

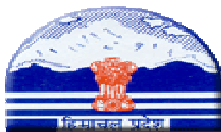
Himachal Pradesh State Roads Transformation Program

(Funded by World Bank)

Baddi Sai-Ramshahr (Km 11.500 to 45.00)

Environment and Social Management Plan

(Draft)



**HIMACHAL PRADESH ROAD & OTHER INFRASTRUCTURE
DEVELOPMENT CORPORATION LTD.**
(Government of Himachal Pradesh Undertaking)
(An ISO 9001:2008 QMS & ISO 14001:2004 EMS conforming company)

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1. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

1.1 DESCRIPTION OF THE PROJECT ROAD

The total length of the Baddi- Sai- Ramshahr road (MDR-07) is 34.00 Km. The project road completely falls in district Solan of Himachal Pradesh. The project road starts from Baddi traverses in rolling & hilly terrain and terminates at Ramshahr, which is a tourist station and famous for Nalagarh fort built in 15th century. Baddi, Barotiwala and Nalagarh are famous industrial areas and known as BBNIA (Baddi-Barotiwala-Nalagarh Industrial Area) belt. The latitude and longitude of the project road (Baddi-Ramshehr) are 30.9636°N & 31.0892°N, and 76.8155°E & 76.7957°E respectively. The altitude of project corridor from Baddi to Ramshahr ranges between 472-1000 m above mean sea level.

The existing width of carriage way varies from 3 to 5m from km 11/500 to km 44/726. The project design aims to provide congestion free, safe and smooth road to the road users travelling through the project road. The concurrent objective of widening and strengthening of project road is for achieving sustainable development of the region, state and ultimately to the country. The location map/index map of the project road has been shown in Figure 1.1.

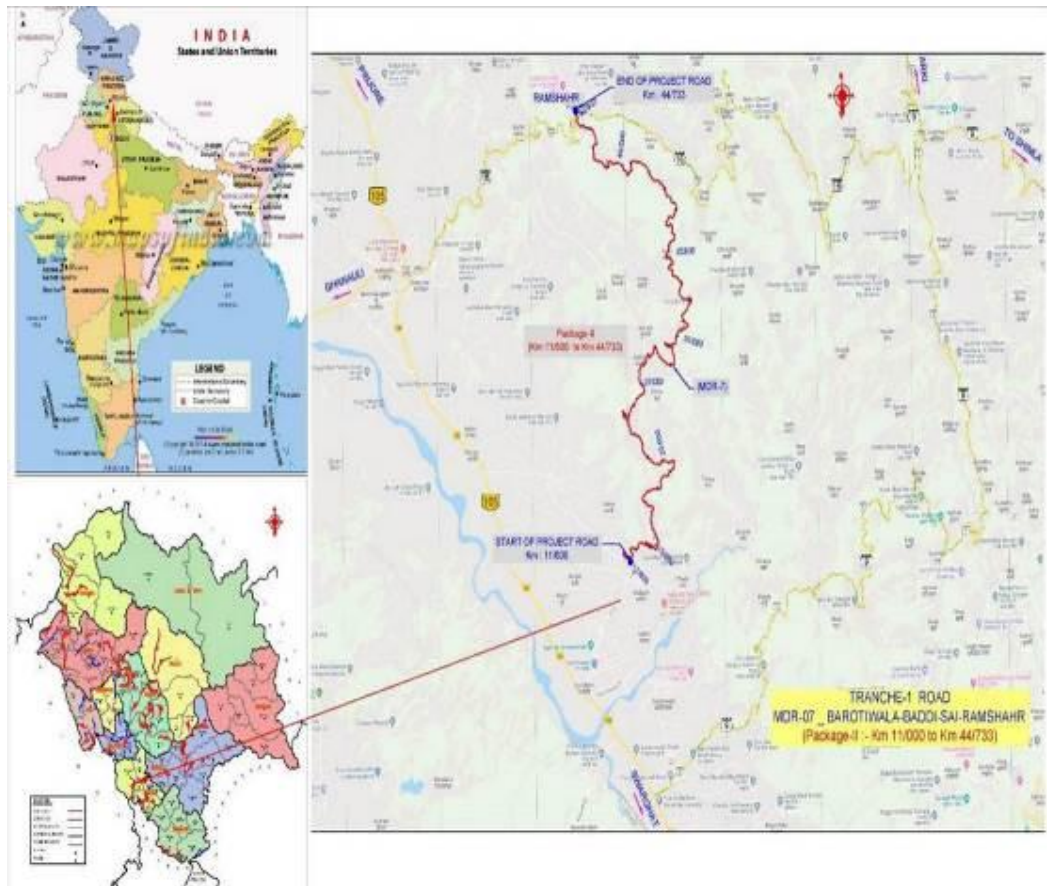


Figure 1.1: Location Map of the project

1.2 OBJECTIVES

The main objective of Environmental and Social Management Plan is to mitigate the various adverse impacts and enhance positive impacts of the project. The objectives at various stages of the project planning, design and implementation stages are as follows.

Design Phase

- To address the preconstruction adverse social impacts such as impacts on private assets ó residential, commercial structures etc and also CPRs through commensurate mitigation measures
- To minimize impact on roadside trees and vegetation cover.
- To incorporate safety of road users and roadside communities in project design.
- To provide mitigation measures to all anticipated environmental degradation.
- To develop a design that incorporate environmental safeguards.

Construction Stage

- To prevent and reduce the negative environmental impacts of the project by implementing the mitigation measures to be carried out by the contractor.
- To ensure that the provision of the ESMP (Environment & Social Management Plan) are strictly followed and implemented by strengthening implementation arrangement.
- To address the construction stage social impacts arising due to various project activities enroute the corridor and particularly at habitations through specific measures that need to be applied across and certain specific measures that shall be determined on a case by case basis.

Operation Stage

- To monitor deterioration of natural environmental components of air, water, soil and noise, etc.
- To improve the safety of road users and the roadside communities.

1.3 SCOPE

The Environmental and Social Management Plan (ESMP) consists of the set of mitigation, monitoring and institutional measures to be taken during the design, construction and operation phase of the project to eliminate adverse social and environmental impacts, to compensate them, offset them, or to reduce them to acceptable levels in accordance with the mitigation hierarchy. The plan also includes the actions needed for the implementation of these measures.

The major components of the Environmental and Social Management Plan are:

- Mitigation of potentially adverse impacts;
- Integration of ESMP with Project planning, design, construction and operation;
- Environment Enhancement Measures;
- Environment and Social Management Plan
- Institutional Capacity Building and Training;
- Implementation Schedule and Environmental Cost Estimates;
- Monitoring during project implementation and operations;

1.4 CONTEXT FOR THE ESMP

This Environmental & Social Management Plan for Baddi ó Sai ó Ramshahr Road (MDR 7) is based on the findings of ESIA (Environmental and Social Impact Assessment) carried out in the project corridor and provides for effective implementation of the environmental and social management measures required for addressing the potential environmental and social impacts. This Environmental & Social Management Plan

assists HPRIDC and the contractor to implement the environmental and social management measures effectively.

1.5 CRITICAL IMPACTS TO BE ADDRESSED

The key environmental components that may be impacted are identified in the ESIA report. The most critical issues to be addressed in ESMP are described in Table 1-1.

Table 1-1 Key Environmental Issues to be Addressed

| Key Environmental Issues | Locations |
|--|--|
| Management of excess debris generated due to hill excavation | Along the entire road Stretch due to excavation of hill and demolition activities. Excess quantity of debris to be disposed off (207,938m ³). |
| Traffic congestion due to development close to the road including Pedestrian and Traffic Safety | Along settlements areas of road. The major settlement areas along road are Baddi, Dharpur, Sai, Baila and Ramshahr. Km 20+200, 22+450, 25+780 and 30+350 are locations with sensitive receptors and would require addressing of safety related issues. |
| Air Quality at sensitive receptors | Hospitals, educational institutions other settlement areas e.g Km 20+200, 22+450, 25+780 and 30+350 |
| High Noise Level Exposure | At sensitive receptors in settlements along the road length (Km 20+200, 22+450, 25+780 and 30+350) |
| Removal of vegetation cover/roadside tree plantation | Along roadside. There exist 1766 trees in RoW. |
| Presence of invasive species | Along the entire road stretch except settlements areas |
| Loss of land due to land-slides resulting from hill cutting activities | Along the entire road Stretch due to excavation of hill and demolition activities |
| Cracks in structures or damage due to construction works e.g.hill cutting activities | -same as above- |
| Drying up of seasons springs or streams due to construction works | -same as above- |
| Disruption to services such as water supply, power supply | -same as above- |
| Disruption to access from houses and shops to roads; | -same as above- |
| Disruption to traffic movement leading to time delays; | -same as above- |
| differential impacts on vulnerable and disadvantaged population | -same as above- |
| Dust emissions during construction leading to impacts on crops and trees | -same as above- |
| Likelihood of increased accidents due to road widening; | -same as above- |
| Possibility of gender-based violence arising from influx of migrant labor a common practice in Himachal Pradesh; and | -same as above- |
| Labour Influx from outside the district | -same as above- |
| Likelihood of spread of HIV/AIDS among construction workers and road side community. | -same as above- |

Key social issues and impacts during pre-construction and construction stage that need to be addressed

Pre-construction stage

- Loss of structures used for residential, commercial and other purposes and associated loss of livelihood i.e., loss of livelihood due to impacts on sources of earning;
- impacts on non-titleholders (encroachers)
- Loss of other properties and assets such as boundary walls, ponds etc.;
- Partial/minor of common property resources such as religious shrines/structures, school building, health centres, water resources (hand pumps), bus/rain shelters, etc.;
- Temporary or permanent disruption of livelihood due to clearing of RoW particularly, petty shop owners and encroachers;

Construction Stage

- Loss of land due to land-slides resulting from hill cutting activities
- Cracks in structures or damage due to construction works e.g.hill cutting activities
- Drying up of seasons springs or streams due to construction works

- Temporary or short duration or prolonged disruption to services such as water supply, power supply
- Disruption to access from houses or shops to the road;
- Disruption to traffic movement leading to time delays;
- differential impacts on vulnerable and disadvantaged population such as constraining their access, movement;
- Dust emissions during construction leading to impacts on crops and trees resulting in lower yield or growth;
- Likelihood of increased accidents due to increased traffic movement following road improvements;
- Possibility of gender-based violence arising from influx of migrant labor for construction works or a common practice in Himachal Pradesh; and
- Likelihood of spread of HIV/AIDS among construction workers and road side community.

1.6 METHODOLOGY FOR ESMP PREPARATION

The comprehensive environmental management approach for the project involves following key steps and processes.

- a) **Preliminary Environmental & Social Screening:** This step involved an initial desk review of the available information about the project road. The exercise helped in identifying the key/significant potential environmental & Social impacts.
- b) **Detailed Environmental & Social Screening:** The purpose of environmental screening was to get an overview of the nature, scale and magnitude of the issues in order to determine the project feasibility and proper scoping of the detailed ESIA.
- c) **Environmental & Social risks/Impact Assessment:** ESIA involved comprehensive study that involves through documentation of existing conditions and identification of impacts with comparison of alternative project design options.
- d) **Environmental & Social Management Plan:** Preparation of ESMP involved the identification and development of measures aimed at avoiding, mitigating and offsetting or reducing impacts to levels that are environmentally accepted during implementation and operation of the project road. ESMP provides an essential link between the impacts predicted and mitigation measures specified within the ESIA and implementation and operation activities.

For developing the ESMP; findings from the stake holder/Public consultation process including suggestions from domain experts, project affected people and vulnerable people were considered.

For addressing pre-construction social impacts, a separate RAP has been prepared.

1.7 LEGAL REQUIREMENTS

The Government of India has laid out various policy guidelines, acts and regulations pertaining to sustenance of environment. The Environment (Protection) Act, 1986 is umbrella legislation for the protection of environment and under this act, the responsibility to administer the legislation has been jointly entrusted to the Ministry of Environment, Forests and Climate Change (MoEF&CC), and the Central Pollution Control Board (CPCB) at Government of India (GoI) level and the State Pollution Control Boards (SPCB) at the respective state levels which in the present case Himachal Pradesh State Pollution Control

Board (HPSPCB), Government of Himachal Pradesh (GoHP). The lists of all applicable regulations at GoI and state levels are provided in the Table 1-2 below.

Table 1-2 Summaries of Applicable Environmental and Social Regulations of GOI/GoHP

| S.No. | Act / Rules | Applicability |
|-------|---|---------------|
| 1. | Environmental protection Act, 1986 and subsequent amendments | Yes |
| 2. | The Forest (Conservation) Act. 1980 | Yes |
| 3. | MoEF&CC circular (1998) on linear Plantation on roadside, canals and railway lines modifying the applicability of provisions of forest (Conversation) Act, to linear Plantation | Yes |
| 4. | Air (Prevention and Control of Pollution) Act, 1981 | Yes |
| 5. | Water (Prevention and Control of Pollution) Act, 1974 | Yes |
| 6. | Noise Pollution (Regulation and Control Act) 1990 | Yes |
| 7. | The Mines and Minerals (Development and Regulation) Act 1957 | Yes |
| 8. | National Resource Efficiency Policy, 2019 (Draft) | Yes |
| 9. | Hazardous Wastes (Management, Handling and Trans-boundary Movement) Rules, 2008. | Yes |
| 10. | Batteries (Management and Handling) Rules, 2001 | Yes |
| 11. | Central Motor Vehicle Act 1988 and Central Motor Vehicle Rules 1989 | Yes |
| 12. | National Labour Act, 1970. | Yes |
| 13. | Public Liability and Insurance Act 1991 | Yes |
| 14. | Building and Other Construction act, 2006 | Yes |
| 15. | The Petroleum Rules, 2002 | Yes |
| 16. | The E-Waste (Management) Rules, 2016, | Yes |
| 17. | Plastic waste Management Rules, 2016 | Yes |
| 18. | State Groundwater Acts and Rules | Yes |
| 19. | Construction & Demolition, Waste Management Rules, 2016 | Yes. |
| 20. | Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013 (RFCTLARR) | Yes |
| 21. | The Himachal Pradesh Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement (Social Impact Assessment and Consent) Rules 2015, | Yes |
| 22. | Acquisition of Land by Private Negotiation and Upkeep of Land Record/General Guidelines and Instruction (Standing Order No .28) (PBW(B)F(5)40/2017-PWD/ GoHP, January 2018 | Yes |
| 23. | The Himachal Pradesh Road Infrastructure Protection Act, 2002 (and Rules 2004) | Yes |
| 24. | The Himachal Pradesh roadside land control act 1968 | Yes |
| 25. | The Right to Information Act, 2005 | Yes |
| 26. | The Rights of Persons with Disabilities Act, 2016 | Yes |
| 27. | Workmen's Compensation Act 1923 | Yes |
| 28. | Child Labour (Prohibition and Regulation) Act ,1986, | Yes |
| 29. | Inter-State Migrant Workmenø (Regulation of Employment and Conditions of Service) Act, 1979, | Yes |
| 30. | Minimum Wages Act, 1948 | Yes |

1.10 World Bank ESF Policy, Directives and Standards – Extent of Relevance

The Environmental and Social Framework (ESF) has become applicable to all investment Project financing operations by the World Bank since, Oct 2018. The ESF protects people and the environment from potential adverse impacts that could arise from Bank-financed projects, and promotes sustainable development.

The Environmental and Social Standards (ESS) 1 to 10 of ESF, 2018, which gets triggered due to the Baddi-Sai-Ramshehr project road, are presented in the Table 1-3.

Table 1-3: Environmental and Social Standards (1 to 10) under ESF 2018, World Bank

| S.No | World Bank ESS Policy, Standards, Directive | Relevance |
|------|---|--------------|
| 1. | World Bank Environment and Social Policy for Investment Project Financing | Relevance |
| 2. | ESS-1: Assessment and Management of Environmental and Social Risks and Impacts | Relevant |
| 3. | ESS-2: Labour-and-Working-Conditions | Relevant |
| 4. | ESS-3:Resource-Efficiency-and-Pollution-Prevention-and-Management | Relevant |
| 5. | ESS-4: Community-Health-and-Safety | Relevant |
| 6. | ESS-5:Land-Acquisition-Restrictions-on-Land-Use-and-Involuntary-Resettlement | Relevant |
| 7. | ESS-6: Biodiversity-Conservation | Relevant |
| 8. | ESS-7: Indigenous-Peoples | Not relevant |
| 9. | ESS-8: Cultural-Heritage | Relevant |
| 10. | ESS-9: Financial-Intermediaries | Not relevant |
| 11. | ESS-10: Stakeholder-Engagement-and-Information-Disclosure | Relevant |
| 12. | Environmental and Social Directive for Investment Project Financing | Relevant |
| 13. | Bank Directive Addressing Risks and Impacts on Disadvantaged or Vulnerable Individuals or Groups | Relevant |
| 14. | World Bank's Guidance note on managing the risks of adverse impacts on communities from temporary project induced labour influx, 2016 | Relevant |
| 15. | General EHS Guidelines, April, 2007, IFC | Relevant |
| 16. | EHS Guidelines for Construction Materials Extraction, April, 2007, IFC | Relevant |

2. ENVIRONMENTAL AND SOCIAL RISKS AND MITIGATION MEASURES

2.1 SUMMARY OF RISK/IMPACTS

Identification of Environmental and social Risks/Impacts was carried during ESIA process is summarized as follows in table 2-1.

Table 2-1: Environmental and Social Risks/Impacts

| Components | Environmental and social Risks | Risk Type |
|------------------------------|--|---------------|
| • Construction Phase | | |
| Topography & Geology | <ul style="list-style-type: none"> Change in existing profile of the land due to earthwork and rock excavation. Disturbance on geological setting due to hill side cutting/quarrying resulting in the accumulation of debris material. | Low risk |
| Soil | <ul style="list-style-type: none"> Loosening of topsoil & loss of vegetative cover along the road due to excavation and back filling which will lead to enhanced soil erosion. | Low risk |
| Land Use | <ul style="list-style-type: none"> Generation of debris waste in the form of excavated material/construction spoils from construction sites. Changes in existing land use pattern of the ROW for construction of the road. Roadside agricultural land will be affected by unauthorised debris disposal. | Moderate risk |
| Drainage | <ul style="list-style-type: none"> Chances of filling of existing drainage courses during earth filling. Scouring of land in the outfall locations of culverts. | Moderate risk |
| Water Use | <ul style="list-style-type: none"> Impact on the local water sources due to its usage as construction water. | Low risk |
| Water Quality | <ul style="list-style-type: none"> Increase of sediment load in the runoff from construction sites and increase in turbidity in receiving streams/water bodies. Water pollution due to sewage from construction camps. | Moderate risk |
| Air Quality | <ul style="list-style-type: none"> Deterioration of air quality due to fugitive dust emission from construction activities like excavation, backfilling & concreting, hauling & dumping of earth materials & construction spoils, and vehicular movement along unpaved roads. Deterioration of air quality due to gaseous emissions from construction activities. | Moderate risk |
| Noise Level | <ul style="list-style-type: none"> Increase in noise level due to construction activities like operation of construction equipment and vehicular traffic. | Moderate risk |
| Flora and Fauna | <ul style="list-style-type: none"> Loss of flora & loss of habitat of fauna due to felling of trees along the ROW. | Low risk |
| Construction Camp | <ul style="list-style-type: none"> Influx of construction work force and supplier who are likely to construct temporary sheds in the vicinity. Likely sanitation and health hazards & other impacts on the surrounding environment due to inflow of construction labourers. Health risks due to lack of health and sanitation conditions through disposal of sewage on open land which may cause mosquito nuisance, water borne diseases etc. Chances of spread of sexually transmittable diseases like AIDs. | Moderate risk |
| Occupational Health & Safety | <ul style="list-style-type: none"> Health & safety related problems to construction workers due to inadequate health & safety measures. | Moderate risk |
| Road Safety | <ul style="list-style-type: none"> Increase on incidence of road accidents due to disruptions caused in existing traffic movements. | Moderate risk |
| • Operational Phase | | |
| Land Use & Encroachment | <ul style="list-style-type: none"> Change of land use by squatter/ encroachment within ROW and induced development outside the ROW. New spaces generated due to shift in alignment could be encroached by local people or other people. | Moderate risk |
| Drainage | <ul style="list-style-type: none"> Environment degradation is due to improper maintenance of drainage. | Moderate risk |
| Air Quality | <ul style="list-style-type: none"> Air pollution due to vehicular emission from road traffic. | Low risk |
| Noise Level | <ul style="list-style-type: none"> Noise pollution due to increased traffic. | Low risk |
| Access | <ul style="list-style-type: none"> Significant severance problem on pedestrian & animal crossing and cross traffic due to widening, partially access control & increase in traffic speed. | Low risk |
| Road Safety | <ul style="list-style-type: none"> Impacts on human health due to accidents. Damage of road due to wear and tear. | Low risk |

| Components | Environmental and social Risks | Risk Type |
|--------------------|---|---------------|
| Land Acquisition | <ul style="list-style-type: none"> Design Measures suggests that there is no land acquisition from private parties | Low risk |
| Private structures | <ul style="list-style-type: none"> Encroachment of 22 structures(13 residential and 9 comercial) of structures will be adequately compensated as per RPF .A RAP will be prepared to mitigate the measures.No displacement will take place due to removal of structures, the impacts are partial. | Moderate risk |

2.2 MITIGATION MEASURES

To address above risks, mitigation measures have been proposed and have been included in various design proposals (as described below) and site-specific enhancement or management plans. These are;

2.2.1 Design Proposals

2.2.1.1 Provision of Protection Measures

Based on the designed alignment and topographic survey results, the location, where the normal fill slopes cannot be used due to the topographic conditions, retaining walls have been provided. Stone Masonry will be used for the retaining wall and breast wall construction respectively. The locations of the proposed protection measures are provided in Table 2-2.

