Environment Management Plan

1.1 Description of the Project Road

The present document set forth the Environmental and Social Management Plan for the sub-project " Construction of 4 Nos. of Intermediate Lane Steel Truss Motor bridge in km 4, 8-(HM 2-4 & HM 8-10) & 12 at Nandprayag Ghat Motor Road" in Chamoli district of Uttarakhand. The Environmental and social management Plan has been prepared based on the outcome of Environmental and Social Impact Assessment study carried out for the sub-project.

Figure: Bridge location

1.2 Objectives of EMP

The Environmental Management Plan (EMP) consists of a set of mitigation, monitoring, and institutional measures to be taken during the different stages of the project to eliminate adverse environmental and social impacts, to offset them, or to reduce them to acceptable levels. The plan also includes the actions needed for the implementation of these measures.

The broad objective of the Environmental Management Plan (EMP) is to ensure that Environmental and Social risks and impacts identified during the Environmental screening and ESIA process, are effectively addressed for the pre-construction, construction, and operation phases of the sub-project. The EMP specifies the mitigation and management measures to be implemented in the project along with institutional arrangements for the implementation, monitoring, and reporting, including the budget.

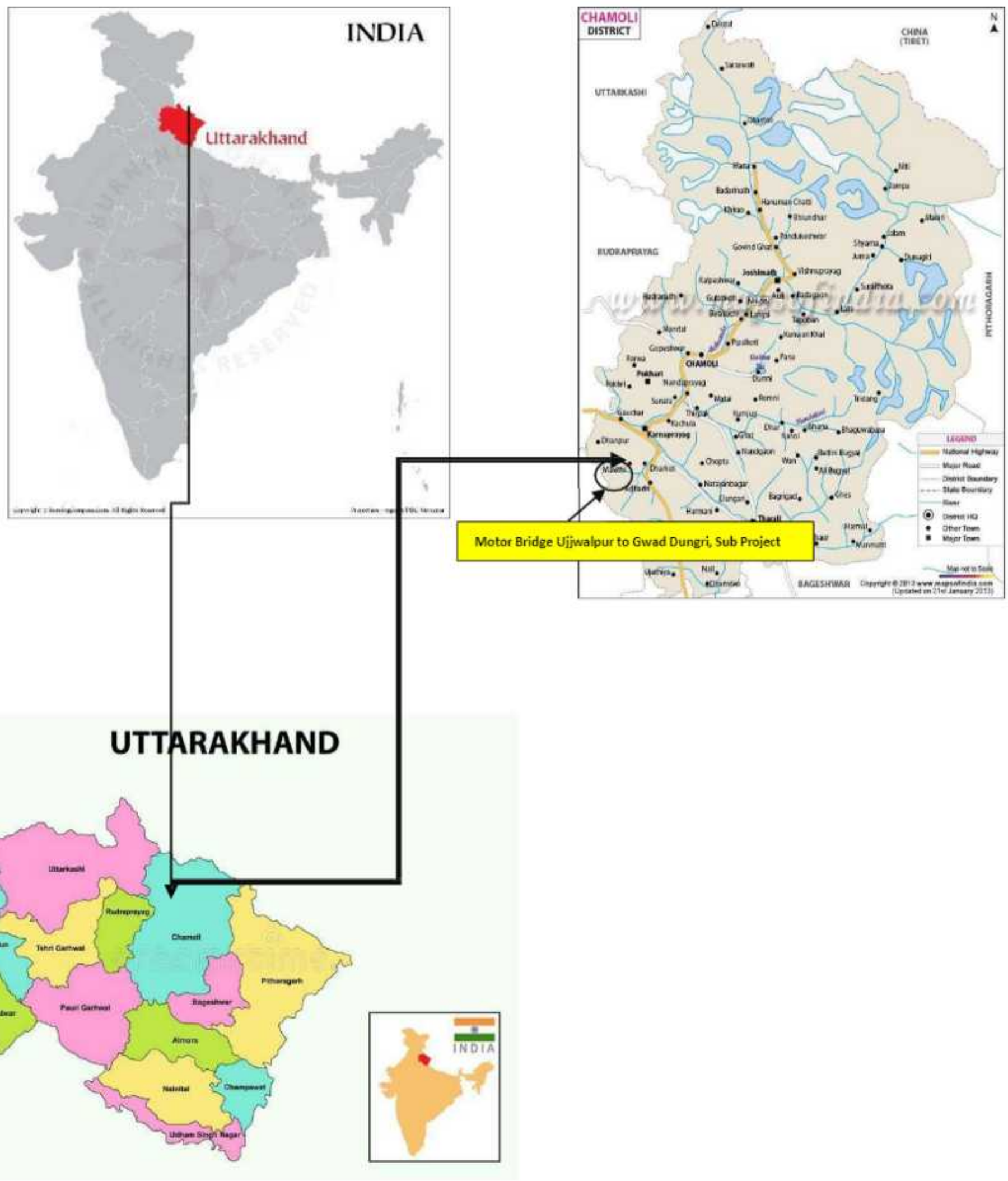

Figure2: Key Map of 04 intermediate lane steel truss bridges

1.3 Key Statutory Clearances/ Permits and Licenses Requirements

Based on the proposed activities of the project, the contractor has to comply with all the relevant regulations on Environmental and Social Safeguards. The project requires several licenses/permits under different acts and rules. The type of permits and licenses required for the sub-project is listed under **Table 1.**

Table Error! No text of specified style in document. **Applicability of National and State Statutes and Regulations**

S. No.	Type of Permits and Licenses	Relevant Acts and rules	Competent Authority	Responsibility	Timeline
