BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL, PRINCIPAL BENCH, NEW DELHI

O.A. No. 127/2024

IN THE MATTER OF:

Nathu Ram ... Applicant

Versus

Ministry of Road Transport and Highways & Ors. ... Respondent

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ADDITIONAL REPLY ON BEHALF OF RESPONDENT NO.-1 (REFERRED TO AS R-1 HEREAFTER) I.E. THE MINISTRY OF ROAD TRANSPORT & HIGHWAYS

Preliminary objections/ Submissions: -

1. That the present additional reply is being filed in response to the written submission made by the applicant dated 23.07.2025.

2. That it is most humbly submitted that the Applicant's written submissions filed on 23.07.2025 has distorted facts to mislead the Hon'ble Tribunal. The assertions made therein are frivolous, misconceived and lacks factual substance.

3. That the applicant has primarily relied on the findings of the Final Report of the Joint Committee constituted by the Hon'ble NGT vide order dt. 06.02.2024, which has already been replied/ objected to and placed on record by R-1 vide reply/ objections filed before the Hon'ble Tribunal (refer to p-3862- 4286).

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Regarding Environmental Impact Assessment (EIA) and Social Impact Assessment (SIA)

4.1. That the averments raised by the applicant regarding non-conduction of Environmental Impact Assessment (EIA) and Social Impact Assessment (SIA) are false, misleading and devoid of factual substance.

4.2. It is respectfully submitted that MoRTH has already clarified that the project does not fall under the category requiring prior environmental clearance in accordance with applicable EIA notifications & MoEF&CC guidelines, previous judgements of the Hon'ble Supreme Court and recommendations of the Expert Committee constituted to examine the matter as per the directions of the Hon'ble Supreme Court of India (refer para 8 at p-3871-3873 of reply filed by R1). The final reports submitted by of DC Sirmour and DC Shimla have also acknowledged the same. Excerpts from final reports of DC Shimla and DC Sirmour are as under:-

i. Para 3.1. of Final Report submitted by DC Shimla (p- 3218), states that:

Now, as the necessary Right of Way (RoW) or land acquisition for all segments of NH 707 in question (0.00-97.00 Km and 97.00-103.00 Km) is below the 40 m threshold, the Ministry of Road Transport and Highways (MoRTH) isn't required to obtain Environmental Clearance. This holds true even if the total length of 103.55 Km isn't segmented as alleged, to reduce it to less than 100 Km. Consequently, there appears to be no requirement for MoRTH to segment the highway to circumvent the need for Environmental Clearance.

ii. Para 3.1.1 of Final Report submitted by DC Sirmour (p- 3218), states that:

As depicted in the table above, because the necessary Right of Way (RoW) or land acquisition for all segments of NH 707 in question (0.00-97.00 Km and 97.00-103.00 Km) is below the 40 m threshold, the Ministry of Road Transport and Highways (MoRTH) isn't required to obtain Environmental Clearance. This holds true even if the total length of 103.55 Km isn't segmented as alleged, to reduce it to less than 100 Km.

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Consequently, there appears to be no requirement for MoRTH to segment the highway to circumvent the need for Environmental Clearance.

4.3. Without prejudice to the above, it is most humbly submitted that the Environmental Impact Assessment (EIA) and Social Impact Assessment (SIA) were conducted by the DPR Consultant as part of the Detailed Project Report (DPR). These reports, along with all other relevant technical and financial analysis reports, were submitted to the Ministry and were duly considered at the time of sanctioning of the Projects. These EIA and SIA are already available on the public domain and are also being submitted herewith for ready reference at Annexure-R1 and Annexure-R2 respectively.

4.4. The Report of the Joint Committee under the Chairmanship of DC- Simrour and DC- Shimla have also acknowledged EIA reports in their Final reply at para 3.xiv (p-2052) and para 3.5.xiv (p-3223) respectively.

4.4. Accordingly, the allegation of the applicant that no EIA/SIA was conducted is factually baseless, contrary to record, and liable to be rejected.

Regarding allegations of Damage to natural water sources/streams

5.1. That the assertions regarding alleged damage to natural sources/ stream of water (refer to para 3.4 p- 2049-2050) have already been denied vide reply/ objection filed by the R-1 (Refer to para 4 at p- 3867-3868 and para- 11 of p-3875-3876)

5.2. It is once again humbly submitted that along the entire stretch from Paonta Sahib to Fediz, passing through Rajban–Kaffota–Shillai–Gumma, adequate provisions for cross-drainage (CD) structures have been incorporated at all natural water channels, without altering the natural drainage pattern, except during the short duration of construction of the CD structures. In total, 9 bridges and 381 culverts have been constructed along the 103.550 km project stretch, thereby providing drainage paths at intervals of approximately every 265 meters. All CD structures have been provided with aprons, catch pits, and longitudinal roadside drains for proper channelization of water. These structures and drains are regularly maintained and cleaned. Accordingly, the allegation of obstruction of natural channels is categorically denied.

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5.3. It is further submitted that in certain instances, a few *kuhls* and natural water sources were temporarily disrupted due to landslides and other adverse natural calamities. Although these water sources were located beyond the acquired ROW and the damage was the result of slides emanating outside the ROW, the Contractors—at the request of local communities and the District Administration—undertook necessary rectification and repair works to ensure uninterrupted water supply to the affected villages. Such actions reflects the proactive and responsive approach of the Respondents.

5.4. In view of the above, the allegation regarding damage or obstruction to natural water sources/streams due to disposal or dumping of debris by the Respondent or the executing Contractors is wholly misconceived, factually untenable, and is specifically denied.

Alleged damage to water supply schemes and Jal Shakti Vibhag submissions

6.1. That the averments regarding damage assessment submitted by the Jal Shakti Vibhag vide their letter no. JSV-DS-DB-Misc-/2024-25-1095-98, dated 14.06.2024 (refer to para- 3.6.2.(ii) p-2055-2058) have already been denied vide reply/ objection filed by the R-1 (refer to para 14.3 at p- 3878)

6.2. At the outset, it is submitted that the water pipelines were installed within the ROW of the already existing National Highway. During widening of the stretch, the contractors have undertaken the shifting/ relocation of these utilities, as per approved estimates provided by the respective utility-owning agencies including the Jal Shakti Vibhag. Any additional pipelines laid within the ROW by the local residents/ villagers have also been relocated, repaired, or replaced by the contractors for ensuring uninterrupted water supply and there is no obstruction to water supply to the local communities.

6.3. That there was provision for shifting of existing water pipelines in the entire project in length of 41.195 kms out of the which shifting of water pipelines has been completed in a length of 32.080 kms and completion certificates/ NOCs to this effect have already been received from the utility owning Dept. which is enclosed at Annexure-R3. Apart from that construction of all the 73 nos. of water harvesting structures sanctioned and proposed to be constructed within the ambit of the Contract Agreement have also been completed.

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6.4. It is further submitted that certain water supply schemes, pipelines and irrigation Kuhls were affected by natural debris flow and flash floods during the monsoons of 2022 & 2023. In such cases, the EPC Contractors, at the instance of the District Administration and local communities, undertook rehabilitation works to ensure uninterrupted water supply to local villages reflecting the Respondents' proactive and humanitarian approach addressing societal needs. In view of the above, the allegation of permanent or irreparable damage to water supply schemes is denied. On the contrary, the project has led to upgradation of the existing older pipelines and improved alignment of Kuhls, thereby providing long-term benefit to the local communities.

6.5. It is also trite to submit that Jal Shakti Vibhag vide their letter no. JSD-Shillai-DB-/2025-1031 dt. 16.06.2025 (Enclosed at Annexure- R4) submitted the details of funds required to restore the damaged water supply and irrigation schemes due to construction works of NH-707 amounting to Rs. 2,22,60,000.00 with coordinates. Accordingly, a joint site visit was conducted by the representatives from PIU, Paonta Sahib, MoRTH, the Social and Environment Experts from Authority's Engineer and representatives from the Contractors to verify the on-site situations and present status of the alleged damages.

6.6. That upon verification at the site, it was observed that permanent restoration has been completed at 23 nos. of locations, wherever civil work has been completed. In stretches where works are ongoing, temporary restoration measures have been implemented to ensure uninterrupted water supply during the construction period. Further, it has been also assured that permanent restoration will be completed before completion of the civil works. The inspection also revealed that many of the reported handpumps were either non-operational or decommissioned prior to the commencement of NH-707 construction. However, handpumps falling within the ROW have either been relocated/ shall be relocated before issuance of the project completion certificate. The same has already been communicated to the Jal Shakti Vibhag vide this office letter No. MoRTH PIU-P.S./Misc./2021-22/Vol. III/4061 dt. 05.07.2025 which is enclosed at Annexure-R5.

6.7. Attention is also invited to the recommendation enshrined in the final report of DC-Sirmour at para vi. b) of p-2064, which states as under:

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Regarding the estimated cost of Rs. 22,260,000 for repairing the damaged components, as assessed by Jal Shakti Vibhag, the Joint Committee observed that all such components and utilities are to be relocated under the supervision of Jal Shakti Vibhag/IPH only after the road construction is completed. The cost for relocating these utilities is to be covered by MoRTH. Relevant documents received from MoRTH show that utility relocation is in progress in areas where construction has been finished, with many utilities in the Sirmaur section already moved and atleast Rs. 40 lakhs have already been paid for Package 1 (Annexure-32). Moreover, the completion certificate for this work is issued to MoRTH/contractors by Jal Shakti Vibhag only after satisfactory completion of the work (a copy of such a certificate for Package 5 in District Shimla is attached as Annexure-33). Therefore, it is recommended that Jal Shakti Vibhag/IPH adhere to the existing system already in place, ensuring that MORTH covers all related expenses, regardless of the amount, for repairing or relocating utility components.

6.8. Reference is also invited to para 3.3. of the Final Report of DC- Shimla:

As per certificate issued by Executive Engineer, Jal Shakti Vibhag, Nerwa on 11.06.2024 (Annexure-7), M/s Shivalik Buildtech Pvt. Ltd. (contractor of MoRTH) has completed the work of providing and laying of GI pipe 20 mm dia, 800 mtr, 1 no. hand pump as per approved estimate submitted by the Jal Shakti Vibhag Nerwa. Further, a report has been received from Executive Engineer, Jal Shakti Vibhag, Nerwa (Annexure-8) that no damage was caused to natural sources of water (rivulets) or any other water supply scheme due to debris generated during construction activity carried out by MoRTH through its contractor on NH-707.

6.9. In view of the foregoing submissions and keeping in view the utility shifting activities already completed/ being taken up, it is respectfully reiterated that the allegations regarding damage to water supply schemes, pipelines, and irrigation Kuhls are misconceived, factually untenable, and hence denied. On the contrary, the Respondents and the EPC Contractors have undertaken extensive measures not only to safeguard and restore the affected utilities but also to upgrade existing infrastructure for the long-term benefit of the local communities. Accordingly, the claims of the applicant in this regard are without merit and are liable to be dismissed.

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Alleged Damages Reported by SDMs and BDOs

7.1. That the allegation regarding damage to natural water resources, agricultural lands, trees etc., and damage to private and public property, etc. by the concerned Sub-Divisional Magistrates (SDMs) and Block Development Officers (BDOs) (refer to para 3.6.2.(iv) p-2058-2061) have already been denied vide reply/ objection filed by the R-1 (refer to para 14.4 at p-3879)

7.2. At the outset, it is most humbly reiterated that the damage reports issued by SDMs and BDOs are generic in nature and lacks critical particulars such as date, details, chainages, locations, etc. which are essentially required to substantiates the alleged damages. Further these alleged damages were neither communicated to the replying respondent nor to the Contractors executing the works and are therefore specifically denied.

7.3. It is also trite to submit that the damage reports issued by the concerned BDOs and SDMs have themselves attributed the cause of such damages to landslides and cloudbursts arising from adverse weather conditions and natural calamities. That the occurrence of extreme weather events resulted in slides emerging from out of Right of Way (ROW) and sliding of muck & debris to the valleys, resulting in damage to natural water sources (Kuhls), agricultural land, private trees, and both public and private property. Such occurrences and incidents have been reported to the DDMA and they have also acknowledged these events. Therefore, these damage caused by natural calamities and extreme weather conditions such as cloudburst, heavy rainfall, and landslides, etc. have been unjustly and wrongfully attributed to the contractors involved in widening of NH-707.

Regarding debris disposal sites and muck management:

7.4. That with regards to damages due to dumping of debris the same is denied since all waste disposal activities have been conducted in compliance with the required procedures at the designated debris disposal sites only. With respect to debris disposal sites, the following are most humbly submitted: -

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7.4.1. The existing stretch from Paonta Sahib-Gumma-Fediz had an original carriageway width of 3.5m to 7.0 m. To facilitate inter-state connectivity, improve transportation of goods and services, the Ministry had sanctioned for widening of the stretch to a carriageway width of 5.5m to 14m.

7.4.2. As per the EIA and the approved DPR, additional land was proposed to be acquired for disposal of excess hill cut materials which was estimated to be generated in order to achieve the new formation width. The hill cut materials in the form of rock, soil and debris were proposed to be optimized for maximizing their utilization in new construction of pavement, structures and slope protection work. Any remaining hill cut materials were proposed to be safely disposed of in designated dumps sites. Accordingly, the Ministry had already designated and acquired 12 nos. of debris disposal sites for accommodating the excess hill cut material. The details of the same are enclosed at Annexure-R6.

7.4.3. It is pertinent to mention here that as per the EIA, the total volume of debris generated due to hill cut, was estimated to be 9,49,574 cum after utilization in construction of pavement and protection works, which was required to achieve the formation width. For safe disposal of the generated debris and to accommodate excess debris generated due to unforeseen events, the Ministry had acquired and designated 12 nos. of debris disposal sites with a total debris accommodating capacity of 12,74,929 cum, i.e. 35% excess of the estimated quantity of debris proposed to be generated.

7.4.4. However, during the execution of the works the State of Himachal Pradesh experienced unforeseen rainfall during 2022, 2023 and 2025, due to the havoc caused during monsoon of 2023 the State Govt. of Himachal Pradesh has declared the whole state as 'Natural Calamity Affected' vide their order placed at p- 2024. This continued and excessive rainfall caused the soil and hill masses to be over-saturated and therefore resulted in triggering several landslides which originated primarily from stretches located beyond the Right of Way. Details of occurrence of all such landslides have been intimated to the District Disaster Management Authority (DDMA) previously (refer to p-4041 to 4251 of the reply by the Respondent). The volume of excess muck/ debris arising out of such adverse climatic conditions, cloudbursts and landslides during the previous years is

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estimated to be approx. 15,00,000 cum which is roughly 160% excess and beyond the initial quantity of estimated disposal volume.

7.4.5. Due to such extremely adverse weather conditions and subsequent landslides, the volume of muck/ debris accumulated on the ROW increased manifolds, which resulted in requirement of additional debris disposal sites for accommodating and safe disposal of the excess muck/ debris. Accordingly, the Contractors arranged the additional debris disposal sites as per provisions of the Contract Agreement (specifically Article- 3.8.1 and Schedule-F of the agreement which have already been placed in record at p-4617- 4618). The list of all such debris disposal sites are enclosed at Annexure- R7.

7.4.6. These debris disposal sites were arranged by the Contractors after strictly adhering to the conditions which are laid out:

a) Obtaining prior permissions from the concerned landowners (Govt./ public/ private) (relevant permissions can be referred at p-869 to 1048 and p-1103 to 1678)
b) Demarcation of the proposed land by the Revenue Department.
c) Approval of stabilization plan of the debris disposal site by the Authority's Engineer (considering various factors like volume of debris, feasible height of dump, etc.)

7.4.7. It is therefore affirmed that in order to keep the roads trafficable and to minimize further damage to the ecologies, these muck/ debris were removed/ picked up and transported to the designated debris disposal sites only.

7.5. It is also submitted that these all the debris disposal sites have been augmented with engineering measures such as toe walls, stepped benching, use of geo-textiles, plantation of indigenous grass & shrubs and hydroseeding. Additionally, it has been proposed to integrate these disposal sites with long-term afforestation plan with the aid of Forest Dept., Himachal Pradesh by plantation of various indigenous tree species.

7.6. In addition, these debris disposal sites are being utilized for developing resources such as playground, parks, wayside amenities etc. with permission/ consent of concerned

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landowner. Furthermore, some sites have also been stabilized with permission of forest department. Details are enclosed in Annexure- R7.

7.7. The para-3.6 at p-2050 of Final Report of DC-Sirmour states that:

As per the documents provided by MoRTH the contractors have selected a total of 41 muck dumping sites in Sirmour Region with total capacity of 48,45,081 cum and out of which 36, 99,360 cum capacity has been utilized by dumping muck at these sites. As per the muck management plan submitted by MoRTH, all the dumping sites were to be provided with proper protective engineering like gabion walls, breast wall etc. and thereafter biological measures like plantation measures for stabilization of the dumping sites is to be carried out by the respective contractors.

7.8. Kind reference is also invited to para-ix of the recommendations of the Final Report of DC Sirmour at p-2065 and para-viii of Final Report of DC- Shimla (p-3228) , which are reproduced as under:

Para-ix of the recommendations of the Final Report of DC Sirmour

The Joint Committee observed that, according to the contract terms between MORTH and the contractors, the contractors are responsible for arranging muck dumping sites on private lands. The contractors negotiate with private landowners near the project sites and sign contracts with them. The selected muck dumping sites are then approved by MoRTH.

Para-viii of Final Report of DC- Shimla (p-3228)

The Joint Committee noted that, under the contract terms between MoRTH and the contractors, ***it is the contractors' responsibility to arrange muck dumping sites on private lands.*** *Contractors negotiate with private landowners near the project sites and finalize agreements with them, after which MoRTH approves the chosen muck dumping sites.*

7.9. In view of the above, damage arising out of dumping of debris is denied since all waste disposal activities have been conducted in compliance with the required procedures at the designated debris disposal sites which have been sufficiently augmented with proper

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slope stabilization measures, bio-engineering measures and drainage facilities, etc. Any damage which is being heedlessly attributed to the Respondent or the Contractors executing the work of widening of the NH is attributable to the force majeure events arising out of extremely adverse weather conditions.

Environmental and Social Compliance by Contractors

8.1. That it is most humbly submitted that as part of the Environment and Social compliance requirements of the World Bank, all Contractors engaged in execution of the project are mandated to submit the Contractor's Environment and Social Management Plan (CESMP) bi-annually, which covers a gamut of aspects including conformity to environmental guidelines, slope protection, road furniture and other site and environment safeguards. Additionally, all the Contractors are ISO:14001:2015 certified for Environmental Management Systems which is enclosed at Annexure- R8.

8.2. In pursuance to these obligations and as part of the environment and social responsibility, the Contractors have undertaken rehabilitation of flora to ensure and promote biodiversity conservation at the debris disposal sites with a view to restoration of ecologies and stabilizing the slopes against potential future slides and failures. More than 800 trees of varied species, including Bamboo, Bel, Amla, and Jamun, have already been planted (Photographs enclosed at *Annexure-R9*). Further, additional plantation measures such as sprinkling of indigenous grass and shrub varieties, along with appropriate bio-engineering interventions, are proposed to be implemented after the designed disposal capacity of the sites has been exhausted.

8.3. Furthermore, in a bid to bolster the efforts of biodiversity conservation at the debris disposal sites, the Forest Department, Government of Himachal Pradesh, has been formally engaged to carry out large-scale plantation activities. An estimate of ₹9,57,740/- has been submitted by the Department for plantation of 3,675 trees over an area of 4.5948 hectares (Detailed estimate enclosed at *Annexure-R10*). The plantation plan includes a balanced mix of low-height and tall tree species such as Deodar, Ban, Kenth, Bamboo, Amla, Bel, Jamun, Seasam, etc.. In addition to plantation, the Forest Department is also responsible for

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implementing bio-engineering measures, providing protective fencing for the saplings, and carrying out five years of maintenance to ensure their survival and growth.

8.4. That the said estimate has been approved and amount has been deposited with Forest Dept., for plantation and they have already planted more than 1500 trees and the remaining activity is proposed to be completed by Nov- 2025. The photographs are enclosed at Annexure- R11.

8.5. Reference is also invited to the Final Report of the Deputy Commissioner, Sirmour, at Table-8 (p-2054), wherein the Forest Department has outlined the following:

Preventive measures: Spread of fast-growing seeds, and planting of fast-growing, soil-binding species in patches.

In this context, it is respectfully submitted that the plantation and bio-engineering initiatives presently being undertaken by the Contractors shall not only augment slope stability at the designated debris disposal sites and other vulnerable slopes, but will also facilitate sustainable re-vegetation of the slopes, thereby restoring the ecological balance in the long term.

Regarding execution of slope protection and erosion control measures:

9.1. That the averments made by the applicant regarding non-execution of slope protection measures are misinterpreted and speculative assertions which are devoid of facts and thus baseless.

9.2. Appropriate geotechnical and geological condition surveys were carried out while preparing DPR for the subject project to assess the requirement of slope protection measures including retaining structures and erosion control measures to stabilize the hill and valley side slopes. The DPR and the EIA for the subject project envisaged for execution of various retaining structures such as retaining wall, gabion wall & toe wall ranging from a height of 0.0m to more than 10.0m. Further additional slope protection measures including erosion control measures such as shotcrete crib walls, interlink chainmesh, coco/ jute mesh, geocell with hydroseeding, hedge brush layer, hydroseeding, etc. were also envisaged to be executed at the critical slopes.

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9.3. These measures were subsequently reviewed at the time of signing of the Contract Agreement and revisions were made in the quantities of the measures proposed to be executed based on site conditions and actual requirements. These measures were made part of the Contract Agreements which have been executed at the site as per various MoRTH and IRC specifications. The detailed statement showing the approved quantities vis-à-vis actual execution of these measures at the site are tabulated as under: -

Details of retaining structures: -

Sr. No.	Retaining Structures	Unit	Quantity as per Scope	Quantity executed on site	Side
1	Breast Wall	Rmt	25273	25228	Hill Side
2	Gabion Structure	Rmt	9630	9630	
3	Toe Wall	Rmt	19755	19783	Valley Side
4	Retaining structure with Gabion Facing	Rmt	21436	21707	
5	PCC Retaining Structure	Rmt	1930	1930	

Details of execution of slope protection measures and erosion control measures: -

Sl.	Slope protection measures	Unit	Quantity as per Scope	Quantity executed on site
1	Use of Coco fibre/Jute erosion control blanket with shrub/grass plantation	sqm	57,432	56,108
2	Shotcrete Crib wall with vegetation	sqm	67,030.0	50,923.3
3	Interlink chain mesh with grass strips	sqm	408,256.0	365,731.0
4	Hydroseeding	sqm	42,472	106,078
5	Bioengineering on Valley Side	sqm	6,647	3,793
6	Geocell with hydroseeding	sqm	12,900	12,900

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Sl.	Slope protection measures	Unit	Quantity as per Scope	Quantity executed on site
7	Hedge Brush Layer	sqm	640	640
8	Bamboo Plantation	sqm	32,128	32,128

9.4. As can be seen from the above, the provisions for slope protection measures and erosion control measures have been mostly completed at the site.

Alleged Delay in Execution of Slope Protection Works

10.1. That it is also most humbly submitted that, the applicant relies on certain letters written and issued by the Respondent/ Authority to the Contractors and the Authority's Engineer for expeditious execution of slope protection and erosion control measures and has erroneously inferred therefrom that slope protection and erosion control measures were not executed in time. Such inferences are wholly misconceived, speculative, and based on misinterpretation of routine correspondence.

10.2. It is the statutory and contractual responsibility of the Authority/ Ministry/ Respondent to issue instructions and directions to the executing Contractors and Authority's Engineers for expedited execution of slope protection, drainage and other ancillary works so as to bolster adequate monsoon preparedness. Further, execution of the works of drain, protection works and ancillary activities related to monsoon preparedness have been duly ensured through submission of RFIs, regular site inspections, continuous monitoring, and if further corroborated with Monthly progress reports and photographic evidences, etc.

10.3. Therefore, the assertions of the Applicant regarding alleged non-execution or delay in execution of slope protection measures are devoid of merit, unsupported by any material particulars and denied in entirety. The letters relied upon by the applicant are merely precautionary and advisory communications issued in advance, and cannot be construed as evidence of mismanagement or non-performance on the part of the executing Contractors or the Authority's Engineer.

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Impact of Force Majeure Events and design of countermeasures/ mitigation plan:

11.1. That it is most respectfully submitted that, most of the provisions for execution of protection measures and erosion control measures envisioned at the time of formulating the DPR have been estimated on the basis of prevailing site conditions considering slope geometry, geology, existing hydrological features, extent and requirement of hill cutting, etc.

11.2. However, during the monsoon seasons of July 2022 and July 2023, the State of Himachal Pradesh experienced exceptionally high rainfall, surpassing the previous all-time records of the last 50 years (Copy of the Monsoon Report circulated by the Government of Himachal Pradesh is enclosed as *Annexure-R12*). Such unprecedented and extreme rainfall led to extremely adverse weather conditions, triggering multiple landslides and cloudburst events. These incidents also constituted *force majeure* circumstances, as per provision of the Contract Agreement since several of the landslides had originated beyond the acquired Right of Way (ROW) and were aggravated by the intensity of the cloudbursts. In terms of Article 21.1 of the executed EPC Contract, a "Non-Political Force Majeure Event" is expressly defined, which squarely covers the aforesaid extraordinary occurrences (Copy enclosed as *Annexure-R13*). *21.2 Non-Political Event*

> *A Non-Political Event shall mean one or more of the following acts or events:*
>
> *(a) act of God, epidemic,* ***extremely adverse weather conditions****, lightning, earthquake,* ***landslide****, cyclone, flood, volcanic eruption, chemical or radioactive contamination or ionizing radiation, fire or explosion (to the extent of contamination or radiation or fire or explosion originating from a source external to the Site);*
>
> *(b) ...*

11.3. Due to occurrence of such unprecedented rainfalls, landslides and cloudbursts were observed to occur at several locations where execution of stabilization measures and erosion control measures were already completed. This not only damaged the protection measures and erosion control measures, but also washed away portions of the stabilized

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hill mass and road in certain instances. Such instances were reported to the DDMA from time to time as well which is already placed in record. This matter was also acknowledged by the Slope Stabilization Experts from various organizations such as GSI, JICA and World Bank.

11.4. After detailed deliberation between the Ministry/ Respondent and slope stabilization experts of various fields including Geological Survey of India (GSI), World Bank, Japan International Cooperation Agency (JICA), it has been decided that the critical slopes shall be stabilized with future landslide mitigation measures by adopting a three-pronged approach, which is elaborated as under: -

a) **Stabilization measures (A):** to address the already identified risky slopes that are included in the current contract provisions. Stabilization measures (A) has been proposed to be implemented within the contract period i.e. by 31.10.2025.

b) **Stabilization measures (B):** to address the already identified risky slopes that will be implemented by granting Change of Scope to the current contracts. The same have been also examined and vetted by IIT- Roorkee before execution. The COS has been approved by the Ministry amounting to Rs. 39.87 Crores and COS orders have already been issued.

   Works under Stabilization measures (B) are underway and has been proposed to be implemented within 31.12.2025.

c) **Vulnerability assessment and design of Long-term measures:** to analyze and map susceptibility (probability that a landslide event occurs) of the terrain along the project roads & vulnerability (potential damage that this event could generate) of the project roads and suggest countermeasures for subsequent implementation of Long-term measures to address the major landslides and susceptible locations. This study shall take into consideration the site conditions along with past experiences with unprecedented rainfall for designing sustainable and cost-effective landslide mitigation measures.

11.5. In accordance with the Action Plan mutually agreed between the Ministry and the World Bank, the slope protection measures are currently ongoing under Stabilization

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measures (A) and Stabilization measures (B). Further, Ministry has also invited tender for Vulnerability assessment and design of Long-term measures for NH 707 so as to engage specialized experts with slope stability and vulnerability assessment backgrounds for design and recommendation of countermeasures at critical landslide locations and mitigation of any future susceptible landslides. (The RFP for the Vulnerability assessment and design of Long-term measures is enclosed at Annexure- R14) The bids for the same are under examination of the Ministry and after evaluation of bids and issuance of Letter of Acceptance to the responsive bidder, the study shall be completed in 9 (nine) months, subsequent to which the work of execution of countermeasures shall be taken up.

11.6. Kind reference is invited to para-viii of the recommendation of the Final Report of DC- Sirmour (p-2065) and para-vii of the Final Report of DC- Shimla (p-3228)

Para-viii of the recommendation of the Final Report of DC- Sirmour (p-2065):

According to the documents provided by MoRTH and DDMA, a total of 275 landslides occurred between 12/07/2021 and 18/03/2024 along the entire stretch of NH 707 in Districts Sirmour and Shimla. The potential for such incidents to recur during the current rainy season and in the future cannot be ruled out. MoRTH's documents indicate that protection against hill failures on both the hillside and valley side falls within the scope of the contractors involved in road construction. However, considering the heavy rains and landslides experienced in previous seasons, it is recommended that MoRTH plans and implements additional protection measures.

Para-vii of the Final Report of DC- Shimla (p-3228)

According to the documents provided by MoRTH, a total of 17 landslides occurred along the entire stretch of NH 707 in District Shimla between 12/07/2021 and 18/03/2024. The possibility of similar incidents recurring during the current rainy season and in the future cannot be ruled out. The contract documents suggest that protection against hill failures on both the hillside and valley side was part of construction work. However, given the heavy rains and landslides experienced in previous seasons, it is strongly recommended that MoRTH plan and implement additional protection measures.

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In light of the above, it is respectfully submitted that while the occurrence of landslides along NH-707 is primarily attributable to the region's fragile geology and unprecedented heavy rainfall, the Respondents have already incorporated slope protection measures under the Contract Agreement and continue to augment them in coordination with expert agencies. The recommendation for additional protection measures is not indicative of any lapse but rather underscores the proactive, forward-looking approach of MoRTH in addressing the evolving challenges of the Himalayan terrain.

11.7. Therefore, the allegation of the applicant regarding delay or non-execution of slope protection measures is misconceived and denied. On the contrary, the aforesaid actions by the Ministry and the Respondent clearly demonstrates the proactive and systematic approach, aimed not only at augmenting the existing slope protection works but also at implementing forward-looking measures to mitigate future risks in the geologically vulnerable Himalayan region.

Allegations of Rolling Debris into Valleys

12.1. That the allegations made by the applicant regarding deliberate and intentional pushing down of the debris of landslides on the downward side of valleys at a few places instead of dumping the muck at designated debris disposal sites is misconceived and therefore denied.

12.2. During the site visit, it was categorically submitted that the material lying on the valley side has been rolled down due to incidents of incessant rainfall and subsequent landslides and cloudburst. Furthermore, any material that had accumulated on the road as a result of such occurrence was promptly lifted from the landslide location and transported to the designated debris disposal sites as submitted in the muck management plan for each package.

12.3. It is also trite to submit herewith that in certain instances, damages occurring due to natural landslides were unjustly and unfairly and attributed to the contractor in the damage reports, despite the fact that the such events are beyond the control of the executing Contractors. However, in order to ensure continuation of the project and for re-opening the roads in public interest, the Contractors have complied with these damage reports and

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settled the payments under protest (refer p- 4284 of the reply). Such compliance under protest was purely without prejudice and cannot, in any manner, be construed as an admission of liability on the part of the Respondents or the Contractors.

12.4. Kind reference is also invited to second pointer para-vi of the Final Report of DC-Sirmour (p-2063):

The District Administration also confirmed during the Joint Committee meeting that verbal instructions were issued during unprecedented heavy rains and landslides to open roads, and that scientific disposal of muck was not feasible under such conditions.

12.5. In view of the above, it is respectfully submitted that the attribution of damages to the Respondents is misplaced on account of the above. The allegation primarily stems from unprecedented natural calamities and unavoidable emergency road-opening operations undertaken in public interest during extreme weather events. Such circumstances clearly fall beyond the control of the Respondents or the Contractors and cannot, in law or equity, be fastened upon them.

Reliance on MoEF&CC Preliminary Observations

13.1. The applicant has sought to rely upon the preliminary observations of the MoEF&CC, as recorded in the report prepared by the Deputy Commissioner, Sirmour, Himachal Pradesh (refer para 4.7.1 at p-796), in order to draw unwarranted conclusions regarding alleged illegal muck dumping and site selection of debris disposal sites. These references are misplaced, misleading, and aimed at creating confusion before the Hon'ble Tribunal.

13.2. It is respectfully submitted that the said observations were made only during the initial site visits of MoEF&CC. After submission of the detailed report along with relevant documents pertaining to debris disposal sites and other ancillary information sought by the Committee and MoEF&CC, such observations were not incorporated in the final report of the Deputy Commissioner, Sirmour, Himachal Pradesh. Hence, the attempt of the applicant to rely upon selective preliminary remarks, while ignoring the final conclusions, is factually incorrect and liable to be rejected.

13.3. Nevertheless, it is reiterated that disposal of all forms of waste and debris generated

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due to construction operations and excess muck/ debris due to landslides are under the control of the executing Contractors, which have been transported and dumped at designated debris disposal sites only. The debris disposal activities have been carried out only after obtaining permission from the concerned landowners, demarcation of land by the Revenue Dept. and approval of the site stabilization plan by the Authority's Engineer. The design and execution of debris disposal operations are governed by MoRTH specifications, IRC guidelines, and considering site-specific topographical and geological conditions. All debris disposal operations have been carried out with appropriate slope stabilization measures, including benching, construction of gabion walls at the toe, and proper Bio-Engineering measures, to prevent erosion or collapse. Furthermore, wherever water bodies are observed on the proximity of the debris disposal sites, additional reattaining structures and slope protection measures have been adopted to prevent debris runoff into the water streams.

Allegations of Damage to Private Properties

14.1. The allegations of the applicant that negligence on the part of the Respondents has resulted in damage to private properties of local residents on account of falling debris are denied in entirety.

14.2. At the outset, it is most humbly submitted that the prayer for compensation towards alleged damages to private property was never part of the Original Application and has been sought to be introduced for the first time in the rejoinder. Such fresh reliefs, being mere afterthoughts, are legally impermissible, cannot be entertained at this belated stage, and are therefore liable to be dismissed.

14.3. It is also trite to submit here that disposal of all forms of waste and debris generated due to construction operations and excess muck/ debris due to landslides are under the control of the executing Contractors, which have been transported and dumped at designated debris disposal sites only. Therefore, allegation of littering of debris on private properties is devoid of material facts and hence denied.

14.4. Furthermore, it is respectfully submitted that the allegations sought to be attributed to the Respondent and the executing Contractors are wholly misconceived and untenable.

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The Respondent has consistently pleaded that the alleged instances of damage are the direct consequence of extremely adverse weather conditions prevailing during the monsoon seasons of 2022 and 2023, which witnessed multiple landslides, cloudbursts and related natural calamities. These unprecedented events, being force majeure events have resulted in the transportation and deposition of muck and debris on both private and public properties. In such circumstances, fastening liability upon the Respondent or the executing Contractors for damages caused solely on account of natural calamities is neither justifiable nor legally sustainable.

14.5. It is also submitted that any alleged damages arising out of natural events or incidental impacts, if attributed to the Respondent or the executing Contractors, ought first to be brought to the notice of the Respondent so that the same may be duly verified at site and, if warranted, necessary remedial measures may be undertaken. Furthermore, effective alternative remedies already exist in the form of the Grievance Redressal Committee, the Civil Courts, the Sub-Divisional Magistrate Courts, and other competent judicial forums. In view of the availability of such remedies, it is neither expedient nor within the ends of justice for this Hon'ble Tribunal to entertain the present plea.

Timebound Action Plan:

15.1. Further, a timebound action plan depicting all the activities which are proposed to be taken up to ensure slope stability and sustainability is as under: -

a) Completion of balance civil work including slope protection and erosion control measures: By Oct-2025.
b) Completion of balance utility shifting including pipe and drinking water supply activities: - By Oct- 2025.
c) Rehabilitation of Flora and Biodiversity Conservation (as detailed in para 8 above):-

   At debris disposal sites which have reached their design capacity: Oct-2025.

   At debris disposal sites where work is under progress: Feb-2026.
d) Completion of activities under Short-term measure-A for slope stabilization (as detailed in para 10 above): - By Oct- 2025.

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e) Completion of activities under Short-term measure-B for slope stabilization (as detailed in para 10 above): - By Dec- 2025.

f) Vulnerability Assessment & Design of Long-Term Measures and execution of long Term mitigation measures (as detailed in para 10 above): - The tender for conducting the Vulnerability Assessment has been floated by the Ministry and the bids are currently under examination. After examination of bids and issuance of LOA to the responsive bidder, the detailed study shall be started, which is proposed to be completed within 9 months. After suggestion of the countermeasures, the work of execution of the mitigation measures shall be taken up.

15.2. The timelines are depicted in fig-1 below: -

Fig-1.

Timelines of slope stabilization and rehabilitation of flora along the project stretch

<table>
<tr><td colspan="2">Year -></td><td>....</td><td colspan="12">2025</td><td colspan="3">2026</td></tr>
<tr><td colspan="2">Month -></td><td>....</td><td>Jan</td><td>Feb</td><td>Mar</td><td>Apr</td><td>May</td><td>June</td><td>July</td><td>Aug</td><td>Sep</td><td>Oct</td><td>Nov</td><td>Dec</td><td>Jan</td><td>Feb</td><td>Beyond Mar- 2026.</td></tr>
<tr><td colspan="2">Completion of Civil works with slope protectetion measures as envisaged in the signed Contract Agreement.</td><td colspan="10">Completion of civil work.</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="2">Balance Utility shifting</td><td colspan="10">Balance Utility shifting</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td rowspan="3">Slope Stabilisation</td><td>Short Term Measures-A</td><td colspan="10">Short Term Measures-A</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Short Term Measures-B</td><td colspan="8">Identification of critical locations, design and approval of Change of Scope</td><td colspan="3">Execution of Short Term Measures-B</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Vulnerability Assessment & Design of Long-Term Measures and execution of long Term mitigation measures</td><td colspan="11"></td><td colspan="4">Bids have been invited and under examination at the Ministry for design of countermeasures and execution of long term slope protection measures.</td></tr>
<tr><td>Rehabilitation of Flora and Biodiversity Conservation</td><td>Bio Engineering and re-vegatation measures at Dump Sites</td><td colspan="9"></td><td colspan="2">At dump sites which have reached their design capacity</td><td colspan="3">At dump sites where work is under progress</td><td colspan="2"></td></tr>
</table>

PARA-WISE REPLY: -

16. That the contents of Para 1 submitted by applicant is denied in entirety, since they are speculative, misconceived and devoid of facts. As already pleaded in the previous paras, the disposal of all forms of waste and debris generated due to construction operations and

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excess muck/ debris due to landslides are under the control of the executing Contractors, which have been transported and dumped at designated debris disposal sites only. No illegal debris disposal has been carried out, as muck disposal has only been conducted after obtaining permission from the concerned landowners, land demarcation by the revenue department, and approval of the stabilization plan by the Authority's Engineer.

17.1. That the allegations with respect to the alleged damage to natural sources/streams of water and the contents of para 2(i) of the applicant's rejoinder are specifically denied. The same already stand answered in para-5 of the reply/objection.

17.2. That the averments regarding damage assessment allegedly submitted by the Jal Shakti Vibhag and the contents of para 2(ii) of the applicant are also denied in toto. Reference may be had to para-6 of the reply/objection wherein this issue already stands dealt with.

17.3. That the allegations concerning damage to natural water resources, agricultural lands, trees, and to private and public property as attributed by the concerned Sub-Divisional Magistrates (SDMs) and Block Development Officers (BDOs), as contained in para 2(iii) of the applicant's rejoinder, are emphatically denied in entirety. The same already stands addressed vide submissions made at para-7 of the reply.

17.4. That the submissions of the applicant at para 2(iv) are denied, save and except those aspects which are already part of the record, and stand clarified in light of the submissions at para-6 above.

18. That with reference to the contents at para-3 of the rejoinder filed by the applicant, it is reiterated that the same already stands answered at para-4 of the reply/objection.

19. That the contents of para-4 of the rejoinder are denied in entirety as being misconceived since the issues raised therein already stand addressed in the foregoing submissions of this reply/objection, which are not being reiterated herein for the sake of brevity and to avoid repetition.

20.1. That with reference to the averments made at paras 5 and 6 of the application, it is humbly submitted that slope protection on both hill side and valley side is the contractual

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responsibility of the executing Contractors, but strictly limited to the extent of the land already acquired and handed over within the Right of Way (ROW).

20.2. It is further submitted that the Contractors are empowered to execute works only within the handed-over ROW, duly acquired for the purpose of development/upgradation under the terms of the EPC Contract Agreement. Any land or slopes situated beyond the ROW fall either under the ownership of the Forest Department, the Government of Himachal Pradesh, or private individuals. Consequently, the Contractors have neither jurisdiction nor authority to enter, survey, plan, or execute any protection works on such lands.

20.3. In view of the above, the averments made by the applicant are wholly perverse, frivolous, and misconceived, and are accordingly denied in entirety.

21. That the contents of paras 7 to 13 of the applicant's rejoinder are denied in entirety as being misconceived and untenable. The issues raised therein already stand duly addressed in the submissions made at paras 10 and 12 of the reply, which are relied upon and not being repeated here for the sake of brevity.

22. That as regards the alleged findings of CPBC and the averments contained in paras 14 and 15 of the application, it is respectfully submitted that the same are misplaced and devoid of merit. The issues raised already stands clarified by the submissions at para 13 above, which are relied upon in denial of the said averments.

23. That the contents at para 16 of the rejoinder are specifically denied in light of the submission at para 14 of the reply.

24. That the Respondent respectfully submits that the present Original Application filed by the Applicant is frivolous, misleading, and entirely devoid of factual or legal merit. The Applicant has deliberately misrepresented facts with the sole intention of maligning the reputation of the Respondent authority and obstructing public interest projects for reasons best known to him. Such vexatious litigation not only wastes the valuable time of this Hon'ble Tribunal but also burdens public resources. Considering the Applicant's

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misconceived pleadings, misleading submissions and abuse of the process of law, the Respondent prays that this Hon'ble Tribunal be pleased to dismiss the OA with costs.

25. The Respondent reserves the right to file additional/ further reply as and when required.

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Respondent No. 1

Through

Gigi C. George, Advocate
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सत्यमेव जयते

Green National Highways Corridor Project

Two Lane Upgradation with Paved Shoulders of Paonta Sahib - Guma Section from Km 0.000 to Km 97.000 of NH 707 in the state of Himachal Pradesh

Environmental Impact Assessment & Environmental Management Plan

December, 2019

Ministry of Road Transport and Highways
Government of India

List of Acronyms

ADT	Average Daily Traffic
AADT	Annual Average Daily Traffic
AMSL	Above Mean Sea Level
HPPCB	Himachal Pradesh Pollution Control Board
ASI	Archaeological Survey of India
BDL	Below Detection Limit
BOQ	Bill of Quantities
CCE	Chief Controller of Explosives
CD	Cross Drainage
CFE	Consent for Establish
CFO	Consent for Operate
CE	Chief Engineer
CGWA	Central Ground Water Authority
CoI	Corridor of Impact
CPCB	Central Pollution Control Board
CO	Carbon Monoxide
DEIAA	District Level Environmental Impact Assessment Authority
DFO	Divisional Forest Officer
DPR	Detailed Project Report
EC	Environmental Clearance
EHS	Environmental, Health and Safety
EIA	Environmental Impact Assessment
EMF	Environment Management Framework
EMP	Environment Management Plan
ESO	Environment & Safety Officer
ESR	Environmental Screening Report
FRO	Forest Range Officer
GHG	Green House Gas
GNHCP	Green National Highways Corridor Project
GoI	Government of India
IRC	Indian Roads Congress
IS	Indian Standards
LCV	Light Commercial Vehicle
LHS	Left Hand Side
Km	Kilometer
MoEFCC	Ministry of Environment, Forest and Climate Change, Govt. of India
MoRTH	Ministry of Road Transport and Highways, Govt. of India
NBWL	National Board for Wildlife
NAAQS	National Ambient Air Quality Standards
NGHM	National Green Highways Mission
NGO	Non-Governmental Organization
NH	National Highways

NHDP	National Highways Development Program
NOC	No Objection Certificate
NO_2	Nitrogen Dioxide
NRSC	National Remote Sensing Centre
OD	Origin and Destination
OP	Operational Policies
PCU	Passenger Car Units
PIU	Project Implementation Unit
POL	Petroleum, Oil and Lubricants
PMC	Project Management Cell
PROW	Proposed Right of Way
PUP	Pedestrian Under Pass
PWD	Public Works Department
RCC	Reinforced Cement Concrete
RET	Rare, Threaten and Endangered
RHS	Right Hand Side
RoW	Right of Way
ROB	Rail Over Bridge
SEAC	State Expert Appraisal Committee
SEIAA	State Level Environmental Impact Assessment Authority
SEI	Significant Environmental Issues
SO_2	Sulphur Dioxide
SIA	Social Impact Assessment
SOI	Survey of India
SH	State Highway
TCS	Typical Cross Section
ToR	Terms of Reference
VEC	Valued Ecosystem Components
PUP	Vehicular Under Pass
WB	The World Bank
WMM	Wet Mix Macadam

CHAPTER 1

INTRODUCTION

1.1 PROJECT BACKGROUND

India's road network of 5.48 million kilometers is the second largest and most dense1 in the world. It carries 65 percent of freight traffic, 85 percent of the total passenger traffic in the country and comprises of a primary network of 116,000 km of National Highways (NH), a secondary network of 160,000 km of State Highways (SH) along with Major and Other District Roads (MDR & ODR), and a tertiary network of Rural Roads. The responsibility for planning, construction and maintenance of the primary network lies with the Ministry of Road Transport and Highways (MoRTH), Govt. of India. The MoRTH also formulates national policies and legislations governing road transport.

In the last sixty years, the vehicle population grew at a Compound Annual Growth Rate (CAGR) of 10.8 percent putting pressure on the road network. The current passenger traffic is 12,000 Billion passenger-kilometer (BPKM) and it is projected to grow at an annual rate of 15 percent and become 168,000 BPKM by 2032. The current freight traffic is 2,000 Billion ton-kilometer (BTKM) and it is projected to grow at an annual rate of 9.7 percent and become 13,000 BTKM by 2032. In contrast with these growth rates, the NH network, which comprise only 2 percent of the total road network but carries about 40 percent of the road traffic, has grown at a rate of only 2.2 percent over the last sixty years and about 40 percent of the network is in poor condition.

In 1998, the Govt. of India (GoI) launched the NHDP covering 56,000 km of NH for development, spread across 7 phases. It is the biggest program (of value about $50 billion) so far that has been taken up by MoRTH primarily through the National Highways Authority of India (NHAI), an independent entity under the aegis of the same ministry. It also consisted of four/six laning of the Golden Quadrilateral (the highways connecting the four metros of Delhi, Mumbai, Chennai and Kolkata) and the North-South and East-West Corridors.

The national highways not covered under the NHDP form a part of non-NHDP network. Most of the roads that form this network are of poor quality and capacity (single/intermediate/two-lane width) and thereby present unsafe and poor traveling

[1] At 1.66 km/sq km of area, which is higher than that of USA, China, Japan and Russia

conditions. In the recent years, the Govt. of India has launched some specific programs to develop these roads as these connect the hinterland of the country and are key to the government's objective of equitable and inclusive growth. These programs among others include the National Highways Interconnectivity Improvement Project (NHIIP), funded by the World Bank and is currently under implementation.

Considering that the sector still faces major challenges in terms of efficient movement of goods, the MoRTH has recently launched the Bharatmala Pariyojana Program (BPP) which aims to enhance effectiveness of already built infrastructure; support multi-modal integration, bridging infrastructure gaps for seamless movement; augment inclusiveness by connecting 550 districts through highway linkages; improvement of Logistics Performance Index (LPI) of the country and; creation of jobs. It envisages development of about 26,000 km of economic corridors; 8,000 km of Inter-Corridors; 7,500 km of Feeder Roads; 1,800 km of Expressways; 1,300 km of Port-Connectivity Roads; 2,000 km of Coastal Roads; 2,000 km of International Connectivity Roads; 3,300 km of border roads; 28 ring roads; 35 logistic parks; and improvement of 66 congestion points and 125 choke points.

1.2 GREEN NATIONAL HIGHWAYS CORRIDOR PROJECT

Creation of infrastructure to meet the burgeoning transport demand has resulted in improved connectivity in India but a lot needs to be done for seamless movement of traffic and efficient movement of logistics. Focusing primarily on ramping up connectivity of the NH network, little attention has been given on enhancing effectiveness of the infrastructure being built.

Most of the non-NHDP network is not built on a trunk transport and feeder route corridor-based approach. In addition to capacity constraints, poor maintenance and disregard for extreme and routine climatic impacts on the built infrastructure are directly affecting Vehicle Operating Costs. Consequently, the cost of movement of logistics in India is one of the highest (about 14 percent of GDP as against about 8-9 percent in developed countries). The road network is not integrated well with other modes of transport resulting in choke points especially around cities and at main intersections. An integrated approach based on enabling the seamless flow of freight and passengers through transport network needs to be built.

The Green National Highways Corridor Project (GNHCP) through its support to the Govt. of India's Bharatmala Pariyojana, will promote the vision of enhancing effectiveness of the transport network of India with cost and natural resources efficiency and safe high capacity highways.

One such road corridor out of the nine proposed for funding under GNHCP is Paonta Sahib to Guma Section (Km 0.00 to Km 97.00) of NH-707 in the State of Himachal Pradesh. The MoRTH intends to rehabilitate and up-grade the existing single lane/intermediate lane between Paonta Sahib to Guma section of NH–707 to 2-lane/2-lane with paved shoulders configuration. The implementation of rehabilitation and up-

gradation of this corridor is proposed to be taken up with World Bank assistance. The design length of the project road is 94.90 Km.

The location map of the project road is given in **Figure 1.1.**

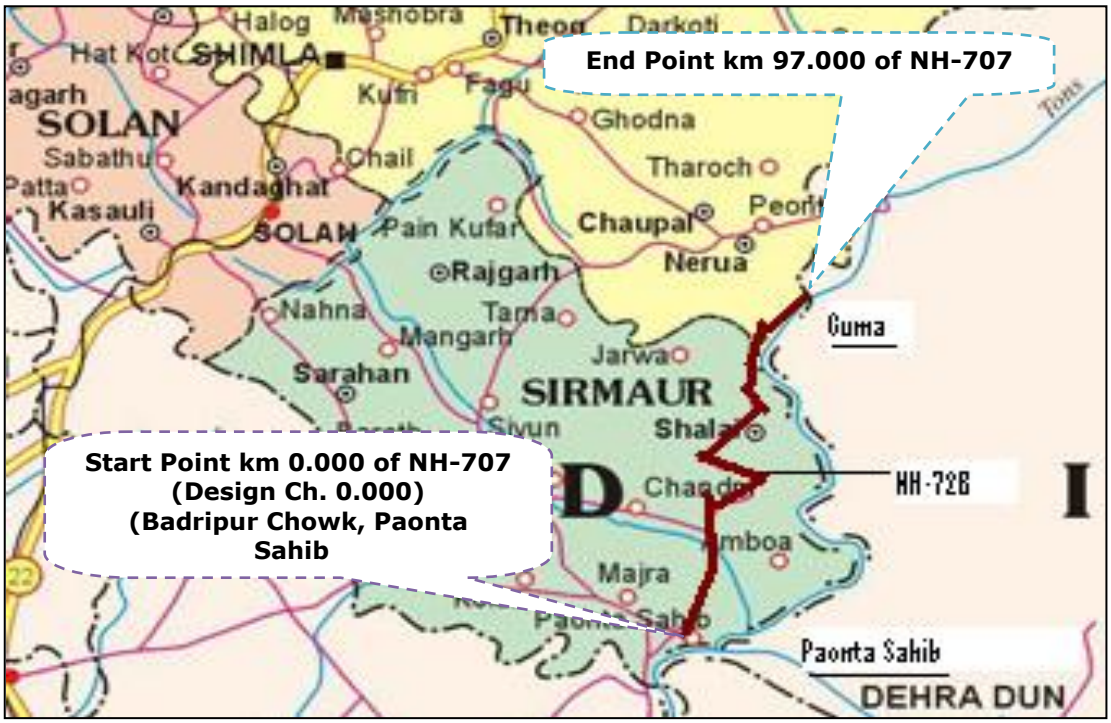


Figure 1.1 Location Map of the Project Road

1.3 NEED AND JUSTIFICATION OF THE PROJECT ROAD

This project road originates from Badripur Chowk situated at Km 0.000 and ends at Guma (Km 97.0) on the existing NH-707 which provides an alternative connectivity to state capital Shimla via Rohru-Hatkoti-Theog.

The project road is a vital lifeline for the people living in interiors and backward areas of Sirmour (Bandli, Drabil, etc) and Shimla (Chopal, Jubbal, etc) Districts. Around 30 villages and urban settlements having approx. 2.7 Lacs population will be directly benefited from this project road besides many other small habitations that have connectivity from this road since it is the only road connecting the area and serves as an important corridor for people's mobility. At present, there are no major medical facilities and marketing areas along the road and people are fully dependent on this road for their day to day needs.

Approx. 125000 MT apple is produced and transported every year through this road. In peak season, approximately 500 truck loads are daily transported to markets in north India primarily Delhi from this area. The apple crop from Rohru, Jubbal and Chopal is also transported through this shortest road for marketing to New Delhi via Yamuna Nagar.

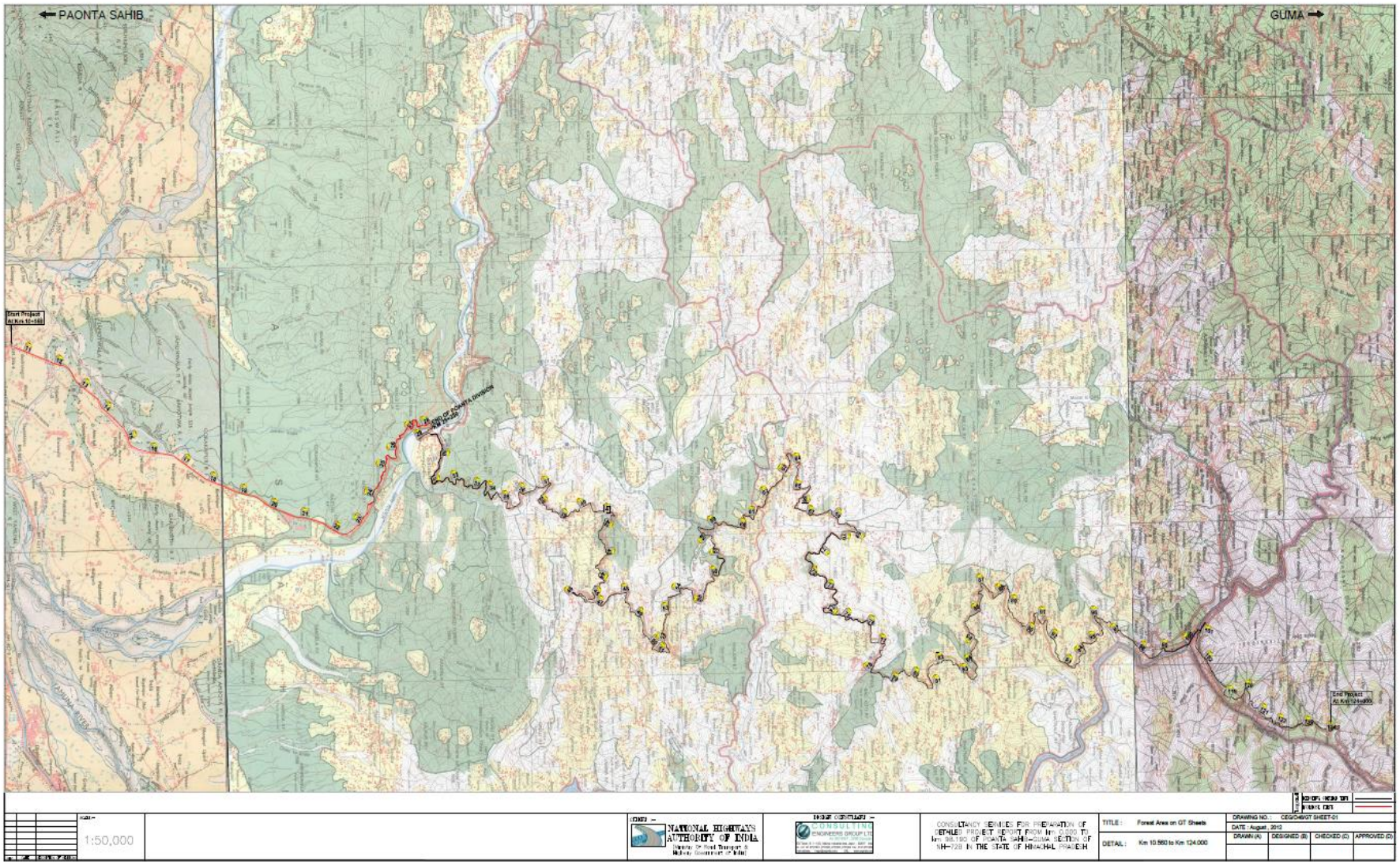


Figure 1.2 Project Road Alignment Marked on Toposheet of Survey of India

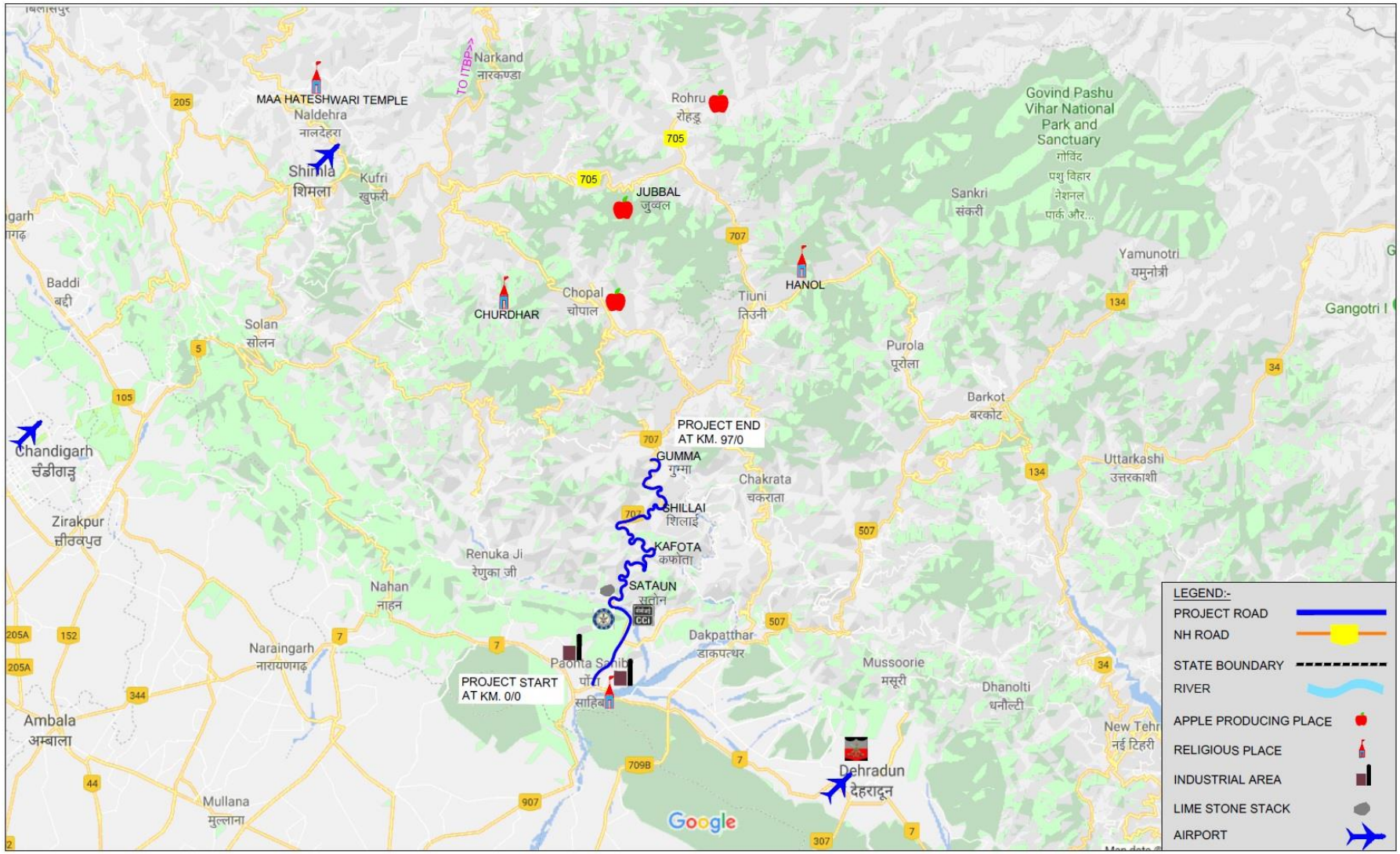


Figure 1.3 : Importance of The Project Road

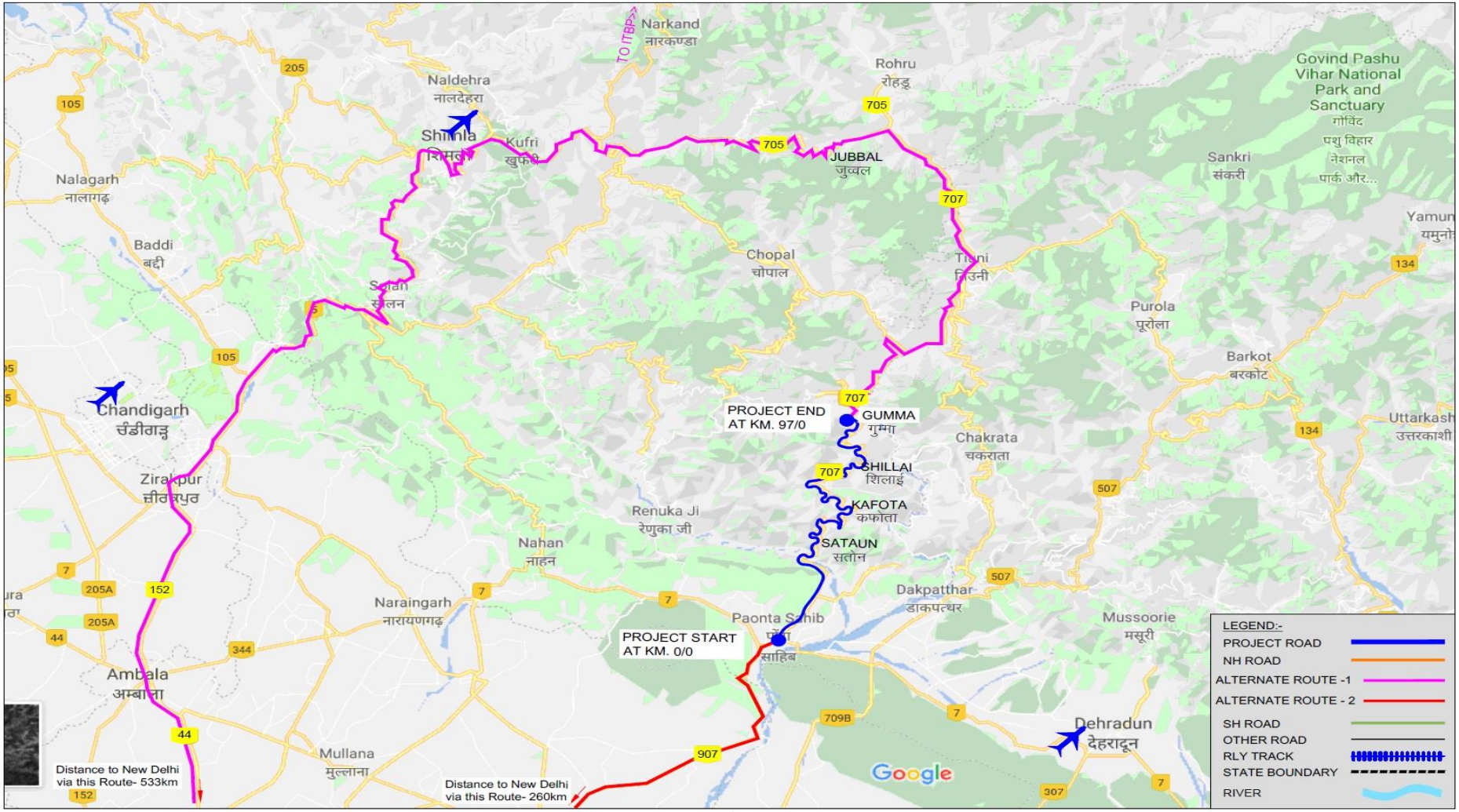


Figure 1.4 : Connectivity Maps of the Area

Around 200 truckloads of apple commute through this road daily in apple season which can increase by at least another 200% as many other transporters use other route via Solan and Parwanu. After the road is improved, this traffic will shift to the project road route as this has the shortest distance to reach New Delhi via Yamuna Nagar. Due to poor geometry, non-negotiable grades and occasional road closures on account of landslides, the usage of this road in present circumstances is very limited.

People of area grow cash crops mainly Ginger, Potato, Cauliflower, Peas, Capsicum, Tomato etc. Rajmah, Kulth, Maize and Urd Dals (lentils) of this area are known for its taste all over. Walnuts are also grown in abundance in this area. All these agriculture and horticulture produce are carried for marketing to Delhi and Faridabad through using this route only.

From Guma to Delhi via Paota Sahib-Yamunanagar is 260 km and from Guma to Delhi via Parwanoo-Solan is 533 km. A straight saving in fuel (thereby carbon footprint) and time is a significant and notable benefit that will accrue after the road is developed.

The area is rich in mines of lime stone between (Sataun) Km 18.0 to (Bohrad) Km 48.0 from where lime stone is quarried and stacked at a yard at Sataun located at Km 20.0 through small tippers from approved mines daily. From Sataun onwards, lime stone is transported to various industrial units all over India after gradations as per requirements of industries.

On an average daily more than 180 truckloads carry lime stone through Paonta Sahib and improvement of this project road will help in saving vehicle operating cost and travel time for these transporters in addition to the industries located near Paonta Sahib.

There are 71 industries operating at present in industrial areas at Paonta Sahib and Rajban along this road and around 17 more are in pipeline which are going to be operational in near future. The project road will be a major lifeline for these industries from where almost 200 trucks per day transport raw materials and manufactured products to various destinations at present. The number is likely to increase with passage of time. A major cement plant has also been proposed at Gumma which will further generate more traffic through this route.

The project road will improve the connectivity for tourists visiting various famous destinations like much famous Chanshal Valley, pilgrimage places like Churdhar, Maa Hateshwari Temple, Mahasu Temple at Hanol and will leading to much famous Chardham yatra in Uttarakhand State. This will help tap the tourists coming to Paonta Sahib, which has a very famous Sikh shrine.

The portion from Gumma Km 97.0 to Km 106.0 at Feddus has been proposed for coverage under GNHCP for which a separate DPR consultant has been appointed.

This missing 9 km connection will further enhance the utility of this project road by providing connectivity to Uttarakhand, specially to important tourist destinations of Yamunotri and Gangotri Also, people working in Industrial areas along the road, commute daily using this road.

Since this area is first choice for the migratory Gaddi Communities who migrate to lowers heights during winter, the project road will become a boon for them also in many ways.

The maps showing connectivity to different important location and road connectivity is shown in Figure 1.3 and Figure 1.4.

1.4 OBJECTIVES OF EIA

The main aim of the Environmental Impact Assessment (EIA) is to ensure that this project proposal may be environmentally sound and sustainable on a long-term basis. The adverse impacts of the proposal need to be identified in advance and duly considered in preparation of project's engineering designs.

To assess the status of various environmental parameters in pre and post project period, environmental standards fixed by the World Bank, Ministry of Environment Forest & Climate Change (MoEF&CC) and Bureau of Indian Standards are referred STRUCTURE OF THE EIA REPORT

The EIA report for the project road has been prepared complying country regulations and The World Bank Guidelines for Environmental Assessment. The report has been structured in the following Chapters:

Executive Summary

Chapter 1 as Introduction describes background, brief description of project road, needs and benefits of the project road, scope of environmental assessment, needs of EIA study, approach and methodology adopted and structure for EIA report.

Chapter 2 as Project Description describes existing road conditions and facilities, traffic projections, right of way, proposed bypass and realignment, proposed roadway improvements, bridge and cross drainage structures, junctions improvement, underpass, ROB, community facilities, construction materials requirement and sources, way side amenities, road safety improvement proposal, etc.

Chapter 3 as Policy, Legal and Administrative Framework presents the legal and administrative framework of World Bank, Government of India and Government of Himachal Pradesh. This section underlines various clearances, permissions, consents involved for the project road at the State level and at the Central level.

Chapter 4 as Baseline Environmental Conditions presents the existing environmental conditions along the corridor, which were ascertained by conducting a field survey along with collection of secondary information pertaining to the corridor. Primary data for various environmental parameters was generated using suitable

monitoring devises. The methodology was strictly adhered to the stipulated guidelines by MOEF&CC and CPCB.

Chapter 5 as Assessment of Potential Impacts describe identification and evaluation of anticipated environmental impacts caused on various environmental and social parameters by the various activities proposed for the upgradation of the project corridor.

Chapter 6 as Analysis of Alternatives presents analysis of alternatives carried out during EIA studies considering with and without project, alternatives for bypasses and realignments, pavement technologies, construction materials, etc.

Chapter 7 as Green Initiatives Chapter describes green highway, green initiatives, GHG emissions reductions and climate resilient initiatives adopted in the project and estimated GHG emissions reduction.

Chapter 8 as Consultations with Key Stakeholders provide details of consultation carried out in order to know the feedbacks of local population and the project affected people (PAP). Public consultation meetings were held with the stake holders to record their views on the environmental issues pertaining to the road and the suggested remedies to be adopted for the proposed project corridor.

Chapter 9 as Environmental Management Plan describes mitigation measures to avoid or minimization of anticipated environmental impacts during design, preconstruction, construction and de-mobilization phases. Environmental Management Plan that include institutional aspects of the project implementation and cost estimates for implementation of EMP.

CHAPTER-2

PROJECT DESCRIPTION

2.1 PROJECT BACKGROUND

The total length of NH-707 (Old NH-72 B) is 161 km, out of which 110 km runs in Himachal Pradesh and 51 km in Uttarakhand. The National Highway 707 starts from junction at Badripur Chowk near Paonta Sahib connecting built-up areas like Rajban, Sataun, Kafota, Shillai, & Gumma in Himachal Pradesh and goes further into Uttarakhand via Tuini and turns back in Himachal Pradesh, terminating at Hatkoti.

The project road starts at Badripur Chowk near Paonta Sahib at Km 0.000 of NH-707 and ends near Gumma at Km 97.000 of NH-707. The road traverses through plain/ rolling and mountainous/steep terrain having mostly carriageway configuration as single/intermediate lanes.

The total length of project road as per existing chainage is 97 km and passes through Sirmaur and Shimla districts in Himachal Pradesh. Total length as per design comes out to be 94.900 km. The project road has been divided in four packages for construction purpose.

The package wise length of proposed project road is given in Table 2.1 below.

Table 0.1: Package-wise Length of Project Road

Package No.	Place		Existing Chainage		Design Chainage		Length
	From	To	From	To	From	To	(km)
I	Paonta Sahib	Hewna	0.000	25.345	0.000	25.000	25.000
II	Hewna	Ashyari	25.345	50.700	25.000	50.000	25.000
III	Ashyari	Shri Kyari	50.700	76.010	50.000	75.000	25.000
IV	Shri Kyari	Gumma	76.010	95.922	75.000	94.900	19.900
Total Length							**94.900**

2.2 EXISTING FEATURES OF THE ROAD

The existing features were assessed by conducting detailed road and pavement inventory of the project road.

2.2.1 Road Features

The inventory of road includes kilometer wise information regarding type of terrain, adjacent land use pattern, location of habitations along the road, carriageway and shoulders width and surface type, height of embankment/cutting, road side drains and type, horizontal and vertical curves with their approximate length, details of road side furniture, right of way, general drainage conditions, etc.

The detailed Road Data features sheet which is given in **Table 2.2**,

Table 0.2: Summary of Road Inventory

S. No.	Particulars	Details
1	Project stretch	Km 0.000 to Km 97.000 of NH-707
2	Length (km)	97 Km
3	District	Sirmour- 89.500 km Shimla- 7.500 km
4	Type of Terrain	Plain Terrain- 1.500 km Rolling Terrain-10.000 km Steep Terrain- 85.500 km
5	Land Use	Km 0.000 to Km 11.500- Built-up Areas with commercial establishments Km 11.500 to km 97.000- Mostly Hilly land with patches of forest and habitations
6	Right of way (m)	8.0 m to 32.50 m
7	Height of Embankment (m)	Varies from 1.0 m to 1.50 m (in plain terrain)
8	Road Configuration	Km 0.000 to Km 11.500- Intermediate/Two Lane Km 11.500 to Km 97.000- Single/Intermediate Lane
9	Type of Pavement	Flexible
10	Carriageway Width (m)	Km 0 to km 11.500- BT- 5.5 m to 7 m Km 11.500 to km 97.000- BT- 3.5 m to 5.5 m
11	Type of Shoulder and width (m)	Earthen Shoulder (varies from 1.0 m to 1.5m on both sides)
12	Junctions	Major Junction - 05 Nos. Minor Junction - 71 Nos.
13	Cross Drainage Structure	Major Bridge- 01 No. Minor Bridges- 13 Nos. Culverts- 320 Nos.

S. No.	Particulars	Details
14	Bus Stop/Shelter	07 Nos.
15	Hill Slopes	Ranges from 50^{o} to 85^{o}
16	No. of Built up Areas	38 Nos.
17	Utilities **(Add supporting data as Annexure)**	(i) BSNL Main Optical Fiber Cables (OFC)- km 0 to km 10 (Both Side), km 10 to km 97 (Hill Side) (ii) Local Network OFC- Valley side in Sataun (3 km), Kamrau (2 km), in Kafota (2.6 km), Timbi (1 km), Shillai (2.4 km) (iii) Water supply mains-km 0 to km 14 (Both Side), Km 17.300 to Km 18.900 (RHS), Km 32.300 to Km 42.700 (RHS), Km 51.500 to Km 51.700 (RHS), Km 65 to Km 66 (LHS) (iv) Sewer line km 0 to km 14.000 (Both Sides). Electric lines- Km 0 to Km 10 (Both Side), Km 10 to Km 97 (Hill Side) **Annexure is attached**
18	Major Landslide Zones	Km 15.500 to Km 17.300 Km 59.500 to Km 64.100

Project Start at Badripur Chowk, Paonta Sahib at Km 0

Major Junction with SH-1 at Km 8+200

Major Bridge over Giri River at Km 17+500

Major Junction, Sataun at Km 18+700

Kafota Town at Km 40

Major Junction in Shillai Town at Km 66

Tons River at Km 88

Project End near Gumma Village at Km 97

Figure 0.1 Photographs of Road Inventory

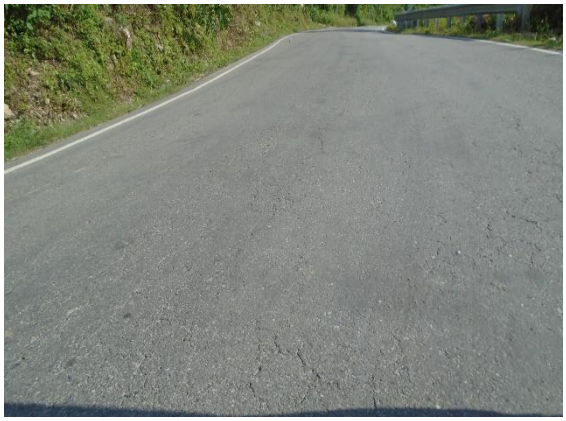
2.2.2 Pavement Condition Survey

Road pavement condition survey of existing road is helpful in determining the extent of improvement and required for economic analysis. The details of the Pavement Condition Survey is shown in **Annexure 4.2 in Volume-I**. The summary of pavement condition is shown in **Table 2.3**,

Table 0.3: Summary of Road Inventory

S. No.	Particulars	Details
1	Pavement Surface Condition	Fair to good- Km 0 to km 11 Fair to Poor- Km 11 to km 97
2	Earthen shoulder Condition	Fair to good- Km 0 to km 11 Fair to Poor- Km 11 to km 98
3	Distresses	Ravelling, patching, pot holes, rutting, lane to shoulder drop-off and cracking
4	Road side drain	Masonry and Concrete Drain with Poor Functioning
5	Embankment condition	Fair to poor

Potholes Near Km 3



Pavement Condition Near Km 20

Pavement Condition Near Km 55

Pavement Condition Near Km 95

Figure 0.2 Photographs of Existing Pavement

2.3 TRAFFIC STUDY AND ANALYSIS

After studying the existing road network, major generation and dispersal point, the project corridor divided into three homogenous sections with assumption that same traffic will ply in the section. CVC have been done at 4 nos. of locations each in km 2.500, km 12.500, km 32.500 and km 65.500 of NH-707.

The classified traffic data is shown in **Table 2.4**,

Table 0.4: Classified AADT at all Survey Locations

Type of vehicle	Survey Stations							
	Km – 2.500		Km – 12.500		Km – 32.500		Km – 65.500	
	Numbers (AADT)	PCU (AADT)	Numbers (AADT)	PCU (AADT)	Numbers (AADT)	PCU (AADT)	Numbers (AADT)	PCU (AADT)
Two Wheeler	3,971	1,985	1,365	684	221	111	276	136
Three Wheeler / Auto	160	160	27	27	0	0	0	0
Car/ Jeep/ Taxi	1,544	1,544	1,122	1,122	1,017	1,017	1,313	1,313
Mini Bus	13	37	65	191	60	179	54	165
Full Bus	59	179	154	468	175	520	175	528
LCV	104	155	361	542	398	597	304	457
2- Axle	634	1,902	923	2,765	1,134	3,400	832	2,498
3- Axle	6	17	2	5	0	0	0	0
Truck- Trailer	6	23	0	2	0	0	0	2
Agri. Tractor (Without)	53	238	129	584	0	0	10	44
Agri. Tractor (With)	25	37	25	40	0	0	0	2
Cycle	532	266	157	80	4	2	7	2
Cycle Rickshaw	67	135	2	7	0	0	0	0
Bullock Cart	1	6	0	0	0	0	0	0
Horse	8	35	0	0	0	0	0	0
Other Motorized	8	32	7	32	0	2	0	0
Total Tollable Traffic (in AADT)	**2,366**	**3,857**	**2,627**	**5,095**	**2,784**	**5,713**	**2,678**	**4,963**
Total Non-Tollable Traffic (in AADT)	**4,825**	**2,894**	**1,712**	**1,454**	**225**	**115**	**293**	**184**
Total Traffic (In AADT)	**7,191**	**6,751**	**4,339**	**6,549**	**3,009**	**5,828**	**2,971**	**5,147**
Total Traffic (In AADT) (PCU)	**6,751**		**6,549**		**5,828**		**5,147**	
Total Induced Traffic (In AADT) (PCU)	**9,847**		**9,552**		**8,501**		**7,507**	

Table 2.5 : Projected Traffic in Homogenous Sections on the Project Road

S. No.	Year	Projected Traffic (PCU)			
		Km 2.500	Km 12.500	Km 32.500	Km 65.500
1	2018	6,751	6,549	5,828	5,147
2	2019	7,089	6,876	6,119	5,404
3	2020	7,443	7,220	6,425	5,675
4	2021	7,815	7,581	6,747	5,958
5	2022	8,206	7,960	7,084	6,256
6	2023	8,616	8,358	7,438	6,569
7	2024	9,045	8,764	7,799	6,887
8	2025	9,494	9,190	8,177	7,221
9	2026	9,967	9,637	8,575	7,571
10	2027	10,463	10,107	8,992	7,939
11	2028	10,984	10,600	9,430	8,326
12	2029	11,533	11,130	9,902	8,742
13	2030	12,109	11,687	10,397	9,179
14	2031	12,715	12,271	10,916	9,638
15	2032	13,351	12,885	11,462	10,120
16	2033	14,018	13,529	12,035	10,626
17	2034	14,716	14,190	12,623	11,144
18	2035	15,449	14,884	13,239	11,688
19	2036	16,218	15,612	13,887	12,259
20	2037	17,026	16,377	14,566	12,858
21	2038	17,875	17,181	15,280	13,487
22	2039	18,768	18,040	16,044	14,162
23	2040	19,707	18,942	16,846	14,870
24	2041	20,692	19,889	17,689	15,613
25	2042	21,727	20,883	18,573	16,394
26	2043	22,813	21,928	19,502	17,214
27	2044	23,950	23,004	20,458	18,057
28	2045	25,143	24,134	21,462	18,943
29	2046	26,397	25,321	22,517	19,873
30	2047	27,713	26,567	23,624	20,850
31	2048	29,094	27,876	24,787	21,875
32	2049	30,549	29,270	26,026	22,969
33	2050	32,077	30,733	27,327	24,117
34	2051	33,680	32,270	28,694	25,323

2.3.1 Origin Destination Survey

Origin and Destination survey was carried out at 2 locations i.e. in km 12.500 and km 20.500. Commodity movement pattern on this corridor shows that there is considerable

movement of limestone from quarry, apple, agricultural produces, textile products, and cement items, in addition to other goods like perishable goods mainly apple and agricultural products etc. Zone-wise analysis of freight vehicles shows that the maximum share of the trips for goods vehicles are originated from or destined to the Paonta Sahib. On the corridor, 11 to 23% of the vehicles have a lead of more than 100 km.

2.4 IMPROVEMENT PROPOSAL

The proposed Project is widening of existing Paonta sahib to Gumma section of NH-707.

Due importance and care have been given to environmental and social issues while road designing. The coordination between environmental, social and design team helped in minimizing the negative impact due to project. In view of its proposed development, Eccentric widening option has been proposed as most of the project section as most of the project road terrain is hilly in one side and to minimize the negative environmental impact for one side only.

The improvement proposals will include widening, curve improvement, design and strengthening of pavement with all ancillaries such as the improvements of geometries; widening and reconstruction of culverts and bridges; providing drainage; junction improvements; providing road marking; signs and other safety devices; to enable all road users (motor vehicles, animal drawn vehicles, cyclists, pedestrians and animals) to use the facility without degrading the environment.

2.4.1 Widening Scheme and Typical Cross Sections

Based on traffic scenario and present road condition, the development proposal for the road project has been made as follows.

(i) The initial 1.5 km of road stretch is under built-up area of Paonta Sahib and hence proposed to be widened to four lane configuration.

(ii) Beyond this, the project road is surrounded by industrial area and scattered built up area up to Km 11.500 is proposed to develop as two lane with paved shoulder configuration along with provision of footpath. The project road up to Sataun (Km 18) carries heavy amount of truck load and hence is being proposed to be developed as two lane with paved shoulder configuration.

(iii) Due to less traffic and existing road having single lane /intermediate lane, Proposal made for two lane only up to Ch. 70+000.

(iv) After Ch. 70+000, only intermediate lane proposal was finalized by MORTH and World Bank officials due to less traffic. Hence beyond this point the intermediate lane configuration with geometrics improvement is proposed.

For above improvements the major consideration has been adopted for minimum land acquisition. Maximum improvements have been done within existing ROW. Land acquisition has been proposed for very deficient curve improvement only and for dumping areas (for dumping of cut material) which are to be developed for project facilities.

For Implementation purpose whole project road divided into four packages as per client requirement. The details of packages proposed and finalized are as below.

There is 1 major bridge along the project stretch which is proposed to be retained and Out of 13 minor bridges 8 single lane minor bridges are replaced by two lane independent bridge adjacent and parallel to the existing bridge, 1 No. is proposed for reconstruction, 4 Nos. of bridges are proposed for rehabilitation. Total 345 nos. culverts are proposed.

The typical cross section schedule for the project road is shown Table 2.5 and the drawing of the same is attached in Annexure-2A.

The following Typical cross section i.e. has been proposed in most of the sections along the project road.

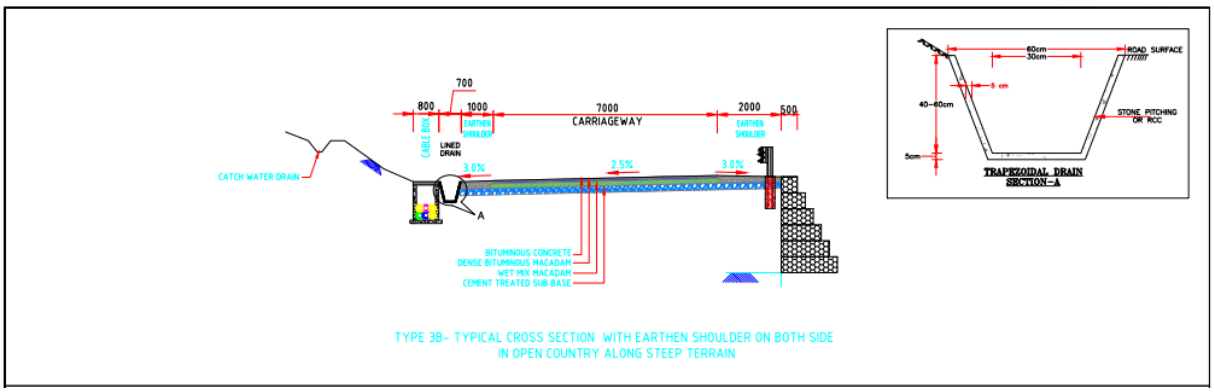


Figure 0.1 Typical Cross Section 3B

Table 0.6: Typical Cross Section Schedule

S. No.	Existing Km of NH-707 as Per Site		Proposed Chainage		Length (km)	Type of Cross - Section
	From	To	From	To		
PACKAGE-I						

S. No.	Existing Km of NH-707 as Per Site		Proposed Chainage		Length (km)	Type of Cross - Section
	From	To	From	To		
1	0+000	1+495	0.000	1.500	1.500	Type-1
2	1+495	4+490	1.500	4.500	3.000	Type-2
3	4+490	11+560	4.500	11.500	7.000	Type-2A
3	11+560	15+310	11.500	15.160	3.660	Type-3A
4	15+310	17+105	15.160	16.950	1.790	Type-5A
5	17+105	17+960	16.950	17.800	0.850	Type-3A
6	17+960	19+072	17.800	18.900	1.100	Type-4
7	19+072	25+345	18.900	25.000	6.100	Type-3B
Total Length (Km)					**25.000**	
PACKAGE-II						
1	25+345	32+275	25.000	31.880	6.880	Type-3B
2	32+275	32+945	31.880	32.550	0.670	Type-4
3	32+945	35+000	32.550	34.500	1.950	Type-3B
4	35+000	35+867	34.500	35.360	0.860	Type-3C
5	35+867	39+635	35.360	39.100	3.740	Type-3B
6	39+635	40+390	39.100	39.820	0.720	Type-4
7	40+390	45+777	39.820	45.000	5.180	Type-3B
8	45+777	50+700	45.000	50.000	5.000	Type-3B
Total Length (Km)					**25.000**	
PACKAGE-III						
1	50+700	51+450	50.000	50.750	0.750	Type-3B
2	51+450	51+670	50.750	50.970	0.220	Type-4
3	51+670	58+345	50.970	57.520	6.550	Type-3B
4	58+345	62+480	57.520	61.580	4.060	Type-5B
5	62+480	65+065	61.580	64.270	2.690	Type-3B
6	65+065	66+035	64.270	65.250	0.980	Type-4
7	66+035	70+905	65.250	70.000	4.750	Type-3B
8	70+905	76+010	70.000	75.000	5.000	Type-6A
Total Length (Km)					**25.000**	
PACKAGE-IV						
1	76+010	88+035	75.000	87.035	12.035	Type-6A
2	88+035	88+390	87.035	87.395	0.360	Type-6B
3	88+390	95+922	87.395	94.900	7.505	Type-6A

S. No.	Existing Km of NH-707 as Per Site		Proposed Chainage		Length (km)	Type of Cross - Section
	From	To	From	To		
Total Length (Km)					**19.900**	
Grand Total (Km)					**94.900**	

The summary of proposed right of way and corridor of impact is shown in below table:

S. No.	COI (m)	Existing Length (m)	Design Length (Km)
1	8-12 m	1.846	1.795
2	12-16 m	76.114	74.579
3	16-20 m	17.500	16.986
4	20-24 m	1.485	1.485
5	>24 m	0.055	0.055
Total Length (Km)		**97.000**	**94.900**

2.4.2 Design Speed

Below table depicts design speeds and parameters thereof:

Table 0.7: Design Speed

Design Speed (km/h)	Km 0.000 to 11.500: Built-up area in Plain/ Rolling Terrain Ruling :100 km/hr Minimum:50 km/hr (Reference IRC 86)	Curves less than 155 and more than 90 m in rolling terrain and curves in hills having radius less than 60 m but more than 30 m are also tried to be improved as far as possible.
	Km 11.500 to km 94.900: Steep Terrain Ruling : 50 km/hr Minimum:30 km/hr	Existing deficient 105 number curves could not be improved to 30 m radius due to compelling site constraints

2.4.3 Intersection

Major Intersection

Table 0.8: Major Intersection Improvement Proposals

S. No.	Existing Chainage of New NH-707	Design Ch.	Type of Junction	Side	Remarks
PACKAGE-I					
1	0.000	0.000	+	BS	Junction of NH-7 and NH-707 (Starting Point of Project)
2	8.130	8.100	T	RHS	Link Road to Kishankot (SH-1) via. Bangran
3	18.675	18.510	+	BS	Link Road to Renukaji (Declared in Principle NH)
PACKAGE-II					
4	39.920	39.355	Y	RHS	Link Road to village Jakhana (Declared in Principle NH)
PACKAGE-III					
5	65.795	65.015	Y	RHS	Link Road to Village Balikoti (Declared in Principle NH)

Minor Intersections

Table 0.9: Schedule for Junctions With Minor Roads

S. No.	Existing Chainage of New NH-707	Design Ch.	Type of Junction	Side	Remarks
PACKAGE-I					
1	0+215	0.200	T	LHS	Paonta Sahib Town Road
2	0+550	0.545	T	LHS	Link Road to Jamniwala Road
3	0+790	0.780	T	RHS	Paonta Sahib Town Road
4	1+170	1.180	Y	LHS	Tamwala to Jambu Khala
5	1+210	1.220	T	RHS	Taruwala to Heerpur Road Village Taruwala
6	1+950	1.900	Y	RHS	Link Road to Jat Colony
7	3+280	3.320	Y	LHS	Link Road to Industry
8	3+600	3.630	+	Both Side	Link Road to Amarkota
9	3+985	4.000	Y	RHS	Link Road to Nihalgarh

S. No.	Existing Chainage of New NH-707	Design Ch.	Type of Junction	Side	Remarks
10	4+105	4.100	Y	LHS	Link Road to Factory
11	4+735	4.750	Y	RHS	Link Road to Laribast/Nihalgarh
12	4+845	4.860	T	LHS	Link Road to AIPL
13	5+505	5.520	Y	RHS	Link Road to Jawalpur & Bashipur
14	6+650	6.670	Y	RHS	Link Road to Naraingarh to Ajali Village Narainagarh
15	10+255	10.130	+	Both Side	Link Road to Army Camp & C.C.I Colony
16	10+390	10.360	Y	RHS	Link Road to C.C.I Colony
17	11+000	10.980	Y	RHS	Link Road to Rajban Village
18	11+165	11.130	Y	RHS	Link Road to Giri Basti
19	11+685	11.570	Y	RHS	Link Road
20	11+840	11.950	Y	LHS	Link Road to Village Chhachati (MDR)
21	13+435	13.350	Y	RHS	Link Road Sirmouri Taal
22	13+905	13.800	Y	RHS	Link Road Sirmouri Taal
23	17+520	17.400	Y	LHS	Link Road
24	18+350	18.180	Y	RHS	Link Road
25	18+265	19.080	Y	RHS	Link Road
26	19+795	19.600	Y	RHS	Link Road
PACKAGE-II					
1	26+530	26.190	Y	LHS	Link Road to Village Badwas
2	27+310	26.890	Y	RHS	Link Road to Mines Area
3	28+220	27.840	Y	RHS	Link Road
4	28+855	28.450	Y	RHS	Link Road
5	29+610	29.200	Y	RHS	Link Road
6	29+780	29.355	Y	RHS	Link Road
7	29+955	29.550	Y	LHS	Link Road
8	30+965	30.550	Y	LHS	Link Road
9	31+535	31.105	Y	LHS	Link Road
10	32+635	32.240	Y	RHS	Link Road
11	35+850	35.350	+	Both Side	To village Bhandh (RHS) & Tibati Colony (LHS)
12	36+490	35.990	Y	RHS	Link Road
13	38+580	38.050	Y	LHS	Link Road
14	38+785	38.330	Y	RHS	Link Road
15	39+640	39.200	Y	LHS	Link Road

S. No.	Existing Chainage of New NH-707	Design Ch.	Type of Junction	Side	Remarks
16	42+540	41.920	+	RHS	Link Road
17	43+950	43.260	Y	LHS	Link Road to Village Sharii
18	44+350	43.650	Y	RHS	Link Road to village Simladar
19	44+910	44.150	Y	RHS	Link Road to Village Dadla
20	46+800	46.010	Y	RHS	Link Road
21	47+300	46.535	Y	LHS	Link Road
PACKAGE-III					
1	51+485	50.785	Y	LHS	Link Road
2	51+580	50.880	Y	LHS	Link Road
3	52+050	51.415	Y	LHS	Link Road to village Millar
4	55+805	55.000	Y	LHS	Link Road to village Bambal
5	58+970	58.050	Y	RHS	Link Road
6	59+825	58.920	Y	LHS	Link Road to village Pad Manal
7	62+070	61.150	Y	RHS	Link Road to village Tikee
8	64+790	63.950	Y	RHS	Link Road
9	65+600	64.700	Y	LHS	Link Road to village Tiker
10	65+600	64.700	Y	RHS	Link Road
11	67+200	66.360	Y	RHS	Link Road
12	68+485	67.625	Y	RHS	Link Road to village Bandli
13	69+125	68.240	Y	RHS	Link Road to village Bandli
14	70+430	69.550	Y	LHS	Link Road
15	71+160	71.250	Y	RHS	Link Road
PACKAGE-IV					
1	76+280	75.250	Y	LHS	Link Road to village Gattusanail
2	78+660	77.620	Y	LHS	Link Road
3	80+710	79.670	Y	RHS	Link Road
4	81+310	80.285	Y	LHS	Link Road
5	81+860	80.800	Y	LHS	Link Road
6	82+990	81.850	Y	RHS	Link Road
7	84+120	83.950	Y	LHS	Link Road to village Ronhat (Junction with Old SH-1)
8	87+360	86.350	Y	RHS	Uttarkhand & Vikasnagar
9	90+400	89.420	Y	LHS	Link Road to village Ronhat (Junction with Old SH-1)

2.4.4 Improvement Proposal for Bridges and Culverts

Table 0.1: Improvement Proposal for Bridges

Structure Type	Total No. Existing	Retained	Rehabilitation	Reconstruction	New Construction adjacent to Old structure	Total after Improvement
Major Bridges	01	01	-	-	-	1
Minor Bridges	13	-	04	01	08	13

Table 0.2: Summary of Improvement Proposal for Culverts

Type of culverts	Pipe	Arch	Slab	Box	Total
Existing	224	9	87	-	320
Discarded	21	-	4	-	25
Balance	203	9	83	-	295
Retained	-	-	-	-	0
Reconstruction to Box Culvert	-	-	-	Pipe to Box- 205 Nos. Arch to Box- 8 Nos. Slab to Box- 51 Nos.	264
New Construction of Box Culvert	-	-	-	50	50
Reconstruction to Slab Culvert	-	-	27	-	27
Widening to Slab Culvert	-	-	4	-	4
Total	-	-	**31**	**264**	**345**

Pre-cast structures shall be provided for cross drainage work and road side drainage.

2.4.5 Retaining Structures

Retaining Structures has been provided in the form of breast wall, gabion wall, toe wall and retaining wall with gabion facing the details of the same is shown in Annexure 6.2 of **Volume-I: Main Report**. The summary of the structures are shown in the table below:

Table 0.3: Summary of Retaining Structures

S. No.	Side of Road	Provision	Length (m)
1	Hill Side	Breast Wall	21,658
2		Gabion Structure	9,630
3	Valley Side	Toe Wall	19,829
4		Retaining Structure with Gabion Facing	21,351

S. No.	Height (m)	Type of Structure	Length (m)
Hill Side			
1	0-1.5 m	Breast Wall	21,658
2	1.5-4.0 m	Gabion Wall	8,106
	4.0-6.0 m		1,068
	6.0-8.0 m		434
	8.0-10.0 m		4
	>10.0 m	Gabion Wall and Geo-cell for Slope Stabilization	18
	Total Length of Gabion Wall (m)		9,630
Valley Side			
1	0-1.5 m	RCC Toe Wall	19,829
2	1.5-4.0 m	Retaining Structure with Gabion Facing	12,658
	4.0-6.0 m		5,830
	6.0-8.0 m		1,623
	8.0-10.0 m		1,133
	>10.0 m	Retaining structure with Gabion facing and Geo cell for Slope Stabilization	107
	Total Length of Retaining wall with Gabion Facing (m)		21,351

In addition to the above slope protection structures, bioengineering measures are provided in the form of jute netting/erosion blanket with shrub plantation, Hydro seeding to protect the hill slope with soft and highly weathered rock. Also, bamboo grid with plantation is proposed to be provided in dumping areas. The summary and methodology of bioengineering provisions is given in subsequent paragraphs.

2.4.6 Slope Protection Measures

Slope Protection Measures in the form of jute netting/erosion blanket with shrub plantation, Shotcrete crib wall with vegetation, hydro seeding and bamboo plantation has been proposed to ensure slope stability and reduce soil erosion. The details of the same is shown in Annexure- 6.4 of Volume-I: Main Report and summary of the same is shown in the table below,

Table 0.4: Summary of Slope Protection Measures

S. No.	Type of Provision	Length (m)/ Nos./Area (Sqm.)	Criteria
1	Jute Netting with Grass and Shrub Plantation	46,384	At locations where required hill slope can be achieved within ROW
2	Erosion Blanket with Grass and Shrub Plantation	6,874	At locations where required hill slope can be achieved within ROW in Pkg-I
3	Hydro seeding	15,772	At locations where required hill slope can't be achieved within ROW
4	Shotcrete crib wall with vegetation	5,850	At landslide areas along with provision of gabion wall on hill side
5	Bamboo Plantation	15 Nos.	At dumping sites along with provision of gabion wall on valley side

2.4.7 Project Facilities

Bus Bay

The location of proposed Bus bay is shown in the table below,

Table 0.5: Details of Proposed Bus bay

S. No.	Design Chainage	Side	Village/Town Name	Type of Project Facilities
1	5+450	LHS	Rajban	Bus Bay
2	18+400	LHS	Sataun	Bus Bay
3	32+275	RHS	Kamrau	Pick-up Bus Stop
4	39+890	RHS	Kafota	Pick-up Bus Stop
5	64+414	RHS	Shillai	Bus Bay
6	94+010	RHS	Gumma	Pick-up Bus Stop

Truck Lay-Bye

The location of proposed truck lay bye is shown in the table below,

Table 0.6: Details of Proposed Truck Lay Bye

S. No.	Design Chainage	Side	Village/Town Name
1	18+700	LHS	Sataun

2.4.8 Other Features

The project will provide various safety aspects to the users. Various provisions like Thrie beam crash barriers, parapet wall, road studs, rumble strip, Road Signs and Road Markings is proposed along the project road to improve the safety for the commuters.

Roadside drainage has been proposed throughout the project stretch with provision of rectangular closed drain along the built-up areas and trapezoidal drain in open country area.

Footpaths, paver blocks, walkways and public toilets are provided with provisions for physically disabled persons and elderly persons. ***Annexure-7*** with this report provides specifications for the same.

Adequate illumination is provided in form of solar lights at built up areas and project facilities along the project stretch at 49 Nos. of locations on an approximate length of 19 Kms.

Water harvesting structures has been proposed at 73 Nos. of locations along the project stretch for local use of people.

Details of the above features are provided under section salient features of the project road.

2.5 NATURAL RESOURCES

2.5.1 Construction Materials

Only first 11.500 km of project road falls in Plain/rolling terrain where existing quarry material may be needed for embankment and subgrade, while rest of 85.50 km length falls in steep hilly terrain where construction of embankment with borrow area soil is not required and natural sub grade is good enough to meet its needed characteristics. Even in first 11.500 km length, high embankment is not a requirement. Therefore borrow areas are not required to be designated for entire length. However, the construction material (i.e. aggregate, soil etc.) required for construction of embankment, subgrade, cement treated sub-base, WMM and slope protection structures shall be obtained from cut material from hill cutting after proper gradation. For construction of bituminous layer and cross drainage structures aggregates shall be obtained from quarry. Bituminous material shall be obtained from Panipat. In addition

to this, lime has been used in the construction of pavement layers which is available around the project area. Also Recycled Asphalt Pavement (RAP) layer is proposed to be used after milling the existing bituminous surface and recycling in a mix plant. Water and sand shall be procured from the project vicinity.

2.5.2 Use of Cut Material and Disposal

Out of 25 lacs of cut material that is estimated to be generated from hill cutting approximately 18 lacs of cut material is proposed to be used different layers of pavement and slope protection structures. Remaining amount of material is proposed to be dumped at 15 Nos. of dumping sites acquired along the project stretch. The summary of the cutting material, their corresponding use and dumping quantity is shown in the table below,

Table 0.7: Summary of Cutting Materials and Reuse

S. No.	Description	Quantity (Cum.)				
		PKG-I	PKG-II	PKG-III	PKG-IV	Total
A	**Total Cutting Qty. from Roadway Excavation (Cum.)**	4,09,042	5,97,663	6,13,298	8,60,735	**24,80,738**
B	**Usable Qty. (B)**					
i	Earthwork and subgrade for embanment (Cum.)	1,23,649	1,49,472	2,24,579	3,80,079	**8,77,779**
ii	Aggregate for sub base (CTSB/WMM) (Cum.)	1,16,710	1,04,049	1,01,192	68,438	**3,90,389**
iii	Stone for Gabion retaining wall (Cum.)	50,421	44,938	1,70,084	1,93,669	**4,59,112**
iv	Stone for Parapet wall (Cum.)	9,000	7,200	9,000	8,640	**33,840**
v	Aggregate to be used in concreting for structures (Cum.)	12,091	18,238	21,770	16,824	**68,923**
	Total (B) (Cum.)	**3,11,871**	**3,23,898**	**5,26,624**	**6,67,650**	**18,30,042**
C	**Quantity of Dumping Material (Cum.)**		2,15,827	2,51,338	3,45,767	**8,12,952**
D	**Balance Cutting Quantity or Excavated material (A)-(B) (Cum.)**	97,171	-14,000	-41,077	20,513	**62,607**

2.5.3 Water Requirement

The water requirement has been assumed based on past project experiences and on the quality control basis. Source of the water will be running water sources (streams & rivers) in the project road area, based on availability. Necessary permission will be taken, if and when required.

Table 0.8: Water Requirement

S. No.	Purpose	Quantity (KLD)
1	For Road Preparation	370
2	For Dust Suppression	80
3	Domestic Uses- Drinking, Cleaning, etc.	10
Total		**460**

2.5.4 Manpower Requirement

Manpower required in Construction and Operation Phases for proposed project is given below. During Construction phase local labor will be hired for un-skilled work and partially local and outside labor will be hired for semi-skilled and skilled work.

Table 0.17: Manpower Requirement during Construction Stage

S. No.	Designation	Nos.
1	Project Managers	4
2	Dept. Project Managers	4
3	Site Engineers	16
4	Mech. Engineers	4
5	Technicians	16
6	Supervisors	32
7	Workers (Skilled-80, Semi-skilled-80 & Un-skilled-160)	320
8	Medical Staff	12
	Total	**408**

Table 0.18: Manpower Requirement During Operation Stage

S. No.	Designation	Nos.
1	Project Director	1
2	Adm. Managers	2
3	Financial Managers	2
4	Tech. Managers	2

S. No.	Designation	Nos.
5	Maintenance Managers	4
6	Accountant	4
7	Supervisors	8
8	Helpers	40
	Total	**63**

2.6 SALIENT FEATURES OF THE PROJECT ROAD

Table 0.19 Salient Features of the Project Road

S. No.	Sailent Features	PKG-I	PKG-II	PKG-III	PKG-IV	Total
1	**Chainage**	0+000 to 25+000	25+000 to 50+000	50+000 to 75+000	75+000 to 94+900	**0+000 to 94+900**
2	**Overall Length (Km)**	25	25	25	19.9	**94.900**
3	**Large/Small Habitations (Nos)**	12	9	12	6	**39**
4	**Junctions**					
A	Major Junctions (Nos)	3	1	1	0	**5**
B	Minor Junctions (Nos)	26	21	15	9	**71**
5	**Cross Drainage Works**					
A	Major Bridge	1 No. (93.40 m)	-	-	-	**1 (93.40 m)**
B	Minor Bridge	3 Nos. (72.65m)	1 No. (18 m)	6 Nos. (157 m)	3 Nos. (83 m)	**13 Nos. (330.650m)**
C	Culverts	84	87	93	81	**345**
6	**Retaining Structure for slope protection**					
A	Breast Wall (m)	4,560	5,998	7,436	3,664	**21,658**
B	Gabion Wall (m)	3,120	710	5,730	70	**9,630**
C	Retaining wall with gabion facing (m)	2,063	3,546	5,599	10,143	**21,351**
D	Toe wall (m)	1,793	6,140	7,058	4,838	**19,829**
7	**Slope Protection Measures**					
A	Jute Netting with Plantation (m)	0	17,344 (1,38,752 m^2)	14,798 (1,18,384 m^2)	14,278 (1,14,224 m^2)	46,420 (3,71,360 m^2)
B	Erosion Blanket with Plantation (m)	6,874 (54,922 m^2)	0	0	0	6,874 (54,922 m^2)
C	Hydro seeding (m)	2,930 (14,650 m^2)	5,904 (29,520 m^2)	3,284 (16,420 m^2)	3,654 (18,720 m^2)	15,772 (78,860 m^2)

S. No.	Sailent Features	PKG-I	PKG-II	PKG-III	PKG-IV	Total
D	Shotcrete Crib with Vegetetaion (m)	1,790 (17,900 m^2)	0	4,060 (40,600 m^2)	0	5,850 (58,500 m^2)
E	Plantation for Slope Protection (Nos.)					
F	Bio Engineering (m)					
8	**Project facilities**					
A	Bus Bay (Nos.)	2	2	1	1	**6**
B	Truck Lay bye (Nos.)	1	0	0	0	**1**
9	**Others**					
A	Metal Beam Crash Barrier (m)	2.063	3.546	5.599	10.143	**21.351**
B	Parapet Wall (m)	10.191	20.044	18.050	9.668	**57.953**
C	Sub Surface Drainage (Nos.)	3	10	7	6	**26**
D	Water Harvesting Structure (Nos.)	9	27	24	13	**73**
E	Solar Lighting (Nos.)	12	14	14	9	**49 Locations (Length 19.170 Km)**
F	Road Studs (Nos.)	6,100	6,310	5,742	4,040	**22,192**
G	Rumble Strips (Nos.)	Length- 4,530 m Location-10 Nos.	Length-3,150 m Location-11 Nos.	Length- 5,980 m Location-12 Nos.	Length- 940 m Location-7 Nos.	**Length- 14,600 m Location-40 Nos.**
H	Road Sign (Nos.)	222	222	185	131	**760**
I	Road Furniture (Nos.)	1,493	1,411	1,921	4,849	**9,674**
J	Footpath (m)	12,600	1,390	1,200	0	**15,190**
K	Paver Block (m)	10,000	0	0	0	**10,000**

S. No.	Sailent Features	PKG-I	PKG-II	PKG-III	PKG-IV	Total
L	Roadside Drainage (m)	Rectangular Closed Drain- 12,600 Trapezoidal Lined Drain- 12,400	Rectangular Closed Drain- 1,390 Trapezoidal Lined Drain- 23,610	Rectangular Closed Drain- 1,200 Trapezoidal Lined Drain- 23,800	Trapezoidal Lined Drain- 19,900	Rectangular Closed Drain- 15,190 Trapezoidal Lined Drain- 79,710

2.7 PROJECT IMPLEMENTATION SCHEDULE

The Project road is estimated to be completed in 24 months from date of start of construction.

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CHAPTER 3

POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

This chapter presents the national and state level environmental legislations and regulations; and World Bank Policies relevant to the "Improvement and upgradation of Paonta Sahib - Gumma Section of NH 707 in the state of Himachal Pradesh". The various environmental regulations applicable and regulatory consents and clearances required for the proposed up-gradation project are also been presented in this Chapter.

3.1 Legal Framework

The Government of India has laid out various policy guidelines, acts and regulations pertaining to environment. The Environment (Protection) Act, 1986 provides umbrella legislation for the protection of environment. As per this Act, the responsibility to administer, the legislation has been jointly entrusted to the Ministry of Environment, Forests and Climate Change (MoEF&CC) at National level, whereas Himachal Pradesh Pollution Control Board (HPPCB) at State level in the present context to "Improvement and upgradation of Paonta Sahib - Gumma Section of NH 707 in the state of Himachal Pradesh".

3.2 Applicable National and State Regulations

The key environmental and other regulations relevant to Improvement and upgradation of Paonta Sahib - Gumma Section of NH 707 in the state of Himachal Pradesh is presented in **Table 3.1.**

Table 3.1: Environmental Regulations Relevant to the Project Road

S. No.	Act / Rules	Purpose	Applicable	Reason for Applicability	Regulatory Clearances Required	Authority
1	Environment (Protection) Act-1986	To protect and improve overall environment	Yes	It is umbrella legislation. Various notifications, rules and schedules are promulgated under this act.	--	MoEF&CC, HPPCB
2	Environmental Impact Assessment Notification, 2006 & subsequent activities	Prior environmental clearance for designated activities for category A and B projects under the Environmental Impact Assessment Notification, 2006 & subsequent activities	Yes	The project road is not covered under the preview of EIA Notification 2006 and subsequent amendments. However, for opening of new borrow areas and stone quarry, prior environmental	No Prior Environmental Clearance for opening borrow areas and stone quarry	SEIAA/ DEIAA

S. No.	Act / Rules	Purpose	Applicable	Reason for Applicability	Regulatory Clearances Required	Authority
				clearance will be required from SEIAA/DEIAA.		
3	Notification for use of Fly ash, 3rd November, 2009 and its amendment on 25th January 2016	"No agency, person or organization shall, within a radius of 300 Kilometres of a thermal power plant undertake construction or approve design for construction of roads or flyover embankments with top soils; the guidelines or specifications issued by the Indian Road Congress (IRC) as contained in IRC specification No. SP: 58 of 2001 as amended from time to time regarding use of fly ash	No	Thermal power plants with 300 km from project Highway are located at Panipat, However, use of fly ash is not proposed because this hill road and cut material will used in valley side filling. For the entire road cement treated sub base has been proposed with utilization of lime in first 11.5 km due presence of clayey type of soil and utilization of cement beyond this section due presence of granular material with low plasticity value.	Use of Fly ash in the Road as per design criteria	MORTH
4	Forest Conservation Act, 1980	To check deforestation by restricting conversion of forested areas into non- forested areas	Yes	The project is passing through reserved forest areas in Paonta Sahib and Renuka Divisions. Diversion of 28.7658 ha forest land is required for project road construction. Same act also governs the cutting of trees on forest area.	Prior Forest Clearance for diversion of forest land for non forest activities	Dept. of Forest, Govt. of Himachal Pradesh/ MOEF&CC
5	The Schedule Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act 2006'	Recognition of Forest Rights of Schedule Tribes and Other Traditional Forest Dwellers along the project road	No	This applicable only when schedule tribes and other traditional forest dwellers, have forest rights for forest land to be diverted for the project road.	NOC	District Authority
6	Air (Prevention and Control of	To control air pollution & controlling emission	Yes	This act is applicable for construction phase	Consent To Establish (CTE) and Consent To	HPPCB

S. No.	Act / Rules	Purpose	Applicable	Reason for Applicability	Regulatory Clearances Required	Authority
	Pollution) Act, 1981	of air pollutants as per the prescribed standards. The NAAQ standards (CPCB) for Ambient Air Quality have been promulgated by the MoEF&CC for various land uses.		to control stack/fugitive emissions and to manage ambient air quality at project site and ancillary activities like crusher plant, hot mix plant, concrete batch mix plant, WMM Plants, DG Set etc, for the road.	Operate CTO) for hot mix plant, batching plant and WMM Plants, DG sets, etc.	
7	The Wildlife Protection Act, 1972	To protect wildlife, if occurred along the project	No	This act is applicable for wildlife protection in the Wildlife Sanctuary, National Park, wildlife corridors, etc.	As there is no Wildlife Sanctuary, National Park, wildlife corridors, etc. within 10 km from the project road, no clearance is required.	NBWL, MOEF&CC
8	Himachal Pradesh Private Forest Act 1954/HP Land Preservation Act, 1978	To regulate trees cutting on non forest private land/Govern felling of trees on private land.	Yes	Trees felling will be required on the private land within the proposed ROW.	Tree cutting permission on private land.	CCF/DFO
9	Biodiversity Act 2002	Conservation of biological diversity, sustainable use of its components and fair and equitable sharing of the benefits arising out of the use of biological resource.	Yes	The road is passing through the reserved forest areas in the length of 28.1 km.	No	National Biodiversity Authority (NBA)/ State Biodiversity Board (NBB)
10	Water Prevention and Control of Pollution) Act1974	To control water pollution by controlling discharge of liquid pollutants as per prescribed standards	Yes	Applicable for construction phase to manage to liquid effluent discharges from camp, batch mix plant, etc.	Consent To Establish (CTE) and Consent to Operate (CTO) for plants and camps	HPPCB
11	Noise Pollution (Regulation and Control) Rule 2000	The standards for noise for day and night have been promulgated by the	Yes	This act will be applicable for all construction equipment/ plant and machinery including	None	HPPCB

S. No.	Act / Rules	Purpose	Applicable	Reason for Applicability	Regulatory Clearances Required	Authority
		MoEF&CC for various land uses.		vehicles deployed for construction of the proposed road to regulate ambient noise levels This act will be applicable to regulate noise nuisance during construction phase		
12	Hazardous and Other Wastes (Management, & Trans-Boundary Movement) Rules, 2016 and amended thereof	Protection to the general public against improper handling and disposal of hazardous wastes	Yes	Rules will be applicable to used oil generated from construction equipment/ machinery during construction works. The rule includes storage, handling, transportation procedures and requirements for safe disposal of hazardous wastes	Hazardous Waste Authorization with CTE and CTO	HPPCB
13	Construction and Demolition Waste Management Rules, 2016	Safe disposal and management of construction and demolition wastes	Yes	Rules shall be applicable to generation of wastes resulting from demolition of bridge and culvert structures and scarifying of surface of existing road and from other activities.	Construction and Demolition Waste Management Plan should be prepared, prior to commencement of works	Local Municipal Corporation
14	Solid Waste Management Rules 2016	Collection and disposal of municipal solid waste	Yes	Applicable to all forms/types of solid waste generated at construction activities, camp site, plant sites, etc..	Solid Waste Management Plan should be prepared prior to commencement of works	Local Municipal Corporation
15	Guidelines to Regulate and Control Ground Water Extraction in India, 2019	Regulate and control ground water extraction for various purpose.	Yes	NOC is required for infrastructure, mining projects, others requiring water withdrawal	NOC from CGWA	CGWA

S. No.	Act / Rules	Purpose	Applicable	Reason for Applicability	Regulatory Clearances Required	Authority
16	HP Ground Water Act 2005	Regulate and control ground water extraction for various purpose	Yes	Permission is required for ground water withdrawal	NOC	HP Ground Water Management Authority
17	Mines and Minerals (Development and Regulation) Amendment Act, 2015	This act has been notified for safe and sound mining activity.	Yes	The construction of project road will require aggregate through mining from riverbeds and quarries	Permit and mining lease for stone quarry	Department of mining, State Government
18	Minor Mineral and concession Rules, 2015	For opening new borrow / quarry	Yes	Regulate use of minor minerals like stone, soil, river sand etc.	Permit and mining lease for stone quarry	District Collector
19	Ancient Monuments and Archaeological Sites and Remains Act, 1958	Protection of Archaeological Monuments sites and Remains	Yes	No notified Archaeological Monuments is located within 300m of the project highway. However for chance finds the provisions laid out in the act will be applicable.	Permission from ASI	Archaeological Survey of India
20	Explosive Act 1984	An Act to regulate the manufacture, possession, use, sale, [transport, import and export] of Explosives	Yes	If contractor open stone quarry and use explosive for quarrying	License for storage and handling of explosive.	Chief Controller of Explosives
21	The Building and Other Construction Workers (regulation of employment and conditions of service) Act, 1996	To regulate the employment and conditions of construction workers and to provide for their safety, health and welfare measure and for other matter incidental thereto	Yes	To ensure safety and welfare measures for workers employed at construction sites. These regulations to be complied with during the construction of proposed road works.	None. Safety and welfare measures for work force employed at construction sites are to be regulated in conformity with this act.	State Labour Department
22	Bonded Labour System (Abolition) Act, 1976 along with Rules, 1976	An Act to provide for the abolition of bonded labour system with a view to preventing the economic and physical exploitation of the weaker sections of the	Yes	Contractors shall employ numbers of Labours during Construction Phase. Contractor will ensure that there is no Bonded Labour by him or sub contractors.	Labour License	State Labour Department

S. No.	Act / Rules	Purpose	Applicable	Reason for Applicability	Regulatory Clearances Required	Authority
		people and for matters connected therewith or incidental thereto				
23	Contract Labour (Regulation and Abolition) Act 1970 along with rules, 1971	The Object of the Contract Labour Regulation and Abolition) Act, 1970 is to prevent exploitation of contract labour and also to introduce better conditions of work	Yes	Contractors shall employ work-force during Construction Phase. The Act applies to the Principal Employer of an Establishment and the Contractor where in 20 or more workmen are employed or were employed even for one day during preceding 12 months as Contract Labour.	Labour License	State Labour Department
24	Employees Provident Funds and Miscellaneous Provisions Acts 1952 along with EPF Scheme Rules and Forms	It is a beneficent piece of social welfare legislation aimed at promoting and securing the well-being of the employees	Yes	Contractors shall be employing Workman more than 20 persons during Construction Phase	Compliance of regulations	State Labour Department
25	Employees State Insurance Act 1948 along with Rules and Regulations	Protect the interest of workers in contingencies such as sickness, maternity, temporary or permanent physical disablement, death due to employment injury resulting in loss of wages or earning capacity. Act also guarantees reasonably good medical care to workers and their immediate dependents.	Yes	Contractor shall be applying large number of labours during construction which will include both Men and Women	Insurance	State Labour Department
26	Equal Remuneration Act, 1976 along with allied Rules	An Act to provide for the payment of equal remuneration to men and women workers and for the prevention of discrimination, on	Yes	Contractor shall be applying large number of labours during construction which will include	Compliance of regulations	State Labour Department

S. No.	Act / Rules	Purpose	Applicable	Reason for Applicability	Regulatory Clearances Required	Authority
		the ground of sex, against women in the matter of employment and for matters, connected therewith or incidental thereto.		both Men and Women.		
27	Inter State Migrant Workmen (Regulation of Employment and Conditions Service Act	To regulate the condition of service of inter- state labourers in Indian labour law. The Act's purpose is to protect workers whose services are requisitioned outside their native states in India. Whenever an employer faces shortage of skills among the locally available workers, the act creates provision to employ better skilled workers available outside the state	Yes	Contractor Shall be employing large number of workers during Construction from other States also.	Compliance of regulations	State Labour Department
28	Minimum Wages Act 1948 along with Central Rules 1950	To ensure that workman gets at least minimum wages as fixed by Govt. Minimum wages sets the lowest limit below which wages cannot be allowed to sink.	Yes	Contractor Shall be employing large number of workers during Construction	Compliance of regulations	State Labour Department
29	Persons with Disabilities (Equal Opportunities, Protection of Rights and Full Participations) Act , 1995 along with Rules,1996 and National Trust for Welfare of Persons with Disabilities Act,1999 with rules 2000.	It gives effect to the proclamation on the full participation and equality of the persons with disabilities in the Asian & Pacific Region and provides for their education, employment, creation of barrier free environment, social security, etc.	Yes	Contractor Shall be employing large number of workers during Construction.	Compliance of regulations	State Labour Department

S. No.	Act / Rules	Purpose	Applicable	Reason for Applicability	Regulatory Clearances Required	Authority
30	Central Motor Vehicle Act 2019	The Act provides in detail the legislative provisions regarding licensing of drivers/ conductors, registration of motor vehicles, control of motor vehicles through permits, special provisions relating to state transport undertakings, traffic regulation, insurance, liability, offences and penalties.	Yes	These rules will be applicable to road users		Motor Vehicle Department
31	National Green Highway Policy 2015	To evolve a policy framework for planation along National Highway	Yes	Road side plantation will be carried out along the road		

3.3 Applicable World Bank Safeguard Policies

The safeguard policies of the World Bank relevant to the Improvement and upgradation of Paonta Sahib - Gumma Section of NH 707 in the state of Himachal Pradesh are given in **Table 3.2**.

Table 3.2: Relevant and Applicability of WB Safeguard Policies for Up-gradation of Paonta Sahib - Gumma Section of NH 707 in the state of Himachal Pradesh

S. No.	World Bank Safeguard Policy	Key Features	Policy Applicability to Sub Project	Policy Triggered Or Not
1.	OP/BP 4.01 Environmental Assessment	Overall governing policy intended to ensure Bank-financed projects are environmentally sound and sustainable	All potential impacts due to the improvement and up-gradation project road are to be assessed and necessary mitigation measures are to be incorporated accordingly.	Triggered

S. No.	World Bank Safeguard Policy	Key Features	Policy Applicability to Sub Project	Policy Triggered Or Not
2.	OP/BP 4.36 Forests	Policy is intended to support sustainable and conservation-oriented forest management, harness potential of forests to reduce poverty in a sustainable manner, integrate forests into sustainable economic development, and protect vital local and global environmental services and values of forests.	The proposed improvement and upgradation of the project road is passing through forest area and prior forest clearance is required for diversion of forest land for non-forest purpose.	Triggered
3.	OP/BP 4.11 Physical Cultural Resources	Policy is intended to ensure that projects identify and inventory cultural resources that are potentially affected by the project. Projects should include mitigation measures, when there are adverse impacts on physical cultural resources.	Construction of road will be on existing road corridor and will avoid cultural property resources (CPR) and therefore does NOT warrant shifting or affect CPRs. However, there may be direct or indirect impact on nearby cultural properties along the road.	Triggered
4.	OP/BP 4.11 Involuntary Resettlement	Involuntary Resettlement Policy addresses direct economic and social impacts from project activities that may cause involuntary taking of land resulting in: (i) relocation or loss of shelter, (ii) loss of assets or access to assets, and/or (iii) loss of income sources or livelihoods	The proposed improvement and upgradation of the project road require land acquisition and Involuntary Resettlement.	Triggered

3.4 Applicable International Conventions

Ramsar Convention on Wetlands of International Importance, 1971

The Ramsar Convention is an international treaty for the conservation and sustainable utilization of wetlands i.e. to stem the progressive encroachment on and loss of wetlands now and in the future, recognizing the fundamental ecological functions of wetlands and their economic, cultural, scientific and recreational value.

According to the Ramsar list of Wetlands of International Importance, there are 25 designated wetlands in the country which are required to be protected. Activities undertaken in the proximity of these wetlands should follow the guidelines of the convention.

International Union for Conservation of Nature (IUCN)

The International Union for Conservation of Nature (IUCN) is a membership Union uniquely composed of both government and civil society organizations. IUCN has evolved into the world's largest and most diverse environmental network. IUCN is the global authority on the status of the natural world and the measures needed to safeguard it.

IUCN produces the IUCN Red List of Threatened Species and the IUCN Red List of Ecosystems. The IUCN Red List of Ecosystems is applicable at local, national, regional and global levels. IUCN' stated goal is to expand the global network of national parks and other protected areas and promote good management of such areas. In particular, it focuses on greater protection of the oceans and marine habitats.

3.5 Provisions in MORTH's Code

Section 111	Precautions for safeguarding the environment
Clause 201.2	Preservation of Property/Amenities during clearing and grubbing
Clause 301.3.2	Stripping and storing of topsoil for reuse during excavation for roadway and drains
Clause 302.4	Restriction on timings for blasting operations
Clause 304.3.6	Public safety near towns/villages where excavation is carried out
Clause 305.2.2.2	Locations of borrowing and relevant regulations
Clause 305.3.3	Stripping and storing of topsoil at borrow locations
Section 306	Soil erosion and sedimentation control
Clause 407.4.2	Provisions for turfing on median and islands
Section 517	Recycling of bituminous pavement and excavated material
Clause 701.2.1	Use of geo-textiles for control of soil erosion
Section 810	Use of Metal beam crash barriers for safety, relevant regulations and specifications
Clause 2501	Precautions during river training works

3.6 Indian Road Congress (IRC) Codes Applicable to the Project Road

Key Indian Road Congress (IRC) Code of Practices applicable for the project road with respect to environment are given below:

Table3.3: Indian Road Congress Code of Practices for Project Road

Sl. No.	IRC Code Theme	Year	Purpose	Applicability
1.	Recommendations for Road Construction in Areas Affected by Water Logging, Flooding and/or Salts Infestation	IRC:34-2011	Construction in water logged areas	No
2.	Recommended Practice for Construction of Earth Embankments and Sub-Grade for Road Works (First Revision)	IRC:36-2010	Issues relating to Borrow pits	Yes
3.	Guidelines for Pedestrian Facilities	IRC: 103 -1988	Safety of pedestrians	Yes
4.	Recommended Practice for Recycling of Bituminous Pavements	IRC:120-2015	For recycling of bituminous pavements	Yes
5.	Guidelines for Use of Construction and Demolition Waste in Road Sector	IRC:121-2017	Use of Construction and Demolition Waste in Road Sector	Yes
6.	Guidelines on Landscaping and Tree Plantation	IRC:SP:21-2009	Landscaping and Tree Plantation along of the road	Yes
7.	Guidelines on Road Drainage	IRC: SP: 42-1994	Drainage	Yes
8.	Highway Safety Code	IRC: SP: 44-1994	Highways safety	Yes
9.	Guidelines for Use of Flyash in Road Embankments	IRC:SP:58-2001	Use of Flyash in Road Embankments	No
10.	Guidelines for Use of Geotextiles in Road Pavements and Associated Works	IRC:SP:59-2002	Use of Geotextiles in Road Pavements and Associated Works	Yes
11.	Guidelines for Soil and Granular Material Stabilization Using Cement Lime and Fly Ash	IRC:SP-89-2010	Soil and Granular Material Stabilization Using Cement Lime and Fly Ash	Yes
12.	Guidelines on Requirements for Environmental Clearance for Road Projects	IRC:SP-93-2017	Requirements for Environmental Clearance for Road Projects	Yes
13.	Use of Cold Mix Technology in Construction and Maintenance	IRC:SP-100-2014	Use of Cold Mix Technology in	No

Sl. No.	IRC Code Theme	Year	Purpose	Applicability
	of Roads Using Bitumen Emulsion		Construction and Maintenance of Roads Using Bitumen Emulsion	
14.	Interim Guidelines for Warm Mix Asphalt	IRC:SP-101-2014	Warm Mix Asphalt	Yes
15.	Guidelines on Preparation and Implementation of Environment Management Plan	IRC:SP-108-2015	Preparation and Implementation of Environment Management Plan	Yes

3.7 Environmental Standards

Environmental standards applicable to the Improvement and upgradation of Paonta Sahib - Gumma Section of NH 707 in the state of Himachal Pradesh are National Ambient Air Quality Standards, 2009 are as given below:

- National Ambient Air Quality Standards, 2009
- Ambient Noise Standards
- Drinking Water Quality Standards-IS:10500:2012
- CPCB Standards for Surface Water Use
- Stack Gas Discharge Standards for Hot Mix Plant

Table Error! No text of specified style in document.**.1: National Ambient Air Quality Standards**

Pollutant	Time Weighted Average	Concentration in Ambient Air	
		Industrial, Residential, Rural and Other Areas	Ecologically Sensitive Area (notified by Central Government)
Sulphur Dioxide (SO_2), µg/m^3	Annual*	50	20
	24 hours**	80	80
Nitrogen Dioxide (NO_2), µg/m^3	Annual*	40	30
	24 hours**	80	80
Particulate Matter (size less than 10 µm) or PM_{10} µg/m^3	Annual*	60	60
	24 hours**	100	100
Particulate Matter (size less than 2.5 µm) or $PM_{2.5}$ µg/m^3	Annual*	40	40
	24 hours**	60	60
Ozone (O_3) µg/m^3	8 hours*	100	100
	1 hour**	180	180
Lead (Pb) µg/m^3	Annual*	0.50	0.50
	24 hours**	1.0	1.0
Carbon Monoxide (CO) mg/m^3	8 hours*	02	02
	1 hour**	04	04
Ammonia (NH_3) µg/m^3	Annual*	100	100
	24 hours**	400	400
Benzene (C_6H_6) µg/m^3	Annual*	5	5
Benzo(a)Pyrene (BaP)-particulate phase only, ng/m^3	Annual*	1	1
Arsenic(As), ng/m^3	Annual*	6	60
Nickel (Ni), ng/m^3	Annual*	20	20
* Annual arithmetic mean of minimum 104 measurements in a year at a particular site taken twice a week 24 hourly at uniform intervals.			
** 24 hourly or 8 hourly or 1 hourly monitored values, as applicable, shall be complied with 98% of the time; they may exceed the limits but not on two consecutive days of monitoring.			
Source: National Ambient Air Quality Standards, Central Pollution Control Board Notification in the Gazette of India, Extraordinary, New Delhi, 18th November, 2009			

Table Error! No text of specified style in document..**2: National Ambient Noise Level Standards**

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

Source: *Central Pollution Control Board, New Delhi.*

Note-1 Day time is reckoned in between 6 AM to 10 PM

Note-2 Night time is reckoned in between 10 PM to 6 AM

Note-3 Silence zone is defined as areas up to 100 meters around such as premises as hospitals, educational institutions and courts. The silence zones are to be declared by the Competent Authority

Note-4 Mixed categories of areas should be declared as one of the four above mentioned categories, by the Competent Authority and the corresponding standard shall apply.

CHAPTER 4

BASELINE ENVIRONMENTAL CONDITIONS

4.1 PREAMBLE

This chapter provides the details of the Environment of the project road. Environment includes all the three components i.e physical, biological and the socioeconomic environment. Study of environment features of the project determines the sensitivity and related impacts due to proposed activities.

Standard methodologies of EIA / NABET were followed for baseline data collection for conducting the EIA study for the project. The data was collected from field studies, DPR of the project which contains survey reports, information from the Forest Department, and official websites of Himachal Pradesh Govt. departments.

The baseline environment study of the project road was initiated in the year 2012, when DPR preparation was carried out for NHIIP. Environment monitoring to collect baseline data for Soil, surface and ground water, ambient air quality and noise levels was conducted in the month of September 2019 by J. P. Test & Research Centre (An NABL & MoEF&CC recognized laboratory). Certification of NABL and Outline of the different aspects covered in the present study is given below

Table 4.1: Summary of the data collection from various source for the study

Aspect	Mode of Data Collection	Parameters Monitored	Source(s)
Meteorology	Secondary	Climate, Temperature, relative humidity, wind speed, direction, rainfall	Indian Meteorological Department, Report of Luhri HEP stage-I
Land Use	Primary and Secondary	Land use pattern	Forest Department (H.P.), National Remote Sensing Agency
Soils	Primary and Secondary	Physico-chemical parameters	Field studies and Literature from HP govt. websites
Geological	Primary	Geological characteristics of the study area	Geological Survey conducted for the Project
Water Quality	Primary	Physico-chemical and biological parameters as per IS 10500:2012	Field studies
Ambient Air	Primary	Parameters depicted	Field studies

Aspect	Mode of Data Collection	Parameters Monitored	Source(s)
Quality		under NAAQS	
Noise Levels	Primary	Hourly noise levels as per Noise level standards by CPCB	Field studies

Study Area: As a primary requirement of EIA process, the primary baseline data in the right of way as well as the area falling within 500 meters on either side of right of way was collected. Secondary data were collected within 10 km aerial distance from the road alignment.

4.1 LAND ENVIRONMENT

4.1.1 Topography and Physiography

Topography and physiographical, most of the areas form a part of hilly tract with undulating terrain. The elevation varies from 2500m to 3500m above mean sea level. The Shiwalik hills standing to a height of about 1100m in the south of limestone deposits are separated from the bare lofty ridges of the lesser Himalayas in the north by the deep valley of river Giri, The project influence area is marked by deep valleys, river terraces, steep escapements and innumerable streams.

The latitude and longitude of project road are as follows:

(a) Start Point (Paonta Sahib) - 30º26’40.18”N longitude, 77º36’23.026” E latitude

(b) End Point (Gumma) - 30 º 48’ 15.113” E longitude, 77 º 43’ 43.566” N latitude

The existing highway NH-707 alignment passes through North Eastern part of Himachal Pradesh. The Existing project road predominantly passes through 85.50 km mountainous terrain, 11.5 km in rolling and plain terrain. The project influence area is predominantly a mountain with deep valleys lying between ranges of varying elevations. The slope is well covered by trees. The uphill slope has good catchment, and the rainwater generally drains out through the natural streams on both flanks of the slide.

Map of the Project Influence area with alignment super-imposing is shown in figure 4.1 below-

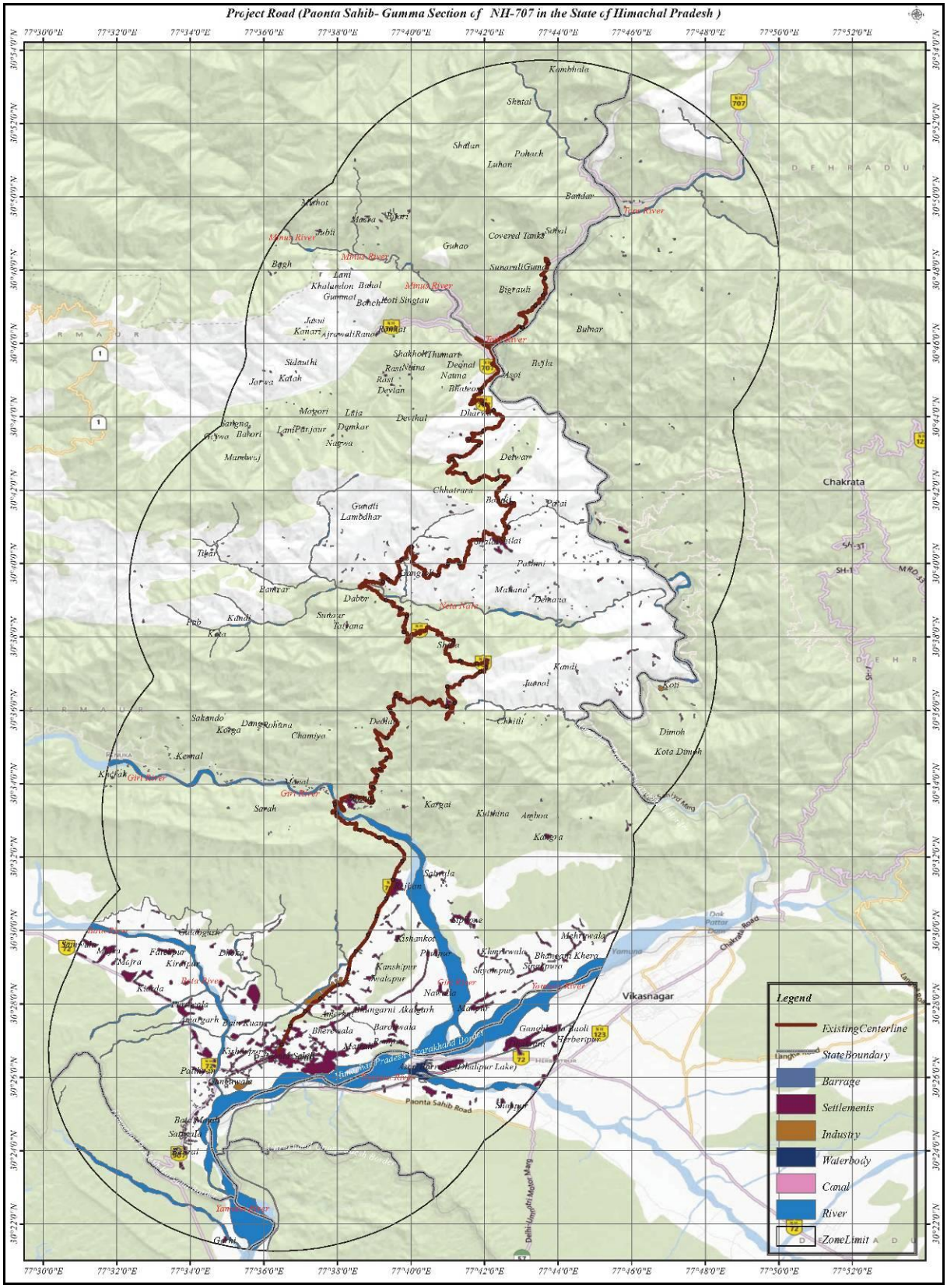


Figure 4.1: Map of the Project Influence Area

Different types of topographic pictures are shown in Fig 3.2 & Fig 3.3 below

Figure 4.2: Hilly Terrain Topography Features of the Project Road

Figure 4.3: Plain Terrain Topography Features of the Project Road

4.1.2 Land use

Land use is the human use of land. Land use involves the management and modification of natural environment or wilderness into built environment such as fields, pastures, and settlements.

It can be estimated from below given map and table that Land use pattern along the project road is pre-dominantly the Rocky barren lands along the alignment, followed by Reserved forest lands in some areas and agriculture lands in starting of the alignment which consists of plain and rolling terrain. There are village settlements in scattered manner and Industrial establishment near Paonta Sahib, Rajban and Sataun. Due to hilly terrain of the road, many streams cross the alignment. There are three major rivers in the project area namely Giri, Tons and Minus.

The project specific land use pattern has been established for area within project influence area i.e. 10 km on either side of the road, using satellite RESOURCE SAT-2, L4FMX as shown in Figure 4.4.

Table 4.2 : Land use Classification of 10 km periphery of project alignment

S. No.	Class	Area (ha.)	Area (%)
1	Settlements	1736.54	1.35
2	Industry	66.43	0.05
3	Open mix jungle	692.38	0.54
4	Barrage	10.13	0.01
5	Water body/ water logged area	58.46	0.05
6	Canal	127.23	0.10
7	River	4264.91	3.33
8	Strip farming land	9990.75	7.79
9	Agriculture crop land	13948.25	10.88
10	Forest land	48924.86	38.17
11	Rocky area	48367.02	37.73
	Total	128186.96	100

Map indicating Land use in the project influence area is given in Figure 4.4 below-

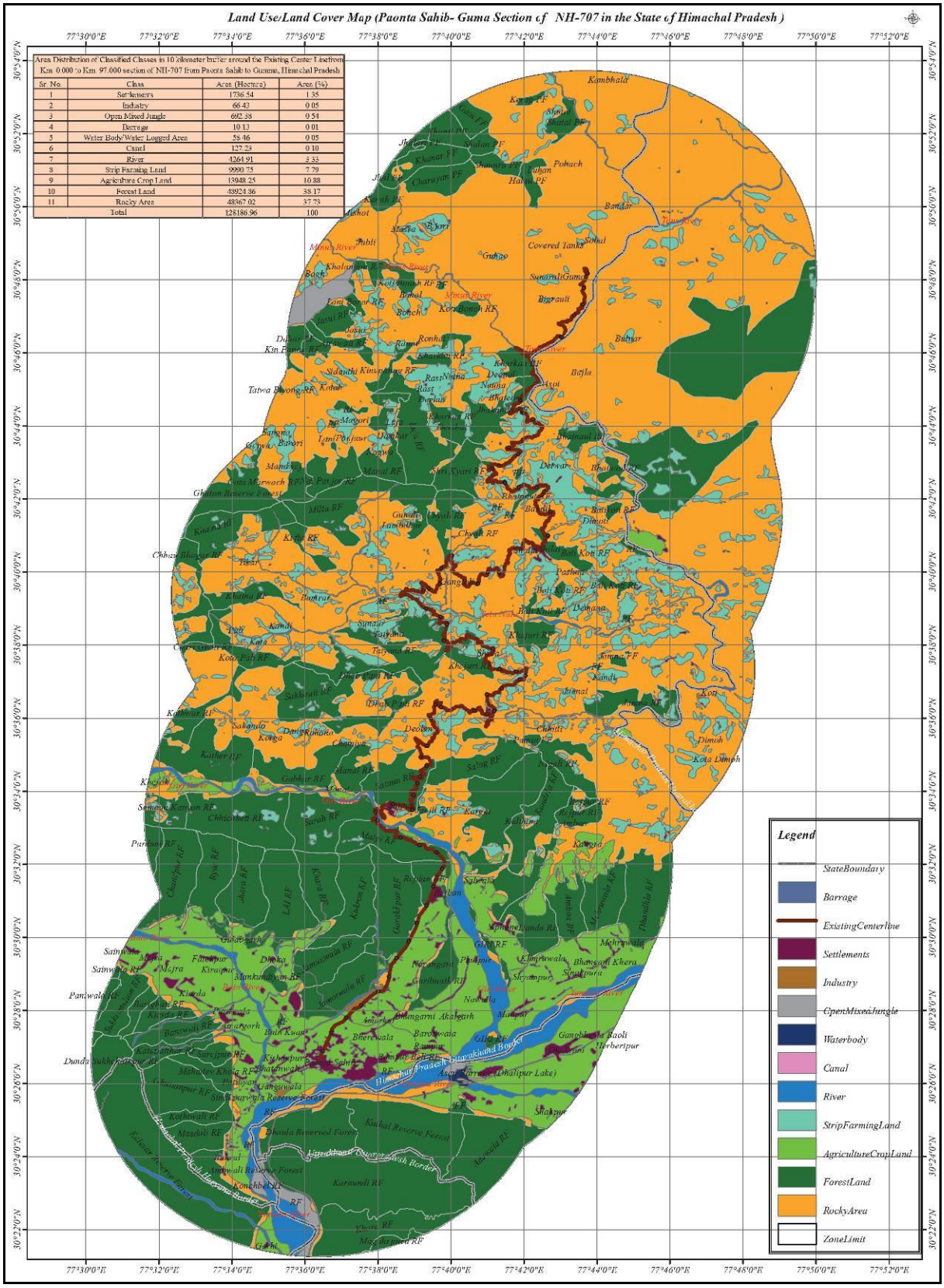


Figure 4.4: Land Use Map of the Project Study Area

4.1.3 Geology of the Area

Sirmaur district presents an intricate mosaic of high mountain ranges, hills and valleys with altitude ranging from 300 to 3000 m above MSL. There is general increase in elevation from south to north and from east to west. In general, trance Giri terrain exhibits highly rugged mountain terrain. The highest peaks in Choordhar remain snow bound throughout the year. Low denuded hill ranges of Siwalik represent the southwestern part of the district. In the areas underlain by high hill ranges of Himalayas, the valleys are narrow and deep with steep slopes. The terrain is moderately to highly dissected with steep slopes. Paonta valley, trending NW-SE, have an area of about 230 sq km and lies between the main Himalayan ranges on the north and outer Shiwalik hill range in the south. The Yamuna River that forms the eastern district boundary with the State of Uttaranchal drains major part of Sirmaur district. Tons, Giri, Bata are its major tributaries. Only a small area in the southeast is drained by river Markanda of the Ghaggar river basin. Giri River practically bisects the district in to two parts, namely trans Giri area and cis-Giri area. Paonta valley is drained by river Bata a tributary of Yamuna. Paonta valley is a narrow tectonic valley or dun and has fluvial and fluvio glacial sediments.

Geologically, the rock formations occupying the district range in age from pre-Cambrian to Quaternary period. The generalized geological succession in the district is given below

Table 4.3: Generalized Geological Succession of Sirmaur and Shimla, H.P

Era	Period	Formation	Lithology
Quaternary	Recent to Pleistocene	Alluvium /valley fills/ Older alluvium	Sand with pebble and clay & multiple cyclic sequence of medium to coarse grained sand with pebble of sandstone and lenses of clay
Tertiary	Pliocene – M-Miocene	Siwalik Group	Sandstone, shale, conglomerate, mudstone, clay, gravel & boulder beds
Pre Tertiary Group	L-Miocene – Oligo-Eocen	Kasauli/Dagshai/ Subathu	Grey, purple sandstone, Shale, nodular clay, Shale, Limestone etc.
	Pemo Carboniferous	Karol/ InfraKarol, Blainis boulder beds	Limestone, shale, red shale Carbonaceous shale, slate, greywacke, dolomitic limestone.
	Devonian	Jaunsar series	Slates schist phyllite
	Pre-Cambrian	Chail series	Slates called Shimla slates
	Achaean	Jutogh series	Quartzites, schist and limestone.

Shimla district presents an intricate mosaic of high mountain ranges, hills and narrow deep valleys with altitude ranging from 1000 to 3000 m above MSL. In theareas underlain by high

hill ranges of Himalayas, the valleys are narrow and deep with steep slopes trending in NW-SE direction. The terrain is moderate to highly dissected with steep slopes. The altitude is higher in northeastern parts and decreases towards southwestern parts. Shimla district is drained by streams/rivers forming part of the drainage basins of the Sutlej, the Yamuna, the Pabbar and Tons rivers. However, major part of the district is drained by tributaries of Sutlej River. The Sutlej River is the longest river traversing along the north western boundary of the area and Giri River which is the tributary of the Yamuna River originates from the eastern part and runs in the SW direction. Whereas, tributaries of Tons river, flows in the southern parts and the Pabbar river in the eastern parts of the district. In general the density of drainage is moderate to high and is not uniform all over the district.

The geological features of project area is given in Figure 4.5 to 4.9 and Table 4.4.

Figure 4.5: Slate exposure at CH 20+250 KM

Figure 4.6: Landslide area at Chainage 16+300 KM

Figure 4.6: Sandstone and slate layers outcrop

Figure 4.7: boulder strata at CH 25+415 KM

Figure 4.8: outcrop of Slate and Limestone interlayer

Figure 4.9: Showing Interlayer of Shale and Phyllite at CH 62+500 KM

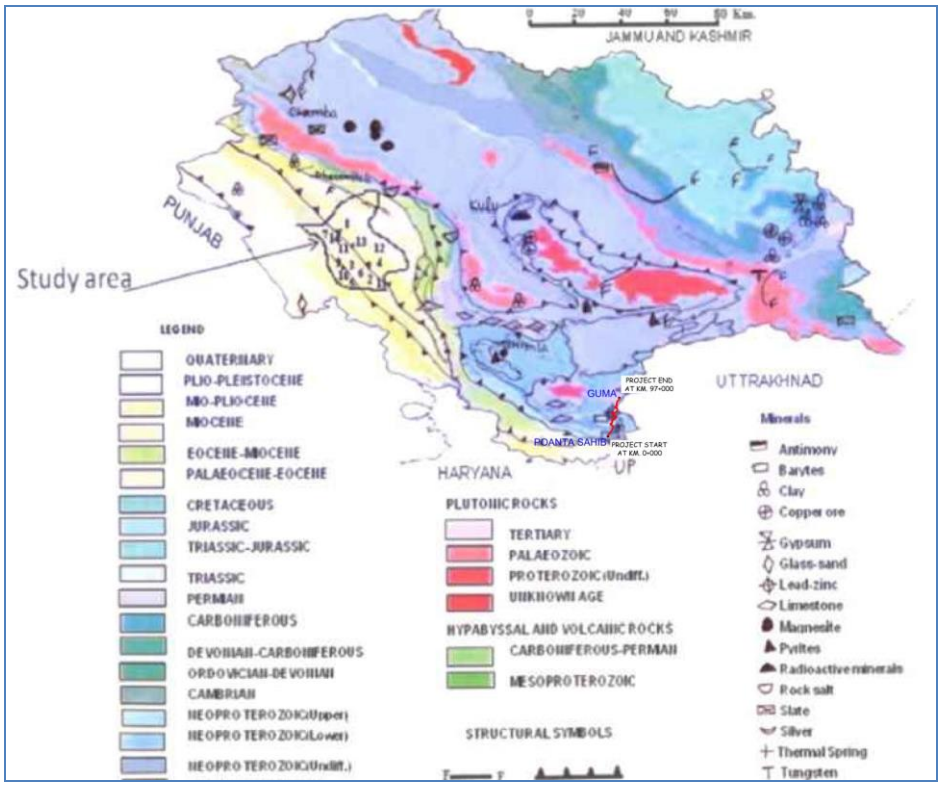


Figure 4.10: Geological Map of Himachal Pradesh showing project alignment (Geological Survey of India)

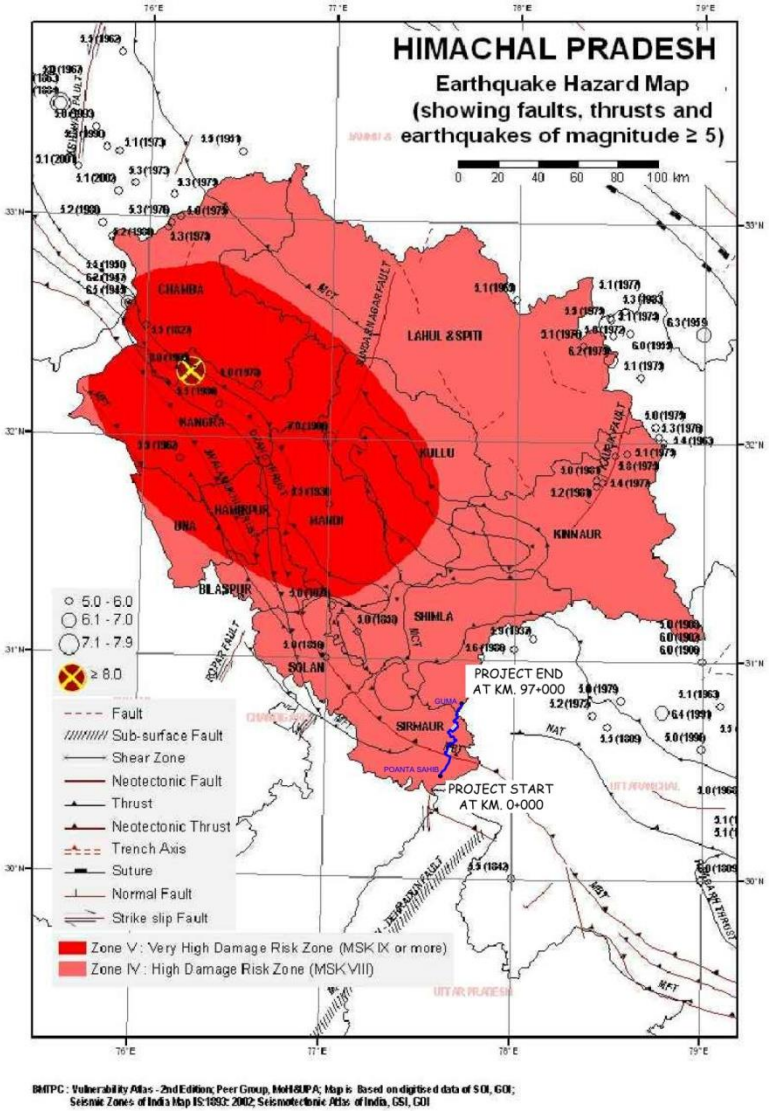
Table 4.4: Geological Characteristics of the Project Influence Area

Location/ District	Geological Characteristics
Sirmour	Shiwalik, Mandhati-Chandpur Groups, Shali-Deoban And Largi Groups
Shimla	Granites, Jutogh Group And Shali Deoban, Largi groups, Nagthat Group, Muth Quartzite Manikaran Quartzite And

	Mandhati Chandpur Group

4.1.4 Seismological Characteristic of the Area

The project road passing through districts Sirmour and Shimla lies in Zone IV as per IS 1893(Part 1):2002. The areas of this zone have the lesser risk to effects by an earthquake as compared to zone V. The earthquake intensity for this zone is between MSK VIII to MSK-IX. The zone factor for this zone is 0.24. This zone is called as High Damage Risk Zone. Map showing seismic zone of India is given below in Figure 4.11.



BMTPC : Vulnerability Atlas - 2nd Edition; Peer Group, MoH&UPA; Map is Based on digitised data of SOI, GOI; Seismic Zones of India Map IS:1893: 2002; Seismotectonic Atlas of India, GSI, GOI

Figure 4.11: Seismic zone Map of Himachal Pradesh showing project alignment (Geological Survey of India)

4.1.5 Drainage pattern of the project area

The majority of the project road area possesses a dendritic to sub-dendritic drainage containing irregular branching of the smaller tributaries. The closeness of these small branches is depending on the permeability of the underlying rocks and the amount and nature of precipitation. It is the most common drainage pattern of hillside slopes of the study area.

The radial drainage pattern is a characteristic feature of the high altitudinal zone specially the summit surfaces. Litho logically, these areas are constituted by the resistant and impervious rocks with steep slopes. The sub-parallel drainage pattern comprises a series of streams, which run approximately parallel to each other. They are evolved in areas of uniformly dripping rocks. Drainage map of the project influence area super-imposed with road alignment is shown in Figure 4.12 below.

The project area consists of three rivers namely Giri, Tons and Minus. The streams which cross the alignment at several locations or run along it, ultimately meet with the rivers in the study area.

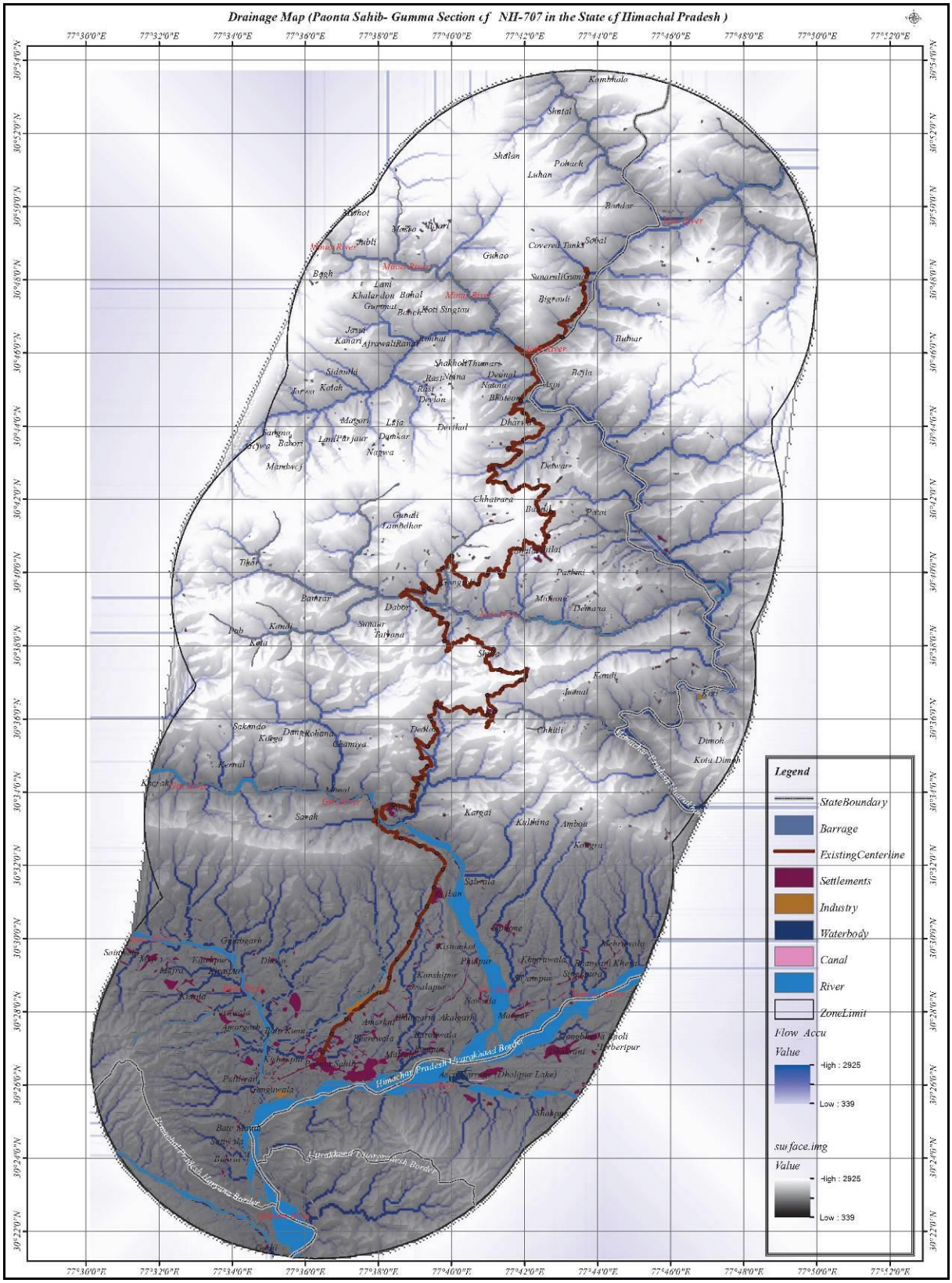


Figure 4.12: Drainage Map of the Project Study Area

4.1.6 Soil and Quality Characteristics

Soil Types

The soil in the Sirmaur district varies from thin and bare soil of high mountains to rich deep alluvial soil of the valleys. In the hilly area i.e. northern part soils are veneer and brown in colour, these are high base status soil of humid regions. In the southern part, combination of shallow black, brown and alluvial soils are found.

Soil in the Shimla district is generally sandy loam in valley areas of the district and in rest of the hilly and mountainous areas soil is skeletal. The soil depth is generally shallow except in areas having good vegetative cover. It is generally dry, shallow and deficient in organic matter. Landslides are the common features in mountainous terrains. Soils are rich in nutrients and thus are fertile.

Major soil types that are scattered throughout the state are described here (Refer. fig. 4.13 below). Alluvial soils and Brown Podzoic soils variety is found in Sirmour and Shimla district (Project influence area).

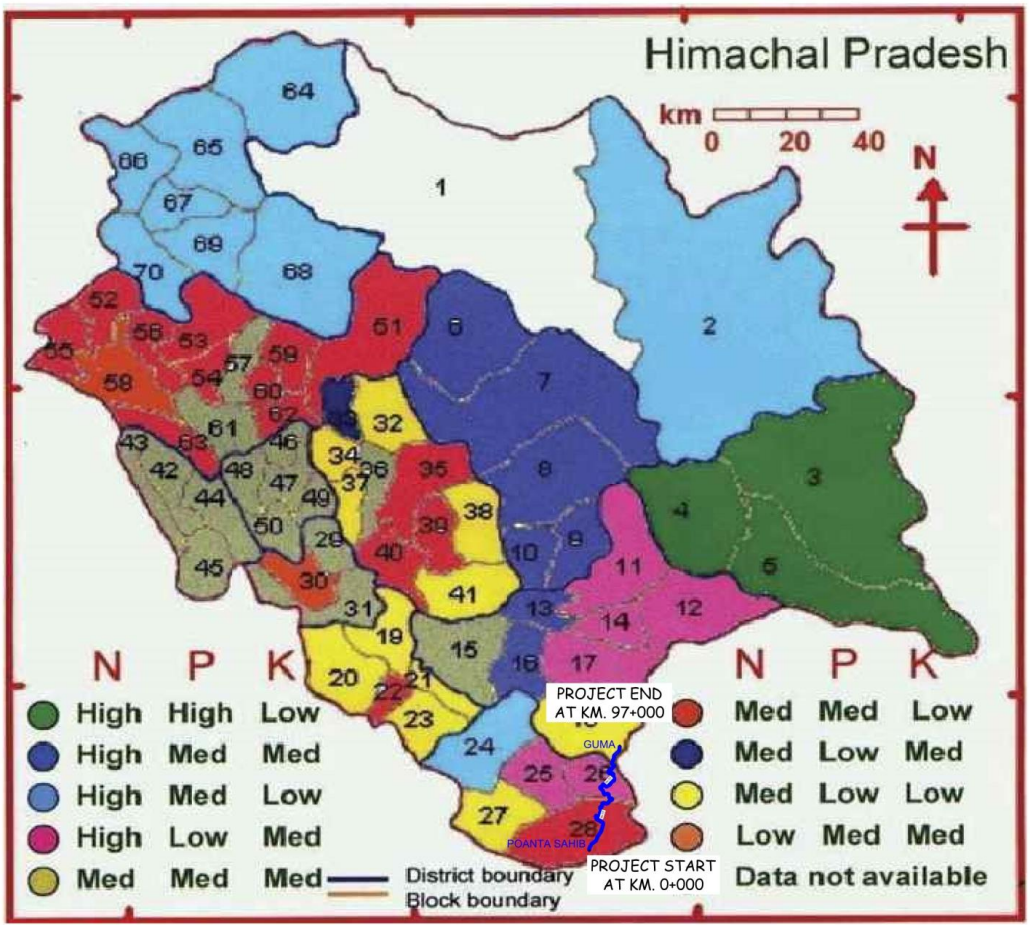


Figure 4.5: Soil Fertility Map of Himachal Pradesh showing project alignment
(Dept. of Soil Sciences, Himachal Pradesh Govt.)

Soil Quality

The soil quality was monitored at seven locations truly representative of area. The results of soil quality monitoring are presented in Table 4.5. The soil quality locations are shown in the map below in Figure 3.14.

The soil quality results in table 3.2 show that soil textures are varying site to site as sandy clay, sandy loam to silty loam. Soil pH in the project area varies from 7.05 to 7.94. Conductivity of the soil samples varied from 118 to 320 μmhos/cm and porosity were found in the range 25.1% to 35.8%. Permeability of the soil samples varied from 1.6 to 2.7 cm/hr. Organic matter were found in the range 0.36 to 0.76% and Available nutrient such as N, P, K were found in good amount.

The fertility of the soil is governed by physical and chemical characteristics of the soil. It can be stated that soil in the project area is fertile in nature which will help plantation to grow.

Permeability results of the soil shows that the soils in the project area are moderately slow and moderate in permeability.

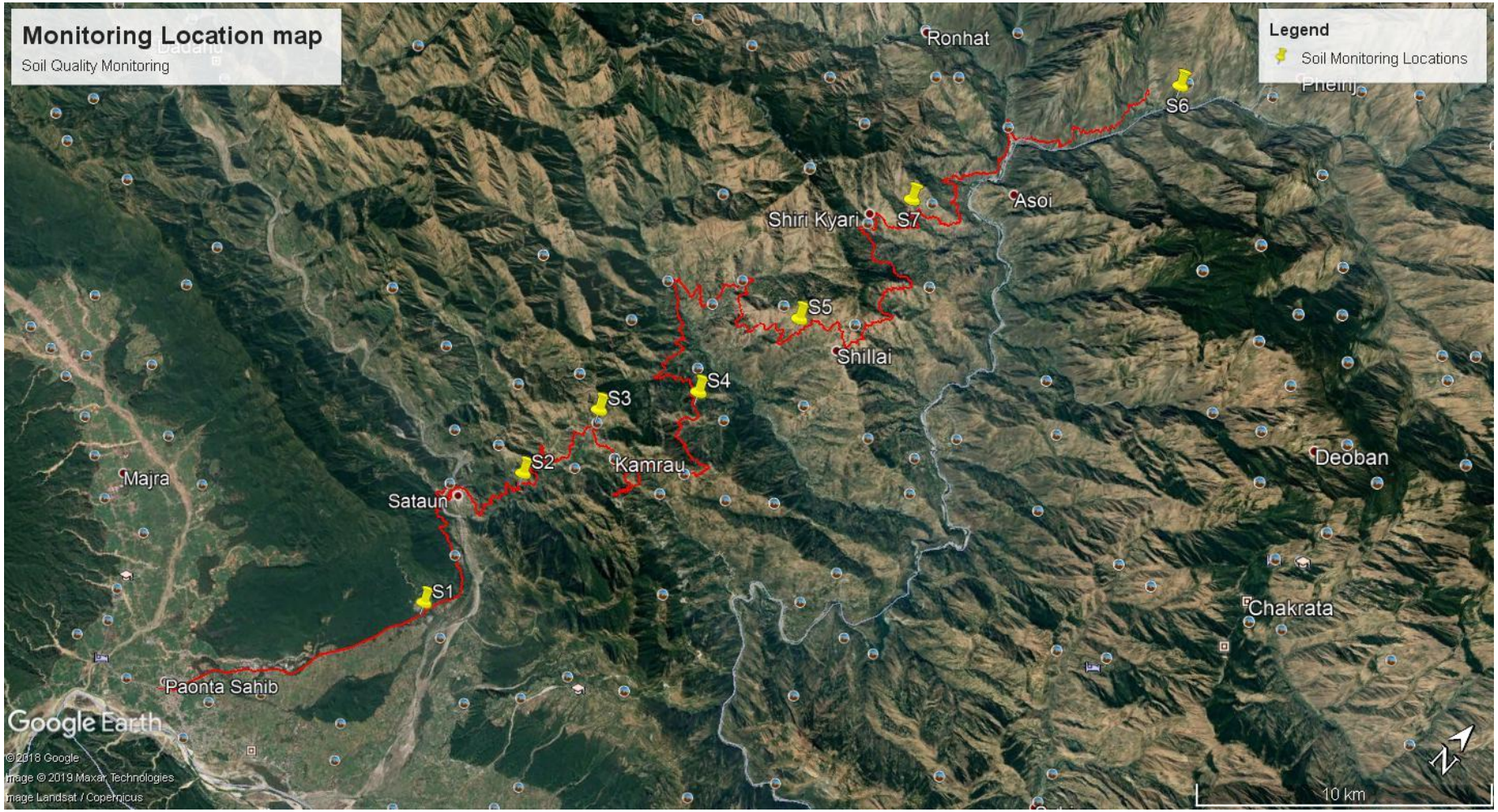


Figure 4.6: Soil Monitoring Location Map

Table 4.5: Physio - Chemical Properties of the Soil Samples

S. No.	Parameters	Unit	CCI at Km 10.08 (S1)	At KM 23/600 (S2)	Khajiyar at KM 28/300 (S3)	Shilla at KM 43/100 (S4)	Shillai at KM 61/800 (S5)	at Km 98/600 (S6)	Drabil at Km 75/000 (S7)	Test Method
1	Texture	-	Sandy Clay Loam	Sandy Clay	Sandy loam	Sandy loam	Sandy loam	Silt loam	Silt loam	Soil Chemical Analysis by M.L. Jackson
2	Particle size distribution: i) Sand, >0.2 mm Dia ii) Silt, 0.02 to 0.2 mm Dia iii) Clay, <0.002 mm Dia	%	50.5 21.2 22.3	50.5 11.2 38.3	62.1 23.0 15.8	59.4 25.1 15.5	54.5 33.4 12.1	34.5 53.2 12.3	35.5 50.2 14.3	Soil Chemical Analysis by M.L. Jackson
3	pH (at 25 ^{0}C) (1:2.5 suspension)	-	7.94	7.83	7.54	7.35	7.05	7.15	7.18	IS: 2720 (part-26):1987 (RA 2011)
4	Electrical Conductivity (µS/cm) (at 25 0C) (1:2.5 suspension)	µmhos/cm	250	118	320	285	148	270	212	IS: 14767 :2000 (RA 2016)
5	Cation Exchange Capacity	meq./100 gm	7.9	5.6	7	8.1	6	7.8	9.2	Soil Chemical Analysis by M.L. Jackson
6	Exchangeable Sodium	mg/kg	120	87	122	212	143	191	253	Soil Chemical Analysis by M.L. Jackson
7	Exchangeable Calcium	mg/kg	1220	840	980	1120	780	1140	1180	Soil Chemical Analysis by M.L. Jackson
8	Exchangeable Magnesium	mg/kg	264	216	192	228	180	288	276	Soil Chemical Analysis by M.L. Jackson

S. No.	Parameters	Unit	CCI at Km 10.08 (S1)	At KM 23/600 (S2)	Khajiyar at KM 28/300 (S3)	Shilla at KM 43/100 (S4)	Shillai at KM 61/800 (S5)	at Km 98/600 (S6)	Drabil at Km 75/000 (S7)	Test Method
9	Sodium Absorption Ratio	-	0.81	0.69	0.93	1.56	1.19	1.35	1.72	Soil Chemical Analysis by M.L. Jackson
10	Porosity	%	31.2	25.1	35.8	34.9	30.4	26.1	27.3	Soil Chemical Analysis by M.L. Jackson
11	Permeability	cm/hr	1.9	1.6	2.7	2.5	2.3	2.1	2	Soil Chemical Analysis by M.L. Jackson
12	Organic Carbon (%)	%	0.41	0.36	0.76	0.65	0.55	0.42	0.43	IS: 2720 (part-22):1977 (RA 2015)
	Available Nutrient									
13	Nitrogen as N	kg/ha.	242	168	310	292	138	167	186	Soil Chemical Analysis by M.L. Jackson
14	Phosphorus as P	kg/ha.	17.8	12.5	22.8	20.1	14.4	12.1	16.9	Soil Chemical Analysis by M.L. Jackson
15	Potassium as K	kg/ha.	187	109	242	211	125	152	183	Soil Chemical Analysis by M.L. Jackson

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4.1.7 Prevailing Slope Stabilization Issues (Landslide, Landslips Etc.)

In a hilly region like Himachal Pradesh, slope stability and slope stabilisation issue are one of the main environmental issues especially with regards to road projects. 'Landslides, landslips, mud flows and flash floods are common affecting the Shiwalik geomorphic zone during the rainy season. The unstable slopes have resulted due to the largely unconsolidated nature of sediments in many sections and heavy pressure of human and livestock population. Landslides have been a major environmental problem in the Himalayas for the past several decades.

The environmental survey team has observed some weak areas as geologically unstable along the project road.

Landslide Zone: Weak spots which are chronic by way of hill slides are identified. The most active sliding zone are in km 15 to Km 17 and Km 57 to Km 61; some other small spots are also observed in km 17, 18, 20, 26, 30, 32 and 35. Thorough study of these spots reveals that the causes of landslides may be mechanical weathering, chemical alteration, influence of seasonal fluctuation of temperature, rains, which generally result in the deterioration of the strength characteristics of slope forming materials. The strip plan showing the landslide prone area is shown in ***Annexure-3.***

Area of Concern

- At Chainage 16+300 KM shows outcrop of Shale and sandstone having vertical slope with slight inclination indicates the possibility of landslide. Major portion of shale rock has been washed out due to flowing water in monsoon and converted into debris & has eroded the top surface which has the possibility of landslides.
- At Chainage 58+500 KM debris found along the slope which might have been washed due to rain, chemical weathering resulting into erosion of top layer.
- At Chainage 72+800 & 73+900 KM debris of slate found on inclined slope eroded due weathering, chemical alteration leading to possibility of landslides.
- At Chainage 86+200 KM inclined slope with slate debris are found which can lead to landslide at the time of excavation.

4.2 WATER ENVIRONMENT

4.2.1 Surface Water & its Quality

The project influence area is divided into basins of Yamuna, Giri, Tons and Minus rivers (Fig. 4.15). Details of the Rivers in the project study area are as follows:

Yamuna River:-Yamuna is the most important and measure river of project region. It flows along the border of Himachal Pradesh and Uttarakhand. Project start at Paonta Sahib is situated near the bank of Yamuna.

Giri River: - The River Giri is an important tributary of the Yamuna River. It drains a part of South-Eastern Sirmour. The Giri rises from Kupar peak just above Jubbal town and flows down in the South- Eastern direction and divides the Sirmour district and crosses project highway in km 18 near Sataun.

Minus River: - The Minus River is a tributary of the Tonns River, which in turn drains into the river Yamuna. The Minus River crosses project highway in km 88 in Minus.

Tonns River: - This River is an important tributary of the Yamuna River and joins it at Kalsi in the North-Western part of Dehradun valley. It flows along about 25 km length of the project highway Which lies between km 90 and end point of the road i.e. Gumma.

Figure 4.7: Minus and Tons River in Valley Side at Project Site

Along with the rivers in the project area, there are several numbers of fresh water streams and nallahs crossing the project alignment. Details of the same locations are given in *Annexure 4.1* (Project Inventory) with Main report.

In order to find out the primary data of existing water quality, three sampling locations for surface water were selected along the project highway. Details of the sampling locations and their results are given in Table 4.6 and Table 4.7 respectively. Location map of the surface water and Ground water sampling is given in Figure 4.16.

Table 4.6: Locations of Surface Water Sampling

S. No.	Chainage (km) of NH-707	Sample Code	Source of Sampling
1	Borad at Km 46.200	SW1	Waterfall alongside Road
2	Khajiyar at Km 23.300	SW2	Waterfall alongside Road
3	At Km 98.600	SW3	Waterfall alongside Road

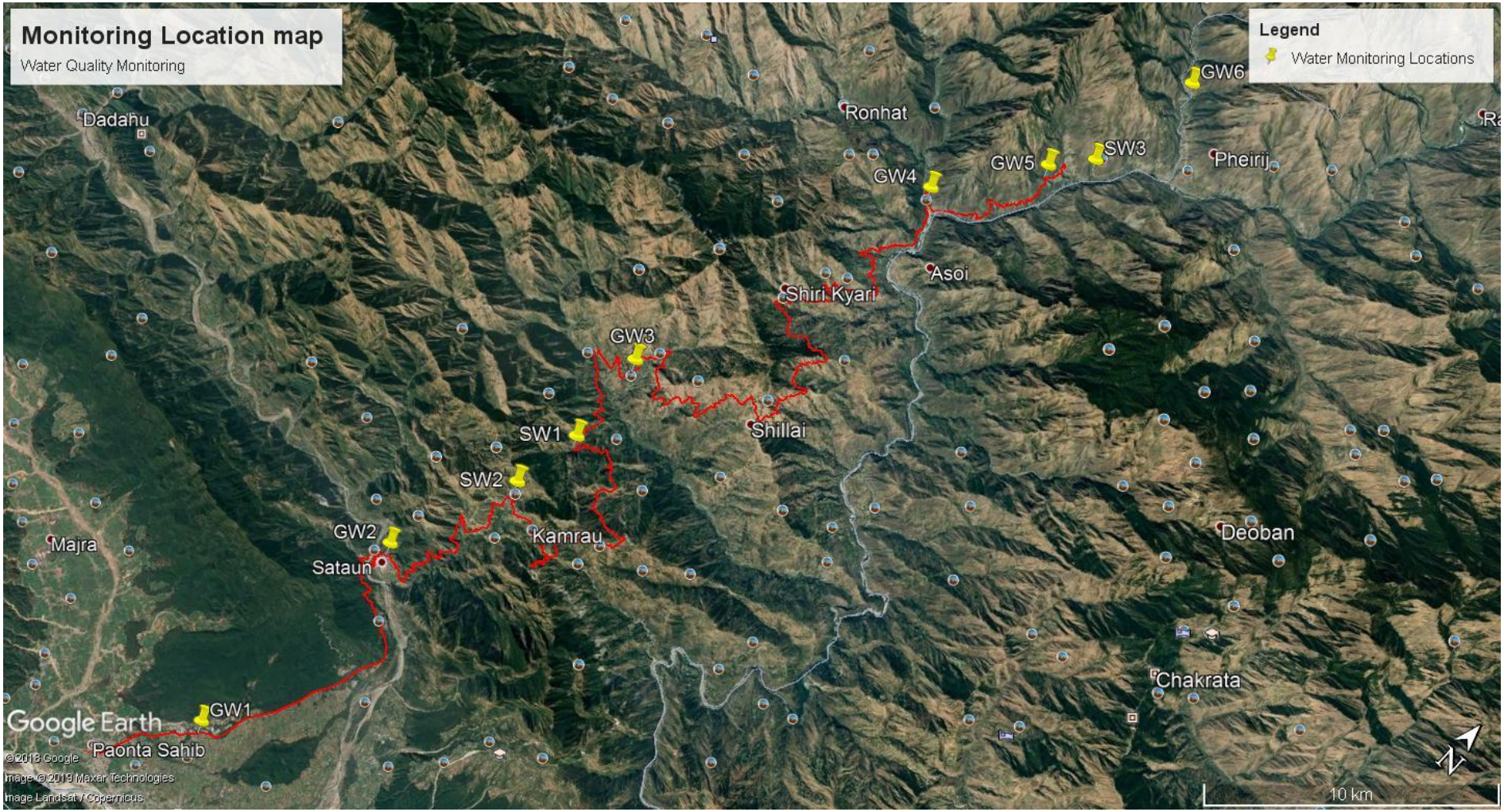


Figure 4.8: Surface and Ground Water Monitoring Location Map

Table 4.7: Results of Selected Surface Water Sources

S. No.	Parameters	Unit	Borad at KM 46.200 (SW1)	Khajiyar at KM 23.300 (SW2)	At KM 98.600 (SW3)	Method of analysis	Limit as per IS 10500:2012	
							Acceptable	Permissible
1	pH Value (at 25°C)	-	7.82	8.12	7.72	IS 3025 (P-11): 1983, RA 2017	6.5-8.5	No relaxation
2	Turbidity	NTU	1	3	<1	IS 3025 (Part 10): 1984, RA 2017	1 (Max.)	5.0
3	Conductivity	µmhos/cm	455	410	235	IS: 3025 Part 14	Not Specified	Not Specified
4	Total Dissolved Solids (TDS)	mg/l	278	265	146	IS: 3025 (Part 16): 1984, RA 2017	500 (Max.)	2000
5	Total Suspended Solids (TSS)	mg/l	<5	<5	<5	IS: 3025 (Part 17): 1984, RA 2017	Not Specified	Not Specified
6	Total Hardness (as $CaCO_3$)	mg/l	156	198	96	IS: 3025 (Part 21): 2009, RA 2014	200 (Max.)	600
7	Chloride (as Cl)	mg/l	52	43	35	IS: 3025 (Part 32): 1988, RA 2014	250 (Max.)	1000
8	Total Alkalinity (as $CaCO_3$)	mg/l	126	138	62	IS: 3025 (Part 23): 1986, RA 2014	200 (Max.)	600
9	Sulphate (as SO_4)	mg/l	19	15	12	IS: 3025 (Part 24): 1986, RA 2014	200 (Max.)	400

S. No.	Parameters	Unit	Borad at KM 46.200 (SW1)	Khajiyar at KM 23.300 (SW2)	At KM 98.600 (SW3)	Method of analysis	Limit as per IS 10500:2012	
							Acceptable	Permissible
10	Nitrate (as NO_3)	mg/l	4.8	5.6	2.8	IS: 3025 (Part 34): 1988, RA 2014	45 (Max.)	No relaxation
11	Fluoride (as F)	mg/l	0.1	0.1	<0.1	APHA 23rd Edi. 4500-F (D)	1.0 (Max.)	1.5
12	Iron (as Fe)	mg/l	<0.05	0.07	<0.05	APHA 23rd Edi. 3111	0.3 (Max.)	No relaxation
13	Zinc (as Zn)	mg/l	<0.05	<0.05	<0.05	APHA 23rd Edi. 3111	5.0 (Max.)	15
14	Calcium (as Ca)	mg/l	34	52	20	IS: 3025 (Part 40): 1991, RA 2014	75 (Max.)	200
15	Magnesium (as Mg)	mg/l	17.3	16.6	11.2	APHA 23rd Edi. 3500-Mg B	30 (Max.)	100
16	Cadmium (as Cd)	mg/l	<0.01	<0.01	<0.01	APHA 23rd Edi. 3111	0.003 (Max.)	No relaxation
17	Copper (as Cu)	mg/l	<0.05	<0.05	<0.05	APHA 23rd Edi. 3111	0.05 (Max.)	1.5
18	Nickel (as Ni)	mg/l	<0.01	<0.01	<0.01	APHA 23rd Edi. 3111	0.02 (Max.)	No relaxation
19	Lead (as Pb)	mg/l	<0.1	<0.1	<0.1	APHA 23rd Edi. 3111	0.01 (Max.)	No relaxation
20	Mercury (as Hg)	mg/l	<0.001	<0.001	<0.001	APHA 23rd Edi. 3112	0.001 (Max.)	No relaxation
21	Arsenic (as As)	mg/l	<0.025	<0.025	<0.025	APHA 23rd Edi. 3114	0.01 (Max.)	0.05
22	Phenolic Compounds (as C_6H_5OH)	mg/l	<0.001	<0.001	<0.001	IS 3025(P-43) : 1992, RA2014	0.001 (Max.)	0.002
23	Phophorus (as P)	mg/l	<0.03	<0.03	<0.03	IS 3025(P-31) : 1992, RA2014	Not Specified	Not Specified
24	Manganese (as Mn)	mg/l	<0.01	<0.01	<0.01	APHA 23rd Edi. 3111	0.1 (Max.)	0.3

S. No.	Parameters	Unit	Borad at KM 46.200 (SW1)	Khajiyar at KM 23.300 (SW2)	At KM 98.600 (SW3)	Method of analysis	Limit as per IS 10500:2012	
							Acceptable	Permissible
25	Cyanide (as CN)	mg/l	<0.05	<0.05	<0.05	IS 3025 (P-27) :1986, RA 2014	0.05 (Max.)	No relaxation
26	Total Chromium (as Cr)	mg/l	<0.05	<0.05	<0.05	APHA 23rd Edi. 3111	0.05 (Max.)	No relaxation
27	Anionic Detergent (as MBAS)	mg/l	<0.01	<0.01	<0.01	APHA 23rd Edi. 5540 C	0.2 (Max.)	1.0
28	Aluminium (as Al)	mg/l	<0.03	<0.03	<0.03	APHA 23rd Edi. 3500 Al-B	0.03 (Max.)	0.2
29	Oil & Grease	mg/l	<2	<2	<2	IS 3025 (P-39) :1991, RA 2014	Not Specified	Not Specified
30	Chemical oxygen demand	mg/l	6	10	<4	IS 3025 (P-58) :2006, RA 2017	Not Specified	Not Specified
31	Biological oxygen demand (27oC at 3 days)	mg/l	<1	1.4	<1	IS 3025 (P-44) :1993, RA 2014	Not Specified	Not Specified
32	Dissolved oxygen	mg/l	8.3	7.8	8.2	IS 3025 (P-38) :1989, RA 2003	Not Specified	Not Specified
33	Total Coliform	MPN Per 100ml	18	24	11	IS:1622:1981 (RA 2019)	Absent/100ml	Absent/100ml

The results of analysis of surface waters show that pH values vary from 7.72 to 8.12, the total hardness as CaCO3 ranges from 96 to 198 mg/l. The Ca and Mg content were observed to vary from 20 to 52 mg/l and 11.2 to 17.3 mg/l respectively. The total dissolved soilds (TDS) range from 146 to 278 mg/l.

