps
- 4) Provide fire extinguishers at storage facilities of fuel and lubricants
- 5) Use of LPG should be encouraged instead of fire wood for cooking at the labour camp
- 6) Small incinerators should be provided for burning waste oil, grease materials etc
- 7) Dedicated service stations with oil & grease interceptors to be provided
- 8) Store Yard for storing used tires, scrap materials/ released materials etc
- 9) 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. Specified locations shall be at least three times per year for two years/construction period whichever is more.

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 Concessionaire shall responsible to identify the locations of Disposal sites have to be selected and approval from the Environmental Specialist of IE as follows.

- 1) Locating the disposal sites is the sole responsibility of the Concessionaire with the approval of Independent Engineer.
- 2) Joint inspection of all disposal sites shall be done by Independent Engineer and Concessionaire prior to approval.
- 3) No residential area are located downwind side of these locations,
- 4) 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.
- 5) 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.

- 6) Public perception about the location of debris disposal site has to be obtained before finalizing the location.
- 7) Permission from the Village/local community is to be obtained for the Disposal site selected.
- 8) Concessionaire will resolve all claims arising out of waste disposal at his own cost.
- 9) 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:

- 10) Identify the disposal area.
- 11) Prepare a Concessionaires debris disposal plan with design drawings for each identified area and get it approved by the Independent Engineer.
- 12) Need to photograph the present land use and condition of the area.
- 13) Construct all required structures (e.g. retaining wall).
- 14) The dumpsites filled only up to the ground level with compaction of the debris materials in layers after disposal.
- 15) The 30 cm top layer of disposal pit shall be provided with good earth suitable for development of vegetation/plantation.
- 16) After levelling, the site could be suitably rehabilitated by planting local species of grass (turfig), 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:

- 1) Locating the bitumen disposal sites is the sole responsibility of the Concessionaire with the approval of Independent Engineer.
- 2) 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.
- 3) Joint inspection of all disposal sites shall be done by Independent Engineer and Concessionaire prior to approval.
- 4) 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.
- 5) 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.
- 6) Public perception about the location of bitumen disposal site has to be obtained before finalizing the location.
- 7) Permission from the Village/local community is to be obtained for the Disposal site selected.
- 8) 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:

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

5.14.5. Provision of Oil Interceptors

The BSRP Provide 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, Water and Soil. Frequency of Environmental Monitoring at construction establishments and other specified locations shall be at least three times per year for two years/construction period whichever is more.

5.14.7. Landscape and Tree Plantation

The Concessionaire shall plant the trees during the construction to overcome the pollution of GHG in the extent use of plants, machinery, and emission from using vehicles that total emission of carbon dioxide from the combustion of diesel in the total life cycle of the project and environmental loss due to construction camp, labour camp, quarry operation, borrow operation and impacts due to other construction activities. Tree shall be planted at open available space at camp sites and other available space on and off the project site to recover the loss. For the plantation strategy IRC: SP-21, IRC – 66 shall be followed. Although, the landscaping shall be carried – out as per the extant police of Authority.

5.14.8. Welfare Facilities to the Labours/Workers

The Concessionaire responsible for provide all welfare facilities to the Labours/Workers as per Environmental norms, Acts and Rules.

Chapter – 05 (A)

Applicable Law and Acts

Apart the above, the ABL shall obtain all applicable Permits and NOC required for environmental protection and conservation from the Competent Authority as provision under the acts and rules governed in India and applicable for this project.

The following Rules and Regulation are applicable for ABL:-

- ✓ MOEF&CC Requirement Road construction -- EIA Report & Environment clearance from MOEF–
Applicable
- ✓ Environment safeguard policy of ADB.
- ✓ Environment Protection Act :1986 -- Applicable
- ✓ The Water (Prevention & control of pollution) Act, 1974 -- Applicable
- ✓ The Water (Prevention & Control of pollution) Cess Act, 1977, including rules, 1978 -- Applicable
- ✓ The Air (Prevention & control of pollution) Act, 1984 -- Applicable
- ✓ The Hazardous Waste (Management & Handling) Rules, 2000 -- Not Applicable
- ✓ Manufacture, Storage & Import of Hazardous Chemicals Rules, 1989 -- Applicable
- ✓ Forest clearance for tree cutting (Local, State and Centre if required) -- Applicable
- ✓ Local authority or *Grampanchyat* permission (NOC) for establishment of plant -- Applicable
- ✓ District Industry Centre permission for industry -- Applicable
- ✓ Factory Act: 1948 (Crusher VSI & HMP) Plant Establishment -- Applicable
- ✓ State Factory Rule (Director of Industrial Safety and Health requirement) -- Applicable
- ✓ Building and Other Construction worker Act, 1996 Applicable & Central rules - 1998
- ✓ The Mines & Minerals Act, 1957 -- Applicable
- ✓ Land acquisition Rule-1998 –Applicable
- ✓ Petroleum Rules, 1976 (Petroleum & Explosive Department) -- Applicable
- ✓ The Indian Electricity Rules, 1956 -- Applicable
- ✓ Batteries Act, 1989 -- Applicable
- ✓ Minimum Wages Act, 1948 -- Applicable
- ✓ National Environmental Tribunal Act, 1995
- ✓ National Environment Appellate Authority Act, 1997
- ✓ Notification on Fly Ash – IRC : SP 56:2001
- ✓ Motor Vehicle Rules (1989) and Amendments of 1994, 2000 & 2002
- ✓ Environmental (Protection) Amendments Rules, 2003
- ✓ Forest (Conservation) Act, 1980
- ✓ The Karnataka Preservation of Trees Act, 1976
- ✓ The Ancient Monuments and Archaeological Sites And Remains Act, 1958
- ✓ The Karnataka Ancient and Historical Monuments and Archaeological Sites and Remains Act, 1961
- ✓ Public Liability Insurance Act, 1991
- ✓ Labour (Regulation & Abolition) Act, 1970 & Rules -1971