1.	Pollution Under Control Certificate for both owned vehicles and hired Vehicles.	Central Motor and Vehicle Act, 2019	Applicable	Contractor	1 Week
2.	NOC for Quarries Material (stone) and Sand NB: In case the contractor is open their own stone quarry	Uttarakhand Minor Mineral Concession Rules, 2023	District Authority	Contractor	2-3 months
3.	Labour License and insurance	The Building and Other Construction Workers (Regulation of Employment & Conditions of Service) Act, 1996 Uttarakhand Building and Other Construction Workers (Regulation of Employment & Conditions of Service) Rules, 2005	Labour Commissioner	Contractor	1-2 month
4.	Labour License (In Case Engagement of Interstate Migrant Labour)	Inter-State Migrant Workmen (Regulation of Employment and Conditions of Service) Act, 1979	Labour Commissioner	Contractor	1-2 month
5.	Non-Forest Tree Cutting	Uttar Pradesh Tree (Protection), Act 1976 (as adopted in Uttarakhand)	Forest Department	Contractor	1-2 month

1.4 Proposed Site-specific Environmental Management Plan

This chapter describes the Environmental and Social Management Plan for the proposed project during different stages of the project. An Environment and Social Management Plan has been developed following the delineation of impacts and mitigation measures. These measures will be adopted by the project proponent and imposed as conditions of the contract. The Management Plan has been formulated for the implementation of environmental and social mitigation measures to be carried out by the Contractor and to ensure that the provisions of the EMP are strictly followed and implemented by strengthening implementation arrangements to prevent and minimize the adverse impacts during the Construction phase of the project. EMP has also addressed certain measures to be taken to prevent further deterioration of the environment and social components for various stages of the project. **Table:2** The table describes the nature of the potential environmental, impacts, the mitigation measures required to be implemented, and the implementing agency and responsible organization.

