

PUBLIC WORKS DEPARTMENT, HIMACHAL PRADESH (HPPWD) ENVIRONMENT MANAGEMENT SYSTEMS (ISO 14001: 2004)

(HPPWD Project Reference No.: - PW-SRC/RIDC/Procurement-ISO/2008)



(WORK INSTRUCTIONS MANUAL)

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AMENDMENT SHEET

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USER GUIDE FOR WORK INSTRUCTION MANUAL

The **Work Instruction Manual** is a controlled document issued by the top management for usage by all those who have been authorized to access it. It gives detailing of the different aspects and associated impacts arising out of the different activities and services of HPPWD/ HPRIDC and explains the right approach, in the form of required Operational control procedures (OCP), to mitigate the impacts of different aspects identified. Further, it highlights the Environment legislation, applicable to the Himachal Pradesh Public Works Department (HPPWD/ HPRIDC) due to the various activities and services It also explains.

INTENT

This User's guide is provided to help the user to understand the structure, presentation and the method to refer the various applicable clauses of Environment legislation as outlined in the Register of Regulation, the aspects arising out of the activities and services of HPPWD/ HPRIDC and the control measures requires to mitigate their impact. The user guide is placed after the Index page followed by the abbreviations used in the manual and the various definitions.

CHAPTERS

The Work instruction manual has been divided into four chapters. First chapter gives the introduction about HPPWD/ HPRIDC and the NH. Second chapter discusses about the different Aspects and Impacts arising out of the different activities and services of HPPWD/ HPRIDC and gives a detailed Qualitative and Quantitative analysis of the same. Third Chapter provides with the different step-by-step, Operational Control procedures that will be required to mitigate the effect of identified aspects. Fourth and the last chapter is the Register of Regulation (ROR), which clause-by-clause details the different Environment Legislation, applicable to HPPWD/ HPRIDC due to their different activities and services.

The Index page nos. for example 3 -1 is to be read as page no. 1 of chapter 3.

If in the electronic format, to refer any chapter of the manual, please go to the Index page and "CLICK" the concerned chapter heading. The relevant page will open up for e.g. to see the Chapter 3: Register of Regulation, go to Index page and CLICK Chapter 3 Header. This will lead to the particular page starting with Chapter 3: Implementation & Operation.

Chapter 1 INTRODUCTION

AN OVERVIEW OF HPPWD/HPRIDC

1. The goal of this service is to bring at least eight units of the road agency of the two setups namely Himachal Pradesh Roads & Other Infrastructure Development Corporation limited (HPRIDC) as well as Himachal Pradesh Public Works Department (HPPWD) National Highway setup to a state where they are ready for certification under ISO 9001:2000 and ISO 14001:2004. This chapter gives a brief introduction regarding these organizations and the different activities they are involved in.

Chapter 2 Aspect & Impact Identification

2. This chapter provides with both qualitative and quantitative analysis of different Aspect and Impacts which may arise out of the different activities and services of HPPWD/ HPRIDC. It also highlights the gaps which have been witnessed in the current system of practice and suggests the additional control measures required to mitigate the impact.

Chapter 3 Operational Control Procedures

3. This chapter details the different Operational Control Procedures which are required to be followed in order to mitigate the effect of different aspects being identified in the register of Environment Aspect Impact i.e. chapter 2 and also to monitor the different Environment elements.

Chapter 4 Register of Regulation

4. This chapter enlists the different Environment legislation which are applicable to the Himachal Pradesh Public Works Department (HPPWD/ HPRIDC) and provides with the details of specific clauses of the act. It also details the procedural requirements which are required to be fulfilled in order to comply with the requirements of legislation and at the same time throws light on the responsibility of different officials at different level to successfully implement and monitor the compliance
5. An amendment sheet has also been provided in this Manual. The Management Representative (MR) shall ensure that any amendment issued in the Manual is recorded in the amendment sheet.

ABBREVIATION

AE	Assistant Engineer
APIO	Assistant Public Information Officer
BOD	Board Of Directors
BOQ	Bill of Quantities
CE	Chief Engineer
CE-cum-PD	Chief Engineer-cum-Project Director
CF	Conservator of Forest
CMUs	Construction Management Units
DLC	District Level Committee
DoEF	Department of Environment & Forestry
DPRS	Detailed Project Reports
EE	Executive Engineer
E-in-C	Engineers- in- chief
EM	Environment Manual
EMC	Environment Management Cell
EMP	Environment Management Plan
EMS	Environment Management System
EP & PCB	Environment Protection & Pollution Control Board
EPC	Engineering Procurement Consultancy
ER	Engineers Representative
FC Act	Forest Conservation Act
FS	Feasibility Study
FSR	Feasibility Study Report
GAD	General Arrangement Drawing
GIS	Geographical Information Systems
GJE	Graduate Junior Engineer
GM	General Manager
GOHP	Government of Himachal Pradesh
GOI	Government of India
GNP	General procurement Notice
GRC	Grievance Redressal Committee
HO	Head Office
HPPWD	Himachal Pradesh Public Works Department
HPRIDC	Himachal Pradesh Road & other Infrastructure Development Corporation Ltd
HPSEB	Himachal Pradesh State Electricity Board
HQ	Headquarters
IES	Initial Environment Studies
IFB	Invitations for Bid
IO	Information Officer
IRC	Indian Roads Congress
ISO	International Organization for Standardization
MD	Managing Director
MIS	Management information Systems
MOEF	Ministry of Environment & Forestry
MOSRTH	Ministry of Shipping, Road Transport & Highways
MOU	Memorandum of Understanding
NCB	National Competitive Bidding
NGO	Non Governmental Organization
NH	National Highway

NHAI	National Highway Authority of India
NITs	Notice Inviting Tenders
PDCA	Plan-do-check-Act
PERT	Project Evaluation and Review Technique
PIA	Project Implementation Area
PIO	Public information Officer
PIU	Project Implementation Unit
PMC	Project Management Consultant
R&R	Resettlement & Rehabilitation
RAP	Resettlement Action Plan
RBI	Reserve bank of India
RE	Resident Engineer
HPRIDC	Road & Other Infrastructure Development Corporation Ltd
RIS	Road Information System
ROBs	Road Over Bridges
ROW	Right of Way
RRO	Resettlement & Rehabilitation Officer
SDO	Social Development Officer
SE(P&D)	Superintending Engineer (Planning & Design)
UNDB	United Nations Development Bank

DEFINITIONS

1. **Negative Impact:** It is described as an adverse effect on the environment caused by the project activities, which is large in magnitude, and its consequences affect the environment for a long period of time.
2. **Positive Impacts:** These are the impacts which bring beneficial effects to the community, local environment or social infrastructure, e.g. construction of highways will get local community access to long distance transport service, easier access to health care facilities and medical treatment, less fuel consumption etc.
3. **Direct and Indirect Impacts:** Direct impacts are those that occur through direct interaction of an activity with an environmental component. For example, discharge of oil or chemicals from construction equipments into a river or pond may lead to decline in water quality.
4. **Indirect Impact:** These are usually associated with the overall region surrounding the project site and can occur over a period of time. Basically these are the after effects of an direct impact or we can say that direct impacts lead to most of the indirect impacts. For example, the decline in water quality in the river may lead to a secondary indirect impact on the prevailing aquatic life in the river. The intensity of these impacts may vary from minimal to severe depending on project activity and site conditions.
 - a) **Minimal impact** - These impacts are easily mitigated at little or no cost and exist for a short duration.
 - b) **Moderate impact** - These impacts are either minor in nature lasting for a long time or they may be severe occurring for a shorter duration. Mitigation measures for these impacts require extra cost both during implementation and monitoring of the project.
 - c) **Severe impact** – These impacts are multiple, diverse, long lasting and intense that require significant expenditure for mitigation and careful monitoring during and after the project is completed.
 - d) **Significant Impacts:** All moderate and severe impacts may be treated as significant.
5. **Mitigation measures:** Specific actions to reduce the intensity and/or duration of adverse impacts that may result from construction and operation activities of the project. The costs associated with implementing these measures should be included in the budget for the project.
6. **Emergency Response Measures:** Specific measures or mitigation actions to minimize the adverse impacts associated with natural or man-made disasters emergencies such as earthquake, hurricane, fire, power failure, flooding, spillage of inflammable and toxic constituents etc.
7. **Right-Of-Way (ROW):** The land secured and reserved for development of a road and all structures pertaining to the road.
8. **Study Area:** Study area will be identified based on alignment and ROW. As per standard practices, 500 meters on either side of the alignment is taken as core study area for carrying out EIA study. The study area for land use and socio-economic aspects is considered 7 km either side as per standard practice followed for environmental clearance from MoEF.

- 9. Environmental Components:** Those aspects (physical, biological and socio-economic) of ecosystems, and environment, which are potentially at risk and may get affected during construction and operation stage activities of highway projects.
- 10. Barrier Effect:** Linear development such as roads may become barriers when they are, or are perceived by wildlife to be, impossible or dangerous to cross. The four most important components of road corridors that can act as functional barriers to wildlife movements are: shoulders, ditches and drains, poorly designed crossing structures and the traffic.
- a) **Shoulders, Ditches and Drains:** The construction and operation of a road bring about changes in the microclimatic conditions at the edge of the road. Variables like temperature, humidity and evaporation are affected by the presence of roads. Research suggests that such edge effects extend from 200-400 meters on either side of the pavement. The physical characteristics of roadside areas may also play a large role in determining the extent of the barrier effect. Deep ditches and steep embankments are especially formidable barriers to smaller terrestrial species such as amphibians and reptiles.
 - b) **Crossing Structures:** Culverts, underpasses and bridges often do not incorporate features that encourage their use by animals, thus ultimately functioning as physical barriers to movements of both terrestrial and aquatic species. Factors influencing the effectiveness of crossing structures are structure width, approach area, length, height above ground and visibility from the structure. For aquatic animals, channelization of flowing water where roads cross-streams create a physical barrier, because it often results in increased water velocity, preventing many aquatic species to move against the newly increased currents. Culverts are of particular concern since their configuration, diameter, length and placement in the watercourse directly determine whether they'll block or permit passage of aquatic species and whether they will become chronic erosion points. Road passing through or beside wetlands can inhibit or prevent aquatic animals from moving between the wetlands and adjacent habitats.
 - c) **Traffic:** Traffic is the second highest cause of animal mortality along roads. Traffic may act as a barrier during the construction and operation stages.
- 11. Environmental Screening:** Screening is the process to identify the regulatory & environmental issues associated with the proposed alignment(s) in case of new road and widening of the existing road. This is to be undertaken at feasibility stage. Screening refers to an early determination of the potential impacts.
- 12. Impact Assessment:** Impact assessment is a phase wise sequential approach comprising of identification, determination, evaluation of impacts, alternative analysis and mitigation measure selection.
- 13. Bio-engineering:** Bio-engineering is the use of vegetation, either alone or in conjunction with civil engineering structures, to reduce instability and erosion on slopes

1. INTRODUCTION

1.1. HPPWD/HPRIDC – A n Overview

1. **Himachal Pradesh Public Works** department is engaged in planning, construction and maintenance of roads, bridges, ropeways and buildings (both residential and non-residential of various Govt. departments) in the State. The department further executes engineering work on behalf of Local Bodies, Public Undertakings, Boards & other Institutions under Himachal Pradesh Government as “Deposit works”. Environment friendly functioning of the Public Works Department is a necessary part of the good governance and an important factor in the Himachal Pradesh state’s infrastructure Development through Adoption of sound practices, systematic approach and standardization.
2. **Himachal Pradesh Road & Other Infrastructure Development Corporation Limited**, a wholly owned organization of Government of Himachal Pradesh, was incorporated on 10th June, 1999 under the Companies Act, 1956, with the main objective of fostering the growth of infrastructure development by developing Roads, Bridges & other infrastructure in the State of Himachal Pradesh. HPRIDC is constituted as a body corporate. It is mandated to act on business principles in the discharge of its functions. In the light of the mandate of transforming HPRIDC from a project implementing Agency to functional Road Agency, the organization in discharge of its functions, is bound to adopt (a) modern business processes in planning, budgeting, management functions and establishing a stable funding mechanism for core road network (b) ICT planning, management and support functions and (c) enhanced human resource development and increased organizational efficiency

1.2. Road Sector Strategy

3. In a hill State like Himachal, roads are key infrastructure for economic and social development. In order to stimulate growth on sustainable basis, acceleration of hydro-power generation, diversification of agriculture, promotion of investment in industry and tourism have been identified as key sectors. In absence of rail and air links and a limited potential of development of these sectors in future, an efficient and reliable road network is necessary to achieve growth in these identified key sectors. The State has currently a network of about 28000 Kms. road length comprising of about 2000 Kms. of National Highways and border roads financed by Government of India, about 4000 Kms. of core roads comprising of State Highways and MDR and the balance being the rural roads. However, the quality and extent of network is currently inadequate and needs to be augmented. The National Highways and Border Roads network is being adequately financed by Government of India for maintenance and upgradation. The connectivity to unconnected habitations, for providing access to services and markets, remains utmost priority of the State and is being adequately financed by the State Government through its own resources, through NABARD resources and under the Government of India programme of Pradhan Mantri Gram Sadak Yojna. However, the core network of State Highways and MDR comprising of about 4000 Kms. which serves as the links between Rural Roads and National Highways, require substantial investment for up-gradation and up keep and the resources to the desired level are not being deployed due to other priorities. Accordingly, the Government of Himachal Pradesh have decided to tie up resources from external funding agencies, through Govt. of India programmes and under PPP mode to address the quality and capacity

enhancing of the core network. Currently, a project with approximate size of Rs.1350.00 crores, mainly comprising of World Bank assistance of about Rs.1000.00 crores is proposed and project preparation is in advanced stage and World Bank sanction is likely to be received in early near future.

4. The State Government has decided to implement this project through HPRIDC keeping in view the advantage that corporate body offers vis-a-vis the Government Department and accordingly the project preparation and implementation of World Bank State Road Project has been entrusted to HPRIDC.

1.3. Role of HPRIDC in Project preparation and implementation

5. **State Roads Project and Management of Highways within the State** The Role of HPRIDC in Project Preparation and Implementation of State Roads Project with World Bank Assistance and its long term role in management of Highways within the State after careful consideration at the Government level has been decided as under (Extract of the Government letter No. PBW (B&R) (WB) 3(6)9/2005-I dated 27th November, 2006 reproduced below).
 - In the first stage, HPRIDC will function as a convenient temporary accounting mechanism and decision making structure with the PWD being the real implementing agency for implementation of the proposed State Roads Project. All the financial matters will be dealt in HPRIDC.
 - In the second stage, the Headquarter Project Implementation Unit (PIU) carved out for this Project under Chief Engineer-cum-Project Director may prepare and implement this Project with dedicated Construction Management Units (CMUs). No PWD assets would need to be entrusted to the agency. However, the HQ PIU and CMUs would strive for ISO: 9001 Certifications.
 - In the long run HPRIDC should become a network manager of 2000 kms. of State Highways and 1250 km of National Highways, which the Government of HP will entrust to the HPRIDC from time to time. This will necessitate the clubbing of management of State Highways and National Highways and transfer their management to HPRIDC. The existing staff of NH and some additional staff of PWD would be transferred to HPRIDC for this purpose.
6. As a sequel to the above role assigned to HPRIDC it has already crossed Stage 1 and entered Stage 2

1.4. Entrustment of State Highways/ Major District Roads

7. The Government has decided to entrust to the HPRIDC all those upgrading works, which shall be taken up under the State Roads Project. Those roads shall be entrusted to the HPRIDC upon completion of works. There will be a gradual transition of entrustment of other core roads (including NHs) which are not taken up under the Project. For this purpose the Memorandum of Articles of Association of HPRIDC shall be amended accordingly

1.5. NH - An Overview

8. Department of National Highway being one of the wings of HPPWD acts as an agency of Ministry of Shipping and Road Transportation, Government of India to look after the construction and maintenance of various national highways falling under the jurisdiction of the state. As on today, the total length of the national Highways in Himachal Pradesh constitutes to be around 1470.606 consisting of NH-20A, NH-21A, NH-22, NH-70, NH-72, NH-88 etc.

9. NH came into existence with effect from June 15, 1989 but became operational only in February, 1995. It is headed by the Chief Engineer (National Highway) and has two circles (at Shimla and Shahpur) under its control. Similarly under each circle there are two to three divisions and under each division there are four to five sub-divisions

2. REGISTER OF ENVIRONMENTAL ASPECT & IMPACT IDENTIFICATION

10. This chapter deals with the identification of the different Environmental Aspects which are arising/ have the potential to arise out of the different activities and services of HPPWD/ HPRIDC and assessment of the associated impacts. The Impact Assessment is being carried out by using both quantitative and qualitative analysis as explained in Environment procedural manual. (Refer EMS/EP-01/Identification of Environmental Aspect and Impact)
11. Further, the chapter discusses about the existing control measures already in place to mitigate the effect of identified aspects and highlights the relevant gaps for the same. In the end it suggests some additional control measures in reflection of the gaps identified, which are required to be adopted in order to reduce the identified significant impacts to insignificant level.
12. The Register of Aspect Impact (EMS/ R01) is prepared in lieu of the various site visits conducted and with the inputs of discussions held with the official of HPPWD/ HPRIDC.

Table 2.1 Aspect Identification, Impact Assessment & Control Measures Worksheet

Activity	Aspect Identification							Impact Assessment				Over riding factor (LC,, PP, EC etc)	Further control measures required		
	Environmental Aspect	What may get affected / exposed	Condition		Adequacy of Impact control measures		Impact Severity	Scale (S)	Impact = P X S (I)		Duration (D)			Impact Priority Number (S + I + D)	Impact Prioritization
			N/ AN	R/ NR	Existing	Gaps if any			Possible Level of Severity (S)	Probability (P)					
Excavation	Generation of Dust	Air	N	R	Sprinkling of water is done and where water is scarce it is restricted to only one time and boards are erected with message similar to 'dust prone area take precautions". Wind screens and dust extraction systems are provided at specific locations Encapsulation of dust source	Sprinkling of water is found to be inefficient and provision for the same was found to be missing in the works of NH Air monitoring as per the monitoring plan is not conducted till date.	Air Pollution	3	4	5	2	25	Intolerable	PP/ Operational Control Procedures (WI-4/ Excavation & WI-11/ Air monitoring) have been prepared and shall be followed Identify a government recognized laboratory to perform air monitoring	

Activity	Aspect Identification							Impact Assessment				Over riding factor (LC,, PP, EC etc)	Further control measures required		
	Environmental Aspect	What may get affected / exposed	Condition		Adequacy of Impact control measures		Impact Severity	Scale (S)	Impact = P X S (I)		Duration (D)			Impact Priority Number (S + I + D)	Impact Prioritization
			N/ AN	R/ NR	Existing	Gaps if any			Possible Level of Severity (S)	Probability (P)					
	Slippage of tools	Worker	N	R	Safety shoes and helmets are provided as personal protection Tool box talks are being conducted at site on regular basis	No planning in place for job specific training	Body injury	1	2	3	3	10	Tolerable		Training Plan has been prepared and the identified relevant trainings shall be provided to the officials
Excavation for foundation & other structures in river bed	Disturbance in the bonding of the soil	Soil	AN	NR	Excavation is done during the lean season Construction over the non-perennial rivers is carried out in the dry season. The time and amount of soil exposed and steep cutting of slope is minimized during construction and all slope protection measures are taken.	No procedure is available for Soil monitoring and it is not conducted as required at the site	Soil erosion	2	3	3	3	14	Moderate		Operational Control Procedure (WI-13/ Soil monitoring) has been prepared and shall be followed A government recognized laboratory shall be identified and appointed for soil monitoring on regular basis