BOD and COD values appear in the samples which may be due to lack of sanitary facilities in the region or due to other anthropogenic activities, and livestock . The values are very low indicating absence of industries generating effluents and low population density. Dissolved oxygen (DO) concentration in surface water ranged from 7.8 to 8.3 mg/l. The trace metal content e.g. Pb, Cd, As, Hg, Cr, Zn etc. were found to below the detection limits.

The quality of surface water is generally good enough for domestic/agriculture uses. However, presence of total coliform doesn't make these water sources suitable for drinking purpose without disinfection.

4.2.2 Ground Water & its Quality

The ground water resource occurs mainly in unconsolidated sediments of intermountain valleys and in sub mountain tract. The project districts, particularly their valley areas depend upon ground water. However to establish baseline quality of ground water six sampling locations were selected along the project highway. Samples were analyzed as per APHA and IS-3025 procedures. Locations of the ground water sampling are given in Figure 4.15 above and details of their results are given in Table 4.8 below.

Table 4.8: Results of Ground Water Monitoring

S. No.	Parameters	Unit	Nihalgarh at Km 04/00 (GW1)	Sataun at KM 18/100 (GW2)	Gangtoli at KM 55/100 (GW3)	Meenus at KM 88/00 (GW4)	Gumma at KM 95/00 (GW5)	Feedus at KM 104/00 (GW6)	Method of analysis	Limit as per IS 10500:2012	
										Acceptable	Permissible
	Source of Sampling	-	Handpump	Handpump	Handpump	Handpump	Handpump	Handpump	-	-	-
1	Taste	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	IS 3025 (P-7) : 1984, RA 2012	Agreeable	Agreeable
2	Odour	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	IS 3025 (P-5) : 1983, RA 2018	Agreeable	Agreeable
3	pH Value (at 25°C)	-	7.38	7.85	7.16	7.42	7.26	7.54	IS 3025 (P-11): 1983,	6.5-8.5	No relaxation

S. No.	Parameters	Unit	Nihalgarh at Km 04/00 (GW1)	Sataun at KM 18/100 (GW2)	Gangtoli at KM 55/100 (GW3)	Meenus at KM 88/00 (GW4)	Gumma at KM 95/00 (GW5)	Feedus at KM 104/00 (GW6)	Method of analysis	Limit as per IS 10500:2012	
										Acceptable	Permissible
	Source of Sampling	-	Handpump	Handpump	Handpump	Handpump	Handpump	Handpump	-	-	-
									RA 2017		
4	Colour	Hazen	<5	<5	<5	<5	<5	<5	IS 3025: (P-4) 1983, RA 2017	5 (Max.)	15.0
5	Turbidity	NTU	<1	<1	<1	<1	<1	<1	IS 3025 (Part 10): 1984, RA 2017	1 (Max.)	5.0
6	Total Dissolved Solids (TDS)	mg/l	326	385	126	387	498	281	IS: 3025 (Part 16): 1984, RA 2017	500 (Max.)	2000
7	Total Alkalinity (as $CaCO_3$)	mg/l	146	172	42	180	202	128	IS: 3025 (Part 23): 1986, RA 2019	200 (Max.)	600
8	Total Hardness (as $CaCO_3$)	mg/l	186	210	58	264	286	162	IS: 3025 (Part 21): 2009, RA 2019	200 (Max.)	600
9	Calcium (as Ca)	mg/l	45	46	13	61	71	35	IS: 3025 (Part 40): 1991, RA 2019	75 (Max.)	200
10	Magnesium (as Mg)	mg/l	17.9	23.1	6.2	27.2	26.5	18.1	APHA 23rd Edi. 3500-Mg B	30 (Max.)	100

S. No.	Parameters	Unit	Nihalgarh at Km 04/00 (GW1)	Sataun at KM 18/100 (GW2)	Gangtoli at KM 55/100 (GW3)	Meenus at KM 88/00 (GW4)	Gumma at KM 95/00 (GW5)	Feedus at KM 104/00 (GW6)	Method of analysis	Limit as per IS 10500:2012	
										Acceptable	Permissible
	Source of Sampling	-	Handpump	Handpump	Handpump	Handpump	Handpump	Handpump	-	-	-
11	Chloride (as Cl)	mg/l	60	70	36	68	102	52	IS: 3025 (Part 32): 1988, RA 2019	250 (Max.)	1000
12	Fluoride (as F)	mg/l	0.2	0.3	0.1	0.3	0.4	0.2	APHA 23rd Edi. 4500-F (D)	1.0 (Max.)	1.5
13	Sulphate (as SO_4)	mg/l	23	28	5	26	38	18	IS: 3025 (Part 24): 1986, RA 2019	200 (Max.)	400
14	Iron (as Fe)	mg/l	0.09	0.16	0.08	0.14	0.12	0.09	APHA 23rd Edi. 3111	0.3 (Max.)	No relaxation
15	Nitrate (as NO_3)	mg/l	6.7	7.8	2.3	7.2	8.3	4.6	IS: 3025 (Part 34): 1988, RA 2019	45 (Max.)	No relaxation
16	Copper (as Cu)	mg/l	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	APHA 23rd Edi. 3111	0.05 (Max.)	1.5
17	Boron (as B)	mg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	APHA 23rd Edi. 4500-B	0.5 (Max.)	1.0
18	Manganese (as Mn)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	APHA 23rd Edi. 3111	0.1 (Max.)	0.3
19	Mineral Oil	mg/l	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	IS 3025 (P-39):1991 RA 2019	0.5 (Max.)	No relaxation

S. No.	Parameters	Unit	Nihalgarh at Km 04/00 (GW1)	Sataun at KM 18/100 (GW2)	Gangtoli at KM 55/100 (GW3)	Meenus at KM 88/00 (GW4)	Gumma at KM 95/00 (GW5)	Feedus at KM 104/00 (GW6)	Method of analysis	Limit as per IS 10500:2012	
										Acceptable	Permissible
	Source of Sampling	-	Handpump	Handpump	Handpump	Handpump	Handpump	Handpump	-	-	-
20	Phenolic Compounds (as C_6H_5OH)	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	IS 3025(P-43) : 1992, RA2019	0.001 (Max.)	0.002
21	Selenium (as Se)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	APHA 23rd Edi. 3114	0.1 (Max.)	No relaxation
22	Anionic Detergent (as MBAS)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	APHA 23rd Edi. 5540 C	0.2 (Max.)	1.0
23	Aluminium (as Al)	mg/l	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	APHA 23rd Edi. 3500 Al-B	0.03 (Max.)	0.2
24	Zinc (as Zn)	mg/l	<0.05	0.13	<0.05	0.08	<0.05	0.07	APHA 23rd Edi. 3111	5.0 (Max.)	15
25	Cadmium (as Cd)	mg/l	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	APHA 23rd Edi. 3111	0.003 (Max.)	No relaxation
26	Cyanide (as CN)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	IS 3025 (P-27) :1986, RA 2014	0.05 (Max.)	No relaxation
27	Lead (as Pb)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	APHA 23rd Edi. 3111	0.01 (Max.)	No relaxation
28	Mercury (as Hg)	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	APHA 23rd Edi. 3112	0.001 (Max.)	No relaxation
29	Arsenic (as As)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	APHA 23rd Edi. 3114	0.01 (Max.)	0.05
30	Chromium	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	APHA 23rd	0.05 (Max.)	No relaxation

S. No.	Parameters	Unit	Nihalgarh at Km 04/00 (GW1)	Sataun at KM 18/100 (GW2)	Gangtoli at KM 55/100 (GW3)	Meenus at KM 88/00 (GW4)	Gumma at KM 95/00 (GW5)	Feedus at KM 104/00 (GW6)	Method of analysis	Limit as per IS 10500:2012	
										Acceptable	Permissible
	Source of Sampling	-	Handpump	Handpump	Handpump	Handpump	Handpump	Handpump	-	-	-
	(as Cr)								Edi. 3111		
31	Total Coliform	Per 100ml	Not detected (<2)	Not detected (<2)	Not detected (<2)	Not detected (<2)	Not detected (<2)	Not detected (<2)	IS:1622:1981 (RA 2019)	Absent/100ml	Absent/100ml
32	Faecal Coliform	Per 100ml	Absent	Absent	Absent	Absent	Absent	Absent	IS:1622:1981 (RA 2019)	Absent/100ml	Absent/100ml

It was observed from above Ground water sampling results that pH of the water samples are neutral (7.16) to slightly alkaline (7.85). The hardness (as CaCO3) ranges from 58 to 286 mg/l, TDS ranges from 126 to 498 mg/l. Fluoride concentration was observed in range from 0.2 to 0.4 mg/l. Faecal Coliform was absent in water samples. The ground water is free from toxic elements. The concentration of all the parameters fall within the permissible limits as specified for drinking water standard IS 10500:2012. Thus water as such can be used for drinking purposes in absence of better alternate source. Water is also suitable for other purposes like construction, irrigation and recreation works etc.

4.3 AIR ENVIRONMENT

4.3.1 Meteorological and Climatic Conditions

The project influence area lies in Humid Sub-Tropical to Sub-Temperate Zone. Based on the broad climatic conditions, the year may be divided into four major seasons, winter, summer, monsoon and post monsoon.

Winter Season

The duration of winter season depends on the altitude; it generally lasts from December to March in most parts of the tract.

Pre-monsoon (summer)

This is almost dry period and lasts from April to June and is characterized by occasional showers.

Monsoon Season

It starts from the onset of monsoon either at the end of June or early July and lasts till end of early September.

Post-Monsoon Season

It normally lasts for less than two months during October to November and is comparatively dry.

Precipitation

The average annual rainfall in project area (Sirmaur & Shimla district) is about 1440 mm (Table 4.9). A major portion of precipitation is received during monsoon period.

Table 4.9: Type of Monsoon in study area

Rainfall	Average (mm)
SW Monsoon	1215
NE Monsoon	35
Winter	60
Summer	130
Annual	1440

Climate

The climate of the project area is sub-tropical to temperate depending upon the elevation. Four major seasons that are the winter season extends from December to March; summer season from April to June followed by the monsoon period extending from July to September end. Maximum precipitation in the form of rain occurs during July to September. Average annual rainfall in the district is about 1440 mm, out of which 84% occurs during monsoon season. During winter period rainfall also occurs

in lower hills and valleys parts. Mean maximum and minimum temperature of 30°C and 0°C respectively.

Humidity

The relative humidity of the area varies from 38 to 89%. The month of May is considered to be having the lowest humidity and higher humidity is observed during the month of August.

4.3.2 Wind Speed / Direction

Environmental Monitoring for the project was conducted in September 2019. Data received from above mentioned laboratory is enclosed as *Annexure-8* with this report. The meteorological station was installed in second week of September month for collecting weather data. It was observed that the average wind speeds was about 0.5 m/s. The dominant wind direction during monitoring period was towards South direction, followed by South-east and North. The relative humidity during the period ranged from 43% to 69%. The representative wind-rose diagram is presented below in Figure 4.16.

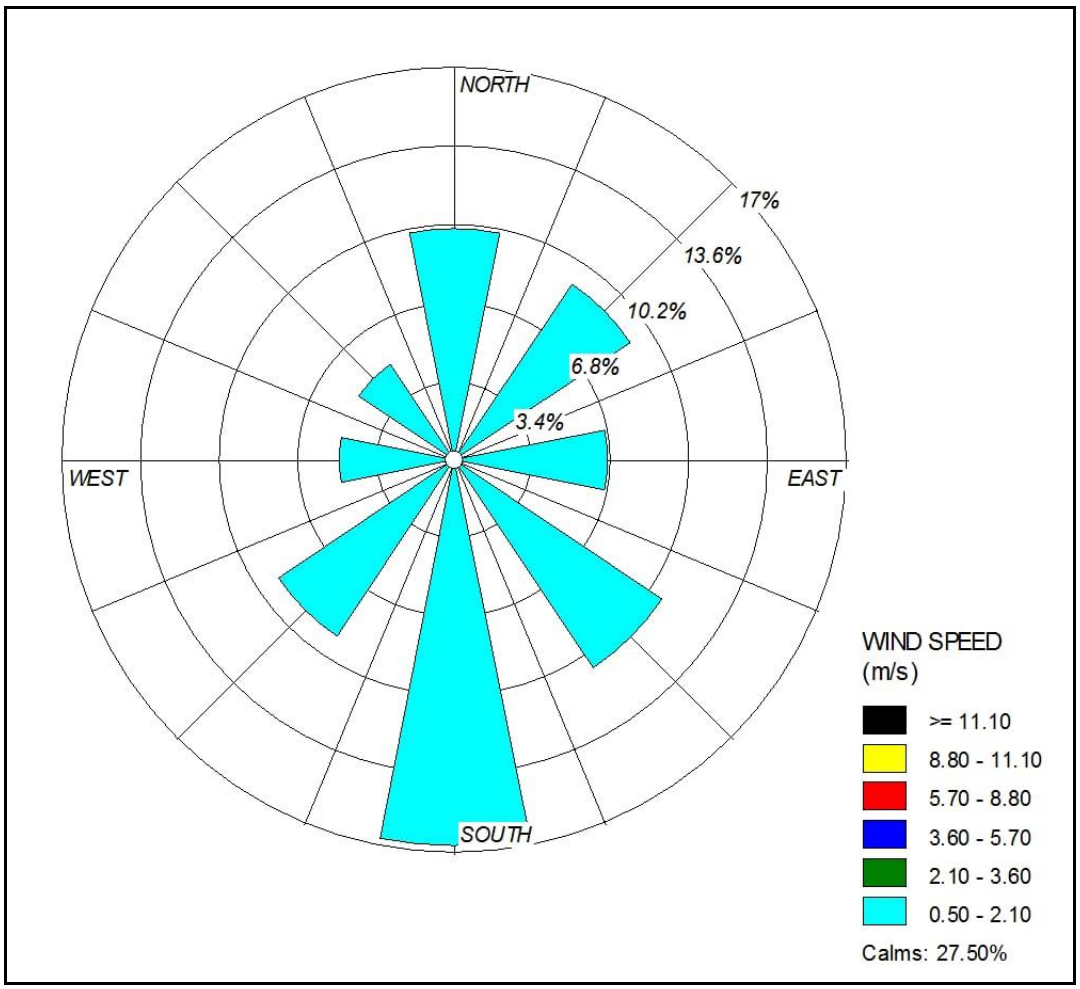


Figure 4.9 Wind-Rose Diagram for September 2019

4.3.3 Ambient Air Quality

Ambient air quality is the most important parameter that is required to quantify the impact on the natural and biophysical environment.

The major sources of existing air pollution in the region are vehicular traffic and dust arising from field / road activities as the current road condition is poor.

Evaluation of the resultant air quality due to the proposed project requires the determination of the existing air quality in terms of Particulate matter (PM_{10}), Particulate Matter ($PM_{2.5}$) Sulphur dioxide (SO_2), Nitrogen Dioxide (NO_2), Carbon monoxide (CO), Ammonia (NH_3), Ozone (O_3), Lead (Pb), Nickel (Ni), Arsenic (As), Benzene (C_6H_6) and Benzo (a) pyrene.

Table 4.10: Ambient Air Quality Locations and Selection criteria

S. No.	Sampling Location	Selection Criteria
1	Near Truck Union at KM 2/650	Commercial Area
2	Sataun at KM 18/100	Residential Area
3	Kafota at KM 40/00	Residential and Commercial Area
4	Timbi at KM 50/00	Residential Area
5	Shillai at KM 66/00	Residential and Commercial Area
6	Drabil at KM 78/00	Residential Area
7	Gumma at KM 95/00	Residential Area

The Air Quality Monitoring for the project was conducted twice in second week of September 2019 by J. P. Test & Research Centre (An NABL certified and MoEF&CC recognized laboratory). To establish the baseline air quality scenario seven representative ambient air quality monitoring stations have been selected within the study corridor covering all land use categories as per the CPCB guidelines. The map of monitoring locations is shown in Figure 4.17. Continuous 24 hours monitoring was done at a frequency of twice a week. The National Ambient Air Quality Standards (NAAQS) and ambient air quality monitoring results are presented in Table 4.11.

It was observed from results of the Ambient Air Quality analysis shown in the table 3.8 below that, PM_{10} in the study area ranges from 38 to 68 µg/m^3, $PM_{2.5}$ ranges from 15.7 to 28.2 µg/m^3, SO_2 ranges from BDL to 7.8 µg/m^3, No_2 ranges from 7.2 to 20.3 µg/m^3 and CO were ranging from 0.23 to 0.49 µg/m^3. Rest of the Parameters were within the permissible limits as per NAAQS, 2009.

The air quality is quite good in the area. Absence of any polluting source and low population density are the attributing factors for good quality of the ambient air.

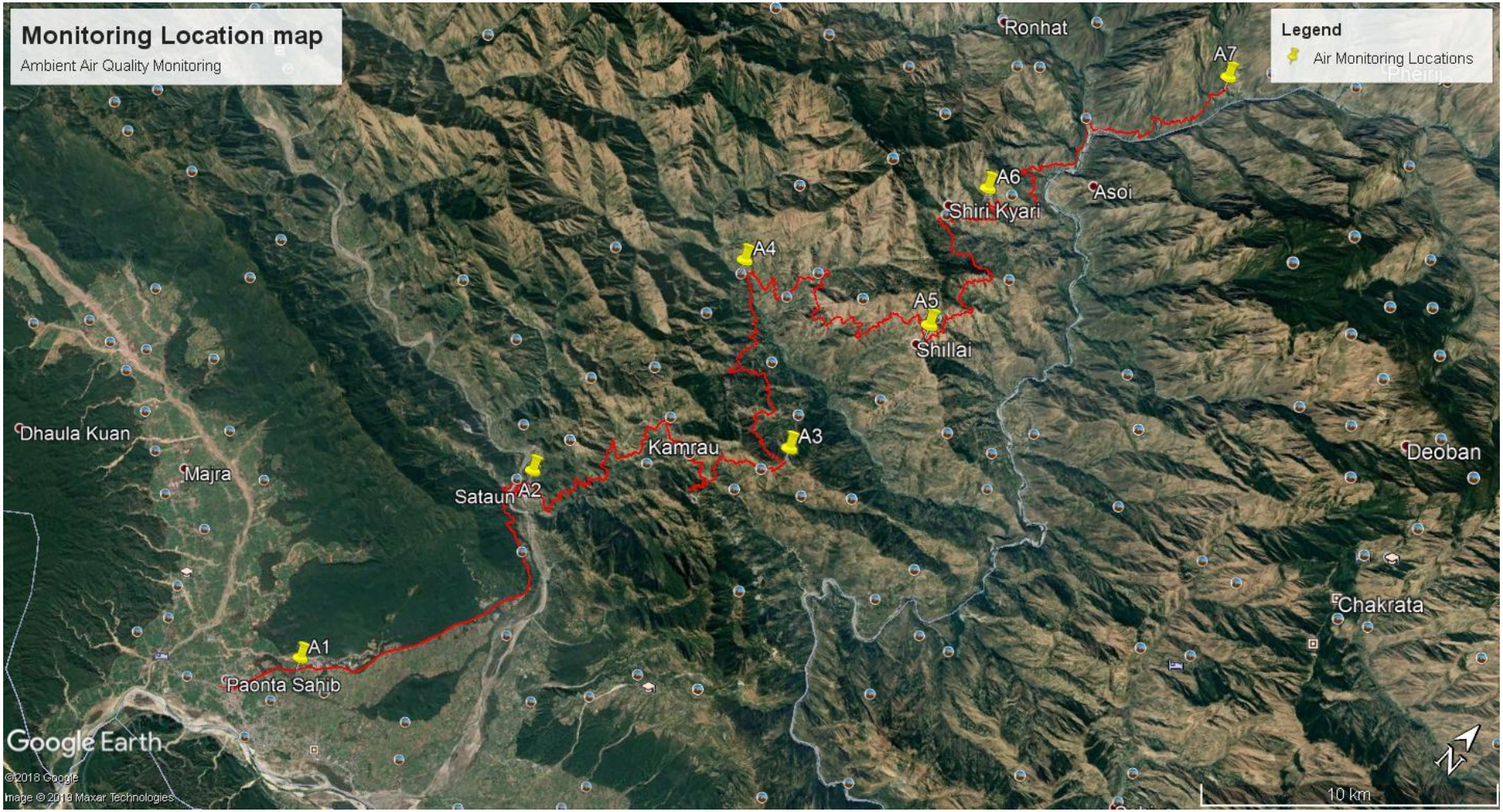


Figure 4.10 Ambient Air Quality Monitoring Location Map

Table 4.11: Ambient Air Quality along the Project Road

S. No.	Parameters	Unit	Near Truck Union at KM 2/650 (A1)		Sataun at KM 18/100 (A2)		Kafota at KM 40/00 (A3)		Timbi at KM 50/00 (A4)		Shillai at KM 66/00 (A5)		Drabil at KM 78/00 (A6)		Gumma at KM 95/00 (A7)		Test Methods
			(i)	(ii)	(i)	(ii)	(i)	(ii)	(i)	(ii)	(i)	(ii)	(i)	(ii)	(i)	(ii)	
1	Particulate Matter (Size less than 10 micron)	µg/m3	68	59	51	55	42	50	48	43	58	62	41	46	38	42	IS: 5182 (part-23): 2006, RA 2017
	98 percentile value		67.82		54.92		49.84		47.9		61.92		45.9		41.92		
2	Particulate Matter (Size less than 2.5 micron)	µg/m3	28.2	25.8	20.8	21.3	17.8	18.6	18.2	16.4	23.8	27.6	15.7	17.4	16.4	19.1	JPT/CH/SOP/AIR/06 (Gravimetric method)
	98 percentile value		28.152		21.29		18.584		18.164		27.524		17.366		19.046		
3	Sulphur dioxide (SO_2)	µg/m3	7.8	7.2	7.1	6.6	6.6	BDL (<6.5)	BDL (<6.5)	BDL (<6.5)	7.4	6.9	BDL (<6.5)	BDL (<6.5)	BDL (<6.5)	BDL (<6.5)	IS: 5182 (part-2): 2001, RA 2017
	98 percentile value		7.788		7.09		6.6		-		7.39		-		-		
4	Nitrogen Dioxide (NO_2)	µg/m3	18.5	20.3	14.2	17.8	12.4	9.8	10.4	9.1	15.6	18.2	7.6	8.9	7.2	7.6	IS: 5182 (part-6): 2006, RA 2017
	98 percentile value		20.264		17.728		12.348		10.374		18.148		8.874		7.592		
5	Ammonia (NH_3)	µg/m3	9.5	8.5	8.2	9.1	7.2	6.8	BDL (<5.0)	BDL (<5.0)	9.8	8.5	BDL (<5.0)	BDL (<5.0)	BDL (<5.0)	BDL (<5.0)	JPT/CH/SOP/AIR/07 (Indo phenol blue method)
	98 percentile value		9.48		9.082		7.192		-		9.774		-		-		
6	Ozone (O3)	µg/m3	15.4	17.2	11.5	10.3	9.5	8.7	8.2	7.8	18.4	16.3	10.4	9.6	13.2	10.5	IS: 5182 (part-09): 1974, RA 2014
	98 percentile value		17.164		11.476		9.484		8.192		18.358		10.384		13.146		

S. No.	Parameters	Unit	Near Truck Union at KM 2/650 (A1)		Sataun at KM 18/100 (A2)		Kafota at KM 40/00 (A3)		Timbi at KM 50/00 (A4)		Shillai at KM 66/00 (A5)		Drabil at KM 78/00 (A6)		Gumma at KM 95/00 (A7)		Test Methods
			(i)	(ii)	(i)	(ii)	(i)	(ii)	(i)	(ii)	(i)	(ii)	(i)	(ii)	(i)	(ii)	
7	Carbon Monoxide (CO)	µg/m$_3$	0.49	0.43	0.36	0.32	0.31	0.28	0.26	0.31	0.39	0.34	0.24	0.28	0.26	0.23	IS: 5182 (part-10): 1999, RA 2014
	98 percentile value		0.4888		0.3592		0.3094		0.309		0.389		0.2792		0.2594		
8	Lead (Pb)	µg/m^3	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	IS: 5182 (part-22): 2004, RA 2014
9	Nickel (Ni)	ng/m$_3$	ND (<10.0)	ND (<10.0)	ND (<10.0)	ND (<10.0)	ND (<10.0)	ND (<10.0)	ND (<10.0)	ND (<10.0)	ND (<10.0)	ND (<10.0)	ND (<10.0)	ND (<10.0)	ND (<10.0)	ND (<10.0)	JPT/CH/SOP/AIR/08 (AAS)
10	Arsenic (As)	ng/m$_3$	ND (<1.0)	ND (<1.0)	ND (<1.0)	ND (<1.0)	ND (<1.0)	ND (<1.0)	ND (<1.0)	ND (<1.0)	ND (<1.0)	ND (<1.0)	ND (<1.0)	ND (<1.0)	ND (<1.0)	ND (<1.0)	JPT/CH/SOP/AIR/08 (AAS)
11	Benzene (C_6H_6)	µg/m$_3$	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	IS: 5182 (part-11): 2006, RA 2017
12	Benzo (a) pyrene	ng/m$_3$	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	JPT/CH/SOP/AIR/10 (GC)

ND- Not detectable

4.4 NOISE ENVIRONMENT

Noise attributed to roads depends on factors such as traffic intensity, the type and condition of the vehicles plying on the road, acceleration/ deceleration/ gear changes by the vehicles depending on the level of congestion and smoothness of road surface (IRC: 104-1988). High noise levels are a concern for sensitive receptors, i.e. hospitals, educational institutions, etc. The Central Pollution Control Board has specified ambient noise levels for different land uses for day and night times and these are given below in Table 3.9 below. Importance was given to the timing of exposure and areas designated as sensitive.

Locations for noise monitoring along the project road were identified based on the criteria same as those used for air monitoring but the relative importance of each criterion carries a weightage in arriving at the final set of locations. In case of noise monitoring locations, sensitive land use such as schools, hospitals and religious places gains more importance due to ill effects of noise. While selecting the noise locations all types of land use in project influence area have been considered. Noise monitoring location map is shown in Figure 4.18 below. Noise quality monitoring results are presented in Table 4.12. The noise levels were monitored with Digital Sound level Meter.

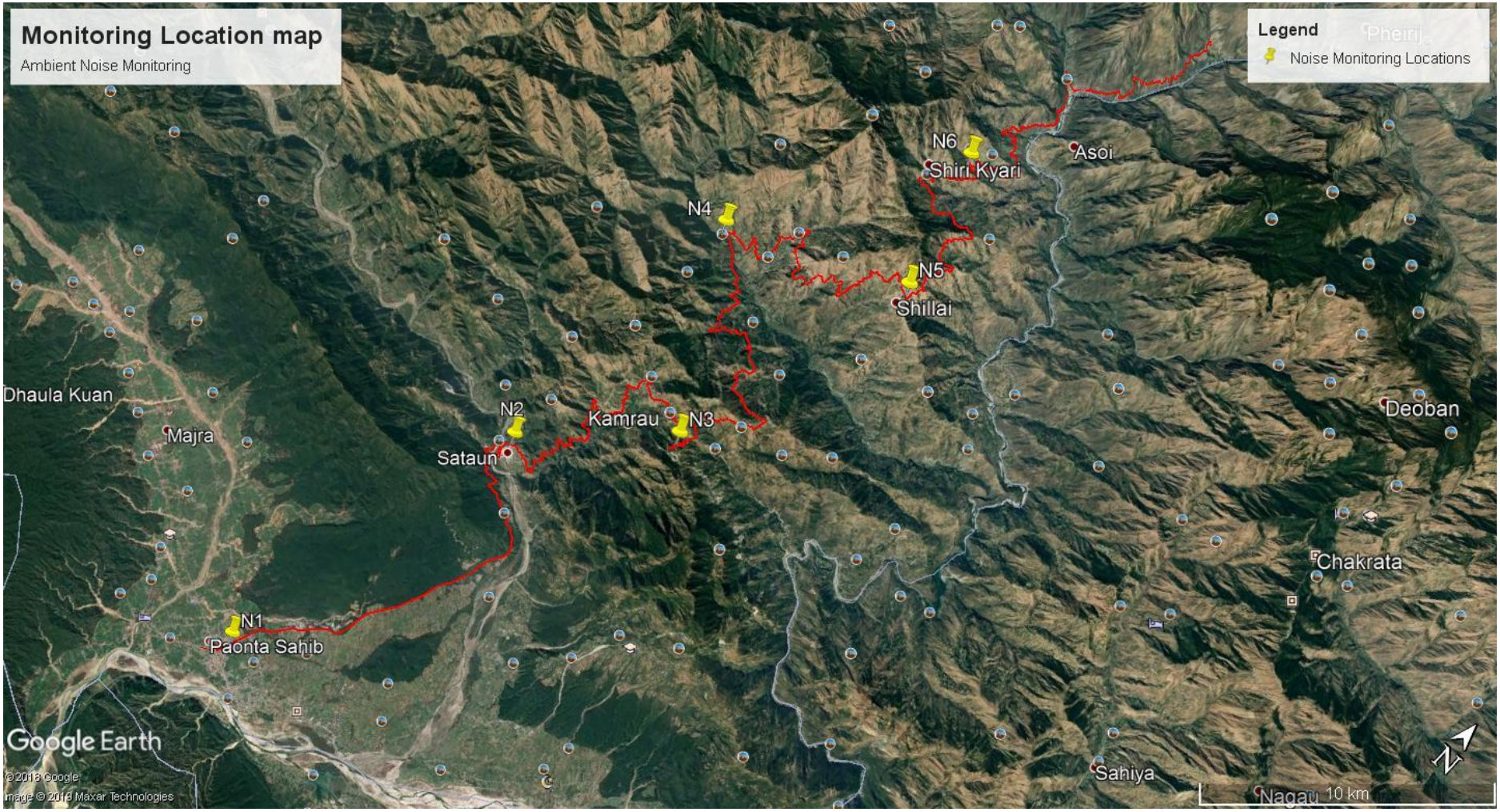


Figure 4.11 Ambient Noise Monitoring Location Map

Table 4.1: Ambient Noise Level Monitoring locations and Results

Locations	Category	Unit	Equivalent Noise Level, Leq (day*)	Equivalent Noise Level, Leq (night**)
Badripur Chowk-Paonta Sahib (N1)	Commercial	dB (A)	63.8	43.5
Satoun at KM 18/100 (N2)	Residential	dB (A)	54.2	40.7
Tilrodhar at KM 35/500 (N3)	Residential	dB (A)	49.8	39.6
Timbi at KM 50/00 (N4)	Residential	dB (A)	52.2	38.4
Shillai at KM 66/00 (N5)	Commercial	dB (A)	58.3	42.8
Drabil at KM 78/00 (N6)	Residential	dB (A)	50.2	39.5
	Test Method: IS: 9876 & JPT/CH/SOP/NSE-01			

It was found from the ambient noise level monitoring results that daytime equivalent sound level at these locations varies between 49.8 to 63.8 dB (A) and night time equivalent sound level ranges between 38.2 to 43.5 dB (A). The results of ambient noise indicate that the noise levels in respective category area are within prescribed limits.

4.5 BIO-ENVIRONMENT

This constitutes the flora, fauna and ecosystems along the project road considered in this report. The bio environment constitutes one of the most important elements of the conservation requirement of the State.

4.5.1 Flora

The natural vegetation follows a climatic altitudinal zonation. In the altitude range of 300-900m, as in Rajban, the vegetation is tropical and subtropical in character. 'Sal' is the main species of the broad leaved hill forest. The important species of plants found in the project study area are: *Shorea robusta* (Sal), *Alnus glutinosa* (Alder), *Albizzia Lebbek* (Siris), *Dalbergia sissoo* (Shisham), *Adina cordifolia* (Holdu), *Sygegium cumini* (Jamun), *Terminali tomentosa (Asin), Akhrot (Juglans nigra), Cheed (Pinus roxburghi) and Deodar (Cedrus deodara).*

The list of species found commonly in the project study area is given **Table 4.13**:

Table 4.13: List of Species Found in the project study area

S. No.	Local/ Common Name	Botanical Name
1	Amaltash	Cassia fistula
2	Alder	*Alnus glutinosa*
3	Holdu	*Adina cordifolia*
4	Bargad	*Ficus benghalensis*
5	Karanj	*Pongamia pinnata*
6	Kachanar	*Bauhinia variegata*
7	Peepal	*Ficus religiosa*
8	Paapadi	*Terminalia catappa*
9	Poplar	*Populus sp.*
10	Reetha	*Sapindus sp.*
11	Shahtut	*Morus alba*
12	Shahjan	*Moringa Oleifera*
13	Siris	*Albizia lebbeck*
14	Sheesham	*Delbergia sissoo*
15	Saal	*Shorea robusta*
16	Safeda	*Eucalyptus globulus*
17	Deodar	*Cedrus deodara*
18	Cheed	*Pinus roxburghi*
19	Toon	*Toona ciliata*
20	Jamun	*Syzgium cumini*
21	Neem	*Azadirecta indica*
22	Nashpaati	*Pyrus communis*
23	Akharot	*Juglans nigra*
24	Amarud	*Psidium guajava*
25	Mango	*Mangifera indica*
26	Ashok	*Saraca asoca*
27	Anaar	*Punica protopunica*
28	Gulmohar	*Delonix regia*
29	Gular	*Ficus racemosa*
30	Erand	*Ricinus communis*
31	Kher	*Acacia catechu*
32	Bela	*Aegle marmelos*
33	Paakad	*Ficus virens*
34	Sagwan	*Tectona grandis*
35	Asin	*Terminali tomentosa*

Shrubs

S. No.	Local Name	Botanical Name

S. No.	Local Name	Botanical Name
1	Baisingu	*Adhatoda zeylanica Medik*
2	Rambans	*Agave cantula Roxb.*
3	Karaunda	*Carissa spinarum L.*
4	Sulla, Surai	*Euphorbia royleana Boissier*
5	Kali tulasi	*Ocimum canum Sims*
6	Kingrei	*Mimosa himalayana*
7	Timroo	*Zanthoxylum armatum DC*
8	Ber	*Ziziphus nummularia*

Herbs/ Grasses

S. No.	Local Name	Botanical Name
1	Mugwort	*Artemisia capillaris Thunb.*
2	Tinta	*Arundo donax L.*
3	Wild oat	*Avena fatua L.*
4	Bhang	*Cannabis sativa L.*
5	Bathuwa	*Chinopodium album L.*
6	Vetiver grass	*Chrysopogon zizanioides*
7	Gajar ghas	*Parthenium hysterophorus*
8	Mountain knotgrass	*Aerva lanata*
9	Mauritian grass	*Apluda mutica*

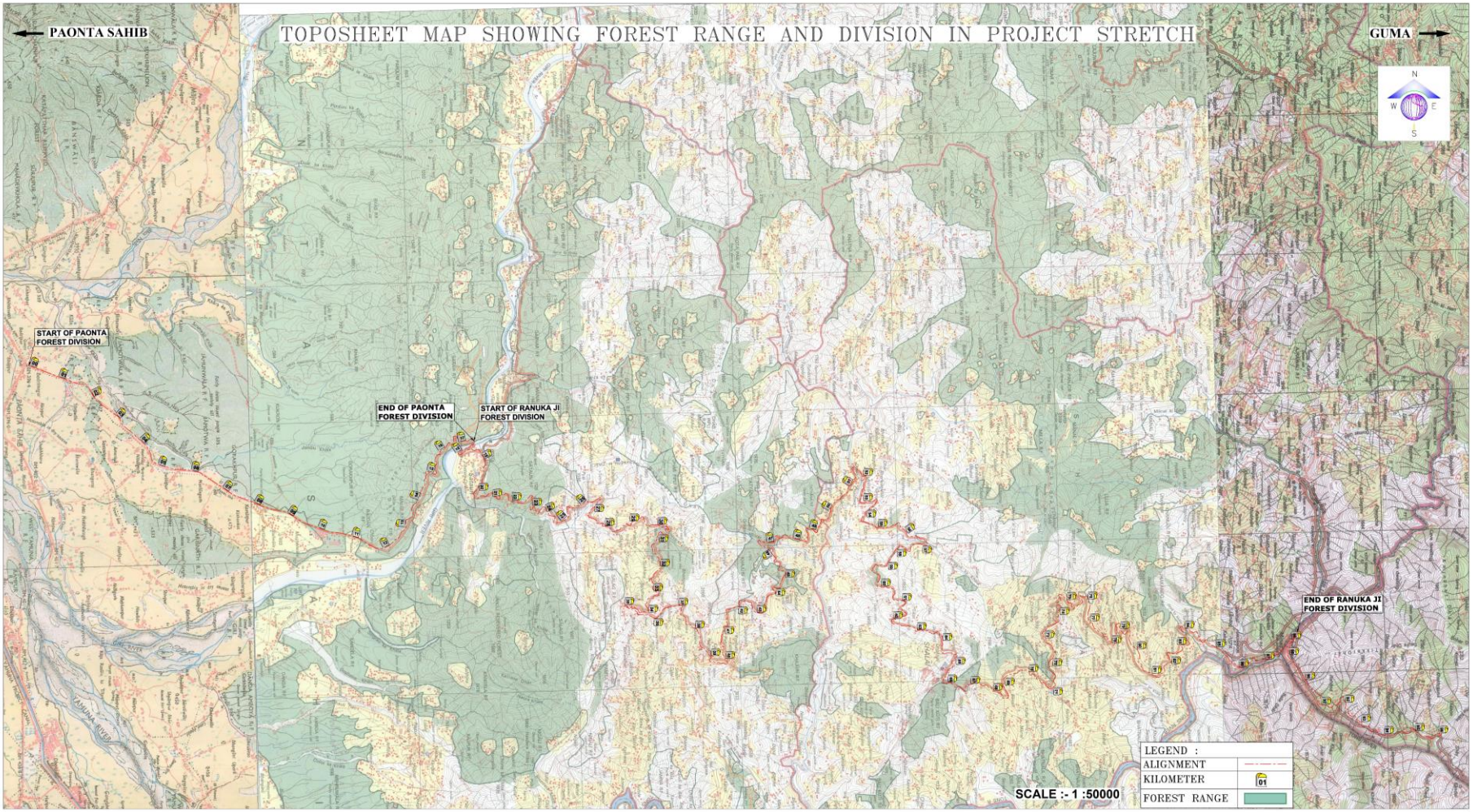
As per Red Data Book of India, no rare and endangered tree species are reported from the project study area.

4.5.2 Forests

The project and its adjoining area comes under 'Tropical Dry Deciduous Forests' with sub group as 'Northern Tropical Dry Deciduous Forests'.

The project study area is crossing two forest divisions of Sirmaur district namely Paonta sahib forest division and Renuka ji forest division. SOI Toposheet map of project alignment showing forest areas is given below:

Figure 4.19: Topo-sheet Map showing Forest area with project alignment



Tree likely to be felled on the Non Forest Land are given in **Table 4.14.**

Table 4.14: Tree likely to be felled on the Non Forest Land

S. No.	Local Name	Botanical Name	Girth Size (mm)				Total Tree
			300-600	600-900	900-1800	1801<	
1	Erand	*Ricinus communis*	1	-	-	-	1
2	Dhashan		1	1	-	-	2
3	Khadig	*Celtis australis*	66	49	27	2	144
4	Khoyad		3	1	-	-	4
5	Kher	*Acacia catechu*	3	1	1	-	5
6	Huidev		1	-	-	-	1
7	Baragad	*Ficus benghalensis*	-	1	3	1	5
8	Beda	*Terminalia bellirica*	-	-	1	-	1
9	Bela	*Aegle marmelos*	-	-	1	-	1
10	Kainch	*Pyrus pashia*	-	-	1	-	1
11	Karanj	*Pongamia pinnata*	2	5	4	-	11
12	Kakadav		-	-	1	-	1
13	Keemu	*Morus alba*	2	2	-	-	4
14	Kangu	*Flacourtia indica*	1	-	-	-	1
15	Kokhodeja		14	5	-	-	19
16	Kou	*Olea cuspidata*	11	4	2	-	17
17	Kachanar	*Bauhinia variegata*	20	15	22	2	59
18	Kurud	*Carissa opaca*	1	-	-	-	1
19	Kuramuri		1	-	-	-	1
20	Kook	*Morus serrata*	1	-	1	-	2
21	Jingan	*Lannea coromandelica*	16	6	3	1	26
22	Kinad		3	-	2	-	5
23	Pirpiriya	*Phanera purpurea*	1	-	-	-	1
24	Singeed		34	27	12	-	73
25	Chhinnan		2	5	2	-	9
26	Haldu	*Haldina cordifolia*	-	-	1	-	1
27	Badadar		3	5	1	-	9
28	Peepal	*Ficus religiosa*	-	1	2	3	6
29	Paakad	*Ficus virens*	13	7	8	-	28
30	Paapadi	*Terminalia catappa*	5	5	1	-	11
31	Papular	*Populus sp.*	26	8	2	-	36

S. No.	Local Name	Botanical Name	Girth Size (mm)				Total Tree
			300-600	600-900	900-1800	1801<	
32	Paja	*Prunus cerasoides*	26	10	2	1	39
33	Padag	*Acer oblongum*	1	4	-	-	5
34	Reetha	*Sapindus sp.*	1	1	-	-	2
35	Raini		29	17	5	-	51
36	Shevari		13	3	-	-	16
37	Shamalu	*Vitex negundo*	25	6	1	-	32
38	Shahora		2	2	-	-	4
39	Shahtut	*Morus alba*	6	2	7	-	15
40	Shahjan	*Moringa Oleifera*	3	3	1	-	7
41	Siris	*Albizia lebbeck*	11	20	14	1	46
42	Sheesham	*Delbergia sissoo*	17	15	11	6	49
43	Sharu	*Cupressus torulosa*	4	2	-	-	6
44	Shama		20	2	-	-	22
45	Saagvan	*Tectona grandis*	27	19	9	-	55
46	Saal	*Shorea robusta*	2	3	4	2	11
47	Safeda	*Eucalyptus globulus*	2	13	46	10	71
48	Shemar	*Bombax ceiba*	6	4	12	2	24
49	Apple	*Pyrus Malus*	1	-	-	-	1
50	Dakano		4	1	2	-	7
51	Dijal		-	1	-	-	1
52	Dek	*Melia azedarach*	4	5	1	-	10
53	Darud	*Punica granatum*	1	3	2	-	6
54	Chen		3	6	2	-	11
55	Dudila	*Excoecaria agallocha*	2	1	-	-	3
56	Devdar	*Cedrus deodara*	62	19	20	1	102
57	Chanan		41	6	2	-	49
58	Vyur	*Grewia optiva*	56	39	15	4	114
59	Ban	*Quercus incana*	79	17	15	3	114
60	Besh		-	2	-	-	2
61	Beli	*Limonia acidissima*	1	-	-	-	1
62	Bandi		2	-	-	-	2
63	Chamareda	*Ehretia laevis*	1	-	-	-	1
64	Cheed	*Pinus roxburghi*	322	117	23	4	466
65	Chukotara		1	-	-	-	1
66	Chullu	*Lonicera angustifolia*	-	-	1	-	1
67	Feguda	*Ficus racemosa*	4	3	1	-	8
68	Tutadi		1	1	-	1	3
69	Tun	*Toona ciliata*	92	64	29	2	187

S. No.	Local Name	Botanical Name	Girth Size (mm)				Total Tree
			300-600	600-900	900-1800	1801<	
70	Jangali	*Rumex nepalensis*	2	2	1	-	5
71	Jamua	*Syzygium cumini*	4	2	-	-	6
72	Jamun	*Syzygium cumini*	8	7	2	1	18
73	Neem	*Azadirecta indica*	3	-	-	-	3
74	Nashapaati	*Pyrus communis*	7	-	-	-	7
75	Nona	*Annona reticulata*	2	1	-	-	3
76	Akharot	*Juglans nigra*	18	9	1	1	29
77	Amarud	*Psidium guajava*	6	2	-	-	8
78	Mango	*Mangifera indica*	6	12	34	41	93
79	Ashok	*Saraca asoca*	3	-	-	-	3
80	Ornamental		-	2	1	-	3
81	onu		1	-	-	-	1
82	Aanwala	*Phyllanthus emblica*	4	1	1	-	6
83	Anaar	*Punica protopunica*	4	1	-	-	5
84	Gudiyal	*Bauhinia purpurea*	1	1	-	-	2
85	Gudish		1	1	-	-	2
86	Gulmohar	*Delonix regia*	2	2	1	-	5
87	Gular	*Ficus racemosa*	160	72	29	2	263
88	Labhera		1	-	-	-	1
89	Lashara	*Cordia dichotoma*	15	1	-	-	16
	Total		**1351**	**675**	**393**	**91**	**2510**

Source: Tree counting survey, CEG 2018

Tree likely to be felled on the Forest Land to be diverted in Paonta Sahib Forest Division are given in Table 4.15.

Table 4.15: Tree likely to be felled on the Forest Land to be diverted in Paonta Sahib Forest Division

Sr. No.	Species (Local Name by Forest Department)	Botanical Name	Number
I.	**Mantaruwala RF**		
1	Sal	*Shorea robusta*	46
2	Kokat	*Misc. Species*	25
3	sheesham	*Dalbergia sissoo*	2
4	Eucalyptus	*Eucalyptus globulus*	1
5	Mango	*Mangifera indica*	26
6	peepal	*Ficus religiosa*	3

Sr. No.	Species (Local Name by Forest Department)	Botanical Name	Number
7	Toon	*Toona ciliata*	3
	Total		106
II.	Jamukhala RF		
1	Sal	*Shorea robusta*	11
2	Kokat	*Misc. Species*	38
	Total		49
III	Gorakhpur RF		
1	Sal	*Shorea robusta*	95
2	Kokat	*Misc. Species*	72
3	Khair	*Acacia catechu*	2
4	Sheesham	*Dalbergia sissoo*	2
5	Sagwan	*Tectona grandis*	50
6	Toon	*Toona ciliata*	4
7	Eucalyptus	*Eucalyptus globulus*	3
8	Mango	*Mangifera indica*	11
9	Peepal	*Ficus religiosa*	1
	Total		240
IV	Rajban C-4		
1	Kokat	*Misc. Species*	58
	Total		58
V	RF-Rajban C-5		
1	Sal	*Shorea* robusta	4
	Total		4
VI	RF-Rajban C-6		
	Sal	*Shorea* robusta	11
1	Kokat	*Misc. Species*	35
	Total		46
VII	RF-Malgi C-15		
	Sal	*Shorea* robusta	11
	Total		11
VIII	Sarah RF C-10		
1	Kokat	*Misc. Species*	12
2	Shisham	*Dalbergia sissoo*	4
3	Khair	*Acacia catechu*	2
	Total		18
IX	Gorakhpur RF C-15		
1	Sal	*Shorea robusta*	34
2	Kokat	*Misc. Species*	77
3	Shisham	*Dalbergia sissoo*	1
4	Toon		7

Sr. No.	Species (Local Name by Forest Department)	Botanical Name	Number
5	Eucalyptus	*Eucalyptus globulus*	2
6	Mango	*Mangifera indica*	27
7	Poplar	*Populus sp.*	49
	Total		197
X	RF -Rajban C-3		
1	Sal	*Shorea robusta*	6
2	Kokat	*Misc. Species*	268
3	Shisham	*Dalbergia sissoo*	2
4	Eucalyptus	*Eucalyptus globulus*	3
	Total		279
	Grand Total		1008

Source: Tree counting survey, CEG 2018

Tree likely to be felled on the Forest Land to be diverted in Renuka ji Forest Division are given in **Table 4.16.**

Table 4.16 : Tree likely to be felled on the Forest Land to be diverted in Renuka ji Forest Division

Sr. No.	Species (Local Name by Forest Department)	Botanical Name	Number
I.	**RF Tatiya C-4**		
1	Chil	*Pinus roxburghi*	21
2	Kokath	*Misc. Species*	7
	Total		28
II.	**RF Sataun C-2, C-3 & C-4**		
1	Kokath	*Misc. Species*	64
2		*Bombax ceiba*	8
3	Sal	*Shorea robusta*	18
4	Khair	*Acacia catechu*	86
5	Sheesham	*Dalbergia sissoo*	2
	Total		178
III.	**RF Chiyali C-5, Shillai Beat**		
1	Chil	*Pinus roxburghi*	33
2	Kokath	*Misc. Species*	4
	Total		37
IV.	**RF Bhatnol C-5, Beat Bhatnol, Block Shillai**		
1	Deodar	*Cedrus deodara*	29
	Total		29
V.	**RF Gorakhpur C-10**		

Sr. No.	Species (Local Name by Forest Department)	Botanical Name	Number
1	Sal	Shorea robusta	4
	Total		4
VI.	**RF-Malgi C-27, 26, 25, 23, 18, 15, 9, 24**		
1	Sal	*Shorea robusta*	72
2	Asin	*Terminalia tomentosa*	1
3	Amaltas	*Cassia fistula*	1
4	Jamun	*Sygegium cumini*	2
5	Shisham	*Dalbergia sissoo*	1
	Total		78
VII.	**RF-Rajban C-5**		
1	Sal	*Shorea* robusta	3
	Total		3
VIII.	**RF-sarah C-10**		
1	Amaltas	*Cassia* fistula	1
	Total		1
	Total		**357**

Source: Tree counting survey, CEG 2018

Hence total Forest Trees to be felled under paonta sahib and Renuka Ji forest division comes out to be 1008+357= 1365 Nos.

4.5.3 Protected Areas

The existing net work of protected areas (PA's) in Himachal Pradesh has 32 Wildlife sanctuaries (5664 sq.km) and two National parks (1440 sqkm) covering a total geographical area of 7,104 sq.km. However, there is no wildlife sanctuary/national park within 10 km aerial distance from the alignment of project road. Nearest wildlife sanctuary/national park is RenukaJi located at 13.8 Km from the project road at Sataun.

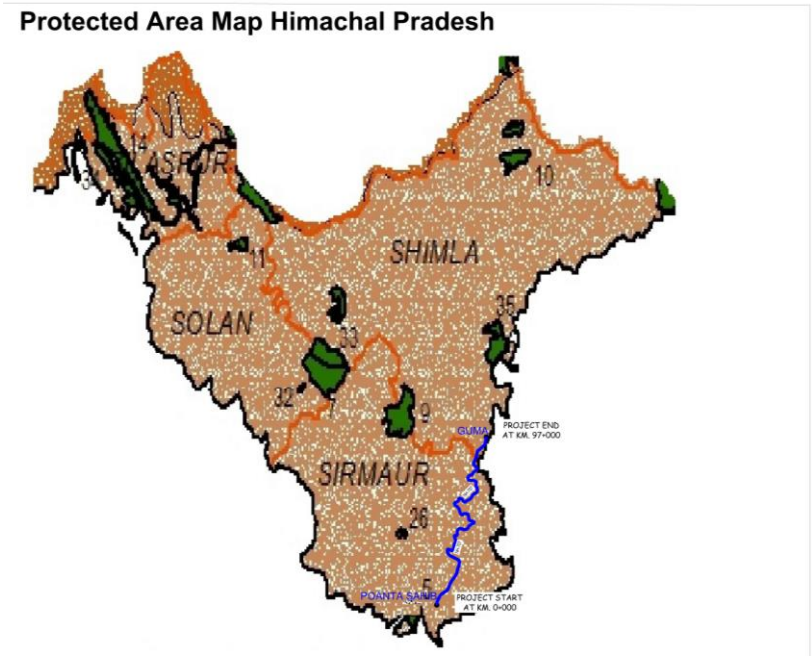


Figure 4.20: Protected area map of project study area (Wildlife Institute of India)

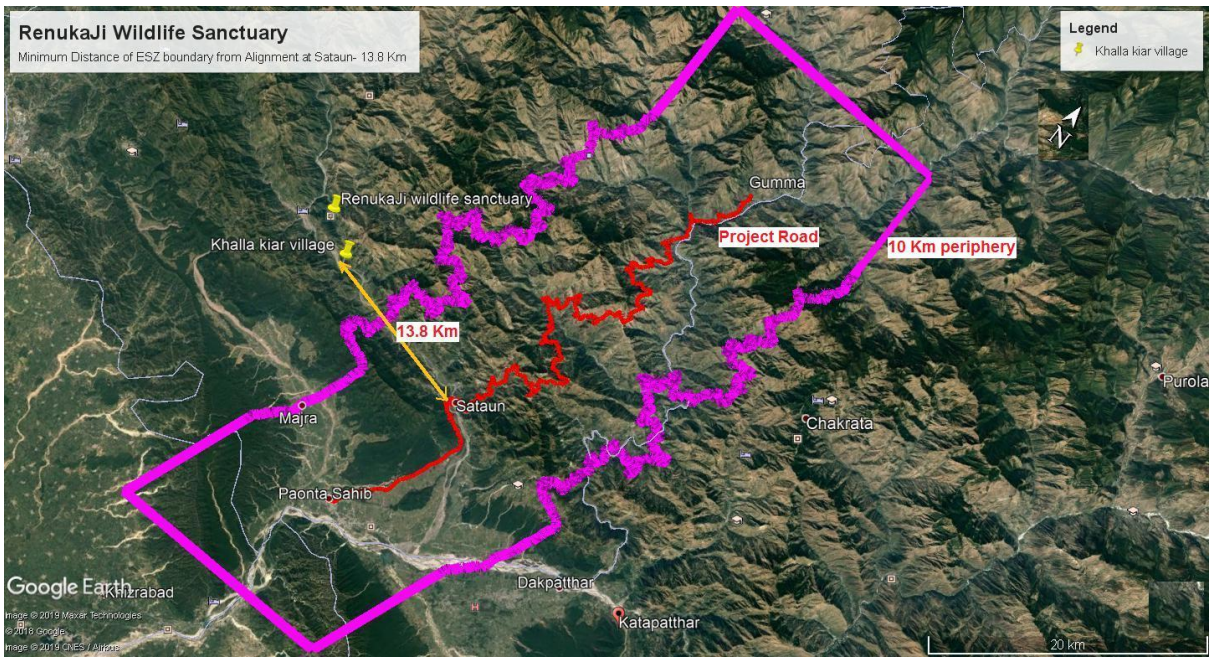


Figure 4.21: Showing nearest WLS (Renuka Ji) from project alignment with 10 Km Periphery marked on google map

4.5.4 Fauna

Himachal pradesh is inhabited by about 107 mammalian species, more than 400 bird species and more than 30 species of herpetofauna. The fauna of state shows a strong affinity with Palaearctic and Oriental biogeographic realms. A few species are of Ethiopian and Australian realms. The species like Ursus arctos and Canis lupus is common in Himalaya and belongs to Palaearctic region, whereas species like Felis bengalensis, F. Chaus and Panthera pardus are distributed in the region with affinities to the Oriental realm. A few species of mammals of this region (Vulpes vulpes and Sus scrofa) show affinity with Ethiopian fauna.

A total of 4,307 living species of mammals have been reported for the world, of which 390 occur in India (Agrawal, 1998). Of the 390 mammalian species of India, about 107 species belonging to 25 families are found in Himachal Pradesh. The region is covered under the bio-geographical province Northwest 2A and West 2B (Rodgers and Panwar, 1988).

Methodology: A field survey was carried out on 10 km study area of the project road during baseline data collection. Forest range officers of Paonta sahib and Renuka ji forest division were consulted for wild animal's occurrence in the study area. The identification of avian fauna was made on the basis of available literature (Ali 1962, Gasten 1978 and Grimmett et al., 2000). Interviews with the villagers and local people were also made to generate information about wild animals and avian fauna. The secondary data and reported list of wild life were also consulted. The ecological status of the wild animals was categorized following IUCN Red Data Book and Wildlife Protection Act (WPA) 1972.

A total of 13 species of mammals has been reported for the project area. Most of the species are of least concern except the Panthera pardus (Leopard), which is of vulnerable category and placed in Schedule I of the Wildlife Protection Act 1972. Two species of lizards and four species of snakes have also been reported for the project area. Three species of amphibians have also been observed in the project area.

4.5.4.1 Reptiles & Amphibians

Out of the species of reptiles recorded (**Table 4.17**), two species of lizard i.e. Monitor Lizard, and Common Garden Lizard are reported common in occurrence. Among reptiles, four species of snake such as Indian krait, Russell's viper, Indian Cobra and Rat Snake recorded in study area also. Out of that, Monitor lizard is listed in Schedule I and Indian cobra is listed in Schedule II of the Indian Wildlife (Protection) Act

1972. None of the reptile species is present in the IUCN Red List of Threatened Animals.

List of Species of Reptiles Recorded in the Study Area are given in Table 4.17.

Table 4.17: List of Species of Reptiles Recorded in the Study Area

S. No.	Zoological Name	Common Name	Conservation Status as per IUCN	Wildlife Protection Act, 1972
1	*Daboia russelii*	Russell's Viper	LC	Schedule II
2	*Bungarus caeruleus*	Indian Krait	LC	Schedule IV
3	*Varanus spp.*	Monitor Lizard	VU	Schedule I
4	*Calotes versicolor*	Indian Garden Lizard	LC	Schedule IV
5	*Ptyas mucosa*	Rat Snake/dhaman	LC	Schedule II
6	*Naja naja*	Indian Cobra	VU	Schedule II
	Amphibians			
1	*Amolops formossuss*	Stream frog	LC	Schedule IV
2	*Bufo stomaticus*	Marbled Toad	LC	Schedule IV
3	*Rana vicina*	Stoliczka's Frog	LC	Schedule IV

LC=Least Concern, VU=Vulnerable

4.5.4.2 Birds

There are many river channels present in the study area which are the major attraction sites for avifauna. Birds like Himalayan Bulbul, Red Vented bulbuls, Purple Sunbird, Rufous Tree Pie, White Capped Water Redstart, Whistling Thrush, Red Jungle Fowl, Parakeet, and Common Myna are commonly found.

Many species of birds found in the study area (Table 4.18). Most of the species of birds are protected as their respective families have been listed under Schedule IV of Indian Wildlife (Protection) Act 1972 and no IUCN red listed endangered, threatened and vulnerable species of birds are recorded in the study area.

Table 4.2: Species of Birds Found in the Study Area

S. No.	Zoological Name	Common name	Conservation Status as per IUCN	Wildlife Protection Act, 1972
1	*Psittacula himalayana*	Slaty-headed Parakeet	LC	Schedule IV

S. No.	Zoological Name	Common name	Conservation Status as per IUCN	Wildlife Protection Act, 1972
2	*Muscicapa dauurica*	Red-throated Flycatcher	LC	Schedule IV
3	*Streptopelia chinensis*	Spotted Dove	LC	Schedule IV
4	*Lanius schach*	Long-tailed Shrike	LC	Schedule IV
5	*Dicrurus macrocercus*	Black Drongo	LC	Schedule IV
6	*Acridotheres tristis*	Common Myna	LC	Schedule IV
7	*Glaucidium radiatum*	Jungle Owlet	LC	Schedule IV
8	*Pyconotus leucogenys*	Himalayan Bulbul	LC	Schedule IV
9	*Psittacula himalayana*	Slaty-headed Parakeet	LC	Schedule IV
10	*Passer domesticus*	House Sparrow	LC	Schedule IV
11	*Francolinus francolinus*	Black Francolin	LC	Schedule IV
12	*Gallus gallus*	Red Jungle Fowl	LC	Schedule IV
13	*Anas strepera*	Gadwal	LC	Schedule IV
14	*Upupa epops*	Common Hoopoe	LC	Schedule IV
15	*Dendrocopos macei Fulvous*	breasted Pied Woodpecker	LC	Schedule IV
16	*Milvus migrans*	Black Kite	LC	Schedule IV
17	*Accipiter badius*	Shikra	LC	Schedule IV
18	*Urocissa erythrorhyncha*	Red-billed Blue Magpie	LC	Schedule IV
19	*Hemipus picatus*	Bar-winged Flycatcher	LC	Schedule IV
20	*Pericrocotus etholotus*	Long-tailed Minivet	LC	Schedule IV
21	*Dicrurus hottentottus*	Spangled Drongo	LC	Schedule IV
22	*Myophonus caeruleus*	Blue Whistling Thrush	LC	Schedule IV
23	*Saxicola torquata*	Common Stonechat	LC	Schedule IV

S. No.	Zoological Name	Common name	Conservation Status as per IUCN	Wildlife Protection Act, 1972
24	*Enicurus maculatusi*	Spotted Forktail	LC	Schedule IV
25	*Rhyacornis fuliginosus*	Plumbeous Water Redstart	LC	Schedule IV

4.5.4.3 Mammals

Inquiry from village people near forest areas during baseline data collection regarding wild animals reveals that Rhesus macaque, Indian hare, fruit bat, etc. are often seen in the area. As per discussed with Forest Range officers of paonta sahib and Renuka ji division it was found that wild animals like Nilgai, Wild boar, Barking deer, jackal, Jungle cat, Samber deer and Leopard are seen in the project study area.

Distribution of monkeys is throughout the project road. Public consultations revealed that monkeys are found often near habitation areas in search of food.

As per reported by forest officials, Wild animals as Nilgai, Wild boars, jackals, Jungle cats and Samber deer are found in the forest areas along the project road. Leopard is mostly seen in between taal sirmaur and rajban forest range in paonta sahib forest division. In renuka ji division leopard is sighted in kafota and shillai range forests. The leopard crossing zone in the project alignment is marked on the Toposheet of the study area and presented in the respective figures in the subsequent section.

Table 4.3: List of Mammal species recorded in the study area

S. No	Zoological Name	Common Name	Conservation Status	Wildlife Protection Act, 1972
1	*Macaca mulatto*	Rhesus Macaque	LC	Schedule II
2	*Semnopithecus entellus*	Common Langur	NT	Schedule II
3	*Lepus nigricollis*	Indian Hare	LC	Schedule IV
4	*Funambulus pennanti*	Five-striped Palm Squirrel	LC	Schedule IV
5	*Pteropus giganteus*	Indian Flying Fox (Bat)	LC	Schedule V
6	*Munticacus munrjak*	Barking deer	LC	Schedule III
7	*Cervvus unicolor*	Samber deer	VU	Schedule III
8	*Boselaphus*	Nilgai	LC	Schedule III

S. No	Zoological Name	Common Name	Conservation Status	Wildlife Protection Act, 1972
	tragocamelus			
9	*Panthera pardus*	Leopard	VU	Schedule I
10	*Canis aureus*	Jackal	LC	Schedule II
11	*Felis chaus*	Jungle cat	LC	Schedule II
12	*Sus scrofa*	Wild boar	LC	Schedule III
13	*Hystrix indica*	Indian Porcupine	LC	Schedule II

LC=Least Concern, VU=Vulnerable, NT=near threatened

Leopard crossing zone at Range Rajban, Range Kafota Range Shillai are shown in **Figure 4.22. Figure 4.23**, and **Figure 4.24**, respectively.

Figure 4.22: Leopard crossing zone at Range Rajban

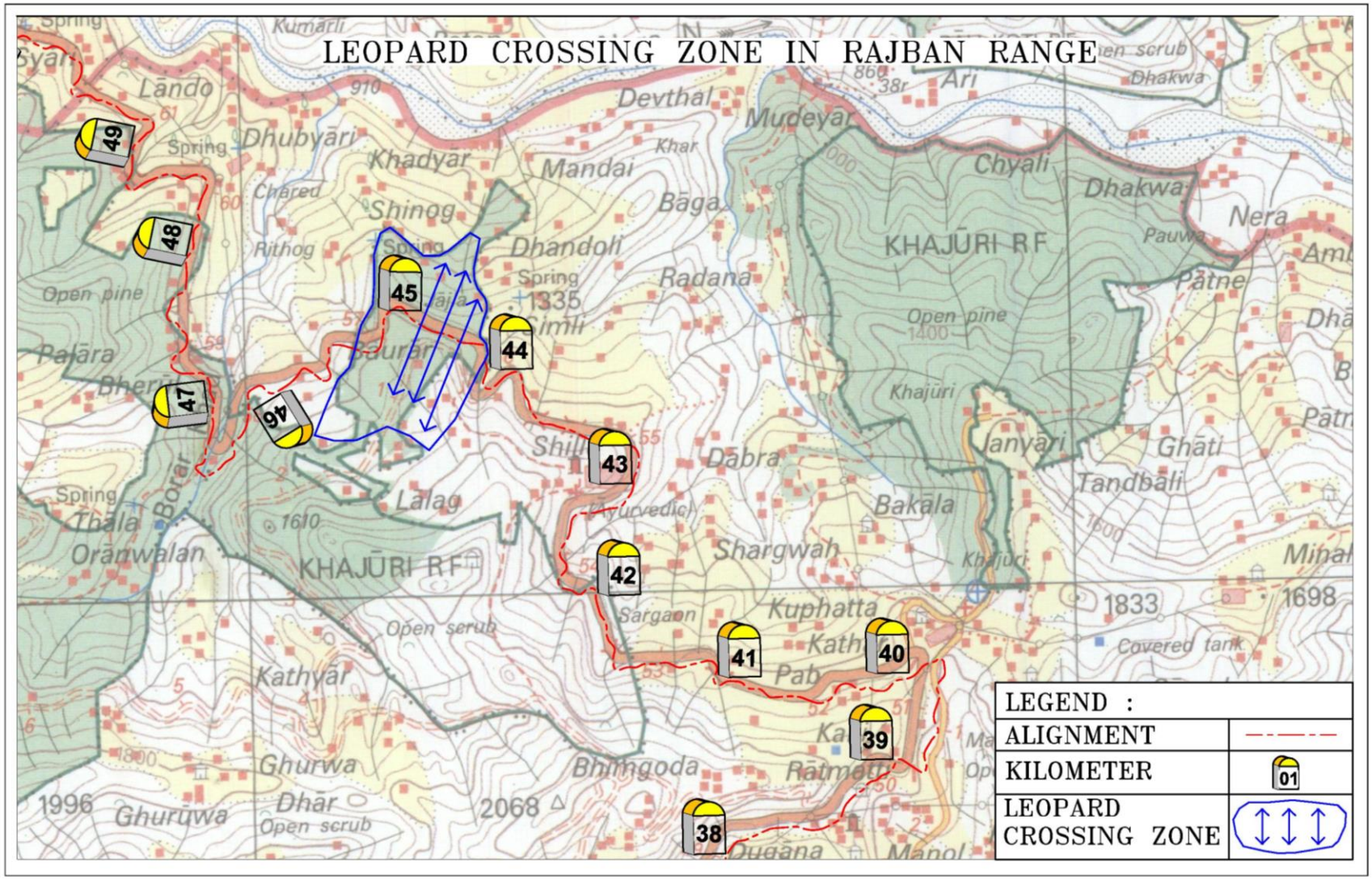


Figure 4.23: Leopard crossing zone at Range Kafota

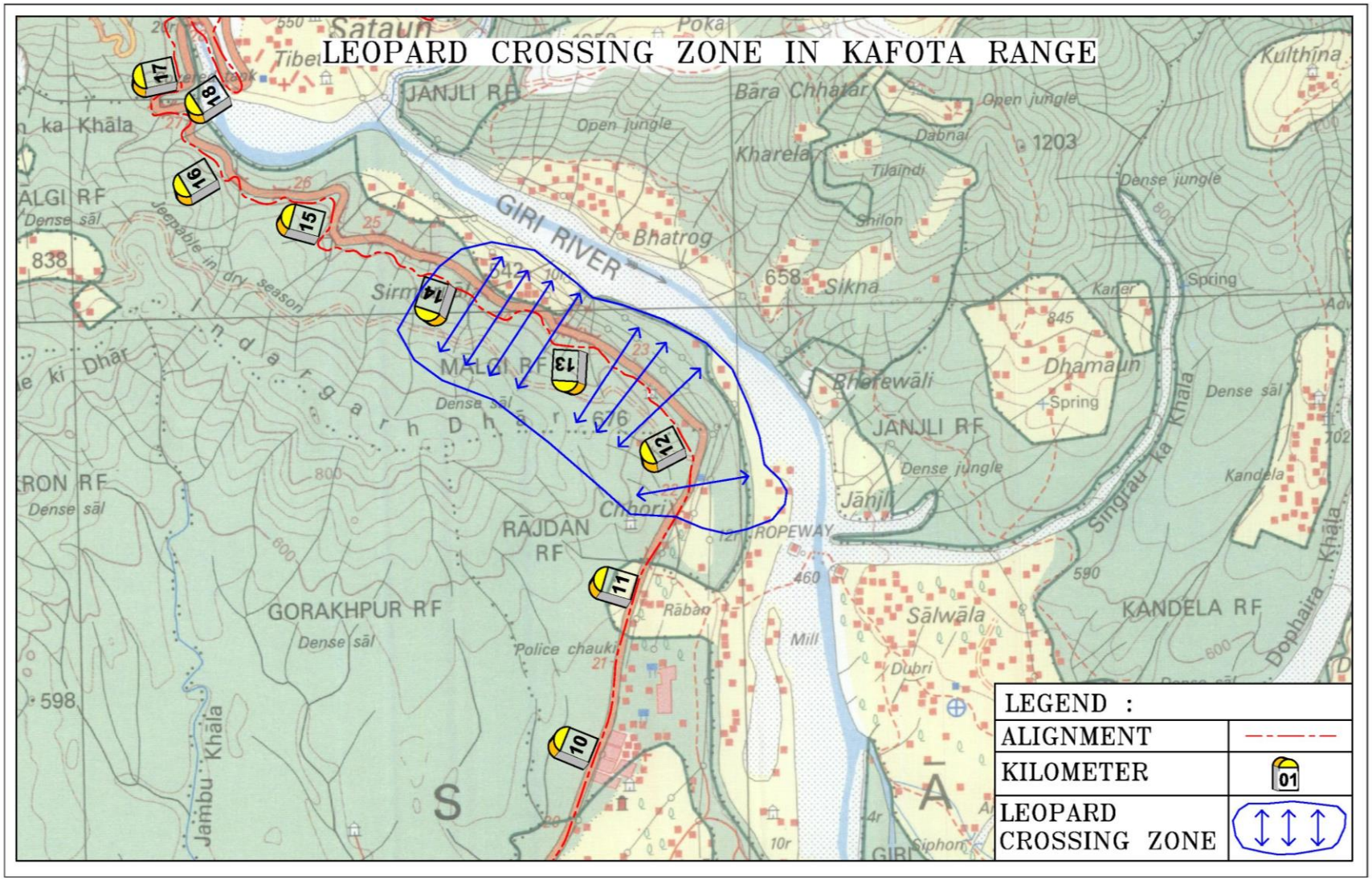
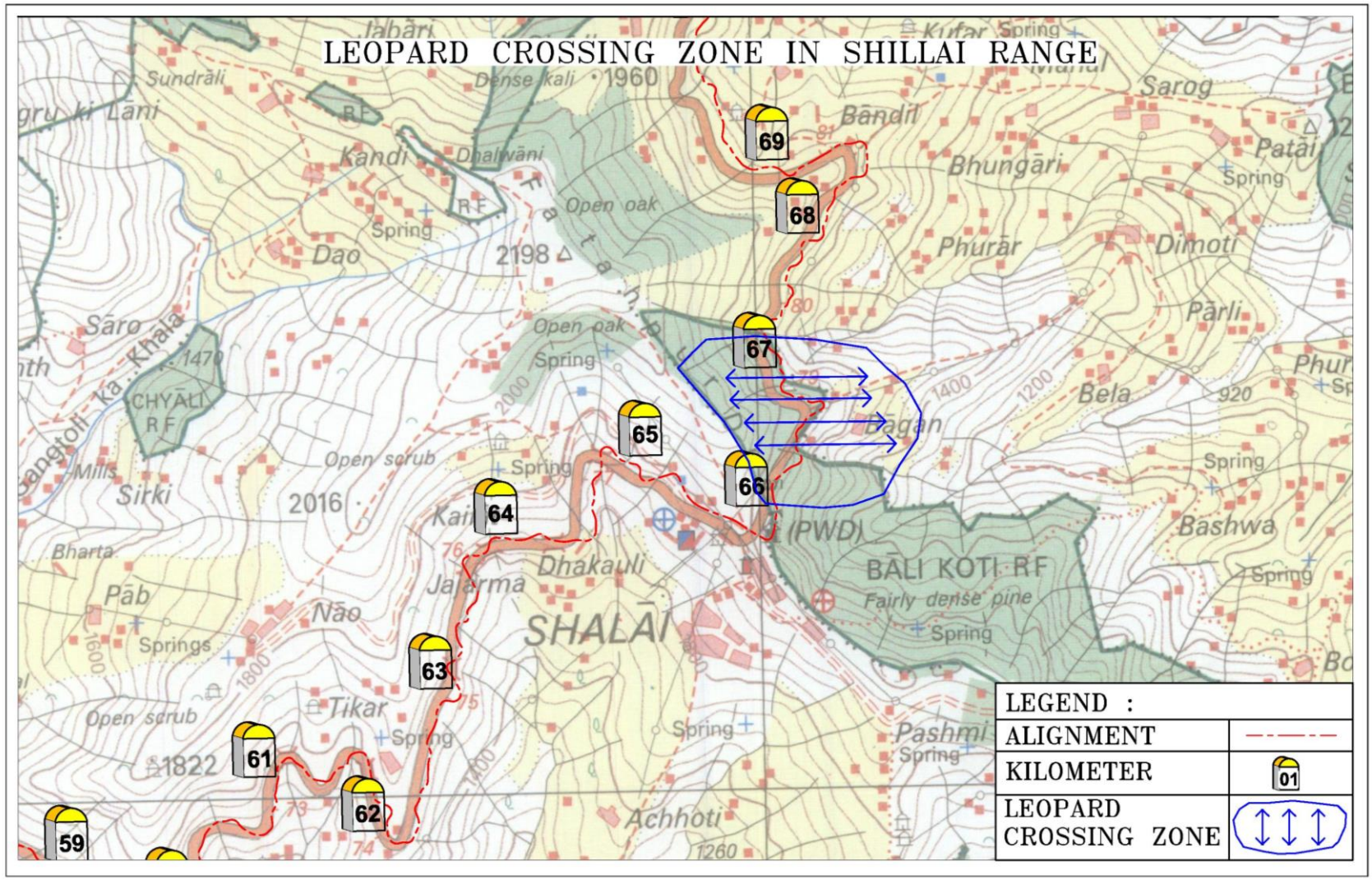


Figure 4.24: Leopard crossing zone at Range Shillai



4.5.4.4 Fish

During survey some fish species were identified from the Giri, Tons and Yamuna rivers. Most common and predominant fish present in the catch was endemic golden mahseer (Tor spp) followed by other fishes including Schizothorax spp., Barilius spp., Channa spp., Glyptothorax spp, Bagarius spp, Puntius spp. None of the fish species recorded from the study area are listed in the IUCN Red List as Threatened Animals. The common fishes of the study area are as follows (Table 4.20):

Table 4.20: Resident Fish Species Recorded in Study Area

Fish Species	Local Name	Common Name	Life Stage encountered	Dwelling habits	Feeding habits	Breeding period
Family: Cyprinidae						
Tor putitora (Hamilton	Mahseer Chiniaru	Golden Mahseer	Fingerlings and Adults	Column and mid water dweller - scavenger	Omnivorous: green matters, insects and their larvae, phyto benthos, zoo benthos.	Monsoon months
Schizothorax richardsoii (Gray)	Sal	Himalayan trout	Fingerlings and Adults	Midwater dweller	Herbivorous: green matters, algae attached on stones, phytobenthos etc.	August to October
Labeo dero (Hamilton)	Gid	Sairu	Fingerlings and Adults	Midwater dweller - scrapper	Herbiomnivorous: macrophytes, Insects, Phytobenthos, Zoobenthos	March to June
Barilius spp. i. B. bendelesis ii. B. barila iii.B. vagra	i.Patha ii. barila iii. Lohari	Hillstream carp	Juveniles, fingerlings and Adults	Column of side waters/ ditches on the bank of small tributaries	Omnivorous: small insects, phytoplankton, zooplankton	February to June *Found in Sep-Nov.
Puntius spp. i. P. ticto ticto ii. P. sarana	ii. Khangni	Minnows	Adults	Shallow pools and riffles	Column feeder, Planktonic feeder	-
Family: Siluroidie						
Bagarius	Goonch	Hillstream	Adult	Bottom	Scavengers:	-

Fish Species	Local Name	Common Name	Life Stage encountered	Dwelling habits	Feeding habits	Breeding period
bagarius		catfish		dweller beneath stones	Feed upon animal flash, Insects	
Family: Sisroidie						
Glyptothorax spp.		Hillstream catfish	Adults	Bottom dweller beneath stones	Scavangers: Feed upon animal flash, Insects	-

4.6 SOCIO-CULTURAL ENVIRONMENT

The project road falls in Shimla and Sirmaur districts of Himachal Pradesh state. Demographic and socio-economic details of Himachal state and both districts are given in table below.

Population density per km sq in Himachal Pradesh is 123, while in project districts Shimla and Sirmaur it is 159 and 188 respectively. In 2011, the total population of H.P. was about 6,864,602 out of which 3,481,873 were males (50.72 %) and 3,382,729 (49.28%) were females. In Shimla district, total population 8,14,010 consisting of 4,25,039 males and 388971 females. In Sirmaur district, total population 5,29,855 consisting of 2,76,289 males and 2,53,566 females.

Himachal Pradesh is one of the well literate states in India. Literacy rate among population age seven and above is 83% compared with 73% for India as a whole. The literacy rate is 91% for males and 77% for females. Notably the gender gap in literacy in state is not significant as compared to that of India. Literacy rates in the project districts are good as 84% in Shimla and 79% in Sirmaur district. Number of females per thousand males in Himachal Pradesh is 972 which is unfavorable to female nonetheless better than all India Sex ratio which is 943. On the other hand, Sex ratios in the project districts are very poor as 915 in Shimla and 918 in Sirmaur.

Table 4.21: Socio-Economic Features of the State and Project affected Districts

State/District	Himachal		Shimla		Sirmaur	
	2001	2011	2001	2011	2001	2011
Area Sq. Km.	55,673		5131		2825	
Persons	60,77,900	6,864,602	7,22,502	8,14,010	458,593	5,29,855
Male	3087940	3,481,873	38,0,996	4,25,039	241,299	2,76,289
Female	29,89,960	3,382,729	3,41,506	3,88,971	217,294	2,53,566
Population growth	12.94%		12.67%		15.54%	
Population Density	109	123	141	159	162	188

State/District	Himachal		Shimla		Sirmaur	
	2001	2011	2001	2011	2001	2011
per Sq km						
Literacy Rate %						
Male	86.02	90.83	87.72	90.73	63.20	79.73
Female	68.08	76.60	70.68	77.80	38.45	60.93
Sex -ratio	970	972	898	915	901	918
Human Development Index	0.518		0.409		0.433	

***Source**: Census of India 2011 data*

4.6.1 Socio-Economic Profiling

The majority of the potentially affected / benefited persons living in the project influence zone frequently travel down the existing roads or proposed alignment of the project. Their purpose of visit brings them generally to the prominent market places by the roadside or transport boarding points along side the road. Other beneficiaries also pass through the important junctions of the feeder roads connecting the project roads / proposed alignment. There are administrative offices, places of worship, community structures, in the major settlements within the project impact zone.

The district wise list of project influenced habitations is presented in Table 4.22 below:

Table 4.22: Villages along the Project Road

Name of the Road Section (project Road)	Districts Covered	Existing Chainage/ Length (km)	Villages Along the Project Road
Paonta Sahib-Gumma NH-707	Sirmaur	0.000-89.500	Paonta Sahib, Nariwala, Badripur. Jwalapur, Taruwala, Gondpur, Amarkot, Nihalgarh, Rajvan, Sataun, Tilordhar, Kafota, Shilla, Timbi, Shillai
	Shimla	89.500-97.000	Rohana, Meenus, Jamli, Gumma

4.6.2 Socio-economic Profile

Socio-Economic Profile of the Villages along the Project Road is given in **Table 4.23.**

Table 4.23: Socio-Economic Profile of the Villages along the Project Road

Villages	No of Households	Total Population	Male	Female	Population 0-6	SC Population	ST Population	Literates Population	Literates Male	Lietrates Female	Illiterate Population	Total Workes	Main Workers	Main Cultivators	Main Agri labors	Marginal Worker Population	Non Working Population
Paonta Sahib	31460	169682	89150	80532	22127	36757	4123	109748	64466	45282	59934	74760	48772	19074	1614	25988	94922
Taruwala	215	1018	511	507	125	161	3	790	428	362	228	300	289	49	0	11	718
Gondpur	225	1024	555	469	127	104	0	716	422	294	308	459	397	101	2	62	565
Nihal Garh	273	1297	714	583	155	418	2	901	536	365	396	511	502	134	4	9	786
Jawalpur	141	703	376	327	89	231	1	478	292	186	225	254	253	100	1	1	449
Kishan Kot	162	799	414	385	109	97	0	543	320	223	256	206	192	49	0	14	593
Rajban	444	1877	999	878	207	288	43	1349	777	572	528	582	549	42	5	33	1295
Sirmauri Tal	83	464	230	234	72	392	6	299	178	121	165	135	135	49	0	0	329
Sataun	607	2963	1560	1403	351	693	9	2121	1193	928	842	993	920	167	26	73	1970
Barwas	159	1027	536	491	120	205	0	599	353	246	428	582	309	131	6	273	445
Kamrou	355	2217	1158	1059	223	347	8	1448	845	603	769	1161	684	256	4	477	1056
Kandon Dugana	379	2678	1374	1304	294	973	4	1545	902	643	1133	1528	821	512	102	707	1150
Shilla	195	1447	786	661	171	353	1	824	515	309	623	874	374	241	3	500	573
Borar	184	1438	755	683	253	515	0	770	448	322	668	1147	580	539	0	567	291

Villages	No of Households	Total Population	Male	Female	Population 0-6	SC Population	ST Population	Literates Population	Literates Male	Lietrates Female	Illiterate Population	Total Workes	Main Workers	Main Cultivators	Main Agri labors	Marginal Worker Population	Non Working Population
Chareu	53	467	241	226	80	252	0	277	174	103	190	123	24	1	0	99	344
Ashyari	243	1730	881	849	285	580	0	976	531	445	754	1079	422	338	5	657	651
Gangtoli	50	371	194	177	62	77	0	215	114	101	156	165	78	45	0	87	206
Tikar	73	487	261	226	71	181	0	294	183	111	193	300	280	244	13	20	187
Dhakoli	47	253	127	126	30	196	0	165	89	76	88	215	65	46	1	150	38
Shillai	8173	60229	31841	28388	9357	18644	30	34926	20534	14392	25303	37545	21961	18214	325	15584	22684
Bandli	188	1425	729	696	205	297	0	815	470	345	610	932	533	362	0	399	493
Kando Bhatnaul	247	2236	1203	1033	308	692	0	1227	735	492	1009	1194	828	776	1	366	1042
Shiri Kyari	175	1454	772	682	233	361	0	877	509	368	577	999	428	345	0	571	455
Syarla Barshol	193	797	407	390	93	312	14	612	345	267	185	320	314	194	16	6	477
Jhakandon	244	1990	1053	937	322	772	0	1114	645	469	876	750	594	458	1	156	1240
Rihana	19	94	49	45	15	0	0	71	40	31	23	73	38	34	1	35	21
Gumma	108	559	274	285	63	196	0	398	221	177	161	352	163	87	13	189	207
	44695	**260726**	**137150**	**123576**	**35547**	**64094**	**4244**	**164098**	**96265**	**67833**	**96628**	**127539**	**80505**	**42588**	**2143**	**47034**	**133187**

Source : Primary Census Survey 2011

4.6.3 Agriculture

The agricultural sector of the Himachal Pradesh Economy contributes over 45% to the net state domestic product and nearly the entire population of the state depends directly upon agriculture.

Paonta-Gumma road section of Himachal located in the plains/rolling and hilly terrains. There is paddy, maize, sugar cane etc, cultivated in the area. Around 17% of project area population are doing agriculture related works.

Himachal Pradesh is known as the Apple State of India. Apples are grown in upper parts of the project highway as Rohru, Jubbal and Chaupal and transported through the project road.

4.6.4 Industrial Development

In the project area, there are Industrial establishment near Paonta Sahib, Rajban and Sataun. There are 71 industries operating at present in industrial area along this road and around 17 more are in pipelines which are going to be operational in near future. The industrial area in paonta sahib have variety of industries such as food processing, limestone, pharmaceutical, engineering workshops, Cement, Chemical, Battery, pulp and paper industries etc. there are mostly small scale industries along with a few large scale industries i.e. CCI Rajban. People working in these industries reside in the project area and use the Project road to commute to their work.

4.6.5 Archaeological/Religious Structures

Under the direct and indirect impact zone there is no Site or Property protected under the Archeological Survey of India and the State Archaeological Department. However, there are a few religious structures (total 6) have been found within the proposed RoW of the project highway.

S. No.	Type of Structure	Village	Chaiange
1	Temple	Taruwala	1.580
2	Temple	Nihalgarh	4.390
3	Temple	Jwalapur	5.390
4	Temple	Sataun	24.690
5	Temple	Rohana	95.450
6	Temple	Guma	96.840

4.6.6 Tourism/Pilgrimage

Tourism/pilgrimage sector is one of the few most important sectors directly related to the rapid economic progress of the State. Basic requirement for this is accident free connectivity for safe access to these locations.

The project road helps in connecting to Chanshal Valley, pilgrimage places like Churdhar, Maa Hateshwari Temple, famous Mahasu Temple at Hanol and leading to much famous Chardham yatra.

4.6.7 Transport

Road development is most important for the sector and it is directly beneficial to socio-economic status of the project affected people. Roads and highways developments are the most important promise of the State compared to railways, airways and waterways.

The project road is a vital life line for the people living in interiors of Sirmour and Shimla District. Around 30 villages having about 2.7 lacs population will be directly benefited from this project road besides many other small habitats living in close vicinity of this road since it is the only single road connecting the area for commutation of people.

The apple crop from Rohru, Jubbal and Chopal is also carried out only through this shortest road for marketing to New Delhi via Yamuna Nagar. Around 200 truckloads of apple commute through this road daily in apple season which may increase by another 200% as many other transporters using another route via Solan Parwanu will also shift to this route after its improvement being shortest distance for New Delhi via Yamuna Nagar.

CHAPTER 5

POTENTIAL ENVIRONMENTAL IMPACTS

5.1 BACKGROUND

This chapter assesses the nature, type and magnitude of the potential impacts likely on the various relevant physical, biological and cultural environmental components along the National Highway NH-707, Paonta Sahib – Gumma project road. The possible impacts due the Paonta Sahib – Gumma project could be visualized as follows **(Figure 5.1).** The impacts of the activities proposed as part of the project can occur during:

- ❖ Planning and Design Stage;
- ❖ Construction Stage and
- ❖ Operation Stage.

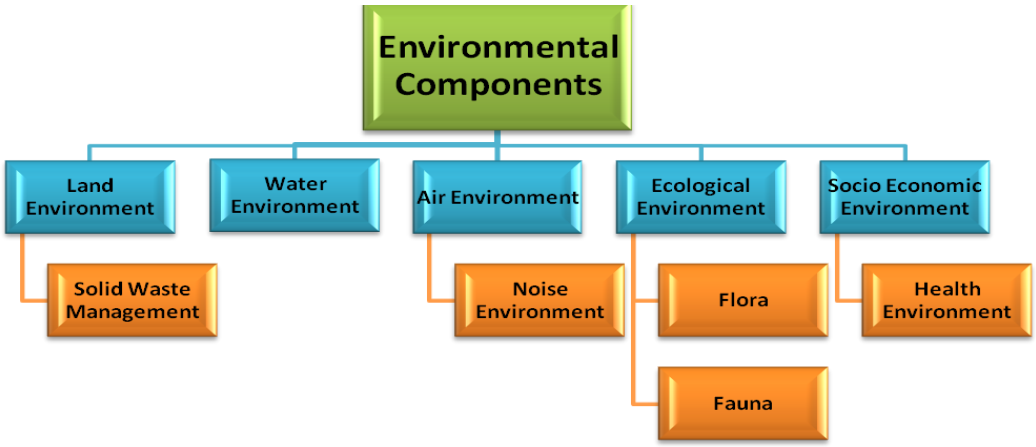


Figure 5.1: Components for Environmental Impact Evaluation

5.2 Anticipated Impacts

Type of Structure: Type of Structures to be provided are given in **Table 5.1:**

Table 5.1: Type of Structure: Type of Structures to be provided

S. No.	Height (m)	Type of Structure	Length (m)
Hill Side			
1	0-1.5 m	Breast Wall	21,614
2	1.5-4.0 m	Gabion Wall	8,106
	4.0-6.0 m		1,068
	6.0-8.0 m		434

S. No.	Height (m)	Type of Structure	Length (m)
	8.0-10.0 m		4
	>10.0 m	Gabion Wall and Geo-cell for Slope Stabilization	18
	Total Length of Gabion Wall (m)		9,630
Valley Side			
1	0-1.5 m	RCC Toe Wall	19,829
2	1.5-4.0 m	Retaining Structure with Gabion Facing	12,448
	4.0-6.0 m		5,871
	6.0-8.0 m		1,623
	8.0-10.0 m		1,125
	>10.0 m	Retaining structure with Gabion facing and Geo cell for Slope Stabilization	115
	Total Length of Retaining wall with Gabion Facing (m)		21,182

These impacts involving various environmental and socio-economic attributes during the different phases of the project are discussed.

Table 5.2: Identified Environmental Issues and Impacts due to the Project Implementation

Project stretch	Major issues	Other issues
Paonta-Gumma Section	• Impacts to avenue plantation • Impacts to wildlife • Longitudinal and cross drainage • Debris • Waste disposal • Impacts to forest areas (Area- 28.7658 ha.) • Stabilization of slopes	• Soil Erosion • Temporary Health and safety issues during construction and operation

In this Project, avoidance has been taken as the principal means to minimize project impacts, to reduce cost and to avoid delays. Therefore most of the construction works in this project will be confined to the existing right of way.

During various surveys, consultations and site investigations; a number of environmental issues were identified. Thought process for analyzing various

alternatives and effective measures for avoidance and impact mitigation were considered.

Table 5.3 : Impact Matrix for The Project Road

S.No.	Parameters	Paonta Sahib - Gumma section
	Negative Impacts	
1.	Handpumps	1
2.	Pond Area	Nil
3.	Relocation Religious Properties	2
4.	Transfer of Agriculture Land (ha)	3.8533 ha Agriculture Land of 8.9153 ha Private Land
5.	Earth (Cum)	10,51,570
6.	Quarry Materials (Cum) (Aggregate)	1,57,069
7.	Water (Cum)	3,84,526
8.	Nos of trees to be felled	3875 2510 (Non-forest land) 1365 (Forest land)
9.	Hill Cutting	Ch. 11.500 to Ch. 94.900
	Positive Impact	
1.	Enhancement Sites (Nos.)	9 at debris disposal site
A.	Cultural/Religious Properties (Nos.)	4
B.	Surface Water Body (Nos.)	14
C.	Educational Institute (Nos.)	3
D.	Safe Access to Educational Institute (Nos.)	3
E.	Enhancement of Bus Bays (Nos.)	6
F.	Rotary Junctions (Nos.)	1
G.	Village Gates (Nos.)	Nil
H.	Sitting Arrangement (Nos.)	2
I.	Vegetative Barrier (Nos.)	Nil
J.	Trees Saving (Nos)	1277 (Initially 5152 trees were likely to be felled)
K.	Wastes Reuse	18.3 Lakh Cum of hill cut material 12000 cum of scarified bituminous waste
2.	Proposed Plantation	15466
3.	**Road Safety Measures**	
A.	Major Junction Improvement (Nos)	5
B.	Proposal for Rotary Junctions	1
C.	Intersection/Access Improvement	71 (Minor Junction)
D.	Bus Bays	6
E.	Pedestrian Crossing	40
F.	Street Lighting (Locations)	48
G.	Signage Boards (Nos.)	760
H.	Sidewalk (Locations)	7 location (15.190 km) both Side Foot Path
I.	Traffic Calming Measures Locations	NIL

J.	Lined Drains (Length in Km)	Rectangular Drain : 15.190 km (Both Side) Lined Trapezoidal Drain : 79.710 Km (Hill Side)
K.	Four Lane Section (Length in Km)	1.5 km (Km 0.000 to Km 1.500)
L.	Crash Barriers/Guard Rails (Lengths)	21.182 Km
M.	Crash Barriers/Guard Rails (Locations)	Not Available

Table 5.4 : Positive and Negative Impact matrix for project road

S. No.	Aspect	Positive	Negative
1	Land	Paved road with stabilized slopes and embankments	Change in Topography due to construction, LA accounts for pvt as well as agriculture land
2	Geology	NA	Drastic Change in Geology due to hill cutting-filling and road widening
3	Soil	with slope stabilization techniques and plantation soil erosion will be controlled	Soil erosion during Construction of road
4	Quarries	Cut material will be used mostly, hence saving in material from quarry	No new quarries opened. Indirect impact by obtaining rocks, soil and aggregate materials for road construction.
5	Slope Stability	Slopes will be stabilized by Engineering and Bio-engineering measures	NA
6	Surface water	NA	Surface water sources may be impacted during construction phase if avoidance majors not followed
7	Ground water	NA	Ground water recharge as water harvesting structures is proposed
8	Drainage	Drainage will be improved due to better draiange provisions in project road i.e. 345 Culverts, drains and sub-surface drainage	NA
9	Air Quality	Air quality will be imnproved due to better road conditions and plantation program	Negative impact due to better road conditions will draw more traffic in the future and temporary impacts due to dust and poluution during construction phase
10	Noise levels	Noise levels will be decreased due to better road conditions and plantation program along the road	Negative impact due to better road conditions will draw more traffic in the future and temporary impacts due to movement of heavy vehicle and machinery during construction phase

S. No.	Aspect	Positive	Negative
11	Flora	Roadside avenue plantation 3841 Nos., Compensatory afforestation 11625 Nos. and plantation for slope stabilization will improve the vegetation cover	Cutting of 3875 Roadside Plants
12	Fauna	Appropriately designed Cross drainage structures as culverts will work as animal crossing pathway	Impacts during construction stage. Loss of habitation for Avifauna, reptiles etc.
13	Road safety	Abundant Traffic safety measures as Road studs, signages, crash barriers etc. will improve road safety	NA
14	Socio-economic condition	Positive Impacts on condition of Living of people, better connectivity, employment etc.	NA
15	Transport	Transport will be improved due to better road conditions	NA
16	Industry	Better road conditions and transport will attract more industries in the area	NA
17	Tourism	Better road conditions and transport will attract more tourists in the area	NA

5.2 LAND/ PHYSICAL ENVIRONMENT

5.3.1 Topography

Construction Stage

During construction stage changes in the local topography will take place due to construction of embankment for improvement of deficient geometry. Construction of cross drainage structures over streams and slope protection works, etc. Maximum Construction material has to be obtained from cutting material obtained from road construction and it will be utilised in embankment construction, however some of best quality aggregates required for bituminous layers shall be taken from nearby Crushers. Hence the project provision considered with minimum impact on topography during construction stage.

Operation Stage

The topography during operation stage having no such impact except material required for maintenance purpose.

There will be some positive impacts as follows:

- More drainage structures will ease/improve the hydrology of the area, and reducing of soil erosion, smooth flow of rain water, avoid road damage due to over flow of rain water which was occurring in present road due to lack of cross drainage structure.
- Vertical geometries improvement leads to better sight distance, safer transportation, and improvement in riding quality will reduce travel time as well as less carbon emission.

Junction design/improvement for better and efficient traffic movement which enhances safety of road user

5.3.2 Geology

Construction Stage

The impact on geology may occur from extraction of minerals. About 12.85 Cum. Material inc. aggregate, sand etc. will be required for construction of project road. The quantity of material required will be used from the cut material obtained. The cutting of hills will impact the geology of the project area.

Operation Stage

In operation stage there is no such impact on Geology of the area anticipated because maximum impact will occur during construction stage only and for construction hill cutting shall be improved by various Bioengineering measures and less carbon emission materials which will improve the geology of the area.

5.3.3 Seismicity

(a) Impacts

During Construction

The project will need hill cutting to adjust the carriageway. The project lies in seismic zone IV (IS 1893:2002). Road construction in this area will have impacts on its earthquake susceptibility of the project area.

During Operation

The embankment and structures may be subjected to seismic effect as it lies in the seismic zone IV.

5.3.4 Land Use Impacts

(a) Impacts

Pre - Construction and Construction Stage

There will be major change of land use in terms of Hill cutting and construction of

road and structures within the proposed corridor of impact. The predominant land use is road side Reserved forest. About 28.7658 Ha of forest land will be required to divert which is falling in patches in project stretch. This forest diversion comprised minimum area along the road which also includes existing row of project road except black top. Apart from that, minimum land acquisition (11.7423 Ha.) is required to improve the road configuration and geometry.

Operation Stage

In operation stage no impact on land use changes in RoW of project road. However, there may be induced land use changes close to RoW near urban areas.

5.3.5 Soil Erosion

(a) Impacts

The soil in the study area varies from Clayey silt to Silty sand. Therefore, the potential of soil erosion is moderate to high particularly in the hilly terrain in the project stretch.

Pre Construction

The soil erosion may take place due to following

- Site preparation may involve demolition of structures, tree removal, temporary rerouting of utilities. This brings risks of erosion to the exposed ground or stored topsoil.
- Setting up of workers camp along the project road may lead to loss of productive soils and impact the soil productivity especially at micro level.

During Construction

The soil erosion may take place along the project stretch during cutting of hill slopes to accommodate the proposed road configuration and locations of cross drainage structures due to rains.

During Operation

Due to provision of roadside drainage throughout the project stretch and sufficient amount of cross drainage and sub-surface drainage structures, minimal soil erosion is anticipated during operation stage.

5.3.6 Compaction of soil

(a) Impacts

Pre-Construction Stage

Compaction of soil will occur in the pre-construction phase due to the

movement of the construction equipment and machinery and during the setting up of construction camps.

Construction Stage

Movement of vehicles during road construction is the major cause of soil compaction. This impact is direct and will be maximum in the RoW. It is necessary to ensure that there is no adverse impact of soil compaction in areas other than the RoW, where vegetation can grow and rain infiltration will take place.

Operation Stage

During the operation period compaction will be restricted to the carriageway of project road.

5.3.7 Contamination of Soil

(a) Impacts

Pre-Construction Stage

Contamination of soil in the pre-construction stage may be considered as a short-term residual negative impact. Soil contamination may take place due to solid waste contamination from the labor camps set up during pre-construction stage. This impact is significant at locations of construction camps; stockyards, hot mix plants etc. as these will come up in this stage.

Construction Stage

Contamination of soil during construction stage is primarily due to construction and allied activities. The sites where construction vehicles are parked and serviced are likely to be contaminated because of leakage or spillage of fuel and lubricants. Pollution of soil can also occur at hot-mix plants from leakage or spillage of asphalt or bitumen. Refuse and solid waste from labor camps can also contaminate the soil. Contamination of soil during construction might be a major long-term residual negative impact. Unwarranted disposal of construction spoil and debris will add to soil contamination. This contamination is likely to be carried over to water bodies in case of dumping being done near water body locations.

Operation Stage

During the operation stage, soil pollution due to accidental vehicle spills or leaks is a low probability but potentially disastrous to the receiving environment, should they occur. These impacts can be long term and irreversible depending upon the extent of spill. However, monitoring of soil quality will be done during construction and operation phase.

5.3.8 Quarries

(a) Impacts

In addition to the cut material re-use in the construction of the road, the quarries used for obtaining rocks, soil and aggregate materials for road construction can cause direct and indirect adverse impacts on the environment. Although the cut operations shall generate ample rock and soil material, it is likely that material from quarries could be needed depending on the appropriateness of the material quality. Quarrying and crushing can have a critical impact especially on the air quality of the area especially in the area downwind to the quarry.

Pre Construction Stage

Existing quarries that are identified by the design team have been recommended for this project and no new quarries have been proposed. The cut material is to be obtained from hill cutting is proposed to be used in different pavement layers and retaining structures based on their suitability after required processing of the same at proposed mobile crushers. Remaining amount of material needed for the construction of the bituminous layers and cross drainage structures will be procured from the existing quarries. As these quarries are already in operation with the requisite environmental clearances and redevelopment plans, no major impacts, which arise in making new quarries operational, are likely.

Construction Stage

A major source of dust during the construction stage is from stone crushing operations from the crusher and the vibrating screen. The dust, in addition to being an eyesore, reduces visibility thereby increasing safety concern. Dust is generated due to procurement and transport of raw materials from quarries to the road construction area. These impacts will persist till the activity ceases.

5.3.9 Slope Stability

(a) Impacts

The widening towards the hill ward side will create new areas of instability; as a result driving would be extremely unsafe with land slide, land slip, mud flow, rock fall etc as major issues especially during the monsoon season. The traffic vibrations also lead to land slips and all other stability issues.

Apart from the unstable areas identified in the baseline section a number of new areas will be developed. This cannot be predicted but will depend on the geological conditions and the vegetation cover, slope angle, and the height of the hill slope.

A. Dumping Area

Additional land has been proposed to be acquired for dumping of remaining cut materials in the form of rock, soil and debris after maximizing its utilization its utilization in new construction of pavement, structures and slope protection work. After proper compaction and slope protection such locations can be used as medical/traffic aid centre, wayside amenity and parking space.

Table 5.5: Details of Dumping/Disposal Locations

S. No.	Design Chainage		Name of the Village	Khasra No.	Type of Land	Area (Sq m.)	Avg. Height of Dumping (m)	Volume of Dumping Site (Cu m.)	Volume of Dumping Material (Cu m.)
	From	To							
1	28+300	28+470	Badwas	1820/1483	Private	3,242	9.02	29,243	46,789
2	30+250	30+400	Kamrau	3223/545	Private	1,962	9.44	18,521	29,634
3	32+750	33+000	Kamrau	355/1106	Private	5,007	8.49	42,509	68,015
4	47+850	48+000	Chadeu	38	Private	808	3.65	2,949	4,719
5	48+600	48+850	Chadeu	264/23	Private	4,549	9.16	41,669	66,670
6	60+100	60+350	Shilai	6250/735	Private	6,002	9.66	57,979	92,767
7	73+615	73+725	Shri Kyari	NA	Private	679	4.8	3,259	5,215
8	78+220	78+420	Dravil	1311/870	Private	2,937	9.56	28,078	44,924
9	90+670	90+960	Rohana	275/1, 281/1, 285/1	Private	4,601	9.49	43,663	69,860
							Total =	**2,67,871**	**4,28,593**

Table 5.6: Details of Additional Dumping/Disposal Location

S. No.	Design Chainage		Name of the Village	Khasra No.	Type of Land	Area (Sq m.)	Avg. Height of Dumping (m)	Volume of Dumping Site (Cu m.)	Volume of Dumping Material (Cu m.)
	From	To							
1	58+550	58+800	Shillai	3617/3	Private	6,726	8.92	59,996	95,993
2	61+050	61+200	Shillai	3600/2	Private	1,666	9.15	15,244	24,390
3	61+400	61+600	Shillai	3039/3	Private	4,323	4.77	20,621	32,993
4	75+100	75+250	Shri Kiyari	1474	Private	1,418	9.83	13,939	22,302
5	80+500	80+800	Dharwa	1110/1006/799 & 1105/1003/798	Private	7,941	8.22	65,275	1,04,440
6	89+600	89+900	Khadkha	312	Private	7,558	8.62	65,150	1,04,240
								Total	**3,84,359**

5.4 WATER ENVIRONMENT - IMPACTS

(a) Impacts

Surface Water: The project road crosses Giri, Tons and Meenus rivers. The river water flow in the project area is predominantly from the south to north. These surface water bodies can be subject to adverse impacts due to the various construction activities as well as during the operation stage of the project.

Ground water: All along the entire length, a total of 05 hand pumps were identified within the RoW. In addition to that, several water streams are crossing/flowing through the project road which are being used by local people for domestic purposes.

5.4.2 Drainage

(a) Impacts

Impacts of road construction, which lead to alteration of drainage, are generally due to construction of cross drainage at locations of crossing. This requires river and or gully training for the period during which the bridge and cross drainage structures are to be constructed. Alteration of drainage can lead to soil erosion of adjacent areas, disturb local vegetation. If the period of alteration is long, there are chances of local ecology being impaired.

No drainage modification of surface flow of rivers/streams is envisaged during preconstruction period hence no impacts are anticipated.

Construction Stage

Construction of Major Bridges on river course is not involved. However, construction /re-construction/rehabilitation of 13 minor bridges is involved. Though construction along the watercourses is to be carried out in the lean flow periods, the construction activities will necessitate minor diversion of the waterways. This diversion of flow may significantly harm the aquatic habitat, present, if any. The impact shall be direct but short term in nature and shall last as long as construction continues.

Operation Stage

One of the unavoidable aftermaths of road construction is the increased surface run off. The addition of hard paved shoulders, which essentially increase paved impervious surface, will cause increased surface runoff in the project influence area. Increase in surface run-off is due to the creation of impervious surfaces that prevent the flow of water into the ground.

5.5 AIR ENVIRONMENT

(a) Impacts

i. Impact on Trees

Loss of about 3875 trees will have an impact on the micro-climatic situation along the project road especially during summer along the Paonta-Gumma road. Travelling along the project road without these trees on sides would be hot and tiring for local communities and other road users. Direct exposure to sunlight along the project road after the removal of trees would be very uncomfortable for the road users.

Road side vegetation is likely to be impacted due to proposed road widening project. The major trees to be affected/ cut are Pine, Khadig, Deodar, Gular, Saal and Kachnar.

The tree removal will take place from Corridor of Impact of project road. This includes 1365 trees enumerated from the Reserved Forest area and 2510 private trees from existing ROW. No tree will be cut beyond the proposed toe line.

ii. Impacts on Ambient Air Quality

Air quality along the project corridor will be impacted both during the construction and operation stages. Construction stage impacts will be of short term and have adverse impacts on the construction workers as well as the settlements adjacent to the road, especially those in the downwind direction. Construction stage impacts will be confined generally to a band of width ranging from 100m to 150m from the edge of the Right of Way.

However, they will continue for the construction of the project. The following sections present the impacts of the project activities on this component.

Generation of Dust

Pre Construction & Construction Stages

Generation of dust is the most likely impact during these stages due to:

- ❖ Site clearance and use of heavy vehicles, machinery, etc.;
- ❖ Procurement and transport of raw materials and quarries to construction sites; It is likely that impacts due to dust generation are felt downwind of the site rather than on the site itself.
- ❖ Dust is also likely to be generated due to the various construction activities including:
- ❖ Stone crushing operations in the crushers;
- ❖ Handling and storage of aggregates in the asphalt plants;

- ❖ Concrete batching plants; and
- ❖ Asphalt mix plants due to mixing of aggregates with bitumen.

Generation of dust is a critical issue and is likely to have adverse impact on health of workers in quarries and stone crushing units. This is a direct adverse impact, which will last almost throughout the construction period.

In addition to air pollution due to activities mentioned above, there will be dust generation due to transport and material storage at site.

Operation Stage

No dust generation is envisaged during the operation stage as project road shall be paved and there will be slope turfing/plantation through Bio-engineering techniques used.

iii. Generation of Exhaust Emissions

Pre Construction & Construction Stages

Generation of exhaust gases is likely during the pre-construction stage due to movement of heavy machinery for construction.

High levels of PM, SO_2, HC, CO and NO_2 are likely from hot mix plant operations. Toxic gases are released through the heating process during bitumen production. Although the impact is much localized, it can spread down wind depending on the wind speeds.

Operation Stage

The impacts on air quality will, at any given time depend upon traffic volume/rate of vehicular emission within a given stretch and prevailing meteorological conditions. Excess discharge of exhaust gases can occur due to

(i) Inadequate vehicle maintenance;

(ii) use of adulterated fuel in vehicles

To predict air quality in the vicinity of project road alignment during operation phase air pollution modeling has been carried out to quantify the impacts incorporating all these variables.

5.6 NOISE ENVIRONMENT- IMPACTS

(a) Impacts

Road noise depends on factors such as traffic intensity, the type and condition of the vehicles plying on the road, acceleration/deceleration/gear changes by the vehicles depending on the level of congestion and smoothness of road surface.

The baseline noise levels monitored at various locations along the Project Road alignment indicate the baseline levels are well will within in the stipulated limits of CPCB for the respective land uses of monitoring locations. The noise is concern as during construction and operation phases there will be generation of significant noise.

The impacts on noise due to the project will be of significance in both the construction as well as the operation stages.

Pre-Construction stage

Noise levels during the pre construction stage are mostly expected to be indicative of prevalent baseline levels apart from localized noise levels at locations where pre construction stage activities are taking place such as establishment of workers camps, stockyards. These increased noise levels will prevail only for a short duration during the pre-construction stage. Moreover, as these activities are not likely to be placed near settlement the increased noise impact is bound to be negligible.

Construction Stage

During construction, the major sources for noise pollution will be movement of vehicles transporting the construction material to the construction yard and the noise generating activities at the yard itself. Crushing plants, asphalt production plants, movement of heavy vehicles, loading, transportation and unloading of construction materials produce significant noise during construction stage. The construction equipment with high noise levels, the noise generated during excavation, loading and transportation of material near the borrow areas will affect the construction personnel and other humans in the area. The typical noise levels associated with the various construction activities and the various construction equipments are presented in Table 5.7.

Table 5.7: Typical Noise Levels of Principal Construction Equipment

Equipment	Noise levels
Tractor-scraper	93 dB
Rock drill	87 dB
Un-muffled concrete breaker	85 dB
Hand-held tree saw	82 dB
Large rotary diesel compressor	80 dB
$1^{1/2}$ tonne dumper truck Diesel	75 dB
concrete mixer	75 dB

Source: The Noise Pollution (Regulation and Control) Rules, 2000

Though the noise levels presented for the various construction activities far exceed the permissible standards, it is important to note that the construction noise is generally intermittent and depends on the type of operation, location and function of the equipment.

Operation Stage

The Noise levels in the project influence area during operation phase are expected to increase slightly as the project road traffic will significantly increase with road users. Though, the noise generated by vehicles will be decreased due to improved road (Roughness) & vehicle conditions.

5.7 IMPACTS RELATING TO BIO-ENVIRONMENT

The project road is passing through following Reserved Forest areas. Details of the same is given as under:

Table 5.8 : Project Road Passing Through Reserved Forest Areas

1.	**Forest Division**	**Paonta Sahib (Sirmaur District)**
	Total Area	12.6705 Ha (in approx. 12.3 Km Length)
	Villages	Gondpur, Rajban, Tal Sirmour, Mughal Kartar Pur & Satun
	Status	Reserved Forest
	Tree likely to fell*	1008 nos.
	Detail	19 nos. Compartment in 6 nos. Range Forest
2.	**Forest Division**	**Renuka Ji (Sirmaur District)**
	Total Area	16.0953 Ha (in approx. 15.8 Km Length)
	Villages	Sataun, Shillai, Tatiyana, Gangtoli, Kando Bhatnol & Jhakando.
	Status	Reserved Forest
	Tree likely to fell*	357 nos.
	Detail	8 nos. Compartment in 6 nos. Range Forest

Note: Number of trees to be felled will be confirmed after joint verification with Forest Department.

Forest Strip Plan showing Reserved Forest area across the project road is attached as Annexure-5 with this report. Forest proposal is under process with Forest Department for obtaining Forest Clearance.

5.7.1 Impacts relating to Flora

(a) Impacts

Roadside Plantations and Reserved Forest Areas

The project and its adjoining area fall under 'Tropical Dry Deciduous Forests' with sub group as 'Northern Tropical Dry Deciduous Forests' which is mostly represented by Northern Dry Mixed Deciduous Forests.

The principal impact on flora involves the removal of trees from the RoW.

- The tree removal will take place from RoW of project road. This removal will be of 2510 trees falling in existing RoW of road side plantation and 1365 Trees of Resrved Forest crossing the project road at different sections.

  Reserved forest area of 12.6705 ha from Paonta sahib and 16.0953 ha from renuka ji division will be required to be diverted for this project.

- Trees need to be cleared to facilitate widening of existing road, construction of drainage and retaining structures and traffic detours.

The stage wise impact on roadside trees and plantation has been described in the following sections.

Pre Construction Stage

The project has a significant, direct and long-term impact on the trees within the RoW. Most visible impact is the loss of shade. Also, there is a possibility of the local people being deprived of tree products, such as wood, fruits, leaves, etc. The numbers of trees to be cut are 3875. This includes 1365 trees enumerated from the Reserved Forest area and 2510 trees (Non-Forest) from existing ROW of NHAI.

The micro-ecosystems supported by the trees are also a point of environmental concern.

Construction Stage

During construction stage no cutting of trees will be involved. The compensatory plantation at 1:3 to each tree felled and avenue plantation in 3841 Nos. will also take place at the end of construction period.

Operation Stage

During operation stage there will be positive impact on flora as Avenue plantation, turfing /Bio-engineering works on side slopes will be matured.

Impact on the Forest Reserves

There is Reserved forest area along the sides of the project road. Other than the declared Reserved Forests, no other forest reserves are impacted for the project.

Total forest reserves that will be acquired for widening has been estimated to be 28.7658 ha (12.6705 ha. in Paonta sahib division and 16.0953 ha. in Renuka ji division) in Sirmaur district.

5.7.2 Protected Areas and Fauna -Impacts

(a) Impacts

Since there are no protected wildlife areas such as wildlife sanctuaries, National parks etc falling within the PIA, no such impacts are foreseen due to the project.

Survey was carried out in 10 km of the proposed road project. The ground studies along the alignment, together with Forest Department consultation have revealed that some wild mammalian species such as Sloth bear, Sambar deer and Leopard may be found near the study area on rare occasions, while livestock of local people i.e. goat, sheep, cow etc and common animals as field mouse, Squirrel, Hare, dog, cat, bats, monkeys etc. are significantly using the area.

5.8 SOCIO-CULTURAL ENVIRONMENT-IMPACTS

The project road passes through two districts namely Sirmaur and Shimla of Himachal Pradesh state. As per social survey, there are around 30 villages along the road, of which 2.6 lacs population will be directly benefitted. Besides many others small habitats living in close vicinity of this road, which will be indirectly benefitted, since it is the only single road connecting the area for commutation of people. Following social impacts are anticipated in the vicinity of the project road:

5.8.1 Land Acquisition

Total 11.7423 ha. land area will be required to acquire for the project road development. The project alignment was designed in a manner to avoid most of the private land and structures en-route.

However, Project affected persons will be resettled and rehabilitated through Entitlement Matrix as per LARR, 2013 and World Bank guidelines.

5.8.2 Agriculture Impacts

The agriculture area is mostly avoided during land acquisition for the project and hence effects are very much minimized.

People of area grow cash crops like Ginger, Potato, Cauliflower, Peas, capsicum,

Tomato, Lentils etc. Main crops as Paddy, maize, sugarcane etc are cultivated intermittently.

All these produces are carried for marketing at New Delhi & Faridabad through this route only. In peak season, approximately 500 truck loads are daily transported to these markets from this area. The apple crop from Rohru, Jubbal and Chopal is also carried out only through this shortest road for marketing to New Delhi via Yamuna Nagar. Around 200 truckloads of apple commute through this road daily in apply season which may increase by another 200% as many other transporters using another route via Solan Parwanu will also shift to this route after its improvement being shortest distance for New Delhi via Yamuna Nagar.

5.8.3 Impacts Relating to Industry

This project road will further bring socioeconomic reforms in terms of industrialization, as there are 71 industries operating at present in industrial area along this road and around 17 more are in pipelines which are going to be operational in near future. The project road will be a major life line for these industries from where almost 200 trucks per day transport raw produce and manufactured produce to various destinations at present and the number is likely to be increased with passage of time. A major cement plant has also been proposed at Gumma which will further generate more traffic through this route. The portion from Gumma km 97/0 to km 106/0 Feddus has been proposed under NH-(O) for further improvements which will further enhance the utility of this project road by feeding traffic to Uttrakhand then on to Yamunotri, Gangotri etc. and Chopal area which is most backward area of district Shimla at present. Hence it can be said that this project road is utmost desired from every angle benefiting directly from a common man to industrialists which will help in growth of people and area all around.

People working in industries of Paonta sahib and rajban reside around the project road area and use the road significantly. Hence the improvement of road will benefit people for commutation and shall provide employment to local people.

5.8.4 Human Health & Safety

(a) Impacts

The project will provide various safety aspects to the users. Various provisions like w beam crash barriers, road studs, rumble strip, Road Signs and Road Markings is proposed along the project road to improve the safety for the commuters.

Footpaths, walkways and public toilets are provided with provisions for physically disabled persons and elderly persons. Adequate illumination is provided in form of

Solar lights along the complete chainage.

Brief details of the Road Appurtenances are given in below **Table 5.9**

Table 5.9: Brief Details of Road Appurtenances

S. No.	Particulars	Length/Details
1	Solar Lighting	48 Locations
2	Rumble Strips	73 Locations
3	Thrie Beam Crash Barriers	21.182 Km
4	Parapet	58.122 Km
5	Road Studs	22,190 Nos. (17,276 Nos. in geometric improvement Portion, 4,914 Nos. in junctions)
6	Road Signs	10,432 Nos.
7	Footpath	15.190 Km
8	Roadside Drainage	Rectangular Closed Drain- 15.190 Km Trapezoidal Lined Drain- 79.710 Km
9	Sub Surface Drain	26 Locations
10	Paver Block	10 Km

5.8.5 Archaeological/Cultural and Religious Properties Impacts

There is no Archaeological site near the project road stretch, hence no impacts anticipated.

5.8.6 Tourisms and Pilgrimage –Impacts & mitigations

The project road will further improve the connectivity for tourists visiting various famous destinations like much famous Chanshal Valley Himalayan Raid de, pilgrimage places like Churdhar, Maa Hateshwari Temple, famous Mahasu Temple at Hanol and leading to much famous Chardham yatra.

5.8.7 Transport Related Impacts & mitigations

The project road is a vital life line for the people living in interiors of Sirmour and Shimla District. Around total of 47 villages having 77,967 population will be directly benefited from this project road besides many other small habitats living in close vicinity of this road since it is the only single road connecting the area for commutation of people. This project road will further bring socioeconomic reforms in

terms of industrialization, transportation of agricultural products and lime to other parts of countries.

The apple crop from Rohru, Jubbal and Chopal is also carried out only through this shortest road for marketing to New Delhi via Yamuna Nagar. Around 200 truckloads of apple commute through this road daily in apply season which may increase by another 200% as many other transporters using another route via Solan Parwanu will also shift to this route after its improvement being shortest distance for New Delhi via Yamuna Nagar.

5.9 SOLID WASTE

(a) Impacts

- Soil contamination may take place due to solid waste contamination from the labor camps set up during pre-construction stage. This impact is significant at locations of construction camps; stockyards, hot mix plants etc.
- Refuse and solid waste from labor camps can also contaminate the soil.
- Toilet waste from Labor camp can pollute the nearby surface water source or soil, if not handled properly.
- Disposal of Construction and demolition waste generated during construction phase is a major concern for this project.

CHAPTER 6

ANALYSIS OF ALTERNATIVES

6.1 PREAMBLE

The mandate of the current project is to widen the existing road to 2 lanes with provision of paved shoulder in the build-up sections and hence there is no alternative site is involved. However, the chapter discusses on the "With" and "Without" project scenarios. The methodology that has been adopted for the evaluation of the alternate alignment route for construction of Project Road and the selection is based on engineering, economic, environmental and social considerations have been highlighted. The minimization of environmental impacts by considering design alternatives determines the extent of mainstreaming of the environmental component. This chapter looks at the decisions made during the project when alternatives were available and describes the rationale behind each decision. The EIA study with EMP and without EMP has also been discussed in the context of Paonta Sahib - Gumma project.

6.2 "WITH" AND "WITHOUT" PROJECT SCENARIO

Keeping in view the site conditions and the scope of development of the area, the 'with' and 'without' project scenarios have been compared as given in Table 5.1.

By looking at the table it can be concluded that "With" project scenario positive/beneficial impacts will improve the environment and enhance social and economic development of the region compared to the "Without" project scenario, which will further deteriorate the present environmental setup and quality of life. Hence the "With" project scenario with minor reversible impacts is an acceptable option than the "Without" project scenario. The implementation of the project therefore will be definitely advantageous to achieve the all – round development of the economy and progress of the region.

Impacts on vegetation are expected during construction phase. Little increase in the pollution levels of the air is possible. Dust and particulate matter during construction will affect the air quality on a short-term basis. However, an important benefit which is not represented in this assessment will be major reduction in the Particulate Matter (PM10 and PM2.5) levels from vehicles using a surfaced road (with project scenario) in the build condition, compared to a continued use of dusty unsurfaced/tracks (without project scenarios).

The minor impacts due to air; noise, vegetative cover and soil erosion will be remunerated by adopting appropriate mitigative measures such as roadside plantation, arboriculture and landscaping, compensatory afforestation, and providing underpasses and bio-engineering measures with retaining structures.

Table 6.1: 'With' and 'Without' Project Scenario

Component	Without' Project Scenario	With' Project Scenario
Connectivity and Development	The connectivity between the other National and State Highways is not good. Existing connectivity with Delhi, Haryana and Uttarakhand need to be improved, for the economic beneficial transportation of horticulture produces and apples. Pavement conditions are in poor condition resulting in high travel time, bad vehicle conditions, and more pollution. Poor pavement conditions restricting people's access to local market, Medical facilities, education centers, work zones etc.	It will improve inter-connectivity between other National Highways (NH-707, NH-124 and and various PMGSY roads). Connectivity with Haryana, Delhi and Uttarakhand will improve. Travel time will be reduced due to improved pavement conditions and road geometry and hence Pollution levels will be reduced as well. Trade of local produce like dairy products, agriculture products, and small scale industrial product will also be increased.
Flora	There will not be any impact on existing terrestrial ecology.	With project scenario involves felling of 3875 trees due to proposed widening. As per the Forest Conservation Act (1980), Compensatory Afforestation will be done through Forest Department in 1:3 ratio. Avenue Plantation will be done as 3841 roadside trees will be planted.
Social and Cultural	There will not be any impact on existing social and	290 structures including 16 common property resources will be

Component	Without' Project Scenario	With' Project Scenario
Environment	cultural environment.	affected due to proposed widening. Necessary R&R plan has been developed to reduce the socio economic impact due to the proposed project. Total land acquisition will be 11.7423 ha. Use of open / barren land has reduced acquisition in other areas.
Carriageway	2 lane/ intermediate / earthen shoulder	2 lane with paved shoulder has been proposed to improve the road condition.
Drainage/ Water logging	Water logging issues are observed along the road side specially settlement area due to absence/non-functional drains.	Will be improved by reconstruction of culverts/ bridges with adequate hydraulic (details are provided in Chapter-2 Project Description) New cross drainage structures and drains are also provided to address the flooding and water logging issues.
Financial Implications	Without project scenario does not involve any capital cost, but there will be recurring maintenance cost to maintain the smooth flow of traffic.	The environmental cost as per environment assessment will be about 4.62 crore and R&R cost will be about 130.85 crores as per SIA.

Therefore, "With" project scenario, with its minor adverse impacts is more acceptable than the "Without" project scenario which would mean an aggravation of the existing problems. The potential benefits of the proposed road improvements are substantial and far-reaching both in terms of the geographical spread and time. Hence, it is clear that the implementation of the project will be a definite advantage to State of Himachal Pradesh in order to achieve all-round development of its economy and progress of its people.

The project will have multiple benefits. The project will release the potential of the area and fast connectivity between Himachal Pradesh Uttarakhand and Haryana. Being improved limestone linkage from Sataun, there is further scope of installation of 17 Nos. new factories at Gumma, which is under active consideration of Government of Himachal Pradesh.

Further, there is vast scope for many pharmaceutical industries and limestone industries after upgradation of NH707. This project will also reduce the travel time substantially. In addition this project road will provide further other benefits like:

- ❖ Fast and safe connectivity resulting in saving in fuel, travel time and Total Transportation cost to the society;
- ❖ Employment opportunities to local people during road construction;
- ❖ Development of local industries, agriculture and handicrafts;
- ❖ Development of tourism and pilgrimage;
- ❖ Transporting, processing and marketing of agricultural products;
- ❖ Reduction in accidents;
- ❖ Reduction in pollution;
- ❖ Opening of opportunities for new occupations;
- ❖ Better approach to medical & educational services and quick transportation of perishable goods like fruits, vegetables and dairy products; and
- ❖ Improved quality of life for people and so on

However, there would be an increase in the vehicular pollution-air and noise, in the vicinity of the highway. This road construction will result in loss of private properties and loss of living.

If the project is not implemented, there is likelihood that the roads presently carrying the traffic between Paonta Sahib and Gumma will deteriorate further and rampant traffic disruptions will hinder the free flow of the traffic. Increased air pollution, due to slow moving traffic and congestion, will follow suit. Noise levels in built up portions will rise due to deterioration of the pavement as well as increased honking.

6.3 SAFETY ASPECTS

While assessing the impacts, safety of the road users and the roadside communities has been found to be a major concern. A number of measures have been proposed to reduce the risk of traffic accidents. In some places, these safety measures are co-terminus with the project's impact minimization measures. Horizontal profile correction and intersection improvement has been suggested for betterment of the project corridor. Other safety measures taken are (Nos. of items provided in chapter-4):

- ❖ Improvement of existing curves,
- ❖ Improvement of existing Curve at bridge approaches.
- ❖ Provision of adequate traffic signage,

- ❖ Widening of bridge with footpath in built-up location,
- ❖ Embankment protection in approaches to bridge,
- ❖ Foot path and pedestrian guard rails in built up zone,
- ❖ Improvement of existing highway junction
- ❖ Retro-reflective painting on roadside plantations.

The project road having a total length of 97 Km is majorly passing through mountainous and steep terrain (in about 85 Km length). The existing alignment is deficient in geometry with around 1,800 nos. of horizontal curves and vertical gradient up to 18% at some places which is proposed to be improved. Hence, due to presence of steep terrain, availability of limited land and involvement of huge amount of cutting of rocks provision of any further realignment and bypass is not feasible. Also, Provision of this will lead to heavy amount of land acquisition and increased project cost.

6.4 Alternative Analysis for minimization of impact on trees and forest land

The corridor of impact (COI) has been minimized by keeping in view the typical cross section, hill cutting and provision of slope protection measures. This will result into minimum impact on forest land and tree cutting.

6.4.1 Alternative for Tree Cutting

The road side vegetation is likely to be impacted due to road widening. Total 5152 trees within the ROW were likely to fall between 3.50 m to 15 m from centerline of existing highway on either side.

By minimizing corridor of impact and optimizing widening scheme of project road, number of trees likely to fall, have been reduced to 3875 trees. Through this exercise 1277 trees have been saved.

The project is passing through reserved forest areas in Paonta Sahib and Renuka Divisions. Diversion of 28.7658 ha forest land is required for the project road construction. This forest land diversion requirement has been kept minimum considering formation width for the upgradation/widening of the project road.

6.5 Alternative Analysis for selection of debris disposal site

There is a need of around 6 Lakhs cum of material to be dumped obtained from hill cutting after utilizing the same for construction of pavement and structures. Initially, 9 nos. of dumping sites have been identified for disposal of debris by keeping in view all the safety measures and standards need to be adopted to serve the purpose. Also, additional 9 nos. of dumping sites have been identified on forest land and is proposed to be utilized for dumping after consultation with forest department.

6.6 Minimization of land uptake by providing intermediate carriageway

By keeping in view the traffic projections and widening requirements, intermediate lane configuration (5.5 m) has been proposed in last 24.900 Km stretch.

This will further reduce the impact on land acquisition that would have occurred by provision of two lane carriageway. For intermediate carriageway corridor of impact varies from 11 m to 14 m as compared to 14 m to 18 m for two lane carriageway.

6.7 Minimization of land uptake by eliminating paved shoulders

Four lane configuration has been proposed in the initial 1.500 km section due to presence of built-up area of Paonta Sahib. Beyond this, two lane configuration with paved shoulder has been proposed in a length of 16.300 km due to presence of industrial area and heavy truck movement upto Sataun which is also a major stockyard of lime. Beyond this point, two lane and intermediate carriageway has been provided in a length of 52.800 km and 24.900 km without the provision of paved shoulder which will also reduce the corridor of impact and minimization of land use.

6.8 Alternative Analysis for use of alternative construction materials to minimize use of aggregate, bitumen, borrow earths.

Green highway approach has been adopted for the project road by which use of construction materials such as aggregate and borrow soil has been minimized. Out of 24.3 lacs cum. of cut materials obtained from hill cutting around 18.3 lacs cum of material is proposed to be utilized in construction of different pavement layers and slope protection structures. Also by adopting innovative technologies there will be a savings of approximately 1.1 lac cum. of aggregate, 2.27 lac cum. of cement and 2.46 lac cum. of sand as compared to conventional approach. In addition to this, utilization of RAP in junctions, project facilities and some portion of carriageway will also save approximately 382 tonnes of bitumen. The summary of cutting material, its reuse and material savings is shown in the table below,

Table 6.2 : Package wise Summary of Cutting Materials and Reuse

S. No.	Description	Quantity (Cum.)				
		PKG-I	PKG-II	PKG-III	PKG-IV	Total
A	**Total Cutting Qty. from Roadway Excavation (Cum.)**	4,09,042	5,97,663	6,13,298	8,60,735	**24,80,738**
B	**Usable Qty. (B)**					
i	Earthwork and subgrade for embanment (Cum.)	1,23,649	1,49,472	2,24,579	3,80,079	**8,77,779**
ii	Aggregate for sub base (CTSB/WMM) (Cum.)	1,16,710	1,04,049	1,01,192	68,438	**3,90,389**
iii	Stone for Gabion retaining wall (Cum.)	50,421	44,938	1,70,084	1,93,669	**4,59,112**
iv	Stone for Parapet wall (Cum.)	9,000	7,200	9,000	8,640	**33,840**
v	Aggregate to be used in concreting for structures (Cum.)	12,091	18,238	21,770	16,824	**68,923**
	Total (B) (Cum.)	**3,11,871**	**3,23,898**	**5,26,624**	**6,67,650**	**18,30,042**
C	**Quantity of Dumping Material (Cum.)**		2,87,765	1,27,752	1,72,572	**5,88,089***
D	**Balance Cutting Quantity or Excavated material (A)-(B) (Cum.)**	97,171	-14,000	-41,077	20,513	**62,607**

*****Quantity of dumping material as per the dumping locations for which land is being acquired (9 locations)

Table 6.3: Resource Efficiency as per Green Highway Concept

S. No.	Material	Quantity		
		As per conventional approach	As per Green Highway approach	Savings
1	Soil (Cum.)	10,37,947	10,51,570	(-)13,623
2	Lime (Tonnes.)	0	2,016	(-)2,016
3	Aggregate (Cum.)	13,33,937	12,23,543	1,10,394
4	Bitumen (Tonnes)	8,881	8,499	382

S. No.	Material	Quantity		
		As per conventional approach	As per Green Highway approach	Savings
5	Cement (Tonnes)	3,86,935	1,59,931	2,27,005
6	Sand (Tonnes)	4,81,912	2,35,434	2,46,478
7	Water (Kilolitres)	6,71,152	3,84,526	2,86,625

6.9 Alternatives considered for minimizing cutting of slopes

Slope/earth retaining structure in the form of gabion wall, breast wall, toe wall, retaining wall and bioengineering measures has been proposed along the project road to ensure slope stability and reduction in soil erosion. This will result into minimization of cutting of slopes and minimum impact on land.

CHAPTER 7

CONSULTATIONS WITH KEY STAKEHOLDERS

7.1 Objective of Public Consultation

Consultation with various stakeholders is an integral part of the environmental and social impact assessment and management process.

Stakeholder consultations have important role in the planning process for development projects. Globally, the practice of involving communities in the planning process has been recognized as an effective tool for mitigating the negative impacts due to the projects and ensuring its timely completion. The effectiveness of participation and consultation is directly related to the degree of involvement of the affected groups. The project requires detail planning to ensure that likely project affected persons, local community, interested groups, non-governmental organizations, civil society organizations; local government, line departments, etc are consulted regularly at different stages. Point-wise objectives of public consultation are following:

- Informing stakeholders
- Gaining their views, concerns and values
- Taking account of public inputs in decision making
- Influencing project design
- Obtaining local knowledge
- Increasing public confidence
- Improving transparency and accountability in decision-making
- Reducing conflict

Consultations at micro-level (e.g. project level along the road) and macro-level (e.g. District/State level institutional consultations) is to help the planners to integrate the short term and long terms requirements of the local, State, regional and National goals in to the planning process. The State, National and regional goals are generally set by the legislations and policies in the various human actions by controlling or limiting the activities in order to reduce and nullify the adverse impact generated by infrastructure projects like roads and highways. The quality of a road design does not limit itself into just the engineering requirements of the product but should integrate the quality assurance in the process, product and services as well. In that process, the benefits

accrued due to the project implementation multiply many folds and the general appreciation from all sections of the society would be largely vibrant positive.

In this project, an all-out effort has been made to involve local institutions in to the project preparation/planning process. Although local institutions are the smallest administrative and planning unit that will have to suffer the direct impact due to the air/water/noise pollution and loss of productive land and buildings, accidents and safety issues, these units are largely neglected and rarely consulted.

7.2 DEFINITION OF STAKEHOLDER

A person, group, or organization that has direct or indirect stake in an organization because it can affect or be affected by the organization's actions, objectives, and policies.

Key stakeholders in a business organization include creditors, customers, directors, employees, government (and its agencies), owners (shareholders), suppliers, unions, and the community from which the business draws its resources. Although stake holding is usually self-legitimizing (those who judge themselves to be stakeholders are stakeholder), all stakeholders are not equal and different stakeholders are entitled to different considerations. It is extremely important to involve stakeholders in all phases of the project for two reasons: Firstly, experience shows that their involvement in the project significantly increases your chances of success by building in a self correcting feedback loop; secondly, involving them in project builds confidence and will greatly ease its acceptance in your target audience.

7.3 TYPES/ CATEGORIES OF STAKEHOLDERS

Based on their role towards the project, stakeholders have been categorized into following;

(i) Owners or Project proponent

This is related to the stakeholder who risks their own money in a venture. Whilst they will get a return on their investment, usually in the form of a dividend they have a vested interest in seeing the Organization being successful, to not only guarantee their dividend but also to ensure it grows.

(ii) Government Agencies

Some government departments which will be affected positive or negative or both by proposed road are required to give their inputs to make project successful. These government agencies are Revenue department, Forest department, Electricity department, Agriculture department, Panchayti-raj department, Education department etc.

(iii) Communities

This is very important stakeholder category i.e. PAFs/PAP who are being affected directly through land acquisition or their structures removal full or partial. Persons other than PAF/PA but residing in same location are also significant to provide their opinions/ suggestions in terms of project design.

(iv) Non-Governmental Organizations (NGOs)

The non-government organizations which are working in project affected area can be considered as stakeholder.

7.4 DISSEMINATION MATERIAL

During the meetings, the project team usually explains the various components of the project and its implementation, prior to obtaining their concerns and issues, where ever required, consultants has provided a summary of the project as a dissemination material.

7.5 TYPE OF CONSULTATIONS

Various types of consultations so far carried out during the investigations include;

One to one meetings with affected communities (Figure 7.1 & 7.2).

Focus group meetings with a group or section of communities (Figure 7.3).

One to one meetings are generally held with a few members of local communities. These consultations sometimes focus on one or more specific issues for example flood problem in a given section of the project road. Where ever possible such type of consultations is generally held with informed people. Informed people are those members of the local communities who in their past had a thorough experience and has geographic, political and general knowledge about the country and requirements of the communities.

Focus group meetings are usually conducted with a sample section of the community usually with a good representation from the affected communities. Such meetings usually provide substantial information about the community concerns.

Further stake holder institutions were consulted at project level (e.g. DFOs, Forest Range Officer etc) and also at State level (Wildlife warden, WWF State officer etc).

7.6 FORMAL AND INFORMAL LOCAL CONSULTATIONS

A number of formal and informal consultations have been carried out as a part of the project preparation. Minutes of meetings have been prepared for all important formal meetings. Since meetings with DFOs are crucial to implement the forest regulations, all meetings with DFOs have been minuted. The informal consultations are usually

held informally with officials to understand the institutional concerns at a given specific location for example a section of the project road.

7.7 LEVELS OF CONSULTATIONS

The public consultations were carried out at three stages namely screening, feasibility and social impact assessment of the project. Public consultations at screening and feasibility levels were conducted at those locations which could likely have more impacts than other affected areas in the region. SIA consultations were carried out at village and district level.

Types of consultations done with various participants using different tools including, interviews with government officials, individual consultations, key informant interviews, focus group discussion, stakeholder consultations, etc, are presented in Table 7.1.

Table 0.1: Types of Consultations

Level	Type	Key Participants
Individual	Local level Consultation	People along the project corridor
Individual	Sample Door to Door Personal Contact	People along the project corridor including those that are impacted directly or indirectly
Settlement	Focus Group Discussion	PAP, women, truckers, weaker sections, agriculturist, school teachers
Institutional	Stake holder Discussion	Line departments

7.8 METHODOLOGY ADOPTED INCLUDING INFORMATION DISSEMINATION

Different techniques of consultation with stakeholders were used during project preparation, viz., in-depth interviews, public meetings, group discussions, Individual Consultations etc. to understand the socio-economic profile of the community and the affected families, structured questionnaires were used and information was collected from the individuals on one-to-one basis. The consultations have also been carried out with special emphasis on the vulnerable groups. The key informants during the project preparation phase included both individuals and groups namely:

- ❖ Heads and members of households likely to be affected
- ❖ Project affected Persons (PAPs)
- ❖ Village and Panchayat, Sarpanch and members
- ❖ Local voluntary organizations and NGO

- ❖ Government agencies and departments such as local revenue authority (update by including other Govt Department like Forest & Wildlife, Irrigation, Horticulture, etc)
- ❖ Other project stakeholders with special focus on PAPs belonging to the vulnerable group.

The various levels at which the consultation were held is shown in Figure 7.4

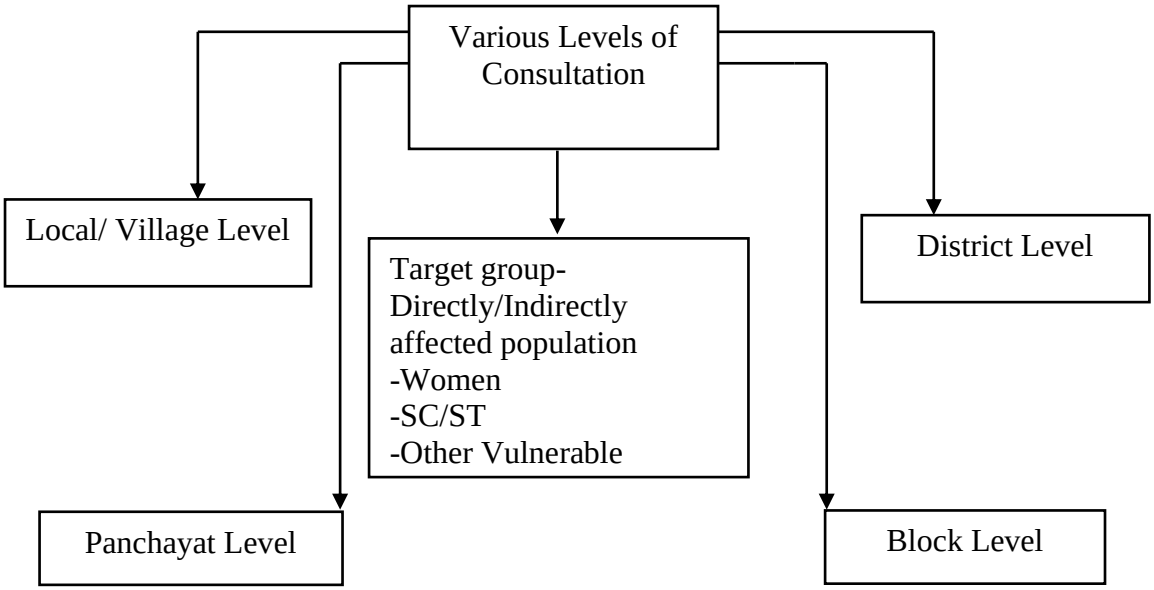


Figure 0.1: Types of Consultations

Videos of Public Consultations carried out in September 2019 have been complied and handed over in CD to the Client and can be accessed by interested individual upon request.

Table 7.2: Summary of Public Consultations

S. No.	**Location**	**Date**	**Type of Consultation**	**No. of persons attended**
1	BDO office meeting hall, Poanta Sahib	07/05/2012	Village Community Consultation	150
2	Panchayat Bhawan, Sataun	08/05/2012	Village Community Consultation	225
3	BDO office meeting hall, Shillai	10/05/2012	Village Community Consultation	350

S. No.	Location	Date	Type of Consultation	No. of persons attended
4	Panchayat Bhawan, Gumma	12/05/2012	Village Community Consultation	250
5	DC office, Nahan, Poanta Sahib	22/10/2018	District Level Consultation	20
6	SARDHA NGO, Kafota	07/03/2019	Focussed Group Discussion	150
7	Gondpur	18/09/2019	Village Community Consultation	35
8	Ajouli	18/09/2019	Village Community Consultation	20
9	Sataun	18/09/2019	Village Community Consultation	30
10	Taal sirmour, Muglawala kartarpura	19/09/2019	Village Community Consultation	25
11	Badwas	19/09/2019	Village Community Consultation	45
12	Kamrau	19/09/2019	Village Community Consultation	38
13	Dugana	19/09/2019	Village Community Consultation	40
14	Bokala pav	19/09/2019	Village Community Consultation	35
15	Shilla	20/09/2019	Village Community Consultation	40
16	Ashyadi	20/09/2019	Village Community Consultation	50

S. No.	Location	Date	Type of Consultation	No. of persons attended
17	Koti Utarau	20/09/2019	Village Community Consultation	35
18	Pab Manal	20/09/2019	Village Community Consultation	55
19	Shillai	21/09/2021	Village Community Consultation	30
20	Bela	21/09/2021	Village Community Consultation	20
21	Bandli	21/09/2021	Village Community Consultation	40
22	Bhatnol	21/09/2021	Village Community Consultation	20
23	Siri kyari	21/09/2021	Village Community Consultation	40
24	Drabil	21/09/2021	Village Community Consultation	35
25	Dharowa, Jhakando	21/09/2021	Village Community Consultation	20
26	Bohar, Gumma	21/09/2021	Village Community Consultation	45
	Total			**1843**

Photos of Public Consultations

Focussed Group Discussions

Meeting with Zila Parishad Members at Shillai

With Sataun Transport Co-op. Society

With Govt. Institutes i.e. SBI, Kafota

Source: *Socio economic survey, CEG (October, 2018)*

At Shillai BDO office Meeting Hall (May 2102) At Panchayat Bhavan, Sataun (May 2102)

Panchayat bhavan Ashyadi Panchayat bhavan Pab Manal

Panchayat bhavan Shilla Panchayat bhavan Gumma

Source: *Socio economic survey, CEG (September, 2019)*

The stake holders include affected communities (on either side of the project road); Institutional stake holders like State Pollution control board, Local Bodies, Water Resource Department, Environment department, Mining and Geological department, Forest department, Horticulture department and project proponent etc

The minutes of meetings and concerns raised by participants along with their signatures has been attached in Annexure-

7.9 PROJECT SPECIFIC CONSULTATIONS

Details of various projects specific consultations have been shown in pictures in subsequent sections. During these consultations specific suggestions/ issues and concerns were sought from the local communities and stake holders.

7.9.1 Local Level Consultations

The objectives of local level consultations were to inform the affected persons about the project, R&R policy of GOI/WB, to incorporate their views in the design and mitigation measures as suggested by them. For organizing the local level consultations, Consultation team was framed-up which includes one Socio-Economic Analyst specialized in qualitative data collection, two women community organizers, two investigators and one moderator. Group discussions were carried out based on semi-structured guidelines. Efforts were made to cover all those villages having major problems viz., relocation of religious structures or big market or residential area getting affected, etc. Both small and big habitations were covered in order to get representation of all the segments of affected population. More than one-group discussions were held in every affected village. The size of group was restricted to 20 to 25 so that everybody gets the chance to express their views on the project. Apart from above Separate group meetings were also organized for women participation in affected villages.

Efforts were made to cover all those villages having major problems viz., relocation of religious structures or big market or residential area getting affected, etc. Both small and big habitations were covered in order to get representation of all the segments of affected population. The Local Level public consultations were carried out at Badri Chowk in Poanta Sahib, Sataun, Kamroo, Tilordhar, Kafota and Shillai in Sirmaur district and in Shimla district are in Guma at the social screening stage. Some selected photographs of the consultation are shows below

Individual Consultations

Badri Chowk RHS side (Poanta Sahib)

Badri Chowk RHS side (Poanta Sahib)

Gondpur RHS side (Poanta Sahib)

Sataun RHS side (Poanta Sahib)

Kafota LHS side (Shillai Tehsil)

Kafota RHS (Shillai Tehsil)

Kafota LHS side (Shillai Tehsil)

Kafota RHS (Shillai Tehsil)

Guma RHS (Chopal Tehsil)

Source: *Public Consultations, CEG*

7.9.2 District Level consultations

District Level consultations were conducted to solicit public and PAPs inputs. Participants in District level consultations included District Magistrate, representatives of District level officials of Revenue departments, NGOs, PAPs and PAP representatives apart from MoRT&H /PIU staff and consultants.

The objectives of district level consultations were:

- To expand awareness of the project among the public, local government, peoples' representatives and non- government organizations.
- To identify social and environmental sensitivities and other concerns in affected districts that should be considered during project design and planning.

To review potential impacts of the project to date; measure taken to avoid, identified in social and environmental assessments reduce or mitigate adverse impacts and minimize displacement; and provisions of projects. District level Consultations Conducted in both the districts shown in Table 7.3 below.

Table 0.3: District level Consultations Conducted in both the districts

S. No.	District	Tehsil	Place of consultation	Remarks
1	Sirmaur	Poanta Sahib	BDO office meeting hall	Importance of Road widening, safety aspects, Compensation for loss
		Sataun	Panchayat Bhawan	Road importance, Safety, Welfare of people
		Shillai	BDO office meeting hall	Safety features, Compensation for loss, facilities
2	Shimla	Guma	Panchayat Bhawan	Compensation for loss, safety aspects, road importance
3	Sirmaur	Poanta Sahib	DC office, Nahan	Safety features, Compensation for loss, transportation
4	Sirmaur	Kafota	SARDHA NGO, Kafota	Compensation for loss, safety aspects, road importance

Source: *District level consultation conducted by CEG*

District Level Consultations

Public Consultations at Poanta Sahib at BDO office Meeting Hall

Public Consultations at Sataun Panchayat Bhawan

Public Consultations at Shillai BDO office meeting hall

Public Consultations at Guma (District Shimla) Panchayat Bhawan

Source: Public Consultations, CEG (May-june, 2012)

Stakeholder's Consultations at Nahan (District Sirmaur) DC Office

Public Consultation with Local People, Various Mahila Mandals, Govt. Bodies, Vyapar Mandal and Students at Kafota, March 2019

7.10 STAKEHOLDER ANALYSIS MATRIX

After the analyses it was found that majority of stakeholders were supportive and showed positive interest in the project. District level authorities including the Tribal welfare officer has been consulted. Information gathered from them clearly indicates that this area falls under Schedule V Area of the Constitution of India. Local users of the road and persons likely to be affected were in favor of the proposed project. However, these people have concern such as compensation and restoration of the means of livelihood. The stakeholder analysis for the project is presented in Table 7.3 The people were concerned about road sides' safety, afforestation and expected employment opportunities in the project.

Table 0.4: Stakeholder Analysis

Stakeholder Category	Relevant Stakeholders	Characteristics (Social, location, size, organizational, capacity)	Interests in terms of support/ opposition	Influence (H-High, M-Medium, L- Low)
Government	District Collector, of Both the districts i.e. Sirmaur and Shimla, Representatives of the PWD NH division Revenue Officers,	Sirmaur and Shimla district	Positive with assurance of full support.	High
Other concerned Departments	Telecom., Water supply, Electricity		Supportive	Low
Intended beneficiaries	Road Users, Local villagers and Transporters Children, women, elderly	Mixed user group, all along the road Dispersed across the corridor	Supportive Supportive	Medium
Adversely affected Persons	Road Side small business units, residents and land owners	Almost all along the project corridor	Supportive with apprehensions of adverse impact	High
Organized interest groups (business associations and trade unions)	Town and small village business groups having their businesses along side road corridors, Transport Organizers etc.	All major habitat-ion areas along side road	Supportive but apprehension of adverse impact	Medium
Civil society (NGOs, CBOs, religious organizations)	SARDHA NGO	N.A.	N.A.	N.A.
Other external/ internal stakeholders	N.A	N.A	N.A	N.A

Source: *Data Collected During Survey*

7.11 MAJOR FINDINGS FROM CONSULTATION

Major findings related to key issues such as land acquisition, compensations for land and structures, alternative alignments, underpasses, general perception about the project, suggestions to mitigate hardships resulting from dislocation and loss of livelihood, resettlement options, perception about HIV/AIDS awareness, CPR requirement etc. However, consultation has been done at different locations at stages as required in the project stretch. Information collected during consultation has been shared with environmental and technical team. Suggestion obtained from people and their representatives have been analyzed on technical and economic merits. Final decisions of engineering design team on alternative alignments, location of pedestrian crossing, location of enhancement of community properties are conveyed to the people. Most of the PAPs suggestions were incorporated in the final design.

Table 0.5: Major Findings from Public consultation in Sirmaur and Shimla districts

S. No	District	Location	Participants	Issues Raised/Discussed	Mitigation Measures
1	**Sirmaur**	**Nahan DC office, May-2012**	Commissioner, PWD, DFO's, HRTC, Education Dept., Chamber of Commerce & Industries, Welfare officer, Consultants etc.	1. DFO Renuka ji was asked to speed up the process of Forest Clearance. 2. Various Stakeholders suggested to develop the sightseeing places along side of the road by dumping the extra soil toward the valley side of the proposed up-gradation of road. 3. President, HPCCI emphasized the Project road to be designed to 4 Lane configuration after 1.5 Km upto Rajban, due to DRDO project near Rajban. 4. The stakeholders expressed satisfaction reg, the project as it will improve commercial connectivity and tourism connectivity. 5. Ex. Eng. Nahan informed, about 4000 Trees will be planted in lieu of trees to be fell.	1. The concerned DFO assured that within next seven days, the forest case for the diversification of the land shall be forwarded to the principle Chief Conservator Forest Shimla. 2. Ex. Eng. Nahan, explained that around 45 lacs cubic meter excavated material will be recovered from site, out of which nearly 15 lacs Cum. will be reused and balance quantity will be dumped in proposed nine dumping sites which will be developed and improved for various purposes e.g. playgro,tttdt, parks, rest areas etc. 3. The Assistant commissioner, Nahan directed to HPSEBL and IPH department to submit the revised estimates at earliest possible to NH wing of the HPPWD.
2	**Sirmaur**	**Poanta**	Local Residents,	6. Compensation for land will be given as per market value? (Shri Toota ram	1 From consultant side –Government will give compensation as per R

S. No	District	Location	Participants	Issues Raised/Discussed	Mitigation Measures
		Sahib, BDO office Meeting Hall, May-2012	Villagers and Public Representatives' of Tehsil, Gram Pradhan. Total Persons-185	Sharma- Gram Pradhan) 7. Widening will be at both sides of the road stretch (Mohit Singh) 8. In the design of the road stretch rain water disposal and drainage system should be considered. (Veerbhadra Singh) 9. NH –Boundary will be marked before finalization of design? (Banshiram-Badripur)	&R Policy of World Bank and Himachal Government Policy. 2. NH-SDO (Dhaula Kuan) Shri N.K. Verma replied widening is based with regards to design & safety. 3. JEN Dhaula Kuan Shri Suryakant Replied – The consultant has investigated the water drainage system, pipe, culverts and bridges as per design. 4. JEN Dhaula Shri Suryakant replied-At present State PWD has marked it. When NH will acquire the land then NH will mark the boundary.
3	**Sirmaur**	**Sataun, Gram Panchayat Pariser, May-2012**	Local Residents, Villagers and Public Representatives' of Tehsil, Gram Pradhan. Total Persons -225	1. Are tenants entitled for compensation? (Shobharam- Kafota) 2. For tenants /titleholders compensation will be finalized under which criteria? (Kauldeep Sharma- Sataun) 3. Widening of road will be equal or different? (Jalim Singh) 4. Land acquisition will be marked/ decided/ finalized by National Highway? (Shri Toot ram Sharma)	1 From consultant side –Government will give compensation as per R &R Policy of World Bank and Himachal Government Policy. 2. As per present market value and R &R Policy as per World Bank and Himachal Government Policy. 3. JEN Dhaula Kuan Shri Suryakant Replied – As per road geometry & position by feasibility and curves.

S. No	District	Location	Participants	Issues Raised/Discussed	Mitigation Measures
				5. Most of the people were concerned about tree cutting and plantation.	5. From consultants' side LA assistant replied- It will be with the assistance of Patwari (Government land assessor). As per Land acquisition plan, acquired land will be marked. 6. They were informed about 4000 Trees will be planted in lieu of trees to be fell.
4	**Sirmaur**	**Shillai BDO office Meeting Hall, May-2012**	Local Residents, Villagers and Public Representatives' of Tehsil, Gram Pradhan. Total Persons -325	1. When the stretch is final from the state PWD, the boundary will be marked by? If it has been marked where it is? (Atiter Singh Naggi-Felicity Board – Poanta) 2. When the land will be acquired by NH. It will be as per existing roads' center line of both the sides? (Sitar am-Shillai) 3. Has NH already marked the boundary line? (Shri Bhawan Singh Shastri-ShriKyri) 4. How much compensation will be given for the acquired land? (Shri Amar Bhardwaj-Shillai)	1. NH-SDO (Dhaula Kuan) Shri N.k. Verma replied-State PWD acquires the land then related department marks and fixed the boundary stones. PWD has already marked and fixed by them but due to heavy rainfall the marked stones were either broken or hidden below the silt. 2. NH-SDO (Dhaula Kuan) Shri N.K. Verma replied- The roads' condition will be investigated such as its curves position, then the land acquisition is acquired. 3. It will be with the assistance of

S. No	District	Location	Participants	Issues Raised/Discussed	Mitigation Measures
					Patwari (Government land assessor). As per Land acquisition plan, acquired land will be marked. 4. From consultant side- Land value will be determined as per present market value. R &R Policy will be based on World Bank and Himachal Government Policy.
5	**Shimla**	**Guma – Tehsil Chopal Out side Pat war Khana, May-2012**	Local Residents, Villagers and Public Representatives' of Tehsil, Gram Pradhan Total Persons-275	1. At present, the road width is equal from both the sides. How much more of land is still required for widening the NH? (Dilip Singh) 2. Who much compensation will be given from the governments' side? (Gram Pradhan-Bohar Shri Dharm Singh) 3. State government PWD has acquired land for road widening but marking is at another place or side? Please look into the matter. (Dharma Singh)	1. NH-JEN (Dhaula Kuan) Shri Suryakant replied- For widening road width, curves and diversion is considered. The road width is different on both the sides. 2 Land value will be determined as per present market value. R &R Policy will be based on World Bank and Himachal Government Policy. 3. NH-JEN (Dhaula Kuan) Shri Suryakant replied- Acquired land has been identified through Khasra numbers by PWD from where the road is passing. Acquired land will be compensated by the Government.

S. No	District	Location	Participants	Issues Raised/Discussed	Mitigation Measures
6	**Sirmaur**	**SARDHA-NGO, kafota, Oct.-2018**	NGO SARDHA, Officials from local Gram Panchayats, Local Govt. bodies, Beopar Mandal officials, ASHA workers, College students etc.	1. Outsider labours may involve in eve teasing and girls and ladies of local area may feel unsafe while morning especially in night hours. (Ms. Manisha Pundir-Student) 2. There are no street lights in habitats and girls feel unsafe while back to their homes from work places during night hours. (Smt. Atro Devi-Presidnet of Teacher association) 3. Payment of compensation to be disbursed may be deposited in individual accounts of ladies instead of joint accounts. (Smt. Geeta sharma president Mahila Mandal Kafota) 4. Local people may be preferred for providing employment in project work during execution. (smt. Mukta sharma president Mahila Mandal Khajuri) 5. Expressed thanks to MoRTH and world Bank for considering this road which will fulfil the needs of local people in much more better ways in coming future	1. Executive Engineer assured that proper check will be maintained on all outsiders and every due consideration will be given that no such unwanted incident occurs. 2. The Executive Engineer NH told to all present that Solar lights have been taken into account for all habitats coming in project stretches and CCTV cameras will also be installed at various locations. 3. Executive Engineer NHHPPWD Nahan assured that proper care has been taken and no such dangers are expected.

S. No	District	Location	Participants	Issues Raised/Discussed	Mitigation Measures
				since people are facing lot of difficulties in present day to day scenario. (sh. Pratap chauhan, president youth Sports club) 6. Expressed thanks and assured full cooperation from all local bodies when project starts. He desired that lobour coming from outside must be provided basis facilities of sanitation. (sh. vir vikram chauhan, president Beopar Mandal) 7. Assured that all outsiders coming in area related to this project will be fully co-operated by local people. (Sh. Ratti Ram) 8. Expressed some fear for his village since same is located on hill top and heavy excavations and cutting may attribute to sliding of their lands. (sh. Kalyan singh chauhan representative of shillai)	

Source: Data Collected During latest Survey

Table 0.6: Details of Village level Public Consultation (September-2019)

Village Name & Date	Common Suggestions by Villagers	Photos of Public Consultation
Gondpur, 18/09/2019, 35 no. of Persons	1. People welcomed for road development with suggestion to provide safety provisions to avoid accidents and better riding quality of road. 2. They are facing problems for commuting to school daily. Project road is welcomed. 3. Existing roads are in bad condition. Good road should be constructed with good thickness of material for long durability. 4. Link roads should be widened as well.	

Village Name & Date	Common Suggestions by Villagers	Photos of Public Consultation
Ajouli, 18/09/2019, 20 no. of Persons	1. People welcomed road development and appreciated for better road provision deliberated in public consultation meeting. 2. Road should be made taking care of human life, business opportunities and tourism.	
Sataun, 18/09/2019, 30 no. of Persons	1. Project road is welcomed by people. It should be widened properly and with drains.	

Village Name & Date	Common Suggestions by Villagers	Photos of Public Consultation
Taal sirmour, Muglawala kartarpura, 18/09/2019, 25 no. of Persons	1. People welcomed the road project. As construction of project road will beneficial for people and Business will be improved.	
Badwas, 19/09/2019, 45 no. of Persons	1. People welcomed the road project as road construction will improve the lifestyle of the people. 2. Road construction should be done with World Bank guidelines. 3. We do not have any problem with road construction, if promises are kept. 4. Proper lighting and provision of culverts should be there. Cutting should be minimized. 5. Provision of Retaining structures and crash barriers should be given for road safety. 6. Hygiene at bus stands should be taken care of with using new technologies.	

Village Name & Date	Common Suggestions by Villagers	Photos of Public Consultation
	7. A passenger shed is required at zero point of the village.	
Kamrau, 19/09/2019, 38 no. of Persons	1. Reasonable compensation must be provided. 2. Road safety should be taken care of. Street lights and crash barriers should be provided. Speed breakers must be provided near schools and hospitals. Proper signboards to be given. 3. Project should be environment friendly. Park should be provided. Plantation should be provided. 4. Proper Dump yard must be provided. 5. Toilet and parking facilities should be provided. 6. Provision of Retaining structures and crash barriers should be given to save houses in valley side. 7. Facility for drinking water and passenger shed is required.	

Village Name & Date	Common Suggestions by Villagers	Photos of Public Consultation
Dugana, 19/09/2019, 40 no. of Persons	1. Proper gradient should be provided on project road to avoid water logging. 2. Crash barriers should be provided. 3. Construction of project road will be beneficial for people. 4. Road should be beneficial for farmers. 5. Road will provide better facility for transport of agriculture produces and vegetables. 6. Reasonable compensation must be provided.	
Bokala pav, 19/09/2019, 35 no. of Persons	1. People appreciated the Project road as it will be beneficial for commuting to school for students. 2. Project road will solve many of our problems like conveyance, paved road, lighting etc.	

Village Name & Date	Common Suggestions by Villagers	Photos of Public Consultation
Shilla,. 20/09/2019, 40 no. of Persons	1. People appreciated the road project as Construction of project road will be beneficial for people. 2. Road safety should be taken care of. Solar lights and crash barriers should be provided. Sign boards must be provided near schools and hospitals. 3. Scholl playground should be provided. Toilet facilities should be provided. 4. Provision of Retaining structures for safety of villagers. 5. Paved Village roads should be constructed. 6. Cutting of hills should be compensated with retaining structures (breast wall with total height of 9m with each step of 3m height & width) 7. Private land should be acquired for dumping yard. 8. Breast wall is required at school building, patwar building, and ayurvedic hospital. 9. Reasonable compensation must be provided.	

Village Name & Date	Common Suggestions by Villagers	Photos of Public Consultation
Ashyadi, 20/09/2019, 50 no. of Persons	1. Project road is required urgently. Reasonable compensation must be provided.	
Koti Utarau, 20/09/2019, 35 no. of Persons	1. Construction of project road will be convenient and beneficial for people. Reasonable compensation must be provided. 2. Project work should be started as soon as possible. 3. Houses built along the road should be kept safe while construction. 4. Double lane road construction will be beneficial for people. 5. Road construction will reduce travel time of passengers.	

Village Name & Date	Common Suggestions by Villagers	Photos of Public Consultation
Pab Manal, 20/09/2019, 55 no. of Persons	1. Cutting should be done with hands instead of machines. Retaining structures should be built with crash barriers. 2. Road should be constructed but with less damage. 3. We should be informed before construction of the road because we have land on road.	
Shillai, 21/09/2019, 30 no. of Persons	1. Local people should be consulted and hygiene should be taken care of.	

Village Name & Date	Common Suggestions by Villagers	Photos of Public Consultation
Bela, 21/09/2019, 20 no. of Persons	1. Project road is very necessary. Provision of drain and culvert is required.	
Bandli, 21/09/2019, 40 no. of Persons	1. Safety features in valley side must be provided. 2. Reasonable compensation must be provided.	

Village Name & Date	Common Suggestions by Villagers	Photos of Public Consultation
Bhatnol, 21/09/2019, 20 no. of Persons	1. Two lane road should be constructed. 2. Reasonable compensation must be provided. 3. Safety features in valley side must be provided.	
Siri kyari, 21/09/2019, 40 no. of Persons	1. Project road should be constructed as soon as possible. Good quality of material should be used in construction. 2. Cut material should not be dumped in private land. It should be dumped in dumping site to avoid damage. 3. Safety features in valley side must be provided to avoid erosion. 4. Reasonable compensation must be provided. 5. Provision of street light must be given	

Village Name & Date	Common Suggestions by Villagers	Photos of Public Consultation
Drabil, 21/09/2019, 35 no. of Persons	1. Two lane road is very necessary. 2. Reasonable compensation must be provided.	
Dharowa, Jhakando, 21/09/2019, 20 no. of Persons	1. Project road is welcomed. 2. Reasonable compensation must be provided.	

Village Name & Date	Common Suggestions by Villagers	Photos of Public Consultation
Bohar, Gumma, 21/09/2019, 45 no. of Persons	1. National highway should be up-garded. 2. Reasonable compensation must be provided. 3. Street lights should be provided. Speed breakers must be provided near schools. 4. Existing condition of the road is bad. Paved road and toilet should be provided in market area. 5. Provision of water storage facilities for irrigation purpose should be given. 6. Proper drainage should be provided. 7. Two lane road construction is necessary because great crowd of vehicles create nuisance during apple season. 8. Reputed contractor must be hired for construction of road to avoid bad quality of construction. 9. In Gumma market, road level should be 1 m down from shop level (ground level) to avoid water entering in shops.	

Note:

1. ***Public consultation form containing individual suggestions of PAPs/stakeholders are enclosed as Annexure-???? with this EIA report***

7.12 CONCLUSION/RECOMMENDATIONS

Major findings related to key issues such as general perception about the project, suggestions to mitigate hardships resulting from dislocation and loss of livelihood, the details of which are presented below Most of the People were aware about the project:

- ❖ People were convinced about the importance of proposed highways in their region since it will reduce accidents and enhance economic opportunities.
- ❖ People consented to cooperate if adequate compensation is given.
- ❖ Most people preferred to resettle if required near to their previous place of business and residence and preferred self-resettlement.
- ❖ Cultivators preferred cash compensation at market rate.
- ❖ Requests were made by the people for providing public facilities and amenities like Street lights, toilets, rain shelter and safer accessibility at points of congestion and intersections
- ❖ Minimum impact on structures along the road was requested.
- ❖ On site relocation for small business enterprise (SBE) is preferred option. They perceived low business growth at new locations
- ❖ Affected People asked about creation of new employment opportunities during road construction and later phases of the project for them
- ❖ People suggested that adequate safety measures should be provided such as Crash barriers, retaining walls, speed breakers, signages etc. near inhabited areas, school and hospitals.

Based on the finding of the consultation with the various stakeholders and especially with the people living along the project corridor, options has been worked out to reduce the loss of assets and livelihood of the people in project impact zone. The consultation process was continued during the design period to minimize the adverse impact.

The community perceives that the project will help in increasing road safety, promote more business, better service facilities, and better conveyance and promote local employment opportunities. They consider that it would lead to increase in land rates and smooth traffic. Apprehensions raised by the community include more accidents, houses coming closer to the proposed alignment, increase in noise, agriculture loss, and effects on livelihood. Compensation should be paid at market rate.

The public consultation meeting was held in presence of Executive Engineer, Assistant Engineer – PWD, NH-Division, Sirmaur and Shimla districts, Gram Pradhan, local public and their representative from Tehsils.

CHAPTER 8

ENVIRONMENTAL MANAGEMENT PLAN

8.1 Introduction

Environmental Management Plan has been prepared which mainly centered on the understanding of the interactions between the environmental setting and the project activities and the assessment of the anticipated impacts. Mitigation measures for anticipated environmental impacts have been elaborated as specific actions which would have to be implemented during the project implementation. The EMP would help the contractors/PIU to implement the project in an environmentally sustainable manner and where contractors, understand the potential environmental impacts arising from the project road and take appropriate actions/mitigation measures to properly mitigate/manage such environmental impacts. EMP can thus be considered to be an overview document for contractors that will guide environment management of all anticipated impacts in proposed two lane upgradation with paved shoulders of Paonta Sahib - Guma section of from Km 0.000 to Km 97.000 of NH 707 in the state of Himachal Pradesh. This EMP may also be considered as flexible and will be further developed by the Contractor in the Contractor's Environment Management Plan.

8.2 Outline of EMP and its Implementation Strategy

The EMP is a guiding tool which discusses the potential environmental impacts and specific mitigation/management measures for the proposed two lane upgradation with paved shoulders of Paonta Sahib - Guma section of from Km 0.000 to Km 97.000 of NH 707 in the state of Himachal Pradesh. It refers to the responsibilities ensuring commitment for implementation and means of verifying/supervision whether the same has been implemented properly. The timing and frequency of monitoring along with the supervision responsibility and reporting requirements are also provided in the Environmental Management Plan. As a part of the EMP, the contractors will commit to identification of the environmental and social impacts at the project road. In case of any future changes in the project road design, the EMP will need to be updated to reflect the new scope of the activities. such revisions will be finalized in consultation with the World Bank.

The PIU will be responsible to ensure implementation of EMP by the contractors with the overall accountability resting with the GNHCP-PMU. Whereas, the PIU/ Independent Engineer will ensure periodic quality audit/ guidance to the PIU and by imparting regular training, monitoring and ensuring that all EMP provisions and requirements are translated into 'contract documents and that these requirements are implemented to their full intent and extent.

Overall responsibility will be of Contractor for effective implementation of EMP and adherence to all the mitigation measures as outlined in this EMP associated with their respective activities. The Contractor will be required to comply with the provisions of the EMP.

8.3 Environmental Management Plan

The Environmental Management Plan (EMP) will guide the environmentally-sound construction of the project road and ensure efficient lines of communication/co-ordination between the PIU, Contractor, GNHCP-PMU. The EMP has been prepared for three stages of project road construction activities as: (i) Pre-construction Stage; (ii) Construction Stage; and (iii) Demobilization Stage. EMP for above project road have been prepared and presented in **Table 8.1.** Various guidelines, checklists and reporting formats for implementation of EMP are given as Annexures at the end of EIA Report.

The purpose of the EMP is to ensure that the activities are undertaken in a responsible non-detrimental manner with the objectives of: (i) provide a pro-active, feasible and practical working tool to enable the measurement and monitoring of environmental performance on site; (ii) guide and control the implementation of findings and recommendations of the environmental assessment conducted for the subproject; (iii) detail specific actions deemed necessary to assist in mitigating the environmental impacts of the project road; and (iv) ensure that safety recommendations are complied with.

Budgetary provisions for implementation of EMP shall be integrated with the bid/construction contract in the form of technical specifications and environmental performance requirements. The costs to be incurred on implementation of EMP shall be incidental to the civil works and therefore, no separate environment budget/cost will be provided to the contractor for implementation of EMP. The contractor will ensure effective implementation of EMP during pre-construction, construction and demobilization stages. EMP for operation stage will be implemented by PIU/PMU.

The Contractor is deemed not to have complied with the EMP if; i), within the boundaries of the project site/ ancillary sites, site extensions and haul/ access roads, (ii) there is evidence of contravention of clauses, (iii) if environmental damage ensues due to negligence, (iv) the contractor fails to comply with corrective action measures or other instructions issued by the PIU) / GNHCP-PMU within a specified timeframe and (v) the Contractor fails to respond adequately to complaints from the public.