Table 2-2: Locations of the proposed protection measures

| S. No. | Chainage | | Length (meters) | Side |
|--------------|-----------|---------|-----------------|------|
| | From (Km) | To (Km) | | |
| 1 | 11+900 | 13+880 | 1980 | LHS |
| 2 | 13+880 | 14+270 | 390 | RHS |
| 3 | 14+270 | 22+730 | 8460 | LHS |
| 4 | 22+730 | 23+200 | 470 | RHS |
| 5 | 23+200 | 29+240 | 6040 | LHS |
| 6 | 29+240 | 44+726 | 15485.9 | RHS |
| TOTAL | | | 33776 | |

2.2.1.2 Provision for Bio Engineering Interventions

Provisions made for the bioengineering interventions covers areas/locations along the RoW at upstream and downstream of seasonal streams, CD structures, muck/debris disposal sites, areas reclaimed /open areas in RoW, areas of cleared of invasive vegetation among others. Based on the slope angles, slope stability and suitability of Bio engineering interventions, the following has been considered as given in table 2-3.

Table 2-3 Provision of Bioengineering Interventions

| S No | Chainage (km) | DESCRIPTION OF WORKS |
|------|------------------|--|
| 1 | 14+200 to 44+700 | <ul style="list-style-type: none"> Hill side: large stature grass plantation alongside 4m breath. Valley side: 2 rows brush layering and grass seed sowing. Fascine 5 % of Brush Layer (BL). |
| 2 | 14+200 to 44+700 | <ul style="list-style-type: none"> Hill side: large stature grass plantation. Valley side: 2 rows brush layering and grass seed sowing. Fascine 5 % of Brush Layer (BL) Protection of 8 nos of Conservation ponds each having (10m X 10m) 100 m² area. Plantation of large stature grass on all sides of pond 2 m high. Hedge row plantation at edges on 3 sides. |
| 3 | | Pilot sites |
| 3a | 18+550 to 18+580 | <ul style="list-style-type: none"> Bamboo Crib Wall (BCW) 30 m and 5 layers; Bamboo plantation 100m² area for each bamboo; Large stature grass plantation in remaining area. |
| 3b | 25+500 to 27+500 | <ul style="list-style-type: none"> Hedge Row Plantation (HRP-) 2000 m |
| 3c | 31+950 to 32+00 | <ul style="list-style-type: none"> Bamboo Crib Wall (BCW) 50 m 5 row; Hedge Brush Layer (HBL) 50m, 5 row |

| S No | Chainage (km) | DESCRIPTION OF WORKS |
|---------|------------------|--|
| 3d | 32+840 to 32+870 | • Brush Layer (BL) 4 row; grass row 5 layers, 5 plants per RM |
| 3e | 43+800 to 43+840 | • Large stature grass slip plantation |
| 3f (i) | 43+370 to 44+600 | • Large stature grass slip plantation |
| 3f (ii) | 43+370 to 44+600 | • 4 layers Brush Layer(BL) |
| 3g | 44+100 to 44+120 | • Bamboo Crib Wall (BCW) 5 row; Hedge Brush Layer (HBL) HBL 4 row; Fascine 2m long, 3 nos; Palisade 2m |

2.2.1.3 Provision of Drainage

Based on topography, three types of surface drains have been proposed for the project and schedule for same is given in table 2-4. These two types are;

V-Shaped and Trapezoidal Drain: These drain is provided normally in the cut slopes located in hilly and rolling terrain, this drain is of lined in nature. Predominant lengths in hilly areas are provided with this drain type.

Rectangular Drain: For the locations, such as built up areas and those with pedestrian movements rectangular drains have been proposed. As per the requirement, it is provided on one side or both sides of the project road.

Table 2-4: Drainage Provisions

| S.No | Chainage (km) | | Length (km) | Type of Drain | |
|------|---------------|--------|-------------|---------------|-------------|
| | From | To | | Left Side | Right Side |
| 1 | 11+650 | 11+800 | 150 | Trapezoidal | - |
| 2 | 11+800 | 11+900 | 100 | - | Trapezoidal |
| 3 | 11+900 | 12+410 | 510 | Trapezoidal | - |
| 4 | 12+410 | 12+440 | 30 | Trapezoidal | - |
| 5 | 12+440 | 12+550 | 110 | Trapezoidal | - |
| 6 | 12+550 | 12+750 | 200 | V-Shaped | - |
| 7 | 12+750 | 12+950 | 200 | Trapezoidal | - |
| 8 | 12+950 | 12+980 | 30 | Trapezoidal | - |
| 9 | 12+980 | 13+160 | 180 | Trapezoidal | - |
| 10 | 13+160 | 13+190 | 30 | Trapezoidal | - |
| 11 | 13+190 | 13+880 | 690 | Trapezoidal | - |
| 12 | 13+880 | 13+920 | 40 | - | Trapezoidal |
| 13 | 13+920 | 14+000 | 80 | Trapezoidal | - |
| 14 | 14+000 | 14+270 | 270 | - | Trapezoidal |
| 15 | 14+270 | 14+560 | 290 | Trapezoidal | - |
| 16 | 14+560 | 14+730 | 170 | Trapezoidal | - |
| 17 | 14+730 | 14+900 | 170 | Trapezoidal | - |
| 18 | 14+900 | 15+000 | 100 | V | - |
| 19 | 15+000 | 15+960 | 960 | Trapezoidal | - |
| 20 | 15+960 | 15+990 | 30 | Trapezoidal | - |
| 21 | 15+990 | 16+920 | 930 | Trapezoidal | - |
| 22 | 16+920 | 17+000 | 80 | Trapezoidal | - |
| 23 | 17+000 | 21+250 | 4250 | Trapezoidal | - |
| 24 | 21+250 | 21+350 | 100 | V-Shaped | - |
| 25 | 21+350 | 22+550 | 1200 | Trapezoidal | - |
| 26 | 22+550 | 22+730 | 180 | V | - |
| 27 | 22+730 | 23+200 | 470 | - | Trapezoidal |
| 28 | 23+200 | 25+650 | 2450 | Trapezoidal | - |
| 29 | 25+650 | 26+400 | 750 | V-Shaped | - |
| 30 | 26+400 | 26+450 | 50 | Trapezoidal | - |
| 31 | 26+450 | 26+920 | 470 | V-Shaped | - |

| S.No | Chainage (km) | | Length (km) | Type of Drain | |
|------|---------------|--------|-------------|---------------|-------------|
| | From | To | | Left Side | Right Side |
| 32 | 26+920 | 27+350 | 430 | Trapezoidal | - |
| 33 | 27+350 | 27+400 | 50 | Trapezoidal | - |
| 34 | 27+400 | 27+600 | 200 | Trapezoidal | - |
| 35 | 27+600 | 27+950 | 350 | V-Shaped | - |
| 36 | 27+950 | 29+240 | 1290 | Trapezoidal | - |
| 37 | 29+240 | 29+750 | 510 | - | Trapezoidal |
| 38 | 29+750 | 29+800 | 50 | Trapezoidal | - |
| 39 | 29+800 | 31+500 | 1700 | - | Trapezoidal |
| 40 | 31+500 | 31+600 | 100 | Trapezoidal | - |
| 41 | 31+600 | 31+920 | 320 | - | Trapezoidal |
| 42 | 31+920 | 31+950 | 30 | Trapezoidal | - |
| 43 | 31+950 | 32+720 | 770 | - | Trapezoidal |
| 44 | 32+720 | 32+770 | 50 | Trapezoidal | - |
| 45 | 32+770 | 37+530 | 4760 | - | Trapezoidal |
| 46 | 37+530 | 37+560 | 30 | Trapezoidal | - |
| 47 | 37+560 | 38+180 | 620 | - | Trapezoidal |
| 48 | 38+180 | 38+740 | 560 | V-Shaped | - |
| 49 | 38+740 | 43+025 | 4285 | - | Trapezoidal |
| 50 | 43+025 | 43+055 | 30 | Trapezoidal | - |
| 51 | 43+055 | 44+600 | 1545 | - | Trapezoidal |
| 52 | 44+600 | 44+726 | 125.909 | - | Rectangular |

2.2.1.4 Provision of Cross drainage structure

Surface drains are further connected to culverts so that water can be channelized down the valley. Erosion control measures in the form of step apron have been provided at the outlet of the culvert. In total there are 179 culverts, which will be improved or constructed new.

2.2.1.5 Bus Stops/ Rain Shelters

List of Bus shelters/Rain shelters as given below in table 2-5.

Table 2-5: List of Bus shelters/Rain shelters

| S. No | Chainage | Bus Stop provisions (RHS/LHS) |
|-------|----------|-------------------------------|
| 1 | 16+250 | RHS |
| 2 | 19+440 | RHS |
| 3 | 22+695 | LHS |
| 4 | 24+830 | RHS |
| 5 | 26+130 | RHS |
| 6 | 26+147 | RHS |
| 7 | 26+360 | RHS |
| 8 | 34+640 | LHS |
| 9 | 38+332 | RHS |

2.2.1.6 Improvement of Major/Minor Intersections

To establish better connectivity to the nearby towns, villages/ settlements, the major/minor intersections along the project road has been designed the details are given in the table 2-6 (Major/minor junctions).

Table 2-6 Lists of Major/Minor Junctions to be Improved

| S. No. | Chainage | Type of Junction | Name of Intersection | Type of Junction (+,T,Y) | Cross Road Leads to |
|--------------|----------|------------------|----------------------|--------------------------|---------------------|
| Major | | | | | |
| 1 | 11+511 | Major | Sai Jn | Y | Jhanur |
| 2 | 44+725 | Major | Ramshar | + | - |
| Minor | | | | | |
| 1 | 24+749 | Minor | Kasodi Jn | Y | Kasodi |
| 2 | 26+350 | Minor | Nallaghat Jn | Y | Nallagad |
| 3 | 28+152 | Minor | - | T | Dhared |
| 4 | 29+655 | Minor | Gurukundra | Y | Talli |
| 5 | 29+684 | Minor | - | Y | Thallab |
| 6 | 31+400 | Minor | - | Y | - |
| 7 | 35+042 | Minor | - | Y | - |
| 8 | 41+132 | Minor | - | Y | - |

2.2.1.7 Safety Measures:

To ensure safe movement of traffic/people along the road, safeguard measures like information/caution boards, object markers, chevrons etc. has been proposed. Quantity of road signage proposed is given in table 2-7.

Table 2-7 Summary of Road Signs for Project Road

| S. No | Description | Unit | No. |
|----------|---|------|------|
| A | Informatory Signs | | |
| | a) Facility information Signs of size 800mm x 600mm | Nos. | 46 |
| | b) Direction / Place Identification signs | Nos. | 110 |
| | c) Advance Direction / Destination / Reassurance / Place Identification signs | Nos. | 30 |
| | e) Route marker signs | Nos. | 32 |
| B | Mandatory Signs, Size | | |
| | a) Circular of size 900mm | Nos. | 34 |
| | b) Octagonal of size 900mm | Nos. | 35 |
| | c) Triangular of size 900mm | Nos. | 178 |
| c | Object Marker (Hazardous) | Nos. | 812 |
| D | Chevron Signs (Hazardous) | Nos | 3378 |

2.2.2 Site Specific Management Measures

As part of the Environmental and Social Impact Assessment, consultations were held in the project road at various locations. The outcome of the consultations was noted and for the discussed impacts and suggested mitigation/enhancement measures have been proposed on locations, as given in table 2-8.

Table 2-8: Provision of Specific management or Enhancement measures

| Chainage (km) | Ref Doc. (Appendix 18) | Specific Enhancement Measures |
|---------------|------------------------|--|
| 22+980 | HP/BAR-RAM/WH-1 | To enhance rain water harvesting structures along the roadsides. |
| 23+180 | HP/BAR-RAM/WH-2 | |
| 23+240 | | |
| 24+780 | HP/BAR-RAM/WH-3 | |
| 26+910 | HP/BAR-RAM/WH-4 | |
| 29+740 | HP/BAR-RAM/WH-5 | |
| 33+800 | HP/BAR-RAM/WH-6 | |

| Chainage (km) | Ref Doc. (Appendix 18) | Specific Enhancement Measures |
|---------------|------------------------|---|
| 42+370 | HP/BAR-RAM/WH-7 | To enhance roadside Natural water sources. |
| 43+800 | HP/BAR-RAM/WH-8 | |
| 24+780 | HP/BAR-RAM/WH-3 | |
| 38+730 | HP/BAR-RAM/WH-9 | |
| 38+770 | | |
| 20+200 | HP/BAR-RAM/MISC-024 | Provision of Noise barriers (masonry wall) for sensitive receptors -Schools |
| 22+450 | | |
| 30+350 | | |

During consultation, the presence of stray animals was also observed along the project road, which triggers the chances of animal-vehicle collision, especially during night. It has been proposed that HPRIDC would engage an agency (e.g., NGO etc.) to identify/find stray animals along project road, and a retro refractive belt will be tied around their neck/horns to avoid traffic-animal collisions. Also, Crematorium at Km 24+900 will be enhanced by provision of sitting arrangements and water tank.

Photographs of some locations, where enhancement measures have been proposed are given below.



Km 22+490



Km 23+180 & 23+240



Km 24+800



Km 26+910



Km 29+740



Km 33+800



Km 24+780



Km 38+730



Km 38+770



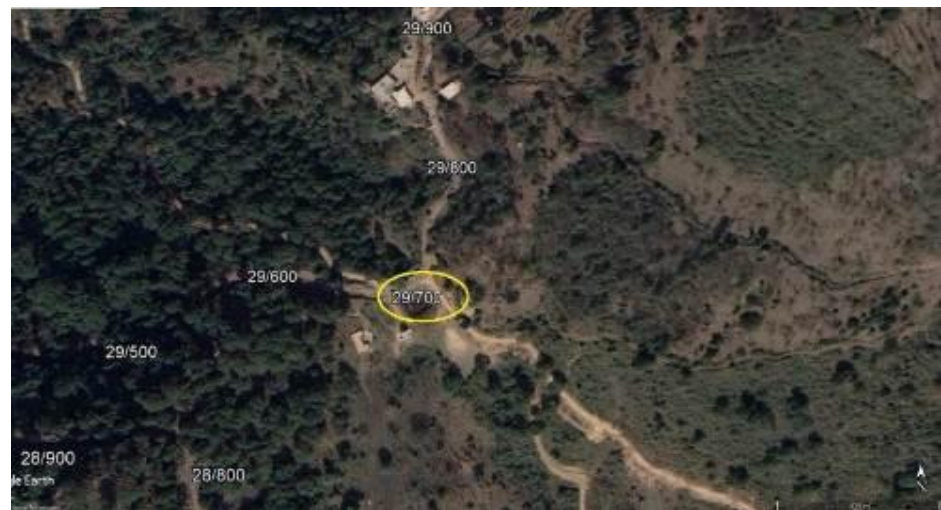
Km 42+370



Km 23+000, 23+180 & 23+230



Km 24+750, 24+900



Km 29+700



Km 33+800



Km 42+450



Km 44+100

3. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

Descriptions of the various management measures during various stages (Pre-construction, Construction & Operation Phase) of the project have been provided in Table 3.1 EMAP (Environment Management Action Plan).

3.1 PRE-CONSTRUCTION ACTIVITIES

Pre-Construction Activities by Project Implementation Unit (ESMU)

Prior to the Contractor mobilization, the PIU will ensure that an encumbrance free road section is handed over to enable the start of construction. The RoW clearance involves 1) compensation and removal of private structures; 2) Forest land acquisition, if the existing land use is with forest (Presently, joint verification of land ownership along forest stretches is underway between PWD, Revenue Department and Forest Departments of GoHP.) 3) Removal of trees. 4) Relocation of private/common property resources impacted.

Pre-Construction Activities by Contractor

The pre-construction stage involves mobilization of the Contractor, the activities undertaken by the Contractor pertaining to the planning of logistics and site preparation necessary for commencing construction activities. The activities includes; 1) Modification of Contract documents 2) Procurement of construction equipment / machinery such as crushers, hot mix plants, batching plants and other construction equipment and machinery 3) Identification and selection of material sources (quarry and borrow material, water, sand etc.) and debris disposal locations 4) Planning traffic diversions and detours, including arrangements for temporary land acquisition for Construction camps.

3.2 CONSTRUCTION STAGE

Construction Stage Activities by the Contractor

Construction stage activities require careful management to avoid environmental impacts. Activities that trigger the need for environmental measures to be followed include 1) Implementation of site-specific mitigation/management measures suggested 2) Monitoring the quality of environment along the construction sites (as air, noise, water and soil).

There are several other environmental issues that have been addressed as part of good engineering practices, the costs for which have been accounted in the engineering costs. They include improvement of major & minor junctions, roadside drainage, provision of additional cross drainage structures or raising the road height in low-lying stretches, provision of bus stops including bio toilets, provision of landslide/erosion prevention measures etc.

3.3 OPERATION STAGE

Monitoring the environmental attributes during the initial years of operation of the road shall be carried out by the PIU (ESMU) as laid down in the monitoring plan.