Tables 2: Environment Management Mitigation Plan

Sr. No	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation
		(Design Stage)		
1.	Hydrological Study, Erosion control & approach connectivity for designing of Bridge	(i) The hydrological study should be carried out for designing of the proposed bridge with flood safeguard (ii) Both Abutment wall be provided with proper slopes and may use a combination of gabion baskets and/or mattresses for slope protection. (iii) Approach slab as per IRC guidelines and well-designed approaches to connect bridge with the existing road or foot track both sidesshouldbeensuredduringthedesignoftheproposed bridge. (iv) In both abutments of the proposed bridge weep holes will be provided with minimum require standard filter Media for draining of water to prevent sliding of backfilling and to avoid any uplift pressure.	Design Engineer /Contractor	FPIU/PIU
2.	Impact of earth quake on bridge	The proposed bridge is located in Seismic zone V and prone to high intensity earthquake. Therefore, it is imperative that seismic load factor must be taken into considerationwhile designing of bridge components.	Design Engineer /Contractor	FPIU/PIU
3	Debris Accumulation on or around the proposed bridge	The project is located in land slide prone area. Accumulation of Debris on or around the bridge may affect integrity of the proposed bridge. This factor should be considered while designing of the proposed bridge.	Design Engineer /Contractor	FPIU/PIU
4	Safety of proposed Bridge and its users	For safety of road users and bridge, necessary road safety signage, hazard signage and warning signage with reflective tapes need to be provided before and at the proposed bridge as per IRC guidelines	Safety/OHS Expert/ Contractor	FPIU/PIU
		(Pre – Construction Stage)		
2	Provision of Early Training of construction contractor regarding EHS Safeguards of World Bank	Contractor team has not adequate training or knowledge on EHS safeguards when working in and over flowing waters, leading to construction period impacts affecting river hydrology and water quality, PIU will provide a training as part of the overall 1.5-day training workshop to be delivered before construction begins, period to the contractor mobilizing to the field	PIU / FPIU Environment Expert	FPIU/PIU
3	Work Programme/ Planning/ Information Dissemination	(i) Contractor shall submit a plan including a method statement and timeline about specific actions that will be taken to implement the provisions mentioned in the EMP. (ii) Project Information Board showing the name of work, project cost, duration, date of commencement, date of completion, executing agency and contact details (including telephone number/s) for providing suggestions/filing grievances shall be displayed prominently in both English and in vernacular.	Contractor	Environment Expert PIU/ Field PIU
4	Regulatory/ statutory clearances/ approvals	The Contractor shall obtain Labour License and all required insurance as specified in the contract conditions from the concerned authorities. Originals will be checked/verified by the Engineer and a copy shall be available at the site office at all times. The Contractor is required to abide by all conditions laid out in the said clearances/consents given by the regulatory authorities. The	Contractor	Environment Expert PIU/ Field PIU

		monthly progress report shall include the status and action taken for each of the conditions mentioned in such permits/ consent letters/ clearances.		
6	Arrangements for temporary land requirements for camp and construction plant	The contractor as per prevalent rules will carry out negotiations with the landowner for obtaining their consent for temporary use of land for construction camp etc.	Contractor	Environment Expert PIU/ Field PIU
7	Labour Requirement & Procurement of construction material	(i)The contractor desired to use unskilled/semiskilled labour from local area to give the maximum benefit to the local community. (ii)The contractor will finalize the approved quarry/crusher for procurement of aggregate / sand for the proposed bridge construction after assessment of the availability of sufficient materials, quality and other logisticarrangements.	Contractor	Environment Expert PIU/ Field PIU
8	Worksite Safety Management	(i) Temporary barricades shall be provided to delineate construction zone, including material stacking areas from the remaining area The construction area along with its labour facility, Warning signage shall beinstalled. All operational areas shall be access controlled with fixed entry and exit points. Watch and ward facilities at all times will be provided by theContractor. (ii) Construction materials shall be stacked in a suitable place/ manner without obstructing the access. Necessary measures shall be taken for smooth and safe movement of men and material. (iii) Safety signage and posters for generating awareness will be provided at the work site.	Contractor	Environment Expert PIU/ Field PIU
9	Measures for prevention of pollution	(i) All precautionary measures for prevention of pollution on account of the construction work (including both on-site and off areas) shall be implemented as per the requirements/standards of CPCB, SPCB and in line with measures listed in this EMP. Contractor will chose/select a material source after assessment of the availability of sufficient materials, quality and compliance to Environment regulatoryrequirements.(ii) During the construction phase, the Contractor will carry out Environment monitoring for ambient air quality and noise levels by engaging reputed / approved laboratory. (iii) The Contractor will be required to submit Monthly Status Reports on EMP compliance covering parameters and points mentioned in the section above.	Contractor	Environment Expert PIU/ Field PIU
		(Construction Stage)		
1	Impact on Water Resource during construction of bridge	The following mitigation measures are suggested during construction of the proposed bridge abutments: (i) Construction of bridge should be done during least flow or no flowarea. (ii) Curtain should be provided over the flowing water to avoid the falling of construction material inwater. (iii) Construction wastes should be collected and disposed in Environmentally sound manner as soon as construction is over. (iv) The construction of bridge should not affect existing flow pattern and drainage system around the proposed bridge. (v) Flowing water will be diverted with guide bunds.	Contractor	Environment Expert PIU/ Field PIU
2.	Water Pollution from Wastes	(i) The contractor will take all precautionary measures to collect and dispose construction wastes generated from the proposed bridge construction site (if any). (ii) No solid or hazardous wastes (oil contaminated waste) from camp site will be dumped on water course bank area or in open	Contractor	Environment Expert PIU/