Table 8.1: Environmental Mitigation Measures and Management Plan

S. No.	Environmental Issues	Environmental Mitigation Measures	Responsibilities	
			Planning and Execution	Supervision/ Monitoring
A.	**Pre-Construction Stage**			
	Pre-construction Activities By the PIU			
A.1	Tree Cutting Permission	• Approximately 3596 trees are likely to felled for upgradation of the project. All efforts will be made to minimise cutting of trees. • Prior permission will be obtained for cutting trees.	PIU	PMU
A.2	Preservation of Trees	• All efforts will be made to preserve trees including evaluation of minor design adjustments/alternatives (as applicable) to save trees. • In the event of design changes, additional assessments including the possibility to save trees shall be made. Stacking, transport and storage of the wood will be done as per the relevant norms Systematic corridor level documentation for the trees cut and those saved will be maintained by the PIU.	PIU	PMU
A.3	Utility Shifting	Prior permission will be taken from line department offices of Electricity (PDD), Telecommunications (for OFC underground cables etc), water Pipeline (PHE) etc. Utility shifting required to be undertaken by PIU.	PIU	PMU
	Orientation of Implementing Agencies	The PIU shall organize orientation sessions for contractor. This shall include on-site training (general as well as specific to the context of this project road. In training session PIU officers, project staff, contractors, consultants etc will be involved.	PIU	PMU
	Pre-construction Activities By the Contractor			
A.4	Appointment and Mobilization of Environment & Safety Officer	• The contractor will appoint qualified and experienced Environment & Safety Officer (ESO), who will dedicatedly work and ensure implementation of EMP including Occupational, Health and Safety measures. • Contractor to inform the PIU for the appointment and mobilization each ESO	Contractor	Independent Engineer /PIU
A-5	Regulatory Approvals	• Prior permission will be obtained from concerned Department for any works related to culverts, embankment construction, protective works etc. along or near natural streams. • Labour license from Department of Labour. • If contractors open new stone quarry or borrow areas, prior Environmental Clearance will be obtained from SEIAA/DEIAA. • For setting–up of Stone Crusher Plant, HMM Plants, Batching Plant, D.G Sets-Consent to Establish and Consent to Operate will be obtained from Himachal Pradesh Pollution Control Board (HPPCB) or if contractor intend to procure construction materials from local authorized third party agencies then	Contractor	Independent Engineer /PIU

S. No.	Environmental Issues	Environmental Mitigation Measures	Responsibilities	
			Planning and Execution	Supervision/ Monitoring
		contractor will collect and submit necessary clearance/approval from authorized third party agencies.		
A-6	Common Property Resources (CPR's)	• All common property resources shall be relocated and restored before the commencement of the road improvement activities. • Before commencement of works, a joint field Monitoring will be conducted by the Contactor and PIU to map out the alignments, to check if any CPR is being impacted due to construction works. While relocating these utilities and facilities all concerned agencies including PIU shall take necessary precautions and shall provide barricades/delineation of such sites to prevent accidental fall of pedestrian and other road users into pits, drains both during demolition and construction/ relocation of sum facilities.	Contractor	Independent Engineer /PIU
A.7	Procurement of Machinery, Crushers, Batching Plants etc	• Specifications of Machinery, crushers, and batching plants shall comply with the requirements of the relevant environmental legislations. Crusher, Batching plants and hot mix plant shall be located 250m away from settlements/ commercial establishments, preferably in the downwind direction. • No plants should be set-up within 250m from the residential/ settlement locations. The Contractor shall submit a detailed layout plan for such sites and seek prior approval of PIU before entering into formal agreement with a land owner for setting-up such sites. • Actions by PIU/PMU against any non-compliance shall be borne by the Contractor at his own cost. Arrangements to minimize dust pollution through provision of water spray shall have to be provided at such sites.	Contractor	Independent Engineer /PIU
A.8	Construction Camp Locations - Selection, Design & Lay-out	• If contractor decides to establish labour camp, siting of the camp will be as per the guidelines given in Annexures- and layout of camp will be approved by PIU. • Labour camp will not be established within 250 m from the nearest settlement to avoid conflicts and stress with the local community.	Contractor	Independent Engineer /PIU
A.9	Arrangements for Temporary Land for Camp	The Contractor will obtain consent from land owners in writing for temporary use of land for labour camp, etc..	Contractor	Independent Engineer /PIU

S. No.	Environmental Issues	Environmental Mitigation Measures	Responsibilities	
			Planning and Execution	Supervision/ Monitoring
A.10	Construction Vehicles, Equipment and Machinery	• All vehicles and equipment to be procured for the proposed up-gradation works of project road will conform to the relevant Bureau of Indian Standard (BIS) norms. The discharge standards promulgated under the Environment Protection Act, 1986 and Motor Vehicles Act, 2019 will be strictly adhered to. • The silent/quiet equipment like DG set as per regulations will be used at the construction site or labour camp. • The contractor will maintain records of Pollution Under Control (PUC) certificates for all vehicles used during the contract period, which will be produced to PIU for Monitoring and whenever required.	Contractor	Independent Engineer /PIU
A.11	Arrangement for Construction Water	• The contractor shall source construction water preferentially from surface water bodies in the project area. Boring of any tube wells shall be drilled only after obtaining necessary permission from Central Ground Water Authority. • To avoid disruption/disturbance to other water users, the contractor shall extract water from fixed locations. The contractor shall consult the local people before finalization the locations. • Contractor can extract ground water only in case surface water sources are not available and that too only after proper permission from Central Ground Water Authority.	Contractor	Independent Engineer /PIU
A.12	Sand (all river beds used directly or indirectly for the project)	If the supplier of sand is another (third) party, the authentic copy of lease agreement that has been executed between the local Tehsildar and the supplier has to be submitted to PIU/PMU of the project, before any procurement is made from such a site. Environmental clearance for stone quarry and borrow area will be obtained from DEIAA/SEIAA.	Contractor	Independent Engineer /PIU
A.14	Labour Requirement	• The contractor preferably will use unskilled/semiskilled labour from local areas to give the maximum benefit to the local community to avoid any additional stress on the existing facilities. On an average150 labours/ day will be required during construction stage depending upon extent of construction work. • All applicable labour regulation will be complied by the contractor. • Necessary facilities will be provided to workers as per The Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996	Contractor	Independent Engineer /PIU
A.15	Traffic Management Plan- Planning for	• Detailed traffic control plan shall be prepared by the contractor and same shall be submitted to the PIU for approval. The traffic control plans shall contain details of temporary diversions, traffic safety arrangements	Contractor	Independent Engineer /PIU

S. No.	Environmental Issues	Environmental Mitigation Measures	Responsibilities	
			Planning and Execution	Supervision/ Monitoring
	Traffic Diversions and Detours	including night time safety measures, details of traffic arrangement after cessation of work each day, safety measures undertaken for transport of hazardous materials and arrangement of flagmen etc to regulate traffic congestion. • The contractor shall provide specific measures for safety of pedestrians and workers as a part of traffic control plans. The contractor shall ensure that the diversion/detour is always maintained in running condition, particularly during the monsoon to avoid disruption to traffic flow. • The Contractor shall also inform local community about diversion in traffic routes and pedestrian access arrangements with assistance from PIU.		
A-17	Stockyard/ Storage of Construction Material and Establishing Equipment Lay-down Area	• Contractor in consultation with PIU shall identify the site for temporary use of land storage of construction materials including pipes etc. These sites shall not cause an inconvenience to local population / traffic movement. These locations shall be approved by the PIU. • Selection of location for materials storage and equipment lay-down areas must take into account prevailing winds, distances to adjacent land uses, general on – site topography and water erosion potential of the soil. Impervious surfaces must be provided wherever necessary. • Protect material stockpiles from storm water (e.g. by excavating a cut-off ditch around stockpiles to keep away storm water). • Enclosed storage for fuel with non- permeable flooring. • Contractor shall cover material stockpiles with tarpaulin or other materials. Avoid stockpiling material near natural streams. • Proper cover and stacking of loose construction material will be ensured during construction of outfall structures at construction site to prevent surface runoff and contamination of receiving water body. • Staff dealing with these materials / substances must be aware of their potential impacts and follow the appropriate safety measures. The contractor must ensure that its staff is made aware of the health risks associated with any hazardous substances like bitumen, diesel, used oil and has been provided with the appropriate protective clothing/equipment in case of spillages or accidents and have received the necessary training. Necessary training and awareness program shall be carried out to make aware the contractor and its staff aware about hazardous nature of substances.	Contractor	Independent Engineer /PIU

S. No.	Environmental Issues	Environmental Mitigation Measures	Responsibilities	
			Planning and Execution	Supervision/ Monitoring
A-18	Information Dissemination and Communication Activities	• Prior to construction activity, information dissemination will be undertaken by contractor at the project site. The wider dissemination of information to public will be undertaken through the disclosure of EA / EMP reports on the website of MORTH. • Project information Board showing the name of work, project cost, duration, date of commencement, date of completion, executing agency and contact details (including telephone numbers) shall be displayed both sides of the both roads in both English and in Vernacular. • Information boards will also be setup at the sites of construction camps and labour camps, plants and stockyard site. • Details of nodal officer with telephone numbers will be displayed for registering compliant/grievances by stakeholder/general public.	PMU Contractor	PMU Independent Engineer /PIU
B.	**Construction Stage**			
B.1	**Site Clearance (Clearing and Grubbing)**			
B.1.1	Clearing, grubbing and Levelling	• If required vegetation will be removed from the construction zone only. • All works will be carried out such that the damage or disruption to flora other than those identified for cutting is minimum. Only ground cover/shrubs that impinge directly on the permanent works or necessary temporary works will be removed with prior approval of PIU. • The Contractor, under any circumstances will not cut or damage trees. • Trees identified under the project will be cut only after receiving necessary permissions. Vegetation with girth size of over 30 cm will be considered as trees and shall be compensated.	Contractor	Independent Engineer /PIU
B.1.2	Dismantling of Culverts	Reconstruction of culverts is proposed in the project road. All necessary measures shall be taken especially while working close to cross drainage channels to prevent earthwork, stonework, materials and appendage as well as the method of operation from impeding cross-drainage at streams, water canals, existing irrigation and drainage systems. Demolition wastes will be collected and disposed as per the provision of Construction & Demolition Rule 2016.	Contractor	Independent Engineer /PIU
B.1.3	Generation & disposal of Debris	• Debris generated due to the dismantling of the existing road shall be suitably reused in the proposed construction. • Scarified asphalts and the other construction wastes shall be appropriately re-used in road construction with the permission of PIU.		

S. No.	Environmental Issues	Environmental Mitigation Measures	Responsibilities	
			Planning and Execution	Supervision/ Monitoring
		The dismantled road and scarified bitumen waste shall be utilized for the paving of cross roads, access roads and paving works in construction sites and campus, temporary traffic diversions, haulage routes, parking areas along the roads or in any other manner approved by the PIU. • The Contractor will suitably dispose off unutilized debris and waste materials either through filling up of borrows areas located in wasteland or at pre-designated disposal locations, subject to the approval of the Environmental Expert of PIU. • At locations identified for disposal of residual bituminous wastes, the disposal will be carried out over a 60 mm thick layer of rammed clay so as to eliminate the possibility of leaching of wastes into the ground water. The Contractor will ensure that the surface area of such disposal pits is covered with a layer of soil. • All arrangements for transportation during construction including dismantling and clearing debris, will be considered incidental to the work and will be planned and implemented by the Contractor as approved and directed by the Environmental Expert of PIU. • The pre-designed disposal locations will be a part of Solid Waste Management Plan to be prepared by Contractor in consultation and with approval of Environmental Expert of PIU. • Debris generated from pile driving or other construction activities shall be disposed such that it does not flow into the surface water bodies or form mud puddles in the area.		
B.1.4	Stripping, stocking and preservation of top soil	The topsoil from areas to be permanently covered will be stripped to a specified depth of 150 mm and stored in stockpiles. A portion of the temporarily acquired area and/or right of use will be earmarked for storing topsoil. The locations for stock piling will be pre-identified in consultation and with approval of Environmental Specialist of PIU. The following precautionary measures will be taken to preserve them till they are used: (a) Stockpile will be designed such that the slope does not exceed 1:2 (vertical to horizontal), and height of the pile is restricted to 2 m. To retain soil and to allow percolation of water, silt fencing will protect the edges of the pile.	Contractor	Independent Engineer /PIU

S. No.	Environmental Issues	Environmental Mitigation Measures	Responsibilities	
			Planning and Execution	Supervision/ Monitoring
		(b) Stockpiles will not be surcharged or otherwise loaded and multiple handling will be kept to a minimum to ensure that no compaction will occur. The stockpiles shall be covered with gunny bags or vegetation. (c) It will be ensured by the Contractor that the topsoil will not be unnecessarily trafficked either before stripping or when in stockpiles. Such stockpiled topsoil will be utilized for: • Covering all disturbed areas including borrow areas, only in a case where there are to be rehabilitation • Dressing of slopes of road embankment • Agricultural fields of farmers acquired temporarily land.		
B 1.5	Accessibility	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. The Contractor will also ensure that the existing accesses will not be undertaken without providing adequate provisions. The Contractor will take care that the cross roads are constructed in such a sequence that construction work on the adjacent cross roads are taken up one after one so that traffic movement in any given area not get affected much.	Contractor	Independent Engineer /PIU
B 1.6	Planning for Traffic Diversions And Detours	Temporary diversions will be constructed with the approval of the Environmental Specialist of PIU. Detailed Traffic Control Plans will be prepared by the Contractor and approved by Environmental Specialist, seven days prior to commencement of works on any section of road. The traffic control plans shall contain details of temporary diversions, traffic safety arrangements for construction under traffic, details of traffic arrangement after cessation of work each day, safety measures for night time traffic and precaution for transportation of hazardous materials and arrangement of flagmen. The Contractor will ensure that the diversion/detour is always maintained in running condition, particularly during the monsoon to avoid disruption to traffic flow.	Contractor	Independent Engineer /PIU

S. No.	Environmental Issues	Environmental Mitigation Measures	Responsibilities	
			Planning and Execution	Supervision/ Monitoring
		The Contractor will also inform local community of changes to traffic routes, conditions and pedestrian access arrangements. 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).		
B.2	**Procurement of Construction Materials**			
B.2.1	Procurement for Aggregate and other construction materials	• No borrow area will be opened without permission of the Environmental Specialist and without obtaining necessary regulatory permission. The location, shape and size of the designated borrow areas will be as approved by the Environmental Specialist and in accordance to the IRC recommended practice for borrow pits for road embankments (IRC 36: 2010). The borrowing operations will be carried out as specified in the guidelines for siting and operation of borrow areas. • The unpaved surfaces used for the haulage of borrow materials, if 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. • During dry seasons (winter and summer) frequency of water sprinkling will be increased in the settlement areas and Environmental Specialist of PIU will decide the sprinkling time depending on the local requirements. Contractor will rehabilitate the borrow areas as soon as borrowing of soil is over from a particular borrow area in accordance with the approved borrow area Redevelopment Plan.	Contractor	Independent Engineer /PIU
B.2.2	Quarry Operations & Crushers	The Contractor shall obtain materials for approved quarries. The crushers will be operated after obtaining consent to establish and consent to operate from APPCB.	Contractor	Independent Engineer /PIU
B.2.3	Transporting Construction Materials	• Contractor will maintain all roads, which are used for transporting construction materials, equipment and machineries. • All vehicles delivering fine materials like aggregate, cement, earth, sand, etc, to the site will be covered by Tarpaulin to avoid spillage of materials and wind blown dust from the top of vehicles.	Contractor	Independent Engineer /PIU

S. No.	Environmental Issues	Environmental Mitigation Measures	Responsibilities	
			Planning and Execution	Supervision/ Monitoring
		• Existing road used by vehicles of the contractor or any of his subcontractor or suppliers of materials will be kept clear of all dust/mud or other extraneous materials dropped by such vehicles. • The contractor will make effort to transport materials to the site in non- peak hours		
B.3	**Construction Work**			
B.3.1	Labour Camp Site	• Project information board will be displayed at the labour camp site. • Electrical cables and wires will be properly arranged with proper electrical safety. Loose electrical connections will not be allowed at the labour camp. • Red danger sign with bone & skull will be displayed as per The Electrical Rules at three phase motors, electrical panels and electrical machines, DG sets, etc. • Housekeeping at labour camp will be maintained properly. Daily sweeping and cleaning will be done at the labour camp. • HIV Aid awareness posters will be displayed at the camp site. • Solid waste generated at the camp site will be collected in covered waste bins. Then, it will be segregated as biodegradable (food waste, paper, etc) and non-biodegradable (plastic, polyethylene bag, etc) wastes. Polyethylene/plastic wastes will be stored in empty cement bags and to be sent for recycling through scrap dealer. Biodegradable (food waste, paper, etc) solid waste will be disposed in compost pit. Non-biodegradable inert wastes will be sent to nearest land fill site. • Proper drinking water, well ventilated accommodation, sanitation, canteen facilities will be provided to workers at the labour camp. • Suitable signages will be displayed at labour camps.	Contractor	Independent Engineer /PIU
B.3.2	Drainage and Flood control	• Bridges and culverts are proposed to be constructed in the proposed project: • The Contractor shall ensure that no construction materials/debris shall block the water flow or create water lodging at the work site. The Contractor shall take remedies to remove accumulated water (if any) from the construction sites, camp sites, storage yard, excavated areas etc. • Construction works should plan well in advance prior to on-set of monsoon to avoid water- pool besides providing temporary cross drainage systems. The contractor shall take all adequate precautions to ensure that construction materials and excavated materials are enclosed in such a manner that erosion or run off of sediments is controlled.	Contractor	Independent Engineer /PIU

S. No.	Environmental Issues	Environmental Mitigation Measures	Responsibilities	
			Planning and Execution	Supervision/ Monitoring
		• Silt fencing shall be installed prior to the onset of the monsoon at all the required locations, as directed by PIU/PMU. Prior to monsoon, the contractor shall provide either permanent or temporary drains to prevent water accumulation in surrounding residential, commercial and agricultural areas.		
B.3.3	Siltation of Water Bodies and Degradation of Water Quality	• The project roads are crossing natural streams at 25 locations, which remain dry in non-rainy days. • The Contractor will not excavate beds of any stream/canals/ any other water body for borrowing earth for embankment construction. • Contractor will construct silt fencing at the base of the embankment construction for the entire perimeter of any water body (including wells) adjacent to the project road and around the stockpiles at the construction sites including ancillary sites close to water bodies. The fencing will be provided prior to commencement of earthwork and continue till the stabilization of the embankment slopes, on the particular sub-section of the road. • Contractor will ensure that construction materials containing fine particles are stored in an enclosure such that sediment-laden water does not drain into nearby watercourse. • On completion of construction of culverts and bridges, drainage channels will be cleared by collecting debris and disposed suitably. Detours/diversions constructed for construction of culverts and bridges will be also be cleared before onset of monsoon.	Contractor	Independent Engineer /PIU
B.3.4	Slope Protection and Control of Soil Erosion	• For construction of realignments at Paonta Sahib - Guma section of from Km 0.000 to Km 97.000 of NH 707, earth filling will be required for embankment for new road construction, which will require slope protection and control of soil erosion. • The Contractor will construct slope protection works as per design, or as directed by PIU to control soil erosion and sedimentation through use of Breast walls, Retaining Walls, gabion wall, dykes, sedimentation chambers, basins, fibber mats, mulches, grasses, slope, drains and other devices. • All temporary sedimentation, pollution control works and maintenance thereof will be deemed as incidental to the earth work or other items of work and as such no separate payment will be made for them. Contractor will ensure the following aspects:	Contractor	Independent Engineer /PIU

S. No.	Environmental Issues	Environmental Mitigation Measures	Responsibilities	
			Planning and Execution	Supervision/ Monitoring
		• After construction of road embankment, the side slopes will be covered with grass and shrubs as per design specifications. • Turfing works will be taken up as soon as possible provided the season is favourable for the establishment of grass sods. Other measures of slope stabilization will include mulching netting and seeding of batters and drains immediately on completion of earthworks. • In borrow pits, the depth shall be so regulated that the sides of the excavation will have a slope not steeper than 1 vertical to 2 horizontal, from the edge of the final section of the bank. • Along sections abutting water bodies, pitching as per design specification will protect slopes.		
B.3.6	Pedestrian and Vehicular Traffic Movement Management	• Detailed traffic control plans will be prepared and submitted to the PIU for approval one week prior to commencement of works. • The traffic control plans shall contain details of temporary diversion, details of arrangements for construction (road stretches, timing and phases). • Provide the construction itinerary in advance so that the road users can use alternative routes. • Erect warning and safety signs of ongoing works. • Suitable retro reflective warning signs should be placed at near construction locations and should be visible at night. • Alternative access ways should be communicated to the community by way of announcement appropriately for the public information. • The contractor shall take all necessary measures for the safety of traffic during construction and shall provide, erect and maintain such barricades, including signs, markings, flagmen as proposed and approved by PIU. The contractor shall ensure that all signs, barricades, pavement markings are provided as per applicable IRC code and guidelines. Install signage, barricading, fencing as required and include safety measures for transport of materials/ equipment's, which shall be limited to certain times, and arrangements for flagmen at intersection.	Contractor	Independent Engineer /PIU
B.3.7	Excavation works for longitudinal drains along road corridor	• As per DPR, proper drainage arrangement of earthen drain length of 46400 m and RCC drain length of 7400m (both sides) at built up locations are proposed along the project road.	Contractor	Independent Engineer /PIU

S. No.	Environmental Issues	Environmental Mitigation Measures	Responsibilities	
			Planning and Execution	Supervision/ Monitoring
		• At the excavation site, warning sign boards will be displayed in vernacular language and English. • Entry of general public/unauthorized person will be restricted. • During excavation for laying of concrete (RCC) cover drains necessary safety measures will be taken by the contractor. • Excavation of 1.5 meters deep or greater requires a sides protection (Close Timbering and step cutting) unless the excavation is made entirely in stable rock. • Contractor to follow strict protocol during construction/ excavation for longitudinal drainage especially along the sensitive receptors like schools, mosque, community centers, religious places, shrines, grave yard etc. • Excavated earth will be collected and disposed in pre-identified site with the approval of PIU. Excavated earth shall not be dump on the carriageway or shoulders. • Casted drain block and drain cover will not be stacked on the road. • To ensure elimination of excavation hazards, excavation will be carried in the presence of competent person. • Suitable barricading will be provided around the excavation site. • Suitable personal protective equipment will be provided to the workers.		
B.3.8	Handling of Cement Bags	• Cement bags will be stored and emptied in covered area to control fugitive dust emissions. • While handling and emptying cement bags, workers will wear masks, hand gloves and protective goggles. • Manual transferring of cement bags from one place to another place will not be allowed. For this purpose, trolley will be used.	Contractor	Independent Engineer /PIU
B.3.9	Work-zone safety Management	• The Contractor shall prepare the construction safety plan as per provisions under the IRC 67-2001, SP-55 for safe work zone to be duly approval by the environmental specialist of PIU/PMU prior to start of road works. • Temporary barricades shall be provided to delineate construction zone as well material stacking areas. The construction site and the labour facility (if any) shall be appropriately barricaded to prevent entry and accidental tress passing of workers, staff and others into the construction site. • All operational areas shall be access controlled. Watch and ward facilities at all times shall be provided by the contractor.	Contractor	Independent Engineer /PIU

S. No.	Environmental Issues	Environmental Mitigation Measures	Responsibilities	
			Planning and Execution	Supervision/ Monitoring
		• Proper retro reflective warning signage will be installed on the access road next to the construction site about movement of construction machinery and vehicles. • In excavations for longitudinal surface road drains, culverts etc., a high visibility warning and retro reflective signage shall be displayed in vermicular language and English. Entry of unauthorized persons should be restricted. Excavation of 1.5 metres deep or greater will be adequately barricaded. • There shall be adequate lighting arrangement at night to prevent mishaps after construction activity ceases for the day • All the retro reflective Safety signage as per IRC 55 will be erected at construction site for generating awareness among local community and road user during the construction.		
B.3.10	Sensitive Receptors- Impact Management	• At each sensitive receptor like schools, religious places, shrines, community centers, grave yards etc and in general residential houses, the construction operations in these areas should be limited to time period of 7:30 am to 6:00 pm. • Periodic maintenance and calibration of construction equipment's/ vehicles to meet applicable CPCB emission standards. • Contractor to ensure regular dust suppression measures by way of standard and efficient water sprinkling through water tankers at these designated sensitive receptors. • Noise barriers shall be installed during the construction phase to protect the school from the noise from construction activities. • Adequate barricading and safety measures to protect dust pollution and noise impacts on sensitive receptors like schools and religious places etc. due to vehicle movement to be ensured prior to the start of work and their effectiveness to be checked during construction.	Contractor	Independent Engineer /PIU
B.3.11	Occupational Health and Safety of Workers	• The contractor will prepare and follow the OHS plan, including provisions for emergency response plan • All workers will be provided with requisite personal protective equipment • Emergency Telephone Numbers shall be displayed at camp and plant site. • Medical facilities shall be provided for workers at Labour camp and plant site.	Contractor	Independent Engineer /PIU
B.4	**Pollution**			

S. No.	Environmental Issues	Environmental Mitigation Measures	Responsibilities	
			Planning and Execution	Supervision/ Monitoring
B.4.1.1	Water Pollution from Construction Wastes	• The project roads are crossing natural streams at design chainage 25 locations, which remain dry in non-rainy days. • The contractor will take all precautionary measures to prevent entering of wastewater into streams, water bodies or the irrigation system during construction. Contractor will avoid construction works close to the streams or water bodies during monsoon. • Contractor shall not wash his vehicles in river water and shall not enter riverbed for that purpose. • Any type construction wastes will not be disposed in rivers or water bodies.	Contractor	Independent Engineer /PIU
B.4.1.2	Water Pollution from Fuel and Lubricants	• The Contractor will ensure that all construction vehicle parking locations, fuel/lubricants storage sites, vehicle, machinery and equipment maintenance and refuelling sites will be located at least 250 m away from rivers and irrigation canal/ponds. The Contractor will submit all locations and layout plans of such sites prior to their establishment and will be approved by the Environmental Specialist of PIU. Contractor will ensure that all vehicle/machinery and equipment operation, maintenance and refuelling will be carried out in such a fashion that spillage of fuels and lubricants does not contaminate the ground. Wastewater from vehicle parking, fuel storage areas, workshops, wash down and refuelling areas will be treated in an oil interceptor before discharging into on land or into surface water bodies or into other treatment system. • In all, fuel storage and refuelling areas, if located on areas supporting vegetation, the top soil will be stripped, stockpiled and returned after cessation of such storage. • Contractor will arrange for collection, storing and disposal of oily wastes to the pre-identified disposal sites • All oil spills, used oil will be disposed off in accordance with Himachal Pradesh Pollution Control Board (HPPCB) guidelines.	Contractor	Independent Engineer /PIU
B.4.1.2	Waste Water from Labour Camp	• Waste water generated from the sanitary facilities at labour camp will be treated in septic tank followed by soak pit. • No untreated raw sewage/waste water will be discharged into any river and water body. • Workers will not be allowed for open defecation. Proper toilets fitted with septic tank and soak pit will be provided for workers at camp site. At the bridge	Contractor	Independent Engineer /PIU

S. No.	Environmental Issues	Environmental Mitigation Measures	Responsibilities	
			Planning and Execution	Supervision/ Monitoring
		construction site portable toilets shall be provided for workers and sewage from portable toilets shall be passed through septic tank followed by soak pit.		
B.4.2	**Air Pollution**			
B.4.2.1	Dust Pollution	• Road construction works specially earth work and movement of construction vehicles plying during construction phase will may add to dust and gaseous air pollution along the project road. • Frequent dust suppression will be ensured for this stretch of the road by use of water tankers. • The contractor will procure the construction machineries, which conforms to the pollution control norms specified by the MoEF&CC/CPCB/HPPCB. • The excavated earth /construction materials will be stored properly so that it does not generate fugitive emissions. • Regular maintenance of vehicles to be used for materials transportation and equipment will be carried and vehicular pollution check should be made mandatory. Mask and other PPE should be provided as a mandatory effort to the construction workers in dust prone areas.	Contractor	Independent Engineer /PIU
B.4.2.2	Emission from Construction Vehicles, Equipment and Machineries	• The contractor will ensure that all vehicles, equipment and machinery used for construction works are regularly maintained and conform that pollution emission levels and comply with the requirements of CPCB and/Motor Vehicles Rules. The contractor will submit Pollution Under Control (PUC) certificates for all vehicles for the project. • DG set will be provided with chimney of adequate height as per CPCB guidelines (Height of stack in meter = Height of the building + 0.2 √KVA). • The environmental monitoring is to be conducted as per the monitoring plan.	Contractor	Independent Engineer /PIU
B.4.3	**Noise Pollution**			
B.4.3.1	Noise Levels from Construction Vehicles and Equipment's	The contractor will confirm the following: • All construction equipment used in excavation, concreting, etc, will strictly conform to the MoEF&CC/CPCB/HPPCB noise standards. • All vehicles and equipment used in construction works will be fitted with exhaust silencers/mufflers.	Contractor	Independent Engineer /PIU

S. No.	Environmental Issues	Environmental Mitigation Measures	Responsibilities	
			Planning and Execution	Supervision/ Monitoring
		• Maintenance and servicing of all construction vehicles and machineries will be done regularly. • Only acoustic enclosures fitted DG sets will be allowed at the construction site and labour camp. • At the construction sites within 150 m of the nearest habitation, noisy construction work and use of high noise generation equipment will be stopped during the night time between 10.00 pm to 6.00 am. • Working hours of the construction activities will be restricted around educational institutes/health centers (silence zones) up to a distance of 100 m from the sensitive receptors. • Noise monitoring shall be carried out in construction areas through the approved monitoring agency.		
B.5	**Archaeological Resources and Cultural Properties**			
B.5.1	Chance Found Archaeological Property	• All fossils, coins, articles of value of antiquity, structures and other remains or things of geological 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. • 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 Expert of the PIU of such discovery and carry out the PIU's instructions for dealing with the same, waiting which all work shall be stopped. • The PIU will seek direction from the Archaeological Survey of India (ASI) before instructing the Contractor to recommence the work in the site.	Contractor	Independent Engineer /PIU
B.5.3	Impacts Cultural Properties	• All necessary and adequate care shall be taken to minimize impact on cultural properties which includes cultural sites and remains, places of worship including mosques, temples, shrines, etc., graveyards, monuments and any other important structures as identified during design stage. • Relocation and enhancement measures shall be taken up as per design and in consultation with local community. Access to such properties from the road shall be maintained clear and clean.	Contractor	Independent Engineer /PIU
B.6	**Personal Safety**			

S. No.	Environmental Issues	Environmental Mitigation Measures	Responsibilities	
			Planning and Execution	Supervision/ Monitoring
B.6.1	Personal Safety Measures for Labours and Staff	The contractor will take necessary measures for personal safety of workers: • Protective safety shoes, gum boots, hand gloves, protective goggles, etc (as required) will be provided to the workers employed in excavation, steel rebaring and bending, concrete works, erection of pump station, etc. • Welder's protective eye-shields will be provided to workers who are engaged in welding works. • Earplugs will be provided to the workers exposed to high noise levels. • Safety vests will be used by workers when on construction site. • The Contractor will comply with all regulations regarding safe scaffolding, ladders, working platforms, gangway, stairwells, excavations, trenches and safe means of entry and egress. • The contractor will comply with all the precautions as required for ensuring the safety of the workmen as far as those are applicable to this contract. • 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 not employ any person below the age of 14 years for any work.	Contractor	Independent Engineer /PIU
B.6.2	Traffic and Safety	The Contractor will take all necessary measures for the safety of traffic during construction and provide, erect and maintain such barricades, including signs, markings, flags, lights and flagmen as proposed in the traffic control plan/drawings and as required by the Environmental Expert for the information and protection of traffic approaching or passing through the section of any existing cross roads. The Contractor will ensure that all signs, barricades, pavement markings are provided as per the MoRTH specifications. Before taking up of construction, a Traffic Control Plan will be devised and implemented to the satisfaction of the Environmental Expert of PIU.	Contractor	Independent Engineer /PIU
B.63	Emergency Management	• Emergency numbers will be displayed at the construction sites and camp site, • First boxes will be made available at construction site and camp site, • Fire extinguishers for petroleum oil fire and electrical fire will be made available at camp site, fuel storage site, construction site etc.	Contractor	Independent Engineer /PIU

S. No.	Environmental Issues	Environmental Mitigation Measures	Responsibilities	
			Planning and Execution	Supervision/ Monitoring
		• Designated vehicles, which can be used as ambulance will be available at construction site at all the time.		
B.6.4	Risk Force Measure	• The contractor will make required arrangements so that in case of any mishap during, operation of machinery/ construction vehicles, dismantling, excavation, concrete pouring, hot asphalt handling and erection of pumps, all necessary steps can be taken for prompt first aid treatment. • Construction Safety Plan for the all the road stretches, embankment development, protection works, works road longitudinal drains, ancillary sites to be prepared by the contractor and will identify necessary actions in the event of an emergency.	Contractor	Independent Engineer /PIU
B.6.5	First Aid Facility	The contractor will arrange for : • A readily available first aid unit including an adequate supply of sterilized dressing materials, burn ointment and appliances as per the state Factories Rules will be maintained all the time by the contractor. • Availability of first aid trained persons will be ensured at the project site during construction phase. • Availability of suitable transport will be ensured at all times to take injured or sick person(s) to the hospital.	Contractor	Independent Engineer /PIU
B.6.6	Informatory Signs and Hoardings	• The Contractor will provide, erect and maintain informatory/safety signs, hoardings written in English and local language, wherever required or as suggested by the Environmental Specialist of PIU.	Contractor	Independent Engineer /PIU
B.7	**Labour Camp and Project Site Management**			
B.7.1	Accommodation for Laborers	• Contractor will follow all relevant provisions of the Building and the other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996 for construction and maintenance of labour camp. • The location, layout and basic facility provision of each labour camp will be submitted to Environmental Expert of PIU prior to their construction. • The construction will commence only upon the written approval of the Environmental Expert of PIU. • The contractor will maintain necessary well ventilated living accommodation, toilets, bath rooms and ancillary facilities in functional and hygienic manner.	Contractor	Independent Engineer /PIU

S. No.	Environmental Issues	Environmental Mitigation Measures	Responsibilities	
			Planning and Execution	Supervision/ Monitoring
		• Proper ventilation along with standard exhaust fans will be provided in labour accommodation rooms. • Regular cleaning and sweeping will be ensured at the labour camp site. • Systematic waste collection management at labour camp to be managed as per SWM Rules 2016. Standard First Aid Kits/units including an adequate of sterilized dressing materials.		
B.7.2	HIV/AIDS Prevention Measures	• Necessary HIV/AIDS prevention measures will be taken at labour camp HIV/AIDS awareness program will be organized by the contractor's Environment & Safety Officer.	Contractor	Independent Engineer /PIU
B.7.3	Potable Water for Workers	• The contractor will construct and maintain labour accommodation in such a fashion that uncontaminated clean water is available for drinking, cooking, bathing and washing. The contractor will also provide potable water facilities within the precincts of workplace/pump stations in an accessible place, as per standards set by the Building and other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996. • The contractor will also provide the following: a) Supply of sufficient quantity of potable water (as per IS) at construction site/labour camp (site at suitable and easily accessible places and regular maintenance of such facilities). b) If any water storage tank is provided that will be kept such that the bottom of the tank at least 1 meter above the surrounding ground level. c) If water is drawn from any existing well/ hand pump, which is within 30 meters proximity of any toilet, drain or other source of pollution, the well will be disinfected before water is used for the drinking. Environmental Expert of PIU will be required to inspect the labour camp once in a week to ensure the compliance of the EMP.	Contractor	Independent Engineer /PIU
B.7.4	Sanitation and Sewage System at Labour Camp	The contractor will ensure that : • The sewage system for the camp will be designed, built and operated in such a fashion that no health hazard occurs and no pollution to the air, ground water or adjacent water courses take place, • Separate toilets/bathrooms, as required, will be provided for men and women, marked in vernacular language, • Toilets will be provided with septic tank followed by soak pit. • Adequate water supply will be provided in all toilets and urinals,	Contractor	Independent Engineer /PIU

S. No.	Environmental Issues	Environmental Mitigation Measures	Responsibilities	
			Planning and Execution	Supervision/ Monitoring
		• Night soil can be disposed of with the help of municipality or disposed of by putting layer of it at the bottom of a permanent pit prepared for the purpose and covered with 15 cm layer of waste or refuse and then covered with a layer of earth for a fortnight.		
B.7.5	Waste Disposal	• The contractor will provide garbage bins in the camp & construction site and ensure that these are regularly emptied and disposed off in a hygienic manner according to Solid Waste Management Plan as per Solid Waste Management Rule 2016. • Burning of wastes at construction site & labour camp and road side will not be allowed. • Solid waste generated at the construction site & labour camp, will be collected in covered waste bins and segregated as biodegradable (food waste, paper, etc) and non-biodegradable (plastic, polyethylene bag, etc) wastes. Polyethylene/plastic wastes will be stored in empty cement bags and to be sent for recycling through scrap dealer. Biodegradable (food waste, paper, etc) solid waste will be disposed in the compost pit.	Contractor	Independent Engineer /PIU
B.8	**Environmental Monitoring**			
B.8.1	Environmental Monitoring-Construction Stage	• Environmental monitoring for ambient air quality, noise levels and water quality will be carried out as per environmental monitoring plan and in accordance to instruction of Environmental Specialist of PIU.	Contractor	Independent Engineer /PIU
B.8.2	Compensatory Plantation	• Loss of trees will be compensated by 1:3 ratio (*i.e.* for loss of 1 tree 3 trees will planted) or greater and transplantation of the same trees may be envisaged wherever applicable. • Regular monitoring will be carried out for plantation along the project road for cutting of trees.	PIU	PMU
C.	**Contractor's Demobilization**			
C.1	Clean-up Operations, Restoration and Rehabilitation	• The contractor will prepare project and labour camp site restoration plan, which will be approved by the PIU / Environmental Expert. The clean-up and site restoration operations are to be implemented by the contractor prior to demobilization from construction site and labour camp. The contractor will clear all temporary structures, debris, construction wastes, garbage, night soils, etc in environmental sound manner. • All disposal pits or trenches will be filled in and effectively sealed off.	Contractor	Independent Engineer /PIU

S. No.	Environmental Issues	Environmental Mitigation Measures	Responsibilities	
			Planning and Execution	Supervision/ Monitoring
		• Construction places including camp 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 PIU.		
C.2	Land Rehabilitation	• All surfaces hardened due to construction activities will be ripped & imported materials thereon removed. • All rubbles to be removed from the site to an approved disposal site. Burying of rubble on site is prohibited. • Surfaces are to be checked for waste products from activities such as concreting or asphalting and cleared in a manner approved by the Engineer. • All embankments are to be trimmed, shaped and replanted to the satisfaction of the PIU. • Borrow pits are to be closed and rehabilitated in accordance with the pre-approved management plan for each borrow pit. The Contractor shall liaise with the PIU regarding these requirements.	Contractor	Independent Engineer /PIU
C.	**Contractor's Demobilization**			
C.1	Clean-up Operations, Restoration and Rehabilitation	• The contractor will prepare project and labour camp site restoration plan, which will be approved by the PIU / Environmental Expert. The clean-up and site restoration operations are to be implemented by the contractor prior to demobilization from construction site and labour camp. The contractor will clear all temporary structures, debris, construction wastes, garbage, night soils, etc in environmental sound manner. • All disposal pits or trenches will be filled in and effectively sealed off. • Construction places including camp 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 PIU.	Contractor	Independent Engineer /PIU
C.2	Land Rehabilitation	• All surfaces hardened due to construction activities will be ripped & imported materials thereon removed. • All rubbles to be removed from the site to an approved disposal site. Burying of rubble on site is prohibited. • Surfaces are to be checked for waste products from activities such as concreting or asphalting and cleared in a manner approved by the Engineer. • All embankments are to be trimmed, shaped and replanted to the satisfaction of the PIU.	Contractor	Independent Engineer/PIU

S. No.	Environmental Issues	Environmental Mitigation Measures	Responsibilities	
			Planning and Execution	Supervision/ Monitoring
		• Borrow pits are to be closed and rehabilitated in accordance with the pre-approved management plan for each borrow pit. The Contractor shall liaise with the PIU regarding these requirements.		
D	**Post Construction Stage**			
D.1	Environmental Monitoring- Post Construction Stage	Environmental monitoring for ambient air quality, noise levels and water quality as per environmental monitoring plan and in accordance to instruction of Environmental Specialist of PMU.	PIU	PMU
D.2	Monitoring of Afforested and Landscape areas	Continuous watch and monitoring of plantation and landscape areas shall be done for its performance and survival rate. The plantation will be properly guarded by watch and ward personnel. Provision will be made for manure application and watering on schedule.	PIU	PMU
D.3	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.	PIU	PMU

8.4 Clause for Nonconformity to Environmental Management Plan (EMP) - Protection of the Environment

The Contractor will implement necessary mitigation measures for which responsibility is assigned to him as stipulated in the EMP. Any lapse in implementing the same will attract the damage clause as detailed below:

- Any complaints of public, within the scope of the Contractor, formally registered with the PIU and communicated to the Contractor, which is not properly addressed within the time period intimated by the PIU shall be treated as a major lapse.
- Non-conformity to any of the mitigation measures like unsafe conditions, non-collection of excavated material (during laying of drainage pipes) regularly and other unattended Health, Safety & Environment (HSE) issues, as stipulated in the EMP Report (other than stated above) shall be considered as a minor lapse.
- On observing any lapses, PIU shall issue a notice to the Contractor, to rectify the same.
- Any minor lapse for which notice was issued and not rectified, first and second reminders shall be given after ten days from the original notice date and first reminder date respectively. Any minor lapse, which is not rectified, shall be treated as a major lapse from the date of issuing the second reminder.
- If a major lapse is not rectified upon receiving the notice PIU shall invoke reduction, in the subsequent interim payment certificate.
- For major lapses, 10% of the interim payment certificate will be withheld, subject to a maximum limit of about 0.5% of the contract value.
- If the lapse is not rectified within one month after withholding the payment, the amount withheld shall be forfeited immediately.

8.5 Environmental Monitoring Plan

The monitoring programme consists of performance indicators, reporting formats and necessary budgetary provisions. The contractors monitoring plan should be in accordance with the baseline environmental monitoring, locations provided in the Environmental impact assessment report.

The monitoring plan has the following objectives:

- To ensure effective implementation of EMP
- To evaluate the performance of mitigation measures proposed in the EMP
- To comply with all applicable environmental, safety, labour and local legislation
- To ensure that public opinions and obligations are taken into account and respected to the required satisfaction level
- To modify the mitigation measures or implementing additional measures, if required

The monitoring requirement for the different environmental components have been prepared is presented in **Table 8.2** below;

8.6 Performance Monitoring Indicators

Environmental components identified of a significance in affecting the environment at critical locations have been suggested as Performance Indicators. 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 will be evaluated under three heads as mentioned below:

- Environmental condition indicators to determine efficacy of environmental mitigation measures for controlling air, noise and water pollution.
- Environmental management indicators to determine compliance with the suggested environmental management measures.
- Operational performance indicators have also been devised to determine efficacy and usefulness of the proposed mitigation measures for the project road.

The performance indicators and monitoring plan prepared for the project road are presented in **Table 8.2**. Details of the performance indicators parameters for each of the component have to be identified and reported during all stages of the implementation.

Table 8.2: Performance Indicators and Monitoring Plan

Sn.	Description of Item	Indicator	Stage	Responsibility
1.	Verification and Identification of the earth borrow areas and stone quarries	Compliance of site selection Criteria	Pre Construction	Contractor
2.	Identification of locations for the construction camp and construction plants sites	Compliance of site selection Criteria	Pre Construction Phase	Contractor
3.	Progress on the Tree Removal	Tree Cutting	Pre Construction Phase	PIU/PMU
4.	Location of the temporary storage areas for excavated materials to be reused in road construction, embankment and sub grade.	Storage of excavated materials	Pre Construction and Construction Phase	Contractor
5.	Implementation of mitigation measures specified in the EMP	Prevention/ Control of Pollution	Construction Phase	Contractor
6.	Environmental monitoring as per the conditions stipulated in the consents / as described in environmental monitoring plan	Environmental Conditions at Construction Sites/Plants/ Camps	Construction Phase	Contractor
7.	Environmental monitoring in accordance with the frequency and duration of monitoring as well as the locations as per the monitoring plan**.** Before the	Ambient Air Quality, Ambient Noise Level, Ground and Surface Water	Construction Phase	Contractor through External agency and will be supervised by the

Sn.	Description of Item	Indicator	Stage	Responsibility
	onset of monsoon all the debris/excavated materials will be cleaned from the work sites and disposed of temporarily stock piled debris for final disposal properly away from the water bodies.	Quality, Silting of Water bodies		Environmental Specialist of Independent Engineer/PIU / PMC
8.	Monitoring of work zone safety	Use of PPEs and signages.	Construction Phase	Contractor and will be supervised by the Environmental Specialist of Independent Engineer / PMC
9.	Implementation of the enhancement measures suggested for the pond redevelopment areas, cultural/community properties	Enhancements/ Shifting	Construction Phase	Contractor
10.	Reporting of accidents at work sites/road construction sites	Accidents Reporting	Construction Phase	Contractor
11.	Plantation of shrubs and grass in high embankment/ enhancement sites and incidental spaces	Landscaping	Construction and Defect Liability Period	Contractor
12.	Compensatory tree plantation and Reporting of the Survival Rate. The survival rate should be monitored and reported on quarterly basis.	Tree Plantation and Survival Rate	Construction and Operation Stage	Forest Department and PMU/PIU
13.	Verification of the borrow area redevelopment as specified in the redevelopment plan and satisfaction of the owners/IRC guidelines	Status of Borrow Area	Construction and Operation Stage	Contractor & PMU/PIU
14.	De-mobilization of Camps and Plant on completion of works	Clean-up and restoration of the site.	De-mobilization	Contractor and will be supervised by the Environmental Specialist of Independent Engineer / PMC

8.7 Monitoring Parameters and Standards

The environmental monitoring parameters and National Ambient Air Quality Standards are discussed below:

8.7.1. Ambient Air Quality Monitoring (AAQM)

The ambient air quality parameters viz: Sulphur Dioxide (SO_2), Nitrogen Dioxide (NO_2), Carbon Monoxide (CO), Particulate Matter (PM_{10}, $PM_{2.5}$), shall be monitored six monthly at identified locations from the start of the construction activity. The ambient air quality parameters shall be monitored in accordance with the National Ambient Air Quality Standards as given in **Table 8.3**. The duration and the pollution parameters to be monitored and the responsible institutional arrangements are detailed out in the Environmental Monitoring Plan.

Table 8.3: National Ambient Air Quality Standards

Sl. No	Pollutant	Time Weighted Average	Concentration in Ambient Air		
			Industrial, Residential, Rural & other areas	Ecologically Sensitive Area (Notified by Central Government)	Methods of Measurement
1	Sulphur Dioxide, (SO_2), µg/m^3	Annual* 24 hours**	50 80	20 10	-Improved West and Gaeke -Ultraviolet fluorescence
2	Nitrogen Dioxide, (NO_2) µg/m^3	Annual* 24 hours**	40 80	30 80	-Modified Jacob & Hochhieser (Na-Arsenite) -Chemiluminescence
3	Particulate Matter(size less than 10 µm), or PM_{10} µg/m^3	Annual* 24 hours**	60 100	60 100	-Gravemetric -TOEM -Beta attenuation
4	Particulate Matter(size less than 2.5 µm), or $PM_{2.5}$ µg/m^3	Annual* 24 hours**	40 60	40 60	-Gravemetric -TOEM -Beta attenuation
5	Carbon Monoxide (CO), µg/m^3	8 hours* 1 hours**	02 04	02 04	-Non Dispersive Infra Red (NDIR) spectroscopy

**Annual arithmetic* *mean of minimum 104 measurements in a year at a particular site taken twice a week 24 hourly at uniform intervals*

***24 hourly or (8 hourly or 01 hourly monitored values, as applicable, shall be complied with 98% of the time in a year. 2% of the time, they may exceed the limits but not on two consecutive days of monitoring.*

8.7.2. Noise Quality Monitoring

The noise levels shall be monitored at designated locations in accordance with the Ambient Noise Quality standards given in **Table 8.4**. The duration and the noise pollution parameters to be monitored and the responsible institutional arrangements are detailed in the Environmental Monitoring Plan**.**

Table 8.4: National Ambient Noise Quality Standards

Area Code	Category of Zones	Limits of Leq in dB(A} Day*	Night*
A	Industrial	75	70
B	Commercial	65	55
C	Residential	55	45
D	Silence Zone**	50	40

**Daytime shall mean from 6:000m to 10:00 pm and Night shall mean from 10:00 pm to 6:00 am*
***Silence zone is defined an area up to 100 meters around premises of hospitals, educational institutions and courts, Use of vehicles horns, loud speakers and bursting of crackers are banned in these zones*

8.7.3. Water Quality Monitoring

Water quality parameters such as pH, BOD, COD, DO coli form count, total suspended solids, total dissolved solids, Hardness, Conductivity etc. shall be monitored at all identified locations during the construction stage as per standards prescribed by Central Pollution Control Board specifications presented in **Table 8.5** The duration and the pollution parameters to be monitored and the responsible institutional arrangements are detailed out in the Environmental Monitoring Plan.

Table 8.5: Surface Water Standards

S. No	Parameters	IS:2296 (Class C)	Method Adopted
1.	pH	6.5-8.5	pH meter
2.	BOD (3 day, 27^0C)	3.0	DO-Azide modification of Wrinkler's Method
3.	Temperature (^{0}C)	NS	Thermometer
4.	Dissolved oxygen	4	Azide modification of Wrinkler's method
5.	Color (Hazen)	300	Visual Comparison method
6.	Chloride (CI)	600	Argentometric Titration
7.	Total Dissolved Solids	1500	Gravimetric Analysis
8.	Sulphates (SO_4)	400	Barium Chloride method
9.	Oil and Grease	0.1	Partition -Gravimetric method
10.	Nitrates	50	Chromotropic acid
11.	Total Coliform (MPN/100 ml)	5000	Multiple Tube Fermentation Technique

NS: Not specified. All the values in mg/l if otherwise mentioned

8.8 Monitoring Plans for Environment Conditions

For each of the environmental components, the environmental monitoring plan specifies the parameters to be monitored; location of the monitoring sites and duration of monitoring. The monitoring plan also specifies the applicable standards, implementation and supervising responsibilities. The monitoring plan for the various environmental condition indicators of the project in construction stages is presented in **Table 8.6**. Monitoring plan does not include the requirement of arising out of regulation provision such as obtaining Consents for plant site operation.

Table 8.6: Brief Description of Measures

Sl. No.	Locations of Work Site	Site Safety Measures
1	Construction Sites	Caution boards, Safety Cones, Delineators
2	Deep Cutting	The construction zone should be barricaded with G.I Sheet or arrangement to be made as per plan approved by the PIU / PMU. [Provide Safety Sign Boards and Safety Barriers marked with reflective tapes]
3	Temporary Diversion (if any)	Diversion Board, Barricading [Provide 'Diversion Ahead' boards at 50m, 100m and 150m ahead of diversions with reflective tape for illumination at night at the all diverted locations]
4	Safety for the Workers	Helmets, Safety-Shoes, Goggles, Dusk mask. etc

Furthermore, periodical site monitoring should be carried out by the Environmental Expert of PIU for surveillance & monitoring of road safety during the road construction. The brief description of measures has been given in **Table 8.7**:

Table 8.7: Environmental Monitoring Plan

Attribute	Timing	Parameter	Standards	Frequency	Duration	Location	Implementation
Ambient Air	Construction	$PM_{2.5}$, PM_{10}, SO_2, NO_2 & CO	National Ambient Air Quality Standards (NAAQM) 2009	Two samples for one week (on non consecutive days) for in winter and summer seasons (six monthly).	24 Hours Sampling, 2 Samples in on Week	Construction labour camps, plants sites and settlements along the work zones (Locations will be decided by Environmental Expert of Independent Engineer /PMC)	Contractor
Ground Water	Construction	Organoleptic and Physical, Chemical & Bacteriological Parameters	Potable Water Standards (IS 10500: 2012)	Winter and Summer Seasons	Grab Sampling Once	Construction labour camp, plants sites, settlements along the work zones (locations will be decided by Environmental Expert of Independent Engineer /PMC)	Contractor
Surface Water	Construction	pH, Total Suspended Solids (TSS), Total Dissolved Solids (TDS), BOD, COD, Oil & Grease (O&G) and Turbidity	Indian Standards (IS:2296-1982) for inland surface waters	Winter and Summer Seasons	Grab Sampling Once from	Construction labour camp, plants sites, River and Ponds (locations will be decided by Environmental Expert of Independent Engineer /PMC)	Contractor
Noise	Construction	Level Equivalent L_{Day} and L_{Night} based on hourly Noise Measurements	Ambient Noise Standards	Winter and Summer Seasons	Hourly noise measurements for one day in winter and summer seasons	Construction labour camp, plants sites, settlements along the work zones (locations will be decided by Environmental Expert of Independent Engineer /PMC)	Contractor

8.9 Environmental Reporting System

The environmental reporting system for the suggested monitoring programme will function at two levels:

- Reporting for environmental condition indicators and environmental management indicators
- Reporting for operational performance indicators at the PMU/PIU level. Environmental monitoring involves regular checking of the environmental management issues detailed in the EMP and to ascertain whether the mitigation measures are achieving desired objectives for environmental protection, with the progress of the works. It provides the necessary feedback for the project management to keep the programme on schedule for achieving the expected outcomes.

The Contractor, Independent Engineer /PMC and PMU/PIU will operate the reporting system for environmental conditions and environmental management indicators. The reporting system is presented in **Table 8.8**. The reporting schedule for contractors and construction supervision consultant have been prepared, which are on the basis of the implementation of EMP by the Contractor and monitoring by the Independent Engineer /PMC and PMU/PIU.

The reporting system will start with the Contractor who is the main executor of the implementation EMP activities. The Contractor will report to the Independent Engineer /PMC, who in turn will report to the PMU/PIU. The reporting system will comprise the following:

- The contractor will submit monthly environmental compliance reports along with formal monthly project progress report to the Independent Engineer
- The Independent Engineer will submit separate quarterly environmental monitoring reports to PMU/PIU in addition to submission of the summary of the activities of the month in the formal monthly report including any deviations and corrective actions
- PMU/PIU will be responsible for the preparation of the targets for identified non compliances for the EMP compliance
- Solutions for further effective implementation may also emerge as a result of the compliance monitoring reports.

The photographic records will be kept to provide useful environmental monitoring tools. All material sources points, disposal locations, plants locations, camp locations, crusher locations etc will be photographed and kept as a record. A full record of construction activities and EMP implementation will be kept as part of normal contract monitoring system. The Reporting and Monitoring Systems for various stages of construction and related activities have been proposed in **Table 8.8**.

Table 8.8: Environmental Reporting System

Item	Contractor	Construction Supervision Consultant (Independent Engineer /PMC)		PMU/PIU	
	Implementation and Reporting to Independent Engineer /PMC	Supervision	Reporting to PMU/PIU	Oversee Compliance Monitoring	Report to World Bank
Pre Construction Stage					
Sites of Camps and Plants	Weekly	Weekly	Monthly	Monthly	Quarterly
Locations of Borrow Area	Weekly	Weekly	Monthly	Monthly	Quarterly
Location of Stone Quarry	Weekly	Weekly	Monthly	Monthly	Quarterly
Shifting of Community/ Cultural Structures	Weekly	Weekly	Monthly	Monthly	Quarterly
Tree cutting and Clearing of Vegetation	Weekly	Weekly	Weekly	Weekly	Monthly
Construction Stage					
Monitoring of construction site and construction Camp	Regular	Regular	Monthly	Monthly	Quarterly
Pollution Monitoring	Six Monthly	As required	In Monthly Report	In Quarterly Report	In Quarterly Report
Monitoring of Enhancements	Weekly	Weekly	Monthly	Monthly	Quarterly
Top soil Preservations	Weekly	Weekly	Monthly	Monthly	Quarterly
Borrow area/ quarry area/ debris disposal area	Weekly	Weekly	Monthly	Monthly	Quarterly
Tree plantation	Monthly	Monthly	Monthly	Monthly	Quarterly
Demobilization of Plants					
Clean-up of plants & camps sites and Restoration of Sites	Monthly	Monthly	Monthly	Monthly	Quarterly

8.10 Institutional Arrangements for Environmental Management

The environmental management requirements/guidelines/plans need to be applied and implemented at all stages of the project. This requires an institutional mechanism to deal with various processes and requirements at each stage. Within the institutional framework proposed for the project, preparation, implementation, supervision and monitoring of environment functions, particularly the Environment Management Plans (EMP), will be carried out at the three levels - national center, state level and the project/community level with an inbuilt mechanism for coordinating activities between the said levels.

Implementation Structure

The Externally-Aided Projects Cell (EAP-Cell) at MoRTH, supported by a Project Management Consultants (PMC), will have the overall project implementation responsibility.

At the central level, the Chief Engineer, Externally Assisted Projects (CE, EAP), MoRTH, Govt. of India will be responsible for the over-all implementation of EMF and EMP. The CE, EAP will have all delegated administrative and financial decisions regarding the implementation of the project as well as environment management and safeguard related functions. CE (EAP) will be assisted by a team comprising Executive Engineer (EE) designated as an Environment and Social Officer (ESO) and a suitable number of technical and secretarial staff. The EE will ensure that all project activities are complied with as per the EMF and EMP.

MoRTH will engage a Project Management Consultant (PMC), which will include an Environment Specialist, to work with the CE, EAP's team. The PMC will be responsible for training, guidance, and recommendations for handling policy and implementation issues at the state and sub-project levels to comply with the EMF and requirements laid out in the EMP.

At the state level, the National Highways (NH) divisions in the state Public Works Department will be responsible for the project execution. In Project Co-ordination Unit, there will be an Environment Officer who will coordinate the preparation/implementation of EMP. He/she will ensure that these comply with requirements laid out in the EMF for GNHCP and are implemented in accordance to provisions laid out in the contract documents.

Finally, for the project road, a Project Site Team (PST) or Project Implementation Unit (PIU) will be responsible. The PST, to be headed by Executive Engineer, will oversee day to day implementation of environment, health and safety plan, including on issues pertaining to tree cutting, plantation works, utility relocation and worksite safety management.

Supervision consultant/ Independent Engineer to be engaged by MORTH will provide the regular supervision and administration services. The Construction Supervision Consultant/Independent Engineer's team will have Environment and Safety personnel for day-to-day supervision and monitoring. The Environmental and Safety Officer on the Contractor's team must ensure compliance with the environmental contractual clauses and will report on progress or challenges to the Construction Supervisory team, as per the requirements/obligations stated in the Contract Document.

Independent Quality Assurance Consultants (QAC) would be engaged to oversee the quality of the green national highway upgrading contracts, including environment management, health and safety related

aspects. This will determine whether the project is complying with regulatory performance standards. It entails a systematic, documented and periodic review of project implementation and could be a useful tool to improve project management performance on EHS aspects.

8.11 Environmental Management – Budget

Implementation of Environmental Management

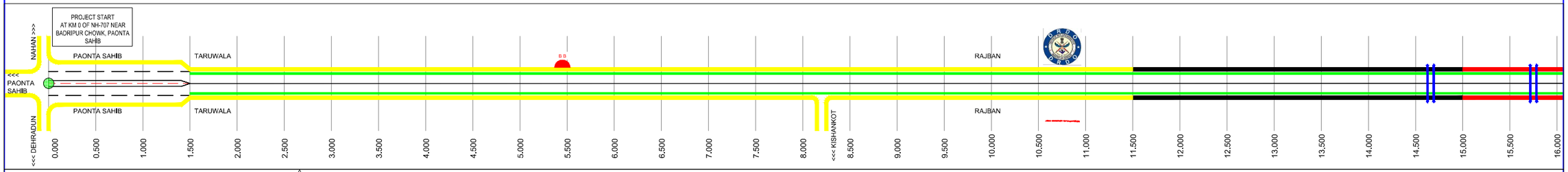
The environmental budget for the various environmental management measures proposed for construction and operation of the project road is detailed in **Table 8.9**. There are several other environmental issues that have been addressed as part of good engineering practices, the costs for which have been accounted for in the engineering cost.

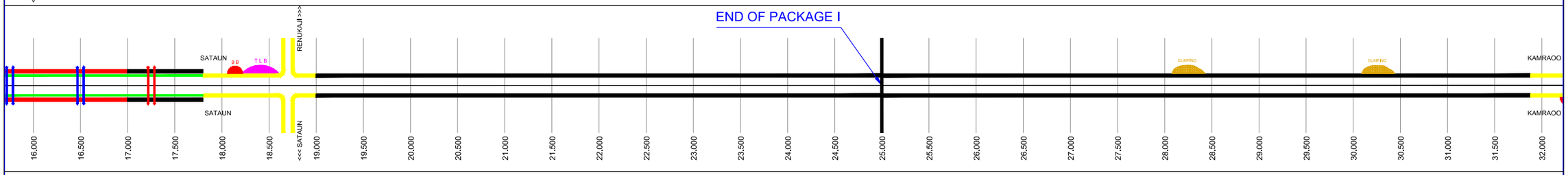
Table 8.9 : Budget for Implementation of Environmental Management Plan

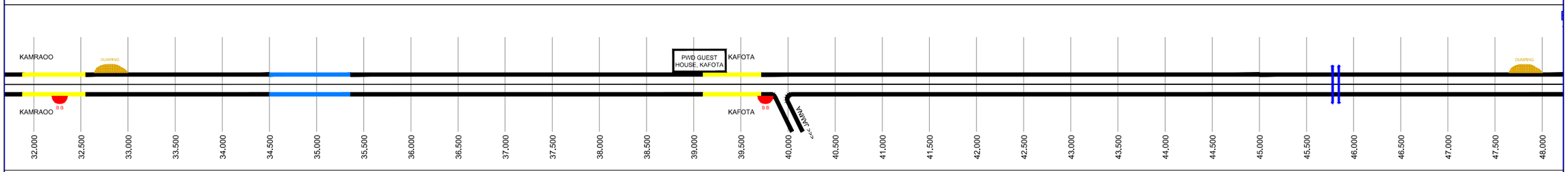
Sr. No	Component	Item	Unit Cost (INR)	Quantity	Total Cost
A. Construction Stage					
1.	Tree Cutting	Cutting of Road Side Trees for construction of road	Cost to be part of DPR		
2.	Environmental Monitoring	Ambient Air Quality noise and surface and ground water Monitoring as per monitoring plan,	Lump sum		1000000
3.	Topsoil Management				
4.	Air	Dust Suppression Measures	Cost to be part of DPR		
5.	Labour camp and ancillary facilities	Labour Camp and all associated facilities as per EMP	Cost to be part of DPR		
6.	Personal Protective Equipment's (PPE's)	Personal Protective Equipments like vest, helmet, safety shoe, hand gloves, gumboots, earplug, Harness belt, Welding Glasses etc	Cost to be part of DPR		
7.	First Aid Kits	First Aid Kits at the construction site, camp and ancillary sites	Cost to be part of DPR		
8.	Compensatory Plantation	Replantation of Trees (3:1)	1500	11625	17437500
9.	Oil Interceptor	Oil Interceptor at Workshop at Camp Site	120000		120000
10.	Borrow Area Rehabilitation and Quarry Management	Rehabilitation and Restoration	Cost to be part of DPR		
11.	Slope Protection Measures	Gabion, Stone Pitching, Bioengineering, etc	Cost to be part of DPR		
12.	Debris and Waste Disposal	Solid Wastes, Demolition Wastes, Hazardous Wastes	Cost to be part of DPR		
13.	Display of Safety Signages and Work Zone Safety	Sign boards, retro reflective tapes, cones, barriers	Cost to be part of DPR		
	Project Enhancement				
14.	Embankment Strengthening (By way of plantation)	Grass Engraining with indigenous shrubs	Cost to be part of DPR		
15..	Protection on bridges, culvert and on high embankment	Slope Protection Measures	Cost to be part of DPR		
16.	Shifting of Community Property Resources,	Shifting and Relocation	Cost to be part of DPR		
	Contingency Cost @ 5%				**922475**
	Total Budget Cost				**19371975**

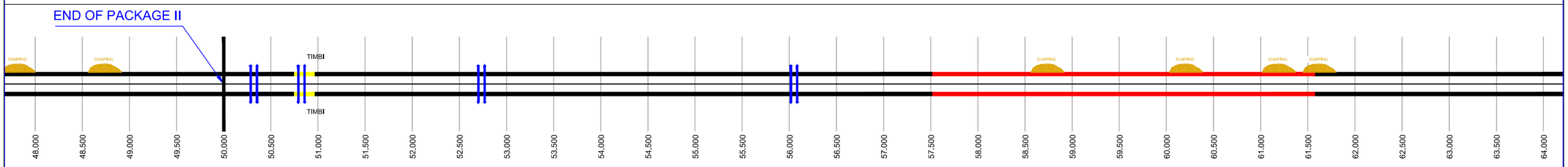
TO PAONTA SAHIB

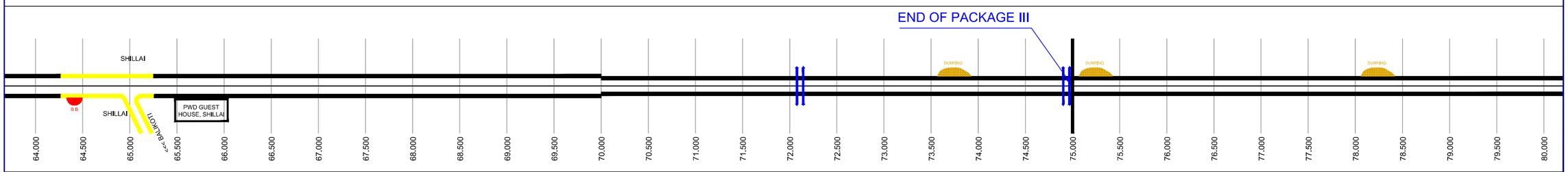
TO GUMA

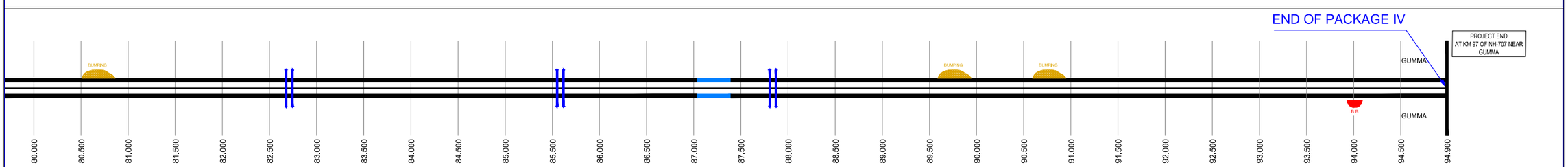










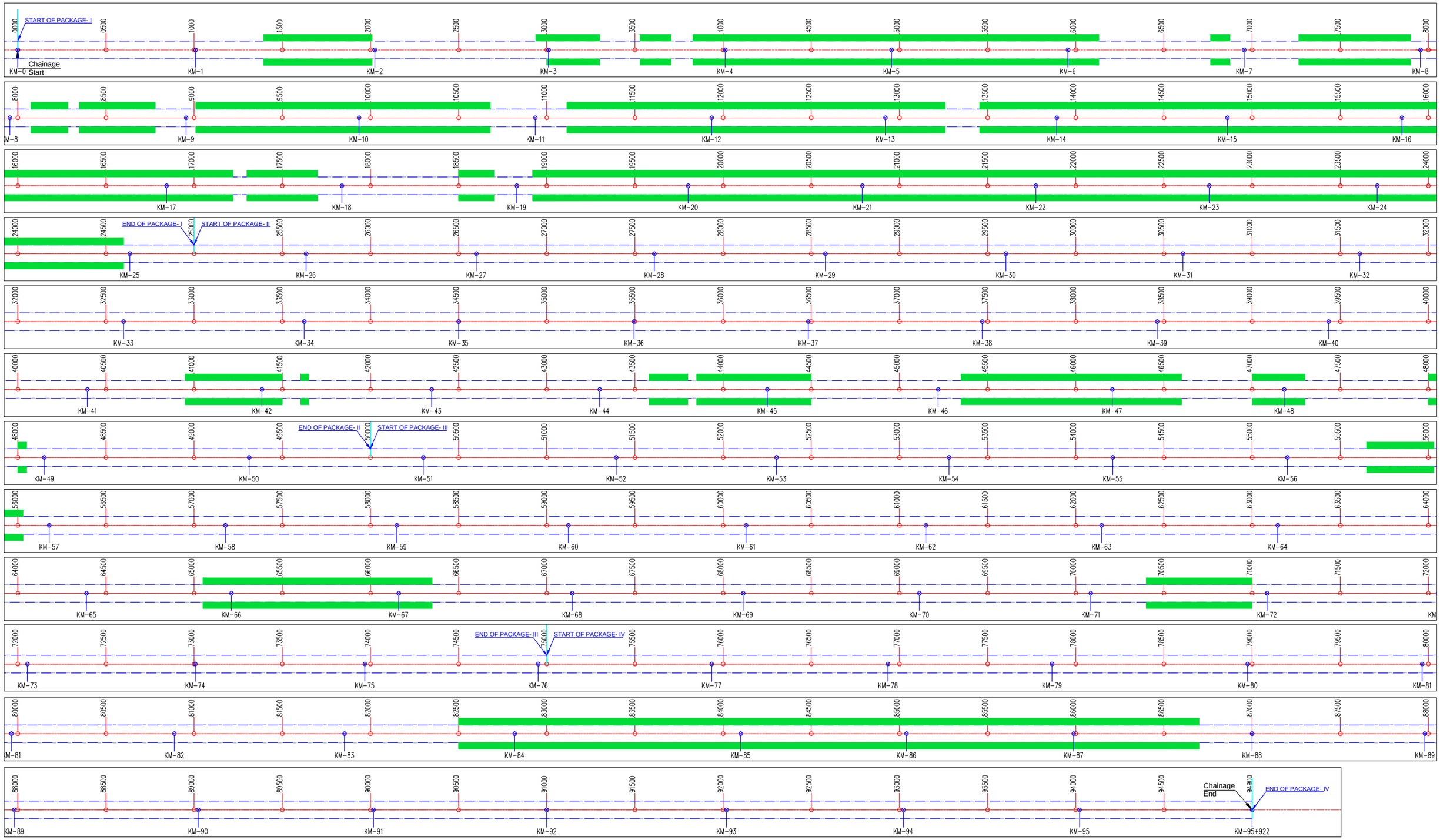


LEGEND:–	OPEN COUNTRY AREA	PAVED SHOULDER	BUILT–UP AREA	LAND SLIDE ZONE	HILL SIDE CHANGE SECTION	MAJOR BRIDGE	MINOR BRIDGE
	PROJECT FACILITIES :–	BUS BAY BB	TRUCK LAY BAY TLB	DUMPING/DISPOSAL DUMPING			

REV	DATE	DESCRIPTION	SCALE:-	CLIENT:-	DESIGN CONSULTANT:-	PROJECT:-	TITLE:	DRAWING NO.:- CEG/D46/STRIP PLAN-01
			NOT TO SCALE	Ministry of Road Transport & Highways (GOVERNMENT OF INDIA)	CONSULTING ENGINEERS GROUP LTD An ISO 9001 : 2008 Company CEG Tower, B -11 (G), Malviya Industrial Area, JAIPUR 302017 (Rajasthan) INDIA Tel : +91 141 2751801/ 802/803/804, Fax : 2751806 Email:ceg@cegindia.com, URL: www.cegindia.com	CONSULTANCY SERVICES FOR PREPARATION OF DETAILED PROJECT REPORT OF PAONTA SAHIB–GUMA SECTION FROM KM 0.000 TO KM 97.000 OF NH–707 IN THE STATE OF HIMACHAL PRADESH	STRIP PLAN - PAONTA SAHIB-GUMA	DATE:- SEPTEMBER - 2019
							DETAIL: FROM CH. 0.000 TO CH. 94.900	DRAWN (A): ASHISH; DESIGNED (B): SIDDHARTH; CHECKED (C): SANJAY EKBOTE; APPROVED (D): PRAMOD JAIN

TO PAONTA SAHIB

TO GUMA



LEGEND :–	EXISTING ROW	FOREST LAND REQUIRED

SCALE: NTS	CLIENT :– NATIONAL HIGHWAYS AUTHORITY OF INDIA (Ministry Of Road Transport & Highway Government of India)	DESIGN CONSULTANT :– CONSULTING ENGINEERS GROUP An ISO 9001:2008 Company CEG Tower, B-11(G), Malviya Industrial Area, Jaipur - 302017 India Tel.+91 141 2751801,2751802,2751803,2751804 Fax: 0114-2751806 Emai address: hqjpr@cegindia.com; URL: WWw.cegindia.com	PROJECT : DPR FOR UP GRADATION TO 2-LANE/2-LANE WITH PAVED SHOULDERS OF PAONTA SAHIB ï GUMA SECTION OF NH ï 72 B IN HIMACHAL PRADESH

TITLE :STRIP PLAN FOR FOREST	DRAWING NO. : CEG/D46/STRIP PLAN/– 7A		
DETAIL : From CH. 0+000 To CH. 95+000	DATE : SEPTEMBER, 2019		
	DRAWN (A)	CHECKED (C)	APPROVED (D)
	SHANKAR	SANJAY EKBOTE	PRAMOD JAIN

History of Natural disasters in Himachal Pradesh

Most Severe earthquakes in Himachal Pradesh

Date	Locations Affected	Magnitude	Damage
4th April 1905	Kangra	7.8	20,000 people died 53,000 domestic animals perished 1,00,000 houses destroyed Economic cost of recovery 2.9 million rupees
1st June 1945	Chamba	6.5	NA
19th January, 1975	Kinnaur	6.8	60 people died 100 badly injured 2000 dwellings devastated 2500 people rendered homeless
26th April 1986	Dharamshala	5.5	6 people died Extensive damage to buildings Loss estimated at 65 crore
1st April 1994	Chamba	4.5	
24th March 1995	Chamba	4.9	Fearsome shaking More than 70% houses developed cracks
29th July 1997	Sundernagar	5	Damage to about 1000 houses

Source: Himachal Pradesh State Disaster Management Authority

Landslide Prone Areas of Himachal Pradesh

District	Sever to very High	High	Moderate to Low	Unlikely	Total Area
Bilaspur	216	842	83	1	1142
Chamba	2120	3829	351	70	6370
Hamirpur	0	851	204	45	1100
Kangra	123	3698	1233	557	5611
Kinnaur	868	4956	498	0	6322
Kullu	1820	3512	65	3	5401
Lahaul & Spiti	127	11637	1825	2	13591
Mandi	968	1978	826	98	3870
Shimla	893	3345	767	14	5019
Sirmaur	95	1805	614	228	2742
Solan	556	1118	157	79	1910
Una	2	678	517	311	1508

Source: BMTPC, Landslide Hazard Zonation Atlas of India. (Area in square kilometer)

Major Flash Floods in Himachal Pradesh

Prominent Flash Floods	History of Damage Occurred
8 July 1973	Lake formed by the blockage of Satluj river due to Nathpa rock fall damaged Sanjay power house, loss of about Rs. 45 million estimated.
19 Jan. 1975	In Satluj basin two blockages were observed in Spiti valley. One on Parechu River between Sumdo and Kaurik due to landslide created by 19 Jan. 1975 earthquake, which occurred along the Sumdo Kaurik fault. Blockage was 60m in height and 150m in length created temporary lake. In march this lake burst causing flash floods in Spiti valley
On 29th Sept. 1988 (2.30 a.m.) a flash flood occurred due to cloud burst in Soldang Khad.	Caused heavy loss of life and property in the Soldng village. • Washed away the Bhabanagar water works. • Washed away 2 Km of NH-22 across Soldan Khad. • Created landslides along the eastern slopes of Soldan Khad and damaged road to Ponda. • Lake was formed on the Satluj river near conference. • Block stopped the flow of Satluj river for about 30 minutes and created a temporary lake having dimensions roughly about 6000 mlong. 200-250 m wide and 25-30 m deep extending up to Wangtoo Bridge. • Lake water entered Sanjay Vidut Pariyojna and damaged the Power House.
31 July and 2 August 1991	Cloudburst and flash flood along Soldan Khad in Satluj valley killed 32 people, 15 houses, 35 bigha agriculture land, 600 apple trees, 2Km of road of NH 22 and 20 m bridge on Soldan Khad washed away. Agriculture land along Leo village situated downstream.
24 Feb 1993	Flood washed away 15 houses, 35 bigha of agriculture land and about 600 apple trees in Soldang village.
4th and 5th September	Satluj river blocked twice due to major landslide and rock fall near Jhakri and Nathpa, damaging NH-22. Another flash flood occurred in two phases along Duling Khad on 4th and 5th September causing extensive damage in Tapri, district Kinnaur.
First flash flood occurred on 4th September 1995 at 2 p.m. After cloudbursts in the upper catchments of Duling and damaged the PWD rest house. Another flood came at 6 a.m. and 9 a.m. on 5th Sept. 1995 bursting the lake formed during the previous cloudbursts.	• 32 people and 35 cattle lost their lives. • Huge debris formed a fan along Satluj and formed a take partially blocking the Satluj • Flash flood caused heavy damage due to change in course of Satluj from left to right bank increased the tow and lateral erosion at Tapri. • Washed away 19 houses, HRTC workshop along with 3 buses. • Change in course is still causing tow erosion to NH-22.

4th and 5th Sept. 1995 flash flood in Kullu valley	Flash flood in Kullu valley occurred which cause damage to the tune of Rs. 759.8 million
Feb-93	500 m road section of NH-22 washed away by Jakhri slide. Rs. 10 million loss to road and forest land, a village upper slope was in danger.
4-5 and 12 Sept. 1995	Flood and landslide along Beas river in Kullu valley killed 65 people. NH damaged at numerous places, loss to government and private property, road and bridges estimated US$ 182 million.
4-5 Sept. 1995	Flash flood along Panwi Khad in Satluj valley washed away 19 houses, 3 buses, HRTC workshop and damaged HPPWD rest house at Tapri.
11-Aug-97	Flash flood and landslide along Andhra khad in Pabbar valley killed 124 people, 456 cattle, washed away government and private buildings, 200 m road section and damaged Andhra power house at Chirgaon. Loss was estimated Rs. 10.63 million.
Aug-97	Cloudburst and flash flood along Satluj river killed 19 people, 464 cattle, 105 houses damaged, 10 cattle sheds and 39-hectare agriculture land. Total loss was estimated Rs.672.9 million.
Flash floods in the night of 31st July and 1st August 2000 in Satluj valley.	Flash floods in the Satluj valley resulting in the increase in water level of Satluj an up to 60 feet above the normal level. The flash flood ws termed as the one that occurs once in 61,000 years. Widespread damage in the valley right from its confluence with Spiti river near Khab to downstream areas. Extensive damage to 200 Km of NH-22, washed away 20 bridges, 22 Jhulas and badly damaged 12 bridges. About 1000 irrigation, sewerage, flood protection and water supply schemes were badly damaged. Expensive damage to hydel projects including NJPC. 135 people and 1673 cattle lost their lives. The total estimated loss was to the tune of Rs. 1466.26 crore.
Flash floods on the night of 23rd July 2001 in Sainj valley in District Kullu.	Cloudbursts in the upper reaches of Sainj valley caused flash floods in two nallahs namely, Sainj and Jeeba, affecting about 40 families 2 bridges on Sainj and Jeeba nallahs and plenty of fertile land were washed away. Connecting road to Slund and Sainj was also washed away at a number of places. Two persons were washed away and 5 cattle perished. Some other areas in Kullu district were also affected due to excessive rains in July and the population of 6355 was adversely affected.
17th and 19th July 2001 floods in Mandi district.	Excessive rains caused damage to 160 houses in Mandi district and destroyed 11 cattle and one human life.
Flash floods in the night of 29th and 30th July 2001 in Chhota Bhangal and Baijnath Sub Division of Kangra District.	Caused widespread damage in the area. 12 deaths occurred due to flash floods and loss of 150 cattle was reported from the area. Bridge connecting Deol and Baijnath was also washed away. Total estimated loss was to the tune of Rs. 18.27 crores.
Flash floods in the night of 9th August and 10th August 2001 on	Flash floods occurred along two streams, one along the Devidhar area and an other along Darkali in Rampur Sub Division. Damage to infrastructure like roads, bridges, water supply schemes, forest wealth, agriculture land, horticulture land, footbridges, village

Moral-Danda peak in the Rohru sub Division in Shimla District.	paths, residential houses and water mills and loss of 3 lives and 39 cattle and destruction of private property. Total loss in both the Sub Divisions was 145.15 lacs. In Rohru Sub Division 7 bridges, 8 village paths, 8 water supply schemes, and I power house were damaged besides 16 houses, whereas in Rampur Sub Division, 10 bridges, 8 village paths, 1 water supply scheme, I soil conservation plant, 7 residential houses and 16 water mills were damaged.
Flash floods in the night of 21st and 22nd August 2001, cloudburst in Ani Sub Division of Kullu district occurred.	Due to flash flood in village Badhali 2 houses in which a couple was buried alive and their two children injured. In village sarli 7 people lost their lives, 15 houses were washed away besides the loss of 12 cows, 18 oxen and 40 sheep and about 115 bighas of agriculture and horticulture land was washed away.
Flash floods in Sihunta ara and Tissa areas of Chamba district in the night of 12th and 13th August 2001.	Washed away 9 hectare of fertile land, 2 small bridges causing a total loss to property of some Rs. 2 Crore.
Flash floods due to cloudbursts in Gharsa valley on 16th July 2003 in Kullu district.	Due to these flash floods 21 people lost their lives, 21 people suffered major injuries and 9 are still missing.
Flash floods in Kangni nalla near Solang in Kullu district on 7th August 2003.	30 people lost their lives and 19 people were injured and 9 people are missing, 2 people lost their lives due to landslide in Bhang nalla.
Flash flood in Satluj river due to breach in the Parachoo lake in Tibetan catchment on 26th June 2005	Extensive damage as a result of risen water level of Satluj river due to breach in Parachoo lake formed in Tibet catchments. Washed away the NH-22 at a number of places, 10 bridges, 11 ropeways washed away, 15 motor able bridges and 8 jeep able and footbridges damaged/affected, 10 Km stretch of NH-22 between Wangtoo and Samdo was washed away, and various link roads were damaged. Total loss estimated to the government as well as public property was some Rs. 610 crore.
Flash floods during July 2005.	Flash floods in Pabbar river in Rohru Sub Division resulted in heavy losses to roads, bridges, public buildings, residential houses, cowsheds, private land. Dhirgaon block was totally cut off. On July 7th, 2005, flash flood in Baspa river took place causing the loss of 6 bridges and 600 mt link road to Sangla. More than 3000 cattle perished in different parts of the state leading a total loss of some of Rs. 55980.76 lacs.
15th August 2007, Bhavi Village, Ghanvi, Shimla	58 persons died; All roads leading to village cut off
7th August 2009, Dharampur, Mandi	2 persons died
12th September 2010, Kharahal Valley	Washed away several roads and bridges

(Source: Bhandari, 1988; Sah et al, 1996; Sah and Mazari 1998; Sah and Bist, 1988; Paul et al, 2000, Revenue Department, Govt. of Himachal Pradesh).

Incidences of Forest Fires in Himachal Pradesh

Year	No. of fire Incidences	Areas Affected (In Hectares)
1995	1669	57143
2000	1900	36887
2001-02	301	5719
2002-03	282	4204
2003-04	550	9896
2007-08	550	8393
2010-11	870	7837.63
2011-12	168	1758.15
2012-13	1798	20773.97
2013-14	397	3237.52
2014-15	725	6726.49
2015-16	672	5749.95
2016-17	1832	19535.76
2017-18	1164	9408.09
2018-19 as on 31.10.2018	2469	25300.902

(https://www.hpsdma.nic.in//admnis/admin/showimg.aspx?ID=2680)

RoW &COI for The Project Road

S. No.	Existing Km of NH-707 as per Site		Design Chainage		ROW (m)			COI (m)		
	From	To	From	To	LHS	RHS	Total	LHS	RHS	Total
Package - I										
1	0+000	1+480	0.000	1.485	13.50	13.50	27.00	15.2	8.5	23.7
2	1+480	1+545	1.485	1.550	9.00	16.00	25.00	17.3	2.0	19.3
3	1+545	1+595	1.550	1.600	11.00	11.00	22.00	17.3	2.0	19.3
4	1+595	1+690	1.600	1.695	9.00	11.00	20.00	7.3	11.9	19.2
5	1+690	2+960	1.695	2.967	15.00	15.00	30.00	9.4	9.8	19.2
6	2+960	2+975	2.967	2.983	25.00	9.00	34.00	9.4	9.8	19.2
7	2+975	3+040	2.983	3.052	15.00	15.00	30.00	9.4	9.8	19.2
8	3+040	3+108	3.052	3.115	9.00	25.00	34.00	9.4	9.8	19.2
9	3+108	7+445	3.115	7.415	14.00	14.00	28.00	9.7	9.5	19.2
10	7+445	7+550	7.415	7.521	9.00	12.50	21.50	9.7	9.5	19.2
11	7+550	7+685	7.521	7.653	12.00	12.00	24.00	9.4	9.8	19.2
12	7+685	7+778	7.653	7.746	15.00	9.00	24.00	9.5	9.7	19.2
13	7+778	8+065	7.746	8.032	13.50	13.50	27.00	9.7	9.5	19.2
14	8+065	8+140	8.032	8.107	9.00	11.00	20.00	9.6	9.7	19.2
15	8+140	8+535	8.107	8.502	12.50	9.00	21.50	9.6	9.6	19.2
16	8+535	9+063	8.502	9.030	12.00	12.00	24.00	9.4	9.8	19.2
17	9+063	9+130	9.030	9.096	15.00	9.00	24.00	9.4	9.8	19.2
18	9+130	9+285	9.096	9.251	11.50	11.50	23.00	9.5	9.7	19.2
19	9+285	9+420	9.251	9.385	9.00	15.00	24.00	10.8	8.4	19.2
20	9+420	9+615	9.385	9.580	12.00	12.00	24.00	9.7	9.5	19.2
21	9+615	9+755	9.580	9.722	17.00	9.00	26.00	9.5	9.7	19.2
22	9+755	9+885	9.722	9.852	11.50	11.50	23.00	9.7	9.5	19.2
23	9+885	10+050	9.852	9.992	10.00	9.00	19.00	9.6	9.6	19.2
24	10+050	10+370	9.992	10.310	10.00	10.00	20.00	9.8	9.4	19.2
25	10+370	10+447	10.310	10.387	9.00	12.50	21.50	9.8	9.4	19.2
26	10+447	10+710	10.387	10.650	13.00	9.00	22.00	9.6	9.6	19.2
27	10+710	11+102	10.650	11.040	14.00	14.00	28.00	9.4	9.8	19.2
28	11+102	12+000	11.040	11.940	10.00	10.00	20.00	9.1	8.2	17.3
29	12+000	13+137	11.940	13.054	9.00	9.00	18.00	12.6	3.2	15.8
30	13+137	13+445	13.054	13.356	12.00	12.00	24.00	11.1	4.1	15.2
31	13+445	13+565	13.356	13.471	9.00	14.00	23.00	11.3	4.3	15.6
32	13+565	13+695	13.471	13.600	10.00	10.00	20.00	11.1	3.9	15.0
33	13+695	13+858	13.600	13.757	9.00	25.00	34.00	9.0	4.4	13.4
34	13+858	13+905	13.757	13.800	10.00	10.00	20.00	9.0	4.4	13.4
35	13+905	14+154	13.800	14.040	9.00	9.00	18.00	6.0	9.7	15.7
36	14+154	16+686	14.040	16.534	9.00	9.00	18.00	13.3	2.9	16.2
37	16+686	17+622	16.534	17.470	10.00	10.00	20.00	12.0	3.2	15.2
38	17+622	17+787	17.470	17.630	10.00	9.00	19.00	9.0	6.7	15.7
39	17+787	17+912	17.630	17.755	9.00	13.00	22.00	9.7	6.4	16.1
40	17+912	18+070	17.755	17.910	12.50	12.50	25.00	10.8	5.2	16.0
41	18+070	18+110	17.910	17.950	11.50	9.00	20.50	9.1	5.4	14.5
42	18+110	19+105	17.950	18.935	12.00	12.00	24.00	8.2	5.0	13.2
43	19+105	24+727	18.935	24.400	9.00	9.00	18.00	9.5	4.6	14.1
44	24+727	25+345	24.400	25.000	13.00	13.00	26.00	9.1	3.4	12.5
Package - II										

45	25+345	25+607	25.000	25.260	9.00	19.00	28.00	2.6	8.4	11.0
46	25+607	25+652	25.260	25.305	9.00	19.00	28.00	2.6	8.4	11.0
47	25+652	26+106	25.305	25.735	14.00	14.00	28.00	9.5	3.5	13.0
48	26+106	26+227	25.735	25.850	9.00	17.00	26.00	10.0	4.6	14.6
49	26+227	26+277	25.850	25.900	11.50	11.50	23.00	11.1	2.3	13.4
50	26+277	26+330	25.900	25.953	9.00	23.00	32.00	11.1	2.3	13.4
51	26+330	26+460	25.953	26.080	11.50	11.50	23.00	16.1	1.1	17.2
52	26+460	26+578	26.080	26.200	9.00	14.50	23.50	8.2	4.7	12.9
53	26+578	26+632	26.200	26.250	15.00	15.00	30.00	6.2	2.4	8.6
54	26+632	26+784	26.250	26.400	9.00	15.50	24.50	8.8	3.9	12.7
55	26+784	27+250	26.400	26.845	11.00	11.00	22.00	13.9	3.5	17.4
56	27+250	27+345	26.845	26.935	9.00	22.00	31.00	12.7	3.5	16.2
57	27+345	27+452	26.935	27.040	11.00	11.00	22.00	11.7	2.7	14.4
58	27+452	27+492	27.040	27.080	9.00	22.00	31.00	11.7	2.7	14.4
59	27+492	28+295	27.080	27.900	12.00	12.00	24.00	7.1	4.6	11.7
60	28+295	28+410	27.900	28.010	9.00	20.00	29.00	9.9	4.5	14.4
61	28+410	28+700	28.010	28.300	14.00	14.00	28.00	10.0	3.0	13.0
62	28+700	28+930	28.300	28.525	9.00	47.00	56.00	9.5	4.0	13.5
63	28+930	29+023	28.525	28.600	9.00	17.00	26.00	10.1	4.2	14.3
64	29+023	29+245	28.600	28.800	12.50	12.50	25.00	8.0	4.6	12.6
65	29+245	29+335	28.800	28.890	9.00	22.00	31.00	4.8	8.3	13.1
66	29+335	29+418	28.890	29.000	13.50	13.50	27.00	11.3	3.6	14.9
67	29+418	29+569	29.000	29.150	9.00	22.00	31.00	11.8	5.6	17.4
68	29+569	29+697	29.150	29.275	17.00	9.00	26.00	7.3	4.6	11.9
69	29+697	29+957	29.275	29.560	11.00	11.00	22.00	8.1	5.8	13.9
70	29+957	30+037	29.560	29.640	9.00	25.00	34.00	8.1	5.8	13.9
71	30+037	30+600	29.640	30.200	13.00	13.00	26.00	8.1	5.8	13.9
72	30+600	30+650	30.200	30.250	9.00	17.00	26.00	6.8	5.1	11.9
73	30+650	30+797	30.250	30.400	10.00	75.00	85.00	7.2	5.4	12.6
74	30+797	30+898	30.400	30.500	10.00	10.00	20.00	11.4	2.3	13.7
75	30+898	31+017	30.500	30.620	9.00	22.00	31.00	8.9	4.3	13.2
76	31+017	31+414	30.620	31.010	12.50	12.50	25.00	12.5	2.5	15.0
77	31+414	31+535	31.010	31.130	9.00	18.00	27.00	15.2	1.6	16.8
78	31+535	31+924	31.130	31.530	12.50	12.50	25.00	13.3	2.7	16.0
79	31+924	32+000	31.530	31.610	17.00	9.00	26.00	6.3	8.0	14.3
80	32+000	32+592	31.610	32.200	15.00	15.00	30.00	12.1	3.2	15.3
81	32+592	32+713	32.200	32.310	9.00	16.00	25.00	13.0	3.4	16.4
82	32+713	32+960	32.310	32.550	12.00	12.00	24.00	9.9	5.5	15.4
83	32+960	33+033	32.550	32.620	9.00	27.00	36.00	10.2	4.9	15.1
84	33+033	33+153	32.620	32.750	11.00	11.00	22.00	15.9	0.9	16.8
85	33+153	33+408	32.750	33.000	10.00	96.00	106.00	8.2	5.7	13.9
86	33+408	35+820	33.000	35.300	12.00	12.00	24.00	11.1	3.9	15.1
87	35+820	35+920	35.300	35.400	9.00	16.00	25.00	0.8	13.0	13.8
88	35+920	37+930	35.400	37.400	12.00	12.00	24.00	7.1	5.9	13.0
89	37+930	37+980	37.400	37.450	19.00	19.00	38.00	13.0	3.5	16.5
90	37+980	39+033	37.450	38.500	12.50	12.50	25.00	11.8	3.2	15.0
91	39+033	39+192	38.500	38.650	9.00	21.00	30.00	14.4	2.8	17.2
92	39+192	39+338	38.650	39.800	12.00	12.00	24.00	10.6	3.8	14.4
93	39+338	39+388	39.800	39.850	9.00	24.00	33.00	8.5	4.5	13.0
94	39+388	40+896	39.850	40.300	12.50	12.50	25.00	7.9	4.2	12.1
95	40+896	40+946	40.300	40.350	9.00	24.00	33.00	4.4	7.1	11.5
96	40+946	42+633	40.350	42.020	11.50	11.50	23.00	7.8	4.3	12.0

97	42+633	42+812	42.020	42.200	9.00	13.00	22.00	9.4	2.5	11.8
98	42+812	42+862	42.200	42.250	12.00	12.00	24.00	8.4	3.7	12.1
99	42+862	43+000	42.250	42.350	19.00	9.00	28.00	10.2	1.4	11.6
100	43+000	43+048	42.350	42.400	9.00	24.00	33.00	10.2	1.4	11.6
101	43+048	43+098	42.400	42.450	11.50	11.50	23.00	8.4	4.6	13.0
102	43+098	43+148	42.450	42.500	19.00	9.00	28.00	8.4	4.6	13.0
103	43+148	43+305	42.500	42.650	9.00	25.00	34.00	8.6	3.9	12.4
104	43+305	44+900	42.650	44.150	13.00	13.00	26.00	10.1	2.7	12.8
105	44+900	44+951	44.150	44.200	17.00	9.00	26.00	8.7	2.8	11.5
106	44+951	45+477	44.200	44.725	11.50	11.50	23.00	7.0	5.0	12.0
107	45+477	45+752	44.725	44.995	9.00	20.00	29.00	9.5	2.7	12.1
108	45+752	45+910	44.995	45.135	11.50	11.50	23.00	11.0	3.3	14.2
109	45+910	46+068	45.135	45.285	9.00	23.00	32.00	12.2	3.8	16.0
110	46+068	46+582	45.285	45.800	11.00	11.00	22.00	10.3	4.0	14.3
111	46+582	46+632	45.800	45.850	9.00	15.00	24.00	10.5	3.7	14.2
112	46+632	46+787	45.850	46.000	9.00	9.00	18.00	5.5	7.5	13.0
113	46+787	46+847	46.000	46.060	9.00	13.00	22.00	7.1	5.9	13.0
114	46+847	46+887	46.060	46.100	11.50	11.50	23.00	7.1	5.9	13.0
115	46+887	46+990	46.100	46.200	14.00	9.00	23.00	11.1	2.3	13.4
116	46+990	47+145	46.200	46.350	9.00	13.00	22.00	13.6	1.7	15.2
117	47+145	47+225	46.350	46.430	11.00	9.00	20.00	9.9	2.6	12.5
118	47+225	47+651	46.430	46.860	12.00	12.00	24.00	10.1	4.0	14.1
119	47+651	47+739	46.860	46.950	9.00	19.00	28.00	10.1	5.1	15.2
120	47+739	48+017	46.950	47.200	11.00	11.00	22.00	10.9	4.8	15.7
121	48+017	48+138	47.200	47.320	9.00	12.00	21.00	12.8	1.8	14.6
122	48+138	48+266	47.320	47.450	11.00	11.00	22.00	10.5	2.8	13.2
123	48+266	48+346	47.450	47.530	9.00	23.00	32.00	7.6	6.0	13.6
124	48+346	48+565	47.530	47.750	13.00	13.00	26.00	9.8	4.3	14.1
125	48+565	48+850	47.750	48.000	16.00	49.00	65.00	10.0	4.2	14.2
126	48+850	49+465	48.000	48.600	14.00	14.00	28.00	9.5	5.1	14.6
127	49+465	49+719	48.600	48.850	14.00	102.00	116.00	10.7	4.3	15.0
128	49+719	49+727	48.850	49.040	9.00	13.50	22.50	13.1	1.7	14.8
129	49+727	49+807	49.040	49.120	11.00	11.00	22.00	6.6	6.6	13.2
130	49+807	49+928	49.120	49.240	9.00	13.00	22.00	9.9	6.0	15.9
131	49+928	50+700	49.240	50.000	10.00	10.00	20.00	10.3	4.8	15.1
Package - III										
131	50+700	51+500	50.000	50.800	10.00	10.00	20.00	10.3	4.8	15.1
132	51+500	51+550	50.800	50.850	14.00	9.00	23.00	10.0	4.4	14.4
133	51+550	52+595	50.850	51.900	9.00	16.00	25.00	5.7	11.2	16.9
134	52+595	52+645	51.900	51.950	11.50	11.50	23.00	5.7	11.2	16.9
135	52+645	52+695	51.950	52.000	18.00	9.00	27.00	5.7	11.2	16.9
136	52+695	52+923	52.000	52.225	12.00	12.00	24.00	8.0	5.3	13.3
137	52+923	53+218	52.225	52.520	9.00	17.00	26.00	10.3	3.5	13.8
138	53+218	53+660	52.520	52.950	11.00	11.00	22.00	11.4	3.4	14.8
139	53+660	53+717	52.950	53.010	18.00	9.00	27.00	10.4	4.5	14.9
140	53+717	54+900	53.010	54.110	11.50	11.50	23.00	10.6	4.1	14.7
141	54+900	54+940	54.110	54.150	9.00	24.00	33.00	9.9	5.9	15.8
142	54+940	56+350	54.150	55.550	12.50	12.50	25.00	8.8	5.6	14.4
143	56+350	56+497	55.550	55.700	9.00	15.00	24.00	9.6	5.3	14.9
144	56+497	56+647	55.700	55.850	12.50	12.50	25.00	9.8	3.9	13.7
145	56+647	56+823	55.850	56.000	9.00	12.50	21.50	8.4	5.8	14.2
146	56+823	56+873	56.000	56.050	18.00	9.00	27.00	8.5	5.0	13.5

147	56+873	57+000	56.050	56.170	11.50	11.50	23.00	8.4	5.5	13.9
148	57+000	57+074	56.170	56.250	9.00	27.00	36.00	7.8	4.4	12.2
149	57+074	57+124	56.250	56.300	12.00	12.00	24.00	7.8	4.4	12.2
150	57+124	57+256	56.300	56.430	9.00	16.00	25.00	9.7	6.0	15.7
151	57+256	57+478	56.430	56.650	12.50	12.50	25.00	9.8	6.6	16.4
152	57+478	57+593	56.650	56.720	9.00	23.00	32.00	10.5	7.3	17.8
153	57+593	58+126	56.720	57.300	10.00	10.00	20.00	8.7	6.7	15.4
154	58+126	59+041	57.300	58.200	9.00	10.00	19.00	10.3	4.7	15.0
155	59+041	59+755	58.200	58.900	10.50	10.50	21.00	11.0	3.7	14.7
156	59+755	59+855	58.900	59.000	9.00	17.00	26.00	11.5	2.9	14.4
157	59+855	60+679	59.000	59.800	12.00	12.00	24.00	9.3	4.7	14.0
158	60+679	60+729	59.800	59.850	9.00	15.00	24.00	5.8	8.0	13.8
159	60+729	60+970	59.850	60.100	12.50	12.50	25.00	7.3	6.1	13.4
160	60+970	61+217	60.100	60.350	12.00	110.00	122.00	11.9	2.4	14.3
161	61+217	62+031	60.350	61.170	12.00	12.00	24.00	10.5	4.0	14.5
162	62+031	62+071	61.170	61.210	9.00	22.00	31.00	9.8	4.3	14.1
163	62+071	62+106	61.210	61.245	13.00	13.00	26.00	10.1	4.4	14.5
164	62+106	62+136	61.245	61.275	9.00	18.00	27.00	9.7	4.6	14.3
165	62+136	62+189	61.275	61.330	12.00	12.00	24.00	9.2	4.7	13.9
166	62+189	62+259	61.330	61.400	9.00	22.00	31.00	9.5	5.5	15.0
167	62+259	62+815	61.400	61.970	12.00	12.00	24.00	10.2	4.6	14.8
168	62+815	62+830	61.970	61.985	9.00	9.00	18.00	10.1	4.9	15.0
169	62+830	63+231	61.985	62.380	12.00	12.00	24.00	10.0	4.6	14.6
170	63+231	63+336	62.380	62.485	9.00	19.00	28.00	10.4	4.0	14.4
171	63+336	63+346	62.485	62.895	13.00	13.00	26.00	9.4	5.0	14.4
172	63+346	63+376	62.895	62.925	9.00	21.00	30.00	10.6	3.6	14.2
173	63+376	64+151	62.925	63.295	13.00	13.00	26.00	10.7	3.2	13.9
174	64+151	64+181	63.295	63.325	9.00	15.00	24.00	10.1	3.5	13.6
175	64+181	64+829	63.325	63.970	14.00	14.00	28.00	10.0	4.3	14.3
176	64+829	64+905	63.970	64.110	9.00	24.00	33.00	10.4	5.8	16.2
177	64+905	65+109	64.110	64.315	12.00	12.00	24.00	10.6	4.3	14.9
178	65+109	65+124	64.315	64.330	9.00	15.00	24.00	10.4	4.2	14.6
179	65+124	65+800	64.330	65.015	12.00	12.00	24.00	9.8	5.0	14.8
180	65+800	65+850	65.015	65.075	9.00	19.00	28.00	9.1	8.0	17.1
181	65+850	66+520	65.075	65.730	12.00	12.00	24.00	9.5	6.0	15.5
182	66+520	66+620	65.730	65.830	9.00	9.00	18.00	10.5	4.4	14.9
183	66+620	66+742	65.830	65.950	10.00	10.00	20.00	8.5	4.9	13.4
184	66+742	66+850	65.950	66.010	17.00	9.00	26.00	6.6	6.7	13.3
185	66+850	66+875	66.010	66.035	11.00	11.00	22.00	8.7	5.1	13.8
186	66+875	66+895	66.035	66.055	9.00	14.00	23.00	10.7	3.5	14.2
187	66+895	67+060	66.055	66.225	11.00	11.00	22.00	9.8	4.2	14.0
188	67+060	67+085	66.225	66.250	9.00	12.00	21.00	10.7	3.5	14.2
189	67+085	67+130	66.250	66.295	10.00	10.00	20.00	10.7	3.5	14.2
190	67+130	67+155	66.295	66.320	9.00	12.00	21.00	8.5	5.5	13.9
191	67+155	67+200	66.320	66.365	10.00	10.00	20.00	9.9	4.1	14.0
192	67+200	67+215	66.365	66.380	9.00	12.00	21.00	10.2	3.8	14.0
193	67+215	67+250	66.380	66.415	15.00	15.00	30.00	9.8	4.2	14.0
194	67+250	67+300	66.415	66.485	9.00	20.00	29.00	9.8	4.2	14.0
195	67+300	67+362	66.485	66.530	13.00	13.00	26.00	9.8	4.2	14.0
196	67+362	67+392	66.530	66.560	9.00	16.00	25.00	6.5	7.5	14.0
197	67+392	67+485	66.560	66.640	11.00	11.00	22.00	7.1	6.5	13.6
198	67+485	67+569	66.640	66.720	9.00	31.50	40.50	6.4	7.0	13.4

199	67+569	67+589	66.720	66.740	14.00	14.00	28.00	5.7	7.6	13.3
200	67+589	67+619	66.740	66.770	18.00	9.00	27.00	6.4	7.0	13.4
201	67+619	67+990	66.770	67.140	13.00	13.00	26.00	8.4	6.0	14.4
202	67+990	68+010	67.140	67.160	9.00	21.00	30.00	10.5	5.2	15.7
203	68+010	68+550	67.160	67.690	14.00	14.00	28.00	9.5	6.2	15.7
204	68+550	68+611	67.690	67.750	10.00	9.00	19.00	10.9	3.0	13.9
205	68+611	68+726	67.750	67.865	12.00	12.00	24.00	10.6	3.9	14.5
206	68+726	68+750	67.865	67.890	9.00	15.00	24.00	10.1	4.1	14.1
207	68+750	68+920	67.890	68.035	12.00	12.00	24.00	7.7	6.0	13.6
208	68+920	68+950	68.035	68.065	9.00	17.00	26.00	8.1	5.6	13.7
209	68+950	69+000	68.065	68.120	13.00	13.00	26.00	10.3	3.5	13.8
210	69+000	69+030	68.120	68.145	9.00	19.00	28.00	10.3	3.5	13.8
211	69+030	69+077	68.145	68.190	11.00	11.00	22.00	10.2	3.6	13.8
212	69+077	69+112	68.190	68.225	9.00	9.00	18.00	10.1	3.6	13.7
213	69+112	69+137	68.225	68.250	14.00	14.00	28.00	10.1	3.6	13.7
214	69+137	69+197	68.250	68.310	9.00	12.00	21.00	9.8	3.7	13.4
215	69+197	69+356	68.310	68.475	15.00	15.00	30.00	9.2	3.9	13.0
216	69+356	69+392	68.475	68.510	9.00	13.50	22.50	8.6	5.0	13.6
217	69+392	70+000	68.510	69.115	14.00	14.00	28.00	10.3	4.6	14.8
218	70+000	70+025	69.115	69.140	9.00	21.00	30.00	9.8	3.5	13.3
219	70+025	70+120	69.140	69.220	15.00	15.00	30.00	9.0	4.4	13.3
220	70+120	70+150	69.220	69.250	9.50	9.50	19.00	8.1	5.2	13.3
221	70+150	70+608	69.250	69.705	13.00	13.00	26.00	10.6	3.4	14.1
222	70+608	70+633	69.705	69.730	11.00	9.00	20.00	12.2	3.2	15.4
223	70+633	70+703	69.730	69.800	9.00	16.00	25.00	9.4	5.0	14.4
224	70+703	70+753	69.800	69.850	9.00	9.00	18.00	10.3	4.1	14.4
225	70+753	70+803	69.850	69.900	9.00	9.00	18.00	9.6	4.3	13.9
226	70+803	70+853	69.900	69.950	9.00	13.00	22.00	8.9	4.4	13.3
227	70+853	70+883	69.950	69.980	11.00	9.00	20.00	8.9	4.2	13.1
228	70+883	70+900	69.980	69.985	9.00	9.00	18.00	8.9	4.2	13.1
229	70+900	70+945	69.985	70.040	9.00	17.00	26.00	8.9	3.9	12.8
230	70+945	70+965	70.040	70.060	12.00	9.00	21.00	9.7	4.4	14.1
231	70+965	70+975	70.060	70.070	9.00	10.00	19.00	10.0	4.7	14.7
232	70+975	71+015	70.070	70.100	10.00	9.00	19.00	9.7	4.4	14.1
233	71+015	71+065	70.100	70.150	9.00	13.00	22.00	11.1	5.4	16.5
234	71+065	71+115	70.150	70.200	14.00	9.00	23.00	10.5	4.7	15.2
235	71+115	71+135	70.200	70.220	9.00	12.00	21.00	9.7	4.5	14.2
236	71+135	71+230	70.220	70.310	10.50	9.00	19.50	9.4	4.4	13.8
237	71+230	71+260	70.310	70.340	9.00	16.00	25.00	9.0	4.7	13.7
238	71+260	71+300	70.340	70.380	9.25	9.00	18.25	9.2	4.7	13.9
239	71+300	71+320	70.380	70.400	9.00	9.50	18.50	9.2	4.7	13.9
240	71+320	71+350	70.400	70.430	11.00	11.00	22.00	9.4	4.6	14.0
241	71+350	71+385	70.430	70.465	9.00	12.00	21.00	10.2	4.2	14.3
242	71+385	71+435	70.465	70.515	10.00	9.00	19.00	10.3	4.2	14.4
243	71+435	71+450	70.515	70.530	9.00	11.00	20.00	11.1	3.7	14.8
244	71+450	71+495	70.530	70.575	12.00	9.00	21.00	10.2	4.1	14.3
245	71+495	71+535	70.575	70.615	9.00	10.00	19.00	11.1	3.7	14.8
246	71+535	71+575	70.615	70.655	9.00	9.00	18.00	11.1	3.6	14.7
247	71+575	71+585	70.655	70.665	9.50	9.50	19.00	10.2	4.1	14.3
248	71+585	71+747	70.665	70.830	19.00	9.00	28.00	12.2	2.6	14.8
249	71+747	71+757	70.830	70.840	9.00	11.00	20.00	15.0	0.7	15.7
250	71+757	71+823	70.840	70.900	12.00	9.00	21.00	13.1	1.5	14.5

251	71+823	71+853	70.900	70.930	10.00	10.00	20.00	11.1	2.2	13.3
252	71+853	71+890	70.930	70.965	9.50	9.00	18.50	9.8	3.9	13.7
253	71+890	71+910	70.965	70.985	9.00	11.00	20.00	9.2	4.7	13.9
254	71+910	71+970	70.985	71.045	12.00	9.00	21.00	7.3	7.2	14.5
255	71+970	72+015	71.045	71.100	9.00	15.00	24.00	5.8	8.6	14.3
256	72+015	72+060	71.100	71.145	18.00	9.00	27.00	4.2	9.9	14.1
257	72+060	72+090	71.145	71.175	9.00	12.50	21.50	5.3	8.8	14.1
258	72+090	72+115	71.175	71.200	13.00	9.00	22.00	6.4	7.7	14.1
259	72+115	72+145	71.200	71.230	9.00	10.25	19.25	8.6	5.4	14.0
260	72+145	72+195	71.230	71.280	9.50	9.00	18.50	9.3	4.7	13.9
261	72+195	72+225	71.280	71.310	9.00	9.50	18.50	9.2	4.7	13.9
262	72+225	72+255	71.310	71.340	10.50	9.00	19.50	9.9	3.9	13.8
263	72+255	72+300	71.340	71.385	9.00	13.00	22.00	9.6	4.1	13.7
264	72+300	72+350	71.385	71.430	12.00	9.00	21.00	9.3	4.3	13.6
265	72+350	72+375	71.430	71.455	11.00	11.00	22.00	9.7	4.3	14.0
266	72+375	72+410	71.455	71.490	11.00	9.00	20.00	9.2	4.8	13.9
267	72+410	72+420	71.490	71.500	9.00	9.00	18.00	9.7	4.5	14.1
268	72+420	72+460	71.500	71.540	9.25	9.00	18.25	9.0	5.2	14.2
269	72+460	72+730	71.540	71.810	11.00	11.00	22.00	9.0	5.0	14.0
270	72+730	72+790	71.810	71.870	9.00	14.50	23.50	11.5	3.5	15.0
271	72+790	72+890	71.870	71.970	12.00	12.00	24.00	7.3	6.6	13.9
272	72+890	73+000	71.970	72.055	9.00	16.00	25.00	10.9	3.4	14.3
273	73+000	73+090	72.055	72.130	11.00	11.00	22.00	8.5	4.3	12.8
274	73+090	73+205	72.130	72.240	14.00	9.00	23.00	6.3	7.0	13.3
275	73+205	73+245	72.240	72.280	10.00	10.00	20.00	8.4	6.0	14.3
276	73+245	73+265	72.280	72.300	13.00	9.00	22.00	8.5	3.6	12.1
277	73+265	73+320	72.300	72.355	9.00	13.50	22.50	4.1	26.6	30.7
278	73+320	73+495	72.355	72.530	10.00	10.00	20.00	10.6	4.0	14.6
279	73+495	73+565	72.530	72.600	13.00	9.00	22.00	10.6	4.0	14.6
280	73+565	73+635	72.600	72.670	11.00	11.00	22.00	11.3	4.6	15.9
281	73+635	73+680	72.670	72.715	9.00	15.00	24.00	10.1	3.9	14.0
282	73+680	73+725	72.715	72.760	15.00	9.00	24.00	13.0	0.8	13.8
283	73+725	73+805	72.760	72.840	9.00	14.00	23.00	13.0	0.8	13.8
284	73+805	74+015	72.840	73.020	10.50	10.50	21.00	11.9	1.9	13.8
285	74+015	74+095	73.020	73.100	9.00	16.00	25.00	8.9	3.9	12.8
286	74+095	74+278	73.100	73.280	10.00	10.00	20.00	15.4	0.9	16.3
287	74+278	74+320	73.280	73.330	9.00	15.00	24.00	10.3	4.0	14.3
288	74+320	74+380	73.330	73.390	20.00	9.00	29.00	11.1	3.4	14.5
289	74+380	74+450	73.390	73.460	11.00	11.00	22.00	11.1	3.4	14.5
290	74+450	74+513	73.460	73.520	9.00	12.00	21.00	9.4	4.6	14.0
291	74+513	74+558	73.520	73.565	19.00	9.00	28.00	9.4	4.6	14.0
292	74+558	74+593	73.565	73.600	10.00	10.00	20.00	8.0	5.1	13.1
293	74+593	74+653	73.600	73.660	13.00	9.00	22.00	8.0	5.1	13.1
294	74+653	74+674	73.660	73.690	9.00	15.00	24.00	8.0	5.1	13.1
295	74+674	74+708	73.690	73.725	14.00	32.00	46.00	8.9	5.2	14.1
296	74+708	74+773	73.725	73.790	14.00	9.00	23.00	8.9	5.2	14.1
297	74+773	74+843	73.790	73.860	10.00	10.00	20.00	8.2	5.1	13.3
298	74+843	74+913	73.860	73.930	18.00	9.00	27.00	8.2	5.1	13.3
299	74+913	75+030	73.930	74.000	10.00	10.00	20.00	8.4	5.4	13.8
300	75+030	75+060	74.000	74.030	9.00	14.00	23.00	8.4	5.4	13.8
301	75+060	75+190	74.030	74.160	10.00	10.00	20.00	10.2	3.1	13.3
302	75+190	75+265	74.160	74.235	9.00	13.00	22.00	8.9	5.3	14.2

303	75+265	75+407	74.235	74.370	10.50	10.50	21.00	10.6	3.6	14.2
304	75+407	75+487	74.370	74.450	13.50	9.00	22.50	9.3	3.9	13.2
305	75+487	75+740	74.450	74.700	11.00	11.00	22.00	13.1	3.2	16.3
306	75+740	75+800	74.700	74.760	17.00	9.00	26.00	13.7	1.0	14.7
307	75+800	75+922	74.760	74.900	10.00	10.00	20.00	6.4	7.9	14.3
308	75+922	75+993	74.900	74.985	20.00	9.00	29.00	12.1	5.2	17.3
309	75+993	76+010	74.985	75.000	20.00	9.00	29.00	12.1	5.2	17.3
Package - IV										
310	76+010	76+070	75.000	75.060	9.00	17.50	26.50	9.3	5.1	14.4
311	76+070	76+115	75.060	75.100	12.00	9.00	21.00	9.3	5.1	14.4
312	76+115	76+247	75.100	75.230	10.00	10.00	20.00	11.5	6.0	17.5
313	76+247	76+287	75.230	75.270	9.00	15.00	24.00	11.4	4.4	15.8
314	76+287	76+392	75.270	75.360	10.00	10.00	20.00	11.3	4.0	15.3
315	76+392	76+432	75.360	75.400	18.00	9.00	27.00	11.3	4.0	15.3
316	76+432	76+502	75.400	75.470	11.00	11.00	22.00	9.9	4.3	14.2
317	76+502	76+572	75.470	75.540	9.00	12.50	21.50	9.5	4.8	14.3
318	76+572	76+630	75.540	75.600	11.00	11.00	22.00	9.5	4.8	14.3
319	76+630	76+695	75.600	75.665	9.00	14.00	23.00	11.1	3.6	14.7
320	76+695	76+715	75.665	75.685	11.00	11.00	22.00	11.1	3.6	14.7
321	76+715	76+760	75.685	75.730	9.00	13.50	22.50	11.1	3.6	14.7
322	76+760	76+860	75.730	75.830	10.00	10.00	20.00	14.2	3.6	17.8
323	76+860	77+050	75.830	75.985	9.00	13.50	22.50	10.0	4.5	14.5
324	77+050	77+100	75.985	76.035	13.00	9.00	22.00	10.0	4.5	14.5
325	77+100	77+245	76.035	76.180	10.00	10.00	20.00	9.5	5.3	14.8
326	77+245	77+285	76.180	76.220	9.00	12.50	21.50	9.5	5.3	14.8
327	77+285	77+440	76.220	76.370	11.00	11.00	22.00	10.9	4.3	15.2
328	77+440	77+505	76.370	76.435	10.50	9.00	19.50	10.9	4.3	15.2
329	77+505	77+682	76.435	76.610	11.00	11.00	22.00	9.7	4.3	14.0
330	77+682	77+782	76.610	76.710	9.00	14.00	23.00	8.5	4.6	13.1
331	77+782	77+842	76.710	76.770	10.00	10.00	20.00	8.5	4.6	13.1
332	77+842	77+902	76.770	76.830	9.00	14.00	23.00	8.5	4.6	13.1
333	77+902	78+030	76.830	76.965	10.00	10.00	20.00	8.5	4.6	13.1
334	78+030	78+120	76.965	77.035	9.00	14.30	23.30	9.4	4.8	14.2
335	78+120	78+135	77.035	77.050	10.00	10.00	20.00	9.4	4.8	14.2
336	78+135	78+155	77.050	77.070	9.00	17.00	26.00	9.4	4.8	14.2
337	78+155	78+185	77.070	77.100	9.00	14.00	23.00	7.1	4.6	11.7
338	78+185	78+288	77.100	77.200	10.00	10.00	20.00	9.2	4.6	13.8
339	78+288	78+298	77.200	77.210	9.00	10.75	19.75	9.2	4.6	13.8
340	78+298	78+368	77.210	77.280	10.00	10.00	20.00	7.8	5.6	13.4
341	78+368	78+408	77.280	77.320	11.75	9.00	20.75	7.8	5.6	13.4
342	78+408	78+438	77.320	77.350	9.00	12.20	21.20	4.9	6.5	11.4
343	78+438	78+518	77.350	77.430	9.00	9.00	18.00	4.9	6.5	11.4
344	78+518	78+588	77.430	77.500	14.50	9.00	23.50	8.6	4.1	12.7
345	78+588	78+668	77.500	77.580	10.00	10.00	20.00	8.9	5.2	14.1
346	78+668	78+765	77.580	77.680	9.00	17.00	26.00	8.1	4.1	12.2
347	78+765	78+775	77.680	77.690	9.00	9.00	18.00	8.1	4.1	12.2
348	78+775	78+815	77.690	77.730	9.00	10.00	19.00	8.1	4.1	12.2
349	78+815	78+825	77.730	77.740	9.25	9.25	18.50	8.1	4.1	12.2
350	78+825	78+932	77.740	77.845	9.00	15.00	24.00	5.2	6.4	11.6
351	78+932	79+005	77.845	77.875	10.00	9.00	19.00	5.2	6.4	11.6
352	79+005	79+030	77.875	77.900	10.00	10.00	20.00	9.1	5.1	14.2
353	79+030	79+110	77.900	77.980	13.00	9.00	22.00	9.1	5.1	14.2

354	79+110	79+320	77.980	78.175	10.00	10.00	20.00	11.7	2.8	14.5
355	79+320	79+345	78.175	78.200	9.00	19.00	28.00	11.7	2.8	14.5
356	79+345	79+370	78.200	78.225	10.00	10.00	20.00	11.7	2.8	14.5
357	79+370	79+525	78.225	78.370	9.00	14.00	23.00	10.5	3.5	14.0
358	79+525	79+575	78.370	78.420	15.50	78.00	93.50	10.4	3.5	13.9
359	79+575	79+690	78.420	78.535	9.00	15.00	24.00	10.4	3.5	13.9
360	79+690	79+745	78.535	78.590	10.00	10.00	20.00	8.7	5.0	13.7
361	79+745	79+907	78.590	78.880	9.00	13.00	22.00	11.0	3.6	14.6
362	79+907	80+007	78.880	78.900	10.00	10.00	20.00	11.0	3.6	14.6
363	80+007	80+080	78.900	79.055	9.00	15.50	24.50	12.6	4.0	16.6
364	80+080	80+195	79.055	79.170	10.00	10.00	20.00	7.9	5.7	13.6
365	80+195	80+260	79.170	79.235	12.50	9.00	21.50	7.9	5.7	13.6
366	80+260	80+275	79.235	79.250	10.00	10.00	20.00	10.0	5.9	15.9
367	80+275	80+340	79.250	79.315	9.00	11.00	20.00	10.0	5.9	15.9
368	80+340	80+365	79.315	79.340	10.00	10.00	20.00	10.4	3.5	13.9
369	80+365	80+535	79.340	79.500	9.00	14.00	23.00	5.3	8.0	13.3
370	80+535	80+580	79.500	79.540	10.00	10.00	20.00	13.8	3.0	16.8
371	80+580	80+600	79.540	79.560	13.50	9.00	22.50	13.8	3.0	16.8
372	80+600	80+670	79.560	79.630	9.00	13.30	22.30	9.9	3.9	13.8
373	80+670	80+740	79.630	79.700	10.00	10.00	20.00	9.9	3.9	13.8
374	80+740	80+805	79.700	79.765	9.00	12.00	21.00	4.7	10.3	15.0
375	80+805	80+890	79.765	79.840	14.50	9.00	23.50	10.3	4.3	14.6
376	80+890	81+280	79.840	80.240	15.00	15.00	30.00	9.2	4.9	14.1
377	81+280	81+310	80.240	80.270	9.00	22.00	31.00	9.2	4.9	14.1
378	81+310	81+380	80.270	80.340	9.00	9.00	18.00	10.4	3.4	13.8
379	81+380	81+470	80.340	80.430	9.00	10.30	19.30	10.4	4.4	14.8
380	81+470	81+510	80.430	80.470	12.50	12.50	25.00	10.4	4.4	14.8
381	81+510	81+582	80.470	80.540	9.00	16.00	25.00	7.1	7.4	14.5
382	81+582	81+651	80.540	80.610	12.00	12.00	24.00	7.1	7.4	14.5
383	81+651	81+686	80.610	80.645	9.00	16.00	25.00	13.0	2.4	15.4
384	81+686	82+023	80.645	80.910	12.00	12.00	24.00	9.5	4.0	13.5
385	82+023	82+063	80.910	80.950	9.00	14.30	23.30	9.5	4.0	13.5
386	82+063	82+073	80.950	80.960	10.00	10.00	20.00	9.5	4.0	13.5
387	82+073	82+162	80.960	81.150	9.00	21.00	30.00	12.0	4.8	16.8
388	82+162	82+372	81.150	81.260	11.00	11.00	22.00	10.6	4.5	15.1
389	82+372	82+412	81.260	81.300	9.00	14.00	23.00	10.6	4.5	15.1
390	82+412	82+462	81.300	81.350	10.00	10.00	20.00	11.8	3.5	15.3
391	82+462	82+537	81.350	81.425	9.00	13.00	22.00	10.4	4.7	15.1
392	82+537	82+603	81.425	81.490	13.00	9.00	22.00	10.4	4.7	15.1
393	82+603	82+910	81.490	81.800	10.00	10.00	20.00	10.0	4.2	14.2
394	82+910	83+010	81.800	81.900	9.00	14.00	23.00	9.9	4.6	14.5
395	83+010	83+313	81.900	82.200	10.00	10.00	20.00	8.5	5.5	14.0
396	83+313	83+920	82.200	82.740	9.00	13.00	22.00	10.1	5.0	15.1
397	83+920	84+130	82.740	82.920	10.50	10.50	21.00	10.7	5.0	15.7
398	84+130	84+212	82.920	83.030	14.00	9.00	23.00	12.6	5.1	17.7
399	84+212	84+405	83.030	83.220	9.00	14.00	23.00	10.5	5.8	16.3
400	84+405	84+563	83.220	83.380	10.50	10.50	21.00	10.2	3.4	13.6
401	84+563	84+700	83.380	83.650	9.00	10.00	19.00	7.0	6.0	13.0
402	84+700	84+750	83.650	83.850	10.00	10.00	20.00	10.1	3.4	13.5
403	84+750	90+880	83.850	89.900	9.00	9.00	18.00	10.8	3.8	14.6
404	90+880	91+673	89.900	90.670	13.00	13.00	26.00	10.8	3.6	14.4
405	91+673	91+965	90.670	90.960	11.50	128.80	140.30	9.4	4.4	13.8

406	91+965	95+922	90.960	94.900	12.50	12.50	25.00	9.3	4.1	13.4

J. P. TEST & RESEARCH CENTRE

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Gazette No. : 352, valid upto 08.02.2022

TEST REPORT

Test Report Number	RAI1912101-102	**Page Number**	Page 1 of 1
Job Order Number	JPT/AI19/12101-102	**Customer Ref. Number**	-
Date of Issue	19.09.2019	**Sample Received On**	12.09.2019
Discipline Name	Chemical Testing	**Group**	Atmospheric Pollution

Project Proponent : The Executive Engineer, National Highway- Division, Public Work Department, Nahan (HP)- 173212
Project Name: Paonta (Badripur) Rajaban Shillai Meenus Gumma Feddus Road km 0/0 to 104/291 on NH-72B (New NH No.- 707)

NAME & ADDRESS OF CUSTOMER	SAMPLE DETAILS		
Issued to, **M/s C & E Consultancy** Chauhan Building P.O Kamlanagar Sanjauli, Shimla	Sample Description	:	Ambient Air
	Sample Location	:	Near Truck Union at RD 2/650
	Coordinate	:	$30^0$27.794' N, $77^0$37.168'E
	Weather Condition	:	Cloudy
	Sampling Method	:	IS: 5182 (Part-14, Part-05)
	Sample done by	:	JPT Lab Representative
	Sampling duration	:	24 Hrs (Except for CO & Ozone 1 hr.)
	Analysis Duration	:	12.09.2019 to 16.09.2019

TEST RESULTS

S.No	Parameters	Unit	Results		NAAQ Standards	Test Method
			09/09/2019	10/09/2019		
1.	Particulate Matter (size less than 10 µm) or PM_{10}	(µg/m^3)	68	59	100	IS: 5182 (part 23): 2006, RA 2017
2.	Particulate Matter (size less than 2.5 µm) or $PM_{2.5}$	(µg/m^3)	28.2	25.8	60	JPT/CH/SOP/AIR/06 (Gravimetric method)
3.	Sulphur Dioxide (SO_2)	(µg/m^3)	7.8	7.2	80	IS: 5182 (part 2): 2001, RA 2017
4.	Nitrogen Dioxide (NO_2)	(µg/m^3)	18.5	20.3	80	IS: 5182 (part 6): 2006, RA 2017
5.	Ammonia (NH_3)	(µg/m^3)	9.5	8.5	400	JPT/CH/SOP/AIR/07 Indo Phenol Blue Method
6.	Ozone (O_3)	(µg/m^3)	15.4	17.2	180	IS: 5182 pt 09:1974, RA 2014
7.	Carbon Monoxide (CO)	(mg/m^3	0.49	0.43	04	IS: 5182 (part 10): 1999, RA 2014
8.	Lead (Pb)	µg/m^3	ND (<0.5)	ND (<0.5)	1.0	IS: 5182 (pt 22):2004, RA 2014
9.	Nickel (Ni)	ng/m^3	ND (<10.0)	ND (<10.0)	20*	JPT/CH/SOP/AIR/08 (AAS)
10.	Arsenic (As)	ng/m^3	ND (<1.0)	ND (<1.0)	6*	JPT/CH/SOP/AIR/08 (AAS)
11.	Benzene (C_6H_6)	µg/m^3	ND (< 0.5)	ND (< 0.5)	5*	IS:5182 pt 11:2006, RA 2017
12.	Benzo(a)Pyrene	ng/m^3	ND (< 0.5)	ND (< 0.5)	1*	JPT/CH/SOP/AIR/10 (by GC)

Note- * = Annual Standard, ND= Not Detected, Value given in parenthesis indicates Detection Limit.

End of Report

Test & Research Centre PRANESH BHARDWAJ Chemist

Checked By

S. PANDEY Quality Manager

For J P Test & Research Centre

Authorized Signatory

* Format No. JPT/5.10F-01 Issue No. 01 Issue Date 16.10.2015 Rev. No. 02 Rev Date 15.05.2019

Note 1. Sample will be retained for 15 days for chemical testing and 7 days for Bacteriological testing from the date of issue of test report, unless specified by the customer. The results given for noise/lux are related to the observed values at the time of monitoring. The customer asked for the above tests only. 2.The parameters marked as * are not accredited by NABL. 3. The results given above are related to the tested sample and mentioned parameters. Endorsement of product is neither inferred not implied . 4. Total liability of our works is limited to invoiced amount. 5. This report can not be used as evidence in a court of law without the written approval of the lab. 6. Certificate shall not be reproduced, except in full, without prior written approval of the laboratory

Laboratory: 4/54, Site-IV, Sahibabad Industrial Area, Ghaziabad, (UP) Pin-201010 Tel: 0120-4345989, 9910833356 Email:jptesthouse@gmail.com
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Gazette No. : 352, valid upto 08.02.2022

TEST REPORT

Test Report Number	RAI1912103-104	**Page Number**	Page 1 of 1
Job Order Number	JPT/AI19/12103-104	**Customer Ref. Number**	-
Date of Issue	19.09.2019	**Sample Received On**	12.09.2019
Discipline Name	Chemical Testing	**Group**	Atmospheric Pollution

Project Proponent :The Executive Engineer, National Highway- Division, Public Work Department, Nahan (HP)- 173212
Project Name: Paonta (Badripur) Rajaban Shillai Meenus Gumma Feddus Road km 0/0 to 104/291 on NH-72B (New NH No.- 707)

NAME & ADDRESS OF CUSTOMER	SAMPLE DETAILS		
Issued to, **M/s C & E Consultancy** Chauhan Building P.O Kamlanagar Sanjauli, Shimla	Sample Description	:	Ambient Air
	Sample Location	:	Satoun at RD18/100
	Coordinate	:	$30^0$33.633' N, $77^0$38.215'E
	Weather Condition	:	Cloudy
	Sampling Method	:	IS: 5182 (Part-14, Part-05)
	Sample done by	:	JPT Lab Representative
	Sampling duration	:	24 Hrs (Except for CO & Ozone 1 hr.)
	Analysis Duration	:	12.09.2019 to 16.09.2019

TEST RESULTS

S.No	Parameters	Unit	Results		NAAQ Standards	Test Method
			09/09/2019	10/09/2019		
1.	Particulate Matter (size less than 10 µm) or PM_{10}	(µg/m^3)	51	55	100	IS: 5182 (part 23): 2006, RA 2017
2.	Particulate Matter (size less than 2.5 µm) or $PM_{2.5}$	(µg/m^3)	20.8	21.3	60	JPT/CH/SOP/AIR/06 (Gravimetric method)
3.	Sulphur Dioxide (SO_2)	(µg/m^3)	7.1	6.6	80	IS: 5182 (part 2): 2001, RA 2017
4.	Nitrogen Dioxide (NO_2)	(µg/m^3)	14.2	17.8	80	IS: 5182 (part 6): 2006, RA 2017
5.	Ammonia (NH_3)	(µg/m^3)	8.2	9.1	400	JPT/CH/SOP/AIR/07 Indo Phenol Blue Method
6.	Ozone (O_3)	(µg/m^3)	11.5	10.3	180	IS: 5182 pt 09:1974, RA 2014
7.	Carbon Monoxide (CO)	(mg/m^3	0.36	0.32	04	IS: 5182 (part 10): 1999, RA 2014
8.	Lead (Pb)	µg/m^3	ND (<0.5)	ND (<0.5)	1.0	IS: 5182 (pt 22):2004, RA 2014
9.	Nickel (Ni)	ng/m^3	ND (<10.0)	ND (<10.0)	20*	JPT/CH/SOP/AIR/08 (AAS)
10.	Arsenic (As)	ng/m^3	ND (<1.0)	ND (<1.0)	6*	JPT/CH/SOP/AIR/08 (AAS)
11.	Benzene (C_6H_6)	µg/m^3	ND (< 0.5)	ND (< 0.5)	5*	IS:5182 pt 11:2006, RA 2017
12.	Benzo(a)Pyrene	ng/m^3	ND (< 0.5)	ND (< 0.5)	1*	JPT/CH/SOP/AIR/10 (by GC)

Note- * = Annual Standard, ND= Not Detected, Value given in parenthesis indicates Detection Limit.

End of Report

Checked By

For J P Test & Research Centre

Authorized Signatory

* Format No. JPT/5.10F-01 Issue No. 01 Issue Date 16.10.2015 Rev. No. 02 Rev Date 15.05.2019

Note 1. Sample will be retained for 15 days for chemical testing and 7 days for Bacteriological testing from the date of issue of test report, unless specified by the customer. The results given for noise/lux are related to the observed values at the time of monitoring. The customer asked for the above tests only. 2.The parameters marked as * are not accredited by NABL. 3. The results given above are related to the tested sample and mentioned parameters. Endorsement of product is neither inferred not implied . 4. Total liability of our works is limited to invoiced amount. 5. This report can not be used as evidence in a court of law without the written approval of the lab. 6. Certificate shall not be reproduced, except in full, without prior written approval of the laboratory

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TEST REPORT

Test Report Number	RAI1912105-106	**Page Number**	Page 1 of 1
Job Order Number	JPT/AI19/12105-106	**Customer Ref. Number**	-
Date of Issue	19.09.2019	**Sample Received On**	12.09.2019
Discipline Name	Chemical Testing	**Group**	Atmospheric Pollution

Project Proponent :The Executive Engineer, National Highway- Division, Public Work Department, Nahan (HP)- 173212
Project Name: Paonta (Badripur) Rajaban Shillai Meenus Gumma Feddus Road km 0/0 to 104/291 on NH-72B (New NH No.- 707)

NAME & ADDRESS OF CUSTOMER	SAMPLE DETAILS
Issued to, **M/s C & E Consultancy** Chauhan Building P.O Kamlanagar Sanjauli, Shimla	Sample Description : Ambient Air Sample Location : Kaffota at RD 40/00 Coordinate : $30^0$37.324' N, $77^0$42.051'E Weather Condition : Cloudy Sampling Method : IS: 5182 (Part-14, Part-05) Sample done by : JPT Lab Representative Sampling duration : 24 Hrs (Except for CO & Ozone 1 hr.) Analysis Duration : 12.09.2019 to 16.09.2019

TEST RESULTS

S.No	Parameters	Unit	Results		NAAQ Standards	Test Method
			09/09/2019	10/09/2019		
1.	Particulate Matter (size less than 10 µm) or PM_{10}	(µg/m^3)	42	50	100	IS: 5182 (part 23): 2006, RA 2017
2.	Particulate Matter (size less than 2.5 µm) or $PM_{2.5}$	(µg/m^3)	17.8	18.6	60	JPT/CH/SOP/AIR/06 (Gravimetric method)
3.	Sulphur Dioxide (SO_2)	(µg/m^3)	6.6	BDL (<6.5)	80	IS: 5182 (part 2): 2001, RA 2017
4.	Nitrogen Dioxide (NO_2)	(µg/m^3)	12.4	9.8	80	IS: 5182 (part 6): 2006, RA 2017
5.	Ammonia (NH_3)	(µg/m^3)	7.2	6.8	400	JPT/CH/SOP/AIR/07 Indo Phenol Blue Method
6.	Ozone (O_3)	(µg/m^3)	9.5	8.7	180	IS: 5182 pt 09:1974, RA 2014
7.	Carbon Monoxide (CO)	(mg/m^3	0.31	0.28	04	IS: 5182 (part 10): 1999, RA 2014
8.	Lead (Pb)	µg/m^3	ND (<0.5)	ND (<0.5)	1.0	IS: 5182 (pt 22):2004, RA 2014
9.	Nickel (Ni)	ng/m^3	ND (<10.0)	ND (<10.0)	20*	JPT/CH/SOP/AIR/08 (AAS)
10.	Arsenic (As)	ng/m^3	ND (<1.0)	ND (<1.0)	6*	JPT/CH/SOP/AIR/08 (AAS)
11.	Benzene (C_6H_6)	µg/m^2	ND (< 0.5)	ND (< 0.5)	5*	IS:5182 pt 11:2006, RA 2017
12.	Benzo(a)Pyrene	ng/m^3	ND (< 0.5)	ND (< 0.5)	1*	JPT/CH/SOP/AIR/10 (by GC)

Note- * = Annual Standard, ND= Not Detected, Value given in parenthesis indicates Detection Limit.

End of Report

For J P Test & Research Centre

Quality Manager

Authorized Signatory

Checked By

PRANESH BHARDWAJ Chemist

* Format No. JPT/5.10F-01 Issue No. 01 Issue Date 16.10.2015 Rev. No. 02 Rev Date 15.05.2019

Note 1. Sample will be retained for 15 days for chemical testing and 7 days for Bacteriological testing from the date of issue of test report, unless specified by the customer. The results given for noise/lux are related to the observed values at the time of monitoring. The customer asked for the above tests only. 2.The parameters marked as * are not accredited by NABL. 3. The results given above are related to the tested sample and mentioned parameters. Endorsement of product is neither inferred not implied . 4. Total liability of our works is limited to invoiced amount. 5. This report can not be used as evidence in a court of law without the written approval of the lab. 6. Certificate shall not be reproduced, except in full, without prior written approval of the laboratory

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TEST REPORT

Test Report Number	RAI1914104-105	**Page Number**	Page 1 of 1
Job Order Number	JPT/AI19/14104-105	**Customer Ref. Number**	-
Date of Issue	19.09.2019	**Sample Received On**	14.09.2019
Discipline Name	Chemical Testing	**Group**	Atmospheric Pollution

Project Proponent : The Executive Engineer, National Highway- Division, Public Work Department, Nahan (HP)- 173212
Project Name: Paonta (Badripur) Rajaban Shillai Meenus Gumma Feddus Road km 0/0 to 104/291 on NH-72B (New NH No.- 707)

NAME & ADDRESS OF CUSTOMER	SAMPLE DETAILS
Issued to, **M/s C & E Consultancy** Chauhan Building P.O Kamlanagar Sanjauli, Shimla	Sample Description : Ambient Air Sample Location : Timbi at RD 50/00 Coordinate : $30^0$39.366' N, $77^0$38.587'E Weather Condition : Cloudy Sampling Method : IS: 5182 (Part-14, Part-05) Sample done by : JPT Lab Representative Sampling duration : 24 Hrs (Except for CO & Ozone 1 hr.) Analysis Duration : 14.09.2019 to 17.09.2019

TEST RESULTS

S.No	Parameters	Unit	Results		NAAQ Standards	Test Method
			11/09/2019	12/09/2019		
1.	Particulate Matter (size less than 10 µm) or PM_{10}	(µg/m^3)	48	43	100	IS: 5182 (part 23): 2006, RA 2017
2.	Particulate Matter (size less than 2.5 µm) or $PM_{2.5}$	(µg/m^3)	18.2	16.4	60	JPT/CH/SOP/AIR/06 (Gravimetric method)
3.	Sulphur Dioxide (SO_2)	(µg/m^3)	BDL (<6.5)	BDL (<6.5)	80	IS: 5182 (part 2): 2001, RA 2017
4.	Nitrogen Dioxide (NO_2)	(µg/m^3)	10.4	9.1	80	IS: 5182 (part 6): 2006, RA 2017
5.	Ammonia (NH_3)	(µg/m^3)	BDL (<5.0)	BDL (<5.0)	400	JPT/CH/SOP/AIR/07 Indo Phenol Blue Method
6.	Ozone (O_3)	(µg/m^3)	8.2	7.8	180	IS: 5182 pt 09:1974, RA 2014
7.	Carbon Monoxide (CO)	(mg/m^3	0.26	0.31	04	IS: 5182 (part 10): 1999, RA 2014
8.	Lead (Pb)	µg/m^3	ND (<0.5)	ND (<0.5)	1.0	IS: 5182 (pt 22):2004, RA 2014
9.	Nickel (Ni)	ng/m^3	ND (<10.0)	ND (<10.0)	20*	JPT/CH/SOP/AIR/08 (AAS)
10.	Arsenic (As)	ng/m^3	ND (<1.0)	ND (<1.0)	6*	JPT/CH/SOP/AIR/08 (AAS)
11.	Benzene (C_6H_6)	µg/m^3	ND (< 0.5)	ND (< 0.5)	5*	IS:5182 pt 11:2006, RA 2017
12.	Benzo(a)Pyrene	ng/m^3	ND (< 0.5)	ND (< 0.5)	1*	JPT/CH/SOP/AIR/10 (by GC)

Note- * = Annual Standard, ND= Not Detected, Value given in parenthesis indicates Detection Limit.

End of Report

Test & Research Centre PRANESH BHARDWAJ Chemist

Checked By

For J P Test & Research Centre
Quality Manager

Authorized Signatory

* Format No. JPT/5.10F-01 Issue No. 01 Issue Date 16.10.2015 Rev. No. 02 Rev Date 15.05.2019

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TEST REPORT

Test Report Number	RAI1914106-107	**Page Number**	Page 1 of 1
Job Order Number	JPT/AI19/14106-107	**Customer Ref. Number**	-
Date of Issue	19.09.2019	**Sample Received On**	14.09.2019
Discipline Name	Chemical Testing	**Group**	Atmospheric Pollution

Project Proponent : The Executive Engineer, National Highway- Division, Public Work Department, Nahan (HP)- 173212
Project Name: Paonta (Badripur) Rajaban Shillai Meenus Gumma Feddus Road km 0/0 to 104/291 on NH-72B (New NH No.- 707)

NAME & ADDRESS OF CUSTOMER	SAMPLE DETAILS
Issued to, **M/s C & E Consultancy** Chauhan Building P.O Kamlanagar Sanjauli, Shimla	Sample Description : Ambient Air Sample Location : Shillai at RD 66/00 Coordinate : $30^0$40.643' N, $77^0$42.453'E Weather Condition : Cloudy Sampling Method : IS: 5182 (Part-14, Part-05) Sample done by : JPT Lab Representative Sampling duration : 24 Hrs (Except for CO & Ozone 1 hr.) Analysis Duration : 14.09.2019 to 17.09.2019

TEST RESULTS

S.No	Parameters	Unit	Results		NAAQ Standards	Test Method
			11/09/2019	12/09/2019		
1.	Particulate Matter (size less than 10 µm) or PM_{10}	(µg/m^3)	58	62	100	IS: 5182 (part 23): 2006, RA 2017
2.	Particulate Matter (size less than 2.5 µm) or $PM_{2.5}$	(µg/m^3)	23.8	27.6	60	JPT/CH/SOP/AIR/06 (Gravimetric method)
3.	Sulphur Dioxide (SO_2)	(µg/m^3)	7.4	6.9	80	IS: 5182 (part 2): 2001, RA 2017
4.	Nitrogen Dioxide (NO_2)	(µg/m^3)	15.6	18.2	80	IS: 5182 (part 6): 2006, RA 2017
5.	Ammonia (NH_3)	(µg/m^3)	9.8	8.5	400	JPT/CH/SOP/AIR/07 Indo Phenol Blue Method
6.	Ozone (O_3)	(µg/m^3)	18.4	16.3	180	IS: 5182 pt 09:1974, RA 2014
7.	Carbon Monoxide (CO)	(mg/m^3	0.39	0.34	04	IS: 5182 (part 10): 1999, RA 2014
8.	Lead (Pb)	µg/m^3	ND (<0.5)	ND (<0.5)	1.0	IS: 5182 (pt 22):2004, RA 2014
9.	Nickel (Ni)	ng/m^3	ND (<10.0)	ND (<10.0)	20*	JPT/CH/SOP/AIR/08 (AAS)
10.	Arsenic (As)	ng/m^3	ND (<1.0)	ND (<1.0)	6*	JPT/CH/SOP/AIR/08 (AAS)
11.	Benzene (C_6H_6)	µg/m^3	ND (< 0.5)	ND (< 0.5)	5*	IS:5182 pt 11:2006, RA 2017
12.	Benzo(a)Pyrene	ng/m^3	ND (< 0.5)	ND (< 0.5)	1*	JPT/CH/SOP/AIR/10 (by GC)

Note- * = Annual Standard, ND= Not Detected, Value given in parenthesis indicates Detection Limit.

End of Report

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For J P Test & Research Centre

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* Format No. JPT/5.10F-01 Issue No. 01 Issue Date 16.10.2015 Rev. No. 02 Rev Date 15.05.2019

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TEST REPORT

Test Report Number	RAI1914108-109	**Page Number**	Page 1 of 1
Job Order Number	JPT/AI19/14108-109	**Customer Ref. Number**	-
Date of Issue	19.09.2019	**Sample Received On**	14.09.2019
Discipline Name	Chemical Testing	**Group**	Atmospheric Pollution

Project Proponent : The Executive Engineer, National Highway- Division, Public Work Department, Nahan (HP)- 173212
Project Name: Paonta (Badripur) Rajaban Shillai Meenus Gumma Feddus Road km 0/0 to 104/291 on NH-72B (New NH No.- 707)

NAME & ADDRESS OF CUSTOMER	SAMPLE DETAILS
Issued to, **M/s C & E Consultancy** Chauhan Building P.O Kamlanagar Sanjauli, Shimla	Sample Description : Ambient Air Sample Location : Drabil at RD 78/00 Coordinate : $30^0$43.331' N, $77^0$41.445'E Weather Condition : Cloudy Sampling Method : IS: 5182 (Part-14, Part-05) Sample done by : JPT Lab Representative Sampling duration : 24 Hrs (Except for CO & Ozone 1 hr.) Analysis Duration : 14.09.2019 to 17.09.2019

TEST RESULTS

S.No	Parameters	Unit	Results		NAAQ Standards	Test Method
			11/09/2019	12/09/2019		
1.	Particulate Matter (size less than 10 µm) or PM_{10}	(µg/m^3)	41	46	100	IS: 5182 (part 23): 2006, RA 2017
2.	Particulate Matter (size less than 2.5 µm) or $PM_{2.5}$	(µg/m^3)	15.7	17.4	60	JPT/CH/SOP/AIR/06 (Gravimetric method)
3.	Sulphur Dioxide (SO_2)	(µg/m^3)	BDL (<6.5)	BDL (<6.5)	80	IS: 5182 (part 2): 2001, RA 2017
4.	Nitrogen Dioxide (NO_2)	(µg/m^3)	7.6	8.9	80	IS: 5182 (part 6): 2006, RA 2017
5.	Ammonia (NH_3)	(µg/m^3)	BDL (<5.0)	BDL (<5.0)	400	JPT/CH/SOP/AIR/07 Indo Phenol Blue Method
6.	Ozone (O_3)	(µg/m^3)	10.4	9.6	180	IS: 5182 pt 09:1974, RA 2014
7.	Carbon Monoxide (CO)	(mg/m^3	0.24	0.28	04	IS: 5182 (part 10): 1999, RA 2014
8.	Lead (Pb)	µg/m^3	ND (<0.5)	ND (<0.5)	1.0	IS: 5182 (pt 22):2004, RA 2014
9.	Nickel (Ni)	ng/m^3	ND (<10.0)	ND (<10.0)	20*	JPT/CH/SOP/AIR/08 (AAS)
10.	Arsenic (As)	ng/m^3	ND (<1.0)	ND (<1.0)	6*	JPT/CH/SOP/AIR/08 (AAS)
11.	Benzene (C_6H_6)	µg/m^3	ND (< 0.5)	ND (< 0.5)	5*	IS:5182 pt 11:2006, RA 2017
12.	Benzo(a)Pyrene	ng/m^3	ND (< 0.5)	ND (< 0.5)	1*	JPT/CH/SOP/AIR/10 (by GC)

Note- * = Annual Standard, ND= Not Detected, Value given in parenthesis indicates Detection Limit.

End of Report

For J P Test & Research Centre

Checked By

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* Format No. JPT/5.10F-01 Issue No. 01 Issue Date 16.10.2015 Rev. No. 02 Rev Date 15.05.2019

Note 1. Sample will be retained for 15 days for chemical testing and 7 days for Bacteriological testing from the date of issue of test report, unless specified by the customer. The results given for noise/lux are related to the observed values at the time of monitoring. The customer asked for the above tests only. 2. The parameters marked as * are not accredited by NABL. 3. The results given above are related to the tested sample and mentioned parameters. Endorsement of product is neither inferred not implied . 4. Total liability of our works is limited to invoiced amount. 5. This report can not be used as evidence in a court of law without the written approval of the lab. 6. Certificate shall not be reproduced, except in full, without prior written approval of the laboratory

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TEST REPORT

Test Report Number	RAI1916101-102	**Page Number**	Page 1 of 1
Job Order Number	JPT/AI19/16101-102	**Customer Ref. Number**	-
Date of Issue	19.09.2019	**Sample Received On**	16.09.2019
Discipline Name	Chemical Testing	**Group**	Atmospheric Pollution

Project Proponent : The Executive Engineer, National Highway- Division, Public Work Department, Nahan (HP)- 173212
Project Name: Paonta (Badripur) Rajaban Shillai Meenus Gumma Feddus Road km 0/0 to 104/291 on NH-72B (New NH No.- 707)

NAME & ADDRESS OF CUSTOMER	SAMPLE DETAILS
Issued to, **M/s C & E Consultancy** Chauhan Building P.O Kamlanagar Sanjauli, Shimla	Sample Description : Ambient Air Sample Location : Gumma at RD 95/00 Coordinate : $30^0$48.134' N, $77^0$43.715'E Weather Condition : Clear Sampling Method : IS: 5182 (Part-14, Part-05) Sample done by : JPT Lab Representative Sampling duration : 24 Hrs (Except for CO & Ozone 1 hr.) Analysis Duration : 16.09.2019 to 19.09.201930

TEST RESULTS

S.No	Parameters	Unit	Results		NAAQ Standards	Test Method
			13/09/2019	14/09/2019		
1.	Particulate Matter (size less than 10 µm) or PM_{10}	(µg/m^3)	38	42	100	IS: 5182 (part 23): 2006, RA 2017
2.	Particulate Matter (size less than 2.5 µm) or $PM_{2.5}$	(µg/m^3)	16.4	19.1	60	JPT/CH/SOP/AIR/06 (Gravimetric method)
3.	Sulphur Dioxide (SO_2)	(µg/m^3)	BDL (<6.5)	BDL (<6.5)	80	IS: 5182 (part 2): 2001, RA 2017
4.	Nitrogen Dioxide (NO_2)	(µg/m^3)	7.2	7.6	80	IS: 5182 (part 6): 2006, RA 2017
5.	Ammonia (NH_3)	(µg/m^3)	BDL (<5.0)	BDL (<5.0)	400	JPT/CH/SOP/AIR/07 Indo Phenol Blue Method
6.	Ozone (O_3)	(µg/m^3)	13.2	10.5	180	IS: 5182 pt 09:1974, RA 2014
7.	Carbon Monoxide (CO)	(mg/m^3	0.26	0.23	04	IS: 5182 (part 10): 1999, RA 2014
8.	Lead (Pb)	µg/m^3	ND (<0.5)	ND (<0.5)	1.0	IS: 5182 (pt 22):2004, RA 2014
9.	Nickel (Ni)	ng/m^3	ND (<10.0)	ND (<10.0)	20*	JPT/CH/SOP/AIR/08 (AAS)
10.	Arsenic (As)	ng/m^3	ND (<1.0)	ND (<1.0)	6*	JPT/CH/SOP/AIR/08 (AAS)
11.	Benzene (C_6H_6)	µg/m^3	ND (< 0.5)	ND (< 0.5)	5*	IS:5182 pt 11:2006, RA 2017
12.	Benzo(a)Pyrene	ng/m^3	ND (< 0.5)	ND (< 0.5)	1*	JPT/CH/SOP/AIR/10 (by GC)

Note- * = Annual Standard, ND= Not Detected, Value given in parenthesis indicates Detection Limit.

End of Report

For J P Test & Research Centre

Authorized Signatory

Checked By

* Format No. JPT/5.10F-01/Issue No. 01 Issue Date 16.10.2015 Rev. No. 02 Rev Date 15.05.2019

Note 1. Sample will be retained for 15 days for chemical testing and 7 days for Bacteriological testing from the date of issue of test report, unless specified by the customer. The results given for noise/lux are related to the observed values at the time of monitoring. The customer asked for the above tests only. 2.The parameters marked as * are not accredited by NABL. 3. The results given above are related to the tested sample and mentioned parameters. Endorsement of product is neither inferred not implied . 4. Total liability of our works is limited to invoiced amount. 5. This report can not be used as evidence in a court of law without the written approval of the lab. 6. Certificate shall not be reproduced, except in full, without prior written approval of the laboratory

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Gazette No. : 352, valid upto 08.02.2022

TEST REPORT

Test Report Number	RNI1916103	**Page Number**	Page 1 of 1
Job Order Number	JPT/NI19/16103	**Customer Ref. Number**	-
Date of Issue	19.09.2019	**Sample Received On**	16.09.2019

NAME & ADDRESS OF CUSTOMER	SAMPLE DETAILS

Project Proponent : The Executive Engineer, National Highway- Division, Public Work Department, Nahan (HP)- 173212
Project Name: Paonta (Badripur) Rajaban Shillai Meenus Gumma Feddus Road km 0/0 to 104/291 on NH-72B (New NH No.- 707)

Issued to,
M/s C & E Consultancy
Chauhan Building P.O Kamlanagar
Sanjauli, Shimla

Description	:	Ambient Noise
Weather condition	:	Cloudy
Sampling location	:	**Badripur Chowk Paonta Sahib**
Coordinate	:	30°26.924' N, 77°36.502'E
Date of monitoring	:	09.09.10.2019 to 10.09.2019
Monitoring procedure	:	IS 9876 & CPCB Guideline
Monitoring Done by	:	Lab representative
Instrument Used	:	Sound level meter, Luttron make
Zone	:	----

TEST RESULT
AMBIENT NOISE QUALITY

S. No	Parameter	Unit	Observed value	Test Method
1.	Equivalent Noise Level, Leq (day*)	dB(A)	63.8	IS:9876 & JPT/CH/SOP/NSE-01
2.	Equivalent Noise Level, Leq (Night)**	dB(A)	43.5	

Area Code	Category of Area /Zone	Limit as per E(P)A 1986 (The noise Pollution Regulation & Control Rule, 2000) in dB(A) Leq	
		Day Time	Night Time
A	Industrial Area	75	70
B	Commercial Area	65	55
C	Residential Area	55	45
D	Silence Zone	50	40

Note: *Day Time mean 6.am to 10 p.m
**Night Time mean 10.p.m to 6 a.m
#The noise Pollution Regulation & Control Rule, 2000

End of Report

For J P Test & Research Centre

Checked By

Authorized Signatory

* Format No. JPT/5.10F-02 Issue No. 01 Issue Date 15.06.2015 Rev. No. 02 Rev Date 15.05.2019

Note 1. Sample will be retained for 15 days for chemical testing and 7 days for Bacteriological testing from the date of issue of test report, unless specified by the customer. The results given for noise/lux are related to the observed values at the time of monitoring. The customer asked for the above tests only. 2.The parameters marked as * are not accredited by NABL. 3. The results given above are related to the tested sample and mentioned parameters. Endorsement of product is neither inferred not implied . 4. Total liability of our works is limited to invoiced amount. 5. This report can not be used as evidence in a court of law without the written approval of the lab. 6. Certificate shall not be reproduced, except in full, without prior written approval of the laboratory

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TEST REPORT

Test Report Number	RNI1916104	**Page Number**	Page 1 of 1
Job Order Number	JPT/NI19/16104	**Customer Ref. Number**	-
Date of Issue	19.09.2019	**Sample Received On**	16.09.2019
NAME & ADDRESS OF CUSTOMER		**SAMPLE DETAILS**	

Project Proponent : The Executive Engineer, National Highway- Division, Public Work Department, Nahan (HP)- 173212
Project Name: Paonta (Badripur) Rajaban Shillai Meenus Gumma Feddus Road km 0/0 to 104/291 on NH-72B (New NH No.- 707)

Issued to,
M/s C & E Consultancy
Chauhan Building P.O Kamlanagar
Sanjauli, Shimla

Description	:	Ambient Noise
Weather condition	:	Cloudy
Sampling location	:	**Satoun at RD 18/100**
Coordinate	:	30°33.629' N, 77°38.217'E
Date of monitoring	:	09.09.10.2019 to 10.09.2019
Monitoring procedure	:	IS 9876 & CPCB Guideline
Monitoring Done by	:	Lab representative
Instrument Used	:	Sound level meter, Luttron make
Zone	:	----

TEST RESULT
AMBIENT NOISE QUALITY

S. No	Parameter	Unit	Observed value	Test Method
1.	Equivalent Noise Level, Leq (day*)	dB(A)	54.2	IS:9876 & JPT/CH/SOP/NSE-01
2.	Equivalent Noise Level, Leq (Night)**	dB(A)	40.7	

Area Code	Category of Area /Zone	Limit as per E(P)A 1986 (The noise Pollution Regulation & Control Rule, 2000) in dB(A) Leq	
		Day Time	Night Time
A	Industrial Area	75	70
B	Commercial Area	65	55
C	Residential Area	55	45
D	Silence Zone	50	40

Note: *Day Time mean 6.am to 10 p.m
**Night Time mean 10.p.m to 6 a.m
#The noise Pollution Regulation & Control Rule, 2000

End of Report

For J P Test & Research Centre

Authorized Signatory

Checked By

Note 1. Sample will be retained for 15 days for chemical testing and 7 days for Bacteriological testing from the date of issue of test report, unless specified by the customer. The results given for noise/lux are related to the observed values at the time of monitoring. The customer asked for the above tests only. 2.The parameters marked as * are not accredited by NABL. 3. The results given above are related to the tested sample and mentioned parameters. Endorsement of product is neither inferred not implied . 4. Total liability of our works is limited to invoiced amount. 5. This report can not be used as evidence in a court of law without the written approval of the lab. 6. Certificate shall not be reproduced, except in full, without prior written approval of the laboratory

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TEST REPORT

Test Report Number	RNI1916105	**Page Number**	Page 1 of 1
Job Order Number	JPT/NI19/16105	**Customer Ref. Number**	-
Date of Issue	19.09.2019	**Sample Received On**	16.09.2019
NAME & ADDRESS OF CUSTOMER		**SAMPLE DETAILS**	

Project Proponent : The Executive Engineer, National Highway- Division, Public Work Department, Nahan (HP)- 173212
Project Name: Paonta (Badripur) Rajaban Shillai Meenus Gumma Feddus Road km 0/0 to 104/291 on NH-72B (New NH No.- 707)

Issued to,
M/s C & E Consultancy
Chauhan Building P.O Kamlanagar
Sanjauli, Shimla

Description	:	Ambient Noise
Weather condition	:	Cloudy
Sampling location	:	**Tilrodhar at RD 35/500**
Coordinate	:	$30^0$35.892' N, $77^0$41.005'E
Date of monitoring	:	09.09.10.2019 to 10.09.2019
Monitoring procedure	:	IS 9876 & CPCB Guideline
Monitoring Done by	:	Lab representative
Instrument Used	:	Sound level meter, Luttron make
Zone	:	----

TEST RESULT
AMBIENT NOISE QUALITY

S. No	Parameter	Unit	Observed value	Test Method
1.	Equivalent Noise Level, Leq (day*)	dB(A)	49.8	IS:9876 & JPT/CH/SOP/NSE-01
2.	Equivalent Noise Level, Leq (Night)**	dB(A)	39.6	

Area Code	Category of Area /Zone	Limit as per E(P)A 1986 (The noise Pollution Regulation & Control Rule, 2000) in dB(A) Leq	
		Day Time	Night Time
A	Industrial Area	75	70
B	Commercial Area	65	55
C	Residential Area	55	45
D	Silence Zone	50	40

Note: *Day Time mean 6.am to 10 p.m
**Night Time mean 10.p.m to 6 a.m
#The noise Pollution Regulation & Control Rule, 2000

End of Report

For J P Test & Research Centre

Checked By

Authorized Signatory

* Format No. JPT/5.10F-02 Issue No. 01 Issue Date 15.06.2015 Rev. No. 02 Rev Date 15.05.2019

Note 1. Sample will be retained for 15 days for chemical testing and 7 days for Bacteriological testing from the date of issue of test report, unless specified by the customer. The results given for noise/lux are related to the observed values at the time of monitoring. The customer asked for the above tests only. 2.The parameters marked as * are not accredited by NABL. 3. The results given above are related to the tested sample and mentioned parameters. Endorsement of product is neither inferred not implied . 4. Total liability of our works is limited to invoiced amount. 5. This report can not be used as evidence in a court of law without the written approval of the lab. 6. Certificate shall not be reproduced, except in full, without prior written approval of the laboratory

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TEST REPORT

Test Report Number	RNI1916106	**Page Number**	Page 1 of 1
Job Order Number	JPT/NI19/16106	**Customer Ref. Number**	-
Date of Issue	19.09.2019	**Sample Received On**	16.09.2019
NAME & ADDRESS OF CUSTOMER		**SAMPLE DETAILS**	

Project Proponent : The Executive Engineer, National Highway- Division, Public Work Department, Nahan (HP)- 173212
Project Name: Paonta (Badripur) Rajaban Shillai Meenus Gumma Feddus Road km 0/0 to 104/291 on NH-72B (New NH No.- 707)

Issued to,
M/s C & E Consultancy
Chauhan Building P.O Kamlanagar
Sanjauli, Shimla

Description	:	Ambient Noise
Weather condition	:	Cloudy
Sampling location	:	**Timbi at RD 50/00**
Coordinate	:	30°39.376' N, 77°38.586'E
Date of monitoring	:	11.09.10.2019 to 12.09.2019
Monitoring procedure	:	IS 9876 & CPCB Guideline
Monitoring Done by	:	Lab representative
Instrument Used	:	Sound level meter, Luttron make
Zone	:	----

TEST RESULT
AMBIENT NOISE QUALITY

S. No	Parameter	Unit	Observed value	Test Method
1.	Equivalent Noise Level, Leq (day*)	dB(A)	52.2	IS:9876 & JPT/CH/SOP/NSE-01
2.	Equivalent Noise Level, Leq (Night)**	dB(A)	38.4	

Area Code	Category of Area /Zone	Limit as per E(P)A 1986 (The noise Pollution Regulation & Control Rule, 2000) in dB(A) Leq	
		Day Time	Night Time
A	Industrial Area	75	70
B	Commercial Area	65	55
C	Residential Area	55	45
D	Silence Zone	50	40

Note: *Day Time mean 6.am to 10 p.m
**Night Time mean 10.p.m to 6 a.m
#The noise Pollution Regulation & Control Rule, 2000

End of Report

PRANESH BHARDWAJ Chemist

Checked By

For J P Test & Research Centre

S. PANDEY

Authorized Signatory

* Format No. JPT/5.10F-02 Issue No. 01 Issue Date 15.06.2015 Rev. No. 02 Rev Date 15.05.2019

Note 1. Sample will be retained for 15 days for chemical testing and 7 days for Bacteriological testing from the date of issue of test report, unless specified by the customer. The results given for noise/lux are related to the observed values at the time of monitoring. The customer asked for the above tests only. 2.The parameters marked as * are not accredited by NABL. 3. The results given above are related to the tested sample and mentioned parameters. Endorsement of product is neither inferred not implied . 4. Total liability of our works is limited to invoiced amount. 5. This report can not be used as evidence in a court of law without the written approval of the lab. 6. Certificate shall not be reproduced, except in full, without prior written approval of the laboratory

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Gazette No. : 352, valid upto 08.02.2022

TEST REPORT

Test Report Number	RNI1916107	**Page Number**	Page 1 of 1
Job Order Number	JPT/NI19/16107	**Customer Ref. Number**	-
Date of Issue	19.09.2019	**Sample Received On**	16.09.2019

NAME & ADDRESS OF CUSTOMER | **SAMPLE DETAILS**

Project Proponent : The Executive Engineer, National Highway- Division, Public Work Department, Nahan (HP)- 173212
Project Name: Paonta (Badripur) Rajaban Shillai Meenus Gumma Feddus Road km 0/0 to 104/291 on NH-72B (New NH No.- 707)

Issued to,
M/s C & E Consultancy
Chauhan Building P.O Kamlanagar
Sanjauli, Shimla

Description	:	Ambient Noise
Weather condition	:	Cloudy
Sampling location	:	**Shillai at RD 66/00**
Coordinate	:	$30^0$40.657' N, $77^0$42.446'E
Date of monitoring	:	12.09.10.2019 to 13.09.2019
Monitoring procedure	:	IS 9876 & CPCB Guideline
Monitoring Done by	:	Lab representative
Instrument Used	:	Sound level meter, Luttron make
Zone	:	----

TEST RESULT
AMBIENT NOISE QUALITY

S. No	Parameter	Unit	Observed value	Test Method
1.	Equivalent Noise Level, Leq (day*)	dB(A)	58.3	IS:9876 & JPT/CH/SOP/NSE-01
2.	Equivalent Noise Level, Leq (Night)**	dB(A)	42.8	

Area Code	Category of Area /Zone	Limit as per E(P)A 1986 (The noise Pollution Regulation & Control Rule, 2000) in dB(A) Leq	
		Day Time	Night Time
A	Industrial Area	75	70
B	Commercial Area	65	55
C	Residential Area	55	45
D	Silence Zone	50	40

Note *Day Time mean 6.am to 10 p.m
**Night Time mean 10.p.m to 6 a.m
#The noise Pollution Regulation & Control Rule, 2000

End of Report

For J P Test & Research Centre

Checked By

Authorized Signatory

Note 1. Sample will be retained for 15 days for chemical testing and 7 days for Bacteriological testing from the date of issue of test report, unless specified by the customer. The results given for noise/lux are related to the observed values at the time of monitoring. The customer asked for the above tests only. 2.The parameters marked as * are not accredited by NABL. 3. The results given above are related to the tested sample and mentioned parameters. Endorsement of product is neither inferred not implied . 4. Total liability of our works is limited to invoiced amount. 5. This report can not be used as evidence in a court of law without the written approval of the lab. 6. Certificate shall not be reproduced, except in full, without prior written approval of the laboratory

Laboratory: 4/54, Site-IV, Sahibabad Industrial Area, Ghaziabad, (UP) Pin-201010 Tel: 0120-4345989, 9910833356 Email:jptesthouse@gmail.com
Regd Office: G-4A, Vikas Deep Building, [illegible] Nagar, Delhi- 110092 Tel: +91-11-[illegible]

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Gazette No. : 352, valid upto 08.02.2022

TEST REPORT

Test Report Number	RNI1916108	**Page Number**	Page 1 of 1
Job Order Number	JPT/NI19/16108	**Customer Ref. Number**	-
Date of Issue	19.09.2019	**Sample Received On**	16.09.2019

NAME & ADDRESS OF CUSTOMER

Project Proponent : The Executive Engineer, National Highway- Division, Public Work Department, Nahan (HP)- 173212
Project Name: Paonta (Badripur) Rajaban Shillai Meenus Gumma Feddus Road km 0/0 to 104/291 on NH-72B (New NH No.- 707)

Issued to,
M/s C & E Consultancy
Chauhan Building P.O Kamlanagar
Sanjauli, Shimla

SAMPLE DETAILS

Description	:	Ambient Noise
Weather condition	:	Cloudy
Sampling location	:	**Drabil at RD 78/00**
Coordinate	:	$30^0$43.331' N, $77^0$41.564'E
Date of monitoring	:	13.09.10.2019 to 14.09.2019
Monitoring procedure	:	IS 9876 & CPCB Guideline
Monitoring Done by	:	Lab representative
Instrument Used	:	Sound level meter, Luttron make
Zone	:	----

TEST RESULT
AMBIENT NOISE QUALITY

S. No	Parameter	Unit	Observed value	Test Method
1.	Equivalent Noise Level, Leq (day*)	dB(A)	50.2	IS:9876 & JPT/CH/SOP/NSE-01
2.	Equivalent Noise Level, Leq (Night)**	dB(A)	39.5	

Area Code	Category of Area /Zone	Limit as per E(P)A 1986 (The noise Pollution Regulation & Control Rule, 2000) in dB(A) Leq	
		Day Time	Night Time
A	Industrial Area	75	70
B	Commercial Area	65	55
C	Residential Area	55	45
D	Silence Zone	50	40

Note: *Day Time mean 6.am to 10 p.m
**Night Time mean 10.p.m to 6 a.m
#The noise Pollution Regulation & Control Rule, 2000

End of Report

Checked By

For J P Test & Research Centre

Quality Manager

Authorized Signatory

* Format No. JPT/5.10F-02 Issue No. 01 Issue Date 15.06.2015 Rev. No. 02 Rev Date 15.05.2019

Note 1. Sample will be retained for 15 days for chemical testing and 7 days for Bacteriological testing from the date of issue of test report, unless specified by the customer. The results given for noise/lux are related to the observed values at the time of monitoring. The customer asked for the above tests only. 2.The parameters marked as * are not accredited by NABL. 3. The results given above are related to the tested sample and mentioned parameters. Endorsement of product is neither inferred not implied . 4. Total liability of our works is limited to invoiced amount. 5. This report can not be used as evidence in a court of law without the written approval of the lab. 6. Certificate shall not be reproduced, except in full, without prior written approval of the laboratory

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Gazette No. : 352, valid upto 08.02.2022

TEST REPORT

Test Report Number	RNI1916109	**Page Number**	Page 1 of 1
Job Order Number	JPT/NI19/16109	**Customer Ref. Number**	-
Date of Issue	19.09.2019	**Sample Received On**	16.09.2019

NAME & ADDRESS OF CUSTOMER | **SAMPLE DETAILS**

Project Proponent : The Executive Engineer, National Highway- Division, Public Work Department, Nahan (HP)- 173212
Project Name: Paonta (Badripur) Rajaban Shillai Meenus Gumma Feddus Road km 0/0 to 104/291 on NH-72B (New NH No.- 707)

Issued to,
M/s C & E Consultancy
Chauhan Building P.O Kamlanagar
Sanjauli, Shimla

Description	:	Ambient Noise
Weather condition	:	Clear
Sampling location	:	**Feddus at RD 104/00**
Coordinate	:	30°50.979' N, 77°44.698'E
Date of monitoring	:	14.09.10.2019 to 15.09.2019
Monitoring procedure	:	IS 9876 & CPCB Guideline
Monitoring Done by	:	Lab representative
Instrument Used	:	Sound level meter, Luttron make
Zone	:	----

TEST RESULT
AMBIENT NOISE QUALITY

S. No	Parameter	Unit	Observed value	Test Method
1.	Equivalent Noise Level, Leq (day*)	dB(A)	51.6	IS:9876 & JPT/CH/SOP/NSE-01
2.	Equivalent Noise Level, Leq (Night)**	dB(A)	38.2	

Area Code	Category of Area /Zone	Limit as per E(P)A 1986 (The noise Pollution Regulation & Control Rule, 2000) in dB(A) Leq	
		Day Time	Night Time
A	Industrial Area	75	70
B	Commercial Area	65	55
C	Residential Area	55	45
D	Silence Zone	50	40

Note: *Day Time mean 6.am to 10 p.m
**Night Time mean 10.p.m to 6 a.m
#The noise Pollution Regulation & Control Rule, 2000

End of Report

For J P Test & Research Centre

Authorized Signatory

Checked By

* Format No. JPT/5.10F-02 Issue No. 01 Issue Date 15.06.2015 Rev. No. 02 Rev Date 15.05.2019

Note 1. Sample will be retained for 15 days for chemical testing and 7 days for Bacteriological testing from the date of issue of test report, unless specified by the customer. The results given for noise/lux are related to the observed values at the time of monitoring. The customer asked for the above tests only. 2.The parameters marked as * are not accredited by NABL. 3. The results given above are related to the tested sample and mentioned parameters. Endorsement of product is neither inferred not implied . 4. Total liability of our works is limited to invoiced amount. 5. This report can not be used as evidence in a court of law without the written approval of the lab. 6. Certificate shall not be reproduced, except in full, without prior written approval of the laboratory

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Recognized from The Ministry of Environment, Forest & Climate Change (MoEF) Under E(P)A 1986 CERTIFICATE No. TC-8047

Gazette No. : 352, valid upto 08.02.2022

TEST REPORT

Test Report Number	RWI1913127	**Page Number**	Page 1 of 2
Job Order Number	JPT/WI19/13127	**Customer Ref. Number**	Nil
Date of Issue	19.09.2019	**Sample Received On**	13.09.2019

NAME & ADDRESS OF CUSTOMER | **SAMPLE DETAILS**

Project Proponent : The Executive Engineer, National Highway- Division, Public Work Department, Nahan (HP)- 173212
Project Name: Paonta (Badripur) Rajaban Shillai Meenus Gumma Feddus Road km 0/0 to 104/291 on NH-72B (New NH No.- 707)

Issued to,
M/s C & E Consultancy
Chauhan Building P.O Kamlanagar
Sanjauli, Shimla

Description	:	One Sample of Ground Water
Sampling Location	:	Nihalgarh at RD 4/00
Coordinate	:	$30^0$28.361'N, $77^0$37.78'E
Sampling Done By	:	JPT Lab Representative
Date of Sampling	:	11.09.2019
Sampling Protocol	:	IS: 3025 Part-01 & IS 1622
Quantity & Marking	:	2.5 Ltr.+ 500ml
Sample packing		Plastic Container + sterilize Glass Bottle
Analysis done on	:	13.09.2019 to 19.09.2019

RESULTS

WATER QUALITY ANALYSIS

Discipline Name: Chemical Testing | Product Group: Water

S.No	Parameters	Unit	Max Requirement as per (IS-10500-2012) Amnd 1		Results	Test Method
			Acceptable, max	Permissible (in absence of alternate source), max		
	PHYSICO-CHEMICAL PARAMETERS					
1	Taste	-	Agreeable	Agreeable	Agreeable	IS:3025(Pt-7)1984R 2012
2	Odour	-	Agreeable	Agreeable	Agreeable	IS : 3025(Pt-5)1983 RA 2018
3	pH value (at 25^0C)	-	6.5-8.5	No Relaxation	7.38	IS : 3025(Pt-11)1983 RA 2017
4	Color	Hazen	5	15	<5	IS : 3025(Pt-4)1983 RA 2017
5	Turbidity	NTU	1	5	<1	IS: 3025(Pt-10)1984 RA 2017
6	Total Dissolved Solids	mg/l	500	2000	326	IS : 3025(Pt-16)1984 RA 2017
7	Total Alkalinity as $CaCO_3$	mg/l	200	600	146	IS : 3025(Pt-23)1986 RA 2019
8	Total Hardness (as $CaCO_3$)	mg/l	200	600	186	IS : 3025(Pt-21)2009 RA 2019
9	Calcium (as Ca)	mg/l	75	200	45	IS : 3025(Pt-40)1991 RA 2019
10	Magnesium (as Mg)	mg/l	30	100	17.9	APHA 23rd Edi. 3500-Mg B
11	Chlorides (as Cl)	mg/l	250	1000	60	IS : 3025(Pt-32)1988 RA 2019
12	Fluoride (as F)	mg/l	1	1.5	0.2	APHA 23rd Edi. 4500 F (D)
13	Sulphate (as SO_4)	mg/l	200	400	23	IS : 3025(Pt-24)1986 RA 2019
14	Iron (as Fe)	mg/l	1.0	No Relaxation	0.09	APHA 23rd Ed. 3111

Continued....

Sr. Chemist
(Checked By)

Chemical
(Authorized Signatory)

Note 1. Sample will be retained for 15 days for chemical testing and 7 days for Bacteriological testing from the date of issue of test report, unless specified by the customer. The results given for noise/lux are related to the observed values at the time of monitoring. The customer asked for the above tests only. 2.The parameters marked as * are not accredited by NABL. 3. The results given above are related to the tested sample and mentioned parameters. Endorsement of product is neither inferred not implied . 4. Total liability of our works is limited to invoiced amount. 5. This report can not be used as evidence in a court of law without the written approval of the lab. 6. Certificate shall not be reproduced, except in full, without prior written approval of the laboratory

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Recognized from The Ministry of Environment, Forest & Climate Change (MoEF) Under E(P)A 1986 CERTIFICATE No. TC-8047

Gazette No. : 352, valid upto 08.02.2022

TEST REPORT

Test Report Number	RWI1913127	**Page Number**	Page 2 of 2
Job Order Number	JPT/WI19/13127	**Customer Ref. Number**	Nil
Date of Issue	19.09.2019	**Sample Received On**	13.09.2019

Discipline Name		Chemical Testing		Product Group		Water
S. No.	**Parameters**	**Unit**	**Max Requirement as per (IS-10500-2012) Amnd 1**		**Results**	**Test Method**
			Acceptable, max	**Permissible (in absence of alternate source), max**		
15	Nitrate (as NO_3)	mg/l	45	No Relaxation	6.7	IS : 3025(Pt-34) 1988R2019
16	Copper (as Cu)	mg/l	0.05	1.5	<0.02	APHA 23rd Ed. 3111
17	Boron (as B)	mg/l	0.5	1.0	<0.1	APHA 23rd Ed. 4500 B
18	Manganese(as Mn)	mg/l	0.1	0.3	<0.05	APHA 23rd Ed. 3111
19	Mineral Oil	mg/l	0.5	No Relaxation	<0.5	IS : 3025(Pt-39) 1991R2019
20	Phenolic Compounds (as C_6H_5OH)	mg/l	0.001	0.002	<0.001	IS : 3025(Pt-43) 1992R2019
21	Selenium (as Se)	mg/l	0.01	No Relaxation	<0.01	APHA 23rd Ed. 3114
22	Anionic Detergent (as MBAS)	mg/l	0.2	1.0	<0.01	APHA 23rd Ed. 5540 C
23	Aluminum (as Al)	mg/l	0.03	0.2	<0.02	APHA 23rd Ed. 3500 Al-B
24	Zinc (as Zn)	mg/l	5	15	<0.05	APHA 23rd Ed. 3111
25	Cadmium (as Cd)	mg/l	0.003	No Relaxation	<0.003	APHA 23rd Ed. 3111
26	Cyanide (as CN)	mg/l	0.05	No Relaxation	<0.05	IS : 3025(Pt-27) 1986R2014
27	Lead (as Pb)	mg/l	0.01	No Relaxation	<0.01	APHA 23rd Ed. 3111
28	Mercury (as Hg)	mg/l	0.001	No Relaxation	<0.001	APHA 23rd Ed. 3112
29	Total Arsenic (as As)	mg/l	0.01	No Relaxation	<0.01	APHA 23rd Ed. 3114
30	Total Chromium (as Cr)	mg/l	0.05	No Relaxation	<0.05	APHA 23rd Ed. 3111
	MICROBIOLOGICAL PARAMETERS					
31	Total Coliform	MPN/100ml	Shall not be detectable		Not detected (<2)	IS: 1622-1981 RA 2019 Amn.4
32	*E.Coli*	*E.coli*/100ml	Absent		Absent	IS: 1622-1981 RA 2019 Amn.4

End of Report

For JP Test & Research Centre

PRANESH BHARDWAJ Chemist
Sr. Chemist
(Checked By)

Sahibabad
Biological

PANDEY Deputy Manager
Chemical
(Authorized Signatory)

* Format No. JPT/5.10F-05 Issue No. 01 Issue Date 15.06.2015 Rev. No. 02 Rev Date: 15.05.2019

Note 1. Sample will be retained for 15 days for chemical testing and 7 days for Bacteriological testing from the date of issue of test report, unless specified by the customer. The results given for noise/lux are related to the observed values at the time of monitoring. The customer asked for the above tests only. 2.The parameters marked as * are not accredited by NABL. 3. The results given above are related to the tested sample and mentioned parameters. Endorsement of product is neither inferred not implied . 4. Total liability of our works is limited to invoiced amount. 5. This report can not be used as evidence in a court of law without the written approval of the lab. 6. Certificate shall not be reproduced, except in full, without prior written approval of the laboratory

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Gazette No. : 352, valid upto 08.02.2022

TEST REPORT

Test Report Number	RWI1913128	**Page Number**	Page 1 of 2
Job Order Number	JPT/WI19/13128	**Customer Ref. Number**	Nil
Date of Issue	19.09.2019	**Sample Received On**	13.09.2019

NAME & ADDRESS OF CUSTOMER

Project Proponent : The Executive Engineer, National Highway- Division, Public Work Department, Nahan (HP)- 173212
Project Name: Paonta (Badripur) Rajaban Shillai Meenus Gumma Feddus Road km 0/0 to 104/291 on NH-72B (New NH No.- 707)

Issued to,
M/s C & E Consultancy
Chauhan Building P.O Kamlanagar
Sanjauli, Shimla

SAMPLE DETAILS

Description	:	One Sample of Ground Water
Sampling Location	:	Satoun at RD 18/100
Coordinate	:	30°33.642'N, 77°38.254'E
Sampling Done By	:	JPT Lab Representative
Date of Sampling	:	11.09.2019
Sampling Protocol	:	IS: 3025 Part-01 & IS 1622
Quantity & Marking	:	2.5 Ltr.+ 500ml
Sample packing		Plastic Container + sterilize Glass Bottle
Analysis done on	:	13.09.2019 to 19.09.2019

RESULTS

WATER QUALITY ANALYSIS

Discipline Name: Chemical Testing — Product Group: Water

S.No	Parameters	Unit	Max Requirement as per (IS-10500-2012) Amnd 1		Results	Test Method
			Acceptable, max	Permissible (in absence of alternate source), max		
	PHYSICO-CHEMICAL PARAMETERS					
1	Taste	-	Agreeable	Agreeable	Agreeable	IS:3025(Pt-7)1984R 2012
2	Odour	-	Agreeable	Agreeable	Agreeable	IS : 3025(Pt-5)1983 RA 2018
3	pH value (at 25°C)	-	6.5-8.5	No Relaxation	7.85	IS : 3025(Pt-11)1983 RA 2017
4	Color	Hazen	5	15	<5	IS : 3025(Pt-4)1983 RA 2017
5	Turbidity	NTU	1	5	<1	IS: 3025(Pt-10)1984 RA 2017
6	Total Dissolved Solids	mg/l	500	2000	385	IS : 3025(Pt-16)1984 RA 2017
7	Total Alkalinity as $CaCO_3$	mg/l	200	600	172	IS : 3025(Pt-23)1986 RA 2019
8	Total Hardness (as $CaCO_3$)	mg/l	200	600	210	IS : 3025(Pt-21)2009 RA 2019
9	Calcium (as Ca)	mg/l	75	200	46	IS : 3025(Pt-40)1991 RA 2019
10	Magnesium (as Mg)	mg/l	30	100	23.1	APHA 23rd Edi. 3500-Mg B
11	Chlorides (as Cl)	mg/l	250	1000	70	IS : 3025(Pt-32)1988 RA 2019
12	Fluoride (as F)	mg/l	1	1.5	0.3	APHA 23rd Edi. 4500 F (D)
13	Sulphate (as SO_4)	mg/l	200	400	28	IS : 3025(Pt-24)1986 RA 2019
14	Iron (as Fe)	mg/l	1.0	No Relaxation	0.16	APHA 23rd Ed. 3111

Continued....