Table 3-1: Environment and Social Management Plan

| S. No | Project Stage/Activity | Mitigation Management Measures/GIIP Measures | Responsibility | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--|--|---|---|------|------|----|-----------|-----|-----|--------|--------|--|------------|--------|--------|--|------------|--------|--------|--|------------|--------|--------|---------|-----|------------|--------|--------|-------|-----|------------|--------|--------|---------|-----|------------|--------|--------|--|---|
| | | | Planning and Execution | Supervision/ Monitoring | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PRE-CONSTRUCTION ACTIVITIES BY ESMU (ENVIRONMENT AND SOCIAL MANAGEMENT UNIT OF HPSRTP/HPRIDC) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | Construction Package including both Road and Bridge Components | The project road does not require any prior environmental clearances. Only permission for tree felling will be required from department of forests, GoHP. ESMU shall apply for the tree permissions well in advance and no site clearance or pre-construction activities shall be initiated in stretches, which involve tree felling. | Environment & Social Management Unit (ESMU) for project Road under HPSRTP/HPRIDC | Nodal Environmental Officer under HPSRTP under the guidance of Superintending Engineer of HPSRTP/HPRIDC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | Clearance of private structures (encroachments and squatters) | The compensation and removal of private assets within the COI, will be carried out in accordance to resettlement policy framework applicable to HPSRTP and as per the Resettlement Action Plan. As per the RAP encroachers will be paid due entitlements (compensation and assistances) and shifted out of COI. | <ul style="list-style-type: none"> ➤ ESMU, HPRIDC ➤ RAP Implementation Agency | Project Director, HPRIDC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | Forest Land Acquisition | <p>Forest land, will be acquired following 1980 FCA at seven stretches of road adjacent to forest.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Forest Name</th> <th>Forest type</th> <th>Side</th> <th>From</th> <th>To</th> </tr> </thead> <tbody> <tr> <td rowspan="4">Dharampur</td> <td>DPF</td> <td>LHS</td> <td>12/775</td> <td>12/825</td> </tr> <tr> <td></td> <td>Both sides</td> <td>12/860</td> <td>13/000</td> </tr> <tr> <td></td> <td>Both sides</td> <td>13/100</td> <td>13/400</td> </tr> <tr> <td></td> <td>Both sides</td> <td>14/170</td> <td>14/370</td> </tr> <tr> <td>Retwali</td> <td>DPF</td> <td>Both sides</td> <td>17/250</td> <td>19/010</td> </tr> <tr> <td>Talli</td> <td>DPF</td> <td>Both sides</td> <td>27/850</td> <td>29/160</td> </tr> <tr> <td>Bhalawa</td> <td>DPF</td> <td>Both sides</td> <td>31/580</td> <td>32/250</td> </tr> </tbody> </table> <p>HPRIDC along with Forest and Revenue departments will undertake joint verification of land ownership along forest stretches. Subsequently, after verification of land ownership application for diversion of forest land shall be submitted with forest department in accordance with FCA, 1980. HPRIDC will not allow civil works at these seven locations until Forest Clearance is obtained.</p> | Forest Name | Forest type | Side | From | To | Dharampur | DPF | LHS | 12/775 | 12/825 | | Both sides | 12/860 | 13/000 | | Both sides | 13/100 | 13/400 | | Both sides | 14/170 | 14/370 | Retwali | DPF | Both sides | 17/250 | 19/010 | Talli | DPF | Both sides | 27/850 | 29/160 | Bhalawa | DPF | Both sides | 31/580 | 32/250 | ESMU, Forest Department, Revenue Dept, | Project Director, HPRIDC ESMU (Environment and Social Management Unit) |
| Forest Name | Forest type | Side | From | To | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dharampur | DPF | LHS | 12/775 | 12/825 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Both sides | 12/860 | 13/000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Both sides | 13/100 | 13/400 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Both sides | 14/170 | 14/370 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Retwali | DPF | Both sides | 17/250 | 19/010 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Talli | DPF | Both sides | 27/850 | 29/160 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bhalawa | DPF | Both sides | 31/580 | 32/250 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| S. No | Project Stage/Activity | Mitigation Management Measures/GHP Measures | Responsibility | |
|--|---|---|--|---|
| | | | Planning and Execution | Supervision/ Monitoring |
| 3 | Relocation of Community Utilities and Common Property | <p>There will be an impact 17 common property resources (including buildings, hand pumps, religious places, retaining walls and compound walls etc) due to project activities.</p> <p>HPRIDC will relocated or rebuild all community utilities and properties i.e., hand pumps, compound walls for school, govt building & temple will be build/relocated before construction of road as per provisions listed in the RPF and ESMP. Relocation of impacted CPRs shall be carried out as per the RPF provisions and in consultation with the affected and interested communities.</p> <p>The HPRIDC will coordinate with respective user agencies for shifting of utilities in a timely manner avoiding disruption to construction schedule.</p> | <ul style="list-style-type: none"> ➤ ESMU, HPRIDC ➤ Collaborating Agencies (PHED for water supply, Education Department for schools) ➤ RAP Implementation NGO | ESMU (Environment and Social Management Unit) |
| PRE-CONSTRUCTION ACTIVITIES BY CONTRACTOR OR PROJECT MANAGEMENT CONSULTANTS (PMC) | | | | |
| 4 | Orientation for Contractor | <p>Contractor is required to be oriented with the requirement of ESMP and ESS requirement of WB. This will include;</p> <ul style="list-style-type: none"> • Obligations under contract to submit and preparation of Contractor Environmental and Social Management Plan • Regulatory compliance requirements • Grievance redress mechanism for both social and environmental issues • Various plans required under C-ESMP related to Occupations Health & safety, traffic and road safety, community health and safety, hazardous and non-hazardous waste, camp site management, emergency response, blasting, borrow area, muck disposal, restoration etc. • Labour management procedures • Community health & safety aspects at workplace and • Reporting requirements etc. under the project. • Stakeholder Engagement Plan <p>Contractor shall appoint one Environmental Officer, Social-cum-Community Liaison Officer and one Health and Safety Officer, both of whom shall solely be responsible for implementation of all ESMP provisions in close co-ordination/consultation with Environmental and Social Specialist in ESMU, HPRIDC.</p> | Environmental and Social Specialists in PMC | Nodal Environmental and Social officers in ESMU,HPRIDC |
| 5 | Joint Field Verification | The Environmental Specialist of PMC and the Contractor will carry out joint field verification to ascertain any possibilities of saving trees; design modification to minimise impact on forest land and due to proneness to erosions, land slide, slides, drainage; environmental and community resources, if these activities are to be taken up by the construction Contractor. | Environmental officer and Project Manager of the Contractor | Environment Specialist and Resident Engineer of Project Management Consultant (PMC) |
| 6 | Crushers, Hot-mix Plants and Batching Plants Location | <p>All construction plants will be sited sufficiently away from settlements and agricultural operations or any commercial establishments. Such plants will be located at least 100 m away from forest, water bodies, and sensitive areas like hospital, schools, temples and the nearest dwelling preferably in the downwind direction.</p> <p>The Contractor shall submit a detailed layout plan for all such site establishments and approval of Environmental Specialist of PMC shall be necessary prior to the establishment. Site specific protection measures required at such location will be considered to minimise associated environmental and social risk, if the site selection is in rolling terrain.</p> <p>Arrangements to control dust pollution through provision of wind Screens, water sprinklers, and dust extraction systems will have to be provided at pollutant sources in all such sites. For dust suppression, water sprinkling will be done minimum three times a day.</p> <p>Specifications for crushers, hot mix plants and batching plants will comply with the requirements of the relevant emission control legislation.</p> | Environmental officer/health & safety officer and Project Manager of the Contractor | Environment Specialist and Resident Engineer of Project Management |

| S. No | Project Stage/Activity | Mitigation Management Measures/GMP Measures | Responsibility | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|--|--|---|--|------------------------|------|---------------|------|--------|----|-----|-----------------|------|--------|----|-----|-----------------|------|--------|----|-----|-----------------|------|--------|----|-----|-----------------|------|--------|----|-----|-----------------|--|--|
| | | | Planning and Execution | Supervision/ Monitoring | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Consent for the Establishment and Operation from HPSPCB shall be obtained by the Contractor before establishment and operation of crushers, hot mix plants and batching plants. A copy of these permissions should be submitted to the PMC and ESMU, HPRIDC. The contractor shall carry out monitoring of these plants as per Monitoring Program in ESMP and will carry out necessary servicing/repair/maintenance to comply with permissible standards for air and noise of GOI and GoHP. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | Other Construction Vehicles, Equipment and Machinery | All vehicles, equipment and machinery to be procured for construction will conform to the relevant Bureau of India Standard (BIS) norms. The discharge standards promulgated under the Environment Protection Act, 1986 and Motor Vehicles Act, (Amendment) 2019 shall be strictly adhered to. The Contractor shall maintain a record of PUC for all vehicles and machinery used during the contract period which shall be produced EO, ESMU/ PWD's verification whenever required. The contractor shall maintain record and conduct fitness test of all vehicles and machinery at regular interval of one year and fitness certificated shall be submitted to PMC. Only fit vehicles and machinery shall be deployed during construction. All vehicles and machinery used during construction should be well maintained, efficient vehicles having a lower emission. | Environmental officer/health & safety officer and Project Manager of the Contractor | Environment Specialist and Resident Engineer of Project Management | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| IDENTIFICATION AND SELECTION OF MATERIAL SOURCES | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | Borrow Areas | The Contractor shall not open any new borrow area without obtaining Environmental Clearance (EC) from DEIAA as required under EIA notification 2006 as amended for minor minerals. The PMC approval of contractor's propose borrowing of area shall be after ascertaining EC requirements under statutory requirement. No borrow area shall be operated in forest and agriculture land, and near to water bodies. If Borrow area land belongs to Govt, then contractor will obtain a prior approval from respective government department/authorities. The Contractor will not start borrowing earth from selected borrow areas until formal agreement is signed between landowner and Contractor, and Borrow Area management and redevelopment plan is submitted and approved by PMC. The operation of borrow area shall strictly adhere to approved borrow area management and redevelopment plan. Planning of haul roads for accessing borrows areas will be undertaken during this stage. No new haulage route to borrow area shall be developed. Preference shall be using of existing village roads wherever available. The contractor to their convenience may decide on using of identified potential borrow areas locations after complying aforementioned requirements. | Environmental officer/health & safety officer and Project Manager of the Contractor | Environment Specialist and Resident Engineer of Project Management | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | <table border="1"> <thead> <tr> <th>Borrow Area</th> <th>Chainage (km)</th> <th>Distance from road (m)</th> <th>Side</th> <th>Land use type</th> </tr> </thead> <tbody> <tr> <td>BA-1</td> <td>17+000</td> <td>20</td> <td>RHS</td> <td>Government land</td> </tr> <tr> <td>BA-2</td> <td>23+200</td> <td>20</td> <td>RHS</td> <td>Government land</td> </tr> <tr> <td>BA-3</td> <td>29+400</td> <td>20</td> <td>RHS</td> <td>Government land</td> </tr> <tr> <td>BA-4</td> <td>36+140</td> <td>20</td> <td>RHS</td> <td>Government land</td> </tr> <tr> <td>BA-5</td> <td>40+400</td> <td>20</td> <td>RHS</td> <td>Government land</td> </tr> </tbody> </table> | Borrow Area | Chainage (km) | Distance from road (m) | Side | Land use type | BA-1 | 17+000 | 20 | RHS | Government land | BA-2 | 23+200 | 20 | RHS | Government land | BA-3 | 29+400 | 20 | RHS | Government land | BA-4 | 36+140 | 20 | RHS | Government land | BA-5 | 40+400 | 20 | RHS | Government land | | |
| Borrow Area | Chainage (km) | Distance from road (m) | Side | Land use type | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| BA-1 | 17+000 | 20 | RHS | Government land | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| BA-2 | 23+200 | 20 | RHS | Government land | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| BA-3 | 29+400 | 20 | RHS | Government land | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| BA-4 | 36+140 | 20 | RHS | Government land | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| BA-5 | 40+400 | 20 | RHS | Government land | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | The environmental Specialist of the PMC will inspect every borrow area locations prior to approval. The PMC should include the Request for Inspection form for approving opening and restoration of borrows area from the environmental angle. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | Quarry | The contractor shall carry out assessment of existing quarries and identify plans to be prepared to comply with provisions in project's ESMP, which will be part of Quarry Management Plan to be submitted for approval of PMC. The PMC should include the Request for Inspection form for approving opening and closing of quarry area from the environmental angle. | Environmental officer/health & safety officer and Project | Environment Specialist and Resident Engineer of | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| S. No | Project Stage/Activity | Mitigation Management Measures/GIIP Measures | Responsibility | |
|-------|---|--|---|--|
| | | | Planning and Execution | Supervision/ Monitoring |
| | | <p>The contractor's Quarry Management Plan shall include</p> <p>a). Existing Quarry</p> <ul style="list-style-type: none"> The Contractor's Environmental Officer due diligence report of existing quarries compliance with existing statutory requirements, identify and measures to offset risk to the project. The various plans to comply with project's ESMP such as OHS of workers, fugitive dust control during transportation and at stock piling, stockpile management and any other anticipated risks. <p>b). New quarry</p> <ul style="list-style-type: none"> The Contractor shall not open any new quarry area without obtaining Environmental Clearance (EC) from DEIAA as required under EIA notification 2006 as amended for minor minerals and The Mines and Minerals (Development and Regulation) Act 1957. The contractor will submit the quarry management plan and conditions for approval of quarry site by Mining Department along with details of locations identified for establishing various requisite temporary establishments for quarry and crusher operations. Consent for the Establishment and Operation from HPSPCB shall be obtained by the Contractor before establishment and operation of crushers, DG Set. A copy of these permissions should be submitted to the PMC and ESMU, HPRIDC. <p>The various plans to comply with project's ESMP such as OHS of workers, establishment of workers accommodations, waste management, fugitive dust control during transportation and at stock piling, waste water and sanitary waster from workers camps, storage of fuel, stockpile management and any other anticipated risks will be part of Quarry Management Plan.</p> | Manager of the Contractor | Project Management |
| 10 | Arrangement for Construction Water | <p>The contractor shall be responsible to arrange project's water demand of 68 ML in compliance to requisite statutory requirements. In doing so, the contractor shall assess water source availability and will prepare a project's water budget and management plan for approval of PMC.</p> <p>To avoid disruption/disturbance and stressing of other water sources like springs and seasonal streams used by the communities, the contractor shall submit list of fixed water sources identified for extracting water and for PMC approval.</p> <p>To meet daily water requirements of water, Contractor shall prepare and implement the approved water management plan in accordance with the Appendix 3.</p> <p>The Contractor will use ground water as a source of construction water and may set up own bore well facility. Creating of new bore well shall be in compliance with the requirements of the State Ground Water Department for the extraction. The contractor shall submit a copy of the permission to PMC and ESMU.</p> <p>The contractor shall construct water harvesting structure along road to meet demand of water during construction.</p> | Environmental officer/health & safety officer and Project Manager of the Contractor | Environment Specialist and Resident Engineer of Project Management |
| 11 | Labour Requirements | <p>The Contractor preferably will use unskilled labour drawn from local communities to give the maximum benefit to the local community. Contractor to be guided by the LMP.</p> | Environmental officer/health & safety officer and Project Manager of the Contractor | Environment Specialist and Resident Engineer of Project Management |
| 12 | Arrangements for Temporary Land Requirement | <p>The Contractor as per prevalent rules will carry out negotiations with the landowners for obtaining their consent for temporary use of lands for construction camp/ borrow areas/Debris Disposal Area etc.</p> <p>The contractor shall identify temporary land for construction camp/ borrow areas/Debris Disposal Area away from Forest Land. HPRIDC will assist contractor in obtaining permission/clearance for any damage to forest land.</p> | Environmental officer/health & safety officer and Project Manager of the Contractor | Environment Specialist and Resident Engineer of Project Management |
| 13 | Orientation of Implementing | <p>The PMC jointly with ESMU shall identify target audience for capacity building of project key stakeholders on implementation of project's ESMP. The PMC and ESMU shall organize orientation sessions and regular training sessions during all stages of the</p> | PMC | ESMU |

| S. No | Project Stage/Activity | Mitigation Management Measures/GHP Measures | Responsibility | |
|---------------------------|---|---|---|--|
| | | | Planning and Execution | Supervision/ Monitoring |
| | Agency and Contractors | Project. This shall include on-site training (general as well as in the specific context of a sub-project). These sessions shall involve staffs of ESMU (involved in the implementation of ESMP), PMC and Contractors. | | |
| CONSTRUCTION STAGE | | | | |
| 14 | Clearing and Grubbing | Vegetation will be removed from the construction zone before commencement of construction. All works will be carried out such that the damage or disruption to flora other than those identified for minimum cutting. Only ground cover/shrubs that impinge directly on the permanent works or necessary temporary works will be removed with prior approval from the Environmental Specialist of PMC. The Contractor, under any circumstances will not cut or damage trees and forest reserves. Trees (1766.Nos.) identified under the project will be cut only after receiving clearance from and by the Forest Department. | Environmental officer/health & safety officer and Project Manager of the Contractor | Environment Specialist and Resident Engineer of Project Management |
| 15 | Stripping, Stocking and Preservation of Topsoil | The topsoil from all areas of cutting and all areas to be permanently covered will be stripped off to a specified depth of 150 mm and stored in stockpiles. The contractor will earmark temporarily land area and/or Right of Way for storing topsoil. The locations for stock piling will be pre-identified in consultation and with approval of Environmental Specialist of PMC. The contractor shall take measures to prevent generation of dust from such stockpile areas by covering or retaining soil moisture. In addition to taking erosion preventive measures, stripping activity shall not be planned or scheduled during monsoon period. Such stockpiled topsoil will be utilized for ó <ul style="list-style-type: none"> To prepare surface for bioengineering measures. Covering all disturbed areas including borrow areas Dressing of slopes of road embankment Agricultural fields of farmers acquired temporarily land. | Environmental officer/health & safety officer and Project Manager of the Contractor | Environment Specialist and Resident Engineer of Project Management |
| 16 | Construction Camp Locations - Selection, Design and Lay-out | Contractor's Environmental Officer and Health and Safety Officer in consultation and with requisite approvals from Gram panchayat and/or private land owners shall identify suitable lands, which can be used as material stack yards and work camp sites for establishing macadam mix plants, hot mix plants and storage of construction materials by the contractor during construction phase. The contractor submit to PMC the lease agreement with private/community/government owner for setting up campsites at suitable locations along road alignment and shall mandatorily restore to its previous state after completion of road construction works. The contractor shall submit location specific lay-out plan of all temporary establishment with details of facilities proposed for approval of PMC. No temporary establishments shall be operated without consent of PMC. Preferably barren lands or uncultivable lands and those away from human settlements shall be the given preference, while selecting and establishing work camp sites. Also, these shall be at least 500m distance away from forest areas and water bodies. The selected land shall not warrant significant change in landforms or terrain, to make it suitable for establishing work camp sites/store yards. In case, land had been earlier used for establishing work camp site and meets the above requirements, same shall be given preference If private land (s) has been identified, no site clearing operations shall commence without a written lease agreement. The agreement with landowner shall clearly state the lease duration, compensation for the agreed lease period, site restoration plan as desired/required by the landowner and any other condition mutually agreed upon between contractor and landowner. In case agricultural land have been chosen with no alternatives, then topsoil (30-45 cm deep) shall be collected and stored in an access-controlled area and covered with net cloth. Regular sprinkling of water in pressurized fine spray shall be done to prevent blowing | Environmental officer/health & safety officer and Project Manager of the Contractor | Environment Specialist and Resident Engineer of Project Management |