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 BSRP 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	KRDC, Project Manager / IE's
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		
Soil Quality	pH, Conductivity, Texture,	Composite sampling	ICAR criteria	4 location in and around	Pre-monsoon	Composite sampling		

Environmental Component	Monitoring						Institutional Responsibility	
	Parameters	Special Guidance	Standards	Location	Frequency	Duration	Implementation	Supervision
	Bulk Density, Porosity, Organic Matter, Sulphate, Moisture, Sodium Sulphate, NPK, etc.	at different depth need to be done	of soil fertility	the camp area covering location of baseline monitoring as per EIA	and Post-monsoon season			
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	Concessionaire/ Contractor through approved agency	KRDCCL, Project Water Quality Manager / IE's
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		
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

BSRP 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.

Sr. No.	Aspects	Safety Measures
		<p>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 painting with products containing lead in any form.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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</p> <ul style="list-style-type: none">- 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. <p>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.</p> <p>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 –</p> <p>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.</p> <p>Availability of suitable transport at all times to take injured or sick person(s) to the nearest hospital.</p> <p>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




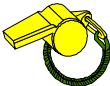




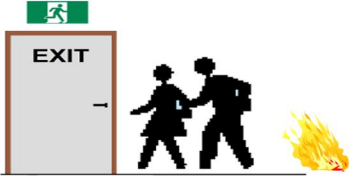
Personal Protective Equipment	Working Location details	Life of PPE	IS Code	Approx Prices in Rs
Safety Helmet 	Is compulsory for all working activities	One & half year	IS:2925-1984	200- 350
Safety Shoes 	Is compulsory for all working activities	One & half year	IS 1989 –1 986 (Pt.2)	350- 750
Reflective 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 for Bitumen & Concrete laying – Rubber Hand gloves For Electrical work – Shock proof Hand gloves For Welding Work – Heat proof	Ten Days Six Months One Year One Year	IS 4770 – 1968 / IS 2573 – 1986/ IS 6994 – 1973 part I	10 – 25 30 – 60 150- 450 100- 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 immediately. 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 Anyone in immediate danger</p>	ONLY IF SAFE TO DO SO!
<p>ALERT Others in immediate area Fire Wardens Activate Whistle, Air Horn, Bell, Siren etc. 3 times for 30 sec. Other Tenants and Adjacent Neighbours</p>	 
<p>RING THE EMERGENCY SERVICES 1. Fire Brigade, Police or Ambulance. Advise Site: Advise address: Advise nearest cross street: Provide your Name & phone number..... Provide details of incident..... DO NOT HANG UP UNTIL THE ADDRESS HAS BEEN REPEATED</p>	 
<p>CONTAIN THE FIRE Use correct Fire Extinguisher or Fire Hose Reel Turn OFF Electricity, Air Conditioning Close doors and windows to contain fire ALL IF ONLY IF SAFE TO DO SO!</p>	   
<p>EVACUATE Proceed to the nearest exit. Gather together at Exit, if safe to do so, then Evacuate via exit and proceed to the Assembly Area</p>	

Incident Controller K.K. Ram 8884430356		
Fire Fighting Team Leader Ganesh Musle 8970999405	Rescue Team Leader JitendraPanasker 8970999419	First Aid Team Leader Vinod Chaugule 8970195533
Fire Chief D. Chauhan 8884430353	Rescue Chief D.S Wag 8884431794	First Aid Chief Satish Wankade 8884477363
AbhilashDeshmukh 8884413158	Abhay bhosale 9403742691	BibekanandaChanda 8970195533
Vikas Appasaheb Pawar 8884413158	Prasant Sapkal 8884413162	Aditya Kumar Sharma 8884413163
Tiwari 8884413158	AnadKharat 8970999414	Deepak . B 8970999417
Madiwal 8884413158	Jai Sharma 8970999402	Nagabhushan 8884430353
Vehicle Co-Ordinator Deepk . B - 8970999417		
Electrical Co-Ordinator Subhas - 8970999414		

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 0831. 2429441
2.	Ambulance	102 /108
3.	Police	100, Bailhongal – (08288) 233133 Doddawada – (08288) 235545
4.	Crane / Hydra	Deepak . B - 8970999417
5.	Hospitals	Bailhongal Govt. Hospital - (08288) 233617 Saundatti Govt. Hospital –(08330) 222375
6.	Security	Deepak Undri 9739778969

CHAPTER 09

ENVIRONMENTAL REPORTING AND FREQUENCY

BSRP 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	Weekly and Monthly
3	Ambient Air Quality	Construction	Quarterly Except Monsoon
4	Noise Level Monitoring	Construction	Quarterly Except Monsoon
5	Prevention and control of Water Pollution	Construction	Quarterly Except Monsoon
6	Solid Waste Management	Construction	Daily and Monthly
7	Erosion and Sediment Control Measures at construction site	Construction	Monthly
8	Prevention and control of oil and chemical spills	Construction	Weekly
9	Construction Worker/Labor Camps	Construction	One Time
10	Community grievance/ Problems during construction	Construction	Monthly
11	Identification of Disposal Site Location	Construction	One Time
12	Setting-up Construction Camp and Storage Area	Construction	Monthly