Activity	Aspect Identification							Impact Assessment					Over riding factor (LC,, PP, EC etc)	Further control measures required	
	Environmental Aspect	What may get affected / exposed	Condition		Adequacy of Impact control measures		Impact Severity	Scale (S)	Impact = P X S (I)		Duration (D)	Impact Priority Number (S + I + D)			Impact Prioritization
			N/ AN	R/ NR	Existing	Gaps if any			Possible Level of Severity (S)	Probability (P)					
	Disruption to flora	Flora	N	NR	Vegetation is removed from the construction zone before commencement of construction Only ground cover/ shrubs that impinge directly on permanent works will be removed Contractor has been allotted with the responsibility to prevent his workmen or any other person from removing or damaging any flora	The required height till which the removal of vegetation shall be carried out from hills is not initially identified and is usually overdone	Loss of Flora & Top soil	2	3	3	4	15	Moderate		The construction workers shall be made aware about the impact of the clearing of the vegetation and shall be trained to identify the required amount of vegetation to be cleared
	Mixing of the loose soil in the nearby water bodies	Water	AN	NR	Beds of any stream/ canal/ nala are not excavated for borrowing earth for embankment construction. Debris disposal plan is being prepared by the contractor	Work Instruction for the management of Debris is not available	Silting/ High turbidity levels in nearby water bodies	3	5	2	4	17	Substantial	PP	Operational Control Procedure (WI-3/ Debris Disposal management) has been prepared and shall be followed

Activity	Aspect Identification							Impact Assessment					Over riding factor (LC,, PP, EC etc)	Further control measures required	
	Environmental Aspect	What may get affected / exposed	Condition		Adequacy of Impact control measures		Impact Severity	Scale (S)	Impact = P X S (I)		Duration (D)	Impact Priority Number (S + I + D)			Impact Prioritization
			N/ AN	R/ NR	Existing	Gaps if any			Possible Level of Severity (S)	Probability (P)					
Use of crusher	Emission of dust	Air	N	R	Consent to establish and operate is taken from HPEP & HPPCB Mining Lease is obtained from the authorized body Provisional registration is obtained from the Geological wing, Department of Industries Provision of wind screens, dust extraction systems is done and sprinkling of water is done on regular basis.	Air monitoring is not being carried out at the site	Air pollution	3	2	4	3	14	Moderate	PP	Operational Control Procedure (WI-11/ Air Quality Monitoring & Analysis) has been prepared and shall be followed A government recognized laboratory shall be identified and appointed for air monitoring on regular basis

Activity	Aspect Identification							Impact Assessment					Impact Prioritization	Over riding factor (LC,, PP, EC etc)	Further control measures required
	Environmental Aspect	What may get affected / exposed	Condition		Adequacy of Impact control measures		Impact Severity	Scale (S)	Impact = P X S (I)		Duration (D)	Impact Priority Number (S + I + D)			
			N/ AN	R/ NR	Existing	Gaps if any			Possible Level of Severity (S)	Probability (P)					
	Generation of Noise	Air	N	R	Consent to establish and operate is taken from HPEP & HPPCB Mining Lease is obtained from the authorized body	Noise monitoring is not being carried out at the site	Air pollution	3	3	4	3	18	Substantial	LC	Operational Control Procedure (WI-12/ Noise Monitoring) have been prepared and shall be followed A government recognized laboratory shall be identified and appointed for noise monitoring on regular basis
Working of Hot Mix plant	Generation of dust	Air	N	R	Consent to establish and operate is taken from HPPCB Wind screens and dust extraction systems are provided at the site. Water sprinkling is also carried out	Air monitoring is not being carried out at the site	Air pollution	3	2	4	3	14	Moderate	PP	Operational Control Procedure (WI-11/ Air Quality Monitoring & Analysis) has been prepared and shall be followed A government recognized laboratory shall be identified and appointed for air monitoring on regular basis

Activity	Aspect Identification							Impact Assessment					Over riding factor (LC,, PP, EC etc)	Further control measures required	
	Environmental Aspect	What may get affected / exposed	Condition		Adequacy of Impact control measures		Impact Severity	Scale (S)	Impact = P X S (I)		Duration (D)	Impact Priority Number (S + I + D)			Impact Prioritization
			N/ AN	R/ NR	Existing	Gaps if any			Possible Level of Severity (S)	Probability (P)					
	Generation of Hazardous Waste	Land	N	NR	A Hazardous Waste management plan is being prepared by the contractor prior to the commencement of work An approval for a pre-identified dumping site is taken from the competent authority for hazardous waste generated.	Specific procedure for handling and disposal of the Hazardous waste is not prepared	Land Pollution	3	2	3	4	13	Moderate	LC	Operational Control Procedure (WI-8/ Management & Handling of Hazardous Waste) has been prepared and shall be followed
		Water	AN	NR	A Hazardous Waste management plan is being prepared by the contractor prior to the commencement of work Proper treatment facility is made available for the effluent coming out of the Hot-mix plant	Monitoring of Water Quality is not carried out	Water Pollution	4	4	2	4	16	Substantial	PP/ LC	Operational Control Procedure (WI-10/ Water Quality Monitoring) has been prepared and shall be followed
Movement of construction and material transfer vehicles	Generation of smoke from exhaust	Air	N	R	PUC for vehicles is maintained by the contractors Maintenance of the vehicles is done on regular basis		Air Pollution	3	2	4	1	12	Tolerable	-	Existing Measures to continue

Activity	Aspect Identification							Impact Assessment					Over riding factor (LC,, PP, EC etc)	Further control measures required	
	Environmental Aspect	What may get affected / exposed	Condition		Adequacy of Impact control measures		Impact Severity	Scale (S)	Impact = P X S (I)		Duration (D)	Impact Priority Number (S + I + D)			Impact Prioritization
			N/ AN	R/ NR	Existing	Gaps if any			Possible Level of Severity (S)	Probability (P)					
	Generation of Noise	Ambient Air	N	R	Maintenance of the vehicles is done on regular basis	-	Noise Pollution	2	1	5	2	9	Tolerable	-	Existing Control measures shall be followed
Tree cutting	Resource	Resource	AN	NR	No activity of cutting is started before prior approval in written is received from Forest Department/ MoEF. A joint field verification is done by Environment specialist of CSC and the contractor to ascertain possibility of saving trees.	At the design stage not much emphasis is given to prepare the design to reduce the no of trees to be cut, to minimum	Resource Loss	2	4	2	5	15	Moderate	LC	Operational Control Procedure (WI-5/ Tree cutting) has been prepared and shall be followed
Transfer of debris from dismantling structures, road surface and hill ward side excavation	Generation of dust	Air	N	R	Vehicles delivering fine material will be covered to avoid spillage Regular water sprinkling is carried out for dust suppression. Debris management plan is available	Air monitoring is not being carried out at the site Work Instruction for the management of Debris Disposal is not available	Air pollution	3	3	4	2	17	Substantial	PP	Operational Control Procedure (WI-11/ Air Quality Monitoring & Analysis and WI-3 /Debris Disposal) has been prepared and shall be followed

Activity	Aspect Identification							Impact Assessment					Over riding factor (LC,, PP, EC etc)	Further control measures required	
	Environmental Aspect	What may get affected / exposed	Condition		Adequacy of Impact control measures		Impact Severity	Scale (S)	Impact = P X S (I)		Duration (D)	Impact Priority Number (S + I + D)			Impact Prioritization
			N/ AN	R/ NR	Existing	Gaps if any			Possible Level of Severity (S)	Probability (P)					
	Falling on ground	Land	N	NR	All existing roads are cleaned periodically to clear dust/mud or other extraneous materials	Sometimes open trucks are used for the same in case of non-availability of closed ones	Land contamination	2	2	4	1	11	Tolerable		Strict control shall be kept for use of closed trucks only for transfer
Disposal of residual bituminous wastes	Leaching	Ground Water	AN	NR	Disposal is done over a 60mm thick layer of rammed clay The disposal pit is covered with a layer of soil Debris disposal plan is being prepared by the contractor	OCP for the disposal of debris is not being prepared	Water pollution	5	3	2	3	14	Moderate		Operational Control Procedure (WI-3/ Debris Disposal management) has been prepared and shall be followed

Activity	Aspect Identification							Impact Assessment					Over riding factor (LC,, PP, EC etc)	Further control measures required	
	Environmental Aspect	What may get affected / exposed	Condition		Adequacy of Impact control measures		Impact Severity	Scale (S)	Impact = P X S (I)		Duration (D)	Impact Priority Number (S + I + D)			Impact Prioritization
			N/ AN	R/ NR	Existing	Gaps if any			Possible Level of Severity (S)	Probability (P)					
Disposal of Debris	Scattering of the generated debris in the nearby area	Land	N	R	<p>The debris generated are reused and recycled for purposes like filling and leveling school grounds, as embankment fill material etc.</p> <p>A debris disposal Plan is prepared and followed for the disposal of debris at a pre-identified site duly approved by Environment experts of CSC.</p> <p>Waste is disposed off as per a Solid Waste management plan, prepared in consultation with the Environment Officer</p>	OCP for the disposal of debris is not being prepared	Land pollution	2	3	3	2	13	Moderate	-	Operational Control Procedure (WI-3/ debris Disposal management) has been prepared and shall be followed

Activity	Aspect Identification							Impact Assessment					Over riding factor (LC,, PP, EC etc)	Further control measures required	
	Environmental Aspect	What may get affected / exposed	Condition		Adequacy of Impact control measures		Impact Severity	Scale (S)	Impact = P X S (I)		Duration (D)	Impact Priority Number (S + I + D)			Impact Prioritization
			N/ AN	R/ NR	Existing	Gaps if any			Possible Level of Severity (S)	Probability (P)					
	Mixing into nearby water	Surface Water	AN	NR	Special care is taken that no waste is disposed off near any water course. No dismantled material is stored in canal bed or on embankment slopes. Waste is disposed off as per Debris Disposal Plan, prepared in consultation with the Environment Officer	-	Water pollution	3	5	1	4	12	Tolerable	-	Existing Control measures shall be followed
	Affecting the agricultural land	Land	AN	NR	Special care is taken that no waste is disposed off near any agricultural land. Waste is disposed off as per a Debris disposal plan, prepared in consultation with the Environment Officer	-	Land contamination	3	3	2	4	13	Moderate	-	Existing Control measures shall be followed

Activity	Aspect Identification							Impact Assessment					Over riding factor (LC,, PP, EC etc)	Further control measures required	
	Environmental Aspect	What may get affected / exposed	Condition		Adequacy of Impact control measures		Impact Severity	Scale (S)	Impact = P X S (I)		Duration (D)	Impact Priority Number (S + I + D)			Impact Prioritization
			N/ AN	R/ NR	Existing	Gaps if any			Possible Level of Severity (S)	Probability (P)					
Borrowing/ Quarrying of soil	Generation of dust during transport	Air	N	R	Sprinkling of water is carried out twice a day and frequency is increased during dry season	Sprinkling of water found missing at times due to shortage of water OCP for Burrow management is not in place	Air Pollution	2	3	4	2	16	Substantial	PP	Operational Control Procedure (WI-9/ Borrow and Quarry management) has been prepared and shall be followed
	Mishandling of Top Soil	Land	AN	NR	Slope of stock pie will not exceed 1:2 Silt fencing will protect the edges of the pile Stockpiles will be covered with gunny bags or vegetation Multiple handling will not be allowed	-	Loss of productive Top Soil	1	2	1	4	7	Tolerable	-	Existing Control measures shall be followed

Activity	Aspect Identification							Impact Assessment					Over riding factor (LC,, PP, EC etc)	Further control measures required	
	Environmental Aspect	What may get affected / exposed	Condition		Adequacy of Impact control measures		Impact Severity	Scale (S)	Impact = P X S (I)		Duration (D)	Impact Priority Number (S + I + D)			Impact Prioritization
			N/ AN	R/ NR	Existing	Gaps if any			Possible Level of Severity (S)	Probability (P)					
Blasting with the use of Gelatin	Generation of Noise	Ambient Air	N		Blasting is carried out during fixed hours and preferably in day-time Silent blasting is carried out in and around the forest and prior consent for the same is taken from the forest department	OCP for managing the process of Blasting is not being developed	Noise Pollution	3	3	3	2	14	Moderate		Operational Control Procedure (WI-7/ Blasting) has been prepared and shall be followed
	Generation of waste material (rocks, boulders etc)	Land	N		Waste is disposed of according to the Solid waste management Plan and Debris as per the Debris Disposal Plan	-	Waste Generation	2	3	2	3	11	Tolerable		Existing Control measures shall be followed
	Damage to natural resources and aquifers	Land	AN	NR	Procedure for blasting is prepared and strictly followed to minimize the resource loss	-	Flash Flood	2	3	3	4	15	Moderate		Operational Control Procedure (WI-7/ Blasting) has been prepared and shall be followed
	Loosening of soil material	Soil properties	N	NR	Bio-engineering is being practiced along with civil engineering to reduce the impact	OCP for Bio-engineering is not available	Soil Erosion/ land Slides	2	3	2	3	11	Tolerable		Operational Control Procedure (WI-6/ Bio-engineering) has been prepared and shall be followed

Activity	Aspect Identification							Impact Assessment					Over riding factor (LC,, PP, EC etc)	Further control measures required	
	Environmental Aspect	What may get affected / exposed	Condition		Adequacy of Impact control measures		Impact Severity	Scale (S)	Impact = P X S (I)		Duration (D)	Impact Priority Number (S + I + D)			Impact Prioritization
			N/ AN	R/ NR	Existing	Gaps if any			Possible Level of Severity (S)	Probability (P)					
	Hazardous Traffic conditions	Workers	AN	R	Personeel Protective Equipments are provided to the workers on site Tool Box talks are conducted on regular basis Traffic management is properly done	-	Body Ijury	2	2	2	5	11	Tolerable		Existing Control Measures to be followed
Provision of constructi on water	Excessive use of water	Resourc e	N	R	Water Management Plan is prepared and specific measures are taken as per the Environment Management Plan	-	Resource loss	3	2	3	1	10	Tolerable		Existing Control measures shall be followed
Disposal of constructi on waste water	Disposal in the water stream/ irrigation system	Water	AN	R	Measures are adopted and discharge outlets are being prepared for the same	-	Water Pollution	4	1	1	4	9	Tolerable		Existing Control measures shall be followed
Washing of the vehicles	Washing in river water	Water	AN		Contractor is not allowed to enter/ wash his vehicles in the river water	-	Water Pollution	4	1	1	4	9	Tolerable		Existing Control measures shall be followed
	Spillage/ leakage of fuel/ lubricants	Land	AN		Periodic Maintenance is carried out for the vehicles and PUC is mandatory to be carried by the driver.	-	Land Pollution	2	1	2	2	6	Trivial		Existing Control measures shall be followed

Activity	Aspect Identification							Impact Assessment					Over riding factor (LC,, PP, EC etc)	Further control measures required	
	Environmental Aspect	What may get affected / exposed	Condition		Adequacy of Impact control measures		Impact Severity	Scale (S)	Impact = P X S (I)		Duration (D)	Impact Priority Number (S + I + D)			Impact Prioritization
			N/ AN	R/ NR	Existing	Gaps if any			Possible Level of Severity (S)	Probability (P)					
Disposal of waste produced from the labor camp	Generation of domestic solid waste	Land	N	R	Garbage bins are provided in the camps and the waste is disposed of according to the available solid waste management plan on regular basis.	-	Land nuisance	2	1	1	3	6	Trivial		Existing control measures to be followed
Operation of the Diesel Generator	Leakage of oil/ grease	Land, water	AN	R	The generator is placed on a concrete platform Oil and grease traps are provided. Regular maintenance is being done	-	Land Contamination	3	3	2	4	13	Moderate	LC	Operational Control Procedures (WI-8/ Hazardous Waste Management & Handling) have been prepared and shall be followed
Demolition of bridges or part thereof	Generation of dust	Air	N	NR	Contractor provides screen around the demolition sites as far as possibly feasible. Sprinkling of water is also carried out regularly Encapsulation of dust source is done and barriers/ screens are erected.	-	Air Pollution	3	4	5	1	24	Substantial		Operational Control Procedures (WI-11/ Air Quality monitoring & Analysis) have been prepared and shall be followed

Activity	Aspect Identification							Impact Assessment					Over riding factor (LC,, PP, EC etc)	Further control measures required	
	Environmental Aspect	What may get affected / exposed	Condition		Adequacy of Impact control measures		Impact Severity	Scale (S)	Impact = P X S (I)		Duration (D)	Impact Priority Number (S + I + D)			Impact Prioritization
			N/ AN	R/ NR	Existing	Gaps if any			Possible Level of Severity (S)	Probability (P)					
	Generation of Noise	Ambient Air	N	NR	Screens are erected to reduce the impact	-	Air pollution	3	3	3	2	14	Moderate		Existing Control measures shall be followed
Handling of the Hazardous materials/ chemicals	Disposal of hazardous waste	Land	N		All the precautions mentioned in the Environment Management plan are taken and PPE's are provided as per the requirement.	No hazardous waste management plan was found in existence OCP for management of hazardous waste is not being prepared	Land pollution	3	4	3	5	20	Substantial	PP	Operational Control Procedure (WI-8/ Management & handling of Hazardous Waste) has been prepared and shall be followed
Stripping/ Cutting	Generation of Dust	Air	N		Sprinkling of water is carried out regularly	-	Air pollution	2	2	4	2	12	Tolerable	-	Existing Control measures shall be followed
	Generation of Noise	Air	N		Work is carried out mostly during day-time	-	Air pollution	1	1	4	1	6	Trivial	-	Existing Control measures shall be followed
	Loosening of the cut area	Top Soil	AN	R	Feasibility study is done to identify the significant areas. All the work is immediately stopped if any such indication is found in the beginning of the cutting	-	Soil Erosion/ Loss of Top Soil	1	2	3	2	9	Tolerable	-	Existing Control measures shall be followed

Activity	Aspect Identification							Impact Assessment					Over riding factor (LC,, PP, EC etc)	Further control measures required	
	Environmental Aspect	What may get affected / exposed	Condition		Adequacy of Impact control measures		Impact Severity	Scale (S)	Impact = P X S (I)		Duration (D)	Impact Priority Number (S + I + D)			Impact Prioritization
			N/ AN	R/ NR	Existing	Gaps if any			Possible Level of Severity (S)	Probability (P)					
	Change in Land use	Land	N	R	Initial land-use pattern is identified and record in the form of photographs are kept Measures are taken to preserve the Top Soil Consideration to minimize the cutting of trees or vegetation in the vicinity of the project area is done in the design stage itself		Loss of Green Cover Loss of productive Top soil Compaction of Soil	1	2	3	2	9	Tolerable	-	Existing Control measures shall be followed
Carpeting	Vehicular Emission	Air	N	R	PUC for vehicles is maintained by the contractors Periodic maintenance of the vehicles is being carried out	-	Air Pollution	2	2	4	1	11	Tolerable	-	Existing Control measured shall be followed

Activity	Aspect Identification							Impact Assessment					Over riding factor (LC,, PP, EC etc)	Further control measures required	
	Environmental Aspect	What may get affected / exposed	Condition		Adequacy of Impact control measures		Impact Severity	Scale (S)	Impact = P X S (I)		Duration (D)	Impact Priority Number (S + I + D)			Impact Prioritization
			N/ AN	R/ NR	Existing	Gaps if any			Possible Level of Severity (S)	Probability (P)					
	Generation of tar/ oil and lubricant waste	Land, Water	N	R	Waste oil is collected in drums and coal tar is also stored in drums	No specific procedure is available for management of waste oil and coal tar	Land & Water Pollution	2	4	2	4	14	Moderate	PP	Operational Control Procedure (WI-8/ Management & Handling of Hazardous Waste) has been prepared and shall be followed
	Over consumption of Fuel	Resource	N	R	Records for the consumption of the different fuels is being kept by the contractor to minimize the losses Periodic maintenance is done to maintain the efficiency of the instruments used and thus reduction in the use of excessive fuels	-	Resource Loss	2	2	2	5	11	Tolerable		Existing Control Measures to be followed
Filling of the patches for maintenance of Road	Getting hit by the On-road vehicles	Workers	AN	R	Barricading is provided and all the workers are provided with PPE's Also, signage are displayed for awareness Tool Box talks are being conducted	Use of PPE was found to be irregular	Body Injury	1	2	2	5	10	Tolerable		Use of PPE shall be further emphasized in the Tool Box Talks

3. ENVIRONMENT OPERATIONAL CONTROL PROCEDURES

13. This chapter contains different Operational Control Procedures which are required to establish and maintain an operational control over the functioning/ delivery of different activities and services of HPPWD/ HPRIDC which are interacting/ have the potential to interact with the environment.
14. These operational control procedures intends to provide step-by-step guidance to the HPPWD engineers in their functions of investigation, designs, inspection and monitoring of different parameters of environment at construction site and area in its vicinity. They also provide guideline for prevention of pollution, conservation of different natural resources and are expected to aid in environment friendly working of HPPWD/ HPRIDC.
15. Up-keeping of the environment in the vicinity of the project area during Bridge and Road construction is dependent on several challenges, right from selection of the terrain, soil conditions, materials, methods for disposal of debris and hazardous waste, management & conservation of water & other natural resources and to monitor the effect on different elements of environment i.e. air, water, noise & soil w.r.t different standards being laid down by the competent authorities.
16. The enclosures will provide with typical guidelines for environment management during the process of road construction, Environment mitigation measures, monitoring plans for Environment elements and the respective monitoring report Performa for presentation of monitoring results. Also, the operational control procedures clearly defines the responsibility and accountability of different officials required to be carried out for safeguarding the environment while performing the different activities as well as monitoring and reporting the progress of the developed EMS and different control measures.
17. These enclosures will not only provide with the typical guidelines for environment management during the entire life cycle of road construction and maintenance but will also suggest the environment mitigation measures, the monitoring plans for different environment elements and will provide with the relevant linkage of the performa required. It is intended to help the internal auditors while carrying out audits of the implemented EMS of HPPWD.
18. This document is an important adjunct to the Procedure Manual (Level II) document and takes into consideration the existing practices and codal needs of HPPWD/ HPRIDC. The formats to be used are the same as necessary for the EMS and the departmental code.