| S. No | Project Stage/Activity | Mitigation Management Measures/GIIP Measures | Responsibility | |
|-------|------------------------|---|------------------------|-------------------------|
| | | | Planning and Execution | Supervision/ Monitoring |
| | | <p>away of soil.</p> <p>The contractor shall be responsible to provide any mitigation and management measures to prevent induced impacts from such establishment due to waste water, solid waste, landslide, erosion, clogging of streams, soil and water contamination, spoil dumping etc. Any claims or complaints arising due to contractor actions shall be addressed in amicable way at their own cost.</p> <p>Requisite consent to establish and consent to operate shall be obtained from HPSPCB. All stipulated consent conditions by HPSPCB shall be strictly adhered and complied by contractor.</p> <p>The work camp sites shall be access controlled with fixed entry and exit points.</p> <p>The dust levels at the work camps sites is to be controlled through regular sprinkling of water through similar mobile tankers deployed at operational areas for road construction. Bitumen mix plants, Batch mix plants deployed for road construction shall conform to regulatory norms/requirements. The site shall be cleared from all remnants of construction and debris and site restored to its previous state, prior to handing the site to the owner. The work camp sites shall mandatorily have designated paved areas with shades/roof for storage of used oils/lubes in plastic/HDPE drums, prior to their final disposal in HPSPCB approved disposal locations</p> <p>Provision of one mobile toilet of 2-seater capacity (1 men and 1 women with separate entrances) shall be stationed at a suitable place within 100 metres from each operational area. The mobile toilet shall have at least 1000 litres overhead water storage, well always maintained and in usable condition. Bottom tanks shall be regularly cleaned and overhead tank replenished as per requirement. Work force shall be oriented to use mobile toilets and avoid using public toilets and/or nearby open places/parks.</p> <p>Every operational area shall be provided with one mobile drinking water kiosk having a storage of 300 litres and placed at a suitable place within 100 metres from work site.</p> <p>All work force shall be provided with suitable type of accommodation, if required and local labour or can return to their normal places of residence. Pooled transportation facilities as may be required, shall be provided by contractor. If establishing workforce camps become utmost necessary, then same shall be established at least 500m away from the settlement areas and away from bridge sites and or any other water body. The camp site shall be restored to its previous state or as agreed upon with the landowner prior to establishing the workforce camp.</p> <p>The workforce camps shall be provided with all basic facilities like water supply, cooking gas facility, sanitation facilities including provision of mobile toilet (of adequate seating capacity for men and women separately) shall be stationed within the workforce camp. The mobile toilet shall be periodically replenished with fresh water for ablution purposes and waste water shall be emptied through suction tankers and carried to the nearest municipal sewage treatment facilities. Alternatively, septic tank cum soak pit arrangements of adequate capacity shall be provided.</p> <p>No waste water from the camp/work force site shall be discharged directly without any treatment in to any surface water channels or drain, which eventually join surface water bodies.</p> <p>The camp sites shall have 4 numbers of septic tank (each 5m Length, 2m Breadth and 1.5 m Clear depth with 0.3 free board) with soak pit arrangement which can serve for work force at peak level as per CPWD specifications. (See appendix 17)</p> | | |

| S. No | Project Stage/Activity | Mitigation Management Measures/GHP Measures | Responsibility | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| | | | Planning and Execution | Supervision/ Monitoring | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17 | Earth / Rock excavation and Disposal of Muck/Construction Debris | <p>The site clearance and/or excavation activities shall be opened up only in segments of 250m stretch at a time and no new stretches shall be opened up unless the clearance and/or excavation activities in previous stretches been satisfactorily completed and clearance given for the opening of next stretch by PMC.</p> <p>Prior to undertaking any site clearance and/or excavation activities, particularly hill side cut and excavation activities in any working stretch, the contractor shall mandatorily prepare an excavation plan with site specific measures/plans to comply with project's ESMP. The contractor through 'Request for Inspection' form will submit 'excavation plan' to PMC for approval in advance before opening of new work zone i.e. 250m for approval of PMC. The excavation plan shall detail estimated volume of material to be cut or excavated, details of approved disposal sites, arrangements made for transport of excavated material to the approved disposal sites, dust suppression measures at excavation site and along transportation routes, method of stacking and/or handling the excavated material at the disposal site, health and safety measures, road safety and traffic management, slope stability and erosion and emergency response etc.</p> <p>The contractor's handling and management of surplus unusable excavation material shall be through a Muck Disposal Plan. The site specific Muck Disposal Plans so prepared shall be reviewed and approved by PMC and shall be mandatory for opening and commencement of excavation or hill side cutting at new work zone or stretch. The site-specific Muck Disposal Plan will contain</p> <ul style="list-style-type: none"> ▪ Agreement with land owner ▪ If muck disposal site is in forest land, the contractor with assistance of HPRIDC shall obtain permission/clearance for any damage to forest land. ▪ On a contour map record land area, boundary limits, existing and surrounding environmental settings, but not limited to topography, drainage, water bodies, settlements, trees, haul road etc. and identify likely environmental risk and safety hazards. ▪ The details of mitigation measures shall include both engineering (toe wall, gabion wall) and non-engineering measures (benching, bio-engineering). ▪ Restoration plan of the muck disposal site <p>The construction debris from all operational areas shall be regularly scavenged and disposed off at disposal sites identified under the project or those approved by District administration. Prior to debris collection, a fine spray of water shall be sprinkled with pressurized fine spray to contain/limit dust levels at source. Following are the locations identified for disposal of debris during excavation or demolition process.</p> <table border="1"> <thead> <tr> <th>S. No.</th> <th>Chainage (Km)</th> <th>Type of Land</th> <th>Quantity</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>12+800</td> <td>Govt. Land</td> <td>2,000</td> </tr> <tr> <td>2</td> <td>12.850</td> <td>Pvt. Land</td> <td>3,600</td> </tr> <tr> <td>3</td> <td>14+950</td> <td>Pvt. Land</td> <td>10,500 (Next to Road) 14,00 (200 m from road)</td> </tr> <tr> <td>4</td> <td>16+400 to 16+500</td> <td>Govt. Land</td> <td>4,200 & 3,600</td> </tr> <tr> <td>5</td> <td>17+400</td> <td>Govt</td> <td>3,200 (2 km form road)</td> </tr> <tr> <td>6</td> <td>21 +700</td> <td>Govt. Land</td> <td>12,250</td> </tr> </tbody> </table> | S. No. | Chainage (Km) | Type of Land | Quantity | 1 | 12+800 | Govt. Land | 2,000 | 2 | 12.850 | Pvt. Land | 3,600 | 3 | 14+950 | Pvt. Land | 10,500 (Next to Road) 14,00 (200 m from road) | 4 | 16+400 to 16+500 | Govt. Land | 4,200 & 3,600 | 5 | 17+400 | Govt | 3,200 (2 km form road) | 6 | 21 +700 | Govt. Land | 12,250 | Environmental officer/health & safety officer and Project Manager of the Contractor | Environment Specialist and Resident Engineer of Project Management |
| S. No. | Chainage (Km) | Type of Land | Quantity | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 12+800 | Govt. Land | 2,000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | 12.850 | Pvt. Land | 3,600 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | 14+950 | Pvt. Land | 10,500 (Next to Road) 14,00 (200 m from road) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | 16+400 to 16+500 | Govt. Land | 4,200 & 3,600 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | 17+400 | Govt | 3,200 (2 km form road) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | 21 +700 | Govt. Land | 12,250 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| S. No | Project Stage/Activity | Mitigation Management Measures/GHP Measures | | | | Responsibility | |
|---|---|--|----------------------|-----------|-------|---|--|
| | | | | | | Planning and Execution | Supervision/ Monitoring |
| | | 7 | 27+100 | Govt Land | 500 | | |
| | | 8 | 31+280 to 31+460 LHS | Govt Land | 16500 | | |
| | | 9 | 31+840 to 31+950 LHS | Govt Land | 10000 | | |
| | | <p>Prior to disposal, the contractor based on soil testing shall screened for recovery of good soil, which can be used in the construction of sub grade, shoulders, back filling of retaining/breast/toe walls and rock boulders for gabions and or noise barrier masonry walls. The use of excavated material in the project is agreement with technical specification and standards prescribed for the project and approval by the PMC.</p> <p>The noise levels during excavation shall be reduced by providing silencers and through deployment of well- maintained and relatively newer machinery. All excavation activities shall be undertaken during day time and at normal work pace.</p> | | | | | |
| 18 | Accessibility | <p>The Contractor will provide safe and convenient passage for vehicles, pedestrians and livestock to and from roadsides and property accesses connecting the project road, providing temporary connecting road.</p> <p>The Contractor will also ensure that the existing accesses will not be undertaken without providing adequate provisions.</p> <p>After completion of the work damaged accesses will be restored by the Contractor.</p> | | | | Environmental officer/health & safety officer and Project Manager of the Contractor | Environment Specialist and Resident Engineer of Project Management |
| 19 | Planning for Traffic Diversions and Detours | <p>Temporary diversions will be constructed with the approval of the Resident Engineer and Environmental Specialist of PMC. Detailed Traffic and Road Safety management Plans will be prepared by the Contractor and submitted to Environmental Specialist and Resident Engineer of PMC for approval seven days prior to commencement of works on any section of road. The traffic management and control plans shall contain details of temporary diversions, traffic safety arrangements for construction under traffic, details of traffic arrangement after cessation of work each day, safety measures for night-time traffic and precaution for transportation of hazardous materials and arrangement of flagmen.</p> <p>The Contractor will ensure that the diversion/detour is always maintained in running condition, particularly during the monsoon to avoid disruption to traffic flow.</p> <p>The Contractor will also inform local community of changes to traffic routes, conditions and pedestrian access arrangements with assistance from PMC and ESMU. The temporary traffic detours will be kept free of dust by sprinkling of water three times a day and as required under specific conditions (depending on weather conditions, construction in the settlement areas and volume of traffic).</p> | | | | Environmental officer/health & safety officer and Project Manager of the Contractor | Environment Specialist and Resident Engineer of Project Management |
| PROCUREMENT OF CONSTRUCTION MATERIAL | | | | | | | |
| 20 | Earth from Borrow Areas for Construction | <p>The location, shape and size of the designated borrow areas will be as approved by the Environmental Specialist of PMC and operated in accordance to the IRC recommended practice for borrow pits for road embankments (IRC 10: 1961). The borrowing operations will be carried out as specified in the guidelines (appendix 1) for siting and operation of borrow areas.</p> <p>If unpaved surfaces used for the haulage of borrow materials, passing through the settlement areas or habitations, will be maintained dust free by the Contractor. Sprinkling of water will be carried out twice a day to control dust along such roads during their period of use.</p> <p>During dry seasons (winter and summer) frequency of water sprinkling will be increased in the settlement areas and Environmental Specialist of PMC will decide frequency of sprinkling depending on the local requirements.</p> <p>Contractor will rehabilitate the borrow areas as soon as borrowing of soil is over from a borrow area in accordance with the approved borrow area management and Redevelopment Plan.</p> | | | | Environmental officer/health & safety officer and Project Manager of the Contractor | Environment Specialist and Resident Engineer of Project Management |
| 21 | Quarry Operations Crushers | <p>The Contractor shall obtain materials for quarries only after consent of the Department of Mining and District Administration. In view of the special situation of excavation of the hill ward side, Contractor will explore reuse of excavated material in road construction in compliance with technical specification.</p> <p>The Contractor will develop a Comprehensive Quarry Redevelopment plan, as per the HP Mineral Policy 2013/guidelines as</p> | | | | Environmental officer/health & safety officer and Project | Environment Specialist and Resident Engineer of Project Management |

| S. No | Project Stage/Activity | Mitigation Management Measures/GIIP Measures | Responsibility | |
|-------|--|---|---|--|
| | | | Planning and Execution | Supervision/ Monitoring |
| | | provided in appendix-4 and submit a copy to ESMU and PMC prior to opening of the quarry site. The quarry operations will be undertaken within the rules and regulations in force. The establishment of crusher will be done as per the existing guidelines (HP Mineral Policy 2013) for setting up of stone crushing units in Himachal Pradesh. | Manager of the Contractor | |
| 22 | Blasting | Except authorized by the Engineer, the Contractor will not use explosives. Where the use of explosives is so provided or ordered or authorized, the Contractor will prepare a Blasting Plan in comply with the requirements of the Sub-Clauses 302 of MoRTH besides complying with applicable law of GoI/GoHP. The Contractor as obligated under existing rules and regulations shall take every possible precaution and will comply with procurement, transportation, handling, storage and use of explosives. The contractor as part of -blasting planø will also include an -early warning systemø to alert and communicate with communities in surrounding blasting site. The blasting plan shall be approved by PMC. The Contractor will always make full liaison with and inform well in advance and obtain such permission as is required for blasting operation from all Government Authorities. Blasting will be carried out during fixed hours (preferably during mid-day) or as permitted by the Engineer. The timing should be made known to all the people within1000m (200m for pre-splitting) from the blasting site in all directions | Environmental officer/health & safety officer and Project Manager of the Contractor | Environment Specialist and Resident Engineer of Project Management |
| 23 | Transporting Construction Materials and Haul Road Management | Contractor will maintain all roads (existing or built for the project), which are used for transporting construction materials, equipment and machineries as precised. All vehicles delivering fine materials to the site will be covered with tarpaulin and fitted with tail board to avoid spillage of materials. All existing roads used by vehicles of the Contractor or any of his subcontractor or suppliers of materials and similarly roads, which are part of the works, will be kept clear of all dust/mud or other extraneous materials dropped by such vehicles. Contractor will arrange for regular water sprinkling as necessary for dust suppression of all such roads and surfaces. If a community/village road is to be used as a haulage road then drivers and other involved workers will be sensitized by imparting training (quarterly) about road safety and driving behaviour and øHow to deal with communityö. Community will be consulted by Contractor to fix the timings of road usages and should be avoided at peak hours. | Environmental officer/health & safety officer and Project Manager of the Contractor | Environment Specialist and Resident Engineer of Project Management |
| 24 | Water requirement of project | The contractor shall not over depend on any one single source and shall identify multiple sources (at least more than one), to avoid conflict of interest between pre-existing users of water sources and the contractor. Water requirements of project are to be met from only existing tube/dug wells, with prior approval of EMU. Contractor shall have more than one source to avoid over dependence on single source and affect pre-existing users. Water for construction should not be sourced from any water body/source used for drinking purpose, but can be taken from water bodies, which are neither used for drinking water or domestic purposes. However, before abstracting the water the contractor has to obtain written permission from the panchayat/letter and from the irrigation and public health department. The Contractor shall consider development of new surface water bodies at suitable places in the vicinity of the project road and or renovation of existing surface water bodies with prior permission of the village panchayat for harvesting of water during rainy season. This water can be used for construction purpose and on completion of the construction the same can be handed over to the community for maintenance and use. During the pre-Construction stage the contractor should preferably identify local depressions along the alignment in consultation with the local panchayat to be developed as water storage areas. The Contractor to consult and make agreement with the panchayat for development of this water body and using the water stored on it for construction purpose. There are no major and perennial surface water bodies along and/or in the vicinity of the project road, the project road construction cannot completely depend on surface water bodies and may have to largely depend on ground water sources. Construction water would not be sourced from any tube wells, without prior permission of the owners or the authorities or local | Environmental officer/health & safety officer and Project Manager of the Contractor | Environment Specialist and Resident Engineer of Project Management |

| S. No | Project Stage/Activity | Mitigation Management Measures/GHIP Measures | Responsibility | |
|-------|---|---|---|--|
| | | | Planning and Execution | Supervision/ Monitoring |
| | | <p>bodies. The permission of IPH shall be obtained in case new tube wells are to be constructed.</p> <p>The contractor shall explore and adopt use of plasticizers/super plasticizers in concrete production to reduce water consumption.</p> <p>The water usage pattern within the construction camps can be minimized by adopting following best practices:</p> <ol style="list-style-type: none"> i. Use buckets for washing purposes instead of using running water; ii. Use of auto shut off taps (without sensors) in labour accommodation; iii. Install water meters with main supply pipes/water tanks/bore well to assess quantity of consumed water. iv. Create awareness among the camp site, work force camp sites at all levels. | | |
| 25 | Vulnerability aspects at all Construction and Operation sites | <ul style="list-style-type: none"> • The overall vulnerability of Solan district including the project road is categorized as moderate. In order to ensure safety of work force during any kind of natural calamity (vulnerable situation) like earthquake, landslide, flood, wind, an emergency response plan must be prepared by contractor, which shall be duly approved by PMC. • All work force irrespective of levels, are to be provided with training to respond in an emergency and periodic mock drill will be conducted to ensure the preparedness to respond any emergency situations. | Environmental officer/health & safety officer and Project Manager of the Contractor | Environment Specialist and Resident Engineer of Project Management |
| 26 | First Aid Facilities and Documenting Safety at all Construction and Operation sites | <p>All labour shall be provided with safety instructions daily, depending upon the work, for which they are likely to be deployed for the day/shift. Labour shall be provided with PPEs at no cost and ensure that same is always being used by work force, while at work. In case of the damaged or lost PPEs, same shall be replaced without any cost to labour. Labour shall be instructed to report, irrespective of small or major or fatal injury to the supervisory staff and all such incidents shall be documented, and ensure such incidents are not repeated by taking adequate precautions. All Supervisory staff shall be provided with mobile phones for better communication across all operational areas, in case of emergency or otherwise</p> <p>All labour shall be instructed to report, irrespective of small or major or fatal injury to the supervisory staff and all such incidents shall be documented, and ensure such incidents are not repeated by taking adequate precautions. All Supervisory staff shall be provided with mobile phones for better communication across all operational areas, in case of emergency or otherwise</p> <p>The contractor shall make available a standby vehicle for emergency purpose for transportation in case of accident with serious injuries at site. Any accident with fatalities shall be reported promptly to PMC and HPRIDC and will take measures to compensate the affected person in accordance with existing regulation.</p> <p>First aid facilities and free emergency care shall be provided to all workforce, irrespective of their rank/level and no cost shall be recovered from them on this account.</p> <p>The contractor shall deploy a medical practitioner at camp site for project duration to attend to health issues/first aids and shall conduct regular health check-up of all staffs and workers employed in project.</p> <p>Further, no wages shall be cut for period of absence as a result of injury ó The contractor shall mandatorily have Contractor All Risk (CAR) policy to cover workers of main contractor and as well as all sub-contractors and third party.</p> <p>All work site shall have first aid kits and details of major/nearby hospitals displayed prominently in local language, in case of emergency and/fatalities to work force and/or public, as a consequence of operations. The supervisory staff shall be provided with wireless communication system (mobile telephones for better communication at operational area and also with other operational area within same substation area, in case of emergency or otherwise. For supervision staff, contractor shall provide rented residential accommodation with water, sanitation and allied facilities for comfortable stay. The project will provide employment opportunities to both skilled and unskilled largely to the local people and also urban poor. All work force sourced</p> | Environmental officer/health & safety officer and Project Manager of the Contractor | Environment Specialist and Resident Engineer of Project Management |