13	Establishment of Borrow Area	Construction	One Time
14	Details of Earth Work	Construction	Daily and Weekly
15	Details of Hot Mix Plant	Construction	One Time
16	Identification of Disposal Site	Construction	One Time
17	Redevelopment of Borrow Area	Construction	One Time
18	Restoration of Construction Site	Construction	One Time
19	Environmental Pollution Monitoring	Construction	Quarterly Except Monsoon
20	Check List for Environmental Inspection	Construction	Weekly and Monthly
21	Cleaning of Culvert Opening & Longitudinal Drain	Construction	Quarterly
22	Identification of Source of Water for Construction	Construction	Need Basis
23	Detail of Machinery in Operation	Construction	Monthly and Quarterly
24	Waste Management	Construction	Weekly and Monthly
25	Environmental Enhancement Sites	Construction	Need Basis
26	Summary Sheet for Environmental Reports	Construction	Weekly
27	Grievance Redressal	Construction	Monthly
28	Air, Water, Noise and Soil	Construction	Quarterly Except Monsoon

FORMAT NO. 1. BSRP/WCP-1/EM-01**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:**

FORMAT NO. 1. BSRP/WCP-1/EM-02
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:**

FORMAT NO. 1. BSRP/WCP-1/EM-03
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 ReportsSupervised and Checked by
(Name and Signature with Date)**Concessionaire's Site Engineer:****Environmental Engineer, IE:**

FORMAT NO. 1. BSRP/WCP-1/EM-04
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				

BSRP**Environment Management Plan****KRDCL – WCP-01**

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

FORMAT NO. 1. BSRP/WCP-1/EM-05**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				

BSRP***Environment Management Plan*****KRDCL – WCP-01**

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:

BSRP**Environment Management Plan****KRDCL – WCP-01****FORMAT NO. 1. BSRP/WCP-1/EM-06****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:**

BSRP

Environment Management Plan

KRDCL – WCP-01

FORMAT NO. 1. BSRP/WCP-1/EM-07
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:

FORMAT NO. 1. BSRP/WCP-1/EM-08
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:

FORMAT NO. 1. BSRP/WCP-1/EM-09**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:**

FORMAT NO. 1. BSRP/WCP-1/EM-10

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:

FORMAT NO. 1. BSRP/WCP-1/EM-11**TITLE: IDENTIFICATION OF DISPOSAL SITE LOCATION****Name of Project Road:****Date:**

Sl. No.	Criteria on which information for each site is to be collected	
1.	Existing Land Use.	
2.	Area covered (m ²).	
3.	Total Material that can be dumped within the site (m ³).	
4.	Depth to which dumping is feasible (m).	
5.	Distance of nearest watercourse (m).	
6.	Nearest Settlements (m).	
7.	Date/s Community Construction/s.	
8.	Whether the community is agreeable to siting of dumping site (Y/N).	
9.	Date of Permission from Villager/local community.	
10.	Proposed future use of the Site.	
11.	Selected Site (Tick any one column only).	

Enclosures (Tick as appropriate)

1. Map of each location.
2. Photographs.
 - a. Each Disposal Location.
 - b. Each community construction.
3. Photo copy of Agreement.

Remarks

Prepared & Checked By

Signature

Name

Environmental Engineer

Approved By IE

Signature

Name

FORMAT NO. 2. BSRP/WCP-1/EM-12
TITLE: SETTING-UP CONSTRUCTION CAMP AND STORAGE AREA

(Site Layout of Construction camp and working drawings of dwelling units with allied facilities to be attached with format).

Name of Project Road:

Date:

Sl. No.	Item	Unit	Details	Remarks if any
1.	Detail of Item Camp			
a.	Size of camp.	m x m		
b.	Area of Camp.	Sq. m		
c.	Distance from Nearest Settlement.			
d.	Distance from Nearest Water Source.	Type Size/Capacity Present Use/ Ownership		
	Date of camp being operational dd/mm/yy.			
	Present land use.			
	No. of trees with girth > 0.3m.			
e.	Details of Storage area (Availability of impervious surface)	m x m		
f.	Availability of separate waste disposal from storage area.	Cum		
2.	Details of Topsoil Stacking			
a.	Quantity of top soil removed	Sq. m		
b.	Detail of storage of topsoil.	Describe attacking arrangement		
3.	Details of Workforce.			
a.	Total No. of Labours	Nos.		
b.	Total No. of Male Workers.	Nos.		
c.	No. of Male Workers below 18 Years of age	Nos.		
d.	Total No of Female Workers.	Nos.		
e.	No. of Female Workers below 18 Years of age	Nos.		
f.	No. of Children.	Nos.		
4.	Details of Dwelling Units.			
a.	No of dwelling/huts	Nos.		
b.	Minimum Size of Dwelling.	m x m		
c.	No. of opening per dwelling.	Nos.		
d.	Minimum size of opening.	m x m		
e.	Walls	Specifications		
f.	Roofing	Specifications		

g.	Flooring	Specifications		
h.	Drinking Water Tank	Specifications		
i.	Capacity of drinking Water Tank	Cum		
J.	Size of Drinking Water Tank.	m x m		
K.	Total no of WC	Nos.		
l.	No. of WCs for female workers	Nos.		
m.	Minimum size of WC	m x m		
n.	Total No. of Bathrooms for female workers	Nos		
o.	Size of septic tank for WC/Baths.	m x m		
p.	Capacity of Water tank for WCs/Bathrooms and general purpose.			
q.	Fencing around camp.	Y/N		
5.	Details of facilities.			
a.	Availability of security guard 24 hrs. a day	Yes/No		
b.	Details of First Aid Facility	Yes/No		
c.	Availability of Day Care centre.	Yes/No		
d.	Availability of dust bins (Capacity 60 Ltr.)	Yes/No		