3.1. Guidelines for Environment Impact Assessment

3.1.1. Purpose

19. The purpose of this document is to provide standardized environmental assessment guidelines for highway projects. This will facilitate HPPWD/ HPRIDC to follow uniform approach for Environmental Impact Assessment

3.1.2. Scope

20. It is applicable to all the sites where construction work of HPPWD/ HPRIDC is being planned

3.1.3. References

- Indian Environmental Legislation applicable to road infrastructure projects with specific reference to Environmental Clearance Notification No. SO 1533 dated 14th September 2006 amended October 2007
- Environmental Impact Assessment Notification, 2009
- World Bank Operational Manual, 1999 and Hand Book on Road & Environment
- World Bank Publication - Management of Environment and Social Issues in Highway Projects in India
- ISO 14001: 2004 International Specification for Environmental Management Systems
- Applicable IRC Guidelines/specifications related to Highways

3.1.4. Responsibilities

21. **Executive Engineer** of CMU/ Division shall make sure that Environment Impact Assessment is carried out for every new road construction project being identified, before commencement of work. He shall be responsible for getting all the identified Environment mitigation measures implemented against the identified Environmental impacts in his area and shall also be responsible for monitoring of the different environmental parameters.
22. **Environment Engineer** shall be responsible for identifying the potential Environment impacts along with the superintendent consultant and shall look for alternatives as available. He shall also be involved in identifying, suggesting as well as implementing the Environment mitigation measures.

3.1.5. Description of Activities

3.1.5.1 Environment Screening

23. Screening refers to an early determination of the potential impacts and shall be undertaken at the feasibility stage. It is the process to identify the regulatory & environmental issues associated with the proposed alignment(s) in case of development of new road as well as the widening of the existing road. The potential impacts & regulatory concern are identified through reconnaissance survey and limited public consultations. In case of new alignments, assessment is carried out for all the probable/ alternative alignments. Screening format (EMS/F-18) is to be used for identification of preferred alignment and assessment of likely magnitude of impacts. The alignment with least environmental impact and minimal regulatory implication is considered most environmentally feasible. The following details should be developed for most environmentally feasible alignment(s).

3.1.5.1.1 Regulatory Compliance Requirements

24. Describe all the applicable national & local environmental regulatory requirements along with all clearances, license, and consent needed that apply to all phases of a project. Review all the environmental legislation; project components, alignment and legal programme for the same. [Refer Register of Regulation (EMS/R 02)]

3.1.5.1.2 Identification of potential impacts and selection of most feasible alignment

25. Describe environmental hotspots (ecologically sensitive habitats) associated with the proposed road project and also identify potential impacts on these hotspots, which will require focused attention during project planning and design. The potential impacts are to be identified based on:
- Site reconnaissance visit
 - Secondary data collection
 - Regulatory consideration
 - Limited public consultation
26. The environmental and social features should be identified preferably on strip maps of 1 Km length each and 100 meter on either side of ROW. Windshield¹ survey method may be followed for strip mapping. Land use features and sensitive location in 7 Km area either side of the road should be identified on the area topo-sheets (1: 50,000 scale).
27. The pedestrian survey and accident survey may also be undertaken at this stage. The output should be considered for alignment selection and deciding road widening options.
28. The most feasible alignment/ widening options should be identified using siting preference and scoring criteria defined at Environmental screening format (Ref No. EMS/F-18). First alignment preference should be assessed based on sitting sensitivity followed by the application of scoring method. The alignment which scores the least should be considered the most preferred alignment.

3.1.5.1.3 Defining the scope of baseline study

29. Identification of baseline data collection requirement at this stage will facilitate effective planning for field data collection. This would include secondary data collection and primary data collection. Secondary data would need to be collected from various Government sources, such as Central & State Pollution Control Board, Indian Meteorological Department, Irrigation Department, Central/ State Groundwater Authorities, Revenue Department, Agriculture Department, District Statistical Department, and Forest Department etc. The baseline data collection planning will include identification of environmental component/ parameters to be monitored, selection of sampling locations, frequency and measurement, techniques etc. The framework for baseline information collection and criteria for baseline data collection and analysis shall be decided in consultation with the superintendent consultant. Based on the project objectives/ screening process, the baseline information collection planning needs to be developed and documented.

3.1.5.2 Impact Assessment

30. Impact assessment is a phase wise sequential approach comprising of identification, determination, evaluation of impacts, alternative analysis and mitigation measure selection. Identification of impacts is carried out at the

¹ Team moves in a vehicle at a speed of 20-30 km per hour and stops wherever environmental and social features are observed.

screening stage with respect to existing physical, biological and socio-economic environment. These results will lead to establishment of baseline monitoring requirements while the determination of impacts will forecast the nature, extent and intensity of the identified environmental impacts. The extent will take into account the following:

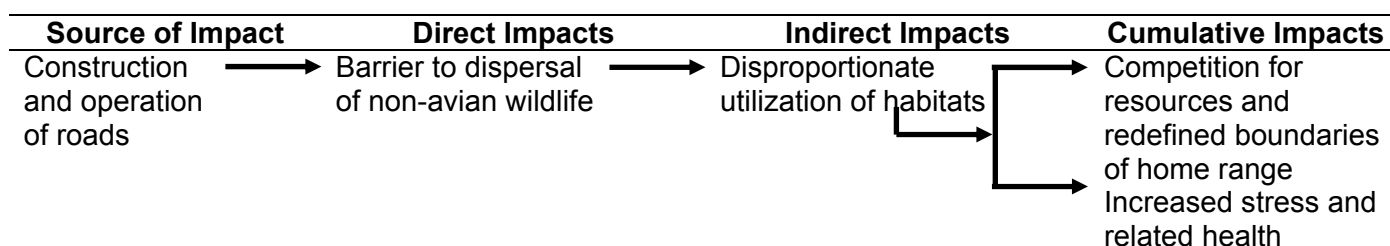
- The physical extent of the proposed project, defined by the limits of the study area.
 - The extent of regulatory boundaries.
31. The intensity of the impacts is determined based on qualitative and quantitative modelling techniques. Further, the determined intensity is compared with national environmental standards. The evaluation of impact is carried out by assessing the significance of likely impact due to each activity during construction, operation and maintenance of road/ highway projects

3.1.5.2.1 *Establishment of Baseline*

32. Environmental baseline should be established to determine the existing environmental conditions and expected changes in the baseline conditions due to proposed road project. The existing environmental conditions will be established with respect to three components, viz physical, ecological and socio-economic environment. The potential impact on these components, identified during screening process will facilitate planning for baseline monitoring. The requirements for measuring baseline will vary by projects (e.g. new alignment, widening and strengthening). This data for physical, ecological and socio-economic components will be collected as per the baseline data collection planning carried out during screening process and the same will be documented as per the standard Baseline Planning guidance and standard sampling and measurement techniques.
33. **Physical Environment:** The physical environment will include:
- Topography
 - Land use (on topo sheet and satellite imagery based)
 - Drainage Pattern
 - Climate
 - Soil
 - Air
 - Noise
 - Hydrology and Water Quality
 - Geology and seismology
 - Land use and construction material sourcing, i.e. through Borrowing and Quarry
34. Identify the land use in the study area w.r.t. agriculture, forest, notified industrial state, fallow/ barren, National Park Sanctuaries / Mangroves. Also identify the construction material sources like borrow areas, quarries with distances from the project site. The borrow area details should include its locations (Chainage, village name), distance (lead), name of owner, current use of the area, soil quantity, and proposed rehabilitation as acceptable to the owner. Preferably enclose lead chart for the borrow areas. Similarly identify the location of stone quarries with its approval status.

35. Also identify the location of any thermal power plant with in a radius of 100 Km of road alignment. Assess the fly ash availability from the thermal power plant for its use in the road construction to comply with the regulatory requirement.
 36. Also identify the existing road infrastructure and need for creating additional access for construction material transportation
 37. **Ecological Environment**
 38. Ecological environment will include establishment of location of ecologically sensitive areas, e.g. forest, mangroves, wetland, national parks, wild life sanctuaries, listing of flora and fauna, including rare and endangered species and inventory of trees in the study area. The tree inventory in the proposed ROW should be developed as per girth size as well as species wise with respect to format EMS/F-19. Further baseline status with respect to wildlife movement paths, migratory routes, fishing grounds, buffer and core zones and boundaries in the context of barrier effect and traffic movement should be established. Wherever animal movement path is identified, the frequency of movement, probable period and time of movements should also be identified through consultation with wild life authorities and local people. Maps and figures in support of it should also be provided.
 39. **Socio-Economic Environment:**
 40. This will include establishment of baseline with respect to existing land use (agriculture/industrial area/ fallow/barren/ forest/ mangroves/ national park/ sanctuaries) supporting different socio-economic activities in the study area. Further the economic status with respect to utilities, education and health facilities should be established. The baseline status should also include inventory of religious places, hospitals, education facilities, community centers and archeological importance in the Corridor of Impact. List these areas with its location (Chainage wise), its distance from the road (both right side & left side)
- 3.1.5.2.2 **Determination of Impacts**
41. Impacts should be determined by estimating the degree of expected change in the baseline condition due to the project activities associated with pre-construction, construction and post construction stage. The impact should be determined qualitatively and quantitatively. The qualitative assessment involves expert judgment based on various reviews such as: environmental conditions at site, baseline information, socio economic conditions, national standards and regulations, public concerns, traffic projections, nature of impacts (direct, indirect), barrier effects etc. The quantitative estimation involves usage of mathematical modeling techniques.
 42. The types of impacts will differ from project to project, i.e. the level of impacts may be more in a new road than the road widening project. An illustration of few examples of impacts from various activities is given as figure 3.1

Figure 3.1 Possible Impacts from different Activities



Source of Impact	Direct Impacts	Indirect Impacts	Cumulative Impacts
Road construction on unstable land	Soil erosion	Siltation of water bodies	declines Degradation of Water Quality as well as aquatic life
Construction & Operational period dust	Dust on vegetation, interference /photosynthesis.	Reduced primary productivity	Reduction of food sources, species decline
Traffic	Disturbance to wildlife species in road verges	Changes in activity patterns leading to habitat use more during night Abandonment of habitat to others	Competition for resources with nocturnal animal decline of certain species Overuse of other habitat areas some species decline
Channel Alternation/ Construction	Alternation in direction and/ or volume of water	Degradation of flow or flooding Diminished GW recharge in receiving streams	Threats to conservation of some water bodies in the vicinity Localized drought Reduced habitat suitability for some species
Construction of temporary access roads for quarries	Facilitation of public access	Eventual acceptance of road as permanent	Colonization stimulating road – habitat conversion
Inadequate management of construction wastes; sewage and garbage, oily wastes	Contamination of surface water, groundwater aquatic resources	Siltation and blockage of water courses	Degradation of Water Quality

3.1.5.2.3 Environment Cost Benefit Analysis

43. Brief analysis of a) environmental costs and benefits of environmental impacts, b) cost, benefits and cost-effectiveness of mitigation measures should be carried out in this section. (Various references can be used for these analysis like ADB guidelines for economic analysis of projects, Economic Analysis of Environmental Impacts by John Dixon, Louise Fallon Scdura, Richar Carpenter and Paul B Sherman)
44. The costs benefic analysis can be based on either primary data collected at site or secondary data collected from various sources. The costs are assessed by quantifying the environmental changes in monetary terms as well as the costs of mitigative measures, similarly assessing the benefits due to projects. Based on assessment of these two costs carryout the overall cost benefits analysis. For cost benefit analysis Start with the most obvious and easily valued environmental impacts. First select the effects that have directly measurable productivity changes that can be valued by market prices (for

example, changes in fish or crop production due to a partial filling of water pond. Always look at both the benefit and cost sides. A clear distinction should be made between benefits (costs avoided) and costs, as these will be the reference from which changes are measured. For instance, the value of a regulation structure should include, from the cost side, the capital operations, and maintenance costs; and from the cost avoided side, the benefits of reduced flooding downstream. Economic analysis should be done in a “with- and without-project framework.” Project alternatives should also be considered. All assumptions in the economic analysis should be stated clearly. When market prices cannot be used directly, surrogate market prices should be used. The time horizon for the economic analysis may coincide with the economically and technically viable project life span

3.1.5.2.4 *Evaluation of Impacts*

45. Determination of the significance of the anticipated impacts of proposed projects is a key component of the EIA process. The criteria for assessing the significance of impact occurring due to each activity during construction, operation and maintenance of new alignments and widening projects is based on severity and intensity of impacts. There can be various techniques for assessing significance of impacts. The suggested evaluation criteria are given below;

- Significance of impact depends on
 - The duration of impacts; can be categorized as short term and long term.
 - The nature of impacts; can be categorized as reversible and irreversible.
 - Intensity of impact; can be categorized as low, medium, high
- Possible scenarios of impacts are indicated below:

Figure 3.2 Impact analysis matrix

Intensity Nature & Duration of Impacts	Low (1)	Medium (2)	High (3)
Short term Reversible	Minimal	Minimal	Moderate
Long term & Reversible	Minimal	Moderate	Severe
Long term & irreversible	Moderate	Severe	Severe

46. The DPR consultant shall establish the low, medium and high intensity and short/ long term duration of the impacts and all moderate and severe impacts may be considered as significant impacts

- It can be inferred that “long term and permanent” scenarios are the worst-case scenarios, while “no impact” is the best-case scenario.

- Both qualitative & quantitative assessment outcome should form the key basis for determining the severity level of the impacts
47. Mitigation measure should focus on elimination or reduction or containment of the above identified significant impacts
- 3.1.5.2.5 Alternate Analysis**
48. The alternative analysis is a potential tool to confirm that the alignment selected in case of new roads meets the stated development objective with least environmental damage or identify the most environmentally feasible option for specific environmental/ concern areas like prevention of wild life migration or minimizing adverse impact to their habitat.
49. The alternate analysis will include description of environmental conditions in “with” or “without” project scenarios. In case of “with project” scenario, the alternate alignment will be evaluated in terms of environmental significance. Components to be covered while assessing the alternate alignment will include the following:
- Technical detail of each alignment
 - Environmental issues with respect to each alignment.
 - Construction issues like material sources and technology.
 - Environmental sensitivity of each alignment, e.g. disturbance to protected areas and allocation of water bodies etc.
 - Cost benefit of alternatives in the context of environmental significance-expected impacts and expected mitigation measures and costs
50. The alternative, which is least environmentally sensitive and most techno economically viable, should be selected for implementation. In case of road widening projects alternative analysis is to be carried out for the options available for various critical or environmentally sensitive locations. The options to be analyzed could include bypass, engineering options like elevated roads, flyovers etc. The analysis of these options should be carried out based on environmental considerations, social considerations, engineering feasibility considerations and economic feasibility considerations. The most feasible options should be recommended with justification of selection. An example of evaluating an alternative project route is given below:

Figure 3.3 Example of Alternate Analysis

Component (Illustration)	Route A	Route B	Route C
Environmental & Socio-Economic			
– Habitation along the corridor	2	2	1
– Water Resources like rivers, lakes, ponds etc	1	2	1
– Sensitive receptors like hospitals, schools, religious places, etc	2	3	1
– Presence of Archeological Monument near ROW	2	1	1
– Reserved Forests, Sanctuaries, protected area			
– Roadside plantation	2	3	2
– Soil erosion potential	1	1	2

	1	1	1
Engineering aspects			
– Geometrics	2	2	1
– RoW Availability	1	2	2
– Blasting requirements	3	3	1
– Surface Roughness			
Economic Assessment	2	2	2
Total Score	19	22	16
Priority Ranking	2	3	1

51. **Level of Scoring**

- Minimal (low) Sensitivity : 1
- Moderate (Medium) Sensitivity : 2
- Significant (High) Sensitivity : 3

52. Route C has favorable rates of return and provide a good level of service for all traffic. It may also serve most of the major settlements and development areas. Therefore, option C can be recommended as the best possible alignment

3.1.5.2.6 *Mitigation Measures Selection*

53. Mitigating measures need to be designed to eliminate, minimize or contain the adverse impact of significant impacts identified during impact assessment and evaluation. The mitigation measures should be developed for each stage of impacts viz design, construction and operation phases.

- Important valued environmental component are also given below:
- Land use
- Transport and traffic
- Noise
- Air Quality
- Soil Stability
- Surface water quality
- Groundwater quality
- Ecology
- Heritage values

54. The EIA report should be prepared containing all the information mentioned above.

3.1.5.3 *Environment Management Plan and Environment Monitoring Plan*

55. The environmental management plan describes how the mitigation and other measures to enhance the benefits of environmental protection would be implemented. An effective environmental management plan should explain how the measures will be implemented, who would implement them, when &

where they would be implemented and what will be the cost of implementation. The environmental management plan should also include environment quality monitoring plan during construction and operation stage with implementation schedule and monitoring cost. It should also highlight the capacity building & training requirements, mechanism for feedback and adjustments. For effective assessment of mitigation measures, key performance indicators especially w.r.t. critical impact areas should be included in the EMP. EMP should be developed separately for each package. The bill of quantity for the mitigation measures should also be included in the EMP. The EMP & monitoring plan should be prepared as per standard format

56. The trainings and capacity building may include areas such as proper handling of construction waste, emergency preparedness, resource conservation etc

3.1.5.3.1 *Cost Estimates and Environmental Budget*

57. To ensure that the cost of mitigation measures and monitoring are adequately allocated in the project cost, the environmental budget should be covering cost of mitigation measures, monitoring, regulatory compliance training & capacity buildings management information system, road operation fro its planned operational life and contingencies, in the standard format EMS/F-20. The example of cost of select environmental protection measures are indicated below;

Figure 3.4 Example: Cost of Environmental Protection Measures

Sr. No	Item	Cost (Rs.)
1	Pollution Control (Included in Project Cost)	1,515,000
	a) Dust suppression during construction & transportation of materials @ Rs. 50,000/- per month for 30 months.	1,500,000
	b) Oil interceptor in truck lay-byes @ Rs 15,000/- per truck lay byes for 1 lay bye.	15,000
2	Solid Waste Management (Included in Project Cost)	
	a) Clearing garbage from construction camps @ 40,000/- per month for 30 months.	1,200,000
3	Shifting of community structures (Included in R&R Cost)	5,708,000
	a) Relocation of community structure (Hand Pumps, water tanks, soak pits, etc.)	
	b) Relocation of Temples and Shrines	
	c) Shifting of Government buildings & structures	
4	Pollution Monitoring - Environmental Cost	1,960,000
	a) Monitoring during construction @ Rs. 2,60,000/yr for 3 years	780,000
	b) Monitoring during operation @ Rs 2,36,000/yr once in every 3 years over 15 years	1,180,000
5	Plantation Development Cost - Environmental Cost	46,734,000
6	Others - Environmental Cost	5,800,000
	a) Training and Mobilization	1,300,000
	b) Environmental Officer to implement the EMP during construction period @ Rs. 1,50,000/month for 30 months	4,500,000

3.1.5.4 *Public Consultation*

58. Ensuring public participation in project design and development is a way to improve environmental governance. It is a mechanism to influence decisions about the use and management of natural resources. Therefore, public

consultation is an important element in the planning and implementation of highway projects to ensure public participation

3.1.5.4.1 *Different elements of Public consultation*

59. Public consultation and information disclosure will be guided by the following general principles:
- **Information Dissemination:** Sufficient information should be provided in accessible and culturally appropriate ways in the local language. Providing information about benefits and disadvantages of the project at an early stage of the EA process will allow people to think about the issues, consider implications, and formulate their views.
 - **Information Solicitation:** Asking and listening to the local community, residents, and interested groups about their views and input into the EA will yield new insights and site-specific information. Information solicitation provides people past experience with authorities and can initiate constructive dialogue
 - **Engaging People in Dialogue:** Public consultation involves engaging people in dialogue – it is a two-way flow of information and ideas between the project proponent and the stakeholders with the opportunity for the stakeholders to express their views and concerns. Ensuring the opportunity to participate in dialogue during the early preparation stage of the EA process will enable to manage expectations and detect any potential serious conflict and help resolve issues before they lead to conflict, reducing financial losses due to delays.
60. A combination of the above approaches should be used for soliciting views of the public. Intensive consultations should be carried out both with the authorities and public. Limited public consultation should be carried out at the screening stage to act as a guidance to identify, evaluate and determine the project impacts. This will further assist in carrying out extensive public consultation to be organized by the regulatory authorities. The findings of the public consultations should also be used in assessing impacts and developing mitigation measures.