| S. No | Project Stage/Activity | Mitigation Management Measures/GHP Measures | Responsibility | |
|-----------------------------|--|--|---|--|
| | | | Planning and Execution | Supervision/ Monitoring |
| | | from local areas can be expected to return to their places of residence after work shift hours. Pooled transportation facilities wherever required shall be provided to workforce as a welfare measure. | | |
| CONSTRUCTION WORK | | | | |
| 27 | Floods, drainage including storm water management at Operational areas | <p>Provision of enough cross-drainage structures with adequate capacities will reduce both the chances as well as impacts of floods. In case of seasonal streams along or crossing project road, ensure construction of check dams on the upstream side of seasonal streams and channelized the water on the downstream side with protection measures to control erosion of soil, which in turn reduce floods on downstream areas.</p> <p>The Contractor shall ensure that no construction materials like earth, stone, or are disposed off in a manner that can block or clog drainage in and around the working areas. Ensure that the drain shall be periodically checked and cleaned throughout the construction phase for deposition of construction debris during construction phase and follow it up with final clean up just prior to opening of the road for traffic and handing over of road.</p> <p>Also, it needs to be ensured that no water logging occurs along road construction area during rainy days/ season and in turn affect the adjacent landowners. In case of excess water logging/ponding/stagnation at site shall be address by the contractor by emptied using dewatering pump or by providing additional pipe and any other means as may be required, to ensure adjacent landowners are not unduly affected.</p> <p>The contractor while providing outfall of cross drainage structure shall avoid discharging to private land or agriculture land.</p> | Environmental officer/health & safety officer and Project Manager of the Contractor | Environment Specialist and Resident Engineer of Project Management |
| POLLUTION PREVENTION | | | | |
| 28 | Water pollution | <p>The Contractor shall provide oil interceptor and take pre-cautionary measures to ensure that no water pollution occurs through surface runoff from construction vehicle parking areas, fuel/lubricants storage sites, vehicle, and machinery/equipment maintenance sites.</p> <p>Contractor shall ensure that all vehicle/machinery and equipment maintenance and refueling shall be carried out in such a manner that spillage of fuel and lubricants do not contaminate soil and groundwater.</p> <p>Areas used for handling of fuel and lubricants, wherever applicable shall be impermeable surfaces and under roof to prevent groundwater and soil contamination in the event of accidental spills.</p> <p>All other off-site operational areas like camp site, work force camp sites, which are likely to have potential for pollution, are to be provided with on-site mobile sanitary facilities, the effluents/waste discharges of which will be transported to nearest sewage treatment plants through mobile tankers. Alternatively, the camp site and work force camp sites shall be provided with septic tank with soak pit arrangement of adequate capacity.</p> | Environmental officer/health & safety officer and Project Manager of the Contractor | Environment Specialist and Resident Engineer of Project Management |
| 29 | Air Pollution | <p>The Contractor will take every precaution to reduce the level of dust from construction plants, construction sites involving earthwork by sprinkling of water, encapsulation of dust source.</p> <p>The Contractor will procure the construction plants and machinery, which will conform to the pollution control norms specified by the MoEF&CC/CPCB/HPSPCB.</p> <p>The concentration of PM10 matter at 40m from a construction plant should be less than 100 µg/m3. The contractor shall conduct</p> | Environmental officer/health & safety officer and Project Manager of the Contractor | Environment Specialist and Resident Engineer of Project Management |

| S. No | Project Stage/Activity | Mitigation Management Measures/GHP Measures | Responsibility | | | | | | | | | | | | | |
|----------|---|---|---|--|-------------------|-------------------|--------|--------|--|---------------------|--------|--------|--------|--------|---|--|
| | | | Planning and Execution | Supervision/ Monitoring | | | | | | | | | | | | |
| | | <p>environmental monitoring as per frequency in the monitoring plan in ESMP.</p> <p>All tipper trucks, carrying construction debris shall be covered with net cloth and wetted prior to dispatch of every trip, to prevent en-route spills as well as airborne dust during transit.</p> <p>Tipper trucks shall not be overloaded beyond designated capacities and will be provided with tail board, to avoid en-route spills.</p> <p>The dust levels during collection and loading operations of construction debris shall be controlled through periodical sprinkling of water through mobile water tankers of adequate capacity fitted with pressurized fine spray with hose reels and stationed at excavation areas.</p> | | | | | | | | | | | | | | |
| 30 | Emission from Construction Vehicles, Equipment and Machinery | <p>Contractor will ensure that all vehicles, equipment and machinery used for construction are regularly maintained and confirm that pollution emission levels comply with the relevant requirements of CPCB and/ Motor Vehicles Rules.</p> <p>The Contractor will submit PUC certificates for all vehicles/ equipment/ machinery used for the Project.</p> <p>Environmental monitoring of all plants for emission shall be conducted in frequency mentioned in Environmental Monitoring Plan.</p> | Environmental officer/health & safety officer and Project Manager of the Contractor | Environment Specialist and Resident Engineer of Project Management | | | | | | | | | | | | |
| 31 | Noise Pollution: Noise from Vehicles, Plants and Equipment Construction of Noise barriers at selected sensitive Receptors (Schools) | <p>The Contractor shall ensure the following:</p> <p>All Construction plants and equipment used in construction shall strictly conform to the MoEF&CC/CPCB noise standards. All vehicles and equipment used in construction will be fitted with exhaust silencers. Servicing of all construction vehicles and machinery will be done regularly and during routine servicing operations, the effectiveness of exhaust silencers will be checked and if found defective will be replaced.</p> <p>The equipment available in the market should be procured, if the Contractor plans to purchase new equipment. For the old equipment, necessary or possible alterations must be carried out to reduce the noise levels to the possible extent.</p> <p>Maintenance of vehicles, equipment and machinery shall be regular and up to the satisfaction of the Environmental Specialist of PMC to keep noise levels at the minimum.</p> <p>At the construction sites within 150 m of the nearest habitation, noisy construction work such as crushing, operation of DG sets, use of high noise generation equipment will be stopped during the night-time between 10.00 pm to 6.00 am.</p> <p>Noise barrier and structures, which are to be reconstructed as part of vacating the encroached RoW shall be completed prior to the road construction work at the respective location of the sensitive receptor.</p> <p>The details of the locations, where mitigation measures are provided near sensitive receptors is given in below table.</p> <table border="1"> <thead> <tr> <th>Chainage</th> <th>Sensitive Location</th> <th>Specific Measures</th> <th>Reference drawing</th> </tr> </thead> <tbody> <tr> <td>20+200</td> <td>School</td> <td rowspan="3">Construction of 3m height Wall and plantation of trees</td> <td rowspan="3">HP/BAR-RAM/MISC-024</td> </tr> <tr> <td>22+450</td> <td>School</td> </tr> <tr> <td>30+350</td> <td>School</td> </tr> </tbody> </table> <p>Ensure no conflicting situation develop/occur with the concerned school authorities as well as local people during the entire road construction phase through a responsive grievance redressal mechanism and conflict management initiatives.</p> | Chainage | Sensitive Location | Specific Measures | Reference drawing | 20+200 | School | Construction of 3m height Wall and plantation of trees | HP/BAR-RAM/MISC-024 | 22+450 | School | 30+350 | School | Environmental officer/health & safety officer and Project Manager of the Contractor | Environment Specialist and Resident Engineer of Project Management |
| Chainage | Sensitive Location | Specific Measures | Reference drawing | | | | | | | | | | | | | |
| 20+200 | School | Construction of 3m height Wall and plantation of trees | HP/BAR-RAM/MISC-024 | | | | | | | | | | | | | |
| 22+450 | School | | | | | | | | | | | | | | | |
| 30+350 | School | | | | | | | | | | | | | | | |
| 32 | Waste Management | The Contractor's ESMP will include a Waste Management Plan for Hazardous and Non-Hazardous waste prepared in accordance | Environmental | Environment Specialist and | | | | | | | | | | | | |

| S. No | Project Stage/Activity | Mitigation Management Measures/GHP Measures | Responsibility | |
|---------------|---|--|---|--|
| | | | Planning and Execution | Supervision/ Monitoring |
| | | <p>with requirements stipulated in (a) The Batteries (Management & Handling) Rules, 2001 (b) Municipal Solid Wastes (Management and Handling) Rules, 2000, (c)Hazardous Waste (Management, Handling & Transboundary Movement) Rules, 2016 and (d) Construction and Demolition Waste Management Rules, 2016. The waste management plan shall be submitted for approval of PMC.</p> <p>The camp site shall have compost pits for treating organic waste and separate bins for collecting the inorganic waste, which shall be disposed at nearest municipal disposal sites. The nearest such sites are available at Mandi and Ghumarwin.</p> <p>The contractor shall collect and store hazardous waste generated at camp sites in steel drums and stored in a segregated roofed area and periodically disposed at approved waste disposal facilities by HPSPCB. The nearest such facility is located at Baddi Barotiwala Nalagarh Industrial Area (BBN) in the adjoining Solan District.</p> <p>The contractor shall also identify HPSPCB authorised recycling agency for handling use oil.</p> <p>The discarded batteries shall be disposed only through authorized recyclers from HPSPCB.</p> | officer/health & safety officer and Project Manager of the Contractor | Resident Engineer of Project Management |
| SAFETY | | | | |
| 33 | Occupational Health and Safety of Labours | <p>The Contractor will comply with all the precautions as required for ensuring the safety of the workmen as per the International Labour Organization (ILO).</p> <p>The Contractor will make sure that during the construction work all relevant provisions of Building and other Construction Workers (regulation of Employment and Conditions of Services) Act, 1996 are adhered to. The Contractor will comply with all regulations regarding safe scaffolding, ladders, working platforms, gangway, stairwells, excavations, trenches and safe means of entry and egress.</p> <p>All workforce deployed shall be governed by labour management procedures under HPSRTP and Himachal Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, with regards to safety and welfare measures (including equal wages for men and women) for workers employed at building and other construction sites.</p> <p>The Contractor will not employ any person below the age of 14 years for any work and no woman will be employed on the work of painting with products containing lead in any form.</p> <p>The Contractor will also ensure that no paint containing lead or lead products is used except in the form of paste or ready made paint.</p> <p>The Contractor will mark -hard hatø and -no smokingø and other -high riskø areas and enforce non-compliance of use of PPE with zero tolerance. These will be reflected in the Construction Safety Plan to be prepared by the Contractor during mobilization and will be approved by PMC and ESMU.</p> <p>To promote and encourage a Safety culture, senior most engineers in Contractors and consultantsø teams shall wear helmets and safety jackets</p> <p>The contractor shall provide to all work force deployed at work sites</p> <p>Protective footwear, protective goggles and nose masks to the workers employed in asphalt works, concrete works, crusher etc.</p> <p>Welderø protective eye-shields to workers who are engaged in welding works</p> | Environmental officer/health & safety officer and Project Manager of the Contractor | Environment Specialist and Resident Engineer of Project Management |

| S. No | Project Stage/Activity | Mitigation Management Measures/GIIP Measures | Responsibility | |
|-------|--|---|---|--|
| | | | Planning and Execution | Supervision/ Monitoring |
| | | <p>Earplugs to workers exposed to loud noise, and workers working in crushing or compaction</p> <p>Facemasks for use to the workers when paint is applied in the form of spray or a surface having lead paint dry is rubbed and PMC rapped.</p> <p>It shall be made mandatory to wear them at work site. The PPEs shall be provided at no cost to workforce and shall be replaced once in three months. Any damaged/lost PPEs shall be replaced with no cost to workforce. Visitors/officials to work sites are to be provided with PPEs (hard hats and safety shoes) and shall be briefed ongoing operations on that specific time and related safety requirement at work site including safe distances to keep during the site visit.</p> <p>Work force shall be subjected only to standard work shifts/hours. Overtime allowances, if applicable/warranted shall be paid with ceiling limits. Working beyond such ceiling limits shall be discouraged, even if, so desired workforce or contractor.</p> | | |
| 34 | Workers Orientation and Sensitization Training | <p>All work force of the Contractor shall be subjected to an orientation program, which familiarize them with work requirements, safety practices at work, safe distances to keep from earth moving equipment, first aid facilities, emergency response, on-site sanitation facilities and practices to be adopted, rights and privileges of workforce among others.</p> <p>Orientation shall also include concern for safety of public around operational areas as well, first aid facilities, emergency care and response shall be provided to all workforce.</p> | Environmental officer/health & safety officer and Project Manager of the Contractor | Environment Specialist and Resident Engineer of Project Management |
| 35 | Traffic and Safety | <p>The contractor prior to start or opening of any work zone shall prepare a Traffic and Road Safety Management Plan and submit to PMC for approval.</p> <p>The contractor shall ensure traffic diversions are in place, to minimize the inconvenience to the existing road users during the road construction phase. Wherever required, adequate number of uniformed traffic wardens with reflective batons shall be deployed to manage the traffic for the entire construction phase.</p> <p>Road construction schedule near sensitive receptors like schools and hospitals shall be informed to the concerned authorities well in advance. All works near sensitive receptors shall be adequately well planned and works shall be completed in shortest possible time, with minimal inconvenience to users of sensitive receptors locations. If warranted, steel barricades shall be used to minimize the inconvenience to the road users as well as occupants of the sensitive receptors.</p> <p>Adequate traffic diversions near sensitive receptors shall be planned with adequate number of uniformed traffic wardens with reflective batons shall be deployed to manage the traffic, to ensure safety and minimal inconvenience to users of sensitive receptors location.</p> <p>For unobstructed visibility to road users and drivers, the contractor shall perform dust suppression measures like regular sprinkling of water shall be carried out with more precaution near sensitive receptors and all work sites to ensure dust levels kept to minimum.</p> <p>The contractor shall clear the roadway by promptly removing debris from landslide and ensure safe passage of traffic and road users.</p> <p>While undertaking, road construction works near the natural water bodies and/or water sources along the project road, steel barricades shall be used to completely avoid trespassing of the construction labour and to avoid/prevent spills of the construction waste (solid or liquid) into the water body.</p> <p>Extreme care shall be taken to ensure that no damage occurs to such natural water bodies and/or water sources along the project</p> | Environmental officer/health & safety officer and Project Manager of the Contractor | Environment Specialist and Resident Engineer of Project Management |

| S. No | Project Stage/Activity | Mitigation Management Measures/GIIP Measures | Responsibility | |
|--|--|---|---|---|
| | | | Planning and Execution | Supervision/ Monitoring |
| | | road due to the road construction works. All work forces shall be specifically oriented to strictly follow these instructions. | | |
| 36 | Informatory Signs and Hoardings | The Contractor as part of -Traffic Management and Road Safety Planøwill provide, erect and maintain informatory /safety signs, traffic control devices, flagmen, hoardings written in English and local language (Hindi), wherever required or as suggested by the Environmental Specialist of PMC. After construction Information boards shall be erected for the tourism enhancement. These boards should be as specified in IRC standards. | Health & safety officer and Project Manager of the Contractor | Environment Specialist and Resident Engineer of Project Management Consultant |
| 37 | Risk from Electrical Equipment(s) | The Contractor will take all required precautions to prevent danger from electrical equipment and ensure that - No material will be so stacked or placed as to cause danger or inconvenience to any person or the public. All necessary fencing and lights will be provided to protect the public in construction zones. All machines to be used in the construction will conform to the relevant Indian Standards (IS) codes, will be free from patent defect, will be kept in good working order, will be regularly inspected and properly maintained as per IS provision and to the satisfaction of the Environmental Specialist of PMC. | Environmental officer/health & safety officer and Project Manager of the Contractor | Environment Specialist and Resident Engineer of Project Management |
| CONSTRUCTION STAGE SOCIAL IMPACTS | | | | |
| 38 | Loss of land due to land-slides resulting from hill cutting activities | <ul style="list-style-type: none"> Assessment of loss -Joint survey with revenue department and others if required (horticulture etc) on a case by case basis and due payment of compensation to land owner as per RPF provisions (in terms of rate determined and valuation done) | <ul style="list-style-type: none"> ➤ RAP implementation Agency ➤ Revenue Department ➤ ESMU, HPRIDC ➤ Contractor | ESMU |
| 39 | Cracks in structures or damage due to construction works e.g.hill cutting activities | <ul style="list-style-type: none"> Advance notice to community for road construction activity. The notice will be served through posters and leaflet. Estimation of loss case by case basis Compensation to structure owner as per RPF provisions if full structure is damaged case by case basis. Process to be followed shall involve: If the structure is partially damaged and after assessment if found unviable for habitation which leads to full demolition of structure, If the structure is partially damaged and viable. Process will be followed- Estimation will be done as per latest BSR without depreciation. Labor charges etc should be top up for arising the damaged cost. The same amount may be paid to the affected person or the project authority will arrange and pay the agency for rectification of the structure to the satisfaction of the affected person. Each individual case should be documented with photograph etc. | <ul style="list-style-type: none"> ➤ RAP implementation Agency ➤ ESMU, HPRIDC ➤ Contractor | ESMU |
| 40 | Disruption to services such as water supply, power supply | <ul style="list-style-type: none"> Advance 7 days notice through poster and leaflet to the community of disruptions and alternate arrangements. Restore the services within 10 days of effect. Provide alternative source of supply | <ul style="list-style-type: none"> ➤ ESMU, HPRIDC and ➤ Contractor | Project Management Consultant |

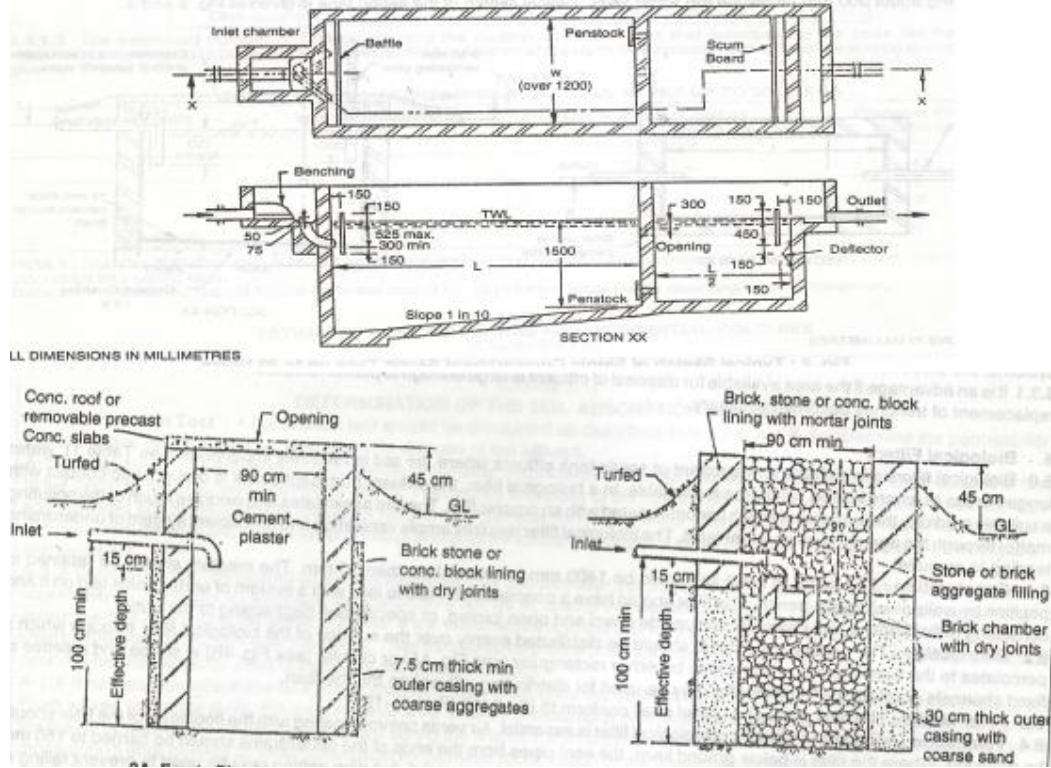
| S. No | Project Stage/Activity | Mitigation Management Measures/GIIP Measures | Responsibility | |
|-------|--|--|--|-------------------------------|
| | | | Planning and Execution | Supervision/ Monitoring |
| 41 | Disruption to access from houses and shops to roads; | <ul style="list-style-type: none"> 7 days advance notice through poster and leaflet before start of work. Provide alternative access before disruption Restore permanent access as in where in basis | <ul style="list-style-type: none"> RAP implementation Agency ESMU, HPRIDC and Contractor | Project Management Consultant |
| 42 | Differential impacts on vulnerable and disadvantaged population | <ul style="list-style-type: none"> 7 days advance notice through poster and leaflet before start of work. Impacted disadvantaged population will be treated case by case basis by provision of temporary access and other assistance as identified | <ul style="list-style-type: none"> RAP implementation Agency ESMU, HPRIDC | Project Management Consultant |
| 43 | Dust emissions during construction leading to impacts on crops and trees | <ul style="list-style-type: none"> Advance information to farmers Precautionary measures like water sprinkling during construction at predetermined frequency. Regular monitoring through Health and Safety officer Regular verbal communication with the community | <ul style="list-style-type: none"> RAP implementation Agency ESMU, HPRIDC and Contractor | Project Management Consultant |
| 44 | Likelihood of increased accidents due to road widening (including at social sensitive locations such as schools, hospitals); | <ul style="list-style-type: none"> Adequate road signage/road marking/rumble strip/glow sign board to be provided. Road safety educations. Regular consultation with school children. Community level consultations Prior intimation in school and communities living in the vicinity for safety measures. | <ul style="list-style-type: none"> NGO, ESMU, HPRIDC and Contractor | Project Management Consultant |
| 45 | Possibility of gender-based violence arising from influx of migrant labor a common practice in Himachal Pradesh; and | <p>To address this the Project will prepare a GBV risk mitigation plan before commencement of civil works. It shall comprise</p> <ul style="list-style-type: none"> Code of Conduct for signing by project workers Integrate GBV into existing IEC strategy/materials, GRM, safety talks, tool box meeting and regular trainings. community consultation and identification of GBV focal points within the community. Training of labours on occupational health and safety issues. Mapping of Service Providers for GBV prevention and Response Identify Hot Spots for GBV within the project include construction work and labour camps alongside local communities, schools, vocational training centers, liquor shops and, migrant labourers residing in rented accommodations within the villages. These areas need to be clearly identified and closely monitored throughout the project cycle. | ESMU, HPRIDC and Contractor | Project Management Consultant |
| 46 | Labour Influx from outside the district | <ul style="list-style-type: none"> Prepare and Implement Labour Influx Management Plan by Contractor that shall be prepared prior to commencement of civil works Educate Labour supplier contractor in all labour laws, behavioural change communication in labour management through IEC process as part of LMP | ESMU, HPRIDC and Contractor | Project Management Consultant |