Remarks

Prepared & Checked By
Signature
Name
Environmental Engineer

Approved By IE
Signature
Name

FORMAT NO. 2. BSRP/WCP-1/EM-13

TITLE: ESTABLISHMENT OF BORROW AREAS

Name of Project Road

Sl. No	Location			Air (m2)	Quantity of Available Material	Tyoe of Material	Distance from nearesrt water course (m)	Distance from nearest water settlement	Land Use		No. of Trees to be Affected	Approved by Env. Exp (Y/N)	Remarks	
	Name of Village	Chainage (Km)	Haul road length (m)						Before	After				

Attach Photograph of Proposed Site, Location Map, and Agreement

Rehabilitation Plan Measures Location 1: Location 2:
--

Remarks

Prepared & Checked By
Signature.....
Name.....
Environmental Engineer

Approved By
Signature.....
Name.....
Independent Engineer

FORMAT NO. 2. BSRP/WCP-1/EM-14**TITLE: DETAILS OF EARTHWORK**

Name of the Project Road:

Date of Submission

1.	Name of Village	Chainage (Km)	Side (LHS / RHS)	Haul road length (m)

(Show on a Sketch Plan clearly indicating distance and approach roads.)

2. Details of Borrow Areas.

2.1	Capacity of the Borrow Area.	
2.2	Percentage of the capacity exhausted	
2.3	Total Quantity of the Earth Excavated In cum)	
2.4	Quality of Top Soil removed from the Borrow Areas	
2.5	Location of Top Soil stored removed	
2.6	Quantity of Top Soil stored at the beginning of the month	
2.7	Quantity of Top Soil utilized at the end of the month	
2.8	Location (s) where Top Soil has been utilized (Specify on a location plan)	
2.9	Quantity of earthwork excavation from existing road	
2.10	Total quantity of earthwork reused in cum. (5%)	
2.11	Location disposal (if other than sites) (Specify clearly on a location plan)	
2.12	Quantity of earthwork re-used in filling operation	
2.13	Location of borrow areas in disuse / exhausted	
2.14	Outline a rehabilitation plan for each of the exhausted borrow areas with special reference to Erosion Protection Measures. Also, submit at separate detailed rehabilitation plan for exhausted borrow areas for approval supported adequately with layouts, plans and drawings.	

Remarks

Prepared & Checked By

Signature

Name

Environmental Engineer

Approved By IE

Signature

Name

FORMAT NO. 2. BSRP/WCP-1/EM-15

TITLE: DETAILS OF HOT MIX PLANT

Name of Project Road:

Date of Submission

1. Environment Features of the surrounding area

1.1	Name and Location of Hot Mix Plant (w. r. t KRDCL km ch.)	
1.2	Wind direction	
1.3	Name (s), distance population and type of settlements in a 1.5 km radius of site.	

2. Draw Sketch plan of HMP clearly indicating distance and approach roads.

--

3. Details of HMP and Mitigation Measures taken

3.1	Installed Capacity	
3.2	Average Utilization	
3.3	Make	
3.4	Model	
3.5	Last Serviced	

4. Explain Air Pollution Control Measures taken at the HMP site

5. Explain Noise Pollution Control Measures taken at the HMP site

Remarks

Prepared & Checked By
Signature
Name
Environmental Engineer

Approved By
Signature
Name

FORMAT NO. 2. BSRP/WCP-1/EM-16

TITLE: IDENTIFICATION OF DISPOSAL SITE

Name of Project Road:

Date of Submission

1. Environment Features of the surrounding area

1.1	Location of each land fill site (Provide sketch Map below)	Name of Village	Chainage (km)	Side (LHS/RHS)	Haul road length (m)
1.2	Capacity of each land fill site				
1.3	Safety measure taken at land fill site (s)				
1.					
2.					
3.					
4.					
5.					

Remarks

Prepared & Checked By
Signature
Name
Environmental Engineer

Approved By IE
Signature
Name

FORMAT NO.2. BSRP/WCP-1/EM-17
TITLE: REDEVELOPMENT OF BORROW AREAS

Name of Project Road:												
Date:												
Drawing for Redevelopment to be attached for each Borrow Area, (photography of sites before use &after rehabilitation to be attached)												
S.No	Borrow Area No	Borrow Area Location					Land Use	Rehabilitation Measures	Date of approval of Rehabilitation	Date of approval of Rehabilitation	Date of Handing Over to Owener	Remarks
		Name of Village	Chainage (Km)	Side (LHS/RHS)	Area (m2)	Heal road length(M)						
Remarks												
Prepared & Checked By Signature Name Environmental Engineer												
Approved by Signature Name Name												

FORMAT NO. 2. BSRP/WCP-1/EM-18

TITLE: RESTORATION OF CONSTRUCTION SITES

Name of the Project Road:

Construction stage Monthly Report - Date: _____ Month: _____ Year: _____

Sl. No.	Contract Package	Labour Camp		Construction Camp		Plant Site		Borrow Areas		Disposal Locations		Top Soil	
		O	R	O	R	O	R	O	R	O	R	Preserved	Reused
1													
2													

Remarks

Prepared & Checked
By
Signature
Name
Environmental
Engineer

Approved By IE
Signature
Name

FORMAT NO. 2. BSRP/WCP-1/EM-19**TITLE: ENVIRONMENTAL POLLUTION MONITORING**

Name of the Project Road

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

Parameter	Chainage (Km)	Details of Locations	Duration of Monitoring	Instruments used	Standard	Results	Reasons for exceeding standards	Mitigation Measures suggested	Type (Residential / Industrial / Commercial)	Remarks
Air Quality					PM2.5	PM2.5				
					PM10	PM10				
					CO	CO				
					SOX	SOX				
					NOX	NOX				
Water Quality					pH	pH				
					TSS	TSS				
					TDS	TDS				
					Turbidity	Turbidity				
					Hardness	Hardness				
					Coliform	Coliform				
					BOD	BOD				
					COD	COD				
					Oil & Grease	Oil & Grease				
					Soil Quality					
Organic Matter	Organic Matter									
Alkalinity	Alkalinity									
Conductivity	Conductivity									
WaterHolding Capacity	WaterHolding Capacity									
Pb	Pb									
Noise Quality					L day equivalent	L day equivalent				
					L night equivalent	L night equivalent				
					L equivalent	L equivalent				

Remarks

Prepared & Checked By

Approved By IE

Signature

Signature

Name

Name

Environmental Engineer

Environmental Engineer

FORMAT NO. 2. BSRP/WCP-1/EM-20**TITLE: CHECKLIST FOR ENVIRONMENT INSPECTION**

Name of Road:

Date of Inspection:

Sl. No.	ESMP Measures
1	Provision of a personnel accountable for implementation of ESMP / Safety Measures with Contractor
2	Consent of PCB to Establish HMP
3	Consent of PCB to operate HMP
4	Compliance of PCB Conditions for HMP installation and operation
5	Whether compliance reported through monthly Progress report of Divisional Office of Executive Engineer
6	PUC taken for all Construction Vehicles
7	Concrete platform with trap bitumen boiler, Fuel Tank for HMP and generator set provided or not
8	Precautions to prevent contamination of soil by emulsion, Bituminous, oil and lubricant taken while storing
9	Providing covert fine construction material & bituminous mix during transportation
10	Borrow Areas:
	a) Borrow areas approved by department
	b) Existing land was used
	c) Nos Opened
	d) Available Quantity
	f) Balance Quantity
	g) Nos of Borrow areas Rehabilitated
11	Spoil and debris disposal:
	a) Present status of land
	b) Closure and completion plan
12	Site specific traffic Safety management Plan
	a) Contractor installed the warning / regulatory Traffic signs at the at the construction site
	b) The arrangement adequate
13	Safety equipment i.e. helmet, gloves, gumboot, mask, earplugs etc. provided to workers
14	Health Facility at camp and worksite i.e. First Aid kit & suitable vehicle for conveyance in case of emergency / accident
15	Permit for Procuring River sand
16	Provision of labour camp with sanitation 7 potable water
17	Fire precautions at Hot Mix Plant and site office
18	Air and noise monitoring done in camp site
19	Whether any cultural property is being impacted
20	Status of drainage provision in camp area
21	General House Keeping

Remarks

Prepared & Checked By
Signature

Name

Approved By IE
Signature

Name

FORMAT NO. 2. BSRP/WCP-1/EM-21

TITLE: CLEANING OF CULVERT OPENING & LONGITUDINAL DRAIN

Name of the Project Road:

Date:

Sl. No.	Structure No.	Pre-monsoon	Date	Post monsoon	Date
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					

Remarks

Prepared & Checked By
Signature
Name
Environmental Engineer

Approved By IE
Signature
Name

FORMAT NO. 2. BSRP/WCP-1/EM-22

TITLE: IDENTIFICATION OF SOURCE OF WATER FOR CONSTRUCTION

Name of the Project Road:

Date:

S. No.	Source Name	Location/ Ch.	Distance from Road	Permission Required	Remarks

Remarks

Prepared & Checked By
Signature
Name
Environmental Engineer

Approved By
Signature
Name

13. DETAILS OF MACHINERY IN OPERATION**FORMAT NO. 2. BSRP/WCP-1/EM-23****TITLE: DETAILS OF MACHINERY IN OPERATION**

Name of Project Road: Date:

(Attach copy of SPCB emission control certificate every 3 months)

1. Details of Machinery Operation

1.1	Total machinery in operation (Nos.)	
1.2	Number of pavers	
1.3	Number of rollers	
1.4	Number of excavators	
1.5	Number of graders	
1.6	Number of dumpers	
1.7	No. of workshops with repairs facility (furnish location and type of facility provided)	
1.8	Number of vehicles in repair at each at each location	
1.9	Number of oil interceptor provided in each Repair / fuelling site	
1.10	Total quantity of oil and wastes recovered in each interceptor during last month.	
1.11	Details of waste disposal. (Whether Sold/Disposed)	