3.2. Guidelines for Water management

3.2.1. PURPOSE

61. To identify, establish and maintain an Operational Control Procedure for conservation and Management of water throughout the project site(s)

3.2.2. SCOPE

62. It is applicable to all the sites where construction work of HPPWD/ HPRIDC is being carried out and also at the camp area, temporarily constructed for the construction workers, if any

3.2.3. REFERENCES

- Environment Policy
- Environment Management plan
- MOSRTH Guidelines
- Water (Prevention and Control of Pollution) Act, 1974
- National & State Water policy

3.2.4. Responsibility

63. **Executive Engineer of CMU/ Division** shall monitor and ensure that the water is being extracted only after approval from local communities or after obtaining license from specific authorities
64. **Environment Engineer** shall take the responsibility to identify the water bodies from which water can be extracted and shall take the necessary environment clearances required prior to extraction.

3.2.5. Description of Activities

65. An approved water management plan shall be prepared by the contractor and he only shall be responsible for the implementation of the same

3.2.5.1 Water Availability

- Contractor shall arrange adequate supply and storage of water for the entire construction period at his own cost.
- Contractor shall submit a list of the sources from where water is planned to be extracted. Emphasis shall be given on the use of ground/ surface water as a source of water for the construction purpose and the contractor may set up his own bore-well facility for extraction of water.
- Water from community drinking water sources shall not be utilised in any scenario
- In case of a spring being the source a check shall be performed to check the discharge, dependency in consultation with local communities
- In case of nallah/ khurd being a source, data for the past several years is required to be analysed to check whether the source is perennial or non-perennial/ any irrigation scheme is running over it or not/ if IPH department is using it or not/ or local people are using it or not.

3.2.5.2 Precautions to be taken

- No excavation work shall be carried out in the beds of any streams/ canals or any other water body for borrowing earth for embankment construction

- No excavation activity shall be carried out for foundation and construction of structures in the river bed during lean season to reduce turbidity levels which will otherwise be on higher side due to mixing of debris or loose soil
- Construction over and close to the perennial rivers shall be carried out in the dry season to avoid siltation
- While working in the close proximity of a perennial river care shall be taken not to obstruct/ prevent the flow of water
- Contractor shall ensure that any spoils or material unsuitable for embankment fill shall not be disposed off near any water course
- It shall be ensured that no construction material like earth, stone, appendage is disposed in such a manner that it has the potential to block the flow of water of any water course or cross drainage channels.
- A silt fencing shall be constructed at the base of the embankment construction for the entire perimeter of any water body (including wells) adjacent to the project road and around the stockpiles at the construction sites including ancillary sites close to water bodies. The fencing shall be provided prior to the commencing of earthwork and shall continue till the stabilization of the embankment slopes, on particular sub-section of the road. Regular evaluation for the different mitigation measures adopted shall be undertaken for the work being undertaken near a water course as per the performa enclosed. (Refer EMS/ F-28)
- It shall be ensured that all the construction material containing fine particles shall be stored in an enclosure such as that sediment-laden water does not drain into nearby watercourse
- A notice shall be served well in advance to the nearby communities if the community water bodies are expected to be effected by the construction work, especially downstream users.
- If water is derived from a well within 30 m proximity of any toilet, drain or other source of pollution, the well shall be disinfected before water is drawn for drinking purpose. All such well shall be covered and provided with a trap door, which will dust proof and waterproof. The trap door shall be kept locked and shall only be opened for the cleaning or inspection purposes, which shall be done at least once a month as per the parameters prescribed in IS 10500-1991.
- It shall be ensured that the velocity in the constricted portion does not increase more than twice the lean season velocity, which will help turbidity control in the downstream
- Entry in the river bed for the purpose of washing of the vehicles shall not be allowed in any circumstances
- It shall be ensured that all the construction vehicle parking locations, fuel/ lubricant storage sites, vehicle, machinery and equipment maintenance and refuelling sites shall be located at least 500 m away from rivers and irrigation canal/ ponds
- Care shall be taken so that there is no spillage of fuel and lubricants on ground during the operation, maintenance and refuelling of the vehicle/ machinery/ equipment.
- Wastewater from vehicle parking, fuel storage areas, workshops, wash down and refuelling areas shall be treated in an oil interceptor before

discharging it on land or into surface water bodies or into other treatment systems

- Arrangement shall be made for proper collection, storage and disposal of oily wastes to the pre-identified sites
- All spills and collected petroleum wastes shall be disposed off in accordance with Petroleum Rules and PCB guidelines

3.2.5.3 *Conservation Measures*

- The contractor shall take all precaution to minimize the wastage of water in the construction process/ operation
- Water after the treatment in oil interceptor shall be reused for the purpose of horticulture or bio-engineering along the slopes
- Assessment of the amount of water required shall be done and the water shall be accordingly extracted from the source. Control shall be exercised on the extraction of ground water and a record for the same shall be maintained as per the performa enclosed.(Refer EMS/ F-25)

3.2.5.4 *Regulatory Compliance Required*

- Uncontaminated water shall be made available for drinking, cooking and washing in all the labour accommodations. Also, potable water shall be made available within the precincts of the workplace in an accessible place, as per the standards set by the Building and other Construction workers (Regulation of Employment and conditions of service) Act, 1996
- Contractor shall take a written permission from the irrigation department before taking surface water from a canal and in doing so shall fix some locations for extraction in consultation with the environment expert.
- Contractor shall take all necessary permissions from the State Ground Water Department before extraction of ground water
- It shall be ensured that if a water storage tank is provided, it shall be kept in such a manner that the bottom of the tank is at least 1 m above the surrounding ground level.

3.2.5.5 *Monitoring*

- Regular monitoring of the quality of water from where extraction is done or where waste water is disposed after specific treatment shall be undertaken as per the operational control procedure for monitoring of air quality. (Refer EMS/ WI-11/ Air quality monitoring and analysis)

3.2.6. *Records*

- Permission from Irrigation department for extraction of surface water
- Written permission from the local community
- Amount of ground water extracted
- Permission from State Ground Water department for extraction of ground water

3.3. Guidelines for management of Debris

3.3.1. Purpose

66. To identify, establish and maintain an Operational Control Procedure for Handling and Management of Debris generated during construction process

3.3.2. Scope

67. It is applicable to all the sites where construction work is being carried out / which have been identified as the sites for disposal of construction and demolition debris by HPPWD/ HPRIDC

3.3.3. References

- Environment Policy
- EIA Notification, 2006
- Environment Management plan
- MOSRTH Guidelines

3.3.4. Responsibility

68. **Executive Engineer of CMU/ Division** shall take the responsibility to monitor the effective implementation of the Debris management plan in coordination with the supervision consultant and shall make sure that all the legal requirements are being fulfilled before the commencement of work
69. **Environment Nodal officer** shall make sure that all the legal and regulatory compliances are being followed and all the required consents and permissions are being sought from relevant authorities.
70. **Environment Engineer** shall be responsible for implementation of the Debris management plan in coordination with the contractor at site

3.3.5. Description of Activities

71. Management and disposal of construction waste especially debris is one of the major issues during construction. The following practices are suggested for disposal of debris:
- The most important aspect is to segregate the debris into useful and non-useful category of material.
 - The debris in the useful category, generated during the dismantling of existing roads or during in-ward cutting of hill, shall be reused in the proposed construction zone subject to the suitability of the materials and approval of both the Resident engineer as well as Environment Engineer as follows:
 - For filling and leveling of school grounds and proposed parking areas
 - The sub grade of the existing pavement shall be used as embankment fill material
 - Existing base and sub-base material shall be recycled as sub-base of the haul road or access roads
 - The existing bitumen surface may be utilized for the paving of cross-roads, access roads and paving works in construction

sites and campus, temporary traffic diversions, haulage routes etc.

- The supervision consultant shall prepare a debris management and disposal plan in consultation with the environmental expert for the debris falling in the non-useful category.
- The debris disposal sites shall be identified in consultation with the neighborhood communities during the project preparation stage, and shall be preferably barren or low-lying areas away from habitat. The disposal sites shall be identified as per EMS/ F-21. A report of the same shall be sent to the Environment expert of resident consultant and respective CMU's.
- These locations shall be physically reviewed on-site and accordingly approved by the Environment expert after satisfactorily meeting the requirements. No disposal activity for waste material shall be commenced prior to the approval of Environment expert
- Photographs shall be taken of the present land use and condition of the area and a written agreement from all concerned (land owner, local communities and SPCB) shall be taken.
- Due care shall be taken during site clearance so that public/private properties are not damaged or effected and at the same time traffic is also not interrupted
- At each identified debris disposal locations, a local community group shall be formulated and shall be entrusted with the duty of supervision and all other assistance required to dumping process.
- Information display boards shall be located at each and every identified disposal site, bearing the capacity of the disposal location, name of the location etc.
- Filling these dumping sites with debris will convert them from mosquito breeding nuisance points to usable open public spaces for parks, playgrounds, stadia, parking lots etc. Identify potential uses from now and publicise these through an on-site signboard.
- A suitable design shall be prepared for the safe disposal of the debris and retaining walls shall be constructed at the disposal site accordingly. However, the fill height for the debris shall be fixed as two meter for it to be manageable.
- Fast growing poplar trees shall be planted on the outer portion of the retaining wall in the form of a linear wall parallel to the retaining wall
- Begin with selected sites, not all together, to minimize debris transport distances in the first phase. Those already in use and not yet filled are the easiest to begin with.
- For selected sites, plan approach route and improve access roads. Preferably plan an IN and OUT route for heavy vehicles to avoid the need for turn- around space or road widening for two trucks to pass, not always available.
- Only the closed dumpers shall be used for transporting the debris to the disposal site
- The debris shall be stored at site ensuring that existing water bodies and drains within or adjacent to the site are kept safe and free from any kind of blockage

- Water shall be sprayed on dust prone stockpiles especially during dry and windy weather to minimize the potential air pollution
- Debris generated from pile driving or other activities shall be disposed such that it does not flow into the surface water bodies or form mud puddles in the area.
- Disposal of residual bituminous waste shall be carried out over a 60mm thick layer of rammed clay so as to eliminate the possibility of leaching of wastes into the ground water.
- The contractor shall ensure that the surface area of each disposal pit is covered with a layer of soil every time at the end of the day of dumping of debris at a particular site.
- Ultimately the disposed area shall be compacted using road rollers.

3.3.6. Records

- Certificate of approved site for disposal of debris
- Amount of debris disposed off at a particular disposal site on daily basis

3.4. Guidelines for management of Excavation process

3.4.1. Purpose

72. To identify, establish and maintain an Operational Control Procedure for safeguarding the Environment during excavation process for roadways and drains

3.4.2. Scope

73. It is applicable to all the sites which have been identified as the sites for construction work of HPPWD/ HPRIDC

3.4.3. References

- Environment Policy
- Environment Management plan
- MOSRTH Guidelines

3.4.4. Responsibilities

74. **Executive Engineer of CMU/ Division** shall take the responsibility to classify the soil type of the area where excavation is required and strictly monitor that excavation is carried out in the specified area only and the Top soil is maintained as per the guidelines
75. **Environment Engineer** shall make sure that all the precautions as mentioned in the guidelines are met and the excavations is done with minimum impact on environment in the vicinity of the area

3.4.5. Description of Activities

76. First, all the materials involved in excavation shall be classified by the Engineer in the following manner:
- (a) Soil
 - (b) Ordinary Rock (not requiring blasting)
 - (c) Hard Rock (requiring blasting)
 - (d) Hard Rock (blasting prohibited)
 - (e) Marshy Soil
77. Then the area for excavation shall be identified and marked

3.4.5.1 Stripping and Storing Topsoil

78. The Topsoil from all areas of cutting shall be stripped off to a specified depth of 159 mm and stored in stockpiles. The portion of the temporary acquired land/ Right of Way shall be earmarked for storing topsoil. and all the area shall be permanently covered
79. The locations for stock piling shall be pre-identified in consultation and with approval of Environment Specialist of Consultant/ engineer in charge
80. Some precaution as mentioned below shall be followed:
- Stockpile shall be designed such that the slope does not exceed 1:2 (vertical to horizontal), and height of the pile is restricted to 2 m. Silt fencing shall be done to retain soil, to allow percolation of water and to protect the edges of the pile.

- Stockpiles shall not be surcharged, otherwise loaded to ensure that no compaction occurs
 - The Topsoil shall not be un-necessarily trafficked either before stripping or when in stockpiles
 - The data for Top-soil shall be managed and well documented as per EMS/F-22
81. It shall be reused in covering of embankment slopes, cut slopes, berms and other disturbed areas where re-vegetation is desired.
82. All the trees, shrubs etc. shall be removed along with their roots, with approval of the Engineer prior to stripping of the Topsoil.
83. During the excavation contractor shall take all precaution against the soil erosion as specified in the Work Instruction for Bio-engineering.
84. The contractor shall not to excavate outside the limits of the excavation
85. All debris and loose material on the slopes of cutting shall be removed.
86. After excavation, the sides of excavated area shall be trimmed and the area contoured to minimise erosion and ponding and allowing for natural drainage to take place
87. If trees were removed, new trees shall be planted, as directed by engineer and the cost for same shall be deemed to be incidental to the work. The records of the trees planted shall be kept as per the performa enclosed. (Refer EMS/ F-26)

3.4.5.2 Slides

88. If slips, slides, over-breaks or subsidence occurs during the process of cutting while construction, they shall be removed at the cost of contractor as ordered by engineer.
89. Adequate precautions shall be taken to ensure that during construction, the slopes are not rendered unstable and if so, adequate Bio-engineering shall be carried out as per the EMS/ WI-6/ Bio-engineering.
90. The classification of the debris material from the slips, slides etc. shall conform to its condition at the time of removal and shall be disposed off as per the guidelines for debris disposal as mentioned in EMS/ WI-3/ Debris Disposal and civil engineering, if required.

3.4.5.3 Dewatering

91. If water is met with the excavations due to springs, seepage, rain or other causes, the work shall be immediately stopped and shall not be carried out further until the water is removed by suitable diversions, pumping or bailing out.
92. Care shall be taken to discharge the drained water into suitable outlets as not to cause damage to the works, crops or any other property

3.4.5.4 Description of Excavated material

93. All the excavated material shall be used for filling up of roadway embankment, the existing pits in the right-of-way and for landscaping of the road as directed by engineer, including levelling and spreading with all lifts and lead up-to 1000m

94. All hard materials, such as hard moorum, rubble etc not intended for use as above shall be stacked neatly on specified land as directed by the Engineer and special care shall be taken that none of the materials either used or stored at site gets carried away to the water source in the vicinity.

3.4.5.5 *Prevention of Property.*

95. The contractor shall undertake all reasonable precautions for the protection and preservation of any or all existing roadside trees, drains, sewers or any other structure above and under the ground while excavation.

3.4.6. Records

- Amount of Top soil generated
- No of trees planted

3.5. Guidelines for management of Tree cutting

3.5.1. Purpose

96. To identify, establish and maintain a procedure for preserving the trees by minimizing their cutting and for handling of the wood of the cut trees as per relevant norms

3.5.2. Scope

97. It is applicable to all the areas where PIA requires cutting of trees either on the forest land or along the road side

3.5.3. References

- Environment Policy
- Forest (Conservation) Rules, 2003
- Forest (Conservation) Act, 1988
- EIA Notification, 2006
- Environment Management plan

3.5.4. Responsibilities

98. **Executive Engineer of CMU/ Division** shall take the responsibility to take all the necessary clearances from appropriate authorities and shall see that no work is started without clearance
99. **Environment Engineer & Environment Nodal Officer** shall make sure that all the legislation are complied and shall actively coordinate during feasibility study with the design wing to identify the alternatives and prepare such a design so as to minimize the trees required to be cut

3.5.5. Description of Activities

100. Forest clearance for cutting of trees is required under the Forest (Conservation) Act, 1980 (with amendments in 1988) as well as Forest (Conservation) Rules, 2003, when acquisition of forest land is also involved in the same. On the other hand, if only cutting of trees is involved, permission from the forest department shall be sought for the same.
101. Clearing of bushes and lopping of tree branches for the purpose of survey shall not attract the provisions of forest Act
102. The design for the expansion of the existing width of road shall be done keeping in view the minimization of the trees required to be cut in the PIA along the road and in the forest area or its vicinity, and special attention shall be given for protection of giant trees and trees with local importance (religious importance etc.) and alternatives shall be taken into account for the same.
103. The DPR consultant should first identify the forestland required for widening/ construction in consultation with the Environment Engineer and the Forest Officials and revenue authorities physically, on Topo-sheets, and on revenue maps.
104. Number of trees required to be cut shall be identified and enlisted and once Forest land and the number of trees are identified, the consultant

should prepare the proposal in the appropriate form appended with the Forest Conservation Rules, 2003.

105. As per the guidelines of MoEF, forest clearance for any project is considered in entirety and only one application shall be submitted for a DPR Package. However, for the sake of convenience and verification by the district level officials, it is advisable to divide the proposal into as many volumes as the no of forest divisions involved.
106. The PD/ CE should submit the application to the concerned Nodal Officer authorized in this behalf by the State Government, along with requisite information and following documents:
 - Location Map of Project area.
 - Road in forest area marked in green and forest boundaries on topo sheets in the scale of 1:50000.
 - Proposed Right of way superimposed on the forest map and revenue maps.
 - Undertaking of Project Authorities etc
 - Rehabilitation Plan For oustees if displacement is in forest areas.
 - Cost Benefit Analysis (if forest land to be diverted is more than 20 ha in plains or more than 5 ha in hills).
107. Copies should also be sent to the concerned Conservator of Forest/ Divisional Forest officers for processing. The PD/ CE should also send a copy of the proposal along with copy of receipt received from Nodal officer of the state to the Assistant Inspector General of Forest (FC)/ Director In-charge of the monitoring cell, at the Ministry of Environment and Forests, Government of India, New Delhi.
108. The concerned Divisional Forest Officer carries out a joint inspection of the site along with the PD and gets the enumeration of trees done and an inventory shall be established as per format EMS/F-19.
109. A written order from the office of of HPPWD/ HPRIDC shall be issued to the contractor after obtaining in-principle and formal clearance from the Forest Dept./ DoEF/ MoEF.
110. Contractor shall not initiate the cutting of trees until and unless he receives a written consent and clearance as mentioned above.
111. Particular species, declared as “protected” by the States Forest Dept., in the private land shall be cut only after obtaining due clearance from Forest Dept.
112. HPRIDC shall also sign a Memorandum of Understanding (MOU) with the Forest Department that defines the roles, responsibilities and timeframe for cutting trees, planting trees and undertaking bio-engineering tasks.
113. The MOU shall give the right to the HPRIDC to include 25% of the identified quantity under Bill of Quantities (BOQ) items in bids to use its own contractors to remove trees and tree stumps, subject to joint control mechanics to be agreed, in the event that the forest department is unable to cut the trees in a timely manner.
114. The MOU may also provide the HPRIDC with the right to use contractors to perform obligatory afforestation and/ or bio-engineering

tasks in the event that the forest department is unable to undertake such work in a timely manner.