Sr. Chemist
(Checked By)

Chemical S. PANDEY
Quality Manager
(Authorized Signatory)

* Format No. JPT/5.10F-05 Issue No. 01 Issue Date 15.06.2015 Rev. No. 02 Rev Date: 15.05.2019

Note 1. Sample will be retained for 15 days for chemical testing and 7 days for Bacteriological testing from the date of issue of test report, unless specified by the customer. The results given for noise/lux are related to the observed values at the time of monitoring. The customer asked for the above tests only. 2.The parameters marked as * are not accredited by NABL. 3. The results given above are related to the tested sample and mentioned parameters. Endorsement of product is neither inferred not implied . 4. Total liability of our works is limited to invoiced amount. 5. This report can not be used as evidence in a court of law without the written approval of the lab. 6. Certificate shall not be reproduced, except in full, without prior written approval of the laboratory

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TEST REPORT

Test Report Number	RWI1913128	**Page Number**	Page 2 of 2
Job Order Number	JPT/WI19/13128	**Customer Ref. Number**	Nil
Date of Issue	19.09.2019	**Sample Received On**	13.09.2019

Discipline Name		Chemical Testing		Product Group		Water
S. No.	**Parameters**	**Unit**	**Max Requirement as per (IS-10500-2012) Amnd 1**		**Results**	**Test Method**
			Acceptable, max	**Permissible (in absence of alternate source), max**		
15	Nitrate (as NO_3)	mg/l	45	No Relaxation	7.8	IS : 3025(Pt-34) 1988R2019
16	Copper (as Cu)	mg/l	0.05	1.5	<0.02	APHA 23rd Ed. 3111
17	Boron (as B)	mg/l	0.5	1.0	<0.1	APHA 23rd Ed. 4500 B
18	Manganese(as Mn)	mg/l	0.1	0.3	<0.05	APHA 23rd Ed. 3111
19	Mineral Oil	mg/l	0.5	No Relaxation	<0.5	IS : 3025(Pt-39) 1991R2019
20	Phenolic Compounds (as C_6H_5OH)	mg/l	0.001	0.002	<0.001	IS : 3025(Pt-43) 1992R2019
21	Selenium (as Se)	mg/l	0.01	No Relaxation	<0.01	APHA 23rd Ed. 3114
22	Anionic Detergent (as MBAS)	mg/l	0.2	1.0	<0.01	APHA 23rd Ed. 5540 C
23	Aluminum (as Al)	mg/l	0.03	0.2	<0.02	APHA 23rd Ed. 3500 Al-B
24	Zinc (as Zn)	mg/l	5	15	0.13	APHA 23rd Ed. 3111
25	Cadmium (as Cd)	mg/l	0.003	No Relaxation	<0.003	APHA 23rd Ed. 3111
26	Cyanide (as CN)	mg/l	0.05	No Relaxation	<0.05	IS : 3025(Pt-27) 1986R2014
27	Lead (as Pb)	mg/l	0.01	No Relaxation	<0.01	APHA 23rd Ed. 3111
28	Mercury (as Hg)	mg/l	0.001	No Relaxation	<0.001	APHA 23rd Ed. 3112
29	Total Arsenic (as As)	mg/l	0.01	No Relaxation	<0.01	APHA 23rd Ed. 3114
30	Total Chromium (as Cr)	mg/l	0.05	No Relaxation	<0.05	APHA 23rd Ed. 3111
	MICROBIOLOGICAL PARAMETERS					
31	Total Coliform	MPN/100ml	Shall not be detectable		Not detected (<2)	IS: 1622-1981 RA 2019 Amn.4
32	*E.Coli*	*E.coli*/100ml	Absent		Absent	IS: 1622-1981 RA 2019 Amn.4

End of Report

For JP Test & Research Centre

PRANESH BHARDWAJ Chemist — Sr. Chemist (Checked By)

Sahibabad Biological — Chemical (Authorized Signatory)

S. PANDEY Quality Manager

* Format No. JPT/5.10F-05 Issue No. 01 Issue Date 15.06.2015 Rev. No. 02 Rev Date: 15.05.2019

Note 1. Sample will be retained for 15 days for chemical testing and 7 days for Bacteriological testing from the date of issue of test report, unless specified by the customer. The results given for noise/lux are related to the observed values at the time of monitoring. The customer asked for the above tests only. 2.The parameters marked as * are not accredited by NABL. 3. The results given above are related to the tested sample and mentioned parameters. Endorsement of product is neither inferred not implied . 4. Total liability of our works is limited to invoiced amount. 5. This report can not be used as evidence in a court of law without the written approval of the lab. 6. Certificate shall not be reproduced, except in full, without prior written approval of the laboratory

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TEST REPORT

Test Report Number	RWI1913129	**Page Number**	Page 1 of 2
Job Order Number	JPT/WI19/13129	**Customer Ref. Number**	Nil
Date of Issue	19.09.2019	**Sample Received On**	13.09.2019

NAME & ADDRESS OF CUSTOMER

Project Proponent : The Executive Engineer, National Highway- Division, Public Work Department, Nahan (HP)- 173212

Project Name: Paonta (Badripur) Rajaban Shillai Meenus Gumma Feddus Road km 0/0 to 104/291 on NH-72B (New NH No.- 707)

Issued to,
M/s C & E Consultancy
Chauhan Building P.O Kamlanagar
Sanjauli, Shimla

SAMPLE DETAILS

Description	:	One Sample of Ground Water
Sampling Location	:	Gangtoli at RD 55/100
Coordinate	:	$30^0$39.662'N, $77^0$39.658'E
Sampling Done By	:	JPT Lab Representative
Date of Sampling	:	11.09.2019
Sampling Protocol	:	IS: 3025 Part-01 & IS 1622
Quantity & Marking	:	2.5 Ltr.+ 500ml
Sample packing		Plastic Container + sterilize Glass Bottle
Analysis done on	:	13.09.2019 to 19.09.2019

RESULTS

WATER QUALITY ANALYSIS

Discipline Name: Chemical Testing — Product Group: Water

S.No	Parameters	Unit	Max Requirement as per (IS-10500-2012) Amnd 1		Results	Test Method
			Acceptable, max	Permissible (in absence of alternate source), max		
	PHYSICO-CHEMICAL PARAMETERS					
1	Taste	-	Agreeable	Agreeable	Agreeable	IS:3025(Pt-7)1984R 2012
2	Odour	-	Agreeable	Agreeable	Agreeable	IS : 3025(Pt-5)1983 RA 2018
3	pH value (at 25^0C)	-	6.5-8.5	No Relaxation	7.16	IS : 3025(Pt-11)1983 RA 2017
4	Color	Hazen	5	15	<5	IS : 3025(Pt-4)1983 RA 2017
5	Turbidity	NTU	1	5	<1	IS: 3025(Pt-10)1984 RA 2017
6	Total Dissolved Solids	mg/l	500	2000	126	IS : 3025(Pt-16)1984 RA 2017
7	Total Alkalinity as $CaCO_3$	mg/l	200	600	42	IS : 3025(Pt-23)1986 RA 2019
8	Total Hardness (as $CaCO_3$)	mg/l	200	600	58	IS : 3025(Pt-21)2009 RA 2019
9	Calcium (as Ca)	mg/l	75	200	13	IS : 3025(Pt-40)1991 RA 2019
10	Magnesium (as Mg)	mg/l	30	100	6.2	APHA 23rd Edi. 3500-Mg B
11	Chlorides (as Cl)	mg/l	250	1000	36	IS : 3025(Pt-32)1988 RA 2019
12	Fluoride (as F)	mg/l	1	1.5	0.1	APHA 23rd Edi. 4500 F (D)
13	Sulphate (as SO_4)	mg/l	200	400	5	IS : 3025(Pt-24)1986 RA 2019
14	Iron (as Fe)	mg/l	1.0	No Relaxation	0.08	APHA 23rd Ed. 3111

Continued....

Sr. Chemist
(Checked By)

Chemical
(Authorized Signatory)

* Format No. JPT/S.10F-05 Issue No. 01 Issue Date 15.06.2015 Rev. No. 02 Rev Date: 15.05.2019

Note 1. Sample will be retained for 15 days for chemical testing and 7 days for Bacteriological testing from the date of issue of test report, unless specified by the customer. The results given for noise/lux are related to the observed values at the time of monitoring. The customer asked for the above tests only. 2.The parameters marked as * are not accredited by NABL. 3. The results given above are related to the tested sample and mentioned parameters. Endorsement of product is neither inferred not implied . 4. Total liability of our works is limited to invoiced amount. 5. This report can not be used as evidence in a court of law without the written approval of the lab. 6. Certificate shall not be reproduced, except in full, without prior written approval of the laboratory

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Gazette No. : 352, valid upto 08.02.2022

TEST REPORT

Test Report Number	RWI1913129	**Page Number**	Page 2 of 2
Job Order Number	JPT/WI19/13129	**Customer Ref. Number**	Nil
Date of Issue	19.09.2019	**Sample Received On**	13.09.2019

Discipline Name		Chemical Testing		Product Group		Water
S. No.	**Parameters**	**Unit**	**Max Requirement as per (IS-10500-2012) Amnd 1**		**Results**	**Test Method**
			Acceptable, max	**Permissible (in absence of alternate source), max**		
15	Nitrate (as NO_3)	mg/l	45	No Relaxation	2.3	IS : 3025(Pt-34) 1988R2019
16	Copper (as Cu)	mg/l	0.05	1.5	<0.02	APHA 23rd Ed. 3111
17	Boron (as B)	mg/l	0.5	1.0	<0.1	APHA 23rd Ed. 4500 B
18	Manganese(as Mn)	mg/l	0.1	0.3	<0.05	APHA 23rd Ed. 3111
19	Mineral Oil	mg/l	0.5	No Relaxation	<0.5	IS : 3025(Pt-39) 1991R2019
20	Phenolic Compounds (as C_6H_5OH)	mg/l	0.001	0.002	<0.001	IS : 3025(Pt-43) 1992R2019
21	Selenium (as Se)	mg/l	0.01	No Relaxation	<0.01	APHA 23rd Ed. 3114
22	Anionic Detergent (as MBAS)	mg/l	0.2	1.0	<0.01	APHA 23rd Ed. 5540 C
23	Aluminum (as Al)	mg/l	0.03	0.2	<0.02	APHA 23rd Ed. 3500 Al-B
24	Zinc (as Zn)	mg/l	5	15	<0.05	APHA 23rd Ed. 3111
25	Cadmium (as Cd)	mg/l	0.003	No Relaxation	<0.003	APHA 23rd Ed. 3111
26	Cyanide (as CN)	mg/l	0.05	No Relaxation	<0.05	IS : 3025(Pt-27) 1986R2014
27	Lead (as Pb)	mg/l	0.01	No Relaxation	<0.01	APHA 23rd Ed. 3111
28	Mercury (as Hg)	mg/l	0.001	No Relaxation	<0.001	APHA 23rd Ed. 3112
29	Total Arsenic (as As)	mg/l	0.01	No Relaxation	<0.01	APHA 23rd Ed. 3114
30	Total Chromium (as Cr)	mg/l	0.05	No Relaxation	<0.05	APHA 23rd Ed. 3111
	MICROBIOLOGICAL PARAMETERS					
31	Total Coliform	MPN/100ml	Shall not be detectable		Not detected (<2)	IS: 1622-1981 RA 2019 Amn.4
32	*E.Coli*	*E.coli*/100ml	Absent		Absent	IS: 1622-1981 RA 2019 Amn.4

End of Report

For JP Test & Research Centre

PRANESH KARDWAR Chemist — Sr. Chemist (Checked By)

Sahibabad — Biological

S. PANDEY Quality Manager — Chemical (Authorized Signatory)

Note 1. Sample will be retained for 15 days for chemical testing and 7 days for Bacteriological testing from the date of issue of test report, unless specified by the customer. The results given for noise/lux are related to the observed values at the time of monitoring. The customer asked for the above tests only. 2.The parameters marked as * are not accredited by NABL. 3. The results given above are related to the tested sample and mentioned parameters. Endorsement of product is neither inferred not implied . 4. Total liability of our works is limited to invoiced amount. 5. This report can not be used as evidence in a court of law without the written approval of the lab. 6. Certificate shall not be reproduced, except in full, without prior written approval of the laboratory

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Gazette No. : 352, valid upto 08.02.2022

TEST REPORT

Test Report Number	RWI1913130	**Page Number**	Page 1 of 2
Job Order Number	JPT/WI19/13130	**Customer Ref. Number**	Nil
Date of Issue	19.09.2019	**Sample Received On**	13.09.2019

NAME & ADDRESS OF CUSTOMER	SAMPLE DETAILS
Project Proponent : The Executive Engineer, National Highway- Division, Public Work Department, Nahan (HP)- 173212 **Project Name:** Paonta (Badripur) Rajaban Shillai Meenus Gumma Feddus Road km 0/0 to 104/291 on NH-72B (New NH No.- 707)	
Issued to, **M/s C & E Consultancy** Chauhan Building P.O Kamlanagar Sanjauli, Shimla	Description : One Sample of Ground Water Sampling Location : Meenus at RD 88/00 Coordinate : 30°46.065'N, 77°41.911'E Sampling Done By : JPT Lab Representative Date of Sampling : 11.09.2019 Sampling Protocol : IS: 3025 Part-01 & IS 1622 Quantity & Marking : 2.5 Ltr.+ 500ml Sample packing : Plastic Container + Sterilize Glass Bottle Analysis done on : 13.09.2019 to 19.09.2019

RESULTS

WATER QUALITY ANALYSIS

Discipline Name: Chemical Testing | Product Group: Water

S.No	Parameters	Unit	Max Requirement as per (IS-10500-2012) Amnd 1		Results	Test Method
			Acceptable, max	Permissible (in absence of alternate source), max		
	PHYSICO-CHEMICAL PARAMETERS					
1	Taste	-	Agreeable	Agreeable	Agreeable	IS:3025(Pt-7)1984R 2012
2	Odour	-	Agreeable	Agreeable	Agreeable	IS : 3025(Pt-5)1983 RA 2018
3	pH value (at 25°C)	-	6.5-8.5	No Relaxation	7.42	IS : 3025(Pt-11)1983 RA 2017
4	Color	Hazen	5	15	<5	IS : 3025(Pt-4)1983 RA 2017
5	Turbidity	NTU	1	5	<1	IS: 3025(Pt-10)1984 RA 2017
6	Total Dissolved Solids	mg/l	500	2000	387	IS : 3025(Pt-16)1984 RA 2017
7	Total Alkalinity as $CaCO_3$	mg/l	200	600	180	IS : 3025(Pt-23)1986 RA 2019
8	Total Hardness (as $CaCO_3$)	mg/l	200	600	264	IS : 3025(Pt-21)2009 RA 2019
9	Calcium (as Ca)	mg/l	75	200	61	IS : 3025(Pt-40)1991 RA 2019
10	Magnesium (as Mg)	mg/l	30	100	27.2	APHA 23rd Edi. 3500-Mg B
11	Chlorides (as Cl)	mg/l	250	1000	68	IS : 3025(Pt-32)1988 RA 2019
12	Fluoride (as F)	mg/l	1	1.5	0.3	APHA 23rd Edi. 4500 F (D)
13	Sulphate (as SO_4)	mg/l	200	400	26	IS : 3025(Pt-24)1986 RA 2019
14	Iron (as Fe)	mg/l	1.0	No Relaxation	0.14	APHA 23rd Ed. 3111

Continued....

Sr. Chemist
(Checked By)

Chemical Quality Manager
(Authorized Signatory)

* Format No. JPT/5.10F-05 Issue No. 01 Issue Date 15.06.2015 Rev. No. 02 Rev Date: 15.05.2019

Note 1. Sample will be retained for 15 days for chemical testing and 7 days for Bacteriological testing from the date of issue of test report, unless specified by the customer. The results given for noise/lux are related to the observed values at the time of monitoring. The customer asked for the above tests only. 2.The parameters marked as * are not accredited by NABL. 3. The results given above are related to the tested sample and mentioned parameters. Endorsement of product is neither inferred not implied . 4. Total liability of our works is limited to invoiced amount. 5. This report can not be used as evidence in a court of law without the written approval of the lab. 6. Certificate shall not be reproduced, except in full, without prior written approval of the laboratory

J. P. TEST & RESEARCH CENTRE

Test & Research Centre

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CERTIFICATE No. TC-8047

TEST REPORT

Test Report Number	RWI1913130	**Page Number**	Page 2 of 2
Job Order Number	JPT/WI19/13130	**Customer Ref. Number**	Nil
Date of Issue	19.09.2019	**Sample Received On**	13.09.2019

Discipline Name		Chemical Testing			Product Group	Water
S. No.	**Parameters**	**Unit**	**Max Requirement as per (IS-10500-2012) Amnd 1**		**Results**	**Test Method**
			Acceptable, max	**Permissible (in absence of alternate source), max**		
15	Nitrate (as NO_3)	mg/l	45	No Relaxation	7.2	IS : 3025(Pt-34) 1988R2019
16	Copper (as Cu)	mg/l	0.05	1.5	<0.02	APHA 23rd Ed. 3111
17	Boron (as B)	mg/l	0.5	1.0	<0.1	APHA 23rd Ed. 4500 B
18	Manganese(as Mn)	mg/l	0.1	0.3	<0.05	APHA 23rd Ed. 3111
19	Mineral Oil	mg/l	0.5	No Relaxation	<0.5	IS : 3025(Pt-39) 1991R2019
20	Phenolic Compounds (as C_6H_5OH)	mg/l	0.001	0.002	<0.001	IS : 3025(Pt-43) 1992R2019
21	Selenium (as Se)	mg/l	0.01	No Relaxation	<0.01	APHA 23rd Ed. 3114
22	Anionic Detergent (as MBAS)	mg/l	0.2	1.0	<0.01	APHA 23rd Ed. 5540 C
23	Aluminum (as Al)	mg/l	0.03	0.2	<0.02	APHA 23rd Ed. 3500 Al-B
24	Zinc (as Zn)	mg/l	5	15	0.08	APHA 23rd Ed. 3111
25	Cadmium (as Cd)	mg/l	0.003	No Relaxation	<0.003	APHA 23rd Ed. 3111
26	Cyanide (as CN)	mg/l	0.05	No Relaxation	<0.05	IS : 3025(Pt-27) 1986R2014
27	Lead (as Pb)	mg/l	0.01	No Relaxation	<0.01	APHA 23rd Ed. 3111
28	Mercury (as Hg)	mg/l	0.001	No Relaxation	<0.001	APHA 23rd Ed. 3112
29	Total Arsenic (as As)	mg/l	0.01	No Relaxation	<0.01	APHA 23rd Ed. 3114
30	Total Chromium (as Cr)	mg/l	0.05	No Relaxation	<0.05	APHA 23rd Ed. 3111
	MICROBIOLOGICAL PARAMETERS					
31	Total Coliform	MPN/100ml	Shall not be detectable		Not detected (<2)	IS: 1622-1981 RA 2019 Amn.4
32	*E.Coli*	*E.coli*/100ml	Absent		Absent	IS: 1622-1981 RA 2019 Amn.4

End of Report

For JP Test & Research Centre

Sr. Chemist
(Checked By)

Sahibabad Biological / Chemical
(Authorized Signatory)

Note 1. Sample will be retained for 15 days for chemical testing and 7 days for Bacteriological testing from the date of issue of test report, unless specified by the customer. The results given for noise/lux are related to the observed values at the time of monitoring. The customer asked for the above tests only. 2.The parameters marked as * are not accredited by NABL. 3. The results given above are related to the tested sample and mentioned parameters. Endorsement of product is neither inferred not implied . 4. Total liability of our works is limited to invoiced amount. 5. This report can not be used as evidence in a court of law without the written approval of the lab. 6. Certificate shall not be reproduced, except in full, without prior written approval of the laboratory

Laboratory: 4/54, Site-IV, Sahibabad Industrial Area, Ghaziabad, (UP) Pin-201010 Tel: 0120-4345989, 9910833356 Email:jptesthouse@gmail.com
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Gazette No. : 352, valid upto 08.02.2022

TEST REPORT

Test Report Number	RWI1913131	**Page Number**	Page 1 of 2
Job Order Number	JPT/WI19/13131	**Customer Ref. Number**	Nil
Date of Issue	19.09.2019	**Sample Received On**	13.09.2019

NAME & ADDRESS OF CUSTOMER	SAMPLE DETAILS
Project Proponent : The Executive Engineer, National Highway- Division, Public Work Department, Nahan (HP)- 173212 **Project Name:** Paonta (Badripur) Rajaban Shillai Meenus Gumma Feddus Road km 0/0 to 104/291 on NH-72B (New NH No.- 707)	
Issued to, **M/s C & E Consultancy** Chauhan Building P.O Kamlanagar Sanjauli, Shimla	Description : One Sample of Ground Water Sampling Location : Gumma at RD 95/00 Coordinate : $30^0$47.873'N, $77^0$43.533'E Sampling Done By : JPT Lab Representative Date of Sampling : 11.09.2019 Sampling Protocol : IS: 3025 Part-01 & IS 1622 Quantity & Marking : 2.5 Ltr.+ 500ml Sample packing : Plastic Container + Sterilize Glass Bottle Analysis done on : 13.09.2019 to 19.09.2019

RESULTS

WATER QUALITY ANALYSIS

Discipline Name: Chemical Testing — Product Group: Water

S.No	Parameters	Unit	Max Requirement as per (IS-10500-2012) Amnd 1		Results	Test Method
			Acceptable, max	Permissible (in absence of alternate source), max		
	PHYSICO-CHEMICAL PARAMETERS					
1	Taste	-	Agreeable	Agreeable	Agreeable	IS:3025(Pt-7)1984R 2012
2	Odour	-	Agreeable	Agreeable	Agreeable	IS : 3025(Pt-5)1983 RA 2018
3	pH value (at 25^0C)	-	6.5-8.5	No Relaxation	7.26	IS : 3025(Pt-11)1983 RA 2017
4	Color	Hazen	5	15	<5	IS : 3025(Pt-4)1983 RA 2017
5	Turbidity	NTU	1	5	<1	IS: 3025(Pt-10)1984 RA 2017
6	Total Dissolved Solids	mg/l	500	2000	498	IS : 3025(Pt-16)1984 RA 2017
7	Total Alkalinity as $CaCO_3$	mg/l	200	600	202	IS : 3025(Pt-23)1986 RA 2019
8	Total Hardness (as $CaCO_3$)	mg/l	200	600	286	IS : 3025(Pt-21)2009 RA 2019
9	Calcium (as Ca)	mg/l	75	200	71	IS : 3025(Pt-40)1991 RA 2019
10	Magnesium (as Mg)	mg/l	30	100	26.5	APHA 23rd Edi. 3500-Mg B
11	Chlorides (as Cl)	mg/l	250	1000	102	IS : 3025(Pt-32)1988 RA 2019
12	Fluoride (as F)	mg/l	1	1.5	0.4	APHA 23rd Edi. 4500 F (D)
13	Sulphate (as SO_4)	mg/l	200	400	38	IS : 3025(Pt-24)1986 RA 2019
14	Iron (as Fe)	mg/l	1.0	No Relaxation	0.12	APHA 23rd Ed. 3111

Continued....

Sr. Chemist (Checked By)

Chemical (Authorized Signatory)

* Format No. JPT/5.10F-05 Issue No. 01 Issue Date 15.06.2015 Rev. No. 02 Rev Date: 15.05.2019

Note 1. Sample will be retained for 15 days for chemical testing and 7 days for Bacteriological testing from the date of issue of test report, unless specified by the customer. The results given for noise/lux are related to the observed values at the time of monitoring. The customer asked for the above tests only. 2.The parameters marked as * are not accredited by NABL. 3. The results given above are related to the tested sample and mentioned parameters. Endorsement of product is neither inferred not implied . 4. Total liability of our works is limited to invoiced amount. 5. This report can not be used as evidence in a court of law without the written approval of the lab. 6. Certificate shall not be reproduced, except in full, without prior written approval of the laboratory

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Gazette No. : 352, valid upto 08.02.2022

TEST REPORT

Test Report Number	RWI1913131	**Page Number**	Page 2 of 2
Job Order Number	JPT/WI19/13131	**Customer Ref. Number**	Nil
Date of Issue	19.09.2019	**Sample Received On**	13.09.2019

Discipline Name		Chemical Testing		Product Group		Water
S. No.	**Parameters**	**Unit**	**Max Requirement as per (IS-10500-2012) Amnd 1**		**Results**	**Test Method**
			Acceptable, max	**Permissible (in absence of alternate source), max**		
15	Nitrate (as NO_3)	mg/l	45	No Relaxation	8.3	IS : 3025(Pt-34) 1988R2019
16	Copper (as Cu)	mg/l	0.05	1.5	<0.02	APHA 23rd Ed. 3111
17	Boron (as B)	mg/l	0.5	1.0	<0.1	APHA 23rd Ed. 4500 B
18	Manganese(as Mn)	mg/l	0.1	0.3	<0.05	APHA 23rd Ed. 3111
19	Mineral Oil	mg/l	0.5	No Relaxation	<0.5	IS : 3025(Pt-39) 1991R2019
20	Phenolic Compounds (as C_6H_5OH)	mg/l	0.001	0.002	<0.001	IS : 3025(Pt-43) 1992R2019
21	Selenium (as Se)	mg/l	0.01	No Relaxation	<0.01	APHA 23rd Ed. 3114
22	Anionic Detergent (as MBAS)	mg/l	0.2	1.0	<0.01	APHA 23rd Ed. 5540 C
23	Aluminum (as Al)	mg/l	0.03	0.2	<0.02	APHA 23rd Ed. 3500 Al-B
24	Zinc (as Zn)	mg/l	5	15	<0.05	APHA 23rd Ed. 3111
25	Cadmium (as Cd)	mg/l	0.003	No Relaxation	<0.003	APHA 23rd Ed. 3111
26	Cyanide (as CN)	mg/l	0.05	No Relaxation	<0.05	IS : 3025(Pt-27) 1986R2014
27	Lead (as Pb)	mg/l	0.01	No Relaxation	<0.01	APHA 23rd Ed. 3111
28	Mercury (as Hg)	mg/l	0.001	No Relaxation	<0.001	APHA 23rd Ed. 3112
29	Total Arsenic (as As)	mg/l	0.01	No Relaxation	<0.01	APHA 23rd Ed. 3114
30	Total Chromium (as Cr)	mg/l	0.05	No Relaxation	<0.05	APHA 23rd Ed. 3111
	MICROBIOLOGICAL PARAMETERS					
31	Total Coliform	MPN/100ml	Shall not be detectable		Not detected (<2)	IS: 1622-1981 RA 2019 Amn.4
32	*E.Coli*	*E.coli*/100ml	Absent		Absent	IS: 1622-1981 RA 2019 Amn.4

End of Report

For JP Test & Research Centre

Sr. Chemist (Checked By)

Biological Chemical (Authorized Signatory)

* Format No. JPT/5.10F-05 Issue No. 01 Issue Date 15.06.2015 Rev. No. 02 Rev Date: 15.05.2019

Note 1. Sample will be retained for 15 days for chemical testing and 7 days for Bacteriological testing from the date of issue of test report, unless specified by the customer. The results given for noise/lux are related to the observed values at the time of monitoring. The customer asked for the above tests only. 2.The parameters marked as * are not accredited by NABL. 3. The results given above are related to the tested sample and mentioned parameters. Endorsement of product is neither inferred not implied . 4. Total liability of our works is limited to invoiced amount. 5. This report can not be used as evidence in a court of law without the written approval of the lab. 6. Certificate shall not be reproduced, except in full, without prior written approval of the laboratory

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Gazette No. : 352, valid upto 08.02.2022

TEST REPORT

Test Report Number	RWI1913132	**Page Number**	Page 1 of 2
Job Order Number	JPT/WI19/13132	**Customer Ref. Number**	Nil
Date of Issue	19.09.2019	**Sample Received On**	13.09.2019

NAME & ADDRESS OF CUSTOMER	SAMPLE DETAILS
Project Proponent : The Executive Engineer, National Highway- Division, Public Work Department, Nahan (HP)- 173212 **Project Name:** Paonta (Badripur) Rajaban Shillai Meenus Gumma Feddus Road km 0/0 to 104/291 on NH-72B (New NH No.- 707)	
Issued to, **M/s C & E Consultancy** Chauhan Building P.O Kamlanagar Sanjauli, Shimla	Description : One Sample of Ground Water Sampling Location : Feddus at RD 104/00 Coordinate : $30^0$50.98'N, $77^0$44.696'E Sampling Done By : JPT Lab Representative Date of Sampling : 11.09.2019 Sampling Protocol : IS: 3025 Part-01 & IS 1622 Quantity & Marking : 2.5 Ltr.+ 500ml Sample packing : Plastic Container + Sterilize Glass Bottle Analysis done on : 13.09.2019 to 19.09.2019

RESULTS

WATER QUALITY ANALYSIS

Discipline Name: Chemical Testing — Product Group: Water

S.No	Parameters	Unit	Max Requirement as per (IS-10500-2012) Amnd 1		Results	Test Method
			Acceptable, max	Permissible (in absence of alternate source), max		
	PHYSICO-CHEMICAL PARAMETERS					
1	Taste	-	Agreeable	Agreeable	Agreeable	IS:3025(Pt-7)1984R 2012
2	Odour	-	Agreeable	Agreeable	Agreeable	IS : 3025(Pt-5)1983 RA 2018
3	pH value (at 25^0C)	-	6.5-8.5	No Relaxation	7.54	IS : 3025(Pt-11)1983 RA 2017
4	Color	Hazen	5	15	<5	IS : 3025(Pt-4)1983 RA 2017
5	Turbidity	NTU	1	5	<1	IS: 3025(Pt-10)1984 RA 2017
6	Total Dissolved Solids	mg/l	500	2000	281	IS : 3025(Pt-16)1984 RA 2017
7	Total Alkalinity as $CaCO_3$	mg/l	200	600	128	IS : 3025(Pt-23)1986 RA 2019
8	Total Hardness (as $CaCO_3$)	mg/l	200	600	162	IS : 3025(Pt-21)2009 RA 2019
9	Calcium (as Ca)	mg/l	75	200	35	IS : 3025(Pt-40)1991 RA 2019
10	Magnesium (as Mg)	mg/l	30	100	18.1	APHA 23rd Edi. 3500-Mg B
11	Chlorides (as Cl)	mg/l	250	1000	52	IS : 3025(Pt-32)1988 RA 2019
12	Fluoride (as F)	mg/l	1	1.5	0.2	APHA 23rd Edi. 4500 F (D)
13	Sulphate (as SO_4)	mg/l	200	400	18	IS : 3025(Pt-24)1986 RA 2019
14	Iron (as Fe)	mg/l	1.0	No Relaxation	0.09	APHA 23rd Ed. 3111

Continued....

Sr. Chemist
(Checked By)

Chemical Manager
(Authorized Signatory)

Note 1. Sample will be retained for 15 days for chemical testing and 7 days for Bacteriological testing from the date of issue of test report, unless specified by the customer. The results given for noise/lux are related to the observed values at the time of monitoring. The customer asked for the above tests only. 2.The parameters marked as * are not accredited by NABL. 3. The results given above are related to the tested sample and mentioned parameters. Endorsement of product is neither inferred not implied . 4. Total liability of our works is limited to invoiced amount. 5. This report can not be used as evidence in a court of law without the written approval of the lab. 6. Certificate shall not be reproduced, except in full, without prior written approval of the laboratory

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CERTIFICATE No. TC-8047

TEST REPORT

Test Report Number	RWI1913132	**Page Number**	Page 2 of 2
Job Order Number	JPT/WI19/13132	**Customer Ref. Number**	Nil
Date of Issue	19.09.2019	**Sample Received On**	13.09.2019

Discipline Name		Chemical Testing			Product Group		Water
S. No.	**Parameters**	**Unit**	**Max Requirement as per (IS-10500-2012) Amnd 1**		**Results**	**Test Method**	
			Acceptable, max	**Permissible (in absence of alternate source), max**			
15	Nitrate (as NO_3)	mg/l	45	No Relaxation	4.6	IS : 3025(Pt-34) 1988R2019	
16	Copper (as Cu)	mg/l	0.05	1.5	<0.02	APHA 23rd Ed. 3111	
17	Boron (as B)	mg/l	0.5	1.0	<0.1	APHA 23rd Ed. 4500 B	
18	Manganese(as Mn)	mg/l	0.1	0.3	<0.05	APHA 23rd Ed. 3111	
19	Mineral Oil	mg/l	0.5	No Relaxation	<0.5	IS : 3025(Pt-39) 1991R2019	
20	Phenolic Compounds (as C_6H_5OH)	mg/l	0.001	0.002	<0.001	IS : 3025(Pt-43) 1992R2019	
21	Selenium (as Se)	mg/l	0.01	No Relaxation	<0.01	APHA 23rd Ed. 3114	
22	Anionic Detergent (as MBAS)	mg/l	0.2	1.0	<0.01	APHA 23rd Ed. 5540 C	
23	Aluminum (as Al)	mg/l	0.03	0.2	<0.02	APHA 23rd Ed. 3500 Al-B	
24	Zinc (as Zn)	mg/l	5	15	0.07	APHA 23rd Ed. 3111	
25	Cadmium (as Cd)	mg/l	0.003	No Relaxation	<0.003	APHA 23rd Ed. 3111	
26	Cyanide (as CN)	mg/l	0.05	No Relaxation	<0.05	IS : 3025(Pt-27) 1986R2014	
27	Lead (as Pb)	mg/l	0.01	No Relaxation	<0.01	APHA 23rd Ed. 3111	
28	Mercury (as Hg)	mg/l	0.001	No Relaxation	<0.001	APHA 23rd Ed. 3112	
29	Total Arsenic (as As)	mg/l	0.01	No Relaxation	<0.01	APHA 23rd Ed. 3114	
30	Total Chromium (as Cr)	mg/l	0.05	No Relaxation	<0.05	APHA 23rd Ed. 3111	
	MICROBIOLOGICAL PARAMETERS						
31	Total Coliform	MPN/100ml	Shall not be detectable		Not detected (<2)	IS: 1622-1981 RA 2019 Amn.4	
32	*E.Coli*	*E.coli*/100ml	Absent		Absent	IS: 1622-1981 RA 2019 Amn.4	

End of Report

For JP Test & Research Centre

PRANESH SHARDIWAJ Chemist

Sr. Chemist (Checked By)

Sahibabad

Biological Chemical (Authorized Signatory)

S. SANDEY Quality Manager

* Format No. JPT/5.10F-05 Issue No. 01 Issue Date 15.06.2015 Rev. No. 02 Rev Date: 15.05.2019

Note 1. Sample will be retained for 15 days for chemical testing and 7 days for Bacteriological testing from the date of issue of test report, unless specified by the customer. The results given for noise/lux are related to the observed values at the time of monitoring. The customer asked for the above tests only. 2.The parameters marked as * are not accredited by NABL. 3. The results given above are related to the tested sample and mentioned parameters. Endorsement of product is neither inferred not implied . 4. Total liability of our works is limited to invoiced amount. 5. This report can not be used as evidence in a court of law without the written approval of the lab. 6. Certificate shall not be reproduced, except in full, without prior written approval of the laboratory

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Gazette No. : 352, valid upto 08.02.2022

TEST REPORT

Test Report Number	RWI1913133	**Page Number**	Page 1 of 2
Job Order Number	JPT/WI19/13133	**Customer Ref. Number**	Nil
Date of Issue	19.09.2019	**Sample Received On**	13.09.2019

NAME & ADDRESS OF CUSTOMER	SAMPLE DETAILS
Project Proponent : The Executive Engineer, National Highway- Division, Public Work Department, Nahan (HP)- 173212 **Project Name:** Paonta (Badripur) Rajaban Shillai Meenus Gumma Feddus Road km 0/0 to 104/291 on NH-72B (New NH No.- 707)	
Issued to, **M/s C & E Consultancy** Chauhan Building P.O Kamlanagar Sanjauli, Shimla	Description : One sample of water described as Surface Water Sample Location : Borad at RD 46/200 Coordinate : $30^0$37.851' N, $77^0$39.872'E Sampling done by : JPT Representative Date of sampling : 11.09.2019 Sampling Protocol : IS:3025, Part-1 & IS: 1622 Packing : Plastic bottle & Glass bottle Quantity : 2.5 L + 500mL Analysis done on : 13.09.2019 to 19.09.2019

S. No.	Parameters	Unit	Results	Test method
1	pH value at 25^0C	-	7.82	IS : 3025(Pt-11)1983 RA 2017
2	Turbidity	NTU	1	IS: 3025(Pt-10)1984 RA 2017
3	Conductivity	µmhos/cm	455	IS: 3025(Pt-14)
4	Total Dissolved Solids	mg/l	278	IS : 3025(Pt-16)1984 RA 2017
5	Total Suspended solids	mg/l	<5	IS: 3025(Pt-17)1984 RA 2017
6	Total Hardness (as $CaCO_3$)	mg/l	156	IS : 3025(Pt-21)2009 RA 2014
7	Chlorides (as Cl)	mg/l	52	IS : 3025(Pt-32)1988 RA 2014
8	Total Alkalinity as $CaCO_3$	mg/l	126	IS : 3025(Pt-23)1986 RA 2014
9	Sulphate (as SO_4)	mg/l	19	IS : 3025(Pt-24)1986 RA 2014
10	Nitrate (as NO_3)	mg/l	4.8	IS : 3025(Pt-34) 1988R2014
11	Fluoride (as F)	mg/l	0.1	APHA 23rd Edi. 4500 F (D)
12	Iron (as Fe)	mg/l	<0.05	APHA 23rd Edi. 3111
13	Zinc (as Zn)	mg/l	<0.05	APHA 23rd Edi. 3111
14	Calcium (as Ca)	mg/l	34	IS : 3025(Pt-40)1991 RA 2014
15	Magnesium (as Mg^{2+})	mg/l	17.3	APHA 23rd Edi. 3500-Mg B
16	Cadmium (as Cd)	mg/l	<0.01	APHA 23rd Edi. 3111

Continued...

J.P. Test & Research Centre
PRANESH BHARDWAJ
Chemist
Checked By

For J P Test & Research Centre
S. PANDEY
Quality Manager
(Chemical)
Authorized Signatory

* Format No. JPT/5.10F-17 Issue No. 01 Issue Date 08.12.2016 Rev. No. 02 Rev Date 15.05.2019

Note 1. Sample will be retained for 15 days for chemical testing and 7 days for Bacteriological testing from the date of issue of test report, unless specified by the customer. The results given for noise/lux are related to the observed values at the time of monitoring. The customer asked for the above tests only. 2.The parameters marked as * are not accredited by NABL. 3. The results given above are related to the tested sample and mentioned parameters. Endorsement of product is neither inferred not implied . 4. Total liability of our works is limited to invoiced amount. 5. This report can not be used as evidence in a court of law without the written approval of the lab. 6. Certificate shall not be reproduced, except in full, without prior written approval of the laboratory

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Gazette No. : 352, valid upto 08.02.2022

TEST REPORT

Test Report Number	RWI1913133	**Page Number**	Page 2 of 2
Job Order Number	JPT/WI19/13133	**Customer Ref. Number**	Nil
Date of Issue	19.09.2019	**Sample Received On**	13.09.2019

S. No.	Parameters	Unit	Results	Test method
17	Copper (as Cu)	mg/l	<0.05	APHA 23rd Edi. 3111
18	Nickel (as Ni)	mg/l	<0.01	APHA 23rd Edi. 3111
19	Lead (as Pb)	mg/l	<0.1	APHA 23rd Edi. 3111
20	Mercury (as Hg)	mg/l	<0.001	APHA 23rd Edi. 3112
21	Total arsenic (as As)	mg/l	<0.025	APHA 23rd Edi. 3114
22	Phenolic Compounds (as C_6H_5OH)	mg/l	<0.001	IS : 3025(Pt-43) 1992R2014
23	Phosphorous as (P)	mg/l	<0.03	IS : 3025(Pt-31) 1992R2014
24	Manganese(as Mn)	mg/l	<0.01	APHA 23rd Edi. 3111
25	Cyanide as CN	mg/l	<0.05	IS : 3025(Pt-27) 1986R2014
26	Total Chromium (as Cr)	mg/l	<0.05	APHA 23rd Edi. 3111
27	Anionic Detergent (MBAS)	mg/l	<0.01	APHA 23rd Ed. 5540 C
28	Aluminum (as Al)	mg/l	<0.03	APHA 23rd Edi. 3500 Al-B
29	Oil & Grease	mg/l	<2	IS : 3025(Pt-39)1991 R2014
30	Chemical Oxygen Demand	mg/l	6	IS : 3025(Pt-58) 2006 R2017
31	Biological Oxygen Demand (27°C 3 days)	mg/l	<1	IS : 3025(Pt-44) 1993 R2014
32	Dissolved Oxygen	mg/l	8.3	IS : 3025(Pt-38) 1989R2003
33	Total Coliform	MPN/100ml	18	IS : 1622-2003 RA – 2009

End of Report

J.P. Test & Research Centre PRANESH BHARDWAJ Chemist
Checked By

For J.P.Test & Research Centre
Sahibabad
(Biological)

J.P. Test & Research Centre S. PANDEY Quality Manager
(Chemical)

Authorized Signatory

* Format No. JPT/5.10F-17 Issue No. 01 Issue Date 08.12.2016 Rev. No. 02 Rev Date 15.05.2019

Note 1. Sample will be retained for 15 days for chemical testing and 7 days for Bacteriological testing from the date of issue of test report, unless specified by the customer. The results given for noise/lux are related to the observed values at the time of monitoring. The customer asked for the above tests only. 2.The parameters marked as * are not accredited by NABL. 3. The results given above are related to the tested sample and mentioned parameters. Endorsement of product is neither inferred not implied . 4. Total liability of our works is limited to invoiced amount. 5. This report can not be used as evidence in a court of law without the written approval of the lab. 6. Certificate shall not be reproduced, except in full, without prior written approval of the laboratory

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Gazette No. : 352, valid upto 08.02.2022

TEST REPORT

Test Report Number	RWI1913134	**Page Number**	Page 1 of 2
Job Order Number	JPT/WI19/13134	**Customer Ref. Number**	Nil
Date of Issue	19.09.2019	**Sample Received On**	13.09.2019

NAME & ADDRESS OF CUSTOMER	SAMPLE DETAILS
Project Proponent : The Executive Engineer, National Highway- Division, Public Work Department, Nahan (HP)- 173212 **Project Name:** Paonta (Badripur) Rajaban Shillai Meenus Gumma Feddus Road km 0/0 to 104/291 on NH-72B (New NH No.- 707)	
Issued to, **M/s C & E Consultancy** Chauhan Building P.O Kamlanagar Sanjauli, Shimla	Description : One sample of water described as Surface Water Sample Location : Khajiyar at RD 23/300 Coordinate : $30^0$36.463' N, $77^0$39.595'E Sampling done by : JPT Representative Date of sampling : 11.09.2019 Sampling Protocol : IS:3025, Part-1 & IS: 1622 Packing : Plastic bottle & Glass bottle Quantity : 2.5 L + 500mL Analysis done on : 13.09.2019 to 19.09.2019

S. No.	Parameters	Unit	Results	Test method
1	pH value at 25^0C	-	8.12	IS : 3025(Pt-11)1983 RA 2017
2	Turbidity	NTU	3	IS: 3025(Pt-10)1984 RA 2017
3	Conductivity	µmhos/cm	410	IS: 3025(Pt-14)
4	Total Dissolved Solids	mg/l	265	IS : 3025(Pt-16)1984 RA 2017
5	Total Suspended solids	mg/l	<5	IS: 3025(Pt-17)1984 RA 2017
6	Total Hardness (as $CaCO_3$)	mg/l	198	IS : 3025(Pt-21)2009 RA 2014
7	Chlorides (as Cl)	mg/l	43	IS : 3025(Pt-32)1988 RA 2014
8	Total Alkalinity as $CaCO_3$	mg/l	138	IS : 3025(Pt-23)1986 RA 2014
9	Sulphate (as SO_4)	mg/l	15	IS : 3025(Pt-24)1986 RA 2014
10	Nitrate (as NO_3)	mg/l	5.6	IS : 3025(Pt-34) 1988R2014
11	Fluoride (as F)	mg/l	0.1	APHA 23rd Edi. 4500 F (D)
12	Iron (as Fe)	mg/l	0.07	APHA 23rd Edi. 3111
13	Zinc (as Zn)	mg/l	<0.05	APHA 23rd Edi. 3111
14	Calcium (as Ca)	mg/l	52	IS : 3025(Pt-40)1991 RA 2014
15	Magnesium (as Mg^{2+})	mg/l	16.6	APHA 23rd Edi. 3500-Mg B
16	Cadmium (as Cd)	mg/l	<0.01	APHA 23rd Edi. 3111

Continued...

J.P. Test & Research Centre — PRANESH BHARDWAJ Chemist — Checked By

For J P Test & Research Centre

J.P. Test & Research Centre — S. PANDEY Quality Manager — (Chemical) Authorized Signatory

* Format No. JPT/5.10F-17 Issue No. 01 Issue Date 08.12.2016 Rev. No. 02 Rev Date 15.05.2019

Note 1. Sample will be retained for 15 days for chemical testing and 7 days for Bacteriological testing from the date of issue of test report, unless specified by the customer. The results given for noise/lux are related to the observed values at the time of monitoring. The customer asked for the above tests only. 2.The parameters marked as * are not accredited by NABL. 3. The results given above are related to the tested sample and mentioned parameters. Endorsement of product is neither inferred not implied . 4. Total liability of our works is limited to invoiced amount. 5. This report can not be used as evidence in a court of law without the written approval of the lab. 6. Certificate shall not be reproduced, except in full, without prior written approval of the laboratory

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Gazette No. : 352, valid upto 08.02.2022

TEST REPORT

Test Report Number	RWI1913134	**Page Number**	Page 2 of 2
Job Order Number	JPT/WI19/13134	**Customer Ref. Number**	Nil
Date of Issue	19.09.2019	**Sample Received On**	13.09.2019

S. No.	Parameters	Unit	Results	Test method
17	Copper (as Cu)	mg/l	<0.05	APHA 23rd Edi. 3111
18	Nickel (as Ni)	mg/l	<0.01	APHA 23rd Edi. 3111
19	Lead (as Pb)	mg/l	<0.1	APHA 23rd Edi. 3111
20	Mercury (as Hg)	mg/l	<0.001	APHA 23rd Edi. 3112
21	Total arsenic (as As)	mg/l	<0.025	APHA 23rd Edi. 3114
22	Phenolic Compounds (as C_6H_5OH)	mg/l	<0.001	IS : 3025(Pt-43) 1992R2014
23	Phosphorous as (P)	mg/l	<0.03	IS : 3025(Pt-31) 1992R2014
24	Manganese(as Mn)	mg/l	<0.01	APHA 23rd Edi. 3111
25	Cyanide as CN	mg/l	<0.05	IS : 3025(Pt-27) 1986R2014
26	Total Chromium (as Cr)	mg/l	<0.05	APHA 23rd Edi. 3111
27	Anionic Detergent (MBAS)	mg/l	<0.01	APHA 23rd Ed. 5540 C
28	Aluminum (as Al)	mg/l	<0.03	APHA 23rd Edi. 3500 Al-B
29	Oil & Grease	mg/l	<2	IS : 3025(Pt-39)1991 R2014
30	Chemical Oxygen Demand	mg/l	10	IS : 3025(Pt-58) 2006 R2017
31	Biological Oxygen Demand (27°C 3 days)	mg/l	1.4	IS : 3025(Pt-44) 1993 R2014
32	Dissolved Oxygen	mg/l	7.8	IS : 3025(Pt-38) 1989R2003
33	Total Coliform	MPN/100ml	24	IS : 1622-2003 RA – 2009

End of Report

J.P. Test & Research Centre — PRANESH BHARDWAJ Chemist — Checked By

For J.P Test & Research Centre

Sahibabad (Biological)

S. PANDEY Quality Manager (Chemical)

Authorized Signatory

* Format No. JPT/5.10F-17 Issue No. 01 Issue Date 08.12.2016 Rev. No. 02 Rev Date 15.05.2019

Note 1. Sample will be retained for 15 days for chemical testing and 7 days for Bacteriological testing from the date of issue of test report, unless specified by the customer. The results given for noise/lux are related to the observed values at the time of monitoring. The customer asked for the above tests only. 2.The parameters marked as " are not accredited by NABL. 3. The results given above are related to the tested sample and mentioned parameters. Endorsement of product is neither inferred not implied . 4. Total liability of our works is limited to invoiced amount. 5. This report can not be used as evidence in a court of law without the written approval of the lab. 6. Certificate shall not be reproduced, except in full, without prior written approval of the laboratory

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Gazette No. : 352, valid upto 08.02.2022

TEST REPORT

Test Report Number	RWI1913135	**Page Number**	Page 1 of 2
Job Order Number	JPT/WI19/13135	**Customer Ref. Number**	Nil
Date of Issue	19.09.2019	**Sample Received On**	13.09.2019

NAME & ADDRESS OF CUSTOMER	SAMPLE DETAILS
Project Proponent : The Executive Engineer, National Highway- Division, Public Work Department, Nahan (HP)- 173212 **Project Name:** Paonta (Badripur) Rajaban Shillai Meenus Gumma Feddus Road km 0/0 to 104/291 on NH-72B (New NH No.- 707)	
Issued to, **M/s C & E Consultancy** Chauhan Building P.O Kamlanagar Sanjauli, Shimla	Description : One sample of water described as Surface Water Sample Location : At RD 98/600 Coordinate : $30^0$48.566' N, $77^0$44.239'E Sampling done by : JPT Representative Date of sampling : 11.09.2019 Sampling Protocol : IS:3025, Part-1 & IS: 1622 Packing : Plastic bottle & Glass bottle Quantity : 2.5 L + 500mL Analysis done on : 13.09.2019 to 19.09.2019

S. No.	Parameters	Unit	Results	Test method
1	pH value at 25^0C	-	7.72	IS : 3025(Pt-11)1983 RA 2017
2	Turbidity	NTU	<1	IS: 3025(Pt-10)1984 RA 2017
3	Conductivity	µmhos/cm	235	IS: 3025(Pt-14)
4	Total Dissolved Solids	mg/l	146	IS : 3025(Pt-16)1984 RA 2017
5	Total Suspended solids	mg/l	<5	IS: 3025(Pt-17)1984 RA 2017
6	Total Hardness (as $CaCO_3$)	mg/l	96	IS : 3025(Pt-21)2009 RA 2014
7	Chlorides (as Cl)	mg/l	35	IS : 3025(Pt-32)1988 RA 2014
8	Total Alkalinity as $CaCO_3$	mg/l	62	IS : 3025(Pt-23)1986 RA 2014
9	Sulphate (as SO_4)	mg/l	12	IS : 3025(Pt-24)1986 RA 2014
10	Nitrate (as NO_3)	mg/l	2.8	IS : 3025(Pt-34) 1988R2014
11	Fluoride (as F)	mg/l	<01	APHA 23rd Edi. 4500 F (D)
12	Iron (as Fe)	mg/l	<0.05	APHA 23rd Edi. 3111
13	Zinc (as Zn)	mg/l	<0.05	APHA 23rd Edi. 3111
14	Calcium (as Ca)	mg/l	20	IS : 3025(Pt-40)1991 RA 2014
15	Magnesium (as Mg^{2+})	mg/l	11.2	APHA 23rd Edi. 3500-Mg B
16	Cadmium (as Cd)	mg/l	<0.01	APHA 23rd Edi. 3111

Continued...

J.P. Test & Research Centre — PRANESH BHARDWAJ — Checked By

For J P Test & Research Centre

S. PANDEY Quality Manager

(Chemical)
Authorized Signatory

* Format No. JPT/5.10F-17 Issue No. 01 Issue Date 08.12.2016 Rev. No. 02 Rev Date 15.05.2019

Note 1. Sample will be retained for 15 days for chemical testing and 7 days for Bacteriological testing from the date of issue of test report, unless specified by the customer. The results given for noise/lux are related to the observed values at the time of monitoring. The customer asked for the above tests only. 2.The parameters marked as * are not accredited by NABL. 3. The results given above are related to the tested sample and mentioned parameters. Endorsement of product is neither inferred not implied . 4. Total liability of our works is limited to invoiced amount. 5. This report can not be used as evidence in a court of law without the written approval of the lab. 6. Certificate shall not be reproduced, except in full, without prior written approval of the laboratory

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Gazette No. : 352, valid upto 08.02.2022

TEST REPORT

Test Report Number	RWI1913135	**Page Number**	Page 2 of 2
Job Order Number	JPT/WI19/13135	**Customer Ref. Number**	Nil
Date of Issue	19.09.2019	**Sample Received On**	13.09.2019

S. No.	Parameters	Unit	Results	Test method
17	Copper (as Cu)	mg/l	<0.05	APHA 23rd Edi. 3111
18	Nickel (as Ni)	mg/l	<0.01	APHA 23rd Edi. 3111
19	Lead (as Pb)	mg/l	<0.1	APHA 23rd Edi. 3111
20	Mercury (as Hg)	mg/l	<0.001	APHA 23rd Edi. 3112
21	Total arsenic (as As)	mg/l	<0.025	APHA 23rd Edi. 3114
22	Phenolic Compounds (as C_6H_5OH)	mg/l	<0.001	IS : 3025(Pt-43) 1992R2014
23	Phosphorous as (P)	mg/l	<0.03	IS : 3025(Pt-31) 1992R2014
24	Manganese(as Mn)	mg/l	<0.01	APHA 23rd Edi. 3111
25	Cyanide as CN	mg/l	<0.05	IS : 3025(Pt-27) 1986R2014
26	Total Chromium (as Cr)	mg/l	<0.05	APHA 23rd Edi. 3111
27	Anionic Detergent (MBAS)	mg/l	<0.01	APHA 23rd Ed. 5540 C
28	Aluminum (as Al)	mg/l	<0.03	APHA 23rd Edi. 3500 Al-B
29	Oil & Grease	mg/l	<2	IS : 3025(Pt-39)1991 R2014
30	Chemical Oxygen Demand	mg/l	<4	IS : 3025(Pt-58) 2006 R2017
31	Biological Oxygen Demand (27°C 3 days)	mg/l	<1	IS : 3025(Pt-44) 1993 R2014
32	Dissolved Oxygen	mg/l	8.2	IS : 3025(Pt-38) 1989R2003
33	Total Coliform	MPN/100ml	11	IS : 1622-2003 RA – 2009

End of Report

Checked By

For J.P.Test & Research Centre

(Biological) (Chemical)

Authorized Signatory

* Format No. JPT/5.10F-17 Issue No. 01 Issue Date 08.12.2016 Rev. No. 02 Rev Date 15.05.2019

Note 1. Sample will be retained for 15 days for chemical testing and 7 days for Bacteriological testing from the date of issue of test report, unless specified by the customer. The results given for noise/lux are related to the observed values at the time of monitoring. The customer asked for the above tests only. 2.The parameters marked as * are not accredited by NABL. 3. The results given above are related to the tested sample and mentioned parameters. Endorsement of product is neither inferred not implied . 4. Total liability of our works is limited to invoiced amount. 5. This report can not be used as evidence in a court of law without the written approval of the lab. 6. Certificate shall not be reproduced, except in full, without prior written approval of the laboratory

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Gazette No. : 352, valid upto 08.02.2022

CERTIFICATE No. TC-8047

TEST REPORT

Test Repot Number	RSI1913136	**Page Number**	Page 1 of 1
Job Order Number	JPT/SI19/13136	**Customer Ref. Number**	-
Date of Issue	19.09.2019	**Sample Received On**	13.09.2019
Discipline Name	Chemical Testing	**Product Group**	Soil

Project Proponent : The Executive Engineer, National Highway- Division, Public Work Department, Nahan (HP)- 173212
Project Name: Paonta (Badripur) Rajaban Shillai Meenus Gumma Feddus Road km 0/0 to 104/291 on NH-72B (New NH No.- 707)

NAME & ADDRESS OF CUSTOMER	SAMPLE DETAILS
Issued to, **M/s C & E Consultancy** Chauhan Building P.O Kamlanagar Sanjauli, Shimla	Sample Description : Soil Sampling Location : CCI at RD 10/08 Co-ordinate : $30^0$31.198' N, $77^0$39.474'E Date of Sampling : 11.09.2019 Sampling done by : JPT Lab representative Sample Quantity : 500g Analysis done on : 13.09.2019 to 18.09.2019

TEST RESULTS
SOIL ANALYSIS

S.No.	PARAMETERS	RESULTS	UNIT	TEST METHOD
	Physical Characteristics			
1.	Texture	Sandy Clay Loam	-	Soil Chemical Analysis by M.L. Jackson
2. i) ii) iii)	Particle Size Distribution: Sand , >0.2-mm Dia Silt , 0.02 to 0.2-mm Dia Clay ,< 0.002-mm Dia	 50.5 21.2 22.3	 % % %	Soil Chemical Analysis by M.L. Jackson
3.	pH (at25°C) (1:2.5 suspension)	7.94	-	IS : 2720 (Part-26) : 1987 (RA 2011)
4.	Elec. Conductivity (at25°C) (1:2 suspension)	250	µmhos/cm	IS : 14767 : 2000 (RA 2016)
5.	Cation Exchange Capacity	7.9	meq/100g	Soil Chemical Analysis by M.L. Jackson
6.	Exchangeable Sodium	120	mg/kg	Soil Chemical Analysis by M.L. Jackson
7.	Exchangeable Calcium	1220	mg/kg	Soil Chemical Analysis by M.L. Jackson
8.	Exchangeable Magnesium	264	mg/kg	Soil Chemical Analysis by M.L. Jackson
9.	Sodium Absorption Ratio	0.81	-	Soil Chemical Analysis by M.L. Jackson
10.	Porosity	31.2	%	Soil Chemical Analysis by M.L. Jackson
11.	Permeability	1.9	cm/hr	Soil Chemical Analysis by M.L. Jackson
12.	Organic Carbon	0.41	%	IS:2720 part 22: 1977 (RA 2015)
	Available Nutrient			
13.	Nitrogen as N	242	kg/ha	Soil Chemical Analysis by M.L. Jackson
14.	Phosphorus as P	17.8	kg/ha	Soil Chemical Analysis by M.L. Jackson
15.	Potassium as K	187	kg/ha	Soil Chemical Analysis by M.L. Jackson

End of Report

Checked By

Authorized Signatory

Format No. 7.5.1/01 Issue Date: 15.06.2015 Rev. No. 02 Rev. 15.05.2018

Note 1. Sample will be retained for 15 days for chemical testing and 7 days for Bacteriological testing from the date of issue of test report, unless specified by the customer. The results given for noise/lux are related to the observed values at the time of monitoring. The customer asked for the above tests only. 2.The parameters marked as * are not accredited by NABL. 3. The results given above are related to the tested sample and mentioned parameters. Endorsement of product is neither inferred not implied . 4. Total liability of our works is limited to invoiced amount. 5. This report can not be used as evidence in a court of law without the written approval of the lab. 6. Certificate shall not be reproduced, except in full, without prior written approval of the laboratory

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CERTIFICATE No. TC-8047

TEST REPORT

Test Repot Number	RSI1913137	**Page Number**	Page 1 of 1
Job Order Number	JPT/SI19/13137	**Customer Ref. Number**	-
Date of Issue	19.09.2019	**Sample Received On**	13.09.2019
Discipline Name	Chemical Testing	**Product Group**	Soil

Project Proponent : The Executive Engineer, National Highway- Division, Public Work Department, Nahan (HP)- 173212
Project Name: Paonta (Badripur) Rajaban Shillai Meenus Gumma Feddus Road km 0/0 to 104/291 on NH-72B (New NH No.- 707)

NAME & ADDRESS OF CUSTOMER	SAMPLE DETAILS
Issued to, **M/s C & E Consultancy** Chauhan Building P.O Kamlanagar Sanjauli, Shimla	Sample Description : Soil Sampling Location : RD 23/600 Co-ordinate : 30°34.506' N, 77°39.216'E Date of Sampling : 11.09.2019 Sampling done by : JPT Lab representative Sample Quantity : 500g Analysis done on : 13.09.2019 to 18.09.2019

TEST RESULTS

SOIL ANALYSIS

S.No.	PARAMETERS	RESULTS	UNIT	TEST METHOD
	Physical Characteristics			
1.	Texture	Sandy Clay	-	Soil Chemical Analysis by M.L. Jackson
2. i) ii) iii)	Particle Size Distribution: Sand , >0.2-mm Dia Silt , 0.02 to 0.2-mm Dia Clay ,< 0.002-mm Dia	 50.5 11.2 38.3	 % % %	Soil Chemical Analysis by M.L. Jackson
3.	pH (at25°C) (1:2.5 suspension)	7.83	-	IS : 2720 (Part-26) : 1987 (RA 2011)
4.	Elec. Conductivity (at25°C) (1:2 suspension)	118	µmhos/cm	IS : 14767 : 2000 (RA 2016)
5.	Cation Exchange Capacity	5.6	meq/100g	Soil Chemical Analysis by M.L. Jackson
6.	Exchangeable Sodium	87	mg/kg	Soil Chemical Analysis by M.L. Jackson
7.	Exchangeable Calcium	840	mg/kg	Soil Chemical Analysis by M.L. Jackson
8.	Exchangeable Magnesium	216	mg/kg	Soil Chemical Analysis by M.L. Jackson
9.	Sodium Absorption Ratio	0.69	-	Soil Chemical Analysis by M.L. Jackson
10.	Porosity	25.1	%	Soil Chemical Analysis by M.L. Jackson
11.	Permeability	1.6	cm/hr	Soil Chemical Analysis by M.L. Jackson
12.	Organic Carbon	0.36	%	IS:2720 part 22: 1977 (RA 2015)
	Available Nutrient			
13.	Nitrogen as N	168	kg/ha	Soil Chemical Analysis by M.L. Jackson
14.	Phosphorus as P	12.5	kg/ha	Soil Chemical Analysis by M.L. Jackson
15.	Potassium as K	109	kg/ha	Soil Chemical Analysis by M.L. Jackson

End of Report

Checked By

S. PANDEY
Quality Manager

Authorized Signatory

* Format No. JPT/6.10F-07 Issue No. 01 Issue Date 15.06.2015 Rev. No. 02 Rev 15.05.2019

Note 1. Sample will be retained for 15 days for chemical testing and 7 days for Bacteriological testing from the date of issue of test report, unless specified by the customer. The results given for noise/lux are related to the observed values at the time of monitoring. The customer asked for the above tests only. 2.The parameters marked as * are not accredited by NABL. 3. The results given above are related to the tested sample and mentioned parameters. Endorsement of product is neither inferred not implied . 4. Total liability of our works is limited to invoiced amount. 5. This report can not be used as evidence in a court of law without the written approval of the lab. 6. Certificate shall not be reproduced, except in full, without prior written approval of the laboratory

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CERTIFICATE No. TC-8047

TEST REPORT

Test Repot Number	RSI1913138	**Page Number**	Page 1 of 1
Job Order Number	JPT/SI19/13138	**Customer Ref. Number**	-
Date of Issue	19.09.2019	**Sample Received On**	13.09.2019
Discipline Name	Chemical Testing	**Product Group**	Soil

Project Proponent : The Executive Engineer, National Highway- Division, Public Work Department, Nahan (HP)- 173212
Project Name: Paonta (Badripur) Rajaban Shillai Meenus Gumma Feddus Road km 0/0 to 104/291 on NH-72B (New NH No.- 707)

NAME & ADDRESS OF CUSTOMER	SAMPLE DETAILS
Issued to, **M/s C & E Consultancy** Chauhan Building P.O Kamlanagar Sanjauli, Shimla	Sample Description : Soil Sampling Location : Khajiyar at RD 28/300 Co-ordinate : $30^0$36.464' N, $77^0$39.592'E Date of Sampling : 11.09.2019 Sampling done by : JPT Lab representative Sample Quantity : 500g Analysis done on : 13.09.2019 to 18.09.2019

TEST RESULTS

SOIL ANALYSIS

S.No.	PARAMETERS	RESULTS	UNIT	TEST METHOD
	Physical Characteristics			
1.	Texture	Sandy Loam	-	Soil Chemical Analysis by M.L. Jackson
2. i) ii) iii)	Particle Size Distribution: Sand , >0.2-mm Dia Silt , 0.02 to 0.2-mm Dia Clay ,< 0.002-mm Dia	 62.1 23.0 15.8	 % % %	Soil Chemical Analysis by M.L. Jackson
3.	pH (at25°C) (1:2.5 suspension)	7.54	-	IS : 2720 (Part-26) : 1987 (RA 2011)
4.	Elec. Conductivity (at25°C) (1:2 suspension)	320	µmhos/cm	IS : 14767 : 2000 (RA 2016)
5.	Cation Exchange Capacity	7.0	meq/100g	Soil Chemical Analysis by M.L. Jackson
6.	Exchangeable Sodium	122	mg/kg	Soil Chemical Analysis by M.L. Jackson
7.	Exchangeable Calcium	980	mg/kg	Soil Chemical Analysis by M.L. Jackson
8.	Exchangeable Magnesium	192	mg/kg	Soil Chemical Analysis by M.L. Jackson
9.	Sodium Absorption Ratio	0.93	-	Soil Chemical Analysis by M.L. Jackson
10.	Porosity	35.8	%	Soil Chemical Analysis by M.L. Jackson
11.	Permeability	2.7	cm/hr	Soil Chemical Analysis by M.L. Jackson
12.	Organic Carbon	0.76	%	IS:2720 part 22: 1977 (RA 2015)
	Available Nutrient			
13.	Nitrogen as N	310	kg/ha	Soil Chemical Analysis by M.L. Jackson
14.	Phosphorus as P	22.8	kg/ha	Soil Chemical Analysis by M.L. Jackson
15.	Potassium as K	242	kg/ha	Soil Chemical Analysis by M.L. Jackson

End of Report

Checked By

S. PANDEY
Quality Manager

Authorized Signatory

Note 1. Sample will be retained for 15 days for chemical testing and 7 days for Bacteriological testing from the date of issue of test report, unless specified by the customer. The results given for noise/lux are related to the observed values at the time of monitoring. The customer asked for the above tests only. 2.The parameters marked as * are not accredited by NABL. 3. The results given above are related to the tested sample and mentioned parameters. Endorsement of product is neither inferred not implied . 4. Total liability of our works is limited to invoiced amount. 5. This report can not be used as evidence in a court of law without the written approval of the lab. 6. Certificate shall not be reproduced, except in full, without prior written approval of the laboratory

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J. P. TEST & RESEARCH CENTRE

Test & Research Centre

(An ISO 9001:2015, ISO 45001:2018 Certified)

Recognized from The Ministry of Environment, Forest & Climate Change (MoEF) Under E(P)A 1986

Gazette No. : 352, valid upto 08.02.2022

CERTIFICATE No. TC-8047

TEST REPORT

Test Repot Number	RSI1913139	**Page Number**	Page 1 of 1
Job Order Number	JPT/SI19/13139	**Customer Ref. Number**	-
Date of Issue	19.09.2019	**Sample Received On**	13.09.2019
Discipline Name	Chemical Testing	**Product Group**	Soil

Project Proponent : The Executive Engineer, National Highway- Division, Public Work Department, Nahan (HP)- 173212

Project Name: Paonta (Badripur) Rajaban Shillai Meenus Gumma Feddus Road km 0/0 to 104/291 on NH-72B (New NH No.- 707)

NAME & ADDRESS OF CUSTOMER	SAMPLE DETAILS
Issued to, **M/s C & E Consultancy** Chauhan Building P.O Kamlanagar Sanjauli, Shimla	Sample Description : Soil Sampling Location : Shilla at RD 43/100 Co-ordinate : $30^0$37.97' N, $77^0$40.933'E Date of Sampling : 11.09.2019 Sampling done by : JPT Lab representative Sample Quantity : 500g Analysis done on : 13.09.2019 to 18.09.2019

TEST RESULTS

SOIL ANALYSIS

S.No.	PARAMETERS	RESULTS	UNIT	TEST METHOD
	Physical Characteristics			
1.	Texture	Sandy Loam	-	Soil Chemical Analysis by M.L. Jackson
2. i) ii) iii)	Particle Size Distribution: Sand , >0.2-mm Dia Silt , 0.02 to 0.2-mm Dia Clay ,< 0.002-mm Dia	 59.4 25.1 15.5	 % % %	Soil Chemical Analysis by M.L. Jackson
3.	pH (at25°C) (1:2.5 suspension)	7.35	-	IS : 2720 (Part-26) : 1987 (RA 2011)
4.	Elec. Conductivity (at25°C) (1:2 suspension)	285	µmhos/cm	IS : 14767 : 2000 (RA 2016)
5.	Cation Exchange Capacity	8.1	meq/100g	Soil Chemical Analysis by M.L. Jackson
6.	Exchangeable Sodium	212	mg/kg	Soil Chemical Analysis by M.L. Jackson
7.	Exchangeable Calcium	1120	mg/kg	Soil Chemical Analysis by M.L. Jackson
8.	Exchangeable Magnesium	228	mg/kg	Soil Chemical Analysis by M.L. Jackson
9.	Sodium Absorption Ratio	1.56	-	Soil Chemical Analysis by M.L. Jackson
10.	Porosity	34.9	%	Soil Chemical Analysis by M.L. Jackson
11.	Permeability	2.5	cm/hr	Soil Chemical Analysis by M.L. Jackson
12.	Organic Carbon	0.65	%	IS:2720 part 22: 1977 (RA 2015)
	Available Nutrient			
13.	Nitrogen as N	292	kg/ha	Soil Chemical Analysis by M.L. Jackson
14.	Phosphorus as P	20.1	kg/ha	Soil Chemical Analysis by M.L. Jackson
15.	Potassium as K	211	kg/ha	Soil Chemical Analysis by M.L. Jackson

End of Report

Checked By

S. PANDEY
Quality Manager

Authorized Signatory

Note 1. Sample will be retained for 15 days for chemical testing and 7 days for Bacteriological testing from the date of issue of test report, unless specified by the customer. The results given for noise/lux are related to the observed values at the time of monitoring. The customer asked for the above tests only. 2.The parameters marked as * are not accredited by NABL. 3. The results given above are related to the tested sample and mentioned parameters. Endorsement of product is neither inferred not implied . 4. Total liability of our works is limited to invoiced amount. 5. This report can not be used as evidence in a court of law without the written approval of the lab. 6. Certificate shall not be reproduced, except in full, without prior written approval of the laboratory

Laboratory: 4/54, Site-IV, Sahibabad Industrial Area, Ghaziabad, (UP) Pin-201010 Tel: 0120-4345989, 9910833356 Email:jptesthouse@gmail.com
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Date of Issue	19.09.2019	**Sample Received On**	13.09.2019
Discipline Name	Chemical Testing	**Product Group**	Soil

Project Proponent : The Executive Engineer, National Highway- Division, Public Work Department, Nahan (HP)- 173212

Project Name: Paonta (Badripur) Rajaban Shillai Meenus Gumma Feddus Road km 0/0 to 104/291 on NH-72B (New NH No.- 707)

NAME & ADDRESS OF CUSTOMER	SAMPLE DETAILS
Issued to, **M/s C & E Consultancy** Chauhan Building P.O Kamlanagar Sanjauli, Shimla	Sample Description : Soil Sampling Location : Near Shillai at RD 61/800 Co-ordinate : $30^0$40.222' N, $77^0$41.48'E Date of Sampling : 11.09.2019 Sampling done by : JPT Lab representative Sample Quantity : 500g Analysis done on : 13.09.2019 to 18.09.2019

TEST RESULTS
SOIL ANALYSIS

S.No.	PARAMETERS	RESULTS	UNIT	TEST METHOD
	Physical Characteristics			
1.	Texture	Sandy Loam	-	Soil Chemical Analysis by M.L. Jackson
2. i) ii) iii)	Particle Size Distribution: Sand , >0.2-mm Dia Silt , 0.02 to 0.2-mm Dia Clay ,< 0.002-mm Dia	 54.5 33.4 12.1	 % % %	Soil Chemical Analysis by M.L. Jackson
3.	pH (at25°C) (1:2.5 suspension)	7.05	-	IS : 2720 (Part-26) : 1987 (RA 2011)
4.	Elec. Conductivity (at25°C) (1:2 suspension)	148	µmhos/cm	IS : 14767 : 2000 (RA 2016)
5.	Cation Exchange Capacity	6.0	meq/100g	Soil Chemical Analysis by M.L. Jackson
6.	Exchangeable Sodium	143	mg/kg	Soil Chemical Analysis by M.L. Jackson
7.	Exchangeable Calcium	780	mg/kg	Soil Chemical Analysis by M.L. Jackson
8.	Exchangeable Magnesium	180	mg/kg	Soil Chemical Analysis by M.L. Jackson
9.	Sodium Absorption Ratio	1.19	-	Soil Chemical Analysis by M.L. Jackson
10.	Porosity	30.4	%	Soil Chemical Analysis by M.L. Jackson
11.	Permeability	2.3	cm/hr	Soil Chemical Analysis by M.L. Jackson
12.	Organic Carbon	0.55	%	IS:2720 part 22: 1977 (RA 2015)
	Available Nutrient			
13.	Nitrogen as N	138	kg/ha	Soil Chemical Analysis by M.L. Jackson
14.	Phosphorus as P	14.4	kg/ha	Soil Chemical Analysis by M.L. Jackson
15.	Potassium as K	125	kg/ha	Soil Chemical Analysis by M.L. Jackson

End of Report

Test & Research Centre Sahibabad

Checked By

Authorized Signatory

* Format No. JPT/5.10F-07 Issue No. 01 Issue Date 15.06.2015 Rev. No. 02 Rev 15.05.2019

Note 1. Sample will be retained for 15 days for chemical testing and 7 days for Bacteriological testing from the date of issue of test report, unless specified by the customer. The results given for noise/lux are related to the observed values at the time of monitoring. The customer asked for the above tests only. 2.The parameters marked as * are not accredited by NABL. 3. The results given above are related to the tested sample and mentioned parameters. Endorsement of product is neither inferred not implied . 4. Total liability of our works is limited to invoiced amount. 5. This report can not be used as evidence in a court of law without the written approval of the lab. 6. Certificate shall not be reproduced, except in full, without prior written approval of the laboratory

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Job Order Number	JPT/SI19/13141	**Customer Ref. Number**	-
Date of Issue	19.09.2019	**Sample Received On**	13.09.2019
Discipline Name	Chemical Testing	**Product Group**	Soil

Project Proponent : The Executive Engineer, National Highway- Division, Public Work Department, Nahan (HP)- 173212
Project Name: Paonta (Badripur) Rajaban Shillai Meenus Gumma Feddus Road km 0/0 to 104/291 on NH-72B (New NH No.- 707)

NAME & ADDRESS OF CUSTOMER	SAMPLE DETAILS
Issued to, **M/s C & E Consultancy** Chauhan Building P.O Kamlanagar Sanjauli, Shimla	Sample Description : Soil Sampling Location : at RD 98/600 Co-ordinate : $30^0$48.567' N, $77^0$44.245'E Date of Sampling : 11.09.2019 Sampling done by : JPT Lab representative Sample Quantity : 500g Analysis done on : 13.09.2019 to 18.09.2019

TEST RESULTS
SOIL ANALYSIS

S.No.	PARAMETERS	RESULTS	UNIT	TEST METHOD
	Physical Characteristics			
1.	Texture	Silt Loam	-	Soil Chemical Analysis by M.L. Jackson
2. i) ii) iii)	Particle Size Distribution: Sand , >0.2-mm Dia Silt , 0.02 to 0.2-mm Dia Clay ,< 0.002-mm Dia	 34.5 53.2 12.3	 % % %	Soil Chemical Analysis by M.L. Jackson
3.	pH (at25°C) (1:2.5 suspension)	7.15	-	IS : 2720 (Part-26) : 1987 (RA 2011)
4.	Elec. Conductivity (at25°C) (1:2 suspension)	270	µmhos/cm	IS : 14767 : 2000 (RA 2016)
5.	Cation Exchange Capacity	7.8	meq/100g	Soil Chemical Analysis by M.L. Jackson
6.	Exchangeable Sodium	191	mg/kg	Soil Chemical Analysis by M.L. Jackson
7.	Exchangeable Calcium	1140	mg/kg	Soil Chemical Analysis by M.L. Jackson
8.	Exchangeable Magnesium	288	mg/kg	Soil Chemical Analysis by M.L. Jackson
9.	Sodium Absorption Ratio	1.35	-	Soil Chemical Analysis by M.L. Jackson
10.	Porosity	26.1	%	Soil Chemical Analysis by M.L. Jackson
11.	Permeability	2.1	cm/hr	Soil Chemical Analysis by M.L. Jackson
12.	Organic Carbon	0.42	%	IS:2720 part 22: 1977 (RA 2015)
	Available Nutrient			
13.	Nitrogen as N	167	kg/ha	Soil Chemical Analysis by M.L. Jackson
14.	Phosphorus as P	12.1	kg/ha	Soil Chemical Analysis by M.L. Jackson
15.	Potassium as K	152	kg/ha	Soil Chemical Analysis by M.L. Jackson

End of Report

Checked By

Authorized Signatory
S. SANDEY
Quality Manager

* Format No. JPTC.10F-07 Issue No. 01 Issue Date 15.06.2015 Rev. No. 02 Rev 15.05.2019

Note 1. Sample will be retained for 15 days for chemical testing and 7 days for Bacteriological testing from the date of issue of test report, unless specified by the customer. The results given for noise/lux are related to the observed values at the time of monitoring. The customer asked for the above tests only. 2.The parameters marked as * are not accredited by NABL. 3. The results given above are related to the tested sample and mentioned parameters. Endorsement of product is neither inferred not implied . 4. Total liability of our works is limited to invoiced amount. 5. This report can not be used as evidence in a court of law without the written approval of the lab. 6. Certificate shall not be reproduced, except in full, without prior written approval of the laboratory

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TEST REPORT

Test Repot Number	RSI1913142	**Page Number**	Page 1 of 1
Job Order Number	JPT/SI19/13142	**Customer Ref. Number**	-
Date of Issue	19.09.2019	**Sample Received On**	13.09.2019
Discipline Name	Chemical Testing	**Product Group**	Soil

Project Proponent : The Executive Engineer, National Highway- Division, Public Work Department, Nahan (HP)- 173212
Project Name: Paonta (Badripur) Rajaban Shillai Meenus Gumma Feddus Road km 0/0 to 104/291 on NH-72B (New NH No.- 707)

NAME & ADDRESS OF CUSTOMER	SAMPLE DETAILS
Issued to, **M/s C & E Consultancy** Chauhan Building P.O Kamlanagar Sanjauli, Shimla	Sample Description : Soil Sampling Location : Drabil at RD 75/00 Co-ordinate : $30^0$43.346' N, $77^0$41.53'E Date of Sampling : 11.09.2019 Sampling done by : JPT Lab representative Sample Quantity : 500g Analysis done on : 13.09.2019 to 18.09.2019

TEST RESULTS

SOIL ANALYSIS

S.No.	PARAMETERS	RESULTS	UNIT	TEST METHOD
	Physical Characteristics			
1.	Texture	Silt Loam	-	Soil Chemical Analysis by M.L. Jackson
2. i) ii) iii)	Particle Size Distribution: Sand , >0.2-mm Dia Silt , 0.02 to 0.2-mm Dia Clay ,< 0.002-mm Dia	 35.5 50.2 14.3	 % % %	Soil Chemical Analysis by M.L. Jackson
3.	pH (at25°C) (1:2.5 suspension)	7.18	-	IS : 2720 (Part-26) : 1987 (RA 2011)
4.	Elec. Conductivity (at25°C) (1:2 suspension)	212	µmhos/cm	IS : 14767 : 2000 (RA 2016)
5.	Cation Exchange Capacity	9.2	meq/100g	Soil Chemical Analysis by M.L. Jackson
6.	Exchangeable Sodium	253	mg/kg	Soil Chemical Analysis by M.L. Jackson
7.	Exchangeable Calcium	1180	mg/kg	Soil Chemical Analysis by M.L. Jackson
8.	Exchangeable Magnesium	276	mg/kg	Soil Chemical Analysis by M.L. Jackson
9.	Sodium Absorption Ratio	1.72	-	Soil Chemical Analysis by M.L. Jackson
10.	Porosity	27.3	%	Soil Chemical Analysis by M.L. Jackson
11.	Permeability	2.0	cm/hr	Soil Chemical Analysis by M.L. Jackson
12.	Organic Carbon	0.43	%	IS:2720 part 22: 1977 (RA 2015)
	Available Nutrient			
13.	Nitrogen as N	186	kg/ha	Soil Chemical Analysis by M.L. Jackson
14.	Phosphorus as P	16.9	kg/ha	Soil Chemical Analysis by M.L. Jackson
15.	Potassium as K	183	kg/ha	Soil Chemical Analysis by M.L. Jackson

End of Report

Checked By

Authorized Signatory

S. PANDEY
Quality Manager

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Year	Month	Date	Hour	Wind Direction	Temprature	Relative Humidity	Wind Speed	Rainfall
				(o)	(oC)	(%)	KMPH	MM
19	9	8	14:00	218	33.2	52.0	1.2	0.0
19	9	8	15:00	222	34.9	50.0	0.9	0.0
19	9	8	16:00	255	29.5	47.4	1.3	0.0
19	9	8	17:00	245	26.8	43.0	1.1	0.0
19	9	8	18:00	358	26.9	45.0	0.0	0.0
19	9	8	19:00	6	26.4	49.0	0.0	0.0
19	9	8	20:00	8	25.9	55.0	0.0	0.0
19	9	8	21:00	175	25.8	58.0	1.1	0.0
19	9	8	22:00	168	24.8	60.0	1.3	0.0
19	9	8	23:00	38	24.5	62.0	1.1	0.0
19	9	8	0:00	305	23.9	62.0	1.2	0.0
19	9	9	1:00	44	23.8	64.0	0.9	0.0
19	9	9	2:00	168	22.6	67.0	1.2	0.0
19	9	9	3:00	162	21.8	67.0	1.3	0.0
19	9	9	4:00	262	22.3	68.0	1.3	0.0
19	9	9	5:00	268	21.8	68.0	1.1	0.0
19	9	9	6:00	2	23.6	68.0	0.0	0.0
19	9	9	7:00	12	25.7	69.0	0.0	0.0
19	9	9	8:00	8	27.6	65.0	0.0	0.0
19	9	9	9:00	14	27.9	62.0	0.0	0.0
19	9	9	10:00	133	28.4	59.0	1.3	0.0
19	9	9	11:00	121	29.5	57.0	1.4	0.0
19	9	9	12:00	99	30.8	57.0	1.5	0.0
19	9	9	13:00	106	31.6	52.0	1.6	0.0
19	9	9	14:00	355	32.4	48.0	1.2	0.0
19	9	9	15:00	346	30.6	46.0	1.1	0.0
19	9	9	16:00	121	30.2	46.0	0.8	0.0
19	9	9	17:00	178	29.8	48.0	1.2	0.0
19	9	9	18:00	35	28.4	50.0	1.4	0.0
19	9	9	19:00	132	27.6	51.0	1.3	0.0
19	9	9	20:00	358	27.1	53.0	0.0	0.0
19	9	9	21:00	352	26.8	58.0	1.0	0.0
19	9	9	22:00	38	25.9	60.0	1.2	0.0
19	9	9	23:00	126	25.8	60.0	1.0	0.0
19	9	9	0:00	169	25.4	60.0	0.9	0.0
19	9	10	1:00	181	25.1	64.0	1.0	0.0
19	9	10	2:00	108	24.6	64.0	1.1	0.0
19	9	10	3:00	210	24.2	68.0	1.3	0.0
19	9	10	4:00	208	24.0	67.0	1.4	0.0
19	9	10	5:00	309	23.9	68.0	1.3	0.0
19	9	10	6:00	352	23.9	68.0	0.0	0.0
19	9	10	7:00	8	22.9	66.0	0.0	0.0
19	9	10	8:00	2	24.3	63.0	0.0	0.0
19	9	10	9:00	37	28.2	64.0	1.5	0.0
19	9	10	10:00	116	29.1	62.0	1.2	0.0
19	9	10	11:00	152	31.2	59.0	1.6	0.0
19	9	10	12:00	164	31.4	57.0	1.1	0.0
19	9	10	13:00	158	32.6	54.0	1.3	0.0
19	9	10	14:00	12	31.9	54.0	1.2	0.0
19	9	10	15:00	355	30.0	50.0	1.0	0.0
19	9	10	16:00	309	29.6	48.0	1.2	0.0
19	9	10	17:00	42	28.4	48.0	1.1	0.0

19	9	10	18:00	16	27.5	47.0	0.0	0.0
19	9	10	19:00	36	26.7	48.0	0.0	0.0
19	9	10	20:00	167	25.9	48.0	1.2	0.0
19	9	10	21:00	155	24.9	50.0	1.1	0.0
19	9	10	22:00	176	23.8	51.0	1.4	0.0
19	9	10	23:00	171	23.0	51.0	1.6	0.0
19	9	10	0:00	33	23.0	55.0	0.0	0.0
19	9	11	1:00	98	22.4	55.0	1.0	0.0
19	9	11	2:00	224	21.6	58.0	1.1	0.0
19	9	11	3:00	216	22.2	60.0	1.0	0.0
19	9	11	4:00	307	21.6	62.0	1.1	0.0
19	9	11	5:00	352	21.2	64.0	1.2	0.0
19	9	11	6:00	43	21.0	66.0	1.3	0.0
19	9	11	7:00	221	21.8	66.0	1.2	0.0
19	9	11	8:00	352	23.7	62.0	0.0	0.0
19	9	11	9:00	348	25.2	57.0	0.0	0.0
19	9	11	10:00	10	26.8	55.0	0.0	0.0
19	9	11	11:00	12	27.4	52.0	0.0	0.0
19	9	11	12:00	205	29.5	52.0	1.1	0.0
19	9	11	13:00	199	32.2	50.0	1.4	0.0
19	9	11	14:00	280	34.5	50.0	1.3	0.0
19	9	11	15:00	292	32.2	47.0	0.0	0.0
19	9	11	16:00	315	32.1	47.0	0.0	0.0
19	9	11	17:00	220	31.6	47.0	0.0	0.0
19	9	11	18:00	18	31.4	48.0	0.0	0.0
19	9	11	19:00	16	30.8	48.0	0.0	0.0
19	9	11	20:00	2	30.8	51.0	0.0	0.0
19	9	11	21:00	285	28.0	52.0	1.1	0.0
19	9	11	22:00	342	27.9	54.0	1.0	0.0
19	9	11	23:00	132	27.5	58.0	1.1	0.0
19	9	11	0:00	23	25.4	58.0	1.0	0.0
19	9	12	1:00	26	25.1	60.0	1.1	0.0
19	9	12	2:00	179	25.0	63.0	1.3	0.0
19	9	12	3:00	166	24.9	63.0	1.2	0.0
19	9	12	4:00	36	23.8	65.0	1.3	0.0
19	9	12	5:00	148	23.0	67.0	1.2	0.0
19	9	12	6:00	154	22.9	67.0	1.3	0.0
19	9	12	7:00	98	24.1	66.0	1.4	0.0
19	9	12	8:00	92	25.2	64.0	1.6	0.0
19	9	12	9:00	302	26.8	64.0	1.5	0.0
19	9	12	10:00	188	28.2	63.0	1.4	0.0
19	9	12	11:00	196	30.1	60.0	1.3	0.0
19	9	12	12:00	128	32.5	60.0	0.0	0.0
19	9	12	13:00	90	33.9	58.0	0.0	0.0
19	9	12	14:00	62	34.6	57.0	0.0	0.0
19	9	12	15:00	12	33.8	51.0	0.0	0.0
19	9	12	16:00	28	32.6	48.0	0.0	0.0
19	9	12	17:00	10	32.1	46.0	1.1	0.0
19	9	12	18:00	108	31.8	46.0	1.2	0.0
19	9	12	19:00	223	31.4	49.0	1.2	0.0
19	9	12	20:00	348	30.5	49.0	1.3	0.0
19	9	12	21:00	342	29.6	49.0	1.1	0.0
19	9	12	22:00	165	29.0	50.0	1.2	0.0
19	9	12	23:00	162	26.8	53.0	1.0	0.0

19	9	12	0:00	167	25.9	53.0	1.1	0.0
19	9	13	1:00	16	24.8	57.0	0.0	0.0
19	9	13	2:00	8	24.6	58.0	0.0	0.0
19	9	13	3:00	360	23.9	60.0	0.0	0.0
19	9	13	4:00	256	23.0	64.0	1.3	0.0
19	9	13	5:00	93	22.7	64.0	1.4	0.0
19	9	13	6:00	153	22.4	63.0	1.2	0.0
19	9	13	7:00	157	23.6	62.0	1.3	0.0
19	9	13	8:00	218	24.5	62.0	1.4	0.0
19	9	13	9:00	12	24.9	60.0	1.2	0.0
19	9	13	10:00	45	26.8	57.0	1.3	0.0
19	9	13	11:00	312	28.5	57.0	1.2	0.0
19	9	13	12:00	342	30.9	53.0	1.0	0.0
19	9	13	13:00	358	31.2	50.0	0.4	0.0

Annexure-7

Provisions/ Facilities for Physically Impaired Persons

A. Bus Stops

General

- At least one accessible route will be provided from the alighting and boarding point of the bus stand to the walkway.
- Directional signs will be installed to direct Persons with Disabilities to an accessible entrance.
- The bus stand/stop will have minimum illumination level of 35 to 40 lux.

Location

- Bus stand will be located nearest to an accessible pathway.
- Where transfer has to be made from a vehicular surface to a pedestrian surface, the driveway, pathway or walkway will be blended to a common level or be ramped.

Passage Width

A clear passageway with a minimum width of 1200mm will be provided.

Seats

Seats will be provided at the bus stand/stop for people with ambulatory disabilities. These seats will be positioned such as not to impede the movement of wheelchair users.

Shelter

A shelter will be provided at the bus stand for protection against adverse weather conditions.

Ramps

- Where a bus stand/stop is not on the same level with the walkway or pathway, it will have two separate ramps for boarding and alighting.
- Where there are curbs between the access aisle and the vehicle pick-up space, it will have a kerb ramp.

Handrails

Handrails will have to:-

- Be slip-resistant with round ends;
- Preferably have knurled surfaces;
- Have a circular section of 38-45 mm in diameter;
- Be free of any sharp or abrasive elements;
- Have a minimum clear space of 50 mm from the wall;

- Be installed at a height of 760 mm to 900 mm;
- Be able to bear a weight of 250 kg.
- Be installed at two levels 760mm and 900 mm from the floor level.

B. Sidewalks/ Footpaths

Sidewalk will have to:

- Have non-slip floor surface;
- Be along the habitation area of the road;
- Be not more than 150mm high;
- Be at least 1800 mm wide;
- Have tactile guiding blocks for persons with visual impairments;
- Preferably have well defined edges of paths and routes by use of different colours and textures;
- Have no obstacles or projections along the pathway. If this is unavoidable, there should be clear headroom of at least 2000 mm from the floor level;
- Have kerb cuts, where ever a person is expected to walk into or off the pathway; and
- Have tactile warning blocks installed next to all entry and exit points from the pathway.

C. Kerb Ramps at Walkways and Pedestrian Crossings

- Kerb Ramp at pedestrian crossing will be wholly contained in the area designated for pedestrians use. At the pedestrian crossings, i.e. for the kerb ramps, tactile floor guidance will be provided.
- Zebra crossings will be provided in 3D texture to be easily detectable by persons with visual impairments.

D. Road Intersections

- Pedestrian crossings will be equipped with traffic control signal;
- Constructing traffic islands to reduce the length of the crossing will be considered for the safety of all road users;
- Guide strips will be constructed to indicate the position of pedestrian crossings for the benefit of people with visual impairments; and
- Road bumps will be provided to reduce the speed of traffic approaching the intersection.

E. Traffic signals

- Pedestrian traffic lights will be provided with clearly audible signals for the benefit of pedestrians with visual impairments;

- Acoustic devices will be installed on a pole at the point of origin of crossing.
- The installation of two adjacent acoustic devices such as beepers will be avoided in order to avoid disorientation;
- The time interval allowed for crossing will be programmed according to the slowest crossing persons; and
- Acoustical signals encourage safer crossing behaviour among children as well.

F. Public Toilet Facilities

General:

Signage at accessible toilet entrance will be clearly visible.

- All Public toilet blocks will have one cubicle suitable for use by persons with disabilities.

The Public toilets shall have: -

- Minimum internal dimensions of 2200 X 2000 mm minimum
- The layout of the fixtures in the toilet will be such that there is a clear manoeuvring space of 800mm x 1800mm in front of the water closet and wash basin in the accessible toilet unit
- All fixtures and utilities will be provided with a clear space of 900mm x 1200 mm for wheelchair users to access them;
- Have clear space of not less than 900 mm wide next to the water closet;
- Toilet Cubicle for Wheelchair Users will be provided.
- In a set of toilets (for ladies or for gents), there shall be one WC for the use of the ambulant disabled persons

Essential Requirements

- The toilet door will be either an outward opening door or two-way opening door or a sliding type and provided with a clear opening width of at least 900 mm.
- Be provided with a horizontal pull-bar, at least 600 mm long, on the inside of the door, located so that it is 130 mm from the hinged side of the door and at a height of 1000 mm.
- Be capable of being locked from the inside by a device that is operable by one hand, activated by a force not more than 22N and which does not require fine finger control, tight grasping, pinching or twisting of the wrist.
- Water closet to be located between 460 mm to 480 mm from the centreline of the water closet to the adjacent wall;
- Water closet will have a clear dimension of 750 mm from the front edge of the water closet to the rear wall to facilitate side transfer;
- The top of the water closet seat will be 450 to 480 mm from the floor; There should be an adequate clear floor space of at least 1350 mm depth and 900 mm width, both in front and on the transfer side, adjacent to the water closet;

- Water closets will be provided with grab bars, be mounted at a height between 200 mm and 250 mm from the water closet seat

Urinals

At least one of the urinals in the Gents toilets on each floor will have grab bars installed on each side and in the front of the urinal to support ambulant Persons with Disabilities (for example, crutch users).

- The front bar is to provide chest support; the sidebars are for the user to hold on to while standing.
- Urinals shall be stall-type or wall-hung, with an elongated rim at a maximum of 430 mm above the finish floor.
- A clear floor space 760 mm by 1220 mm will be provided in front of urinals to allow forward approach. Urinal shields (that do not extend beyond the front edge of the urinal rim) may be provided with 735 mm clearance between them.

(Ref.: Guidelines & standards for Persons with disabilities by MoUD, GoI)

Annexure 8

Attendance sheet

Public Consultation meeting held on 16th March, 2019 at Kafota for proposed Rehabilitation & Up-gradation to 2 lanes/2 Lanes Paved Shoulder Configuration & Strengthening of Paonta-Sataun-Shillai-Gumma-Feddus Road km. 0/0 to 104/800 section of NH 707 in the state Himachal Pradesh. -16/3/19

S.N.	Name of Participant & Address	Contact No.	Signature
1	Er. V.K. AGGARWAL	9816648098	
2	GURDEEP SINGH PAONTA SAHIB	70180 98058	
3	Daya Ram	97367 63898	
4	Rajender Kaur	9816984309	
5			9736235 08
6			9857483288
7	Sanjeev Pundir		9817300087
8	Suresh Kumar Rudia		9876/23857
9	Pradeep Kurlia		9736154987
10	Balbir Singh		8628804887
11	Babu Ram Chauhan		9805287484

16/3/19

(1)

S.N.	Name of Participant & Address	Contact No.	Signature
12	सुधा रानी शर्मा	7560015561	सुधा रानी
13	[illegible]	9805271531	
14	[illegible]		
15	शिवराम आयु व s/o शिमला	8219638548 9816343706	
16	[illegible]	9816649247	
17	[illegible]	9805455978	
18	सुभाष शर्मा ग्राम वॉयड डा० शिमला	8628882288	
17	Smt. Sunita Panchi V PO Dugana		
20	Smt. Roman Sharma V/Pab. P.o. Shilla	8894613703	Roman
21	Smt Meena Devi	8894381414	
22	Kanta Sharma	9805214346	
23	Attro Devi	9882538609	
24	मस्तो देवी		मस्तो देवी
25	उर्मिला देवी		उर्मिला देवी

S.N.	Name of Participant & Address	Contact No.	Signature
26	Mukta Devi w/ Surender Kumar Kh	8219028512	Mukta Devi
27	Kaushalya Devi w/ Rajender	8580747181	कौशल्या देवी
28	Vaibhav Singh S/o Sh Shobha Ram	9816984307	
29	Sanjeev Singh S/o Sh Satbir	8894982864	
30	Kamlesh Kumari Sh DIR	9816369216	
31	Surat Singh S/o Dharam Singh	9882507048	Surat Singh
32	Ram Sahay Thakur Shilla	86288-23855	
33	Naresh Sharma Kaffota	9805484206	Naresh Sharma
34	Suresh Thakur Kaffota	8894467479	
35	अनिल शर्मा कोटी	8219649063	Anil Sharma
36	Gian Singh Chauhan Shilla	9805240111	
37	Kapil Thakur Shilla	9816225264	
38	शीला देवी ठुणाना		शीला देवी
39	रेशमी देवी ठुणाना		रेशमी देवी

16/3/19

(3)

S.N.	Name of Participant & Address	Contact No.	Signature
40	Medha Sharma VPO Dagana teh Paonta Sahib Distt Sirmaur H.P (173029)	98053-74127 98577-07140	Mdharma
41	Usha Forest Guard Khajuri Kaffota vill kalabi P.O Rajana Teh Sangrah Distt Sirmaur	9627825837	Usha
42	गायत्री देवी		गायत्री
43	अंजु Shimla	9816279132	अन्जु
44	ANNU मोहन	9816338353	ANNU
45	Shauhan V. Kaffota	8219109749	Shauhan
46	Geeta V kaffota	8580495880	Geetashams
47	सुनीता V. kaffota	9805288159	सुनीता
48	इन्द्रा देवी V. kaffota	8219109749	इन्द्रा देवी
49	Manisha Devi, village-Dugona	98054-50587	Manisha
50	Rabina Sharma village Sharah	9882494718	Rabina
51	Ritusharma V.P.O Dagana	8580718894	Rsharma
52	Neelam Pundir V.P.O Dugana	8894755808	Npundir
53	Manoj Kumar V.P.O Tatiyana	8544735501	Mkum

16/3/19

(4)

S.N.	Name of Participant & Address	Contact No.	Signature
54	Vinod Kumar VPO Jamna	8219086629	
55			
56	Subhash Sharma Vill. Bokola Po. Shilla Teh Paonta	9805353618	Sharma
57	Sunil Kumar VPO Dugana Teh Kamrau Distt. Sirmaur.	9357381765	
58	Manjeet Singh Geat - ITI Kaffota	9882384885	
59	Joginder Singh. V.P.O Dugana. Kamrau - Distt. Sirmaur.	9882272859	
60	Er. Rahul AE IPH Sub Div Kolata	9418503968	
61	Raghubir Singh Rudi IPH SDO Kaffota	8219795087	
62	Kalyan Sharma EO IPH Sub Division Kaffota	8219724890	
63	Raghubir Singh Sodhi IPH Sirmaur Kaffota	9418096115	
64	Gulab Singh C/o IPH Sirmaur Kaffota	9459231156	
65	Kamlesh Sharma S/o Dayaram	9805784817	
66	Mayaram Tomar S/o Dayaram Vill → Dugana	9882282287	
67	Jaman Singh Chauhan S/o Kendhu Ram Vill – Padeni	9816411787	

16/3/19

(5)

S.N.	Name of Participant & Address	Contact No.	Signature
68	Dalbir Singh S/o Mehar Singh Vill & Pob	9816228259	
69	[illegible]	9882401791	
70	[illegible]	9816[illegible]571	
71	Kuldeep Sharma S/o Sita Ram Sharma Village Bokala	99944 27050	
72	Er Sanjay Aggarwal AE NH Kaithal	94180 89437	
73	[illegible] CE Gurgaon	8119814157	
74	Aatish Thakur JE HPPWDC BLR) Sub Division Sataun	7018808493	
75	Mohinder Singh P.R.O Kaithal	9418189076	
76	C. S. Chauhan Ex. Dy. Comdt ITBP	9810371933	
77.	Y M Agnihotri; Principal GSSS Kaithal	9805040050	
78.	Rathi Ram Sharma. ex Pardhan G.P. Bokala-Pdg. P/O Bokala	9805336425	
79.	Bansi Ram Sharma. Pradhan Gram Panchayat Dugana Tehsil Kamran Simran	9418132519	
80.	रामानंद उप प्रधान ग्राम पंचायत दुगाना	9816855427	
81.	देवराज प्रधान पंचायत पावबोकाला	9805486388	

16/3/19

(6)

S.N.	Name of Participant & Address	Contact No.	Signature
82.	Rohit Kaushal JE (NH) Sub-div. Kaithal.	94181 44859	
83.	Sandeep Kumar Surveyor (NH) Sub Division Kaithal	85447 22511	
84.	Vivek Sharma S/o Dalip Ram Vill. Bokda Distt	98057 25231	
85.	Rahul Sharma. Kaithal	82 19959130	
86	Rakesh Sharma Patwari (NH) Sub-div. Kaithal.	70185 87403	
87.	बलवीर सिंह गांव-पांव	—	

5784

Gram Panchayat Amarkot

PUBLIC CONSULTATION

18/09/19

Village: Gondpur

PORJECT NAME: Up-gradation to 2-lane/2-lane with paved shoulders for Paonta Sahib - Gumma section of from Km 0.000 to Km 97.000 of NH 707 in the state of Himachal Pradesh

Meeting Location: Village:			Tehsil:	District:
Sr. No.	**Name of Participants**	**Contact Details**	**Issue Raised**	**Signature**
1	Kirpal Singh.	9882024025	रोड N.H बनना चाहिए और जनता को और जाने की सुविधा मिल सके इससे काई हानि इसमें नहीं है। क्योंकि रोड खुला होगा तो दुर्घटनाएं कम होंगी।	
(2)	Sharukham	8351847582	रोड तंग है तो बनना चाहिए और जनता को सुविधा मिल इसमें दूसरे कोई भी नहीं रुकावट होनी चाहिए और साईड नहीं देते	Sharukham
3	Gagan Goswami	8318805890	अच्छी सड़क बनना जरूरी है हमें स्कूल - जाने में देर होती है	Gagan Goswami
4	NARESH		अच्छी सड़क बनना जरूरी है क्योंकि आने में बड़ी परेशानी होती है क्योंकि सारी सड़क टूटी हुई है	NARESH V
5	Rafik Mohmd	88944 70802	अच्छी सड़क होनी चाहिए और ताकि कवरेट मोटी डाली जाए। जो कि कई वर्ष चले	Rafik Mohmd
6.	Pardeep		सड़क खुली होने से आने-जाने में सुविधा होगी	Pardeep
7	Alamshar	82194 72836	NH खुला होने से सड़क दुर्घटना भी कम होगी जनता को आने-जाने में सुविधा होगी। यह NH खुलने से पूर्ण सहमत है।	
	Reena	8219305270	NH खुला होने से सड़क दुर्घटना भी कम होगी। आने-जाने में सुविधा होगी।	
	a. RakeshShama	70185-87403		

Place:
Date:

18/09/2019

Annexure-R1-288

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18/09/19

Village :- Gondpur

PUBLIC CONSULTATION

PORJECT NAME: Up-gradation to 2-lane/2-lane with paved shoulders for Paonta Sahib - Gumma section of from Km 0.000 to Km 97.000 of NH 707 in the state of Himachal Pradesh

Meeting Location: Village:			**Tehsil:**	**District:**
Sr. No.	**Name of Participants**	**Contact Details**	**Issue Raised**	**Signature**
	Kanwal Singh	98822 41912		Kanwal

Place:

Date:

Aman Singh
WI NHPWD

अजौली ग्राम पंचायत

PUBLIC CONSULTATION

5786

18/09/19

PORJECT NAME: Up-gradation to 2-lane/2-lane with paved shoulders for Paonta Sahib - Gumma section of from Km 0.000 to Km 97.000 of NH 707 in the state of Himachal Pradesh

Meeting Location: Village: **Tehsil:** **District:**

Sr. No.	Name of Participants	Contact Details	Issue Raised	Signature
1.	Dharampal	7018404571	रोड बनना चाहिए हमें सुविधा हो जाएगी	Dharpal
2	Sanjay kumar	9816218562	रोड चौड़ा से हमें बहुत फायदे हो जाएंगे	Sanjay Kumar
3.	RajRam.	8894538222	रोड बनने से हमारा आयत बढ़ेगा। और कई प्रकार का लाभ होगा।	Rajram
4	Rakesh Kum	9805298040	रोड बनने से हमारा फायदा होगा।	Rakesh Kum
5	Raviedsingh.	9805582401	रोड चौड़ीने से हमारा फायदा होगा।	
6	Ram	9816194120	रोड बनने से हमारा भला होगा।	
7	Surender	8219292354	रोड बनने से सुविधा हो जाएगा।	
8	Suneel chaudhary	9318923230	सड़क लोगों की सुविधा के लिए है तो सम्भावित सड़क का चौड़ा होना उचित है, परन्तु इसमें मानवीय जीवन को ध्यान में रखते हुए कार्य होना चाहिए। सड़क अच्छी व सही तरीके से होनी चाहिए इससे व्यापार, पर्यटन आदि को बढ़ावा मिल सके।	18/9/19
9	राजेश कुमार	9805363503	रोड बनने से हमारा आयत बढ़ेगा।	राजेश कुमार
10	दिनेश कुमार	8219113104	अच्छी बात है कि रोड बनना चाहिए	Dinesh
11	Rakesh Sharma	70185-87403		

Place:

Date:

Amar Singh
WNH PWD

18/9/19
Pawtami

प्रधान
ग्राम पंचायत अजौली
विकास खण्ड पांवटा साहिब
जिला सिरमौर (हि0प्र0)

Panchayat Mughlanwala Kartarpur मुगलावाला करतारपुर

PUBLIC CONSULTATION 19/9/19

PORJECT NAME: Up-gradation to 2-lane/2-lane with paved shoulders for Paonta Sahib - Gumma section of from Km 0.000 to Km 97.000 of NH 707 in the state of Himachal Pradesh

Meeting Location: Village:			Tehsil:	District:
Sr. No.	**Name of Participants**	**Contact Details**	**Issue Raised**	**Signature**
1.	Mohan Lourry o/p Pardhan	8894444424	रोड़ बनाने से क्या फायदे होंगे।	
2	Hirdesh Rattan	9736585187	सुविधा के लिए रोड बने।	
3.	Som Dutt	9816836943 8219660206	— do —	
4.	Balwant Singh	9418228965	अच्छा रोड बनने से लोगों को अच्छी सुविधाएं मिलेगी व व्यापार बढ़ेगा।	
5	Rakesh kumar	9805428871	रोड बनना चाहिए	
6	मुनीम सिंह	9816-3574	रोड़	मुनीम सिंह
7	श्यामसिंह		रोड़ बना चाहीये हमारे लीयमक्षवाल है	श्यामसिंह
8	Ramlal	98823-98984	बहुत अच्छी बात है, रोड बनना चाहीए। हमसहमत है।	Ramlal

Place: Rakesh Sharma 70185-87403
Date:

Aman Singh
WI NH PWD

19/9/19
Pawtami
NH

प्रधान Balwant Singh
ग्राम पंचायत मुगलावाला करतारपुर
विकास खण्ड पांवटा साहिब
जिला सिरमौर (हि०प्र०)

पंचायत सतौन

PUBLIC CONSULTATION 18/09/19

PORJECT NAME: Up-gradation to 2-lane/2-lane with paved shoulders for Paonta Sahib - Gumma section of from Km 0.000 to Km 97.000 of NH 707 in the state of Himachal Pradesh

Meeting Location: Village: **Tehsil:** **District:**

Sr. No.	Name of Participants	Contact Details	Issue Raised	Signature
1	Raghubir Sag	7018246908	N.H. बनाया चाहिए	
2	Ranjeet Singh	94181-32733	N.H. 72 B(707) रोड़ बनना चाहिए	
3	Arun Kumar	9816966225	— do —	Arun Kumar
4	Balbir singh	8894539625	— do —	
5	Naresh Thakur	9805077747	- do -	
6	Devinder Thakur	9882255082	- do -	
7	Ramprakash	7018455326	- do -	
8	Gulab Sin	98169-36245	— do —	Shakur
9	Rajkal Sha	8894711008	— do —	
10	Vijay Kumar	9816170699	— do —	
11				
12	गोविंद	98169-36195	—	
13	[illegible]	9882500061	- सड़क अच्छी और चौड़ी	
14	पंचायत G.P. सतौन		होनी चाहिए।	
15				
16	Rakeshsharma	70185-87403		

पंचायत सतौन
तहसील...18/9/2019
दिनांक

Place:

Date: 18/9/19 Pawtari NH

Amar Singh
WI NH PWD

ग्राम-पंचायत बड़वास **PUBLIC CONSULTATION** 19/9/19

(1)

PORJECT NAME: Up-gradation to 2-lane/2-lane with paved shoulders for Paonta Sahib - Gumma section of from Km 0.000 to Km 97.000 of NH 707 in the state of Himachal Pradesh

Meeting Location: Village:			**Tehsil:**	**District:**
Sr. No.	**Name of Participants**	**Contact Details**	**Issue Raised**	**Signature**
1	Vinay Kumar	98821-67264	रोड बनने से हमारे जीवन जीने की शैली में सुधार आ जाएगा।	Vinay Kumar
2	Sunil	85 44778781	रोड बनना चाहिए	Sunil
	मीनाराम		रोड बनना चाहिए	मीनाराम
	सुनिता देवी	9882446066	रोड बनना चाहिए	सुनिता देवी
	माया देवी	8894286753	रोड बनना चाहिए	माया देवी
	सांता देवी		रोड बनना चाहिये	संतराम देवी
	गायत्री देवी		रहिना चाहिये	श्रीमती गायत्री
	सावित्री देवी		" "	रमाकांत
	श्री इन्द्रेश्वर			विद्या चौहान
	Karan Singh	98161-11961	" " "	Karan Singh
	Numberdar		बनान चाहिए हमारा कोई भी ऐतराज नहीं है।	
	Mohan Singh	7018489955	No objection from village	
	Retd Teacher		it must be made according to the direction of Govt.	

Place:

Date:

पंचायत सचिव
ग्राम पंचायत बड़वास
वि.खण्ड पांवटा साहिब (हि.प्र.)

ग्राम पंचायत पड़वार

PUBLIC CONSULTATION

5790

19/9/19

(2)

PORJECT NAME: Up-gradation to 2-lane/2-lane with paved shoulders for Paonta Sahib - Gumma section of from Km 0.000 to Km 97.000 of NH 707 in the state of Himachal Pradesh

Meeting Location: Village:			**Tehsil:**	**District:**
Sr. No.	**Name of Participants**	**Contact Details**	**Issue Raised**	**Signature**
	मीत सिंह	6239462570	रोड बनना चाहिए	मीत सिंह
	सोहन सिंह	9736623638	—	सोहन सिंह
	शुभम चौहान	9882140329	आपके किये हुए वायदे पूरे होने चाहिए हमें कोई भी रोड बनने से कोई शिकायत नहीं होगी। धन्यवाद	Shubham
	आदित्य सुमवाड़ीवी	7807041209	रोड बना चाहिये	Aditya सुमवाड़ीवी
	जगजीत	9805140701	रोड बनना चाहिये	जगजीत
	Devender Thakur	9816168245	नं।	Thakur
	Er Sayay Aggarwal	9418089425	AE NH Sub Div. Kafota (CSDO NH) Kafota	

Place: Trakesh Shamli

Date: 70185-87403

19/9/19 Thakur Patwari ADT NH

ग्राम पंचायत बड़वास

(3)

5791

PUBLIC CONSULTATION

PORJECT NAME: Up-gradation to 2-lane/2-lane with paved shoulders for Paonta Sahib - Gumma section of from Km 0.000 to Km 97.000 of NH 707 in the state of Himachal Pradesh

Meeting Location: Village:			**Tehsil:**	**District:**
Sr. No.	**Name of Participants**	**Contact Details**	**Issue Raised**	**Signature**
	दलपोय	8219478544	रोड पर लाईट, पुलिया का ~~प्रबंध~~ प्रबंधन व जमीन का कम से कम क्षति करें।	
	विनोद कुमार	9805484159	- do -	
	शान्ति राम	9736790948	~~दोनों तरफ~~ डंगे और कोड़ा वेस्टिज आदि लगे होने चाहिए - do -	शान्तिराम
	विक्रम चौहान	9882509871	हर बस स्टैंड पर स्वच्छ व हर जगह पर नई तकनीक का प्रयोग करें।	
	बलवीर सिंह	9736031076	हमें zero point के पास एक रोड भी चाहिए जिससे कि पैसेंजर कोई दिक्कत न हो	

Place:

Date:

Anur Singh
NH PWD

पंचायत सचिव
ग्राम पंचायत बड़वास
वि.खण्ड पांवटा साहिब

19/8/2019

ग्राम पंचायत. कमरौऊ

PUBLIC CONSULTATION

5792

19/9/19

PORJECT NAME: Up-gradation to 2-lane/2-lane with paved shoulders for Paonta Sahib - Gumma section of from Km 0.000 to Km 97.000 of NH 707 in the state of Himachal Pradesh

Meeting Location: Village: Kamrau **Tehsil:** Kamrau **District:** Sirmaur

Sr. No.	Name of Participants	Contact Details	Issue Raised	Signature
01	Rajender Singh W.M. Gr.P. Kamrau	8219674815	Personal Compensation, Road Safety, environment friendly, Park. Proper development	
02	Rajesh Sharma W.M. Gr.P. Kamrau	9892056935	with Road Safety, street Light, Crash Barrier speed Breaker, near School & Hospital	
03	Chattar Singh Th. Kamrau (Shalna)	9882271788	Some Real Compensation, speed Breaker, near School & Hospital, street Light & plantation	
04	Surender Thakur Kamrau (Shalna)	9805946625	Real Compensation, Speed Breaker, street Light, plantation, Sign Board.	
5	[illegible]	9805418635	[illegible]	
6	[illegible]	9805763721	[illegible]	
7	[illegible]	8249954 61		
8. 9	Sudesh Tomar Sanjay Aggarwal	7018831618 ~~8894~~ 9418894437	रोड बनना चाहिए AE NH Capt SDO NH	

Place: Kamrau

Date: 19-9-19

Anuj Singh
NHNH PWD

19/09/2019

ग्राम पंचायत - कमरोऊ

PUBLIC CONSULTATION 19/9/19

5793

PORJECT NAME: Up-gradation to 2-lane/2-lane with paved shoulders for Paonta Sahib - Gumma section of from Km 0.000 to Km 97.000 of NH 707 in the state of Himachal Pradesh

Meeting Location: Village:			**Tehsil:**	**District:**
Sr. No.	**Name of Participants**	**Contact Details**	**Issue Raised**	**Signature**
1	Avinash Thakur	8091166303	Toilt	
2	Rahul Sharma	8544790802	Parking.	Rahul.
3	mahender singh	98051-73462	रोड में टोयलट होने चाहिए और स्कूल रास्ता ठीक से बनना चाहिए स्ट्रीट लाइट होनी चाहिए ?	mahender singh
4	हिरदा राम	88947-11019	मेरा घर रोड के नीचे है उस के उपर डगालना चाहिए और क्लास बेरीयर होना चाहिए	Hira Ram
5	Mamta Sh	9882172553	[illegible] पौधे लगाए जाने चाहिए	
6	Seema Rao	98820/800/	हमें रोड सुविधा चाहिए कि रोड के किनारे पानी होना चाहिए।	
7	Kaushlya Devi	8278760355	हमारे रोड के किनारे सैड बनाना चाहिए जिससे हमें और हमारे बच्चों को सुविधा मिल	
8	Rekha Devi	9805808609	Parking रोड [illegible]	Rekha

Place: Rakesh Sharma 70185-87403

Date:

(9)

Anuj Singh
WI NHPWD

ग्राम पंचायत दुगाना

PUBLIC CONSULTATION 19/9/19

PORJECT NAME: Up-gradation to 2-lane/2-lane with paved shoulders for Paonta Sahib - Gumma section of from Km 0.000 to Km 97.000 of NH 707 in the state of Himachal Pradesh

Meeting Location: Village: **Tehsil:** **District:**

Sr. No.	Name of Participants	Contact Details	Issue Raised	Signature
1	RajuRam	7807102873	रोड अच्छा बनना चाहिए बारी इसमें इस रोड से बेनिफिट है।	RajuRam
2				
3	रघुवीर सिंह	9805290525	रोड में दोनो साइड लेपर पत्थर होना चाहिए ताकि रोड पे पानी न टिके	रघुवीर सिंह
4				
5	सीमादेवी	8894366596	रोड बनना चाहिये	सीमादेवी
6	सुरमीदेवी	9816829799	,, ,, ,,	सुरमीदेवी
7				
8	विनीता देवी	8894823224	रोड़ की कटिंग ठीक ढंग से होनी चाहिए	विनीता देवी
9	कबीला	9816790659	,, ,,	कबीला
10	गुमानसिंह	9816417787	,, ,, ,, ,,	गुमानसिंह
11	अतर सिंह	9816211478	क्रेश बेरियर सबसे पहले लगने चाहिए	
12	कल्याण सिंह	9816160970	अति शीघ्र सुविधा प्रदान की जाए	Kalyan Singh
13	अतर सिंह	9816157132	,, ,, ,, ,,	
14	खजानासिंह	9805353576	,, ,, ,,	खजानासिंह
15	Kamlesh	9816977171	इसरोड की अति शीघ्र सिविधा चाहिए	Kamlesh
16	Aghnihotri	9805880617	इसे आवेर लाई के बारे में विशेष ध्यान देना चाहिए	

Place: दुगाना
Date: 19/9/19

Amar Singh
XEN NH PWD

19-9-2019

(2)

PUBLIC CONSULTATION

PORJECT NAME: Up-gradation to 2-lane/2-lane with paved shoulders for Paonta Sahib - Gumma section of from Km 0.000 to Km 97.000 of NH 707 in the state of Himachal Pradesh

Meeting Location: Village: **Tehsil:** **District:**

Sr. No.	Name of Participants	Contact Details	Issue Raised	Signature
1	Er Sanjay Aggarwal	9418089437	AE NH Kafia	
2.	सुनील	9816068890	NH से हटके बनाई दो	सुनील
3.	[illegible]	9816686[illegible]	NH से रोड, नाले से हमारे को नुकसान है	[illegible]
4.	रमेश चन्द	9882545728	[illegible] बहुत बड़ा फायदा होने वाला है	रमेश चन्द
5.	सुनील	8894459888	NH 707 से हमें कोई आपत्ति नहीं है	सुनील
6.	[illegible]	8894356316	NH में कोई आपत्ति नहीं	चौहान
7.	[illegible]	98053-99017	NH - 707 से हमें कोई आपत्ति नहीं है धन्यवाद।	
8.	[illegible]	9805325215		
9.	अमित	9817129319	NH-707 किसानों के लिए लाभान्वित होगा।	
10.	[illegible]	8894363499	[illegible]	[illegible]
11.	[illegible]	8628077311		[illegible]
12.	[illegible]	8894410477		[illegible]
13.	Rambha	8091090008	NH 707 लोगों के आने-जाने रास्ते मिलेंगे और लोगों का [illegible]	Rambha
14.	Surender	9414837390		
15.	रामानन्द	9816855222	सभी लोगों को मुआवजा मिलना चाहिये	
16.	Keshsharma (Paontaar NH)	70185-87403		

Place:

Date:

Anuj Singh
NI NH PWD

19-9-2019

ग्राम पंचायत - वोकलाघांव

5796

PUBLIC CONSULTATION

(11)

PORJECT NAME: Up-gradation to 2-lane/2-lane with paved shoulders for Paonta Sahib - Gumma section of from Km 0.000 to Km 97.000 of NH 707 in the state of Himachal Pradesh

Meeting Location: Village:			**Tehsil:**	**District:**
Sr. No.	**Name of Participants**	**Contact Details**	**Issue Raised**	**Signature**
1	हीरा राम	9816131032		
2	Anshish -	7816949071	हमें इस N.H. से कई सारी परेशानियां हुआ करती - जैसे - गाड़ी, मोटरसाइकिल, पैदल चलने में दिक्कत	
3.	Hathu Ram	—	—— do ——	
4.	Payal		हम स्कूल के छात्र है रोड बनना चाहिए इससे हम जल्दी-से-जल्दी स्कूल पहुंच सकते है	Payal
5.	Anjali Sharma		—— do ——	Anjali
6.	Anju Thakur		—— do ——	Ku. Anju
7	Kajal		—— do ——	Kajal
8.	[illegible]		—— do ——	
9.	37 [illegible] Rakesh Sharma (HPPWD)	8219531380		

Place: वोकलाघांव

Date: 19/9/19

Anuj Singh
HPWD

19/9/19
Patwari NH

ग्राम पंचायत वोकलाघांव
तह. पावंटा साहिब, जिला सिरमौर

हस्ताक्षर
दिनांक

PUBLIC CONSULTATION

(7)

PORJECT NAME: Up-gradation to 2-lane/2-lane with paved shoulders for Paonta Sahib - Gumma section of from Km 0.000 to Km 97.000 of NH 707 in the state of Himachal Pradesh

Meeting Location: Village: **Tehsil:** **District:**

Sr. No.	Name of Participants	Contact Details	Issue Raised	Signature
	बीजा राम	9816680 43	रोड बनना जरूरी है।	बीजा राम
	तोता राम शर्मा	8894427951	रोड बनना चाहिए	
	सहदेव राम	8580854811	〃 〃 〃	सहदेव राम
	गीता राम			गीता राम
	[illegible]			[illegible]
	तेलू राम			तेलू राम
	मोहन शर्मा	9816445787	रोड बनना चाहिए	
	Sanjay Aggr Surveyor	9418089437 9418033580	AE NH left to SDO NH	

ग्राम पंचायत बोकाला पाव • तहसील पावंटा साहिब, जिला सिरमौर •

Place: बोकाला पाव
Date: 19/9/19

Amar Singh
JE NHPWD

हस्ताक्षर
दिनांक

ग्राम पंचायत शिल्ला

PUBLIC CONSULTATION

5798

PORJECT NAME: Up-gradation to 2-lane/2-lane with paved shoulders for Paonta Sahib - Gumma section of from Km 0.000 to Km 97.000 of NH 707 in the state of Himachal Pradesh

Meeting Location: Village:			**Tehsil:**	**District:**
Sr. No.	**Name of Participants**	**Contact Details**	**Issue Raised**	**Signature**
1	Gumansingh Chauhan V.P.O SHILLA	9418164128	Note सुझाव की पंचायत स्तर पर संकलन किया गया है।	Gumman
2	रामलाल चौहान	8628923885	,,	रामलाल चौहान
3	जय सिंह	9805-84601	,,	जय सिंह
4	रतीराम	8894627128	,,	रतीराम
	Kaushiya	94054 30402	,,	गंगाराम
	~~Rai~~			महेन्द्र
	RakeshSharma	70185-87403		

20/9/19 Paonta NH

प्रधान ग्राम पंचायत शिल्ला जिला. पांवटा साहिब, जिला सिरमौर

Place: शिल्ला
Date: 20/9/19

Annexure-R1-802

स्ताक्षर

20/9/19

ग्राम पंचायत शिल्ली

PUBLIC CONSULTATION -20/9/19

PORJECT NAME: Up-gradation to 2-lane/2-lane with paved shoulders for Paonta Sahib - Gumma section of from Km 0.000 to Km 97.000 of NH 707 in the state of Himachal Pradesh

Meeting Location: Village: **Tehsil:** **District:**

Sr. No.	Name of Participants	Contact Details	Issue Raised	Signature
1	Arun Chauhan	8628046677	रोड सड़क बनने से यातायात में सुविधा, कामकाज में तेजी,	
2	गंगाराम	9805710929	रोड बननी चाही	गंगाराम
3	सुनील दत्त	9805058825	रोड बनने चाही	सुनील दत्त
	जस सिंह	9805164601	रोड बनना चाहिए	
	रामदास	8890040645 46	〃 〃 〃 〃	रामदास
	Chatter Singh Chauhan	9816144734	— do —	Chauhan
	रमेश चन्द			
	Amit Chauhan	98160-43808	safty wall under the village, school safty wall, Bus stop, solar lites, toilet, school playground.	Amit Chauhan
	खत्री राम	—		खत्री
	Harish Chauhan		रोड बनना चाहिए साथ में गांव की सेफ्टी के लिए दिवार बनाई जाए	Chauhan
	Bhawan Singh		पी मान्दा हुआ रोड चाहिए और साथ में गांव को सेफ्टी चाहिए तथा गांव के School और Hospital के लिए फुटपाथ रोड	Bhawan Singh
	GUMAN CHAUHAN V.P. OSHILLA	9418164128	गांव के पास में Lite लगाई जाए	

Place: शिल्ली

Date: 20/9/19

NOTE: सुझाव ग्रामीण पंचायत लेटर पेड पर उपलब्ध कराएं

Anurag Singh
NHAI NH PWD

Shimla 20/9/19

S.K. Sharma CDO

Pankaj Pawtani NH

R. Kaul J.C.

ग्राम पंचायत शिलाई 19/9/19

5800

PUBLIC CONSULTATION

PORJECT NAME: Up-gradation to 2-lane/2-lane with paved shoulders for Paonta Sahib - Gumma section of from Km 0.000 to Km 97.000 of NH 707 in the state of Himachal Pradesh

Meeting Location: Village:			**Tehsil:**	**District:**
Sr. No.	**Name of Participants**	**Contact Details**	**Issue Raised**	**Signature**
	नाजरू देवी	9805350[illegible]	रोड बनना चाहिए लेकिन सुरक्षा दीवार	नाजरी
	मिया देवी		do	मिया देवी
	सविता देवी		do	
	अनिल चौहान		रोड बननी चाहिए	
	अमर सिंह		रोड बननी चाहिए	अमर सिंह
	दिनेश	9626945267	do	दिनेश
	अजय	8580603535	do	
	KAPIL	9805424534	रोड बनना चाहिए लेकिन गांव रोड से अप हैं तो निचे से सुरक्षा दिवार लगनी चाहिए।	

Place: शिलाई
Date: 19/9/19

Amar Singh
WI NHPWD

SDOshimla
CEC Ltd

Shivay 20/9/19

कार्यालय ग्राम पंचायत शिल्ला

विकास खण्ड पाँवटा साहिब, जिला सिरमौर (हि0प्र0)

क्रमांक.....

दिनांक 20-9-019

(1) गांव के जितने भी रास्ते हैं वो दुबारा से पक्के बनाये जाएं।

(2) गांव के नीचे जितनी कटिंग होनी है 1/2 पलगिंग (or Brest wall) जिसकी ऊंचाई लगभग 9मीo होनी चहिए 3-3मीटर के स्टेप होने चहिए

(3) जितना भी हो सके बाहर की तरफ Reatams wall मजबूती वाले ढेड के जरूरी चहिए।

(4) स्टोक यार्ड के लिए किसी भी खाले में नहीं डाला जाएं बल्कि प्राइवेट भूमि मालिकों से बंसी जमीन ली जाएं जिससे आगे उसके नीचे की भूमि बरबाद ना हो या फूल वगैरहा का नुकसान ना हो

(5) मिडल स्कूल, पटवार सर्कल, आयुर्वेदिक हस्पताल के निचे सारा ढेड के Brest wall की आवश्यकता है।

(6) जिस भी जगह किसी भूमि मालिक की ~~बरबाद~~ हो रही है उसको ~~मुआ~~ मुआवजा मिलना चाहिए।

भूमि use

Gurmeet Singh
Mob 9418164128

Thakur
मेहीराम

Gurmeet Singh
9418164128

गंगाराम

20/9/19

LTI
खत्रीराम
रमेश कुमार

सनाराम

हस्ताक्षर

5801

ग्राम पंचायत अश्याड़ी

5802

PUBLIC CONSULTATION 20/9/19

PORJECT NAME: Up-gradation to 2-lane/2-lane with paved shoulders for Paonta Sahib - Gumma section of from Km 0.000 to Km 97.000 of NH 707 in the state of Himachal Pradesh

Meeting Location: Village: **Tehsil:** **District:**

Sr. No.	Name of Participants	Contact Details	Issue Raised	Signature
I	Rajender Chauhan	9805714666 7018983077	रोड का होना बहुत आवश्यक है हमें रोड बनने से कोई आपत्ति नहीं है। रास्ते का मुआवजा मिलना भी आवश्यक	Rajender
(2)	Rajbir Singh	9916054101	〃 〃	Rajbir Singh
(3)	Nitram	9805573032	〃 〃	Sundar Singh
(4)	Sundar Singh	9805654639	रोड बनने से कोई आपत्ति नहीं है।	Neetaram
(5)	जगतसिंह उप-प्रधान	9816827440	〃 〃 〃	जगतसिंह
(6)	अनिल चौहान ग्राम सियारी	7018616291	NH रोड. का होना अति आवश्यक है रोड बनने से हमें कोई आपत्ति नहीं है। लेकिन कैलाशी की जमीन NH में आ रही है मुआवजा मिलना चाहिए	Anil Chauhan
7	चन्द्रमणी चौहान V.P.O Timbi	9805959341	NH रोड. से कोई आपत्ति नहीं है। लेकिन कुछ लोगों के पास बहुत कम जमीन है। अतः हमारी विनती है कि लोगों को रोड बनने से पहले उचित मुआवजा दिया जाए।	Chandramani
8	परमानन्द V.P.O हिम्बी	9805121129	NH रोड. से हमें कोई आपत्ति नहीं है बल्कि रोड होना चाहिए	परमानन्द
9	इन्द्रसिंह	9816727586	रोड़ का बनना बहुत आवश्यक है।	INDER
10	बहादुर सिंह	9805751927	रोड़ से प्रभावित परिवारों को उचित मुआवजा मिले।	बहादुर
11	गीता राम शर्मा	9816133173	〃	गीता राम
12	Surender Sharma	9816727492	रोड़ का बनना जनहित में उचित है	20-9-19

Place: अश्याड़ी

Date: 20-09-19

बतीराम 9816054595

RakeshSharma 70185-87403

Sushama

20/9/19

NH

हस्ताक्षर जगतसिंह
दिनांक 20-09-2019

ग्राम पंचायत कोटी-उतरोज़

5803

PUBLIC CONSULTATION - 20/9/19

PORJECT NAME: Up-gradation to 2-lane/2-lane with paved shoulders for Paonta Sahib - Gumma section of from Km 0.000 to Km 97.000 of NH 707 in the state of Himachal Pradesh

Meeting Location: Village:			**Tehsil:**	**District:**
Sr. No.	**Name of Participants**	**Contact Details**	**Issue Raised**	**Signature**
1	Bhagat Singh	9816305846	रोड के आस पास रहने वाले व्यक्ति के लिए सड़क सुरक्षा संबंधी	
2	Amar Singh	9816030864	रोड़ सड़क के लिए रिफ्लेक्टर लगाने का कार्य किया जाए	अमर सिंह
3.	Jaram Singh	9816830687	— do —	
4.	Jagat Singh	8894152626	रोड़ के साथ बसे व्यक्ति के लिए सड़क सुरक्षा संबंधी	जगत सिंह
		8894586990		
5	Chhiter Singh	9805878923	— do —	
6	Parvat Singh	9816830387	रोड़ के साथ के जो मकान बने हुए हैं उन मकान को भी सुरक्षित रखने का प्रावधान होना चाहिए तभी बचाव है।	

Place: कोटी उतरोज़

Date: 20/9/19

SK Sharma 20/9/19

J.E.

PUBLIC CONSULTATION 20/9/19

PORJECT NAME: Up-gradation to 2-lane/2-lane with paved shoulders for Paonta Sahib - Gumma section of from Km 0.000 to Km 97.000 of NH 707 in the state of Himachal Pradesh

Meeting Location: Village: **Tehsil:** **District:**

Sr. No.	Name of Participants	Contact Details	Issue Raised	Signature
7	Dhyan Singh	9805736550	इधें रोड अच्छा चाहिये पर बिस किसी गरीब के पास इतनी ही जगीन है तो कृपया आप मुवावजा देने की कृपा करें।	ध्यान सिंह
8	Anita Devi	8894652799	रोड़ बनने के बाद कुछ जगह पुलिया छोटी पड़ी है उसे बड़ा करने व नाला ठीक करने की मांग है।	Anita
9	BabuRam	9805925444	रोड़ चौड़ीकरण से ग्राम वासियों को कहीं जमीन के नुकसान होगा व कुछ पेड़ पौधे सम्पत्ति को नुकसान लगेगा तथा ग्राम वासियों को मकान का मुवावजा मिलना चाहिये	
	Rakeshsharma	70185-87403		

Place: कोटी-उतरोड़
Date: 20/9/19

20/9/19
Pawtam
NH

प्रधान ग्राम पंचायत कोटी तहसील पांवटा साहिब जिला सिरमौर

हस्ताक्षर
दिनांक 20/9/19

ग्राम पंचायत - पांवटा साहिब

PUBLIC CONSULTATION 20/9/19

PORJECT NAME: Up-gradation to 2-lane/2-lane with paved shoulders for Paonta Sahib - Gumma section of from Km 0.000 to Km 97.000 of NH 707 in the state of Himachal Pradesh

Meeting Location: Village: **Tehsil:** **District:**

Sr. No.	Name of Participants	Contact Details	Issue Raised	Signature
1	Surat Singh	9816313945	सड़क की कटिंग मशीन की जगह हाथ से होनी चाहिए मिट्टी के साथ-2 पेड़ उगे थे को के कि इनके के लिए काटने चाहिए	
	कमलादेवी	88[illegible]14135	रोजगार मिलना चाहिये	कमलादेवी
	Anita	889[illegible]601333	,, ,, ,,	Anita
	मनोनी	9805373288	,, ,, ,,	मनोनी
	मालादेवी		,,	मालादेवी
	सतोदेवी		,, ,,	
	सत्या	8629064588	,, ,,	सत्या
	सुमा देवी	9805423851		
	Rakesh Sharma	70185-87403	,, ,,	

Place: पांवटा साहिब

Date: 20/9/19

20/9/19 Pawtaur

सचिव
ग्राम पंचायत पांवटा साहिब
विकास खण्ड शिलाई
जिला सिरमौर हि.प्र.

20/9/19 Pawtaur NH

ग्राम पंचायत पाव मानल (सिरमौर) PUBLIC CONSULTATION 20/9/19

PORJECT NAME: Up-gradation to 2-lane/2-lane with paved shoulders for Paonta Sahib - Gumma section of from Km 0.000 to Km 97.000 of NH 707 in the state of Himachal Pradesh

Meeting Location: Village: **Tehsil:** **District:**

Sr. No.	Name of Participants	Contact Details	Issue Raised	Signature
1	रामलाल	83528 87927	रोड़ बनाना चाहिए लेकिन नुकसान कम से कम हो	रामलाल
2	जगपालसिंह	98169 02932	यह रोड अवश्य बनना चाहिए लेकिन नुकसान कम होना चाहिए	Jagpal
	जगपालसिंह	98160 55040	यह रोड अवश्य बनना चाहिए	जगपाल
	राजेन्द्रसिंह	8075 48809	जब काम चले तो हमारे को पहले सूचित करे क्योंकि हमारी दुकान इस रोड पर है रोड अवश्य बनना चाहिए	राजेन्द्रसिंह
	सौम्यकांत	70183 [illegible]	जब रोड का काम चलेगा तब उसे की सूचित किया जाये हमारी दो जमीन आती है रोड पे	सौम्यकांत
	जगदीशशर्मा	98053 99115	रोड़ अनिवार्य है मगर नुकसान बहुत है मोआवजा गरीबों को मिलना चाहिए सेक्टरी घिवार का भी होना चाहिए	Jagdish

Place: पाव मानल
Date: 20/9/19

सचिव
ग्राम पंचायत पाव मानल
विकास खण्ड शिलाई
जिला सिरमौर हि.प्र.

ग्राम पंचायत पाव मोल

PUBLIC CONSULTATION 20/9/19

PORJECT NAME: Up-gradation to 2-lane/2-lane with paved shoulders for Paonta Sahib - Gumma section of from Km 0.000 to Km 97.000 of NH 707 in the state of Himachal Pradesh

Meeting Location: Village:			**Tehsil:**	**District:**
Sr. No.	**Name of Participants**	**Contact Details**	**Issue Raised**	**Signature**
	चमेल सिंह	9805380 33	रोड बनाने	चमेल सिंह
	जगतसिंह	9816788932		जगतसिंह
	Balbir Thakur	98052.75666		
	सुन्दर सिंह	-		
	अतर सिंह	78070316 11	रोड बनाते समय बलासिंग करते समय नीचे मकान रिटायनी व मजबूत ग्रीन की सेफ्टी होनी चाहिए।	अतर सिंह
	वस्तीराम	9816833870	- यथोचित	वस्तीराम
	उदेराम	98059 20187	जमीन ली	उदेराम
	रमेश	9805587555	रोड बनाते समय मेरे खेत के निचे व मकान के के लिए दीवार का प्रावधान होना चाहिए	रमेश

Place:

Date:

ग्राम पंचायत पाव मोल
विकास खण्ड शिलाई
जिला सिरमौर हि.प्र.

ग्राम पंचायत शिलाई

5808

PUBLIC CONSULTATION 21/9/19

PORJECT NAME: Up-gradation to 2-lane/2-lane with paved shoulders for Paonta Sahib - Gumma section of from Km 0.000 to Km 97.000 of NH 707 in the state of Himachal Pradesh

Meeting Location: Village: **Tehsil:** **District:**

Sr. No.	Name of Participants	Contact Details	Issue Raised	Signature
1	दीपचन्द तोमर	9816707998	जनता कि राय लेना जरूरी है	दीपचन्द तोमर
2	गुमान सिंह तोमर	—		गुमान सिंह
3	हिरा सिंह तोमर	—		हीरा सिंह
4	कुकु सिंह	98052 87119		कुकु सिंह
5	प्रताप सिंह	—		प्रताप सिंह
6	अमर सिंह	9805353617	जनता की सामहिक रुचि है सरकार ये ध्यान रखे की सुरक्षा का ध्यान रखे एवं अच्छी रखरखाव के लिए	Amar Singh
7	शान्ति राम	—		Shanti Ram
8	रोजिन्द तोमर	9816463937	ये मेरा भी जमीन रोड़ सड़क के लिए सरकार को	Rajinder Singh
9	रघुवीर सिंह	9805846827	कोई एतराज नहीं है अच्छा भी रहेगा रोड़	रघुवीर सिंह
10	अमर सिंह तोमर	94184-58988		Amar Singh
11	कुन्दन सिंह	8580552621		कुन्दन सिंह
12	प्रताप सिंह	9882776350		
13	विरेन्द्र सिंह	8628063505		Virender
14	पंकज राम	—		Pankaj
15	Sanjay Aggarwal	9418089437	AE NH Kafota	AE
16	Atmaram Tomar	8219782987	जो काम हो रहा है या होना है अच्छा है	Atmaram
	Place: Delu Ram Tomar	9816322132	" " " "	Delu Ram
	Date:			
17.	Rakesh Sharma	70185-87403		

CEO Sashma NH: Kafota 21/9/19 Paonta NH

सचिव
ग्रा0 प0: Shillai
वि0ख0, शिलाई, जिला सिरमौर (हि0प्र0)

ग्राम पंचायत बैला-मशवा

5809

PUBLIC CONSULTATION 21/9/19

PORJECT NAME: Up-gradation to 2-lane/2-lane with paved shoulders for Paonta Sahib - Gumma section of from Km 0.000 to Km 97.000 of NH 707 in the state of Himachal Pradesh

Meeting Location: Village: Bela (Baswa) **Tehsil:** Shillai **District:** Sirmaur

Sr. No.	Name of Participants	Contact Details	Issue Raised	Signature
1	[illegible]	9805670958	रोड बनना चाहिए	[illegible]
2	[illegible]	8894993596	रोड़ बना जरूरी है.	[illegible]
3	विनेन्द्र नेगी	82193-57900	रोड़ बनना जरूरी है!	[illegible]
4	मोहनसिंह ठाकुर	8219511176	रोड़ के साथ Drain व कलवट की जगह पर छोटी-2 पुलिया होनी चाहिए	[illegible]
5	रणसिंह पंवार GP बैला	9816270560	——— ″ ——— रोड़ बनना बहुत जरूरी है	[illegible]
6	[illegible]	9805412819		[illegible]
7	इन्द्र सिंह	8893-86773	रोड़ बनना अति आवश्यक है। इन्द्रसिंह	[illegible]
8.	Rakesh Sharma	70185-87403		Sharma Pabbar NH 21/9/19

Place: BALA
Date: 21/9/19

21-09-19.
सचिव
ग्राम पंचायत-बैला
विकासखण्ड शिलाई
जिला सिरमौर (हि0प्र0)

BANDLI

PUBLIC CONSULTATION 21/9/19

PORJECT NAME: Up-gradation to 2-lane/2-lane with paved shoulders for Paonta Sahib - Gumma section of from Km 0.000 to Km 97.000 of NH 707 in the state of Himachal Pradesh

Meeting Location: Village: **Tehsil:** **District:**

Sr. No.	Name of Participants	Contact Details	Issue Raised	Signature
1.	Ramesh Chauhan Bandli	9816237794	NH Road के निचली साईड सेंपल ठीक ढंग से लगाए जाए	RKauhan
2.	Ramesh Thakur	9805657718	N.H Road में जो हमारी जमीन जा रही है उसका उचित मुवावजा दिया जाये	RChauhan
3.	Mohan Singh	———	N.H. " "	मो हन सिंह
4.	Dalip Singh	82194937774	N.H. में जो हमारी जमीन जाएगी उसका सही मुआवजा मिले व अच्छा पास हो।	दलीप सिंह
5.	Arjun Chauhan	7018747066	" " "	अर्जुन सिंह
6.	Dalat Ram.	8894599172	N.H. के जो हमारा जमीन जा रही है उसका दलीप सिंह मुआवजा मिलना चाहिए।	
7.	Ranbir Singh	8544781377	" " " ———	रणवीर सिंह
8.	Basti Ram	82 78883782	— — — ———	बस्ती राम
9.	Rakesh Sharma	70185-87403		21/9/19 Pawtasi NH

Place: Bandli
Date: 21/9/19

CE, SP Sharma 24/9/19 AE

सचिव
ग्राम पंचायत: Bandli
विकास खण्ड, शिलाई, जिला सिरमौर (हिमाचल प्रदेश)

BANDLI

PUBLIC CONSULTATION 21/9/19

PORJECT NAME: Up-gradation to 2-lane/2-lane with paved shoulders for Paonta Sahib - Gumma section of from Km 0.000 to Km 97.000 of NH 707 in the state of Himachal Pradesh

Meeting Location: Village: **Tehsil:** **District:**

Sr. No.	Name of Participants	Contact Details	Issue Raised	Signature
9	Mohar Singh	9805853946	जमीन अच्छा होनी चाहिए हैं कोई एतराज नहीं है। सही मुआवजा मिलना चाहिए	Mohar Singh
10.	Madan Singh	8894035621	,,	मदन सिंह
11.	Gulab Singh		,,	गुलाब सिंह
12.	Prakash Varma		,,	उर्मिला देवी
13.	Urmila Devi		,,	आशा देवी
14.	Asha Devi		,,	Asha
15.	Asha Devi	8894339357	,,	Neelam Thakur
16	Neelam Devi	8580890190	,,	Saraj
17.	Saraj Devi	7807578140	,,	Reena
18.	Reena Devi	9816574340	,,	Baru Ram
19.	Baru Ram	9816055089	,,	Roop Singh
20	Roop Singh		,,	Balbir Singh
21	Balbir Singh		,,	Kanwar Singh
22	Kanwar Singh		better compencation.	Ratan Singh
23	Ratan Singh	82192 49495	,,	Rakesh Sharma
	Rakesh Sharma	70185-87403		

Place:

Date: 21/9/19

21/9/19 PAWTAH NH

सचिव
ग्रा0 प0: .....
वि0ख0, शिलाई, जिला सिरमौर (हि0प्र0)

ग्राम पंचायत कांडो-भटनोल

5812

PUBLIC CONSULTATION

PORJECT NAME: Up-gradation to 2-lane/2-lane with paved shoulders for Paonta Sahib - Gumma section of from Km 0.000 to Km 97.000 of NH 707 in the state of Himachal Pradesh

Meeting Location: Village: भटनोल **Tehsil:** शिलाई **District:** सिरमौर

Sr. No.	Name of Participants	Contact Details	Issue Raised	Signature
	Deep Ram	8580748974	सड़क अला बननी चाहिए मुआजा उचित मिलना चाहिए गद्दा कटिंग हो पिछे दीवाल लगनी चाहिए।	
	Subhash	7807126113	सड़क सबल बननी चाहिए मुआवजा अधिक मिलना चाहिए दुर्घ कटिंग ~~कोई~~ आवश्यक्ता हुगी वाहे कटिंग के उपर	
	Mnesh	8219048224	सड़क सबल बननी चाहिए मुआवजा उचित मिलना चाहिए पक्का कटिंग कि आवश्यक्ता होवे	
	नमाया सिंह	8894431556	सड़क बननी चाहिए	नमाया सिंह
	सुन्दर सिंह	9805924041	—	
	धर्मी सिंह	98168795 45		धर्मी सिंह
	गुलाब सिंह प्रधान	9805169143		गुलाब सिंह
	इन्दर सिंह	9805572355		इन्दर सिंह
	Rakesh Sharma	70185-87403		

Place: Kande Bhatnol-
Date: 21.09.2019

CEN Sarahan 21/9/19 CEN Paonta NH

President G.P. Kande Bhatnol Dev. Block Shillai 21/9/2019

शिरीकाली

PUBLIC CONSULTATION 21/9/19 dt-21.01.2019

PORJECT NAME: Up-gradation to 2-lane/2-lane with paved shoulders for Paonta Sahib - Gumma section of from Km 0.000 to Km 97.000 of NH 707 in the state of Himachal Pradesh

Meeting Location: Village: Srikyani **Tehsil:** Shillai **District:** Sirmaur

Sr. No.	Name of Participants	Contact Details	Issue Raised	Signature
1	भगवानसिंह चौहान	7807902519	मेरे विचार अनुसार यह सड़क जल्दी बननी चाहिए तथा सड़क के लिए अच्छी सामग्री का प्रयोग किया जाना चाहिए। कटिंग के दौरान जो पत्थर व मिट्टी को उनकी निजी जमीन में न डालें तथा उसे किसी खड्ड में डालें ताकि नुकसान न हो कच्ची जगह छिड़ी दीवारें लगे तथा और कटाव न हो यह सुनिश्चित किया जाए।	Bhagwan Singh
2.	अमर सिंह चौहान	9816729201	मेरा सुझाव यह है कि उक्त सड़क के निर्माण में अच्छी सामग्री का प्रयोग और जिन जमीदारों की मालकियत भूमि रोड में जाएगी उन्हें उचित मुआवजा दिया जाए,	अमर सिंह
3.	जगत सिंह	9805315873.	मेरा सुझाव है कि जिन जमीदारों की भूमि सड़क में जाएगी उनको मुआवजा दिया जाए।	जगत सिंह
6.	Rakesh Sharma	70185-87403	रोड की मिट्टी एक साइड में फेंकी जाए।	

Place: G.P. Srikyani
Date:

21/9/19
Pawtam

हस्ताक्षर Anita
दिनांक 21/9/19

श्री रीचपारी

PUBLIC CONSULTATION 21/9/19

Date- 21.09.2019

PORJECT NAME: Up-gradation to 2-lane/2-lane with paved shoulders for Paonta Sahib - Gumma section of from Km 0.000 to Km 97.000 of NH 707 in the state of Himachal Pradesh

Meeting Location: Village: Sri kyan **Tehsil:** Shillai **District:** Sirmaur

Sr. No.	Name of Participants	Contact Details	Issue Raised	Signature
1	Gutha Logan			x
	उमिला			उमिला
	सुनीता देवी			सुनीता देवी
	निक्कु राम	8894995997	रोड बननी चाहिये	निक्कु राम
	दलीप सिंह	9816125208	" " "	दलीप सिंह
	कुलदीप	9805320713		
	जालम सिंह	9816196045	रोड बनना चाहिये	जालम सिंह
	भरत	9805438411	" " " "	भरत
	विक्रम सिंह	8278781705	रोड बनना चाहिए	Vikram singh
	Gopal	8894575277		Gopal
	Chatter Singh	9805872260	State light होनी चाहिए	Chatter Singh
	Kuldeep Chauhan	7807268371	" "	Kuldeep

Place: Gram Panchayat - Sri kyan
Date: 21.9.2019.

हस्ताक्षर... Anil
दिनांक 21/9/19

शिरी कचारी

5815

PUBLIC CONSULTATION 21/9/19

PORJECT NAME: Up-gradation to 2-lane/2-lane with paved shoulders for Paonta Sahib - Gumma section of from Km 0.000 to Km 97.000 of NH 707 in the state of Himachal Pradesh

Meeting Location: Village: **Tehsil:** **District:**

Sr. No.	Name of Participants	Contact Details	Issue Raised	Signature
	भड्डू राम	9418226894.	सड़क बननी चाहिए और सड़क के बिछे हिवाल भी लगानी चाहिए	Bhajuram
	रविन्द्र चौहन	8219945218	सड़क बननी चाहिए।	
	वीरु राम	9805615826		
	विनोद	8894365864	सड़क बननी चाहिए।	Vinod
	रणजान सिंह	7018267655	साइन बोर्ड लगने चाहिए	
				Anita 21/9/19

Place:

Date:

ग्राम पंचायत प्राबिल

5816

PUBLIC CONSULTATION

Date-21.09.2019

PORJECT NAME: Up-gradation to 2-lane/2-lane with paved shoulders for Paonta Sahib - Gumma section of from Km 0.000 to Km 97.000 of NH 707 in the state of Himachal Pradesh

Meeting Location: Village: Drabril		**Tehsil:** Ronhat	**District:** Sirmaur	
Sr. No.	**Name of Participants**	**Contact Details**	**Issue Raised**	**Signature**
1	Satpal	9805788110	Two lane Road is very important	
2.	जीत सिंह			
3	[illegible]	9805715681	ye	
4	Satpal Ram	9805129487	जिन लोगो की इस रोड मे जमीन कटती है उनको इसका मुआवजा भी मिलना चाहिए OR रोड की अच्छी बनानी चाहिए	
5	Bhagat Ram	9816851404	do	
	लोटाराम	9816938314	do	
	[illegible]	8894126962 - 6		
	[illegible]	7018049860	do	

Place: Drabril

Date: 21.09.2019

Dinesh - 8627941417

Rakesh Sharma 9805878470, 7018581463

प्रधान ग्राम पंचायत प्राबिल • वि.ख. शिलाई, जिला सिरमौर •

हस्ताक्षर .....

दिनांक .....

GP - Jhakando GP (Village - Dharoura, Jheekande)
GP - Sakoli GP. (Kharkan)

PUBLIC CONSULTATION

dt 21.09.2019

PORJECT NAME: Up-gradation to 2-lane/2-lane with paved shoulders for Paonta Sahib - Gumma section of from Km 0.000 to Km 97.000 of NH 707 in the state of Himachal Pradesh

Meeting Location: Village: **Tehsil:** **District:**

Sr. No.	Name of Participants	Contact Details	Issue Raised	Signature
1	सुरेन्द्र सिंह	98169-22827	सड़क बननी चाहिए और जमीन की उचित मुआवजा मिलना चाहिए	सुरेन्द्र सिंह
2	पुलाप सिंह	8894628228	do	
3	दलीप सिंह	9805350399	do	
4	Narayan Singh	9805169764	Yes	
5	Vijay Singh	9805942969	Road कहां से कहां तक बनाया जाना है, पूरा ब्यौरा, जमीन जायदाद (सड़क) में आती है वहां की मुआवजा मिलना चाहिए।	
6	अनिल सिंह	8894408505	do	
7.	मोहन सिंह	88949.25427	do	
8.	सन्त राम	8219894790	— do —	
9.				

Place: GP-
Date: 21/9/19

CEG Sharma 21/9/19

Gram. Panchayat - Bohar (Village - Rohana, Gumma)

5818

PUBLIC CONSULTATION

PORJECT NAME: Up-gradation to 2-lane/2-lane with paved shoulders for Paonta Sahib - Gumma section of from Km 0.000 to Km 97.000 of NH 707 in the state of Himachal Pradesh

Meeting Location: Village:			**Tehsil:**	**District:**
Sr. No.	**Name of Participants**	**Contact Details**	**Issue Raised**	**Signature**
	Deya Singh Bhardwaj	9816182437	NH. सड़क बननी चाहिए जो पर लोगों ने पहले मकान बनाये है. यदि यह ऐक्वायर किए जाते है उसका कम्पन से शेडान होना चाहिए Speed Breaker स्कूल के आस पास बनने चाहिए सोलर लाईट भी होनी चाहिए सड़क आज की Date में NH के हालात खस्ता है सड़क को पक्की बाजार पोरगान गुम्मा में होनी चाहिए टोलेट भी बाजार के आस पास बनने चाहिए।	DSBhardwaj
	~~Sukhwinder~~ सुरतसिंह	9816640730		
	मनोहर			मनोहर
	RSJ	98166-69864	NH 707 पर बाजार के अन्दर चबका टायल व Lights का होना जरूरी है! पानी Storage का अच्छा प्रबन्ध होने चाहिए गर्मी शेष बन्दी जगीन में सिंचाई की व्यवस्था उपलब्ध हो।	RSJ

Place: Gumma.
Date: 21.09.2019.

Soshan 21/9/19

21/09/19 Rathwa NH

ग्राम पंचायत बोहर • जि. ख. चौपाल, जिला शिमला •

हस्ताक्षर
दिनांक 21-9-2019

Gram. Panchayat - Bohar at Gemo 21/9/19

5819

PUBLIC CONSULTATION Village - (Rohana, Gama)

PORJECT NAME: Up-gradation to 2-lane/2-lane with paved shoulders for Paonta Sahib - Gumma section of from Km 0.000 to Km 97.000 of NH 707 in the state of Himachal Pradesh

Meeting Location: Village:			**Tehsil:**	**District:**
Sr. No.	**Name of Participants**	**Contact Details**	**Issue Raised**	**Signature**
	Mohisam Sharma	9862680 63	road has been constructed for public purpose	
	Ramsingh	9816634856	"	
	Hari Ram	9805267781	"	
	Narayan Sharma	8894598648	"	
	Hira Singh	8580981953		
	कमला सेखान	8628860453	रोड़ बनी चाहिये · वाड मेम्बर बीगरोली	
	Sant Ram	8894485159		
	Laig Ram	9805878895		
	Deep Sharma	9816770983	NH Need proper drainge and proper lighting system. It should be up graded to two lane structure as during Apple season great crowd & vehicles produce Nuicarey in market	

Place: Gema (GP- Bohar)

Date: 21.09.2019.

19/9/19 patwari NH

Bohar Gram Panchayat - 21/9/19

5820

PUBLIC CONSULTATION

(Village - Rohana & Gumma)

PORJECT NAME: Up-gradation to 2-lane/2-lane with paved shoulders for Paonta Sahib - Gumma section of from Km 0.000 to Km 97.000 of NH 707 in the state of Himachal Pradesh

Meeting Location: Village:			**Tehsil:**	**District:**
Sr. No.	**Name of Participants**	**Contact Details**	**Issue Raised**	**Signature**
	Rattu Ram.	9816484858	Compensation to the land Owner as per market rate	Rattu Ram.
	[illegible]	9816507474	रोड का काम अच्छी करने की अनुमति हो नाली बाद में कोई परेशानी न हो (illegible)	[illegible]
	Baldev Singh	98168-91371	गुम्मा बाजार में सड़क की लम्बाई 1811.22 मीटर बढ़ाई जाना चाहिए ताकि दुकान सड़क से नीचे न रहे। Kindly Regrade Market side Road.	Baldev
	Rakesh Sharma			Rakesh

Place: Gumma
Date: 21/9/19

CEA Soshang 21/9/19

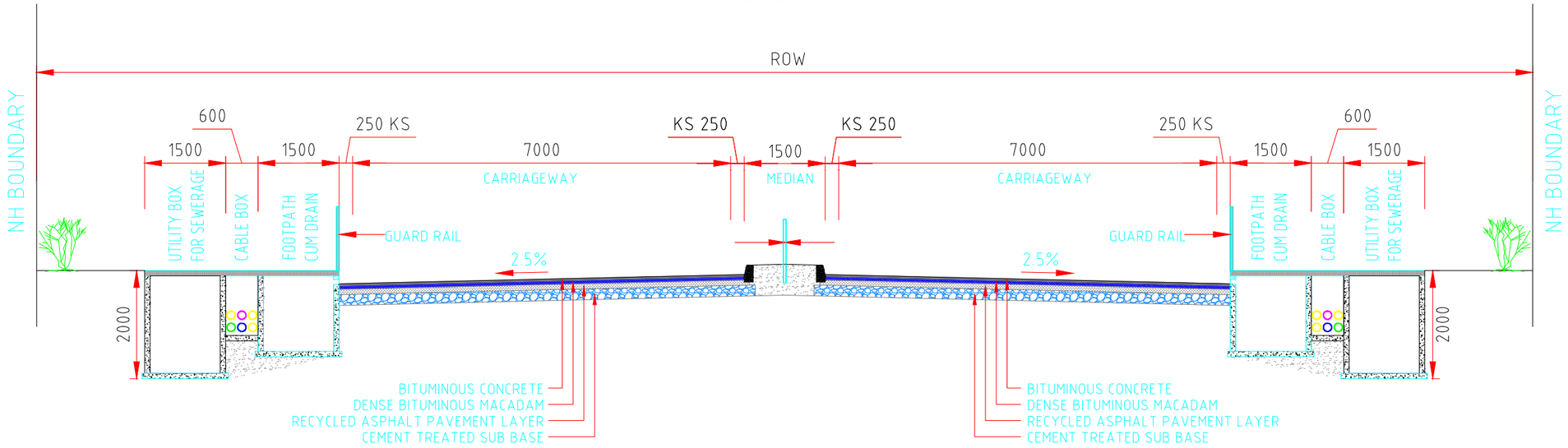
NH. Sub-divisar Kafota 21/9

जोगिन्द्र सिंह

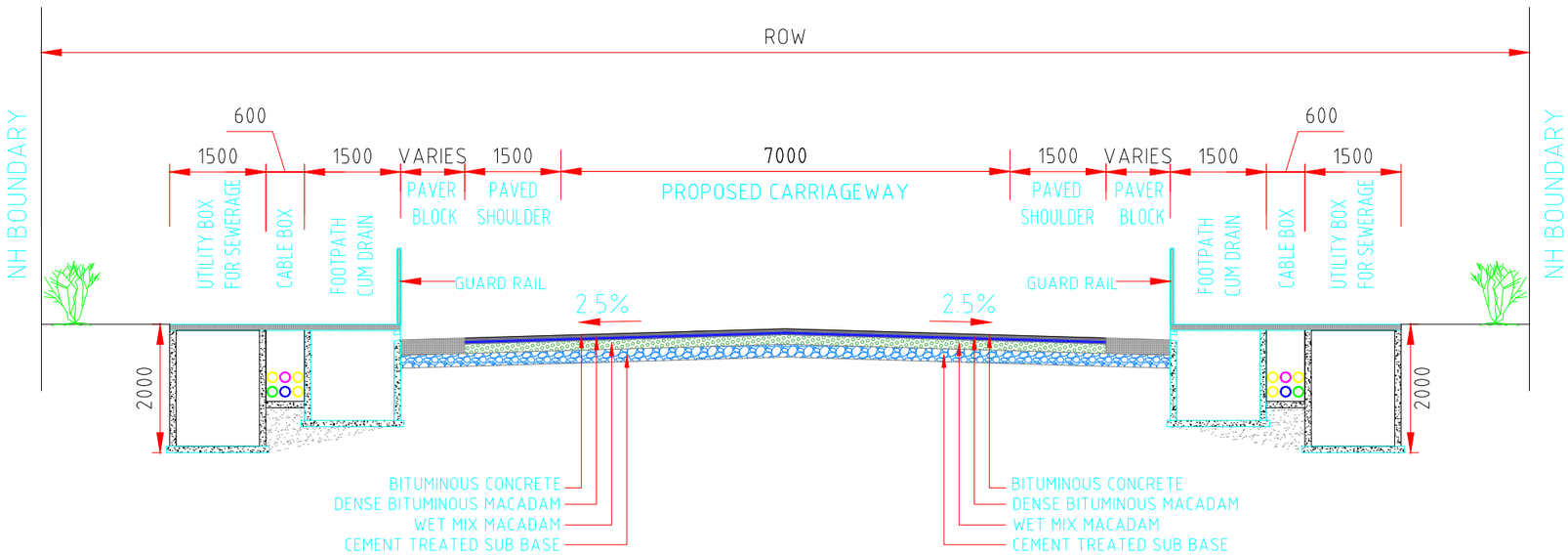
Sharma 21/09/19 Patwari NH

ग्राम पंचायत बोहर, तहसील पौंटा, जिला सिरमौर

हस्ताक्षर [illegible]
दिनांक 21/9/2019



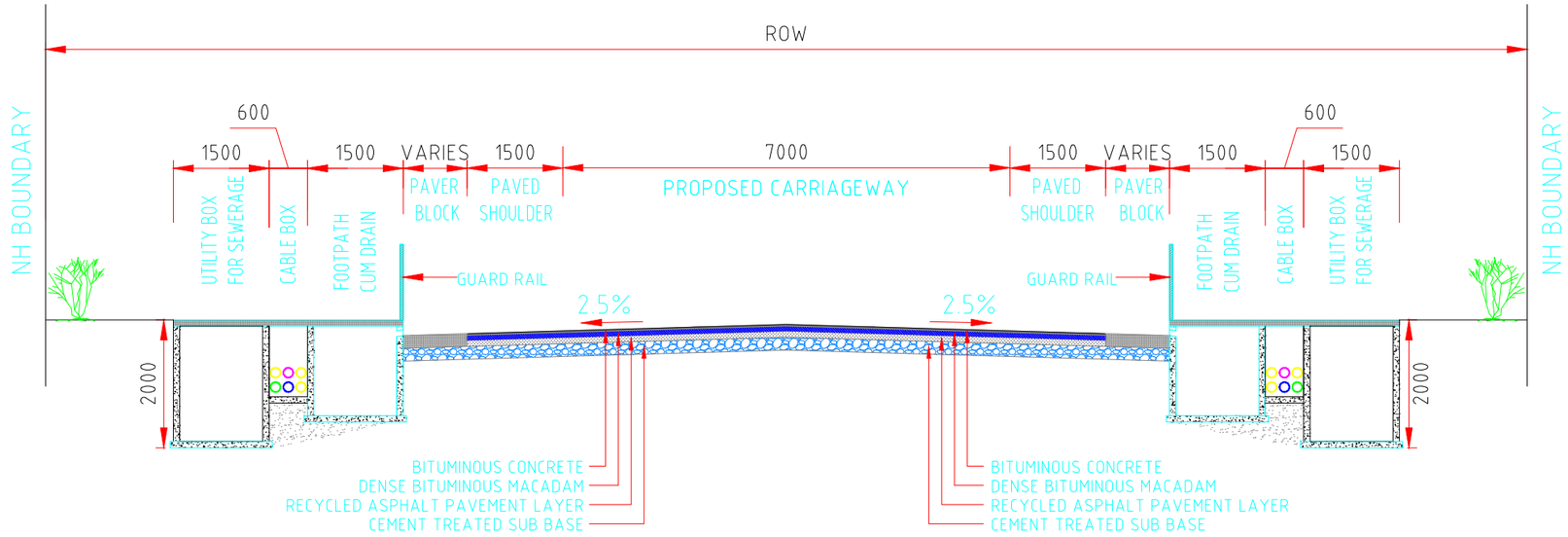
TYPE 1- TYPICAL CROSS SECTION FOR 4-LANE DIVIDED CARRIAGEWAY IN BUILT-UP AREA WITH RAP AT URBAN AREA OF PAONTA SAHIB



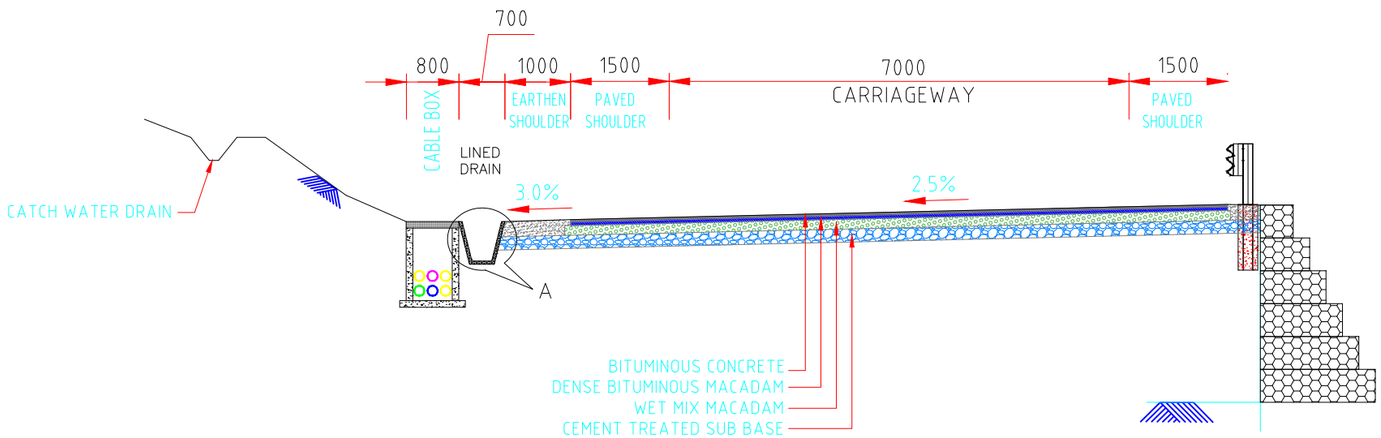
TYPE 2 - TYPICAL CROSS SECTION BUILTUP AREA IN ROLLING TERRAIN

NOTE :- 1. ALL DIMENSIONS ARE IN MM

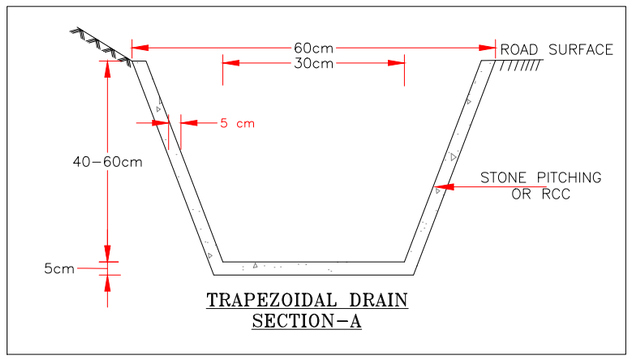
REV	DATE	DESCRIPTION	SCALE:-	CLIENT:-	DESIGN CONSULTANT:-	PROJECT:-	TITLE:	DRAWING NO.:- CEG/D46/TCS- 01			
			NOT TO SCALE	Ministry of Road Transport & Highways (GOVERNMENT OF INDIA)	CONSULTING ENGINEERS GROUP LTD An ISO 9001 : 2008 Company CEG Tower, B - 11 (G), Malviya Industrial Area, JAIPUR- 302017 (Rajasthan) INDIA Tel : +91 141 2751801/ 802/803/804, Fax : 2751806 Email: ceg@cegindia.com, URL: www.cegindia.com	CONSULTANCY SERVICES FOR PREPARATION OF DETAILED PROJECT REPORT OF PAONTA SAHIB–GUMA SECTION FROM KM 0.000 TO KM 97.000 OF NH–707 IN THE STATE OF HIMACHAL PRADESH	TYPICAL CROSS SECTION	DATE:- APRIL - 2019			
							DETAIL: TCS-1 & TCS-2	DRAWN (A) BHAGCHAND	DESIGNED (B) SIDDHARTH	CHECKED (C) SANJAY EKBOTE	APPROVED (D) PRAMOD JAIN



TYPE 2A - TYPICAL CROSS SECTION FOR BUILTUP AREA WITH RAP IN ROLLING TERRAIN



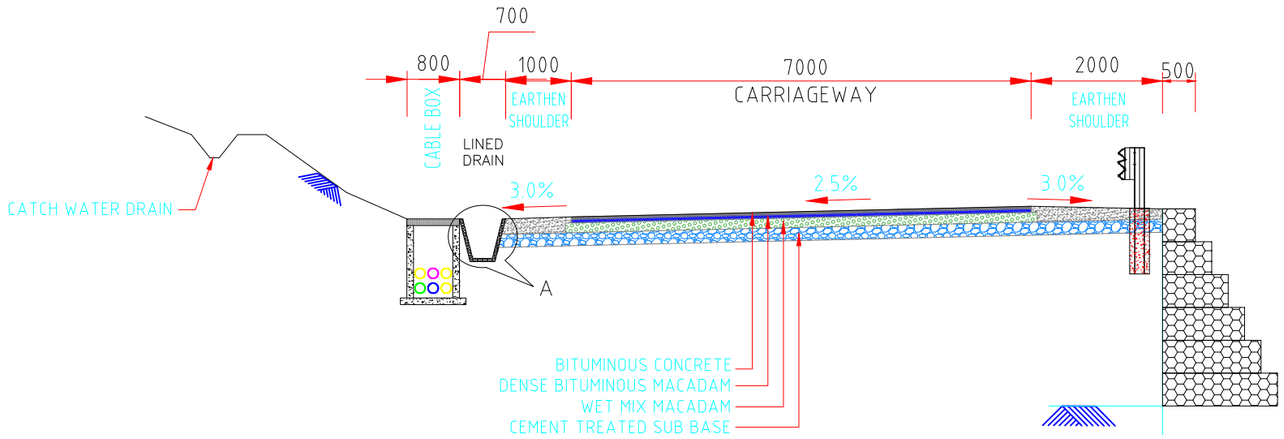
TYPE 3A- TYPICAL CROSS SECTION WITH PAVED SHOULDER ON BOTH SIDE IN OPEN COUNTRY ALONG STEEP TERRAIN



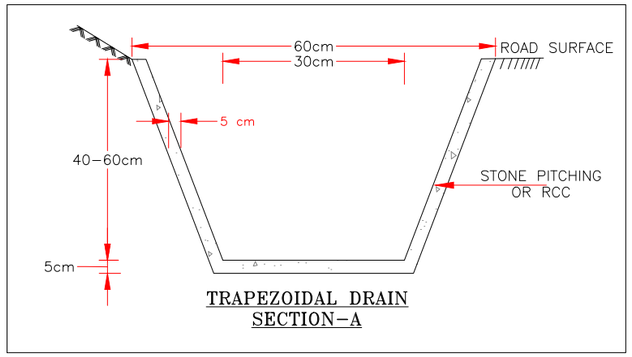
TRAPEZOIDAL DRAIN
SECTION-A

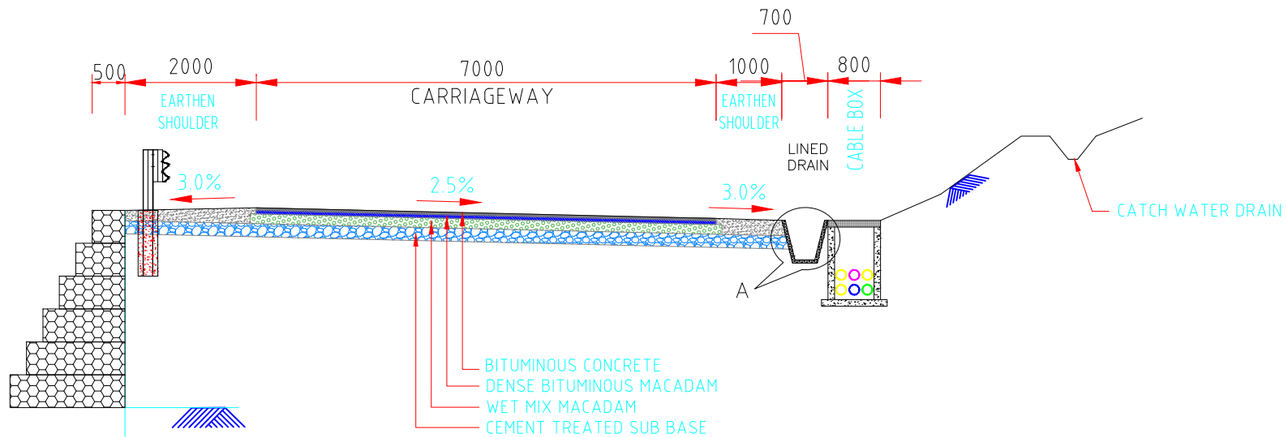
NOTE :- 1. ALL DIMENSIONS ARE IN MM
2. THE RETAINING STRUCTURE SHOWN IN THE DRAWING IS INDICATIVE AND THE SAME SHALL BE PROVIDED AS PER SCHEDULE-B AND SITE REQUIREMENT.

REV	DATE	DESCRIPTION	SCALE:-	CLIENT:-	DESIGN CONSULTANT:-	PROJECT:-	TITLE:	DRAWING NO.:- CEG/D46/TCS- 02			
			NOT TO SCALE	Ministry of Road Transport & Highways (GOVERNMENT OF INDIA)	CONSULTING ENGINEERS GROUP LTD An ISO 9001 : 2008 Company CEG Tower, B-11(G), Malviya Industrial Area, JAIPUR- 302017 (Rajasthan) INDIA Tel : +91 141 2751801/ 802/803/804, Fax : 2751806 Email: ceg@cegindia.com, URL: www.cegindia.com	CONSULTANCY SERVICES FOR PREPARATION OF DETAILED PROJECT REPORT OF PAONTA SAHIB-GUMA SECTION FROM KM 0.000 TO KM 97.000 OF NH-707 IN THE STATE OF HIMACHAL PRADESH	TYPICAL CROSS SECTION	DATE:- APRIL - 2019			
							DETAIL: TCS-2A & TCS-3A	DRAWN (A) BHAGCHAND	DESIGNED (B) SIDDHARTH	CHECKED (C) SANJAY EKBOTE	APPROVED (D) PRAMOD JAIN



TYPE 3B- TYPICAL CROSS SECTION WITH EARTHEN SHOULDER ON BOTH SIDE
IN OPEN COUNTRY ALONG STEEP TERRAIN





TYPE 3C- TYPICAL CROSS SECTION WITH EARTHEN SHOULDER ON BOTH SIDE
IN OPEN COUNTRY ALONG STEEP TERRAIN
(HILL SIDE ON RHS)

NOTE :- 1. ALL DIMENSIONS ARE IN MM
2. THE RETAINING STRUCTURE SHOWN IN THE DRAWING IS INDICATIVE AND THE SAME SHALL BE PROVIDED AS PER SCHEDULE-B AND SITE REQUIREMENT.