		areas. Such wastes will be collected and disposed in EnvironmentallysoundmannerasperEnvironment regulations/ local regulations		Field PIU
3.	Dust and Gaseous Pollution	The contractor will take every precaution to reduce the level of dust and gaseous pollution from batching plant and bridge construction site. (i) The contractor will procure the batching plant and construction machinery, which will conform to the pollution control norms specified by the MoEF&CC/CPCB/UEPCB. (ii) The excavated materials at the bridge construction site will be collected and disposed properly so that it does not generate fugitive dustemissions. (iii) Regular maintenance of machinery and equipment will be carried and vehicular pollution check will be made mandatory. (iv) LPG shall be used as fuel for cooking of food at construction labour camp instead of fuelwood. (v) Water sprinkling is mandatory around construction site & in construction camp area. (vi) Personal Protective equipment (PPE) should be provided as a mandatory effort to the construction workers at the batchingplant.	Contractor	Environment Expert PIU/ Field PIU
4	Emissions from Construction Vehicles, Equipment & Machineries (like DG set)	The contractor will ensure (i) that all vehicles, equipment and machinery used for construction works are regularly maintained and confirm that pollution emission levels comply with the relevant requirements of CPCB and/Motor Vehicles Rules. The contractor will submit PUC certificates for all vehicles/ equipment/machinery used for the construction ofbridge. (ii) DG set will be provided with chimney of appropriate height as per CPCB guidelines (Height of stack in meter = Height of the building + 0.2√KVA).	Contractor	Environment Expert PIU/ Field PIU
5	Noise Pollution: Noise Levels from Vehicles, Plant and Equipment's	The contractor will confirm the following: (i) All construction plant and equipment used for construction will strictly confirm to the MoEF&CC/CPCB noise standards. (ii) All vehicles and equipment used in construction works will be fitted with exhaust silencers/mufflers. (iii) Maintenance and servicing of all construction vehicles and machineries will be done regularly. (iv) Only acoustic enclosures fitted DG set will be allowed at the bridge construction site and batching plant/camp site.	Contractor	Environment Expert PIU/ Field PIU
6	Personal Safety Measures for Labours and Staff	The contractor will take necessary measures for personal safety during the bridge construction: (i) Protective footwear, protective goggles, Ladders Safety hooks and rope (if workers is working above 3m height) and nose masks (as required) will be provided to the workers employed in batching plant and concrete works at bridge construction site, painting etc. (ii) Welder's protective eye-shields will be provided to workers who are engaged in welding works (as required). (iii) Earplugs will be provided to the workers exposed to high noise levels. (iv) Safety vests will be used by workers when on bridge site. The contractor will comply with all the precautions as required for ensuring the safety of the workmen. (v)The Contractor will make sure that during the construction work all relevant provisions of the Building and other Construction Workers (regulation of Employment and Conditions of Services) Act, 1996 are adhered to. (vi) The Contractor will not employ any person below the age of 14 years for any work.	Contractor	Environment Expert PIU/ Field PIU

7	Fire Safety	Adequate fire safety precautions shall be taken and the required fire safety equipment (such as fire extinguishers) shall be provided by theContractor in the construction camp & plant area.	Contractor	Environment Expert PIU/ Field PIU
8	Emergency Management, Risk Force Measure and First Aid	(i) Emergency n u m b e r s (Fire, police & nearest health center) will be displayed at the camp construction plant and bridge constructionsite, (ii) The contractor will arrange for A readily available first aid unit including an adequate supply of sterilized dressing materials and appliances as per the Factories Rules in construction workzone. First boxes will be made available at the camp, construction plant and construction site, (iii) The contractor will make required arrangements so that in case of any mishap on the bridge construction site, all necessary steps can be taken for prompt first aid treatment.	Contractor	Environment Expert PIU/ Field PIU
9.	**Labour Camp Management**			
9.1	Accommodation for workers	(i) Contractor will follow all relevant provisions of the Building and the other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996 for construction and maintenance of labour camp. (ii) The location, layout and basic facility provision of labour camp will be submitted to PIU prior to theirconstruction. (iii) The Contractor will maintain necessary living accommodation and ancillary facilities functionally and hygienically. (iv) Proper ventilation will be provided in labor accommodation rooms. (v) Regular cleaning and sweeping will be ensured at the labour campsite. (vi) Fuel wood will not be allowed for cooking at labour camps. LPG cylinders will be provided at labour camp by the contractor (vii) Fire Safety: Adequate fire safety precautions shall be taken and the required fire safety equipment (such as fire extinguishers) shall be provided by theContractor.	Contractor	Environment Expert PIU/ Field PIU
9.2	HIV/AIDS PreventionMeasures	(i) Necessary HIV/AIDS prevention measures will be taken at construction &labour camp (ii) HIV/AIDS & Occupational Health awareness programme will be organized by the contractor's Environment & Safetyofficer.	Contractor	Environment Expert PIU/ Field PIU
9.3	Potable Water forWorkers	(i) The contractor will construct and maintain labour accommodation in such a fashion that uncontaminated clean water is available for drinking, cooking, bathing and washing. (ii) The Contractor will also provide potable water facilities at bridge construction site in an accessible place, as per the Building and other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996 (iii) site personals of DSC will be required to inspect the labour camp twice in a week to ensure the compliance of the EMP.	Contractor	Environment Expert PIU/ Field PIU
9.4	Sanitation and Sewage System at Labour Camp	The contractor will ensure that: (i) The sewage disposal system for the camp will be designed, built and operated in such a fashion that no health hazard occurs and no pollution to the air, surface &	Contractor	Environment Expert PIU/