115. In case of any design change during the implementation period, assessment shall be made to minimize the number of trees affected and measures shall be taken to safeguard the same.
116. Stacking, transport and storage of the wood shall be done as per the relevant norms.

3.5.6. Records

- Clearance certificate from the Forest Department
- Systematic corridor level documentation for trees cut and those planted

3.6. Bio-engineering

3.6.1. Purpose

117. To identify, develop and implement an Operation Control Procedure for use of Bio-engineering techniques to increase the stability of slopes along the road side

3.6.2. Scope

118. It is applicable to all the sites which have been identified as prone to the soil erosion or land slide due to their slope as well as construction practices being adopted.

3.6.3. References

- Environment Policy
- Environment Management Plan
- IRC guidelines for Hill Roads
- MOSRTH Guidelines

3.6.4. Responsibilities

119. **Environment Engineer** shall identify all the areas which are prone to land slide or soil erosion in co-ordination with the site contractor
120. **Horticulture Department** shall be responsible for designing and implementation of the Bio-engineering technology in the identified areas in consultation with the Environment Engineer and the Executive Engineer of that CMU/ division

3.6.5. Description of Activities

121. Bio-engineering is a fundamental part of the design and construction of all roads, mainly because it provides one of the best ways to armor slopes against erosion.
122. It is often known as “soil bio-engineering” to distinguish it from the bio-medical science that uses the same term and uses vegetation, either alone or in conjunction with the civil engineering structures, to reduce instability and erosion on slopes.
123. It is crucial to be fully aware of the parameters that control stability on each slope under investigation and to take full account of the factors that will affect the short term and long term slope management. It is advisable, therefore, to assess carefully all the factors that comprise the overall slope environment.
124. While the contribution made by individual plants to a slope is complex, plants used in combination can provide much greater effects than single plants.
125. Vegetation can provide protection and reinforcement of backfill and surrounding slope areas, protection from scours and the undercutting of the foundations and sides of structures and proves to be flexible. Being capable of absorbing movement and at the same time recovering from damage, makes bio-engineering a sustainable asset management since it helps to ensure the life of physical structures and reduces the overall maintenance costs.
126. It provides a very valuable protection and strengthening of top 500 or so of a slope, the zone in which all erosion and the great majority of mass failure occurs.

127. Grasses are more suited for armoring the surface, while shrubs and trees fulfill functions such as reinforcing and supporting, but, plants cannot emulate all the functions of civil engineering, particularly those having effects deeper than 0.5 meter nor can they provide the comparable strength.

3.6.5.1 Different situation for Bio-engineering

128. In case of valley side damage from tipped debris, slopes generally reach a semi-stable angle of repose in 1 or 2 monsoons. After this, erosion protection is required, achieved by robust bio engineering techniques such as brush layering, with shrub and tree planting in between
129. In case of small hill side failures in over steep cut slopes, the slope needs to be trimmed to an even angle, often as steep as 40 or 500, depending on material. It can then be planted, by most commonly using grass slips in diagonal lines. Sometimes a low toe wall helps as a revetment.
130. In case of, general degradation of cut slopes, including erosion and mini failures of small volume of debris, grass line planting, horizontal or diagonal, is necessary on steep sections, and dense shrub planting or palisades if there is a more gentle lower section (to catch debris)
131. Bio-engineering also offers various social and economical benefits for poor and rural farmers with their productivity post implementation. Following are the different plant type and associated guidelines which shall be taken into account while applying the technology of Bio-engineering.

3.6.5.2 Shrubs:

132. Prior to planting all the loose debris shall be removed and shall be filled with good soil and to ensure better growth and survival, it shall be ensured that the layer of good quality soil exists up-to 45 cm
133. The area shall be leveled after filling the soil
134. The contractor shall be responsible for planting of shrubs at enhancement sites and along bridge approaches during construction phase
135. Where available, shrubs shall be selected from following species:

Table 3.1 Species of Shrubs

Shrubs	
Garna	Caroissa Spinarum
Karir	Caparis deciduas
Hins	Capris zeylanica
Gandhala	Murra yakoenigil
Malla	Zizyphus nummularia
Jhau	Artemesia spp
Jindu	Xanthium stumarium
Panwar	Cassia tora
Jangli Mirch	Capsicum fruitscens

Akk	Ipomea gossypiolides
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3.6.5.3 *Turfing with Grasses*

136. Care shall be taken that the surface chosen for turfing of the grass shall be well prepared and should have not been subjected to undue stress from erosion and mass movements in its initial stages.
137. The contractor shall supervise all field operations like preparation of surface, sowing of grasses and quality of grass seeds used and following measures shall be considered:
138. A cover of 25 grams of grass seed per square meter of surface shall be prepared
139. Bed shall be preferably prepared in June and the seed sowing must be carried out before the onset of monsoon so that they yield desired results. Till the onset of the monsoon, watering of the surface shall be done by tankers with controlled flow sprinklers.
140. After sowing, mulch of prepared and dried out herbs shall be laid over the whole seeded area in a thin layer so that the direct sunlight and transpiration loss may not affect the grasses
141. The grass species recommended for median are khabbal, Dhalua, Plawan, Sariala and Kahi
142. A record of the details of the Shrubs and Grass plantation shall be kept as per the EMS/ F-24

3.6.5.4 *Bush Layering:*

143. Woody cuttings shall be laid across the slope, usually following the contour
144. This will form a strong barrier, preventing the development of rill and will trap material moving down the slope, thus armoring and reinforcing the slope.
145. If they are applied at an angle are capable of providing a drainage function for the water thus reducing the chances of erosion
146. Apart from the above mentioned practices commonly used composite systems like **vegetative stone pitching**, which provides strong armoring for ephemeral water courses & **planted geo-textiles**, where the geo-textiles provides armoring later supplemented by vegetation etc can also be implemented

3.6.5.5 *Precautionary Measures:*

147. Plantation shall be made in the monsoon months (July – August)
148. The height of the plants should not be less than 1 ft. and should be supplied within polythene bags which are not removed until the moment of planting
149. All plants supplied must be planted within three days of removal from the nursery
150. Arrangements must be made to water in case of insufficient rains after planting

3.6.6. *Records*

- Record for the shrubs and grass plantation
- Data for the monitoring of survival rate of the trees planted

3.7. Guidelines for management of Blasting process

3.7.1. Purpose

151. To identify, establish and maintain an Operational Control Procedure for Management of the process of Blasting during road construction

3.7.2. Scope

152. It is applicable to all the sites which have been identified as the sites where blasting will be required during on-going construction work of HPPWD/ HPRIDC

3.7.3. References

- Environment Policy
- MOSRTH Guidelines
- Environment Management Plan

3.7.4. Responsibilities

153. **Executive Engineer of CMU/ Division** shall take the responsibility to take all the necessary clearances from appropriate authorities and shall see that no work is started without clearance
154. **Assistant Engineer** shall make sure that sufficient warning Flagmen are deployed and information for the blast is given well in advance to the local community

3.7.5. Description of Activities

155. The contractor shall not at all use any explosives, until and unless it is mentioned in the contract or ordered/ authorized by the Engineer.
156. The contractor shall be responsible to comply with all the legislation as applicable for import, handling, transportation, storage and usage of explosives (Register of Regulation).
157. The applicable legislation as identified are listed below:
- The Explosives Act, 1884
 - The Explosives substances Act, 1908
 - The Manufacture, Storage and import of Hazardous Chemical Rules, 1989
 - The Manufacture, Storage and import of Hazardous Chemical (Amendment) Rules, 2000
 - The Chemical Accidents (Emergency Planning, Preparedness and Response) Rules, 1996
 - Public Liability Insurance Act
158. The contractor shall apply for and obtain the permission as required by the government authorities before commencing any blasting operation
159. After obtaining the permission, the contractor as well as the Assistant Engineer of the site shall be responsible to liaison and inform well in advance to all the Government authorities, public bodies, private parties and whomsoever concerned or affected or likely to be concerned or affected by blasting operations, before actual commencement.

160. The contractor shall also post sufficient warning flagmen, to the full satisfaction of the Assistant Engineer in order to warn the local people in the vicinity
161. After this small wholes shall be drilled deep into the rock and each whole shall then be loaded with the explosives and after the explosives are loaded the shot shall be fired
162. A time-frame shall be set for carrying out the blasting operation and preferably it shall be carried out during mid-day and no blasting shall be carried out during the period between sunset and sunrise.
163. There shall be a maximum of only one blast per day and shall not be taken on weekends, public holidays or school holidays unless otherwise advised
164. Blasting is subject to weather so it shall generally be avoided when the cloud cover is low and dense
165. Some of the major impacts of blasting are generation of noise, dust and vibration. However the noise expected from the controlled blast will be minimal and will last only for few seconds and the vibration will not be felt beyond immediate vicinity. However, the monitoring shall be carried out to record noise and vibration for each controlled blast and corrective action shall be planned for the next blast, in case the readings exceed the laid down standards.

3.7.6. Records

- Certificate of permission from Government Authorities
- Record of permission from the site engineer

3.8. Management and Handling of Hazardous Waste

3.8.1. Purpose

166. To identify, establish and maintain an Operational Control Procedure for proper storage, handling and disposal of the Hazardous Waste

3.8.2. Scope

167. It is applicable to all the areas where Hazardous waste is generated/ stored due to the activities and services of HPPWD/ HPRIDC

3.8.3. References

- Environment Policy
- Environment Management Plan
- Hazardous waste (Management, Handling and Trans-boundary movement rules), 2008
- MOSRTH Guidelines

3.8.4. Responsibilities

168. **Executive Engineer** shall be responsible to identify all the type of hazardous waste generated at sites in his jurisdiction and shall monitor and keep a record of the quality with the help of Environment engineer.
169. **Environment Nodal Officer** shall take all the concerns associated with the use, handling, storage or disposal of hazardous waste and shall make sure that all the applicable legislation are being complied.
170. **Environment Engineer** shall make sure that all the legislation relating to use, handling, storage or disposal of hazardous waste are complied. He shall in co-ordination with the contractor prepare a hazardous waste management plan and shall make sure that a site is identified for dumping of the Hazardous waste. He shall also make sure that all the hazardous wastes shall be disposed off to a government approved recycler/ disposal facility and shall make arrangement for availability of proper treatment technology and implementation of the same at project site.

3.8.5. Description of Activities

171. The contractor shall prepare a hazardous waste management and disposal plan and shall submit a copy of the same to the environmental officer.
172. All construction plants such as crushers/ Hot-mix plants/ Batching plants shall be located at least 100 m away from nearest dwelling facility, preferably in downwind direction.
173. All the sites where plants for hazardous processes are being planned shall be identified and a consent for the establishment of the same shall be sought from concerned authorities.
174. The identified dumping site of hazardous waste should be clearly marked to indicate the type of hazardous wastes stored.
175. A specific location shall be identified for storage of hazardous waste and an approval shall be sought for the same as well from competent authority
176. It shall be ensured that all the construction vehicle parking locations, fuel/ lubricant storage sites, vehicle, machinery and equipment maintenance and

refuelling sites shall be located at least 500 m away from rivers and irrigation canal/ ponds

177. Care shall be taken so that there is no spillage of fuel and lubricants on ground during the operation, maintenance and refuelling of the vehicle/ machinery/ equipment.
178. Wastewater from vehicle parking, fuel storage areas, workshops, wash down and refuelling areas shall be treated in an oil interceptor before discharging it on land or into surface water bodies or into other treatment systems
179. Arrangement shall be made for proper collection, storage and disposal of oily wastes to the pre-identified sites and a record shall be maintained for the consumption and storage of these hazardous fuels and wastes as per the performa enclosed. (Refer EMS/ F-27)
180. All spills and collected petroleum wastes shall be disposed off in accordance with Petroleum Rules and PCB guidelines and it shall be strictly ensured that no hazardous waste is allowed to leak or spill on the ground while it is transported from the location of generation to the disposal site and is only transported in covered containers.
181. It shall be ensured that the hazardous waste is sold only to those vendors who have a valid certificate of approval from either State Pollution control board or Ministry of Environment and forest.
182. Records of hazardous waste disposal shall be maintained in **form 3** while the annual return of hazardous waste shall be duly filed with the pollution control board in **form 4**.
183. To ensure the maintaining of manifest in **Form 9** for the hazardous waste sold to recyclers
184. While disposal of oil to the authorized vendors ensure that the general labelling in **Form 8** is available on the containers of the hazardous waste
185. Proper segregation of the hazardous waste is done at the site itself

3.8.6. Records

- Approval certificate for the identified dumping site
- Records for Form 3, Form 4, Form 9 and Form 8 as per the schedule of the Hazardous waste (Management and Handling) rules

3.9. Borrow and Quarry area management

3.9.1. Purpose

186. To identify, establish and maintain an Operational Control Procedure for Management and rehabilitation of quarry or borrow areas

3.9.2. Scope

187. It is applicable to all the sites where construction work of HPPWD/ HPRIDC is being carried

3.9.3. References

- Environment Policy
- Environment Management plan

3.9.4. Responsibilities

188. **Executive Engineer of CMU/ Division** shall make sure that the quarry material is obtained only from license quarries
189. **Environment Engineer** shall take the responsibility to identify the borrow/ quarry areas and obtain the necessary environment clearances from State Pollution Control Board

3.9.5. Description of Activities

190. Specific sites shall be identified by the contractor in consultation of the landowner for the borrowing of the earth material/ quarry areas.

3.9.5.1 Consents and Approval

191. No further process shall be undertaken unless a formal agreement is signed between the landowner and the contractor
192. Then, an environment clearance shall be obtained from the State Pollution Control Board for the identified borrow areas
193. The contractor shall obtain material from quarry only after the consent of the Department of mining and district.

3.9.5.2 Management

194. For an effective management of borrow and quarry areas the contractor shall prepare a management plan providing at-least the following details:
- Name, Location & Ownership of the borrow/ quarry areas
 - Targeted quantity of the material required
 - Total area involved
 - Existing land use with number of trees & species to be cut, if any
 - Understanding with the owner (in the form of a contract)
 - Restoration, rehabilitation and landscaping plan
195. The location, shape and size of the designated borrow areas will be as approved by the Environment engineer and in accordance to the IRC recommended practice for borrow pits for road embankments (IRC 10:1961)
196. Planning of haul roads for assessing the borrow areas shall be done during this stage. The haul roads shall be routed in such a way that

maximum possible usage is done of the existing village roads and the agricultural areas are avoided as far as possible for the same.

197. The unpaved surfaces used for haulages of borrow materials, if passing through the settlement areas or habitations, shall be maintained dust free by the contractor by adopting a practice of sprinkling of water twice a day.
198. A record of the borrow area management shall be kept as per the performa enclosed. (Refer EMS/ F-23)

3.9.5.3 *Rehabilitation*

199. During dry seasons (winter and summer) frequency of water sprinkling shall be increased in the settlement areas.
200. Borrow/ quarry area shall be rehabilitated as soon as possible in an environmentally sound manner and as per the agreement with the owner.
201. The following measures may be considered for effective management and rehabilitation of the borrow/ quarry area;
 - Effective conservation and re-use of the Top soil
 - Backfilling with the rejected construction waste
 - Vegetative covering of the back filled area
 - Preservation of trees during pilling of material
 - Restoring the previously existing natural drainage flow
 - Digging of ditches to collect run-off
 - Planting of native trees & shrubs in the open and surrounding areas
 - Construction of walk ways along the borrow/ quarry sites
202. Landscaping and aesthetic improvement

3.9.6. *Records*

- Agreement between the contractor and the landowner
- Environment clearance from the State Pollution control board
- Clearance from the Department of Mining and district in case of quarries

3.10. Water Quality Monitoring and Analysis

3.10.1. Purpose

203. To identify and implement an Operational Control Procedure for the monitoring and analysis of Water Quality in the vicinity of the project area

3.10.2. Scope

204. It is applicable to all the sites which have been identified for construction and maintenance of roads/ bridges

3.10.3. References

- Environment Policy
- Environment Management Plan
- CPCB Guidelines

3.10.4. Responsibilities

205. **Environment Nodal Officer** shall be responsible to identify and appoint a government recognized laboratories for the purpose of testing of water quality.
206. **Environment Engineer of the contractor** shall be responsible for conducting water sampling on regular basis and shall forward the result of the same to the respective CMU/ Division to keep a check

3.10.5. Description of Activities

207. To assess the water quality status, monitoring stations shall be identified on the basis of meteorology in the upstream and downstream direction.
208. Grab sampling methodology shall be adopted for collection of sample from the source and shall be analyzed as per the standard methodology for examination.
209. The sampling and monitoring shall be done once in every season for all four seasons and comparison shall be done with the laid down standards enclosed as Annexure 1.1 to establish the legal compliance and action shall be initiated, if any deviation is observed.

3.10.5.1 Construction:

210. The samples shall be taken from the drinking water of labour camps and from hand pumps. Samples shall also be taken from surface water from the water courses near the work sites
211. Four samples shall be taken per season

3.10.5.2 Operation:

212. The samples shall be taken from surface water sources
213. Two water samples shall be taken per season

3.10.6. Records

- Records of the results of the analysis of water samples

3.11. Air Quality Monitoring and Analysis

3.11.1. Purpose

214. To identify and implement an Operational Control Procedure for the monitoring and analysis of Air Quality in the vicinity of the project area

3.11.2. Scope

215. It is applicable to all the sites which have been identified for construction of road

3.11.3. References

- Environment Policy
- Environment Management Plan
- CPCB Guidelines
- MOSRTH Guidelines

3.11.4. Responsibilities

216. **Environment Nodal Officer** shall be responsible to identify and appoint the government recognized laboratories for the purpose of testing of air quality.
217. **Environment Engineer of the contractor** shall be responsible for conducting air sampling on regular basis and shall forward the result of the same to the respective CMU/ Division.

3.11.5. Description of Activities

218. To assess the ambient air quality status, monitoring stations shall be identified on the basis of meteorology in the upwind and downwind direction.
219. Due consideration shall be given to locate the monitoring stations so as find the impact of the air on the concerned area from any particular source of emission.
220. Following parameters shall be analyzed while conducting the air monitoring:
- Nox
 - So₂
 - SPM
 - RSPM
 - CO
221. Calibrated High Volume Respirable Dust sampler (with an average flow of 1.2-1.4 m³/min) shall be used for monitoring of RSPM & SPM and for sampling of SO₂ & NO_x with proper flow controller (1 L/min).
222. The sampler shall be placed 50 m from the plant in the down wind direction
223. SPM and RSPM shall be monitored on 24 hourly basis while, the gaseous pollutants (SO₂ & NO_x, CO) shall be monitored on 8hourly basis.
224. Collected samples shall be analyzed on the same day of sample collection using the procedure specified by CPCB.
225. The National Ambient Air Quality Standards laid down by CPCB are enclosed in the Annexure 1.2

3.11.5.1 Construction:

- 226. The monitoring shall be done once in every season, for three seasons (except monsoon season) per year, for each year of construction
- 227. The sampling shall be done at construction plant sites and different work zones
- 228. Six samples shall be taken per season for the analysis.

3.11.5.2 Operation:

- 229. The monitoring shall be done once in summer and winter season for three years
- 230. The sampling shall be done along the road side
- 231. Two samples shall be taken per season for the analysis

3.11.6. Records

- 232. Records of the samples and the quantity of the above mentioned pollutants in Ambient Air shall be maintained in the Air Monitoring Sheet (refer EMSM/ F-29)

3.12. Noise Monitoring and Analysis

3.12.1. Purpose

233. To identify and implement an Operational Control Procedure for the monitoring and analysis of Noise in the vicinity of the project area

3.12.2. Scope

234. It is applicable to all the sites which have been identified for construction of road

3.12.3. References

- Environment Policy
- Environment Management Plan
- CPCB Guidelines

3.12.4. Responsibilities

235. **Environment Nodal Officer** shall be responsible to identify and appoint the government recognized laboratories for the purpose of testing of ambient air quality.
236. **Environment Engineer of the contractor** shall be responsible for taking noise samples on regular basis and shall forward the result of the same to the respective CMU/ Division

3.12.5. Description of Activities

237. To assess the Equivalent noise level in the project vicinity, an integrated noise level meter shall be used.
238. The noise level meter shall be kept at a distance of 15 m from the edge of the pavement and at about 1.5 m above ground level.
239. MoEF Noise rules 2000 shall be used be referred for the same.