REV	DATE	DESCRIPTION

SCALE:- NOT TO SCALE

CLIENT:- **Ministry of Road Transport & Highways** (GOVERNMENT OF INDIA)

DESIGN CONSULTANT:-
C O N S U L T I N G
ENGINEERS GROUP LTD
An ISO 9001 : 2008 Company
CEG Tower, B - 11 (G), Malviya Industrial Area, JAIPUR- 302017 (Rajasthan) INDIA
Tel : +91 141 2751801/ 802/803/804, Fax : 2751806
Email: ceg@cegindia.com, URL: www.cegindia.com

PROJECT:- CONSULTANCY SERVICES FOR PREPARATION OF DETAILED PROJECT REPORT OF PAONTA SAHIB-GUMA SECTION FROM KM 0.000 TO KM 97.000 OF NH-707 IN THE STATE OF HIMACHAL PRADESH

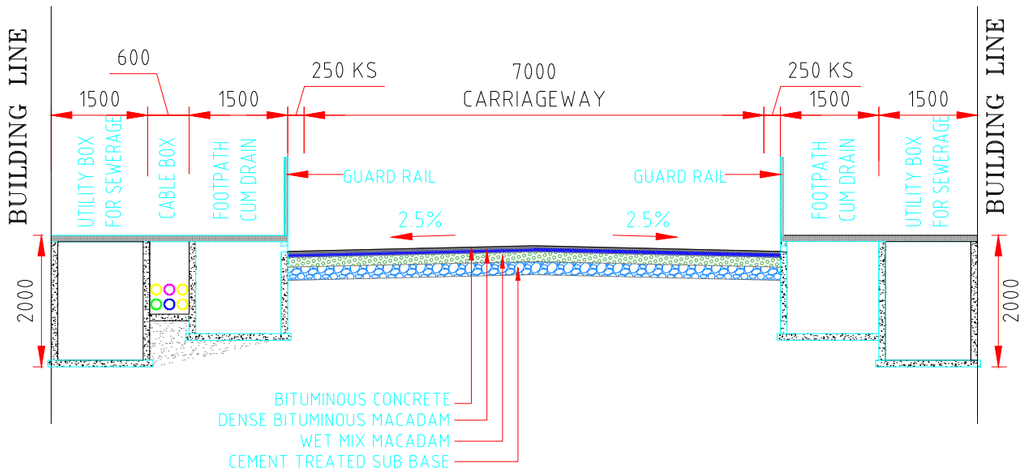
TITLE: TYPICAL CROSS SECTION

DETAIL: TCS- 3B & TCS-3C

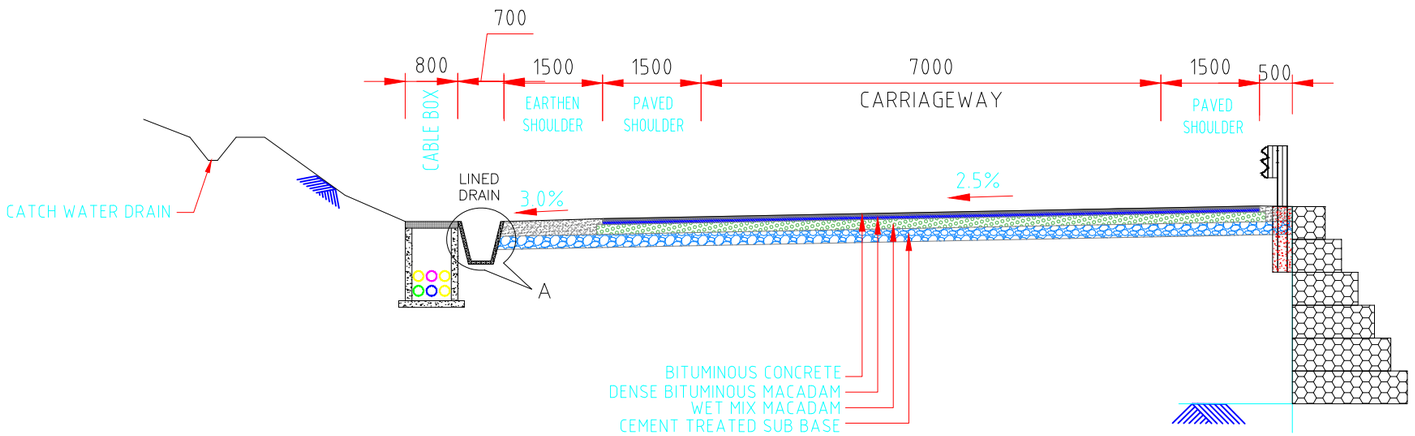
DRAWING NO.:- CEG/D46/TCS- 03

DATE:- APRIL - 2019

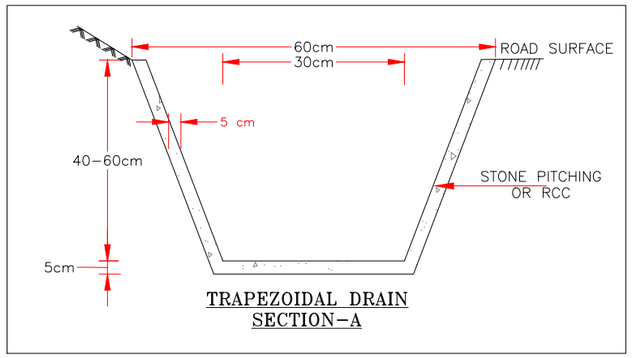
DRAWN (A)	DESIGNED (B)	CHECKED (C)	APPROVED (D)
BHAGCHAND	SIDDHARTH	SANJAY EKBOTE	PRAMOD JAIN



TYPE 4- TYPICAL CROSS SECTION FOR BUILT-UP AREA ON BOTH SIDE IN STEEP TERRAIN

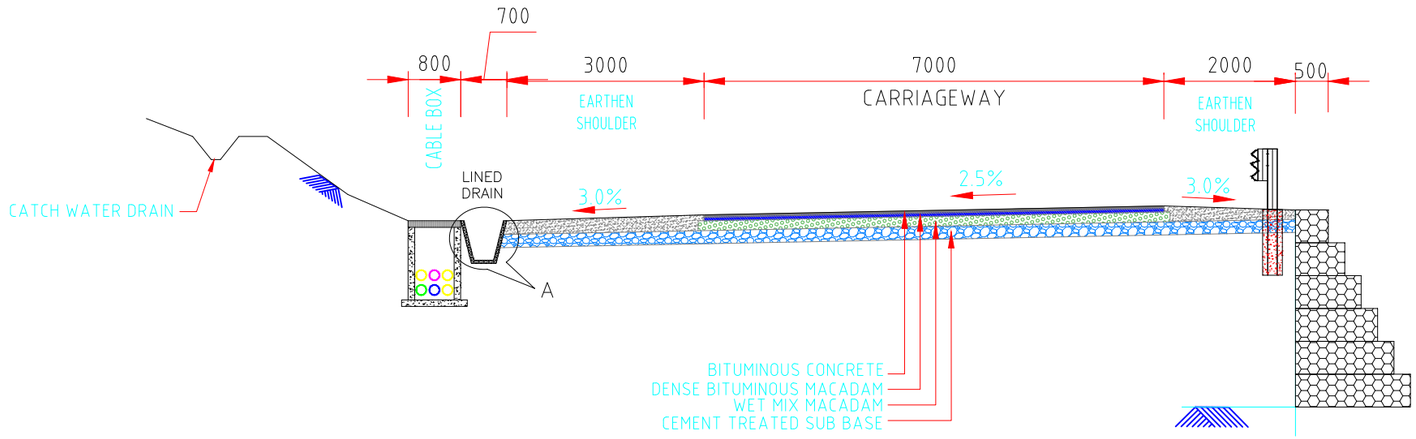


TYPE 5A - TYPICAL CROSS SECTION WITH PAVED SHOULDER ON BOTH SIDE IN LAND SLIDE ZONE

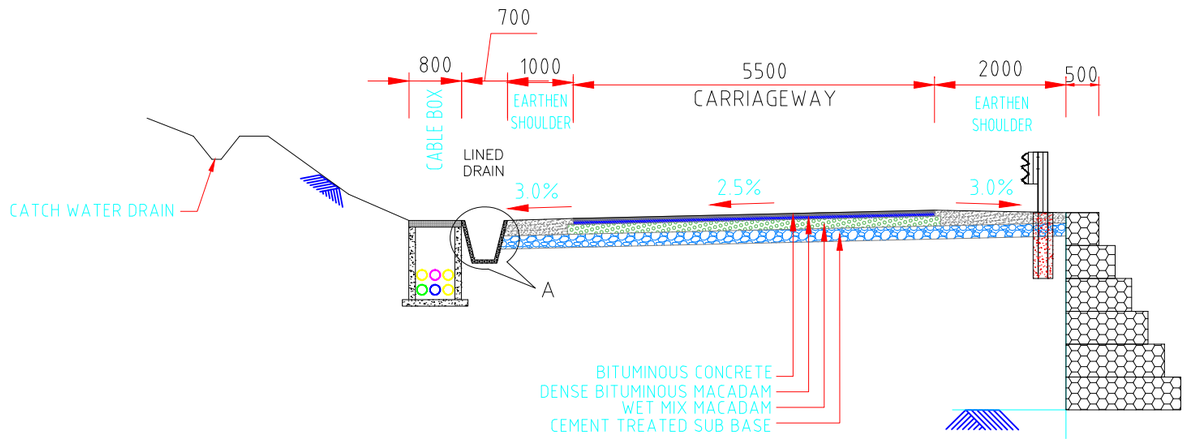


NOTE :- 1. ALL DIMENSIONS ARE IN MM
2. THE RETAINING STRUCTURE SHOWN IN THE DRAWING IS INDICATIVE AND THE SAME SHALL BE PROVIDED AS PER SCHEDULE-B AND SITE REQUIREMENT.

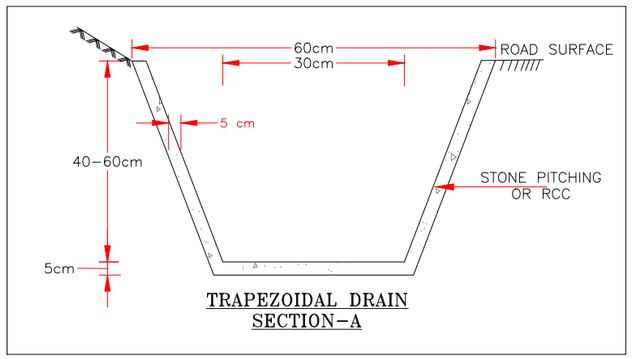
REV	DATE	DESCRIPTION	SCALE:-	CLIENT:-	DESIGN CONSULTANT:-	PROJECT:-	TITLE:	DRAWING NO.:- CEG/D46/TCS- 04			
			NOT TO SCALE	Ministry of Road Transport & Highways (GOVERNMENT OF INDIA)	CONSULTING ENGINEERS GROUP LTD An ISO 9001 : 2008 Company CEG Tower, B - 11 (G), Malviya Industrial Area, JAIPUR- 302017 (Rajasthan) INDIA Tel : +91 141 2751801/ 802/803/804, Fax : 2751806 Email: ceg@cegindia.com, URL: www.cegindia.com	CONSULTANCY SERVICES FOR PREPARATION OF DETAILED PROJECT REPORT OF PAONTA SAHIB-GUMA SECTION FROM KM 0.000 TO KM 97.000 OF NH-707 IN THE STATE OF HIMACHAL PRADESH	TYPICAL CROSS SECTION	DATE:- APRIL - 2019			
							DETAIL: TCS- 4 & TCS- 5A	DRAWN (A) BHAGCHAND	DESIGNED (B) SIDDHARTH	CHECKED (C) SANJAY EKBOTE	APPROVED (D) PRAMOD JAIN



TYPE 5B - TYPICAL CROSS SECTION WITH EARTHEN SHOULDER ON BOTH SIDE IN LAND SLIDE ZONE



TYPE 6A- TYPICAL CROSS SECTION FOR INTERMEDIATE LANE IN OPEN COUNTRY ALONG STEEP TERRAIN



NOTE :- 1. ALL DIMENSIONS ARE IN MM
2. THE RETAINING STRUCTURE SHOWN IN THE DRAWING IS INDICATIVE AND THE SAME SHALL BE PROVIDED AS PER SCHEDULE-B AND SITE REQUIREMENT.

REV	DATE	DESCRIPTION

SCALE:- NOT TO SCALE

CLIENT:- **Ministry of Road Transport & Highways** (GOVERNMENT OF INDIA)

DESIGN CONSULTANT:- CONSULTING ENGINEERS GROUP LTD
An ISO 9001 : 2008 Company
CEG Tower, B - 11 (G), Malviya Industrial Area, JAIPUR- 302017 (Rajasthan) INDIA
Tel : +91 141 2751801/ 802/803/804, Fax : 2751806
Email: ceg@cegindia.com, URL: www.cegindia.com

PROJECT:- CONSULTANCY SERVICES FOR PREPARATION OF DETAILED PROJECT REPORT OF PAONTA SAHIB–GUMA SECTION FROM KM 0.000 TO KM 97.000 OF NH–707 IN THE STATE OF HIMACHAL PRADESH

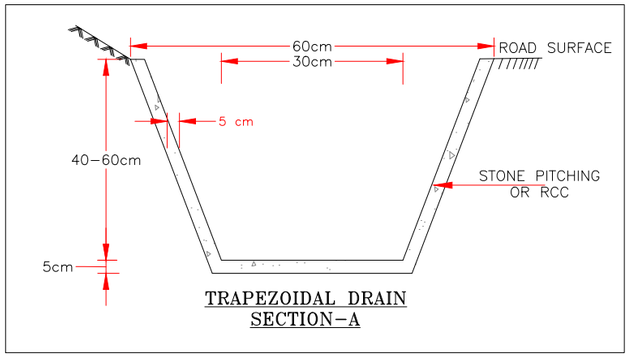
TITLE: TYPICAL CROSS SECTION

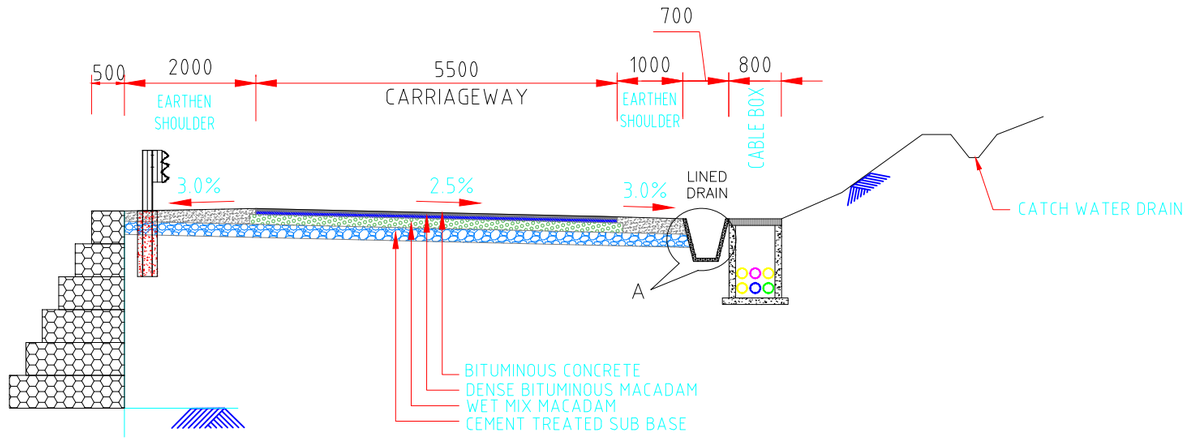
DETAIL: TCS- 5B & TCS- 6A

DRAWING NO.:- CEG/D46/TCS- 05

DATE:- APRIL - 2019

DRAWN (A)	DESIGNED (B)	CHECKED (C)	APPROVED (D)
BHAGCHAND	SIDDHARTH	SANJAY EKBOTE	PRAMOD JAIN





TYPE 6B- TYPICAL CROSS SECTION FOR INTERMEDIATE LANE
IN OPEN COUNTRY ALONG STEEP TERRAIN
(HILL SIDE ON RHS)

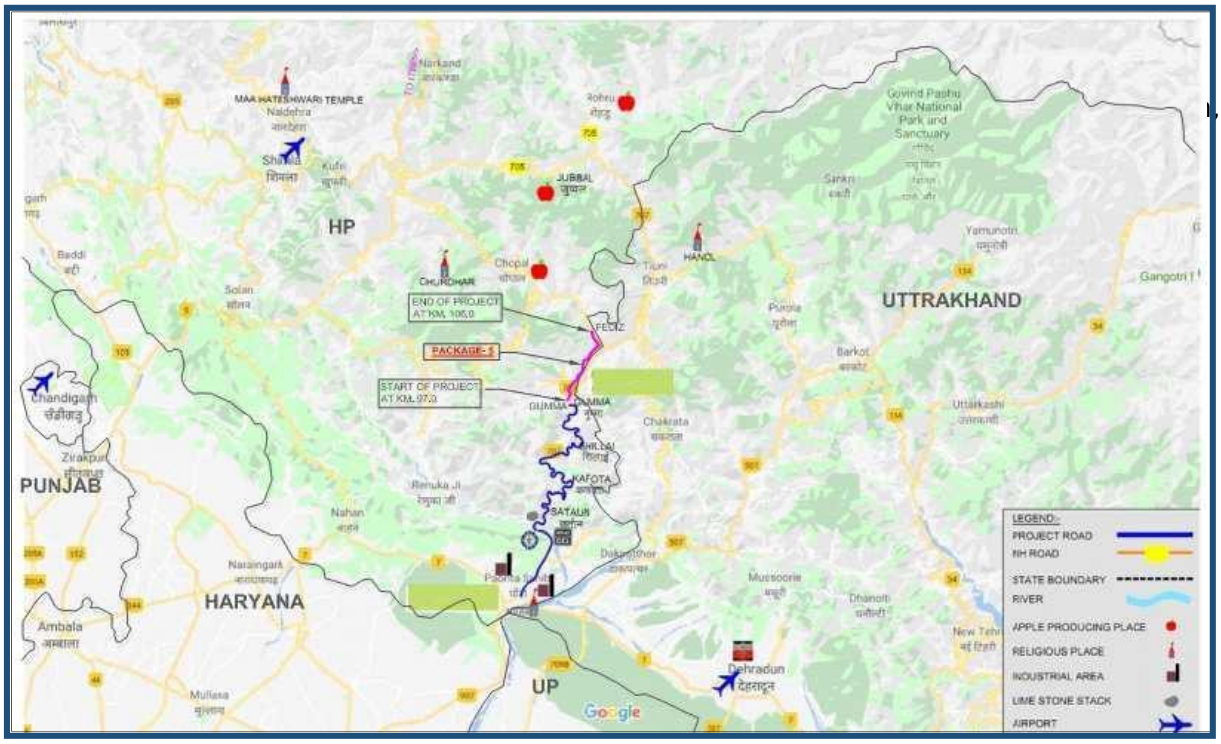
NOTE :- 1. ALL DIMENSIONS ARE IN MM
2. THE RETAINING STRUCTURE SHOWN IN THE DRAWING IS INDICATIVE AND THE SAME SHALL BE PROVIDED AS PER SCHEDULE-B AND SITE REQUIREMENT.

REV	DATE	DESCRIPTION	SCALE:-	CLIENT:-	DESIGN CONSULTANT:-	PROJECT:-	TITLE:	DRAWING NO.:- CEG/D46/TCS- 06			
			NOT TO SCALE	**Ministry of Road Transport & Highways** (GOVERNMENT OF INDIA)	CONSULTING ENGINEERS GROUP LTD An ISO 9001 : 2008 Company CEG Tower, B - 11 (G), Malviya Industrial Area, JAIPUR- 302017 (Rajasthan) INDIA Tel : +91 141 2751801/ 802/803/804, Fax : 2751806 Email: ceg@cegindia.com, URL: www.cegindia.com	CONSULTANCY SERVICES FOR PREPARATION OF DETAILED PROJECT REPORT OF PAONTA SAHIB–GUMA SECTION FROM KM 0.000 TO KM 97.000 OF NH–707 IN THE STATE OF HIMACHAL PRADESH	TYPICAL CROSS SECTION	DATE:- APRIL - 2019			
							DETAIL: TCS- 6B	DRAWN (A) BHAGCHAND	DESIGNED (B) SIDDHARTH	CHECKED (C) SANJAY EKBOTE	APPROVED (D) PRAMOD JAIN

C E A

"REHABILITATION AND UPGRADATION TO INTERMEDIATE LANE OF PAONTA SAHIB RAJBAN SHILLAI MEENUS HATKOTI ROAD PORTION BETWEEN KM 97+000 TO 106+120 (GUMMA TO FEDIZ)(DESIGN RD 94+900 TO 103+550) OF NH 707 IN THE STATE OF HIMACHAL PRADESH"

ENVIRONMENTAL IMPACT ASSESSMENT (EIA)



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1. INTRODUCTION

1.1 BACKGROUND

1.1.1 General

The Ministry of Road Transport & Highways, Govt. Of India has taken up massive development work of existing National Highways in the country. Up gradation, improvement, widening and strengthening of main and important arteries of National Highway network is taken up under National Highway Development Programme (NHDP). Also substantial length of single lane or intermediate lane National Highways (non-NHDP roads) has already been taken up for improvement in one scheme or the other. The Ministry of Road Transport and Highways with an aim to improve interconnectivity has under taken development of many single or intermediate lane National Highways to 2 lane/2 lane with hard shoulders configuration under National Highways Interconnectivity Project (NHIIP) aided by the World Bank. The total number of Project Roads under this scheme is 33. One of these roads is Paonta- Gumma–Fediz section of NH-707 Km 96+180 to Km. 104+890 in Himachal Pradesh. The Ministry of Road Transport and Highways (MORT&H), has already got prepared DPR of Paonta-Sahib-Gumma Section (Km 0.000 to Km 96.180), for Rehabilitation and Upgrading to 2 Lane/2 Lane with paved shoulder configuration and strengthening.

Further a length of about 9 Kms from Gumma to Fediz (Km.96+180 to Km.104+890) has also been proposed to be upgraded under GNHP (Green National Highway Project). M/s Consulting Engineers Associates, Panchkula have been assigned the consultancy job for preparation of DPR of this section (Gumma to Fediz) on 08th March 2019 by the Executive Engineer NH-Division, Nahan. The survey work at site has been completed with a planning to complete the independent activities and submit the DPR in a month's time.

The main objective of the consultancy service is to establish the technical, environmental, social, economic and financial viability of the project and prepare detailed project reports for rehabilitation and upgrading of the existing single lane road to intermediate lane configuration.

1.1.2 Importance of Project

This project road is a part of the main road which continues from RD 96+180 near village Gumma on New NH 707 and ends at Fediz Km 104+890 on existing NH-707 which further leads to state capital Shimla via NH-705 (Rohru-Hatkoti-Theog).The complete length of this NH-707 has either been improved/upgraded or proposed to be improved/upgraded by MORT&H except this section i.e. from Gumma to Fediz. For the optimum utilization of the Highway (NH-707), this missing section (Km 96+180 to Km 104+890 of NH-707) needs to be upgraded to National Highway Standards. This complete NH project road is a vital life line for the people living in interiors of Shimla District. Many villages having substantial population will be directly benefitted from this project road besides many other small habitats living in close vicinity of this road since it is the only highway connecting the area for commutation of people. People of this area grow cash crops like Ginger, Potato, Cauliflower, Peas, Capsicum, Tomato, Walnuts etc. Rajmah, Kulth, Maize & Urd lentils of this area are known for their taste. All these produces are transported through this Highway for marketing at New Delhi,

Chandigarh and Panchkula. Presently approx.500 trucks per day ply on this highway to transport apple crop from Rohru, Jubbal and Chopal to New Delhi via Yamuna Nagar. On upgradation of this Highway it is expected that the number of trucks will increase as the part of the traffic presently using Solan-Parwanoo route will use this Highway being the shortest route to New Delhi via Yamuna Nagar.

Lime stone mines are situated in this area between (Sataun) Km 18/0 to (Bohrad) Km 48/0. This Highway is used to transport the lime stone to various industrial units all over India. On up gradation there will be a lot of saving in running and maintenance of these vehicles, ultimately leading to saving of fuel, transportation cost, time and environment. The project road will further improve the connectivity for tourists visiting various famous destinations like much famous Chanshal Valley Himalayan Raid de, pilgrimage places like Churdhar, Maa Hateshwari Temple, famous Mahasu Temple at Hanol and leading to much famous Chardham yatra.

This highway is important and strategic from defence point of view as it connects the other routes leading to Indo-China Border. Defence Research and Development Organization has their unit/base at RD 12/0 near Rajban on this highway. This highway will become a boon for the migratory Gaddi Communities who migrate to lower heights during winter. About 71 industrial units are operational along this highway and 17 more industries are expected to become operational along this highway in near future. Planning of setting up a major cement plant at Gumma is in pipeline. This highway will facilitate the transportation of goods to and fro from these industries. This highway will ease the movement of traffic to Yamunotri, Gangotri etc. With up gradation of this highway the most backward Chopal area of district Shimla will also get benefitted by way of improvement of their social and economic life. From the above it can be concluded that this project is of utmost importance as it will have direct impact on life of a common man and boost the industries of this area, ultimately leading to multi-dimensional growth of the area and raising the socioeconomic standards of people along this highway.

The map showing connectivity to different important states and roads is shown below:

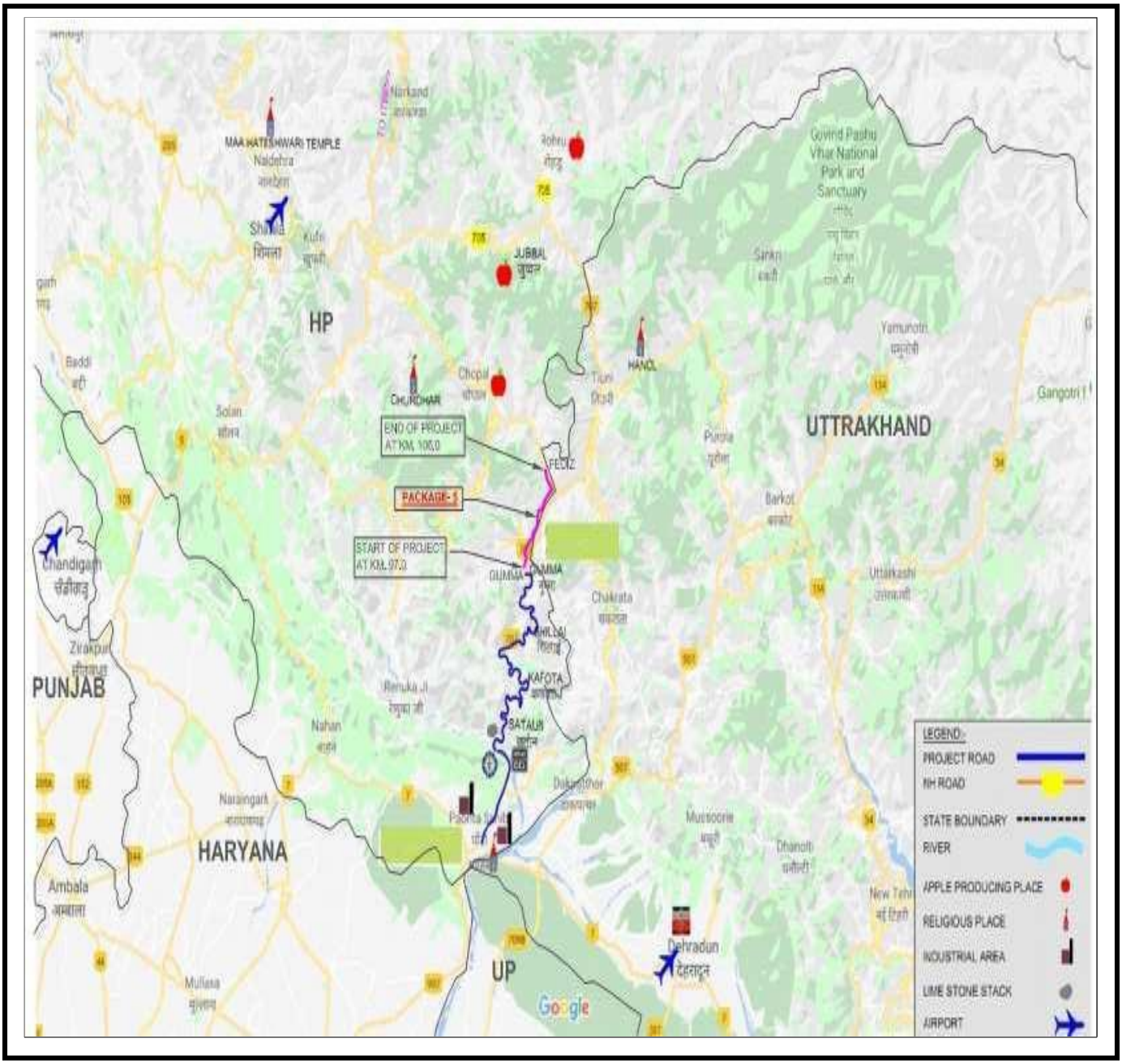

Figure 1-1 Connectivity of Different Important States and Roads

1.2 THE STUDY METHODOLOGY

The process of Environmental Impact Assessment is a detailed process, which requires considering of all aspects of environment which may be impacted due to the proposed project.

EIA process mainly consists of following broad steps:

- **i.** Reconnaissance & Study of Background information on project
- **ii.** Screening Report Preparation
- **iii.** Survey Part-1 (Baseline Survey or Baseline Data Collection).
- **iv.** Survey Part-2 (socio-economic survey)
- **v.** Analysis of practical Impacts.
- **vi.** Meeting with concerned Stakeholders
- **vii.** Mitigation Measures Adoption
- **viii.** Environment Management Plan

1.2.1 Environmental Assessment

The latitude and longitude of project road are as follows:

- **a)** Start Point: Gumma (30°48'1.21"N, 77°43'41.23"E)
- **b)** End Point: Fediz (30°50'59.34"N, 77°44'40.37"E)

The existing highway alignment passes through North Eastern part of Himachal Pradesh. The Existing project road predominantly passes through 8.650 km mountainous terrain. The project influence area is predominantly a mountain with deep valleys lying between ranges of varying elevations, longest length from west to east 77 km & maximum width from north to south are 80 km. This part has undulated topography of varying thicknesses of overburden consisting of reddish lateritic soil mixed with boulders of up to 1 m in diameter. The slope is well covered by trees. The uphill slope has good catchment, and the rainwater generally drains out through the natural streams on both flanks of the slide.

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1.3 STRUCTURE OF THE OF REPORT

The report has been divided into 8 chapters including this Introduction as follows:

1. **Chapter 2: Project Description**. In this section Project road details are described from an environmental perspective with salient features such as ROW, roadway improvements proposed, cross sections, cross drainage structures etc.
2. **Chapter 3: Policy, Legal and Institutional** Framework within which the project is set. The major stakeholder departments of the State and Central Governments with their specific roles along with applicable Acts and Laws are described. At the end of this chapter clearance requirements are presented.
3. **Chapter 4: Baseline Environmental** situation includes the meteorological baseline, components of the biophysical and natural environments.
4. **Chapter 5: Public Consultation** was carried out during the project preparation stage.
5. **Chapter 6: Analysis** of Alternatives considered during the project design. The minimization of environmental impacts by considering design alternatives.
6. **Chapter 7: Potential** Environmental Impacts on each of the environmental components due to the proposed project.
7. **Chapter 8: Mitigation**, Avoidance and Enhancement Measures for the adverse impacts identified in earlier section. This section forms the basis for Environmental Management Plan.

2. DESCRIPTION OF THE PROJECT

2.1 GENERAL DESCRIPTION

Total length of the NH-707 is 161 km., out of which 117 km is in the state of Himachal Pradesh and remaining 42.13 km is in the state of Uttarakhand. This NH takes off from junction with NH-707 at Badripur Chowk near Paonta Sahib and terminate at Hatkoti in Himachal Pradesh. The first section from Km.0.00 to Km.104+890 (Paonta to Fediz) traverses in Himachal Pradesh and it enters Uttarakhand at Fediz. After traversing for a length of about 42.13 Kms in Uttarakhand it re-enters Himachal Pradesh at Snail. Further about 12.75 Km length of this NH from Snail to Hatkoti is in Himachal Pradesh. This highway connects built-up areas like Rajban, Sataun, Kafota, Shillai, Meenus, Gumma, Antrauli & Fediz in Himachal Pradesh, Tuini in Uttrakhand and Hatkoti in Himachal Pradesh. The detailed project report for widening and upgradation of section Km.0.00 to Km.96.180 (Design Ch. 94+900) stands already submitted to the MORT&H/World Bank. The section from Km.0.00 to Km.94+900 is proposed to be got executed in four packages. To upgrade the missing link from Gumma (Design Ch. Km.94+900) to Fediz (Design Km. 103+550), the DPR is being prepared now. The existing bridge on river Tons at Fediz falling in the present project is being constructed under NH (O). The existing section of this NH in Uttarakhand has been repaired and strengthened. Further the section from Snail to Hatkoti in Himachal Pradesh state has also been strengthened by MORT&H. This (Design Ch. km 94+900 to 103+550) is the only stretch left out which is neither widened nor strengthened. DPR of this remaining stretch i.e. from Gumma to Fediz km 94+900 to km 103+550 (Design Chainage) is now proposed to be prepared.

This report deals with the section from Gumma to. Fediz (Existing Chainage Km.97+000 to Km.106+120 and Design Chainage km 94+900 to 103+550 Km.). This section of NH- 707, ends at RD 103+550 which falls just before Fediz bridge which is under construction on Tons river/HP-UK Border. Total length of the project road as per existing Chainage is 9+120 and passes entirely through Himachal Pradesh.

2.2 ENGINEERING DESIGNS AND IMPROVEMENT PROPOSALS

2.2.1 Design Standards [Including Geometric Design and Regulation of Access]

a) Introduction

The design standards for the project highway have been adopted after reviewing the relevant latest Indian Roads Congress Codes (IRC) such as IRC: SP:48-1998 Hill Road Manual, IRC :37:2018, IRC:78 - 2014 and international standards such as AASHTO etc.

The various design elements and factors, which govern the functioning of any highway, can be broadly grouped under the following:

- Geometric Design Standards;

- Terrain classification & Design Speed
- Cross sectional Element
- Horizontal Alignment
- Vertical Alignment
- Standards for Interchange elements
- Subsurface drainage
- Design parameters for Bridges and Cross drainage Structures

The basic design philosophy is based on the consideration of providing suitable alignment, cross-sectional layout, geometrics, safety and access control to cater to the fast and uninterrupted movement of through traffic. It is also based on the consideration that the widening proposals will be adjusted in the existing ROW to the extent feasible, involving minimum land acquisition for curves, intersections, improvement of geometrics, realignment and bypasses, uprooting of trees, dismantling of structures/ buildings and maximum utilization of existing road / structures.

b) Terrain Classification & Design Speed

The design speed is the guiding criteria for correlating features such as sight distance, curvature and super elevation upon which the safe operation of the vehicle depends.

The terrain in the project stretch is virtually all mountainous with the general cross slope of the country remaining more than 25 % and less than 60%.

The ruling design speed considered in this project is 50 Km/Hr as per hill road manual.

c) Right Of Way (Row):

The available Right of Way (ROW) along the existing alignment of the project highway varies from 16.0 m to 25.0 m.

2.2.2 CROSS SECTIONAL ELEMENTS

The details of cross sectional elements adopted for the project road are as per Hill road Manual: IRC:SP:48

2.2.2.1 Carriageway: -

The carriageway width in open and built-up areas as well shall be 5.5 m.

2.2.2.2 Shoulders:-

As the project road is proposed as intermediate lane configuration so the earthen shoulder on BHS have been provided.

2.2.2.3 Cross fall

- The cross fall on straight sections of road carriageway, paved shoulders and paved portion of median shall be 2- 2.5 percent for thin bituminous surface and 2.0 percent for high bituminous surface.
- The cross fall shall be unidirectional for either side carriageway sloping towards the shoulder in straight reaches and towards the lower edge on horizontal curves. The camber on the existing road shall be modified to unidirectional cross fall.
- The cross fall for earthen shoulders on straight portions shall be at least 0.5 percent steeper than the slope of the pavement and paved shoulder subject to a minimum of 3.0 percent. On super elevated sections, the earthen portion of the shoulder shall have the same cross fall as the pavement.

2.2.2.4 Typical Cross-Sections

Broadly typical cross-sections of Project Highway for various locations are given as below:

Typical cross sections (TCS) for various configurations proposed in built up area and open country area in rolling/hilly terrain are shown on pages from 16 to 19. Improvement proposal along with type of cross-section are given below:

Table 2-1 Type of cross-section

S. No.	Configuration of road	Type of Cross - Section	Existing Chainage		Proposed Chainage		Design Length (km)	Terrain
			from	to	from	to		
1	Intermedia te-lane carriageway	TCS-1 to TCS-13	96+180	104+890	94+900	103+550	8.650	Steep

Table 2-2 The Typical cross section

S. No.	Configuration of road	Type of Cross - Section	Design Chainage		Main carriage way width (m)	Earthen shoulders	Design Length (km)	Remarks
			from	to				
1	Inter-lane carriageway	TCS-1 TO TCS 13	94+900	103+550	5.5	As per TCS	8.650	--

Complete Plan and Profile along with TCS have been provided in separate volume of Drawings.

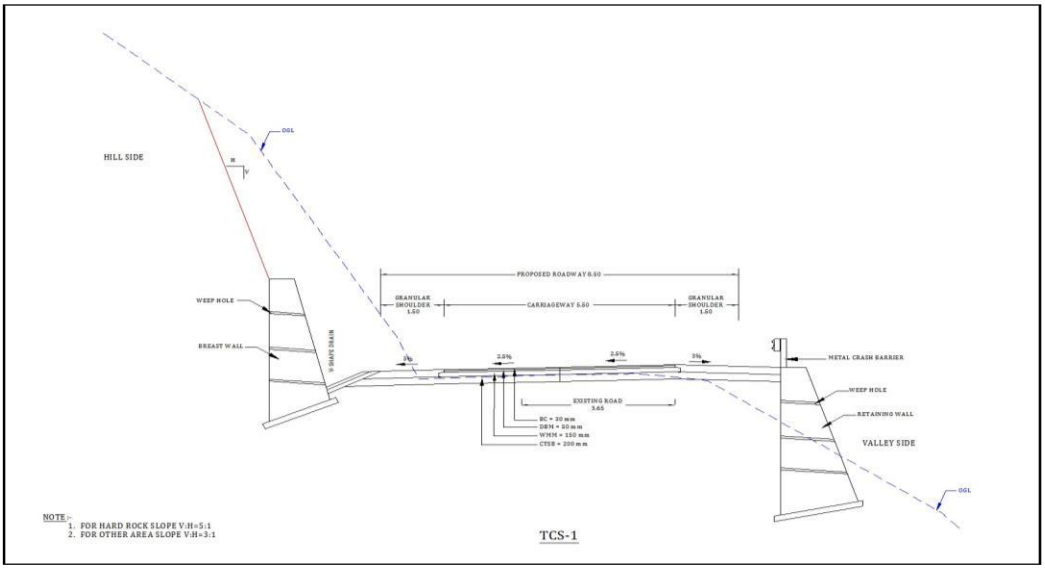

Figure 2-1 TCS for Proposed intermediate lane new construction

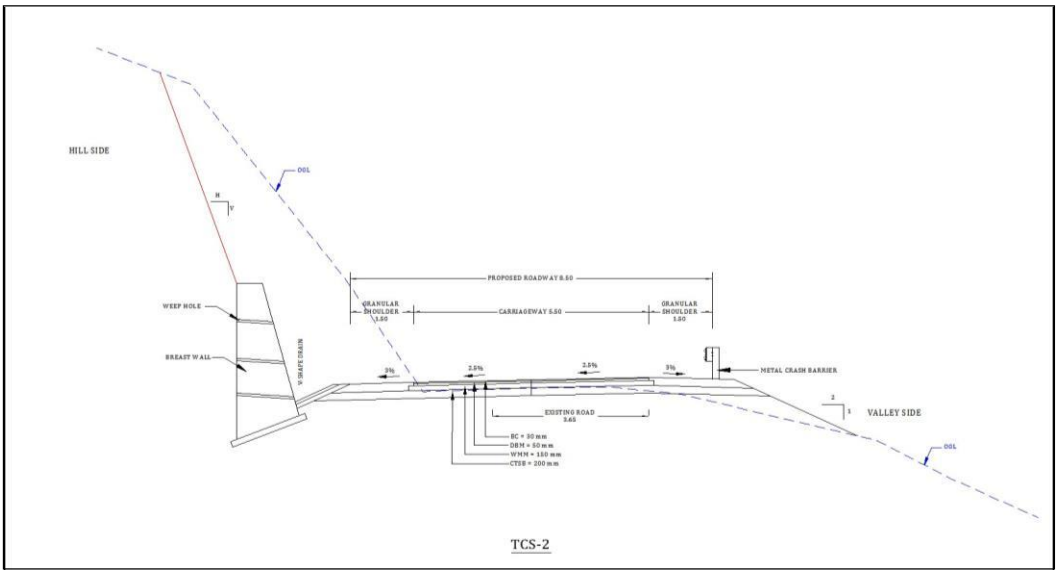

Figure 2-2 TCS for Proposed intermediate lane new construction

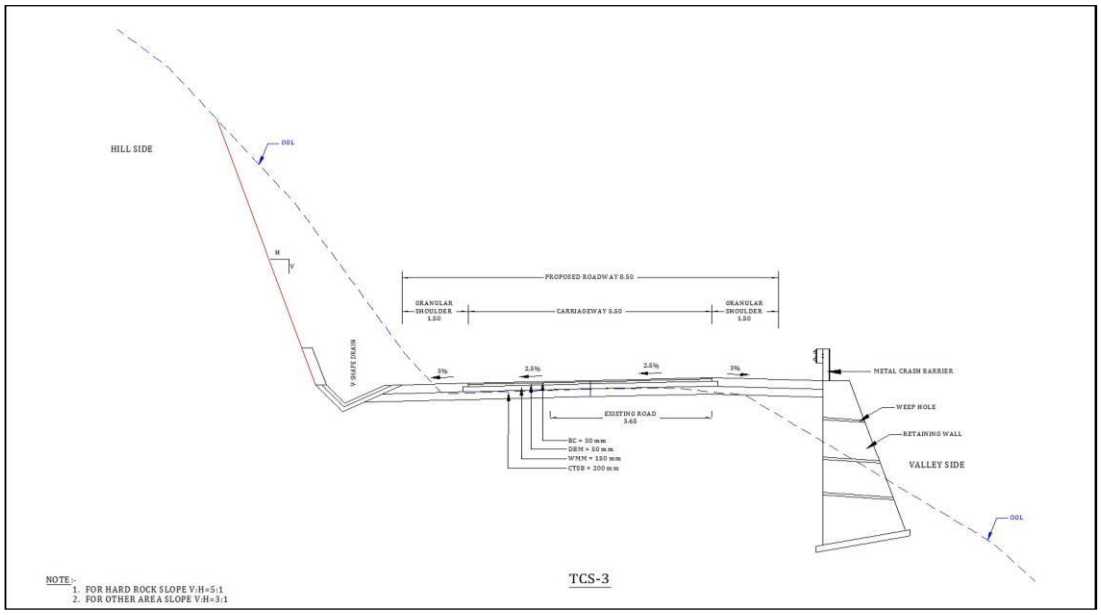

Figure 2-3 TCS for Proposed intermediate lane new construction

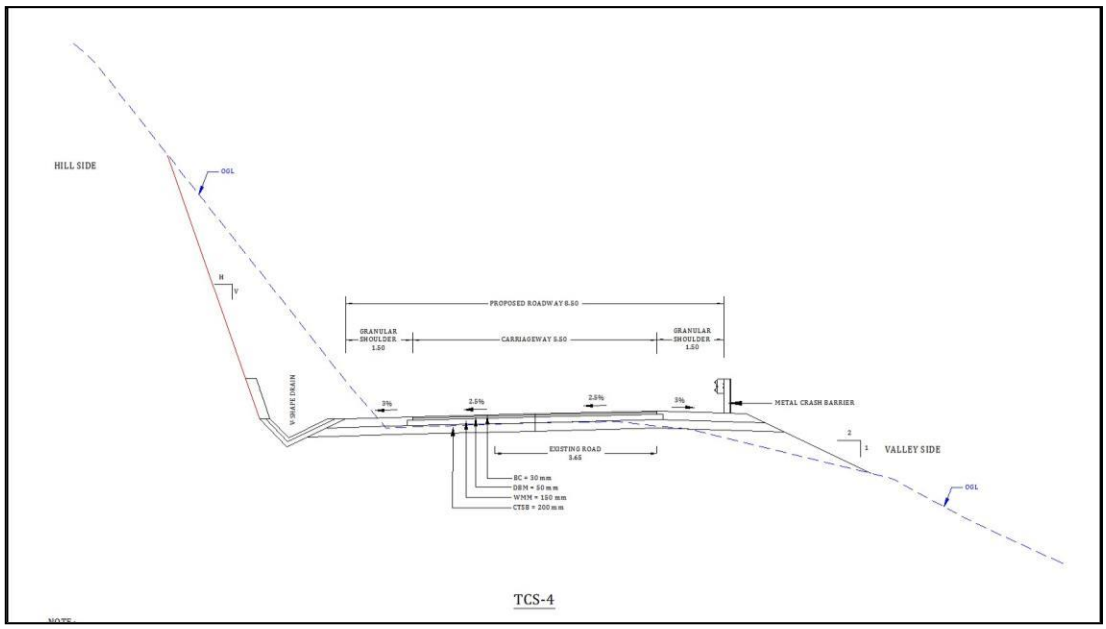

Figure 2-4 TCS for Proposed intermediate lane new construction

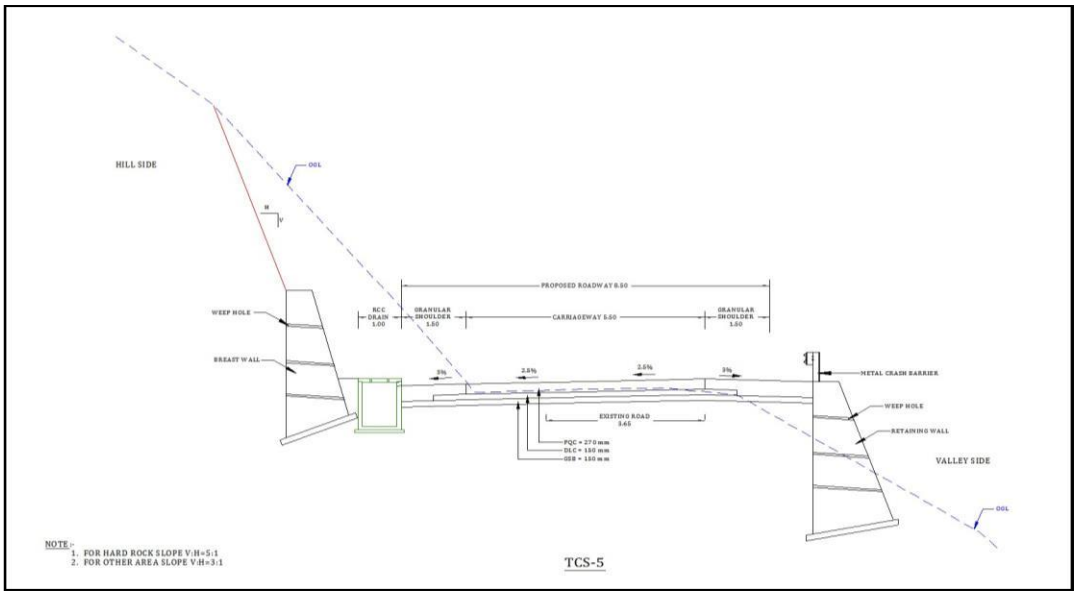

Figure 2-5 TCS for Proposed intermediate lane new construction

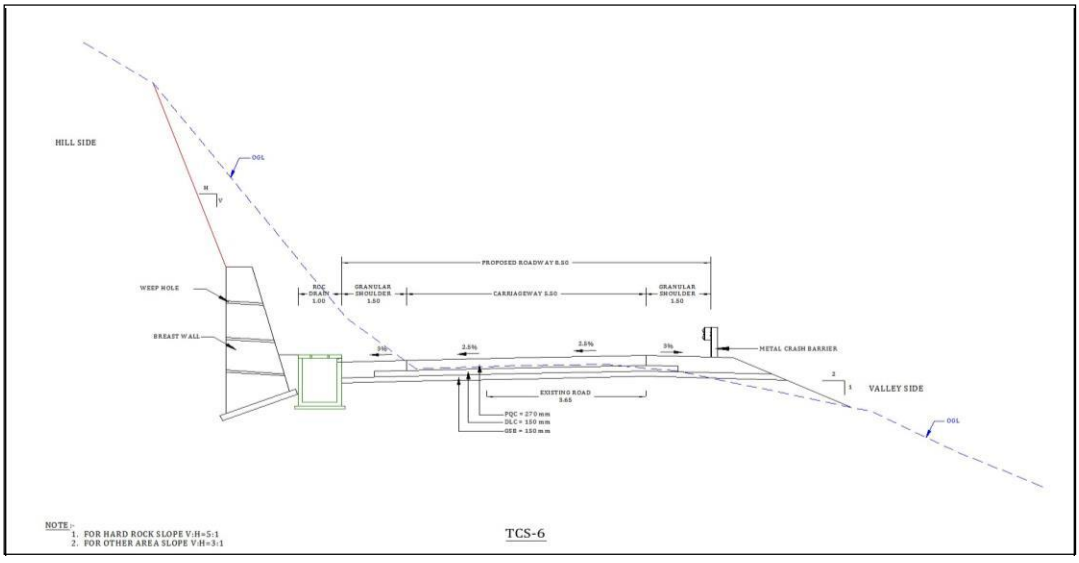

Figure 2-6 TCS for Proposed intermediate lane new construction

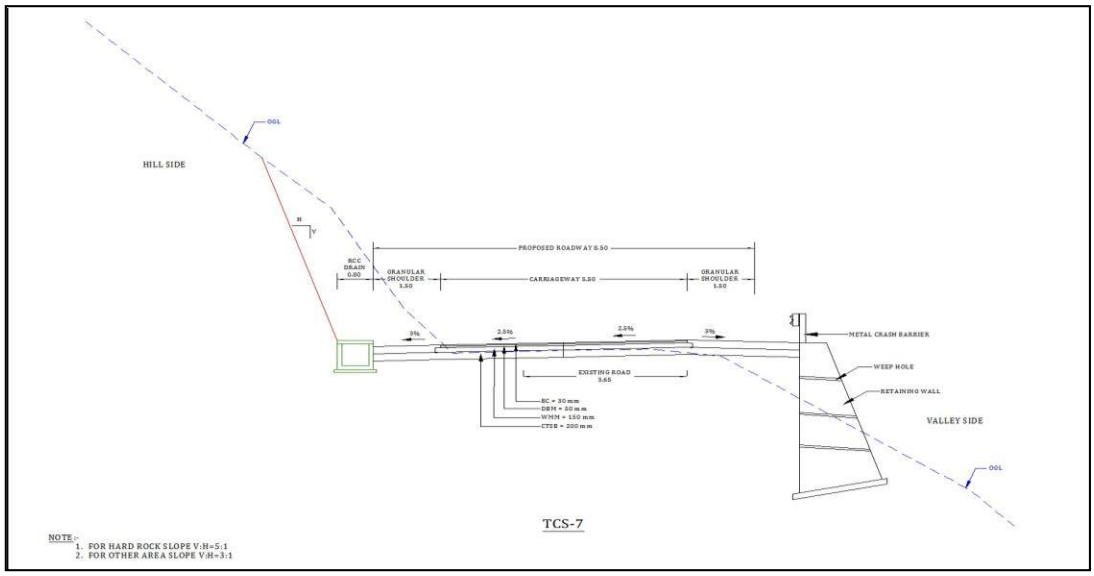

Figure 2-7 TCS for Proposed intermediate lane new construction

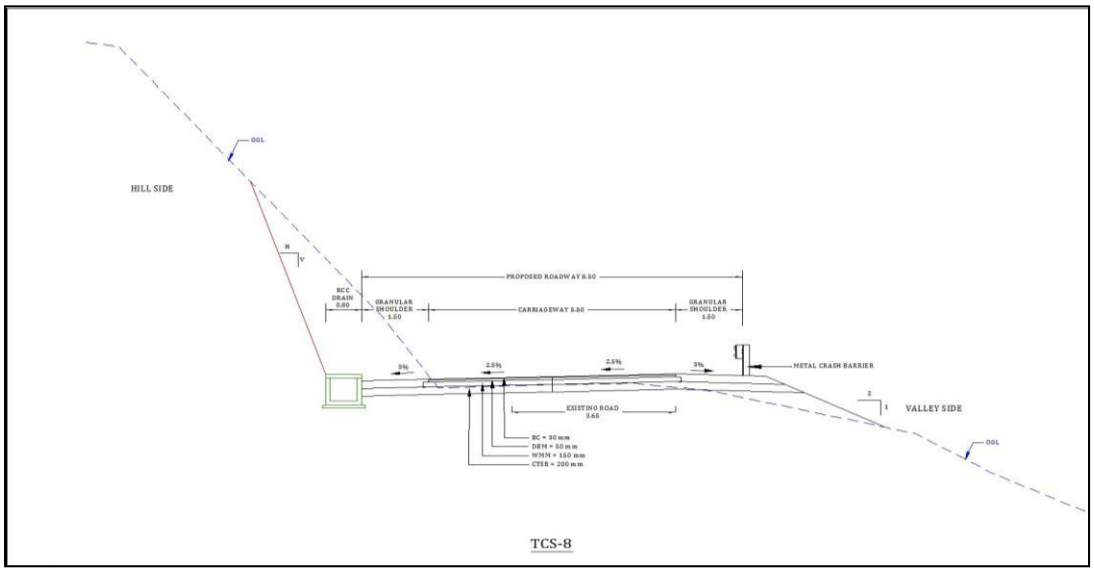

Figure 2-8 TCS for Proposed intermediate lane new construction

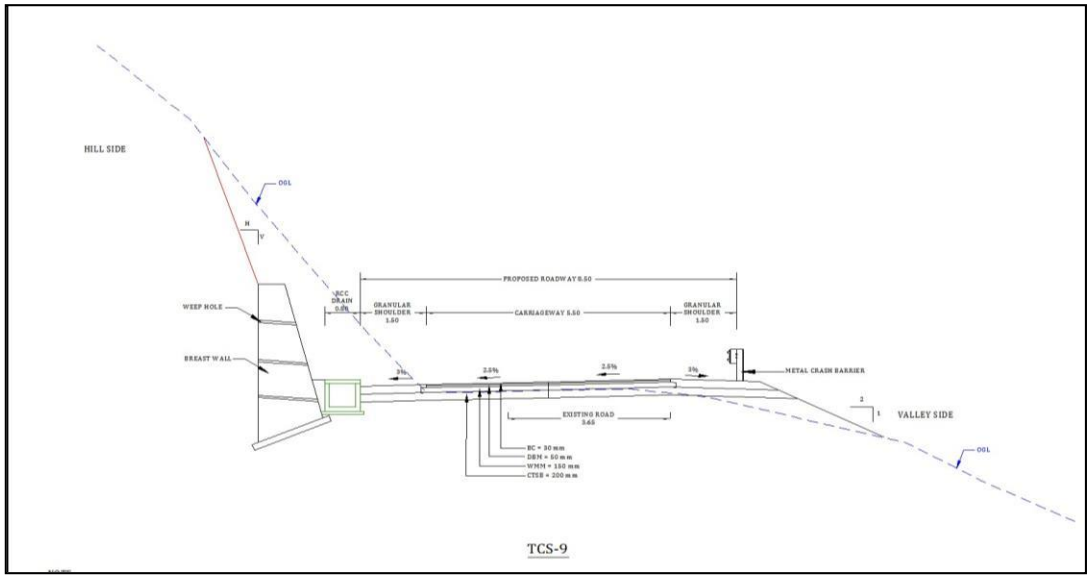

Figure 2-9 TCS for Proposed intermediate lane new construction

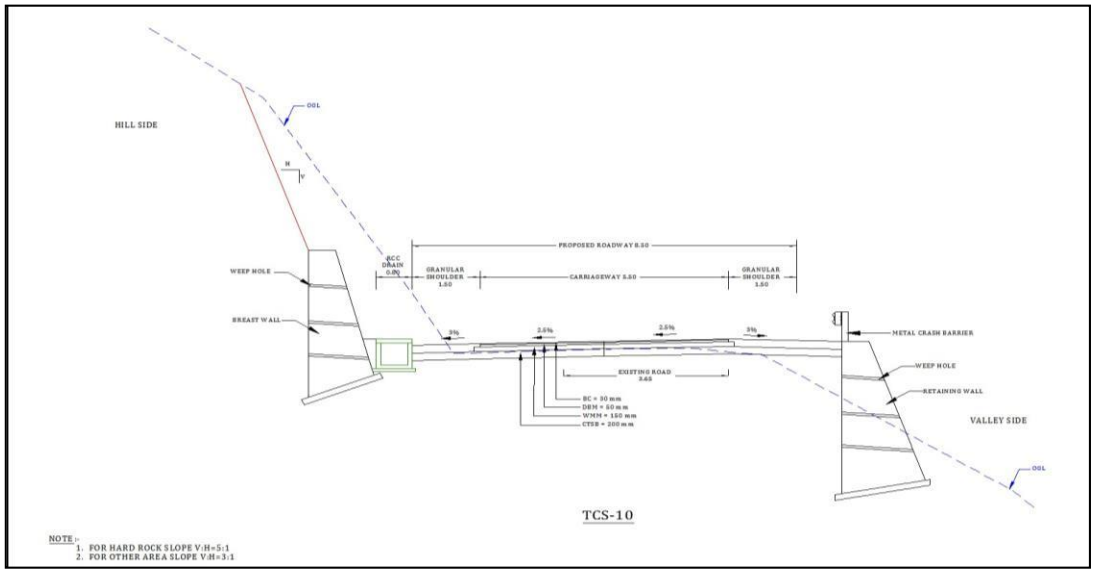

Figure 2-10 TCS for Proposed intermediate lane new construction

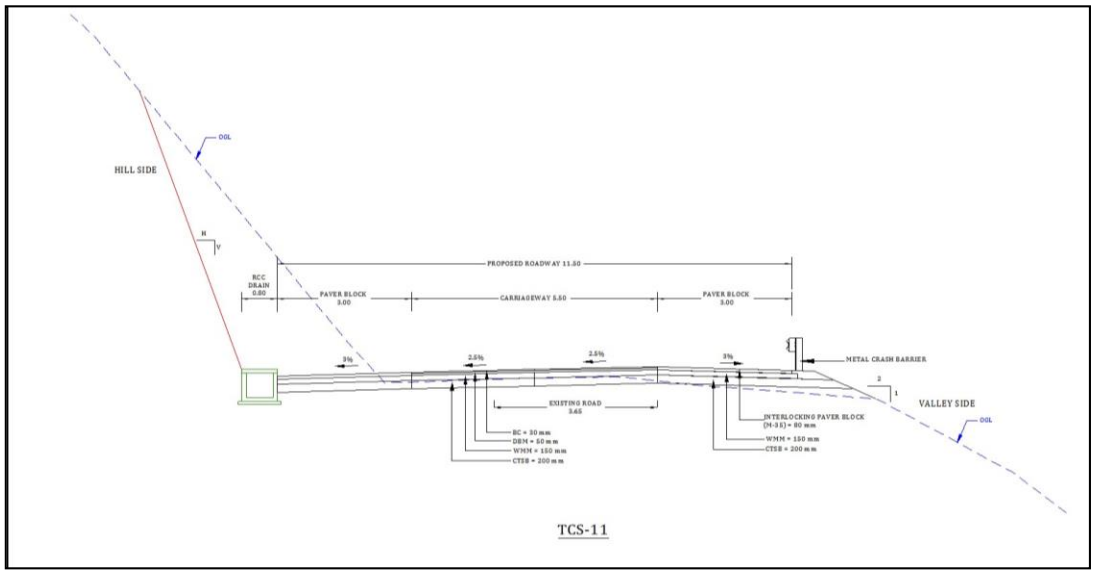

Figure 2-11 TCS for Proposed intermediate lane new construction

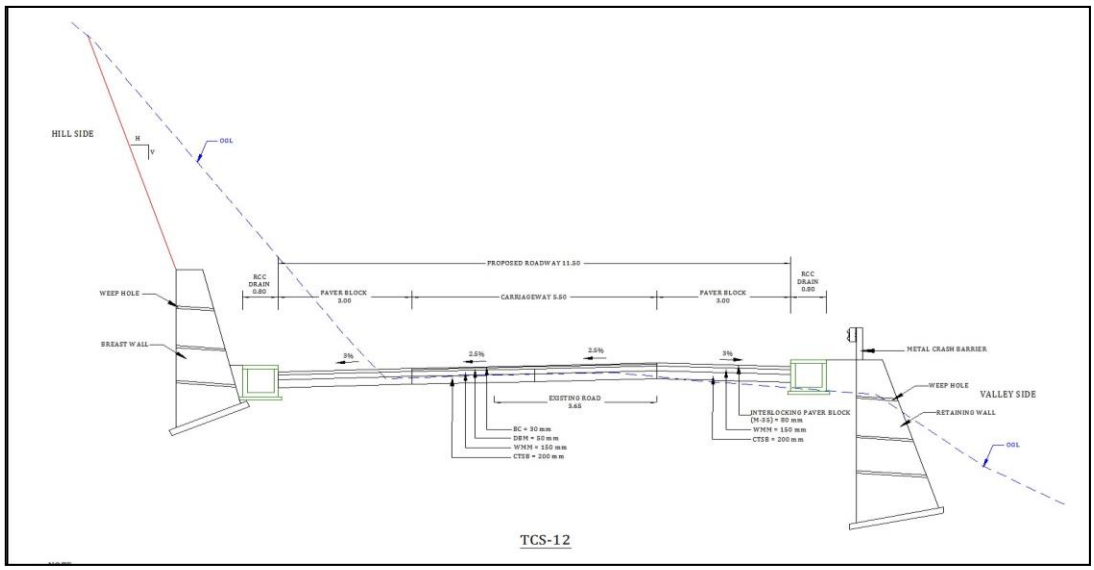

Figure 2-12 TCS for Proposed intermediate lane new construction

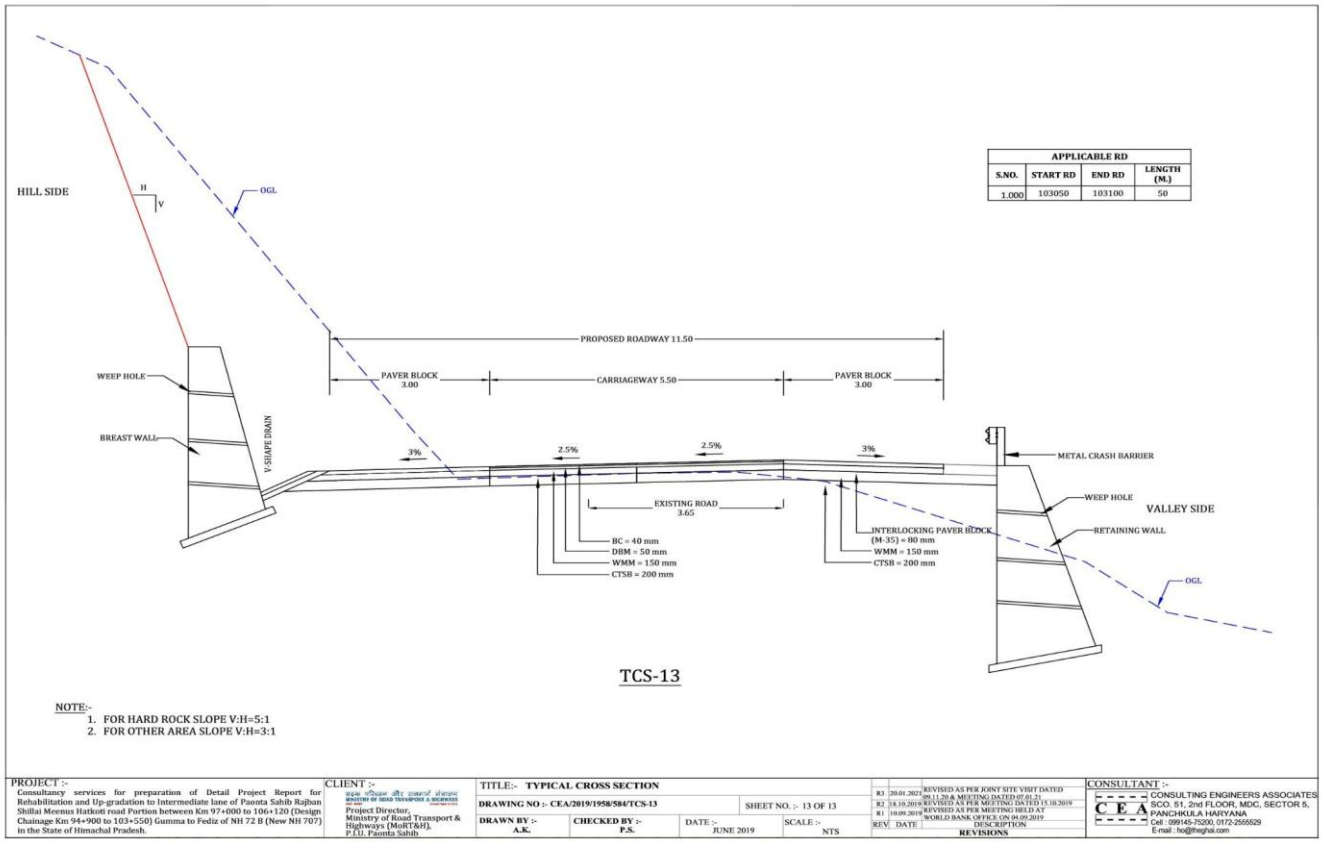

Figure 2-13 TCS for Proposed intermediate lane new construction

2.2.2.5 Intersections

The existing 01 Nos. of major junction and 5 No. minor junctions are proposed to be developed and the details of the same is shown in the table below:

Table 2-3 Details of Intersection

S. No.	Existing Chainage	Type of Junction	Side	Remarks
1	104+336	T	LHS	-

Table 2-4 Intersection description

S. No.	Existing Chainage	Type of Junction	Side	Remarks
1	95+922	Y	LHS	Road to vill. Bohar
2	96+292	Y	RHS	Road to residences
3	99+015	Y	LHS	Village road
4	99+407	Y	LHS	Road to vill. Pawana
5	103+832	Y	LHS	Road to village

2.2.2.6 Improvement Proposals

These improvements will include widening, realignment, design and strengthening of pavement with the improvements of geometrics; widening and reconstruction of culverts; providing drainage; junction improvements; providing road marking; signs and other safety devices etc. to enable all road users to use the facility without degrading the environment. The summary of improvement proposal is shown in the table below:

Table 2-5 Summary of Improvement Proposal

S. No.	Particulars	Details
1	Length (km)	8.650 Km Flexible Pavement (Design Chainage from km 94+900 to 103.55km)

2	Carriageway Width (m)	Carriageway–5.5 m+ Earthen Shoulders–BHS		
3	Right of Way (m)	16.0-25.0 m		
4	**Junctions:**			
A	Major Junction	1 at RD 103+260		
B	Minor Junction	5 Nos. At RD 94+900, RD 95+250, RD 97+960 ,98+350 & RD 102+750		
5	**Cross Drainage Structure:**			
A	Major Bridge	1 No. But not in the scope of this project. Taken separately under NH(O) project		
B	Minor Bridge	Nil		
C	Culverts	2x2 m box culverts in place of existing Hume pipe culverts =29 no. Reconstruction of slab culverts with: Box culvert size 3x3 m=2 no. Box culvert size 4x4 m=1 no Box culvert size 6x6 m=2 no New Construction Box Culverts of size 2x2=4 no. Total no of culverts=38 no.		
6.	**Drainage**	**FROM**	**TO**	**LENGTH (m)**
A	RCC Box Drain LHS	97+950	98+335	385
	RCC Box Drain LHS	99+210	99+300	90
	RCC Box Drain BHS	99+300	99+450	150

	RCC Box Drain LHS	99+920	101+170	1250
			TOTAL LENGTH	2025
B	V-Shaped PCC drain	94+900	97+950	3050
	V-Shaped PCC drain	98+335	99+210	875
	V-Shaped PCC drain	99+450	99+920	470
	V-Shaped PCC drain	101+170	103+100	1930
	V-Shaped PCC drain	103+350	103+550	200
			TOTAL LENGTH	6525
7.	**Paver Blocks on shoulders:**			
	Paver Blocks on shoulders up to drain 3 m wide BHS	99+300	99+450	150x2=300
	Paver Blocks on both side of shoulders	103+050	103+190	140x2=280
			Total length	580 m or 0.58 km
8.	**Slope Protection Work:**			
A	Gabion wall	0.085 km		
B	Breast Wall	3.615 km		
C	Retaining Wall	1.930 km		
D	Toe Wall	NIL		
9.	**Road Safety and Appurtenances:**			
A	W-Metal Beam Crash Barriers	km 94+850 to km 103+550 on Valley side (minimum length = 8700km)		
B	Road Sign	As per section 16 & 17 of Manual and as per IRC provisions		
10	**Project Facilities:**			
A	Bus lay bye/bus stops	At 98+375 , 99+420, 102+125 and 103+125		

B	Passing Places	At RDs= 95+360, 95+580, 96+040, 96+560, 97+250, 97+570, 98+680, 98+940, 99+880, 101+140, 101+700, 102+240, 102+960
C	Wayside Amenities	1 no. at RD 99+300 ON LHS
D	Medical Aid Centre	1 no. at RD 99+300 ON LHS
E	Traffic Aid Centre	1 no. at RD 99+300 ON LHS
F	Field lab., site office and labour camp Hutments	1 no. at RD 99+300 ON LHS
H	Solar Lighting	In Built up area at RD 98+050 to 98+400, RD 99+300 to 99+450
I	Electric Lighting	At Junction RD 103+260

2.2.2.7 Roadside Drainage

Design of drains in plain/rolling terrain has been carried out for self-cleansing velocity, for the runoff it will carry, considering the available fall. For trapezoidal drain on hill side, standard section as given in Hill Road Manual (IRC SP 48) is opted. It has been ensured that there is minimum three nos. of cross drainage structures are present in each km to carry the run-off of the roadside drainage. The details of roadside drainage are shown in the table below,

Table 2-6 Summary of Proposed RCC Drain

S. No.	Type of Cross - Section	Design Chainage		Length (km)	Terrain	Remarks
1	Rectangular	97+950	98+335	0.385	steep	LHS
2	Rectangular	99+210	99+300	0.090	steep	LHS
3	Rectangular	99+300	99+450	0.150	steep	BHS
4	Rectangular	99+920	101+170	1.250	steep	LHS

Table 2-7 Detail of Proposed V Shaped PCC Drain

S. No.	Type of Cross - Section	Design Chainage		Net Length (km)	Terrain	Remarks
1	V Shaped Without Breast Wall	94+900	97+950	3.050	steep	Hill side
2	V Shaped Without Breast Wall	98+335	99+210	0.875	steep	Hill side
3	V Shaped Without Breast Wall	99+450	99+920	0.470	steep	Hill side
4	V Shaped Without Breast Wall	101+170	103+100	1.930	steep	Hill side
5	V Shaped Without Breast Wall	103+350	103+550	0.200	steep	Hill side

2.2.2.8 Pavement Design

The existing pavement thorough out the project length is flexible. Green highway design has been adopted in place of conventional design.

(i) Design life for flexible pavement - 20 years

(ii) Effective CBR value for subgrade soil - 12%

(iii) Design traffic - 30 msa

(iv) Bituminous concrete BC - 40 mm

(v) Dense bituminous macadam DBM - 50 mm

(v) Granular Base course - Wet Mix Macadam 150 mm

(vi) CTSB - Granular mix material 200 mm

The details of proposed pavement crust is shown in the table below,

Table 2-8 Summary of Proposed Pavement Crust composition

S. No.	Existing Chainage (km)		Length (km)	Existing crust layers	Design Chainage (km)		Crust layers proposed for new construction			
	From	To			From	To	CTSB (mm)	WMM (mm)	DBM (mm)	BC (mm)
1	97+000	106+120	9.120	To be scraped and removed	94+900	103+550	200	150	50	40

2.2.2.9 Improvement Proposal for Cross Drainage Structures

Culverts

Culverts less than 10 m wide in hills and 12 m wide in plain/rolling terrain shall be widened. All 33 nos. of existing culverts (29 nos. of pipe culvert and 04 nos. of slab culvert) and 1 no. causeway shall be reconstructed being in poor condition, having inadequate waterway and damaged condition. All the existing pipe culverts (29 no.) and slab culverts (4 no.) shall be replaced with new construction box culverts. Additional 4 nos. of new box culverts are proposed at the locations where cross drainage is found inadequate. One no. culvert of box size 6x6 m in place of causeway shall also be constructed for proper drainage at the existing location. Thus finally there will be in all 38 nos. of culverts in the project road.

The details of improvement proposal of culverts are shown in the table below.

Table 2-9 Detail of culverts proposed for new construction

Sr. no.	Design Chainage (km)	Type of culvert	No. of span & Size of culvert in m	Outer to outer width of culvert in m	Remarks
1.	95+218	Box	1x2x2	12.0	Reconstruction
2.	95+318	Box	1x2x2	12.0	Reconstruction
3.	95+415	Box	1x2x2	12.0	Reconstruction
4.	95+603	Box	1x2x2	12.0	Reconstruction
5.	95+820	Box	1x2x2	12.0	Reconstruction
6.	96+008	Box	1x2x2	12.0	Reconstruction
7.	96+152	Box	1x2x2	12.0	Reconstruction
8.	96+300	Box	1x2x2	12.0	Reconstruction

9.	96+940	Box	1x2x2	12.0	Reconstruction
10.	97+188	Box	1x2x2	12.0	Reconstruction
11.	97+494	Box	1x2x2	12.0	Reconstruction
12.	97+702	Box	1x2x2	12.0	Reconstruction
13.	97+955	Box	1x2x2	12.0	Reconstruction
14.	98+150	Box	1x2x2	12.0	Reconstruction
15.	98+959	Box	1x3x3	12.0	Reconstruction
16.	99+618	Box	1x3x3	12.0	Reconstruction
17.	99+912	Box	1x2x2	12.0	Reconstruction
18.	100+117	Box	1x2x2	12.0	Reconstruction
19.	100+247	Box	1x2x2	12.0	Reconstruction
20.	100+378	Box	1x2x2	12.0	Reconstruction
21.	100+615	Box	1x2x2	12.0	Reconstruction
22.	100+808	Box	1x2x2	12.0	Reconstruction
23.	100+968	Box	1x2x2	12.0	Reconstruction
24.	101+176	Box	1x2x2	12.0	Reconstruction
25.	100+494	Box	1x2x2	12.0	Reconstruction
26.	100+745	Box	1x2x2	12.0	Reconstruction
27.	101+838	Box	1x2x2	12.0	Reconstruction
28.	102+088	Box	1x2x2	12.0	Reconstruction
29.	102+288	Box	1x2x2	12.0	Reconstruction
30.	102+483	Box	1x4x4	12.0	Reconstruction
31.	102+780	Box	1x2x2	12.0	Reconstruction
32.	103+014	Box	1x2x2	12.0	Reconstruction
33.	103+386	Box	1x6x6	12.0	Reconstruction
34.	103+500	Box	1x2x2	12.0	Reconstruction
35.	94+920	Box	1x2x2	12.0	New

36.	96+620	Box	1x2x2	12.0	New
37.	98+470	Box	1x2x2	12.0	New
38.	99+220	Box	1x6x6	12.0	New

2.2.2.10 Stability of Slopes

Stability of slopes is important for hill road. Disturbance can occur due to erosion caused by rainfall and run-off and consequent slides. Therefore, slope stability and erosion control become very vital for control and prevention of landslides/slips.

2.2.2.11 Landslide Zone

Weak spots which are chronic by way of hill slides are identified. The most active sliding zone is in km 95 – km 99 & km 101-km 103. Thorough study of these spots reveals that the causes of landslides may be mechanical weathering, chemical alteration, influence of seasonal fluctuation of temperature, rains, which generally result in the deterioration of the strength characteristics of slope forming materials.

2.2.2.12 Breast Wall

Other areas where hill slopes are made of soft and highly weathered rocks, earthen boulders etc. and the cut slopes fail by slumping, sliding and toe failures due to erosion. Such spots are identified and toe protection of slopes is proposed by constructing the breast walls. The height of breast wall is proposed as 1.5m as suggested in 'Hill Road Manual'. The front batter is kept 1:3 and top width 60 cm. The breast walls are provided in Stone Random Rubble masonry in 1:6 cement mortars. Road side drains are also constructed with breast wall.

Table 2-10 Details of PCC Breast Wall (3 m Height)

S. No.	Proposed Chainage		Length (in m)	Side
	From	To		
1.	94+840	94+890	50	Hill side
2.	95+100	95+215	115	Hill side
3.	95+400	95+430	30	Hill side
4.	95+520	95+570	50	Hill side
5.	96+250	96+280	30	Hill side

6.	96+630	96+660	30	Hill side
7.	98+090	98+140	50	Hill side
8.	98+800	98+850	50	Hill side
9.	100+000	100+230	230	Hill side
10.	100+230	100+500	270	Hill side
11.	100+800	101+000	200	Hill side
12.	101+840	102+270	430	Hill side
13.	102+600	102+760	160	Hill side
14.	102+785	102+850	65	Hill side
Total			**1760 m**	

Table 2-11 Details of PCC Breast Wall (5 m Height)

S. No.	Proposed Chainage		Length (in m)	Side
	From	To		
1.	95+000	95+050	50	Hill side
2.	95+720	95+750	30	Hill side
3.	95+900	95+930	30	Hill side
4.	96+050	96+100	50	Hill side
5.	96+450	96+570	120	Hill side
6.	97+750	97+800	50	Hill side
7.	97+850	97+950	100	Hill side
8.	98+160	98+230	70	Hill side
9.	98+350	98+450	100	Hill side

10.	98+520	98+550	30	Hill side
11.	98+850	98+990	140	Hill side
12.	99+550	99+680	130	Hill side
13.	99+920	100+000	80	Hill side
14.	100+500	100+800	300	Hill side
15.	101+000	101+270	270	Hill side
16.	101+370	101+470	100	Hill side
17.	101+690	101+735	45	Hill side
18.	102+490	102+600	110	Hill side
19.	103+050	103+100	50	
Total			**1855 m**	

2.2.2.13 Retaining Wall

Retaining wall is provided on the earthen shoulder edge of valley side of the project road where the existing slope does not allow construction of embankment and the road is to be retained by means of a solid protection work. The details of the retaining wall is shown in the table below:

Table 2-12 Schedule of Retaining Wall (4, 6 and 8m Heights)

S. No.	Design Chainage		Length (m)	Remarks
	From	To		
1.	95+260	95+275	15	4M valley side
2.	95+400	95+430	30	4M valley side
3.	95+590	95+620	30	4M valley side
4.	95+805	95+835	30	4M valley side
5.	95+930	95+950	20	4M valley side
6.	96+000	96+020	20	4M valley side

7.	96+130	96+170	40	4M valley side
8.	96+290	96+310	20	4M valley side
9.	97+470	97+500	30	4M valley side
10.	99+210	99+230	20	4M valley side
11.	99+420	99+450	30	4M valley side
12.	99+470	99+500	30	4M valley side
13.	99+590	99+630	40	4M valley side
14.	94+900	94+930	30	6M valley side
15.	95+020	95+085	65	6M valley side
16.	95+100	95+140	40	6M valley side
17.	95+300	95+340	40	6M valley side
18.	96+370	96+400	30	6M valley side
19.	96+610	96+630	20	6M valley side
20.	96+710	96+740	30	6M valley side
21.	96+770	96+795	25	6M valley side
22.	96+920	96+960	40	6M valley side
23.	96+980	97+005	25	6M valley side
24. `	97+040	97+060	20	6M valley side
25.	97+180	97+200	20	6M valley side
26.	97+830	97+850	20	6M valley side
27.	98+130	98+160	30	6M valley side
28.	98+630	98+650	20	6M valley side
29.	98+860	98+900	40	6M valley side
30.	98+945	99+000	55	6M valley side
31.	99+080	99+100	20	6M valley side

32.	99+530	99+550	20	6M valley side
33.	100+370	100+390	20	6M valley side
34.	100+605	100+625	20	6M valley side
35.	100+800	100+820	20	6M valley side
36.	100+960	100+980	20	6M valley side
37.	101+735	101+750	15	6M valley side
38.	102+080	102+100	20	6M valley side
39.	102+250	102+310	60	6M valley side
40.	102+470	102+490	20	6M valley side
41.	103+005	103+025	20	6M valley side
42.	103+350	103+400	50	6M valley side
43.	95+205	95+255	50	8M valley side
44.	96+510	96+530	20	8M valley side
45.	97+690	97+710	20	8M valley side
46.	97+930	97+980	50	8M valley side
47.	98+315	98+335	20	8M valley side
48.	98+460	98+480	20	8M valley side
49.	98+700	98+720	20	8M valley side
50.	99+360	99+400	40	8M valley side
51.	99+900	99+920	20	8M valley side
52.	100+100	100+150	50	8M valley side
53.	100+235	100+255	20	8M valley side
54.	100+300	100+340	40	8M valley side
55.	101+170	101+200	30	8M valley side
56.	101+485	101+510	25	8M valley side

57.	101+550	101+580	30	8M valley side
58.	101+720	101+770	50	8M valley side
59.	102+000	102+020	20	8M valley side
60.	102+280	102+295	15	8M valley side
61.	102+760	102+790	30	8M valley side
62.	103+050	103+100	50	8M valley side
63.	103+430	103+530	100	8M valley side
Total length			**1930 m**	

2.2.2.14 Gabion Wall

Reinforced Soil Gabion Wall (as per IRC:SP:116) shall be provided at the following locations: -

S. No.	Design Chainage		Hill Side / Valley Side
	From	To	
1	96+220	96+350	Valley Side at Dumping sites
2	99+050	99+250	Valley Side at Dumping sites
	Length (Rmtr.) minimum		85 m

Other requisite measures vis-à-vis slope protection works/ retaining structures as per manual and M/o RT&H specifications shall also be provided at aforesaid locations depending upon site requirement such as provision of wayside amenities, other structures etc.

2.2.2.15 CC Interlocking Paver blocks:

CC Interlocking Paver blocks have been provided along the project highway in gap between RCC drain and main carriageway for vegetable market as below:

Table 2-13 Interlocking Paver blocks

S. No.	Design Chainage		Length (m)	Side
	From	To		
1	99+300	99+450	150	BHS
2	103+050	103+190	140	BHS

2.3 Dumping Area

Additional land has been proposed to be acquired for dumping of remaining cut materials in the form of rock, soil and debris after maximizing its utilization in new construction of pavement, structures and slope protection work. After proper compaction and slope protection such locations can be used as medical/traffic aid center, wayside amenities and parking space. The details of such area along with its intake capacity is shown in the table below:

Table 2-15 Details of Dumping Area

S. No.	Design Chainage		Length in m	Side
	From	To		
1	96+220	96+350	130	Valley Side
2	99+050	99+250	200	Valley Side

2.4 ROAD SAFETY AND APPURTENANCES

Various provisions like Modified Thrie beam crash barriers, road studs, Road Signs and Road Markings is proposed along the project road to improve the safety for the commuters. The details of such provisions is shown in the section below:

2.4.1 Road Side Crash Barrier-

Modified Thrie beam crash barrier is proposed in valley side throughout the complete project stretch (except the structures where RCC crash Barrier shall be provided) along the steep terrain and high embankment sections. The details of the same is shown in the table below:

Table 2-16 Details of Modified Thrie beam Crash Barriers

S. No.	Design Chainage		Side of Crash Barrier	Net Length (m)
	From	To		
1	94+850	103+550	On valley side	8700

2.4.2 Project Facilities

The project facilities proposed along the project stretch are shown in the below section.

2.4.3 Bus Shelter

The location of Bus Shelter is shown in the table below,

Table 2-17 Details of Proposed Bus Shelter

S. No.	Design Chainage	Remarks
1	98+375	As per IRC:SP:73
2	99+420	As per IRC:SP:73
3	102+125	As per IRC:SP:73
4	103+125	As per IRC:SP:73

2.4.4 Passing Places

Passing Places have been proposed for convenience of HCV drivers so that they can park their trucks in some open space for some time for taking short rest or repairs, if need be. Detail of Passing Places is given as below.

Table 2-18 Detail of Passing Places

S. No.	Design Chainage	Remarks
1	95+360	As per section 6 of the manual
2	95+580	As per section 6 of the manual
3	96+040	As per section 6 of the manual
4	96+560	As per section 6 of the manual
5	97+250	As per section 6 of the manual
6	97+570	As per section 6 of the manual
7	98+680	As per section 6 of the manual
8	98+940	As per section 6 of the manual
9	99+880	As per section 6 of the manual
10	101+140	As per section 6 of the manual
11	101+700	As per section 6 of the manual

12	102+240	As per section 6 of the manual
13	102+960	As per section 6 of the manual

2.4.5 Wayside Amenities

In compliance to the order of Hon'ble High Court of Himachal Pradesh CWPIL 06/2017 provision of wayside amenities along the project road has been made. The locations of the wayside amenities are shown in the table below:

Table 2-19 Details of Wayside Amenities

S. No.	Design Chainage	Name of the Village	Remarks
1	99+250	Near Vegetable market, Vill. Antrauli	LHS

2.4.6 Medical Aid Centre

One no. medical aid center equipped with Ambulance and emergency are proposed at the following location:

Table 2-20 Details of Medical Aid Centre

S. No.	Design Chainage	Name of the Village	Remarks
1	99+300	Near Vegetable market, Vill. Antrauli	LHS

2.4.7 Loading/Unloading Platform

A platform is proposed to be developed as Loading/Unloading Platform and shown in the table below:

Table 2-21 Details of Loading/Unloading Platform

S. No.	Design Chainage	Name of the Village	Remarks
1.	99+425	Near Vegetable market, Vill. Antrauli	LHS

2.4.8 Solar Lighting

Provision for solar lighting will be made in all the built-up areas along the project stretch. The details of the same are shown in the table below:

Table 2-22 Details of Solar Lighting Location

S. No.	Name of village/ town	Design Chainage		Lengths (Km)
		From	To	
1	Antrauli	98+050	98+400	0.350
2	Vegetable Market (Subzi Mandi)	99+300	99+450	0.150

The design parameters of the project are given below:

Table 2-23 Design Parameters of the Project

Sr. no.	Description	Details
1	Design Speed	30-50 kmph
2	Intermediate lane carriageway	5.5 m
3	Camber	
	i) Carriageway	2.5%
	ii) Earthen shoulders	3.0%
5	Maximum Super Elevation	7.0%
6	Minimum stopping sight distance	45 m
7	Minimum Intermediate sight distance	90 m
8	Minimum radius of horizontal curve	20 m
9	Minimum radius of horizontal curve without transition	Nil
10.	Ruling vertical gradient	5.0 %
11	Minimum length of Vertical curve	50 m
12	Maximum grade change not requiring vertical Curve	1.2 %
13	Vertical Clearance in mountainous areas	5.0 m

3. POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

3.1 ENVIRONMENTAL POLICY FRAMEWORK

The chapter presents a review of the existing institutions and legislations relevant to the project at the International, National and State levels. The various statutory clearances from various state and central government authorities and the institutional framework are discussed below.

3.1.1 National Environmental Policy Framework

Development of environmental protection and enhancement measures in India has been determined to a considerable extent by the central legislation. The Ministry of Environment and Forest (MoEF), set up in 1980, is the controlling institution in this regards. The MoEF has two wings as Environment and Forests.

The Central Pollution Control Board (CPCB) is another technical wing of the MoEF entrusted with the responsibilities for detection and abatement of pollution.

The various national environmental policies prevalent in India are listed below:

- The National Forest Policy, 1988
- National Water Policy, 2012
- National Environment Policy, 2006
- National Conservation Strategy
- Wildlife Conservation Strategy, 2002 and Policy Statement on Environment and Development
- National Policy on Resettlement and Rehabilitation for Project Affected Families, 2007

3.2 LEGAL FRAMEWORK

The Government of India has laid out various policy guidelines, acts and regulations pertaining to sustenance of environment. The Environment (Protection) Act, 1986 provides umbrella legislation for the protection of environment. As per this Act, the responsibility to administer the legislation has been jointly entrusted to the Central Ministry of Environment and Forests (MOEF) and the Central Pollution Control Board (CPCB) / State Pollution Control Board (SPCB).

The legislations/acts followed for present study has been summarized in Table below:

Table 3-1 Summary of Key Legislations Relevant to the Project

Act or Notification	Year	Objective	Applicable Yes/No	Responsible Agency
The Environment (Protection) Act. The Environment (Protection) Rules	1986	To protect and to improve the quality of the environment and to prevent, control and abate Environmental pollution.	Yes	MoEF, CPCB, HPSPCB
The Forest (Conservation) Act The Forest (Conservation) Rules as amended in 2003 and 2004	1980	To check deforestation by restricting conversion of forested areas into non-forested areas.	No	MoEF, State Deptt. Of Forests
The Wildlife (Protection) Act as amended in 2002	1972	To protect wildlife through creation of National Parks and Sanctuaries.	No	Chief Conservator, Chief Wildlife Warden, Wildlife Wing, DOEF.
The Air (Prevention and Control of Pollution) Act	1972 amended in 1981	To prevent, control and reduce air pollution including noise pollution as per the prescribed standards.	Yes	HPSPCB & CPCB
The Water (Prevention & Control of Pollution) Act The Water (Prevention & Control of Pollution) Cess Act	1974 1977	To control water pollution and restoration of water quality as per the prescribed standards. To levy and collect Cess from industries based on water consumption.	Yes	HPSPCB & CPCB
The EIA Notification and its subsequent amendments	2006	To issue environmental clearance to development projects based on EIA report.	No	MOEF, SEIAA
Ancient Monuments and Archaeological Sites and Remains Act.	1958 amended in 2010	Conservation of Cultural and historical remains found in India	No	Archaeological Survey of India and State Department of Archaeology
Notification of use of Fly Ash	2009	Utilization of Fly ash	No	HPSPCB, MoEF
The Factory Act	1948	To Maintain hygiene and health for workers	Yes	HPSPCB

		during the construction period.		
The Building and Other Construction Workers (Regulatation of Employment and conditions of services	1996	For welfare of Employees/labour/ workers	Yes	State Labour Commissioner
Hazardous Wastes (Management and Handling) Rules	1989	For protection against improper handling and disposal of hazardous waste	Yes	HPSPCB
Chemical Accidents (Emergency Planning, preparedness and response)Rules	1996	Protection against chemical accident while handling any chemical	Yes	HPSPCB

Other State Level Legislations and Acts

- Consent to Establish (CTE) and Consent to operate (CTO) will be required for setting up hot-mix plants, batching plants, etc., under the Air (Prevention and Control of Pollution) Act of 1981 and the Water (Prevention and Control of Pollution) Act of 1974 from the Himachal Pradesh State Pollution Control Board (HPSPCB).
- All Construction vehicles and off-road equipment are to be registered with Regional Transport Office as required under Central Motor Vehicles Act and possess appropriate PUC certificate.

3.3 ENVIRONMENTAL CLEARANCE REQUIREMENTS

3.3.1 GOI Requirements

With reference to the EIA notification dated 14th Sept 2006 **(Published in the Gazette of India, Extraordinary, Part-II, and Section 3, Sub-section (ii)**), Item No. 7(f) of Schedule (Highway Projects), Environmental Clearance are not required from the MoEF, Govt. of India as;

(a) This project is widening of existing State Highway; it does not fall under any category for the environment clearance as per the EIA notification 2006 (and its subsequent amendments till date)

(b) It does not pass through ecologically sensitive areas, and

(c) It is not a highway include expressway.

3.3.2 State Level Clearance Requirements

Besides, the GOI environmental clearance requirements, the project also requires clearance from some of the state level agencies as discussed below.

Forest Clearances: Not required.

State Pollution Control Board: The Project also requires obtaining 'No Objection Certificate' (NOC) from HPSPCB in pursuant of the Water (Prevention and 'Control of Pollution) Act of 1974, The Cess Act of 1977 and the Air (Prevention and Control of Pollution) Act of 1981. Consent for the Establishment and Operation has to be taken during the Construction stage of the Project for the operation of all Construction Plants.

State/Central Ground Water Board: Clearance from the State/Central Ground Water Boards/Authorities is required for extraction of ground water.

State Environmental Impact Assessment Authority (SEIAA): Clearance is required from SEIAA for mining of normal earth from borrow areas, if required.

3.3.3 World Bank Requirements

The World Bank environmental impact assessment (EIA) requirements are based on a three- category classification system (Category A, B and C) as defined by the World Bank OP 4.01. A project designated as Category A, requires a full environmental impact assessment (EIA), Category B projects require a lesser level of environmental investigation. Category C projects require no environmental analysis beyond that determination. This project has been classified as Category 'B' project due to the cumulative impacts from the project on the environmental and social components.

The various clearances required for highway project and their applicability viz this project is given in Table below:

Table 3-2 Clearances Required for the Project

S. No.	Regulatory Clearances	Corresponding Regulations	Approving Authority	Applicability to the Project	Typical Time Required	Responsibility for compliance	
						Execution	Supervision
Pre-Construction Stage							
01	Environmental Clearance	EIA Notification, 2006 and amended till date	State Environmental Impact Assessment Authority or CEIAA in MoEF, GoI	Not applicable	-	-	-
02	Consent to Establish	Water (Prevention and Control of Pollution) Act 1974; Air (Prevention and Control of Pollution) Act 1981	Himachal Pradesh State Pollution Control Board (HPSPCB)	Subject to establishing Labour camps, Hot mix plants, DG sets units, cement batching plant or any water/air pollution generating units.	3 Months	Contractor	HP PWD/CMU
03	Wild Life Clearance	Wild Life Act 1972	Hon'ble Supreme Court	Not applicable	-	-	-
05	Permission for felling & trimming of trees	Forest (Conservation) Act, 1980 and its amendments;	Regional Office MoEF Dehradun	Not applicable	-	-	-
Construction Stage							
06	Permission for locating and operating Borrow pits	-	Mining Department/SEIAA, Local Administration –	Applicable if Earth is required	1 Month	Contractor	HP PWD

S. No.	Regulatory Clearances	Corresponding Regulations	Approving Authority	Applicability to the Project	Typical Time Required	Responsibility for compliance	
						Execution	Supervision
			Municipal Government/ Panchayat				
07	Permission for Withdrawal of Ground Water	Environment Protection Act 1986	Central Ground Water Board	Applicable, if withdrawal is proposed	1 month	Contractor	HP PWD/CMU
08	Permission for withdrawal of Surface Water from River/Irrigation Canals		Irrigation Authorities for use of water from Irrigation Canal. River Board / Authorities for withdrawal of water from Rivers	Applicable if withdrawal is proposed	1 month	Contractor	HP PWD/CMU
09	Authorization to generate, store, transport and dispose of Hazardous Waste	The Hazardous Wastes (Management, Handling and Trans-boundary Movement) Rules, 2008 and amendments till date	Himachal Pradesh State Pollution Control Board (HPSPCB)	Applicable, if hazardous waste is generated in the project (disposal of bituminous wastes – verify with PPCB)	2 months	Contractor	HP PWD
10	Consent to Operate	Water (Prevention and Control of Pollution) Act 1974; Air (Prevention and	Himachal Pradesh State Pollution Control Board (HPSPCB)	Subject to establishing, Hot mix plants or any water/air pollution	3 Months	Contractor	HP PWD/CMU

S. No.	Regulatory Clearances	Corresponding Regulations	Approving Authority	Applicability to the Project	Typical Time Required	Responsibility for compliance	
						Execution	Supervision
		Control of Pollution) Act 1981		generating units, Labour camps			
11	Traffic Police Clearance for diversion of routine traffic	Local Traffic Police Regulations and Bye-laws	Traffic Police Department	Applicable if diversion is required in urban/semi urban areas	1 Month	Contractor	CMU/ HP PWD
12	NOC from Archaeological Survey of India	The Ancient Monument and Archaeological sites and Remains Act 1958.	Department of Archaeology Govt. of Himachal Pradesh	Subject to chance finds, if any	2 Months	Contractor	CMU/ HP PWD
13	Permission for Sand Mining from river bed	Himachal Pradesh Mines and Minerals Concession Rules 1969	River Board Authorities/ Department of Mining Govt. of Himachal Pradesh	Applicable, if river sand is mined	6 Months	Contractor	CMU/ HP PWD
14	Permission for Opening of new Quarry sites	Himachal Pradesh Mines and Minerals Concession Rules 1969	Department of Mining Govt. of Himachal Pradesh Himachal Pradesh State Pollution Control Board	Applicable only if Contractor opens a new quarry site	6 Months 3 Months	Contractor	HP PWD /CMU

4. BASELINE ENVIRONMENTAL STATUS

4.1 GENERAL

Physiographical, most of the areas form a part of hilly tract with undulating terrain. The elevation varies from 2500m to 3500m above mean sea level. The Shiwalik hills standing to a height of about I 100m in the south of limestone deposits are separated from the bare lofty ridges of the lesser Himalayas in the north by the deep valley of river Giri, The project influence area is marked by deep valleys, river terraces, steep escapements and innumerable streams.

The latitude and longitude of project road are as follows:

(a) Start Point: Gumma (30°48'1.21"N, 77°43'41.23"E)

(b) End Point: Fediz (30°50'59.34"N, 77°44'40.37"E)

Figure 4-1 Hilly Terrain Topography Features of the Project Road

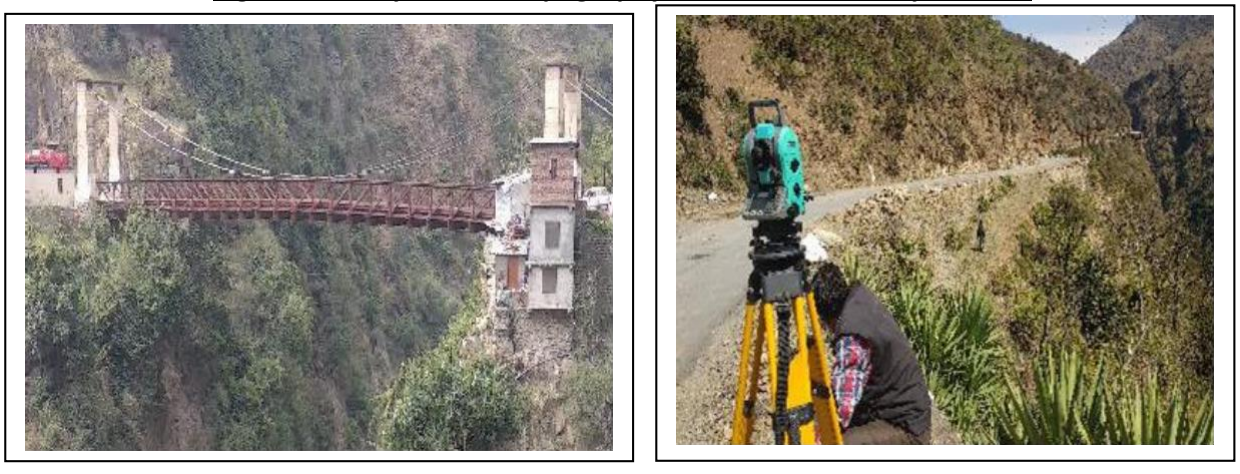

Figure 4-2 Plain Terrain Topography Features of the Project Road

The project road passes through North Eastern part of Himachal Pradesh. The project road section is of 8.650 km mountainous terrain. There is lot of undulations in the topography of the area. The uphill slope has good catchment, and the rainwater generally drains out through the natural streams on both flanks of the slide.

Different types of topographic pictures are given in Fig 4-1 & Fig 4-2.

4.1.1 Geological analysis of the Area

The project area primarily consists of alluvial deposits. The other geological formations in the project area comprise of sandstone. Primarily clay forms the top zone of project area. There is presence of variable sizes and types of rocks in the area. The geological features map of project area is given in **Fig 4-3.**

Figure 4-3 Geological Map of India

4.1.2 Seismology

The area is moderately earthquake prone. Earthquakes have been experienced in many parts of the state. The epicenters of various earthquakes experienced in the past lies outside the state boundaries as well.

As per the Bureau of the Indian Standards (BIS) map IS: 1983-1984, the district of Sirmour and Shimla lies in Zone V. Zone V is the highest earthquake zone. Map showing seismic zone of India is given below in **Figure 4-4.**

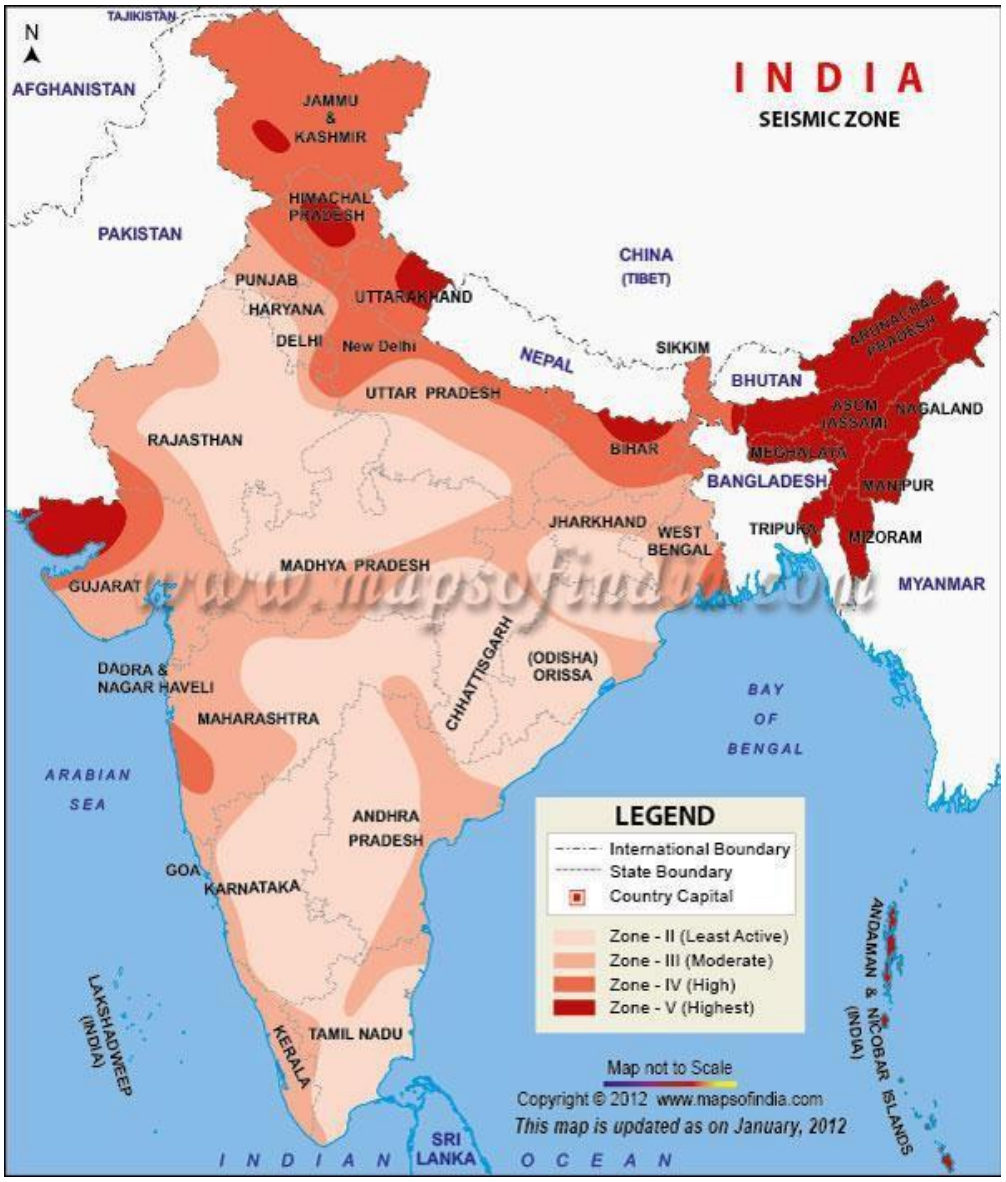

Figure 4-4 Seismic Zones of India

4.1.3 Soil Characteristics

Major soil types that are scattered throughout the state are alluvial soils and Brown Podzoic soils and similiar variety is found in the Project area as well.

The problem of soil erosion is one of the major environmental problems affecting the Himalayan region, with millions of tons of soil being either washed or blown away in due course of time. This in turn affects soil fertility adversely.

4.1.4 Landslides

There is major issue of soil stability in the hilly terrain of the project area. This is accompanied by landslips, mud flows and flash floods affecting the entire area. The problem rises during rainy season and adversely affects the road structure. The environmental survey team has observed some weak areas as geologically unstable along the project road.

Landslide Zone: Weak spots which are chronic by way of hill slides are identified. The most active sliding zones are tabulated in the Table No. 1 below. Some other small spots are also observed. Thorough study of these spots reveals that the causes of landslides may be mechanical weathering, chemical alteration, influence of seasonal fluctuation of temperature, rains, which generally result in the deterioration of the strength characteristics of slope forming materials.

Table 4-1 SLIDING ZONES (As per Design Chainage)

S. No.	FROM (Km)	UPTO (Km)
1	95.530	95.580
2	95.400	95.430
3	96.520	96.570
4	98.800	98.850
5	101.170	101.270
6	101.370	101.470
7	101.690	101.730
8	102.630	102.690

4.1.5 Climate

The Project corridor (NH-707) is located in Humid Sub-Temperate region and the climate is distinguished by three distinct seasons.

a. Summer Season (April to June)

b. Rainy Season (July to Aug.)

c. Winter Season (Nov. to Feb)

4.1.6 Rainfall

Annual average rainfall of the area lies between 1400mm to 1600mm, 75 % of which is received during monsoon season. The distribution throughout the year depends upon various other factors. During summers the area gets average of 130mm rainfall, during winters the area gets average of 60mm rainfall and during monsoon the area gets average of 1251mm rainfall.

During a heavy rainstorm may wash away as much as 90 tons of soil per acre. Most of the splashed soil particles don't leave the field; they clog surface pores, which in turn reduce water infiltration, increases water runoff, and increases soil erosion.

4.1.7 Variation in Temperature

The temperature in the project area varies, according to season and elevation. There is change from moderately hot to freezing cold temperature depending upon the time of the year or season. The period from 15th December to 15th February is the coldest period. Temperature increases gradually till June. The winter prevails from November to February, spring in March, summer from April to June and monsoon in July-August. The minimum temperature in winters is as low as 0°C and rises to 42°C in summers.

4.1.8 Humidity Condition

There is variation of relative humidity in the project area from 19.91 to 98%. However, mostly the relative humidity remains high throughout year. It is recorded lowest around the month of May and highest around the month of August.

4.1.9 Wind Characteristics

Intensity of wind is moderately blows throughout the season and keeps within the range of 1-19 km/hr. Some increase in the month of September is observed in recent years. During monsoon it varies from 0.6 to 1.12 m/sec. The direction of wind is mostly towards south. After monsoon is over the direction of wind is from East to West.

4.2 PHYSICAL ENVIRONMENT

4.2.1 Air Environment

The ambient air quality status of the project area forms the basis for prediction of the impacts due to the proposed project. Degradation of ambient air quality is the most commonly identified adverse impact on the natural and bio-physical environment during the construction and operation of the road projects.

The National Ambient Air Quality Standards (NAAQS) and ambient air quality monitoring results of previous studies carried out in the adjoining area are presented in tables below:

Table 4-2 National Ambient Air Quality Standards

Pollutant	Time Weighted Average	Concentration in Ambient Air		
		Industrial, Residential, Rural and other areas	Ecologically sensitive area(notified by central government)	Methods of measurement
(1)	(2)	(3)	(4)	(5)
Sulphur dioxide (SO2), µg/m3	Annual*	50	20	-Improved West & Gaeke-Ultraviolet fluorescence
	24 hours**	80	80	
Nitrogen Dioxide (NO2), µg/m3	Annual*	40	30	-Modified Jacob & Hochheiser (Na-Arsenite) chemiluminescenc
	24 hours**	80	80	
Particulate Matter (Size less than 10m) or PM10µg/m3	Annual*	60	60	- Gravimetric - TOEM - Beta attenuation
	24 hours**	100	100	
Particulate Matter (Size less than 2.5m) or PM2.5µg/m3	Annual*	40	40	- Gravimetric - TOEM - Beta attenuation
	24 hours**	60	60	
Carbon Monoxide (CO) mg/ m3	8 hours**	02	02	-Non Dispersive Infra Red (NDIR) spectroscopy
	1 hour**	04	04	
Avg. SPM (µg/m3)	Annual*	360 & 140	70	- Gravimetric
	24 hours**	500 & 200	100	- TOEM - Beta attenuation

(Source: National Ambient Air Quality Standards, CPCB)

Annual average: Annual Arithmetic Mean of minimum 104 measurements in a year taken twice a week 24-hourly at uniform interval

****24 hourly or 08 hourly or 01 hourly monitored values, as applicable, shall be complied with 98% of the time in a year. 2% of the time, they may exceed the limits but not on two consecutive days of monitoring.***

4.2.1.1 Methodology

High volume ambient air samplers were used for the collection of samples in ambient air for 3 locations (One location at upwind direction and two locations at downwind direction) near the proposed alignment. The selection of the receptors was based on the following considerations:

- Covering the proposed ROW;
- Covering land use characteristics and socio-economic conditions observed along the route.

Samples were collected on 24 hourly basis for PM10, PM 2.5, NO_X, CO, Pb and SO_2. Samples for CO were collected for one-hour duration. The sampling and analysis has been done according to the relevant IS code and practices and guideline of PPCB.

4.2.1.2 Ambient Air Quality in Study Area

Out of total three (3) locations, at each location samples were collected for parameters PM10, SO2 and NO_x and PM2.5 were collected for 24 hrs. Basis. The details of Locations are given in the **Table 4-3.**

Table 4-3 Details of Ambient Air Quality Monitoring Locations

Station Code	Location Name	Chainage	Land Use	Offset from pavement edge
AAQ-01	Gumma	95/00	Residential/ Commercial	45 m
AAQ-02	Antroli Village	98/300	Residential/ Commercial	05 m
AAQ-07	Fediz	104/00	Residential/ Commercial	6m

The Details of minimum, maximum and mean values of the ambient air quality parameters monitored along the project bypass are presented in **Table 4-4.**

Table 4-4 Onsite 24-Hourly Ambient Air Quality along the Project*

Station Code	Land Use	PM_{10}	$PM_{2.5}$	SO_2	NOx (µg/m3)	CO (ppm)
AAQ - 1	Commercial	63.5	27.0	7.5	19.4	0.46
AAQ - 2	Commercial	53.0	21.1	6.85	16.0	0.34
AAQ - 7	Commercial	40.0	17.8	BDL (<6.5)	7.4	0.25
Maximum		63.5	27.0	7.5	19.4	0.46
Minimum		40.0	17.3	6.85	7.4	0.25
Mean		51.75	22.15	7.18	13.4	0.71

*Samples were collected in June 2015.

Note: Conversion Factor for Carbon Monoxide 1ppm CO = 1157 µg/m3

4.2.2 Noise Environment

Noise attributed to roads depends on factors such as traffic intensity, the type and condition of the vehicles plying on the road, acceleration/deceleration/gear changes by the vehicles depending on the level of congestion and smoothness of road surface (IRC: 104-1988).

4.2.2.1 Sampling Criteria

Hourly noise levels were recorded at 03 locations identified along proposed ***Gumma to Fediz Section of NH-707***. Details of the locations are presented in table below.

The hourly noise values were used to calculate daytime and night time equivalent noise levels. In order to arrive at daytime noise levels, the logarithmic average of hourly values was taken from 6:00 AM to 10:00 PM. The night time noise levels were derived by taking logarithmic average of hourly values from 10:00 PM to 06:00 AM. The hours of day and night were considered as specified durations for 'day' and 'night' in Noise Rules Published by the MoEF. Details of the recorded noise levels are given below:

Table 4-5 Recorded Noise Levels at Various Locations*

Location Code	Description of Location	Distance from Proposed ROW (m)	Noise Levels dB (A) Leq.	
			Day time	Night
Gumma to Fediz Section of NH-707				
NQ-1	Gumma	10m	63.8	43.3
NQ-2	Antroli Village	5m	54.2	40.2
NQ-3	Fediz at 104/00	7m	51.6	38.2

*Noise Quality (NQ) recorded in September, 2019.

Table 4-6 National Ambient Noise Levels Standards (as per CPCB)

Area Code	Category	Limits in Decibels (dBA)	
		Day Time	Night Time
A	Industrial	75	70
B	Commercial	65	55
C	Residential	55	45
D	Silence	50	40

Note: (1) **Day Time:** 6 AM to 10 PM, **Night Time:** 10 PM to 6 AM

(2) Silence zone is an area up to 100 m around premises as hospitals, educational institutions and courts. Source: Central pollution Control Board, New Delhi.

4.2.3 Water Environment

There are 1 Number of river flowing along the **Gumma to Fediz Section of NH-707**, which comprises the surface water resources of the Project area. The water resources of the Project Area is summarized in **table below:**

Table 4-7 Surface and Groundwater Sources in the Project Area

S. No.	Name of Project corridor	Water sources Nearby project		Water sources in direct influence area of road.			
		Canals	River	Wells	Tube wells	Hand pumps	Ponds/ Tanks
1	*Gumma to Fediz Section of NH-707*	-	01	-	-	-	-

4.2.3.1 Surface Water

Rivers Details of the Rivers in the project study area are as follows:

Yamuna River:-Yamuna is the most important and measure river of project region. It flows along the border of Himachal Pradesh and Uttarakhand. Project start at Paonta Sahib is situated near the bank of Yamuna.

Giri River: - The River Giri is an important tributary of the Yamuna River. It drains a part of South-Eastern Sirmour. The Giri rises from Kupar peak just above Jubbal town and flows down in the South- Eastern direction and divides the Sirmour district and crosses project highway in km 18 near Sataun.

Minus River: - The Minus River is a tributary of the Tonns River, which in turn drains into the river Yamuna. The Minus River crosses project highway in km 88 in Minus.

Tonns River: - This River is an important tributary of the Yamuna River and joins it at Kalsi in the North-Western part of Dehradun valley. It flows along about 25 kin length of the project highway which lies between km 90 and end point of the road i.e. Guinina.

4.2.3.2 Groundwater

The ground water resource occurs mainly in unconsolidated sediments of intermountain valleys and in sub mountain tract. The project districts, particularly their valley areas depend upon ground water. The exploitation is done through open wells and infiltration galleries. However, to establish baseline quality of ground water four sampling locations were selected along the project highway. Samples were analyzed as per APHA and IS-3025 procedures.

4.2.3.3 Water Quality

Water quality is a concern for the numerous surface water sources and the groundwater sources. Two surface and one ground water samples have been collected from sources present along the proposed alignment to ascertain the baseline conditions of water quality. Location details of the surface water and ground water samples collected are **presented in table below:**

Table 4-8 Details of the Sampling Locations of the Surface and Ground Water

Sample Code	Description of source	Name of the Settlement	Type of Sample
GWHP-01	Hand Pump near Gumma	Gumma	Ground Water
SWHP-01	River at start of the project	Gumma	Surface Water
SWHP-02	River near Fediz Bridge	Fediz	Surface Water

The water quality of the surface water and ground water samples are presented in Table 4-9 and Table 4-10 respectively. These samples were analyzed for all essential characteristics and for most of the desirable characteristics specified in IS 10500: 2012, and are analyzed in accordance with the standard methods specified by IS codes.

Table 4-9 Characteristics of Surface Water*

S. No.	Parameters	Unit	SWHP-01	SWHP-02
1	PH Value at 25°C	-	7.82	8.12
2	Turbidity	NTU	1	3
3	Conductivity		455	410
4	Total Dissolved Solids	Mg/l	278	265
5	Total Suspended Solids	Mg/l	<5	<5
6	Total Hardness (as $CaCO_3$)	Mg/l	156	198
7	Chlorides (as Cl)	Mg/l	52	43
8	Total Alkalinity	Mg/l	126	138
9	Sulphate (as SO4)	Mg/l	19	15
10	Nitrate (NO3)	Mg/l	4.8	5.6
11	Fluoride (as F)	Mg/l	0.1	0.1
12	Iron (as Fe)	Mg/l	<0.05	0.07
13	Zinc (as Zn)	Mg/l	<0.05	<0.05
14	Calcium (as Ca)	Mg/l	34	52
15	Magnesium (as Mg)	Mg/l	17.3	16.6
16	Cadmium as cd		<0.01	<0.01
17	Copper (As Cu)	Mg/l	<0.05	<0.05
18	Nickel (as Ni)	Mg/l	<0.01	<0.01
19	Lead (as Pb)	Mg/l	<0.1	<0.1

20	Mercury (as Hg)	Mg/l	<0.001	<0.001
21	Total Arsenic (as As)	Mg/l	<0.025	<0.025
22	Phenolic Compound (as C_6H_5OH)	Mg/l	<0.001	<0.001
23	Phosphorous as (P)	Mg/l	<0.03	<0.03
24	Manganese (As Mn)	Mg/l	<0.01	<0.01
25	Cyanide as CN	Mg/l	<0.05	<0.05
26	Total Chromium (as Cr)	Mg/l	<0.05	<0.05
27	Anionic Detergent (MBAS)	Mg/l	<0.01	<0.01
28	Aluminum (as Al)	Mg/l	<0.03	<0.03
29	Oil & Grease	Mg/l	<2	<2
30	Chemical Oxygen Demand	Mg/l	6	10
31	Biological Oxygen Demand (27°C 3 Days)	Mg/l	<1	1.4
32	Dissolved Oxygen	Mg/l	8.3	7.8
33	Total Coliform	MPN/100ml	18	24

*Samples were collected in September, 2019.

Table 4-10 Characteristics of Ground Water*

S. No.	Parameters	GWHP-01	Max. Requirement as per(IS-10500-2012) Amend 1	
			Acceptable Max.	Permissible (in Absence of alternate source) Max.
1	Color	5	5	15
2	Taste	Agreeable	Agreeable	Agreeable
3	Odour	Agreeable	Agreeable	Agreeable
4	Turbidity (NTU)	<1	1	5
5	Ph Value	7.54	6.5 to 8.5	No Relaxation
6	Total Hardness as CaCO3, (mg/l)	162	200	600
7	Iron as Fe (mg/l)	0.09	0.1	No Relaxation
8	Chloride as Cl (mg/l)	52	250	1000
9	Total dissolved Solids (mg/l)	281	500	2000
10	Calcium as Ca (mg/l)	35	75	200
11	Copper as Cu (mg/l)	<0.02	0.05	1.5
12	Manganese as Mn (mg/l)	<0.05	0.1	0.3
13	Sulphate as SO4 (mg/l)	18	200	400
14	Nitrate as NO3 (mg/l)	4.6	45	No Relaxation
15	Fluoride as F (mg/l)	0.2	1.0	1.5
16	Phenolic compounds as C_6H_5OH (mg/l)	<0.001	0.001	0.002
17	Selenium as Se (mg/l)	<0.01	0.01	No Relaxation
18	Zinc as Zn (mg/l)	0.07	5	15
19	Anionic detergents as MBAS	<0.01	0.2	1.0
20	Total Alkanity (mg/l)	128	200	600
21	Aluminium as Al (mg/l)	<0.02	0.03	0.2

22	Boron	<0.1	0.5	1.0
23	Cadmium as Cd (mg/l)	<0.003	0.003	No Relaxation
24	Cyanide as CN (mg/l)	<0.005	0.05	No Relaxation
25	Lead as Pb. (mg/l)	<0.01	0.01	No Relaxation
26	Total Chromium (mg/l)	<0.05	0.05	No Relaxation
27	Magnesium as Mg (mg/l)	18.1	30	100
28	Mineral Oil	<0.5	0.5	No Relaxation
29	Mercury as Hg (mg/l)	<0.001	0.001	No Relaxation
30	Arsenic as As (mg/l)	<0.01	0.01	No Relaxation
31	Coliforms (MPN/100 ml)	Not Detected	Shall not be detected	
32	E. Coli/100 ml	Absent	Absent	

*Samples were collected in September, 2019.

The characteristics of the ground water and surface water samples were found to be well within the standard limits specified for the water quality characteristic for the desirable limits as specified in BIS10500: 2012 except a few deviations for the surface water and ground water.

4.2.4 Land Environment

Land and soil constitute the basic components of the physical environment. The alignment of a road may cause changes in land, land use, soil and denudation processes in different intensities.

4.2.4.1 Geology and Soils

Geology and Soil Types of the Area:

Major soil types that are scattered throughout the state are described here. Alluvial soils and Brown Podzoic soils variety is found in Sirmour and Shimla district (Project influence area).

4.2.4.2 Soil Analysis

For the assessment of the base line soil quality, soil samples were collected at 2 locations from near the proposed alignment of the project road. Details of the soil sampling locations are presented in **Table 4-11**. Soil samples were collected for 15 cm and 100 cm depth for each location.

Table 4-11 Location Details of Soil Samples

Sample Code	Location of Sample	Depth	Land Use
Gumma to Fediz Section of NH-707			
SQHP-01	Gumma	15 cm	Agricultural Field
SQHP-02	Fediz	100cm	Agricultural Field

The characteristics of the soil along the proposed project road are presented in **Table 4-12.**

Table 4-12 Soil Characteristics of along the Project *

S. No.	Parameter	Unit	SQHP-01	SQHP-02
1	pH (1:2.5)	-	7.11	7.68
2	Electrical Conductivity of Saturation Extract (1:2)	umhos/cm	510	498
3	Soil Moisture Content	%	56.48	49.85
4	Soil Texture	-	Sandy clay	Sandy clay
5	Organic Matter	%	1.48	0.98
6	Lead (pb)	mg/kg	0.11	BDL
7	Permeability	mm/hr	53.24	52.61

*Samples were collected in September, 2019.

Note: BDL - Below Detection Limit Meq - milli Equivalent

4.3 ECOLOGICAL RESOURCES

Ecological resources are among the most important resources impacted by the proposed bypass. In this section baseline details of the flora and fauna are presented.

4.3.1 Flora

The natural vegetation follows a climatic altitudinal zonation. In the altitude range of 300-900m, as in Rajban, the vegetation is tropical and subtropical in character. 'Sal' is the main species of the broad leaved hill forest. Some patches on the hill slopes are clad in dense forests which are `reserved'. The important species of plants found in the project study area are:- *Shorea robusta* :(Sal), *Quercus* intone : (Oak),Alnus glutinoa:(Alder), *Albizzia Lebbek* :(Seris), *Dalbergia sissoo*:(Shisham), *Adinacard folia*:(Holdu), *Bachanania lot folio* : (Bhilova), *Condia mysea* : (Lasors), *Eugenia jambolana* : (Jamun), *Ruododenron arboretum*, *Terminate tomentos* : (Asin).

Among the shrubs there area Vitex, Munj, Ber, Dodenea, Bamboo etc and among grasses Vetiver, Sanchrus, Munj are common.

Road side vegetation is likely to be impacted due to proposed road widening project. The major trees to be affected/ cut are Pine, Khadig, Deodar, Gular, Saal and Kachnar. The tree removal will take place from Corridor of Impact of project road.

4.3.2 Protected Areas and Fauna

The existing network of protected areas (PA's) in Himachal Pradesh has 32 Wildlife sanctuaries (5664 sq.km) and two National parks (1440sgkm) covering a total geographical area of 7,104 sq.km. However, No wild life sanctuary/National Park is located within 10 km aerial distance from the alignment of project road or none of the same has their Eco-sensitive zone in the project study area. Survey was carried out in 10km of the proposed road project. The ground studies along the alignment, together with Forest Department and stakeholder consultation have revealed that there are some wild mammalian species such as Sloth bear,

Sambhar deer and Leopard found near the study area occasionally, while livestock of local people i.e. goat, sheep, cow etc. and common animals as field mouse, Squirrel, flare, dog, cat, bats, monkeys etc. are significantly using the area.

There are many river channels present in the buffer zone of study area which are the major attraction sites for avifauna. Birds like Himalayan Bulbul, Red Vented bulbuls, Purple Sunbird, Rufous Tree Pie, White Capped Water Redstart, Whistling Thrush, Red Jungle Fowl, Parakeet, and Common Myna are found common in occurrence.

Due to diversified forest lying along and across the riverbed, the area is equally important for butterfly diversity. Butterflies form important part of the food chain components for the birds, reptiles, spiders and other predatory insects making them inevitable part of present ecosystem.

The information of important animal groups such as Birds, Reptiles, Fishes and Mammals were collected by trekking inhabiting area, along the river banks, adjoining forest on the slopes, nallahs, hill top and agricultural fields present in the project influence area.

4.3.3 Biodiversity and Endangered Fauna

4.3.3.1 Reptiles

Out of the species of reptiles recorded (Table 3.13), two species of lizard i.e. Monitor Lizard and Common Garden Lizard are reported common in occurrence. Among reptiles, three species of snake such as Russells Viper and Rat Snake recorded in study area also, which are listed in Schedule II, Part II of the Indian Wildlife (Protection) Act 1972. None of the reptile species is present in the IUCN Red List of Threatened Animals (2007).

Table 4-13 List of Species of Reptiles Recorded in the Study Area

S. No.	Zoological Name	Common Name	Conservation Status as per IUCN
1	*Daboia russelii*	Russell's Viper	LC
2	*Bungarus caeruleus*	Indian Krait	LC
3	*Varanus spp.*	Monitor Lizard	VU
4	*Calotes versicolor*	Indian Garden Lizard	LC
5	*Pi Pas mucosa*	Rat Snake	LC

Source: CEA sunoeto, LC=Least Concern, VU= Vulnerable

4.3.3.2 Birds

Many species of birds are found in the study area (Table 3.14). Most of the species of birds are protected as their respective families have been listed under Schedule IV of Indian Wildlife (Protection) Act 1972 and none under IUCN red listed endangered, threatened and vulnerable species of birds are recorded in the study area.

Table 4-14 Species of Birds Found in the Study Area

S. No.	Zoological Name	Common name
1	*Psittacula hinzalarana*	Slaty-headed Parakeet
2	*Columba Livia*	Blue Rock Pigeon
3	*Streptopelia chinensis*	Spotted Dove
4	*Streptopelia senegalensis*	Laughing Dove
5	*Dicrurus macrocercus*	Black Drongo
6	*Acridotheres tristis*	Common Myna
7	*Hr psipetes leucocephalus*	Black Bulbul
8	*Pyconotus leucogenys*	Himalayan Bulbul
9	*Pvcononotus cafer*	Red-vented Bulbul
10	*Passer domesticus*	I louse Sparrow

Source: *CEA, survey*

4.3.3.3 Mammals

Area is not rich in wild mammals, but many domesticated mammal species are reported from buffer zone during the field survey. Common grazing animals like buffalo, cow, goat etc. can be noticed in open grass fields. Small mammals like Indian palm squirrel *(Funambulus palmarum)* and field mouse *(Apodemus svlvaticus)* are noticed in vicinity of village. Inquiry from village people regarding wild animals reveals that Rhesus macaque *(Macaca mulatta*), Indian hare (*Lepus nigricollis*), fruits bat (*Pteropus conspicillatus*), etc. are often seen in the area. As per discussed with Rajban Forest Range officials it was found that Sloth bear (*Melursus ursinus*), Sambhar (*Rusa unicolor*) and Leopard (*Panthera Pardus*) are seen occasionally in the upper reaches of the project study area.

Table 4-15 List of important Mammal species recorded in the study area

S. No	Zoological Name	Common Name	Conservation Status
1	*Macaca mtdatto*	Rhesus Macaque	LC
2	*Semnopithecus entellus*	Common Langur	NT
3	*Lepus nigricollis*	Indian Hare	LC
4	*Funambulus pennanti*	Five-striped Palm Squirrel	LC
5	*Pteropus giganteus*	Indian Flying Fox Bat	LC
6	*Apodemus svlvaticus*	Field Mouse	LC
7	*Melursus ursinus*	Sloth bear	VU
8	*Rusa unicolor*	Sambhar	VU
9	*Panthera pardus*	Leopard	VU

Source: *CEA survey, LC=Least Concern. VU= Vulnerable, AT=near threatened*

4.3.3.4 Fishes

During survey some fish species were identified from the Giri, Tons and Yamuna rivers. Most common and predominant fish present in the catch was endemic golden mahseer (Tor spp) followed by other fishes including Schizothorax spp., Barilius spp., Channa spp., Glyptothorax spp, Bagarius spp, Puntius spp. None of the fish species recorded from the study area are listed in various schedules of the Indian Wildlife (Protection) Act 1972 or listed in the IUCN Red List as Threatened Animals (2006).

The common fishes of the study area are as follows (Table 4-16):

Table 4-16 Resident Fish Species Recorded in Study Area

Fish Species	Local Name	Common Name	Life Stage encountered	Dwelling habits	Feeding habits	Breeding period
Family: Cyprinidae						
Tor puNlora (Hamilton	Mahseer chiniaru	Golden mahseer	Fingerlings and Adults	Column and mid water dweller scavenger	Column Ormnivorous: green matters, insects and their larvae, phyto benthos, Zoo benthos.	Monsoon months
Sclrrolborax richardsoii (Gray)	Sal	Himalayan trout	Fingerlings and Adults	Midwater dweller	Herbivorous: green matters, algae attached on stones, phytobenthos etc.	August to October
Labeo deco (Hamilton)	Gid	Sairu	Fingerlings and Adults	Midwater dweller scrapper	Herbiomnivorous: macrophytes, Insects, Phytobenthos, Zoobenthos	March to June
Barilius spp. i. B. bendelesis ii. B. barila iii.B. vagra	i.Patha ii.----- iii. Lohari	Hillstream carp	Juveniles, fingerlings and Adults	Column of side waters/ ditches on the bank of small tributaries	Omnivorous: small insects, phytoplankton, zooplankton	February to June *Found in Sep-Nov.

Puntius spp. i. P. ticto ticto ii. P. sarana	ii. Khangni	Minnows	Adults	Shallow pools and riffles	Column feeder, Planktonic feeder	-
Family: Siluroidie						
Bagarius bagarius	Goonch	Hillstrear catfish	Adult	Bottom dweller beneath stones	Scavengers: Feed upon animal flash, Insects	-
Family: Sisroidie						
Gly*ptothorax* spp.	catfish	Hillstream	Adults	Bottom dweller beneath stones	Scavangers: Feed upon animal flash, Insects	-
Family: Channidae						
Channa orientalis	Dauli	Snake head	Adults	Shallow pools and muddy water	Carnivores, small insects and zoo benthos	-

*None of the Fish is in IUCN Red List

Source: CEA, surrey

4.4 SOCIO-CULTURAL ENVIRONMENT

4.4.1 Demographic Features

Gumma to Fediz Section of NH-707: Project road falls in two districts of Himachal Pradesh state. Demographic and socioeconomic details of Himachal state and both districts namely Shimla and Sirmaur are given below:

4.4.2 Socio-economic Profile of Project Affected People

The majority of the potentially affected / benefited persons living in the project Influence zone frequently travel down the existing roads or proposed alignment of the project. Their purpose of visit brings them generally to the prominent market places by the roadside or transport boarding points alongside the road. Other beneficiaries also pass through the important junctions of the feeder roads connecting the project roads / proposed alignment. There are administrative offices, places of worship, community structures, in the major settlements within the project impact zone.

Table 4-17 Socio Economic Profile

State/District	Himachal		Shimla		Sirmaur	
Population	2001	2011	2001	2011	2001	2011
Persons	60,77,900	68,56,509	7,22,502	8,13,384	4,58,593	4,72,926
Male	3087940	34,73,892	38,0,996	4,24,486	2,41,299	2,46,599
Female	2989960	33,82,617	3,41,506	3,88,898	2,17,294	2,26,327
Population Density per Sq. km	109	123	141	159	162	188
Literacy Rate %						
Male	86.02	90.83	87.72	90.73	63.2	79.73
Female	68.08	76.6	70.68	77.8	38.45	60.93
Sex ratio	970	988	898	916	897	901
Human Development Index	0.518		0.409		0.433	

Source: District Statistical office. Nahan, Dist.

4.4.3 Agriculture

The agricultural sector of the Himachal Pradesh Economy contributes over 45% to the net state domestic product and nearly the entire population of the state depends directly upon agriculture.

Gumma to Fediz road section of Himachal located in the Plains & Rolling and Hilly both terrains. There is paddy, maize, sugar cane etc., cultivated intermittently. Since there is no water scarcity along this alignment, the area is used for cultivation. Around 17% of project area population are doing agriculture related works.

Himachal Pradesh is known as the Apple State of India. However, apples are grown in upper parts of the project highway as Rohru, Jubbal and Chaupal and transported through the project road.

5. PUBLIC CONSULTATION

5.1 INTRODUCTION

The ***Gumma to Fediz Section of NH-707*** project will bring overall benefits to the people in the area as well as to those living close to the corridor. However, a few are likely to experience negative impacts, which can be overcome through proper mitigation measures. Throughout the process of consultation, the focus was on understanding community impacts and to obtain their feedback to effectively establish appropriate road design and implementation.

5.2 METHODOLOGY ADOPTED FOR PUBLIC CONSULTATIONS

5.2.1 Levels of Public Consultations and Profile of Stakeholders

Public consultation was conducted at project preparation stage. Public consultations have been held at the levels as follows:

Local level:

Public consultations in the project area were held at local level. The following steps have been adopted for carrying out public consultations in this project:

- Disseminating information and requesting villagers to attend the public consultation meetings through village Sarpanch and field staff.
- Sharing the opinions and identify the local environmental issues.
- Involving the PAPs to avoid/mitigate the impacts.

Institutional level:

- Institutional level consultations were held with Himachal Pradesh Forest Department and Himachal Pradesh State Pollution Control Board.

5.3 CONSULTATION PROGRAMME

Focus Group Discussions (FGDs) were held at two (2) locations along the ***Gumma to Fediz Section of NH-707 project road.*** During the FGD, interaction/discussion was held with the general public and the village Sarpanch. The public consultations in the project area were mainly conducted at the local level i.e. at village level

The details of the stakeholder consultations including the date, location, participants, the issues discussed and the outcome / mitigation measures (design) is summarized in table below:

Detailed Attendance sheets of these consultations are presented in **Annexure –I.**

Table 5-1 Summary of Local level Consultations at *Gumma to Fediz Section of NH-707*

Project Corridor	Location	Chainage	No. of participants	Typical Issues	Remarks
Gumma to Fediz Section of NH-707	Antroli Village	98+300	18	• Drainage problem • Road Safety • Bus Stop • Dust suppression measures should be adopted • Provision of speed breaker • Relocation of Structures • Junction Improvement	Issues considered in design
	Near Starting Point Gumma Village	95/000	16		

5.4 DETAILED ISSUES RAISED

Some of the general issues raised during the different consultation sessions can be summed up as follows.

Loss of Income Restoration Options

This issue was raised by most villagers as loss of fertile land will deteriorate their income sources. Instead of lump sum money they were more interested in limited regular income.

Road Safety

Safety issues were paramount in all the consultation sessions i.e. curve improvement, Traffic calming measures etc. Woman participants raised the issue of their children's safety.

Drainage

Water logging and divide of agricultural land in two parts are one of the important concerns of public.

Higher Level of Pollutants due to Increase in Traffic

People were concerned about pollution levels in the area after construction of the project road. Some of the participants were also concerned about noise pollution after construction. Vegetative noise barrier are proposed to minimize the noise pollution at several locations as specified in above table.

5.5 REDRESS OF ISSUES

The project has tried to address all the issues raised during consultations under the constraints of suitability from engineering point of view. A table of general issues that arose during public consultations and their redress has been presented in Table 5-2.

Table 5-2 Address of General Issues and Concerns under the Project

Issue/Concern	Redress Under the Project
Loss of Income Restoration Option	People will be compensated a s per R&R framework (The detail is provided in RAP document prepared by HPSPCB).
Road Safety	Traffic calming measures (at all intersections), crossing points have been proposed for the safety of local people. Hazard markers, RRPM, road marking etc. have also been provided. Crash barrier has also been proposed throughout the alignment
Land Acquisition and Mode of Compensation	Compensation will be made as per RAP
Flood Problem	Total 38 nos. culverts have been provided at various locations
Drainage	Drainage has been provided throughout the alignment
Loss of Trees	Compensatory forestation would be done at the ratio of two trees for each tree to be cut. Local species of trees have been selected for plantation.
Impact on Health	Further study has been suggested to study the impact of bypass on community's health. Roadside plantation has been proposed to screen emissions from the traffic reaching the settlement areas.
Utilities and Basic Infrastructure	All the utilities and basic infrastructures to be impacted will be relocated under the project cost.
Employment During Construction	The locals will be given preference for employment during construction provided they meet job requirements.

5.6 PHOTOGRAPHS

LOCATION: VILLAGE-ANTROLI (98+300)

LOCATION: NEAR STARTING POINT GUMMA VILLAGE (96/200)

6. ANALYSIS OF ALTERNATIVES

6.1 GENERAL

The mandate of the current project is to widen the existing road to 2 lanes with provision of paved shoulder in the build-up sections and hence there is no alternative site is involved. However, the chapter discusses on the “With” and “Without" project scenarios. The methodology that has been adopted for the evaluation of the alternate alignment route for construction of Project Road and the selection is based on engineering, economic, environmental and social considerations have been highlighted. The minimization of environmental impacts by considering design alternatives determines the extent of mainstreaming of the environmental component. This chapter looks at the decisions made during the project when alternatives were available and describes the rationale behind each decision. The EIA study with EMP and without EMP has also been discussed in the context of Gumma to Fediz project.

6.2 WITH AND WITHOUT PROJECT ALTERNATIVES

Keeping in view the site conditions and the scope of development of the area, the `with' and `without' project scenarios have been compared as given in **Table 6-1.**

By looking at the table it can be concluded that "With" project scenario positive/beneficial impacts will improve the environment and enhance social and economic development of the region compared to the "Without" project scenario, which will further deteriorate the present environmental setup and quality of life. Hence the "With" project scenario with minor reversible impacts is an acceptable option than the "Without" project scenario. The implementation of the project therefore will be definitely advantageous to achieve the all - round development of the economy and progress of the region.

Impacts on vegetation are expected during construction phase. Little increase in the pollution levels of the air is possible. Dust and particulate matter during construction will affect the air quality on a short-term basis. However, an important benefit which is not represented in this assessment will be major reduction in the Particulate Matter (PM 10 and PM2.5) levels from vehicles using a surfaced road (with project scenario) in the build condition, compared to a continued use of dusty unsurfaced/tracks (without project scenarios). The minor impacts due to air; noise, vegetative cover and soil erosion will be remunerated by adopting appropriate mitigated measures such as roadside plantation, arboriculture and landscaping, compensatory afforestation, and providing underpasses and bio-engineering measures with retaining structures.

Table 6-1 'With' and 'Without' Project Scenario

Component	Without' Project Scenario	With' Project Scenario
Connectivity and development	Without' Project Scenario The connectivity between the other National and State Highways is not good. Existing connectivity with Delhi, Haryana and Uttarakhand need to be apples Pavement conditions are in poor condition resulting in high travel time, bad vehicle conditions, and more pollution. Poor pavement conditions restricting people's access to local market, Medical facilities, education centers, work zones etc.	It will improve inter-connectivity between other National Highways (NH-707, NH-124 and various PMGSY roads). Connectivity with Haryana, Delhi and Uttarakhand will improve. Travel time will be reduced due to improved pavement conditions and road geometry and hence Pollution levels will be reduced as well. Trade of local produce like dairy products, agriculture products, and small scale industrial product will also be increased.
Flora	There will not be any impact on existing terrestrial ecology.	-
Social and Cultural Environment	There will not be any impact on existing social and cultural environment.	03 structures (Encroachments) including and none of the common property resources will be affected due to proposed widening. Necessary R&R plan has been developed to reduce the socio economic impact due to the proposed project.
Carriageway	2 lane/ intermediate / earthen shoulder	Intermediate lane with has been proposed to improve the road condition

Drainage/ Water logging	Water logging issues are observed along the road side specially settlement area due to absence/non-functional drains.	Will be improved by reconstruction of culverts/ bridges with adequate hydraulic (details are provided in Chapter-2 Project Description) New cross drainage structures and drains are also provided to address the flooding and water logging issues.
Financial Implications	Without project scenario does not involve any capital cost, but there will be recurring maintenance cost to maintain the smooth flow of traffic.	The environmental cost as per environment assessment will be about 24,94,16,431/-.

Therefore, "With" project scenario, with its minor adverse impacts is more acceptable than the "Without" project scenario which would mean an aggravation of the existing problems. The potential benefits of the proposed road improvements are substantial and far-reaching both in terms of the geographical spread and time. Hence, it is clear that the implementation of the project will be a definite advantage to State of Himachal Pradesh in order to achieve all-round development of its economy and progress of its people.

The project will have multiple benefits. The project will release the potential of the area and fast connectivity between Himachal Pradesh Uttarakhand and Haryana. Being improved limestone linkage from Sataun, there is further scope of installation of 17 Nos. new factories at Gumma, which is under active consideration of Government of Himachal Pradesh.

Further, there is vast scope for many pharmaceutical industries and limestone industries after up-gradation of NH707. This project will also reduce the travel time substantially. In addition this project road will provide further other benefits like:

- Fast and safe connectivity resulting in saving in fuel, travel time and Total Transportation cost to the society;
- Employment opportunities to local people during road construction;
- Development of local industries, agriculture and handicrafts;
- Development of tourism and pilgrimage;
- Transporting, processing and marketing of agricultural products; Reduction in accidents;

Reduction in pollution;

- Opening of opportunities for new occupations;
- Better approach to medical & educational services and quick transportation of perishable goods like fruits, vegetables and dairy products; and
- Improved quality of life for people and so on

However, there would be an increase in the vehicular pollution-air and noise, in the vicinity of the

highway. This road construction will result in loss of private properties and loss of living.

If the project is not implemented, there is likelihood that the roads presently carrying the traffic between Paonta Sahib and Gumma will deteriorate further and rampant traffic disruptions will hinder the free flow of the traffic. Increased air pollution, due to slow moving traffic and congestion, will follow suit. Noise levels in built up portions will rise due to deterioration of the pavement as well as increased honking.

SAFETY ASPECTS

While assessing the impacts, safety of the road users and the roadside communities has been found to be a major concern. A number of measures have been proposed to reduce the risk of traffic accidents. In some places, these safety measures are co-terminus with the project's impact minimization measures. Horizontal profile correction and intersection improvement has been suggested for betterment of the project corridor. Other safety measures taken are:

- Improvement of existing curves,
- Improvement of existing Curve at bridge approaches.
- Provision of adequate traffic signage,
- Widening of bridge with footpath in built-up location,
- Embankment protection in approaches to bridge
- Foot path and pedestrian guard rails in built up zone,
- Improvement of existing highway junction
- Retro-reflective painting on roadside plantations.

6.3 EIA WITHOUT EMP

The Environment Impact Assessment (EIA) without Environment Management Plan (EMP) will not be complete. The Coverage for project will be limited to establishment of baseline scenario and extent of impact due to project implementation. Without EMP the project implementation will be difficult, as inconvenience to local public will increase. This will result in resistance of local public to the project.

Environmental Management Plan suggests the environmental treasures to monitor, mitigate and manage the adverse impacts of the project on the components of valued ecosystem. If a project is implemented without EMP it will be environmentally disastrous.

6.4 EIA WITH EMP

The EIA with EMP will be more fruitful as it will have detailed mitigation measures, budget and monitoring plan for the project - for pre-construction, construction and operation phases. The EMP will help to mitigate adverse impacts of project, a plan for monitoring to check the efficacy of mitigation measures is also laid out in the design of EMP. The implementation of EMP will also reduce inconvenience to local public during construction and the project will become environmentally sustainable and human friendly.

6.5 CONCLUSION

The analysis indicates little choice of alignment alternatives for the Gumma to Fediz Project. Socioeconomic and Environmental considerations have been given due weightage in the finalization of

the alignment.

The minor adverse impacts are manageable to an acceptable level by implementing Environmental Management Plan and the unavoidable loses will be compensated as per the applicable R&R guiding principles.

7. ENVIRONMENTAL IMPACTS

7.1 GENERAL

Due to the activities of the proposed improvement there will be some potential impacts on the surrounding environment of varying magnitude. Impacts have been assessed based on the information collected from field surveys, baseline data collection studies and additional secondary data collected as part of the study.

The impacts on the natural, biological and social environment can be direct or indirect. Areas of pollution generated include the Corridor of Impact and Operational Facilities of the Contractor. Environmental Impacts due to the project are summarized in **Table 7-1.**

Table 7-1 Environmental Impact Summary

Sr. No.	Parameter	Gumma to Fediz Section of NH-707
I. Negative Impacts		
1	Hand Hand Pumps/Tube 1Relocation (Nos.)	2
2	Pond Area (sq. m)	0
3	Relocation of Religious properties	0
4	Transfer of Agricultural land (ha.)	0
5	Borrow Earth (Cum)	Nil
6	Quarry Material (Cum)	130879
7	Water (cum)	107675
II. Positive Impacts		
1	**Enhancement sites**	
A	Cultural/Religious Properties	0
B	Surface water body	River tons
C	Educational Institute	0
D	Safe Access to educational institution	0
E	Enhancement of Bus bays/Bus shelter	1
F	Vegetative Screen Barrier	0
G	Tree Saving (Nos.)	-
1	**Proposed Plantation – Bamboo plantation**	5700 sqm
2	**Road safety Measures - Modified Thrie beam Crash Barrier on valley side**	
A	Major junction improvement (nos.)	1
B	Proposal for Rotary Junctions (nos.)	0
C	Bus Shelter (nos.)	5
D	City Lights/ solar light in buildup area	26
	ELECTRIC LIGHTS single arm	10

7.2 IMPACTS ON PHYSICAL ENVIRONMENT

7.2.1 Impact on Soil

Loss of Productive Soil

Top soil will not be used in the road construction work.

Soil Erosion

Construction Stage

Slopes of the project road are relatively stable as the embankment of the road is not high compared to the adjacent lands.

Operation Stage

There will not be any soil erosion during the operation stage as slope of embankments will be protected with appropriate slope protection measures.

Compaction of soil

Compaction of soil may occur, particularly on haul roads during site clearance due to movement of heavy machinery and vehicles and during setting up of construction camps and stockyards. During construction, there is a possibility of compaction beyond the COI, due to the movement of vehicles and heavy machinery.

Contamination of Soil during the Construction Stage

In this project contamination of the soil may take place, from the following activities at the construction zones, construction labour camps, construction plant sites and other auxiliary facilities required for the construction. Details of the activities from which the contamination can occur are presented below;

- Scarified bitumen wastes.
- Maintenance of the machinery and operation of the diesel generator sets on site.
- Oil Spill from the operation of the mechanical works hops, diesel pumps and diesel storage, during transportation and transfer, parking places, and diesel generator sets.
- Operation of the emulsion sprayer and laying of hot mix.
- Operation of the residential facilities for the labour and officers.
- Storage and stock yards of bitumen and emulsion.
- Excess production of hot mix and rejected materials.

Table 7-2 gives the details of debris generated and reused. From the table it can be observed that all excavated material can be used for embankment fill. The remaining quantity of earth will be procured from approved borrow areas.

Table 7-2 Details of the Quantities of Debris and Spoil

Excavated Material	Qty. likely to be generated (Cum)	Qty. Required for Embankment Fill (Cum)	Debris Unused/ disposal qty. (Cum)
Scarified Bituminous	4745.183	74439.64	298178.722
Concrete	4861.179		
Spoils/earth/other debris	363012		
Total	**372618.362**	**74439.64**	**298178.722**

7.2.2 Impact on Water Resources

Due to the proposed project there will be some impacts on the water resources. The impacts are due to relocation of hand pumps, use of water for the construction and construction facility operations and accident spills during operation stage.

Details of the water resources affected due to the project are presented in **Table 7-3.**

Table 7-3 Affected Hand Pumps and Wells

Hand Pumps (Nos.)	Bore Wells (Nos.)
2	-

Increased surface run-off

Due to the construction of new pavement and construction of the paved shoulder, the surface runoff may marginally increase as the increased paved surface area reduces the infiltration of water into the ground. There will not be a significant impact on the ground water levels.

Impacts on Water Quality

The sources of water pollution from the construction activities are as follows:

- Water flow from scarified bitumen materials.
- Oil spills from the Maintenance of the machinery and operation of the diesel generator sets on site.
- Oil Spill from the operation of the mechanical workshops, diesel pumps and diesel storage, transportation and transfer, parking places, and diesel generators.
- Operation of the emulsion sprayer and laying of hot mix.
- Operation of the residential facilities for the labour and officers and offices.
- Storage and stock yards of bitumen and emulsion.
- Degradation of water quality is also possible due to accidental discharges into watercourses from drainage of workers camps and from spillages from vehicle parking and/or fuel and lubricant storage areas.

Water requirements for construction

With the following assumptions the approximate water quantity required for the Project has been calculated.

1. 8-10% of weight of soil for the embankment construction.
2. 7-8% of weight of soil for sub grade construction
3. 5-6% of weight of GSB materials for GSB and WMM
4. 150 liters/ cum for concrete

Domestic requirement of 100 liters per worker/day has been assumed. For this project about 50 resident workers have been considered. Details of the water requirement assessed for the project is presented in **Table 7-4.**

Table 7-4 Requirement of Water for Proposed Construction Works

Sr. No.	Purpose	Qty. (Cum)
1	Permanent works (Total quantity in cum)	15
2	Dust Suppression at work zone in (cum/day)	30
3	Curing (cum/day)	15
4	Laboratory (cum/day)	10
5	Haul Roads (cum/day)	20.5
6	Crusher (cum/day)	22
7	Plant Cleaning and workshop washing in (cum/day)	15
8	Domestic Purpose in (cum/day)	20
Total Requirement(cum/day)		**147.5**

Daily water requirement for the permanent works has been calculated based on the total working days (i.e. 730 days) .

7.2.3 Impact on Air Environment

In addition to the direct impacts during the preconstruction, construction and operation phases, the ribbon development adds to the pollution load along the road and will increase the closeness of the receptors.

The Air pollution sources and types has been described in **Table 7-5.**

Table 7-5 Summary of Air Pollution during different stages

Stage	Likely Impacts	Reasons/Activities for Impacts	Remarks
1. Pre-Construction Stage	• Dust Generation	• Site clearance/Grubbing • Cutting of Trees/Shrubs • Transportation of Man and Material • Construction of Stock Yard and office buildings • Installation of Construction plants • Activities performed in Dry	• The impacts are temporary and location specific. • The width of impact is limited.

		Weather	
2. Construction Stage	• Increases the level of PM10 and PM2.5. • Increases the Gases Pollutant level (i.e. CO, SOx and NOx) • Carbon based emission from HMP • Impact on agricultural land having crops, vegetation etc.	• Clearing and grubbing, material dumping, drying of material etc. • Movement of vehicles in Construction camp, • Transportation of quarries/aggregate and soil from borrow area. • Operation of HMP, WMM and Batching Plant. • Emission of fine dust/ rejected material from bag filters of HMP. • Material Storage and handling (loading and uploading). • Construction machinery and vehicle uses.	• The impact area is particularly near working zones, plant sites.
3. Operation Stage	• Dust generation • Emission from vehicular tyres. • Increase the gases pollutant from diesel vehicles (i.e. trucks, buses, cars, utilities etc.)	• Increases the Vehicle moment in rural area. Presently the area is agricultural land and does not have commercial vehicle moments. • Abrasive action of tyres on bypass road.	• The impact is permanent

7.2.4 Noise Environment

The impacts of noise due to the project will be of temporary significance locally in the construction phase and slight increase may occur during the operation stages. However as the present noise levels are already high the impact will be relatively low. The impact is tabulated in **Table 7-6**.

Table 7-6 Summary of Noise Impacts at different stages

Stage	Likely Impacts	Reasons/Activities for Impacts	Remarks
1. Pre-Construction Stage	• Noise level/exposure will increases for the local communities as the proposed road will passes through agricultural and residential rural area.	• Use of heavy Machinery and Equipment for Site Clearance/Grubbing. • Transportation of Man and Material • Construction of plant sites.	• The impacts are temporary and location specific. • The width of impact is limited and not significant.

2. Construction Stage	• The impacts of noise exposure will be on the community residing near to the work zones. • The activities of plants (i.e. HMP, WMM etc.) and DG sets shall produce significaly high noise level.	• The use of machinery involved in the construction operation i.e. dozer, roller, grader, paver, tractors, brooms/rotary brushing, tippers, generators, excavators etc. • Operation of HMP, WMM, Batching Plant and DG sets.	• The impact area is particularly near work sites, plant sites and will also vary for different receptors. • The impact will be quite significant but will be localized to the plant sites.
3. Operation Stage	• Possibly Higher Ambient Noise level on Day and Night time in agricultural and rural residential area near to proposed bypass.	• Uninterrupted movement of heavy and light vehicle on high speed.	• The impact is permanent

The impact on village noise pollution may be significant caused by traffic. Therefore, measures are required to reduce noise from traffic passing through project area.

7.3 NATURAL ENVIRONMENT IMPACT ON ROAD SIDE TREE

The major impact in this project on flora involves the removal of trees to permit construction and to provide clear zone for safety of the road users.

Pre-Construction Stage

Cutting of trees for fuel by workers, especially near their camps is of major concern. Therefore, adequate training of the workers and availability of their fuel requirements are to be ensured by the Contractor.

Operation Stage

Trees and shrubs will be planted along the project corridor; aesthetic view of the corridor will be improved.

Under the proposed project the road aesthetics will be improved by the way of tree plantation, landscaping of embankment slopes, improving the road cross sections providing more bus bays, foot paths, medians and drains. The aesthetics may be reduced during the pre-construction and construction stage and will be improved during the operation phase.

Construction Stage

During construction, the initial visual impacts will be associated with the removal of encroachments from Corridor of Impact and structures from the acquired land, removal of cultural properties, clearing of mature trees and vegetation for the construction activities. These activities create significant differences in the local aesthetics of which some are negative and some are positive. Some activities pose positive impacts such as creation of clearer views along roads or from roadside houses and other buildings that were previously blocked by encroachments. Changes in the aesthetics during the construction stage are generally temporary negative impacts.

7.4 IMPACT ON SOCIO-CULTURAL ENVIRONMENT

7.4.1 Economic Impacts

The direct economic benefits from the strengthening of the state road transport infrastructure include:

- Reduction of Vehicle Operating Cost.
- Lower transport costs by reducing road roughness and improved alignment.
- Improving financial sustainability for road development and maintenance.
- Increased vehicle speeds.
- Reduced passenger time costs.

The relatively short-lived economic impacts of the construction stage are likely to be experienced in local communities for the duration of construction as workers make everyday purchases from local market. This is likely to give a short-lived stimulus to these vendors that will disappear as soon as the construction is complete.

7.4.2 Impact on Religious and Historic Sites

Along the proposed Road no cultural, heritage and religious structures of National and State importance are present.

7.5 IMPACT ON SAFETY AND PUBLIC HEALTH

7.5.1 Impact on Safety

Construction stage

During the road construction operations there will be some discomfort, even after providing proper safety measures, to the pedestrians, community residing near the construction zone. The levels of discomfort can be reduced with proper planning of construction works and providing required construction zone safety measures. Special attention must be given while working in urbanized work zones.

Operation stage

After construction of Project road there will be some negative impacts. The negative impacts are due to increase of traffic volumes and speeds, which would have a direct bearing on the risk exposure to accidents. There will be potential for increased collisions between vehicular traffic travelling at higher speeds between traffic travelling through link roads (i.e. Gumma to Fediz) as well as pedestrians using the roads.

7.5.2 Impact on Public Health

Pre-Construction and Construction Stage

The following health hazards will result due to the project activities:

- Due to the influx of the workers for the construction works there will be some discomfort to the local environmental system if the proper sanitation facilities are not constructed and operated. These include setting up of labour camps near the road alignment, at construction plant sites. There will also be some increased demands on the local infrastructure such as electricity, water supply and medical facilities.
- Due to migration of the workers from other places there is possibility of transmission of the communicable diseases. During the construction stage work, crews and their dependents may bring with them a multitude of communicable diseases including sexually transmitted diseases (STDs) like AIDS. This is likely, as the project requires more male-workers, who have migrated from other parts of the state or country.
- During Corridor construction and its allied activities dust will be generated, which will create discomfort to the local people.
- Noise generated during the construction activities may cause temporary local nuisance to nearby communities.

Operation stage

After the completion of the project there will be both positive and negative impacts on the public health. The positive impacts include increased speed of accessibility to local and regional health centers and other community support facilities.

Health impacts due to vehicular pollution: Health impacts associated with road projects in operation stage are long-term impacts. General health impacts will be respiratory infections and lung infections. Respirable Particulate Matter (RPM) i.e., particulates of size less than 10µm are a major cause of the infections and allergies. They enter human body through inhalation. These particulates are more in the emissions of heavy diesel vehicles. Hence, higher volumes of heavy vehicles increase the pollution load and consequent health impacts. Hydrocarbons from exhaust emissions are carcinogenic at high concentrations. Though impacts due to higher emissions exist, such severe impacts shall be at concentrations higher than those generated by the project. However, there will be the potential for adverse impacts on public health related to increases in noise, especially as traffic volumes increase. Impacts associated with noise are also long term and restricted to the direct area of influence.

8. AVOIDANCE, MITIGATION AND ENHANCEMENT MEASURES

8.1 OVERVIEW

The best way of impact mitigation is prevention but this would stop all development. As far as possible avoidance and reduction of adverse impacts approaches were adopted during the design stage with consideration of the views of environmental and social experts. This is reflected in the designs of the cross sections, construction methods, construction materials and alignment.

The main impacts identified have been addressed during design wherever possible and will be further mitigated by the construction procedures and specific measures provided in the contract drawings and specifications. These are summarized in **Table 8-1.**

Table 8-1 Key Environmental Impacts and Management in the Project

Issue	Addressed in design	Addressed in Implementation	Operation
Flooding/ Drainage	Total 38 nos. culverts have been provided at various locations and Drainage has been provided throughout the alignment	Keep channels clear prior to monsoon period.	Maintain culvert channels
Tree removal	Minimize by alignment selection for proposed ROW.	Control tree cutting operations for minimize the possibility of damage to nearest plants/ shrubs during construction stage Implement afforestation Programme in 1:3 ratio.	Monitor plantation Programme and check survival rates
Erosion	Identification of erodible soils. Treatment of embankment slopes and stream inlet and outlet.	Close control of timing of embankment treatment after earthwork operations.	Monitor and maintenance.
Borrow Areas	Minimized borrow requirements with reuse of the excavated material /earth in embankment formation.	Select suitable sites with land owners and cultivators Rehabilitate with topsoil	No action required
Road Safety	Provided median for all section to avoid head on collision.	Provide safe traffic management methods as specified in	Monitor Accidents

	Provided traffic calming measures near junctions and village area. Provided pedestrian crossings. Crash barriers has been proposed throughout the alignment. Provide high standard of road signs, RRPM, hazard marker and markings as per IRC codes	documents.	
Air Pollution	Wider road with paved shoulders will reduce use of unpaved shoulders.	Siting of work areas/camp site etc. away from sensitive receptors. Modern well maintained construction equipment with PUC certificates. Dust suppression measures on plant i.e. maximum paved area, sprinkling of water etc., diversions and haul roads.	National Motor Vehicle emission controls.
Noise Pollution	Impossible for project to lower existing high noise levels. Selected flexible pavement. Vegetation barrier for noise reduction at source	Sitting of work areas away from sensitive receptors. Use of well-maintained construction equipment and machinery. Acoustic enclosures for DG sets.	No action required
Aggregate / Sand	Use only controlled renewable resources	Conform to regulations	No action required
Debris disposal	Minimized the debris generation.	Use scarified material and spoils in embankment fill as filling is required for the project.	No action Required
Land	Provide shortest alignment for corridor where social disruption outweighs loss of agricultural land.	Reinstate site working areas on completion of works	No action Required

8.2 PHYSICAL ENVIRONMENT

8.2.1 Environmental Management at Quarries

The Contractor will ensure that the quarries have all appropriate licenses.

8.2.2 Soil

Soil Erosion Control Measures

For control of the soil erosion from the embankments the slopes have been restricted to 1 vertical: 2 horizontal for entire sections;
Surface erosion is prevented and controlled by adopting following methods:

A. Hedge Brush Layer-

This shall be provided in the landslide zone or places having soft rock/ soil to protect the hill slope from crumbling/weathering. This shall be provided over the embankment on valley side throughout the project road (except the stretches in built-up area, Bridges and Culverts) to prevent the compacted material from sliding into the valley.

Figure 8-1 Hedge Brush Layer

Hedge brush layer method is proposed from 97+750 to 99+200 total length is 640 RM. The detail is given below:

Table 8-2 Details of Proposed Hedge Brush Layer

Chainage		Side	Length of Treatment (in RM)
From	To		
97+750	97+950	LHS	200
98+160	98+350	LHS	190
98+450	98+500	LHS	50
99+200	99+400	LHS	200

B. Bamboo Net Plantation

This shall be provided in the proposed dumping sites to check sliding of dumped material. Bamboo for the said technique may be procured from the low lying parts of the state. A National Bamboo Mission (NBM) under Centrally Sponsored Scheme-Mission for Integrated Development of Horticulture (MIDH) is being implemented in Himachal Pradesh since 2006-07.

Figure 8-2 Bamboo Net Plantation

Bamboo Plantation method is proposed from 97+550 to 103+550 total length is 1900 RM. The detail is given below:

Table 8-3 Details of Proposed Bamboo Plantation

Chainage		Side	Area (in m^2)
From	To		
96+960	97+750	Hill	7900
97+950	98+050	Hill	1500
99+400	99+500	Hill	1500
99+700	99+950	Hill	3750
101+740	102+190	Hill	4500
102+850	103+050	Hill	7900
Dumping site-1 slopes		Valley	7145
Dumping site-2 slopes		Valley	3833

C. Hydroseeding

Hydroseeding is a method of seeding that consists of applying a mixture of water, seed, wood fiber, and soil stabilizer (if used) with hydroseeding equipment.

INSTALLATION/CONSTRUCTION PROCEDURES Hydroseeding will be done immediately after completion of a phase of grading. Hydroseeding can be accomplished using a multiple-step or one-step process. The multiple-step process ensures maximum direct contact of the seeds to soil. When the one-step process is used to apply the mixture of seed, fiber, etc., the seed rate shall be increased to compensate for all seeds not having direct contact with the soil. Follow-up applications shall be made as needed to cover weak spots. Avoid overspray on existing vegetation, waterways, sidewalks, and roadways. Straw or other mulch should be applied to reduce the erosive capacity of storm water and keep soil and seed in place.

Figure 8-3 Hydroseeding

Hydroseeding method is proposed from 95+520 to 102+690 total length is 1740 RM. The detail is given below:

Table 8-4 Details of Proposed Hydroseeding

Chainage		Side	Length of Treatment (in RM)
From	To		
95+570	95+720	LHS	150
96+050	96+100	Hill	50
96+600	96+700	Hill	100
98+500	98+650	Hill	150
99+200	99+400	Hill	200
99+500	99+700	Hill	200
100+970	101+170	Hill	200
101+470	101+670	Hill	200
Dumping site-1 slopes		Valley	130
Dumping site-2 slopes		Valley	200
Total Area (minimum)		23477 m^2	

D. Geocell with Hydroseeding

Geocell with Hydroseeding shall be provided in sliding zones

Sr. No	Design Km		Length	Side (Hill Side/ Valley Side)
	From	To		=
1	95+520	95+570	50	Hill side
2	95+900	95+930	30	Hill side
3	96+520	96+570	50	Hill side
4	98+800	98+850	50	Hill side
5	101+170	101+270	100	Hill side
6	101+370	101+470	100	Hill side
7	101+690	101+740	50	Hill side
8	102+630	102+690	60	Hill side
9	Total Area (Minimum)		12900 m2	

Soil Contamination

For the prevention of the soil contamination the following control measures shall be implemented effectively:

Construction Stage

- Impervious concrete base and a sump will be constructed at all the fuel, waste oil and bitumen, emission and chemical storage yards. A berm will also be constructed along the periphery of the concrete platforms. An oil interceptor will be constructed for providing for treating the oil wastes collected in the sumps.
- All non-toxic wastes generated from the construction sites shall be used appropriately in the Project construction.
- Some of the wastes can be reused for the development of the access roads to the construction plant sites, labour camps, internal roads, access roads to the soil borrow areas, granular sub base quarries and quarries and for any other auxiliary sites.
- Landfills of contaminated soils with the bitumen, oil and chemicals shall be avoided as far as possible, these materials shall be buried in the construction of slopes or shoulders.
- Proper collection, storage and disposal mechanism shall be in place for the solid and liquid wastes generated from site facilities during the construction stage.
- All petroleum products and chemicals meant for construction shall be stored in accordance with guidelines provided in Materials Safety Data Sheet (MSDS).
- Procedures and Plans shall be in place for cleaning up of any accidental spills.
- Checks for ensuring erosion control structures are in place before earthworks are started.
- Concrete platforms will be constructed for the parking bays.
- Washing bay with oil interceptor will be constructed for the effective collection of oil spills generated during washing.
- Platforms of the workshop shall be paved for the effective collection of oil spills.
- Oil trays shall be used for the collection of oil spills during emergency repairs of the machinery on site.

Operation Stage

During the operation stage, the probability of contamination of soil is only from spillage and road runoff. Provision has been made in the design for the collection and discharge of the runoff from the bypass road into nearest water bodies through well-designed lateral drains.

Loss of Productive Top Soil

Efforts have been made for the minimization of the use of the soil from good agricultural soil areas. As far as possible the soil excavated from the roadside will be used for the construction of embankments and sub grade construction. The borrow areas; construction camp locations; traffic detours during the construction and other construction sites shall be selected to minimize loss of the agricultural land. To conserve the productive topsoil in affected areas,

The following mitigation measures will be adopted:

- The topsoil from all areas to be restored as agricultural areas shall be stripped to 150 mm and stored in stockpiles.
- The stockpile shall be designed such that the slope does not exceed 1:2 (vertical to horizontal), and the height of the pile will be restricted to 2m.
- Stockpiles will not be surcharged or otherwise loaded and multiple handling will be kept to a minimum and stock pile shall be covered with gunny bags or tarpaulin.
- It shall be ensured that the topsoil will not be trafficked either before stripping or when in stockpiles.
- To prevent any compaction of soil in the adjoining productive lands, the movement of construction vehicles, machinery and equipment will be restricted to CoI as far as possible.
- The stored topsoil will be utilized for; covering all disturbed areas including for the redevelopment of borrow areas after filling and dressing of the slopes of road embankment.

Borrow Areas Management:

The usage of soil borrow areas is at the discretion of the Contractor who may identify set of borrow areas based on the haulage and suitability of materials. Location of source of supply of material for embankment or sub-grade and the procedure for excavation or transport of material shall be in compliance with the environmental requirements of the MoRTH specifications and as specified in IRC: 10-1961.

The Contractor has to comply with the regulatory compliance for excavation of earth from borrow area and also to the World Bank is guidelines for use and redevelopment of borrow areas .These will be provided in EMP.

8.2.3 Water Environment

Relocation of Ground Water Supply Sources

- Total 2 nos. of ground water source i.e. Hand pumps will be relocated before the construction of work, with the consent of private owner and local gram Panchyat.
- The relocation site will be identified with the consent of the local community for whom the water source is intended.

Minimize the use of natural water resources

The water required for construction will be extracted in such a manner that there will be very little disruption to the local community. The total quantity required for the Project is about 30.5 cum/day.

Mitigation for water quality degradation:

Oil Interceptor: Oil and grease from polluting run-off is another major concern. During construction, discharge of Oil and Grease is most likely from workshops, oil and waste oil storage areas, diesel oil pumps, vehicle parking areas from the construction camps.

The source is well defined and restricted. Gravity separation technique will be used for the separation of oil and water. Enough detention time is provided to allow oil to float to the surface.

For each construction camp one oil interceptor will be constructed. Wastewater contaminated with oils and waste oils and grease will be treated in the oil interceptor to remove all oil and grease spills before discharging appropriately. As far as possible the ground will be leveled in such manner that the wastewater will flow in one direction. The wastewater channels will be constructed with a slope of 1: 150 to ensure that

wastewater flows into the interceptor before discharge. Oil and grease of the oil interceptors will be cleaned once in a fortnight from outside by skimming of oil film over the surface. Figure 8-4 provides the details of the arrangement for the oil interceptor for the removal of oil and grease.

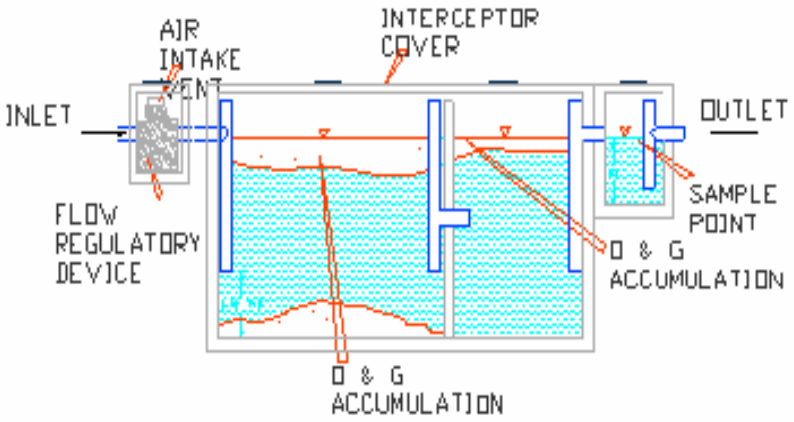

Figure 8-5 Oil Interceptor

The location of all fuel storage and vehicle cleaning areas will be at least 300 m from the nearest drain/ water body. In addition, the maintenance and repairs of vehicles will be carried out in such a way that contamination of water bodies and drainage channels can be avoided. The slopes of embankments leading to water bodies will be modified and re channeled to prevent entry of contaminants into the water body.

8.2.4 Air Environment

From the impact analysis it was observed that the expected levels of pollutants emitted from different sources over and above the contribution from back ground sources reflected that major air pollutants of concern are dust and gaseous pollutants.

Details of the mitigation measures proposed are detailed below.

The specific mitigation measures for working zone include:

- Vehicles delivering fine materials like soil and fine aggregates shall be covered to reduce spills on existing roads.
- Water will be sprayed on earthworks, temporary haulage and detours on a regular basis.
- All vehicles, equipment and machinery used for construction will be regularly maintained to ensure that the emission levels conform to the SPCB/CPCB norms.
- Air pollution monitoring plan has been delineated for construction phase separately for checking the effectiveness of the mitigation measures adopted during the construction phase of the Contract.

Mitigation Measures for Plant Sites:

- HMP plant should be well mounted with Exhaust control and dispersion system.
- Batch type hot mix plants fitted with the bag filter / cyclone and scrubber will be installed for the reduction of the air pollution
- Plant sites shall be located at a significant distance from nearest human settlement in the predominant down wind direction.
- Regular sprinkling of water should be done on plant site.
- The maximum area within the camp site should be paved to reduce the possibility of dust generation at camp site.

8.2.5 Noise Environment

An integrated strategy is proposed for the prevention and control at different stages for the reduction of noise propagation from sources to receptors. The first step is to control emission of noise at the source itself, followed by noise control within the sound transmission path and lastly is the option of protection at the receiving end like construction of the masonry walls.

Details of noise prevention and control measures for the proposed Project are described in the following sub sections.

Construction Stage

The impacts due to noise and vibration will be significant during construction stage where the settlements are located near the road alignment. For the reduction of the noise levels during the construction stage the following mitigation measures will be implemented.

- Noise standards will be strictly enforced for all site vehicles, plants, equipment, and construction machinery.
- Machinery and vehicles will be maintained regularly, with particular attention to silencers and mufflers, to keep construction noise levels to minimum. Workers in the vicinity of high noise levels must wear earplugs/ earmuffs and be engaged in diversified activities to prevent prolonged exposure to noise levels of more than 90dB(A) per 8-hour shift.
- Construction camps shall be located at about 1000 m from settlement areas. No hot mix, batching and aggregate crushing plants shall be located within 1000 m on the down wind direction of sensitive land uses such as schools, hospitals etc. In unavoidable circumstances, the time of the operation of the plant shall be limited. All the diesel generator sets to be used for the Project shall be fitted with the noise control systems such as acoustic enclosures.
- Noise levels were monitored at various locations along the road covering different land use pattern. Based on the field monitoring and other reconnaissance surveys noise barriers are proposed as follows:

8.2.6 Construction Camp

8.2.6.1 Layout of Construction Camp

The construction camps for labour accommodation, offices and construction plant sites shall be identified based on the RPCB guidelines and World Bank Guideline for Setting out of Construction Camp. Detailed guidelines are given in EMP.

8.2.6.2 Facilities at Workers Camps

During the construction stage of the Project the construction Contractor will construct and maintain necessary (temporary) living accommodation and ancillary facilities for labour. It will be ensured that all the temporary accommodation will be provided with uncontaminated water for drinking, cooking and washing. Adequate washing and bathing places shall be provided, and kept in clean and drained condition. Construction camps will be sited away from vulnerable people and adequate health care will be provided for the work force.

Sanitation Facilities: Construction camps shall be provided with sanitary latrines and urinals. Closed drainage systems and the proper treatment systems according to the local conditions should be constructed for the proper flow and effective treatment. The sewage system built for the camp will be operated properly to avoid health hazard, ground water and soil pollution. Compost pits will be constructed for the disposal of the garbage and other biodegradable wastes generated from the camps. Proper collection, transportation and disposal of the wastes will be ensured.

Shelter at Workplace: At such workplaces where the duration of the works will prevail for more than one month some form of shelters will be provided for meals, resting, change of clothes and for keeping the tools of the work and personal protective equipment. The height of shelter shall not be less than 3m from floor level to lowest part of the roof. Sheds shall be kept clean and the space provided shall be on the basis of at least 1m2 per head.

Canteen Facilities: A cooked food canteen on a moderate scale shall be provided for the benefit of workers wherever it is considered necessary. All the wastes generated from the canteen will be treated/ disposed of as detailed in the other sections of waste disposal.

Health Care Facilities: Health problems of the workers should be taken care of by providing basic health care facilities through a health center set up at the construction camps. The health center will have at least a doctor (part time), nurses, duty staff, medicines and minimum medical facilities to tackle first-aid requirements for minor accidental cases. Some arrangements will be made with the nearest hospital to refer patients of major illnesses or critical cases.

The design layout of construction camp will be provided in the EMP for ensuring the implementation of effective pollution control measures at the construction base camps and construction plant sites, redevelopment/ closure plans for the closure of these sites will be made part of the Environmental Management Plan of the construction Contract.

8.3 NATURAL ENVIRONMENT

The environment along the project road shall be enhanced, principally through plantation of various types of shade and ornamental trees along with shrubs and grasses. Tree plantations have manifold benefits. During the construction stage, all precautions will be taken to ensure that the trees outside the CoI or those not marked will not be removed. To compensate for the tree cutting, two times of the diverted protected forest area will be afforested in accordance with the Forest (Conservation) Act, 1980.

8.3.1 Landscaping Strategy for Project Corridor

Landscape strategy has been developed to enhance the visual quality and safety concern at intersection of proposed corridor.

The following improvements are incorporated in Design:

a. Plantation Scheme

Shrubs will be planted at road as part of the compensatory afforestation. Shrubs will be planted at median as antiglares for the road users and increase the aesthetic value of the road. With due importance to aesthetic value and comfort along a new road, 25 % of the species selected should be flowering species and the rest will be shade providing and fruit bearing species.

8.4 SOCIO-CULTURAL ENVIRONMENT

Relocation of the CPR affected by the Project is detailed in the Resettlement Action Plan. Relocation process will be monitored to ensure that all the structures totally affected will be relocated as desired by the local community requirements.

8.5 ENHANCEMENT MEASURES

For the proposed corridor alignment no enhancement is involved except the necessary inherently enhancements i.e. landscaping, traffic calming etc.

8.6 SAFETY MEASURES

8.6.1 Health/Safety Measures for Labors

First Aid Boxes will be placed at all work places and in the Construction Camp. Some of the workers should have received First Aid training to respond to the emergencies at the working zones and at auxiliary sites. Arrangements with nearby health centers and local doctors should be made for treating injuries. During the construction phase, workers should be provided personal protective equipment's based on the nature of the work. Details of the personal protective equipment which are to be given to the workers are presented in **Table 8-6.**

Table 8-6 List of Personal Protective Equipment

S. No.	Part of the Body	Personal Protective Equipment
1	Eye	Safety Glasses, Goggles
2	Face	Face Shields
3	Nose	Nose Masks
4	Head	Helmets
5	Feet	Safety Shoes
6	Hands and arms	Gloves
7	Bodies	Vests
8	Hearing	Earplugs, Earmuffs

8.6.2 Traffic Safety Plans

Design Stage

Safety of pedestrians as well as vehicles on the road will be of highest importance and adequate measures have been incorporated in the design of the Project. For the safety and convenience of the local people, traffic calming measures, traffic control systems and unpaved shoulders for pedestrians in the village areas has been incorporated. The details of traffic calming measures adopted along the project corridors are presented in **Table 8-7.**

Table 8-7 Locations of Traffic/Road Safety Measures at Junctions

Section	Chainage	Type of Measures
J 01	94+900	Traffic Calming & Junction Improvement
J 02	95+250	Traffic Calming , Junction Improvement & Pedestrian Crossing
J 03	97+960	Traffic Calming & Junction Improvement
J 04	98+350	Traffic Calming & Pedestrian Crossing
J 05	102+750	Traffic Calming & Pedestrian Crossing

Construction Stage

Safety during the construction will be considered as an integral part and high priority element of the road Project. All precautions required will be taken to ensure closure of the road is for minimum period and traffic delay is as limited as possible. It will also be ensured that inconvenience to the road users, community residing near the work site and the work crew and machinery will be minimized. All safety precautions will be ensured during temporary and permanent works for the road construction.

The safety practices, therefore, are oriented towards reducing the conditions that lead to such hazards and consequent stress on the driver, so as to control and regulate his behavior as warranted by the site conditions through the construction zone.

Components of the Construction Zone

- **Construction Zone** is the area of the road which is affected by the works and which affects traffic flow resulting in a conflict between the road users and the construction activities.
- **Work Zone** is the area where workmen are working i.e. excavation, overlaying improvements etc.
- **Working Space** is the space around the work area that allows the workmen to move around to do the job and will include space required for storing excavated material, plant and equipment and clear space required for swinging of equipment and excavation arms.
- **Safety Zone** is provided to protect the workmen from the moving traffic. This includes providing lateral and longitudinal buffer zones.

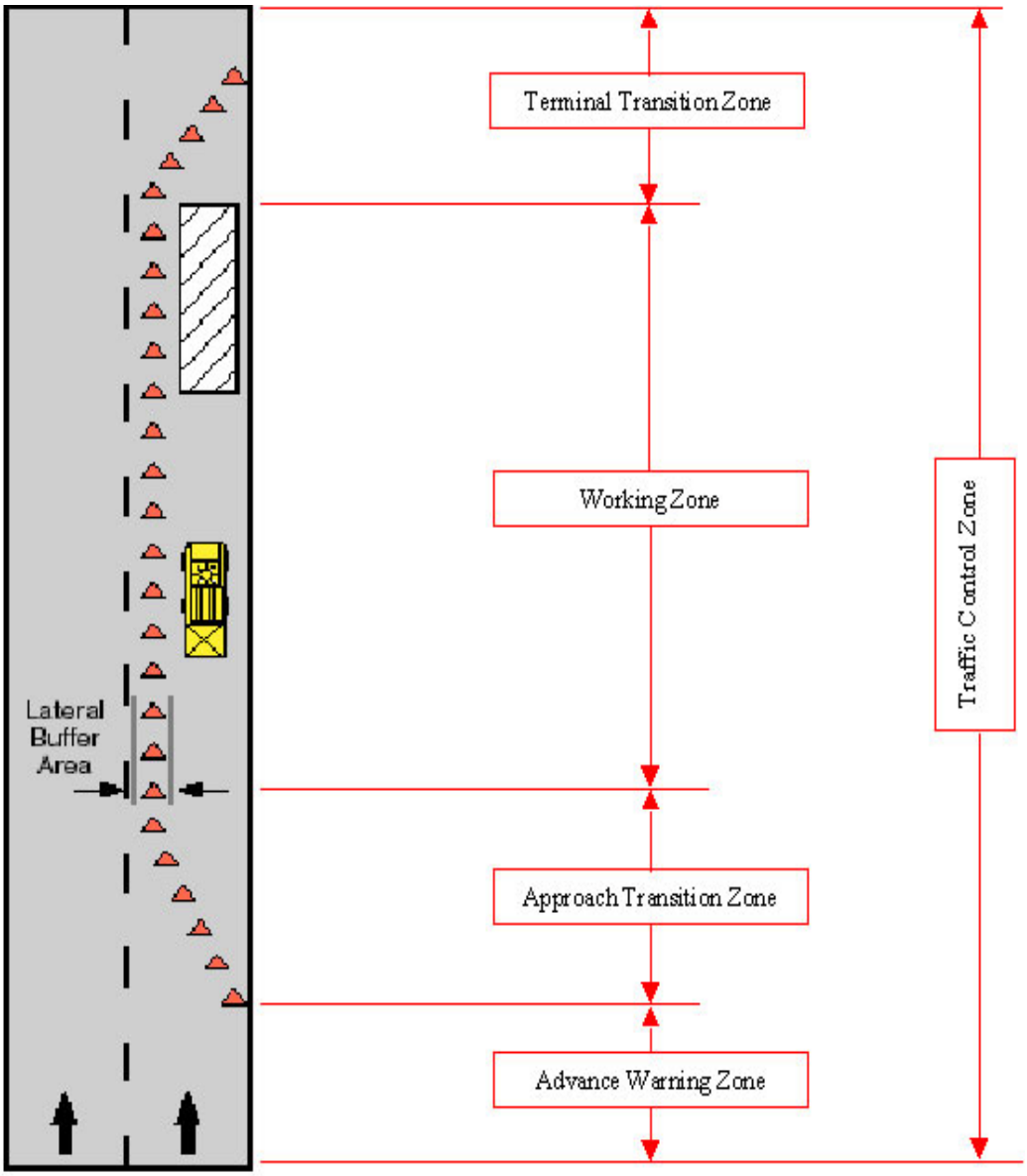

Figure 8-6 Traffic Control Zone

- **Traffic Control Zone** includes those areas in advance of the actual work site that are required for advance working as well as safety zones, the transition zones and the working zones itself.
- For providing all required safety precautions specific traffic management plans will be prepared and implemented during construction in accordance with the IRC: SP: 55:2014 (Guidelines on Safety in Road Construction Zones). Some guiding drawings for the general safety measures are provided below:

Though each construction zone will pose unique problems there is a basic layout that should be followed for all schemes but that will need to be amended to suit local conditions. These will be influenced by:

- Environment: Rural, Urban;
- Type of Carriageway such as single-lane, two-lanes, 4-lanes, multi-lanes, divided carriageway;
- Traffic Volume and Speed, with and without work in progress on road;
- Type of Traffic such as mixed or segregated;
- Available Sight Distance in construction zone; and
- Mobility of Work Zone, that is, for minor pot hole repairs, lane marking etc. the workers and equipment may move along the road.