		ground water or adjacent water courses take place, (ii) Separate toilets / bathrooms required will be provided for men and women (if deployed), marked in vernacular language, (iii) Toilets will be provided with septic tank followed by soak pit. Adequate water supply is to be provided in all toilets and urinals,		Field PIU
9.5	Wastes Disposal	(i) The contractor will provide garbage bins in the camp; construction plant and bridge construction site and it will be ensured that these are regularly emptied and disposed of hygienically as per Solid Waste Rule2016. Burning of wastes will not beallowed. (ii) Solid waste generated at the bridge construction site, batching plant & camp site, will be collected in covered waste bins and segregated as biodegradable (food waste, paper, etc) and non-biodegradable (plastic, polyethylene bag, etc) wastes. Polyethylene/plastic wastes will be stored in empty cement bags and to be sent for recycling through scrap dealer. Biodegradable (food waste, paper, etc) solid waste will be disposed in compostpit.	Contractor	Environment Expert PIU/ Field PIU
10	Clean-up, Restoration and Rehabilitation	(i) On completion of construction of bridge, the contractorwill prepare site restoration and demobilization plan, which will be approved by the Environment Expert of PIU. The clean-up and restoration operation are to beimplemented by the contractor prior to demobilization. (ii) The Contractor will clear all temporary structures; dispose all garbage, night soils and POL (Petroleum, Oil and Lubricants) wastes in Environment soundmanner. (iii) Disposal pits or trenches will be filled in and effectively sealedoff. (iv) Construction area including camp, and any other area used/affected due to the bridge construction work will be left clean and tidy at the contractor's expense to the entire satisfaction to the land owner/Environment Expertof PIU.	Contractor	Environment Expert PIU/ Field PIU

Note: - The Contractor has to ensure procurement and placement of labour camp and temporary housing for labours, safety measures, first aid and grievance redress mechanism as mentioned above before starting the project work.

Environment Monitoring

The objectives of environmental monitoring are: to ensure effective implementation of EMP; comply with all applicable Environmental, safety, labour and local legislation; ensure that public opinions and obligations are taken into account and respected to the required satisfaction level; and modify the mitigation measures or implementing additional measures ifrequired.

The environmental monitoring plancontains:

* All performance indicators
* Environment monitoring programme
* Necessary budgetary provisions

Performance Indicators

The physical, biological, and social components identified to be particularly significant in affecting the environment at critical locations have been suggested as Performance Indicators (Pls). The Performance Indicators shall be evaluated under three heads:

a) Environment condition indicators to determine the efficiency of environmental management measures in control of air, noise, and waterpollution.
b) Environment management indicators to determine compliance with the suggested environmental managementmeasures.
c) Performance indicators that have been devised to determine the efficiency and utility of the proposed mitigationmeasures.The Performance Indicators and monitoring plans prepared are presented in the Table below:

The Performance Indicators and monitoring plan

Performance Indicators	**Target**	**Achievement inSemiannually and annually**
Budget	Environment Budget (EMMP Budget)	Expenditure till date
Performance Indicators of Monitoring Plan		
Ambient Air Quality	Total Number of samples as per Environment Monitoring Plan	Total Number of samples collected
Noise Level		
Water Quality		
Soil		
Safety of Workers	List of PPE as per the number of labours	List of PPEs actually provided in the project
Performance Indicators of Environment Mitigation Plan		