| S. No | Project Stage/Activity | Mitigation Management Measures/GHP Measures | Responsibility | |
|---------------------------------|--|---|---|---|
| | | | Planning and Execution | Supervision/ Monitoring |
| 47 | Likelihood of spread of HIV/AIDS among construction workers and road side community. | <p>An MOU will be signed with State AIDS control society (SACS) to implement the following activities.</p> <ul style="list-style-type: none"> • Training to migrant labour and community • Making available condoms etc at vending machines at convenient locations • Community based meetings, consultations in camp, distribution of leaf let, IEC communication, posters, banners, • Programme convergence with State AIDs control society. • installation of Condom vending machines at Labour camp | ESMU, HPRIDC and Contractor | Project Management Consultant |
| BIO-DIVERSITY MANAGEMENT | | | | |
| 48 | Bio-diversity Management | <p>In order to limit the impacts on the flora due to the road construction, the following measures are considered:</p> <p>Compensatory Plantation, in lieu of trees felled (at least 3 saplings for every tree cut with 90% survival rate with three years maintenance) is to be taken up either along the project corridor or at places identified by the Forest Department, GoHP in order to compensate for the tree felled. With this compensatory plantation measures, the tree cover lost could be regained in 5 to 7 years and thus the impacts could get mitigated. Only local species, which are less water consuming and approved by the forest department shall be used for plantation. Normally, all such afforestation will be undertaken by the department of forest and maintained for three years as a deposit work. Therefore, cost provision for Compensatory Plantation is included in ESMP Budget.</p> <p>In order to limit the propagation of invasive species, firstly all such invasive species within the corridor of impact and/or right of way shall be removed/cleared and replanted with local species. The department of forests, GoHP has framed a procedure for removal of invasive species and replanting of local species. The same is given in Annexure -9 of ESIA report. Normally, all such activities will be undertaken by the department of forest and maintained for three years as a deposit work. Therefore, cost provision for corridor plantation is included in ESMP Budget. In order to limit the impacts on the fauna due to the road construction, the following measures are considered:</p> <ul style="list-style-type: none"> • The camp sites and work force camps shall be access controlled and well-lit to avoid/prevent entry of stray or wild animals. • No pet animals shall be allowed to be raised / kept within the camp sites or work sites, which in turn may attract the wild animals like leopard. • The work force shall be oriented not to feed monkeys • All work force shall be oriented to keep calm and walk away from the scene, in case, wild animals are sighted either during work hours/night-time. • Work force shall be strictly instructed not to harm / kill wild animals under any circumstances • Work force shall be strictly prohibited like hunting of wild animals like wild boar etc., either for consumption or for pleasure. • The Work force shall be strictly prohibited from entering into forest areas or private lands under any circumstances. • The Construction camp and work force camp sites shall not be established in the vicinity/nearby forest areas. At least | Environmental officer and Project Manager of the Contractor | Environment Specialist, Bioengineering Expert and Resident Engineer of Project Management |

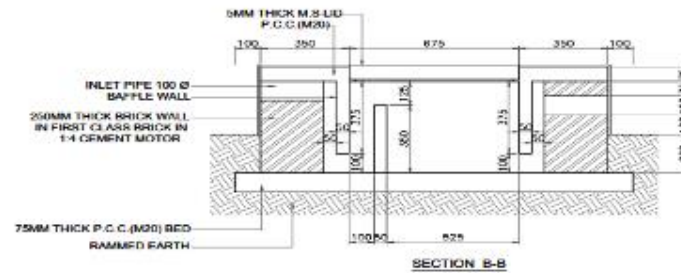
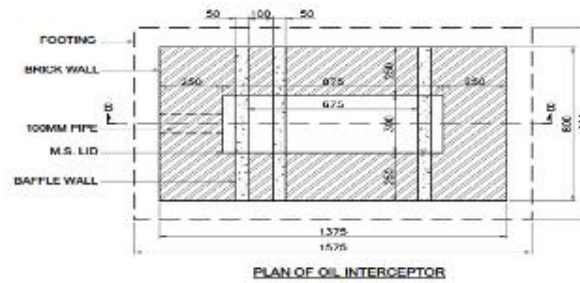
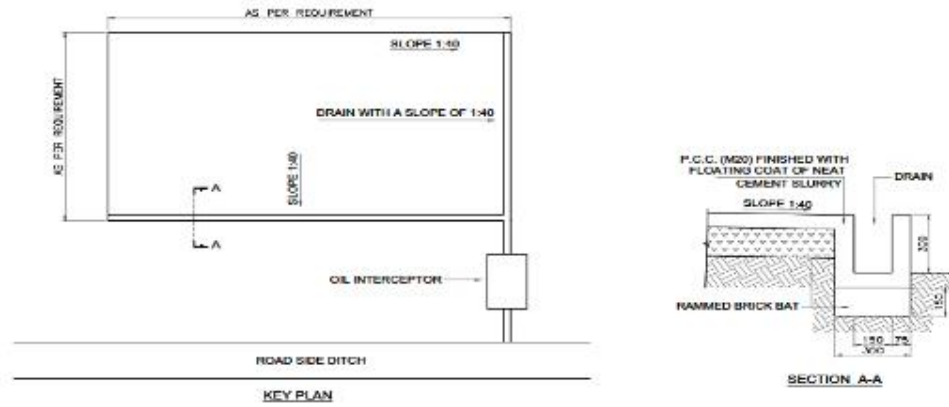
| S. No | Project Stage/Activity | Mitigation Management Measures/GHP Measures | Responsibility | | | | | | | |
|--|--|--|--|---|-------------------------------|-------------------------------|------------------------|--------|--|-----------------|
| | | | Planning and Execution | Supervision/ Monitoring | | | | | | |
| | | <p>500m distance shall be kept from such areas under unavoidable circumstances.</p> <ul style="list-style-type: none"> The construction work shall be restricted to day hours only and work shall not be carried out in the late evening hours/night hours /early mornings. | | | | | | | | |
| 49 | Ancient and Historical Monuments and Chance Finds | <p>Project road corridor does not have any Ancient and Historical Monuments and therefore no measures are warranted. Hence cultural heritage expert is not required to be deputed by ESMU.</p> <p>All fossils, coins, articles of value of antiquity, structures and other remains or archaeological interest discovered on the site shall be the property of the Government and shall be dealt with as per provisions of the relevant legislation.</p> <p>The Contractor will take reasonable precautions to prevent his workmen or any other persons from removing and damaging any such article or thing. He will, immediately upon discovery thereof and before removal acquaint the Environmental Specialist of PMC of such discovery and carry out the PMC's instructions for dealing with the same, waiting which all work shall be stopped. The PMC will seek direction from the Archaeological Survey of India (ASI) through HPRIDC before instructing the Contractor to recommence the work in the site.</p> | Environmental officer and Project Manager of the Contractor | Environment Specialist and Resident Engineer of Project Management | | | | | | |
| CONTRACTOR'S DEMOBILIZATION | | | | | | | | | | |
| 50 | Environmental Conditions | The Contractor will undertake seasonal monitoring of air, water, noise and soil quality through an approved monitoring agency. The parameters to be monitored, frequency and duration of monitoring as well as the locations to be monitored will be as per the Monitoring Plan prepared. National Standard of Air, Noise and Water given in Appendix-8. | Environmental officer and Project Manager of the Contractor | Environment Specialist, and Resident Engineer of Project Management | | | | | | |
| 51 | Continuous Community Participation | The Environmental Specialist of PMC will have continuous interactions with local people around the project area to ensure that the construction activities are not causing undue inconvenience to the locals residing in the vicinity of project site under construction due to noise, dust or disposal of debris etc. The stakeholder's engagement plan will be followed for community participation procedures. | Environmental officer and Project Manager of the Contractor | Environment Specialist, and Resident Engineer of Project Management | | | | | | |
| 52 | Clean-up Operations, Restoration and Rehabilitation | <p>Contractor will prepare 'Site Restoration Plans', which will be approved by the Environmental Specialist of PMC. The clean-up and restoration operations are to be implemented by the Contractor prior to demobilization. The Contractor will clear all temporary structures; dispose all garbage, night soils and POL (Petroleum, Oil and Lubricants) wastes as per Comprehensive Waste Management Plan and as approved by PMC.</p> <p>All disposal pits or trenches will be filled in and effectively sealed off. Residual topsoil, if any will be distributed on adjoining/ proximate barren land or areas identified by the Contractor and approved by the Environmental Specialist of PMC in a layer of thickness of 75 mm-150 mm.</p> <p>All construction zones and facilities including culverts, road-side areas, camps, Hot Mix plant sites, Crushers, batching plant sites and any other area used/affected due to the project operations will be left clean and tidy, at the Contractor's expense, to the entire satisfaction to the Environmental Specialist of PMC.</p> | Environmental officer, Health and safety officer and Project Manager of the Contractor | Environment Specialist, and Resident Engineer of Project Management | | | | | | |
| OTHER SPECIFIC ENHANCEMENT MEASURES | | | | | | | | | | |
| 53 | Specific enhancement measures | There are some site-specific enhancement measures provided on project road. These include enhancement of existing natural water sources/structures, rainwater harvesting structures, community property (crematorium) with provisions of access and water tank and benches to sit. | Environmental officer and Project Manager of the Contractor | Environment Specialist, and Resident Engineer of Project Management | | | | | | |
| | | <table border="1"> <thead> <tr> <th>Chainage (km)</th> <th>Specific Enhancement Measures</th> <th>Ref Doc. (Appendix 16)</th> </tr> </thead> <tbody> <tr> <td>22+980</td> <td>To enhance rainwater harvesting structures along the</td> <td>HP/BAR-RAM/WH-1</td> </tr> </tbody> </table> | | | Chainage (km) | Specific Enhancement Measures | Ref Doc. (Appendix 16) | 22+980 | To enhance rainwater harvesting structures along the | HP/BAR-RAM/WH-1 |
| | | Chainage (km) | | | Specific Enhancement Measures | Ref Doc. (Appendix 16) | | | | |
| 22+980 | To enhance rainwater harvesting structures along the | HP/BAR-RAM/WH-1 | | | | | | | | |
| | | | | | | | | | | |

| S. No | Project Stage/Activity | Mitigation Management Measures/GIIP Measures | | | Responsibility | | | |
|---|---|--|--|-----------------|---|-------------------------|------|----------|
| | | | | | Planning and Execution | Supervision/ Monitoring | | |
| | | 23+180 | roadsides. | HP/BAR-RAM/WH-2 | | | | |
| | | 23+240 | | | | | | |
| | | 24+780 | | HP/BAR-RAM/WH-3 | | | | |
| | | 26+910 | | HP/BAR-RAM/WH-4 | | | | |
| | | 29+740 | | HP/BAR-RAM/WH-5 | | | | |
| | | 33+800 | | HP/BAR-RAM/WH-6 | | | | |
| | | 42+370 | | HP/BAR-RAM/WH-7 | | | | |
| | | 43+800 | | HP/BAR-RAM/WH-8 | | | | |
| | | 24+780 | To enhance roadside Natural water sources. | HP/BAR-RAM/WH-3 | | | | |
| | | 38+730 | | HP/BAR-RAM/WH-9 | | | | |
| | | 38+770 | | | | | | |
| Other than this, to avoid accidents in collision with stray cattle, provision of encircling a retroreflective band has been made which will be tied in the neck and horns of the animals. | | | | | | | | |
| OPERATION STAGE | | | | | | | | |
| 54 | Monitoring Operation Performance | The ESMU will monitor the operational performance of the various mitigation/ enhancement measures carried out as a part of the project. The indicators selected for monitoring include the survival rate of trees; utility of enhancement provision made under the project; status of rehabilitation of borrow areas; and effectiveness of noise barriers. | | | | | ESMU | ESMU/PWD |
| 55 | Maintenance of Drainage | PWD will ensure that all drains (side drains, median drain and all cross drainages) are periodically cleared especially before monsoon season to facilitate the quick passage of rainwater and avoid flooding. | | | | | ESMU | ESMU/PWD |
| 56 | Pollution Monitoring | The periodic monitoring of the ambient air quality, noise level, water (both ground and surface water) quality, soil quality in the selected locations as suggested in pollution monitoring plan through the HPCB or its approved monitoring agency. | | | Pollution Monitoring Agency | ESMU/PWD | | |
| 57 | Soil Erosion and Monitoring of Borrow Areas | Visual monitoring and inspection of soil erosion at borrow areas, quarries (if closed and rehabilitated), embankments and other places expected to be affected, will be carried out once in every three months as suggested in monitoring plan. | | | ESMU | ESMU/PWD | | |
| 58 | Changes in Land Use Pattern | Necessary hoardings will be erected indicating the availability of ROW and legal charges for encroachment of RoW. Budgetary provisions are to be made to control the ribbon development along project road. | | | ESMU, Revenue Department and Local Civic Bodies | ESMU/PWD | | |
| 59 | Public awareness on Noise levels and Health Affects | However, the public will be advised to construct the noise barriers such as walls, double glazed windows and tree plantation between the roads and their property the public awareness is necessary regarding the human health through the newspapers and consultations and distribution of pamphlets during the operation stage. | | | ESMU | ESMU/PWD | | |

| S. No | Project Stage/Activity | Mitigation Management Measures/GHP Measures | Responsibility | |
|-------|------------------------|---|------------------------|-------------------------|
| | | | Planning and Execution | Supervision/ Monitoring |



Figure; Septic Tank Specifications



Figure; Oil Interceptor

4. ENVIRONMENTAL MONITORING PROGRAMME

4.1 GENERAL

The monitoring and evaluation are critical activities in implementation of the Project. Monitoring involves periodic checking to ascertain whether activities are going according to plan or not. It provides the necessary feedback for project management to ensure that the project objectives are met and on schedule.

The reporting system is based on accountability to ensure that the environmental mitigation measures are implemented.

Environmental monitoring program has the underlying objective to ensure that the intended environmental mitigation are realized and these results in desired benefits to the target population causing minimal deterioration to the environmental parameters. Such program targets proper implementation of the EMP.

The broad objectives are:

1. To evaluate the performance of mitigation measures proposed in the EMP.
2. To evaluate the adequacy of environmental assessment.
3. To suggest ongoing improvements in management plan based on the monitoring and to devise fresh monitoring based on the improved EMP.
4. To enhance environmental quality through proper implementation of suggested mitigation measures.
5. To meet the requirements of the existing environmental regulatory framework and community obligations.

4.2 PERFORMANCE INDICATORS

Environmental components identified of a significance in affecting the environment at critical locations have been suggested as performance indicators (PIs). For example, near the construction site, a thick layer of dust over the nearby vegetation/leaf is an indication that the dust control measures are not effective. The performance indicators shall be evaluated under three heads as;

- Environmental condition indicators to determine efficacy of environmental management measures in control of air, noise, water and soil pollution.
- Environmental management indicators to determine compliance with the suggested environmental management measures.
- Operational performance indicators have also been devised to determine efficacy and utility of the proposed mitigation measures.

The performance indicators and monitoring plans prepared for the Baddi-Sai-Ramshehr road section are presented in table 4-1. Details of the performance indicative parameters for each of the component have to be identified and reported during all stages of the implementation.

Table 4-1: Performance Indicators

| S No. | Description of Item | Indicator | Stage | Responsibility |
|-------|---|--------------------------|------------------|----------------|
| 1 | <ul style="list-style-type: none">• No. of Borrow Areas identified and verified• No. of sites for which Restoration Plans have been prepared• No. of Site Restored and Rehabilitated• No. of Sites handed over | Borrow Area and Quarries | Pre-Construction | Contractor |
| 2 | <ul style="list-style-type: none">• No. of Quarry Areas identified & verified• No. of sites Restoration Plans are required and have been prepared• No. of Site Restored and Rehabilitated | Borrow Area and Quarries | Pre-Construction | Contractor |

| S No. | Description of Item | Indicator | Stage | Responsibility |
|-------|---|--|-----------------------------------|--|
| | <ul style="list-style-type: none"> No. of Sites handed over | | | |
| 3 | Quantity of Debris and Spoils to be disposed off <ul style="list-style-type: none"> No. of locations Approved for Debris disposal Quantity disposed off at each location No. of locations for which Rehabilitation works have been completed | Disposal sites | Construction | Contractor |
| 4 | <ul style="list-style-type: none"> No. of location/s identified for the Construction camp and Construction Plant sites No. of location/s approved Lay-out/s Approved No. of sites for which Site Restoration and Rehabilitation has been completed | Construction Camps and Plant Sites | Pre-Construction | Contractor |
| 5 | <ul style="list-style-type: none"> No. of Trees to be Cut No. of Trees cut % Progress on the tree removal | Tree cutting | Pre-Construction | ESMU |
| 6 | No. of Locations identified for temporary storage areas for storage of the excavated materials to be used in embankment and sub grade | Storage of excavated materials | Pre-Construction and Construction | Contractor |
| 7 | Before the onset of monsoon all the debris/excavated material shall be cleaned from the work sites and disposed of at the pre-identified approved locations. | Silting of Water bodies | Construction | Contractor |
| 8 | Implementation of enhancement measures for <ul style="list-style-type: none"> Noise Barrier at sensitive locations | Enhancements | Construction | Contractor |
| 9 | Drainage <ul style="list-style-type: none"> Length (by type) No. of Locations | Work sites | Construction | Contractor |
| 10 | Safety Provisions <ul style="list-style-type: none"> Signage (by type and no.) Crash barriers footpath | Work sites | Construction | Contractor |
| 11 | Soil erosion prevention measures <ul style="list-style-type: none"> Construction of retaining walls Downstream at culvert locations (No. of Locations & length) | Work sites | Construction | Contractor |
| 12 | No. of HIV awareness sessions conducted | - | Construction | Contractor |
| 13 | No. of safety awareness sessions conducted | - | Construction | Contractor |
| 14 | Accidents/Incidents <ul style="list-style-type: none"> No of accidents/incidents recorded | Along project road | During construction | Contractor |
| 15 | Environmental parameter monitoring in accordance with the frequency and duration of monitoring as well as the locations as per the Monitoring Plan given in Table 4.2 | Air Quality Noise Quality Soil Quality Water Quality | Construction and Operation | Contractor through NABL Accredited agency. |
| 16 | <ul style="list-style-type: none"> No. of Training Sessions Organised for <ol style="list-style-type: none"> Departmental Staff Contractors Combined No. of People Trained <ol style="list-style-type: none"> Departmental Staff Contractors | Training Imparted | Construction /Operational face | ESMU |
| 17 | No. of awareness sessions for educating the public about road safety and other environmental aspects (Such as waste dumping, preservation of enhanced sites, pollution and health impacts etc.) | - | Construction/ Operation Stage | ESMU |
| 18 | No. of Trees Planted (Total) <ul style="list-style-type: none"> No. of Trees under Compensatory Afforestation No. of Trees Planted along Roadsides No. of Trees planted at other locations (such as camps, borrow areas, debris disposal sites and plant areas) No. of trees planted at enhancement sites | Roadside and other plantation areas | Post construction stage | Forest Department and ESMU |
| 19 | Survival Rate Trees Planted (Average) | Roadside and other | Post construction | Forest Department |

| S No. | Description of Item | Indicator | Stage | Responsibility |
|-------|--|------------------|-------|----------------|
| | <ul style="list-style-type: none"> • Compensatory Afforestation • Roadside Plantation • Other locations (such as camps, borrow areas, debris disposal sites and plant areas) • Enhancement sites | plantation areas | stage | and ESMU |

4.3 MONITORING PLAN FOR ENVIRONMENTAL CONDITIONS

For each of the Environmental Conditions, the Monitoring Plan specifies the parameters to be monitored, location of the monitoring sites, frequency and duration of monitoring. The monitoring plan also specifies the applicable standards, implementation and supervising responsibilities. The monitoring plan and details of monitoring locations for environmental condition indicators of the project during the construction and operation stage are presented in Table 4-2.