Figures 8-7 and 8-8 below shows the basic layout that would permit two-way working of traffic past the working zone.

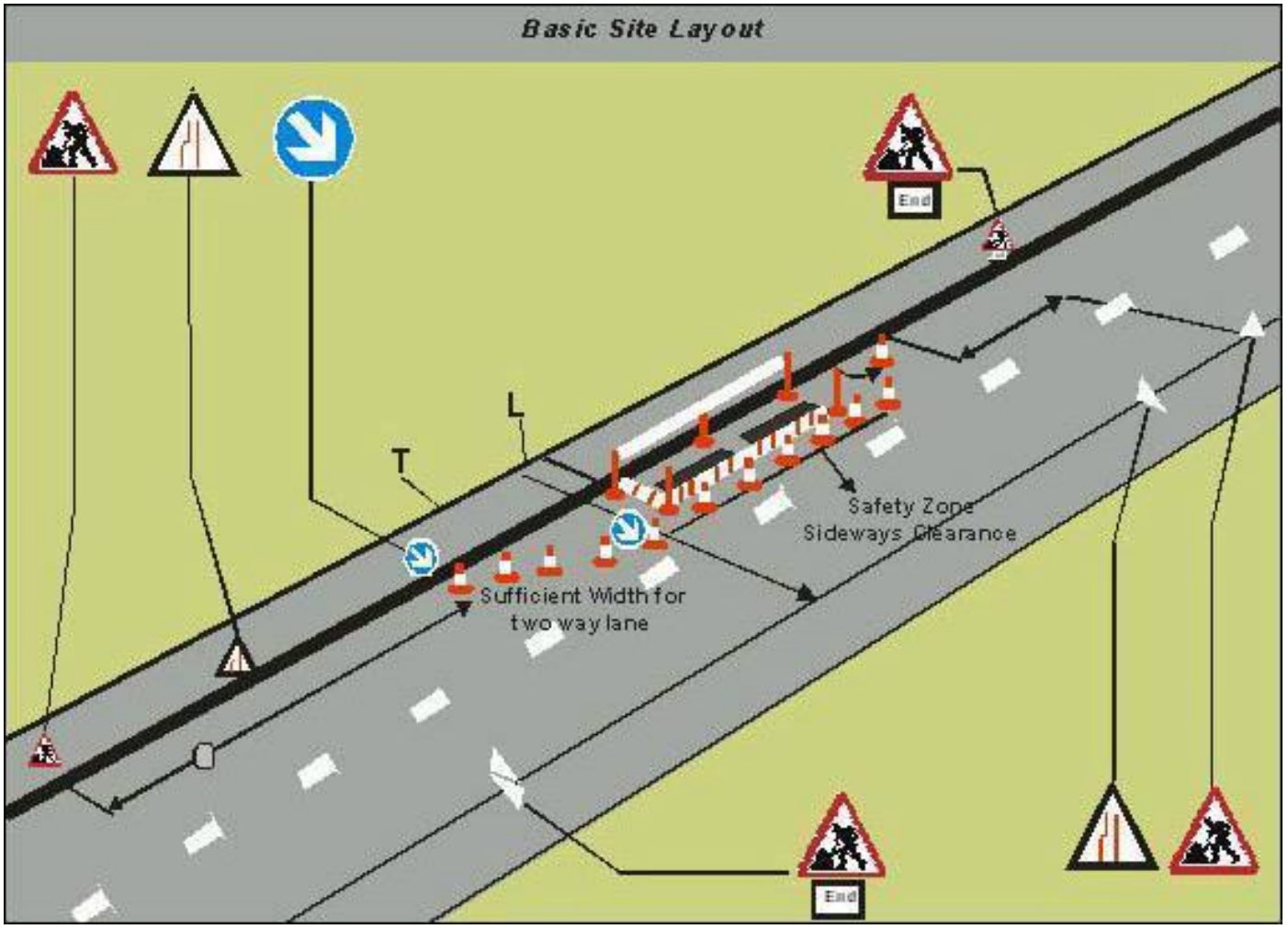

Figure 8-7 Basic Layout for Signs at a Road Works Site, Including Work Space and a Safety Zone.

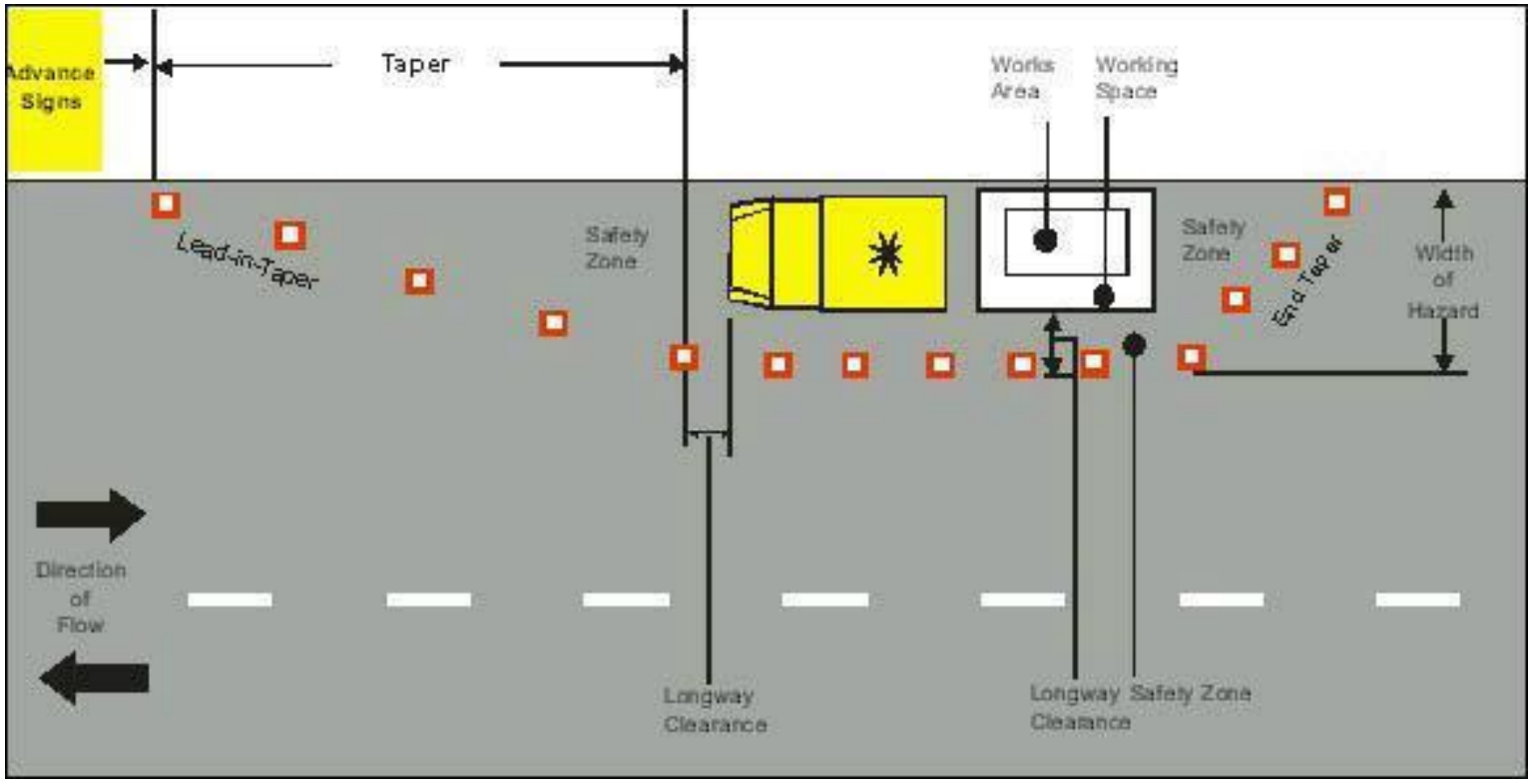

Figure 8-8 Basic Layout with Works Vehicle

8.7 HANDLING OF PETROLEUM PRODUCTS

Petroleum products such as petrol, diesel, light diesel oil, bitumen and emulsion will be handled, stored and used in accordance with the relevant rules, acts and guidelines to avoid any damage to the environment and reduce the probability of the occurrence accidents. Wastes generated from the use of the petroleum products will also disposed of safely as detailed in the relevant rules, regulations and guidelines. The rules and regulations applicable for the handling of these products are listed below;

- Environmental Protection Act, 1986
- Petroleum Act, 1934
- Petroleum Rules, 2002

Petroleum products such as petrol, diesel, light diesel oil, bitumen and emulsion will be handled, stored and used in accordance with the relevant rules, acts and guidelines to avoid any damage to the environment and reduce the probability of the occurrence accidents. Wastes generated from the use of the petroleum products will also disposed of safely as detailed in the relevant rules, regulations and guidelines. The rules and regulations applicable for the handling of these products are listed below;

- Environmental Protection Act, 1986
- Petroleum Act, 1934
- Petroleum Rules, 2002

8.8 HANDLING OF PETROLEUM PRODUCTS

Petroleum products such as petrol, diesel, light diesel oil, bitumen and emulsion will be handled, stored and used in accordance with the relevant rules, acts and guidelines to avoid any damage to the environment and reduce the probability of the occurrence accidents. Wastes generated from the use of the petroleum products will also disposed of safely as detailed in the relevant rules, regulations and guidelines. The rules and regulations applicable for the handling of these products are listed below;

- Environmental Protection Act, 1986
- Petroleum Act, 1934
- Petroleum Rules, 2002

8.9 ENVIRONMENTAL MANAGEMENT PLAN

Environmental Management Plan (EMP) has been prepared for corridor project and will be part of the contract document between the Contractor and HP PWD. It is expected that implementation of all the environmental measures proposed in the EMP are adopted. The implementation actions, responsibilities and timeframes have been specified for each component and adverse impact anticipated. The following sections details the monitoring plan, a comprehensive monitoring system and budgetary estimate.

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8.9.1 Monitoring Plans

To ensure the effective implementation of the EMP, it is essential that an effective monitoring program be designed and carried out.

Various physical, biological and social components identified as of particular significance in affecting the environment at critical locations in various stages of the Project have been suggested as Performance Indicators (PIs). These are listed below and shall be the focus for monitoring.

- Air quality (PM10, PM2.5, NOx, SO2,Pb and CO);
- Water quality (Physical, chemical and Biological parameters)
- Noise levels around sensitive locations/residential area
- Plantation success / survival rate.

The monitoring plans during construction and operation stages have been described in detail in the EMP documents and summary of monitoring plan and locations are presented in **Table 8-8 & Table 8-9.** For each of the environmental components, the monitoring plan specifies the parameters to be monitored; location of monitoring sites; frequency and duration of monitoring. The monitoring plan also specifies the applicable standards, implementation and supervising responsibilities.

Table 8-8 Environmental Monitoring Plan

Attribute	Project Stage	Parameter	Special Guidance	Standards	Frequency	Duration	Location	Implementation	Monitoring/ Supervision
Air	Construction	CO, NOx, SPM, RPM, and SO2	High volume sampler to be located 50 m from the plant in the downwind direction. Use method specified by CPCB for analysis	Air (prevention and Control of Pollution) Rules, CPCB, 1994	Quarterly	24 hours Sampling	Ref. Table No. 8.6	Contractor	HP PWD
Water	Construction	All essential characteristics and some of desirable characteristics as decided by the PRBDB	Grab sample collected from source and analyse as per Standard Methods for Examination of Water and Wastewater	Indian Standards for Inland Surface Waters (IS: 2296, 1982) and for Drinking Water (IS : 10500 - 1991)	Quarterly	Grab Sampling	Ref. Table No. 8.6	Contractor	HP PWD

Noise	Construction	Noise levels on dB (A) scale	Equivalent noise levels using an integrated noise level meter kept at a distance of 15 from edge of pavement Equivalent noise levels using an integrated noise level meter kept at a distance of 15 from edge of pavement	MoEF Noise Rules, 2000	Quarterly	Leq. in dB(A) of day time and night time	Ref. Table No. 8.6	Contractor	HP PWD
Soil	Construction	Monitoring of Pb, SAR and Oil & Grease	Sample of soil collected to acidified and analysed using absorption spectrophotometer	Threshold for each contaminant set by IRIS database of USEPA until national standards are promulgated	Once in Six Months	Grab Sampling	Ref. Table No. 8.6	Contractor	HP PWD
Borrow area	Construction	As per Guidelines	Visual Observation	-	Once in a Month	-	Borrow area location	Contractor	CMU/ HP PWD
Tree plantation	Operation stage	As per Rehabilitation			Quarterly	-	Areas where	-	CMU/ HP PWD

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Table 8-9 Environmental Monitoring Locations

Environmental Component	S. N.	Location	Remarks
Air Quality	1.	Upstream of proposed Gumma Fediz Section of NH-707	Rural Residential/ Commercial
	2.	Middle of proposed Gumma Fediz Section of NH-707 near village Antroli	Residential/Commercial
	3.	Near End of Gumma Fediz Section of NH-707	Rural Residential/Commercial
	4	HMP Camp Site	Residential/Commercial
Water quality	1.	HMP Camp Site	Surface water / Ground water
	2.	Hand Pump at village Gumma	Ground water
	3	Hand Pump at Village Antroli	Ground water
	4	Giri River near disposal site -1	Surface water
	5	Giri River near disposal site -2	Surface water
	6	Giri River at Nearest point to HMP Camp Site	Surface water
Noise Monitoring	1.	Upstream of proposed Gumma Fediz Section of NH-707	Residential/Commercial
	2.	Middle of proposed Gumma Fediz Section of NH-707 near village Antroli	Rural Residential
	3.	Near End of Gumma Fediz Section of NH-707	Rural Residential
	4.	HMP Camp Site	Residential/Commercial
Soil quality	1.	Random Location at Completed section of Gumma to Fediz section of NH-707	Agricultural
	2	Near Construction Site	Agricultural
	3.	HMP Plant site	Agricultural

8.9.2 Reporting System

The Monitoring and Evaluation of the management measures envisaged are critical activities in implementation of the Project. The rationale for a reporting system is based on accountability to ensure that the measures proposed as part of the Environmental Management Plan get implemented in the Project. Detail is provided in EMP.

8.9.3 Environmental Budget

An indicative estimate of the cost component involved in mitigation of impacts, enhancements (through landscaping or specific enhancement measures), road safety, monitoring and evaluation of various components in pre-construction, construction and operation period has been estimated.

A summary of the environmental budget is presented in **Table 8-10.**

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Table 8-10 Environmental Budget

S.N.	Component	Description	Unit Rate (Rs.)	Quantity	Amount (Rs.)
1.	**Forest Clearances**	Nil	-	-	-
Total (A)					**-**
2.	**Mitigation Measures**				
2.1	Air Pollution	Dust Management measures, Covers for vehicles transportation of construction material etc.	Lump sum	-	400000
2.2	Oil Inceptor	Provision at workshop in construction camp site	200000	1 Nos.	200000
2.3	Top Soil Preservation	Stripping of Top Soil, Staking and reuse	200	15000	3000000
2.4	Soil Erosion Control Measures	A. Hedge Brush Layer B. Hydroseeding C. Bamboo Plantation D. Rock Anchoring	AS per BOQ	AS per BOQ	195935000
Total (B)					**19,95,35,000/-**
3.	**Enhancement Measures**				
3.1	Landscaping	Landscaping at all intersections, median with fine grass and shrubs including maintenance for one year	Lump sum	-	500000
Total (C)					**5,00,000/-**
4.	**Road Safety Measures**				

4.1	Junction Improvement	Traffic Calming measures, Pedestrians crossing facilities	AS per BOQ	AS per BOQ	2612481
4.2	Road Safety Furniture	Road Safety signs/boards, hazard markers, RRPM, delineators, Solar Blinker, High must Light, safety cones etc.	AS per BOQ	AS per BOQ	6848647
4.3	Road Safety Item	Crash Barrier	AS per BOQ	AS per BOQ	26339330
Total (D)					**3,58,00,458/-**
5.	**Environmental Monitoring Cost**				
5.1	Air	Sampling, monitoring & analysis of ambient air quality and gaseous pollutant.	10000	24 Nos.	240000
5.2	Water	Sampling, monitoring & analysis of surface & drinking quality.	10000	36 Nos.	360000
5.3	Noise	Sampling, monitoring & analysis of ambient noise quality.	5000	24 Nos.	120000
5.4	Soil	Sampling, monitoring & analysis of Soil quality.	7000	12 Nos.	84000
Total (E)					**8,04,000/-**
6	**Miscellaneous Cost**				
6.1	Logistics and Administrative	Uses of vehicle for environmental cell , data processing, administrative support, stationary, remuneration of Environment Expert etc.	Lump sum	-	2400000
Total (F)					**24,00,000/-**
Total Environmental Budget (A+B+C+D+E+F)					**23,90,39,458/-**
Contingency @ 5 % on Total Environmental Budget					**1,19,51,973/-**
GRAND TOTAL					**25,09,91,431/-**

Annexures

Annexure-I
Attendance sheets of
Consultations at Antroli and Gumma Village

PUBLIC/STAKEHOLDER'S CONSULTATION MEETING ATTENDANCE SHEET							
Project	Gumma-Fediz section (NH 707) Antsol- Chanehyat - Pawan.						
District		Taluka		Block/ward No		GP/MC	
Settlement		PS/Thana		Chainage/km		Venue	
Date	22-09-2019.	Time		Total No. of participants	Male	Female	Total

S. No	Name	Age	Gender	Contact Details	Occupation	Caste	Signature
1.	Virender Singh	32		9805267773			
2.	Anil Kumar	30		9896380899			
3.	KEWAL RAM	33		9805163066			
4.	Bhagmal	40		9805730780			
5.	Hema Singh	36		8894238891			Hema Singh
6.	Pawan Singh	35		9816719060			
7.	Jeetha Ram	41		9805087493			
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PUBLIC/STAKEHOLDER'S CONSULTATION MEETING ATTENDANCE SHEET

Antroli - (Panchyat Bhawan)

Project	Gumma-Fediz section (NH 707)						
District		Taluka		Block/ward No		GP/MC	
Settlement		PS/Thana		Chainage/km		Venue	
Date	22-09-2019.	Time		Total No. of participants	Male	Female	Total

S. No	Name	Age	Gender	Contact Details	Occupation	Caste	Signature
1.	[illegible]	60		9816640736	किसान		[signature]
2.							
3.	मानसिंह चौहान	61		9816527221	किसान		मानसिंह
4.							
5.	भगतराम	60		—	किसान		[signature]
6.	कुलदीप चौहान	41		9805087493	"		[signature]
7.	जगदीश चन्द्र	30		9816248374	"		[signature]
8.	[illegible]	35	M.	X no			[signature]
9.	Tara Chauhan	36	F	9816575900			[signature]
10.							
11.	Geeta Devi						
12.	Pradhan G.P. Fabay	40		9816311193			
13.							
14.	Mani Ram Sharma	53		8894801372			
15.							
16.	Seea Ram	43		9816311247			[signature] 22/9/19
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PUBLIC/STAKEHOLDER'S CONSULTATION MEETING ATTENDANCE SHEET

Project	Gumma-Fediz section (NH 707)						
District		Taluka		Block/ward No		GP/MC	
Settlement		PS/Thana		Chainage/km	94+900	Venue	Gumma - Market
Date	21/09/2019	Time	5:00 PM	Total No. of participants	Male	Female	Total

S. No	Name	Age	Gender	Contact Details	Occupation	Caste	Signature / issue raised
1.	Deye Singh Bharadwaj	65	M.	9816182437	Farmer	[illegible]	DSBharadwaj
2.	Tarun Gaul	28	M	9885453416	Farmer	[illegible]	[illegible]
3.	Lakhi Ram	48	M	9816324814	[illegible]	[illegible]	[illegible]
4.	Rajender Singh	39	Male	8219499947	Business	Rajput	[illegible]
5.	Gulab Singh	47	male	9805517500	Business	Rajput	[illegible]
6.	Gaj. M	28	M.	8894814508	Student	Gen.	[illegible]
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दिनांक 21-9-2019

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PUBLIC/STAKEHOLDER'S CONSULTATION MEETING ATTENDANCE SHEET

Project	Gumma-Fediz section (NH 707)						
District		Taluka		Block/ward No		GP/MC	
Settlement		PS/Thana		Chainage/km	94+900	Venue	Gumma - Market
Date	21/09/2019	Time	5:00PM	Total No. of participants	Male	Female	Total

S. No	Name	Age	Gender	Contact Details	Occupation	Caste	Signature
1.	Rati Ram.	58	M.	9816484858			Rati Ram
2.	Ratan Lal	33	M	8219224679			Shem
3.	[illegible]	33	M	9816507474			[illegible]
4.	Surender Kumar	35	M	8278877191			Surender
5.	Narayan Singh	42	M	8894548648			[illegible]
6.	Hari Ram	47	M	9805267781			[illegible]
7.	Lig Ram.	60	M.	9805878895			[illegible]
8.	AJENDER SINGH	29	M	8219233143			[illegible]
9.	SARLA JOSHI			9805926333			[illegible]
10.	KAPIL						[illegible]
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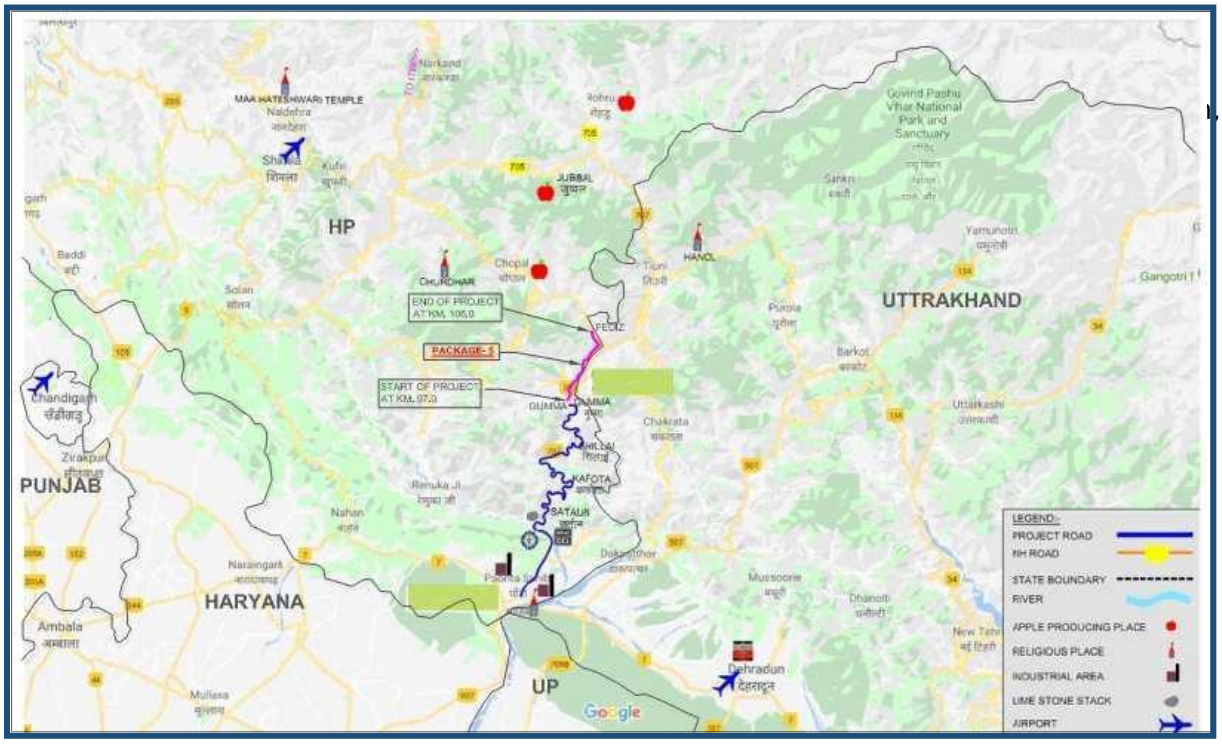
"REHABILITATION AND UPGRADATION TO INTERMEDIATE LANE OF PAONTA SAHIB RAJBAN S HILLAI MEENUS HATKOTI ROAD PORTION BETWEEN KM 97+000 TO 106+120 (GUMMA TO F EDIZ)(DESIGN RD 94+900 TO 103+550) OF NH 707 IN THE STATE OF HIMACHAL PRADESH"

ENVIRONMENTAL MANAGEMENT PLAN (EMP)



Submitted By:

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Mansa Devi Road, Sector-5, Panchkula
Tel: 0172-2555529, Cell: 099145-75200
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Submitted To:

Executive Engineer, NH Division,
HPPWD Nahan.

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1. INTRODUCTION

1.1 BACKGROUND

In coordination with the World Bank, Government of India via Ministry of Road Transport & Highways (MoRTH) has decided to take up the work of upgrading all single lane National Highways to at least 2 Lane/Intermediate Lane standards with provision of paved/earthen shoulders. The basic idea for up-gradation of the corridor is to provide better riding comfort along with safety for the commuters in the long hilly terrain and continuous stretch. There are more than 30 different National Highway stretches selected by Ministry of Road Transport & Highways (MoRTH) with approx. total length of more than 3000 km for up gradation. The present report pertains to Gumma to Fediz Section (Km 94.900 to Km 103.550) of NH-707 in the State of Himachal Pradesh. The MoRTH intends to rehabilitate and up-grade the existing single lane of 3.65m between Gumma to Fediz Section to intermediate lane of 5.5m with earthen shoulders of 1m on the valley side and 3m on the hill side keeping in mind the future widening option. The implementation of rehabilitation and up- gradation of this corridor is likely to be taken up with World Bank assistance. The World Bank has agreed to support this sub-project in-principle provided the implementation conforms to environmental and social safeguard policies of the World Bank and the legal framework of the country.

The Project 'Preparation of Detailed Project Report for up gradation to 2-lane/2- lane with paved shoulders for Paonta Sahib - Gumma section of from Km 0.000 to Km 97.000 of NH 707 in the state of Himachal Pradesh' has already been prepared which being longer stretch of 94 km on NH-707. The present project is extension of the same road stretch of 8.65 km only. The tests and other findings at the Gumma station holds equally good for the similar and continuous stretch of 8.65km.

1.2 ENVIRONMENTAL ASSESSMENT (EA) PROCESS

The Environmental Assessment process for the project corridor is based statutory requirements and the World Bank Safeguard Policy requirements.

1.3 OBJECTIVES OF ENVIRONMENTAL MANAGEMENT PLAN (EMP)

The objectives of the Environmental Management Plan (EMP) are to:

- Identify a range of mitigation measures which could reduce and mitigate the potential impacts to minimal or insignificant levels.
- Identify measures that could optimize beneficial impacts.
- Create management structures that address the concerns and complaints of all the stakeholders with regards to the development.
- Establish a method of monitoring and auditing environmental management practices during all phases of development.
- Describe the practical mitigation measures that should be implemented on road improvement works and ancillary sites (quarry and borrow areas) to prevent or mitigate any negative environmental impacts and to enhance the positive issues.
- Ensure that the construction and operational phases of the project continue within the principles of Integrated Environmental Management.
- Detail specific actions deemed necessary to assist in mitigating the environmental impact of the project.

- Ensure that the safety recommendations are complied with.
- Propose mechanisms for monitoring compliance with the EMP and reporting thereon.
- Specify time periods within which the measures contemplated in the draft environmental management plan must be implemented, where appropriate.
- Establish the roles and responsibilities of all parties which includes HPPWD/NHAI, Contractor, PWD involved in the implementation of environmental controls;
- Establish monitoring and reporting system for facilitating appropriate implementation of the EMP.

1.4 ENVIRONMENTAL REGULATIONS APPLICABLE TO THE PROJECT

Summary of environmental clearances/ permits/ approvals required for the sub-project is presented in Table 1-1.

1.5 METHODOLOGY OF PREPARING EMP

The methodology adopted for the preparation of EMP is based on EIA Notification, dated 4thSeptember 2006 and subsequent amendments, World Bank's OP and GoI Guidelines.

Table 1-1 List of Environmental Regulations Applicable to the Project Road

S. No.	Regulatory Clearances	Corresponding Regulations	Approving Authority	Applicability to the Project	Typical Time Required	Responsibility for compliance	
						Execution	Supervision
Pre-Construction Stage							
01	Environmental Clearance	EIA Notification, 2006 and amended till date	State Environmental Impact Assessment Authority or CEIAA in MoEF, GoI	Not applicable	-	-	-
02	Consent to Establish	Water (Prevention and Control of Pollution) Act 1974; Air (Prevention and Control of Pollution) Act 1981	Himachal Pradesh State Pollution Control Board (HHPSPCB)	Subject to establishing Labour camps, Hot mix plants, DG sets units, cement batching plant or any water/air pollution generating units.	3 Months	Contractor	HPPWD/CMU
03	Wild Life Clearance	Wild Life Act 1972	Hon'ble Supreme Court	Not applicable	-	-	-

S. No.	Regulatory Clearances	Corresponding Regulations	Approving Authority	Applicability to the Project	Typical Time Required	Responsibility for compliance	
						Execution	**Supervision**
05	Permission for felling & trimming of trees	Forest (Conservation) Act, 1980 and its amendments;	Regional Office MoEF	Not applicable	-	-	-
Construction Stage							
06	Permission for locating and operating Borrow pits	-	Mining Department/SEIAA, Local Administration – Municipal Government/ Panchayat	Applicable	1 Month	Contractor	HPPWD
07	Permission for Withdrawal of Ground Water	Environment Protection Act 1986	Central Ground Water Board	Applicable, if withdrawal is proposed	1 month	Contractor	HPPWD/CMU
08	Permission for withdrawal of Surface Water from River/Irrigation Canals		Irrigation Authorities for use of water from Irrigation Canal. River Board / Authorities for	Applicable if withdrawal is proposed	1 month	Contractor	HPPWD/CMU

S. No.	Regulatory Clearances	Corresponding Regulations	Approving Authority	Applicability to the Project	Typical Time Required	Responsibility for compliance	
						Execution	**Supervision**
			withdrawal of water from Rivers				
09	Authorization to generate, store, transport and dispose of Hazardous Waste	The Hazardous Wastes (Management, Handling and Trans-boundary Movement) Rules, 2008 and amendments till date	Himachal Pradesh State Pollution Control Board (HHPSPCB)	Applicable, if hazardous waste is generated in the project (disposal of bituminous wastes – verify with HHPSPCB)	2 months	Contractor	HPPWD
10	Consent to Operate	Water (Prevention and Control of Pollution) Act 1974; Air (Prevention and Control of Pollution) Act 1981	Himachal Pradesh State Pollution Control Board (HHPSPCB)	Subject to establishing, Hot mix plants or any water/air pollution generating units, Labour camps	3 Months	Contractor	HPPWD/CMU

S. No.	Regulatory Clearances	Corresponding Regulations	Approving Authority	Applicability to the Project	Typical Time Required	Responsibility for compliance	
						Execution	**Supervision**
11	Traffic Police Clearance for diversion of routine traffic	Local Traffic Police Regulations and Bye-laws	Traffic Police Department	Applicable if diversion is required in urban/semi urban areas	1 Month	Contractor	CMU/ HPPWD
12	NOC from Archaeological Survey of India	The Ancient Monument and Archaeological sites and Remains Act 2010	Department of Archaeology Govt. of Himachal Pradesh	Subject to chance finds, if any	2 Months	Contractor	CMU/ HPPWD
13	Permission for Sand Mining from river bed	Himachal Mines and Minerals Concession Rules 1969	River Board Authorities/ Department of Mining Govt. of Himachal Pradesh	Applicable, if river sand is mined	6 Months	Contractor	CMU/ HPPWD
14	Permission for Opening of new Quarry sites	Himachal Mines and Minerals Concession Rules 1969	Department of Mining Govt. of Himachal Pradesh HHPSPCB	Applicable only if Contractor opens a new quarry site	6 Months 3 Months	Contractor	HPPWD/CMU

2. ENVIRONMENTAL MANAGEMENT PLAN

2.1 INTRODUCTION

Environmental Management Plan (EMP) is the key to ensure that the environmental quality of the direct project influence area and indirect project influence area does not deteriorate beyond the expected levels due to the construction and operation of the project. The EMP comprises a set of measures to be taken in different stages like the design, construction and operation to eliminate, offset or reduce adverse environmental impacts to acceptable levels. Elimination/prevention is possible through the elimination of impacts or by avoiding the action.

The detailed Environmental Impact Assessment (EIA) for Gumma to Fediz Section of NH-707 has been done by the CEA, Panchkula and available for with HPPWD/Employer.

EMP as the Table2-1 called 'EMP' lists those measures, which are for this road for the improvement work lists those measures which are specific to this link.

2.2 Objective of EMP

The EMP is a plan of action for mitigation / management / avoidance of the negative impacts of the project and enhancement of the project road. Table 2-1 explains the environmental issues and the avoidance/ mitigation/ minimization or enhancement measures adopted and/or to be adopted during different phases of the project. It also provides the references for the suggested measures, responsible agency for its implementation/ management as well as its time frame.

2.3 COMPLIANCE WITH THE EMP

A copy of the EMP must be kept at the construction site office during the construction period at all times. The EMP will be made binding on contractor operating on the site and must be included as Contractual Clauses in any contractual agreement for the Contractor.

- All persons employed by the contractor or his sub-contractors will abide by the requirements of the EMP.
- Contract conditions to include measures to be taken.
- The Contractor will not direct a person to undertake any activity which would place them in breach of the specifications contained within the EMP.
- Should the Contractor be in breach of any of the specifications contained in the EMP, the HPPWD will in writing, instruct the Contractor responsible for the incidence of non-compliance regarding corrective and/or remedial action required, specify a timeframe for implementation of these actions, implement a penalty and/or indicate that work could be suspended should non-compliance continue.
- Should non-compliance continue, further written notification will be forwarded to the contractor responsible for the incident of non-compliance outlining the required corrective and/or remedial action, the timeframe for implementation, penalties and/or work could be suspended as specified previously.

- Contracts with contractor to include Clauses to hold the contractor responsible for the cost of any delays, corrective or remedial actions required as a result of non-compliance with the specifications and Clauses of the EMP.
- An appropriate reporting schedule for frequent reporting (of compliance with the EA/EMP) to the HPPWD will be developed. The process to be followed for the auditing of the EA conditions / EMP, as well as the reporting procedure to be followed, will be outlined in this document.

2.4 NON-CONFORMANCE AND CORRECTIVE ACTION

The Contractor is deemed not to have complied with the EMP if:

- Within the boundaries of the site, site extensions and haul/ access roads there is evidence of a contravention of Clauses.
- If environmental damage ensues due to negligence.
- The contractor fails to comply with corrective or other instructions issued by the HPPWD within a specified time.
- The Contractor fails to respond adequately to complaints from the public.

2.5 PENALTY CLAUSE FOR NONCONFORMITY TO EMP

The duration over which the Contractor's controls shall be in place to cover the construction period of the project as well as the limited time after the contract completion in terms of the contract as the defects liability period. The Contractor shall implement all mitigation measures for which responsibility is assigned to him as stipulated in the EMP Report.

Application of a penalty Clause to the contractor will apply to incidents of non-compliance. The penalty imposed will be per incident and will be deducted from the contractor's payment. Unless stated otherwise in the project specification, the penalties imposed per incident or violation will be determined in consultation with the HPPWD and depending on the severity and/or regularity of the incidence occurring. Any lapse in implementing the EMP will attract the penalty Clause as detailed below:

- All lapse in obtaining clearances/permissions under statutory regulations and violations of any regulations shall be treated as a major lapse.
- Any complaints of public, within the scope of the Contractor, formally registered with the HPPWD, or with the NHAI and communicated to the contractor, which is not properly addressed within the time period intimated by the HPPWD shall be treated as a major lapse.
- Non-conformity to any of the mitigation measures stipulated in the EMP Report (other than stated above) shall be considered as a minor lapse.
- On observing any lapses, HPPWD shall issue a notice to the Contractor, to rectify the same.
- Any minor lapse for which notice was issued and not rectified, first and second reminders shall be given after one month from the original notice date and first reminder date respectively. Any minor lapse, which is not rectified shall be treated as a major lapse from the date of issuing the second reminder.
- If a major lapse is not rectified upon receiving the notice, HPPWD shall invoke the penalty Clause, in the subsequent interim payment certificate.
- Penalty for major lapses shall be with-holding of 10% of the interim payment certificate, subject to a maximum limit of ₹ 3,000,000.
- If the lapse is not rectified within one month after withholding the payment, the amount withheld shall be forfeited.

HPPWD will issue each notice of noncompliance to the contractor. The notice for invoking penalty Clause will also be issued.

2.6 INTERNATIONAL PRACTICES FOR CONSIDERATION DURING EMP IMPLEMENTATION

The contractor while implementing the EMP will develop procedures to achieve the following:

- Minimum air emissions from construction activities to maintain better levels of ambient air quality in the surroundings of construction sites and construction camps
- Minimise energy consumption in construction activities
- Minimise waste water generation at camp and construction sites
- Use of optimum natural resources
- Effective reutilisation of waste and proper disposal of waste which cannot be reused/recycled
- Minimum disturbance to the population on account of noise generation
- Minimise/avoid pollution to water sources
- Safe working environment to the construction crew through safe operating procedures and encouraging use of personal protective equipment by the work force. For this contractor will procure adequate personal protective equipment.
- Effective traffic management on the project road to achieve better safety of construction crew and road users
- Prevention of communicable diseases through awareness campaign for STD/HIV-AIDS and Hepatitis

Further, the contractor will prepare an 'On Site Emergency Plan' to deal with any mishap such as fire, explosion, and spillage of hazardous materials at camp and construction sites.

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Table 2-1 The Environmental Management Plan (EMP)

ENVIRONMENTAL MANAGEMENT PLAN

<table>
<tr><th rowspan="2">Sl. No.</th><th rowspan="2">Environmental Issue</th><th rowspan="2">Management Measures</th><th colspan="2">Responsibility</th></tr>
<tr><th>Planning and Execution</th><th>Supervision/ Monitoring</th></tr>
<tr><td colspan="3">PRE-CONSTRUCTION STAGE</td><td></td><td></td></tr>
<tr><td colspan="3">Pre-construction activities by HPPWD/NHAI</td><td></td><td></td></tr>
<tr><td>P.1</td><td>Clearance & Approvals</td><td>Secure the following clearances & NOCs prior to start of construction activity:
<table>
<tr><th>Type of Clearances</th><th>Applicability</th></tr>
<tr><td>NOC & Consents for Air, Water & Environment Protection Acts and Noise rules from HHPSPCB.</td><td>For Establishment of Construction Camp</td></tr>
<tr><td>Consent to Operate (CTO) and Consent to Establish (CTE) from HHPSPCB.</td><td>For establishment & Operating Construction Plant and HMP.</td></tr>
<tr><td>Explosive License from Chief Controller of Explosive</td><td>For Storing Fuel, Lubricant, Diesel etc.</td></tr>
<tr><td>NOC from State Ground Water Board</td><td>For utilization of Ground Water.</td></tr>
<tr><td>Labour Licenses</td><td>Engagement of Labour</td></tr>
</table></td><td>Contractor</td><td>Employer/ HPPWD/NHAI</td></tr>
<tr><td>P.2</td><td>Preservation of Trees</td><td>Nil</td><td>-</td><td>-</td></tr>
</table>

Sl. No.	Environmental Issue	Management Measures	Responsibility	
			Planning and Execution	Supervision/ Monitoring
P.3	Relocation of Community Utilities and Common Property Resources	Due to proposed corridor 2 hand pump will be relocated and compensated as per R&R plan before execution of work. Environmental considerations with suitable/required actions including health and hygiene aspects will be kept in mind while relocating all community utilities and resources.	PWD (B&R)/Contractor	Employer/ HPPWD/NHAI
P.4	Field Verification and Modification of the Contract Documents			

Sl. No.	Environmental Issue	Management Measures	Responsibility	
			Planning and Execution	Supervision/ Monitoring
P.4.1	Joint Field Verification	The Environmental Expert of HPPWD/NHAI and the Contractor will carry out joint field verification to ascertain any additional possibility to saving trees, environmental and community resources. The verification exercise should assess the need for additional protection measures or changes in design/scale/nature of protection measures including the efficacy of enhancement measures suggested in the EMP. Proper documentation and justifications/reasons shall be maintained in all such cases where deviation from the original EMP is proposed.	Contractor/ Environmental Expert of HPPWD/NHAI	Employer/ HPPWD/NHAI
P.4.2	Assessment of Impacts due to Changes/Revisions/Additions in the Project Work	The Environmental Expert of HPPWD/NHAI will assess impacts and revise/modify the EMP and other required sections of the project document/s in the event of changes/revisions (including addition or deletion) in the project's scope of work.	Contractor/ Environmental Expert of HPPWD/NHAI	Employer/ HPPWD/NHAI
P.4.3	Crushers, hot-mix plants and Batching Plants Location	Hot mix plants and batching plants will be sited sufficiently away from settlements and agricultural operations or any commercial establishments. Such plants will be located at least 1000 m away from the nearest village/settlement preferably in the downwind direction. The Contractor shall submit a detailed layout plan for all such sites and approval of Environmental Expert of HPPWD/NHAI shall be necessary prior to their establishment. Arrangements to control dust pollution through provision of windscreens, sprinklers, dust encapsulation will have to be provided at all such sites.	Contractor	Employer/ HPPWD/NHAI

Sl. No.	Environmental Issue	Management Measures	Responsibility	
			Planning and Execution	Supervision/ Monitoring
		Specifications of crushers, hot mix plants and batching plants will comply with the requirements of the relevant current emission control legislations and Consent/NOC for all such plants shall be submitted to the "HPPWD/NHAI/ PWD. The Contractor shall not initiate plant/s operation till the required legal clearances are obtained and submitted. The engineer will ensure that the regulatory and legal requirements are being complied with. Form P4 shall be used for reporting to Engineer/Employer.		
P.4.4	Other Construction Vehicles, Equipment and Machinery	All vehicles, equipment and machinery to be procured for construction will confirm to the relevant Bureau of India Standard (BIS) norms. The discharge standards promulgated under the Environment Protection Act, 1986 will be strictly adhered to. Noise limits for construction equipment to be procured such as compactors, rollers, front loaders concrete mixers, cranes (moveable), vibrators and saws will not exceed 75 dB (A), measured at one meter from the edge of the equipment in free field, as specified in the Environment (Protection) Rules, 1986. The Contractor shall maintain a record of PUC for all vehicles and machinery used during the contract period, which shall be produced for HPPWD/NHAI/ PWD's verification whenever required. Mobile equipment shall be placed at least 100metres away from the nearest dwelling. Form C1 shall be used for reporting to Engineer/Employer.	Contractor	Employer/HPPWD/NHAI

Sl. No.	Environmental Issue	Management Measures	Responsibility	
			Planning and Execution	Supervision/ Monitoring
P.6	Identification and Selection of Material Sources			
P.6.1	Borrow Areas	The estimated quantity of good earth required for the project is around 7980 cum. For finalizing borrows areas for borrowing earth and all logistic arrangements as well as compliance to environmental requirements, as applicable, will be the sole responsibility of the contractor. Sitting of the construction camps will be as per the guidelines given in Annexure-2 The Contractor will not start borrowing earth from select borrow area until the Environmental Clearance obtained from SEIAA and formal agreement is signed between landowner and contractor and a copy is submitted to the "HPPWD/NHAI through the Engineer. Planning of haul roads for accessing borrow materials will be undertaken during this stage. The haul roads shall be routed to avoid agricultural areas as far as possible (in case such a land is disturbed, the Contractor will rehabilitate it as per Borrow Area Rehabilitation Guidelines) and will use the existing village roads wherever available. Reporting will be as per the Reporting Format for Borrow Area and will include a reference map. Form P3 shall be used for reporting to Engineer/Employer.	Contractor	Employer/HPPWD/NHAI
P.6.2	Quarry	The estimated quantity of quarry required for the project is around 20681 cum.	Contractor	Employer/HPPWD/NHAI

Sl. No.	Environmental Issue	Management Measures	Responsibility	
			Planning and Execution	Supervision/ Monitoring
		Contractor will finalize the quarry for procurement of construction materials after assessment of the availability of sufficient materials, quality and other logistic arrangements. The contractor will procure the material from authorized/approved quarry sites. Contractor will also work out haul road network and report to PWD/HPPWD/NHAI.		
P.6.3	Arrangement for Construction Water	An estimated quantity of approx. 107675 Cum of water may be consumed during the construction period. The Contractor will provide a list of locations and type of sources from where water for construction will be used. The contractor will seek approval from the Environment Expert of HPPWD/NHAI prior to the finalization of these locations. Form P6 shall be used for reporting to Engineer/Employer. The contractor will not be allowed to pump from any irrigation canal and surface water bodies used by community. The contractor will need to comply with the requirements of the State Ground Water Department and seek their approval for doing so and submit copies of the permission to "HPPWD/NHAI/ PWD" prior to initiation of any construction work.	Contractor	Employer/HPPWD/NHAI
P.7	Labour Requirements	The contractor preferably will use unskilled labour drawn from local communities to give the maximum benefit to the local community. The contractor would notify requirement of unskilled labours in nearby/surrounding village Panchayats.	Contractor	Employer/HPPWD/NHAI

Sl. No.	Environmental Issue	Management Measures	Responsibility	
			Planning and Execution	Supervision/ Monitoring
P.8	Construction Camp Locations – Selection, Design and Lay-out	Sitting of the construction camps will be as per the guidelines given in Annexure 1. Locations identified by the contractor will be reported. Form P2 shall be used for reporting to Engineer/Employer. Construction camps will not be proposed within 1000 m from the nearest settlements to avoid conflicts and stress over the infrastructure facilities with the local community applies only in case where a construction camp doesn't house plant sites. Location for stockyards for construction materials will be identified at least 1000 m from watercourses. The waste disposal and sewage system for the camp will be designed, built and operated such that no odour is generated.	Contractor	Employer/HPPWD/NHAI
P.9	Arrangements for Temporary Land Requirement	The contractor as per prevalent rules will carry out negotiations with the landowners for obtaining their consent for temporary use of lands for construction sites/hot mix plants/traffic detours/borrow areas etc. The Contractor will submit a copy of agreement to the HPPWD/NHAI. The Environmental Expert of HPPWD/NHAI will be required to ensure that the clearing up of the site prior to handing over to the owner (after construction or completion of the activity) is included in the contract.	Contractor	Employer/HPPWD/NHAI
P.10	Orientation of Implementing	The Contractor shall organize orientation sessions and regular training sessions during all stages of the project. This shall include on-site training (general as well as in the specific context of a sub-project). These sessions shall involve, field level	Contractor	Employer/HPPWD/NHAI

Sl. No.	Environmental Issue	Management Measures	Responsibility	
			Planning and Execution	Supervision/ Monitoring
	Agency and Contractors	implementation staff of PWD and Contractor, Environmental Experts of HPPWD/NHAI and Contractors. The contractor will ensure that his staff including engineers, supervisors and operators attend the training sessions.		

ENVIRONMENTAL MANAGEMENT PLAN

S. No.	Environmental Aspect/Issue	Management Measures	Responsibility	
			Execution /Civil Work	Supervision/ Monitoring
CONSTRUCTION STAGE				
Activities to be Carried Out by the Contractor				
C.1	**Site Clearance**			
C.1.1	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 cutting is minimum. The Contractor under any circumstances will not cut trees other than those identified for cutting and for which he has written instructions from the PWD. The PWD will issue these instructions only after receiving all stages of clearances from the Forest Department/ MoEF. Vegetation only with girth of over 30 cm will be considered as trees and shall be compensated, in the event of PWD's instruction to undertake tree cutting. The sub grade of the existing pavement shall be used as embankment fill material. The existing base and sub-base material shall be recycled as sub-base of the haul road or access roads.	Contractor	Employer/HPPWD/NHAI

S. No.	Environmental Aspect/Issue	Management Measures	Responsibility	
			Execution /Civil Work	Supervision/ Monitoring
		The existing bitumen surface may be utilized for the paving of cross roads, access roads and paving works in construction sites and campus, temporary traffic diversions, haulage routes etc.		
C.1.2	Disposal of debris from dismantling structures and road surface	The estimated quantity for generation of debris is 3, 76,612 Cum, it includes scarified material, concert and spoil/earth. Approximate 90,000 cum will be reused. The CEA has identified two (2) disposal sites at RD 96+220 and 99+050. The contractor may identify new disposal sites as per requirements. The identified locations will be reported to the PWD/HPPWD/NHAI. These locations will be checked on site and accordingly approved by Environmental Expert of HPPWD/NHAI prior to any disposal of waste materials. All arrangements for transportation during construction including provision, maintenance, dismantling and clearing debris, will be considered incidental to the work and will be planned and implemented by the contractor as directed by the Environmental Expert of HPPWD/NHAI. The pre-designed disposal locations will be a part of Comprehensive Solid Waste Management Plan to be prepared by Contractor in consultation and with Environmental Expert of HPPWD/NHAI. Debris generated from pile driving or other construction activities shall be disposed such that it does not flow into the surface water bodies or	Contractor	Employer/HPPWD/NHAI

S. No.	Environmental Aspect/Issue	Management Measures	Responsibility	
			Execution /Civil Work	Supervision/ Monitoring
		form mud puddles in the area. Form P1 shall be used for reporting to Engineer/Employer.		
C.1.3	Other Construction Wastes Disposal	The pre-identified disposal locations will be a part of Comprehensive Waste Disposal Solid Waste Management Plan to be prepared by the Contractor in consultation and with approval of Environmental Expert of HPPWD/NHAI. The HPPWD/NHAI/PWD will approve these disposal sites after conducting a joint inspection on the site with the Contractor. Contractor will ensure that any spoils of material unsuitable for embankment fill will not be disposed-off near any water course, agricultural land, and natural habitat like grass lands or pastures. Such spoils from excavation can be used to reclaim borrow pits and low-lying	Contractor	Employer/HPPWD/NHAI

S. No.	Environmental Aspect/Issue	Management Measures	Responsibility	
			Execution /Civil Work	Supervision/ Monitoring
		areas located in barren lands along the project corridors (if so desired by the owner/community and approved by HPPWD/NHAI). All waste materials will be completely disposed and the site will be fully cleaned and certified by Environmental Expert of HPPWD/NHAI before handing over. The contractor at its cost shall resolve any claim, arising out of waste disposal or any non-compliance that may arise on account of lack of action on his part.		
C.1.4	Stripping, stocking and preservation of Top Soil	The top soil from land where construction camp will be established and all areas to be permanently covered will be stripped to a specified depth of 150 mm and stored in stockpiles. A portion of the temporarily acquired area and/or Right of Way will be earmarked for storing topsoil. The locations for stock piling will be pre-identified in consultation and with approval of Environmental Expert of HPPWD/NHAI. The following precautionary measures will be taken to preserve them till they are used: Stockpile will be designed such that the slope does not exceed 1:2 (vertical to horizontal), and height of the pile is restricted to 2 m. To retain soil and to allow percolation of water, silt fencing will protect the edges of the pile. Stockpiles will not be surcharged or otherwise loaded and multiple handling will be kept to a minimum to ensure that no compaction will occur. The stockpiles shall be covered with gunny bags or vegetation.	Contractor	Employer/HPPWD/NHAI

S. No.	Environmental Aspect/Issue	Management Measures	Responsibility	
			Execution /Civil Work	Supervision/ Monitoring
		It will be ensured by the contractor that the topsoil will not be unnecessarily trafficked either before stripping or when in stockpiles. Such stockpiled topsoil will be utilized for -covering all disturbed areas including borrow areas only in case where these are to be rehabilitated as farm lands (not those in barren areas) top dressing of the road embankment and fill slopes filling up of tree pits, in the median and in the agricultural fields of farmers, acquired temporarily. Residual topsoil, if there is any will be utilized for the plantation at median and side of the main carriageway.		
C.1.5	Accessibility	The contractor will provide safe and convenient passage for vehicles, pedestrians and livestock to and from project site and property accesses connecting the project road worksite, providing temporary connecting road. The contractor will also ensure that the work on / at existing accesses will not be undertaken without providing adequate provisions as per IRC:SP:55:2014.	Contractor	Employer/HPPWD/NHAI
C.1.6	Planning for Traffic Diversions and Detours	A temporary diversion route is being identified by PWD/HPPWD/NHAI. The temporary diversion will be provided by PWD, before handing over the site for Project road. The contractor will disclose local community for changes in traffic routes, conditions and pedestrian access arrangements with assistance of PWD.	Contractor/PWD	Employer/HPPWD/NHAI

S. No.	Environmental Aspect/Issue	Management Measures	Responsibility	
			Execution /Civil Work	Supervision/ Monitoring
C.2	**Procurement of Construction Material**			
C.2.1	Earth from Borrow Areas for Construction	No borrow area will be opened without EC obtained from the SEIAA. The location, shape and size of the designated borrow areas will be as recommended by SEIAA and in accordance to the IRC recommended practice for borrow pits for road embankments (IRC 10: 1961). The unpaved surfaces used for the haulage of borrow materials, if passing through the settlement areas or habitations; will be maintained dust free by the contractor. Sprinkling of water will be carried out thrice a day to control dust along such roads during their period of Execution. Contractor will rehabilitate the borrow areas as soon as borrowing is over from a particular borrow area as suggested by Environmental Expert of HPPWD/NHAI. Form C4 shall be used for reporting to Engineer/Employer.	Contractor	Employer/HPPWD/NHAI
C.2.2	Quarry Operations	The Contractor shall obtain materials from new quarries only after the consent of the Department of Mining / HHPSPCB/ District Administration or will be use the existing approved sources of such materials. A copy of the consent/ approval for opening or use of a quarry source will be submitted to Environmental Expert and PWD. The quarry operations will be undertaken within the rules and regulations in force.	Contractor	Employer/HPPWD/NHAI

S. No.	Environmental Aspect/Issue	Management Measures	Responsibility	
			Execution /Civil Work	Supervision/ Monitoring
C.2.3	Transporting Construction Materials and Haul Road Management	The Contractor will maintain all roads (existing or built for the project), which are used for transporting construction materials, equipment and machinery. In case of spillage of material during transportation, the contractor is liable for undertaking all remedial measures, including ensuring safe operations involving other road users/public and to rectify or resolve the issue at his own cost. All existing highways and roads used by vehicles of the contractor or any of his sub-contractor 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 with specific attention to the settlement areas. The unloading of materials at construction sites/close to settlements will be restricted to daytime only.	Contractor	Employer/HPPWD/NHAI
C.2.4	Construction Water	Contractor will arrange adequate supply and storage of water for the whole construction period at his own costs. The Contractor will submit a list of source/s from where water will be used for the project to HPPWD/NHAI through the Engineer. The contractor will source the requirement of water preferentially from ground water but with prior permission from the Ground Water Board. A	Contractor	Employer/HPPWD/NHAI

S. No.	Environmental Aspect/Issue	Management Measures	Responsibility	
			Execution /Civil Work	Supervision/ Monitoring
		copy of the permission will be submitted to HPPWD/NHAI through the Engineer. The contractor will take all precaution to minimize the wastage of water in the construction process/ operation.		
C.3	**Construction Work**			
C.3.1	Disruption to Other Users of Water	While working across or close to any perennial water bodies, contractor will not obstruct/ prevent the flow of water. Construction over and close to the non-perennial streams shall be undertaken in the dry season. If construction work is expected to disrupt users of community water bodies, notice shall be served well in advance to the affected community by the contractor.	Contractor	Employer/HPPWD/NHAI
C.3.2	Drainage	The Contractor will ensure that construction materials like earth, stone, fly ash are disposed-off so as not to block the flow of water of any watercourse and cross drainage channels. The Contractor will take all necessary measures to prevent the blockage of water flow. In addition to the design requirements, the Contractor will take all required measures as directed by the Environmental Expert to prevent temporary or permanent flooding of the site or any adjacent area.	Contractor	Employer/HPPWD/NHAI

S. No.	Environmental Aspect/Issue	Management Measures	Responsibility	
			Execution /Civil Work	Supervision/ Monitoring
		Form O1 shall be used for reporting to Engineer/Employer.		
C.3.3	Siltation of Water Bodies and Degradation of Water Quality	The Contractor will not excavate beds of any stream/canals/any other water body for borrowing earth for embankment construction. The Contractor will ensure that construction materials containing fine particles are stored in an enclosure such that sediment-laden water does not drain into nearby water course.	Contractor	Employer/HPPWD/NHAI
C.3.4	Slope Protection and Control of Soil Erosion	The contractor will take slope protection measures as per design, or as directed by the Environmental Expert to control soil erosion and sedimentation. All temporary sedimentation, pollution control works and maintenance thereof will be deemed as incidental to the earth work or other items of work and as such as no separate payment will be made for them. Contractor will ensure the following aspects: During construction activities on - project roads, the side slopes of all cut and fill areas will be graded and covered with stone pitching, grass and shrub as per design specifications. Turfing works will be taken up as soon as possible provided the season is favourable for the establishment of grass sods. Other measures of slope stabilization will include mulching netting and seeding of batters and drains immediately on completion of earthworks.	Contractor	Employer/HPPWD/NHAI

S. No.	Environmental Aspect/Issue	Management Measures	Responsibility	
			Execution /Civil Work	Supervision/ Monitoring
		In borrow pits, the depth shall be so regulated that the sides of the excavation will have a slope not steeper than 1 vertical to 2 horizontal, from the edge of the final section of the bank. Along sections abutting water bodies, stone pitching as per design specification will protect slopes.		
C.4	**Pollution**			
C.4.0	Pollution Monitoring	The periodic monitoring of the ambient air quality, noise level, water (both ground and surface water) quality, soil quality at/near project road locations will be done as per MoEF and CPCB guidelines. Form C3 shall be used for reporting to Engineer/Employer.	Contractor	Employer/HPPWD/NHAI
C.4.1	Water Pollution			
C. 4.1.1	Water Pollution from Construction Wastes	The Contractor will take all precautionary measures to prevent the wastewater generated during construction from entering into streams, water bodies or the irrigation system. Contractor will avoid construction works close to the streams or water bodies during monsoon. All waste arising from the project is to be disposed of in the manner that is acceptable and as per norms of the Himachal State Pollution Control Board.	Contractor	Employer/HPPWD/NHAI
C.4.1.2	Water Pollution from Fuel and Lubricants	The contractor will ensure that all construction vehicle parking location, fuel/lubricants storage sites, vehicle, machinery and equipment	Contractor	Employer/HPPWD/NHAI

S. No.	Environmental Aspect/Issue	Management Measures	Responsibility	
			Execution /Civil Work	Supervision/ Monitoring
		maintenance and refuelling sites will be located at least 500 m from rivers and irrigation canal/ponds. All location and layout plans of such sites will be submitted by the Contractor prior to their establishment and will be approved by HPPWD/NHAI. Contractor will ensure that all vehicle/machinery and equipment operation, maintenance and refuelling will be carried out in such a fashion that spillage of fuels and lubricants does not contaminate the ground. Oil interceptors will be provided for vehicle parking, wash down and refuelling areas as per the design provided. Guidelines For Silt Fencing and Oil Interceptor is given in Annexure-5 In all, fuel storage and refuelling areas, if located on agricultural land or areas supporting vegetation, the top soil will be stripped, stockpiled and returned after cessation of such storage. Contractor will arrange for collection, storing and disposal of oily wastes to the pre-identified disposal sites and approved by HPPWD/NHAI. All spills and collected petroleum products will be disposed of in accordance with MoEF and HHPSPCB guidelines.		
C.4.2	Air Pollution			
C.4.2.1	Dust Pollution	The contractor will take every precaution to reduce the level of dust from crushers/hot mix plants, construction sites involving earthwork by	Contractor	Employer/HPPWD/NHAI

S. No.	Environmental Aspect/Issue	Management Measures	Responsibility	
			Execution /Civil Work	Supervision/ Monitoring
		sprinkling of water, encapsulation of dust source and by erection of screen/barriers at worksite/campsites. All the plants will be sited at least 1 km in the downwind direction from the nearest human settlement. PM2.5, PM10, SO2, CO and NOx should be in permissible limit as stated in National Ambient Air Quality Standards during the construction phase. Dust screening vegetation will be planted on the edge of the camp site. Hot mix plant will be fitted with dust extraction units.		
C.4.2.2	Emission from Construction Vehicles, Equipment and Machineries	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 HPSPCB. The Contractor will submit PUC certificates for all vehicles/ equipment/machinery used for the project. Monitoring results will also be submitted to HPPWD/NHAI.	Contractor	Employer/HPPWD/NHAI
C.4.3	Noise Pollution			
C.4.3.1	Noise Pollution: Noise from Vehicles, Plants and Equipment	The Contractor will confirm the following: All plants and equipment used in construction (including the aggregate crushing plant) shall strictly conform to the MoEF/CPCB/HHPSPCB noise standards.	Contractor	Employer/HPPWD/NHAI

S. No.	Environmental Aspect/Issue	Management Measures	Responsibility	
			Execution /Civil Work	Supervision/ Monitoring
		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. Limits of noise emission for construction equipment used in the project such as compactors, rollers, front loaders, concrete mixers, cranes (moveable), vibrators and saws shall not exceed 75 dB (A) (measured at one meter from the edge of equipment in the free field), as specified in the Environment (Protection) rules, 1986. Maintenance of vehicles, equipment and machinery shall be regular and up to the satisfaction of the Environmental Expert to keep noise levels at the minimum. At the construction sites within 150 m of the nearest habitation, construction work such as crushing, concrete mixing, batching will be stopped during the night time between 9.00 pm to 6.00 am. No construction activities will be permitted around educational institutes/health centres (silence zones) up to a distance of 100 m from the sensitive receptors i.e., school, health centres and hospitals between 9.00 am to 6.0 pm.		
C.5	**Occupational Health & Safety**			

S. No.	Environmental Aspect/Issue	Management Measures	Responsibility	
			Execution /Civil Work	Supervision/ Monitoring
C.5.1	Personal Safety Measures for Labour	The Contractor will provide: Protective footwear and protective goggles to all workers employed on mixing asphalt materials, cement, lime mortars, concrete etc. Welder's protective eye-shields to workers who are engaged in welding works Protective goggles and clothing to workers engaged in stone breaking activities Earplugs to workers exposed to loud noise, and workers working in crushing, compaction, or concrete mixing operation. Adequate safety measures for workers during handling of materials at site. The Contractor will comply with all regulations regarding safe scaffolding, ladders, working platforms, gangway, harness, stairwells, excavations, trenches and safe means of entry and egress. The Contractor will comply with all the precautions as required for ensuring the safety of the workmen as per the International Labour Organization (ILO) Convention No. 62 as far as those are applicable to this contract. 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. The Contractor will also ensure that	Contractor	Employer/HPPWD/NHAI

S. No.	Environmental Aspect/Issue	Management Measures	Responsibility	
			Execution /Civil Work	Supervision/ Monitoring
		no paint containing lead or lead products is used except in the form of paste or readymade paint.He will provide facemasks for use to the workers when paint is applied in the form of spray or a surface having lead paint is rubbed and scraped. Luminous jacket, Regulation (industrial or safety) shoes and hard hats shall be made mandatory for all workers at site. The Contractor will mark 'no smoking' in high risk 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 Engineer and HPPWD/NHAI.		
C.5.2	Traffic and Safety	The Contractor will take all necessary measures for the safety of traffic during construction as per IRC:SP:55:2014 and provide, erect and maintain such barricades, including signs, markings, flags, lights and flagmen as proposed in the Traffic Control Plan/Drawings and as required by the Environmental Expert for the information and protection of traffic approaching or passing through the section of any existing cross roads. The Contractor will ensure that all signs, barricades, pavement markings are provided as per the IRC SP 55:2014 / MoRTH specifications or as directed by the Engineer. Before taking up construction on any section of the existing lanes of the highway, a Traffic Management Plan will be devised and implemented to the satisfaction of the Environmental Expert and the Engineer. Rash driving by the Contractor's vehicle drivers must	Contractor	Employer/HPPWD/NHAI

S. No.	Environmental Aspect/Issue	Management Measures	Responsibility	
			Execution /Civil Work	Supervision/ Monitoring
		be strictly controlled. Guidlines for Traffic Management plan is attached as Annexure -3 Form P5 shall be used for reporting to Engineer/Employer.		
C.5.3	Risk from Electrical Equipment(s)	The Contractor will take all required precautions to prevent danger from electrical equipment and ensure that - No material will is so stacked or placed as to cause danger or inconvenience to any person or the public. All necessary fencing and lights is 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, are free from patent defect, are kept in good working order, regularly inspected and properly maintained as per IS provision and to the satisfaction of the Environmental Expert .	Contractor	Employer/HPPWD/NHAI
C.5.4	Risk Force Measure	The Contractor will take all reasonable precautions to prevent danger to the workers and public from fire, flood etc. resulting due to construction activities. The Contractor will make required arrangements so that in case of any mishap all necessary steps can be taken for prompt first aid treatment.	Contractor	Employer/HPPWD/NHAI
C.5.5	First Aid	The contractor will arrange for -	Contractor	Employer/HPPWD/NHAI

S. No.	Environmental Aspect/Issue	Management Measures	Responsibility	
			Execution /Civil Work	Supervision/ Monitoring
		a readily available first aid unit including an adequate supply of sterilized dressing materials and appliances as per the Factories Rules in project road work zone availability of suitable transport at all times to take injured or sick person(s) to the nearest hospital equipment and trained nursing staff at construction camp		
C.5.6	Informatory Signs and Hoardings	The contractor will provide, erect and maintain Informatory/safety signs, hoardings written in English and local language, wherever required as per IRC:67:2012 , IRC:SP:55:2014, IRC:35:2015 and MoRTH specifications.	Contractor	Employer/HPPWD/NHAI
C.5.7	Prevention of Mosquito Breeding	Measures shall be taken to prevent breeding at site. The measures to be taken shall include: -Empty cans, oil drums, packing & other receptacles, which may retain water shall be deposited at a central collection point & shall be removed from the site regularly. -Still waters shall be treated at least once every week with oil in order to prevent mosquito breeding. -Contractor's equipment & other items on the site, which may retain water, shall be stored, covered or treated in such a manner that water could not be retained. -Water storage tanks shall be provided.		Employer/HPPWD/NHAI

S. No.	Environmental Aspect/Issue	Management Measures	Responsibility	
			Execution /Civil Work	Supervision/ Monitoring
		-Posters in Hindi & English which draw attention to the dangers of permitting mosquito breeding shall be displayed prominently on the site. -Contractor periodic interval shall arrange to prevent mosquito breeding by fumigation / spraying of insecticides		
C.5.8	Transmission of Diseases & HIV/ AIDS prevention & control	The Contractor shall conduct an HIV/AIDS awareness programme via an approved service provider or specialized NGO to reduce the risk of the transfer of the HIV virus between and among the contractors' personals and local community. The contractor shall throughout the contract period – (i) Conduct information, education and consultation communication (IEC) campaigns, at least every alternate month. (ii) Provide male or female condoms for all workforce as appropriate; (iii) Provide for Sexually Transmitted Infections (STI) and HIV/AIDS screening, diagnosis, counselling and referral to a dedicated national STI and HIV/AIDS program.	Contractor	Employer/HPPWD/NHAI
C.6	**Flora and Fauna: Plantation/Preservation/ Conservation Measures**			
C.6.1	Flora and Chance found Fauna	The Contractor will take reasonable precaution to prevent his workmen or any other persons from removing and damaging any flora (plant/vegetation) and fauna (animal) including fishing in any water body and hunting of any animal.	Contractor	Employer/HPPWD/NHAI

S. No.	Environmental Aspect/Issue	Management Measures	Responsibility	
			Execution /Civil Work	Supervision/ Monitoring
		If any wild animal is found near the construction site at any point of time, the Contractor will immediately upon discovery thereof sensitize the Environmental Expert and carry out the ENGINEER's instructions for dealing with the same. The Environmental Expert will report to the nearby forest office (range office or divisional office) and will take appropriate steps/ measures, if required in consultation with the forest officials.		
C.6.2	Chance Found Archaeological Property	All fossils, coins, articles of value of antiquity, structures and other remains or things of geological 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. 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 Expert of such discovery and carry out the Engineer's instructions for dealing with the same, waiting which all work shall be stopped. The Engineer will seek direction from the Archaeological Survey of India (ASI) before instructing the Contractor to recommence the work in the site.	Contractor	Employer/HPPWD/NHAI
C.7	**Labour Camp Management**			

S. No.	Environmental Aspect/Issue	Management Measures	Responsibility	
			Execution /Civil Work	Supervision/ Monitoring
C.7.1	Accommodation	The Contractor will follow all relevant provisions of the Factories Act, 1948 and the Building and the other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996 for construction and maintenance of labour camp. The location, layout and basic facility provision of each labour camp will be submitted to Engineer and PIU prior to their construction. Form P2 shall be used for reporting to Engineer/Employer. The Contractor will maintain necessary living accommodation and ancillary facilities in functional and hygienic manner and as approved by the Engineer.	Contractor	Employer/HPPWD/NHAI
C.7.2	Potable Water	The Contractor will construct and maintain all labour accommodation in such a fashion that uncontaminated water is available for drinking, cooking and washing. The Contractor will also provide potable water facilities within the precincts of every workplace in an accessible place, as per standards set by the Building and other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996. The contractor will also guarantee the following: Supply of sufficient quantity of potable water (as per IS) in every workplace/labour camp site at suitable and easily accessible places and regular maintenance of such facilities.	Contractor	Employer/HPPWD/NHAI

S. No.	Environmental Aspect/Issue	Management Measures	Responsibility	
			Execution /Civil Work	Supervision/ Monitoring
		If any water storage tank is provided that will be kept such that the bottom of the tank at least 1mt. from the surrounding ground level. If water is drawn from any existing well, which is within 30mt. proximity of any toilet, drain or other source of pollution, the well will be disinfected before water is used for drinking. All such wells will be entirely covered and provided with a trap door, which will be dust proof and waterproof. A reliable pump will be fitted to each covered well. The trap door will be kept locked and opened only for cleaning or inspection, which will be done at least once in a month. Testing of water will be done as per parameters prescribed in relevant IS Standards.		
C.7.3	Sanitation and Sewage System	The contractor will ensure that - the sewage system for the camp are designed, built and operated in such a fashion that no health hazards occurs and no pollution to the air, ground water or adjacent water courses take place separate toilets/bathrooms, wherever required, screened from those from men (marked in vernacular) are to be provided for women adequate water supply is to be provided in all toilets and urinals all toilets in workplaces are with dry-earth system (receptacles) which are to be cleaned and kept in a strict sanitary condition.	Contractor	Employer/HPPWD/NHAI

S. No.	Environmental Aspect/Issue	Management Measures	Responsibility	
			Execution /Civil Work	Supervision/ Monitoring
C.7.4	Waste Disposal	The Contractor will provide segregated garbage bins in the camps and ensure that these are regularly emptied and disposed-off in a hygienic manner as per the Comprehensive Solid Waste Management Plan approved by the Environmental Expert. (Form C2 shall be used for reporting to Engineer/Employer). Comprehensive waste management plan is given in Annexure-4	Contractor	Employer/HPPWD/NHAI
C.8	**Contractor's Demobilization**			
C.8.1	Clean-up Operations, Restoration and Rehabilitation	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 waste as per Comprehensive Waste Management Plan and as approved by Engineer. 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 Environmental Expert in a layer of thickness of 75 mm-l50 mm. Environmental Expert will certify in this regard. All construction zones including river-beds, culverts, road-side areas, camps, hot mix plant sites, crushers, batching plant sites and any other area used/affected by the project will be left clean and tidy, at the contractor's expense, to the entire satisfaction to the Environmental Expert. Form O2 shall be used for reporting to Engineer/Employer.	Contractor	Employer/HPPWD/NHAI

3. IMPLEMENTATION ARRANGMENTS

3.1 GENERAL

This chapter summarizes the institutional arrangements and reporting system arrangements for the implementation of the environmental management plan.

3.2 EXISTING INSTITUTIONAL ARRANGEMENTS

3.2.1 Existing Institutional Capacity in NH Division, HPPWD

Himachal Pradesh Public Works Department (HPPWD) has been entrusted the responsibility of successful implementation of the Gumma to Fediz Section of NH-707 funded by the World Bank.

The HPPWD comes under the Secretary Public Works Himachal Pradesh. Presently, NH Division of HPPWD is headed by the Chief Engineer of NH Division. The Chief Engineer NH Division is responsible for the successful implementation of the Project. Executive Engineers and his supporting staff are responsible as Employers representatives for the project implementation. NHAI/HPPWD may appoint Environment Expert for the supervision/monitoring of environmental issues for this project execution.

3.3 PROPOSED IMPLEMENTATION SETUP

The proposed set up for implementation of EMP is given in Figure 3.1.

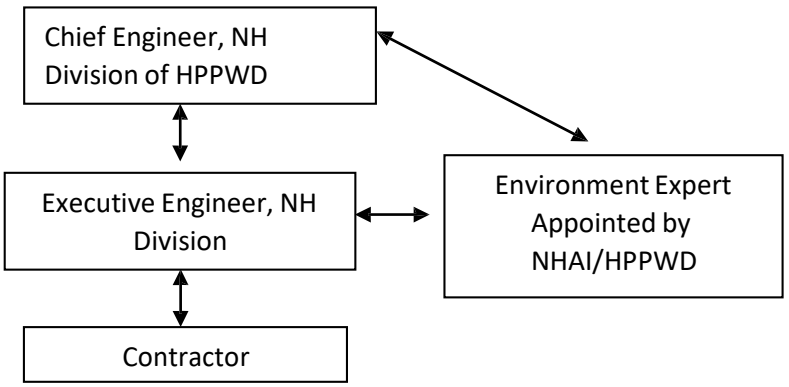

Figure 3-1 Proposed Implementation Setup

3.4 CONTRACTOR

The Construction Contractor is responsible for the physical implementation of the mitigation measures proposed in the Environmental Management Plan (EMP). To ensure the effective implementation of the EMP, the EMP will be made as part of the Contract Document between the Construction Contractor and Client. It follows that the Contractor has to have an Environmental Expert to incorporate environmentally sound construction methods.

3.5 GRIEVANCE REDRESSAL MECHANISM

Grievance Redress Mechanism at HPPWD: The HPPWD will form a Grievance Redressal Cell (GRC) at PWD and it shall be headed by the Executive Engineer. The Environmental Specialist HPPWD and Social Specialist, HPPWD will also be a member of this cell to redress complaints pertaining to environmental issues. The contact details of the members (email and phone numbers) of this cell will be available at HPPWD Web site and the details will also be available at construction camp of contractors, local PWD offices.

This GRC shall discuss the issue/complaint in its monthly meeting and resolve the issues within two weeks' time after receiving the grievance. If the matter is not resolved by GRC at PWD level within stipulated time, it shall be referred to the Chief Engineer, NH Division who will resolve the complaint within a period of two months.

Complaints register with the Contractor: The contractor shall keep and maintain a complaint register report at his site office along the project road as well as project facilities like construction camp, labour camp etc., for public to register their complaints. The Contractor, after taking necessary action based on the complaint, shall also incorporate the same, in the complaint register. This report shall also be part of the monthly report, for HPPWD /AE to monitor and take necessary action, if needed. It has to be noted that, inaction upon the complaint of the public shall be considered as a major lapse from the side of the Contractor, leading to invoking of penalty Clause, which is given in Chapter 2 of this report as well as the Contract document.

4. ENVIRONMENTAL MONITORING AND REPORTING REQUIREMENTS

4.1 MONITORING AND REPORTING OF ENVIRONMENTAL MANAGEMENT MEASURES

A robust monitoring and reporting system is mandatory to ensure compliance to EMP by the contractor.

A) Monitoring Plan

- To ensure the effective implementation of the EMP, it is essential that an effective monitoring program be designed and carried out.
- Various physical, biological and social components identified as of particular significance in affecting the environment at critical locations in various stages of the Project have been suggested as Performance Indicators (PIs). These are listed below and shall be the focus for monitoring.
- Air quality (PM10, PM2.5, NOx, SO2,Pb and CO);
- Water quality (Physical, chemical and Biological parameters)
- Noise levels around sensitive locations/residential area
- Plantation success / survival rate.

The monitoring plans during construction and operation stages have been described in detail in the EMP documents and summary of monitoring plan is presented in Table 4.1 & Table 4.2. For each of the environmental components, the monitoring plan specifies the parameters to be monitored; location of monitoring sites; frequency and duration of monitoring. The monitoring plan also specifies the applicable standards, implementation and supervising responsibilities.

Table 4-1 Environmental Monitoring Plan

Attribute	Project Stage	Parameter	Special Guidance	Standards	Frequency	Duration	Location	Implementation	Monitoring/ Supervision
Air	Construction	CO, NOx, SPM, PM2.5,PM10 and SO2	High volume sampler to be located 50 m from the plant in the downwind direction. Use method specified by CPCB for analysis	Air (prevention and Control of Pollution) Rules, CPCB, 1994	Quarterly	24 hours Sampling	Ref. Table No. 5.7	Contractor	HPPWD/NHAI
Water	Construction	All essential characteristics and some of desirable characteristics as decided by the HPPWD/NHAI	Grab sample collected from source and analyse as per Standard Methods for Examination of Water and Wastewater	Indian Standards for Inland Surface Waters (IS: 2296, 1982) and for Drinking Water (IS: 10500 - 1991)	Quarterly	Grab Sampling	ef. Table o. 5.7	Contractor	HPPWD/NHAI

Noise	Construction	Noise levels on dB (A) scale	Equivalent noise levels using an integrated noise level meter kept at a distance of 15 from edge of pavement Equivalent noise levels using an integrated noise level meter kept at a distance of 15 from edge of pavement	MoEF Noise Rules, 2000	Quarterly	Leq in dB(A) of day time and night time	Ref. Table No. 5.7	Contractor	HPPWD/NHAI
Soil	Construction	Monitoring of Pb, SAR and Oil & Grease	Sample of soil collected to acidified and analysed using absorption spectrophotometer	Threshold for each contaminant set by IRIS database of USEPA until national standards are promulgated	Once in Six Months	Grab Sampling	Ref. Table No. 5.7	Contractor	HPPWD/NHAI

Borrow area	Construction	As per Guidelines	Visual Observation	-	Once in a Month	-	Borrow area location	Contractor	HPPWD/NHAI
Tree plantation	Operation stage	As per Rehabilitation Plan			Quarterly	-	Areas where plantation is being done	-	HPPWD/NHAI

Table 4-2 Environmental Monitoring Locations

Environmental Component	S. N.	Location	Remarks
Air Quality	1.	Upstream of proposed Gumma Fediz Section of NH-707	Rural Residential/ Commercial
	2.	Middle of proposed Gumma Fediz Section of NH-707 near village Antroli	Residential/Commercial
	3.	Near End of Gumma Fediz Section of NH-707	Rural Residential/Commercial
	4	HMP Camp Site	Residential/Commercial
Water quality	1.	HMP Camp Site	Surface water / Ground water
	2.	Hand Pump at village Gumma	Ground water
	3	Hand Pump at Village Antroli	Ground water
	4	Giri River near disposal site -1	Surface water
	5	Giri River near disposal site -2	Surface water
	6	Giri River at Nearest point to HMP Camp Site	Surface water
Noise Monitoring	1.	Upstream of proposed Gumma Fediz Section of NH-707	Residential/Commercial
	2.	Middle of proposed Gumma Fediz Section of NH-707 near village Antroli	Rural Residential
	3.	Near End of Gumma Fediz Section of NH-707	Rural Residential
	4.	HMP Camp Site	Residential/Commercial
Soil quality	1.	Random Location at Completed section of Gumma to Fediz section of NH-707	Agricultural
	2	Near Construction Site	Agricultural
	3.	HMP Plant site	Agricultural

4.2 REPORTING REQUIREMENT

The reporting system evolved for Gumma- Fediz Project is given in table 4.3 below:

Table 4-3 List of Reporting Requirement

P2: Setting-Up Construction Camp and Storage Area

P3: Establishment of Borrow Areas

P4: Establishment of Hot Mix Plant / Batch Mix Plant

P5: Road Safety Reporting Formats

P6: Identification of Source of Water For Construction

C1: Detail of Machinery in Operation

C2: Detail of Waste Management

C3: Environmental Pollution Monitoring

C4: Detail of Earth Works

C5: Redevelopment of Borrow Areas

O1: Cleaning of Culvert Opening and Longitudinal Drain

O2: Restoration of Construction Sites

P1: IDENTIFICATION OF DISPOSAL SITE LOCATIONS

(To be filled by the Contractor)

Name of Project:

(Give Chainages and nearest settlements from both ends) Chainage No. –

Sl. No.	Criteria on which information for each site is to be collected	Site 1
1.	Existing Land Use.	
2.	Area covered (m2).	
3.	Total Material that can be dumped within the site (m3).	
4.	Height to which dumping is feasible (m).	
5.	Distance of nearest water course (m).	
6.	Nearest Settlements (m).	
7.	Date/s Community Construction/s.	
8.	Whether the community is agreeable to sitting of dumping site (Y/N).	
9.	Date of Permission from Villager/local community.	
10.	Proposed future use of the Site.	
11.	Selected Site (Tick any one column only).	

Enclosures (Tick as appropriate):

Map of each location.

Photographs.

Each Disposal Location.

Photo copy of Agreement.

Remarks:

Submitted By:

Signature…….
Name ……
Designation……
(Contractor)

Checked By:

Signature ……
Name……
(Environmental Expert)

Approved By:

Signature ……
Name ……
(The Engineer, PWD)

P2: SETTING-UP CONSTRUCTION CAMP AND STORAGE AREA

(To be filled by the Contractor)

Name of Project:

Construction Stage Report: Date - Month - Year - .

(Site Layout of Construction camp and working drawings of dwelling units with allied facilities to be attached with format. Format to be submitted before target date of establishing camps.)

Location of Camp:

Sl. No.	Item	Unit	Details	Remarks if any
1.	Detail of Item Camp			
a.	Size of camp.	mxm		
b.	Area of Camp.	Sq. m		
c.	Distance from Nearest			
d.	Distance from Nearest Water Source.	Type Size/Capacity Present		
	Date of camp being operational dd/mm/yy.			
	Present land use.			
	No. of trees with girth > 0.3m.			
e.	Details of Storage area (Availability of impervious surface)	mxm		
f.	Availability of separate waste disposal from storage area.	Cum		
2.	Details of Topsoil Stacking			
a.	Quantity of top soil removed	Sqm		
b.	Detail of storage of topsoil.	Describe attacking arrangement		
3.	Details of Workforce.			
a.	Total No. of Labours	Nos.		

Sl. No.	Item	Unit	Details	Remarks if any
b.	Total No. of Male Workers.	Nos.		
c.	No. of Male Workers below 18	Nos.		
d.	Total No of Female Workers.	Nos.		
e.	No. of Female Workers below 18	Nos.		
f.	No. of Children.	Nos.		
4.	Details of Dwelling Units.			
a.	No of dwelling/huts	Nos.		
b.	Minimum Size of Dwelling.	mxm		
c.	No. of opening per dwelling.	Nos.		
d.	Minimum size of opening.	mxm		
e.	Walls	Specifications		
f.	Roofing	Specifications		
g.	Flooring	Specifications		
h.	Drinking Water Tank	Specifications		
i	Capacity of drinking Water Tank	Cum		
J	Size of Drinking Water Tank.	mxm		
K	Total no of WC	Nos.		
l.	No, of Wcs for female workers	Nos.		
m.	Minimum size of WC	mxm		
n.	Total No. of Bathrooms for	Nos		
o.	Size of septic tank for WC/Baths.	mxm		
p.	Capacity of Water			
q.	Fencing around camp.	Y/N		
5.	Details of facilities.			
a.	Availability of security guard 24	Yes/No		
b.	Details of First Aid Facility	Yes/No		

Sl. No.	Item	Unit	Details	Remarks if any
c.	Availability of Day Care centre.	Yes/No		
d.	Availability of dust bins	Yes/No		

Remarks:

Submitted By:

Signature……..
Name ……
Designation……
(Contractor)

Checked By:

Signature ……
Name……
(Environmental Expert)

Approved By:

Signature ……
Name ……
(The Engineer, PWD)

P3: ESTABLISHMENT OF BORROW AREAS

(To be submitted by Contractor for taking consent for opening of Borrow area)

Name of Project

Date:

Sl. No.	Location				Area (m2)	Quantity of Available Material	Type of Material	Distance from nearest Water Course (m)	Distance from nearest Settlement	Land Use		No. of Trees to be Affected	Approved by EO (Y/N)	Remarks
	Name of Village	Chainage (Km)	Side (LHS/ RHS)	Haul road length (m)						Before	After			
1.														

Attach Photograph of Proposed Site, Location Map, and Agreement

Submitted By:

Signature……..
Name ……
Designation……
(Contractor)

Checked By:

Signature ……
Name……
(Environmental Expert)

Approved By:

Signature ……
Name ……
(The Engineer, PWD)

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P4: ESTABLISHMENT OF HOT MIX PLANT / BATCH MIX PLANT

(To be submitted by Contractor for taking permission from PWD)

Name of Project:

Date:

Sl. No.	Location				Area (m2)	Distance from nearest Water Course (m)	Distance from nearest Settlement	Existing Land Use	Prevalent Wind Direction	Whether in Down Wind Direction (Y/N)	Approved by EO (Yes/ NO)	Remarks
	Name of Village	Chainage (Km)	Side (LHS/ RHS)	Haul road length (m)								
1.												

Attach Photograph of Proposed Site

Submitted By:

Signature……..
Name ……
Designation……
(Contractor)

Checked By:

Signature ……
Name……
(Environmental Expert)

Approved By:

Signature ……
Name ……
(The Engineer, PWD)

P5: ROAD SAFETY REPORTING FORMATS

(Reporting by Contractor)

Name of Project:

One time reporting before commencement of construction in the Construction Zone.

Sketch of construction zone showing all sub zones and location of signs, etc. to be attached with format. Format on Acquisition of Temporary diversions to be attached with format.

Construction stage: Monthly Report:

Date …… Month …….. Year…… .

DIVERSION NO. Location (Km).

Sl. No.	Item	Unit	Compliance	Remarks
	Details of Construction Zone.			
1.	Length of Construction Zone	Km		
2.	Distance between this and next construction zone.	Km		
3.	Length of transition sub zone (should be min 50 for a speed of 50 km/ hr).			
4.	Length of work sub zone in urban stretch (should be <	Km		
5.	Length of work sub zone in rural stretch (5-10 Km)	Km		
6.	Distance between two work sub zones			
	Signage's in Construction Zones			
1.	Sign saying 'Men at Work' 1 Km ahead of transition	Y/N		
2.	Supplementary sign saying diversion 1 Km provided.	Y/N		
3.	Sign saying 'Road Closed Ahead' provided	Y/N		
4.	Compulsory Right Turn / left sign provided	Y/N		
5.	Detour sign placed.			
6.	Sharp deviation sign placed at end of advance warning	Y/N		
	Signage in Transition Sub Work Zone.			
1.	Signage saying 'Keep Right / Left' provided.	Y/N		
2.	Delineators placed along length of transition.	Y/N		

	Signage in Work Sub Zone			
1.	Hazard Marker placed where railing for CD structure on diversion starts.	Y/N		
2.	Barricade on either side of work sub zone.			
	Signage in Termination sub zone.			
1.	Sign for indication of end of work zone 120 m from end of termination sub zone.	Y/N		
	Road Delineator			
1.	Roadway indicators provided.			
2.	Hazard Makers Provided.			
3.	Object Makers Provided.			

Remarks:

Submitted By:

Signature……..
Name ……
Designation……
(Contractor)

Checked By:

Signature ……
Name……
(Environmental Expert)

Approved By:

Signature ……
Name ……
(The Engineer, PWD)

P6: IDENTIFICATION OF SOURSE OF WATER FOR CONSTRUCTION

(To be filled by the Contractor)

Name of Corridor:

Construction Stage Monthly Report- Date: Month: Year:

S.No.	Source Name	Location/ Ch.	Distance from Road	Permission Required	Remarks
1.					

Remarks:

Submitted By:

Signature……..
Name ……
Designation……
(Contractor)

Checked By:

Signature ……
Name……
(Environmental Expert)

Approved By:

Signature ……
Name ……
(The Engineer, PWD)

C.1: DETAILS OF MACHINERY IN OPERATION

(To be filled by the Contractor)

Name of Project Road:

Date:

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

1. Details of Machinery Operation

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

Remarks:

Submitted By:

Signature……..
Name ……
Designation……
(Contractor)

Checked By:

Signature ……
Name……
(Environmental Expert)

Approved By:

Signature ……
Name ……
(The Engineer, PWD)

C.2: WASTE MANAGEMENT

(To be filled by the Contractor)

Name of Project Road:

Date:

Sl. N.	Characteristics of Waste	Type of Waste	Total Quantity generated (cum/l)	Reused/ Recycled, If any (Quantity in cum/l)	Final Quantity of waste generated (cum/l)	Disposed Quantity (cum/l)	Disposal Practices	Disposal site	Remarks

Remarks:

Submitted By:

Signature…….
Name ……
Designation……
(Contractor)

Checked By:

Signature ……
Name……
(Environmental Expert)

Approved By:

Signature ……
Name ……
(The Engineer, PWD)

C.3 :ENVIRONMENTAL POLLUTION MONITORING

(To be filled by the Contractor)

Project Name:

Time Period: Date:

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

Parameter	Chainage (Km)	Details of Locations	Duration of Monitoring	Instruments used	Standard	Results	Reasons for exceedingstandards	Mitigation Measures suggested	Type (Residential / Industrial / Commercial)	Remarks
Air Quality					PM2.5	PM2.5				
					PM10	PM10				
					CO	CO				
					SOX	SOX				
					NOX	NOX				
Water Quality					pH	pH				
					TSS	TSS				
					TDS	TDS				
					Turbidity	Turbidity				
					Hardness	Hardness				
					Coliform	Coliform				
					BOD	BOD				
					COD	COD				
					Oil & Grease	Oil & Grease				
					pH	pH				
					Organic	Organic				
					Matter	Matter				
					Alkalinity	Alkalinity				

Soil Quality					Conductivity Water Holding Capacity Pb	Conductivity Water Holding Capacity Pb				
Noise Quality					L day equivalent L night equivalent L equivalent	L day equivalent L night equivalent L equivalent				

Remarks:

Submitted By:

Signature……..
Name ……
Designation……
(Contractor)

Checked By:

Signature ……
Name……
(Environmental Expert)

Approved By:

Signature ……
Name ……
(The Engineer, PWD)

C.4: DETAILS OF EARTHWORK

(To be filled by the Contractor)

Name of the Project Road:

Date of Submission

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

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

Details of Borrow Areas.

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

Remarks:

Submitted By:

Signature……..
Name ……
Designation……
(Contractor)

Checked By:

Signature ……
Name……
(Environmental Expert)

Approved By:

Signature ……
Name ……
(The Engineer, PWD)

C5: Redevelopment of Borrow Areas

(To be filled by the Contractor)

Name of Project:

Construction stage: Monthly Report –

Date: ……Month ……Year

Drawing for Redevelopment to be attached for each Borrow Area, (photography of sites before use &after rehabilitation to be attached)

Sl. No.	Borrow Area No.	Borrow Area Location					Land Use	Rehabilitation Measures	Date of approval of Rehabilitation	Date of Handing Over to Owner	Remarks
		Name of Village	Chainage (Km)	Side (LHS /RHS)	Area (m2)	Haul road length (M)					

Submitted By:

Signature……..
Name ……
Designation……
(Contractor)

Checked By:

Signature ……
Name……
(Environmental Expert)

Approved By:

Signature ……
Name ……
(The Engineer, PWD)

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O: 1 CLEANING OF CULVERT OPENING AND LOGITUDINAL DRAIN

(To be filled by the Contractor)

Name of the Corridor: Pkg. No.:

Construction stage Monthly Report - Date: _Month: Year:

Sl. No.	Structure No.	Pre monsoon	Date	Post monsoon	Date
Name of the Corridor					
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

Remarks:

Submitted By:

Signature…….
Name ……
Designation……
(Contractor)

Checked By:

Signature ……
Name……
(Environmental Expert)

Approved By:

Signature ……
Name ……
(The Engineer, PWD)

O2.: RESTORATION OF CONSTRUCTION SITES

(To be filled by the Contractor)

Name of the Project Road:

Construction stage Monthly Report - Date: _Month: Year:

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

Remarks:

Submitted By:

Signature……..
Name ……
Designation……
(Contractor)

Checked By:

Signature ……
Name……
(Environmental Expert)

Approved By:

Signature ……
Name ……
(The Engineer, PWD)

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5. ENVIRONMENTAL BUDGET

5.1 COST ESTIMATE FOR ENVIRONMENTAL MANAGEMENT

Mitigation measures proposed in the EMP will be implemented by the Contractor. The works to be undertaken by the Contractor have been quantified and the quantities included in the respective BoQ items such as earthworks, slope protection, noise barriers, road safety features, and shrub plantation. Ref. EIA prepared by CEA, Panchkula for reference.

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6. Annexures

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6.1 ANNEXURE 1: GUIDELINES FOR SETTING, MANAGEMENT AND REDEVELOPMENT OF CONSTRUCTION CAMPS

A. OVERVIEW

Construction camp accommodates a mix of activities, which are highly polluting in nature causing considerable environmental impact and its proper siting, management and redevelopment is crucial to avoid, minimize and mitigate those impacts. The EMP clearly distinguishes between various impacts that may occur at various stages of the camp like

- Siting,
- Setting up,
- Operation and
- Closure / redevelopment and provide respective mitigation measures to some extent.

In addition to that, this guideline has been prepared to provide the Contractor with comprehensive and systematic information on the various steps to be undertaken during these four stages, so that s/he can execute his/her role in an environmentally sound manner. Various mitigation measures have been synthesized into this guideline so that it serves as a single and standalone document for the Contractor.

B. CRITERIA FOR SETTING THE CAMP

To the extent, possible barren land or wastelands shall be preferred during site selection and fertile land and agricultural land shall be avoided. All such sites must be above the HFL with adequate drainage facility. In areas prone to floods, cyclones, cloudbursts or heavy rainfall, selection of the site should be made keeping in mind the safety of the camp and the workers. In addition, the Contractor should take care of the following criteria for locating the site:

- A minimum of 250 m away from any major settlement or village in downwind direction.
- A minimum of 200 m of any major surface water course or body
- Not within 500 m from ecologically sensitive areas like wildlife sanctuary, mangroves etc.
- Sufficiently wide access roads (at least 5.5 m Wide) for heavy vehicle movements

After identification of the site the Contractor should fill up the prescribed reporting format and submit the same for approval to the HP PWD without which any activity shouldn't be started on the site.

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C. FINALIZATION OF SELECTED SITE/S

After identification of the site, the Contractor should fill up the prescribed reporting format provided in EMP and submit the same for approval to the HP PWD /PWD. Environmental Engineer of HP PWD /PWD shall approve the selected site/s, after considering the compliance with the EMP Clauses. No agreements or payments shall be made to the landowner/s prior to receipt of a written approval from the HP PWD /PWD. Any consequence of rejection prior to the approval shall be the responsibility of the contractor and shall be made good at his own cost. After obtaining a written approval for the selected site, the contractor has to enter into an agreement with the landowner to obtain his/her consent before commencing any operation / activities in the land. The agreement should also mention its type, duration, amount and mode of payment as well as the preferences of the owner regarding site maintenance and redevelopment.

In the absence of site meeting the stipulated criteria, an alternate site can be selected specifying the reasons. In such a case, the construction camp management plan should incorporate additional measures specific to the site as suggested by the HP PWD /PWD.

D. DESIGNING OF CAMP / PREPARATION OF LAYOUT PLAN

The contractor should design a layout plan of the camp with adequate space for (i) site office along with store room, rest area and sanitary facilities, (ii) plants, machineries, (iii) workshops, (iv) vehicle washing area, (v) fuel handling area, (vi) room for raw material unloading and stocking, (vii) space for storage and handling of solid wastes (viii) security cabin etc. The laying out of these should be undertaken in such a manner that it facilitates smooth functioning of both man and machine. Fuel pumps, storage facility for inflammable and hazardous chemicals/ materials shall be provided inside the camp, but at a safe distance from office. Electric safety practices shall be integrated/ incorporated during the lay-out plan preparation.

Prevailing wind direction shall be kept in mind while planning out the lay-out of internal facilities. Cutting of trees should be minimum and the existing ones need to be integrated into the lay-out plan with proper planning. The roads within the camp should be well planned with adequate space for movement of vehicles and their parking.

E. SETTING UP OF CONSTRUCTION CAMP

(i) Site preparation: The stripping, stacking and preservation of top soil will be mandatory in case of farm lands and fertile areas and absolutely no material stacking or equipment instalment or vehicle parking or any other activity should be allowed prior to the satisfactory completion of this activity as per guidelines in EMP. Thereafter, the site should be graded and rendered free from depressions such that the water does not get stagnant anywhere. A compound wall of 2.4 m height should be constructed all around the camp to prevent the trespassing of humans and animals. Green belt should be provided along the boundary and as detailed in the EMP, it should be integrated with storm water drain and sedimentation trenches as given in annexure in EMP. No. of trees

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planted should not be less than ten times the number of trees cut. The approved layout plan should be strictly adhered to while setting up the camp.

(ii) Setting up of plants and machineries: Adequate arrangements should be made for avoiding fugitive emissions from plants and camp premises. This will include (a) control of air pollution through provision of in-built dust extraction systems like bag filter, damper and cyclone filter for bitumen hot mix plant, (b) a chimney of appropriate height (as per HPSPCB guideline) from ground level attached with dust extraction system and scrubber for the hot mix plant, (c) a chimney of appropriate height for the DG set (d) water sprinkling facilities for the concrete batching plant, wet mix macadam plant as well as in the camp premises and (e) garden net to prevent fugitive emissions from storage place of cement and aggregates. It has to be also ensured that effluent from the sludge tank of the scrubber is recycled and reused and the sludge is used for land filling with top soil spread on it.

To ensure that noise levels are within the limit, all plants and machineries should have their own silencers or any other noise control devices. All pollution control devices should be provided with backup power. Following conditions should be complied regarding the sound level conditions:

The sound level (Leq) measured at a distance of 1 m from the boundary of the site shall not exceed 55dB (A) during day time (6am - 6pm) and 45 dB (A) during night time (6 pm - 6am).

The total sound power level of the DG set shall be less than 96+10 log 10(kava) dB(A) where kVA is the nominal power rating of DG set.

The DG set shall be provided with acoustic enclosure/acoustic treatment with an insertion loss of minimum 25 dB (A).

The DG set shall be provided with proper exhaust muffler with insertion loss of minimum 25 dB (A).

A proper, routine and preventive maintenance procedure for the DG set shall be set and followed in consultation with the DG set manufacturer.

Concrete flooring with slope drains and oil interceptors should be proposed for hot mix plant area and workshop, vehicle washing and fuel handling area as per EMP, so that oil and lubricants that may spill on the floor does not contaminate any soil or water body. In case of any oil spills, it should be cleaned properly. There shall also be provisions for storage of used oil until it is disposed as per comprehensive waste management plan prepared by Contractor and approved by HP PWD/PWD.

(iii) Sanitation Facilities: Adequate no. of toilets shall be provided separately for males and females (depending on their strength), screened from those of men and provided with markings in vernacular language. All such facilities must have adequate

water supply with proper drainage and effluent treatment system like septic tank with soak pit. Soak pit should have a sealed bottom, honey comb wall and 75 cm. thick, 2 mm sand envelope around that. The sewage system for the camp must be properly sited, designed, built and operated so that no health hazard occurs and no pollution to the air, ground or adjacent watercourses takes place.

Portable toilets may be brought to use and the night soil from such units has to be disposed through designated septic tanks so as to prevent pollution of the surrounding areas. In the construction camp, no night soil or sewerage shall be disposed of at any place other than the septic tanks constructed at the site.

(iv) Waste Disposal: While preparing the layout plan, the Contractor should allocate adequate space for storage and handling of various wastes generated until they are disposed off in pre-identified disposal sites. The Contractor should provide separate garbage bins for biodegradable, non-biodegradable and domestic hazardous wastes in the camps and ensure that these are regularly emptied and disposed of in a hygienic manner. No incineration or burning of wastes shall be carried out by the Contractor. The disposal of any biodegradable matter shall be carried out in pits covered with a layer of earth within the camp site. Discarded plastic bags, paper and paper products, bottles, packaging material, gunny bags, hessian, metal containers, strips and scraps of metal, PVC pipe scrubber and poly urethane foam, auto mobile spares, tubes, tires, belts, filters, waste oil, drums and other such materials shall be either reused or sold /given out for recycling. POL (petroleum, oil and lubricants) waste shall be disposed of by transfer only to recycler/ re-refiners possessing valid authorization from the Tamil Nadu Pollution Control Board and valid registration from the Central Pollution Control Board. Used lead batteries, if any, should be disposed as per the Batteries (Management and Handling) Rules 2001.

(v) First aid / safety facilities: At every camp site, a readily available first-aid unit including an adequate supply of sterilized dressing materials, appliances and basic medicine should be provided. Workplaces which are remote and far away from regular hospitals should have indoor health units with one bed for every 250 workers. Details of nearest clinics as well as major hospitals like their location, distance from camp, phone nos. facilities offered by the hospital should be displayed in the camp office at clearly visible location in a legible manner. Suitable transport should be provided to facilitate taking injured and ill persons to the nearest hospital. Adequate personal protective equipment and firefighting equipment as detailed out in EMP should be made available in the camp and provided to the staff / workers. Operation manuals and training should be provided to machine operators. Warning signs should be placed at accident prone areas as well as at the entrance of the site.

(vi) Training to workers: Workers shall be trained in smooth operation of plants and machines, their regular maintenance and various safety measures to be followed as well as about the need for adherence to these measures.

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(vii) Information dissemination: There should be a sign board of size 6' x 4' mentioning the project details and Contractor's details to disseminate the information to the public. There should be a second sign board displaying the latest air and noise monitoring data against the standards specified.

Warning signboards should be set up at the entrance gate for the public as well as at other required places for the workers to alert them about the nature of operation being undertaken at those respective places.

Once the construction camp is set up, the date of commissioning of the camp should be intimated to the Head Office and concerned District Office of the HPSPCB.

F. **OPERATION OF CONSTRUCTION CAMP**

During the operation phase of the camp it is important to ensure that all vehicles and machineries are maintained regularly and their PUC certificates are renewed at regular intervals. All pollution control devices should be monitored and maintained properly at regular intervals. In case of process disturbance/ failure of pollution control equipment, the respective units should be shut down and should not be restarted until the control measures are rectified to achieve the desired efficiency. All units should operate only between 6 am and 10 pm. or as specified by HPSPCB in the consent letter.

Oil and grease waste generated from garages in construction camps should be drained out through oil interceptors and they should be maintained properly. Necessary arrangements should be made for regular sprinkling of water for dust suppression. Raw materials and products should be transported with proper cover to prevent spreading of dust.

Hygienic environment must be ensured by (i) provision of safe drinking water, (ii) proper maintenance of toilets including daily cleaning and disinfection using proper disinfectants, (iii) regular cleaning of drains by removing the silt and solid waste, (if any) and iv) appropriate waste management practices. While it is of utmost importance to ensure that firefighting equipment like fire extinguishers are in working condition, it should also be monitored that construction workers use the personal protective equipment provided to them and they are replaced when necessary. All these facilities should be inspected on a weekly basis to achieve the desired levels of safety and hygiene standards.

Environmental monitoring should be undertaken by the Contractor as stipulated in the EMP. If any standard is set by HPSPCB for hot mix plant emissions, the Contractor should collect samples of emission from all the chimneys and analyse for the parameters at least once in a month. The Consent to Operate (CTO) certificate from HPSPCB should be renewed at regular intervals and the same should be intimated to HP PWD/PWD.

A register should be maintained at the site office which provides (i) a one page format for each migrant labourer which will give their personal profile (including name, age, sex, educational qualification, address, blood group and any major illness), along with a

copy of any ID proof and an original photograph, (ii) a copy of the ID card of local labourers. A copy of the details of the migrant labourers should be submitted to the local police station.

G. **PREPARATION OF CONSTRUCTION CAMP MANAGEMENT AND REDEVELOPMENT PLAN**

After the site for the construction camp has been finalized and approved by HP PWD, the Contractor should prepare a construction camp management plan to be submitted to HP PWD/PWD for approval prior to setting up of the camp and it should comprise the following details:

Section–1: Details of site: Copy of approved site identification report along with location plan on a village map or an FMB, showing the site, its survey no., access road, project stretch, distance from the project stretch, surrounding features and land use like residences, agricultural land, water bodies etc., photograph of the site showing the topography and other existing features.

Section-2: Site preparation: Activities that will be undertaken for preparing the site based on EMP and this guideline.

Section-3: Arrangements/ facilities within the camp: List of plants / machineries to be set up within the camp like hot mix plant, batching plant, DG set etc., and other facilities to be provided like site office, store room, rest room, toilet room, material stocking yard etc. layout plan showing all these details along with vehicular movement path, green belt etc. Species wise no. of trees to be cut shall be provided.

Section-4: Mitigation measures that will be undertaken as per the EMP and this guideline while setting up of the camp and operation of the camp should be separately listed out here.

Sectoin-5: Other details: Any other relevant detail like list of trainings to be provided to workers, details of information dissemination, date of CTE certificate from HPSPCB, its validity, additional conditions laid down in it etc. should be included.

Section 6: Re-development plan, which should indicate the following points: (i) List of structures to be demolished and list of the clean-up activities that needs to be undertaken, (ii) Proposed use of the land after demobilizing and (iii) Presence of facilities that could be put in use by the land owner if it is a leased out private land or community in case of a public property.

Section-7: Annexure- (a) Working drawings: Electrical plan showing the electrical network planned for the site, location of plants, generators, master switch boards etc. and plumbing drawing showing the network of water supply lines, sewerage line and drainage line, (b) Copy of certificates / permissions obtained from regulatory authorities

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/ local governing body /community etc. as applicable, (c) Copy of agreement entered with the owner of the site if it is a leased out land.

All the drawings should have north direction marked in it along with prevailing wind direction. Necessary dimensions and specifications should be provided where ever necessary. The construction camp management plan should be submitted to the HP PWD/PWD for a written approval before any physical work (includes storage of materials, equipment etc.) is undertaken on a particular site. The HP PWD/PWD shall carefully examine the proposals considering the specific conditions of each site as well as various EMP and regulatory provisions and provide suggestions, as necessary to the Contractor who shall incorporate it in the management plan.

H. **DEMOBILIZATION AND REDEVELOPMENT OF THE SITE**

The Contractor should clear all temporary structures; dispose all building debris, garbage, night soils and POL waste as per the approved debris management plan. All disposal pits or trenches should be filled in, disinfected and effectively sealed off. All the areas within the camp site should be levelled and spread over with stored top soil. Residual topsoil, if any will be distributed or spread evenly in plantation sites, on adjoining/near-by barren land or affected agricultural land adjacent to the RoW that has been impacted on account of any accidental spillage. Entire camp area should be left clean and tidy, in a manner keeping the adjacent lands neat and clear, at the Contractor's expense, to the entire satisfaction of landowner and HP PWD.

These activities should be completed by the Contractor prior to demobilization. Once the Contractor finishes his job, he needs to obtain a certificate from the owner, stating that the site has been re- developed to his/her satisfaction and in tune with the agreement. Then following documents needs to be submitted to the HP PWD by the Contractor:

Copy of approved site identification report

Photographs of the concerned site 'before' and 'after' setting up the camp.

Certificate from the owner stating his/her satisfaction about status of re-development of the site.

HP PWD shall ensure, through site verification that all clean-up and restoration operations are completed satisfactorily and a written approval should be given to the Contractor mentioning the same before the 'works completion' certificate is issued/recommended. The PWD shall ensure through site inspection that the Contractor has complied with all these provisions. The site can then be handed over to the concerned owner or local bodies or for local communities as the case may be.

Certification/documentation pertaining to approval for clean-up and restoration operations and thereafter handing-over to the owner shall be properly maintained by the Contractor.

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6.2 ANNEXURE 2: GUIDELINES FOR SITING, MANAGEMENT AND REDEVELOPMENT OF BORROW AREAS

A. BORROW AREA SELECTION

A borrow describes an area where material (usually soil or sand) has been dug for use at another location, for example, soil might be excavated to fill an embankment for a highway. In some cases, the borrow pits may become filled with ground water posing a danger to the surrounding community. If properly redeveloped, it can be turned into recreational areas or sustainable wildlife habitats. In other cases, borrow pits may be used for landfill and waste disposal also.

B. CRITERIA FOR SITE SELECTION

The Contractor in addition to the established practices, rules and regulation shall also use the following criteria before finalizing the locations of borrow areas:

The borrow area should not be located in agriculture areas especially in paddy fields unless unavoidable i.e. barren land is not available. In case borrowing needs to be done on an agricultural land, top-soil stripping, stacking and preservation is a must.

Borrow pits shall not be located within a distance of 100m from any NH, SH or other roads.

Site shall be located 30m away from toe of the embankment along road side.

Site should be located not less than 30m from the toe of the bank along the river side or irrigation tank bund.

Borrow area shall be located at a minimum distance of 30m from the toe of the irrigation tank bund.

Borrow site shall be located at a minimum distance of 500 m in down-wind direction of villages and settlements.

No borrow pits shall be located within 250 m. from schools, colleges, playgrounds, religious structures and health centres.

No borrow area shall be opened within 500 m. from a reserved or protected forest area/sites, wildlife movement zone and cultural heritage site.

Loss of vegetation shall be almost nil or minimum.

Borrow area near any surface water body will be at least 100 m. away from the toe of the bank or high flood level, whichever is maximum. After identification of borrow area location/s, the Contractor will fill the prescribed reporting format and submit the same for approval to the "Site Engineer" at least 7 working days before commencement of earth works. A written approval from HP PWD/PWD shall be necessary before any activity/work is commenced.

Borrow pit location shall be located at least 0.8 km from villages and settlements. If unavoidable, they should not be dug for more than 30 cm and should be drained.

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C. FINALIZATION OF THE SELECTED AREA

After identification of the site, the Contractor should fill up the prescribed reporting format provided in EMP and submit the same for approval to the HP PWD/PWD. The selected site/s shall be approved by Environmental Engineer of HP PWD, after considering the compliance with the EMP Clauses. No agreements or payments shall be made to the land owner/s (in case of a leased or rented out land) prior to receipt of a written approval from the HP PWD/PWD. Any consequence of rejection prior to the approval shall be the responsibility of the Contractor and shall be made good at his own cost. After obtaining a written approval for the selected site, the Contractor has to enter into an agreement with the land owner to obtain his/her consent before commencing any operation / activities in the land. The agreement should also mention its type, duration, amount and mode of payment as well as the preferences of the owner regarding site maintenance and redevelopment.

D. BORROW AREA MANAGEMENT

Before the start of operations, the area to be borrowed shall be marked by the Contractor with wooden or stone pegs to ensure that the land required for slope stabilization or bund creation is maintained.

After receiving the approval, the Contractor will begin operations keeping in mind the following points.

Top soil conservation is to be undertaken only if its reuse is envisaged for the proposed activity in the borrow area rehabilitation. Top soil that cannot be re-used in rehabilitation of borrow areas shall be used in the plantation belt/zone along the road.

Damage to productive and fertile areas has to be minimum. This includes appropriate planning of haul roads.

No excavated acceptable material other than surplus to requirements of the Contract shall be removed from the site. Contractor should be permitted to remove acceptable material from the site to suit his operational procedure, and then be shall make good any consequent deficit of material arising there from.

Where the excavation reveals a combination of acceptable and un-acceptable materials, the Contractor shall, unless otherwise agreed by the Engineer, carryout the excavation in such a manner that the acceptable materials are excavated separately for use in the permanent works without contamination by the un-acceptable materials. The acceptable material shall be stockpiled separately.

The Contractor shall ensure that he does not adversely affect the stability of excavation or fills by the methods of stockpiling materials, use of plants or siting of temporary buildings or structures.

The following principles shall be adhered to during borrow area operations:

A 15 cm topsoil layer will be stripped off from the borrow pit and this will be preserved in stockpiles in a designated area with a height not exceeding 2m and side slopes not steeper than 1:2 (Vertical: Horizontal).

Borrowing of earth will be allowed up to a depth of 1.5 m from the existing ground level only.

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Ridges of not less than 8m width will be left at intervals not exceeding 300m.Small drains will be cut through the ridges, if necessary, to facilitate drainage.

The slope of the edges will be maintained not steeper than 1:4 (vertical: Horizontal).

Rehabilitation shall be satisfactorily undertaken immediately after the use has ceased and at least three weeks prior to monsoon.

If the rehabilitation plan envisages re-use of top soil, then preserved top soil has to be spread uniformly over the land used as a borrow area.

Bunds and temporary fencing (using barbed wire) along with plantation should be provided in case the borrow area is developed as a pond to ensure safety of the residents and the cattle. However, the depth shall not exceed 1.5 m.

E. PREPARATION OF BORROW AREA MANAGEMENT AND REDEVELOPMENT PLAN

The Contractor after getting approval from the competitive authority for the selected site should submit a detailed Borrow Area Management and Redevelopment Plan comprising the following details:

Section–1: Details of site: Copy of approved site identification report along with location plan on a village map or an FMB, showing the site, its survey no., access road, project stretch, distance from the project stretch, surrounding features and land use like residences, agricultural land, water bodies etc., photograph of the site showing the topography and other existing features.

Section-2: Site preparation: Activities that should be undertaken for preparing the site based on EMP and this guideline.

Section-3: Layout plan: A layout plan showing all these details along with vehicular movement path, green belt locations where digging of contour trenches should be undertaken etc.

Section-4: Mitigation measures that will be undertaken as per the EMP and this guideline while setting up of the camp and operation of the camp should be separately listed out.

Sectoin-5: Other details: Any other relevant detail like list of awareness camps to be provided to workers, details of information dissemination etc. date of quarry license obtained from Dept of Mines, its validity, additional conditions laid down in it etc. should be included in the quarry management plan. Species wise no. of trees to be cut and the details of top soil to be removed and conserved like quantity, location of storing etc. shall also be provided.

Section 6: Re-development plan: which should indicate following points: (i) proposed use of the land in the post construction phase, (ii) preferences of land owner with respect to redevelopment, (iii) Presence of existing facilities that could be put in use by the land owner if it is a leased out private land or by the community in case of a public property, (iv) Extent of community involvement.

Section-7: Annexure-(a) Copy of permissions obtained from local governing body / community etc. as applicable, (b) Copy of agreement entered with site owner, in case of leased out sites.

All the drawings should have north direction marked in it along with prevailing wind direction. Necessary dimensions and specifications should be provided where ever necessary. The

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management plan should be submitted to the PWD for a written approval before any physical work (includes storage of materials, equipment etc.) is undertaken on a particular site.

F. REHABILITATION OR RE-DEVELOPMENT OF BORROW AREAS

The objective of the borrow area rehabilitation is to return the borrowing sites to a safe and environmentally sound condition. The concept entails enhancing benefits (including those linked to livelihood) for the community and individuals. Top soil preservation (and its re-use) and proper stabilization of slopes are the fundamental requirements of the rehabilitation process. Re-development plan shall be prepared and submitted along with reporting format by the Contractor before the borrowing operation is permitted by the PWD. The redevelopment is to be prepared in consultation with land owner/s (whether public, private or institutional) and by within the environmental and safety requirements of the EMP. Some key points on borrow area rehabilitation are presented in the table provided below. However, the Contractor is free to prepare other rehabilitation scheme/s subject to the approval by the Environmental Engineer of the HP PWD.

Type/Form of Rehabilitation	Re-Use of Top Soil	Actions Required for Rehabilitation
Farm land	Yes	Levelling Slope Stabilization along the edges if there is a level difference
Ponds including creation of new ones and enhancing capacity of existing ones (for irrigation; pisiculture and general uses by people and/or cattle)	No	Slope Stabilization (angle/benching) Access / Approach Ramp Bund creation and Temporary Fencing Plantation in the periphery
Water recharging areas/percolation tanks (depth up to one meter)	No	Slope Stabilization Small bund creation
Levelled lands that can be developed later for various uses (such as residential areas, parking lots, community grounds etc.)	Generally no	Levelling Top soil re-use depends on the type of developmental work envisaged
Construction waste disposal sites (for non-toxic/non-hazardous wastes) (reinstated with top-soil with plantation over the rehabilitated site)	No	Depression after filling-in of wastes to be levelled-up Top soil re-use depends on the type of developmental work envisaged

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Type/Form of Rehabilitation	Re-Use of Top Soil	Actions Required for Rehabilitation
Plantation Zones	Yes	Levelling Selection of Species as per TNRSP Project Guidelines
Water holes for animals and birds (outside forest and protected areas)	No	Gentle Slopes on all sides Plantation in the periphery Depth up to 1.5 m.

Rehabilitation works shall be undertaken immediately upon the exhaustion of the approved quantity and shall not be delayed.

These activities should be completed by the Contractor prior to demobilization. Once the Contractor finishes his job, he needs to obtain a certificate from the owner, stating that the site has been re- developed to his/her satisfaction and in tune with the agreement. Then following documents needs to be submitted to the HP PWD by the Contractor:

Copy of approved site identification report

Photographs of the concerned site 'before' and 'after' setting up the camp.

Certificate from the owner stating his/her satisfaction about status of re-development of the site.

PWD shall ensure, through site verification that all clean-up and restoration operations are completed satisfactorily and a written approval should be given to the Contractor mentioning the same before the 'works completion' certificate is issued/recommended. The PWD shall ensure through site inspection that the Contractor has complied with all these provisions. The site can then be handed over to the concerned owner or local bodies or for local communities as the case may be.

Certification/documentation pertaining to approval for clean-up and restoration operations and thereafter handing-over to the owner shall be properly maintained by the Contractor.

6.3 ANNEXURE 3: GUIDELINES FOR PREPARATION OF TRAFFIC MANAGEMENT PLAN

Traffic Safety Plans (Design Stage)

Safety of vulnerable road users i.e. pedestrians, cyclist, school children etc. as well as vehicles on the road will be of highest importance and adequate measures have been incorporated in the design of the Project. For the safety and convenience of the local people, traffic calming measures, school zone treatment, village gate treatment, traffic control systems and unpaved shoulders for pedestrians in the village areas has been incorporated. IRC:67:2012 and IRC 35:2015 have been referred for sign boards and pavement marking.

Construction Stage

Safety during the construction will be considered as an integral part and high priority element of the road Project. All precautions required will be taken to ensure closure of the road is for minimum period and traffic delay is as limited as possible. It will also be ensured that inconvenience to the road users, community residing near the work site and the work crew and machinery will be minimized.

All safety precautions will be ensured during temporary and permanent works for the road construction.

The safety practices, therefore, are oriented towards reducing the conditions that lead to such hazards and consequent stress on the driver, so as to control and regulate his behaviour as warranted by the site conditions through the construction zone.

Components of the Construction Zone

Construction Zone is the area of the road which is affected by the works and which affects traffic flow resulting in a conflict between the road users and the construction activities.

Work Zone is the area where workmen are working i.e. excavation, overlaying improvements etc.

Working Space is the space around the work area that allows the workmen to move around to do the job and will include space required for storing excavated material, plant and equipment and clear space required for swinging of equipment and excavation arms.

Safety Zone is provided to protect the workmen from the moving traffic. This includes providing lateral and longitudinal buffer zones.

Traffic Control Zone includes those areas in advance of the actual work site that are required for advance working as well as safety zones, the transition zones and the working zones itself.

For providing all required safety precautions specific traffic management plans will be prepared and implemented during construction in accordance with the IRC: SP:55:2014 (Guidelines on Safety in Road Construction Zones). Some guiding drawings for the general safety measures are provided below

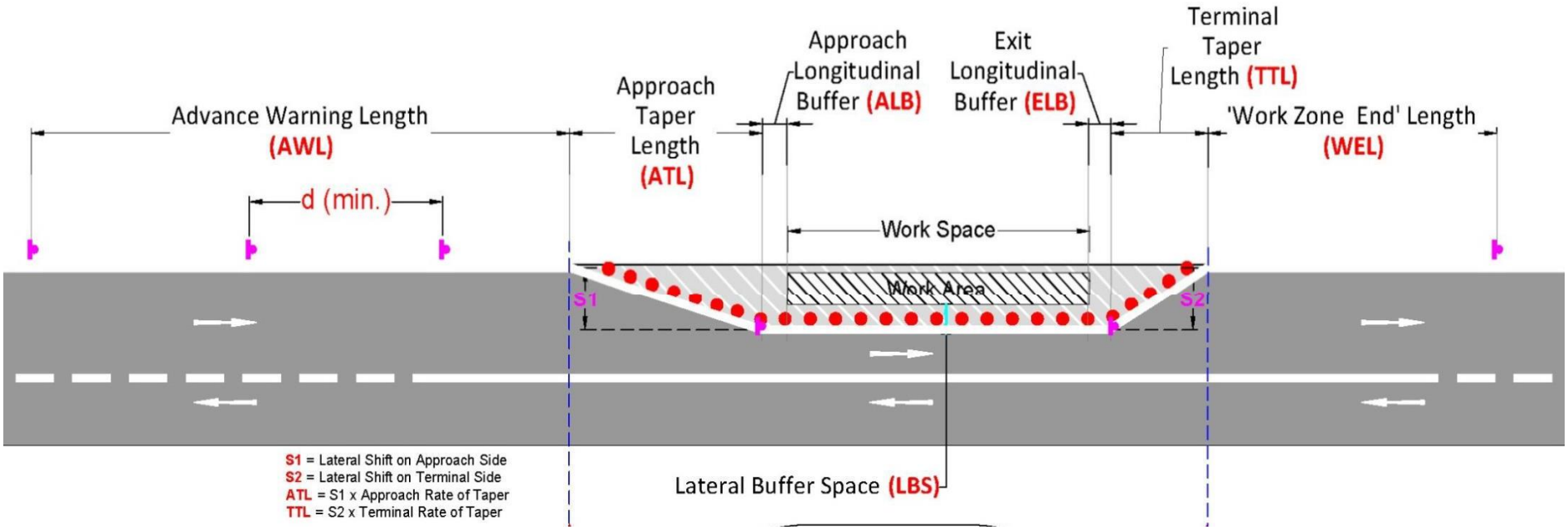


Figure 2 Traffic Control Zone

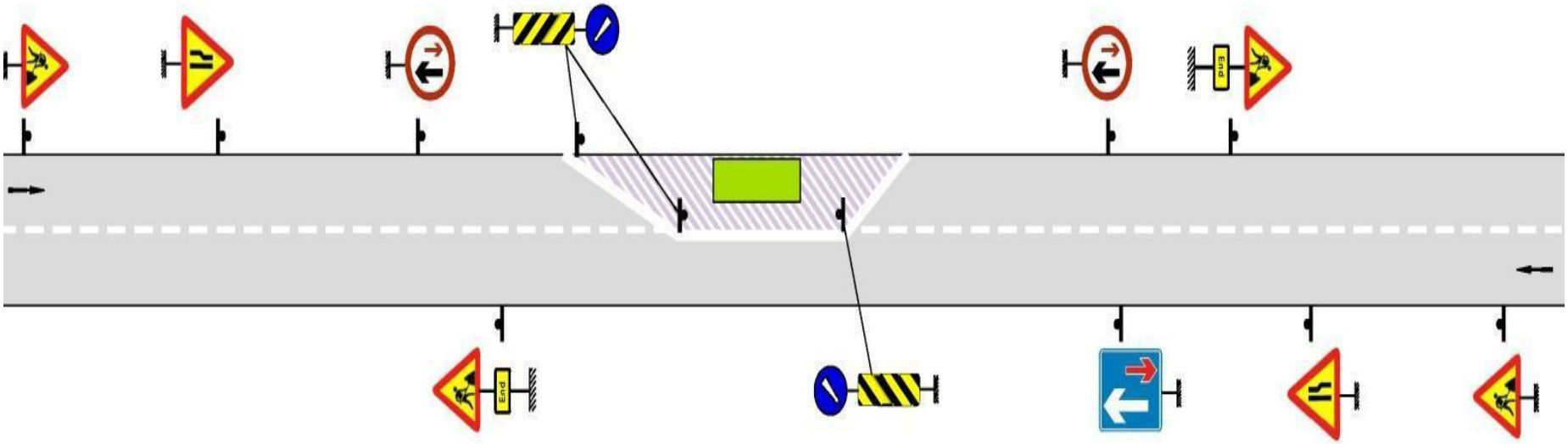
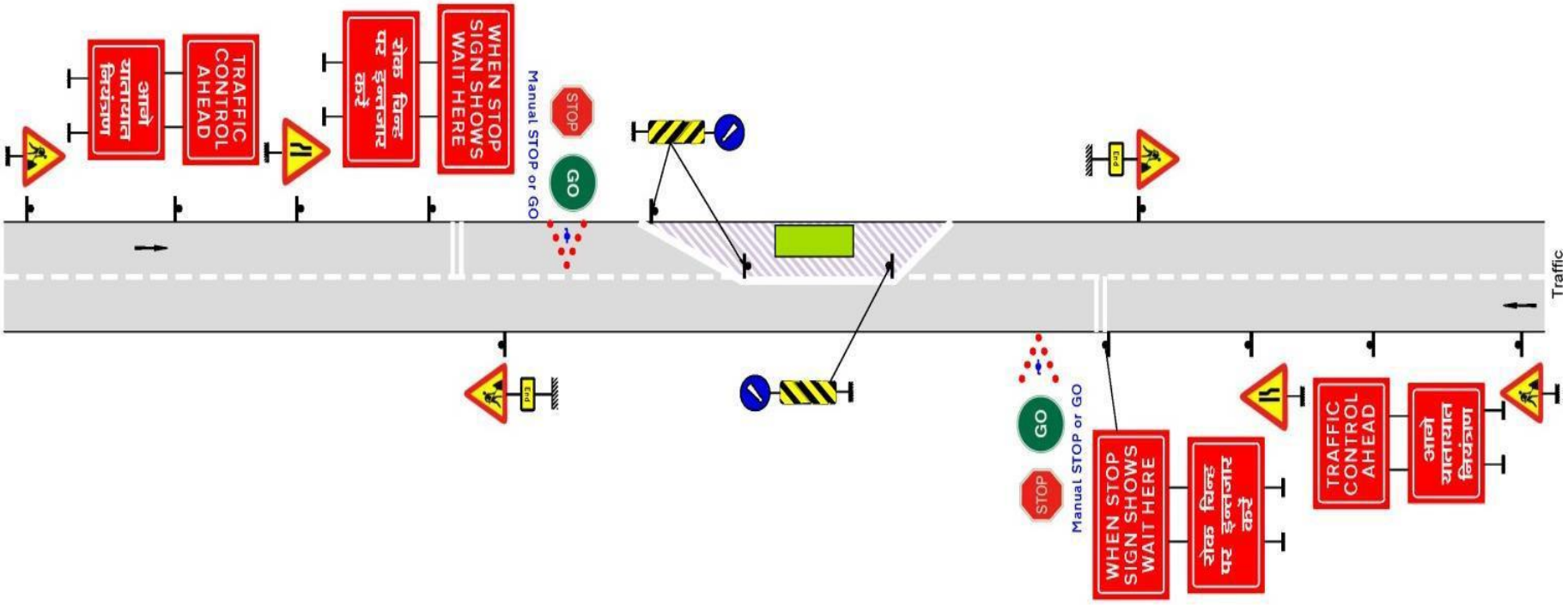


Figure 3 Basic Layout with priority Signs


आगे यातायात नियंत्रण
TRAFFIC CONTROL AHEAD
रोक दिखे पर इन्तजार करें
WHEN STOP SIGN SHOWS WAIT HERE
Manual STOP or GO
STOP
GO
Traffic

Environm

Speed (kmph)	Distance in Meter			
	a	b	c	z
Up to 50	60	60	60	45
51 to 65	90	90	90	60
66 to 80	110	120	120	75
81 to 100	160	160	180	105

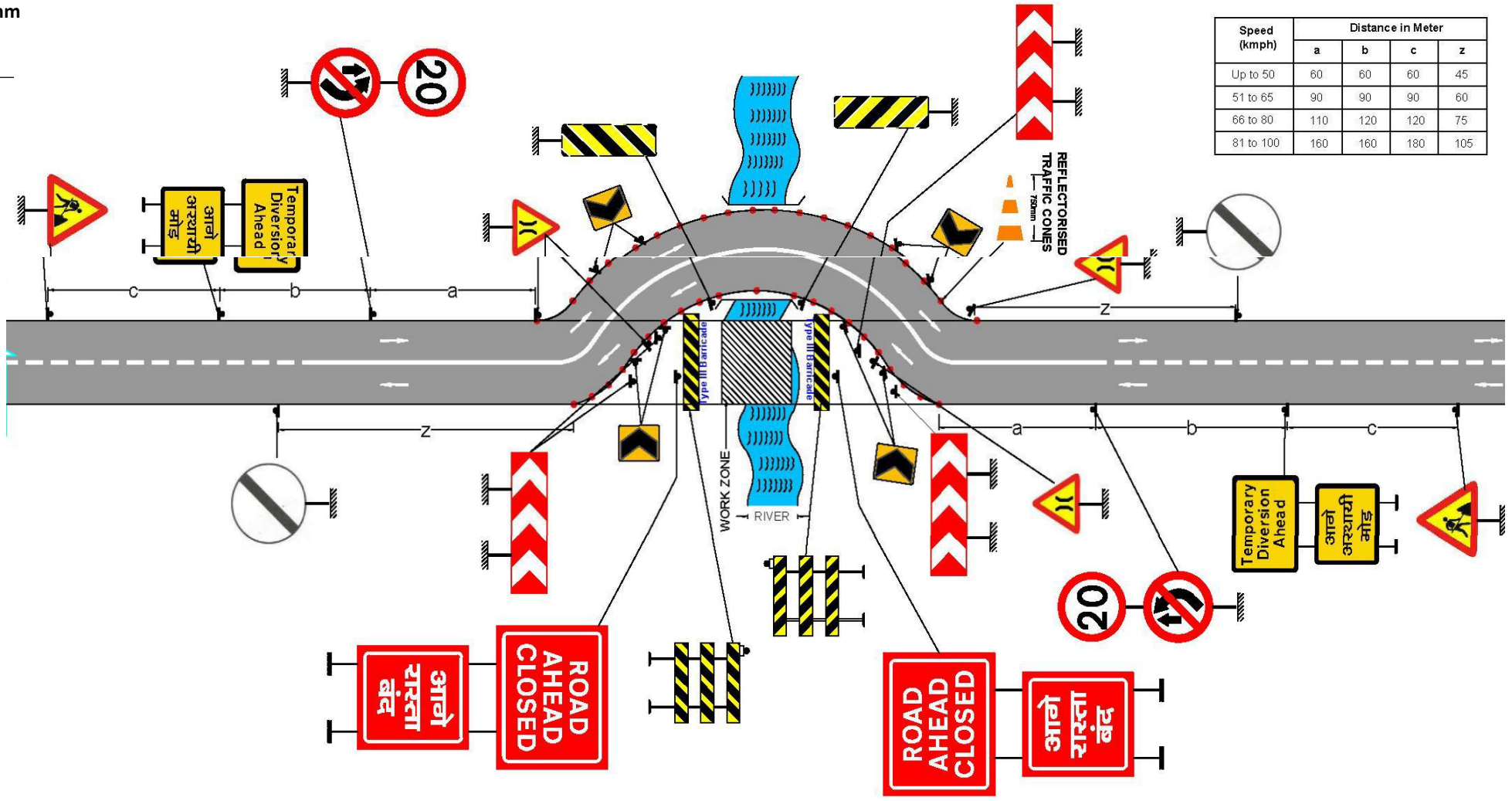


Figure 4 Basic Layout with Traffic Diversion

6.4 ANNEXURE 4: COMPREHENSIVE WASTE MANAGEMENT PLAN

Introduction

Construction and demolition waste is generated whenever any construction/demolition activities take place during construction and widening of roads, bridges, flyover, subway, and resurfacing and rehabilitation works involved in the road projects. It consists mostly of inert and non-biodegradable material such as concrete, plaster, metal, wood, plastics etc. These wastes are having high density and very heavy, often bulky and occupy considerable storage space either on the road or Community waste bin/container. It is estimated that the construction industry in India generates about 10-12 million tons of waste annually. Projections for building material requirement of the housing sector indicate a shortage of aggregates to the extent of about 55,000 million cum and for highway projects 750 million cum aggregate material from construction and demolition waste may reduce the demand-supply gap in both these sectors. While retrievable items such as bricks, wood, metal, titles are recycled, the concrete and masonry waste, accounting for more than 50% of the waste from construction and demolition activities are not being currently recycled in India. Concrete and masonry waste can be recycled by sorting, crushing and sieving into recycled aggregate. This recycled aggregate can be used to make concrete and WMM for road constructions and building materials. Works on recycling of aggregate has been done at Central Building Research Institute (CBRI), Roorkee and Central Road Research Institute (CRRI) New Delhi.

Characteristics

This category of waste is complex due to the different types of construction materials being used but in general may comprise the following materials:

- Clearing and Grubbing (C&G)
- Scarified/Dismantled Bituminous materials
- Dismantled Concrete/Bricks waste
- Oil/Battery/Tyre waste
- Waste from Hot Mix Plant (Aggregate dust)
- Settling Tank waste (Concrete Batching Plant)
- Organic Waste from camp site and Kitchen of different workers' camp

Storage/ Collection and Reuse of Construction and Demolition Waste

These waste are best stored at source; i.e., at the point of generation. If they are scattered around or thrown on the road, they may not only cause obstruction to traffic but also add to the workload of the local body. Following methods shall be adopted such as:

Clearing and Grubbing (C&G):

The material collected after C&G at site stored within the ROW or at approved disposal site so that waste does not get scattered and does not become an eyesore. The waste material is carted to disposal site in tippers properly covered and disposed of at disposal site.There are various types of materials collected during C&G process like weeds, stumps of trees, or other organic matters.Attempts are made to keep the waste segregated into different heaps as far as possible so that further gradation and reused is facilitated. These materials are generally self-degrading and are not health hazard and some of the material are may be used for land fill if required.

Scarified / Dismantled Bituminous Material:

The material collection for scarification of bituminous road or from dismantling of existing road are stored at site and preserved.These materials may be mixed in required percentage with WMM material to achieve the desired gradation.The material is carted by tippers to the stockyard and preserved for reuse.

Dismantled Concrete/Bricks Waste:

The materials are collected from different location of dismantling of bridges and other structures during the road construction.They are generally heavy and bulky in nature and require huge effort to handle such type of waste.The material is generally stacked at or near the site and later is disposed in suitable locations. The suitable and reusable materials are stacked separately for reuse.

Oil/ Battery/ Tyre Waste:

The oil waste is collected in the oil interceptor constructed at each workshop location. Further, the oil is collected the in the drums. Similarly, the batteries/ Tyres those are out of service and become un-usable are stored at safe place. Those wastes when collected in sufficient amount are generally sold in the market for re-use.Hazard to the surrounding due to such waste are prevented and income to the pocket is added by just good practices. The proper record of such waste must be maintained at site.

Waste from hot Mix Plant (Aggregate Dust):

The aggregate waste is collected near the plant and considerable amount of waste shall be reused as filled in the bituminous works.Dust at plant site is to be reduced at considerable extent.

Settling Tank Waste (Concrete Batching Plant):

The waste generated at batching plant is allowed to settle in the settling tank. Further this will be collected and reused for the haul road to the plant site.This helps in the reducing of dust during the movement of heavy vehicles. Further, the haul road shall be regularly watered and kept moist.

Organic Waste from Kitchen/Workers Mess:

The waste generated in the kitchen at camp site is to be collected in proper covered container (20 kg /day)

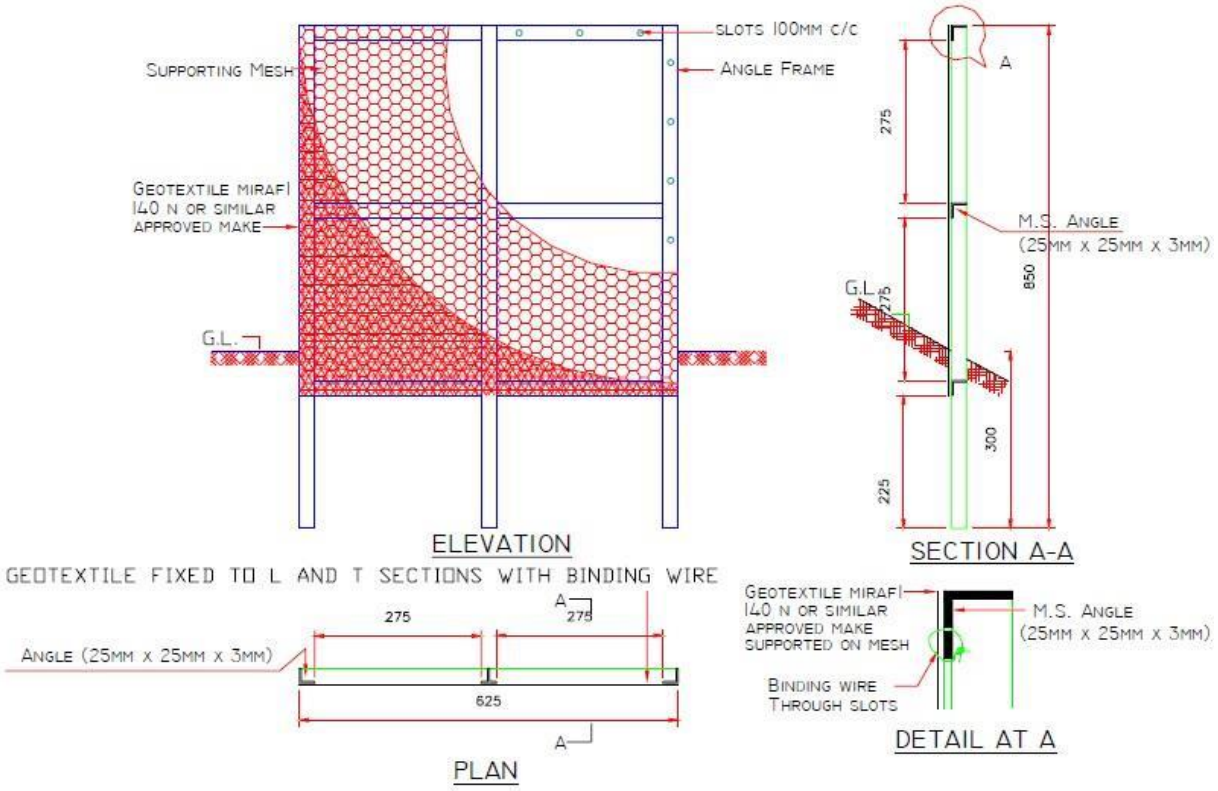
The waste is further carried away and disposed to the municipal committee waste disposal areas and after that shall be send for composting.

6.5 ANNEXURE 5: GUIDELINES FOR SILT FENCING AND OIL INTERCEPTOR

Silt fencing will be provided to prevent sediments from the construction site entering into the nearby watercourses, if required. The silt fencing consists of geo textile with extremely small size supported by a wire mesh mounted on a panel made up of angle / wooden frame and post. It is expected a single person will be able to drive the angles by pressing from the top. The frame will be installed at the edge of the water body along which construction is in progress. The number of such units to be installed can be decided depending upon the length of the water body along the side of the road construction

Locations of silt traps will depend on Contractor's proposals for site facilities and work sites and should be provided in the Contractors Proposals. This will be checked by the PWD and monitored by HP PWD. The probable locations where silt fencing proposed are given in the following table:

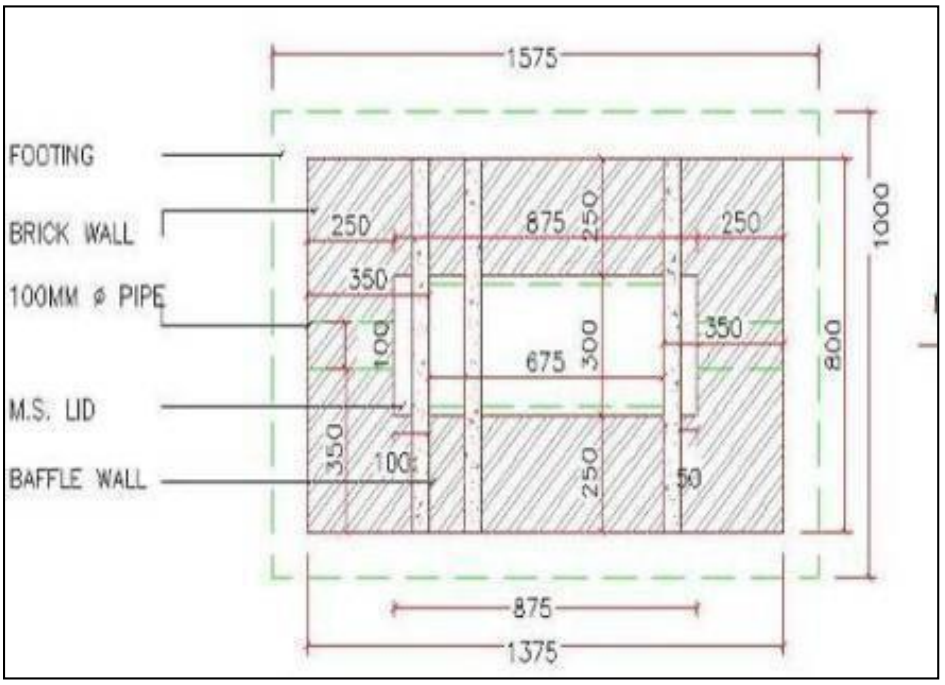
Design and locations of Silt Fencing:



Design and locations of Oil interceptor:

Oil and grease from road run-off is another major concern during construction as well as operation. During construction, discharge of oil and grease is most likely from workshops, oil and waste oil storage locations and vehicle parking areas of Construction camps. A total of 1 Oil interceptors shall be provided at Camp site to arrest oil and grease, as per given figure. The arrested products shall be disposed as per MoEF and HPSPCB guidelines. The location of all fuel storage and vehicle cleaning area will be at least 300 m from the nearest drain / water body.

Oil Interceptor



Social Impact Assessment and Abbreviated Resettlement Action Plan

On

Rehabilitation and Up-gradation to Intermediate lane of Paonta Sahib Rajban Shillai Meenus Hatkoti road portion between Km 96+180 to 104+890 (Gumma to Fediz) (Design RD 94+900 to 103+550) of NH 707 in the state of Himachal Pradesh

APRIL, 2021

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ABBREVIATIONS

B.P.L.	:	Below Poverty Line
B.S.R.	:	Basic Schedule of Rates
COI	:	Corridor of Impact
C.P.R.	:	Common Property Resources
Ch.	:	Chainage
DLC	:	District Level Committee
EP	:	Entitled Person
WHH	:	Women Headed Households
GRC	:	Grievance Redressal Committee
Ha	:	Hectare
Km.	:	Kilometer
LAA	:	Land Acquisition Act
LHS	:	Left Hand Side
m.	:	Meter
MoRT&H	:	Ministry of Road Transport and Highways
NGO	:	Non-Government Organization
NH	:	National Highways

EXECUTIVE SUMMARY

A. PROJECT BACKGROUND AND DESCRIPTION

In coordination with the World Bank, Government of India via Ministry of Road Transport & Highways (MoRTH) has decided to take up the work of upgrading all single lane National Highways to at least 2 Lane/Intermediate Lane standards with provision of paved/earthen shoulders. The basic idea for up-gradation of the corridor is to provide better riding comfort along with safety for the commuters in the long hilly terrain and continuous stretch. There are more than 30 different National Highway stretches selected by Ministry of Road Transport & Highways (MoRTH) with approx. total length of more than 3000 km for up gradation.

The present report pertains to Gumma to Fediz Section which falls entirely in the state of Himachal Pradesh. This project road is a part of the main road which continues from existing RD 96+180 near village Gumma on New NH 707 and ends at Fediz existing RD 104+890 on NH-707 which further leads to state capital Shimla via SH-08 (Sainj -Chopal-Nerwa-Shallu). Total length of the project road as per existing chainage is 8+710 Km. The available ROW of the project road varies from 16 to 35 m. (Avg. 24-25m.). Further, The length of the project road from Gumma (Design Ch. Km.94+900) to Fediz (Design Km. 103+550) is 8.65 Km (as per design).

The latitude and longitude of project road are as follows:

a) Start Point: Gumma (30°48'1.21"N, 77°43'41.23"E)

b) End Point: Fediz (30°50'59.34"N, 77°44'40.37"E)

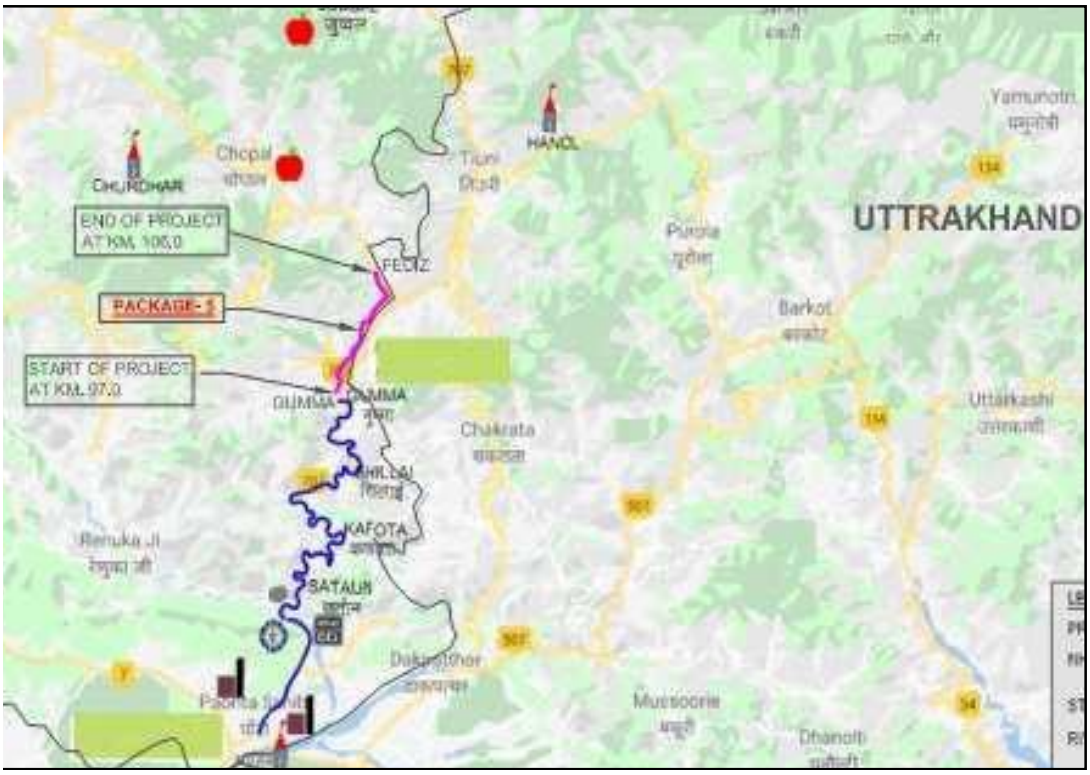

Figure 1 MAP of Proposed Project Road

I. Need of the Project Road

The project road is a part of the main road which continues from Km 96+180 (existing chainage) near village Gumma and ends at Fediz Km 104+890 (existing chainage) on NH-707 which further leads to state capital Shimla via NH-705 (Rohru-Hatkoti-Theog). One of the objectives of the Social Impact Assessment is to examine whether the proposed project is a public purpose project? The proposed up-gradation/widening of Gumma-Fediz section road is required for the following reasons:

- This complete NH project road is a vital life line for the people living in interiors of Shimla District. Many villages having substantial population will be directly benefitted from this project road.
- People of this area grow cash crops like Ginger, Potato, Cauliflower, Peas, Capsicum, Tomato, Walnuts etc. Rajmah, Kulth, Maize & Urad lentils of this area are known for their taste. All these produces are transported through this Highway for marketing at New Delhi, Chandigarh and Panchkula.
- On up-gradation of this Highway it is expected that the number of trucks will increase. Presently approx. 500 trucks per day travel on this highway to transport apple crop from Rohru, Jubbal and Chopal to New Delhi via Yamuna Nagar.
- This highway being the shortest route to New Delhi via Yamuna Nagar, a part of the traffic presently using Solan-Parwanoo route, will prefer using this road after widening.
- This highway is important and strategic from defense point of view also, as it connects to the other routes leading towards Indo-China Border. Defense Research and Development Organization has their unit/base at RD 12/0 near Rajban on this highway.

II. Key Benefit of The Project

Key Benefits of the project are:

- Efficient movement of traffic in the project corridor
- Better connectivity among the settlement area,
- Good quality roads
- Reducing the travel time and
- To help the population to have easy accessibility of various basic facilities like health facilities, education facilities etc.

III. Objective of SIA and RAP Study

The implementation of this project is likely to have positive as well as negative impacts on the people. Thus, a Social Impact Assessment (SIA) study has been conducted to identify the positive and negative impact of the project on the people and their socio-economic activities and any impact on the structure along the project road.

Based on the findings of SIA, an Abbreviated Resettlement Action Plan (ARAP) has been prepared to deal with the likely impacts due to project implementation.

Thus, the objective of SIA study and preparation of ARAP is:

- To identify the project activities and assessment of potential impacts associated with these activities
- To conduct stakeholders' consultation and suggest mitigation measures taking into consideration their feedback
- To propose mitigation and monitoring measures for impacts identified
- To assess the extent of asset loss and undertake the census of the project affected people
- Ensure that the poorest sections of the people in the project area can obtain maximum benefit by accessing the mainstream economy and social infrastructure; and
- Ensure that any aspect of the project does not disadvantage the poorest sections of the local communities.
- To outline the entitlements for the affected persons for payment of compensation and assistance for establishing their livelihoods

B. SOCIO -ECONOMIC CHARACTERISTICS OF THE PROJECT AREA

Project lies in the district Shimla in the state of Himachal Pradesh. Population density per km sq. in Himachal Pradesh is 123, while in project district Shimla is 159. Himachal Pradesh is one of the well literate states in India. Literacy rate among population age seven and above is 83% compared with 73% for India as a whole. The literacy rate is 91% for males and 77% for females. The population living in a village with health facilities is 7% for hospitals and 41% for dispensaries or clinics.

Most of the people in the project area are dependent on the agricultural activities (Cultivators, agricultural labourers). Agriculture/Horticulture provides direct employment to about 70% of the total workers in the State since it is the State where maximum of the population lives in the rural areas. Agriculture and horticulture are the prime economic activities of the project affected district Shimla.

There is micro and small scale industries in the Project influenced state. Attraction in Himachal Pradesh unending natural beauty, pleasing climate and friendly people is a paradise on earth.

C. IMPACTS DUE TO PROPOSED PROJECT

To assess the impacts likely to arise from loss of structures, Land, the detailed Census cum socio-economic Survey was conducted in the month of September, 2019 for each affected household/structure. The requirement of additional land of 3.032 Ha will be for way side amenities, loading-unloading platforms and two dumping sites. Government land is available along the project road for the aforesaid additional requirement and thus, no private land would be acquired for the project.

As per the Census survey, only 5 structures will be impacted due to project activities, out of which 3 are private structures and 2 are Community Property resources (CPRs). All the 3 private structures are encroachers and are within the existing ROW. Out of 3 private structures (2 permanent and 1 is semi-permanent), 2 structures are abandoned and one is Residential cum commercial structure. Summary Project affected structures are given in below table:

Table 0-1 Structures to be affected due to proposed Project

Project	Abandoned	Residential cum Commercial	CPR	Total
Gumma-Fediz Section of new NH 707	02	01	02	05

Tabular presentation for project impacted households is given in the following table:

Table 0-2 Number of PAHs, PAFs and PAPs

Prosed Alignment	Project Affected Households (PAHs)	Project Affected Families (PAFs)	Project Affected Persons (PAPs)
Gumma to Fediz Section of NH-707	03	07	31

It was informed during the census cum socio-economic survey that the owners of these two abandoned structures lives at another location in the village and these structures are no more in use. All the households belong to general category and 1 household is WHH falls under vulnerable category.

D. STAKEHOLDERS CONSULTATION

Involuntary resettlement creates feelings of insecurity, curiosity and misunderstanding among PAPs. Social assessment and public/community participation helps to remove such uncertainties and at the same time help the project-proponent to incorporate valuable suggestions perceptions of stakeholders. The main objectives of the consultation program were to minimize negative impact in the project area and to make people aware of the project. During the process efforts were made to ascertain the views and preferences of the people.

As part of the Social Impact Assessment process, detailed consultations were conducted with all stakeholders at two locations i.e. at start point Gumma and at Antroli Village.

Table 0-3 Detail of Consultations

Project Corridor	Location	Date	Chainage	No. of participants
Gumma to Fediz Section of NH-707	**Near Starting Point Gumma Village**	21.09.2019	94+900	16
	Antroli Village	22.09.2019	98+250	18

Most of the issues raised by the community during these two consultations were the same which were majorly related to compensation, road safety and employment opportunities during construction stage. One of the major concerns raised by the local people was related to use of good construction material for the road construction, so that it is durable for long time.

E. GENDER ANALYSIS

Total 17 females are getting affected by the project (54.84% of the total population) out of 31 persons. Only 1 women headed household is being affected by the project. They constitute around 33.33% of the total affected PAHs in the project area. According to the Socio- economic status along the road parameters like literacy rate is higher among women, work force participation rate is low as compare to male population.

F. COMPENSATION AND ASSISTANCE

Compensation will be given for the loss of structures. As per census cum socio-economic survey data, 3 private structures are being affected, out of which 2 are permanent and one is semi-permanent in nature. To calculate the cost of structure, the CPWD Plinth Area Rates, 2019 and HPPWD SOR 2019 were referred.

R&R assistance costs are calculated by using Census cum socio-economic survey data and applicable Entitlement Matrix of Resettlement Policy Framework (RPF). The R&R assistance includes subsistence allowance, shifting allowance, one time rehabilitation amount and assistance to women headed household. Out of 3 affected structures, 2 are abandoned and so no R&R assistance has been calculated for these households. One of the owners of the abandoned structure is a Woman and so apart from structure cost; she will also get an additional assistance under vulnerable category. Also, for CPR an amount of Rs. 3, 00,000/- per hand pump for relocation has been included in the budget.

The total Structure and Assistance budget for the project works out to be about Rs. 1.48 Crore of which Rs. 76.36 lakhs is towards compensation for Structures and Costs for R&R Assistances is about Rs. 4 lakhs including Administrative expenses of Rs. 61.05 lakhs. The relocation cost of Cost of Common Property resources is 6.60 lakhs. The details of the budget are summarizing in Table 9.5 below:

Table 0-4 Summary of Total R&R Budget

Sr. No	Description	Cost (Rs.)
1.	Structure Cost as per Schedule of rates of CPWD/HPPWD with Contingency @ 10%	76,36,888
2.	R&R Assistance as per RPF Entitlement Matrix Inc. Contingency costs	4,00,400
3.	Cost of Common Property resources	6,60,000
4.	Administrative, NGO, Monitoring & other expenses	61,05,000
Total R&R Budget		**1,48,02,288**

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1. INTRODUCTION

1.1 BACKGROUND

In coordination with the World Bank, Government of India via Ministry of Road Transport & Highways (MoRTH) has decided to take up the work of upgrading all single lane National Highways to at least 2 Lane/Intermediate Lane standards with provision of paved/earthen shoulders. The basic idea for up-gradation of the corridor is to provide better riding comfort along with safety for the commuters in the long hilly terrain and continuous stretch. There are more than 30 different National Highway stretches selected by Ministry of Road Transport & Highways (MoRTH) with approx. total length of more than 3000 km for up gradation.

The present report pertains to Gumma to Fediz Section (Km 94.900 to Km 103.550) of NH-707 in the State of Himachal Pradesh. The MoRTH intends to rehabilitate and up-grade the existing single lane of 3.65m between Gumma to Fediz Section to intermediate lane of 5.5m with earthen shoulders of 1.5 m on the valley side and hill side. The implementation of rehabilitation and up-gradation of this corridor is likely to be taken up with World Bank assistance. The World Bank has agreed to support this sub-project in-principle provided the implementation conforms to environmental and social safeguard policies of the World Bank and the legal framework of the country.

1.2 PROJECT LOCATION

The length of the project road from Gumma (Design Ch. Km.94+900) to Fediz (Design Km. 103+550) is 8.65 Km (as per design) which is a part of NH-707 in the state of Himachal Pradesh. The project road passes through Shimla district of Himachal Pradesh. The latitude and longitude of project road are as follows:

c) Start Point: Gumma (30°48'1.21"N, 77°43'41.23"E)

d) End Point: Fediz (30°50'59.34"N, 77°44'40.37"E)

The available ROW of the project road varies from 16 to 35 mtrs (Av. 24-25m). The existing ROW is sufficient for the widening but land would be required for way side amenities and dumping sites, As per Land survey, the project will not involve any acquisition of private land as government land is available for the wayside amenities and dumping sites. There is a existing bridge at Fediz of 60 m in length which is not included in the scope of the project and will be separately executed by National Highway division of the Himachal Pradesh PWD. The map showing connectivity to different important states and roads is shown below:

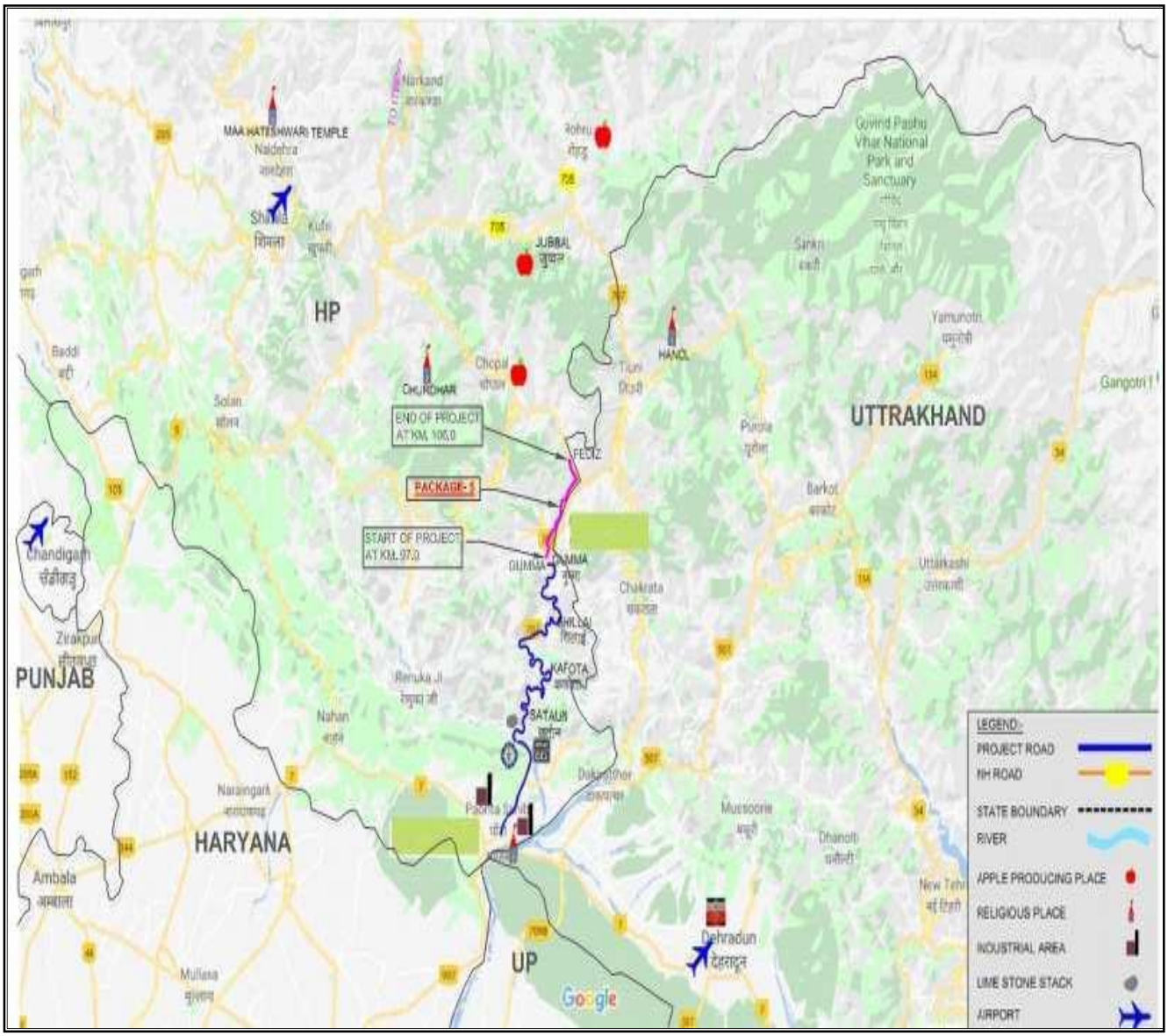


Figure 2 Connectivity of Different Important States and Roads

1.3 NEED AND JUSTIFICATION OF THE PROJECT ROAD

The project road is a part of the main road which continues from Km 96+180 (existing chainage) near village Gumma on New NH 707 and ends at Fediz Km 104+890 (existing chainage) on existing NH-707 which further leads to state capital Shimla via NH-705 (Rohru-Hatkoti-Theog).The complete length of NH-707 has either been improved/upgraded or proposed to be improved/upgraded by MORT&H except this section i.e. from Gumma to Fediz. This complete NH project road is a vital life line for the people living in interiors of Shimla District. Many villages having substantial population will be directly benefitted from this project road besides many other small habitants living in close vicinity of this road since it is the only highway connecting the area for commutation of people.

People of this area grow cash crops like Ginger, Potato, Cauliflower, Peas, Capsicum, Tomato, Walnuts etc. Rajmah, Kulth, Maize & Urad lentils of this area are known for their taste. All these produces are transported through this Highway for marketing at New Delhi, Chandigarh and Panchkula. Presently approx.500 trucks per day travels on this highway to transport apple crop from Rohru, Jubbal and Chopal to New Delhi via Yamuna Nagar.

On up-gradation of this Highway it is expected that the number of trucks will increase. This highway being the shortest route to New Delhi via Yamuna Nagar, a part of the traffic presently using Solan-Parwanoo route, will prefer using this road after widening. . Lime stone mines are situated in this area between (Sataun) Km 18/0 to (Bohrad) Km 48/0. This Highway is used to transport the lime stone to various industrial units all over India.. The project road will further improve the connectivity for tourists visiting various famous destinations like Chanshal Valley Himalayan Raid de, pilgrimage places like Churdhar, Maa Hateshwari Temple, famous Mahasu Temple at Hanol and leading to much famous Chardham yatra.

This highway is important and strategic from defense point of view also, as it connects to the other routes leading towards Indo-China Border. Defense Research and Development Organization has their unit/base at RD 12/0 near Rajban on this highway.

About 71 industrial units are operational along this highway and 17 more industries are expected to become operational along this highway in near future. Planning of setting up a major cement plant at Gumma is in pipeline. This highway will facilitate the transportation of goods to and from these industries. This highway will ease the movement of traffic to Yamunotri, Gangotri etc. With up gradation of this highway, the most backward Chopal area of district Shimla will also get benefitted by way of improvement of their social and economic life. From the above it can be concluded that this project is of utmost importance as it will have direct impact on life of a common man and boost the industries of this area, ultimately leading to multi-dimensional growth of the area and raising the socioeconomic standards of people along this highway.

1.4 OBJECTIVE OF Social Impact Assessment (SIA) AND Abbreviated Resettlement Action Plan (ARAP)

The objective of the project is to augment capacity for safe and efficient movement of traffic in the project corridor, better connectivity among the settlement area, reducing the travel time and help the population to have easy accessibility of various basic facilities like health facilities, education facilities etc. The implementation of the subproject is likely to have positive as well as negative impacts on the people. Thus, a Social Impact Assessment (SIA) study has been conducted to identify the positive and negative impact of the project on the people and their socio-economic activities and any impact on the structure along the project road. During the SIA, the profiling of the project area has been done for better planning and implementation of the project. Based on the findings of SIA, an Abbreviated Resettlement Action Plan (ARAP) has been prepared to deal with the likely impacts due to project implementation. The Resettlement Action plan aims to mitigate the negative impacts on the people.

Thus, the objective of SIA study and preparation of ARAP is:

- To identify the project activities and assessment of potential impacts associated with these activities
- To conduct stakeholders' consultation and suggest mitigation measures taking into consideration their feedback
- To propose mitigation and monitoring measures for impacts identified
- To assess the extent of asset loss and undertake the census of the project affected people
- Ensure that the poorest sections of the people in the project area can obtain maximum benefit by accessing the mainstream economy and social infrastructure; and
- Ensure that any aspect of the project does not disadvantage the poorest sections of the local communities.
- To outline the entitlements for the affected persons for payment of compensation and assistance for establishing their livelihoods

1.5 APPROACH AND METHODOLOGY

The social analysis for this project incorporates both qualitative and quantitative data. Besides, the information on the prevailing social issues from the project area, congregated through community consultations and focus group discussions were also used for analysis. The various methods used in the data collection are summarised in the following sub-sections:

1.5.1 Census and Socio-economic Survey

Census and socio-economic survey was carried out in the month of September, 2019 by a team of trained enumerators. To collect the Census and Socio-Economic information, a structured questionnaire was used (attached as **Annexure 1-1**). The objectives of the survey was to generate an inventory of social impacts on the people affected by the project, their structures affected, social profile of the project affected people, their poverty, their views about the project and also their views on various options of rehabilitation and resettlement. It is important to elucidate here that, Economic status of the affected families/persons, source of livelihood, monthly incomes, number of bread earners in family and types of incomes, land/structure ownership etc. have also been calculated. CPRs, govt. structures etc. have been identified.

The census survey includes the following:

- Inventory of the affected assets
- Categorization and measurements of potential loss
- Physical measurements of the affected assets/structures
- Identification of trees and crops
- Household characteristics, including social, economic and demographic profile
- Identification of non-titleholders
- Assessment of potential economic impact

1.5.2 Review of Secondary Information

Apart from collecting primary data through census survey, a preliminary analysis was undertaken of existing statistical records and census data. Published works, research reports, National Human Development reports, State women development cell reports and periodic reviews has been

considered to get an overview of the general gender, health, trafficking issues. Secondary sources were relied on preparing the socio-economic profile of project affected area which includes demographic features, population growth, density, sex ratio, vulnerable groups, literacy rates, employment pattern, agricultural profile etc.

1.5.3 Stakeholders Consultations

The consultation was carried out with key informants of the area, affected households, Govt. officials of HPPWD, knowledgeable persons of the village and local people. The affected households were separately consulted also during the census and socio-economic survey.

1.6 CUT-OFF DATE

In case of land acquisition, the date of publication of preliminary notification for acquisition under section 11 of the Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013 will be treated as the cut-off date. For non-titleholders, the cut-off date will be the beginning of the census survey. For this project, the census survey began on 21st September, 2019 and it was found that all the affected households are Non-title-holders. So, this date will be considered as the Cut-off date for this project.

1.7 STRUCTURE OF THE REPORT

The SIA study and preparation of ARAP requirement is to assess and analyse the impacts on the properties, people and key stakeholders and prepare a mitigation plan to minimize, mitigate and compensate the affected people for their losses. It thus requires identification of broad categories of affected properties and project-affected people (PAPs) including assessment of beneficial and adverse social impacts. To meet the above requirements, this report has been organized in following Chapters:

Chapter 1: Introduction which includes Background of the project and Methodology adopted for the study

Chapter 2: Project Description includes details of the project area, existing and proposed improvements details.

Chapter 3: Socio-Economic Profile of Project Affected Area includes demographic features, population growth, density, sex ratio, vulnerable groups, literacy rates, employment pattern, agricultural profile etc.

Chapter 4: Project Impacts details the level of impact and its type

Chapter 5: Stakeholder Consultation and Disclosure, which includes issues and concerns raised by Project affected persons, community, Panchayat officials, local PWD departments etc. Also mitigation measures towards issues have been described in brief.

Chapter 6: Policy Framework & Entitlement Matrix details the applicable policy for this project and includes the entitlement matrix that will be followed for this project in case of any impact.

Chapter 7: Gender Analysis briefs the type of impact on women due to project activities

Chapter 8: Institutional Arrangement details the arrangements made at project level for ARAP Implementation

Chapter 9: R&R Budget provides details of the compensation and assistance to be provides to the affected households

Chapter 10: Monitoring and Evaluation provide details on the monitoring mechanism to be used to monitor the implementation of ARAP

Chapter 11: Grievance Redress Mechanism details the procedure to be followed to address any grievances related to the project.

2. PROJECT DESCRIPTION

2.1 THE PROJECT DESCRIPTION

The project road is a part of NH-707 which runs through two states Total length of the NH-707 is 161 km., out of which 117 km is in the state of Himachal Pradesh and remaining 42.13 km is in the state of Uttarakhand. This NH takes off from junction with NH-07 at Badripur Chowk near Paonta Sahib and terminates at Hatkoti in Himachal Pradesh. The first section from Km.0.00 to Km.104+890 (Paonta to Fediz) traverses in Himachal Pradesh and it enters Uttarakhand at Fediz. After traversing for a length of about 42.13 Kms in Uttarakhand it re-enters Himachal Pradesh at Snail. Further about 12.75 Km length of this NH from Snail to Hatkoti is in Himachal Pradesh.

This highway connects built-up areas like Rajban, Sataun, Kafota, Shillai, Meenus, Gumma, Antrauli & Fediz in Himachal Pradesh, Tuini in Uttrakhand and Hatkoti in Himachal Pradesh. The section from Km.0.00 to Km.94+900 is proposed to be got executed in four packages. The 5th package is from Gumma (Design Ch. Km.94+900) to Fediz (Design Km. 103+550), whose DPR is being prepared now. The detailed project report for widening and up-gradation of section Km.0.00 to Km.96.180 (Design Ch. 94+900) stands already submitted to the MORT&H/World Bank. There is an existing bridge on local nallah at Fediz (at Ch. Km 103+190 to Km 103+250) falling in the present project is not included in the project scope and will be separately executed by National Highway division of the State.

The length of the project road from Gumma (Design Ch. Km.94+900) to Fediz (Design Km. 103+550) is 8.65 Km (as per design).

2.2 PROJECT LOCATION

The project location falls entirely in the state of Himachal Pradesh. This project road is a part of the main road which continues from existing RD 96+180 near village Gumma on New NH 707 and ends at Fediz existing RD 104+890 on NH-707 which further leads to state capital Shimla via SH-08 (Sainj - Chopal-Nerwa-Shallu). Total length of the project road as per existing chainage is 8+710 Km.

2.3 ENGINEERING DESIGNS AND IMPROVEMENT PROPOSALS

2.3.1 Design Standards [Including Geometric Design and Regulation of Access]

a) Introduction

The design standards for the project highway has been adopted after reviewing the relevant latest Indian Roads Congress Codes (IRC) such as IRC:SP:48-1998 Hill Road Manual , IRC :37:2018 , IRC:78 - 2014 and international standards such as AASHTO etc.

The various design elements and factors, which govern the functioning of any highway, can be broadly grouped under the following:

- Geometric Design Standards;
- Terrain classification & Design Speed
- Cross sectional Element
- Horizontal Alignment

- Vertical Alignment
- Standards for Interchange elements
- Subsurface drainage
- Design parameters for Bridges and Cross drainage Structures

The basic design philosophy is based on the consideration of providing suitable alignment, cross-sectional layout, geometrics, safety and access control to cater to the fast and uninterrupted movement of through traffic. It is also based on the consideration that the widening proposals will be adjusted in the existing ROW to the extent feasible.

b) Terrain Classification & Design Speed

The design speed is the guiding criteria for correlating features such as sight distance, curvature and super elevation upon which the safe operation of the vehicle depends. The terrain in the project stretch is virtually all mountainous with the general cross slope of the country remaining more than 25 % and less than 60%. The ruling design speed considered in this project is 50 Km/hr as per hill road manual.

c) Existing Right of Way (Row)

The available Right of Way (ROW) along the existing alignment of the project highway varies from 16.0 m to 35.0 m. Chainage wise detail of ROW is given in **Annexure 2-1**.

d) Existing Traffic and Projection for Traffic on the Road

Existing Traffic and projection Traffic on the Road Is given in following Table:

Table 2-1 Traffic on the Road

Road	Existing Traffic	Projection Traffic
Gumma to Fediz Section of New NH 707	1437 AADT	5593

2.4 CROSS SECTIONAL ELEMENTS

The details of cross-sectional elements adopted for the project road are as per Hill road Manual: IRC:SP:48.

e) Carriageway

The carriageway width in open and built up areas shall be 5.5 m.

f) Shoulders

The project road is proposed as intermediate lane configuration so the earthen shoulder of 1.5m width proposed on BHS of the carriageway.

g) Cross fall

- The cross fall shall be unidirectional for either side carriageway sloping towards the shoulder in straight reaches and towards the lower edge on horizontal curves. The camber on the existing road shall be modified to unidirectional cross fall.
- The cross falls for earthen shoulders on straight portions shall be at least 0.5 percent steeper than the slope of the pavement and paved shoulder subject to a minimum of 3.0 percent. On super elevated sections, the earthen portion of the shoulder shall have the same cross fall as the pavement.

h) Typical Cross-Sections

Broadly typical cross-sections of Project Highway for various locations are given as below:

Typical cross sections (TCS) for various configurations proposed in built up area and open country area in rolling/hilly terrain are shown in section are given below:

Table 2-2 Type of cross-section

Sr. No.	Configuration of road	Type of Cross - Section	Existing Chainage		Proposed Chainage		Design Length (km)	Terrain
			from	to	from	to		
1.	Inter-lane carriageway	TCS 1 to TCS 12	96+180	104+890	94+900	103+550	8.650	Steep

Table 2-3 Detail of Proposed Typical Cross Sections

Sr. No.	No. of Type of Cross - Section	Length
1	TCS 1	505
2	TCS 2	1810
3	TCS 3	1150
4	TCS 4	3230
5	TCS 5	190
6	TCS 6	1060
7	TCS 7	70
8	TCS 8	180
9	TCS 9	195
10	TCS 10	30
11	TCS 11	150
12	TCS 12	140

Table 2-4 The Typical cross section

Sr. No.	Configuration of road	Type of Cross - Section	Design Chainage		Main carriage way width (m)	Earthen shoulders	Design Length (km)	Remarks
			from	to				
1	Inter-lane carriageway	TCS-1 TO TCS 12	94+900	103+550	5.5	1.5 m on BHS	8.650	--

Complete Plan and Profile along with TCS have been provided in separate volume of Drawings.