3.12.5.1 Construction:

240. The monitoring shall be done once in every season during the construction stage.
241. The monitoring shall be done near the construction camps, working zones, sensitive receptors and construction plant sites

3.12.5.2 Operation:

242. The monitoring shall be done once in season for five year after completion of construction activity.
243. The sampling shall be done along sensitive receptors.
244. The National Ambient Air Quality Standards laid down by CPCB as enclosed in the Annexure 1.3:

3.12.6. Records

- Records of the results of the noise monitoring shall be kept in the Noise Monitoring Sheet (refer EMSM/ F-30).

3.13. Soil Monitoring and Analysis

3.13.1. Purpose

245. To identify and implement an Operation Control Procedure for the monitoring and analysis of Soil Quality in the vicinity of the project area

3.13.2. Scope

246. It is applicable to all the sites which have been identified for construction of road

3.13.3. References

- Environment Policy
- Environment Management Plan
- CPCB Guidelines
- MOSRTH Guidelines

3.13.4. Responsibilities

247. **Environment Nodal Officer** shall be responsible to identify and appoint the government recognized laboratories for the purpose of testing of soil quality.
248. **Environment Engineer of the contractor** shall be responsible for conducting soil sampling on regular basis and shall forward the result of the same to the respective CMU/ Division

3.13.5. Description of Activities

249. To assess the status of soil quality, following parameters shall be analyzed while conducting the soil analysis:
- Pb
 - SAR
 - Oil
 - Grease
250. The soil sample shall be collected using the Grab sampling technique
251. Soil sample shall be acidified and analyzed using absorption spectrometer.
252. Threshold for each contaminant set by IRIS data base of USPEA shall be referred until other standards are available for use

3.13.5.1 Construction:

253. The monitoring shall be done during pre & post monsoon season each year for the entire construction period
254. Ten samples shall be taken per season
255. The samples shall be taken from construction camp/ plant sites and productive agricultural lands abutting traffic detours and traffic diversions and major intersections.

3.13.5.2 Operation:

256. The sample shall be taken from the Surface water sample
257. Two samples shall be taken per season

3.13.6. Records

258. Records of the analysis of the samples collected during construction as well as operation period

3.14. Guidelines for Emergency Preparedness & Response Plan

3.14.1. Purpose

259. To define operation framework for identification of potential environmental, occupational health and safety emergency situations, and handling these emergencies during construction, operation and maintenance

3.14.2. Scope

260. It is applicable to all the sites where construction work of HPPWD/ HPRIDC is being carried and also at the camp area, temporarily constructed for the construction workers, if any

3.14.3. References

- Environment Policy
- ISO 14001: 2004 Clause 4.4.7 (Emergency preparedness and response)

3.14.4. Responsibilities

261. **Executive Engineer of CMU/ Division** shall make sure that there is an Emergency Preparedness and Response Plan at the site and review it from time to time for continuing suitability. Also, he shall be responsible for investigating any emergency, if it breaks out along with the Environment Engineer and other relevant officials
262. **Assistant Engineer** shall be responsible for making the on-site workers aware about the Emergency Preparedness and Response plan and shall be responsible for conducting the mock-drill at regular interval in consultation with the consultant of the site
263. **Environment Engineer** shall be responsible for identifying the potential Environment Emergency situations and shall be responsible for assisting in the mock drills conducted and also in the investigation of any investigation related to incident/ accident

3.14.5. Description of Activities

3.14.5.1 Availability of 'On-Site Emergency Plan'

264. Every contractor shall have a written on-site emergency plan. The contractor should submit a copy of this plan to Technical Division of NHAI before the start of the work.
265. Contractor shall develop the onsite emergency plan considering the potential environmental, occupational health and safety emergency situation at site.
266. Contractor shall include a list of these potential emergency situations in the on site emergency preparedness & response plan.

3.14.5.2 Identification of Potential Environmental and Occupational Emergency Situations during construction, operation and maintenance stages

267. The potential emergency situations have been defined below for guidance purposes. The contractors can follow these for developing site specific on site emergency preparedness plan

Table 3.2 Identified Emergency Situations

Emergency conditions / situations	Sources
Collapse/ subsidence of soil	<ul style="list-style-type: none"> ▪ Civil structures
Flash Flood	<ul style="list-style-type: none"> ▪ Blasting in the hills, heavy land slides
Land Slide in hilly area	<ul style="list-style-type: none"> ▪ Soil Erosion
Bulk spillage	<ul style="list-style-type: none"> ▪ Hazardous substance / inflammable liquid storage ▪ Vehicular movement on highway
Fire and explosion	<ul style="list-style-type: none"> ▪ Inflammable Storage Areas ▪ Gas Cylinder Storage Areas ▪ Isolated Gas Cylinders (LPG / DA) ▪ Welding / Gas Cutting Activity
Accidents due to Vehicles	<ul style="list-style-type: none"> ▪ Heavy Earth Moving Machinery ▪ Cranes ▪ Fork Lifts ▪ Trucks ▪ Workman Transport Vehicles (cars / scooters / motor cycles / cycles) ▪ Collapse, toppling or collision of transport equipment
Collision with stationary / moving objects	<ul style="list-style-type: none"> ▪ Vehicular movement on highway
Other Hazards	<ul style="list-style-type: none"> ▪ Cuts & Wounds ▪ Confined Space (under & inside machinery etc.) ▪ Hot Burns

3.14.5.3 Design of 'On-Site Emergency Plan'

268. The 'On-site emergency plan' to be prepared by contractor for each road stretch shall include minimum the following information:

- Name & Address of Contractor
- Up-gradation sheet
- Project Location
- Name, Designation & Contact Numbers of the organization, nearby hospitals, fire agencies etc and key personnel including their assigned responsibilities in case of an emergency.
- The roles and responsibilities of executing personnel
- Site Layout Diagram
- Identification of Potential Emergencies Situations/ preventive measures / control & response measures
- Location of Emergency Control Centre (or designated area for emergency control / coordination) with requisite facilities.
- Medical services / first aid
- List of emergency equipment including fire extinguishers, fire suits etc

3.14.5.4 Emergency Control Centre

269. The emergency control centre shall be equipped with following facilities

- Copy of current on-site emergency plan
- Display of the name of site emergency controller
- Two numbers of artificial respiratory sets
- Two numbers of Stretchers
- Vehicle for 24 hours (for large construction sites)
- Inter personnel/section telephone (2 numbers)
- Site layout diagram with entry and exit routes / Assembly points
- Directory of internal / external emergency phone Numbers
- A set of fire extinguishers (DCP type / Foam Type / CO2)
- List of fire extinguishers installed in the construction site including maintenance record
- A set of personal protective equipment (PPE)
- Two numbers of first-aid boxes with prescribed first-aid medicines
- List of competent first-aiders
- List of fire trained personnel
- Two numbers of blankets
- Drinking water
- Two numbers of rescue ropes
- Two numbers of high beam torches
- Two numbers of gas leak detectors
- Life boat & jackets (if working in or near water course)

3.14.5.5 Route Patrols

270. The route patrol shall be provided by the contractor on a 24 hour basis. The route patrol will be carried out by a patrol vehicle. The patrol vehicle (white in color and preferably a multi utility vehicle) should minimally be equipped with:

- Sufficient rear space for equipment storage, fitted with rotating light and hooter, and painted with a unique color pattern for quick recognition, emblem painted prominently on sides, back and front, together with the Control Centre and Help line numbers shall be provided. Vehicle should be in good condition with registration number not older than two years.
- Each vehicle should also carry the following equipment.
 - Fire extinguisher 1 no.
 - Gas cutter with protective glass (2 nos)
 - Liquid container 2 no., water container with fresh water 1 no. Funnel.
 - Rubber gloves, leather gloves (1 pair each)
 - Brooms one hard bristle, other soft-2 no.
 - Gum boot 4 pr, rain coat 4 pr., blanket 1.
 - Torch lights – 4 nos., spare batteries, Flashing light 1 no.
 - Hydraulic jack, towing chain, animal hook, rope.
 - Tool set (with standard set of spanners, pliers hammer etc), shovels.
 - Paper pad, forms, pen/pencils, folders.
 - First aid kit, rain coat, water proof sheets, stretchers (two numbers)
 - List of hospitals

- Each vehicle should also carry traffic management equipment, such as
 - Sign boards – “accident ahead” – 3 Nos. “lane merging” – 3 no.
 - “direction arrows” – 3 no, “speed limit” (80/60/40)-3 no, “keep left / right” – 2 no (all signs 1200 mm size)
 - Sign stand set (one for triangular and other for circular sign) 6 sets.
 - Flags, whistle, reflective hand signal.
 - Traffic cones 500 mm size 20 no.
 - Barricades, tape, stands, flags of 600 mm by 600 mm made of good read cloth secured to a staff at 1 M length, paddles of at least 600 mm wide and provided with rigid handle with markings SLOW, STOP.
 - Reflective jackets.
- As a minimum, each patrol vehicle should carry sufficient communication equipment to render its passengers capable of direct communication with the established Incident Management Control Centre.

3.14.5.6 Ambulance

271. The operation and maintenance contractor shall also provide adequate number of ambulances that will be deployed on the highway to provide any emergency relief in line with HPPWD/ HPRIDC overall road safety plans. The ambulance vehicle should comply with the following guidelines:
272. The vehicle preferably white color Matador Van/ Swaraj Mazda/ Tempo Traveler (or equivalent specifications) with the provision of two stretchers, fitted with rotated light for reorganization, emblem painted permanently on sides, back and front, together with control center help numbers, should be used. An ambulance is required to have the following medicines and equipments and paramedical staff

3.14.5.6.1 Suggested Ambulance Inventory

273. It shall be fixed as per the Annexure 1.4

3.14.5.6.2 Paramedical Staff Required

- Paramedical staff having BSC (Nursing Degree) 2
- Nursing staff having diploma in general nursing 2
- Driver trained for first aid (from recognized institute/hospital) 2

3.14.5.7 Site Emergency Controller

274. Contractor shall designate a Site Emergency Controller. His roles and responsibilities, amongst other shall include

3.14.5.7.1 Pre Event

- Co-ordinate / work in consultation with PIU and Supervision consultant
- Actively participate in the safety awareness training programs.
- Maintain up-to-date on-site emergency plan & preparedness at the construction site
- Co-ordinate Training Activities for workman on emergency preparedness and response
- Maintain emergency control centre at the construction site with the requisite facilities

3.14.5.7.2 Event

- Rush to the site as soon as the information of occurrence of an Incident / Accident is received.
- Avoid panic.
- Provide instructions to the supervisor / workman on the site based on logical thinking.
- Inform PIU at the earliest feasible
- Organize emergency response for fire, gaseous leakage / occupational accidents as per the plan.
- Oversee the first-aid / medical assistance to the victim at the earliest feasible

3.14.5.7.3 *Post-Event*

- Documenting the causes for occurrence of above incidents
- Recording injury to personnel if any
- Recording the damage to property & company assets if any
- Recording the man hours lost
- Evaluating the loss of property & to assets
- Recommending measures to prevent such recurrences in future
- Conduct accident investigation and reporting as per the E&P division procedure

3.14.5.8 General Guidance on First Response on Emergency Situation

- The person who notices first, the incident, should “shout” about the incident to attract everybody’s attention and seek assistance for first aid.
- Immediately inform available shift in-charge, the site incident controller
- Site incident controller should visit the affected area immediately
- Evacuate the people nearby to the affected site, if required to a designated assembly point / safer place as soon as possible.
- If the incident is small and can be controlled with his limits, he should call the concerned people and try to control the incident
- Contractor shall provide basic awareness to all workman for undertaking first response on emergency situation

3.14.5.9 Training

- Contractor shall provide general emergency awareness and Do’s and Don’ts measures during emergencies to all its workman
- Contractor shall provide specific training on first-aid (including cardiac pulmonary procedure) and fire fighting to select number of personnel and maintain their up-to-date list

3.14.5.10 Mock-Drill

- Contractor shall conduct mock-drill of the on-site emergency plan to test its effectiveness and shall take corrective and preventive actions based on findings. The contractor should involve PIU as witness for such Mock Drill
- Contractor shall plan mock-drills in consultation with PIU.
- The Frequency of the mock-drill shall be at least once in six months.
- Inform all the employees about mock-drills and signals to be given

- The mock-drill findings shall be recorded by contractor as per EMS/ F-17 and appropriate corrective and preventive actions taken

3.14.5.11 Periodic Review of the Plan

275. Contractor shall review and revise the on-site emergency plan, if necessary after any incident / accident investigation; otherwise it shall be reviewed on a six monthly basis

3.14.6. Records

- Accident/ Incident Records
- Record of Mock Drills
- Record of Accident Investigation

4. REGISTER OF REGULATION

276. This chapter details the clause by clause requirement applicable to the HPRIDC/ HPPWD due to their activities and services. Following is the list of applicable legislation:
- The Indian Explosives Rules, 1884
 - Land Acquisition Act, 1894
 - The Explosive Substance Act, 1908
 - The Indian Electricity Act, 1919 and Rules 1956
 - Factories Act, 1948
 - The Mines Act, 1952
 - Water (Prevention and Control of Pollution) Act, 1974, Amendment 1998
 - Indian Petroleum Rules, 1976
 - The Water (Prevention and Control of Pollution) Cess Act, 1977
 - Forest (Conservation) Act, 1980
 - Energy Conservation Act 2001
 - Air (Prevention and Control of Pollution) Act, 1981
 - Environment (Protection) Act, 1986 and Environment (Protection) Rules, 1986, Amendments Rules 1992, 1993 & 1994
 - The Motor Vehicles Act, 1988
 - Manufacture, Storage and Import of Hazardous Chemical Rules, 1989, Amendment Rules 1989/ 1994/ 2000
 - Public Liability Insurance Act, 1991
 - Building and other construction Workers (Regulation of Employment & Conditions of Service) Act, 1996
 - Batteries (Management and Handling) Rules, 2001
 - Noise Pollution (Regulation and Control) (Amendment) Rules, 2002
 - The DG Rules, 2000, Amendment 2002
 - Gas Cylinder Rules, 2004
 - The Hazardous Wastes (Management, Handling And Transboundary Movement) Rules, 2008
277. All the environment legislation as mentioned above have been detailed clause by clause with the requirements as well as defined responsibilities in the below given table. All the requirements as mentioned shall be followed and fulfilled to demonstrate compliance with the legislation.

Table 4.1 Clause-wise description of applicable Environment Legislation

Applicable Legislation	Procedural Requirement	Status	Responsibility for Compliance	License / compliance Records required
The Indian Explosives Rules, 1884	<ul style="list-style-type: none"> Submit / obtain a License in prescribed format (Form 23 and Form 26, as given in the Explosives Rules, 1883) for storage, transportation, handling and use of explosives from District authority and Controller of Explosives respectively, Ensure compliance with license conditions 		Construction Contractor	<p>A copy of each pass issued for each consignment</p> <p>Renewable of license for transportation after 31st March every year</p>
	Whenever explosives are loaded, unloaded or handled, depute a competent person experienced in the handling of explosives to be present at and to conduct the operations in accordance with these rules.		Construction Contractor	
	No explosive shall be handled between sunset and sunrise unless the place is guarded and properly illuminated		Construction Contractor	
	Substances like matches, smoke, lights etc shall not be allowed around the explosives		Construction Contractor	
	Obtain a license for use of explosives		Construction Contractor	
	Store explosives in premises specified in the license		Construction Contractor	

Applicable Legislation	Procedural Requirement	Status	Responsibility for Compliance	License / compliance Records required
	Anyone holding a license granted for possession, sale or use of explosives shall maintain records in the prescribed Forms		Construction Contractor	
	A holder of a license shall purchase only such quantity of explosives in a given period as may be specified in the license		Construction Contractor	
	A qualified shot firer holding a Short-Firer's permit shall be employed for blasting		Construction Contractor	
	An explosive of one description shall not be converted into an explosive of another form or disintegrated in its components		Construction Contractor	
	(1) Explosives shall only be conveyed to near the site in original unopened packages or in closed containers. (2) Explosives shall not be taken to a point nearer than 50 metres from any site until such site is ready for charging. (3) Explosives shall not be conveyed in any vehicle with any other materials or tools other than that required for the purpose of blasting. (4) Explosives left over after the day's work shall be returned to the licensed premises (5) The containers used for carrying explosives from regional packages shall be maintained thoroughly cleaned and dried and shall be kept closed when not in use. The containers shall be provided with either		Construction Contractor	

Applicable Legislation	Procedural Requirement	Status	Responsibility for Compliance	License / compliance Records required
	handles or carrying straps of adequate strength and shall be conspicuously marked with the work "Explosives". (6) Detonators shall be conveyed in special containers. These shall not be carried with other explosives.			
	All explosives shall be checked for any visible defects and gunpowder which is found to be caked owing to moisture shall not be used Frozen nitro-glycerine explosives shall not be used until thawed under the supervision of experienced persons.		Construction Contractor	
	(1) The electric power at the blasting site shall be discontinued as far as practicable before charging the explosives. (2) No other work shall be carried out within 10 metres of the holes (3) Surplus explosives detonators and fuses after charging shall be removed from the vicinity of the hole to avoid premature detonation. (4) The holes which have been charged with explosives shall not be left unattended till the blasting is completed. (5) Care shall be taken to ensure that fuse or wires connected to the detonators are not damaged during the placing of stemming material and tamping.		Construction Contractor	

Applicable Legislation	Procedural Requirement	Status	Responsibility for Compliance	License / compliance Records required
	A clear warning procedure consisting of warning signs and audible signals shall be laid down and all persons employed in the area shall be made fully conversant with such signs and signals			
	(1) The end of the safety fuse should be freshly cut before being lighted. (2) The exploders shall be regularly tested and maintained in a fit condition for use in firing. An exploder shall not be used for firing a circuit above its rated capacity. (3) The electric circuit shall be tested for continuity before firing. All persons other than the shot-firer and his assistants. If any, shall be withdrawn from the site before testing the continuity. (4) For the purpose of joining, the ends of all wires and cables should have the insulation removed for a maximum length of 5 cms. And should then be made clean and bright for a minimum length of 2.5 cms. And the ends to be joined should be twisted together so as to have a positive metal contact.		Construction Contractor	
	Every application for the renewal of a license shall be made in form 13 so as to reach the authority empowered to renew the license at least 30 days before the date on which the license expires		Construction Contractor	

Applicable Legislation	Procedural Requirement	Status	Responsibility for Compliance	License / compliance Records required
	Whenever there occurs any accident by explosion or fire attended with loss of human life or serious injury to person or property, it shall be reported to the Chief Controller of Explosives of that jurisdiction within 24 hrs and to the officer-in-charge of the nearest Police Station.		Construction Contractor	
Land Acquisition Act, 1894	A notification shall be published in the official gazette and in two daily newspapers whenever a land is identified to be required in the interest of public purpose. Collector shall cause notice of the same at appropriate places.		HPRIDC	Letter of appointment of a collector
	A declaration shall be made that a land is required for a public purpose to that effect under the signature of Secretary to such government duly authorized to certify its orders		HPRIDC	
	The collector shall get the land marked and measured and a plan for the same shall be prepared		HPRIDC	
	The collector shall cause a notice near the land to be taken, stating that government intends to take possession of land and shall indicate the time and place where the collector intends to meet the person interested or agent on their behalf The collector shall also cause notice to the land owners if any		HPRIDC	
	After inquiring in the objections and the true		HPRIDC	

Applicable Legislation	Procedural Requirement	Status	Responsibility for Compliance	License / compliance Records required
	value of the land the collector shall make an award within a period of two years from the date of publication of the declaration			
	In case of an emergency the collector, on expiry of 15 days from the date of publication of notification by collector, may take the possession of land without making any compensation		HPRIDC	
	<p>In making the reference, the Collector shall state for the information of the court, in writing under his hand:</p> <p>(a) the situation and extent of the land, with particulars of any trees, buildings or standing crops thereon;</p> <p>(b) the names of the persons whom he has reason to think interested in such land;</p> <p>(c) the amount awarded for damages and paid or tendered under sections 5 and 17, or either of them, and the amount of compensation awarded under section 11;</p> <p>(cc) the amount paid or deposited under sub-section (3A) of section 17;</p> <p>(d) if the objection be to the amount of the compensation, the grounds on which the amount of compensation was determined.</p>		HPRIDC	