Remarks

Prepared & Checked By

Signature

Name

Environmental Engineer

Approved By

Signature

Name

FORMAT NO. 2. BSRP/WCP-1/EM-24**TITLE: WASTE MANAGEMENT**

Name of Project Road:									
S.No	Characteristics of Waste	Type of Waste	Total Quantity generated (cum/l)	Reused/ Recycled, If any (Quantity in cum/l)	Final Quantity of waste generated (cum/l)	Disposed Quantity (cum/l)	Disposal Practices	Disposal site	Remarks
Remarks									
Prepared & Checked By					Approved by				
Signature					Signature				
Name					Name				
Environmental Engineer									

FORMAT NO. 2. BSRP/WCP-1/EM-25**TITLE: ENVIRONMENTAL ENHANCEMENT SITES**

Name of Project Road:														
S.No	Project Road	Chainage	Side	Offset from PCL	Type of Property/structure	Ownership	Size (Sqm)	Community consultation status	Consent Status	Willingness / participation	Proposed enhancement	Drawing no.	Status	Remarks
Attach Photograph of Proposed Enhancement Site, Location														
Enhancement Site														
Location 1:														
Location 2:														
Remarks														
Prepared & Checked By Signature										Approved by Signature				
Name										Name				
Environmental Engineer										...				

FORMAT NO. 2. BSRP/WCP-1/EM-26**TITLE: SUMMERY SHEET FOR ENVIRONMENTAL REPORTS**

Name of the Project Road:

Date:

Sl. No.	Description	Remarks
1	No Objection Certificate	
A	Hot Mix Plant	
	Location 1	
	Location 2	
	Location 3	
B	Cement Batching Plant	
	Location 1	
	Location 2	
	Location 3	
2	Pollution Under Certificate	
	Vehicles	
	Machineries	
3	No Objection Certificate	
	Location 1	
	Location 2	
4	Labour Camps	
	No. of sites Identified	
	Approved	
	Opened	
	Conforms to conditions imposed at the time of opening of Sites	
	Closed	
5	Workers	
	No. of Workers employed	
	No. of male workers	
	No. of female workers	
	No. of days workers	
6	Borrow Area	
	No. of sites Identified	
	Approved	
	Opened	
	Quantity of available material	
	Quantity of measures Utilized	
	Quantity Topsoil preserved	
	Quantity of top soil used	
	No of sites closed	
	No. of sites Rehabilitated	
7	Disposal Locations	

BSRP**Environment Management Plan****KRDCL – WCP-01**

	No. of sites Identified	
--	-------------------------	--

Sl. No.	Description	Remarks
	Approved	
	Opened	
	Amount of Waste disposed	
	Type of waste disposed	
	No. of sites Rehabilitated	
8	Road Safety	
	Road Safety norms followed as per guidelines, SP-55 and approved Traffic plan	
9	Cleaning of Culvert / drains	
	No. of culverts / drains	
	Nos. Cleaned	
10	Tree	
	No. of tree marked for cutting in field	
	No. of trees cut	
	No. of trees to be Planted	
	Trees Planted	
11	Haul Roads	
	Adequacy of maintenance of Haul Road Network	

Remarks

Prepared & Checked By
Concessionaire

Signature

Name

Environmental Engineer

Approved By
Independent Engineer

Signature

Name

Environmental Engineer

FORMAT NO. 2. BSRP/WCP-1/EM-27

TITLE: GRIEVANCE REDRESSAL

Name of the Project Road:

Date:

Contract Package	Place (village)	Link & Chainage (km)	Date	Grievance	Redressal Action by the Contractor	Date of Compliance

Supervised and Checked by

(Name and Signature with Date)

Concessionaire’s Site Engineer:

Environmental Engineer, IE:

**FORMAT NO. 2. BSRP/WCP-1/EM-28
TITLE: AIR, WATER, NOISE AND SOIL**

M/S Mysore Bellary Highway Private Limited						Date :	
Health Safety and Environment Work Instructions							
Doc No: MBHPL/WAP-1/EM 9							
Title : Locations at which monitoring to be conducted as per EMP							
Sl. No	Chainage	Details of Location	Duration of Monitoring	Instruments Used	Completion Target		Reason for Delay if any
					Target Date	Date of Completion if task completed	
Air Monitoring							
1							
2							
3							
4							
5							
Water Monitoring							
1							
2							
3							
4							
5							
Noise Monitoring							
1							
2							
3							
4							
5							
Soil Monitoring							
1							
2							
3							
4							
5							
This is to certified that the Pollution Monitoring has been conducted at all the locations specified in the EMP. Enclose : Photographs and Monitoring Reports							
(NAME AND SIGNATURE WITH DATE) Concessionaire's HSE Expert / Engineer							
ENVIRONMENTAL EXPERT/ ENGINEER IE							