Drawing of Typical Cross Section has been provided in **Annexure 2-2**

i) Intersections

The existing 01 Nos. of major junction and 5 No. minor junctions are proposed to be developed and the detail of the same is shown in the table below:

Table 2-5 Details of Major Intersection

S. No.	Chainage	Type of Junction	Side	Remarks
1	103+250	T	LHS	SH-08

Table 2-6 Details of Minor Intersection

S. No.	Chainage	Type of Junction	Side	Remarks
1	94+900	y	LHS	Road to Vill. Bohar
2	95+250	y	RHS	Road to residences
3	97+960	y	LHS	Village road
4	98+350	y	LHS	Road to Vill. Pawana
5	102+750	y	LHS	Road to village

j) Improvement Proposals

These improvements will include widening, realignment, design and strengthening of pavement with the improvements of geometrics; widening and reconstruction of culverts; providing drainage; junction improvements; providing road marking; signs and other safety devices etc. to enable all road users to use the facility without degrading the environment. The summary of improvement proposal is shown in the table below:

Table 2-7 Summary of Improvement Proposal

S. No.	Particulars	Details		
1	Length (km)	8.650 Km (Design Chainage from km 94+900 to km 103+550) Flexible Pavement length=7.4 km and Rigid pavement length=1.25 km		
2	Carriageway Width (m)	Carriageway–5.5 m+ Earthen Shoulders–1.5m BHS		
3	Right of Way (m)	16.0-35.0 m (Av. 24-25m)		
4	**Junctions:**			
A	Major Junction	1 at RD 103+250		
B	Minor Junction	5 Nos. At RD 94+900, RD 95+250, RD 97+960 , RD 98+350 & RD 102+750		
5	**Cross Drainage Structure:**			
A	Major Bridge	1 No. But not in the scope of this project. Taken separately under NH(O) project		
B	Minor Bridge	Nil		
C	Culverts	2x2 m box culverts in place of existing Hume pipe culverts =29 no. Reconstruction of slab culverts with: Box culvert size 3x3 m=2 no. Box culvert size 4x4 m=1 no Box culvert size 6x6 m=1 no New Construction Box Culverts of size 2x2=4 no. Box culvert size 6x6 m=1 no Total no of culverts=38 no.		
6.	**DRAIN**	LENGTH (m)		
	RCC Covered Drain LHS 0.60 x 0.60	760 m		
	RCC Covered Drain LHS 0.80 m x 1.20 m	1250 m		
	V Shaped PCC Drain	6580 m		
	TOTAL LENGTH	8600 m		
	Paver Blocks on shoulders:	**From**	**To**	**Length**

7.	Paver Blocks on BHS of shoulders	99+300	99+450	150x2=300
	Paver Blocks on both side of shoulders	103+050	103+190	140x2=280
			Total length	580 m or 0.58 km
8.	**Slope Protection Work:**			
A	Breast Wall	3.850 km		
B	Retaining Wall	2.000 km		
C	Bioengineering	Geocell, Hydroseeding, Bamboo Plantation, Hegde Brush Layer		
9.	**Road Safety and Appurtenances:**			
A	Metal Beam Crash Barriers	km 94+900 to km 103+550 on Valley side		
B	Road Sign	3819 no.		
10	**Project Facilities:**			
A	Bus lay bye/bus stops	RD 98+375, RD 99+420(RHS), RD 101+700 (RHS), RD 102+125 (RHS) RD 103+115 (RHS)		
B	Passing Place	RD 95+360 (RHS), RD 98+680 (RHS) RD 102+240 (RHS)		
C	Wayside Amenities			
C1	Medical Aid Centre	1 no. at RD 99+300 ON LHS		
C2	Traffic Aid Centre	1 no. at RD 99+300 ON LHS		
C3	Loading -Unloading Platform	1 no. at RD 99+425 ON LHS		
D	Field lab., site office and labour camp	1 no. at RD 98+030 ON LHS		
E	Solar Lighting	In Built up area at RD 98+050-98+400, RD 99+300-99+450		
F	Electric Lighting	At Junction RD 103+260		
G	Solar Panels	At the Roof top Wayside Amenities		

k) Roadside Drainage

Design of drains in plain/rolling terrain has been carried out for self-cleansing velocity, for the runoff it will carry, considering the available fall. For trapezoidal drain on hill side, standard section as given in Hill Road Manual (IRC SP 48) is opted. It has been ensured that there are minimum three nos. of cross drainage structures are present in each km to carry the run-off of the roadside drainage. The detail of roadside drainage is shown in the table below:

Table 2-8 Summary of Proposed RCC Drain

S. No.	Type of Cross - Section	Design Chainage		Length (km)	Size	Remarks
1.	Rectangular	97+950	98+340	0.390	0.60 x 0.60 m	LHS
2.	Rectangular	99+220	99+450	0.230	0.60 x 0.60 m	LHS
3.	Rectangular	103+050	103+190	0.140	0.60 x 0.60 m	LHS
4.	Rectangular	99+920	101+170	1.250	0.80 x 1.20 m	LHS
Total		**97+950**	**101+170**	**2.01**	**-**	**-**

Table 2-9 Detail of Proposed V Shaped PCC Drain

Sr. No.	Design Chainage		Net Length (km)	Remarks
1.	94+900	97+950	3.050	LHS
2.	98+340	99+220	0.880	LHS
3.	99+450	99+920	0.470	LHS
4.	101+170	103+050	1.880	LHS

l) Subsurface Drainage

Subsurface drainage provision, may be taken in seepage area portion exists at design RD from 99.920 to 101.170 which is a length of 1.250 Km. In design, 8 No culverts and RCC box drain of size 0.8 x 1.2 m are proposed in this stretch.

2.5 PROJECT FACILITIES

The project facilities proposed along the project stretch are shown in the below section.

a) Bus Shelter

The location of Bus Shelter is shown in the table below,

Table 2-10 Details of Proposed Bus Shelter

S. No.	Design Chainage	Side
1	98+300	RHS improvement of existing Bus Shelter
2	99+420	RHS
3	101+700	RHS
4	102+125	RHS
5	103+115	RHS

b) Passing Places

Passing Places have been proposed for convenience of HCV drivers so that they can park their trucks in some open space for some time for taking short rest or repairs, if need be. Detail of Passing Places is given as below:

Table 2-11 Detail of Passing Places

S. No.	Design Chainage	Side
1	95+360	Valley Side
2	98+680	Valley Side
3	102+240	Valley Side

c) Wayside Amenities

The wayside Amenities are proposed to be provided near newly planned vegetable market in Antroli Village. The wayside amenities are given in the sub-section below:

I. Medical Aid Centre and Traffic Aid Centre

As per proposal, a medical aid center and a Traffic Aid centre are to be equipped with Ambulance, JCB vehicle type at the following location:

Table 2-12 Details of Medical Aid Centre and Traffic Aid Centre

S. No.	Design Chainage	Name of the Village	Side
1	99+300	Near Vegetable market, Vill. Antrauli	LHS

II. Loading/Unloading Platform

A platform is proposed to be developed as Loading/Unloading Platform and shown in the table below:

Table 2-13 Details of Loading/Unloading Platform

S. No.	Design Chainage	Name of the Village	Side
1.	99+425	Near Vegetable market, Vill. Antrauli	LHS

d) Solar Lighting

Provision for solar lighting will be made in all the built-up areas along the project stretch. The details of the same are shown in the table below:

Table 2-14 Details of Solar Lighting Location

S. No.	Name of village/ town	Design Chainage		Lengths (Km)
		From	To	
1	Antrauli	98+050	98+400	0.350
2	Vegetable Market (Subzi Mandi)	99+300	99+450	0.150

The design parameters of the project are given below:

Table 2-15 Design Parameters of the Project

Sr. no.	Description	Details
1	Design Speed	30-40 kmph
2	Intermediate lane carriageway	5.5 m
3	Camber	
	i) Carriageway	2.5%
	ii) Earthen shoulders	3.0%
5	Maximum Super Elevation	7.0%
6	Minimum stopping sight distance	45 m
7	Minimum Intermediate sight distance	90 m
8	Minimum radius of horizontal curve	20 m
9	Minimum radius of horizontal curve without Transition	Nil
10.	Ruling vertical gradient	5.0 %
11	Minimum length of Vertical curve	50 m
12	Maximum grade change not requiring vertical Curve	1.2 %
13	Vertical Clearance in mountainous areas	5.0 m

3. SOCIO-ECONOMIC PROFILE OF THE PROJECT AREA

1.8 INTRODUCTION

Himachal Pradesh is a mountainous state situated in North India. On the North the state is bordered by Jammu and Kashmir, on the west by Punjab, on the southwest by Haryana, on the southeast by Uttarakhand and Tibet on the east. Shimla is the State capital and the major towns of the state are Dharamshala, Kangra, Kullu, Chamba, Hamirpur, Dalhousie and Manali.

Himachal Pradesh is spread over on area 55,673 (Sq. Km) which is 1.69% of country area. It is located between 30º22' and 30º12' north latitude and between 75º47' and 79º4' east longitude. Himachal Pradesh is almost wholly mountainous with altitudes ranging from 350 meters to 6,975 meters above the mean sea level. It has a deeply dissected topography, complex geological structure and a rich temperate flora in the sub-tropical latitudes.

Population density per km sq. in Himachal Pradesh is 123, while in project district Shimla it is 159. In 2011, the total population of H.P. was about 6,864,602 out of which 3,481,873 were males (50.72 %) and 3,382,729 (49.28%) were females.

Himachal Pradesh is one of the well literate states in India. Literacy rate among population age seven and above is 83% compared with 73% for India as a whole. The literacy rate is 91% for males and 77% for females. Notably the gender gap in literacy in state is not significant as compared to that of India.

The population living in a village with health facilities is 7% for hospitals and 41% for dispensaries or clinics. Overall 60% of women live in village that has some kind of health facility. Average distances from particular health facilities are 6.4 km from a primary Health Centres, 1.5 km from a sub centre, 9.9 km from a hospital and 2.3 km from dispensary or clinic. 8% rural population in Himachal Pradesh needs to travel a maximum 5-9 km in order to reach the nearest health facility.

The state is divided into twelve (12) districts, seventy five (75) Tehsils, fifty seven (57) towns. The map of the State Himachal Pradesh is given in the figure below:

Figure 3 Map of Himachal Pradesh

1.9 SOCIO-ECONOMIC STATUS OF PROJECT INFLUENCE DISTRICTS

The socio economic study has been conducted in the Project Influence Area. Proposed alignment lies in district Shimla of Himachal Pradesh.

Project influence District - Shimla

Shimla District lies between 30º 45'48''-30º43'0'' North latitude and 76º 59' 22'' - 78º 18' 40'' East longitude. It is bounded by Kinnaur district in the Northeast, by Kullu and Mandi districts in the Northwest, by Solan and Sirmaur districts in the Southwest and by the State of Utterakhand in the Southeast. The total area of the present district is 5,131 Sq. Kms. It has a total number of 2,897 villages, of these 2311 villages are inhabited and the remaining is uninhabited. The district comprises of 7 sub-divisions and 17 tehsil and sub tehsil the sub-divisions are, namely Shimla (rural), Shimla (urban), Thoeg, Rampur, Rohru, Chopal and Dodra Kawar. The tehsil are namely Seoni, Shimla urban, Theog, umarsain, Rampur, Rohru, Kotkhai, Chopal, Jubbal- Cirgaon and Dodra Kwar while Junga, Nankhari, Tikkar, Chela, Nerwa are the Sub- Tehsil. For the rural development, the district has been divided into nine community development Blocks. The topology of the district is hilly and rolling.

1.9.1 Population Distribution

There has been an increase in the population of Himachal Pradesh from 60.78 Lakh in 2001 to 68.65 Lakh in 2011 according to Census, 2011. The total population of Himachal Pradesh is 6,864,602 of which males are 3,481,873 and females are 3,382,729. The Details of the population of project influence district in comparison with Himachal Pradesh is given in the table below:

Table 3-1 Population Distribution

State and District	Population(2011)			Population(2001)		
	Male	Female	Total	Male	Female	Total
Shimla	425,039	388,971	814,010	380,996	341,506	722,502
Himachal Pradesh	**3,481,873**	**3,382,729**	**6,864,602**	**3,087,940**	**2,989,960**	**6,077,900**

Source: Census of INDIA, 2011

1.9.2 Population Growth

The population growth is the increase in the number of people that reside in a country, state or city. In this decade the total population growth of Himachal Pradesh was 12.94 percent while in previous one it was 17.53 percent. The total child population (0-6 Age) for the year 2011 was 777,898 while during 2001 it was 793,137. The information regarding the population growth for the State and the project influence district are given in the tables below:

Table 3-2 Decadal Growth for the Project Affected District and State

Sr. No.	State/District	Decadal Growth Rate (%)
1	Shimla	12.67
Himachal Pradesh		**12.94**

Source: Census of INDIA, 2011

1.9.3 Population Density

Total area of Himachal Pradesh is 55,673 sq. km. Density of Himachal Pradesh is 123 per sq. km. The population density for the Project Influence district i.e. Shimla is 159. The tabular representation of the data is given in tables below:

Table 3-3 Details of Population Density

Sr. No.	District/State	Population Density (persons per square km)
1.	Shimla	159
Himachal Pradesh		**123**

Source: Census of INDIA, 2011

1.9.4 Sex Ratio

Sex Ratio is the ratio of males to females in a population. In Himachal Pradesh sex ratio was 972 i.e. for each 1000 male. In 2001, the sex ratio of female was 968 per 1000 males in Himachal Pradesh.

The details of sex ratio for Himachal Pradesh and the Project influenced District is given in the table below:

Table 3-4 Sex Ratio

Sr. No.	Districts/State	2011	2001
1	Shimla	915	896
Himachal Pradesh		972	968

Source: Census of INDIA, 2011

1.9.5 Vulnerable Groups

The schedule caste population in the project influenced State is approximately 1,729,252 (25.19 %) and schedule tribe population is 392,126 (5.71%). The details of such vulnerable groups in the project influenced district are given in the table below:

Table 3-5 Details of Vulnerable Groups

Sr. No.	District/State	Population (2011)		Population in Percent (%)	
		Schedule Caste	Schedule Tribe	Schedule Caste	Schedule Tribe
1	**Shimla**	215,777	8,755	26.51	1.08
Himachal Pradesh		**1,729,252**	**392,126**	**25.19**	**5.71**

Source: Census of INDIA, 2011

1.9.6 Literacy Rate

Literacy rate in Himachal Pradesh has seen upward trend and is 82.80 percent as per 2011 population census. Of that, male literacy stands at 89.53 percent while female literacy is at 75.93 percent. In actual numbers, total literates in Himachal Pradesh stands at 5,039,736 of which males were 2,752,590 and females were 2,287,146.

The details for the numbers of literates and literacy rate for the Project influenced district is given the table below:

Table 3-6 Details of Literacy Rate

Sr. No.	District/ State	Number of Literates			Literacy Rate (in percent)		
		Total	Female	Male	Total	Female	Male
1	Shimla	612,642	269,796	342,846	83.64	77.13	89.59
Himachal Pradesh		**5,039,736**	**2,287,146**	**2,752,590**	**82.8**	**75.93**	**89.53**

Source: Census of INDIA, 2011

1.9.7 Work Participation Rate

The details of workers and non-workers in the project influenced district and state are given table below:

Table 3-7 Number of Workers and Non-Workers

Sr. No.	District/ State	Number of Workers			Number of Non workers		
		Male	Female	Persons	Male	Female	Persons
1	Shimla	258,628	172,298	430,926	166,411	216,673	383,084
Himachal Pradesh		**2,043,373**	**1,516,049**	**3,559,422**	**1,438,500**	**1,866,680**	**3,305,180**

Source: Census of INDIA, 2011

1.9.8 Type of workers

There are two classifications for the workers category i.e. main workers and marginal workers. The details of type of workers for the project influenced district are given in the table below:

Table 3-8 Type of Workers

Sr. No.	District/State	Type of Workers		
		Main Workers	Marginal Workers	Total Workers
1	**Shimla**	311,770	119,156	430,926
Himachal Pradesh		**2,062,501**	**1,496,921**	**3,559,422**

Source: Census of INDIA, 2011

1.9.9 Employment Pattern

After categorising the workers in two categories (marginal workers and main workers) they can be further classified into four categories which are cultivators, agricultural labourers, workers in household industry and other workers. The detail of the employment pattern for the state of Himachal Pradesh is given in the table 3-9 below:

Table 3-9 Employment Pattern

Industry Classification	Male (%)	Female (%)	Persons (%)
Cultivators	44.35	76.24	57.93
Agricultural Laborers	5.04	4.75	4.92
Household Workers	1.82	1.42	1.65
Other Workers	48.79	17.59	35.5

Source: Census of INDIA, 2011

1.9.10 Agriculture Profile

Agriculture is the main occupation of the people of Himachal Pradesh. In the context of economy of the State agriculture plays a vital role. Agriculture/Horticulture provides direct employment to about 70% of the total workers in the State since it is the State where maximum of the population lives in the rural areas. The chief food crops cultivated in Himachal Pradesh agriculture include wheat, rice, maize, seed potato, ginger, mushrooms, olives, hopes and fig. Himachal Pradesh is also known as the 'Apple State of India'. Himachal Pradesh agriculture provides employment to around 71% of the working population in the state. The project influenced district Shimla is very well known for the apple production.

Project Influence district:

Shimla:

Shimla is the totally hilly district of Himachal Pradesh. Agriculture and horticulture are the prime economic activities of the district. The major field crops cultivated in the region include Maize, Paddy, and Wheat, Barley, Pulses (Rajmah/moong/mash) and oil seeds (Mustard/rapeseed).

The horticulture crops and vegetables grown in the area are apple, walnut and dry fruits, citrus, potato, pea (green), cabbage, tomato and other vegetables (cauliflower, French bean, capsicum).

1.9.11 Industrial profile of Himachal Pradesh

Himachal Pradesh was predominantly an agrarian economy but with the passage of time it has shown tremendous growth in the sector if establishment of different micro or small scale industries. The growths of registered industries in the State during the last three years have been recorded in district Solan followed by district Sirmaur and Una respectively. The different groups of industries in the area include chemicals, textiles, Electricals, automobiles, foot wears etc.

Industrial progress plays a vital role in determining the economic development of a region. The different industries established in the state are:

- Food processing industries
- Horticulture and Agro
- Aromatic/Medicinal herbs base soap
- Wool and Wool Products
- IT based Industries
- Mineral Water Boiling

There are about the 41 industrial areas established in the State including different regions like Bilaspur, Gwalthai, Garnota, Hatli, Hamirpur, Nadaun, Nagrota Bagwan, Sansarpur Terrace, Nagri, Dhaliara, Bain Attarian, Badhal, Raja Ka-Bag, Nargala Jawali, Shamshi, Reckong Peo, Sauli Khad (Mandi), Ratti, Bhambla, Maigal, Shogi, Maindli, Jais, Jubber Hatti, Paonta Sahib, Kala Amb, Baddi, Barotiwala , Chambaghat, EPIP Baddi(Phase I&II), Banalgi, Mamlig, Katha Bhatoli, Mehatpur , Amb, Tahliwala, Gagret, Jeetpur Bheri and Basal.

Project Influence districts:

Shimla:

Due to topographical conditions of the district there are very less number of large and medium scale enterprises in the district but In case of micro and small enterprises a steady growth has been observed. The different types of industries in the area include agro based, soda water, cotton textile, woollen, silk & artificial thread based clothes, Jute & Jute Based, ready-made garments & embroidery, leather based etc.

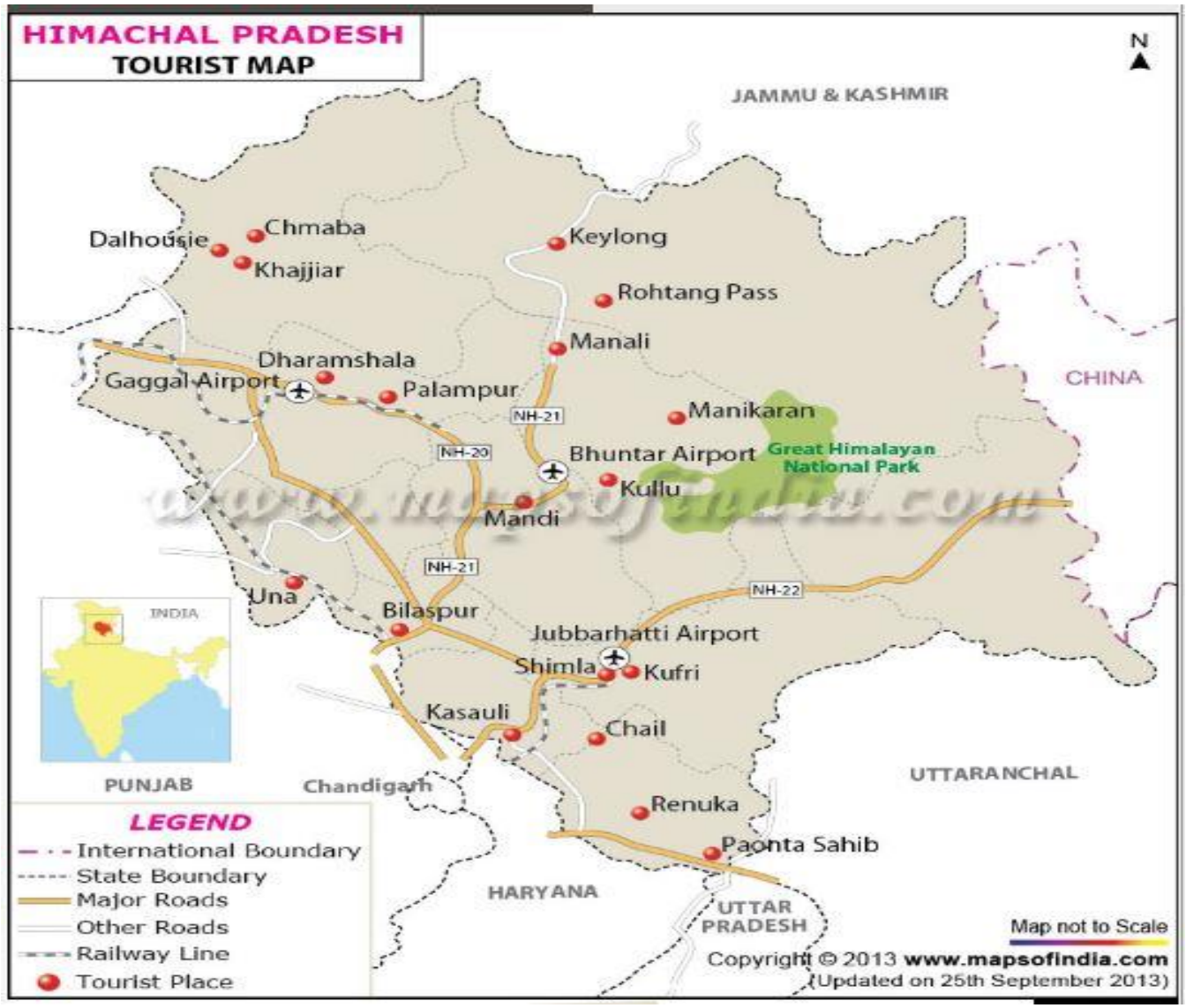
The large scale industries in the region are M/s Adani Agri Fresh Pvt. Ltd, Sainj, district Shimla and M/s HPMC, Shimla (Having Packing Grading and cold stores for apples at Gumma, Kotkhai, Rohru, Odi and Tutu Pani).

1.9.12 Tourism in Himachal Pradesh

Himachal Pradesh is a northern Indian state in the Himalayas. It's home to scenic mountain towns and resorts such as Dalhousie. Host to the Dalai Lama, Himachal Pradesh has a strong Tibetan presence. This is reflected in its Buddhist temples and monasteries, as well as its vibrant Tibetan New Year celebrations. The region is also well known for its trekking, climbing and skiing areas.

Attraction in Himachal Pradesh unending natural beauty, pleasing climate and friendly people is a paradise on earth. Each and every district has several fine tourism sites in its kitty, which attract people all around the world. The most popular and frequently visited tourist areas in Himachal Pradesh are Rohtang pass, Chamba, Kangra, Shimla, Kullu, Manali and Dalhousie.

Map of the most famous tourist places in the state are given in the figure below:



Source: *Maps of INDIA*

Figure 4 Tourist Places in Himachal Pradesh

The brief description of tourism of the Himachal Pradesh is given in the table below:

Table 3-10 Tourism in Himachal Pradesh

S. No.	Year	Foreign	Domestic	Total
1	2005	2.08	69.28	71.36
2	2006	2.82	76.72	79.54
3	2007	3.39	84.82	88.21
4	2008	3.77	93.72	97.49
5	2009	4.01	110.37	114.38
6	2010	4.54	128.12	132.66

Source: Directorate of Tourism and Civil Aviation Government of Himachal Pradesh

Project Influence district Shimla:

The 'Queen of Hill Stations', Shimla is one of the prominent tourist destinations in north India. There are many places of interest in the city. Some of them are:

Christ Church and St. Michael's Cathedral, Jakhu Hill and Jakhu Temple, Himachal State Museum and Library, The Mall etc.

There are many more places of interest in Shimla including Jutogh, Tara Devi Temple, Junga, Totu, Kufri, Kali Bari, Potter Hill, Prospect Hill, Elysium Hill and Sankat Mochan temple. For the shopping lovers, there are many shops in Shimla, especially in the Lower Bazaar, Lakkar Bazaar, The Mall and the Tibetan Bazaar. These markets are very popular for goods like handicrafts, metalwork, toys, tweeds, Himachali shawls, caps and many more.

4. SOCIAL IMPACTS OF THE PROJECT

4.1 INTRODUCTION

Based on the available proposed alignment and engineering designs the census and socio-economic survey of the project affected persons (PAPs) falling within the proposed ROW was carried out by using structured questionnaires. The purpose of this exercise was to assess the losses and social impacts due to the proposed project and to gather information on the affected persons.

As per the final design, the construction activities will be confined within the existing ROW and additional land would only be required for wayside amenities, loading-unloading platforms and two dumping sites. Thus, this project do not involve any private land acquisition

In this particular stretch, the impact on land is due to way side amenities, loading-unloading platforms and dumping sites at two locations. In context of the existing available RoW and the encroachments in the RoW, the project-affected structures are owned by non-titleholders. To assess the impacts likely to arise from loss of structures, the detailed Census cum socio-economic Survey was conducted in the month of September, 2019 for each affected household/structure. Information regarding project impacts and socio-economic data is presented in sub-sequent sections in this chapter.

4.2 EXISTING STATUS OF LAND AVAILABILITY

The project road is Intermediate/Two Lane from Chainage Km 94+900 to Km 103+550. Based on detailed field verification with respect to revenue maps, it has been found that the existing ROW varies between 16 to 35m. The existing ROW details collected from Revenue and PWD department is attached as **Annexure 1-1** (Chapter-1).

4.3 ADDITIONAL LAND REQUIREMNET FOR THE PROJECT

The existing land for the project is 20.187 Ha and the total land required for the project is 23.219 Ha. The requirement of additional land of 3.032 Ha will be for way side amenities, loading-unloading platforms and two dumping sites. Government land is available along the project road for the aforesaid additional requirement and thus, no private land would be acquired for the project. A detail of existing land and land requirement is given in tables Table 5.1 below.

Table 4-1 Detail of Land Requirement for Proposed Project

Project	Existing Land (in Hectare)	Land Required (in Hectare)	Total Land (in Hectare)
Gumma-Fediz Section of new NH 707	20.187 Hectare	3.032 Hectare	23.219 Hectare

The activity wise land requirements are given in below table:

Table 4-2 Activity wise land requirements for Proposed Project

Particulars	Land required (in Hectare)
Road widening	20.187
Wayside amenities	0.3
Loading and unloading Platforms	
Dumping site at 96+220 to 96350	2.732
Dumping site at99+050 to 99+250	
TOTAL	**23.219**

4.4 IMPACT ON STRUCTURES

As per the Census survey, only 5 structures will be impacted due to project activities, out of which 3 are private structures and 2 are Community Property resources (CPRs). All the 3 private structures are encroachers and are within the existing ROW. Out of 3 private structures, 2 structures are abandoned and one is Residential cum commercial structure. It was informed during the census cum socio-economic survey that the owners of these two abandoned structures lives at another location in the village and these structures are no more in use. The census and socio-economic related information for the affected households of these abandoned structures were collected from the neighbours. The nature of activities of residential cum commercial structure is grocery store and cement store. Remaining 2 structures are common property resources as shown in Table 5.2.

Table 4-3 Category of Structures likely to be affected

Project	Abandoned	Residential cum Commercial	CPR	Total
Gumma-Fediz Section of new NH 707	02	01	02	05

4.4.1 Ownership Status of Private Structures likely to be affected

As per the census cum socio-economic survey, all the affected private structures are on government land, thus, belonging to Non-titleholders (Encroachers).

Table 4-4 Ownership of Private Structures

Project	Non-Title-holders	Total
	Encroachers	
Gumma-Fediz Section of new NH 707	03	03

4.4.2 Type of Construction of Private Structure likely to be affected

Majority of private structures likely to be affected are of Permanent construction (80%). Detail is summarized in Table 5-4.

Table 4-5 Type of Construction of Private Structures likely to be affected

Sr. No.	Type of Construction	No. of structures	Area	Percentage
1	Permanent	2	334.75	80.00
2	Semi-Permanent	1	25.00	20.00
Total		**3**	**359.75**	**100.00**

Structure wise area is given in **Annexure 4-1.**

4.4.3 Common Property Resources (CPRs) likely to be affected

Only 2 hand pumps are getting affected due to road widening. Details of CPRs are given in **Annexure 4-2**.

4.5 SOCIO-ECONOMIC PROFILE OF PAPs OF STUDY REGION

This section presents socio-economic analysis of the project affected households likely to be affected by the proposed upgrading. The socio-economic details of the affected households were collected during the census cum socio-economic survey which includes information related to social category, household size, occupational pattern, income level etc.

4.5.1 Project Affected Households (PAHs), Project Affected Families (PAFs) and Project Affected Persons (PAPs)

The implementation of the project will affect about 3 households comprising of 7 families and 31 PAPS. The detail of the households is attached as **Annexure-4-3**.

Table 4-6 Number of PAHs, PAFs and PAPs

Prosed Alignment	Project Affected Households (PAHs)	Project Affected Families (PAFs)	Project Affected Persons (PAPs)
Gumma to Fediz Section of NH-707	03	07	31

Source: *Census cum Socio-economic Survey, Sep. 2019*

4.5.2 Gender and Age wise project affected Population

The analysis of the census data shows that there are a total of 31 affected persons, the males comprising 14 (45.16%) and the females 17 (54.84%). The following table shows the population in the project area, disaggregated by gender and age.

Table 4-7 Distribution of Affected Population by Age and Sex

Sl. No.	Age Group (Years)	Total PAPs	Percentage	Gender Disaggregated Population			
				Male	Percentage	Female	Percentage

1	<18	14	45.16	6	19.35	8	25.81
3	26-40	11	35.49	5	16.13	6	19.35
4	41-55	4	12.90	2	6.45	2	6.45
5	56 & Above	2	6.45	1	3.23	1	3.23
Total		**31**	**100.00**	**14**	**45.16**	**17**	**54.84**

Source: *Census cum Socio-economic Survey, Sep. 2019*

4.5.3 Social Categories of PAHs

It has been enumerated from the screening of survey data that all of the affected households belong to the General Category.

4.5.4 Education and Literacy

Table 4-8 presents the educational level of households, wherein majority of them were found to be literate. As per census cum socio-economic data literacy rate is highest in primary i.e. 41.94 %. The following table shows the gender-disaggregated information on the education and literacy level of the affected people in the project area.

Table 4-8 Education and Literacy among PAPs

Sr. No.	Indicators	Total Persons	Percentage	Gender Disaggregated Information			
				Male	Percentage	Female	Percentage
1	**Primary**	13	41.94	5	16.12	8	25.81
2	**Upper Primary**	5	16.12	4	12.90	1	3.23
3	**Higher Secondary**	3	9.68	1	3.23	2	6.45
4	**Graduate**	2	6.45	1	3.23	1	3.23
5	**Illiterate**	5	16.13	2	6.45	3	9.67
6	**Not Applicable***	3	9.68	1	3.23	2	6.45
Total		**31**	**100.00**	**14**	**45.16**	**17**	**54.84**

Source: *Census cum Socio-economic Survey, Sep. 2019*

*Note: *Not Applicable includes children below or equal to three (3) years.*

4.5.5 Occupation Pattern of the Affected Persons

Out of 31 PAPs, 10 are from working population and 21 are from the non- working population. Occupation-wise analysis of working and non-working group population is shown in Table 5-9 and 5-10 respectively. As far as occupation of the affected population is concerned, majority of PAPs are engaged in agricultural (90.00%) activities.

Table 4-9 Occupation Pattern of working population

Sr. No.	Occupation	Total Number of PAPs in working population	Percentage	Project Affected Persons by Gender			
				Male	Percentage	Female	Percentage
1	**Shopkeepers**	1	10.00	1	10.00	0	0

2	**Farmer**	9	90.00	7	70.00	2	20.00
Total		**10**	**100.00**	**8**	**80.00**	**2**	**20.00**

Source: *Socio-economic Survey, Sep. 2019*

Table 4-10 Occupation Pattern of Non-working population

Sr. No.	Occupation	Total Number of PAPs in non-working population	Percentage	Project Affected Persons by Gender			
				Male	Percentage	Female	Percentage
1	**Not in Workforce***	15	71.43	6	28.57	9	42.86
2	**Household Work**	6	28.57	0	0	6	28.57
Total		**21**	**100.00**	**6**	**28.57**	**15**	**71.43**

Source: *Socio-economic Survey, Sep. 2019*

Note: **Not in the work force. Persons who are neither employed nor unemployed are not in the workforce. This category includes retired persons, students, those taking care of children or other family members, and others who are neither working nor seeking work.*

It was also noted that women are largely engaged in household works. Further, the data reveals that no child labour exists along the project road.

4.5.6 Income Pattern of the Affected Households

As per the census survey, none of the households falls under Below Poverty Line (BPL) category. Two households earn between 2-5 Lakh per annum and one earns more than 5 lakh per annum. The incomes have been grouped into categories shown in the Table 5-11.

Table 4-11 Annual Income of the affected households

Sr. No.	Annual Income	Number of PAH	Percentage
1	200000 to 500000	2	66.67
2	Above 500000	1	33.33
Total		**3**	**100.00**

Source: *Socio-economic Survey, Sep. 2019*

4.6 VULNERABLE GROUP

The information on vulnerable groups was also collected during census cum Socio-economic survey. All the affected households belong to general category. Among these households there is only **1 Women Headed Household (WHH)** and can be considered under vulnerable category[1]. This household needs special consideration so that they can be benefitted from the project and do not further get socially and economically marginalised. As per the census and socio-economic survey none of the affected household belongs to ST, BPL, SC and divyang category. Provisions for additional assistance are made in entitlement matrix for any impact on vulnerable groups.

[1] Vulnerable category includes persons who are physically challenged, widows, persons above sixty years of age, ST, SC, below-poverty line households and woman-headed household

5. STAKEHOLDERS CONSULTATION AND DISCLOSURE

5.1 INTRODUCTION

Participation is a process, through which stakeholder influence and share control over development initiatives and the decisions and the resources, which affects them. The effectiveness of R&R program is directly related to the degree of continuing involvement of those affected by the project. Participation of persons directly affected by projects is a primary requirement in development of R&R, if its programs are to be suited to the needs of the resettled population. Their involvement vastly increases the probability of their successful resettlement and rehabilitation.

Involuntary resettlement creates feelings of insecurity, curiosity and misunderstanding among PAPs. Social assessment and public/community participation helps to remove such uncertainties and at the same time help the project-proponent to incorporate valuable suggestions perceptions of stakeholders. Consultation with the community and their involvement in different stages of project planning and implementation is often used as a tool to inform and educate the stakeholders about the proposed action.Public consultation has been carried out in this Project with the objectives to inform people about the project interventions and the likely impact due to the project. These consultations also aimed to take suggestions from the local people and to listen and reciprocate on the concerns raised by them.

5.2 OBJECTIVE OF CONSULTATION

As part of the Social Impact Assessment process, detailed consultations were conducted with all stakeholders. The main objectives of the consultation program were to minimize negative impact in the project area and to make people aware of the project. During the process efforts were made to ascertain the views and preferences of the people.

5.3 METHODS ADOPTED FOR COMMUNITY PARTICIPATION

The consultation process used different types of consultation such as in-depth interviews with key informants and meetings. Discussions were held with the following key stakeholders:

- Affected households
- Community members of the villages along the road;
- Government Departments.

5.4 SUMMARY OF PUBLIC CONSULTATION

Public consultations were held at two (2) locations along the project road. The public consultations were also attended by village Sarpanch, Pradhan, representatives from Local PWD Departments.

Overall, majority of the respondents have their apprehensions about the processes of compensation amount and its procedures. The affected households, in general, showed their agreement towards

the proposed road widening/improvement. Some of the households were not available at the time of survey as they are residing at some other place and structures are left abandoned.

Most of the issues raised by the community during these two consultations were the same which were majorly related to compensation, road safety and employment opportunities during construction stage. One of the major concerns raised by the local people was related to use of good construction material for the road construction, so that it is durable for long time.

The details of the stakeholder consultations including the date, location, participants, the issues discussed and the outcome / mitigation measures (design) is summarized in table below:

Table 5-1 Summary of Local level Consultations at Gumma to Fediz Section of NH-707

Project Corridor	Location	Date	Chainage	No. of participants	Issues/Concerns	Redress Under the Project
Gumma to Fediz Section of NH-707	**Near Starting Point Gumma Village**	21.09.2019	94+900	16	1. Loss of Livelihood – Issue raised by one Household whose shops will be impacted due to proposed improvements on the project road. 2. Road Safety was the Major Public concern along the project area. 3. Flood and Drainage issues were raised. 4. Loss of Trees along the road was concern of Local PWD-NH Division	1. Compensations will be given as per R&R framework. 2. Traffic calming measures (at all intersections), crossing points have been proposed for the safety of local people. Hazard markers, RRPM, road marking etc. have also been provided. Crash barrier has also been proposed throughout the alignment.

	Antroli Village	22.09.2019	98+250	18	(SDO- Sanjay Agarwal). 5. Utilities along the road – Concern were raised by Smt. Sarla Joshi Pradhan of the village – Gumma. 6. Local People were concerned about the Employment during Construction. Local Panchayat persons have raised these concerns or demands in order to provide source of income to local people. 7. Overall the major concern was road should be constructed with good thickness of material for long durability as the Existing roads are in bad condition. Local People, Pradhan and other Panchayat officials raised this concern in common at both Gumma and Antroli village. They are facing problem in daily routine due to bad quality of roads. Issue raised by Pradhan of Village Antroli Smt. Gita Devi 8. CPRs should be relocated as a concern for village people.	3. Total 38 nos. culverts have been provided at various locations. Drainage will also be provided throughout the alignment. 4. Compensatory forestation would be done at the ratio of three trees for each tree to be cut. Local species of trees have been selected for plantation. 5. All the utilities and basic infrastructures to be impacted will be relocated under the project cost. Utility Shifting Plan is already prepared. 6. The locals will be given preference for employment during construction provided they meet job requirements. 7. Concern is genuine and will be taken care off at the time of construction of the road in order to provide better and good quality roads. 8. Two CPRs (Hand-pumps) will be impacted throughout the road stretch and will be relocated.

Detailed Attendance sheets of these consultations are presented in **Annexure 5–I.**

Photographs of the Consultations are given below:

LOCATION: NEAR STARTING POINT GUMMA VILLAGE (94/900)

LOCATION: AT ANTROLI VILLAGE (98/250)

5.5 DISCLOSURE

The SIA and Draft Abbreviated Resettlement Action Plan (ARAP) would be disclosed on MoRTH website as well at the World Bank Info shop/ Public Information Centre. Feedback if any would be incorporated into the final ARAP document, following which the final ARAP will be re-disclosed. Further to enhance transparency in implementation, the list of PAPs for disbursement of benefits shall be separately disclosed at the concerned Panchayat Offices/ Urban Local Bodies, District Collector Offices, Block development Offices, District Public Relations Offices (at the state and district levels), Project office, and any other relevant offices, etc. However there is only livelihood loss of one PAH, none of the titleholders are affected throughout the project road. The Resettlement Policy Framework, Executive Summary of the SIA and ARAP will be placed in vernacular language in the District Collector's Office.

6. POLICY FRAMEWORK AND ENTITLEMENT MATRIX

6.1 INTRODUCTION

This chapter of the report discusses about the existing law and regulations of the country and state those are applicable to the proposed project. It is imperative to analyze the Acts and bylaws to understand the legalities and procedures in implementing project and identifying the gaps and area where there is a need for strengthening to comply with the World Bank policy on resettlement and rehabilitation of project affected persons.

The aim of the project is to establish and provide better connectivity of various existing National Highways in the country. Most of the infrastructure work planned for this Green National Highway Corridor project will take place within the existing Right of Way (RoW) except at some of the congested villages/settlements where Curve improvements proposed and at locations where minor improvements are required for accommodating road safety measures.

6.2 APPLICABLE LEGAL AND POLICY FRAMEWORK

Applicable acts, notifications and policies relevant in the context of this project are discussed in tabular form is given below:-

The Project Authority (MoRTH) will ensure that project activities implemented are consistent with the national, state, local regulatory/legal framework.

Table 6-1 Applicable Legal and Policy Framework

Sr. No.	Acts, Notifications and policies	Relevance to this Project	Applicability
1.	**RTFCTLARR Act, 2013**	Land required, R&R for the project shall be acquired and provided as per the provision of this Act.	Applicable via Himachal Pradesh Relevant Rules
2	**The Provisions of the Panchayat (Extension to the scheduled Areas) Act, 1996**	One of the important provisions of this act states "the Gram Sabha or Panchayat" at the appropriate level shall be consulted before making the acquisition of land.	Applicable
3	**World Bank OP 4.12-Involuntary Resettlement**	The project entails land acquisition though, at a low scale for widening, curve improvements, junction improvements etc. It would also adversely affect structures used for various purposes, livelihood of people) mainly earning their livelihood by means of petty shops, and providing various services). Many of them have	Applicable

		been operating from the government land. Thus both title holders and non- title holders alike would be affected as a consequence of the project.	
4	**National Highways Act, 1956**	Land acquired for the project shall be acquired as per the provision of this act.	Applicable
5	**The Right to Information Act, 2005**	The Act provides for setting out the practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, the constitution of a central Information Commission and State Information Commissions and for matters connected therewith or incidental thereto.	Applicable

6.3 RESETTLEMENT POLICY FRAMEWORK

This RPF for the GNHCP has been prepared based on the findings of Social Survey Report (SSR) covering initial impact assessment and review of applicable legal and policy framework discussed above.

In order to address the adverse impacts of land acquisition and involuntary resettlement, MoRTH, Govt. of India recognised the need for the development of Resettlement Policy Framework. Review of Social Screening Reports (SSRs) reveal that applicable legal and administrative procedures vary from State to State and also there are gaps between Resettlement and Rehabilitation Policies of the country and certain states and the Bank's Resettlement Policy. Hence, there is a need to understand the critical elements of the existing legal and policy framework and agree on a mechanism that will address the key social issues and formulate a specific policy framework for the project to bridge the major gaps to conform to the provisions of World Bank's operational policies related to Involuntary Resettlement and Indigenous Peoples. This policy framework will help expedite the process and facilitate consistent preparation of ARAPs across all project roads in different states.

The purpose of preparing a RPF is to:

a) Bring commonality in resettlement and rehabilitation benefits under the project.
b) Bridge the gap between Bank's policy on Involuntary Resettlement and LARR, 2013.
c) Bring together and built upon the current good practices in terms of procedures to address more systematic and institutional issues.
d) Establish institutional arrangements at project, state and central level (MoRTH) for the implementation of ARAP.
e) Establish mechanism for Redressal of grievances; and monitoring and evaluation, etc.

Following definitions that will be applicable unless otherwise stated specifically.

Agricultural labourers: means a person primarily resident in the affected area for a period of not less than five years immediately before the declaration of the affected area, who does not hold any land in the affected area but who earns his livelihood mainly by manual labour on agricultural land therein immediately before such declaration and who has been deprived of his livelihood;

Agricultural land: Denotes land used or capable of being used for the purpose of agriculture or horticulture, dairy farming, poultry farming, pisciculture, sericulture, breeding of livestock or nursery growing medicinal herbs, raising of crops, grass or garden produce and land used by an agriculturist for the grazing of cattle, but does not include land used for cutting of wood only;

Below poverty line (BPL) or BPL family: means below poverty line families as defined by the Planning Commission of India, from time to time and those included in the BPL list for the time-being in force.

Corridor of impact (COI): Refers to the minimum land width required for construction including embankments, facilities and features such as approach roads, drains, utility ducts and lines, fences, green belts, safety zone, working spaces etc. Additional land width would be acquired/purchased or taken on temporary lease if the Corridor of Impact extends beyond the available Right of Way.

Cut-off date: Refers to the date on which the census survey of PAPs starts in that road section/stretch. For entitlement purpose, the PAPs would be those who have been in possession of the immovable or movable property within the affected area/zone on or prior to cut off date. However, the cut-off date for land acquisition purpose is the date on which the notification under section 3A will be issued under the NH Act, 1956.

Encroacher: A person who has extended their building, agricultural lands, business premises or work places into public/government land without authority.

Entitled person (EP): A person who is adversely impacted by the project and is entitled to assistance as per the project entitlement framework is considered to be an Entitled Person.

Holding: means the total land held by a person as an occupant or tenant or as both;

Kiosk: A kiosk is a booth/stall/cabin/cubicle made of wood or iron or any other building material which could be shifted to another location as a single unit without much damage and is used for carrying out petty business/ commercial activities and has been in operation/existence prior to cut off date.

"Land acquisition" or "acquisition of land": means acquisition of land under the NH Act, 1956 for the time being in force.

Landowner: A person who is an allot tee or a grantee of any land under any scheme of the Government under which such allotment or grant is to mature into ownership, who has mortgaged his land (or any portion thereof) or who has permanent rights and interest in land.

Marginal farmer: Refers to a cultivator with an un-irrigated land holding up to one hectare or irrigated land holding up to half hectare.

Below poverty line (BPL) or BPL family: means below poverty line families as defined by the Planning Commission of India, from time to time and those included in the BPL list for the time-being in force.

Corridor of impact (COI): Refers to the minimum land width required for construction including embankments, facilities and features such as approach roads, drains, utility ducts and lines, fences, green belts, safety zone, working spaces etc. Additional land width would be acquired/purchased or taken on temporary lease if the Corridor of Impact extends beyond the available Right of Way.

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"Land acquisition" or "acquisition of land": means acquisition of land under the NH Act, 1956 for the time being in force.

Landowner: A person who is an allot tee or a grantee of any land under any scheme of the Government under which such allotment or grant is to mature into ownership, who has mortgaged his land (or any portion thereof) or who has permanent rights and interest in land.

Marginal farmer: Refers to a cultivator with an un-irrigated land holding up to one hectare or irrigated land holding up to half hectare.

Small farmer: Refers to a cultivator with an un-irrigated land holding up to two (2) hectares or with an irrigated land holding up to one (1) hectare.

Squatter: A person who has settled on public/government land, land belonging to institutions, trust, etc. and or someone else's land illegally for residential, business and or other purposes and/or has been occupying land and building/asset without authority.

Tenant: A person who holds / occupies land / structure of another person and is or (but for a special contract) would be liable to pay rent for that land / structure to other person and includes the predecessor and successor-in- interest of such person but does not include mortgage of the rights of a landowner or a person to whom holding has been transferred or an estate or holding has been let in farm for the recovery of an arrear of land revenue or of a sum recoverable as such an arrear or a person who takes from Government a lease of unoccupied land for the purpose of subletting it.

Titleholder: A PAP/PAF/PAH who has legal title to land, structures and other assets in the affected zone.

Vulnerable group: This includes Scheduled Caste. ST, family/household headed by women/ female, disabled, handicapped, orphans, destitute, BPL, abandoned woman; unmarried girls; widows; and persons above the age of 65 years irrespective of their status of title (ownership). Vulnerable groups would also include those farmers who (after acquisition of land) become small/marginal farmers and also qualify for inclusion in BPL. For such cases, total land holding of the landowner in that particular revenue village will be considered in which land has been acquired.

Wage earner: Wage earners are those whose livelihood would be affected due to the displacement of the employer. The person must be in continuous employment for at least six months prior to the cut-off date with the said employer and must have reliable documentary evidence to prove his/her employment.

6.4 RESETTLEMENT PRINCIPLES AND ELIGIBILITY CRITERIA

Based on the above analysis of government provisions and requirements as per World Bank IR policy the broad resettlement principle for this project shall be the following:

- Proposed highway improvement and strengthening work will take place mostly on the existing alignment and within the available RoW or at locations were curve improvement is necessary to incorporate required safety measures;
- The involuntary resettlement and adverse impacts on persons affected by the project would be avoided or minimized as much as possible exploring viable alternative project design;
- Where it is not feasible to avoid resettlement, resettlement activities should be conceived and executed as sustainable development programs, providing sufficient investment resources to enable the persons displaced by the project to share in project benefits;
- Efforts should be made to improve their livelihoods and standards of living or at least to restore them, in real terms, to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher;
- Displaced persons should be meaningfully consulted and should have opportunities to participate in planning and implementing resettlement programs;
- Replacement land shall be an option for compensation in the case of loss of land. In case of unavailability of replacement land, cash-for-land with compensation on replacement cost option will be made available to the PAPs;
- Compensation for loss of land, structures and other assets will be based on full replacement cost and will be paid before physical displacement of PAPs including transaction costs;
- In the event of necessary relocation, PAPs shall be assisted to integrate into host communities;

- All land acquisition for the project would be done as per the National Highways Act, 1956. Additional assistance would be provided to the PAPs for meeting the replacement cost of the property;
- The uneconomic residual land remaining after land acquisition will be acquired by the project. The owner of such land/property will have the option to seek acquisition of his entire contiguous holding/ property provided the residual land is less than the average land holding of the district;
- Any structure/asset rendered unviable/unsafe because of the project shall also be considered as affected and entitlements shall be extended accordingly;
- The affected persons who does not own land or other properties, but have economic interests or lose their livelihoods will be assisted as per the policy principles described in this document;
- Cut-off date for titleholders will be the date of publication of notification under Section 3A of the National Highways Act, 1956. For non-titleholders who has not any legal holding of the occupied land such as squatters and encroachers the date of project census survey or a similar designated date declared by the executing agency will be considered as cut-off date;
- An entitlement matrix for different categories of people affected by the project has been prepared and provisions will be kept in the budget for those who were not present at the time of census survey. However, people moving in the project area after the cut-off date will not be entitled to any compensation or assistance;
- Vulnerable groups (PAPs below poverty line (BPL), the landless, disabled, elderly persons, women and children, indigenous peoples) will be identified and given additional support and assistance under the project;
- All common property resources (CPR) lost due to the project will be reconstructed or compensated by the project;
- Information related to the preparation and implementation of resettlement plan will be disclosed to all stakeholders and people's participation will be ensured in planning and implementation;
- Appropriate grievance Redressal mechanism will be established at sub-project, state and central levels to ensure speedy resolution of disputes;
- An effective monitoring and evaluation mechanism will be established to ensure consistent implementation of resettlement activities planned under the project including third party monitoring.

6.5 ENTITLEMENT MATRIX

This entitlement matrix has been developed in accordance with the basic principles adopted in the RPF and analysis of initial identification of project impacts.

In case where a State Government through any Act or Gazette Notification or as approved by any authority of State Government (duly authorized for the purpose) as per their approved procedure has fixed a rate for compensation of land and is higher than the provisions under the project, the same may be adopted by the Competent Authority in determining the compensation for land.

Similarly, in case where a State Government through any Act or Gazette Notification or as approved by any authority of State Government (duly authorized for the purpose) as per their approved

procedure has fixed a rate for resettlement and rehabilitation assistance and is higher than the provisions under the project, the same may be adopted by the Executing Authority.

Table 6-2 Entitlement Matrix

Sl. No.	Impact	Entitled Unit	Entitlement Details
A. Loss of Private Agricultural, Home-Stead & Commercial Land			
1	Loss of Land (agricultural, homestead, commercial or otherwise) within the Corridor of Impact (COI)	Title Holder/ Owner/Families with traditional land right/occupiers)	For all land acquired under NH Act; or Direct Purchase or acquisition of missing land parcels/plot (MORTH circular dated 28th December 2017), Compensation/lease amount shall be calculated and payable in accordance with Sections 26 to 30 and Schedule I of RFCTLARR Act 2013. Partial Impact on Land: In case only part of any land plot is affected, and its owner desires the whole plot be acquired on grounds that the plot has become uneconomical or has been severed due to LA (under Section 94 and Note C), the competent authority can award compensation for remaining part of the plot or award 25% of actual value upto of the remaining land holding as additional compensation, allowing the owner to retain the remaining land plot, if agreeable. For all land acquired NH Act; or Direct Purchase or acquisition of missing land parcels/plot (MORTH circular dated 28th December 2017), Rehabilitation and Resettlement Assistance shall be as follows (Schedule II of Act 2013): i. If as a result of land acquisition, the land owner becomes landless or is reduced to the status of a "small" or "marginal" farmer, assistance amount of Rs. 6 lakhs OR annuity policies that shall pay not less than two thousand rupees per month for each affected land owner for twenty years with appropriate indexation to the Consumer Price Index for Agricultural Labourers. ii. Each land owner shall be given a one-time "Resettlement Allowance" of Rs. 60,000/- only. iii. Refund of stamp duty and registration charges incurred for replacement land to be paid by the project; replacement land must be bought within a year from the date of payment of compensation to project affected persons
B. Loss of Private Structures (Residential/Commercial)			
2	Structure within the	Title Holder/ Owner	i. Compensation in accordance with Sections 26 to 30 and Schedule I of RFCTLARR Act 2013

Sl. No.	Impact	Entitled Unit	Entitlement Details
	Corridor of Impact (CoI)		ii. Right to salvage material from affected structures iii. Three months advance notice to vacate structure iv. For those losing cattle shed, a one-time assistance of Rs. 28,000/- would be payable v. For each affected family of an artisan or self-employed or own non-agricultural land, that is displaced and must relocate, a one-time assistance of Rs. 28,000/- would be payable; and vi. One-time subsistence grant of Rs. 40,000/- for each affected family who are displaced and require to relocate; vii. One-time financial assistance of Rs. 60,000/- for each displaced family towards shifting/transportation cost for shifting of the family, building materials, belongings and cattle viii. Refund of stamp duty and registration charges for purchase of new alternative houses/shops at prevailing rates on the market value as determined. Alternative houses/shops must be bought within a year from the date of payment of compensation ix. **For a house lost**, a constructed house shall be provided as per the Indira Awas Yojana specifications or equivalent cost of the constructed house in lieu, shall be payable. In case of partial impact, 25% additional award to be paid on compensation award for the affected part of the structure to enable damage repair where the owner/occupier of his/her own will, interested to retain the remaining part of the structure, provided the unimpaired continuous use of the such structure is possible without hazards
3	Structure within the Corridor of Impact (CoI)	Tenants/ Lease Holders	i. Registered lessees will be entitled to an apportionment of the compensation payable to structure owner as per applicable local laws. ii. One-time financial assistance of Rs. 60,000/- as transportation and relocation cost. iii. Three months' notice to vacate structure.
C. Loss of Trees and Crops			
4	Standing Trees, Crops within the Corridor of	Owners and beneficiaries (Registered/ Un-registered tenants,	i. Cash compensation as estimated under Section 29(3) of Act to be paid at the rate estimated by: • The Forest Department for timber trees • The State Agriculture Extension Department

Sl. No.	Impact	Entitled Unit	Entitlement Details
	Impact (CoI)	contract cultivators, leaseholders & sharecroppers	for crops • The Horticulture Department for fruit/flower bearing trees. ii. Three months advance notice to project affected persons to harvest fruits, standing crops and removal of trees, or compensation in lieu as determined above. Registered tenants, contract cultivators & leaseholders & sharecroppers will be eligible for compensation for trees and crops as per the agreement document between the owner and the beneficiaries. Un-registered tenants, contract cultivators, leaseholders & sharecroppers will be eligible for compensation for trees and crops as per mutual understanding between the owner and the beneficiaries
D. Loss of Residential/ Commercial Structures to Non-Title Holders			
5	Structures within the Corridor of Impact (CoI) or Govt. land	Owners of Structures or Occupants of structures (Encroachers, Squatters) identified as per Project Census Survey	**For loss of House** i. Compensation at PWD BSR without depreciation for structure ii. One-time resettlement cost of Rs. 28,000/- iii. Shifting/transportation assistance of Rs. 60,000/- iv. Encroachers shall be given three months' notice to vacate occupied land or cash assistance at replacement cost for loss of structures. v. Right to salvage the affected materials **For loss of shop[2]** vi. Compensation at PWD BSR without depreciation for structure vii. One-time subsistence grant of Rs. 40,000 viii. One-time rehabilitation grant of Rs. 28,000/- ix. Shifting/transportation assistance of Rs. 60,000/- x. Encroachers shall be given three months' notice to vacate occupied land or cash assistance at replacement cost for loss of structures. xi. Right to salvage the affected materials
6	Loss of employment	Livelihood loser	Subsistence allowance equivalent to Minimum Wages/Minimum Agricultural Wages[3] for 3 months

[2] Small shop includes commercial fixed kiosks and shanties where business is carried out
[3] As per rates issued by Department of Labor, Government of project state for different skills and trades

Sl. No.	Impact	Entitled Unit	Entitlement Details
	in non-agricultural activities or daily agricultural wages or other wage earners		Only agricultural labourers who are in fulltime / permanent employment of the land owner, or those affected full time employees of the business, will be eligible for this assistance. *Seasonal agricultural labourers will not be entitled for this assistance.*
E. Additional Support to Vulnerable Group			
7	Families within the Corridor of Impact (CoI)	Vulnerable affected families	i. One-time Resettlement Allowance of Rs. 60,000/- ii. Training for skill development. This assistance includes cost of training and financial assistance for travel/conveyance and food. iii. Additional Subsistence Grant of Rs. 60,000/- for displaced families belonging to **Scheduled Caste and Tribe Category** iv. Displaced vulnerable households will be linked to the government welfare schemes, if found eligible and not having availed the scheme benefit till date.
F. Loss of Community Infrastructure/Common Property Resources			
8	Structures & other resources (e.g. land, water, access to structures etc.) within the Corridor of Impact (CoI)	Affected communities and groups	Reconstruction of community structure and common property resources, will be done in consultation with community
G. Temporary Impact During Construction			
9	Land and assets temporarily impacted during construction	Owners of land and assets	i. Compensation for temporary impact during conversion e.g. diversion of normal traffic, damage to adjacent parcel of land/assets (crops, trees, structures, etc.) due to movement of heavy machinery and plant site ii. Contractor shall bear the cost of compensation of any impact on structure or land due to movement of machinery during construction or establishment of construction plant. iii. All temporary use of land outside ROW, would be done based on written approval/ prior approval landowner and contractor

7. GENDER ANALYSIS

7.1 INTRODUCTION

There are two important aspects of project where gender issues require an address. Women are going to experience socio-economic impacts due to loss of structure for the project and during the

construction//implementation phase.

Global Context: Violence against women and children takes many forms, including sexual, physical, emotional and economic abuse. It occurs in the home and on the streets and in times of peace and in conflict and crisis. Recent estimates by the World Health Organization indicate that 35 percent, or one in three women worldwide have experienced some form of physical or sexual assault. GBV is an expression of gender inequality that prevents women and their families from escaping poverty, drains public resources and impedes human development and economic productivity.

National Context: Women and girls in India today continue to experience multiple forms of violence, across multiple intersections, including of religion, caste, class, abilities and sexual orientation. In India, the global data on gender violence is complemented by NFHS (National Family Health Survey (NFHS4), 2015-16 at the national level which shows that 30 percent of women have experienced physical violence since age 15, and 6 percent have ever experienced sexual violence in their lifetime. 33 percent of ever-married women have experienced physical, sexual, or emotional spousal violence. Despite this, only 14 percent of women who have experienced physical or sexual violence by anyone have sought help to stop the violence.

7.2 LEGAL AND POLICY ENVIRONMENT FOR WOMEN'S SAFETY

7.2.1 International Instruments

Over the past three decades, the international community has undertaken many measures to make the world a safer place for women and children. Intimate partner violence is the most common and widespread form of gender violence experienced by women globally. A number of studies capture the extent of this violence in different countries.

The international legal and policy framework establishes standards for action by countries to meet their legal obligations and policy commitments to address violence against women. Some of the key International instruments1 for the protection of women include the following:

a) **United Nations General Assembly, Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW):**
Date of adoption: 18 December 1979.
Under CEDAW, States ensure through competent national tribunals and other public institutions the effective protection of women against any act of discrimination and refrain from engaging in any practice of discrimination against women and to ensure that public authorities and institutions shall act in conformity with this obligation.

b) **Fourth World Conference on Women, Beijing Declaration and Platform for Action**
Date of adoption: 15 September 1995

The Platform for Action states that 'women may be vulnerable to violence perpetrated by persons in positions of authority in both conflict and non-conflict situations. Training of all officials in humanitarian and human rights law and the punishment of the perpetrators of

violent acts against women would help to ensure that such violence does not take place at the hands of the public officials in whom women should be able to place trust, including police and prison officials and the security forces' (para. 121).

c) United Nations General Assembly, Resolution 52/86 on Crime Prevention and Criminal Justice Measures to Eliminate Violence Against Women

Date of adoption: 2 February 1998.

d) United Nations Security Council Resolution 1325 on Women, Peace and Security

Date of adoption: 31 October 2000

UN SCR 1325 is a key document in influencing police organizations to incorporate gender aspects into the reforms. The resolution calls on all actors involved, when negotiating and implementing peace agreements, to adopt a gender perspective, including measures that ensure the protection of and respect for human rights of women and girls, particularly as they relate to the constitution, the electoral system, the police and the judiciary. The Council invites Member States to incorporate the protection, rights and the particular needs of women, as well as the importance of involving women in all peacekeeping and peace-building measures, into their national training programmes for military and civilian police personnel in the preparation for deployment.

7.2.2 National Instruments

Existing gender inequalities in India create conditions of unequal access to the resources between men and women and manifests into violence through the practice of differentiation. Norms such as male pre-eminence, female seclusion, value of male child, honour, chastity, practice of dowry, restricted mobility, and female circumcision and acts of direct violence (rape, wife-beating, dowry death etc.) are manifestations of deep seated gender inequalities across India.

Domestic violence is one of the most common forms of gender-based violence against women and has been recognized since 1983 as a criminal offence under Indian Penal Code 498-A. However, it was not until the enactment of the Protection of Women from Domestic Violence Act 2005 (PWDVA), which came into effect in 2006 that civil protections were afforded to victims of domestic violence. Similarly the laws on sexual violence and rape were amended in 1983 in the Mathura rape case where a 16 year old girl was raped by two policemen in the police station while her relatives were waiting outside. More recently, India amended its Criminal Procedure Code in 2013 and enacted the Sexual Harassment of Women at workplace (Prevention, Prohibition, Redressal) Act.

Some of the key policies and laws pertaining to gender based violence in India include the following

- **National Policy for the Empowerment of Women**[2] Year of adoption: 2001. India has signed and ratified **Convention on Elimination of Discrimination against Women (CEDAW)** [3]**.** Since then, the national policy for Women 2016 and other policies and amendments on acts has been reflecting the principles highlighted in the related international conventions the goal of this

Policy is to bring about the advancement, development and empowerment of women.

- **The Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal)** Act, 2013, is introduced to prevent and provide Redressal of complaints of sexual harassment. One of the main provisions in this act is that it calls for constituting an Internal Complaints Committee at each office or branch with 10 or more employees/workers.
- The **Protection of Women from Domestic Violence Act, 2005**[4] defines domestic violence, describes the powers and duties of protection officers, service providers and lists the procedures for obtain reliefs.
- **The Dowry Prohibition Act, 1961** makes giving and demanding dowry as a punishable offence. Section 8B identifies Dowry Prohibition Officers who are appointed not only to prevent the offence but also to collect evidence and perform additional functions that are deemed to serve the purpose of the act.
- The **Protection of Children from Sexual Offences Act, 2012**[5] has been framed to strengthen the legal measures for protecting children from any kind of sexual offences. Despite having sexual offences covered under different sections of Indian Penal Code, those existing sections do not entirely cover similar offences against children. Recognizing the children as a person of 18 years or below, the various offences have been clearly defined under this Act. The Act also defines the gravity of certain offences carried out against children and suggests stringent punishments accordingly.
- The **Convention on the Rights of the Children**[6] lays out a universal definition of 'child'. It articulates how children should be treated in a non-discriminatory manner and calls for action that considers the best interests of the child. While Article 32 keeps in view of protecting the childhood from being engaged as labours, articles 33, 34, 35, 36, 37 and 38 protects children from drug abuse, sexual exploitation, abduction, sale and trafficking, other forms of exploitation, detention and punishment and war and armed conflicts. Article 39 focuses specifically on rehabilitation of child victims who are categorized as neglected, abused, or exploited in any manner. As a signatory to the Convention, India put in place necessary institutional arrangements including strengthening the NGO framework across the country to address survival rights, development rights, protection rights, participation rights. It is noted that as on date India has signed Optional Protocol to CRC on Sale of Children, Child Prostitution and Child Pornography and Optional Protocol to CRC on the involvement of Children in Armed Conflict. The third optional protocol to the Convention on the Rights of the Child on a Communications Procedure is not signed by India as of now. India ratified the Convention for the Suppression of the Traffic in Persons and of the Exploitation of the Prostitution of Others7 and following that, the country enacted The Immoral Traffic (Prevention) Act in 19569a and punishes trafficking in relation to prostitution.

7.3 IMPACT ON WOMEN

17 females are getting affected by the project (54.84% of the total population) out of 31 persons. Only 1 women headed household is being affected by the project. They constitute around 33.33% of the total affected PAHs in the project area. According to the Socio- economic

status along the road parameters like literacy rate is higher among women, work force participation rate is low as compare to male population.

7.4 WOMEN HEADED HOUSEHOLD

Female-headed households are considered a vulnerable group as per these SIA. The resettlement plan ensures that socio-economic conditions, needs and priorities of women in the affected area are identified and the process of land acquisition and resettlement does not disadvantage women. During disbursement of compensation and provision of assistance, priority will be given to female-headed households.

However, one (1) household is women headed along the proposed project area.

8. INSTITUATIONAL ARRANGEMENT FOR ARAP IMPLEMENTATION

8.1 INTRODUCTION

The key elements of institutional arrangements are co-operation/ support, collaboration and sharing of responsibilities with clearly defined roles, involvement of key stakeholders and vertical and horizontal linkages amongst different agencies. The Institutional Arrangements for implementation of RPF and ARAPs are detailed below. The Institutional Arrangements are required at three levels viz., MoRT&H (Central Govt.), State Level and Sub-Project Level and this is presented in the below figure 8-1.

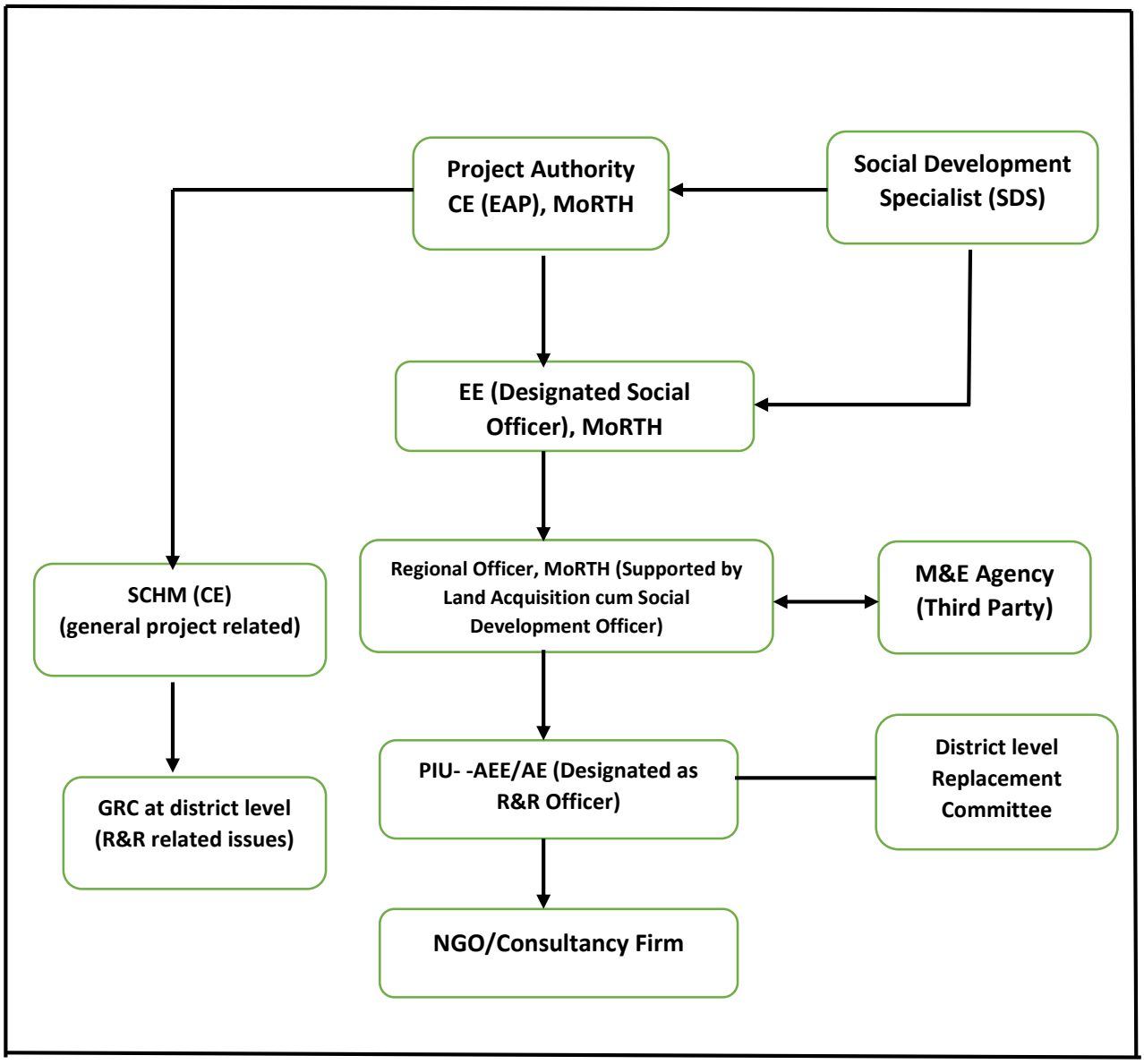


Figure 5 Institutional Arrangement for ARAP Implementation

8.2 CENTRAL LEVEL

At Central Level, the Chief Engineer (EAP), MoRTH, Govt. of India will be overall responsible for the implementation of RPF. CE (EAP) will have all delegated administrative and financial decisions with regard to implementation of the project as well as land acquisition, ARAP including TDP/VCDP implementation. It will include further augmenting the capacity of MoRTH with regard to resettlement and rehabilitation and management of other social issues. CE (EAP) will be assisted by a team comprising EE designated as Social Officer and a suitable number of technical and secretarial staff. MORTH also will engage a Social Development Specialist (SDS) either as individual consultant or through Project Management Consultant (PMC), to work with EAP and assist Social Officer. The EAP will be responsible for ensuring training, guidance, and recommendations for handling policy and implementation issues at the state and sub-project levels in compliance with RPF. The Social Development Specialist either individually or with PMC will provide policy and strategic assistance to EAP on social issues including land acquisition and rehabilitation and resettlement. The designated Social Officer will be specifically responsible for implementation of ARAP & TDP. The Social Officer will ensure that all social safeguards issues are complied with as per the RPF. The roles and responsibilities of the SDS would broadly include the following:

i. Ensure adequate staffing at state and sub-project level to ensure timely implementation of ARAP.
ii. Guide and supervise in matters related to resettlement and rehabilitation & TDP to state and sub-project level offices.
iii. Ensure preparation and disclosure of SIA, ARAP including TDP/VCDP and Land Acquisition Plan for sub projects as per RPF.
iv. Ensure free, prior and informed consultation with tribal families along the project and also ensure that sufficient supporting documentation is maintained.
v. Co-ordinate with state government departments in matters related to implementation of ARAP & TDP.
vi. Interact with implementation agencies at state and sub-project level on a regular basis.
vii. Undertake field visits as and when required.
viii. Facilitate necessary help needed at site with regards to LA and R&R issues.
ix. Compile data related to resettlement and rehabilitation & TDP activities received from field offices and update Chief Engineer (CE) and suggest suitable measures to be taken.
x. Ensure budgetary provision for resettlement and rehabilitation of PAPs and relocation, rehabilitation and reconstruction of common property resources (CPRs) and implementation of & TDP.
xi. Ensure timely release of budget for implementation of ARAP&TDP.
xii. Monitor implementation of ARAP including TDP carried out by the agency through RRO at subproject level.
xiii. Ensure third party audit of ARAP & TDP implementation; and
xiv. Perform other roles and responsibilities related to implementation of ARAP including TDP as assigned by the CE (EAP) from time to time.

8.3 STATE LEVEL

At State Level, a Land Acquisition cum Social Development Officer (LA cum SDO) would be appointed in the Project Coordination Unit (PCU) headed by Nodal Officer. Additional sociologist as individual consultant will also be engaged to assist LA cum SDO in states as required, particularly in states with larger share of sub projects such as Andhra Pradesh, Himachal Pradesh, and Uttar Pradesh etc. The roles and responsibilities of the LA cum SDO would broadly include the following:

i. Facilitate preparation and implementation of land acquisition and ARAP including TDP in compliance with RPF;
ii. Ensure consultation and stakeholder participation in finalization of ARAP including TDP;
iii. Guide and supervise ARAP including TDP implementation at sub-project level;
iv. Interact with ARAP implementation support agencies and undertake field visits for first-hand information;
v. Co-ordinate with various government departments in matters related to implementation of ARAP & TDP;
vi. Check implementation of ARAP including TDP/VCDP carried out by the agency from time to time by undertaking site visits and consultations with PAPs;
vii. Facilitate and cooperate in third party audit of ARAP & TDP implementation;
viii. Guide and supervise the ARAP implementing agency to roll out HIV prevention activities;
ix. Ensure a well -functioning GRM including "confidential" handling of complaints relating to Gender Based Violence;
x. Compile data on LA progress and ARAP implementation activities received from field offices and update EAP, MoRTH and suggest suitable measures to be taken; and
xi. Perform other roles and responsibilities related to implementation of ARAP including TDP/VCDP as assigned by the EAP, MoRTH from time to time

8.4 SUB-PROJECT LEVEL

A Project Implementation Unit (PIU) comprising officials of State PWD will be constituted at subproject level and headed by the Superintending Engineer/ Executive Engineer – who will be designated as Project Director. The PIU will be responsible for the project execution including ARAP & TDP/VCDP implementation. There will be a designated or appointed Resettlement & Rehabilitation Officer (RRO) at respective PIUs who will be responsible only for the implementation of ARAP and TDP at site. Additional sociologist as individual consultant will also be engaged to assist RRO as required. RRO will assist Project Director at PIU in all matters related to resettlement and rehabilitation. The roles and responsibilities of the Resettlement and Rehabilitation Officer are as under:

i. Ensure ARAP including TDP implementation with assistance from implementation agency as per the time line agreed upon.
ii. Interact with ARAP implementation agency on a regular basis.
iii. Undertake field visits with implementation agency from time to time.
iv. Co-ordinate with district administration and other departments in matters related to implementation of R&R.
v. Facilitate necessary help needed at site with regard to LA and R&R, HIV issues to implementation agency.

vi. Ensure distribution of Resettlement and Rehabilitation Policy and entitlement matrix for the project to PAPs.
vii. Ensure preparation and distribution of photo identity cards.
viii. Ensure and attend meetings organized by implementation agency on thematic areas related to resettlement and rehabilitation policy and entitlements and awareness generation including aspects relating to GBV.
ix. Ensure inclusion of PAPs who could not be enumerated during census but have documentary evidence to be included in the list of PAPs.
x. Ensure preparation of identity cards, and approval from the PCU and distribution of the same to PAPs.
xi. Ensure timely preparation of micro-plan from ARAP implementation agency and approval from PCU.
xii. Ensure disbursement of resettlement and rehabilitation assistance in a transparent manner.
xiii. Participate in meetings related to resettlement and rehabilitation issues.
xiv. Facilitate in opening of joint account of PAPs.
xv. Ensure release of compensation and assistance before taking over the possession of land for start of construction work.
xvi. Ensure relocation, rehabilitation and reconstruction of CPRs before dismantling through proper mechanism.
xvii. Ensure development of resettlement sites, where required.
xviii. Attend and participate in Grievance Redress Committee meetings for Redressal of grievances of PAPs and other committees involving R&R matters,
xix. Liaison with government and other agencies for inclusion of PAPs in employment and income generation Programme/scheme.
xx. Ensure that tribal families get equal opportunity to participate during implementation and become overall beneficiaries in the project.
xxi. Prepare monthly progress report related to physical and financial progress of implementation of ARAP including TDP & submit to PCU.
xxii. Provide all necessary information and data related to R&R on monthly basis to designated Social Officer at Central Level through Project Director.
xxiii. Carry out any other work related to resettlement and rehabilitation that may be entrusted from time to time by the PCU for compliance of R&R.

8.5 ARAP IMPLEMENTING SUPPORT AGENCY AT SUB-PROJECT LEVEL

The Project Authority [CE (EAP), MoRTH to implement ARAP for each of the sub-project, will engage the services of **NGOs/Consultancy firms** having experience in resettlement and rehabilitation issues. Broad roles and responsibilities of implementation agency would be as:

i. The ARAP implementation agency will be the main link between the Project Authority and PAPs,
ii. Shall be responsible for verification of PAPs as prepared by the DPR consultants,
iii. Undertake public information campaign along with RRO at the commencement of the ARAP&TDP,
iv. Develop rapport with PAPs,

v. Distribute pamphlets of R&R Policy including Entitlement Matrix to PAPs, Panchayat Raj Institutions, and concerned Govt. Offices in the project area, etc.
vi. Include PAPs who could not be enumerated during census cum socio-economic survey and certification from R&R Officer,
vii. Distribute identity cards for PAPs,
viii. Prepare and submit micro-plan to RRO for approval from PCU,
ix. Organize consultations at regular interval with PAPs with regard to resettlement and rehabilitation,
x. Organize training program for skill up gradation of the PAPs,
xi. Assist PAPs in all matters related to compensation and R&R,
xii. Assist and facilitate aggrieved PAPs (for compensation and assistance) by bringing their cases to GRC,
xiii. Facilitate in opening of joint account of PAPs,
xiv. Generate awareness about the alternative economic livelihood and enable PAPs to make informed choice,
xv. Consultations with PAPs regarding the choice of resettlement (i.e. self or assisted), development of resettlement site, participation of women, etc.
xvi. Identify training needs of PAPs for income generation and institutions for imparting training,
xvii. Undertake outreach activities for HIV prevention for awareness and behavior change as per ARAP,
xviii. Hold consultations with local people and Panchayat Raj Institutions with regard to relocation, rehabilitation, reconstruction of affected CPRs as well as provision of new facilities under the project,
xix. Participate in various meetings relating to ARAP and TDP/VCDP preparation and implementation,
xx. Submit monthly progress report, and
xxi. Undertake any other activities that may be required for the implementation of ARAP & TDP, etc.

8.6 REPLACEMENT COST COMMITTEE AT DISTRICT LEVEL

A committee at district level will be constituted to fix the replacement cost **of** land in case of lands acquired through Direct Purchase method or Land lease, structures and other properties (trees, crops and other assets, tube well, hand pump, etc.). The committee may be chaired by the District Collector/ Dy. Commissioner or his designated representative (not below the rank of SDM), Project Director-cum-Executive Engineer of the concerned PIU, District Agriculture Officer, Range Officer (Forest Department, if required), an independent certified valuer, Executive Engineer of the concerned District, elected representative (MLA) of the concerned area and Team Leader of ARAP implementation agency.

The highest value of land obtained by the three methods mentioned in Section 26 and Schedule 1 of RFCTLARR will be presented by the Project Authority and approved by the committee as the replacement cost. Similarly, latest schedule of rates of the concerned districts shall be used for

obtaining replacement cost of structures. For items not available in the schedule of rates, for those items market rates shall be collected from three different sources and then replacement cost shall be fixed by the committee. For replacement costs of crops, trees and other such items similar methods will be followed.

The committee will be constituted through an executive order and or other suitable instrument within one month (30 days) from the date of mobilization of ARAP implementation agency at site.

8.7 MECHANISM FOR IMPLEMENTATION OF ARAP, TRAINING AND CAPACITY BUILDING – AT PROJECT AND SUB-PROJECT LEVEL

Training and development of project staff is an integral part for implementing GNHCP. A training needs identification shall carried out at Central, Regional and Site level, based on which focused training modules will be developed in the first six months of project implementation;

- Strengthening in house capacity to implement the provisions of RPF/ARAP,
- Creating Awareness, providing the tools for implementation of ARAP, and accompanying set of management procedures to all departments,
- Developing competence within key officials to provide training in their respective level.

Based on skill requirement/improvement at all levels for proper implementation of RPF, a training Programme focusing project implementing partners at Centre, State and field PIUs has been developed which will be implemented by the Project Authority (MoRTH) in the next two years. These training programs, which will be zeroed down after a quick training needs assessment, are to be conducted with the help of local and national training institutions and experts in various aspects of social management. MoRTH will also identify courses offered by the premier institutions in India and abroad on social management and inter-phase these with identified Programme. There is a provision for separate budget for this activity. The budget reported under "institutional" head includes the cost estimates of training programs discussed above.

9. REHABLITATION AND RESETTLEMENT BUDGET

9.1 R&R BUDGET

Based on the Entitlement Matrix, the R&R budget for Gumma-Fediz section of NH 707 has been finalized and is presented in this chapter. The budget is indicative of outlays for the different expenditure categories and may be required to be updated during the project implementation. The R&R budget includes the cost of structure, R&R assistance to be provided to the affected people, replacement cost of religious and community property etc. The project does not involve any land acquisition and the affected households are non-titleholders. Thus, the R&R budget comprises of only two broad components namely compensation for structures and assistance to the affected families. Compensation for structures and assistances will be given as per entitlement matrix.

9.2 COMPENSATION COST FOR STRUCTURE

To calculate the cost of structure, the CPWD Plinth Area Rates, 2019 and HPPWD SOR 2019 were referred (attach as **Annexure 9-1**). The cost estimation is based on current rates which might differ in later stages of the project.

As per census cum socio-economic survey data, 3 private structures are being affected, out of which 2 are permanent and one is semi-permanent in nature. The estimated cost of the properties/ structures based on their construction type is given in **the Table 9-1**.

Table 9-1 Estimated cost of the structures

Sl. No.	Details of Structures	Rate	(in Sq. Mt)/ Quantity	Cost (in Rs.)
1.	Permanent Structure (Non-Title Holder)	19,500	334.75	65,27,625
2.	Semi-Permanent Structure (Non-Title Holder)	16,600	25.0	4,15,000
Sub-Total				69,42,625
Contingency @ 10%				6,94,263
Total				**76,36,888**

9.3 R&R ASSISTANCE

R&R assistance costs are calculated by using Census cum socio-economic survey data and applicable Entitlement Matrix of Resettlement Policy Framework (RPF) and are presented in **Table 9-2.** A tentative cost that would be incurred while providing this assistance to the affected household has been calculated to be Rs. 4,00,400/-. The R&R assistance includes subsistence allowance, shifting allowance, one time rehabilitation amount, one time resettlement allowance and assistance to women headed household.

Out of 3 affected structures, 2 are abandoned but still R&R assistance has been calculated for these households. One of the owners of the abandoned structure is a Woman and hence apart from

structure cost, she will also get an additional assistance under vulnerable category. The details of assistance amount will be updated at the implementation stage.

Table 9-2 Estimated Cost of the R&R Assistance

Sr. No.	Item	Unit	Rate	Quantity	Total
A. Loss of Residential/ Commercial Structures to Non-Title Holders					
1	One-time subsistence grant payable over a period of 12 months/ one year- For loss of 01 no. Shop	One time	40,000	1	40,000
2	Shifting/transportation assistance- For loss of House	One time	60,000	3	1,80,000
3	One-time rehabilitation grant for reconstruction of affected shop given to artisans- For loss of 01 no. shop (which is res-cum-commercial structure)	One time	28,000	1	28,000
4	One time resettlement cost- 2 houses	One time	28,000	2	56,000
	Sub-Total-1				**3,04,000**
B. Additional Support to Vulnerable Group					
5	One-time Resettlement Allowance	One time	60,000	1	60,000
	Sub-Total-2				**60,000**
Total (Sub-Total 1+2)					**3,64,000**
Contingency @ 10%					**36,400**
Total R & R Assistance Cost					**4, 00,400**

9.4 RELOCATION AND ENHANCEMENT OF COMMUNITY STRUCTURES

The census cum socio-economic survey showed that about 2 hand pumps are likely to be affected due to the widening of project road. For the relocation of these hand pumps, a lump sum amount of Rs. 3, 00,000/- per hand pump has been included in the budget.

Table 9-3 Estimated Cost of Common Property resources

Sl. No.	Details of Structures	Rate/ Sq. Mt/R.M.	(in Sq. Mt/ R.M.)/	Cost (in Rs.)
1.	CPR includes Hand Pumps	3,00,000	2	6,00,000
Contingency @ 10%				60,000
Total Cost				**6,60,000**

9.5 ADMINISTRATIVE, NGO, MONITORING & OTHER EXPENSES

The cost related to NGO recruitment will be about 20 Lac, External monitor will be about 10 Lacs, Administrative expenses of PIU will cost around 5 lac, Execution Cost of GBV, LMP & SEP will cost about 10 lacs. The total administrative Cost will be 61.05 lacs. Including other expenses and contingency as indicated in table below.

Table 9-4 Estimated Administrative Costs

Sl. No.	Item	Unit	Rate	Quantity	Total
1	NGO Recruitment	LS	20,00,000	1	20,00,000
2	External Monitor	LS	10,00,000	1	10,00,000
3	Administrative Expenses PIU	LS	5,00,000	1	5,00,000
4	Disclosure Expenses	LS	5,000	10	50,000
5	Training for PIU and PMU Staff	LS	1,00,000	5	5,00,000
6	Execution Cost of GBV, LMP & SEP	LS	10,00,000	1	10,00,000
7	Grievance Redressal Mechanism	LS	5,00,000	1	5,00,000
	Sub-Total-3				**55,50,000**
Contingency @ 10%					**5,55,000**
Total Administrative Cost					**61,05,000**

9.6 COST OF NGO INVOLVEMENT

The involvement of NGOs is required to help in implementation of the project, especially when the compensation is distributed among the affected household. The lump sum budget which includes salary of the key professionals, sub-professionals, office staff, field staff, vehicle cost, vehicle running cost, training and workshop expenses, office equipment expenses, rent of the office, stationery, overhead expenses and miscellaneous expenses etc. for one NGO is Rs. 20,00,000/- for the project road.

9.7 TOTAL R&R BUDGET FOR THE PROJECT INCLUDING LAND, STRUCTURES AND ASSISTENCES

The total Structure and Assistance budget for the project works out to be about Rs. 1.48 Crore of which Rs. 76.36 lakhs is towards compensation for Structures and Costs for R&R Assistances is about Rs. 4.00 lakhs including Administrative expenses of Rs. 61.05 lakhs. The relocation cost of Cost of Common Property resources is 6.60 lakhs. The details of the budget are summarizing in Table 9.5 below:

Table 9-5 Summary of Total R&R Budget

Sr. No	Description	Cost (Rs.)
1.	Structure Cost as per Schedule of rates of CPWD/HPPWD with Contingency @ 10%	76,36,888
2.	R&R Assistance as per RPF Entitlement Matrix Inc. Contingency costs	4,00,400
3.	Cost of Common Property resources	6,60,000
4.	Administrative, NGO, Monitoring & other expenses	61,05,000
Total R&R Budget		**1,48,02,288**

10. MONITORING AND EVALUATION

10.1 INTRODUCTION

Monitoring and evaluation are important activities of infrastructure development project particularly, those involving involuntary resettlement. It helps making suitable changes, if required during the course of implementation of ARAP and also to resolve problems faced by the PAPs. Monitoring is periodical checking of planned activities and provides midway inputs, facilitates changes, if necessary and provides feedback to project authority for better management of the project activities. Evaluation on the other hand assesses the resettlement effectiveness, impact and sustainability of R&R activities. In other words, evaluation is an activity aimed at assessing whether the activities have actually achieved their intended goals and purposes. Thus monitoring and evaluation of resettlement action plan implementation are critical in order to measure the project performance and fulfilment of project objectives.

The monitoring and evaluation of ARAP implementation will ensure monitoring of key indicators on inputs, outputs, project processes and evaluation of impact indicators. The overall purpose of the monitoring is to keep track of the implementation processes and progress, achievement of performance targets fixed in the annual work plans, learning lessons and taking corrective actions to deal with emerging constraints and issues. Monitoring and evaluation will constitute the following:

- Implementation progress (physical and financial aspects), monitoring of inputs, and outputs;
- Process documentation (case studies and lessons learnt);
- Impact evaluation based on sample survey and consultations; and
- Thematic studies.

10.2 INSTITUTIONAL ARRANGEMENT FOR M & E

The Resettlement Policy Framework (RPF) stipulates hiring services of an external agency (third party) for monitoring and evaluation of ARAP implementation. This means the project authority through an external agency will carry out monitoring and evaluation from the subsequent month of the mobilization of ARAP IA at project site. Internal monitoring will be carried out by the Social Officer of Project Coordination Unit (PCU) with assistance from R&R officer and ARAP IA whereas external monitoring and evaluation will be carried by the third party engaged for the purpose. This will help monitor project activities closely. Regular monitoring by undertaking site visits and consultations with PAPs will help identify potential difficulties and problems faced in the implementation and accordingly help take timely corrective measures including deviations, if needed.

Components of monitoring will include performance monitoring i.e., physical progress of the work and impact monitoring and external evaluation. Indicative indicators to be monitored related to performance are provided in the following sections. In case during the project implementation, if some other indicators are found relevant they will also be considered for monitoring.

10.3 MONITORING AND EVALUATION (M&E) AT PROJECT AND SUB-PROJECT LEVEL

The Resettlement Action Plan contains indicators and benchmarks for achievement of the objectives under the resettlement programme. These indicators and benchmarks will be of three kinds:

(1) Proposed indicators, indicating project inputs, expenditures, staff deployment, etc.

(2) Output indicators, indicating results in terms of numbers of affected People compensated and resettled, training held, credit disbursed, etc,

(3) Impact indicators, related to the longer-term effect of the project on People's lives.

The benchmarks and indicators will be limited in number, and combine quantitative and qualitative types of data. Some of these indicators may include, percentage of PAPs actually paid compensation before any loss of assets; percentage of PAPs whose incomes after resettlement are better than, or at least same as before resettlement; percentage of assets valued at replacement cost compensation; percentage grievances resolved; and/or percentage of cases to court. The first two types of indicators, related to process and immediate outputs and results, will be monitored to inform project management about progress and results, and to adjust the work programme where necessary if delays or problems arise. The results of this monitoring will be summarized in reports which will be submitted to the World Bank on a regular basis. Provision will be made for participatory monitoring involving the project affected people and beneficiaries of the resettlement programme in assessing results and impacts. The Project Authority will engage services of an external agency (third party), which will undertake independent concurrent evaluations at least twice a year during the project implementation period. At the end of the project an impact evaluation will be carried out as part of the project completion report. Such independent evaluation will focus on assessing whether the overall objectives of the project are being met and will use the defined impact indicators as a basis for evaluation. Specifically, the evaluation will assess: (i) The level of success (including the constraints and barriers) in land acquisition programme, resettlement plan, and income recovery of the PAPs after they have been displaced from the project affected area, and, (ii) the types of complaints/ grievances and the success of the handling of grievance and public complaints towards the construction of project's infra-structures, means of redress for assets and lands and the amount of compensation, resettlement, and other forms of complaints.

Summarizing, M&E would be carried out for regular assessment of both process followed and progress of the ARAP implementation. The internal monitoring will be carried out by the State PCU by the Land Acquisition cum Social Development Officer with assistance from ARAP Implementation Support Agency and a quarterly report will be submitted to MoRTH. Each quarterly report would also be uploaded on the MoRTH website. The external agency (third party) however, would conduct assessment six monthly for each sub-project by undertaking field visits and all other necessary activities including consultations. The six monthly reports would cover detailed information on process and progress of ARAP implementation. The report would highlight issues, if any that need attention of the Project Authority and suggest corrective measures that may be followed for better implementation of ARAP.

10.4 PROCESS & PERFORMANCE MONITORING

Process monitoring would enable the project authority to assess whether the due process are being followed or not, whereas performance monitoring would mainly relate to achievement in measurable terms against the set targets. Monitoring report will also provide necessary guidance and inputs for any changes, if required during the course of the implementation. A list of indicators is given in Table 13.1.

Table 10-1 Performance Monitoring for ARAP Implementation

Sr. No.	Indicators	Target	Status	Achievement (in %)	Remarks
1	Land acquisition (Private)				
	Notification published u/s 3D				
	Award declared u/s ……. for				
	Land area (ha)				
	Land owners (No.)				
	Compensation disbursed by Competent Authority to land owners (No.)				
	Govt. land transfer (ha)				
2	Verification of identified PAPs completed (No.)				
3	New PAPs added, if any (who could not be enumerated at the time of survey)				
4	Consultations held with regard to ARAP (dissemination of information, awareness generation, entitlements, HIV/ AIDS, SCHM, etc.) – No.				
5	Leaflets, containing salient features of ARAP, hand bills, fliers and other awareness materials distributed (No.)				
6	Measurement of structures likely to be affected completed (No.)				
7	Date of formation of DLC				
8	Meetings held by DLC for fixing the replacement cost (No.)				
9	Valuation of affected properties completed (No.)				
10	Micro plan submitted for THs for approval (No.)				
11	Identity cum entitlement card issued to PAPs (No.)				
12	Consultations held with local community regarding relocation or rehabilitation of CPRs (No.)				
13	Estimate submitted for relocation/ rehabilitation of CPRs for approval				
14	Agency to carryout relocation/ rehabilitation of CPRs as agreed by the project authority				
15	R&R assistances disbursed to PAPs (THs – No.				
16	PAPs re-established their shops/ business (No.)				
17	PAPs covered under income generation schemes (No.)				
18	PAPs provided training for alternate livelihood (No.)				
19	CPRs relocated/ rehabilitated (No.)				

20	Grievance/ complaints brought to GRC for Redressal (No.)				
21	GRC meeting held and cases resolved (No.)				
22	Various channels of SCHM used by category (No.)				
23	Consultation meetings held by LA cum SDO of Project Coordination Unit (PCU) (No.)				

10.5 EVALUATION

The external agency engaged by the Project Authority shall carry out the evaluation at two stages viz., mid-term and after the completion of ARAP implementation. The evaluation will be carried out under a set term of reference. The evaluation study would involve both quantitative and qualitative surveys and compare results before and after the implementation of the project. It will focus on assessing whether the overall objectives of the project are being met and will use the defined impact indicators as a basis for evaluation. The evaluation study would undertake the following but not limited to:

- Review monthly progress report submitted by ARAP Implementation Agency (ARAP IA);
- Undertake consultations with PAPs in order to assess their point of view with regard to overall process;
- Intensity and effectiveness of information dissemination with regard to RAP implementation covering eligibility of different categories of PAPs, frequency of interactions by ARAP IA personnel with PAPs, deployment of ARAP IA staff, quality of report maintained by ARAP IA personnel with PAPs, capability of ARAP IA personnel, behavior of ARAP IA staff, availability of ARAP IA staff, level of satisfaction as regards the work of ARAP IA, etc;
- Collect information about distribution of awareness generation materials, entitlements, distribution of identity cum entitlement card, adequacy of dissemination of information, consultations meetings with regard to policy and eligibility for entitlement, alternatives and relocation related issues, measurement and valuation of affected properties, understanding and use of grievance procedure, disbursement of assistance, and other R&R related issues, compliance of resettlement policy, etc;
- Conduct sample survey (25% of PAPs) for making comparative analysis substantiated by qualitative surveys and case studies, etc.

It may be noted that one of the key objectives of the project is improvement or at least restoration of economic status of the PAPs to the pre project level. An illustrative list of indicators is given in Table 13.2, which would be measured against the baseline data collected for the preparation of ARAP. The M&E agency would finally select the indicators for the evaluation of the project depending upon the progress of R&R activities.

Table 10-2 Impact Indicators

Sr. No.	Indicator	Unit	Before Project Implementation	During/after ARAP Implementation
1	Monthly income of family/household			
2	Consumer durables/material Assets owned			
3	Ownership of Transport and farm implements owned			
4	Occupation of head of Household and other members			
5	Type of dwelling units			
6	Number of Earning members/households			
7	Family under debt			
8	Size of loan			
9	Households purchased loans			
10	Households with various sizes of land			
11	Ownership/tenancy of dwelling units (owner, encroacher, squatter)			
12	Access to water and sanitation facilities			
13	Access to modern sources of lighting and cooking			
14	Animal and poultry birds owned			
15	Migration for employment			

10.6 REPORTING

Monthly Progress Reports on the progress of ARAP implementation including mobilization of staff members, opening of site offices, etc. of the project would be prepared by ARAP IA and submitted to the R&R Officer at sub-project level.

Quarterly Monitoring Reports shall be compiled by the LA cum SDO of Project Coordination Unit (PCU) and submitted to MoRTH for review and onward submission to World Bank

Six monthly reports shall be prepared by the M&E agency by undertaking site visits and review of progress report, consultations, etc.

Evaluation Report shall be prepared by the M&E agency at the end of the project implementation as part of the project completion report.

11. GRIEVANCE REDRESSAL MECHANISM

11.1 NEED FOR GRIEVANCE REDRESS MECHANISM

The Resettlement Policy Framework (RPF) mandates formation of Grievance Redressal Mechanism in order to resolve disputes in an effective manner and at the door steps of the PAPs. Compensation and assistance as per eligibility is provided in the entitlement matrix of the approved RPF. The Grievances will be redressed at the PIU level, if not can be referred to the court by the aggrieved. The first contact person at PIU to review and redress the grievance is the RRO. If not resolved, the aggrieved can reach to the Grievance Redress Committee formed at the PIU level. The decision of the GRC will be binding, unless vacated by court of law.

11.2 GRIEVANCE REDRESSAL COMMITTEE (GRC)

The GRC at PIU level will be constituted by the Project Authority with the aim to settle as many disputes as possible on Land Acquisition (LA) and R&R through consultations and negotiation. There will be one GRC for each PIU. The GRC will comprise six members headed by a retired Revenue Officer/Social Welfare Officer not below Group I officer rank. Other members of the GRC will include the concerned Project Director-cum-Executive, a retired PWD Officer (not below the rank of Executive Engineer), RRO, representative of PAPs and Sarpanch (Elected Head of Village) of the concerned village. Grievances of PAPs in writing will be brought to GRC for redressal by the ARAP implementation agency. The ARAP implementation agency will provide all necessary help to PAPs in presenting his/her case before the GRC. The GRC will respond to the grievance within 15 days. The GRC will normally meet once in a month but may meet more frequently, if the situation so demands. A time period of 45 days will be available for redressing the grievance of PAPs. The decision of the GRC will not be binding to PAPs. This means the decision of the GRC does not debar PAPs taking recourse to court of law, if he/she so desires. Broad functions of GRC are as under:

- Record the grievances of PAPs, categorize and prioritize them and provide solution to their grievances related to resettlement and rehabilitation assistance.
- The GRC may undertake site visit, ask for relevant information from Project Authority and other government and non-government agencies, etc. in order to resolve the grievances of PAPs.
- Fix a time frame within the stipulated time period of 45 days for resolving the grievance.
- Inform PAPs through implementation agency about the status
- of their case and their decision to PAPs and Project Authority for compliance.

The GRC will be constituted within 3 months by an executive order from competent authority (centre/ state) from the date of mobilization of ARAP implementation agency. The RRO will persuade the matter with assistance from implementation agency in identifying the suitable persons from the nearby area for the constitution of GRC. Secretarial assistance will be provided by the PIU as and when required. The flow diagram (Figure. xxx) shows the entire process of grievance Redressal.

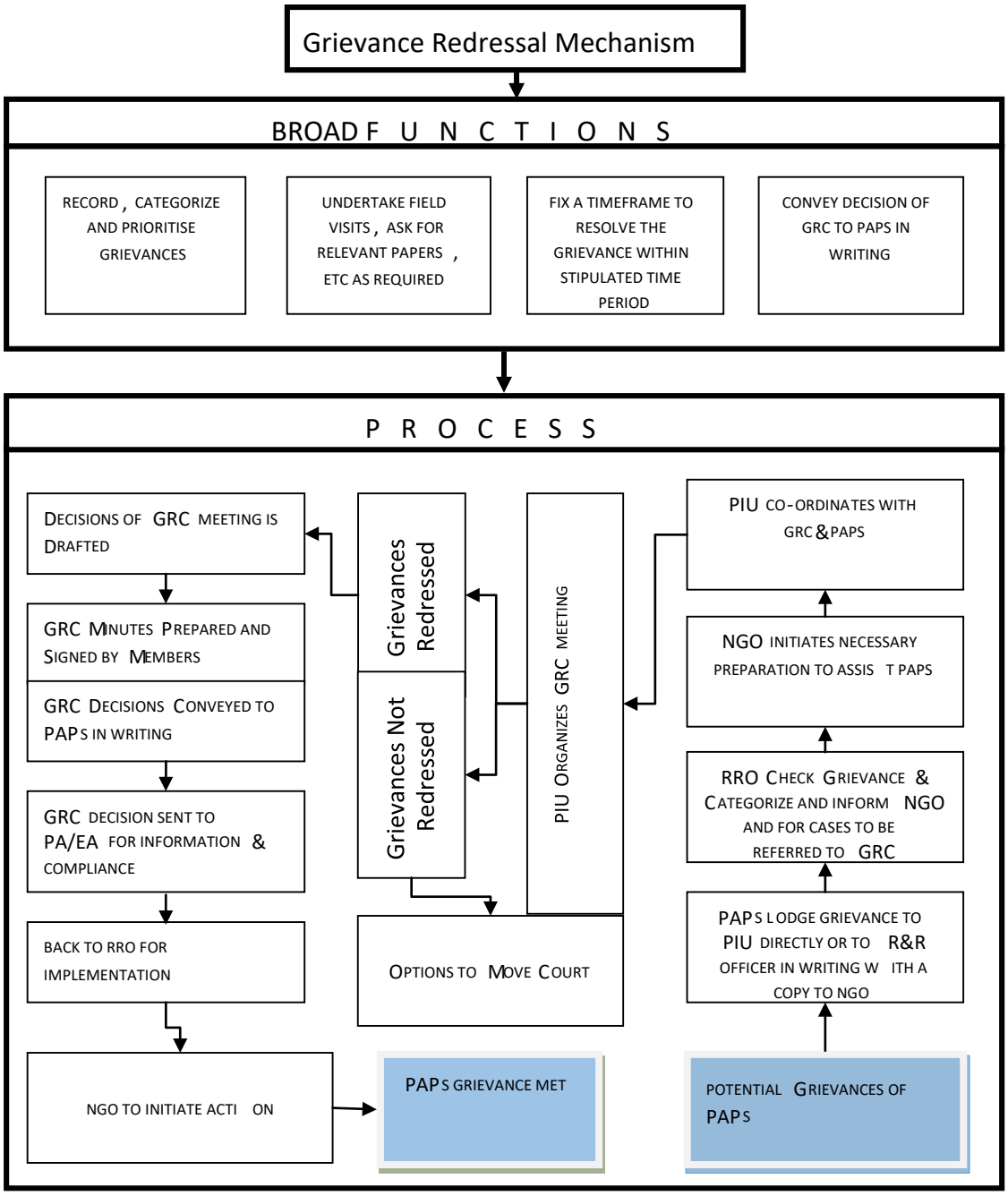


Figure 6 Grievance Redressal Mechanism

PAPs will be fully made aware about the GRM for effective, inexpensive and amicable settlement of claims for compensation and assistance by holding meetings with PAPs, public meetings and distributing leaflets containing salient features and procedures of GRM. The ARAP IA will assist the PAPs in getting their record of rights updated in case of disputes related to land. The RRO with support from ARAP IA will make all possible efforts for amicable settlement. The ARAP IA will document all cases brought to GRC and maintain the records of the proceedings of the grievance redressal committee meetings.

11.3 SUGGESTION AND COMPLAINT HANDLING MECHANISM (SCHM)

The MoRTH recognizes the importance of this and hence intends to establish a SCHM for the GNHCP. The communication channels to report project related complaints/concerns will be disclosed at all levels of institutions—MoRTH, State and Sub-project levels.

Through the Right to Information Act, 2005 an Act of the Parliament of India provides for setting out the practical regime of right to information for citizens. The Act applies to all States and Union Territories of India. Under the provisions of the Act, any citizen may request information from a "public authority" (a body of Government or "instrumentality of State") which is required to reply expeditiously or within thirty days. The Act also requires every public authority to computerize their records for wide dissemination and to pro-actively publish certain categories of information so that the citizens need minimum recourse to request for information formally. In other words under the act, citizens have right to seek information from concerned agencies by following the set procedures. However, it is quite likely that many people may not use the provisions of this Act, only in limited cases covering serious concerns. Being an inter-state project involving several states and large scale of civil works along with R&R and Environment issues, the project is likely to receive many suggestions, complaints, inquiries, etc. through the project implementation period. Therefore, MoRTH has agreed to establish SCHM as a good practice to address public concerns pertaining to various issues. SCHM will report all project related LA and R&R of the PAPs for redressal through the concerned PIU or GRC as appropriate. Several communication channels viz., toll free phone number, dedicated email, mechanism for on line submission of suggestions/complaints/inquiries, provision of suggestion/complaint box (at site and project office), post and other suitable means shall be set up for suggestion and complaint handling.

Public Disclosure Authorized

Public Disclosure Authorized

सत्यमेव जयते

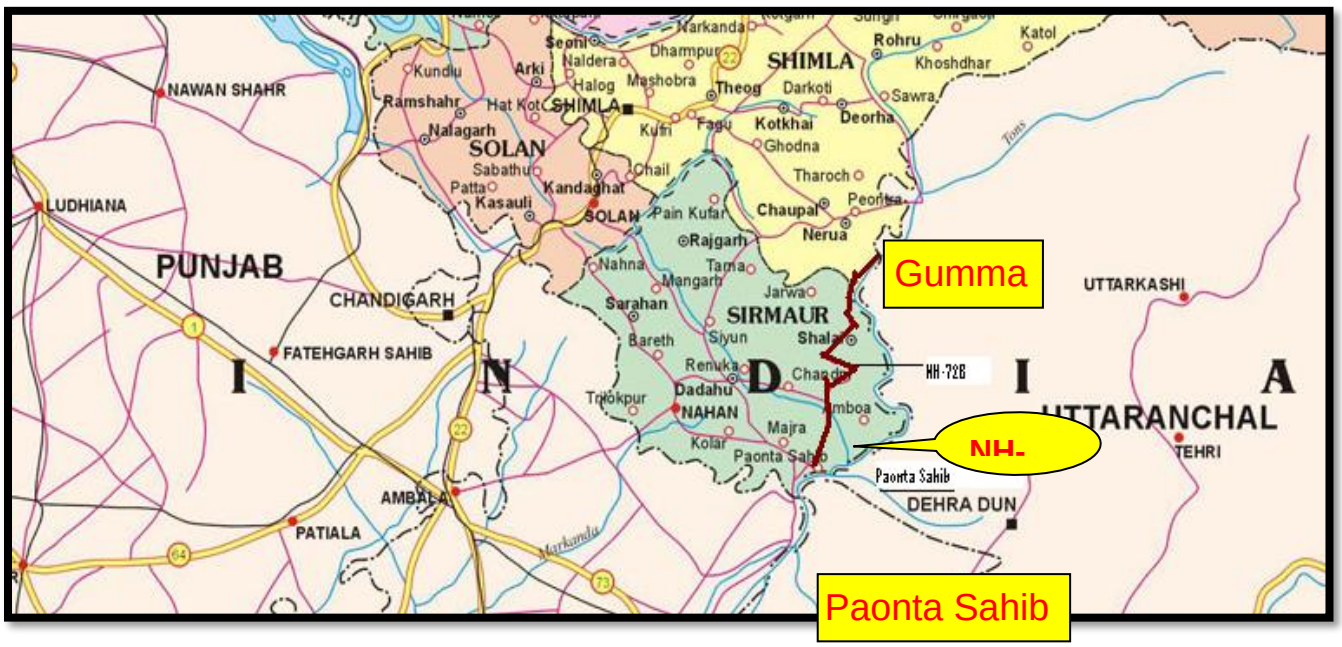
MINISTRY OF ROAD TRANSPORT AND HIGHWAYS

(Government of India)

Consultancy Services for Preparation of Detailed Project Report for Rehabilitation and Upgrading to 2-Lane/2-Lane with Paved Shoulders Configuration and Strengthening from **Km 0+000 (Paonta) to Km 97+000 (Gumma) of NH-707** in the State of Himachal Pradesh (Package No. SP/C/5)

FINAL DETAILED PROJECT REPORT

VOLUME-V : SIA & RAP REPORT



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ABBREVIATIONS

B.P.L.	:	Below Poverty Line
BP	:	Bank Policy
B.S.R.	:	Basic Schedule of Rates
HLARRP	:	Himachal Pradesh Land Acquisition, Resettlement and Rehabilitation Policy
C.O.I	:	Corridor of Impact
C.P.R.	:	Common Property Resources
RRO	:	Rehabilitation and Resettlement Officer
CD	:	Cross Drainage
Ch.	:	Chainage
CW	:	Carriageway
DLC	:	District Level Committee
EP	:	Entitled Person
EA	:	Executing agency
ESMF	:	Environment and Social Management framework
GP	:	Gram Panchayat
GoH	:	Government of Himachal Pradesh
GDP	:	Gross Domestic Product
GRC	:	Grievance Redreassal Committee
Ha	:	Hectare
IEC	:	Information Education Communication
Km.	:	Kilometer
RTFCTLARR	:	Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation

and Resettlement

LHS : Left Hand Side

m. : Meter

Max. : Maximum

Min. : Minimum

MoRT&H : Ministry of Road Transport and Highways

N.G.O. : Non-Government Organization

NRRP : National Resettlement and Rehabilitation Policy, 2007

N.H.A. : National Highways Act

NH : National Highways

NHDP : National Highways Development Project

GNHCP : Green National Highway Corridor Project

OD : Operational Directive

SCHM **:** Suggestion Complain Handling Mechanism

EXECUTIVE SUMMARY

E.1 PROJECT BACKGROUND & INTRODUCTION

The Ministry of Road Transport and Highways with an aim to improve interconnectivity, has under taken development of about 3800 km single or intermediate lane National Highways to 2 lane/2 lane with hard shoulders configuration under National Highways Interconnectivity Project (NHIIP) aided by the World Bank. The total No of Project Roads under this scheme is 33 including Paonta - Gumma Section of NH 72B (New NH-707) in Himachal Pradesh.

The Ministry of Road Transport and Highways (MORTH), as the employer has commissioned the Consultancy Services of Consulting Engineers Group Ltd, Jaipur (CEG), for Preparation of Detailed Project Report for Rehabilitation and Upgrading to 2 Lane/2 Lane with paved shoulder configuration and strengthening of Paonta Sahib-Gumma Section of National Highway No. 72B (New-NH-707) in the State of Himachal Pradesh (Package No. SP/C/5). In pursuance to the above, the consultants commenced the service w.e.f 15th June, 2010. The Final DPR of the project is submitted vide letter no. CEG/PR/DPR/Pao-Gumma/NH-72B/220 dated 11th June, 2014. Accordingly Modified DPR after incorporating all comments was approved vide letter No. PW/CE-NH-WB/NH-72B (Ponta-Gumma km 0/0 to 97/00)- 1121-26 dated 20.12.2017. Further in December, 2018, it was suggested by PWD/RO MORTH to modify DPR as per latest World Bank Guidelines and requirements after World Bank site visits and various meeting at CE (NH), World Bank, and MORTH. To modify DPR as per latest guidelines and to update the project cost as per revised proposal under GNHCP (Green National Highway Corridor Project) scheme additional consultancy services was required to execute in above contract that was recommended to CE(EAP) MORTH by RO MORTH vide letter RO/HP/CONSULTANCY(NH-72B)/2018-19/383 dated 20.03.2019.

The MoRTH intends to rehabilitate and up-grade the existing single lane/intermediate lane between Paonta Sahib to Gumma section of NH–707 to 2-lane/2-lane with paved shoulders configuration. The total length of the project is 97 Km passing through Sirmaur and Shimla districts. The existing highway NH-707 alignment passes through North Eastern part of Himachal Pradesh. The Existing project road predominantly passes through 85.50 km mountainous terrain, 11.5 km in rolling and plain terrain. This SIA report pertains to Paonta Sahib to Gumma Section (Km 0.00 to Km 97.00) of NH-707 in the State of Himachal Pradesh. The location map of the project road is depicted below in figure ES.1.

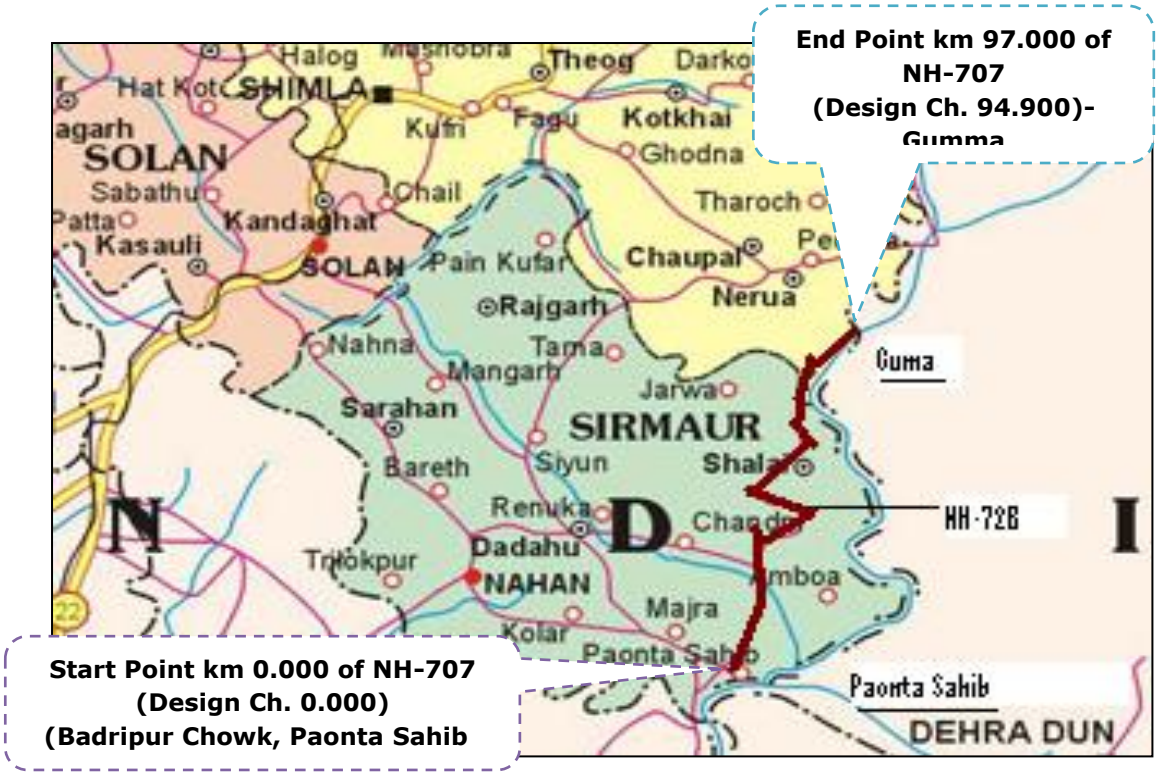


Figure ES.1: Location Map of the Project Road

E.2 PROJECT DESCRIPTION

Additional land area is needed for various purposes namely, widening of project road, junction improvement, Curve improvements etc. Approximately, 11.7423 hectare of additional land area which includes 2.8270 ha of Govt. land and 8.9153 ha private land would be required for the project road from 29 revenue villages. Efforts have been made to minimize the adverse impacts of the project by (i) utilizing available ROW as much as possible, (ii) adopting the principle of Corridor of Impact (CoI) for land requirements in open sections of project stretch instead of having a uniform land width throughout the road stretch (iii) different type of cross sections has been used for different locations to minimize the impact.

Based on traffic scenario and present road condition, the development proposal for the road project has been made as follows.

(i) The initial 1.5 km of road stretch is under built-up area of Paonta Sahib and hence proposed to be widened to four lane configuration.

(ii) Beyond this, the project road is surrounded by industrial area and scattered built up area up to Km 11.500 is proposed to develop as two lane with paved shoulder configuration along with provision of footpath. The project road up to Sataun (Km 18) carries heavy amount of truck load and hence is being proposed to be developed as two lane with paved shoulder configuration.

(iii) Due to less traffic and existing road having single lane /intermediate lane, Proposal made for two lane only up to Ch. 70+000.

(iv) After Ch. 70+000, only intermediate lane proposal was finalized by MORTH and World Bank officials due to less traffic. Hence beyond this point the intermediate lane configuration with geometrics improvement is proposed.

The project include 1 Major bridge, 13 Minor bridges and 347 culverts. Various Engineering (Breast Wall, Gabion Structures, Toe Wall, Retaining Structure with Gabion Facing etc.) and Bio-engineering (Erosion Blanket, Hedge Brush Layer, bamboo plantation etc.) measures for slope protection will be adopted.

Various provisions like Thrie beam crash barriers, parapet wall, road studs, rumble strip, Road Signs and Road Markings is proposed along the project road to improve the safety for the commuters. Facilities as Bus bays are truck lay-by are provided. Solar lights and Water harvesting are also proposed under facilities in the project.

E.3 SOCIO ECONOMIC PROFILE OF THE PROJECT AREA

The Sirmaur District has 5,29,855 and Shimla District has 8,14,010 Population as per 2011 Census of India. Population density per km sq in Himachal Pradesh is 123, while in project districts Shimla and Sirmaur it is 159 and 188 respectively. The sex ration of Sirmaur district is 918 against of Shimla district's 915. Literacy rates in the project districts are good as 84% in Shimla and 79% in Sirmaur district. Shimla district has Human development index of 0.409 and Sirmaur has 0.433 as per Census data 2011.

E.4 R & R PRINCIPLES, POLICY FRAME WORK & ENTITLEMENT MATRIX

A Resettlement Policy Framework has been prepared by the Ministry of Road, Transport & Highways of Government of India for Green National Highways Corridor Project (GNHCP). This RPF includes resettlement and rehabilitation principles and approach which is to be followed in minimizing and mitigating adverse impacts likely to be caused by the project implementation, entitlements as per eligibility criteria and commensurate to the type and nature of impact, institutional arrangements, monitoring and evaluation and grievance redressal mechanism etc.

E.5 STAKEHOLDER'S CONSULTATIONS AND DISCLOSURE

Public information and consultations were held during the social screening, census cum socio-economic survey stages. The different techniques of consultation with stakeholders were used during project preparation, viz., public meetings, group discussions, interactions with affected households, media interactions etc. The consultations have also been carried out with special emphasis on the vulnerable and women groups. It ensured participation of potential project affected persons (PAPs), local community and other stakeholders.

During consultations brief description about the project, road development agency, involvement of the funding agency, likely adverse impacts and positive impacts, employment generation, etc were discussed. Concerns, views and suggestions

expressed by the participants during these consultations have been shared with design team for minimizing the impacts wherever possible. District level Consultations were held at 6 places and Village level Consultations were held at 20 Panchayat covering 23 villages during the project preparation.

Concerns and apprehensions expressed by the community covered compensation amount for land, structure and other assets, impacts on structures, impacts on sources of earning, road accidents, etc. Overall, project affected persons and other stakeholders are in favor of the proposed project. The community perceives that the project will help development in the area and also generate employment opportunities.

E.6 ANALYSIS OF ALTERNATIVES

The project is to widen the existing 2 lane road to 2 lanes with paved shoulder and hence there is no alternative site involved. Keeping in view the site conditions and the scope of development of the area, the 'with' and 'without' project scenarios have been compared under chapter-6 of this report. It was concluded that "With" project scenario positive/beneficial impacts will enhance social and economic development of the region compared to the "Without" project scenario, which will further deteriorate the present Socio-environmental setup and quality of life.

The project will increase the potential of the area and fast connectivity between Himachal Pradesh, Uttarakhand and Haryana. Travel time will be reduced due to improved pavement conditions and road geometry. Trade of local produce like dairy products, agriculture products, and small scale industrial product will also be increased. Development of tourism and pilgrimage, Reduction in accidents, Improved quality of life for people etc. are some other benefits from the project.

E.7 PROJECT IMPACTS

Socio-economic profile of the project affected households has been worked out on the basis of Census & Socio-economic survey conducted for structures and other properties likely to be affected. During Census survey it was found that 290 Nos. structures including 274 private structures and 16 CPRs will be affected in the project. There will be private land acquisition of 8.9153 Ha.

A total of 938 PAPs comprising 521 males (55.54%) and 417 (44.46%) females from 274 households are likely to be affected by the proposed widening and upgrading of the project road. There are 800 females per thousand males. Family types of PAHs have been categorized based on the number of members in the family. 39.42% of the households belong to nuclear families, 36.86% lives in joint families and other families constitute of 23.72% of the total affected household. The average size of the household works out to be 3-4 members. PAHs constitute of 59.9% General caste, 15% OBCs, 11.7% SCs and 13.5% others.

It was found that out of the total affected PAPs who have achieved education upto primary level are 16.2%, Upper primary are 19.7%, high school are 17.5% and graduation are 17%. Only 4.4% of the affected PAPs have completed their post-graduation or are technically qualified. About 6% of the PAPs didn't respond about their educational qualification.

As per the census survey, 290 Nos. structures including 16 CPRs will be affected, out of which 53.10% are commercial structure. About 18.62% Residential and 22.76% resident-cum-commercial structures will be impacted.

Out of 274 private structures, 36.1% structures are owned by titleholders (Owners), 57.7% are Encroachers and 6.2%. are squatters.

Out of total 290 structures, 162 structures (55.86%) are permanent in nature which includes all the 16 CPRs/Govt. impacted structures. About 31.38% of affected structures are temporary and 12.76% are semi-permanent.

Occupational profile indicates that the affected PAPs are mainly engaged in trade and business (38.32%). A small percentage of earning members (22.12%) is either servicemen or are in professional jobs. About 23% persons are engaged in agriculture and agriculture labor work. About 17% persons are working as non-agriculture labor.

As per available information collected during survey, The Income Level of the affected households is mostly (71.5%) above Rs. 60,000 per annum. About 8.4% families earn between 36,000 to 60,000 per annum. About 20% families didn't share information about their income level.

Vulnerable Population has been identified as defined in the Resettlement Policy Framework for the project. They include Persons who are 65 years & above in age, households covered under below poverty line (BPL), WH, SC and PH. A total of 57 households have been identified as vulnerable.

E.8 GENDER ISSUE & WOMENS PARTICIPATION

417 females are getting affected by the project (45% of the total population) out of 938 persons. Only 8 women headed households are affected by the project. They constitute around 2.9% of the total affected population in the project area. Socio-economic parameters like literacy, work force participation rate and general health conditions etc. reveal that social status of women is low respectively, thereby brought forward the scope of considering the households headed by women as vulnerable. Participation of women has been envisaged specifically in the pre-planning and planning stages. These include: inclusion of women members as investigators/facilitators in the NGO/Consultancy firm for RAP implementation; encouragement in evaluate the project outputs with specific gender indicators. All assistance would be paid in a joint

account in the name of both the spouses; involvement in construction activities by provision of preference in labor opportunities, temporary Housing, health centre, day crèches, and wherever feasible, primary educational facilities could be extended.

E.9 REHABILITATION & RESETTLEMENT BUDGET

Based on the Entitlement Matrix, the R&R budget for the Paonta-Gumma Road Project has been estimated. It comprises of two broad components namely compensation and assistance.

The total estimated R&R budget for the project works out to Rs. 73.90 crore of which Rs. 55.34 crore is towards compensation for land, cost of Structures is Rs.10.10 crore, Costs for R&R Assistances is 6.49 crore and Administrative expenses of 1.43 cr.

E.10 INSTITUTIONAL ARRANGEMENT FOR RAP IMPLEMENTATION

Institutional arrangements for the implementation of RAP have been made fixed by making it a part of the RPF. The Institutional Arrangements will be set up at three levels viz., MoRT&H (Central Govt.), State Level and Sub-Project Level on partnership model wherein concerned agencies at different levels supplement and complement each other efforts. The key elements of institutional arrangements are co-operation/ support, collaboration and sharing of responsibilities with clearly defined roles, involvement of key stakeholders and vertical and horizontal linkages amongst different agencies.

E.11 GRIEVANCE REDRESSAL MACHANISM

Any disputes or grievances will be addressed through the grievance redressal mechanism proposed here. The GRCs are expected to resolve the grievances of the eligible persons within a stipulated time. The decision of the GRCs is binding, unless vacated by court of law.

The GRC will be constituted by the Project Authority with the aim to settle as many disputes as possible on LA and R&R through consultations and negotiations. There will be one GRC for each PIU. The GRC will comprise six members headed by a retired Revenue Officer/Social Welfare Officer not below Group I officer rank . Other members of the GRC will include the concerned Project Director-cum-Executive, a retired PWD Officer (not below the rank of Executive Engineer), RRO, representative of PAPs and Sarpanch (Elected Head of Village) of the concerned village.

Grievances of PAPs in writing will be brought to GRC for redressal by the RAP implementation agency. The RAP implementation agency will provide all necessary help to PAPs in presenting his/her case before the GRC. The GRC will respond to the grievance within 15 days. The GRC will normally meet once in a month but may meet more frequently, if the situation so demands. A time period of 45 days will be available for redressing the grievance of PAPs. The decision of the GRC will not be binding to PAPs. The decision of the Grievance Committees will not be binding on the DPs and

they will have the option of taking recourse to court of law, if s/he so desires at his or her own expense.

E.12 MONITORING AND EVALUATION (M&E)

The overall purpose of the monitoring is to keep track of the implementation processes and progress, achievement of performance targets fixed in the annual work plans, learning lessons and taking corrective actions to deal with emerging constraints and issues.

The evaluation study will focus on assessing whether the overall objectives of the project are being met and will use the defined impact indicators as a basis for evaluation. Reports on the progress of RAP and TDP implementation including mobilization of staff members, opening of site offices, etc of the project would be prepared by Implementation agency and submitted to the R&R officer at sub-project level. The Monthly Progress Report shall be prepared by the Implementation agency. Quarterly Progress Reports shall be prepared by LA cum SDO, and six monthly progress reports shall be prepared by M&E agency. Evaluation Report shall be prepared by the M&E agency at the end of the project implementation as part of the project completion report.

The Resettlement Policy Framework (RPF) stipulates hiring services of an external agency (third party) for monitoring and evaluation of RAP implementation. This means the project authority through an external agency will carry out monitoring and evaluation from the subsequent month of the mobilization of RAP IA at project site. Internal monitoring will be carried out by the Social Officer of Project Coordination Unit (PCU) with assistance from R&R officer and RAP IA whereas external monitoring and evaluation will be carried by the third party engaged for the purpose. This will help monitor project activities closely. Regular monitoring by undertaking site visits and consultations with PAPs will help identify potential difficulties and problems faced in the implementation and accordingly help take timely corrective measures including deviations, if needed.

Components of monitoring will include performance monitoring i.e., physical progress of the work and impact monitoring and external evaluation. Indicative indicators to be monitored related to performance are provided in the following sections. In case during the project implementation, if some other indicators are found relevant they will also be considered for monitoring.

CHAPTER 1: PROJECT BACKGROUND AND INTRODUCTION

1.1 Project Background

The Road wing of MORTH has taken up massive development work of existing National Highways in the country. Up gradation, improvement, widening and strengthening of main and important arteries of National Highway network is taken up under 'National Highway Development Programme' (NHDP). About 19,702 km single lane or intermediate lane National Highways (non-NHDP roads) exist in the country. Also, substantial length of such National Highways has already been taken up for improvement in one scheme or the other, but 5,937 km stretches are not covered for improvement under any scheme. The Ministry of Road Transport and Highways with an aim to improve interconnectivity has under taken development of about 3800 km single or intermediate lane National Highways to 2 lane/2 lane with hard shoulders configuration under National Highways Interconnectivity Project (NHIIP) aided by the World Bank. The total No of Project Roads under this scheme is 33 including Paonta - Gumma Section of NH 72B (New NH-707) in Himachal Pradesh.

The Ministry of Road Transport and Highways (MORTH), as the employer has commissioned the Consultancy Services of Consulting Engineers Group Ltd, Jaipur (CEG), for Preparation of Detailed Project Report for Rehabilitation and Upgrading to 2 Lane/2 Lane with paved shoulder configuration and strengthening of Paonta Sahib-Gumma Section of National Highway No. 72B (New-NH-707) in the State of Himachal Pradesh (Package No. SP/C/5). In pursuance to the above, the consultants commenced the service w.e.f 15th June, 2010. The Final DPR of the project is submitted vide letter no. CEG/PR/DPR/Pao-Gumma/NH-72B/220 dated 11th June, 2014. Accordingly Modified DPR after incorporating all comments was approved vide letter No. PW/CE-NH-WB/NH-72B (Ponta-Gumma km 0/0 to 97/00)- 1121-26 dated 20.12.2017. Further in December, 2018, it was suggested by PWD/RO MORTH to modify DPR as per latest World Bank Guidelines and requirements after World Bank site visits and various meeting at CE (NH), World Bank, and MORTH. To modify DPR as per latest guidelines and to update the project cost as per revised proposal under GNHCP (Green National Highway Corridor Project) scheme additional consultancy services was asked to execute in above contract that was recommended to CE(EAP) MORTH by RO MORTH vide letter RO/HP/CONSULTANCY(NH-72B)/2018-19/383 dated 20.03.2019. This DPR incorporates all the comments/suggestions for latest Modification.

The MoRTH intends to rehabilitate and up-grade the existing single lane/intermediate lane between Paonta Sahib to Gumma section of NH–707 to 2-lane/2-lane with paved shoulders configuration. The total length of the project is 97 Km passing through

Sirmaur and Shimla districts. The existing highway NH-707 alignment passes through North Eastern part of Himachal Pradesh. The Existing project road predominantly passes through 85.50 km mountainous terrain, 11.5 km in rolling and plain terrain. This SIA report pertains to Paonta Sahib to Gumma Section (Km 0.00 to Km 97.00) of NH-707 in the State of Himachal Pradesh.

1.2 Project Road Description

The Project Road, section of NH-707 (Old NH-72 B), starts at Badripur Chowk near Paonta Sahib at km 0 of NH-707 and ends near near Gumma at km 97 of NH-707. The total length of project road as per existing chainage is 97 km and passes entirely through Himachal Pradesh. Total length as per design comes out to be 94.900 km. The latitude and longitude of project road are as follows:

(a) Start Point (Paonta Sahib) - 30º26’ 40.18” Nlongitude, 77º36’23.026” E latitude

(b) End Point (Gumma) - 30 º 48’ 15.113” E longitude, 77 º 43’ 43.566” N latitude

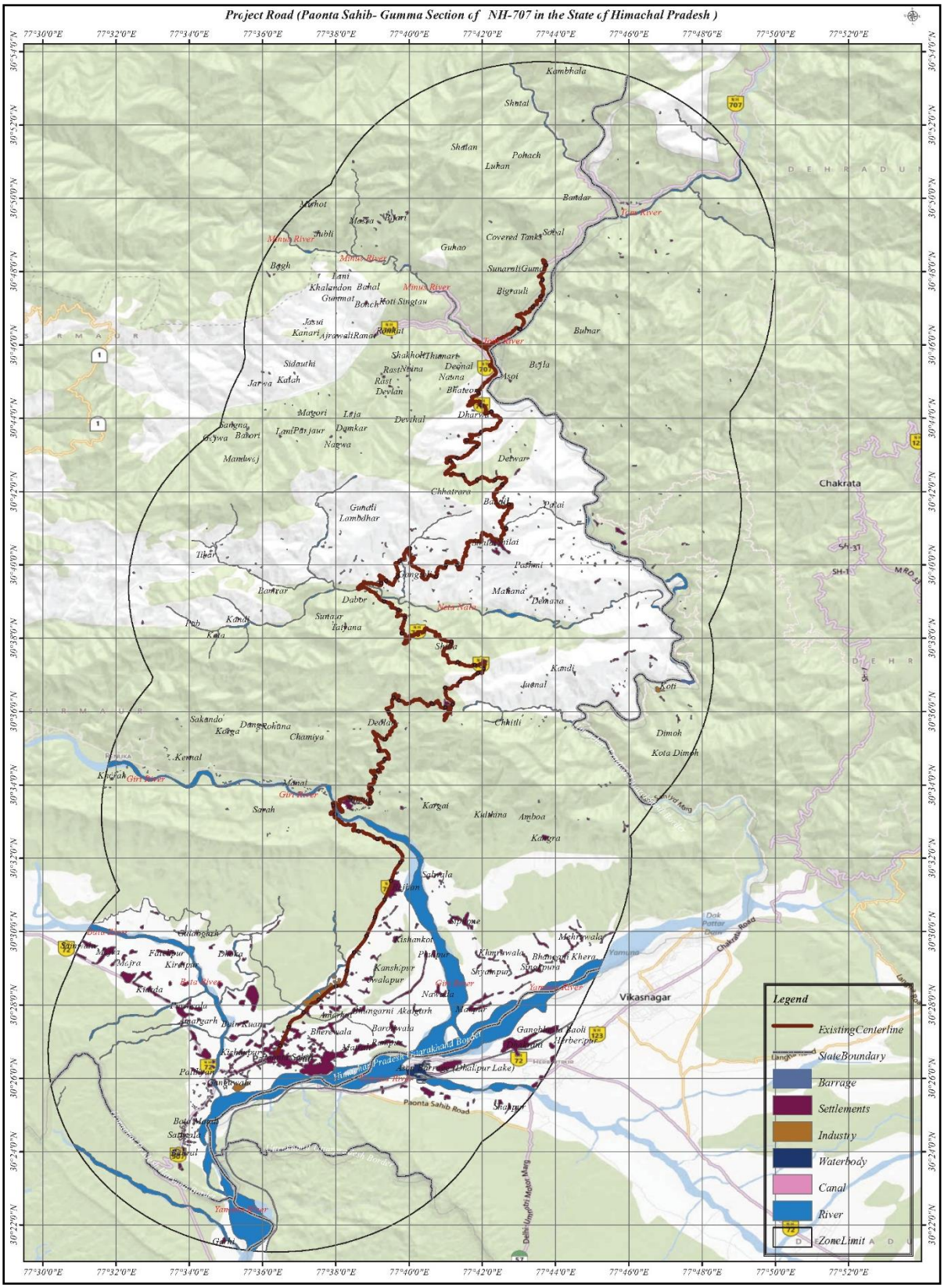
The Project Highway transverses through two districts viz Sirmaur and Shimla about 89 (km) of the highway is in Sirmaur district and rest about 8 (km) is passing through Shimla district. After detailed discussion with MoRTH, the project road is proposed to be developed under four number of packages as shown in table below:

Table 0.1: Project Road

Package No.	Place		Existing Chainage		Design Chainage		Length
	From	To	From	To	From	To	(km)
I	Paonta Sahib	Hewna	0.000	25.345	0.000	25.000	25.000
II	Hewna	Ashyari	25.345	50.700	25.000	50.000	25.000
III	Ashyari	Shri Kyari	50.700	76.010	50.000	75.000	25.000
IV	Shri Kyari	Gumma	76.010	95.922	75.000	94.900	19.900
Total Length							**94.900**

Source: *CEG survey*

Only first 11.500 Km of the road falls in plain / rolling terrain and rest about 85.500 km are in Mountainous /steep Terrain. From Km 11.500 to 18.500 the hills are low rise with mild slopes, consists of earthen boulder or soft rocks. From Km 18.500 onward the Terrain is Mountainous / steep as road traverses in interior and on high altitude. A Geographical map of route plan of Project Highway is shown in **Figure 0.1.**


Project Road (Paonta Sahib- Gumma Section of NH-707 in the State of Himachal Pradesh)
Legend
Existing Centerline
State Boundary
Barrage
Settlements
Industry
Waterbody
Canal
River
Zone Limit
Chakrata
Vikasnagar
Paonta Sahib
Kambhala
Shntal
Shellan
Pohach
Luhan
Bandar
Tons River
Covered Tanks
Sobal
Guhao
Bagh
Minus River
Sunarali Gumma
Bigrauli
Khalandon
Bohal
Gunmat
Boneh
Koti Singtau
Jasui
Kanari
Ajrowali Rana
Ronkhat
Buhar
Shakhol
Thamark
Rast Nagina
Rast
Devlan
Deonal
Natina
Bhateon
Bijla
Jogi
Dharkot
Sidauthi
Jarwa
Kalah
Margori
Lilja
Devthal
Lanipar jaur
Damkar
Nagwa
Bahori
Mamlwaj
Dehwar
Chhatrara
Bandli
Pokai
Gundli
Lambdhar
Tihar
Pashmi
Mahana
Dehana
Dabor
Sunaur
Talyana
Kandi
Kota
Shilla
Jaunal
Koti
Sakando
Korga
Dangri
Rohana
Chamiya
Deolo
Chhitli
Dimoh
Kota Dimoh
Kemal
Khigrak
Giri River
Sarah
Kargai
Kulhana
Amboa
Kangra
Sahjala
Kishankot
Pachhar
Khumrawala
Bhangani Khera
Mehrawala
Shyampur
Singhpura
Kanshipur
Kwalapur
Nawada
Giri River
Yamuna River
Yamuna
Dak Pattar Dam
Chakrata Road
Kishanpur
Bhangarni
Akalgarh
Bhersiwala
Barchiwala
Ganghal
Kalaul
Herberpur
Uttarakhand Border
Himachal Pradesh
Paonta Sahib Road
Shahpur
Delhi Shimla Nagar Marg
Yamuna River
Ghaggar
Sahnala
Bata River
Ghaggarkhk
Dhaka
Kirtanpur
Fatehpur
Majra
Kishanpur
Pathrala
Jhanjharwala
Jhanjharwala
Sangrowala
Bata River
Kishanpur
Bata River

1.3 Importance and need for Project

The project road is a vital life line for the people living in interiors of Sirmour and Shimla District. Around 30 villages having about 2.7 lacs population will be directly benefited from this project road besides many other small habitats living in close vicinity of this road.It is the only single road connecting the area for commutation of people. At present, there are no major medical facilities and marketing area in the villages along the road and people are fully dependent on this road to access these facilities in the nearby town like Paunta, Sataun, Kafota, Shillai, Gumma for their day to day needs.

People of area grow cash crops mainly like Ginger, Potato, Cauliflower, Peas, capsicum, Tomato etc. Rajmah, Kulth, Maize & Urd Dals. Wall nuts are also grown in abundance in this area. All these produces are transported for marketing at New Delhi & Faridabad through this route only. In peak season, approximately 500 truck loads are daily transported to these markets from this area. The apple crop from Rohru, Jubbal and Chopal is also carried out only through this shortest road for marketing to New Delhi via Yamuna Nagar. Around 200 truckloads of apple ply through this road daily in productive season which may increase by another 200% as many other transporters using another route via Solan Parwanu will also shift to this route after its improvement. This route is the shortest route for New Delhi via Yamuna Nagar.

The area is rich in mines of lime stones between (Sataun) Km 18/0 to (Bohrad) Km 48/0 from where lime stone is quarried and stacked at stack yard in Sataun on Km 20/0 through small tippers from approved mines daily. From Sataun onwards, this lime stone is transported to various industrial units all over India after gradations as per requirements of industries. On a daily average, more than 180 truckloads carry this lime stone through Paonta Sahib and this project road is going to benefit these transporters directly by all means which will save their transportation time and running cost as well.

The project road will further improve the connectivity for tourists visiting various famous destinations like much famous Chanshal Valley Himalayan Raid de, pilgrimage places like Churdhar, Maa Hateshwari Temple, famous Mahasu Temple at Hanol and leading to much famous Chardham yatra.

Since the road further leads to Indo Tibetain border, its importance from defense point of view also makes it more important. Dehradun where Indian Military Acadamy (IMA) is located is just 45 Km away from its project road Starting point and Defence Research and Development Organisation has its heavy base on RD 12/0 (Rajban) along this project road.

There are 71 industries operating at present in industrial area along this road and around 17 more are in pipelines which are going to be operational in near future. The project road will be a major life line for these industries from where currently almost 200 trucks

per day transport the raw material and manufactured produce to various destinations and the number is likely to be increased with setting up of new industries. A major cement plant has also been proposed at Gumma which will further generate more traffic through this route. The portion from Gumma km 97/0 to km 106/0 Feddus has been proposed under NH-(O) for further improvements which will further enhance the utility of this project road by feeding traffic to then on to Yamunotri, Gangotri etc. in Uttrakhand and Chopal area which is most backward area of district Shimla at present. Also, people working in Industrial area along the road, commute daily using this road.

Hence it can be said that this project road is utmost required and will directly benefitthe industries and the local people.

The map showing connectivity to different important Location and roads is shown in ***Annexure-1A & Annexure-1B***.

1.4 Scope of Impact

The existing ROW, as per details obtained from State PWD, varies from 8 mtrs to 32.5 mtrs. Details of existing ROW is attached as **Annexure 2**. The proposed ROW for widening and improvement works is maximum 18 mtrs. At most of the locations, the existing ROW is sufficient and only at few locations, majorly requiring curve improvements, acquisition of private land will be required. To minimize the impact on private land, the design has such been finalized that few densely settlement areas the width of carriageway has been accommodated within the existing ROW. Also, different type of cross sections has been used for different locations to minimize the impact. The typical cross section schedule and its detail is given in **Annexure 3**. Thus, proposed width of carriageway is different in many sections of the project road. As per the final design, 8.91 Ha of private land will be acquired and about 290 structures will be impacted due to the project.

The major towns along the project road are Paonta Sahib, Sataun, Kamrau, Kafota and Shillai. Apart from this, there are few small towns also along the project road. List of settlements and habitation along the project road is given in below table:

Table 0.2: List of Settlements and Habitation along the Project Road

Villages	Design Chainage	
	From	To
Paonta Sahib	0.000	0.630
Taruwala	0.630	2.320
Gondpur	2.420	3.520
Nihalgarh	3.620	5.650
Jawalapur	5.650	5.950
Nariwala	5.950	6.450
Kishan Kot	6.450	7.250
Baliwala	8.450	9.250

Villages	Design Chainage	
	From	To
Rajban	9.450	11.050
Rajban Chodiwala	11.380	11.640
Sirmour	13.120	13.220
Sataun	17.800	18.900
Barwas	28.400	29.400
Kamrau	30.300	32.600
Kamrau	32.800	33.100
Tillordhar	35.300	35.500
Dugana	37.900	38.200
Kafota	39.100	40.100
Shilla	42.000	42.200
Borar	44.900	45.150
Chadeu	47.520	48.800
Ashyari	49.920	50.020
TImbi	50.800	51.020
Gangtoli	54.150	55.880
Uttri	58.300	58.400
Shillai	60.100	60.350
Tikkar	60.700	60.800
Dhakali	63.500	63.900
Shillai	64.320	65.300
Bandli	67.700	67.800
Kandobhathol	70.070	70.170
Shri Kiyari	73.220	73.750
Dravil	78.300	78.450
Brasal	79.250	79.350
Dharwa	82.060	82.160
Jhakando	83.640	83.760
Meenus	87.000	87.100
Rohana	90.430	91.050
Gumma	93.910	94.950

1.5 Objective of SIA and RAP

The objective of the project is to augment capacity for safe and efficient movement of traffic in the project corridor, better connectivity among the settlement area, reducing the travel time and help the population to have easy accessibility of various basic facilities like health facilities, education facilities etc. The implementation of the sub-

project is likely to have positive as well as adverse impacts on the local people and community. To identify these impacts, a, Social Impact Assessment (SIA) study has been conducted. During the SIA, the profiling of the project area has been done for better planning and implementation of the project. Based on the findings of SIA, a Resettlement Action Plan (RAP) has been prepared to deal with the likely impacts due to project implementation. The Resettlement Action plan aims to mitigate the adverse impacts of the project.

Thus, the objective of SIA study and preparation of RAP is:

- to identify the project activities and assessment of potential impacts associated with these activities;
- to conduct stakeholders' consultation and make more informed decision making by involving public since the beginning of project;
- to assess the extent of asset loss and undertake the census of the project affected people
- to outline the entitlements for the affected persons for payment of compensation and assistance for establishing their livelihoods
- to propose suggest mitigation measures taking into consideration the suggestions of the community;

1.6 Approach and Methodology

This report is largely based on primary data collected during field survey and is well supported by a review of available secondary data for preparation of baseline information. A Census of the affected households was conducted in Sep.-Oct, 2019. Project specific Census Survey and Socio-Economic Questionnaires (attached as **Annexure- 4**) were administered to assess the potential adverse social impacts with the objectives to manage the social aspect of the subproject.

- **Census and Socio-economic Survey:** The census and the socio-economic survey were required in order to generate necessary data/input for preparing the Rehabilitation Action Plan. All the structures within the CoI were counted . The census and socio-economic survey were carried out jointly and covered all the affected households which included non-titleholders and squatters also. The Corridor of Impact (CoI) is the width considered for upgradation of the road and curve improvements. A Chainage-wise table of proposed RoW and CoI is given in **Annexure-5**.

  During the census survey, the location, size and shape, type of construction of the structures were recorded. Information about the affected household/ family, their occupation, literacy level, income and other socio-economic information was also

collected to determine whether the households were to be categorized as vulnerable (for special considerations under the entitlement framework of the project). The existing ROW details were obtained from Public Works Department (PWD) and Revenue maps were collected from Revenue Department to ascertain the ownership status of the land and the structures falling within the CoI during the census survey. Assets such as boundary wall, public property and institutions were also recorded. With the completion of final designs for the project, only those within the CoI had been considered eligible for entitlement under the project.

- **Stakeholder's Consultation:** Public consultations, FGDs with stakeholder at village levels were also conducted during the SIA study and RAP preparation. Community consultations were held along major settlements near to the proposed alignment and with those who are likely to be affected due to project implementation. Meetings were conducted with affected titleholders, cultivators, shopkeepers, squatters, kiosks etc. at important junctions along the project stretch. Focus Group Discussions were also organized, in separate sessions, with groups like, youth / elders, shopkeepers / operators, women & especially vulnerable people who were available during survey. Government line agencies, implementing agencies were also consulted during this study.
- **Key informant interviews** were conducted with local leaders / village Panchayat functionaries, members & Senior citizen of the area to gain an insider's views regarding specific highway related issues in the area. In some cases, interviews were undertaken at places convenient to the key persons, even beyond project impact zone.
- **Gender Analysis** has been given proper emphasis during public consultation discussions. Separate discussion sessions were held with women who could share their experience related to highway for the purpose that are specific for the women. Their collective perception about project impacts and probable benefits particularly for the women has been taken.
- **Review of Secondary Information-** Relevant baseline data on socio-economic were collected from available secondary sources, like census of India 2011, District Handbooks and respective government portals and website. Published works, research reports, National Human Development reports, State women development cell reports and periodic reviews has been referred to get an overview of some important topics like general gender, health, trafficking issues.
- **Structure of the Report**

  The SIA study and preparation of RAP requirement is to assess and analyse the impacts on the properties, people and key stakeholders and prepare a mitigation plan to minimize, mitigate and compensate the affected people for their losses. It

thus requires identification of broad categories of affected properties and project-affected people (PAPs) including assessment of beneficial and adverse social impacts. To meet the above requirements, this report has been organized in following Chapters:

Chapter 1: Background and Introduction

Chapter 2: Project Description

Chapter 3: Socio-Economic Profile of the Project Area

Chapter 4: R&R Principals, Policy Framework & Entitlement Matrix

Chapter 5: Stakeholder's Consultation and Disclosure

Chapter 6: Analysis of Alternatives and Minimization of Impacts

Chapter 7: Project Impacts

Chapter 8: Gender Issue & Women Participation

Chapter 9: R&R Budget

Chapter 10: Institutional Framework for RAP Implementation

Chapter 11: Grievance Redressal Mechanism

Chapter 12: Monitoring and Evaluation

CHAPTER 2: PROJECT DESCRITION

2.1 Introduction

The present project road NH-707 under consideration for Rehabilitation and Upgrading to 2 lane / 2 lane with paved shoulders configuration and strengthening from km 0.00 (Poanta Sahib) to km 97.00 (Gumma) Section of NH 707 package no SO (C/5). Aims to:

- Improve and strengthen the existing quality of the pavement to take heavy loads so that pavement failure, maintenance etc. are minimized.
- Improve the horizontal and vertical alignment of the existing road.
- Improve the existing speed of traffic flow by removing all bottlenecks at various important points.
- Increase the carrying capacity of the existing traffic volume and enable it to cater to the future traffic.
- Improve accessibility of the existing road network.
- Provide highway amenities like Truck Lay-bye, bus bay, traffic and medical aid center, parking space etc.
- Improve the numerous intersections on entire stretch of the NH-707 within the section.

2.2 Project Description

The Project Road section of NH-707 (Old NH-72 B), starts at Badripur Chowk near Paonta Sahib at km 0 of NH-707 and ends near Gumma at km 97 of NH-707.

The total length of project road as per existing chainage is 97 km and passes through Sirmaur and Shimla districts in Himachal Pradesh. Total length as per design comes out to be 94.900 km.

The location map of the project road is given in **Figure 0.1** below:

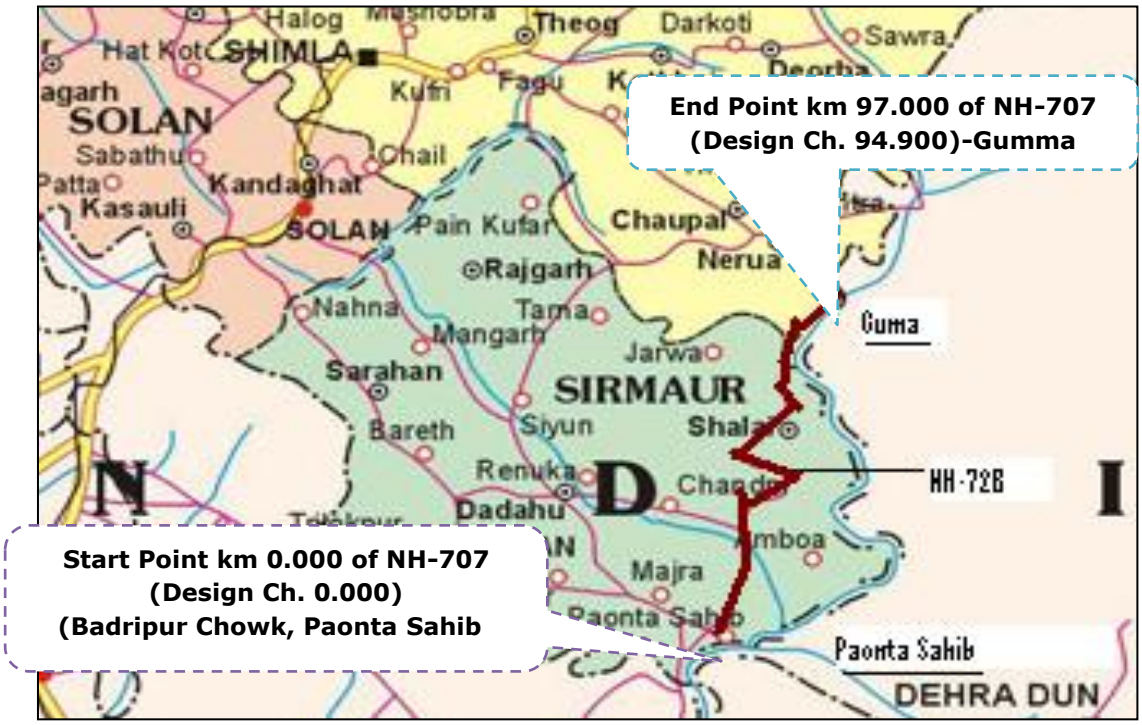


Figure 0.1: Location map of the project road

2.3 Existing Road and Structures

The road traverses through plain, rolling and mountainous terrain having mostly carriageway configuration as 2 lane and single lane road. The major towns along the project road are Paonta Sahib, Sataun, Kamrau, Kafota and Shillai. Apart from this, there are few small towns also along the project road. List of settlements and habitation along the project road is given in table no. 1.2 of chapter 1.

The inventory of road includes kilometer wise information regarding type of terrain, adjacent land use pattern, location of habitations along the road, carriageway and shoulders width and surface type, height of embankment/cutting, road side drains and type, horizontal and vertical curves with their approximate length, details of road side furniture, right of way, general drainage conditions etc. The summary of road inventory is shown in Table 0.1**.**

Table 0.1: Summary of Road Inventory

S. No.	Particulars	Details
1	Project stretch	Km 0.000 to Km 97.000 of NH-707
2	Length (km)	97 Km
3	District	Sirmaur- 89.500 km Shimla- 7.500 km

S. No.	Particulars	Details
4	Type of Terrain	Plain Terrain- 1.500 km Rolling Terrain-10.000 km Steep Terrain- 85.500 km
5	Land Use	km 0 to km 11.500- Built-up Areas with commercial establishments km 11.500 to km 97.000- Mostly Barren Hilly land with patches of forest and Habitations
6	Right of way (m)	8.0 m to 32.50 m
7	Height of Embankment (m)	Varies from 1.0 m to 1.50 m
8	Road Configuration	Km 0 to Km 11.500- Intermediate/Two Lane Km 11.500 to Km 97.000- Single/Intermediate Lane
9	Type of Pavement	Flexible
10	Carriageway Width (m)	Km 0 to km 11.500- BT- 5.5 m to 7 m Km 11.500 to km 97.000- BT- 3.5 m to 5.5 m
11	Type of Shoulder and width (m)	Earthen Shoulder (varies from 1.0 m to 1.5m on both sides)
12	Junctions	Major Junction - 05 Nos. Minor Junction - 71 Nos.
13	Cross Drainage Structure	Major Bridge- 01 No. Minor Bridges- 13 Nos. Culverts- 320 Nos.
14	Bus Bay	07 Nos.
15	Hill Slopes	Ranges from 50^{o} to 85^{o}
16	No. of Built up Areas	38 Nos.
17	Road Safety Features	W-beam and Concrete crash barriers
18	Slope Protection Works	Masonry Wall and Gabion Wall
19	Utilities	(i) BSNL Main Optical Fiber Cables (OFC)- km 0 to km 10 (Both Side), km 10 to km 97 (Hill Side)

S. No.	Particulars	Details
		(ii) Local network OFC- valley side in Sataun (3 km), Kamrau (2 km), in Kafota (2.6 km), Timbi (1 km), Shillai (2.4 km) (iii) Water supply mains-km 0 to km 11. (iv) Sewer line km 0 to km 2.000. (v) Electric lines- km 0 to km 10 (Both Side), km 10 to km 97 (Hill Side)
20	Major Landslide Zones	km 15.500 to km 17.300 km 59.500 to km 64.100

2.4 Corridor of Impact (COI)

The existing ROW, as per details obtained from State PWD, varies from 8 mtrs to 32.5 mtrs. Details of existing ROW is attached as Annexure 2. The proposed ROW for widening and improvement works is maximum 18 mtrs. At most of the locations, the existing ROW is sufficient and only at few locations, majorly requiring curve improvements, acquisition of private land will be required. To minimize the impact on private land, the design has such been finalized that at few densely settlement areas the width of carriageway has been accommodated within the existing ROW. Also different type of cross sections has been used for different locations to minimize the impact. The typical cross section schedule and its detail is given in Annexure 3. Thus, proposed Width of carriageway is different in many sections of the project road. In context of present project improvement of NH-707 as 2-lane/2 lane with paved shoulders configuration, the Corridor of Impact was the most important parameter in determining the number of PAPs. The requirement of the project demands that the entire corridor of impact should be free from any encroachment, human habitation and structure causing hindrances to traffic. The details of proposed right of way and corridor of impact is shown in Annexure-5.

In context of Corridor of impact of project road and the encroachments in the ROW, total 290 Nos. the structures comprising of Temporary Hutments / Katcha, Semi Pucca and Pucca falling within the Corridor of Impact are likely to be partially or fully affected. These project-affected households are mainly encroachers and squatters.

Large number of kiosks is also located along the highway. They are in the form of Gumti, Tea stalls hutments, Booth, Fruit Stalls, Vegetable stalls, Small Carts.

2.5 Design Considerations

2.5.1 Proposed Design Standards for Highway

Due importance and care has been given to environmental and social issues while road designing. The coordination between environmental, social and design team helped in minimizing the negative impact due to project. In view of its proposed development, Eccentric widening option has been proposed as most of the project section as most of the project road terrain is hilly in one side and to minimize the negative environmental Impact for one side only.

The improvement proposals will include widening, curve improvement, design and strengthening of pavement with all ancillaries such as the improvements of geometries; widening and reconstruction of culverts and bridges; providing drainage; junction improvements; providing road marking; signs and other safety devices; to enable all road users (motor vehicles, animal drawn vehicles, cyclists, pedestrians and animals) to use the facility without degrading the environment.

Based on traffic scenario and present road condition, the development proposal for the road project has been made as follows.

(i) The initial 1.5 km of road stretch is under built-up area of Paonta Sahib and hence proposed to be widened to four lane configuration.

(ii) Beyond this, the project road is surrounded by industrial area and scattered built up area up to Km 11.500 is proposed to develop as two lane with paved shoulder configuration along with provision of footpath. The project road up to Sataun (Km 18) carries heavy amount of truck load and hence is being proposed to be developed as two lane with paved shoulder configuration.

(iii) Due to less traffic and existing road having single lane /intermediate lane, Proposal made for two lane only up to Ch. 70+000.

(iv) After Ch. 70+000, only intermediate lane proposal was finalized by MORTH and World Bank officials due to less traffic. Hence beyond this point the intermediate lane configuration with geometrics improvement is proposed.

For above improvements the major consideration has been adopted for minimum land acquisition. Maximum improvements have been done within existing ROW. Land acquisition has been proposed for very deficient curve improvement only and for dumping areas (for dumping of cut material) which are to be developed for project facilities.

For Implementation purpose whole project road divided into four packages as per client requirement. The details of packages proposed and finalized are as below.

The package wise length of proposed project road is given in **Table 0.2** below.

Table 0.2: Package-wise Length of Project Road

Package No.	Place		Existing Chainage		Design Chainage		Length
	From	To	From	To	From	To	(km)
I	Paonta Sahib	Hewna	0.000	25.345	0.000	25.000	25.000
II	Hewna	Ashyari	25.345	50.700	25.000	50.000	25.000
III	Ashyari	Shri Kyari	50.700	76.010	50.000	75.000	25.000
IV	Shri Kyari	Gumma	76.010	95.922	75.000	94.900	19.900
Total Length							**94.900**

The typical cross section schedule for the project road is shown **Table 0.3** and the drawing of the same is attached in **Annexure-3**. The details of proposed right of way and corridor of impact is shown in **Annexure-5.**

Table 0.3: Typical Cross Section Schedule

S. No.	Existing Km of NH-707 as Per Site		Proposed Chainage		Length (km)	Type of Cross - Section
	From	To	From	To		
PACKAGE-I						
1	0+000	1+495	0.000	1.500	1.500	Type-1
2	1+495	4+490	1.500	4.500	3.000	Type-2
3	4+490	11+560	4.500	11.500	7.000	Type-2A
3	11+560	15+310	11.500	15.160	3.660	Type-3A
4	15+310	17+105	15.160	16.950	1.790	Type-5A
5	17+105	17+960	16.950	17.800	0.850	Type-3A
6	17+960	19+072	17.800	18.900	1.100	Type-4
7	19+072	25+345	18.900	25.000	6.100	Type-3B
Total Length (Km)					**25.000**	
PACKAGE-II						
1	25+345	32+275	25.000	31.880	6.880	Type-3B
2	32+275	32+945	31.880	32.550	0.670	Type-4
3	32+945	35+000	32.550	34.500	1.950	Type-3B
4	35+000	35+867	34.500	35.360	0.860	Type-3C
5	35+867	39+635	35.360	39.100	3.740	Type-3B

S. No.	Existing Km of NH-707 as Per Site		Proposed Chainage		Length (km)	Type of Cross - Section
	From	To	From	To		
6	39+635	40+390	39.100	39.820	0.720	Type-4
7	40+390	45+777	39.820	45.000	5.180	Type-3B
8	45+777	50+700	45.000	50.000	5.000	Type-3B
Total Length (Km)					**25.000**	
PACKAGE-III						
1	50+700	51+450	50.000	50.750	0.750	Type-3B
2	51+450	51+670	50.750	50.970	0.220	Type-4
3	51+670	58+345	50.970	57.520	6.550	Type-3B
4	58+345	62+480	57.520	61.580	4.060	Type-5B
5	62+480	65+065	61.580	64.270	2.690	Type-3B
6	65+065	66+035	64.270	65.250	0.980	Type-4
7	66+035	70+905	65.250	70.000	4.750	Type-3B
8	70+905	76+010	70.000	75.000	5.000	Type-6A
Total Length (Km)					**25.000**	
PACKAGE-IV						
1	76+010	88+035	75.000	87.035	12.035	Type-6A
2	88+035	88+390	87.035	87.395	0.360	Type-6B
3	88+390	95+922	87.395	94.900	7.505	Type-6A
Total Length (Km)					**19.900**	
Grand Total (Km)					**94.900**	

2.5.2 Intersection/Junction – With Improvement of Cross Road

1. Intersection Improvement Proposals

Table 0.4: Major Intersection Improvement Proposals

S. No.	Existing Chainage of New NH-707	Design Ch.	Type of Junction	Side	Remarks
PACKAGE-I					
1	0.000	0.000	+	BS	Junction of NH-7 and NH-707 (Starting Point of Project)
2	8.130	8.100	T	RHS	Link Road to Kishankot (SH-1) via. Bangran
3	18.675	18.510	+	BS	Link Road to Renukaji

S. No.	Existing Chainage of New NH-707	Design Ch.	Type of Junction	Side	Remarks
					(Declared in Principle NH)
PACKAGE-II					
4	39.920	39.355	Y	RHS	Link Road to village Jakhana (Declared in Principle NH)
PACKAGE-III					
5	65.795	65.015	Y	RHS	Link Road to Village Balikoti (Declared in Principle NH)

2. Minor Intersections

Table 0.5: Schedule for Junctions With Minor Roads

S. No.	Existing Chainage of New NH-707	Design Ch.	Type of Junction	Side	Remarks
PACKAGE-I					
1	0+215	0.200	T	LHS	Paonta Sahib Town Road
2	0+550	0.545	T	LHS	Link Road to Jamniwala Road
3	0+790	0.780	T	RHS	Paonta Sahib Town Road
4	1+170	1.180	Y	LHS	Tamwala to Jambu Khala
5	1+210	1.220	T	RHS	Taruwala to Heerpur Road Village Taruwala
6	1+950	1.900	Y	RHS	Link Road to Jat Colony
7	3+280	3.320	Y	LHS	Link Road to Industry
8	3+600	3.630	+	Both Side	Link Road to Amarkota
9	3+985	4.000	Y	RHS	Link Road to Nihalgarh
10	4+105	4.100	Y	LHS	Link Road to Factory
11	4+735	4.750	Y	RHS	Link Road to Laribast/Nihalgarh
12	4+845	4.860	T	LHS	Link Road to AIPL
13	5+505	5.520	Y	RHS	Link Road to Jawalpur & Bashipur
14	6+650	6.670	Y	RHS	Link Road to Naraingarh to Ajali Village Narainagarh

S. No.	Existing Chainage of New NH-707	Design Ch.	Type of Junction	Side	Remarks
15	10+255	10.130	+	Both Side	Link Road to Army Camp & C.C.I Colony
16	10+390	10.360	Y	RHS	Link Road to C.C.I Colony
17	11+000	10.980	Y	RHS	Link Road to Rajban Village
18	11+165	11.130	Y	RHS	Link Road to Giri Basti
19	11+685	11.570	Y	RHS	Link Road
20	11+840	11.950	Y	LHS	Link Road to Village Chhachati (MDR)
21	13+435	13.350	Y	RHS	Link Road Sirmauri Taal
22	13+905	13.800	Y	RHS	Link Road Sirmauri Taal
23	17+520	17.400	Y	LHS	Link Road
24	18+350	18.180	Y	RHS	Link Road
25	18+265	19.080	Y	RHS	Link Road
26	19+795	19.600	Y	RHS	Link Road
PACKAGE-II					
1	26+530	26.190	Y	LHS	Link Road to Village Badwas
2	27+310	26.890	Y	RHS	Link Road to Mines Area
3	28+220	27.840	Y	RHS	Link Road
4	28+855	28.450	Y	RHS	Link Road
5	29+610	29.200	Y	RHS	Link Road
6	29+780	29.355	Y	RHS	Link Road
7	29+955	29.550	Y	LHS	Link Road
8	30+965	30.550	Y	LHS	Link Road
9	31+535	31.105	Y	LHS	Link Road
10	32+635	32.240	Y	RHS	Link Road
11	35+850	35.350	+	Both Side	To village Bhandh (RHS) & Tibati Colony (LHS)
12	36+490	35.990	Y	RHS	Link Road
13	38+580	38.050	Y	LHS	Link Road
14	38+785	38.330	Y	RHS	Link Road
15	39+640	39.200	Y	LHS	Link Road
16	42+540	41.920	+	RHS	Link Road
17	43+950	43.260	Y	LHS	Link Road to Village Sharii

S. No.	Existing Chainage of New NH-707	Design Ch.	Type of Junction	Side	Remarks
18	44+350	43.650	Y	RHS	Link Road to village Simladar
19	44+910	44.150	Y	RHS	Link Road to Village Dadla
20	46+800	46.010	Y	RHS	Link Road
21	47+300	46.535	Y	LHS	Link Road
PACKAGE-III					
1	51+485	50.785	Y	LHS	Link Road
2	51+580	50.880	Y	LHS	Link Road
3	52+050	51.415	Y	LHS	Link Road to village Millar
4	55+805	55.000	Y	LHS	Link Road to village Bambal
5	58+970	58.050	Y	RHS	Link Road
6	59+825	58.920	Y	LHS	Link Road to village Pad Manal
7	62+070	61.150	Y	RHS	Link Road to village Tikee
8	64+790	63.950	Y	RHS	Link Road
9	65+600	64.700	Y	LHS	Link Road to village Tiker
10	66+600	65.700	Y	RHS	Link Road
11	67+200	66.360	Y	RHS	Link Road
12	68+485	67.625	Y	RHS	Link Road to village Bandli
13	69+125	68.240	Y	RHS	Link Road to village Bandli
14	70+430	69.550	Y	LHS	Link Road
15	71+160	71.250	Y	RHS	Link Road
PACKAGE-IV					
1	76+280	75.250	Y	LHS	Link Road to village Gattusanail
2	78+660	77.620	Y	LHS	Link Road
3	80+710	79.670	Y	RHS	Link Road
4	81+310	80.285	Y	LHS	Link Road
5	81+860	80.800	Y	LHS	Link Road
6	82+990	81.850	Y	RHS	Link Road
7	84+120	83.950	Y	LHS	Link Road to village Ronhat (Junction with Old SH-1)
8	87+360	86.350	Y	RHS	Uttarkhand & Vikasnagar
9	90+400	89.420	Y	LHS	Link Road to village Ronhat (Junction with Old SH-1)

2.5.3 Improvement Proposal for Bridges and Culverts

There is only one existing major bridge on the project road at km 17.415 over river Giri which is to be retained without any improvement proposal. There are 13 nos. of minor bridges on the project road out of which only four are having 7.5 m carriageway width and are in sound condition. These bridges are proposed to be retained with minor rehabilitation. One no. of bridge is proposed to be reconstructed and remaining eight nos. of bridges are proposed for new construction of single lane bridges adjacent and parallel to the existing bridges.

Out of the 320 nos. of existing culverts, 25 nos. of culverts (21 nos. of pipe culvert and 04 nos. of slab culvert) are discarded being redundant. 52 nos. of new culverts are proposed at the locations where cross drainage is found inadequate. Hence, there will be 347 nos. of culverts in the project.

Table 0.6: Improvement Proposal for Bridges

Structure Type	Total No. Existing	Retained	Rehabilitation	Reconstruction	New Construction adjacent to old structure	Total after Improvement
Major Bridges	01	01	-	-	-	1
Minor Bridges	13	-	04	01	08	13

Table 0.7: Improvement Proposal for Culverts

Structure Type	Total No. Existing	Retained	Abandoned	Widened	Reconstruction	Choked/ Not visible	New Const.	Total after Improvement
Culverts	320	-	25	04	291	-	52	347

2.5.4 Slope Protection Structures

Slope protection works has been provided in the form of breast wall, gabion wall, toe wall and retaining wall with gabion facing. The summary of the structures are shown in the table below,

Table 0.8: Summary of slope protection structures

S. No.	Side of Road	Provision	Length (m)
1	Hill Side	Breast Wall	21,658
2		Gabion Structure	9,630
3	Valley Side	Toe Wall	19,829
4		Retaining Structure with Gabion Facing	21,351

2.5.5 Bioengineering

Bioengineering in the form of jute netting/erosion blanket with shrub plantation, geo cell with bamboo plantation, hydro seeding and bamboo plantation has been proposed to ensure slope stability and reduce soil erosion. The summary of the same is shown in the table below,

Table 0.9: Summary of Bioengineering Provisions

S. No.	Type of Provision	Length (Km)/ Nos.	Avg. Height (m)	Criteria
1	Erosion Blanket with Grass and Shrub Plantation	7.169	8	Altitude-700 m to max altitude Hill Slope- upto 60 degree Geological Feature- Slight to moderately weathered rock
2	Hydroseeding	15.465	6	Hill Slope- 60 to 85 degrees Geological Feature- Slight to moderately weathered rock
3	Shotcrete Crib with Vegetation	6.641	10	Geological Feature- Moderately weak soil starta/Land slide prone area
4	Chain Link Mesh with Grass Strips	51.032	8	Altitude-700 m to max altitude Hill Slope-60 to 85 degrees Geological Feature- Hard rock
5	Hedge Brush Layer	3.170	8	At dumping sites along with provision of gabion wall on valley side

2.5.6 Project Facilities

The project facilities proposed along the project stretch are shown in the section below. Project facilities mainly consists Bus stops and bays and truck lay-bye. Out of total 6 bus bays proposed 3 nos. are Bus bays with rain shelter and 3 nos. are bus stops only due to unavailability of RoW in curve portion. There is one truck lay-bye proposed near sataun in project section.

Bus Bay

The location of proposed Bus bay is shown in the table below,

Table 0.10: Details of Proposed Bus bay

S. No.	Design Chainage	Side	Village/Town Name	Type of Project Facilities
1	5+450	LHS	Rajban	Bus Bay
2	18+400	LHS	Sataun	Bus Bay
3	32+275	RHS	Kamrau	Pick-up Bus Stop
4	39+890	RHS	Kafota	Pick-up Bus Stop
5	64+414	RHS	Shillai	Bus Bay
6	94+010	RHS	Gumma	Pick-up Bus Stop

Truck Lay-Bye

The location of proposed truck lay bye is shown in the table below,

Table 0.11: Details of Proposed Truck Lay Bye

S. No.	Design Chainage	Side	Village/Town Name
1	18+700	LHS	Sataun

2.5.7 Other Features

The project will provide various safety aspects to the users. Various provisions like Thrie beam crash barriers, parapet wall, road studs, rumble strip, Road Signs and Road Markings is proposed along the project road to improve the safety for the commuters.

Roadside drainage has been proposed throughout the project stretch with provision of rectangular closed drain along the built-up areas and trapezoidal drain in open country area. Footpaths, paver blocks, walkways and public toilets are provided with provisions for physically disabled persons and elderly persons. **Annexure-6** with this report provides specifications for the same.

Adequate illumination is provided in form of solar lights at built up areas and project facilities along the project stretch at 49 Nos. of locations on an approximate length of 18 Kms. Water harvesting structures has been proposed at 73 Nos. of locations along the project stretch for local use of people.

Details of the above features are provided under section salient features of the project road. The package-wise salient features are presented in **Table 0.12** below.

Table 0.12: Salient Features of the Project

S. No.	Salient Features	PKG-I	PKG-II	PKG-III	PKG-IV	Total
1	**Chainage**	0+000 to 25+000	25+000 to 50+000	50+000 to 75+000	75+000 to 94+900	**0+000 to 94+900**
2	**Overall Length (Km)**	25	25	25	19.9	**94.900**
3	**Large/Small Habitations (Nos)**	12	9	12	6	**39**
4	**Junctions**					
A	Major Junctions (Nos)	3	1	1	0	**5**
B	Minor Junctions (Nos)	26	21	15	9	**71**
5	**Cross Drainage Works**					
A	Major Bridge	1 No. (93.40 m)	-	-	-	**1 (93.40 m)**
B	Minor Bridge	3 Nos. (72.65m)	1 No. (18 m)	6 Nos. (157 m)	3 Nos. (83 m)	**13 Nos. (330.650m)**
C	Culverts	87	87	92	81	**347**
6	**Retaining Structure for slope protection**					
A	Breast Wall (m)	4,560	5,998	7,436	3,664	**21,658**
B	Gabion Wall (m)	3,120	710	5,730	70	**9,630**
C	Retaining wall with gabion facing (m)	2,063	3,546	5,599	10,143	**21,351**
D	Toe wall (m)	1,793	6,140	7,058	4,838	**19,829**
7	**Slope Protection Measures**					
A	Erosion Blanket with Grass and Shrub Plantation (m^2)	37,304	15,600	4,448	0.000	5735.2
B	Hydroseeding (m^2)	0.000	48,336	44,454	0.000	92,790
C	Shotcrete Crib with Vegetation (m^2)	23,690	0.000	42,720	0.000	66,410
D	Chain Link Mesh with Grass Strips (m^2)	42,472	1,14,360	92,504	1,58,920	4,08,256

S. No.	Salient Features	PKG-I	PKG-II	PKG-III	PKG-IV	Total
E	Hedge Brush Layer (m^2)	0.000	7.760	8.880	8.720	25,360
F	Others					
8	**Project facilities**					
A	Bus Bay (Nos.)	2	2	1	1	**6**
B	Truck Lay bye (Nos.)	1	0	0	0	**1**
9	**Others**					
A	Metal Beam Crash Barrier (m)	2.063	3.546	5.599	10.143	**21.351**
B	Parapet Wall (m)	10.191	20.044	18.050	9.668	**57.953**
C	Sub Surface Drainage (Nos.)	3	10	7	6	**26**
D	Water Harvesting Structure (Nos.)	9	27	24	13	**73**
E	Solar Lighting (Nos.)	12	14	14	9	**49 Locations (Length 19.170 Km)**
F	Road Studs (Nos.)	6,100	6,310	5,742	4,040	**22,192**
G	Rumble Strips (Nos.)	Length-4,530 m Location-10 Nos.	Length-3,150 m Location-11 Nos.	Length-5,980 m Location-12 Nos.	Length-940 m Location-7 Nos.	**Length-14,600 m Location-40 Nos.**
H	Road Sign (Nos.)	222	222	185	131	**760**
I	Road Furniture (Nos.)	1,493	1,411	1,921	4,849	**9,674**
J	Footpath (m)	12,600	1,390	1,200	0	**15,190**
K	Paver Block (m)	10,000	0	0	0	**10,000**
L	Roadside Drainage (m)	Rectangular Closed Drain-12,600 Trapezoidal Lined Drain-12,400	Rectangular Closed Drain-1,390 Trapezoidal Lined Drain-23,610	Rectangular Closed Drain-1,200 Trapezoidal Lined Drain-23,800	Trapezoidal Lined Drain-19,900	Rectangular Closed Drain-15,190 Trapezoidal Lined Drain-79,710

CHAPTER 3: SOCIO-ECONOMIC PROFILE OF THE PROJECT AREA

3.1 Introduction

Himachal Pradesh is spread over on area 55,673 (Sq.Km) which is 1.69% of country area. It is located between 30º22' and 30º12' north latitude and between 75º47' and 79º4' east longitude. Himachal Pradesh is almost wholly mountainous with altitudes ranging from 350 meters to 6,975 meters above the mean sea level. It has a deeply dissected topography, complex geological structure and a rich temperate flora in the sub-tropical latitudes.

Population density per km sq in Himachal Pradesh is 123, while in project districts Shimla and Sirmaur it is 159 and 188 respectively. In 2011, the total population of H.P. was about 6,864,602 out of which 3,481,873 were males (50.72 %) and 3,382,729 (49.28%) were females.

Himachal Pradesh is one of the well literate states in India. Literacy rate among population age seven and above is 83% compared with 73% for India as a whole. The literacy rate is 91% for males and 77% for females. Notably the gender gap in literacy in state is not significant as compared to that of India.

The population living in a village with health facilities is 7% for hospitals and 41% for dispensaries or clinics. Overall 60% of women live in village that has some kind of health facility. Average distances from particular health facilities are 6.4 km from a primary Health Centers, 1.5 km from a sub centre, 9.9 km from a hospital and 2.3 km from dispensary or clinic. 8% rural population in Himachal Pradesh needs to travel a maximum 5-9 km in order to reach the nearest health facility.

3.2 Socio- economic status of Project Influence Districts

The Project Highway transverses through two districts viz Sirmaur and Shimla about 89 (km) of the highway are in Sirmaur district and rest about 8 (km) are in Shimla district.

3.2.1 Shimla & Sirmaur District Profile

Shimla District lies between 30º 45'48"-30º43'0" North latitude and 76º 59' 22" - 78º 18' 40" East longitude. It is bounded by Kinnaur district in the Northeast, by Kullu and Mandi districts in the Northwest, by Solan and Sirmaur districts in the Southwest and by the State of Utterakhand in the Southeast. The total area of the present district is 5,131 Sq. Kms. It has a total number of 2,897 villages, of these 2311 villages are inhabited and the remaining is uninhabited. The district comprises of 7 sub-divisions

and 17 tehsil and sub tehsil the sub-divisions are, namely Shimla (rural), Shimla (urban), Thoeg, Rampur, Rohru, Chopal and Dodra Kawar. The tehsil are namely Seoni, Shimla urban, Theog, Kumarsain, Rampur, Rohru, Kotkhai, Chopal, Jubbal-Cirgaon and Dodra Kwar while Junga, Nankhari, Tikkar, Chela, Nerwa are the Sub-Tehsil. For the rural development, the district has been divided into nine community development Blocks. The topology of the district is hilly and rolling.

District Sirmaur is the southern end district of Himachal Pradesh. The district shares its Boundary with district Shimla in the north; district Solan in the northwest, Panchkula and Yamuna Nagar districts of Haryana in the southwest and, Dehradun district of Uttaranchal and Saharanpur district of Uttar Pradesh in the east. Its longitudinal and latitudinal extend is from 77° 01' 12" to 77° 49' 40" East and from 30° 22' 30" to 31° 01' 20" North respectively. The district has an area of 2825 Sq km, which is only about 5 per cent of the area of the state.

The terrain is generally flat with a few areas having high mountainous slopes .It is one of the three districts to experience substantial industrialization in the state, the other two being Solan and Una. The district has a comparatively higher level of urbanization 10.4%.

Demography- Population density per km sq in Himachal Pradesh is 123, while in project districts Shimla and Sirmaur it is 159 and 188 respectively. In 2011, the total population of H.P. was about 6,864,602 out of which 3,481,873 were males (50.72 %) and 3,382,729 (49.28%) were females. In Shimla district, total population 8,14,010 consisting of 4,25,039 males and 388971 females. In Sirmaur district, total population 5,29,855 consisting of 2,76,289 males and 2,53,566 females.

Himachal Pradesh is one of the well literate states in India. Literacy rate among population age seven and above is 83% compared with 73% for India as a whole. The literacy rate is 91% for males and 77% for females. Notably the gender gap in literacy in state is not significant as compared to that of India. Literacy rates in the project districts are good as 84% in Shimla and 79% in Sirmaur district. Number of females per thousand males in Himachal Pradesh is 972 which is unfavorable to female nonetheless better than all India Sex ratio which is 943. On the other hand, Sex ratios in the project districts are very poor as 915 in Shimla and 918 in Sirmaur.

Table 3.1 shows the demographical statistics of Himachal Pradesh, Sirmaur & Shimla.