Permissions/NoC's/Consents requirement	Target timeline to obtain the permit/NoC/ consents and its validity	List of Permission and NoCs /Consents obtained till dateand status of itsvalidity.
Grievance redressal	Total number of complaints received, its timeline to response and resolution	Actual number of complaints resolved in percentage, response time.
Issues raised in public consultation	Target to attend the issues raised in the Public Consultation	Status of compliance to the issues of public consultation
Information disclosure	List of information and locations where information to be disclosed	Actual locations where information has been disclosed.
Education of site staffonEnvironmenttraining	Total Number of staffs to be trained	No of staff actually
Capacity Building	Total number of sessions to be covered Total Number of contractors, PIUs and DSCs to be covered	Number of Sessions completed and Number of contractors, PIUs and DSCs.
Implementation of EMP mitigation Measures	All items of Environment Management Plan with timeline	Implementation status of EMP items till date
Reporting	List and number of Report to be submitted	List and number of reports submitted

Monitoring, Communication, and Reporting

Monitoring is an essential aspect of environmental and social management plan. An Effective monitoring of the whole project cycle will assist for the implementation of a monitoring plan and coordination of work of the project with concerned stakeholders as well as identify the unexpected problems/outcomes that might come in the physical, biological and socio-economicsectors and facilitate the correction of those. Land use patterns, settlement, health and safety, infrastructure, and implementation of the mitigation measures are a few areas ofmonitoring. PIU and DSC are responsible for regular monitoring and reporting of the implementation of the project.

The Environment monitoring will be carried out at all the project impact areas in a regular or intermittent schedule.

The contractor shall: Appoint an Environmentand OHS Expert to monitor the contractor's compliance with the EMP. The contractor shall also ensure that the Environment Specialist receives full support during the auditing period. The details of monitoring parameters, schedule, and method are presented in the table given below.

Environment monitoring for Air, Water and Noise

S,No	Parameter	Indicators	Method	Location /Schedule	Agencies to be Consulted
1	Air Quality	Dust around the proposed site/ project areas	Visual Observation	Construction site Weekly during construction	FPIU/PIU
2	Noise Quality	Construction equipment's	Observation		
3	Waste Management	Unpleasant odor and visual impact	Visual Observation	Labor camp/ construction sites Weekly during construction	FPIU/PIU
4	Workers and community people accident, Health and Safety issues	Impacts on health of the workers; No. of accidents	Inspection of the construction place; Records of accidents	Project area Continuous during construction period	District hospital/ local health center's
5	Employment	No. of local people employed by project	Records kept by contractor and DSC	Project area Continuous during construction period	FPIU/PIU
6	Air Quality	PM10, PM2.5, SO2, NOx, CO.	High volume sampler Use method specified by CPCB for 24 hr sampling	Once in a Quarter where work is in progress and near sensitive receptors; and at the construction camp sites (except monsoon) for the entire construction	Contractor Monitoring through NABL Accredited Laboratory
7	Water Quality (Drinking & Surface)	Grab sample collected from source and analyze as per standard methods for examination	IS for Inland surface waters (IS:2296,1982) and for drinking water (IS: 105000-2012)	Once in a Quarter, except monsoon season Drinking water samples from the labour camps and from hand pumps, Surface water from the water courses along the proposed site	Contractor Monitoring through NABL Accredited Laboratory
8	Noise	Equivalent noise level using and integrated noise level meter kept at a distance of 15m from edge of pavement Leq in db (A) of day time and nighttime	NAANQM 2000	Once in a Quarter, except monsoon season Near the construction camps, working zones, sensitive receptors at major human settlements	Contractor Monitoring through NABL Accredited Laboratory