FORMAT NO. 2. BSRP/WCP-1/EM-29
TITLE: CONSTRUCTION OF LABOUR CAMP

M/S Bagewadi Saundatti Road Project				Date :
Health Safety and Environment Work Instructions				
Doc No: BSRP/WCP-1/EM29				
Title : Site Layout of Construction camp and working drawings of dwelling units with allied facilities will be submitted with format)Format to be submitted before of establishing New Labor/ Construction camps				
Location of Labour/ Construction Camp				Km :
Sl. No	Item	Unit	Details	Remarks
1	Detail of item camp			
a	Size of Camp	mxm		
b	Area of Camp	sq.m		
c	Distance from Nearest Settlement			
d	Distance from Nearest Water Source	Type/Size/Capacity/Present Use/Ownership		
e	Date of camp being operational dd/mm/yy			
f	Present land use			
g	No other trees with girth > 0.3m.			
h	Details of Storage area(Availability of impervious surface)	mxm		
i	Availability of separate waste disposal from storage area	Cum		
2	Details of top soil stacking			
a	Quantity of top soil removed	sq.m		
b	Detail of storage of topsoil	Describe stacking arrangement		
3	Details of workforce			
a	Total No of Labourers	nos		
b	Total no of Male Workers	nos		
c	No of Male Workers below 18 years of age	nos		
d	Total No of Female Workers	nos		
e	No of Female workers below 18 years of age	nos		
f	No of children	nos		
4	Details of dwelling units			
a	No of dwellings/huts	nos		
b	Minimum Size of Dwelling	mxm		
c	No of openings per dwelling	nos		
d	Minimum size of opening	mxm		
e	Walls	specifications		
f	Roofing	specifications		
g	Flooring	specifications		
h	Drinking Water Tank	specifications		
i	Capacity of Drinking water Tank	cum		
j	Size of Drinking Water Tank	mxmxm		
k	Total no of WC	nos		
l	No of Wcs for female workers	nos		
m	Minimum Size of WC	mxm		
n	Total No of Bathrooms for female workers	nos		
o	Size of septic tank for WC/Baths	mxmxm		
p	Capacity of Water Tank for WCs/ Bathrooms and general purpose			
q	Fencing around camp	Y/N		
5	Details of facilities			
a	Availability of security guard 24 hrs a day	Yes/No		
b	Details of First Aid Facility	Yes/No		
c	Availability of Day Care Centre	Yes/No		
d	Availability of dust bins (capacity 60 ltr)	nos		
This is to certified that the furnished information is correct the quality of work is as per god practice and all relevant information as required is attached				

(NAME AND SIGNATURE WITH DATE)

CONCESSIONAIRE'S HSE EXPERT / 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 <ul style="list-style-type: none">a. Arrangements with the land owner including the restoration aspectsb. Site layout plan of the construction campc. Establishment and maintenance of demarcated and levelled different areas within the camp as per the approved layout pland. Number of trees (to be) removed, if any, along with compensation measures.e. Proposed top soil managementf. Activities planned in the construction campg. Machinery & equipment to be used on siteh. Site drainage provisionsi. Copy of the consents to establish and operate and conditions laid down there in the consent/ clearance/ licenses and plansj. Access road condition and proposed maintenancek. Safety provision such as fire protection equipment and personal protective measurel. Closure/ completion plan
2. Checklist for Labour camp site selection and management <ul style="list-style-type: none">a. Arrangements with the land owner including the restoration aspectsb. Site layout plan of the labour campc. Establishment and maintenance of demarcated and levelled different areas within the camp as per the approved layout pland. Number of trees (to be) removed, if any, along with compensation measurese. Proposed top soil managementf. Site drainage provisionsg. Copy of the consents to establish and operate and conditions laid down there in the consent/ clearance/ licenses and plansh. Access road condition and proposed maintenancei. Safety provision such as fire protection equipment and other labour camp facilities onsite.j. Sanitation and health facilitiesk. Staff strength and details such as contractor staff v/s subcontractors, women labour, migrant v/s local labour and skilled & unskilled labourl. Closure/ completion plan
3. Checklist for Borrow Area Management <ul style="list-style-type: none">a. Environmental Clearance from MoEF/SEIAA for opening of new borrow areab. Consent of concerned Gram Sabha to be obtainedc. Name of the land owner, arrangement with the owner including restoration aspectd. 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 takene. Land use (before opening) of borrow area and area surrounding the proposed borrow areaf. A map / drawing showing the dimension of the borrow areas, access roads and features of surrounding areag. Number of trees to be removed, if any along with the compensation measureh. soil management if requiredi. Access road condition and proposed maintenancej. 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

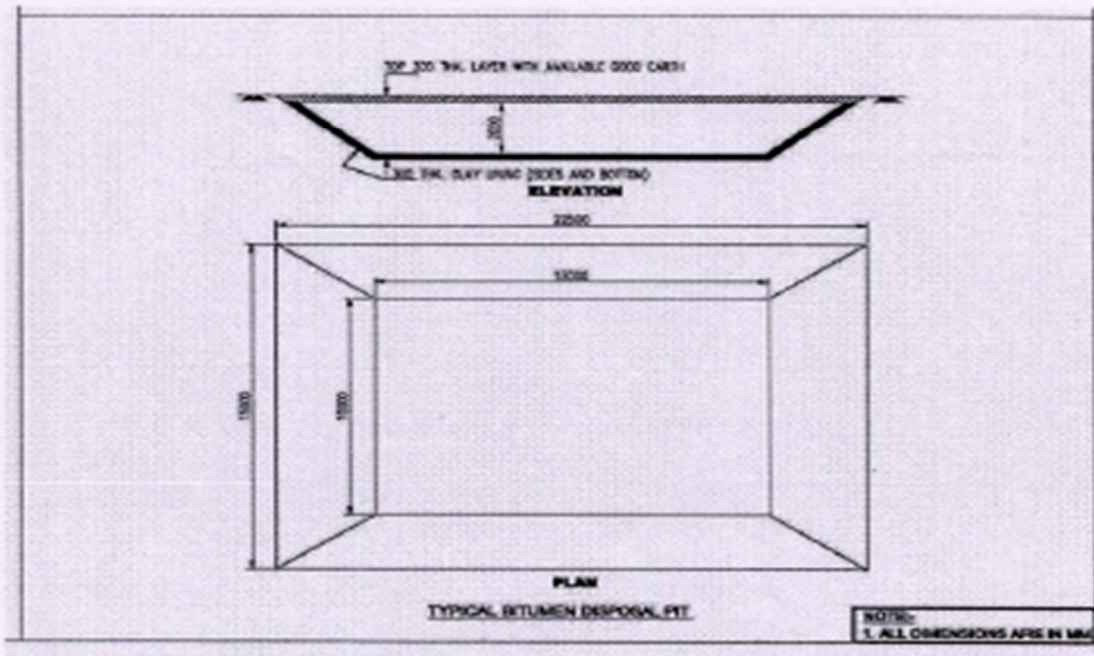
- a. Public awareness and education programs designed to sensitize highway users
- b. Road & Traffic safety awareness