The monitoring will be carried out by Contractor through the NABL approved agency and will be supervised by the Environment Specialists of the PMC and ESMU.

Table 4-2: Environmental Monitoring Plan for Air, Water, Noise and Soil

| Attribute | Timing | Parameter | Special Guidance | Standards | Frequency | Duration | Location | No of Samples/Year | Implementation |
|-----------|--------------|--|---|--|--|--|---|--------------------|----------------|
| Air | Construction | CO, NOx, PM10, PM2.5 and SO ₂ | High Volume sampler to be located 50 m from the plant in the down wind direction. Use method specified by CPCB for Analysis | CPCB Guidelines (NAAQMS/ Volume-I/2013-14) | Every month at 3 locations | 24 hours sampling | 3 locations (Construction Plant Sites, settlements and Work Zones) | 36 | Contractor |
| | Operation | | | | | | Roadside | 4 | ESMU |
| Water | Construction | As per Drinking Water Standards | Grab sample collected from source and analyse as per standard methods for examination | Indian standards for inland surface waters (IS:2296,1982) and for drinking water (IS:10500-2012) | Every month at 3 locations | As per Grab Sampling guidelines | Drinking water samples from the labour camps and from hand pumps Surface water from the water courses near the work site and River. | 36 | Contractor |
| | Operation | | | | | | Surface water sources | 4 | ESMU |
| Noise | Construction | Noise Levels on dB (A) scale | Equivalent noise levels using, and integrated noise level meter kept at 15 m from edge of pavement | Noise rules 2000 by CPCB | Every month at 3 locations | Leq in dB(A) of daytime and night-time | Near the working zones, sensitive receptors and construction plant sites | 36 | Contractor |
| | Operation | | | | | | Sensitive receptors | 4 | ESMU |
| Soil | Construction | Monitoring of Pb, SAR and Oil and Grease | Sample of soil collected to acidified and analysed using absorption spectrum | (IS): 2720 for 'Method of Test for Soils' | During the pre & post monsoon season each year | Grab Sampling | Construction Camp/ plant sites & productive agricultural lands abutting traffic detours and traffic diversions and major intersections. | 18 | Contractor |
| | Operation | | | | | | Surface water sample | 4 | ESMU |

4.4 REPORTING SYSTEM

Reporting system for the suggested monitoring programme operates at two levels:

- 1) Reporting for environmental condition indicators and environmental management indicators
- 2) Reporting for operational performance indicators at the ESMU level.

Environmental monitoring involves regular checking of the environmental management issues detailed in the ESMP and to ascertain whether the mitigation measures are achieving their objectives, according to the EMP, with the progress of the works. It provides the necessary feedback for Project management to keep the programme on schedule.

The Contractor, PMC and ESMU operate the reporting system for environmental conditions and environmental management indicators. The reporting system is presented in table 4-3. Reporting formats for Contractors have been prepared, which will form the basis of the implementation by the Contractor and monitoring by the PMC and ESMU. The list of reporting formats prepared for the Project is presented in Table 4-4 and Formats are presented in Appendix-7.

- The reporting system will start with the Construction Contractor who is the main executor of the implementation activities. The Contractor will report to the Project Management Consultant, who in turn shall report to the ESMU.
- The Contractor will submit monthly and quarterly environmental compliance reports along with formal monthly and quarterly reporting to the PMC.
- The PMC will submit separate quarterly environmental monitoring reports to ESMU in addition to submission of the summary of the activities of the month in the formal monthly report including any deviations and corrective actions
- ESMU/PMC will be responsible for the preparation of the targets for identified non-compliances.
- Solutions for further effective implementation may also emerge as a result of the compliance monitoring reports.
- Environmental Management Compliance Certificate (appendix 15) will be issued by Environment Specialist of PMC during the submission of each Interim Payment Certificate (IPC). This certificate will be based on compliance status of environmental measures during that tenure for which IPC has been produced.
- Photographic records will be kept to provide useful environmental monitoring tools. All material source locations, debris disposal locations, plants locations, Construction camp locations, Crusher locations etc. will have a complete photographic record. Photographs for all these establishments will be taken prior to establishment activities begin, during the establishment and operation process and after rehabilitation. The record will be submitted to PMC half yearly and will also be availed to PMC/ESMU, as and when required.
- A full record of construction activities will be kept as a part of normal Contract monitoring system.
- The operation stage monitoring reports may be annual, provided the Project Environmental Completion Report shows that the implementation was satisfactory.

This reporting will be as follows:

- Reporting by the Contractor to the PMC.
- Reporting by PMC to ESMU.
- Reporting by ESMU for the information of all interested parties.

Table 4-3: Reporting System

| Items | Contractor | Project Management Consultant | | ESMU | | World Bank (WB) |
|---|-----------------------------------|-------------------------------|---------------------|-------------------------------|--------------|---------------------|
| | Implementation & Reporting to PMC | Supervision | Reporting to HPRDIC | Oversee Compliance Monitoring | Report to WB | Desired Supervision |
| Construction Stage | | | | | | |
| Monitoring of Construction Site and Construction Camp | Before start of work | Regular | Monthly | | Quarterly | Quarterly |
| Pollution Monitoring | As required | As required | Quarterly | Quarterly | Quarterly | Quarterly |
| Debris Disposal Area | Weekly | Regular | Monthly | Quarterly | Quarterly | Quarterly |
| Monitoring of Enhancements | Implementation | As required | Quarterly | Quarterly | Quarterly | Yearly |
| Topsoil Preservation | Weekly | As required | Monthly | Quarterly | Quarterly | Yearly |
| Borrow Area/Quarry Area | Regular | Regular | Monthly | Quarterly | Quarterly | Yearly |
| Tree Cutting | - | - | - | Quarterly | Quarterly | Yearly |
| Operation Stage | | | | | | |
| Pollution Monitoring | | | | As per monitoring plan | - | - |

Table 4-4: Summary Details of Reporting Formats

| Format No. | Item | Stage | Contractor | Project Management Consultant (PMC) | |
|------------|---|----------------------------|---|-------------------------------------|-------------------|
| | | | Implementation & reporting to PMC | Supervision | Reporting to ESMU |
| RF 1 | Approval of Construction Camp/ Plant Site and its Management Plan | Pre-Construction | One Time | One Time | One Time |
| RF 2 | Approval of Borrow Management Plan (General & Specific) | Pre-Construction | General -One Time Specific re- development plan - one for each borrow area | Regular | Quarterly |
| RF 3 | Construction Camp and Plant Site Management | Construction | Monthly | Regular | Quarterly |
| RF 4 | Topsoil Management | Construction | Monthly | Regular | Quarterly |
| RF 5 | Pollution Control and Construction Plants | Construction | Monthly | Regular | Quarterly |
| | Pollution Monitoring | Construction and Operation | - | | Quarterly |
| RF 6 | Vehicles and Pollution Control | Construction | Monthly | Regular | Quarterly |
| RF 7 | Details of the DG Sets and Pollution Control | Construction | Monthly | Regular | Quarterly |
| RF 8 | Details of Oil Storage | Construction | Monthly | Regular | Quarterly |
| RF 9 | Working at Water Courses & Pollution Control | Construction | Monthly | Regular | Quarterly |
| RF 10 | Details of Water Extraction | Construction | Monthly | Regular | Quarterly |
| RF 11 | Details of Personal Protective Equipment | Construction | Monthly | Regular | Quarterly |
| RF 12 | Status of Consent for Water Extraction | Construction | Quarterly | Quarterly | Quarterly |
| RF 13 | Deviations and Corrective Actions | Construction | ô | Monthly | Quarterly |
| RF 14 | Implementation of Enhancement Measures for Cultural Properties, Water Harvesting Structures | Construction | Monthly | Regular | Quarterly |
| RF 15 | Debris generated by the hill ward side widening, cutting of hill slopes | During construction | Throughout the construction period during widening | Regular | Quarterly |

| Format No. | Item | Stage | Contractor | Project Management Consultant (PMC) | |
|------------|---|---------------------|-----------------------------------|-------------------------------------|---------------------------------|
| | | | Implementation & reporting to PMC | Supervision | Reporting to ESMU |
| RF 16 | Grievance Redressal Mechanism during Construction | During Construction | Monthly | Regular | Quarterly |
| RF 17 | Work Force Management | During Construction | Monthly | Regular | Quarterly |
| RF 18 | Occupational Health Safety Measures | During Construction | Monthly | Regular | Quarterly |
| RF 19 | Road Safety Measures | During Construction | Monthly | Regular | Quarterly |
| RF 20 | Accidents Reporting | During Construction | Monthly | Regular | Quarterly |
| RF 21 | Monthly Reporting | During Construction | Monthly | Regular | Monthly (as an annexure to MPR) |

The Environment Specialist of PMC can make required changes in the formats specified in Appendix 10 of ESMP to ensure effective reporting of environmental issues. For making any required changes in the frequency of reporting and change in the contents of the report for effective and simple for implementation and monitoring, PMC should discuss the reporting formats with the Contractor and ESMU. This will not only ensure that the environmental provisions are addressed but also link the satisfactory compliance to environmental procedures prior to approval of the Interim Payment Certificate (IPC) by the Engineer. In the regular monthly meeting, the environmental aspects should also be discussed and the staff responsible for the implementation of the environmental management from the Contractor, ESMU and PMC should also be present.

Social monitoring indicators will be indicated as part of the Resettlement Action plan that will be prepared for the corridor before invitation of bids.

4.5 INSTITUTIONAL ARRANGEMENTS

Institutional arrangements are intended to achieve certain level of quality in the project during implementation of various project components by the Government of Himachal Pradesh (GoHP) as specified by the various conditions of loan agreement between the World Bank and the GoHP. These are basically to meet the World Bank ESS (Environment and Social Standards) that in turn will make sure that the country laws (Indian laws and regulations) are not violated during the pre-construction, construction and Operational (defect liability period) stages of the project.

ESMU is headed by the Chief Engineer, who will be responsible for the successful implementation of the Project. The Chief Engineer is also the Project Director in the ESMU set up for the implementation of the project. The Project Director (PD) will be assisted by Superintendent Engineer of ESMU, who further will have support from Construction Management Unit (CMU) at site and Experts (Nodal Environmental Officer, Social Development officer, Horticulture Officer) at the head office. The Nodal Environmental officer at the HQ will coordinate with CMU for the implementation of the Environmental Management Plan at ESMU headquarters. Roles and responsibilities of ESMU in HPRIDC is given below in table 4-4.

Table 4-5: Roles and responsibilities of the staff in ESMU of HPRIDC

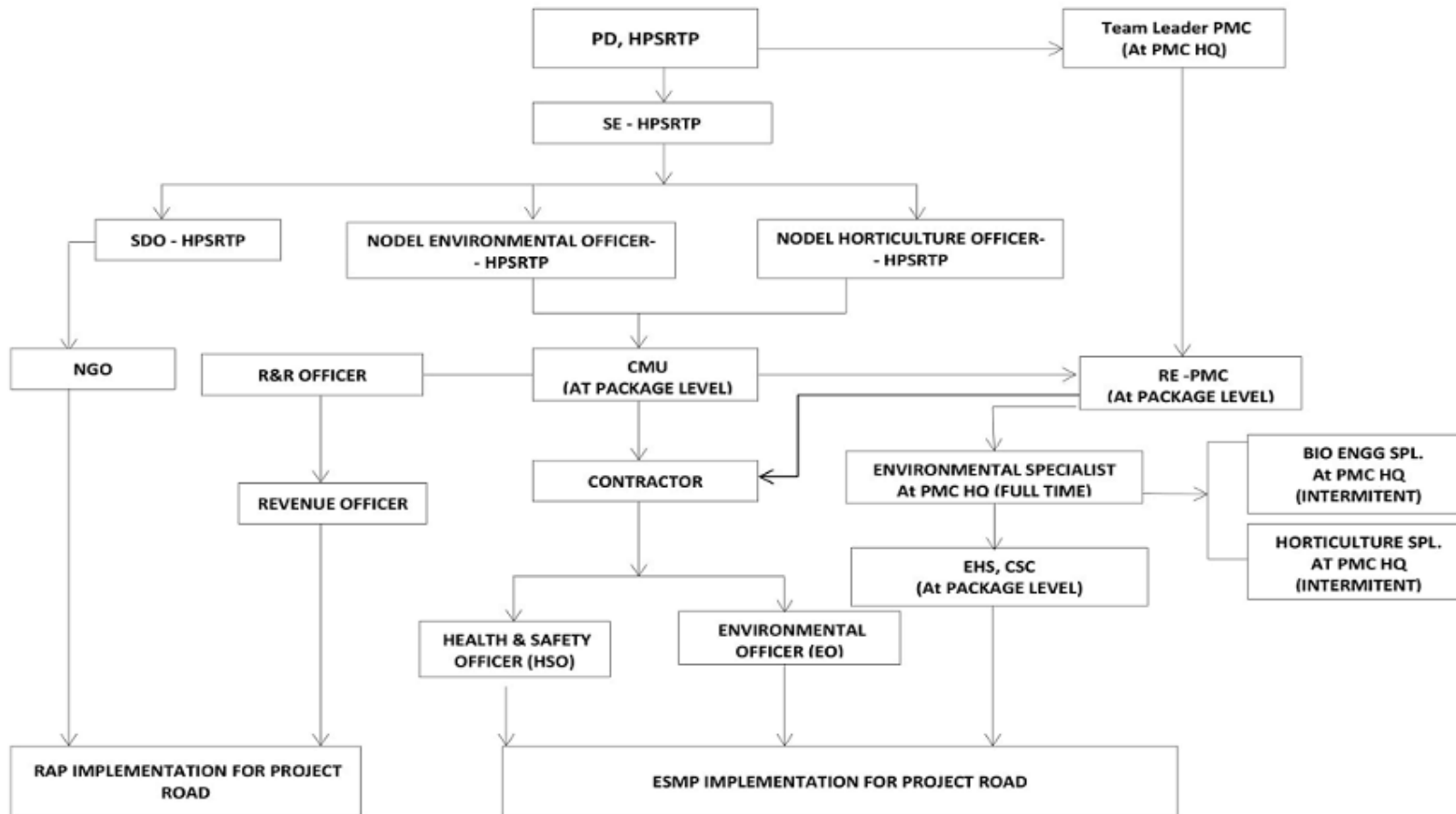
| Position | Roles & Responsibilities |
|--|---|
| Project Director | Chief Engineer-cum-Project Director will be overall in-charge of the Road and other Projects in HPRIDC. He is responsible to the Board and the State Government for efficiently carrying out of all preparatory studies, works in his administration and accounts pertaining to all such studies and works |
| Superintendent Engineer | Superintending Engineer (Planning & Design) will be assisting the Chief Engineer-cum-Project Director in efficient functioning of the Project Implementation Unit of HPRIDC. |
| Nodal Environmental Officer, ESMU | Nodal Environment Officer will be directly responsible to the CE-cum-PD for the efficient discharging of duties. He will deal with matters pertaining to integration of EA/EMPs into project design, construction management during project implementation, reporting and documentation etc. He will interact with CMUs for collecting information on environment management. He will be assisted by Junior Engineer. |

| | |
|-----------------------------------|--|
| Social Development officer | Social Development Officer will be directly responsible to the CE-cum-PD for the efficient discharging of duties. He will be overall responsible for coordinating with Land Acquisition Officers (LAOs), Public Works and Revenue Departments for land acquisition for upgrading works. He will coordinate the activities of NGOs on board and RRO of CMUs for implementation of Resettlement Action Plans (RAPs) and R & R assistance. |
| Horticulture Specialist | Nodal Forest Officer will be directly responsible to the CE-cum-PD for the efficient discharging of duties. He will be responsible for regulatory clearances, plantation works including compensatory afforestation, biodiversity management and coordination with the concerned departments/agencies. |

For PMC, Environment and Social Specialists (full time) at PMC, Head Quarter (HQ) will look after the ESMP implementation and report to Resident Engineer on site. Bio-Engineering Expert and Horticulture Development Officers at PMC, HQ will have intermittent input and will visit sites as per requirements. At site PMC will have an EHS officer to implement EMP.

For Contractor, Project manager will be assisted by one Environmental Officer and one Health and Safety officer who will coordinate with PMC and ESMU staff for implementation of EMP.

ESMU will hire a NGO or any other agency for the implementation of RAP on site. The agency will support Social development officer, ESMU and will coordinate with R&R and Revenue officer posted in CMU at site.