APPENDIX – 1

ENVIRONMENT STANDARDS

National Ambient Air Quality Standards

Pollutants	Time Weighted	Industrial Area	Residential Rural &Other	Sensitive Area[3]	Method of Measurement
Sulphur Dioxide (SO_2)	Annual	80µg/ m^3	60µg/ m^3	15µg/ m^3	Improved West and Gaekemethod
	24 hour	120µg/ m^3	80µg/ m^3	30µg/ m^3	Ultraviolet fluoresce
Oxides of Nitrogen (NO_x)	Annual	80µg/ m^3	60µg/ m^3	15µg/ m^3	Jacobe and Hochheiser
	24 hours	120µg/ m^3	80µg/ m^3	30µg/ m^3	Gas phase Chemiluminescence
Carbon Monoxide (CO)	8 hours	5000µg/ m^3	2000µg/ m^3	1000µg/ m^3	Non dispersive infrared spectroscopy
	1 hour	1000µg/ m^3	4000µg/ m^3	2000µg/ m^3	
Hydrocarbon (HC)		Not Establish	Not Established	NotEstablis	
Lead (Pb)	Annual	1.0µg/ m^3	0.75µg/ m^3	0.50µg/ m^3	AAS Method 24 hours after sampling using EPM 20000 or equivalent filter paper
	24 hours	1.5µg/ m^3	1.00µg/ m^3	0.75µg/ m^3	
Respirable Particulate (RPM)- size less than10 µ	Annual	120µg/ m3	60µg/ m3	50µg/ m3	
	24 hours	150µg/ m3	100µg/ m3	75µg/ m3	
Suspended Particulate Matter (SPM)	Annual	360µg/ m3	140µg/ m3	70µg/ m3	Average flow rate not less than 1.1cu.m/minute
	24 hours	500µg/ m3	200µg/ m3	100µg/ m3	

* *Average Arithmetic mean of minimum 104 measurements in a year taken for a week 24 hourly at uniforminterval. 24 hourly/8 hourly values should meet 98 percent of the time in a year.*

Sensitive areas may include:

⇒ One km around the periphery of health resorts so notified by SPCB in consultation with the Department of public Health.

⇒ One km around the periphery of Biosphere Reserves, Sanctuaries, and National parks so notified by MoEFCC.

⇒ One km around the periphery of an Archaeological Monuments declared to be of national importance or otherwise so notified by ASI in consultation with SPCB.

⇒ Areas where crops sensitive to air pollution are grown, so notified by SPCB in consultation with the Department of Agriculture.

⇒ One km around the periphery of tourism or pilgrimage sites due to their religious, historic, scenic or other attraction so notified by the Department of Tourism of the concerned state in construction with SPCB.

Indian Standards of Drinking Water Specifications-IS 10500: 2012

S. No.	Substanceor Characteristic	Requirement (Desirable Limit)	Undesirable Effect outside the DesirableLimit	Permissible Limit in the Absence of Alternate Source	Methods of Test (Ref.To IS)	Remarks
Essential Characteristics						
1.	Colour, Hazen units, Max.	5	Above 5, consumer acceptance decreases	25	3025(Part 4) 1983	Extended to 25 only if toxic substances, in absence of alternate sources
2.	Odour	Unobjectionable	-	-	3025 (Parts 5) 1984	a) Test cold and whenheated b) Tests at severaldilutions
3.	Taste	Agreeable	-	-	3025(Part 7 and 8) 1984	Test to be conducted only after safety has been established
4.	Turbidity NTU, Max.	5	Above 5, consumer acceptance decreases	10	3025 (Part 10) 1984	-
5.	pH Value	6.5 to 8.5	Beyond this range, the water will affect the mucous membrane and /or water supply system	No Relaxation	3025 (Part 11) 1984	-
6.	Total hardness (as $CaCO_3$)mg/L. Max.	300	Encrustation in water supply structure and adverse effects on domestic use	600	3025 (Part 21) 1983	-
7.	Iron (as Fe) mg/L. Max.	0.3	Beyond this limit taste/appearance are affected, has adverse effects on domestic uses and water supply structures, and promotes iron bacteria	1	32 of 3025:1964	-
8.	Chlorides (asCl) mg/L	250	Beyond this limit, taste, corrosion and palatability are affected	1000	3025 (Part 32) 1988	-
9.	Residual,freechlorine ,mg/L, Min	-	-	-	3025 (Part 26) 1986	To be applicable only when water is chlorinated. Tested at consumer end. When protection against viral infection is required, itshould be Min 0.5 mg/l.