Appendix C-III

Scarified Bitumen Disposal Pits

The locations for scarified bitumen disposal pits shall be finalized in consultation with Independent Engineer.

Figure 1 Typical Scarified Bitumen Disposal Pits

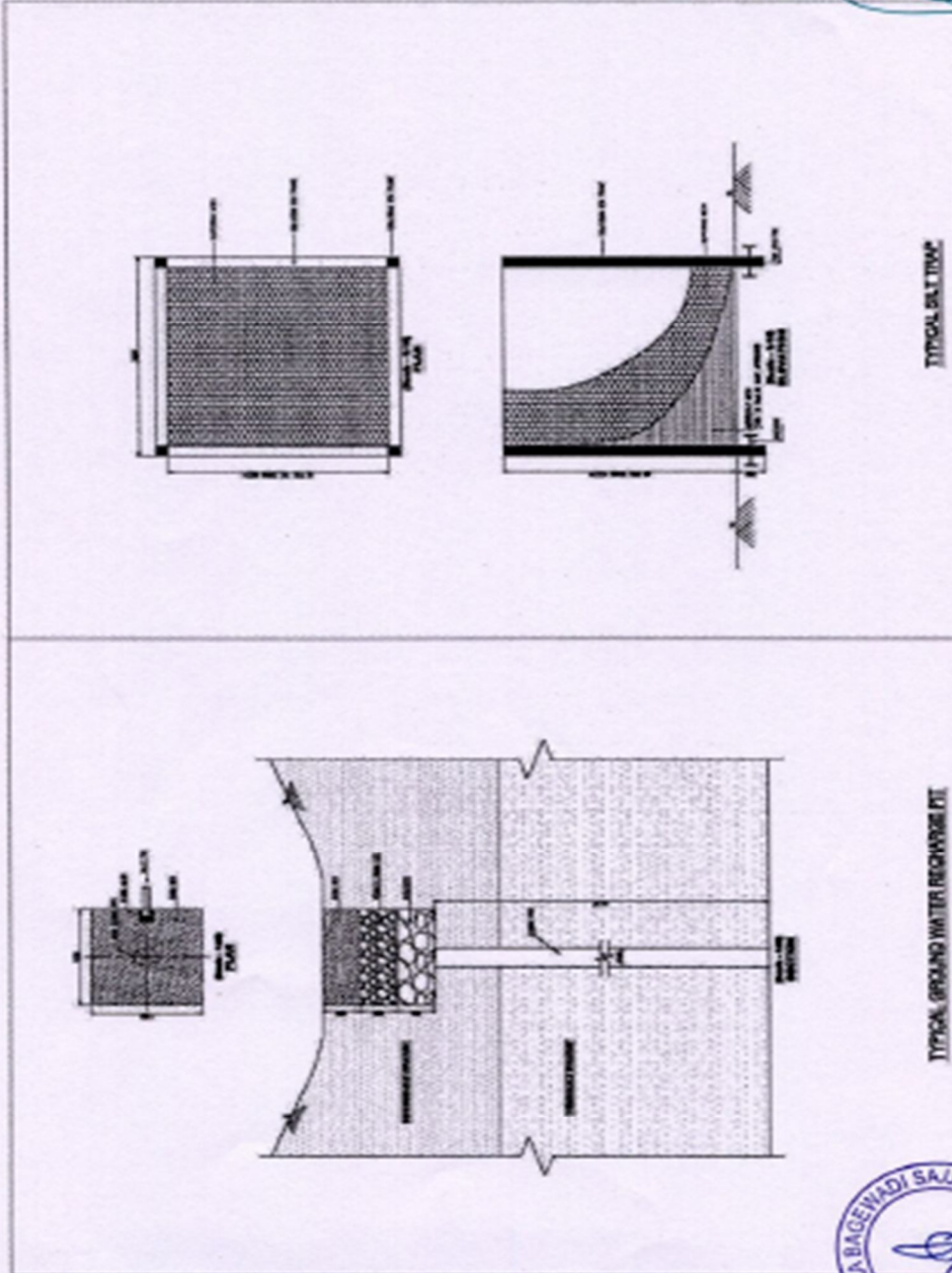


Karnataka Road Development Corporation Ltd.

Managing Director
KRDCL

Schedule-C
Appendix C-IV

Consultancy Services for Revitalization of DPR, Economic Analysis, Social/Environmental/Land Acquisition Surveys of 450km of State Highways in various parts of Karnataka



Managing Director
KRDCL
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Figure 1 Typical Groundwater recharge Pit & Silt Trap

Karnataka Road Development Corporation Ltd.