Applicable Legislation	Procedural Requirement	Status	Responsibility for Compliance	License / compliance Records required
	<p>If only a part of a building etc. is to be acquired, Government shall acquire the whole of the building etc., if the owner so desires.</p> <p>In case of dispute, the Collector shall refer the question to the court and shall not take possession until that question is decided</p>		HPRIDC	
The Explosive Substance Act, 1908	Any person who unlawfully and maliciously causes by any explosive substance an explosion of a nature likely to endanger life or to cause serious injury to property shall, whether any injury to person or property has been actually caused or not, be punished with transportation for life or any shorter terms, to which fine may be added.		Construction contractor	
The Indian Electricity Act, 1919 and Rules 1956	All electric supply lines, wires, fittings and apparatus shall be maintained in safe condition and all precautions shall be taken to avoid danger and service lines shall be insulated		Construction contractor	
	The consumer shall ensure that a suitable cut-out is being provided for every service line other than earthed or earthed neutral conductor, in an accessible position and shall be contained within an adequately enclosed fireproof receptacle.		Construction contractor	
	The consumer shall ensure that a suitable earthed terminal is being provided by the		Construction contractor	

Applicable Legislation	Procedural Requirement	Status	Responsibility for Compliance	License / compliance Records required
	<p>supplier, in an accessible position</p> <p>For consumers of medium voltage, the consumer shall also include his own earthing system with an independent electrode; and,</p> <p>Shall take precautions to prevent mechanical damage to the earthed terminal and its lead</p>			
	The owner shall ensure that all the bare conductors in a building are inaccessible and switches are provided in readily assessable position		Construction Contractor	
	The owner of every medium voltage installation shall affix a danger notice in Hindi or English and the local language of the district, with sign of skull and bones as near as possible.		Construction contractor	
	To ensure that chart for restoration of person suffering from electrical shock shall be affixed by the owner in a conspicuous place in every generating station and enclosed switch station		Construction contractor	
	Where the owner is using any supply line protected by material of a bituminous character, it shall be sealed at its point of entry into the street box unless approved by the Inspector.		Construction contractor	

Applicable Legislation	Procedural Requirement	Status	Responsibility for Compliance	License / compliance Records required
	Such supply line shall be periodically inspected and tested where accessible and test records for the same shall be kept by the owner or supplier			
	<p>Fire buckets filled with clean dry sand and fire extinguishers for suitable to deal with electric fire, shall be marked and kept at appropriate positions</p> <p>First-aid boxes or cupboards, equipped with proper contents shall be provided and maintained. All such boxes shall be kept in charge of responsible persons who are trained in first-aid treatment and he shall be available during working hours.</p> <p>Two or more gas masks shall be kept in the transformer area with capacity of 5 MVA.</p>		Construction contractor	
	<p>Instruction for the restoration of persons suffering from electric shock shall be fixed in the appropriate language in enclosed sub-station, enclosed switch-station and such premises where electricity is used.</p> <p>Owner shall also ensure that all authorized persons employed by him shall be competent to apply the instructions mentioned above</p>		Construction contractor	
	If any accident occurs in use or supply of electricity leading to injury or loss of human		Construction contractor	

Applicable Legislation	Procedural Requirement	Status	Responsibility for Compliance	License / compliance Records required
	being or an animal, the same shall be reported to the inspector through a telegraphic report within 24 hrs of the knowledge of the occurrence of the fatal accident and a written report in the form set out in annexure XIII within 48 hrs of the knowledge of the occurrence of the fatal accident and all other accidents			
	The owner shall get the inspection of its electrical installations and the subsequent certificate within 5 years and shall pay the fees for the same in advance to the State or Central Government		Construction Contractor	
	<p>It shall be the responsibility of the consumer to continually observe that;</p> <p>Controls are in place to carry and break the current after the point of commencement of supply</p> <p>Every transformer is provided with a linked switch with fuse(s) or circuit breaker of adequate capacity</p> <p>No live parts are so exposed as to cause danger</p> <p>No person other than the supplier shall interfere with the service lines and apparatus placed by the supplier on the premises.</p>		Construction contractor	

Applicable Legislation	Procedural Requirement	Status	Responsibility for Compliance	License / compliance Records required
	A 30 days notice shall be served to the Inspector before making any application for commencement of supply or re-commencement. Owner shall provide cut-outs at the point of commencement of supply and shall ensure that electrical installations/ works carried out and maintained in a such a manner as to prevent danger due to shock and fire hazards		Construction Contractor	
	The consumer shall ensure that seal of the meter is not broken otherwise than by the supplier		Construction contractor	
	If any person responsible for use of energy fails to report to the Inspector and other authorities concerned, the occurrence of an accident, he shall be punishable with a fine which may be extended to three hundred rupees.		Construction contractor	
The Factories Act, 1948	Obtain a prior permission in writing from State Government or the Chief Inspector for the site on which factory is to be located Obtain a license of factories and also for the renewable of license		Construction contractor	
	Send a return notice to the chief inspector of factories at least 15 days before he begins to occupy or use any premises as a factory		Construction contractor	

Applicable Legislation	Procedural Requirement	Status	Responsibility for Compliance	License / compliance Records required
	containing specified particulars.			
	Every occupier has been obligated with the responsibility: <ul style="list-style-type: none"> • to ensure the health, safety and welfare for workers while they are at work • to provide such information, instruction, training and supervision as, are necessary to ensure the health and safety of all workers at work 		Construction Contractor	
	Maintain maintenance register for hoists and lifts.		Construction contractor	
	Maintain register of adult workers and display period of work.		Construction contractor	
	Not to allow and child who has not completed 14 years of age or an adolescent).		Construction contractor	
	Notify prescribed authority about the occurrence of an accident, which causes death or any bodily injury by reason of which the person is prevented from working for a period 48 hours or more.		Construction contractor	

Applicable Legislation	Procedural Requirement	Status	Responsibility for Compliance	License / compliance Records required
	Notify prescribed authorities in case a worker contracts any disease specified in schedule 3		Construction contractor	
	Restrict employment of women, children and adolescent in area of dangerous operations		Construction contractor	
	Effective arrangement shall be made for treatment of wastes and effluents		Construction contractor	Monitoring records
	Effective arrangements shall be made to provide drinking water to the employees and all such points shall be marked as "drinking water" Also, water cooling arrangements shall be made during hot weather		Construction contractor	
	Sufficient latrine and urinals shall be situated within the workplace Separate accommodations shall be arranged for male and female workers		Construction contractor	
	The young person shall be provided with sufficient training He shall be well addressed with the dangers and subsequent precautions required		Construction contractor	Records of Trainings provided
	All the hoists and Lifts shall be examined by a competent person at least once in every six		Construction contractor	Certificate of Calibration

Applicable Legislation	Procedural Requirement	Status	Responsibility for Compliance	License / compliance Records required
	months and records for the same shall be kept			
	All the Lifting machines, chains, ropes etc shall be examined by a competent person at least once in every twelve months and records for the same shall be kept		Construction contractor	Certificate of calibration
	Before entry into any confined place, a test shall be carried out by competent person to ensure that the space is reasonably free from any danger		Construction contractor	Certificate in writing by competent person
	If the inspector gives in writing the requirement to verify the safety of the building, ways, machinery or plant, tests shall be carried out as mentioned in the order		Construction contractor	Record of the tests carried out
	Suitable sitting arrangements shall be made for the workers required to work in standing position		Construction contractor	
	Ensure that no adult worker is allowed to work in a factory for more than 48 hours in any week		Construction contractor	
	First-aid boxes or cupboards shall be maintained with all the prescribed contents There shall be at least one box for every one hundred and fifty employees		Construction contractor	

Applicable Legislation	Procedural Requirement	Status	Responsibility for Compliance	License / compliance Records required
	Different person for every first-aid box, with certificate in first-aid treatment recognized by State Government, shall be made responsible Where more than five hundred workers (ordinarily employed) are there, an ambulance room of prescribed size shall be maintained in charge of a medical and nursing staff			
	Above two hundred and fifty workers a canteen shall be established and maintained for the same		Construction contractor	
	Above one hundred fifty ordinarily employed workers suitable shelters or rest rooms and a lunch room shall be provided		Construction contractor	
	Above thirty ordinarily employed women workers, a suitable room shall be provided and maintained for their children below six years of age		Construction contractor	
	Above five hundred ordinarily employed workers a welfare officer shall be appointed		Construction contractor	
	Child who has completed his fourteenth year		Construction	

Applicable Legislation	Procedural Requirement	Status	Responsibility for Compliance	License / compliance Records required
	shall be employed only after receiving a certificate of fitness granted or shall carry a token giving reference to such certificate		contractor	
	A display containing such abstracts of this act as prescribed and also the name and address of the inspector and tile certifying surgeon shall be displayed at convenient places in English and local language		Construction contractor	
Mines Act, 1952	A notice shall be served to the Chief Inspector, the Controller, Indian Bureau of Mines and the District Magistrate of the district in which the mine is situated at least one month before the commencement of work		Construction contractor	
	Owner shall appoint a manager for each mine having the prescribed qua;ifications		Construction contractor	
	Drinking water shall be made available in the mine area		Construction contractor	
	In case any person employed contacts any disease notified by central Government in the official gazette as a disease connected with mining operation, the owner, agent or		Construction contractor	

Applicable Legislation	Procedural Requirement	Status	Responsibility for Compliance	License / compliance Records required
	manager shall send a notice of same to the Chief Inspector			
	<p>A notice shall be served and one copy shall be kept on a special notice board in case of:</p> <ul style="list-style-type: none"> - an accident causing loss of life or serious bodily injury - an explosion, ignition, spontaneous heating, outbreak of fire or irruption or inrush of water or other liquid matter, - an influx of inflammable or noxious gases, or - a premature collapse of any part of the workings, - any other accident which may be prescribed, <p>It shall be ensured that the notice is kept on the board for not less than fourteen days from the date of such posting.</p>		Construction contractor	
	If any person is deprived of any of the weekly days of rest, then he shall be allowed within a month or within two months following that month compensatory days of rest equal in number to the days of rest of which he has been deprived.		Construction contractor	
	No adult employed above ground shall be allowed to work for more than forty eight hours		Construction contractor	

Applicable Legislation	Procedural Requirement	Status	Responsibility for Compliance	License / compliance Records required
	<p>in a week or for more than nine hours in a day.</p> <p>He shall also be not allowed to work for more than five hours continuously before he has had an interval for rest of at least half an hour:</p> <p>Persons belonging to two or more shifts shall not be allowed to do work of the same kind above ground as the same time:</p>			
	When the work of a person extends beyond midnight, a weekly day of rest in his case shall mean twenty four hours beginning when his shift ends		Construction contractor	
	If a person works for more than nine hours above the ground he shall be entitled to wages at a rate of twice his ordinary rate of wage		Construction contractor	
	No person shall be allowed to work in a mine if he has already been working in any other mine with the preceding twelve hours		Construction contractor	
	No person shall be allowed to work for more than ten hours including the overtime in a day		Construction contractor	
	No women shall be employed above ground		Construction contractor	

Applicable Legislation	Procedural Requirement	Status	Responsibility for Compliance	License / compliance Records required
	except between the hours 6 am and 7am Every women shall be allowed an interval of not less than eleven hours between the termination of employment on any one day and the commencement of the next period of employment.			
	For every mine a register shall be maintained of all the persons employed with: - Name of the employee with the name of his father or, of her husband - Age and sex of the employee; - Nature of employment (whether above ground or below ground, and if above ground, whether in opencast working or otherwise) and date of commencement thereof; - Such other particulars as may be prescribed, and the relevant entries		Construction contractor	
Water (Prevention and Control of Pollution) Act, 1974 Amendment 1998	No person shall knowingly cause or permit any poisonous, noxious or polluting matter to enter (whether directly or indirectly) into any ⁵ [stream or well or sewer or on land]; or which may impede the proper flow of the water of the stream in a manner leading or likely to lead to		Construction contractor/ HPRIDC	

Applicable Legislation	Procedural Requirement	Status	Responsibility for Compliance	License / compliance Records required
	<p>a substantial aggravation of pollution</p> <p>A person shall not be constructing, improving or maintaining in or across or on the bank or bed of any stream any building, bridge, weir, dam, sluice, dock, pier, drain or sewer or other permanent works which he has a right to construct, improve or maintain and shall not deposit any material, any sand or gravel or other natural deposit on the bank or in the bed of any stream and shall not permit, the deposit accumulated in a well, pond or reservoir to enter into any stream.</p>			
	<p>No person / industry without previous consent of the State Board shall establish or operate any industry, operation or process or treatment or disposal system.</p> <ul style="list-style-type: none"> • Application for Consent to establish (before taking any step for establishing an industrial unit) in the prescribed form of the concerned State Pollution Control Board along with prescribed fee • Application for Consent to operate (before commissioning the facility of the company) in the prescribed form of the concerned State Pollution Control Board along with the Prescribed fee 		Construction contractor	

Applicable Legislation	Procedural Requirement	Status	Responsibility for Compliance	License / compliance Records required
	<ul style="list-style-type: none"> • Application for renewal of consent to operate before its expiry in the prescribed form of the concerned State Pollution Control Board along with the prescribed fee • Submit compliance reports against consent conditions including monitoring results with the applicable wastewater discharge standards at the intervals prescribed by the State Pollution Control Board 			
	If there is any accidental discharge in the water stream or the potential of that incident leading to water pollution, the same shall be intimated to the State Board and such other authorities		Construction contractor	
	Report of analysis signed by a government analyst shall be kept as a record		Construction contractor	
Indian Petroleum Rules, 1976	No person shall smoke and no such substance as matches, fires or lights etc shall be allowed in proximity to a place where petroleum is stored or handled.		Construction contractor	
	Barrels, drums and other containers filled with petroleum shall be loaded with and hung upwards.		Construction contractor	

Applicable Legislation	Procedural Requirement	Status	Responsibility for Compliance	License / compliance Records required
	The loading and unloading of petroleum shall be carried out during the sunrise and sunset.		Construction contractor	
	No electrical wiring shall be installed and no electric apparatus shall be used in any refinery, installation, storage shed, service station or in any other place where petroleum is stored, loaded or unloaded.		Construction contractor	
	<p>Requirements for license :</p> <p>Petroleum Class A</p> <p>In case it is not intended for sale and the total quantity in his possession does not exceed 30 Litres.</p> <p>Petroleum Class B</p> <p>If the total quantity in possession at any one place does not exceed 2500 litres and none of it is contained in a receptacle exceeding 1000 Litres in capacity</p> <p>Petroleum Class C</p> <p>If the total quantity in possession at any one place does not exceed 45,000 Litres and such</p>		Construction contractor	

Applicable Legislation	Procedural Requirement	Status	Responsibility for Compliance	License / compliance Records required
	petroleum is transported or stored in accordance with the rules under Section 4.			
	Application is required to be made to the Chief controller for obtaining license for the premises identified for storage of the petroleum		Construction contractor	
	Every storage shed or service station for petroleum shall prominently mark the number of the licence held for it		Construction contractor	
	An extract of rules 3 to 12, 102 to 115, 116 to 134 and rules 147 to 149 and 152 to 160 and of the conditions of the licence shall be exhibited in a conspicuous place in every licensed installation, service station or storage shed		Construction contractor	
	If the quantity stored exceeds 2,500 litres at any one time; the doorway and opening shall be built up-to a height of 30 cm or the floor shall be sunk to a depth of 30 cm		Construction contractor	
	An application shall be made to the Controller of explosives for the renewable of the license		Construction contractor	

Applicable Legislation	Procedural Requirement	Status	Responsibility for Compliance	License / compliance Records required
	at least thirty days before 31 st December			
	An application shall be made to a competent authority, in form VIII, for the license to store petroleum		Construction contractor	
	An application shall be made to the district Authority for no objection certificate along with two copies of the site plan		Construction contractor	
	Prior approval is required from the licensing authority for the plan of proposed alteration		Construction contractor	
	In case a licence is lost or accidentally destroyed, a copy of the plan or plans identical with those attached to the licence shall be submitted for duplicate license		Construction contractor	
	A notice about the accident shall be served to the Chief Controller by telegraph followed by a letter within 24 hours of occurrence and to the officer-in-charge of the nearest police station		Construction contractor	
The Water (Prevention and Control of Pollution) Cess Act,	Submit the "Water Cess Return" in the prescribed form at specified interval to PCB		Construction contractor	Return of the water Cess

Applicable Legislation	Procedural Requirement	Status	Responsibility for Compliance	License / compliance Records required
1977	Pay Water Cess, as prescribed within the time specified as indicated in assessment order			
	Affix meters of prescribed standards for the purpose of measuring and recording the quantity of water consumed		Construction contractor	
Forest (Conservation) Act, 1980	An application shall be made to the State Government/ Central Government for the consent to use forest land and cutting of trees thereof for the purpose of road construction etc. (<i>Public Purpose</i>)		HPRIDC	
Energy Conservation Act 2001	For Factory specified as energy intensive under the Rule 2 of the Act to conduct energy conservation audit once in a year & followed guidelines under the Act.		HPRIDC	

Applicable Legislation	Procedural Requirement	Status	Responsibility for Compliance	License / compliance Records required
Air (Prevention and Control of Pollution) Act, 1981	<p>Obtain Consent to establish (before taking any step for establishing an industrial unit) in the prescribed form of the concerned PCB along with prescribed fee</p> <p>Obtain Consent to operate (before commissioning of the facility of the company) in the prescribed form of the concerned PCB along with the Prescribed fee</p> <p>Apply for renewal of consent to operate before its expiry in the prescribed form of the concerned SPCB along with the prescribed fee</p> <p>Submit compliance reports against consent conditions including monitoring results with the applicable emission standards at the prescribed intervals</p>		Construction contractor	
	Not to emit, in any air pollution control area, discharge or cause or permit to discharge emission of any air pollutant in excess of the standards laid down by the PCB		Construction contractor/ HPRIDC	
	Intimate PCB and to such authorities or agencies as may be prescribed, in case of emission of any air pollutant into the atmosphere in excess of the standards laid		Construction contractor	

Applicable Legislation	Procedural Requirement	Status	Responsibility for Compliance	License / compliance Records required
	down by the PCB or is apprehended to occur due to accident or other unforeseen act or event.			
Environment (Protection) Act, 1986 and Environment (Protection) Rules, 1986 Amendments Rules 1992, 1993 & 1994	Industry (those units which are requiring consent under Water Act or Air Act or Authorization under Hazardous Waste Rules) shall Submit annual “ Environmental Statement ” report every year before 30 th September for the last financial year		Construction contractor	
	Obtain prior “ Environmental Clearance ” from MOE&F, in case of a new project or for modernization / expansion of the existing project, if it falls under the specified Schedule, subject to certain conditions.		Construction contractor	
	Not to discharge or emit or permit to be discharged or emitted any environmental pollutants in excess of the prescribed standards (as specified in Schedule I to Schedule IV).		Construction contractor/ HPRIDC	
	Not to handle or cause to be handled any hazardous substance except in accordance with such procedure and after complying with such safeguards as may be prescribed		Construction contractor	

Applicable Legislation	Procedural Requirement	Status	Responsibility for Compliance	License / compliance Records required
	Occupier to inform prescribed Authorities (Central Pollution Control Board, District collector, district police, and health officer) in case of discharge of any environmental pollutant in excess of the prescribed standards or is apprehended to occur due to any accident or other unforeseen act or event and shall be bound to prevent or mitigate the environmental pollution.		Construction contractor	
	Furnishing of information to authorities in certain cases, where the discharge of air pollutants in excess of the prescribed standards occurs or is apprehended to occur due to any accident or other unforeseen Act		Construction contractor	
	Agencies to include officer in-charge for emergency operations, SPCB, as listed in Schedule IV		Construction contractor	
The Motor vehicles Act, 1988	No person shall drive a motor vehicle in any public place unless he holds an effective driving licence, issued to him, authorising him to drive the vehicle; and no person shall so drive a transport vehicle [other than a motor cab hired for his own use or rented under any scheme] unless his driving licence specifically entitles him so to do.		Construction contractor	