Note: NGO, R&R officer and Revenue Officer to be Appointed by SE –HPSRTP

Institutional arrangements for Implementation of Environmental and Social Management Plan (ESMP & RAP)

4.6 GRIEVANCE REDRESS MECHANISM

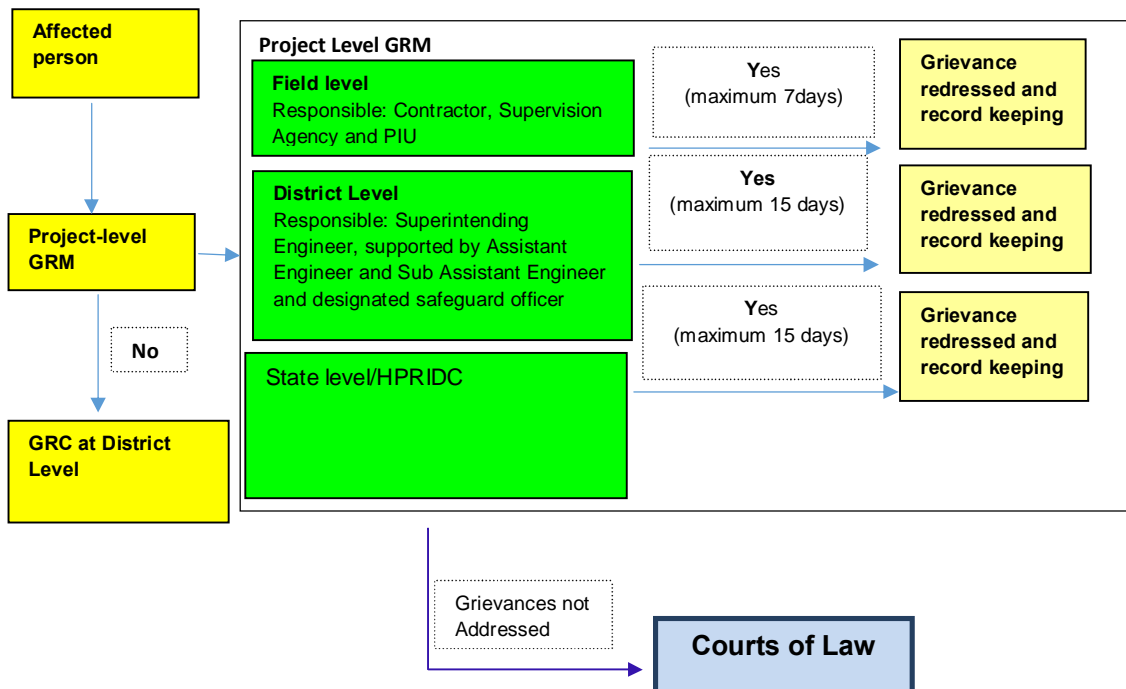
Efficient Grievance redress mechanism will be developed to assist the PAPs resolve their queries and complaints. Each RP will detail specific grievance redress mechanisms. Grievances of PAPs will first be brought to the attention to the site office level of the HPRIDC which shall be redressed within two weeks from the receipt of complaints. Grievances not redressed by the HPRIDC staff (field level) will be brought to the Grievance Redress Committee (GRC) which shall be redressed within four weeks from the date of receiving the complaint at ESMU/CMU level. The GRC will have representatives from PAPs, ESMU, field level staff, district magistrate/commissioner, local administration, revenue authority and local community.

The main responsibilities of the GRC are to: (i) provide support to PAPs on problems arising from land/property acquisition; (ii) record AP grievances, categorize, and prioritize grievances and resolve them; (iii) immediately inform the PMU of serious cases; and (iv) report to PAPs on developments regarding their grievances and decisions of the GRC and the PMU. Other than disputes relating to ownership rights under the court of law, GRC will review grievances involving all resettlement benefits, compensation, relocation, replacement cost and other assistance.

The GRC will meet every month (if grievances are brought to the Committee), determine the merit of each grievance, and resolve grievances within a month of receiving the complaint. Records will be kept of all grievances received including contact details of complainant, date the complaint was received, nature of grievance, agreed corrective actions and the date these were effected, and final outcome. The GRCs will continue to function during the life of the Project including the defects liability period.

The proposed GRC does not impede access to the country's judicial or administrative remedies. The PAP has the right to refer the grievances to appropriate courts of law at any stage of the process. The HPRIDC will ensure that PAPs has the right to approach court of law any time during the process of grievance redress activities. **For more details refer to the Stakeholder Engagement Plan**

Figure 2: Grievance Redress Mechanism



5. CAPACITY BUILDING AND TRAINING

5.1 CAPACITY BUILDING AND TRAINING

Capacity building and training would be required especially for the CMU and PIU staff associated with the project as the Environmental Safeguards. The training and capacity building would not only be project specific but would also target and develop long term capacities in the ESMU.

5.2 TRAINING PROGRAMMES

The training programme will be implemented as per training modules provided in table 5-1. These training programmes are not part of the Contractors plan and estimates but will be a part of the project cost that includes institutional strengthening, capacity building and training. Training module can be changed during construction phase based on requirements by ESMU. Total earmarked training & capacity building cost is estimated 10 lakhs. Out of this amount, seven lakhs have been proposed for Training sessions for 9 days (in complete project cycle) as given in table 5-1. Three lakhs have been proposed for Crash Courses on Focused Themes Relating to Environmental Management as suggested in table 5-2.

The basic objective of giving training to different Stakeholder is to enhance their capabilities for implementation of Environmental Management and Monitoring Plan. It is recommended that training be given at least 4 times both off-site and on site.

- Before Start of Construction Work
- During Construction
- Before demobilization of Contractor
- After Construction before Start of Monitoring

Table 5-1 Training Module

| S. No. | Training Recipients | Mode of Training | Environmental and Social Aspects to be covered in training modules | Training Conducting Agency |
|--|---|---|---|------------------------------|
| (Before Start of Construction Work by ESMU) | | | | |
| One day | | | | |
| 1 | Staff of ESMU and CMU | Lecture Session, presentation & discussion | World Bank's Environment and Social Management Framework | Environment Specialist, ESMU |
| 2 | Staff of ESMU and CMU | Lecture Session, presentation & discussion | Legal requirements of the project, ESCP, etc. | Environment Specialist, ESMU |
| 3 | Staff of ESMU and CMU | Lecture Session, presentation & discussion | Specific Environment and Social Management Plan and ESCP | Environment Specialist, ESMU |
| (Before Start of Construction Work) | | | | |
| Day-1 (Session-I) | | | | |
| 1 | Staff of ESMU, staff of PMC, Engineering Staff of Contractor and Collaborating Government Agencies | Lecture Sessions, Presentation and discussion | Overall generic Environment Issues, Regulations & Statuary requirements and Mitigation Measures, ESCP | PMC |
| 2 | Staff of ESMU, staff of PMC, Engineering Staff of Contractor and Collaborating Government Agencies. | Lecture Sessions, Workshops & Presentation | Institutional Set Up, Role and Responsibility of Stake Holders and Contractual obligations | PMC |
| Day-1 (Session-II) | | | | |
| 3 | Staff of ESMU, staff of PMC, Engineering Staff of Contractor and Collaborating Government Agencies. | Lecture Sessions, Workshops & Presentation | Bioengineering; Introduction, Scope, institutional Set Up, methods etc | PMC |

| S. No. | Training Recipients | Mode of Training | Environmental and Social Aspects to be covered in training modules | Training Conducting Agency |
|--|---|---|---|----------------------------|
| 4 | Staff of ESMU, staff of PMC, Engineering Staff of Contractor and Collaborating Government Agencies. | Lecture Sessions, Workshops & Presentation | Biodiversity Management; Concept, scopes and measures in the project | PMC |
| Day-2 (Session-I) | | | | |
| 1 | Staff of ESMU, staff of PMC, Engineering Staff of Contractor and other Concerned Agencies. | Lectures; Demonstration sessions | Project related environmental issues and Project related mitigation measures | PMC |
| 2 | Staff of ESMU (Nodal Level), staff of PMC, Engineering Staff of Contractor. | Group Discussions and action plan for the project | Environmentally Sound Construction Management & Environmentally, Sustainable operations of Highways | PMC |
| Day-2 (Session-II) | | | | |
| 3 | Staff of ESMU staff of PMC, Engineering Staff of contractor. | Lectures; Group Discussions | Supervision and Monitoring, Reporting Formats | PMC |
| 4 | Staff of ESMU, staff of PMC, Engineering Staff of Contractor and Collaborating Government Agencies. | Lecture Sessions, Workshops & Presentation | Occupational Health and Safety Community Health and Safety | PMC |
| Module for Training During Construction (Immediately after Commencement of Construction activities) | | | | |
| Day-1 | | | | |
| 1 | Staff of ESMU involved in the project, staff of PMC, involved in construction, contractor | Lecture Sessions, Presentation & Workshops | Implementation of Environment Management Plan, Environment friendly Construction Methodology and Workers Safety during Construction | PMC |
| 2 | Staff of ESMU involved in the project, staff of PMC, involved in construction, contractor | Lecture Sessions, Workshops & Presentation | Interactive discussion, Monitoring and Reporting System | PMC |
| 3 | Staff of ESMU staff of PMC, Engineering Staff of contractor. | Lectures; | Bio-engineering types and various methods | PMC |
| Day-2 | | | | |
| 4 | Staff of ESMU staff of PMC, Engineering Staff of contractor. | Lectures; | Biodiversity Management; Concept, scopes and measures in the project | PMC |
| 5 | Staff of ESMU staff of PMC, Engineering Staff of contractor. | Lectures; | Occupational and Community Health and Safety; Introduction, Scope and management measures | PMC |
| 6 | Staff of ESMU staff of PMC, Engineering Staff of contractor. | Lectures; | Stake holders engagement procedures, Grievance redressal mechanism | PMC |
| Module for Training during Construction | | | | |
| One day | | | | |
| 1 | ESMU, Staff of PMC, All Staff of contractor | Lecture Sessions, Workshops & Presentation | Environment friendly Construction Methodology and Workers Safety | PMC |
| 2 | ESMU, Staff of PMC, All Staff of contractor. | Practical on Site | Traffic and Safety Management during construction; Safety Practices | PMC |
| 3 | ESMU, Staff of PMC, All Staff of contractor. | Practical on Site | Demonstration of Bioengineering techniques to be used in project on site | PMC |
| Module for Training before Contractor Demobilization | | | | |
| One day | | | | |
| 1 | ESMU Staff, Staff of PMC, Engineering Staff of Contractor. | Lecture, Presentation Sessions | Restoration of Site | PMC |
| 2 | ESMU Staff, Staff of PMC, Engineering Staff of Contractor. | Lecture Sessions, Presentation, Workshop and lesson learned | Reporting Formats for Restoration | PMC |
| After Construction before Start of Monitoring | | | | |
| One day | | | | |
| 1 | ESMU | Lecture Sessions, Presentation and Workshop | Environment Monitoring | PMC |
| 2 | ESMU | Lecture Sessions, Presentation, Workshop | Reporting Formats | PMC |

Table 5-2 Crash Courses on Focused Themes Relating to Environmental Management

| S. No | Training Institutions | Target groups | Contents of the training |
|-------|--|------------------------------------|---|
| 1 | Indian institute of Remote sensing, Dehradun | PWD Executive Engineers | Geographic information Systems (GIS) |
| 2 | National Environmental Engineering Research Institute (NERI) Nagpur | Junior Engineers | Air, Water Noise Quality modelling |
| 3 | National Remote Sensing Agency, Hyderabad | Assistant Engineers | Application of satellite imageries in road planning |
| 4 | Indian Institute of Ecology and Environment, New Delhi | Selected Engineers from all levels | Himalayan Ecology |
| 5 | Forest Research Institute, Dehradun | Environmental Engineers | Training programme on environmental management relating to transport projects |
| 6 | Centre of Environmental Education, Ahemadabad | Selected Engineers from all levels | Legal dimension of Environmental management |
| 7 | Wadia Institute of Himalayan Geology | Junior Engineers | Himalayan Geology and seismicity |
| 8 | National Institute of Training for Highway Engineers (NITHE), Noida | Junior and Assistant Engineers | Environmental Management in Transport Projects |
| 9 | Environment Protection Training and Research Institute, Hyderabad | Junior Engineers | Theoretical aspects of environmental management |
| 10 | Tata Energy Research Institute (TERI) | Assistant Engineers | Hydro Energy and ecological systems |
| 11 | Centre for Water Resources Development and Management, (CWRDM) Kozhikode, Kerala | Selected group of Engineers | Water Resources Management in hilly terrain |
| 12 | Centre for Earth Science Studies, Thiruvananthapuram, Kerala | Selected Group of Engineers | Tectonic and Seismic forces in Himalayan Region |
| 13 | Kerala Forest Research Institute (KFRI) Trichur, Kerala | Senior Engineers | Biodiversity and forest ecosystems |
| 14 | Hind swaraj trust, Ahmed Nagar Pune | Junior and Assistant Engineers | Soil and water conservation |

These training programmes are expected to impart in-depth knowledge from experienced professional working at geographically distant locations. However, these training programmes are only indicative and can be considered in coordination with the respective institutes in geographically distant areas of the Indian sub-continent.

6. IMPLEMENTATION SCHEDULE

Generally, the construction of project is of about 18 months. Tentative implementation schedule of the project is listed below.

Table 6-1: Indicative Implementation Schedule

| S. No | Description | Indicative Time Frame |
|----------|--|---|
| 1 | Project Implementation | April 2020 |
| A | Detailed Design and Bidding Documents | Month of Nov 2019 |
| B | Procurement | March 2020 |
| C | Construction commencement | August 2020 |
| D | Project Completion | 18 months (January 2022) |
| E | Defects Liability Period | One year after completion (February 2022 to January 2023) |
| 2 | Pre-Construction Phase - Environmental & Social Management | |
| A | Payment of Compensation and assistance, removal and relocation of structures and CPRs as per RAP | Prior to commencement of civil works |
| B | Preparation of GBV Action Plan by HPRIDC | Prior to commencement of invitation of bids |
| C | Obtain Forest clearances for specific locations as identified | Prior to commencement of civil works |
| D | Preparation of Labor Management Procedures | Prior to commencement of civil works |
| 3 | Construction Phase - Environmental & Social Management | |
| A | Contractor submission of project Contractor Environmental and Social Management Plan (C-ESMP) including Labor influx management plan | 1 month after effectiveness of contract and before start of works |
| B | Implementation of mitigation measures and conduct of environmental effects monitoring following the ESMP. | After award of the contract |
| C | Management of construction stage social impacts | During construction stage/project implementation |
| D | Monthly EMR for Project's Monthly Progress Report | 8 th day after effective month |
| E | Semi-Annual EMR during construction for submission to World Bank | 8 th day after effective 6-months |
| F | Restoration of sites | Before demobilization |
| 4 | Operation Phase | |
| A | Implementation of mitigation measures and monitoring activities as Specified in the EMP | Semi annual |
| B | Submission of EMR by Operator | Semi annual |

Table 7-2: Indicative Implementation Schedule

| Activity | Timeline (Months) | | | | | | | | | | | | | | | | | |
|---|--------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|
| | Construction Phase | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| Mobilization of Environmental Representative by Contractor/ PMC | █ | | | | | | | | | | | | | | | | | |
| Review of Environmental Management Plan Contractor/ PMC | █ | █ | | | | | | | | | | | | | | | | |
| Identification/ Establishment of Construction camp sites (HMP, Crusher, Batching plant, WMM Plant, and Labour Camp etc) | █ | █ | █ | | | | | | | | | | | | | | | |
| Identification of Sites for Debris Disposal and Borrow Areas/Quarry areas | █ | █ | █ | █ | █ | █ | | | | | | | | | | | | |
| Preparation of Project specific Environmental Management Plan by Contractor | | █ | █ | █ | █ | | | | | | | | | | | | | |
| Training by PMC as per training Plan | | █ | | | | | | █ | █ | | | | | | | █ | █ | |
| EMR Reporting on ESMP compliances by Contractor/PMC | | | | █ | | | | █ | | | █ | | | | | █ | | |
| Compensatory Afforestation | | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ |
| Implementation of ESMP | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ |

Operation Phase

| Activity | Timeline (Months) | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| Implementation of mitigation measures and monitoring activities as Specified in the ESMP | | | | | | | | | | | | █ | | | | | | | | | | | | | █ |
| Submission of EMR by Operator | | | | | | | | | | | | █ | | | | | | | | | | | | | █ |

7. ENVIRONMENTAL BUDGETORY PROVISIONS

The budgetary provisions for the implementation of the environmental management plan of the Project is categorised in to two types and summarised below in table 7-1 and 7-2. The complete breakups of the budgetary provisions are provided in Appendix 16.

- ESMP works to be implemented by the Contractor as per the Civil Works BOQ (Table 7-1).
- ESMP works to be implemented by the Contractor as per the ESMPBOQ (not included in civil works BOQ) (table 7-2).

Table 7-1: ESMP Works to be implemented as per Civil Works BOQ

| S. No | Description | Reference | Amount |
|-------|--|--|---------------------------------|
| 1 | Disposal of Excess debris Material with an average lead of 2.5 Km | Bill no 2.09 of Civil Works BOQ | Cost included under Civil Works |
| 2 | Construction of cross drainages structure including erosion control measures downstream of the culvert locations | Bill No 5 (culverts) & 6 (bridge) of Civil works BOQ | Cost included under Civil Works |
| 3 | providing surface line drain on roadsides to channelize the water into nearby cross drainage structures | Bill No 7.02 to 7.06 of Civil works BOQ | Cost included under Civil Works |
| 4 | Providing protection measures (retaining & breasts walls) to restrain the soil to slopes | Bill No 7.15 to 7.21 of Civil works BOQ | Cost included under Civil Works |
| 5 | Provision of Gabion Walls to retain debris at 7 identified debris disposal sites | Bill no 7.22 of Civil Works BOQ | Cost included under Civil Works |
| 6 | Provision of traffic safeguards measures on the road (information/caution boards, chevrons etc.) | Bill No 8.02 of Civil works BOQ | Cost included under Civil Works |
| 7 | Traffic and Safety Management During Construction | Bill No 9.06 of Civil works BOQ | Cost included under Civil Works |

BoQ summary of the ESMP works to be implemented by the Contractor as per the ESMP BOQ (not included in civil works BOQ)

The total budget for ESMP is sum of budget for implementation of ESMP and RAP, which works out to INR 877.85 lakhs (INR 877,85,000)

Table 7-2 : Budgetary Provisions for Specific Environmental Impact Mitigation / Enhancement Measures (additional Requirements to be implemented by Contractor against budget):

| S. No | Description | Amount in lakhs |
|-------|---|-----------------|
| 1 | Enhancement measures for identified Water bodies along the project corridor | 15.8 |
| 2 | Provision of Enhancement measures for Natural water sources along project road | 4.25 |
| 3 | Provision of Noise Barriers at 3 Sensitive receptor locations (Ch 20+200, 22+450, 30+350) | 13.2 |
| 4 | Bio Engineering Interventions at selected locations along the project road including Muck Disposal Sides and reclaimed vacant areas within RoW Vacant low lying | 468.74 |
| 5 | Clearance/Removal of Invasive Species like Lantana and Sea Ruthenium etc. form the road corridor and Plantation of Indigenous local vegetation and Maintenance and upkeep for | 75 |

| S. No | Description | Amount in lakhs |
|--------------------|--|--|
| | 70% survival rate for 6 months | |
| 6 | Provision for diversion of 1.5 Ha forest land for road construction Net Present value (NPV cost) as per current rates of GoHP Forest department. | Cost shall be borne by HPRIDC to forest Department of GoHP |
| 7 | Provision of plantation and maintenance (tree guard) of 3000 Avenue trees along roadside and in RoW @ 1800 per tree. | 54 |
| 8 | Improvement of Crematorium at Ch 24+900 along Project Road | 2 |
| 9 | Monitoring Cost as per CPCB Standard Procedures | 12.96 |
| 10 | Provision for Compensatory Afforestation in lieu of Tree felling for road construction | Cost shall be paid by HPRIDC to forest Department of GoHP |
| 11 | Provisions of Environmental specialist (full time), EHS Officer (fulltime), Bio-Engineering Specialist (intermittent input), Horticultural specialist (intermittent input) and Training sessions for implementation of EMP | To be included by PMC |
| 12 | Land acquisition and Resettlement & Rehabilitation Cost | Covered in RAP Budget |
| 13 | Relocation and construction of hand pumps, water storage tanks, OHTs, open wells & water taps as per directions of the Engineer. | Covered in Utility Shifting Budget |
| 14 | Provision for retro-reflective bands for marking of stray animals along project corridor (to be implemented through NGO) | 10 |
| 15 | Cost for institutional strengthening, capacity building and training by HPRIDC | Cost shall be borne by HPRIDC |
| 16 | Contingencies 10% | 79.9 |
| Grand Total | | 877.85 |

Budget for addressing pre-construction social impacts is provided as part of the Resettlement Action Plan. Actions relating to GBV actions shall be included in the GBV Plan that would be prepared by HPRIDC prior to invitation of bids and included in the Bids.