Desirable Characteristics						
1.	Dissolved solids mg/L, Max	500	Beyond this palatability decreases and may cause gastrointestinal irritation	2000	3025 (Part 16) 1984	-
2.	Calcium (as Ca) mg/L, max	75	Encrustation in water supply structure and adverse effects on domestic use	200	3025 (Part 40) 1991	-
3.	Magnesium (as Mg) mg/L, Max	30	Encrustation to water supply structure and adverse effects on domestic use	100	16,33,34 of IS 3025: 1964	-
4.	Copper (as Cu) mg/L, Max	0.05	Astringent taste, discoloration and corrosion of pipes, fitting andutensils will be caused beyond this	1.5	36 of 3025: 1964	-
5.	Manganese (as Mn) mg/L,Max	0.1	Beyond this limit taste / appearance are affected, has adverse effectson domestic uses and water supply structures	0.3	35 of 3025:1964	-
6.	Sulphate (asSO4) mg/L,Max	200	Beyond this causes gastrointestinal irritation when magnesium or sodium are present	400	3025 (Part 24) 1986	May be extended up to 400 provided (as Mg) does not exceed 30
7.	Nitrate (as NO2), mg/L,Max	45	Beyond this methemoglobinemia takesplace	100	3025 (Part 34) 1988	-
8.	Fluoride (as F) mg/L, Max	1	Fluoride may be kept as low as possible, high fluoride may cause fluorosis	1.5	23 of 3025: 1964	-
9.	Phenolic compounds (As C5H5OH) mg/L, Max	0.001	Beyond this, it may cause objectionable taste andodor	0.002	54 of 3025: 1964	-
10.	Mercury (as Hg) mg/L, Max	0.001	Beyond this, the water becomes toxic	No relaxation	Mercury io n analyzer	To be tested when pollution issuspected
11.	Cadmium (as Cd), mg/L, Max	0.01	Beyond this, the water becomes toxic	No relaxation	-	To be tested when pollution issuspected
12.	Selenium (as Se), mg/L, Max	0.01	Beyond this, the water becomes toxic	No relaxation	28 0f 3025: 1964	To be tested when pollution issuspected
13.	Arsenic (as As) mg/L, Max	0.05	Beyond this, the water becomes toxic	No relaxation	3025 (Part 37) 1988	To be tested when pollution issuspected
14.	Cyanide (as CN) mg/L,	0.05	Beyond this, the water becomes toxic	No relaxation	3025 (Part 27) 1986	To be tested when pollution issuspected

	Max					
15.	Lead (as Pb) mg/L, Max	0.05	Beyond this, the water becomes toxic	No relaxation	-	To be tested when pollution is suspected
16.	Zinc (as Zn) mg/L,	5	Beyond this limit it can cause	15	39 0f 3025:	To be tested when pollution
	Max		astringent taste and an opalescence in water		1964	is suspected
17.	Amonic detergent (as MBAS) mg/L, Max	0.2	Beyond this limit it can cause a light froth in water	1	Methylene-blue extraction method	To be tested when pollution issuspected
18.	Chromium (as Cr+) mg/L, max	0.05	May be carcinogenic above this limit	-	38 of 3025: 1964	To be tested when pollution issuspected
19.	Polynuclear aromatic hydrocarbon (as PAH) g/L, Max	-	May be carcinogenic above this limit	-	-	-
20.	Mineral oil mg/L, Max	0.01	Beyond this limit undesirable taste and odor after chlorination takeplace	0.03	Gas Chromatograph	-
21.	Pesticides mg/L, Max	Absent	Toxic	0.001	-	-
22.	RadioactiveAlpha emitters Bq/L,Max	-	-	0.1	58 of 3025: 01964	-
23.	Radioactive Bet a emitters pci/L,Max	-	-	1	58 of 3025: 01964	-
24.	Aluminium (as Al), mg/L Max	200	Beyond limit taste becomes thi s unpleasant	600	13 of 3025: 1964	-
25.	Aluminium (as Al), mg/L Max	0.03	Cumulative effect is reported to cause dementia	0.2	31 of 3025: 1964	-
26.	Boron, mg/L, Max	1	-	5	29 of 3025: 1964	-

Source: Indian Standard Drinking water Specification- IS 10500: 2012 ®

Noise Level Standards

Category	Noise level for Day Time Leq dB (A)	Noise level for Night Time dB (A)
Industrial area	75	70
Commercial area	65	55
Residential area	55	45
Silence Zone	50	40

Note:

Day Time- 6.00 am –10.00 pm (16hours)

Night Time- 10.00 pm –6.00 am (8hours)

***Silence Zone**: The silence zone includes a radius of 100 m around premises where loud noise is prohibited (including hospitals and educational institutions)*

Source: CPCB, 1989, GOI.

Standards for Suspended Particulate Matter for Stone CrushingUnit

The suspended particulate matter measured between 3 to 10 meters from any process equipment of a stone crushing unit shall not exceed 600$\mu g/m^3$

(Source: EPA Notification [G.S.R. 742(E) dt. 30th Aug; 1990] & [S.O. 8(E) dt. Dec. 31, 1990)