Applicable Legislation	Procedural Requirement	Status	Responsibility for Compliance	License / compliance Records required
	No person under the age of eighteen years shall drive a motor vehicle in any public place		Construction contractor	
	No owner or person in charge of a motor vehicle shall cause or permit any person who does not satisfy the provisions of section 3 or section 4 to drive the vehicle		Construction contractor	
	All the vehicles under the jurisdiction shall be registered and the registration mark shall be displayed on the vehicle in prescribed manner		Construction contractor	
	An application shall be made for the registration of the vehicle accompanied by the relevant documents, particulars and information		Construction contractor	
	Every registered vehicle shall carry a certificate of fitness, being issued by an authorized testing station		Construction contractor	
Centre Motor Vehicles Rules, 1989	Owner of the vehicles to ensure valid registration, vehicle is equipped with first-aid, safety equipment, information driver for emergency situations, driver's license, information about dangerous good (TREM) card, mandatory spark arrestor for carrying goods of dangerous nature, PUC, display class labels.		Construction and Operation/ Maintenance Contractor	Maintain regulatory compliance records (Registration certificate, valid Insurance certificates, valid pollution Under Control certificates, valid state / national permit certificates

Applicable Legislation	Procedural Requirement	Status	Responsibility for Compliance	License / compliance Records required
Manufacture, Storage and Import of Hazardous Chemical Rules, 1989 Amendment Rules 1989/ 1994/ 2000	FOLLOWING SHALL APPLY TO INDUSTRIAL ACTIVITY IN WHICH A HAZARDOUS CHEMICAL SATISFIES ANY OF THE CRITERIA LISTED IN PART 1 OF THE SCHEDULE 1 OR LISTED IN PART 11 OF SCHEDULE 1 :		Construction contractor	
	Occupier to identify major accident hazards and take steps to prevent such major accidents and to limit their consequences on persons as well as environment by providing to the persons working on the site information, training and equipment including antidotes necessary to ensure their safety.		Construction contractor	
	Occupier to arrange or develop information on safety data sheets (Schedule 9)		Construction contractor/ HPRIDC	
	Occupier to inform the concerned authority as identified, about the accident within 48 hours from the occurrence of a major accident		HPRIDC	
	To label every container of hazardous chemicals of its content name and address of the manufacture/ importer and physical, chemical and toxicological.		Construction contractor/ HPRIDC	
	A written report to the concerned authority		Construction contractor	

Applicable Legislation	Procedural Requirement	Status	Responsibility for Compliance	License / compliance Records required
	containing the particulars specified in Schedule 7 shall be submitted at least 3 months before commencing any industrial work or before such shorter time as the concerned authority may agree			
	A further report needs to be submitted if the occupier makes any change in the activity performed at the site (including an increase or decrease in the maximum threshold quantity of a hazardous chemical)		Construction contractor	
	An occupier shall prepare and keep up-to-date an on-site emergency plan detailing how major accidents will be dealt and shall include the name of the person who is responsible for the safety on the site and the name of those who are authorized to take action in accordance with the plan in case of an emergency.		Construction contractor	
	The occupier shall take appropriate steps to inform persons outside the site either directly or through District Emergency Authority who are likely to be in an area which may be affected by a major accident about- (a) the nature of the major accident hazard;		Construction contractor	

Applicable Legislation	Procedural Requirement	Status	Responsibility for Compliance	License / compliance Records required
	and (b) the safety measures and the "Do's' and 'Don'ts" which should be adopted in the event of a major accident			
Public Liability Insurance Act, 1991	If death or injury to any person or damage to any property has resulted from an accident, the owner shall be liable to give such relief as is specified in schedule for such death, injury or damage In case of any claim for relief the claimant shall not be required to plead and establish that the accident was due to some wrongful act, neglect or default of any person.		Construction contractor / HPRIDC	
	Every owner shall take out, before he starts handling any hazardous substance, one or more insurance policies providing for contracts of insurance and shall renew the same from time to time before expiry of period of validity. No insurance policy taken out by an owner shall be for a amount less than the amount of the paid-up capital of the under taking handling any hazardous substance and owned or controlled by that owner and more than the amount, not exceeding fifty crore rupees, as may be prescribed.		Construction contractor / HPRIDC	

Applicable Legislation	Procedural Requirement	Status	Responsibility for Compliance	License / compliance Records required
	Every owner shall also, together with the amount of premium, pay to the insurer, for being credited to the Relief Fund established under section 7A, such further amount, not exceeding the amount of premium, as may be prescribed			
	The owner shall, within such period, deposit such amount in such manner as the Collector may direct		Construction contractor/ HPRIDC	
	Whoever contravenes any of the provisions of act or fails to comply with any directions issued, he shall be punishable with imprisonment for a term which shall not be less than one year and six months but which may extend to six years, or with fine which shall not be less than one lakh rupees, or with both Whoever, is convicted for the second offence or any offence subsequent to the second offence, he shall be punishable with imprisonment for a term which shall not be less than two years but which may extend to seven years and with fine which shall not be less than one lakh rupees.		Construction contractor/ HPRIDC	
Building and other construction Workers (Regulation of Employment & Conditions of Service) Act, 1996	The Employer of the establishment is required to provide safety measures at construction site including other welfare measures		Construction and Operation/ Maintenance Contractor	

Applicable Legislation	Procedural Requirement	Status	Responsibility for Compliance	License / compliance Records required
	Pay cess at the rate not exceeding 2% of the cost of construction as may be notified by the Government. for canteens, first-aid facilities, ambulance, housing accommodations for workers near the work place etc.			
	Every owner shall make an application for the registration of the establishment within a period of sixty days of its commencement		Construction contractor	Certificate of registration
	An application shall be made to the officer authorized by the board to register the workers, engaged for not less then ninety days during the preceding twelve months, as beneficiary		Construction contractor / HPRIDC	
	Every employer shall maintain a register in such form as may be prescribed showing the details of employment of beneficiaries employed		Construction contractor / HPRIDC	
	Every employer shall maintain registers and records about the particulars of employed workers like the work performed, wages paid to them etc.		Construction contractor/ HPRIDC	
	The employer shall make appropriate provision of drinking water at suitable points in every place where construction work is in progress		Construction contractor	

Applicable Legislation	Procedural Requirement	Status	Responsibility for Compliance	License / compliance Records required
	In every place where construction work is going on, sufficient latrines and urinals shall be provided by the employer			
	the employer shall provide free of charges and within the work site a temporary living accommodation to all the workers		Construction contractor	
	He shall also be responsible for the demolition of the same after the work is over			
	Above fifty ordinarily employed women workers, a suitable room shall be provided and maintained for their children below six years of age		Construction contractor	
	Every employer shall provide first-aid facilities at construction site		Construction contractor	
	Above two hundred and fifty workers a canteen shall be established and maintained for the same		Construction contractor	
	In establishment with more than five hundred employees shall constitute a safety committee and shall appoint a safety officer with required qualifications		Construction contractor	

Applicable Legislation	Procedural Requirement	Status	Responsibility for Compliance	License / compliance Records required
	An employer shall provide constant and adequate supervision of any construction work in his establishment as to ensure compliance with the provisions relating to safety and for taking all practical steps to prevent accidents.		Construction contractor	
	Every employer shall be responsible for payment of wages to each worker employed by him		Construction contractor/ HPRIDC	
	A written notice along with the required information shall be sent to the inspector of the jurisdiction at least thirty days before commencement of any work		Construction contractor	
Batteries (Management and Handling) Rules, 2001	To enter a buy back contract with the supplier at the time of procurement of the batteries and ensure that the supplier is approved by Ministry of Environment and Forest or State Pollution Control Board.		Construction contractor	
	Maintain record of: (a) Purchase & disposal of lead acid Batteries (b) Sale of used lead acid batteries to MoEF authorized recyclers		Construction Contractor	Half Yearly return for batteries used
Noise Pollution (Regulation and Control) (Amendment) Rules,	Industry to follow the ambient air quality standards with respect to noise		Construction contractor	Monitoring reports

Applicable Legislation	Procedural Requirement	Status	Responsibility for Compliance	License / compliance Records required
2002	Obtain written permission from the authority on the use of loud speakers / public address system during day time (i.e. 6:00 am to 10:00 pm).		Construction contractor	
The DG Rules, 2000 Amendment 2002	Noise limit for diesel generator sets (up to 1000 KVA) manufactured on or after the 1st July, 2003. <u>APPLICABLE IF WE GO FOR NEW PURCHASE.</u> <ul style="list-style-type: none"> The maximum permissible sound pressure level for new diesel generator (DG) sets with rated capacity up to 1000 KVA, manufactured on or after the 1st July, 2003 shall be 75 dB(A) at 1 meter from the enclosure surface. The diesel generator should be provided with integral acoustic enclosure at the manufacturing stage itself. The implementation of noise limit for these diesel generator sets shall be regulated as given in paragraph 3 below. 		Construction contractor	
	Noise limit for DG sets not covered by paragraph 1 as above: <ul style="list-style-type: none"> Noise limits for diesel generator sets not covered by paragraph 1, shall be as follows: Noise from DG set shall be controlled by providing an acoustic enclosure or by 		Construction contractor	

Applicable Legislation	Procedural Requirement	Status	Responsibility for Compliance	License / compliance Records required
	<p>treating the room acoustically, at the users end.</p> <ul style="list-style-type: none"> The acoustic enclosure or acoustic treatment of the room shall be designed for minimum 25 dB(A) insertion loss or for meeting the ambient noise standards, whichever is on the higher side (if the actual ambient noise is on the higher side, it may not be possible to check the performance of the acoustic enclosure / acoustic treatment. Under such circumstances the performance may be checked for noise reduction up to actual ambient noise level, preferably, in the nighttime). The measurement for Insertion Loss may be done at different points at 0.5 m from the acoustic enclosure / room, and then averaged. The DG set shall be provided with proper exhaust muffler with insertion loss of minimum 25 dB(A). 			
	<ul style="list-style-type: none"> These limits shall be regulated by the State Pollution Control Boards and the State Pollution Control Committees. Guidelines for the manufacturers / users of Diesel Generator sets shall be as under: The manufacturer shall offer to the user a standard acoustic enclosure of 25 dB(A) 		Construction contractor	

Applicable Legislation	Procedural Requirement	Status	Responsibility for Compliance	License / compliance Records required
	<p>insertion loss and also a suitable exhaust muffler with insertion loss of 25 dB(A).</p> <ul style="list-style-type: none"> The user shall make efforts to bring down the noise levels due to the DG set, outside his premises, within the ambient noise requirements by proper siting and control measures. Installation of a DG set must be strictly in compliance with the recommendations of the DG set manufacturer. A proper routine and preventive maintenance procedure for the DG set should be set and followed in consultation with the DG set manufacturer which would help prevent noise levels of the DG set from deteriorating with use. 			
Gas Cylinder Rules, 2004	<ul style="list-style-type: none"> Submit/ obtain license in prescribed Form for possession of gas cylinders from Chief Controller of explosives Ensure compliance with license conditions 		Construction and operation/maintenance Contractor	
	<p>No License is required when cylinder with quantity given below is available:</p> <ul style="list-style-type: none"> Liquefied petroleum gas when the total quantity of gas does not exceed 100 Kg at any time. Any other flammable but non toxic gas 			

Applicable Legislation	Procedural Requirement	Status	Responsibility for Compliance	License / compliance Records required
	<p>when the total number of cylinders containing such gas does not exceed 25 or the total weight of gas does not exceed 200 kg, whichever is less at any one time.</p> <ul style="list-style-type: none"> - Any non-flammable, non-toxic gas when a total number of cylinders does not exceed 200 at any one time. - Any toxic gas when a total quantity of such gas does not exceed five at any one time. - Acetylene gas contained in cylinders in dissolved state when the total quantity of such cylinders does not exceed 50 at any one time. 			
	Apply for amendment of license in case of any alteration by applying in the prescribed Form to the chief controller along with the prescribed fee.		Construction and operation/maintenance Contractor	
	Apply for renewal of license before expiry of the validity time frame		Construction contractor	
	Notice of accident to chief controller in case of loss of human life or serious injury to human life or property.		Construction contractor	
The Hazardous Wastes (Management, Handling And Transboundary Movement) Rules, 2008	Application for authorization in the prescribed form of the concerned State Pollution Control Board along with the prescribed fee (Form 1)		Construction contractor	

Applicable Legislation	Procedural Requirement	Status	Responsibility for Compliance	License / compliance Records required
	Application for renewal of authorization before its expiry with the concerned State Pollution Control Board in the prescribed form along with the prescribed fee.		Construction contractor	
	Provide general label (Form 12) in all containers of hazardous wastes.		Construction contractor/ HPRIDC	
	Provide the filled in copies of manifest (Form 13) as prescribed to the transporter of the waste and the concerned State Pollution Control Board.		Construction contractor	
	Occupier to provide transport with 6 copies of the manifest (Form 13) as per the colour coding		Construction contractor	
	Occupier to provide transporter the relevant information regarding the nature of the wastes and measures to be taken in case of emergency.		Construction contractor	
	To maintain records of Hazardous wastes in the prescribed format (Form 3)		Construction contractor	

Applicable Legislation	Procedural Requirement	Status	Responsibility for Compliance	License / compliance Records required
	To submit annual return regarding disposal of Hazardous wastes in the prescribed format (Form 4) to the concerned State Pollution Control Board		Construction contractor	
	To report to the State Pollution Control Board of the accident occurred on the site or during transportation of hazardous wastes		Construction contractor	

ANNEXURE

APPENDIX 1.1 : WATER QUALITY STANDARDS

S.No	Parameters	is:2296	is:10500	Method Adopted
1	PH	6.5-8.5	6.5-8.5	pH meter
2	BOD(3 DAYS 27 °C	3.0	NS	DO- AZIDE MODIFICATION
3	TEMPERATURE (C)	NS	NS	THERMOMETER
4	DISSOLVED OXYGEN	4	NS	AZIDE MODIFICATION OF WINKLER'S METHOD
5	COLOR (HAZEN)	300	NS	VISUAL COMPARISON
6	FLUORIDES (F)	1.5	1.0 (1.5)	SPANDS METHOD
7	CHLORIDES (CL)	600	250 (1000)	ARGENTOMETRIC
8	TOTAL DISSOLVED	1500	500 (2000)	GRAVIMETRIC ANALYSIS
9	SULPHATES (SO4)	400	200 (400)	BARIUM CHLORIDE
10	IRON (FE)	50	.3 (1.0)	PHENANTHROLIN
11	OIL AND GREASE	.1	NS	PARTITION –
12	NITRATES	50	45 (100)	CHROMOTROPIC ACID
13	CHROMIUM (CR6+)	.05	.05	ATOMIC ABSORPTION
14	CADMIUM (CD)	.01	.01	ATOMIC ABSORPTION
15	LEAD (PB)	.1	.05	ATOMIC ABSORPTION
16	COPPER (CU)	1.5	.05 (1.5)	ATOMIC ABSORPTION
17	CYANIDE (CN)	.05	.05	CHLORAMINE – T –
18	SELENIUM (SE)	.05	.01	ATOMIC ABSORPTION
19	ARSENIC (AS)	.2	.05	ATOMIC ABSORPTION
20	PHENOLS	.005	.001 (.002)	SPECTROPHOTOMETER
21	DETERGENTS	1.0	.2 (1.0)	SPECTROPHOTOMETER
22	DDT	ABSENT	ABSENT	SPECTROPHOTOMETER
23	TOTAL COLIFORM (MPN/ 100 ML)	5000	NS	MULTIPLE TUBE FERMENTATION

APPENDIX 1.2 : NATIONAL AMBIENT AIR QUALITY STANDARDS

Pollutant	Time Weighted average	Concentration in ambient air			Method of measurement
		Industrial Area	Residential Rural & other areas	Sensitive Area	
Sulphur Dioxide (SO ₂)	Annual Average	80 µg/m ³	60 µg/m ³	15 µg/m ³	Improved West and Gacke method
	24 hours	120 µg/m ³	80 µg/m ³	30 µg/m ³	Ultraviolet fluorescence
Oxides of Nitrogen as NO ₂	Annual Average	80 µg/m ³	60 µg/m ³	15 µg/m ³	Jacob & Hochheiser modified (Na-Arsenite) Method
	24 hours	120 µg/m ³	80 µg/m ³	30 µg/m ³	Gas Phase Chemiluminescence
Suspended Particulate Matter (SPM)	Annual Average	360 µg/m ³	140 µg/m ³	70 µg/m ³	High Volume Sampler (Average flow rate not less than 1.1 m ³ /minute)
	24 hours	500 µg/m ³	200 µg/m ³	100 µg/m ³	
Respirable Particulate matter (size less than 10 µm)	Annual Average	120 µg/m ³	60 µg/m ³	50 µg/m ³	Respirable Particulate Matter Sampler
	24 hours	150 µg/m ³	100 µg/m ³	75 µg/m ³	
Lead (Pb)	Annual	1.0 µg/m ³	.75 µg/m ³	.50 µg/m ³	AAS Method after sampling using EPM 2000 or equivalent filter paper
	24 hours	1.5 µg/m ³	1.0 µg/m ³	.75 µg/m ³	
Carbon Monoxide (CO)	8 hours	5.0 µg/m ³	2.0 µg/m ³	1.0 µg/m ³	Non dispersive infrared spectroscopy
	1 hour	10.0 µg/m ³	4.0 µg/m ³	2.0 µg/m ³	

Source: Central Pollution Control Board, 1997 Gazette Notification dated 4/94, Part II Sec 3 (ii)

APPENDIX 1.3 : NATIONAL AMBIENT AIR STANDARDS

Area Code	Category of Area/ Zone	Limits in dB(A) Leq	
		Day time	Night Time
(A)	Industrial Area	75	70
(B)	Commercial Area	65	55
(C)	Residential Area	55	45
(D)	Silence Zone	50	40

Note:

- Daytime shall mean 6:00 am to 10:00 pm and Night shall mean from 10:00 pm to 6:00 am.
- Silence zone is defined as area up to 100 meters around premises of hospitals, educational institutions and courts.
- Use of vehicle horns, loud speakers and bursting of cracking are banned in these zones

APPENDIX 1.4 : AMBULANCE INVENTORY

- Inj. Atropine 10,
- inj. Adrenaline 10,
- inj. Calmpose 3,
- inj. Dopamine 5,
- inj. Deriphylline 4,
- inj. Epsolin 2,
- inj. Lasix 6,
- inj. Avil 2,
- inj. Fortwin 2,
- inj. Phenargan 2,
- inj. Paracetamol 2,
- inj. Perinorm 3,
- inj. Emset 2,
- inj. Voveran 2,
- inj. Ranitidine 2,
- inj. Tramadol 2.
- Inj. Nahco3 8,
- inj. Calcium gluconate 3,
- inj. Hydrocortisone 3,
- inj. Aminophylline 2,
- inj. Xylocard 2,
- inj. Dexona 3,
- inj. Distilled water 5,
- ipravent nebulization 1.
- C-circuit 1,
- laryngoscope with adult & child blade 1,
- xylocaine jelly 1,
- cath. Mount 1,
- t. Piece 1,
- foley's catheter 14,161,
- nasopharyngeal airway 1,
- guedel airway 1,2,3,4- 1,
- et tube 5-9 with connectors 1,
- magill's forceps 1,
- artery forceps 1,
- knee hammer 1,
- condom catheter 1,
- stillet 1.
- Ambubag with mask (a) 1,
- ambubag with mask (p) 1,
- stethoscope 1,
- b. P. Apparatus 1,

- spinal collar 1,
- Cotton 1,
- cosy sheet 1,
- iv cannula no 18-2,
- iv cannula no 20-2,
- iv cannula no 22-2,
- syringe 50ml 3,
- syringe 20ml 2,
- syringe 10ml 10,
- syringe 5ml 10,
- syringe 2ml 10,
- ryles tube 14,16-1,
- iv set 4,
- blood set 2,
- lectospiral 3,
- betadine 1,
- spirit 1,
- dynaplast 1,
- cut plaster 1,
- gauze bandage 4,
- cardiac gel 1,
- urobag 1,
- micropore 3,
- scissors 1, 3-way 3,
- mannitol 100ml 1,
- dextrose 25% 1,
- dextrose 10% 2,
- dextrose 5% 2,
- dns 500ml 2,
- ns 500ml 2,
- rl 500ml 2,
- haemacoel 2,
- mv set 2,
- suction tube 10,
- gauze pkt. 5,
- gloves 10,
- isolate m 1,
- isolate p 1,
- t. Sorbitrate 10,
- t. Depin 10,
- t. Alprax 10,
- t. Disprin 10,
- t. Crocin 10,

- thermometer 1,
- oxygen masks 5 1,
- nebulization kit 1.
- Suction machine,
- oxygen cylinder with regulator and accessories (2 nos),
- trauma stretcher with scoop to spiral injuries (2 nos),
- iv stand/hook for iv lines,
- cabinet for medicines,
- blanket