Table 0.1: Demographic Features of the State and PIA Districts

State/District	Himachal		Shimla		Sirmaur	
	2001	2011	2001	2011	2001	2011
Area Sq. Km.	55,673		5131		2825	

State/District	Himachal		Shimla		Sirmaur	
	2001	2011	2001	2011	2001	2011
Persons	60,77,900	6,864,602	7,22,502	8,14,010	458,593	5,29,855
Male	3087940	3,481,873	38,0,996	4,25,039	241,299	2,76,289
Female	29,89,960	3,382,729	3,41,506	3,88,971	217,294	2,53,566
Population growth	12.94%		12.67%		15.54%	
Population Density per Sq km	109	123	141	159	162	188
Literacy Rate %						
Male	86.02	90.83	87.72	90.73	63.20	79.73
Female	68.08	76.60	70.68	77.80	38.45	60.93
Sex -ratio	970	972	898	915	901	918
Human Development Index	0.518		0.409		0.433	

***Source**: Census of India 2011 data*

3.3 Project Impact Area

The majority of the potentially affected / benefited persons living in the project influence zone frequently travel down the existing roads or proposed alignment of the project. Their purpose of visit brings them generally to the prominent market places by the roadside or transport boarding points along side the road. Other beneficiaries also pass through the important junctions of the feeder roads connecting the project roads / proposed alignment. There are administrative offices, places of worship, community structures, in the major settlements within the project impact zone.

For the purpose of Social Analysis, habitations within the corridor of impact has been considered as directly impacted. Habitations within 1 km of the project road has been considered as Indirectly impacted habitations.

3.3.1 Socio-Economic Profiling

District wise list of major project impacted habitations/ settlements is presented in Table 3.2 below:

Table 0.2: Major Project Affected Villages Falling within CoI along NH-707

Name of the Road Station (project Road)	Districts Covered	Chainage/ Length (km)	Major Project affected villages
Paonta Sahib-Gumma NH-707	Sirmor	0.000-89.500	Paonta Sahib, Nariwala, Badripur. Jwalapur,Taruwala, Gondpur, Amarkot, Nihalgarh, Rajvan,

			Sataun, Tilordhar, Kafota, Shillai, Timbi, Shillai
	Shimla	89.500-97.000	Rohana, Meenus, Jamli, Gumma

Source: *CEG Soci--economic Survey, 2019*

Table 3.3 below shows the Socio-Economic Statistics of project-affected villages.

Table 0.3: Socio-Economic Statistics of project-affected villages

Villages	No of Households	Total Population	Male	Female	Population 0-6	SC Population	ST Population	Literates Population	Literates Male	Literates Female	Illiterate Population	Total Workers	Main Workers	Main Cultivators	Main Agri. labors	Marginal Worker Population	Non Working Population
Paonta Sahib	31460	169682	89150	80532	22127	36757	4123	109748	64466	45282	59934	74760	48772	19074	1614	25988	94922
Taruwala	215	1018	511	507	125	161	3	790	428	362	228	300	289	49	0	11	718
Gondpur	225	1024	555	469	127	104	0	716	422	294	308	459	397	101	2	62	565
Nihal Garh	273	1297	714	583	155	418	2	901	536	365	396	511	502	134	4	9	786
Jawalpur	141	703	376	327	89	231	1	478	292	186	225	254	253	100	1	1	449
Kishan Kot	162	799	414	385	109	97	0	543	320	223	256	206	192	49	0	14	593
Rajban	444	1877	999	878	207	288	43	1349	777	572	528	582	549	42	5	33	1295
Sirmauri Tal	83	464	230	234	72	392	6	299	178	121	165	135	135	49	0	0	329
Sataun	607	2963	1560	1403	351	693	9	2121	1193	928	842	993	920	167	26	73	1970
Barwas	159	1027	536	491	120	205	0	599	353	246	428	582	309	131	6	273	445
Kamrou	355	2217	1158	1059	223	347	8	1448	845	603	769	1161	684	256	4	477	1056
Kandon Dugana	379	2678	1374	1304	294	973	4	1545	902	643	1133	1528	821	512	102	707	1150
Shilla	195	1447	786	661	171	353	1	824	515	309	623	874	374	241	3	500	573
Borar	184	1438	755	683	253	515	0	770	448	322	668	1147	580	539	0	567	291
Chareu	53	467	241	226	80	252	0	277	174	103	190	123	24	1	0	99	344

Villages	No of Households	Total Population	Male	Female	Population 0-6	SC Population	ST Population	Literates Population	Literates Male	Literates Female	Illiterate Population	Total Workers	Main Workers	Main Cultivators	Main Agri. labors	Marginal Worker Population	Non Working Population
Ashyari	243	1730	881	849	285	580	0	976	531	445	754	1079	422	338	5	657	651
Gangtoli	50	371	194	177	62	77	0	215	114	101	156	165	78	45	0	87	206
Tikar	73	487	261	226	71	181	0	294	183	111	193	300	280	244	13	20	187
Dhakoli	47	253	127	126	30	196	0	165	89	76	88	215	65	46	1	150	38
Shillai	8173	60229	31841	28388	9357	18644	30	34926	20534	14392	25303	37545	21961	18214	325	15584	22684
Bandli	188	1425	729	696	205	297	0	815	470	345	610	932	533	362	0	399	493
Kando Bhatnaul	247	2236	1203	1033	308	692	0	1227	735	492	1009	1194	828	776	1	366	1042
Shiri Kyari	175	1454	772	682	233	361	0	877	509	368	577	999	428	345	0	571	455
Syarla Barshol	193	797	407	390	93	312	14	612	345	267	185	320	314	194	16	6	477
Jhakandon	244	1990	1053	937	322	772	0	1114	645	469	876	750	594	458	1	156	1240
Rohana	19	94	49	45	15	0	0	71	40	31	23	73	38	34	1	35	21
Gumma	108	559	274	285	63	196	0	398	221	177	161	352	163	87	13	189	207
	44695	260726	137150	123576	35547	64094	4244	164098	96265	67833	96628	127539	80505	42588	2143	47034	133187

Source: *Census of India-2011 data*

3.3.2 Demographic details

In the affected villages' total number of household are 44,695 and population of 2.61 lacs. There are 1,37,150 males and 1,23,576 females in the affected villages. Hence the sex ratio, which comes out to be 901 females per 1000 males, is very poor. The village wise population details is given in **Table 3.3 above**.

3.3.3 Literacy Status

As per 2011, Census in the affected villages male literacy is about 71% and female literacy rate is 55%. Male literacy rate is higher in comparison to female literacy rate, but is still poor. Out of the total population about 37% population is still illiterate.

3.3.4 Working and Non- Working Population.

Percentage of workers engaged in different activities indicates the nature of employment available in the area. The total working population in the project stretch is 48.5%. Out of them, main workers are 63% and marginal workers are 37%. Non workers constitutes of 51.5% of the total population which indicates high dependency ratio. Most of the non workers in the affected villages are females.

3.3.5 Existing Public Amenities

Public amenities are those basic services utilized away from the individual residential dwelling unit within the public environment. Presence of basic infrastructure facilities is found only, in the project districts. They satisfy specific individual or community needs including communication, recreation, education, health and public administration. Public amenities are generally the responsibility of government or the local authorities of the area. Accessibility of basics infrastructure is an important factor from the social development context. List of public amenities in the districts of the project road is presented in **Table 0.4.** Improvement of project road will increase access to public facilities like higher level schools, colleges, health services (CHCs, PHCs), government offices, etc.

Table 0.4: Public Amenities in both the Districts

Amenities	**Sirmaur**	**Shimla**
Education		
Primary School	987	1616
Secondary School	202	355
Higher/ Sr. Secondary School	152	307
Colleges	6	4
Engg. College/ Medical College	3	1
I.T.I.	7	-
University	-	1

Amenities	Sirmaur	Shimla
Health Centres		
Hospitals	5	46
PHCs/CHCs/ Sub Centres	184	313
Subsidiary Health Centres	-	30
ESI Dispensaries	3	30
Ayurvedic Hospitals	1	2
Ayurvedic Dispensaries	79	147
Homeopathis Dispensaries	1	-
Others		
Electrified Villages	966	100%
Nationalized Bank Branches/ Cooperative Bank Branches	82	164
Post Offices	169	348

***Sources**- district website of Shimla and Sirmaur*

CHAPTER 4: R&R PRINCIPLES, POLICY FRAMEWORK & ENTITLEMENT MATRIX

4.1 Introduction

This chapter of the report discusses about the existing law and regulations of the country and state those are applicable to the proposed project. It is imperative to analyze the Acts and bylaws to understand the legalities and procedures in implementing project and identifying the gaps and area where there is a need for strengthening to comply with the World Bank policy on resettlement and rehabilitation of project affected persons.

The aim of the project is to establish and provide better connectivity of various existing National Highways in the country. Most of the infrastructure work planned for this Green National Highway Corridor project will take place within the existing Right of Way (RoW) except at some of the congested villages/settlements where Curve improvements proposed and at locations where minor improvements are required for accommodating road safety measures.

4.2 Applicable Legal and Policy Framework

Applicable acts, notifications and policies relevant in the context of this project are discussed in tabular form is given below :

The Project Authority (MoRTH) will ensure that project activities implemented are consistent with the national, state, local regulatory/legal framework.

TABLE 0.1: APPLICABLE LEGAL AND POLICY FRAMEWORK

S. No.	Acts, Notifications and policies	Relevance to this Project	Applicability
1.	**RTFCTLARR Act, 2013**	Land required, R&R for the project shall be acquired and provided as per the provision of this Act.	Applicable via Himachal Pradesh Relevant Rules
2	**The Provisions of the Panchayat (Extension to the scheduled**	One of the important provisions of this act states "the Gram Sabha or Panchayat" at the appropriate level shall be consulted before making the acquisition of land.	Applicable

S. No.	Acts, Notifications and policies	Relevance to this Project	Applicability
	Areas) Act, 1996		
3	**World Bank OP 4.12- Involuntary Resettlement**	The project entails land acquisition though, at a low scale for widening, curve improvements, junction improvements etc. It would also adversely affect structures used for various purposes, livelihood of people) mainly earning their livelihood by means of petty shops, and providing various services). Many of them have been operating from the government land. Thus, both title holders and non-title holders alike would be affected as a consequence of the project.	Applicable
4	**National Highways Act, 1956**	Land acquired for the project shall be acquired as per the provision of this act.	Applicable
5	**The Right to Information Act, 2005**	The Act provides for setting out the practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, the constitution of a central Information Commission and State Information Commissions and for matters connected therewith or incidental thereto.	Applicable

4.3 Comparative analysis of applicable policy

For the purpose of development, maintenance and management of national highways, a special law, the National Highways Act (NH Act), 1956 has been promulgated in India. This act provides for acquiring land through a "competent authority", which means any person or authority authorized by the Central Government by notification in

the official Gazette to perform functions of the competent authority for such areas as may be specified in the notifications.

National Policy specifies that the compensation award shall be declared well in time before displacement of the affected families. Full payment of compensation (section 3H under NH Act) as well as adequate progress in resettlement shall be ensured in advance of the actual displacement of the affected families. National and State policy also requires that the compensation and assistance to PAPs (other than capacity building support for livelihood restoration) be provided prior to any displacement or start of civil works.

Both the National Policy and the Himachal Pradesh Land Acquisition Act on rehabilitation and resettlement aim to see that involuntary resettlement should be avoided or minimized, wherever feasible, exploring all viable alternative project designs, and where displacement is unavoidable, people losing assets, livelihood or other resources shall be assisted in improving or at a minimum regaining their former status of living at no cost to themselves.

Also Central and State policy requires consultation with PAPs during planning and implementation of resettlement action plan and public disclosure of drafts. Once the draft is prepared it is to be made available at a place accessible to, and in a form, manner and language understandable to the displaced or affected people and local NGOs. RTFCTLARR Act, 2013, also requires disclosure of draft SIA, RAP and other project reports followed by Public Hearing as per project requirement. Based on the detailed comparative analysis of the above discussed applicable legal and policy framework, key differences identified between these policies which needs to be addressed under the Resettlement Policy Framework (RPF) is listed below:

1. Recognition of non-titleholders who have no recognizable legal right to the land they are occupying and extending R&R benefits under the project;
2. Establishment of cut-off date to identify the non-titleholders in the project;
3. Compensation for the entire replacement of the lost and other assets fully or partially;
4. Need for preparation and public disclosure of Social Impact Assessment (SIA) and Resettlement Action Plan (RAP) as per project requirements.

4.4 Resettlement Policy Framework

This RPF for the GNHCP has been prepared based on the findings of Social Survey Report (SSR) covering initial impact assessment and review of applicable legal and policy framework discussed above.

In order to address the adverse impacts of land acquisition and involuntary resettlement, MoRTH, Govt. of India recognised the need for the development of Resettlement Policy Framework. Review of Social Screening Reports (SSRs) reveal that applicable legal and administrative procedures vary from State to State and also there are gaps between Resettlement and Rehabilitation Policies of the country and certain states and the Bank's Resettlement Policy. Hence, there is a need to understand the critical elements of the existing legal and policy framework and agree on a mechanism that will address the key social issues and formulate a specific policy framework for the project to bridge the major gaps to conform to the provisions of World Bank's operational policies related to Involuntary Resettlement. This policy framework will help expedite the process and facilitate consistent preparation of RAPs across all project roads in different states.

The purpose of preparing a RPF is to:

a) Bring commonality in resettlement and rehabilitation benefits under the project.

b) Bridge the gap between Bank's policy on Involuntary Resettlement and LARR, 2013.

c) Bring together and built upon the current good practices in terms of procedures to address more systematic and institutional issues.

d) Establish institutional arrangements at project, state and central level (MoRTH) for the implementation of RAP.

e) Establish mechanism for Redressal of grievances; and monitoring and evaluation, etc.

4.4.1 Definitions

Following definitions that will be applicable unless otherwise stated specifically.

- **Agricultural labourers:** means a person primarily resident in the affected area for a period of not less than five years immediately before the declaration of the affected area, who does not hold any land in the affected area but who earns his livelihood mainly by manual labour on agricultural land therein immediately before such declaration and who has been deprived of his livelihood;

- **Agricultural land:** Denotes land used or capable of being used for the purpose of agriculture or horticulture, dairy farming, poultry farming, pisciculture, sericulture, breeding of livestock or nursery growing medicinal herbs, raising of crops, grass or garden produce and land used by an agriculturist for the grazing of cattle, but does not include land used for cutting of wood only;

- **Below poverty line (BPL) or BPL family:** means below poverty line families as defined by the Planning Commission of India, from time to time and those included in the BPL list for the time-being in force.
- **Corridor of impact (COI):** Refers to the minimum land width required for construction including embankments, facilities and features such as approach roads, drains, utility ducts and lines, fences, green belts, safety zone, working spaces etc. Additional land width would be acquired/purchased or taken on temporary lease if the Corridor of Impact extends beyond the available Right of Way.
- **Cut-off date:** Refers to the date on which the **census survey of PAPs starts** in that road section/stretch. For entitlement purpose, the PAPs would be those who have been in possession of the immovable or movable property within the affected area/zone on or prior to cut off date. However, the cut-off date for land acquisition purpose is the date on which the notification under section 3A will be issued under the NH Act, 1956.
- **Encroacher:** A person who has extended their building, agricultural lands, business premises or work places into public/government land without authority.
- **Entitled person (EP):** A person who is adversely impacted by the project and is entitled to assistance as per the project entitlement framework is considered to be an Entitled Person.
- **Holding:** means the total land held by a person as an occupant or tenant or as both;
- **Kiosk:** A kiosk is a booth/stall/cabin/cubicle made of wood or iron or any other building material which could be shifted to another location as a single unit without much damage and is used for carrying out petty business/ commercial activities and has been in operation/existence prior to cut off date.
- **"Land acquisition" or "acquisition of land":** means acquisition of land under the NH Act, 1956 for the time being in force.
- **Landowner:** A person who is an allot tee or a grantee of any land under any scheme of the Government under which such allotment or grant is to mature into ownership, who has mortgaged his land (or any portion thereof) or who has permanent rights and interest in land.
- **Marginal farmer:** Refers to a cultivator with an un-irrigated land holding up to one hectare or irrigated land holding up to half hectare.

- **Non-agricultural laborer:** means a person who is not an agricultural laborer but is primarily residing in the affected area for a period of not less than five years immediately before the declaration of the affected area and who does not hold any land under the affected area but who earns his livelihood mainly by manual labour or as a rural artisan immediately before such declaration and who has been deprived of earning his livelihood mainly by manual labour or as such artisan in the affected area;
- **Non-titleholder:** Affected persons/ families/ households with no legal title to the land, structures and other assets adversely affected by the project. Non-titleholders include encroachers, squatters, etc.
- **Notification:** means a notification published in the Gazette of India.
- **Occupier:** means a member of a Scheduled Tribes community in possession of forest land prior to the 13th day of December, 2005;
- **Project affected area:** Refers to the area of village or locality under a project for which land will be acquired under NH Act 1956 through declaration by Notification in the Official Gazette by the appropriate Government or for which land belonging to the Government will be cleared from obstructions.
- **Project affected family:** includes a person, his or her spouse, minor sons, unmarried daughters, minor brothers, unmarried sisters, father, mother and other relatives residing with him or her and dependent on him or her for their livelihood; and includes "nuclear family" consisting of a person, his or her spouse and minor children.
- **Project affected person (PAP):** Any tenure holder, tenant, Government lessee or owner of other property, or non-titleholder who on account of the project has been affected from such land including plot in the abadi or other property in the affected area will be considered as PAP.
- **Project displaced person (PDP):** Any tenure holder, tenant, Government lessee or owner of other property, or non-titleholder who on account of the project has been involuntarily displaced from such land including plot in the abadi or other property will be considered as PDP. A displaced will always be a PAP but all PAP may not be PDP.
- **Project affected household (PAH):** A household that may comprise of one family or several families.
- **Replacement cost:** A replacement cost/value of any land or other asset is the cost/value equivalent to or sufficient to replace/purchase the same land or other asset.

- **Small farmer:** Refers to a cultivator with an un-irrigated land holding up to two (2) hectares or with an irrigated land holding up to one (1) hectare.
- **Squatter:** A person who has settled on public/government land, land belonging to institutions, trust, etc and or someone else's land illegally for residential, business and or other purposes and/or has been occupying land and building/asset without authority.
- **Tenant:** A person who holds / occupies land / structure of another person and is or (but for a special contract) would be liable to pay rent for that land / structure to other person and includes the predecessor and successor-in-interest of such person but does not include mortgage of the rights of a landowner or a person to whom holding has been transferred or an estate or holding has been let in farm for the recovery of an arrear of land revenue or of a sum recoverable as such an arrear or a person who takes from Government a lease of unoccupied land for the purpose of subletting it.
- **Titleholder:** A PAP/PAF/PAH who has legal title to land, structures and other assets in the affected zone.
- **Vulnerable group:** This includes Scheduled Caste. ST, family/household headed by women/ female, disabled, handicapped, orphans, destitute, BPL, abandoned woman; unmarried girls; widows; and persons above the age of 65 years **irrespective of their status of title** (ownership). Vulnerable groups would also include those farmers who (after acquisition of land) become small/marginal farmers and also qualify for inclusion in BPL. For such cases, total land holding of the landowner in that particular revenue village will be considered in which land has been acquired.
- **Wage earner:** Wage earners are those whose livelihood would be affected due to the displacement of the employer. The person must be in continuous employment for at least six months prior to the cut-off date with the said employer and must have reliable documentary evidence to prove his/her employment.

4.5 Resettlement principles and Eligibility Criteria

Based on the above analysis of government provisions and requirements as per World Bank IR policy the broad resettlement principle for this project shall be the following:

- Proposed highway improvement and strengthening work will take place mostly on the existing alignment and within the available RoW or at locations where curve improvement is necessary to incorporate required safety measures;

- The involuntary resettlement and adverse impacts on persons affected by the project would be avoided or minimized as much as possible exploring viable options;
- Where it is not feasible to avoid resettlement, resettlement activities should be conceived and executed as sustainable development programs, providing sufficient investment resources to enable the persons displaced by the project to share in project benefits;
- Efforts should be made to improve their livelihoods and standards of living or at least to restore them, in real terms, to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher;
- Displaced persons should be meaningfully consulted and should have opportunities to participate in planning and implementing resettlement programs;
- Replacement land shall be an option for compensation in the case of loss of land. In case of unavailability of replacement land, cash-for-land with compensation on replacement cost option will be made available to the PAPs;
- Compensation for loss of land, structures and other assets will be based on full replacement cost and will be paid before physical displacement of PAPs including transaction costs;
- In the event of necessary relocation, PAPs shall be assisted to integrate into host communities;
- All land acquisition for the project would be done as per the National Highways Act, 1956. Additional assistance would be provided to the PAPs for meeting the replacement cost of the property;
- The un-economic residual land remaining after land acquisition will be acquired by the project. The owner of such land/property will have the option to seek acquisition of his entire contiguous holding/ property provided the residual land is less than the average land holding of the district;
- Any structure/asset rendered unviable/unsafe because of the project shall also be considered as affected and entitlements shall be extended accordingly;
- The affected persons who does not own land or other properties, but have economic interests or lose their livelihoods will be assisted as per the policy principles described in this document;

- Cut-off date for titleholders will be the date of publication of notification under Section 3A of the National Highways Act, 1956. For non-titleholders who has not any legal holding of the occupied land such as squatters and encroachers the date of project **census survey** or a similar designated date declared by the executing agency will be considered as **cut-off date**;
- An entitlement matrix for different categories of people affected by the project has been prepared and provisions will be kept in the budget for those who were not present at the time of census survey. However, people moving in the project area after the cut-off date will not be entitled to any compensation or assistance;
- Vulnerable groups (PAPs below poverty line (BPL), the landless, disabled, elderly persons, women and children, indigenous peoples) will be identified and given additional support and assistance under the project;
- All common property resources (CPR) lost due to the project will be reconstructed or compensated by the project;
- Information related to the preparation and implementation of resettlement plan will be disclosed to all stakeholders and people's participation will be ensured in planning and implementation;
- Appropriate grievance Redressal mechanism will be established at sub-project, state and central levels to ensure speedy resolution of disputes;
- An effective monitoring and evaluation mechanism will be established to ensure consistent implementation of resettlement activities planned under the project including third party monitoring.

4.6 Entitlement Matrix

This entitlement matrix has been developed in accordance with the basic principles adopted in the RPF and analysis of initial identification of project impacts.

In case where a State Government through any Act or Gazette Notification or as approved by any authority of State Government (duly authorized for the purpose) as per their approved procedure has fixed a rate for compensation of land and is higher than the provisions under the project, the same may be adopted by the Competent Authority in determining the compensation for land.

Similarly, in case where a State Government through any Act or Gazette Notification or as approved by any authority of State Government (duly authorized for the purpose) as per their approved procedure has fixed a rate for resettlement and rehabilitation assistance and is higher than the provisions under the project, the same may be adopted by the Executing Authority.

Table 0.2: Entitlement Matrix

S. No.	Impact	Entitled Unit	Entitlement Details
A. Loss of Private Agricultural, Home-Stead & Commercial Land			
1	Loss of Land (agricultural, homestead, commercial or otherwise) within the Corridor of Impact (COI)	Titleholder/owner/ families with traditional land right/ occupiers	For all land acquired under NH Act; Compensation/lease amount shall be calculated and payable in accordance with Sections 26 to 30 and Schedule I of RFCTLARR Act 2013 i. **Partial Impact on Land:** In case only part of any land plot is affected, and its owner desires the whole plot be acquired on grounds that the plot has become uneconomic or has been severed due to LA (under Section 94 and Note C), the competent authority can award compensation for remaining part of the plot or award 25% of actual value upto of the remaining land holding as additional compensation, allowing the owner to retain the remaining land plot, if agreeable. For all land acquired under NH Act; or direct purchase or acquisition of missing land parcels/plot (MoRT&H circular date 28th December, 2017), Rehabilitation and Resettlement Assistance shall be as follows (Schedule II of Act 2013): ii. If as a result of land acquisition, the land owner becomes landless or is reduced to the status of a "small" or "marginal" farmer, assistance amount of Rs. 6 lakhs OR annuity policies that shall pay not less than two thousand rupees per month for each affected land owner for twenty years with appropriate indexation to the Consumer Price Index for Agricultural Labourers. iii. Each land owner shall be given a one-time "Resettlement Allowance" of Rs. 60,000/- only. iv. Refund of stamp duty and registration charges incurred for replacement land to be paid by the project; replacement land must be bought within a year from the date of payment of compensation to project affected persons
B. Loss of Private Structures (Residential/Commercial)			
2	Structure within the	Title Holder/ Owner	i. Compensation in accordance with Sections 26 to 30 and Schedule I of RFCTLARR Act 2013

S. No.	Impact	Entitled Unit	Entitlement Details
	Corridor of Impact (CoI)		ii. Right to salvage material from affected structures iii. Three months advance notice to vacate structure iv. For those losing cattle shed, a one-time assistance of Rs. 28,000/- would be payable v. For each affected family of an artisan or self-employed or own non-agricultural land, that is displaced and must relocate, a one-time assistance of Rs. 28,000/- would be payable; and vi. One-time subsistence grant of Rs. 40,000/- for each displaced family who are displaced and require to relocate; vii. One-time financial assistance of Rs. 60,000/- for each affected family towards shifting/transportation cost for shifting of the family, building materials, belongings and cattle viii. Refund of stamp duty and registration charges for purchase of new alternative houses/shops at prevailing rates on the market value as determined. Alternative houses/shops must be bought within a year from the date of payment of compensation ix. For a house lost, a constructed house shall be provided as per the Indira Awas Yojana Specifications or equivalent cost of the constructed house in lieu, shall be payable. x. In case of partial impact, 25% additional award to be paid on compensation award for the affected part of the structure to enable damage repair where the owner/occupier of his/her own will, interested to retain the remaining part of the structure, provided the unimpaired continuous use of the such structure is possible without hazards
3	Structure within the Corridor of Impact (CoI)	Tenants/ Lease Holders	i. Registered lessees will be entitled to an apportionment of the compensation payable to structure owner as per applicable local laws. ii. One-time financial assistance of Rs. 60,000/- as transportation. iii. Three months notice to vacate structures.

S. No.	Impact	Entitled Unit	Entitlement Details
C. Loss of Trees and Crops			
4	Standing Trees, Crops within the Corridor of Impact (CoI)	Owners and beneficiaries (Registered/ Un-registered tenants, contract cultivators, leaseholders & sharecroppers	i. Cash compensation as estimated under Section 29(3) of Act to be paid at the rate estimated by: • The Forest Department for timber trees • The State Agriculture Extension Department for crops • The Horticulture Department for fruit/flower bearing trees. ii. Three months advance notice to project affected persons to harvest fruits, standing crops and removal of trees, or compensation in lieu as determined above. Registered tenants, contract cultivators & leaseholders & sharecroppers will be eligible for compensation for trees and crops as per the agreement document between the owner and the beneficiaries. Un-registered tenants, contract cultivators, leaseholders & sharecroppers will be eligible for compensation for trees and crops as per mutual understanding between the owner and the beneficiaries
D. Loss of Residential/ Commercial Structures to Non-Title Holders			
5	Structures within the Corridor of Impact (CoI) or Govt. land	Owners of Structures or Occupants of structures (Encroachers, Squatters) identified as per Project Census Survey	**For loss of House** i. Compensation at PWD BSR without depreciation for structure ii. One-time resettlement cost of Rs. 28,000 /- iii. Shifting/transportation assistance of Rs. 60,000/- iv. Encroachers shall be given three months' notice to vacate occupied land or cash assistance at replacement cost for loss of structures. v. Right to salvage the affected materials **For loss of shop** i. Compensation at PWD BSR without depreciation for structure ii. One-time subsistence grant of Rs. 40, 000/- iii. Onetime rehabilitation grant of Rs. 28,000/- iv. Shifting/transportation assistance of Rs. 60,000/-

S. No.	Impact	Entitled Unit	Entitlement Details
			v. Encroachers shall be given three months' notice to vacate occupied land or cash assistance at replacement cost for loss of structures. vi. Right to salvage the affected materials
6	Loss of employment in non-agricultural activities or daily agricultural wages or other wage workers	Livelihood loser	Subsistence allowance equivalent to Minimum Wages/Minimum Agricultural Wages[1] for 3 months Only agricultural labourers who are in fulltime / permanent employment of the land owner, or those affected full time employees of the business, will be eligible for this assistance. *Seasonal agricultural labourers will not be entitled for this assistance.*
F. Additional Support to Vulnerable Group			
7	Families within the Corridor of Impact (CoI)	Vulnerable affected families	i. One-time Resettlement Allowance of Rs. 60,000/- ii. Training for skill development. This assistance includes cost of training and financial assistance for travel/conveyance and food. iii. Additional Subsistence Grant of Rs. 60,000/- for displaced families belonging to **Scheduled Caste and tribe Category** iv. Displaced vulnerable households will be linked to the government welfare schemes, if found eligible and not having availed the scheme benefit till date.
G. Loss of Community Infrastructure/Common Property Resources			
8	Structures & other resources (e.g. land, water, access to structures etc.) within the	Affected communities and groups	Reconstruction of community structure and common property resources, will be done in consultation with community

[1] As per rates issued by Department of Labor, Government of project state for different skills and trades

S. No.	Impact	Entitled Unit	Entitlement Details
	Corridor of Impact (CoI)		
H. Temporary Impact During Construction			
9	Land and assets temporarily impacted during construction	Owners of land and assets	i. Compensation for temporary impact during conversion e.g. diversion of normal traffic, damage to adjacent parcel of land/assets (crops, trees, structures, etc.) due to movement of heavy machinery and plant site ii. Contractor shall bear the cost of compensation of any impact on structure or land due to movement of machinery during construction or establishment of construction plant. iii. All temporary use of land outside ROW, would be done based on written approval/ prior approval landowner and contractor

CHAPTER 5: STAKEHOLDER'S CONSULTATIONS AND DISCLOSURE

5.1 Introduction

Till very recent, the highway sector involving road projects was being looked at as a field of engineering only. Due to the problems faced in implementation in the development projects in general, and highway sector in particular, over the years, public consultations have acquired a very important role in the planning process for development projects. The practice of involving the communities in the planning process has been recognized as an effective tool for mitigating the negative impacts due to the project and ensuring timely completion of the projects.

In context of the highway projects, which are primarily linear in nature, the issue of involving people in the planning and designing process has a much more significance, as the nature and extent of impact on the social, economic and cultural fabric of the society spread across a larger and a highly varied group of the society.

The project will therefore ensure that the affected population and other stakeholders are informed, consulted, and allowed to participate actively in the development process. Stakeholder's consultation will be done throughout the project cycle, i.e. during preparation, implementation, and monitoring stages.

During implementation and monitoring stages, information will be disseminated to project affected persons and other key stakeholders in appropriate ways. This information will be disclosed in Hindi and other local languages, as required, describing the main project features, project interventions, entitlements for the affected families, implementation schedule etc.

The stakeholder's consultations for the project road were initiated in the year 2012, when DPR preparation was initiated by MoRTH under its NHIIP, which is also World Bank funded project. The DPR was finalized under NHIIP and submitted to MoRTH in June 2014, which was later approved in 2017. Further in December 2018, it was communicated by PWD/RO MORTH to modify DPR as per latest World Bank Guidelines and requirements after World Bank site visits and various meetings between CE (NH), World Bank, and MORTH. To modify DPR as per latest guidelines and to update the project as per revised proposal under GNHCP (Green National Highway Corridor Project) scheme, the census survey data was revised and another round of stakeholder's consultations were conducted to further update the SIA and RAP. The details of stakeholder consultations conducted in 2012 is also included in the report.

5.2 Methodological framework for Public Consultation

Stakeholder's Consultations were carried out in appropriate ways taking into consideration the culture, type of groups consulted and any other factors that might need special consideration. Public consultations in the project area were held at village and Panchayat level.

The different techniques of consultation with stakeholders were used during project preparation, viz., public meetings, group discussions, interactions with affected households, media interactions etc. The consultations have also been carried out with special emphasis on the vulnerable and women groups. The key informants during the project preparation phase included both individuals and groups namely:

- Project affected persons;
- Village Panchayat, Sarpanch and ward members;
- Local voluntary organizations and NGOs;
- Government agencies and departments;
- Other project stakeholders with special focus on women and PAPs belonging to the vulnerable group.

Stakeholder's consultations were conducted at District level as well as at Village Panchayat level as explained below:

A. District Level consultations

District Level consultations were conducted to solicit public and PAPs inputs. Participants in District level consultations included District Magistrate, representatives of District level officials of Revenue departments, NGOs, PAPs and PAP representatives apart from MoRT&H /PIU staff and consultants.

The objectives of district level consultations were:

- To inform public about the project;
- To take suggestions from the local people and also to note their concerns;
- To explain procedures to be followed for land acquisition and payment of compensation and assistance to project affected persons losing their assets due to project interventions.
- To inform people about the census surveys, asset verification, Photography/ Videography, and village level consultations to be conducted as part of SIA and RAP preparation.

B. Local level Consultations

At local level, consultations were conducted in all the affected village panchayats. As per the census data, 31 villages falling under 25 panchayats, will be impacted due to road widening. To initiate the process, Block Development Officers (BDOs) were contacted before conducting public consultations. Respective BDOs further communicated/circulated the information to all village panchayat pradhans/secretaries. Accordingly dates for public consultations in affected villages were scheduled.

As per dates scheduled, the village panchayat Pradhans sent their representatives to inform ("Munaadi" in local language) villagers about schedule dates for public consultation. The public consultations were held at Panchayat Bhavans of respective villages.

During public consultation, people were informed about the project by Consultants, PWD officials, Gram Pradhan/Secretary and ward members. Suggestions from the people were recorded in minutes of meeting. The photographs and attendance sheet for district level consultations and attendance sheet of village level consultations are attached as **Annexure 7**. Minutes of meeting of district level consultations are given in table 5.2 below. Minutes of meeting and photographs of village level consultations is given in table 5.3. Major information shared with the community included:

- Improvement Proposal of the project road and its need
- Type of likely impact in each affected village
- Project Facilities & Safety Features
- Information about measures to be adopted to minimize or compensate the impact.

The various levels at which the consultation were held is shown in **Figure 0.1.**

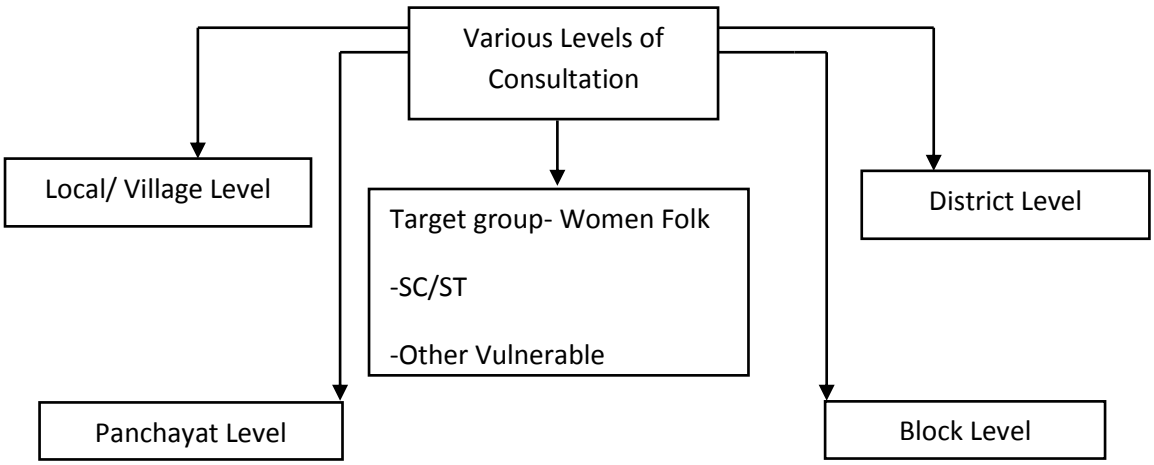


Figure 0.1: Various Level of Consultation

The consultation methods/ types followed to elicit required information (their views & opinions) are detailed below in **Table 0.1.**

Table 0.1: Methods of Public Consultations

Stakeholders	Consultation Method
PAPs	Interactions during census & Socio-economic Survey
Village Pradhan/representative of PAPs	Focus Group Discussions
Local communities	Focus Group Discussions
Women's groups	Focus Group Discussions
Vulnerable groups (SC, ST, BPL)	Focus Group Discussions
Road Construction Department/PWD	Individual interaction, discussion, joint field visit
Line Departments- Forest department, Electricity department, Municipal body, PHED, Telecom Department etc.	Individual meeting/interactions, discussions

5.3 Details of Stakeholder's Consultation

5.3.1 District level Consultations

District Level Public Consultations was organized at six major congested areas, namely,

1. Poanta Sahib BDO office meeting hall,
2. Sataun Panchayat Bhawan,
3. Shillai BDO office meeting hall,
4. Nahan DC office-Sirmaur
5. Gumma Near Panchayat Ghar.
6. Panchayat bhavan, Kafota with Mahila mandal & NGO

Out of the 6 consultation meetings, 4 were organized in 2012 and 2 more meetings were conducted recently (one each in 2018 and 2019) when the project data was further revised based on modified design under GNHCP. In these consultations apart from the PAPs, representative of Block development Officer, Circle Officers, officials of revenue department, Mahila mandal members, NGOs and project authorities etc were present.

The details of discussion and the suggestions received during district level consultations is given below in **Table No. 5.2.**

Table 0.2: Minutes of District Level Consultations in Project Area

S. No.	District	Location, Date and No. of participants	Type of stakeholders	Issues Raised/Discussed	Remarks
1	**Sirmaur**	Nahan DC office, Oct.-2018 No. of participants-about 35	- Commissioner, PWD, DFO's, HRTC, Education Dept., Chamber of Commerce & Industries, Welfare officer, Consultants etc. - Affected persons	• To avoid any delay in project implementation, District Collector requested the forest department to expedite the process of Forest diversion. Local people requested for developing the dumping sites as parking/ rest/ recreational area by leveling and developing the site. • President, HPCCI emphasized the Project road to be designed to 4 Lane configuration after 1.5 Km upto Rajban, due to DRDO project near Rajban. • The stakeholders expressed satisfaction regarding the project as it will improve commercial connectivity and promote tourism. • It was also informed by Ex. Eng. Nahan that 4000 Trees will be planted in lieu of trees to be fell.	1. The concerned DFO assured that within next seven days, the forest case for the diversification of the land shall be forwarded to the principle Chief Conservator Forest Shimla. 2. Ex. Eng. Nahan, explained that around 45 lacs cubic meter excavated material will be recovered from site, out of which nearly 15 lacs Cum. will be reused and balance quantity will be dumped in proposed nine dumping sites which will be developed and improved for various purposes e.g. playground, parks, rest areas etc. 3. The Assistant commissioner, Nahan directed to HPSEBL and IPH department to submit the revised estimates at earliest possible to NH wing of the HPPWD.

S. No.	District	Location, Date and No. of participants	Type of stakeholders	Issues Raised/Discussed	Remarks
2	**Sirmaur**	Poanta Sahib, BDO office Meeting Hall, May, 2012 No. of participants- about 150 (attendance sheet signed by 72 only)	Local Residents, Villagers and Public Representatives' of Tehsil, Gram Pradhan.	1. Affected people showed their concern regarding the rate of Compensation for land and Enquired whether the compensation would be paid at market rate. market value? (Gram Pradhan) 2. People enquired about the widening options, whether the widening would be at both sides of the road stretch 3. It was suggested by the people that in the design of the road stretch rain water disposal and drainage system should be considered. It was enquired by the people that NH –Boundary will be marked before finalization of design.	1 It was informed to the participants that Government will give compensation as per R &R Policy of World Bank and Himachal Government Policy. 2. NH-SDO (Dhaula Kuan) Shri N.K. Verma replied widening is based with regards to design & safety. 3. JEN Dhaula Kuan Shri Suryakant Replied – The consultant has investigated the water drainage system, pipe, culverts and bridges as per design. 4. JEN Dhaula Shri Suryakant replied- At present State PWD has marked it. When NH will acquire the land then NH will mark the boundary.
3	**Sirmaur**	Sataun, Gram Panchayat Pariser, May, 2012	Local Residents, Villagers and Public Representatives' of Tehsil, Gram Pradhan.	1. People enquired about entitlement of tenants for compensation to tenants entitled for compensation.	1 From consultant side –Government will give compensation as per R &R Policy of World Bank and Himachal Government Policy.

S. No.	District	Location, Date and No. of participants	Type of stakeholders	Issues Raised/Discussed	Remarks
		No. of participants- about 225 (attendance sheet signed by 86 only)		2. People inquired about the criteria for compensation to eligible tenants. 3. People enquired about scheme of widening 4. Authority for land Acquisition process was enquired by people, if it will be done by NHAI.	2. JEN, Dhaula Kuan, Shri Suryakant Replied – Widening will be done as per road geometry & position by feasibility and curves. 3. From consultants' side LA assistant replied- Land Acquisition will be done with the assistance of Patwari (Government land assessor). As per Land acquisition plan. The acquired land will be marked.
4	**Sirmaur**	Shillai BDO office Meeting Hall, May, 2012 No. of participants- about 350 (attendance sheet signed by 143 only)	Local Residents, Villagers and Public Representatives' of Tehsil, Gram Pradhan.	1. People enquired about the boundary marking and when the stretch will be finalized by PWD. 2. People enquired about the time period over which the land will be acquired by National Highway and whether has marked the boundary line for land acquisition. They also wanted to know whether the widening would be carried out at both the sides of the existing road equally.	1.NH-SDO (Dhaula Kuan) Shri N.k. Verma replied-State PWD acquires the land then related department marks and fixed the boundary stones. PWD has already marked and fixed by them but due to heavy rainfall the marked stones were either broken or hidden below the silt. 2.NH-SDO (Dhaula Kuan) Shri N.K. Verma replied- The roads' condition will be investigated such as its curves position, then the land acquisition will be done.

S. No.	District	Location, Date and No. of participants	Type of stakeholders	Issues Raised/Discussed	Remarks
				3. People enquired about the amount and rate of compensation to be given for the acquired land.	. 3. From consultant side- Land value will be determined as per present market value. R &R Policy will be based on World Bank and Himachal Government Policy.
5	**Shimla**	Gumma –Tehsil Chopal Outside Patwar Khana, May, 2012 No. of participants- about 250 (attendance sheet signed by 82 only)	Local Residents, Villagers and Public Representatives' of Tehsil, Gram Pradhan	1. At present, the road width is equal from both the sides. People asked that how much more of land is still required for widening of NH? 2. People enquired that how much compensation will be given from the governments' side? (Gram Pradhan) 3. State government PWD has acquired land for road widening but marking is at another place or side. People requested to look into the matter.	1 NH-JEN (Dhaula Kuan) Shri Suryakant replied- For widening road width, curves and diversion is considered. The road width is different on both the sides. 2 Consultant informed that Land value will be determined as per present market value. R &R Policy will be based on World Bank and Himachal Government Policy. 3. NH-JEN (Dhaula Kuan) Shri Suryakant replied- Acquired land has been identified through Khasra numbers by PWD from where the road is passing. Acquired land will be compensated by the Government policies.

S. No.	District	Location, Date and No. of participants	Type of stakeholders	Issues Raised/Discussed	Remarks
6	**Sirmaur**	SARDHA-NGO, Kafota, Oct., 2018 No. of participants-about 150 (attendance sheet signed by 87 only)	NGO SARDHA, Officials from local Gram Panchayats, Local Govt. bodies, Beopar Mandal officials, ASHA workers, College students etc.	1. Students informed that outsider labours may involve in eve teasing and girls and ladies of local area may feel unsafe while morning and especially in night hours. (Student) 2. There are no street lights in habitats and girls feel unsafe while back to their homes from work places during evening/night hours. (Presidnet of Teacher association) 3. Mahila mandal representative requested that payment of compensation to be disbursed may be deposited in individual accounts of ladies instead of joint accounts. (Representative of Mahila Mandal, Kafota) 4. Local people may be preferred for employment in project work during execution. (President, Mahila Mandal Khajuri)	1. Executive Engineer assured that proper check will be maintained on all outsiders and every due consideration will be given that no such unwanted incident occurs. 2. The Executive Engineer NH told to all present that Solar lights have been taken into account for all habitats coming in project stretches and CCTV cameras will also be installed at various locations. 3. Executive Engineer NHHPPWD Nahan assured that proper care has been taken and no such dangers are expected.

S. No.	District	Location, Date and No. of participants	Type of stakeholders	Issues Raised/Discussed	Remarks
				5. Expressed thanks to MoRTH and world Bank for considering this road which will fulfil the needs of local people in much more better ways in coming future since people are facing lot of difficulties in present day to day scenario. (President youth Sports club) 6. Expressed thanks and assured full cooperation from all local bodies when project starts. He desired that lobour coming from outside must be provided basic facilities of sanitation. (President Beopar Mandal) 7. People assured that all outsiders coming in area related to this project will be fully co-operated by local people8. People expressed some fear for villagers since same is located on hill top and heavy excavations and cutting may attribute to sliding of their lands.	

5.3.2 Local Level Consultations

The objectives of local level consultations were to inform the affected persons about the project, R&R policy of GOI/WB, to incorporate their views in the design and mitigation measures as suggested by them. For organizing the local level consultations, Consultation team was framed-up which included one Socio-Economic Analyst specialized in qualitative data collection, two women community organizers, two investigators and one moderator. Group discussions were carried out based on semi-structured guidelines. Efforts were made to cover all those villages having major problems viz., relocation of religious structures or big market or residential area getting affected, etc. Both small and big habitations were covered in order to get representation of all the segments of affected population.

When the project was conceptualized in the year 2012, the local level public consultations were held at few locations during social screening stage. These locations were Badri Chowk in Poanta Sahib, Sataun, Kamrau, Tilordhar, Kafota and Shillai in Sirmaur district and Gumma in Shimla district. Further to this, when the design was to be revised in 2019,census survey was again conducted in September-October 2019 and another round of consultations were carried out with the community to inform them about the proposed and revised design and obtain their suggestions. The latest Local Level public consultations in September 2019 were carried out at almost all affected village panchayats viz. Gondpur, Ajouli, Sataun, Taal sirmour, Muglawala kartarpura, Badwas, Kamrau, Dugana, Bokala pav, Shilla, Ashyadi, Koti Utarau, Pab Manal, Shillai, Bela, Bandli, Bhatnol, Siri kiyari, Drabil, Dharowa, Jhakando, Bohar and Gumma.

These public consultations were majorly attended by private land holders losing their land due to the project. They raised their concerns for adequate compensation and assistance. The details of discussion and the suggestions received during these consultations is given below in **Table No. 5.3.**

Table 0.3: Some Selected Photographs and Minutes of Meeting (Summarized) of the Public Consultations held in Sep., 2019

S. No.	Village Name, Date and number of participants	Common Issues and Suggestions by Villagers	Photos of Public Consultation
1	**Gondpur,** 18/09/2019, 35 no. of Persons	1. People welcomed the road development with suggestion to provide safety provisions to avoid accidents and better riding quality of road. 2. Existing roads are in bad condition. Good road should be constructed with good thickness of material for long durability. 3. They expressed their problem in commuting to school due to bad condition of the road. 4. Link roads should be widened as well.	
2	**Ajouli,** 18/09/2019, 20 no. of Persons	1. People welcomed road development and appreciated for better road provision deliberated in public consultation meeting. 2. They supported the project and requested that road should be designed taking into consideration the safety of the local people during construction stage and business business/ employment opportunities should be provided to the local people during project implementation. 3. They anticipate that with the better road condition will boost the tourism industry in the area.	

S. No.	Village Name, Date and number of participants	Common Issues and Suggestions by Villagers	Photos of Public Consultation
3	**Sataun,** 18/09/2019, 30 no. of Persons	1. Project road is welcomed by people. They suggested that the road widening should be done with provision of road side drains.	
4	**Taal sirmour, Muglawala kartarpura,** 18/09/2019, 25 no. of Persons	1. People welcomed the road project as better road connectivity will be beneficial for local people and will provide improved business opportunities.	

S. No.	Village Name, Date and number of participants	Common Issues and Suggestions by Villagers	Photos of Public Consultation
5	**Badwas,** 19/09/2019, 45 no. of Persons	1. People welcomed the road project as road construction will improve the lifestyle of the people. 2. Road construction should be done with World Bank guidelines. 3. Proper lighting and provision of culverts should be included in the design. 4. Hill Cutting should be minimized. 5. Provision of Retaining structures and crash barriers should be provided for road safety. 6. Toilet facilities should be provided at the proposed bus stop/ shelter. A passenger shed is required at zero point of the village.	
6	**Kamrau,** 19/09/2019, 38 no. of Persons	1. Agriculture land holders demanded that reasonable compensation must be provided. 2. Road safety should be taken care and provisions for Street lights and crash barriers should be included in the design. 3. Speed breakers must be provided near schools and hospitals. Proper signboards to be given near such sites. 4. Project should be environment friendly. Park should be provided. Plantation should be provided. 5. Proper Dump yard must be provided. 6. Toilet and parking facilities should be provided. 7. Provision of Retaining structures and crash barriers should be given to save houses in valley side. 8. Facility for drinking water and passenger shed is required.	

S. No.	Village Name, Date and number of participants	Common Issues and Suggestions by Villagers	Photos of Public Consultation
7	**Dugana,** 19/09/2019, 40 no. of Persons	1. Proper gradient should be provided on project road to avoid water logging. 2. Crash barriers should be provided. 3. Construction of project road will be beneficial for people. 4. Road should be beneficial for farmers. 5. Road will provide better facility for transport of agriculture produces and vegetables. 6. Private land holders and structure owners demanded for adequate compensation.	
8	**Bokala pav,** 19/09/2019, 35 no. of Persons	1. People appreciated the Project road as it will be beneficial for commuting to school for students. 2. Project road will solve many of their problems like conveyance, paved road, lighting etc.	

S. No.	Village Name, Date and number of participants	Common Issues and Suggestions by Villagers	Photos of Public Consultation
9	**Shilla,.** 20/09/2019, 40 no. of Persons	1. People appreciated the road project as Construction of project road will be beneficial for people. 2. Road safety should be taken care and provision of Solar lights and crash barriers should be included in the design. Sign boards must be provided near schools and hospitals. 3. School playground should be provided. 4. Toilet facilities should be provided along the road. 5. Provision of Retaining structures for safety of villagers. 6. Paved Village roads should be constructed. 7. Cutting of hills should be compensated with retaining structures (breast wall with total height of 9m with each step of 3m height & width) 8. Private land which are not of much use should be acquired for dumping yard. 9. Breast wall is required at school building, patwar building, and ayurvedic hospital. 10. Villagers demanded for adequate compensation to residential, commercial and private land owners.	

S. No.	Village Name, Date and number of participants	Common Issues and Suggestions by Villagers	Photos of Public Consultation
10	**Ashyadi,** 20/09/2019, 50 no. of Persons	1. Project road is required urgently. People demanded for adequate compensation for the loss of their houses and shops.	
11	**Koti Utarau,** 20/09/2019, 35 no. of Persons	1. Construction of project road will be convenient and beneficial for people. Reasonable compensation must be provided to families losing their land and house. 2. Project work should be started as soon as possible. 3. Houses built along the road should be kept safe while construction. 4. Double lane road construction will be beneficial for people. 5. Road construction will reduce travel time of passengers.	

S. No.	Village Name, Date and number of participants	Common Issues and Suggestions by Villagers	Photos of Public Consultation
12	**Pab Manal,** 20/09/2019, 55 no. of Persons	1. Cutting should be done with hands instead of machines to avoid any landslide. Retaining structures should be built with crash barriers. 2. Road should be constructed but with less damage. 3. People should be informed before construction of the road because we have land on road.	
13	**Shillai,** 21/09/2019, 30 no. of Persons	1. Local people should be consulted and adequate measures should be taken to minimize dust and noise pollution. 2. Safety measures should be taken during the construction stage to avoid any accidents.	

S. No.	Village Name, Date and number of participants	Common Issues and Suggestions by Villagers	Photos of Public Consultation
14	**Bela,** 21/09/2019, 20 no. of Persons	1. Project road is very necessary. 2. Provision of drain and culvert should be made in the design.	
15	**Bandli,** 21/09/2019, 40 no. of Persons	1. Safety features in valley side must be provided. 2. Village people demanded for adequate compensation for their structure and Land.	

S. No.	Village Name, Date and number of participants	Common Issues and Suggestions by Villagers	Photos of Public Consultation
16	**Bhatnol,** 21/09/2019, 20 no. of Persons	1. Two lane road should be constructed. 2. Adequate compensation must be provided. 3. Safety features in valley side must be provided.	
17	**Siri Kyari,** 21/09/2019, 40 no. of Persons	1. Project road should be constructed as soon as possible. Good quality of material should be used in construction. 2. Cut material should not be dumped in private land. It should be dumped in dumping site to avoid damage. 3. Safety features in valley side must be provided to avoid erosion. 4. Adequate compensation must be provided to structure and land losers. 5. Provision of street light must be given	

S. No.	Village Name, Date and number of participants	Common Issues and Suggestions by Villagers	Photos of Public Consultation
18	**Drabil,** 21/09/2019, 35 no. of Persons	1. Two lane road is very necessary. 2. Adequate compensation must be provided.	
19	**Dharowa, Jhakando,** 21/09/2019, 20 no. of Persons	1. Project road is welcomed. 2. Land holders demanded for adequate compensation.	

S. No.	Village Name, Date and number of participants	Common Issues and Suggestions by Villagers	Photos of Public Consultation
20	**Bohar, Gumma,** 21/09/2019, 45 no. of Persons	1. National highway should be upgraded as existing condition of the road is bad. Two lane road construction is necessary because during apple season the vehicle movement in the area increase many folds and thus creating problem for the local people. 2. Adequate compensation must be provided. 3. Street lights should be provided. Speed breakers must be provided near schools. 4. Paved road and toilet should be provided in market area. 5. Provision of water storage facilities for irrigation purpose should be given. 6. Proper drainage should be provided. 7. Reputed contractor must be hired for construction of road to avoid bad quality of construction. 8. In Gumma market, road level should be 1 m down from shop level (ground level) to avoid water entering in shops.	

Note: During public consultations most of the people were not willing to sign the attendance sheet. However, tentative Nos. of persons attended the meetings is mentioned in the above table.

5.3.3 Information Disclosure through Media

Public consultations were also covered by print media and details of discussions have been reported in local newspapers. Local newspapers have covered the consultations conducted in 2012 (NHIIP) as well as additional consultations in 2018 and 2019. Electronic media coverage was also telecasted in local news channel which reported the details of the project and it's importance in developing better road connectivity in the area which will further promote tourism and business opportunities.

These media coverage helped in information dissemination among the local and affected people about the project interventions and impacts. The copy of newspapers has been attached as **Annexure-8** and media coverage has been attached as CD with this report.

5.4 Summary of findings of all type of consultations

- Majority of PAPs agreed that given the road condition and traffic volume, widening and strengthening is necessary. They agreed that better connectivity enhance economic opportunities.
- Compensation was the major issue in every discussion. Most of the PAPs feared payment of low compensation because of past experience. However, consultants informed them about the procedure of calculating compensation and were also informed about R&R assistance to meet the replacement value. Cash compensation is more preferred by the PAPs. Requests were made by the affected people for providing facilities and amenities like bus stop/rain shelters along the road and safer accessibility at points of congestion and intersections;
- Affected People are hopeful about employment opportunities to be provided to local people during road construction and later phases of the project
- People suggested that adequate safety measures should be provided such as speed breakers, signages, Crash barriers, retaining walls etc. near inhabited areas, school and hospitals. Safety was the paramount concern among the local population staying along the highway.
- It was suggested by the people that in the design of the road stretch rain water collection/harvesting and proper drainage system should be considered.
- Participants were informed that road safety provisions, extra wide road, footpath and drains will be provided in the urban areas.

5.5 Women's participation in consultations and out comes

A public consultation was held with Local People, Various Mahila Mandals, Govt. Bodies, Vyapar Mandal and College Students at Kafota on March 2019 emphasizing issues on Women safety and Women empowerment (photos enclosed in above section & Attendance sheet is attached as **Annexure-7** with this report)

The meeting was called vide Executive Engineer NH Division HPPWD Nahan office letter No. 14582-98 dated 07-03-2019 at Kafota (RD 40/0) on NH 707.

Wide publicity was made and all local people, various Mahila Mandals working in the area for welfare of females, a well prominent NGO SARDHA (Social Action for Rural Development of Hill Area) Reg. under Act. 1860 (XXI), Officials from local Gram Panchayats, Local Govt. bodies, Beopar Mandal officials, ASHA workers, college students etc. participated in the meeting with full enthusiasm. The participants were requested to express their views and any other suggestions for this road project. Questionnaire used in the public consultation regarding Women safety & Empowerment and Answers by female participants has been given in **Chapter-VII** of this report. The details of discussion and suggestions put forward during this meeting are summarized below:

1. Only primary health centers (PHCs) are located in villages and the quality of treatment and medical facilities are less than satisfactory. In emergency they have to reach hospitals at district headquarters only.
2. The major part of the stretch depends on the hand-pumps for its water needs; the issue of replacement of hand-pumps attains a very special significance in context of the women.
3. The women feel that their mobility will increase as market & relative's places will be easily accessible for them as better road condition will induce more transport vehicles to operate. More shops, markets will open within the village approach area and as a result they will get quality leisure time at their disposal
4. The girl students will be able to attain higher education at colleges, since journey time and cost will be greatly reduced and the girls can commute from home all by themselves free of hazard.
5. Women from poor families will get job opportunity during construction work as casual labour or at office. Besides, women can operate individual / family enterprise by opening small tea stalls, Shops/eateries to provide meals to the construction labourers. This will enhance their family income as well as their entrepreneurial skill, which may be useful in future.

6. Women labourers feel that improved road network will provide them with better job opportunity as they will be able to travel further and even can commute from home. Moreover, travel by public transport system, like Govt. bus service, will become cheaper and money saved on transport can be better utilized for household needs.

5.6 Disclosure

The SIA and Draft Resettlement Action Plan (RAP) would be disclosed on MoRTH website as well at the World Bank Info-shop/ Public Information Centre. Feedback if any would be incorporated into the final RAP document, following which the final RAP will be re-disclosed. Further to enhance transparency in implementation, the list of PAPs for disbursement of benefits shall be separately disclosed at the concerned Panchayat Offices/ Urban Local Bodies, District Collector Offices, Block development Offices, District Public Relations Offices (at the state and district levels), Project office, and any other relevant offices, etc. The Resettlement Policy Framework, Executive Summary of the SIA and RAP will be placed in vernacular language in the District Collector's Office.

5.7 Framework for continued consultation

Information dissemination and consultation will be held during RAP implementation, monitoring and evaluation stages. Consultation will be carried out by the Project Authority through NGO with active involvement of R&R officer at project level. Besides, the Social officer at state level will also carry out consultations with PAPs, local community and other government department officials at suitable time intervals directly with support from NGO and R&R Officer at site.

The information dissemination and consultation will start after the mobilization of NGO at site. It will be carried out by organizing public meetings at suitable locations involving PAPs, local communities, local authorities, NGOs, and other institutions available in the area. Leaflets containing brief information about the project, policy provisions, entitlements, GRC, etc shall be given to PAPs and local authorities as prior information. A month wise work plan for holding consultations will be prepared by the NGO and submitted to R&R Officer. The date, time and venue for holding consultations will be intimated to PAPs, local community and local authorities at least 7 days in advance. The timing of consultation shall be fixed as per the suitability of villagers giving due consideration to peak working time. The intimation for the consultation shall be done by way of drum beating, announcement by loud speaker and by putting up information on the notice board of concerned village/town, and other such public places.

The team of NGO must have women and tribal members while carrying out consultations. Separate/additional consultations/interactions with the women, tribal and other vulnerable groups shall be organized.

After verification of PAPs, list of PAPs will be displayed in the concerned village/town. In the consultation meetings various aspects covered in the RPF will be explained for better understanding of the people in general and PAPs in particular. It is expected that people would have several questions and doubts which require clarifications. The forum will provide a platform to discuss those questions and clear doubts. Consultations with people at frequent intervals would improve their understanding about the project, importance of their participation and also the likely benefits associated with the project. Further, one to one consultations with PAPs will also be carried out by the RAP implementation agency to inform the extent of impact, explain the entitlement, importance of identity card, opening of joint account, mechanisms for grievance redress, and also providing suggestions and complaints. Micro plan approved by the project authority will be placed in concerned villages with panchayat office for review and to minimize grievances. Every item contained in the micro plan shall be explained to the satisfaction of PAPs so that there is no scope of any grievance at a later stage. Further, consultations at household level will be undertaken for skill improvement training purpose, use of compensation amount and livelihood restoration.

In the first three months of the RAP implementation, at least 3 rounds of consultations will be carried out at those locations where project is likely to cause adverse impacts.

In addition to the above, the Social Officer (at State Level) shall separately organize information dissemination and consultation meetings every quarterly in the project stretch. In the consultation meetings various aspects of the project would be explained and also the status of the project (technical, social & environmental) would be revealed. PAPs, local community and others would be given opportunity to discuss issues and seek clarifications in context of the project. It is expected that regular interactions with PAPs and local community directly and through NGO would help build good rapport with them. Printed leaflets/ information booklets would be prepared by the Social Officer for distribution in the project area. The Social Officer will play lead role to explain various aspects of the project, importance of consultations and also seek their participation and co-operation in the project. The RAP implementation agency will help and assist the Social Officer (Project Authority) organizing information dissemination and consultation meetings without any additional financial implications. For wider publicity of the consultation meetings similar procedure shall be followed. In addition, government officials in the surrounding areas shall be officially invited to participate in the meetings.

A Minutes of Meeting would be prepared and read out to people present in the meeting. The Minutes of Meeting would be signed by the officials and some of the participants present and will be kept in project file documentation purpose.

5.8 Suggestion and Complaint Handling Mechanism (SCHM)

The MoRTH recognizes the importance of this and hence intends to establish a SCHM for the NHIIP. The communication channels to report project related complaints/concerns will be disclosed at all levels of institutions—MoRTH, State, Project/site level.

Though the Right to Information Act, 2005 an Act of the Parliament of India provides for setting out the practical regime of right to information for citizens. The Act applies to all States and Union Territories of India except the State of Jammu and Kashmir. Under the provisions of the Act, any citizen may request information from a "public authority" (a body of Government or "instrumentality of State") which is required to reply expeditiously or within thirty days. The Act also requires every public authority to computerize their records for wide dissemination and to pro-actively publish certain categories of information so that the citizens need minimum recourse to request for information formally. In other words under the act, citizens have right to seek information from concerned agencies by following the set procedures. However, it is quite likely that many people may not use the provisions of this Act, only in limited cases covering serious concerns. Being an inter-state project involving several states and large scale of civil works along with R&R and environment issues, the project is likely to receive many suggestions, complaints, inquiries, etc through the project implementation period. Therefore, MoRTH has agreed to establish SCHM as a good practice to address public concerns pertaining to various issues. SCHM will report all project related LA and R&R of the PAPs for redressal through the concerned PIU or GRC as appropriate. Several communication channels viz., toll free phone number, dedicated email, mechanism for on line submission of suggestions/complaints/inquiries, provision of suggestion/complaint box (at site and project office), post and other suitable means shall be set up for suggestion and complaint handling.

From the initial stage of the RAP implementation, the RAP IA will also disseminate information regarding SCHM to local people and road users by organizing consultations, distributing fliers, announcement by loud speakers, hoardings, etc. During consultations the RAP IA personnel will explain the process of SCHM in detail.

CHAPTER 6: ANALYSIS OF ALTERNATIVES AND MINIMIZATION OF IMPACTS

6.1 General

The mandate of the current project is to widen the existing road to 2 lanes with provision of paved shoulder in the built-up sections and hence there no alternative site is involved. However, the chapter discusses on the "With" and "Without" project scenarios. The methodology that has been adopted for the evaluation of the alternate alignment route for construction of Project Road and the selection is based on engineering, economic, environmental and social considerations have been highlighted. The minimization of social impacts by considering design alternatives determines the extent of mainstreaming of the social component. This chapter looks at the decisions made during the project when alternatives were available and describes the rationale behind each decision..

6.2 "With" and "Without" Project Scenario

Keeping in view the site conditions and the scope of development of the area, the 'with' and 'without' project scenarios have been compared as given in Table 6.1.

By looking at the table 6.1, it can be concluded that "With" project scenario positive/beneficial impacts will enhance social and economic development of the region compared to the "Without" project scenario, which will further deteriorate the present environmental setup and quality of life. Hence the "With" project scenario with minor reversible impacts is an acceptable option than the "Without" project scenario. The implementation of the project therefore will be definitely advantageous to achieve the overall development of the economy and progress of the region.

The project will have multiple benefits. The project will increase the potential of the area and fast connectivity between Himachal Pradesh, Uttarakhand and Haryana. Being improved limestone linkage from Sataun, there is further scope of installation of 17 Nos. new factories at Gumma, which is under active consideration of Government of Himachal Pradesh.

Table 0.1: 'With' and 'Without' Project Scenario

Component	Without' Project Scenario	With' Project Scenario
Connectivity and Development	• The connectivity between the other National and State Highways is not good. • Existing connectivity with	• It will improve inter-connectivity between other National Highways (NH-707, NH-124 and various

Component	Without' Project Scenario	With' Project Scenario
	Delhi, Haryana and Uttarakhand need to be improved, for the economic beneficial transportation of horticulture produces and apples. • Pavement conditions are in poor condition resulting in high travel time, bad vehicle conditions, and more pollution. • Poor pavement conditions restricting people's access to local market, Medical facilities, education centers, work zones etc.	PMGSY roads). • Connectivity with Haryana, Delhi and Uttarakhand will improve. • Travel time will be reduced due to improved pavement conditions and road geometry and hence Pollution levels will be reduced as well. • Trade of local produce like dairy products, agriculture products, and smallscale industrial product will also be increased.
Social and Cultural Environment	• There will not be any impact on existing social and cultural environment.	• 290 structures including 16 common property resources will be affected due to proposed widening. • Necessary R&R plan has been developed to address the socio economic impact due to the proposed project. • Total private land acquisition will be 8.92. ha.
Carriageway	• 2 lane/ intermediate / earthen shoulder	• 4 lane, 2 lane with paved shoulder and intermediate lane at various chainages has been proposed to improve the road condition.
Drainage/ Water logging	• Water logging issues are observed along the road side specially settlement area due to absence/non-functional drains.	• Water logging conditions will be improved by reconstruction of culverts/ bridges with adequate hydraulic (details are provided in Chapter-2 Project Description) • New cross drainage structures and drains are also

Component	Without' Project Scenario	With' Project Scenario
		provided to address the flooding and water logging issues.
Financial Implications	• Without project scenario does not involve any capital cost, but there will be recurring maintenance cost to maintain the smooth flow of traffic.	• The total R&R cost will be about 91.62 crores.

The potential benefits of the proposed road improvements are substantial and far-reaching both in terms of the geographical spread and time.

Further, there is vast scope for many pharmaceutical industries and limestone industries after up-gradation of NH-707. This project will also reduce the travel time substantially. In addition this project road will provide further other benefits like:

- ❖ Fast and safe connectivity resulting in saving in fuel and Total Transportation cost to the society;
- ❖ Employment opportunities to local people during road construction;
- ❖ Development of local industries, agriculture and handicrafts;
- ❖ Development of tourism and pilgrimage;
- ❖ Transporting, processing and marketing of agricultural products;
- ❖ Reduction in accidents;
- ❖ Reduction in pollution;
- ❖ Opening of opportunities for new occupations;
- ❖ Better approach to medical & educational services and quick transportation of perishable goods like fruits, vegetables and dairy products; and
- ❖ Improved quality of life for people and so on

However, there would be an increase in the vehicular pollution-air and noise, in the vicinity of the highway. This road construction will result in loss of private properties and loss of living. But at the same time, if the project is not implemented, there is likelihood that with the further deterioration of the project road, the economic development and business opportunities in the area will be hampered. Hence, it is clear that the implementation of the project will be a definite advantage to State of Himachal Pradesh in order to achieve all-round development of its economy and progress of its

people.

6.3 Safety Aspects

While assessing the impacts, safety of the road users and the roadside communities has been found to be a major concern. A number of measures have been proposed to reduce the risk of traffic accidents. In some places, these safety measures are co-terminus with the project's impact minimization measures. Horizontal profile correction and intersection improvement has been suggested for betterment of the project corridor. Other safety measures taken are:

- ❖ Improvement of existing curves in road design,
- ❖ Improvement of existing Curve at bridge approaches.
- ❖ Provision of adequate traffic signage,
- ❖ Widening of bridge with footpath in built-up location,
- ❖ Embankment protection in approaches to bridge,
- ❖ Foot path and pedestrian guard rails in built up zone,
- ❖ Improvement of existing highway junction,
- ❖ Retro-reflective painting on roadside plantations.
- ❖ Provision of retaining walls, breast walls, gabion walls, other engineering and bio-engineering measures of slope protection to avoid landslides.

6.4 Why alternative for realignment and bypasses are not applicable for this road

The project road having a total length of 97 Km is majorly passing through mountainous and steep terrain (in about 85 Km length). The existing alignment is deficient in geometry with around 1,800 nos. of horizontal curves and vertical gradient up to 18% at some places which is proposed to be improved. Hence, due to presence of steep terrain, availability of limited land and involvement of huge amount of cutting of rocks provision of any further realignment and bypass is not feasible. Also, Provision of this will lead to heavy amount of land acquisition and increased project cost.

6.5 Minimization of land uptake by providing intermediate carriageway

By keeping in view the traffic projections and widening requirements, intermediate lane configuration (5.5 m) has been proposed in last 24.900 Km stretch. This will further reduce the impact on land acquisition that would have occurred by provision of two lane carriageway. For intermediate carriageway corridor of impact varies from 11 m to 14 m as compared to 14 m to 18 m for two lane carriageway.

6.6 Minimization of land uptake by eliminating paved shoulders

Four lane configuration has been proposed in the initial 1.500 km section due to presence of built-up area of Paonta Sahib. Beyond this, two lane configuration with paved shoulder has been proposed in a length of 16.300 km due to presence of industrial area and heavy truck movement upto Sataun which is also a major stockyard of lime. Beyond this point, two lane and intermediate carriageway has been provided in a length of 52.800 km and 24.900 km without the provision of paved shoulder which will also reduce the corridor of impact and minimization of land use.

CHAPTER 7: SOCIAL IMPACTS OF THE PROJECT

7.1 Introduction

The proposed project can be viewed as boosting economic growth and poverty reduction which will bring substantial social and economic development in the region. The social benefits arising due to the project will be triggered off by the improved accessibility to various services such as easy access to markets, health facilities, schools, workplace etc. It will in turn increase the income of the local people and elevate their standard of living. The possible direct and indirect positive impacts are listed below:

- The immediate benefit of road construction and improvement is that it brings direct employment opportunities for the roadside habitations. Especially for those who work as daily wage laborers etc.
- Improved road networks provide better links between villages, communities and urban areas. It provides wider access to market facilities, health centers, education etc.
- Improved road networks encourage urban entrepreneurs to invest in far and remote areas in commercial farming and industrial activities.
- Improved roads also help people building strong institutional network with outside agencies.
- Road network not only link people to better markets but also introduce them to newer work opportunities at distant places. People can shuttle to distant places for work such as engage in construction, factories, business as well as domestic works.

Due to the proposed project, a number of adverse effects are also likely to be encountered by the people. The losses likely to be experienced by the people are loss of residential structure, loss of commercial structure, loss of agricultural land, loss of fruit bearing and non-fruit bearing trees, loss of common property etc.

In this particular stretch, the impact of land is due to curve improvements at few locations. In context of the existing RoW and the encroachments in the RoW, the project-affected structures are owned by both titleholder and non-titleholders.

To assess the impacts likely to arise from land acquisition, the detailed Census Survey was conducted in the month of September-October, 2019 for each affected household/structure. During the Census survey, Socio-economic data was also collected as much as possible. However, some of the families were not willing to share

complete information mainly related to family details, income level, assets owned etc. In such cases, their data has not been included in the analysis and have been separately mentioned under each section. Collected data and information regarding project impacts and socio-economic data is presented in subsequent sections in this chapter.

7.2 Land Availability

The project road is Intermediate/Two Lane from Chainage Km 0 to Km 11.500 and is Single/ Intermediate Lane from Chainage Km 11.500 to Km 97.000. Based on detailed field verification with the help of revenue maps, it has been found that the land width in project section is varying between 8 to 32.5 m. The chainage wise existing ROW details collected from Revenue and PWD department is attached as **Annexure-2.**

7.3 Land requirement for the project

Land is to be acquired for junction improvement, curve improvements, widening and for dumping purposes. In total, 29 villages will be affected due to land acquisition. District-wise Land Acquisition Details of the affected villages is given in tables **Table 0.1** below.

Table 0.1: Land Acquisition by District

District	No. of Village (Land to be Acquired)	Land Required (Area in Ha)
Sirmaur	27	9.405
Shimla	2	2.3373
Total	**29**	**11.7423**

Source: *As per LA Plan (Approved 3A) Sep, 2019*

The additional land required as per final design, which is 11.7423 ha, includes both government and private land. Out of 11.7423 Ha, 8.9153 ha is private land which will be acquired for the project. **Table 0.2** shows the Land type required for the project road.

Table 0.2: Type of Land Required

District	Private	Government	Total
Sirmaur	8.8889	0.5161	9.405
Shimla	0.0264	2.3109	2.3373
Total	**8.9153**	**2.8270**	**11.7423**

Source: *As per LA Plan (3A) Sep, 2019*

7.4 Impact on land

The project requires acquisition of 8.9153 Ha of private land and the acquisition will

be done as per the provisions of the National Highway Act 1956. Out of total 8.9153 ha. private land, area requirement for road widening/curve improvement will be 69.01%, for dumping sites 25.37% and for other facilities will be 5.62%. The activity wise requirement for land acquisition is given below:

Table 0.3 Land Required for Road Widening/ Curve Improvements, Dumping Sites, Facilities

Sr. No.	Particulars	Land Area (ha.)	Percentage
1	Road widening/ curve improvements	8.1036	69.01
2	Dumping Sites	2.9787	25.37
3	Truck lay-by	0.66	5.62
Total		**11.7423**	**100**

In total, 433 landholders will be impacted due to land acquisition. A major portion of the land will be acquired in Sirmaur district where 406 private landholders will lose their land. In Shimla district, only one private landholder is losing land. District wise breakup of the number of affected landholder is given in below table:

Table 0.4: Summary of Total Landholders

District	Private	Govt.	Total
Sirmaur	406	15	421
Shimla	1	11	12
Total	**407**	**26**	**433**

Out of the 407 private landholders impacted, 77.6% are agriculture landholders and 22.4% are non-agriculture landholders. List of agriculture and non-agriculture private landholders is given in table 7.5 below:

Table 0.5: Agriculture and Non-agriculture Land

District	Agriculture	Non-Agri	Total
Sirmaur	316	90	406
Shimla	0	1	1
Total	316	91	407
Percentage	**77.6**	**22.4**	**100**

Source: *As per LA Plan (Approved 3A) Sep, 2019*

7.5 Impact on structures

The project between Chainage km 0 to km 11.500 has built-up areas with commercial establishments and the road is mostly Barren Hilly land with patches of forest and Habitations between Chainage km 11.500 to km 97.000. During the Census survey in the month of Sep.-Oct., 2019, it was found that there are encroachments within the existing ROW. Among the Non-titleholders, majority of the affected households are encroachers. The nature of activities of Non-titleholders varied from small shops, tea stalls, grocery, general stores, cigarette/ pan stalls, shoe repair, auto repair shops etc. As per the Census survey, a total of 290 structures will be impacted due to project activities which includes 274 private structures and 16 Community Property resources.

7.5.1 Impact on structures by usage of structure

As per the census survey, 290 Nos. structures will be affected out of which 53.10% are commercial structure. About 22.76% are resident-cum-commercial structures. It was noted during field visits and consultations that many owners of these structures have extended a portion of their property into the government land to open small shops (made of tin sheds). In majority of the cases, with the road widening they will be losing this commercial establishment only and will not have much impact on the residential part. A total of 16. CPR & Govt. properties will also be impacted due to the proposed project. **Table 0.6** Shows the Impact on structures by Usage.

Table 0.6: Impact on Structures by Usage

Name of District	Residential	Commercial	Res cum commercial	CPRs /Govt.	Total
Sirmaur	50	140	60	14	264
Shimla	4	14	6	2	26
Total	**54**	**154**	**66**	**16**	**290**
Percentage	18.62	53.10	22.76	5.52	100

Source: *Sept.-Oct., 2019 Census Survey, CEG*

7.5.2 Impact on structures by typology of structure

Out of total 290 structures, 162 structures (55.86%) are permanent in nature which includes all the 16 CPRs/Govt. impacted structures. About 31.38% of affected structures are temporary in nature. The **Table 0.7** gives the details of Impact on structures by typology.

Table 0.7: Impact on Structures by Typology

District	Permanent	Semi-Permanent	Temporary	Total
Sirmaur	147	30	88	265
Shimla	15	7	3	25
Total	**162**	**37**	**91**	**290**

Percentage	55.86	12.76	31.38	100

Source: *Sep.-Oct., 2019 Census Survey, CEG*

During the census survey, the affected area of the settlements was calculated by taking measurements from existing centerline to COI. Most of the structures are partially affected and very few structures are affected fully or loosing total land. The affected permanent & Semi-permanent structure area is 4204.71 sq m, and temporary structure area is 1074.87 sq m.

Table 0.8: Affected Area of Structures

Sr. No.	Type of structure	Affected Area (Sq. M.)
1	Permanent & Semi-Permanent	4204.71
2	Temporary	1074.87
Total		**5279.58**

7.5.3 Impact on Common Property Resources (CPRs)

CPRs impacted include religious structures, Bus stop and govt. building. Total 16 CPRs are getting affected which includes 2 religious structures, i.e. temple and 10 Bus Stops. **Table 0.9** Shows the Impact on Common Property Resources.

Table 0.9: Impact on Common Property Resources

CPRs	Nos.	Percentage
Religious Structures (Temples)	2	12.5
Hand Pump	1	6.25
Bus Stop & Sheds	10	62.5
Govt. Building	3	18.75
Total	**16**	**100.00**

Source: *Sep.-Oct. 2019, Census Survey, CEG*

7.5.4 Ownership status of private structures

Out of 290 affected structures, 274 are private structures. Out of total 274 affected structures, 36.1% structures are owned by titleholders (Owners), 57.7% are Encroachers and 6.2%. are squatters. **Table 0.10** Impact on Structures shows the district wise details on impacted structures.

Table 0.10: Impact on Structures

Name of District	Titleholders	Encroachers	Squatter	Total
Sirmaur	89	146	16	251
Shimla	10	12	1	23

Total	**99**	**158**	**17**	**274**
Percentage	36.1	57.7	6.2	100

Source: *Sep.-Oct., 2019 Census Survey, CEG*

7.5.5 Affected Households & Persons

The socio-economic characteristics of the project affected habitation have been analyzed based on information collected during Socio-economic survey. As per the census survey, 274 households and 938 PAPs will be impacted due to the project, as shown in **Table 7.11.**

Table 0.11: Affected Households and PAPs

District	Affected households	PAPs
Sirmaur	251	897
Shimla	23	41
Total	**274**	**938**

Out of total 938 project affected persons, 521 are males and 417 are females with a sex ratio of 800, which is very poor in comparison to national sex ratio of 943.

Table 0.12: Affected Male & Female Population

Districts	Male	Female	Total
Sirmaur	493	404	897
Shimla	28	13	41
Total	**521**	**417**	**938**

7.6 Socio-Economic survey of project affected households

The socio-economic survey of affected households was conducted along with census survey conducted in Sept.-Oct., 2019. A questionnaire was used for both census and socio-economic surveys which is attached in **Annexure-4.** The socio-economic details of the people includes their education status, Social stratification, Income level, Occupation etc.

7.6.1 Demographic details of affected households

As per the census and socio-economic survey, total household affected are 274 and the total PAPs are 938. The sex ratio of the affected households is 800 females over 1000 males. The literacy rate of affected household is 78%. The details of summary of households is given in

Table 0.13, which shows village wise breaks up of proposed project affected people with their sex ratio and literacy rate.

Table 0.13: Village Wise Demographic Details of Affected Households

Districts	Project Affected Villages	Affected PAHs	Affected PAPs Total	Males	Females	Sex Ratio	Literacy of PAHs (%)
Shimla	Gumma	8	15	12	3	250	86.7
	Jamli	4	5	3	2	667	40.0
	Meenus	8	18	10	8	800	50.0
	Rohana	3	3	3	0	0	33.3
Sirmaur	Badripur	33	160	83	77	928	85.0
	Bokala	1	4	2	2	1000	100.0
	Chandav Malan	2	9	4	5	1250	44.4
	Chillon	2	8	5	3	600	50.0
	Dabraha	3	5	3	2	667	40.0
	Drabil	4	8	4	4	1000	75.0
	Dhakkardhar	1	NA*	NA	NA	NA	NA
	Fedewala	1	2	1	1	1000	100.0
	Gangtoli	3	4	2	2	1000	50.0
	Gondpur	5	10	6	4	667	80.0
	Havena	5	13	7	6	857	69.2
	Jawalapur	5	16	8	8	1000	75.0
	Kafota	21	74	42	32	762	73.0
	Kamrau	28	136	77	59	766	82.4
	Kando	1	2	1	1	1000	50.0
	Khijiyar	3	12	8	4	500	83.3
	Nariwala	1	NA	NA	NA	NA	NA
	Nihalgarh	1	2	1	1	1000	100.0
	Rajban	2	4	2	2	1000	100.0
	Sataun	4	18	10	8	800	72.2
	Shilla	3	6	4	2	500	100.0
	Shillai	57	162	88	74	841	76.5
	Shri Kayari	1	2	1	1	1000	100.0
	Tal Sirmaur	1	2	1	1	1000	100.0
	Taruwala	8	35	21	14	667	82.9

Districts	Project Affected Villages	Affected PAHs	Affected PAPs Total	Males	Females	Sex Ratio	Literacy of PAHs (%)
	Tilordhar	22	90	51	39	765	78.9
	Timbi	33	113	61	52	852	77.9
	Total	**274**	**938**	**521**	**417**	**800**	**78.0**

Source: *Sep.-Oct. 2019, Census Survey, CEG (NA*-Not Available)*

7.6.2 Social Category

Out of total 938 PAPs, about 60% belong to General cast, 11.7% are SC, 15% are OBC and 13.5% are others who did not respond about their cast. There is no ST family found to be affected during survey. Villages wise break up of households getting affected as per their social stratification is given in below table 7.14.

Table 0.14: Village Wise Social Stratification of Affected Households

Districts	Affected Villages	Gen	SC	ST	OBC	Not Responded
Shimla	Gumma	8	0	0	0	0
	Jamli	1	0	0	1	2
	Meenus	1	2	0	2	3
	Rohana	2	0	0	0	1
Sirmaur	Badripur	20	4	0	5	4
	Bokala	1	0	0	0	0
	Chandav Malan	1	0	0	1	0
	Chillon	0	2	0	0	0
	Dabraha	1	1	0	0	1
	Dhakkrdhar	0	0	0	0	1
	Drabil	1	0	0	3	0
	Fedewala	1	0	0	0	0
	Gangtoli	1	1	0	0	1
	Gondpur	0	0	0	2	3
	Havena	2	1	0	0	2
	Jawalapur	2	0	0	3	0
	Kafota	16	3	0	2	0
	Kamrau	24	1	0	1	2
	Kando	0	0	0	1	0
	Khijiyar	0	0	0	1	2
	Nihalgarh	1	0	0	0	0
	Nariwala	0	0	0	0	1
	Rajban	2	0	0	0	0

Districts	Affected Villages	Gen	SC	ST	OBC	Not Responded
	Sataun	3	1	0	0	0
	Shilla	3	0	0	0	0
	Shillai	35	11	0	1	10
	Shri Kayari	1	0	0	0	0
	Tal Sirmaur	0	0	0	1	0
	Taruwala	3	1	0	4	0
	Tilordhar	15	1	0	6	0
	Timbi	19	3	0	7	4
	Total	**164**	**32**	**0**	**41**	**37**
	Percentage	59.9	11.7	0.0	15.0	13.5

Source: *Sep.-Oct. 2019, Census Survey, CEG*

7.6.3 Family Types

The socio-economic survey revealed that the average family size of the affected households is 3.42 persons and the concept of joint family is still prevailing in the region. Out of affected 274 households, 65 households did not share their family information during the census survey and thus has not been included in below table 7.10. Out of total 274 affected households, 36.86% are joint families and 39.42% is nuclear family. The nuclear family in the project affected area is growing due to migration, employment etc. **Table 0.15:** gives the family type of the project households/ families.

Table 0.15: Family Types of PAHs

District	Nuclear	Joint	Info Not Avail.	Total
Sirmaur	98	86	-	**274**
Shimla	10	15	-	
Total	**108**	**101**	**65**	
Percentage	39.42	36.86	23.72	100

Source: *Sep.-Oct. 2019, Census Survey, CEG*

7.6.4 Literacy & Educational Status

The social development of a region can be signified by many indices, one of which is literacy status of the population. It was found that out of the total affected PAPs who have achieved education upto primary level are 16.2%, Upper primary are 19.7%, high school are 17.5% and graduation are 17%. Only 4.4% of the affected PAPs have completed their post-graduation or are technically qualified. About 6% of the PAPs didn't respond about their educational qualification. **Table 0.16:** shows Literacy Status of the project-affected persons.

Table 0.16: Literacy Status of PAPs

Literacy Level	Sirmaur	Shimla	Total	Percentage
Illiteracy	166	14	180	19.2
Primary	145	7	152	16.2
Upper primary	179	6	185	19.7
High School	159	5	164	17.5
Graduate	156	3	159	17.0
Technical	7	0	7	0.7
Post Graduate	32	3	35	3.7
Not Responded	49	7	56	6.0
Total	**844**	**38**	**938**	**100**

Source: *Sep.-Oct. 2019, Census Survey, CEG*

7.6.5 Occupational Pattern

Occupational pattern of the head of the household and members were recorded during the Census cum Socio-economic survey. Out of 938 PAPs, 617 persons are either housewives, children or elderly persons. They have not been included in the working population and are not included in the below table.

Occupational pattern reflects the dominant economic activity in the area. The affected PAPs are mainly engaged in trade and business (38.32%). A small percentage of earning members (22.12%) is either servicemen or are in professional jobs. About 22% persons are engaged in agriculture and agriculture labor work. **Table 0.17:** shows the occupational background of the project-affected persons.

Table 0.17: Occupation Patterns of PAPs

Type of Occupation	Persons	Percentage
Agriculture	10	3.12
Agriculture Laborer	62	19.31
Service\ Professional	71	22.12
Trade\ Business\ Self Employed	123	38.32
Non Agricultural Labourers	55	17.13
Total	**321**	**100**

Source: *Sep.-Oct. 2019, Census Survey, CEG*

7.6.6 Income Level

Annual Income helps in assessing family's financial condition. During the Census survey incomes of a household through the Questionnaire were recorded. As most of the household were not willing to share this information, data of 219 households is presented in table below. As per available information collected during survey, The

Income Level of the affected households is mostly (71.5%) above Rs. 60,000 per annum. About 8.4% families earn between 36,000 to 60,000 per annum. About 20% families didn't share information about their income level. **Table 0.18:** shows the income level of the affected households.

Table 0.18: Income Level of PAPs

Income Slab	Number of Household	Percentage
Up to 36,000 per annum	0	0
36,000-60,000 per annum	23	8.4
60,000 & above per annum	196	71.5
Not Responded	55	20.1
Total	**274**	**100**

Source: *Sep.-Oct. 2019, Census Survey, CEG*

The proposed road alignment will reduce the distances and improve the road conditions. This will facilitate growth of more economic activities, access to better economic prospect outside the area and hence increase in income generation.

7.7 Vulnerable groups

The information on vulnerable groups were also collected during / Socio-economic survey. Many households belonged to Schedule Caste, Below Poverty Level (BPL) categories and many households were vulnerable in context that the head of the households were either Physically Challenged, Women Headed Households (WHH) or Old Aged (above 65 years). The affected households falling within any of these groups has been considered as vulnerable group. These households need special consideration so that they can be benefitted from the project and do not further get socially and economically marginalized Single vulnerability has been considered for affected households falling within any of these categories. As per the socio-economic survey, Women Headed Household and BPLs are least in number among the affected households. None of the affected household belong to ST category. Total affected SCs households are 31 Nos. and 42 Nos. persons falls in old age (>65 years) category. There are 8 BPL families getting affected which accounts for 3% of the total affected households. **Table 0.19:** gives the details of the vulnerability category.

Table 0.19: Vulnerability Category

Vulnerability Category	No. of Households
Women Headed Household	8
Physically Challenged	9

Below Poverty Line	8
Scheduled Caste	32
Scheduled Tribe	-
Total	**57**

Source: *Sep.-Oct. 2019, Census Survey, CEG*

7.8 Impact on women

Project would impact 8 Women Headed Households. The percentages of such families affected are around 3% from the total affected households. For the purpose of compensation and assistance to be provided to these households, it is better to consider the absolute number of such families in the affected and displaced categories. Chapter 7 provides details on mitigation and other support measures regarding gender issues.

7.9 Level of impacts

Out of the total 274 private structures, 97 structures will be fully affected. Most of these fully affected structures (79.38%) are commercial in nature and are non-titleholders. The details of fully affected structures are given in Table 7.20. During census survey and public consultation, it was noted that the owners of these structures have been residing here since two/three generations and they d not want to be relocated. They have demanded for adequate compensation and assistance, so that they can make their own arrangements.

Table 0.20: Level of Impacts

S. No.	Descriptions	Nos.	Percentage
1	Losing Total House	4	4.12
2	Losing Total House and part of Plot (Aangan or Courtyard	2	2.06
3	Losing Total Plot and Total House	3	3.09
4	Losing Total Commercial Structure	77	79.38
5	Losing Total Commercial Structure and Total Plot	5	5.15
6	Losing Total House and Total Commercial Structure	5	5.15
7	Losing Total Livelihood for Commercial Tenant	1	1.03
	Total	**97**	

Source: *Sep.-Oct. 2019, Census Survey, CEG*

CHAPTER 8: GENDER ISSUE & WOMEN'S PARTICIPATION

8.1 General

There are important aspects related to women that need to be be addressed. Women are going to experience socio-economic impacts due to acquisition of land for the project and during the construction//implementation phase.

Impacts on women due to land acquisition have been addressed in the following section. 'Women's Participation' deals with the aspects of the project on RAP and during the construction phase. Women as a vulnerable group, woman-headed households, livelihood and training for women, etc., are mentioned in other Sections of the Report also.

Global Context: Recent estimates by the World Health Organization indicate that 35 percent, or one in three women worldwide have experienced some form of physical or sexual assault. GBV is an expression of gender inequality that prevents women and their families from escaping poverty, drains public resources and impedes human development and economic productivity.

National Context: Women and girls in India today continue to experience multiple forms of violence, across multiple intersections, including of religion, caste, class, abilities and sexual orientation. In India, the global data on gender violence is complemented by NFHS (National Family Health Survey (NFHS4), 2015-16 at the national level which shows that 30 percent of women have experienced physical violence since age 15, and 6 percent have ever experienced sexual violence in their lifetime. 33 percent of ever-married women have experienced physical, sexual, or emotional spousal violence. Despite this, only 14 percent of women who have experienced physical or sexual violence by anyone have sought help to stop the violence.

8.2 Legal and policy environment for women's safety

8.2.1 National Instruments

Some of the key policies and laws pertaining to gender based violence in India include the following:

- **National Policy for the Empowerment of Women**[2] Year of adoption: 2001.

[2] "Draft National Policy for Women 2-16_0.pdf" on http://wcd.nic.in/sites/default/files

- India has signed and ratified **Convention on Elimination of Discrimination against Women (CEDAW)[3].** Since then, the national policy for Women 2016 and other policies and amendments on acts has been reflecting the principles highlighted in the related international conventions The goal of this Policy is to bring about the advancement, development and empowerment of women.
- The **Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act, 2013**, is introduced to prevent and provide redressal of complaints of sexual harassment. One of the main provisions in this act is that it calls for constituting an Internal Complaints Committee at each office or branch with 10 or more employees/workers.
- The **Protection of Women from Domestic Violence Act, 2005[4]** defines domestic violence, describes the powers and duties of protection officers, service providers and lists the procedures for obtain reliefs.

8.2.2 Other Instruments related to the Project

8.3 World Bank Good Practice Note

This Good Practice Note[5] was prepared to assist Task Teams in establishing an approach to identifying risks of GBV, in particular sexual exploitation and abuse and sexual harassment, that can emerge in IPF with major civil works contracts and to advise Borrowers accordingly on how to best manage such risks. The GPN builds on World Bank experience and good international industry practices, including those of other development partners.

This GPN sets out good practice for task teams on identifying, assessing and managing the risks of GBV in the context of Bank-financed IPF projects in any World Bank Global Practice that involve major civil works, defined here as civil works large enough to be carried out by a contractor, i.e., not small-scale projects such as community-driven development investments which often involve self-construction by beneficiary communities.

[3] http://treaties.un.org/

[4] "TheProtectionofWomenDomesticViolenceAct2005.pdf" on http://ncw.nic.in/acts

[5] Good Practice Note : Addressing Gender Based Violence in Investment Project Financing involving Major Civil Works, 28 September 2018,the World Bank group

8.4 Proposed Action Plan

Based on the gender risk assessments and field consultations and findings, a GBV action plan (see below) has been prepared outlining the key actions and responsibilities of project partners

Table 0.1: GBV Action Plan

S. No.	Particular	Actions	Responsibility
1	Policy for GBV	Prepare IEC material in the local language for policy against Sexual harassment at workplace and display in strategic locations	MoRTH, Contractor
2	Training staff on GBV	Capacity building of staff on GBV	MoRTH, Contractor
3	Training focal social specialists	Ongoing capacity building of social specialists	MoRTH
4	GBV in safety Induction	Inclusion of GBV in safety induction	Contractor
5	GBV in Tool Box Talk and task Briefing	Inclusion of GBV in Tool Box Talk and Task Briefing	Contractor
6	Developing a Code of Conduct for GBV	Signing of the CoC by all labourers	Contractor
7	GBV in Community interface	Orienting and building awareness of the community on GBV prevention, reporting and response mechanisms.	Contractor
8	Stakeholder consultations	Continuous stakeholder consultation will be carried out in the adjoining villages to inform the community about GBV risks and redressal mechanisms	Contractor
9	Monitoring	To be integrated into projects safeguards monitoring (PMC, SESMRC). Focused monitoring of identified hot spots	MoRTH

S. No.	Particular	Actions	Responsibility
10	Strengthen institutional linkages with other departments and response actors for GBV risk mitigation and response	Leveraging existing institutional mechanisms (wcd, police, local ngo's) for GBV risk mitigation and response	Contractor

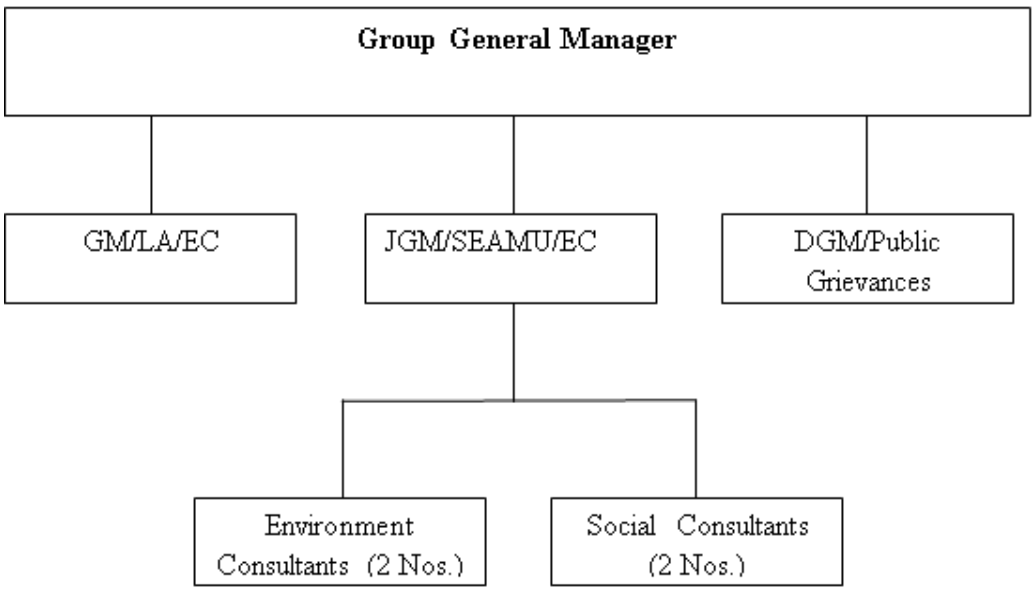
8.5 GBV Prevention and Response Actors

8.5.1 Identification of Service Providers and Assessment of capacities

The key stakeholders and response actors identified to support the project are MoRTH, Contractor, Local NGO's, State Women and Child Development, State Health and Family Welfare and State Police Departments.

8.5.2 MoRTH: Social and Environmental Management Unit (SEMU)

MoRTH will established a social and environmental management unit for overseeing management of environmental and social safeguard measures. The unit is headed by a Group General Manager at the corporate level supported by General Manager/ LA/ Joint General Manager SEMU, and Deputy General Manager-grievances, as depicted in the figure below-



8.6 Impact on Women

417 females are getting affected by the project (45% of the total population) out of 938 persons. Only 8 women headed households are affected by the project. They constitute around 2.9% of the total affected population in the project area. Socio-economic parameters like literacy, work force participation rate and general health conditions etc. reveals that social status of women is low respectively, thereby brought forward the scope of considering the households headed by women as vulnerable Low awareness level coupled with insignificant role in decision making at household and community level further poses constraints for women and other vulnerable groups to access the opportunities created by the project equitably. The changes caused by relocation tend not to have equal implications for members of both sexes and may result in greater inconvenience to women. Due to disturbance in production systems, reduction in assets like land and livestock, women may have to face additional challenge of running a household on limited income and resources. This may force women as well as children to participate in involuntary work to supplement household income, which may also lead to deteriorate social capital/network of women and men alike hence making them more vulnerable to both social hazards. It is therefore important to assess status of project affected women and other vulnerable groups, their potential impacts, and accordingly, design an appropriate strategy/ plan.

8.7 Women Headed Household

Women headed households are found to be less in number in the project area. The percentages of such families affected are around 2.9%. For the cause of compensation and assistance to be provided to these households, it is better to consider the absolute number of such families in the affected category. Table 8.2 shows that 8 women headed households are getting affected.

Table 0.2: Affected Women Headed Households

Affected Women Headed Household	Project Districts		Total
	Sirmaur	Shimla	
	8	0	8

Source; *Census cum Socio-economic Survey, CEG, Sep.-Oct., 2019*

8.8 Women involvement in development process through empowerment

The development experience of at least two decades shows that it is equally necessary to consult women and offer them choices, in enabling them to make informed choices and decide for their own development Participation of women has been envisaged specifically in the following areas:

- In the pre-planning and planning stages participation from women could be

sought through allowing them for taking part in the consultation process.

- Each field team of the NGO shall include at least one women investigator / facilitator.
- Compensation for land and assets lost being same for all the affected or displaced families, special care should be taken by the NGOs for women group while implementing the process of acquisition and compensation as well.
- It is imperative that the PIU ensures that the women are consulted and invited to participate in- group based activities, to gain access and control over the resource as a part of the RAP, Additionally.
- The NGOs should make sure that women are actually taking part in issuance of identity cards, opening accounts in the bank, receiving compensation amounts by cheques in their name or not, etc. This will further widen the perspective of participation by the women in the project implementation.
- For monitoring and evaluation, there should be scope for women's participation. Monitoring of project inputs concerning benefit to women should involve their participation that will make the process more transparent to them.
- Women should be encouraged to evaluate the project outputs from their point of view and their useful suggestions should be noted for taking necessary actions for further modifications in the project creating better and congenial situation for increasing participation from women.
- The Monitoring & Evaluation team(s) shall constitute – 33% women. All assistance would be paid in a joint account in the name of both the spouses; except in the case of women headed households and women wage earners.

8.9 Involvement of women in construction activities

The construction works for widening and strengthening the project corridor will start after the R&R activities are over and the ROW is clear of any encroachment and land is temporarily acquired for borrow areas and construction camps. The construction contractors will set up their construction camps on identified locations where labour force required for the construction activities will be provided with temporary residential accommodation and other necessary infrastructure facilities.

The labour force required for the construction activities will be mostly of high-skill nature since a lot of machine work will be there in the construction of the highway. In addition, there will be requirement of unskilled labour where women will certainly contribute. Apart from this, women as family members of the skilled and semi-skilled labourers, will also stay in the construction camps and will be indirectly involved during

the construction phase. The families of labourers will include their children also.

The construction contractors are expected to bring along their labour force. Thus, in most cases the labourers, both male and female, will be migratory labourers. But, the involvement of local labour force, especially for unskilled activities, cannot be fully ruled out. Moreover, the RAP suggests the provision of creation of man-days for local affected people. Hence, there will be involvement of local women also in the local labour force.

Foreseeing the involvement of women, both direct and indirect in the construction activities, certain measures are required to be taken towards welfare and well being of women and children in particular during the construction phase.

8.10 Provisions in the construction camp for women

The overall objective of the Action Plan is to identify potential GBV risks and to strengthen prevention and response measures in the World Bank supported Paonta-Gumma Road Project. Furthermore, the Action Plan aims to identify and assess the capacities of the project partners and prevention and response actors in the region, and to draw up an effective risk mitigation and response strategy for GBV in the project.

The provisions mentioned under this section will specifically help all the women and children living in the construction camp.

8.10.1 Temporary Housing

During the construction the families of labourers /workers should be provided with residential accommodation suitable to nuclear families.

8.10.2 Health Centre

Health problems of the workers should be taken care of by providing basic health care facilities through health centers temporarily set up for the construction camp. The health centre should have at least a doctor, nurses, medicines and minimum medical facilities to tackle first-aid requirements or minor accidental cases, linkage with nearest higher order hospital to refer patients of major illnesses or critical cases.

The health centre should have MCW (Mother and Child Welfare) units for treating mothers and children in the camp. Apart from this, the health centre should provide with regular vaccinations required for children.

8.10.3 Day Crèche Facilities

It is expected that among the women workers there will be mothers with infants and small children. Provision of a day crèche may solve the problems of such women who can leave behind their children in such a crèche and work for the day in the construction activities.

8.10.4 Proper Scheduling of Construction Works

Owing to the demand of a fast construction work it is expected that a 24 hour-long work-schedule would be in operation. Women, especially the mothers with infants should to be exempted from night shifts as far as possible. If unavoidable, crèche facilities in the construction camps must be extended to them in the night shifts too.

8.10.5 Educational Facilities

The construction workers are mainly mobile groups of people. They are bound to move from one place to another taking along their families with them. Thus, there is a need for educating their children at the place of their work. For this at least primary schools are required to be planned in the construction camps. Wherever feasible, day crèche facilities could be extended with primary educational facilities.

8.10.6 Control on Child Labour

Minors i.e., persons below the age of 15 years should be restricted from getting involved in the constructional activities. Measures should be taken to ensure that no child labourer is engaged in the activities. Exploitation of young unmarried women is very common in these kinds of camps. A strong vigilance mechanism should be created to check this and ensure ceasing of such exploitation.

8.10.7 Special Measures for Controlling STD/AIDS

Awareness and sensitization camps for the target people, both in the construction camp and neighboring villages as well, and supply of condoms at concession rate to the male workers may help to large extent in this respect.

8.11 Status of current referral system in case of reporting of incidence of safety and harassment In the project area currently, very rare incidents are reported of such kind relating Gender based violence/ harassment of women/ violence against Children. However, if these kinds of incidents persist, there are Police stations, active community based organizations and women-led groups int towns along the existing road alignment as support providers as well as Panchayat Bhavans in villages to address such problems.

8.12 Women based public consultations

a. At Kafota in March, 2019

A public consultation was held with Local People, Various Mahila Mandals, Govt. Bodies, Vyapar Mandal and College Students at Kafota on March 2019 emphasizing issues on Women safety and Women empowerment.

Wide publicity was made and all local people, various Mahila Mandals working in the area for welfare of females, a well prominent NGO Sardha (Social Action for Rural Development of Hill Area) Reg. under Act. 1860 (XXI), Officials from local Gram

Panchayats, Local Govt. bodies, Beopar Mandal officials, ASHA workers, Girls college students etc. participated in the meeting with full enthusiasm. The attendance sheet of the same is attached as **Annexure-6** with this report.

The participants were requested to express their views and any other suggestions. Minutes of meeting of the same is given in Chapter- Stakeholders Consultations and Disclosure with this report.

Questionnaire used in the public consultation regarding Women safety & Empowerment and Answers by female participants is shown in table below-

Questionnaire and answers about Women Safety & Empowerment during Public Consultation

Questions asked to Public	Answer by Female participants
• **Community perceptions about Safety of Women and Adolescent Girls:**	
(a) Do women in the community regularly venture out?	Yes women in the community regularly venture out.
(b) What are the typical reasons that require women to step out of the house? Education/ Health/ Household requirements/ Paid Work/ Leisure/ Any other (please specify).	They moved out of house for daily routine works like going for work, to the hospital, and other routine works.
(c) Are women engaged in income-generating activities? If yes, what is the nature of those activities?	Yes, Engaged in income generating local activities. Apart from govt. jobs in various sectors, some pine leaves develop things used in the house, agricultural activities, diary activities, Goat & Sheep framing etc.
(d) What are the typical timings when women are spotted outdoors in the neighborhood? (Morning/ afternoon/ late afternoon/ evening).	They are spotted outdoors in early morning, late afternoon & evening.
(e) Is the neighborhood well-lit? Are there adequate street lights?	No street lights. It's urgently required.
(f) Are there any areas known for eve-teasing/ harassment?	There are no areas known for eve-teasing/ harassment.
(g) Are community centers/any other kind of public spaces used by women on a regular basis?	Not on regular basis but community centers are used only once or twice a

Questions asked to Public	Answer by Female participants
	month for meeting of G.P. or Mahila Mandle.
(h) Is it an established community (families staying in the same house for generations) or is there considerable presence of migrants (first generation/ second generation)? (Please provide socio-cultural specifications-dominant caste, other castes, language spoken, prevalent gender norms, etc.	Yes, they are established community and dominant caste Rajput are established and S.C. and OBC caste also is living there. Mostly people speaking Pahadi language but Hindi also people used in daily use.
(a) Do Men migrate out for work and women and children remain in the community?	Yes, most of men migrate out for work.
(b) Do local women work in construction activities?	No, women are not associated with construction activities.
(c) Do children work in construction activities?	No.
(d) Is there any in migration of men in the project area?	Yes in Paonta Sahib, Sataun & upto Bohrad RD (46/0) migrated people are working.
(e) What are the vulnerabilities and Risks such women and children face?	Mostly all these people are facing inadequate Medical activities, Education facilities, Transportation facilities etc.
(a) Do SHG members meet regularly?	Yes, they meet on regular basis.
(b) What are the broad community issues they have taken up, if any? (Example: alcoholism, teacher attendance, etc.)	The board community issue are raised mostly upon alcoholism, development, employment, women empowerment etc.
(c) Have SHG members come across any cases of physical abuse, harassment at the community level? If yes, what was the community's reaction? Did the SHG group play a role in helping the victim and/ or dealing with the culprit?	There are no any cases of physical abuse, harassment across with SHG members.

Questions asked to Public	Answer by Female participants
(a) Has the village/town been declared as open defecation free (ODF)?	Most of Panchyats along project road have been declared ODF.
(b) Are toilets being used regularly by both women and men?	Yes, maximum toilets are being used regularly by both women and men.
(c) Is water available for toilet usage?	Inadequate water for toilet usage.
(d) Do women continue to defecate in the open?	Around 3 to 5% of women continue to defecate in the open.
(a) What is the principal mode of transport used by women in the area?	Maximum women use buses for traveling.
(b) Is it common for women to travel alone in buses/ tempos?	Yes the feel safe to travel alone in buses.
(c) Do women ride cycles?	No, women do not ride cycles.
(d) Is it common to find adolescent girls and boys using scooter/ motorbikes?	Yes adolescent girls and boys using scooter and motorbikes.
(e) Do women own their individual mobile phones?	90 to 95% women have own their individual mobile phones.
(f) Do adolescent girls and boys own smart phones?	Adolescent girls and boys also have 45-50% own smart phones.
(g) Do they regularly access social media platforms like facebook, WhatsApp etc.?	Only 5% women access social medial platforms.
(a) How far is the secondary school located from the habitations?	Secondary school far from habitations around 1 to 1.5km.
(b) What is the enrollment number of girls v/s boys in class 8^{th}-10^{th} (average figure)?	Class 8^{th} to 10^{th} enrollment numbers of girls v/s boys have 194 and 146 respectively.
(c) How far is the nearest degree college located?	College located near habitation in between 1 to 1.5 km.
(d) What is the enrollment number of girls v/s boys in a degree course (average figure)?	In a degree college enrollment numbers of girls v/s boys have 192 and 102 respectively.
(e) How do students travel to the schools? If they walk, is that road well-lit?	Maximum students walk for school and college.

Questions asked to Public	Answer by Female participants
(f) What is the mode of transport typically used to reach the college?	Bus transport typically used by college students.
(g) Do school-going girls, enrolled in class 8-12th, find the commute safe?	Yes, school-going girls, enrolled in class 8-12th and the find the commute safe.
(h) Do girls, enrolled in the degree course, find the journey safe?	Yes, girls, enrolled in the degree course and they feel safe in the journey.
(a) Is the sub-centre/PHC easily accessible?	Yes, PHC easily accessible for women and local people.
(b) Do women patients go the a sub-centre or PHC alone or are they generally accompanied by someone?	Yes, women patients go to a sub-centre or PHC alone.
(c) Do women patients find it to be a safe and secure environment?	Yes, already have safe and secure environment for women to go the alone PHC.
(d) Have ANMs and ASHA workers come across any cases of physical abuse, harassment that led to substantial injuries at the community level?	No, complaint by ANMs and ASHA workers of physical abuse, and harassment by someone.
(a) Do women participate actively in WUAs/ Graam Sabhas and other such public meetings?	Yes, women participate actively in UWAs/ Graam Sabhas and other such public meetings.
(b) When community level disputes (given an example here) are resolved, how are women consulted?	Maximum disputes are resolved at community level.
(c) Do women hold positions such as Treasurer, Sarpanch, etc.?	Yes, women hold positions such as Treasurer, Sarpanch, in various villages.
(a) Do women have say in sale/ purchase of land?	Yes, women have rights to say in sale/ purchase of land.
(b) Do ownership of land and assets/ lack of make women vulnerable to forms of violence?	No, ownership of land and assts/ lack of does not make women vulnerable to forms of violence.
(c) Can land acquisition and compensation make women vulnerable to harassment/ violence?	No, land acquisition and compensation will out make women vulnerable to harassment/ violence.

Figure 0.1: Women Based Public Consultation At Kafota, March, 2019

Figure 0.2: Women Based Consultations at village Bandli and Badwas in Sep., 2019

8.13 Women based consultations and out comes

Women based consultations were conducted along the road in Kafota, Bandli and Badwas villages. Women members were turned up in few numbers only. Some of their specific concerns are summarized below.

7. Only primary health centers (PHCs) are located in villages and the quality of treatment and medical facilities are less than satisfactory. In emergency they have to reach hospitals at district headquarters only.
8. The women feel that their mobility will increase as market & relative's places will be easily accessible for them as better road condition will induce more transport vehicles to operate.
9. More shops, markets will open within the village approach area and as a result they will get quality leisure time at their disposal.
10. The girl students will be able to attain higher education at colleges, since journey time and cost will be greatly reduced and the girls can commute from home all by themselves free of hazard.
11. Women from poor families will get job opportunity during construction work as casual labour or at office. Besides, women can operate individual / family enterprise by opening small tea stalls, Shops/eateries to provide meals to the construction labourers. This will enhance their family income as well as their entrepreneurial skill, which may be useful in future.
12. Women labourers feel that improved road network will provide them with better job opportunity as they will be able to travel further and even can commute from home. Moreover, travel by public transport system, like Govt. bus service, will become cheaper and money saved on transport can be better utilized for household needs.

8.14 Recommended Actions for Gender Issues

Provisions for participation of women have to be created by following the recommendations given below:

- It is to be seen while engaging NGOs that, women members as a key persons are there.
- Each field team of the NGO should include at least one women investigator/facilitator.
- The Monitoring team(s) should constitute 33% women.
- The Evaluation team(s) should constitute 33% women.
- As a precondition the contractors should assure employing a woman inspector

of works, not below the rank of Senior Engineer.

- Cases of compensation to women should be handled with care and concern considering their non- forward nature of interacting.
- All compensations and assistances would be paid in a joint account in the name of both the spouses; except in the case of women headed households and women wage earners.
- Create scope for income earning for the women of host communities along with the affected women.
- If possible, create job opportunities for local women in the constructional activities.
- Provide all the facilities for the welfare of women and children in construction camps.
- Special measures to be taken in restricting abuse of women and child labour in the construction camps/ activities.

CHAPTER 9: REHABILITATION & RESETTLEMENT BUDGET

9.1 R&R Budget

Based on the Entitlement Matrix, the R&R budget for NH 707 has been finalized and is presented in this chapter. The budget is indicative of outlays for the different expenditure categories and may be required to be updated during the project implementation. The R&R budget includes the cost of structure, land cost, R&R assistance to be provided to the affected people, replacement cost of religious and community property etc. It comprises of two broad components namely compensation and assistance. Compensation for land, structures and assistances will be given as per entitlement matrix.

9.2 Compensation cost for land acquisition

The Cost of Land acquisition has been worked out as per DLC rates, 2019 of Himachal Pradesh Revenue department. Detailed Calculation of Land cost village-wise is given in **Annexure-9** with this report.

Table 0.1: Summary of Cost for Land Acquisition

S. No.	Description	Unit	Rate	Quantity	Total
	1. Land Cost as per First Schedule of RTFCTLARR Act, 2013				
1.	Land Cost @ Circle rate (Multiply Factor @ 2 + Solatium 100% + Contingency -10%)	Hectare	6.22 cr/ha (as per Circle Rates)	8.9153 Ha.	55,34,31,660

9.3 Cost of structure

The estimated cost of structures has been finalized on the basis of Census survey of the properties likely to be affected. The cost estimates for structures are based on rates from document of CPWD Plinth Area Rates, 2019 and HPPWD SOR 2019. The cost estimation is based on current rates which might get revised at a later stage . The estimated cost of the properties/ structures being affected has been figured out in the **Table 0.2.**

Table 0.2: Estimated cost of the structures

Sl. No.	Details of Structures	Rate/ Sq. Mt/R.M.	(in Sq. Mt/ R.M.)/	Cost (in Rs.)
1	Temporary Structure (Title Holder)	9,000	329.60	29,66,400
2	Permanent Structure (Title Holder)	19,500	2,068.13	4,03,28, 535

Sl. No.	Details of Structures	Rate/ Sq. Mt/R.M.	(in Sq. Mt/ R.M.)/	Cost (in Rs.)
3	Temporary Structure (Non-Title Holder)	9,000	745.27	67,07,430
4	Permanent Structure (Non-Title Holder)	19,500	2,136.58	4,16,63,310
5	Compound Wall	9,000	20.00	1,80,000
6	Contingency @ 10%			91,84,567.50
	Total			**10,10,30,242.5**

9.4 R&R Assistance

R&R assistance costs are calculated by using Census survey data and applicable Entitlement Matrix of Resettlement Policy Framework (RPF) and is presented in **Table 0.3**. With the acquisition of land and the demolition of the residential and commercial structure, many families would be adversely affected. RTFCTLARR Act, 2013 has provisions for assistances to be provided to the affected people to restore their livelihood. A tentative cost that would be incurred while providing these assistance to the affected people has been calculated and briefed in **Table 0.3**. The details of assistance amount will be updated at the implementation stage.

Table 0.3: Estimated Cost of the R&R Assistance

S. No.	Item	Unit	Rate	Quantity	Total
1	If the Affected family becomes landless or is reduced to the status of a “small” or “marginal” farmer, assistance amount will be paid	One time	6,00,000	30	1,80,00,000
2	Each affected family shall be given a "Resettlement Allowance"	One time	60,000	433	2,59,80,000
	Loss of Private Structures (Residential/Commercial) to Title-holders and Tenants				
3	Subsistence grant for each affected family who are displaced and require to relocate	One time	40,000	23	9,20,000
4	Financial assistance for each affected family towards shifting/ transportation cost for shifting of the family, building materials, belongings and cattle	One time	60,000	23	13,80,000

S. No.	Item	Unit	Rate	Quantity	Total
	Loss of Residential/ Commercial Structures to Non-Title Holders				
5	Subsistence grant for loss of House	One time	41,000	22	9,02,000
6	Shifting/transportation assistance-For loss of House	One time	60,000	22	13,20,000
7	Rehabilitation grant for reconstruction of affected shop given to artisans	One time	28,000	52	14,56,000
8	Shifting/transportation assistance-For loss of shop	One time	60,000	52	31,20,000
9	For each affected family of an artisan or self-employed or own non-agricultural land, that is displaced and must relocate, assistance would be payable	One time	28,000	23	6,44,000
	Additional Support to Vulnerable Group				
10	Resettlement Allowance	One time	60,000	57	34,20,000
11	Additional Subsistence Grant for displaced families belonging to Scheduled Caste category	One time	60,000	32	19,20,000
	Sub-Total				**5,90,62,000**
	Contingency @ 10%				**59,06,200**
	Total				**6,49,68,200**

9.5 Administrative, NGO, Monitoring & Other Expenses

The cost related to NGO recruitment will be about 50 Lac, External monitor will be about 30 Lacs, Administrative expenses of PIU will cost around 5 lac, Execution Cost of GBV, LMP & SEP will cost about 30 lacs. The total administrative Cost will be 1.43 Cr. including other expenses and contingency as indicated in table below.

Table 0.4: Estimated Administrative Costs

S. No.	Item	Unit	Rate	Quantity	Total
1	NGO Recruitment	LS	50,00,000	1	50,00,000
2	External Monitor	LS	30,00,000	1	30,00,000

S. No.	Item	Unit	Rate	Quantity	Total
3	Administrative Expenses PIU	LS	5,00,000	1	5,00,000
4	Disclosure Expenses	LS	5,000	10	50,000
5	Training for PIU and PMU Staff	LS	1,00,000	5	5,00,000
6	Execution Cost of GBV, LMP & SEP	LS	30,00,000	1	30,00,000
7	Grievance Redressal Mechanism	LS	10,00,000	1	10,00,000
	Sub-Total				1,30,50,000
	Contingency @ 10%				13,05,000
	Total				**1,43,55,000**

9.6 Relocation and enhancement of religious and community structures

The census and socio-economic survey showed that about 2 religious structures (Temples), 10 Bus stops/Shelters and 1 hand pump and Boundary wall of 3 govt. buildings is likely to be affected due to the widening of project road. The relocation and enhancement cost of the religious and other community structures has been taken as lump-sum amount and calculation is indicated in table below

Table 0.5: Estimated cost of Common Property Resources

Sl. No.	Details of Structures	L.S.	Nos.	Cost (in Rs.)
1.	Common property Resources including 2 temples, 10 bus stops/shelters, 1 hand-pump and boundary wall of 3 govt. buildings	3,00,000	16	48,00,000
	Contingency @ 10%			4,80,000
	Total			**52,80,000**

9.7 Total R&R budget for the project including land, structures, administrative and assistance costs

The total Land, Structure, Administrative and Assistance budget for the project works out to be **Rs. 73.90 crore** of which Rs. 55.34 crore is towards compensation for land, cost of Structures is Rs.10.10 crore, Costs for R&R Assistances is 6.49 crore and Administrative expenses of 1.43 cr. The details of the budget are summarizing in **Table**

0.6 below.

Table 0.6: Summary of Total R&R Budget

S. No.	Description	Cost (Rs)
1.	Cost of Land Acquisition	55,34,31,660
2.	Structure Cost as per Schedule of rates of CPWD/HPPWD	10,10,30,242.5
3.	R&R Assistance as per RPF Entitlement Matrix	6,49,68,200
4.	Administrative, NGO, Monitoring & other expenses	1,43,55,000
5.	Cost of Community Property Resources	52,80,000
Total R&R Budget		739065102.5

CHAPTER 10: INSTITUTIONAL FRAMEWORK FOR RAP IMPLEMENTATION

10.1 Introduction

Institutional arrangements for the implementation of RAP have been made fixed by making it a part of the RPF. The Institutional Arrangements will be set up at three levels viz., MoRT&H (Central Govt.), State Level and Sub-Project Level on partnership model wherein concerned agencies at different levels supplement and complement each other efforts. The key elements of institutional arrangements are co-operation/ support, collaboration and sharing of responsibilities with clearly defined roles, involvement of key stakeholders and vertical and horizontal linkages amongst different agencies. The institutional arrangement is depicted in **Figure 0.1.**

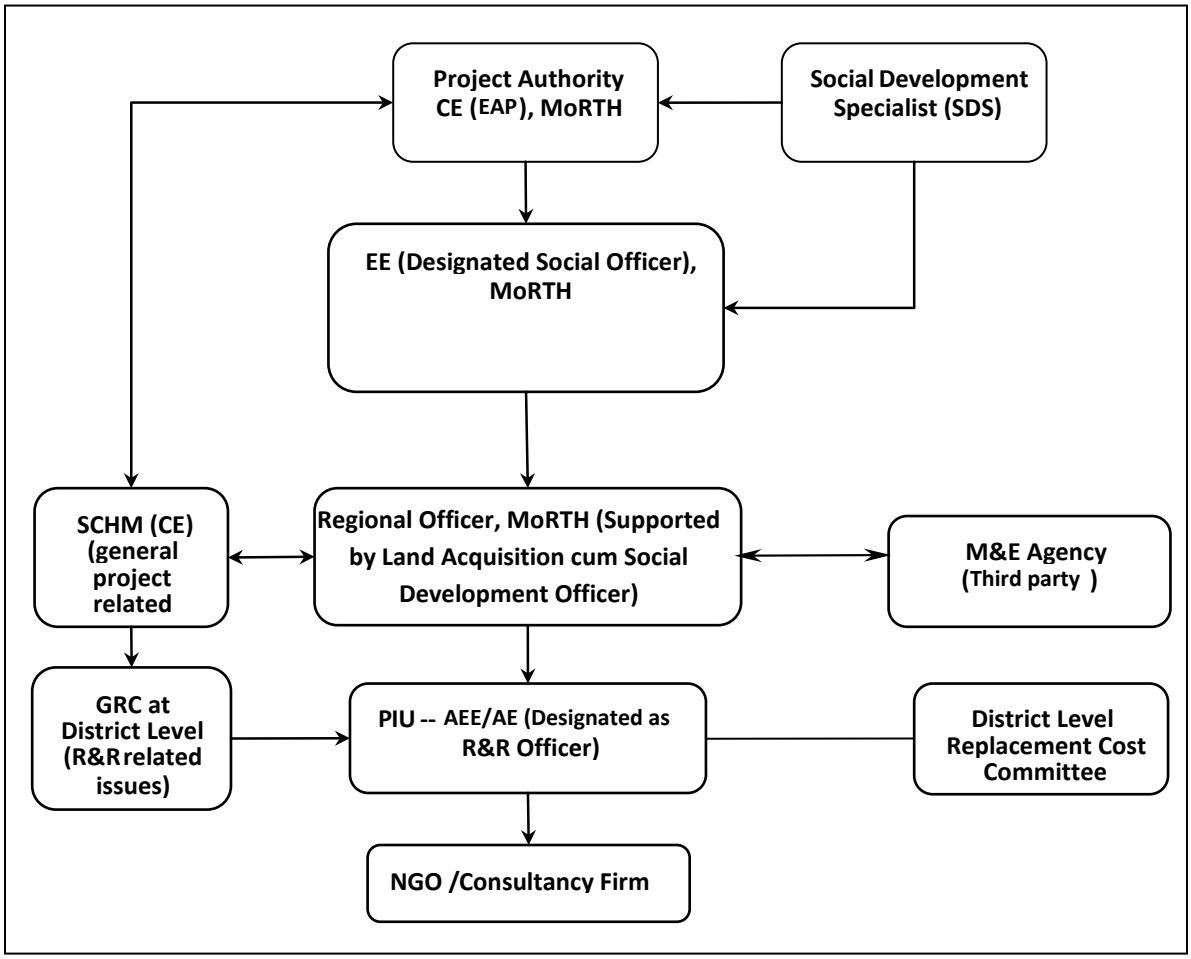


Figure 0.1: Institutional Arrangement for RAP Implementation

The institutional arrangements to manage and implement Resettlement Action Plan & Tribal Development Plan/Vulnerable Communities Development Plan will be set up at three levels viz., Central, State and Sub-Project Level. These are presented below:

10.2 Central Level

At Central Level, the Chief Engineer (EAP), MoRTH, Govt. of India will be overall responsible for the implementation of RPF. CE (EAP) will have all delegated administrative and financial decisions with regard to implementation of the project as well as land acquisition, RAP including TDP/VCDP implementation. It will include further augmenting the capacity of MoRTH with regard to resettlement and rehabilitation and management of other social issues. CE (EAP) will be assisted by a team comprising EE designated as Social Officer and a suitable number of technical and secretarial staff. MORTH also will engage a Social Development Specialist (SDS) either as individual consultant or through Project Management Consultant (PMC), to work with EAP and assist Social Officer. The EAP will be responsible for ensuring training, guidance, and recommendations for handling policy and implementation issues at the state and sub-project levels in compliance with RPF. The Social Development Specialist either individually or with PMC will provide policy and strategic assistance to EAP on social issues including land acquisition and rehabilitation and resettlement. The designated Social Officer will be specifically responsible for implementation of RAP & TDP. The Social Officer will ensure that all social safeguards issues are complied with as per the RPF. The roles and responsibilities of the SDS would broadly include the following:

(i) Ensure adequate staffing at state and sub-project level to ensure timely implementation of RAP.

(ii) Guide and supervise in matters related to resettlement and rehabilitation & TDP to state and sub-project level offices.

(iii) Ensure preparation and disclosure of SIA, RAP including TDP/VCDP and Land Acquisition Plan for sub projects as per RPF.

(iv) Ensure free, prior and informed consultation with tribal families along the project and also ensure that sufficient supporting documentation is maintained.

(v) Co-ordinate with state government departments in matters related to implementation of RAP & TDP.

(vi) Interact with implementation agencies at state and sub-project level on a regular basis.

(vii) Undertake field visits as and when required.

(viii) Facilitate necessary help needed at site with regards to LA and R&R issues.

(ix) Compile data related to resettlement and rehabilitation & TDP activities received from field offices and update Chief Engineer (CE) and suggest suitable measures to be taken.

(x) Ensure budgetary provision for resettlement and rehabilitation of PAPs and relocation, rehabilitation and reconstruction of common property resources (CPRs) and implementation of & TDP.

(xi) Ensure timely release of budget for implementation of RAP&TDP.

(xii) Monitor implementation of RAP including TDP carried out by the agency through RRO at subproject level.

(xiii) Ensure third party audit of RAP & TDP implementation; and

Perform other roles and responsibilities related to implementation of RAP including TDP as assigned by the CE (EAP) from time to time.

10.3 State Level

At State Level, a Land Acquisition cum Social Development Officer (LA cum SDO) would be appointed in the Project Coordination Unit (PCU) headed by Nodal Officer. Additional sociologist as individual consultant will also be engaged to assist LA cum SDO in states as required, particularly in states with larger share of sub projects such as Andhra Pradesh, Himachal Pradesh, Uttar Pradesh etc. The roles and responsibilities of the LA cum SDO would broadly include the following:

(i) Facilitate preparation and implementation of land acquisition and RAP including TDP in compliance with RPF;

(ii) Ensure consultation and stakeholder participation in finalisation of RAP including TDP;

(iii) Guide and supervise RAP including TDP implementation at sub-project level;

(iv) Interact with RAP implementation support agencies and undertake field visits for first-hand information;

(v) Co-ordinate with various government departments in matters related to implementation of RAP & TDP;

(vi) Check implementation of RAP including TDP/VCDP carried out by the agency from time to time by undertaking site visits and consultations with PAPs;

(vii) Facilitate and cooperate in third party audit of RAP & TDP implementation;

(viii) Guide and supervise the RAP implementing agency to roll out HIV prevention activities;

(ix) Ensure a well -functioning GRM including “confidential” handling of complaints relating to Gender Based Violence;

(x) Compile data on LA progress and RAP implementation activities received from field offices and update EAP, MoRTH and suggest suitable measures to be

taken; and Perform other roles and responsibilities related to implementation of RAP including TDP/VCDP as assigned by the EAP, MoRTH from time to time

10.4 Sub-Project Level

A Project Implementation Unit (PIU) comprising officials of State PWD will be constituted at subproject level and headed by the Superintending Engineer/ Executive Engineer – who will be designated as Project Director. The PIU will be responsible for the project execution including RAP & TDP/VCDP implementation. There will be a designated or appointed Resettlement & Rehabilitation Officer (RRO) at respective PIUs who will be responsible only for the implementation of RAP and TDP at site. Additional sociologist as individual consultant will also be engaged to assist RRO as required. RRO will assist Project Director at PIU in all matters related to resettlement and rehabilitation. The roles and responsibilities of the Resettlement and Rehabilitation Officer are as under:

(i) Ensure RAP including TDP implementation with assistance from implementation agency as per the time line agreed upon.

(ii) Interact with RAP implementation agency on a regular basis.

(iii) Undertake field visits with implementation agency from time to time.

(iv) Co-ordinate with district administration and other departments in matters related to implementation of R&R.

(v) Facilitate necessary help needed at site with regard to LA and R&R, HIV issues to implementation agency.

(vi) Ensure distribution of Resettlement and Rehabilitation Policy and entitlement matrix for the project to PAPs.

(vii) Ensure preparation and distribution of photo identity cards.

(viii) Ensure and attend meetings organised by implementation agency on thematic areas related to resettlement and rehabilitation policy and entitlements and awareness generation including aspects relating to GBV.

(ix) Ensure inclusion of PAPs who could not be enumerated during census but have documentary evidence to be included in the list of PAPs.

(x) Ensure preparation of identity cards, and approval from the PCU and distribution of the same to PAPs.

(xi) Ensure timely preparation of micro-plan from RAP implementation agency and approval from PCU.

(xii) Ensure disbursement of resettlement and rehabilitation assistance in a transparent manner.

(xiii) Participate in meetings related to resettlement and rehabilitation issues.

(xiv) Facilitate in opening of joint account of PAPs.

(xv) Ensure release of compensation and assistance before taking over the possession of land for start of construction work.

(xvi) Ensure relocation, rehabilitation and reconstruction of CPRs before dismantling through proper mechanism.

(xvii) Ensure development of resettlement sites, where required.

(xviii) Attend and participate in Grievance Redress Committee meetings for redressal of grievances of PAPs and other committees involving R&R matters,

(xix) Liaison with government and other agencies for inclusion of PAPs in employment and income generation programme/scheme.

(xx) Ensure that tribal families get equal opportunity to participate during implementation and become overall beneficiaries in the project.

(xxi) Prepare monthly progress report related to physical and financial progress of implementation of RAP including TDP & submit to PCU.

(xxii) Provide all necessary information and data related to R&R on monthly basis to designated Social Officer at Central Level through Project Director.

(xxiii) Carry out any other work related to resettlement and rehabilitation that may be entrusted from time to time by the PCU for compliance of R&R.

10.5 RAP Implementing Support Agency at Sub-Project Level

The Project Authority CE(EAP), MoRTH to implement RAP for each of the sub-project, will engage the services of NGOs/Consultancy firms having experience in resettlement and rehabilitation issues. Broad roles and responsibilities of implementation agency would be as:

(i) The RAP implementation agency will be the main link between the Project Authority and PAPs,

(ii) Shall be responsible for verification of PAPs as prepared by the DPR consultants,

(iii) Undertake public information campaign along with RRO at the commencement of the RAP&TDP,

(iv) Develop rapport with PAPs,

(v) Distribute pamphlets of R&R Policy including Entitlement Matrix to PAPs, Panchayat Raj Institutions, and concerned Govt. Offices in the project area, etc.

(vi) Include PAPs who could not be enumerated during census cum socio-economic survey and certification from R&R Officer,

(vii) Distribute identity cards for PAPs,

(viii) Prepare and submit micro-plan to RRO for approval from PCU,

(ix) Organize consultations at regular interval with PAPs with regard to resettlement and rehabilitation,

(x) Organize training program for skill up gradation of the PAPs,

(xi) Assist PAPs in all matters related to compensation and R&R,

(xii) Assist and facilitate aggrieved PAPs (for compensation and assistance) by bringing their cases to GRC,

(xiii) Facilitate in opening of joint account of PAPs,

(xiv) Generate awareness about the alternative economic livelihood and enable PAPs to make informed choice,

(xv) Consultations with PAPs regarding the choice of resettlement (i.e. self or assisted), development of resettlement site, participation of women, etc.

(xvi) Identify training needs of PAPs for income generation and institutions for imparting training,

(xvii) Undertake outreach activities for HIV prevention for awareness and behaviour change as per RAP,

(xviii) Hold consultations with local people and Panchayat Raj Institutions with regard to relocation, rehabilitation, reconstruction of affected CPRs as well as provision of new facilities under the project,

(xix) Participate in various meetings relating to RAP and TDP/VCDP preparation and implementation,

(xx) Submit monthly progress report, and

(xxi) Undertake any other activities that may be required for the implementation of RAP & TDP, etc.

10.6 Replacement Cost Committee at District Level

A committee at district level will be constituted to fix the replacement cost **of** land in case of lands acquired through Direct Purchase method or Land lease, structures and other properties (trees, crops and other assets, tube well, hand pump, etc). The committee may be chaired by the District Collector/ Dy. Commissioner or his designated representative (not below the rank of SDM), Project Director-cum-Executive Engineer of the concerned PIU, District Agriculture Officer, Range Officer (Forest Department, if required), an independent certified valuer, Executive Engineer of the concerned District, elected representative (MLA) of the concerned area and Team Leader of RAP implementation agency.

The highest value of land obtained by the three methods mentioned in Section 26 and Schedule 1 of RFCTLARR will be presented by the Project Authority and approved by the committee as the replacement cost. Similarly, latest schedule of rates of the concerned districts shall be used for obtaining replacement cost of structures. For items not available in the schedule of rates, for those items market rates shall be collected from three different sources and then replacement cost shall be fixed by the committee. For replacement costs of crops, trees and other such items similar methods will be followed.

The committee will be constituted through an executive order and or other suitable instrument within one month (30 days) from the date of mobilization of RAP implementation agency at site.

10.7 Training and Capacity Building at Project and Sub-project Level

Training and development of project staff is an integral part of project implementation. A training needs identification shall be carried out at Corporate, Regional and Site level, based on which focused training modules will be developed in the first six months of project implementation;

(i) Strengthening in house capacity to implement the provisions of RAP & TDP,

(ii) Creating awareness, providing the tools for implementation of RAP & TDP, strategy and accompanying set of management procedures to all departments,

(iii) Developing competence of key officials to provide training at respective level.

Based on skill requirement/improvement at all levels for proper implementation of RAP, a training programme focusing project implementing partners at Centre, State and field PIU has been developed (Annexure-12) which will be implemented by the PMU, MoRTH in the next two years. These training programs, which will be zeroed down after a quick training needs assessment, are to be conducted with the help of local and national training institutions and experts in various aspects of social management. MoRTH will also identify courses offered by the premier institutions in India and abroad on social management and inter-phase with identified programme. Provision for separate budget has been made for this activity. The budget reported under "institutional" head includes the cost estimates of training programs discussed above.

CHAPTER 11: GRIEVANCE REDRESSAL MECHANISM

11.1 Need for Grievance Redress Mechanism

The Resettlement Policy Framework (RPF) mandates formation of Grievance Redressal Mechanism in order to resolve disputes in an effective manner and at the door steps of the PAPs. Compensation and assistance as per eligibility is provided in the entitlement matrix of the approved RPF. Grievance of PAPs will be brought to the grievance redress committee for redressal. The decision of the GRC will be binding, unless vacated by court of law.

11.2 Grievance Redressal Committee (GRC)

The GRC will be constituted by the Project Authority with the aim to settle as many disputes as possible on LA and R&R through consultations and negotiations. There will be one GRC for each PIU. The GRC will comprise six members headed by a retired Revenue Officer/Social Welfare Officer not below Group I officer rank . Other members of the GRC will include the concerned Project Director-cum-Executive, a retired PWD Officer (not below the rank of Executive Engineer), RRO, representative of PAPs and Sarpanch (Elected Head of Village) of the concerned village.

Grievances of PAPs in writing will be brought to GRC for redressal by the RAP implementation agency. The RAP implementation agency will provide all necessary help to PAPs in presenting his/her case before the GRC. The GRC will respond to the grievance within 15 days. The GRC will normally meet once in a month but may meet more frequently, if the situation so demands. A time period of 45 days will be available for redressing the grievance of PAPs. The decision of the GRC will not be binding to PAPs. ***The decision of the Grievance Committees will not be binding on the DPs and they will have the option of taking recourse to court of law, if s/he so desires at his or her own expense***. Broad functions of GRC are as under:

(i) Record the grievances of PAPs, categorize and prioritize them and provide solution to their grievances related to resettlement and rehabilitation assistance.

(ii) The GRC may undertake site visit, ask for relevant information from Project Authority and other government and non-government agencies, etc, in order to resolve the grievances of PAPs. Fix a time frame within the stipulated time period of 45 days for resolving the grievance.

(iii) Inform PAPs through implementation agency about the status of their case and their decision to PAPs and Project Authority for compliance.

(iv) ***In case of grievances/complaints relating to GBV, ensure confidentiality and appropriate referral to mapped service providers.***

The GRC will be constituted within 3 months by an executive order from competent authority (centre/ state) from the date of mobilization of RAP implementation agency.

The RRO will persuade the matter with assistance from implementation agency in identifying the suitable persons from the nearby area for the constitution of GRC. Secretarial assistance will be provided by the PIU as and when required. The flow diagram **(Figure 0.1)** shows the entire process of grievance redressal.

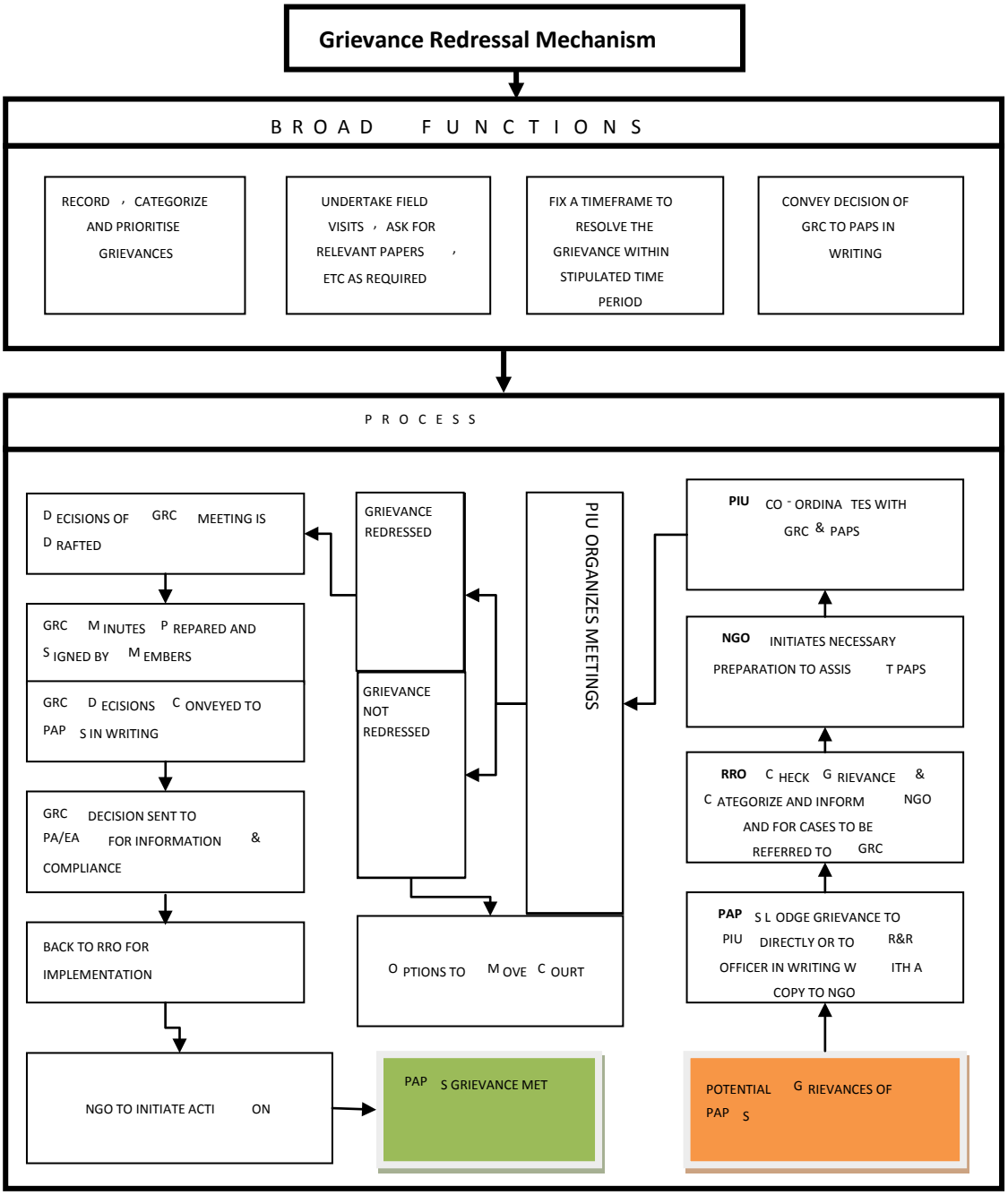


Figure 0.1: Grievance Redressal Mechanism

PAPs will be fully made aware about the GRM for effective, inexpensive and amicable settlement of claims for compensation and assistance by holding meetings with PAPs, public meetings and distributing leaflets containing salient features and procedures of GRM. The RAP IA will assist the PAPs in getting their record of rights updated in case of disputes related to land. The RRO with support from RAP IA will make all possible efforts for amicable

settlement. The RAP IA will document all cases brought to GRC and maintain the records of the proceedings of the grievance redressal committee meetings.

11.3 Suggestion and Complaint Handling Mechanism (SCHM)

The MoRTH recognizes the importance of this and hence intends to establish a SCHM for the GNHCP. The communication channels to report project related complaints/concerns will be disclosed at all levels of institutions—MoRTH, State and Sub-project levels.

Though the Right to Information Act, 2005 an Act of the Parliament of India provides for setting out the practical regime of right to information for citizens. The Act applies to all States and Union Territories of India except the State of Jammu and Kashmir. Under the provisions of the Act, any citizen may request information from a "public authority" (a body of Government or "instrumentality of State") which is required to reply expeditiously or within thirty days. The Act also requires every public authority to computerize their records for wide dissemination and to proactively publish certain categories of information so that the citizens need minimum recourse to request for information formally. In other words under the act, citizens have right to seek information from concerned agencies by following the set procedures. However, it is quite likely that many people may not use the provisions of this Act, only in limited cases covering serious concerns. Being an inter-state project involving several states and large scale of civil works along with R&R and Environment issues, the project is likely to receive many suggestions, complaints, inquiries, etc through the project implementation period. Therefore, MoRTH has agreed to establish SCHM as a good practice to address public concerns pertaining to various issues. SCHM will report all project related LA and R&R of the PAPs for redressal through the concerned PIU or GRC as appropriate. Several communication channels viz., toll free phone number, dedicated email, mechanism for on line submission of suggestions/ complaints/ inquiries, provision of suggestion/complaint box (at site and project office), post and other suitable means shall be set up for suggestion and complaint handling.

CHAPTER 12: MONITORING AND EVALUATION

12.1 Monitoring and Evaluation

Monitoring and evaluation are important activities of infrastructure development project particularly, those involving involuntary resettlement. It helps making suitable changes, if required during the course of implementation of RAP and also to resolve problems faced by the PAPs. Monitoring is periodical checking of planned activities and provides midway inputs, facilitates changes, if necessary and provides feedback to project authority for better management of the project activities. Evaluation on the other hand assesses the resettlement effectiveness, impact and sustainability of R&R activities. In other words, evaluation is an activity aimed at assessing whether the activities have actually achieved their intended goals and purposes. Thus monitoring and evaluation of resettlement action plan implementation are critical in order to measure the project performance and fulfillment of project objectives.

The monitoring and evaluation of RAP implementation will ensure monitoring of key indicators on inputs, outputs, project processes and evaluation of impact indicators. The overall purpose of the monitoring is to keep track of the implementation processes and progress, achievement of performance targets fixed in the annual work plans, learning lessons and taking corrective actions to deal with emerging constraints and issues. Monitoring and evaluation will constitute the following:

- Implementation progress (physical and financial aspects), monitoring of inputs, and outputs;
- Process documentation (case studies and lessons learnt);
- Impact evaluation based on sample survey and consultations; and
- Thematic studies.

12.2 Institutional Arrangement for M & E

The Resettlement Policy Framework (RPF) stipulates hiring services of an external agency (third party) for monitoring and evaluation of RAP implementation. This means the project authority through an external agency will carry out monitoring and evaluation from the subsequent month of the mobilization of RAP IA at project site. Internal monitoring will be carried out by the Social Officer of Project Coordination Unit (PCU) with assistance from R&R officer and RAP IA whereas external monitoring and evaluation will be carried by the third party engaged for the purpose. This will help monitor project activities closely. Regular monitoring by undertaking site visits and consultations with PAPs will help identify potential difficulties and problems faced in the implementation and accordingly help take timely corrective measures including deviations, if needed.

Components of monitoring will include performance monitoring i.e., physical progress of the work and impact monitoring and external evaluation. Indicative indicators to be monitored related to performance are provided in the following sections. In case during the project

implementation, if some other indicators are found relevant they will also be considered for monitoring.

12.3 Monitoring and Evaluation (M&E) at Project and Sub-Project level

The Resettlement Action Plan contains indicators and benchmarks for achievement of the objectives under the resettlement programme. These indicators and benchmarks will be of three kinds:

(1) Proposed indicators, indicating project inputs, expenditures, staff deployment, etc.

(2) Output indicators, indicating results in terms of numbers of affected People compensated and resettled, training held, credit disbursed, etc,

(3) Impact indicators, related to the longer-term effect of the project on People's lives.

The benchmarks and indicators will be limited in number and combine quantitative and qualitative types of data. Some of these indicators may include, percentage of PAPs actually paid compensation before any loss of assets; percentage of PAPs whose incomes after resettlement are better than, or at least same as before resettlement; percentage of assets valued at replacement cost compensation; percentage grievances resolved; and/or percentage of cases to court. The first two types of indicators, related to process and immediate outputs and results, will be monitored to inform project management about progress and results, and to adjust the work programme where necessary if delays or problems arise. The results of this monitoring will be summarized in reports which will be submitted to the World Bank on a regular basis. Provision will be made for participatory monitoring involving the project affected persons and beneficiaries of the resettlement programme in assessing results and impacts. The Project Authority will engage services of an external agency (third party), which will undertake independent concurrent evaluations at least twice a year during the project implementation period. At the end of the project, an impact evaluation will be carried out as part of the project completion report. Such independent evaluation will focus on assessing whether the overall objectives of the project have been met and will use the defined impact indicators as a basis for evaluation. Specifically, the evaluation will assess:

(i) The level of success (including the constraints and barriers) in land acquisition programme, resettlement plan, and income recovery of the PAPs after they have been displaced from the project affected area, and,

(ii) The types of complaints/ grievances and the success of the handling of grievance and public complaints towards the construction of project's infra-structures, means of redress for assets and lands and the amount of compensation, resettlement, and other forms of complaints.

Summarizing, M&E would be carried out for regular assessment of both process followed and progress of the RAP & TDP implementation. The internal monitoring will be carried out by the State PCU by the LA cum SDO with assistance from NGO/Consultancy firm and a quarterly report will be submitted to MoRTH. Each quarterly report would also be uploaded on the MoRTH website. The external agency (third party) however, would conduct assessment

annually for each sub-project by undertaking field visits and all other necessary activities including consultations. The annual reports would cover detailed information on process and progress of RAP including TDP implementation. The report would highlight issues, if any that need attention of the Project Authority and suggest corrective measures that may be followed for better implementation of RAP & TDP.

12.4 Process & Performance Monitoring

Process monitoring would enable the project authority to assess whether the due process are being followed or not, whereas performance monitoring would mainly relate to achievement in measurable terms against the set targets. Monitoring report will also provide necessary guidance and inputs for any changes, if required during the course of the implementation. A list of indicators is given in Table 0.1.

Table 0.1: Performance Monitoring for RAP Implementation

Sr. No.	Indicators	Target	Status	Achievement (in %)	Remarks
1	Land acquisition (Private)				
	Notification published u/s 3D				
	Award declared u/s ……. for				
	Land area (ha)				
	Land owners (No.)				
	Compensation disbursed by Competent Authority to land owners (No.)				
	Govt. land transfer (ha)				
2	Verification of identified PAPs completed (No.)				
3	New PAPs added, if any (who could not be enumerated at the time of survey)				
4	Consultations held with regard to RAP (dissemination of information, awareness generation, entitlements, HIV/ AIDS, SCHM, etc) – No.				
5	Leaflets, containing salient features of RAP, hand bills, fliers and other awareness materials distributed (No.)				
6	Measurement of structures likely to be affected completed (No.)				

Sr. No.	Indicators	Target	Status	Achievement (in %)	Remarks
7	Date of formation of DLC				
8	Meetings held by DLC for fixing the replacement cost (No.)				
9	Valuation of affected properties completed (No.)				
10	Micro plan submitted for THs for approval (No.)				
11	Identity cum entitlement card issued to PAPs (No.)				
12	Consultations held with local community regarding relocation or rehabilitation of CPRs (No.)				
13	Estimate submitted for relocation/ rehabilitation of CPRs for approval				
14	Agency to carryout relocation/ rehabilitation of CPRs as agreed by the project authority				
15	R&R assistances disbursed to PAPs (THs – No.				
16	PAPs re-established their shops/ business (No.)				
17	PAPs covered under income generation schemes (No.)				
18	PAPs provided training for alternate livelihood (No.)				
19	CPRs relocated/ rehabilitated (No.)				
20	Grievance/ complaints brought to GRC for redressal (No.)				
21	GRC meeting held and cases resolved (No.)				
22	Various channels of SCHM used by category (No.)				
23	Consultation meetings held by LA cum SDO of Project Coordination Unit (PCU) (No.)				

12.5 Evaluation

The external agency engaged by the Project Authority shall carry out the evaluation at two stages viz., mid-term and after the completion of RAP implementation. The evaluation will be carried out under a set term of reference. The evaluation study would involve both quantitative and qualitative surveys and compare results before and after the implementation of the project. It will focus on assessing whether the overall objectives of the project are being met and will use the defined impact indicators as a basis for evaluation. The evaluation study would undertake the following but not limited to:

- Review monthly progress report submitted by RAP Implementation Agency (RAP IA);
- Undertake consultations with PAPs in order to assess their point of view with regard to overall process;
- Intensity and effectiveness of information dissemination with regard to RAP implementation covering eligibility of different categories of PAPs, frequency of interactions by RAP IA personnel with PAPs, deployment of RAP IA staff, quality of rapport maintained by RAP IA personnel with PAPs, capability of RAP IA personnel, behavior of RAP IA staff, availability of RAP IA staff, level of satisfaction as regards the work of RAP IA, etc;
- Collect information about distribution of awareness generation materials, entitlements, distribution of identity cum entitlement card, adequacy of dissemination of information, consultations meetings with regard to policy and eligibility for entitlement, alternatives and relocation related issues, measurement and valuation of affected properties, understanding and use of grievance procedure, disbursement of assistance, and other R&R related issues, compliance of resettlement policy, etc;
- Conduct sample survey (25% of PAPs) for making comparative analysis substantiated by qualitative surveys and case studies, etc.

It may be noted that one of the key objectives of the project is improvement or at least restoration of economic status of the PAPs to the pre project level. An illustrative list of indicators is given in **Table 0.2**, which would be measured against the baseline data collected for the preparation of RAP. The M&E agency would finally select the indicators for the evaluation of the project depending upon the progress of R&R activities.

Table 0.2: Impact Indicators

Sr. No.	Indicator	Unit	Before Project Implementation	During/ after RAP Implementation
1	Monthly income of family/ household			
2	Consumer durables/material Assets owned			
3	Ownership of Transport and farm implements owned			
4	Occupation of head of Household and other members			
5	Type of dwelling units			
6	Number of Earning members/households			
7	Family under debt			
8	Size of loan			
9	Households purchased loans			
10	Households with various sizes of land			
11	Ownership/tenancy of dwelling units (owner, encroacher, squatter)			
12	Access to water and sanitation facilities			
13	Access to modern sources of lighting and cooking			
14	Animal and poultry birds owned			
15	Migration for employment			

12.6 Reporting

Monthly Progress Reports on the progress of RAP implementation including mobilization of staff members, opening of site offices, etc of the project would be prepared by RAP IA and submitted to the R&R Officer at sub-project level.

Quarterly Monitoring Reports shall be compiled by the LA cum SDO of Project Coordination Unit (PCU) and submitted to MoRTH for review and onward submission to World Bank

Six monthly reports shall be prepared by the M&E agency by undertaking site visits and review of progress report, consultations, etc.

Evaluation Report shall be prepared by the M&E agency at the end of the project implementation as part of the project completion report.

6257

No. IPH-AB-Misc. Paonta/2023-24 Date: -

Certificate

Utility Shifting of Pipe Line Construction of Rehabilitation and up-gradation to 2-lane/2-lane with paved shoulder/4-lane configuration of Paonta Sahib-Hewna Section (km. 0.000 to km. 25.000) of NH-707 in the state of Himachal Pradesh under Green National Highways Corridor Project (GNHCP) with loan assistance of World Bank on EPC Mode.

The work has been carried out as per standards & Practice of the Himachal Pradesh State Jal Shakti Vibhag. It is Certified that dismantle material. Which was initially laying to the contactor is now deposited/handed over in departmental store by the firm M/S ABCI Infrastructures Pvt. Ltd: nothing outstanding against M/S ABCI Infrastructures Pvt. Ltd.

Assistant Engineer
Jal Shakti Sub Division
Paonta Sahib (H.P.)

Executive Engineer,
Jal Shakti Division
Paonta Sahib (H.P.)

6258

No. IPH-AB-Misc. Paonta/2023-24 Date: -

Certificate

Utility Shifting of Pipe Line Construction of Rehabilitation and up-gradation to 2-lane/2-lane with paved shoulder/4-lane configuration of Paonta Sahib-Hewna Section (km. 0.000 to km. 25.000) of NH-707 in the state of Himachal Pradesh under Green National Highways Corridor Project (GNHCP) with loan assistance of World Bank on EPC Mode.

The work has been carried out as per standards & Practice of the Himachal Pradesh State Jal Shakti Vibhag. It is Certified that dismantle material. Which was initially laying to the contactor is now deposited/handed over in departmental store by the firm M/S ABCI Infrastructures Pvt. Ltd. nothing outstanding against M/S ABCI Infrastructures Pvt. Ltd.

JE

Assistant Engineer
Jal Shakti Sub Division
Paonta Sahib (H.P.)

Executive Engineer,
Jal Shakti Division
Paonta Sahib (H.P.)

6259

No. IPH-AB-Misc. Paonta/2023-24

Date: -

Certificate

Utility Shifting of Pipe Line Construction of Rehabilitation and up-gradation to 2-lane/2-lane with paved shoulder/4-lane configuration of Paonta Sahib-Hewna Section (km. 0.000 to km. 25.000) of NH-707 in the state of Himachal Pradesh under Green National Highways Corridor Project (GNHCP) with loan assistance of World Bank on EPC Mode.

The work has been carried out as per standards & Practice of the Himachal Pradesh State Jal Shakti Vibhag. It is Certified that dismantle material. Which was initially laying to the contactor is now deposited/handed over in departmental store by the firm M/S ABCI Infrastructures Pvt. Ltd. nothing outstanding against M/S ABCI Infrastructures Pvt. Ltd.

Assistant Engineer
Jal Shakti Sub Division
Paonta Sahib (H.P.)

Executive Engineer,
Jal Shakti Division
Paonta Sahib (H.P.)

6260

GOVERNMENT OF HIMACHAL PRADESH
JAL SHAKTI VIBHAG

TO WHOM IT MAY CONCERN

This is to certify that M/S Shivalik Buildtech Pvt. Ltd. Have completed the work of P/L of GI Pipe 20 mm dia 800 Rmt, 1No hand pump installed as per the approved estimate submitted by this office anexuture attached. This no objection certificate is being issued to M/S Shivalik Buildtech Pvt. Ltd. For onward submission to concerned officials involved in rehabilitation/upgradation of Gumma-Fediz section of NH-707.

Dated: - 11-06-2024

Junior Engineer
JSV Section Gumma

Assistant Engineer
JSV Sub Division Nerwa

Executive Engineer
JSV Division Nerwa

6261

GOVERNMENT OF HIMACHAL PRADESH

JAL SHAKTI VIBHAG,

[illegible] JSV/NSD/2022-23 dated [illegible] 2022

"TO WHOMEVER MAY CONCERNED"

It is certified that this office has taken up matter with Dhatarwal Construction Company about the damage of water supply schemes, HAND pumps and irrigation schemes during execution of work rehabilitation & up-gradation to intermediate lane configuration of [illegible] section, water supply schemes and Hand Pumps of this department has been restored.

Assistant Engineer
Jal Shakti Sub-Division
Nerwa

QUANTITY SURVEYOR
L.N.M. Infra Projects
Pvt. Ltd. (NH-707),
Paonta Sahib

6262

NO. JSD-Shillai-DB-/2025 1031

Dated 13/6/2025

To

The project Director,
Morth Paonta Sahib Opposite Sun Pharma,
Up Sampda Bata Mandi Paonta Sahib District Sirmour.

Subject **Regarding requirement of fund to restore the damaged water supply and irrigation scheme due to construction work of NH 707.**

Reference **Minutes of meeting regarding OA No. 127/2024 titled as Nathu Ram V/S Ministry of Road Transport & Highways and other held on 26.04.2025 at 10:30 AM under The chairmanship of the Assistant commissioner to Deputy commissioner,**

On the above subject cited in this regard it is brought to your kind notice that the main pipe lines of water supply as well as Main Channel of various LIS/FIS schemes have been badly damaged during the Road cutting and other related activities executing by the **MORTH** due to which the water supply to the beneficiaries are interrupted and the beneficiaries of these villages are in continuous approach to this office as well as to the higher office to restore these schemes properly. It is therefore, requested, that necessary fund required for restore the various schemes to be provide please.

Detail of Water supply schemes/Irrigation schemes damaged due to Construction of NH-707

Jal Shakti Sub Division Shillai

Sr. No.	Zone	Circle	Division	District	Constituency	Name of Scheme	Components Damaged	Tentative Estimate Cost of Restoration (Rs, in Lakh)	Location&Coordinates	Remarks
1	Shimla	Nahan	Shillai	Sirmour	Shillai	GWSS Ishari	Distribution line 32mm dia at various RD's 150 Rmt	0.70	30° 37′ 52″N 77° 39′ 52″N	Damaged
2	Shimla	Nahan	Shillai	Sirmour	Shillai	GWSS Charew	Distribution line 32mm dia =60 Rmt,50mm dia=200 Rmt at various RD's.	1.00	30° 38′10″N 77° 39′ 48″N	Damaged
3	Shimla	Nahan	Shillai	Sirmour	Shillai	GWSS Timbi	Distribution line 25mm dia =300 Rmt,15mm dia=600 Rmt at various RD's	2.50	30° 39′15″N 77° 39′ 01″N	Damaged
4	Shimla	Nahan	Shillai	Sirmour	Shillai	FIS Ishari	Main C.C Channel 60 Rmt, B/wall 20mtr length damaged.	5.00	30° 39′43″N 77° 39′ 12″N	Damaged
5	Shimla	Nahan	Shillai	Sirmour	Shillai	GWSS Bhangi	Distribution line 25mm dia = 600 Rmt at various RD's.	2.50	30° 39′41″N 77° 39′ 11″N	Damaged
6	Shimla	Nahan	Shillai	Sirmour	Shillai	GWSS Gangtoli	Distribution line 32mm dia=1600 Rmt at various RD's.	4.50	30° 39′30″N 77° 39′ 34″N	Damaged
7	Shimla	Nahan	Shillai	Sirmour	Shillai	FIS Gangtoli	Head weir & main C.C Channel at various RD's 750 Rmt.	7.50	30° 40′14″N 77° 39′ 52″N	Damaged
8	Shimla	Nahan	Shillai	Sirmour	Shillai	GWSS Lohara	Distribution line 32mm dia=60Rmt at various RD's.	0.70	30° 40′27″N 77° 40′01″N	Damaged
9	Shimla	Nahan	Shillai	Sirmour	Shillai	GWSS Kumarli	Distribution line 32mm dia=60Rmt at various RD's.	0.70	30° 40′28″N 77° 40′01″N	Damaged

P.I.U. Paonta Sahib
Ministry of Road Transport & Highways
Government of India
Diary no.:- 3748
Date :- 25/06/2025

P.I, AE to coordinate with P-2 & P-3 and submitt a pointwise compliance status within 7 days. (If work completed/hindered/ongoing/not our responsibility).

Anand

10	Shimla	Nahan	Shillai	Sirmour	Shillai	LWSS Shillai &LWSS Kandi Sundrari	Rising main 125mm dia 2 No's (M/G) =120 Rmt,Distribution line 50mm dia=1800 Rmt,65mm dia=1800 Rmt,100mm dia =60 Rmt , 80mm dia =120 Rmt,15mm dia =900 Rmt damaged at various RD's	30.00	30° 40'40''N 77° 41'50''N	Likely to be Damaged
11	Shimla	Nahan	Shillai	Sirmour	Shillai	GWSS Bhankoli	Distribution line 25mm dia=900Rmt at various RD's.	3.50	30° 40'53''N 77° 42'01''N	Damaged
12	Shimla	Nahan	Shillai	Sirmour	Shillai	GWSS Shillai village	Distribution line 40mm dia=260Rmt at various RD's.	2.50	30° 40'45''N 77° 42'30''N	Damaged
13	Shimla	Nahan	Shillai	Sirmour	Shillai	GWSS Shillai Colony	Distribution line 20mm dia=1300Rmt at various RD's.	3.50	30° 41'38''N 77° 42'42''N	Damaged
14	Shimla	Nahan	Shillai	Sirmour	Shillai	GWSS Bandli	Distribution line 25mm dia=550Rmt at various RD's.	2.50	30° 41'03''N 77° 42'32''N	Damaged
15	Shimla	Nahan	Shillai	Sirmour	Shillai	GWSS Pasta Bass	Distribution line 25mm dia=450Rmt at various RD's.	2.50	30° 42'21''N 77° 42'39''N	Damaged
16	Shimla	Nahan	Shillai	Sirmour	Shillai	GWSS Kando	Distribution line 40mm dia=350Rmt at various RD's.	2.50	30° 40'15''N 77° 41'57''N	Damaged
17	Shimla	Nahan	Shillai	Sirmour	Shillai	GWSS Dakker	Distribution line 25mm dia=250Rmt at various RD's.	2.00	30° 42'55''N 77° 41'22''N	Damaged
18	Shimla	Nahan	Shillai	Sirmour	Shillai	GWSS Khannar	Distribution line 25mm dia=600Rmt at various RD's.	2.50	30° 43'15''N 77° 41'51''N	Damaged
19	Shimla	Nahan	Shillai	Sirmour	Shillai	GWSS Hakaina Tapra	Distribution line 25mm dia=180Rmt at various RD's.	1.00	30° 41'03''N 77° 42'32''N	Damaged
20	Shimla	Nahan	Shillai	Sirmour	Shillai	GWSS Bagna	Distribution line 25mm dia=120Rmt at various RD's.	0.80	30° 39'52''N 77° 41'21''N	Damaged
Detail of Handpump damaged due to Construction of NH-707 in respect of Jal shakti Division Shillai										
21	Shimla	Nahan	Shillai	Sirmour	Shillai	Handpump	Gangtoli	2.00	30° 39'39''N 77° 39'39''N	Damaged
22	Shimla	Nahan	Shillai	Sirmour	Shillai	Handpump	Dharva	2.00	30° 44'26''N 77° 41'56''N	Damaged
23	Shimla	Nahan	Shillai	Sirmour	Shillai	Handpump	Jambli	2.00	30° 44'40''N 77° 41'54''N	Damaged
							Total Amount	**84.40**		

Jal Shakti Sub Division Kaffota										
Sr. No.	Zone	Circle	Division	District	Constituency	Name of Scheme	Components Damaged	Tentative Estimate cost of Restoration (Rs,in Lakh)	Location&Coordinates	Remarks
1	Shimla	Nahan	Shillai	Sirmour	Shillai	GWSS Devlan in GP Kamrou	Intake Damage & GMS Pipe 32 mm dia= 100 Rmt	0.80	30° 36′ 19″N 77° 39′ 33″E	Temporally restored
2	Shimla	Nahan	Shillai	Sirmour	Shillai	GWSS basog in GP kamrou	GMS pipe 25mm dia=360 Rmt	0.95	30° 36′ 26″N 77° 39′ 34″E	Temporally restored
3	Shimla	Nahan	Shillai	Sirmour	Shillai	GWSS Parlo in GP Kamrou	GMS pipe 25mm dia=300 Rmt &20 mm dia =300 Rmt	3.00	30° 36′ 15″N 77° 39′ 33″E	Temporally restored
4	Shimla	Nahan	Shillai	Sirmour	Shillai	GWSS Rithog Shirog in GP Shilla	GMS pipe 25 mm dia=1000 Rmt	3.50	30° 37′ 55″N 77° 39′ 57″E	Damaged
5	Shimla	Nahan	Shillai	Sirmour	Shillai	GWSS Satoun in GP Satoun	GMS pipe 100 mm dia = 300 Rmt and GMS pipe 80 mm dia = 280 Rmt	5.50	30° 33′ 38″N 77° 39′ 02″E	Temporally restored
6	Shimla	Nahan	Shillai	Sirmour	Shillai	GWSS Shimble Dhar	GMS 50 mm dia =1370 Rmt	7.50	30° 38′ 11″N 77° 40′ 11″E	Temporally restored
7	Shimla	Nahan	Shillai	Sirmour	Shillai	LWSS Kaffota	GMS pipe 65 mm dia=1660 Rmt	9.45	30° 37′ 19″N 77° 41′ 35″E	Temporally restored
8	Shimla	Nahan	Shillai	Sirmour	Shillai	LWSS Bokala Pab (Feeder line)	GMS pipe 40 mm dia=850 Rmt	3.95	30° 38′ 13″N 77° 40′ 33″E	Damaged
9	Shimla	Nahan	Shillai	Sirmour	Shillai	LWSS Dugana (Habitation Dabra)	GMS pipe 20 mm dia =1020 Rmt	2.20	30° 36′ 42″N 77° 41′ 19″E	Damaged
10	Shimla	Nahan	Shillai	Sirmour	Shillai	GWSS Shirgaon	GMS pipe 20 mm dia =650 Rmt	1.45	30° 37′ 21″N 77° 41′ 20″E	Damaged
11	Shimla	Nahan	Shillai	Sirmour	Shillai	LWSS Basog Chambyara	Rising Main	1.90	30° 36′ 20″N 77° 40′ 11″E	Damaged
12	Shimla	Nahan	Shillai	Sirmour	Shillai	LWSS kamrou	GMS Pipe 32 mm dia=750 Rmt	3.00	30° 36′ 10″N 77° 40′ 29″E	Likely to be damaged
13	Shimla	Nahan	Shillai	Sirmour	Shillai	GWSS Hevna (Temple line)	GMS 15 mm dia=1200 Rmt	2.10	30° 34′ 55″N 77° 39′ 27″E	Temporally restored
14	Shimla	Nahan	Shillai	Sirmour	Shillai	FIS Satoun	Main channel at various RD's	15.00	30° 33′ 53″N 77° 39′ 13″E	Damaged
15	Shimla	Nahan	Shillai	Sirmour	Shillai	FIS Maloun (Chadeu)	Diversion weir and Main channel	3.50	30° 57′ 53″N 77° 39′ 54″E	Damaged
16	Shimla	Nahan	Shillai	Sirmour	Shillai	FIS Rithog Shirog	Diversion weir and Main Channel	7.50	30° 37′ 56″N 77° 39′ 57″E	Damaged
Detail of Handpump damaged due to Construction of NH-707 in respect of Jal shakti Division Shillai										
17	Shimla	Nahan	Shillai	Sirmour	Shillai	Hand Pump	Hand Pump Near Bus stop Kaffota	4.50	30° 37′ 19″N 77° 42′ 01″E	Damaged

18	Shimla	Nahan	Shillai	Sirmour	Shillai	Hand Pump	Hand pump near Village Pab	4.50	30° 37′ 15″N 77° 41′ 50″E	Damaged
19	Shimla	Nahan	Shillai	Sirmour	Shillai	Hand Pump	Hand Pump near Bank Kamrou	3.80	30° 36′ 08″N 77° 40′ 30″E	Damaged
20	Shimla	Nahan	Shillai	Sirmour	Shillai	Hand Pump	Hand pump nr old Bus stop Kamrou	3.70	30° 36′ 14″N 77° 40′ 35″E	Damaged
21	Shimla	Nahan	Shillai	Sirmour	Shillai	Hand Pump	Hand Pump nr Shop of Layak Ram kamrou	3.90	30° 36′ 12″N 77° 40′ 28″E	Damaged
22	Shimla	Nahan	Shillai	Sirmour	Shillai	Hand Pump	Hand pump nr Khajiar Bus stop	3.50	30° 36′ 28″N 77° 39′ 36″E	Damaged
23	Shimla	Nahan	Shillai	Sirmour	Shillai	Hand Pump	Hand pump at Chalani (Barwas Bus stop)	3.50	30° 36′ 08″N 77° 39′ 31″E	Damaged
24	Shimla	Nahan	Shillai	Sirmour	Shillai	Hand Pump	Hand Pump near Tilordhar Bus stand	3.80	30° 36′ 08″N 77° 41′ 08″E	Damaged
25	Shimla	Nahan	Shillai	Sirmour	Shillai	Hand Pump	Hand Pump Near Old Bus stand Sataun	2.85	30° 33′ 38.6″N 77° 38′ 15.5″E	Damaged
26	Shimla	Nahan	Shillai	Sirmour	Shillai	Hand Pump	Hand pump near old JE residence	3.50	30° 37′ 05″N 77° 41′ 55″E	Damaged
27	Shimla	Nahan	Shillai	Sirmour	Shillai	Hand Pump	Hand Pump near Nichla Bus stand	2.80	30° 33′ 33.5″N 77° 38′ 10.8″E	Damaged
28	Shimla	Nahan	Shillai	Sirmour	Shillai	Hand Pump	Hand Pump near Kanta (Weigh bridge) of Sh. Rajnish Pradhan	2.75	30° 33′ 29.1″N 77° 38′ 13.5″E	Damaged
29	Shimla	Nahan	Shillai	Sirmour	Shillai	Hand Pump	Hand Pump near Bridge Sataun	2.50	30° 33′ 30″N 77° 38′ 00″E	Damaged
30	Shimla	Nahan	Shillai	Sirmour	Shillai	Hand Pump	Hand Pump nr Bus stand Hevna	3.80	30° 34′ 52″N 77° 39′ 23″E	Damaged
31	Shimla	Nahan	Shillai	Sirmour	Shillai	Hand Pump	Hand pump nr Bus stop Borad	3.60	30° 37′ 51″N 77° 39′ 52″E	Damaged
32	Shimla	Nahan	Shillai	Sirmour	Shillai	Hand Pump	Hand pump nr house of Ramesh Chand Maloun	3.50	30° 38′ 14″N 77° 39′ 48″E	Damaged
33	Shimla	Nahan	Shillai	Sirmour	Shillai	Hand Pump	Hand pump near Bus stop Chadeu	3.25	30° 38′ 36″N 77° 39′ 53″E	Damaged
34	Shimla	Nahan	Shillai	Sirmour	Shillai	Hand Pump	Hand pump nr Panchayat Ghar Dugana	3.65	30° 37′ 00″N 77° 41′ 48″E	Damaged
35	Shimla	Nahan	Shillai	Sirmour	Shillai	Hand Pump	Hand Pump Nr Bus Stop Shilla	3.50	30° 37′ 44″N 77° 40′ 58″E	Damaged
							Total Amount	**138.20**		

Executive Engineer,
Jal Shakti Division Shillai

Annexure-R4-4

Government of India
Ministry of Road Transport & Highways
(Project Implementation Unit, Paonta Sahib, Himachal Pradesh)
[Opposite Sun Pharma, Up-sampda Bata Mandi, Paonta Sahib, Distt. Sirmour, H.P.- 173025]

No.: MoRTH PIU-P.S./Misc./2021-22/Vol. III/4061 **Dated: 05.07.2025**

To,

The Executive Engineer,
Jal Shakti Department (IPH),
Shillai, Distt. Sirmour, Himachal Pradesh.

Sub: Rehabilitation/upgradation of Paonta Sahib - Gumma section of NH-707 in the state of Himachal Pradesh - **Restoration of damaged water supply and irrigation schemes - Reg.**

Ref.: **(i)** **Your letter no. JSD-Shillai-DB-/2025-1031 dated 13.06.2025.**
(ii) **Letter no. LNM/MoRTH-PIU/PKG-II & III/2024-25/3780 dated 01.07.2025.**

Sir,

This is in reference to the grievances raised by your office regarding damages to water supply and irrigation schemes due to the construction work of NH-707. The matter was thoroughly examined through joint site inspections conducted with representatives from the M/o RT&H, PIU, Paonta Sahib, Authority's Engineer, Contractor and local villagers. based on the following points are submitted for your kind consideration:

(i) **Joint Inspection and Findings:**

- Detailed inspections at all locations mentioned in your letter has been carried out and point wise reply is enclosed.
- It has been ascertained that some of the reported damages fall outside the Right of Way (ROW) of NH-707 and do not pertain to the scope of this project.
- For alleged damages within the ROW;
  (a) Permanent restoration has been completed at 23 nos. of locations, wherever civil work is completed
  (b) Wherever works are ongoing, temporary restoration measures have been implemented to ensure uninterrupted water supply during the construction period. Permanent restoration will be completed upon the conclusion of civil works.
- The inspection revealed that many of the reported handpumps were either non-operational or decommissioned prior to the commencement of NH-707 construction.
- Wherever handpumps fall within the ROW and require relocation, the same will be addressed before the issuance of the project completion certificate.

2. In the event of any further damages occurring during the remaining construction period, the same will be duly rectified by the concerned contractors as per the signed Contract Agreement.

3. In view of the above, it is requested that any further grievances or observations may be brought to our notice for necessary action. We assure you of our full cooperation in ensuring minimal disruption to public utilities during the project's execution.

Yours faithfully

Enclosure: As above.

Project Director

L.N. MALVIYA INFRA PROJECTS PVT. LTD.
6268
Office: House No. 202/2 Ward No. 4 Durga Colony, Paonta Sahib
Email: lnmpsnh707@gmail.com
CIN No. U45201DL2010PTC373715

Ref: LNM/MoRTH-PIU/PKG-II & III/2024-25/ 3780 **Date: 01.07.2025**

To,

The Executive Engineer & Project Director,
Ministry of Road Transport & Highways,
PIU - Paonta Sahib, Himachal Pradesh.

Sub.: "Rehabilitation & Up-gradation to 2-lane configuration of Paonta Sahib - Gumma- Fediz Section (Km 0.000 to Km 103.550) of NH-707 in the State of Himachal Pradesh under Green National Highways Corridor Project (GNHCP) with loan assistance of World Bank on EPC mode" - **Requirement of fund to restore the damaged water supply and irrigation scheme due to construction work of NH 707- Reg.**

Ref.:- (i) MoRTH PIU-P.S./Misc./2021-22/Vol.III/4037, dated on: 25.06.2025.

Dear Sir,

With regard to the ref. above cited letter, a joint site vist was conducted by the Authority's Engineer with representavives from Contractor & local villagers, based on the coordinates provided. A report has been prepared accordingly and enclosed hereunder. In this regard, the following are submitted:

1. It was found that while some coordinates are related to obstruction/ damage to the water pipelines/ hand pumps falling on the ROW, several others do not come on the ROW of NH-707.
2. As per the signed EPC agreement, the Contractors are responsible for shifting/ relocation of existing utilities including water pipelines/ hand pumps etc. Wherever work has been completed with complete carriageway and protection measures, the shifting and restoration activities are completed satisfactorily upto a large extent. The remaining shifting/ restoration works shall also be completed shortly.
3. At locations where construction activities are still pending, the water pipelines have been temporarily restored for the time being and water supply in being ensured by the Contractors by providing HDPE pipes/ water tankers on regular basis.

   As soon as the construction and protection works are completed, the pipelines will be permanently restored by the EPC contractor.
4. Regarding the handpumps, the matter was inquired with the local residents and found that handpumps never existed at most of the locations mentioned in the coordinates. At a few locations where handpumps were found, it was observed that they had either been decommissioned/ become non-operational even before the road construction work began, and their pipes had already been removed.
5. Wherever hand pumps are within the ROW/ are proposed to be shifted as per the EPC agreement, the same shall be completed before issuance of completion certificate.

2. In view of the joint visit and above submissions, it is ascertained that the damages being attributed due to widening work of NH 707 is devoid of any merit.

Assuring you of best services at all times.

L.N. MALVIYA INFRA PROJECTS PVT. LTD.

Office: House No. 202/2 Ward No. 4 Durga Colony, Paonta Sahib
Email: lnmpsnh707@gmail.com

CIN No. U45201DL2010PTC373715

Yours sincerely

For L. N. Malviya Infra Projects Pvt. Ltd.

Harpreet Singh
Team Leader Cum Sr. Highway Engineer

Copy to: -

1. **The C.M.D.,** M/s L.N. Malviya Infra Projects Pvt. Ltd.
2. **The Project Coordinator,** M/s L.N. Malviya Infra Projects Pvt. Ltd.

L.N. MALVIYA INFRA PROJECTS PVT. LTD.

Office: House No. 202/2 Ward No. 4 Durga Colony, Paonta Sahib
Email: lnmpsnh707@gmail.com

CIN No. U45201DL2010PTC373715

Sr. No.	Zone	Circle	Division	District	Constituency	Name of Scheme	Components Damaged	Location & Coordinates	Remarks
1.	Shimla	Nahan	Shillai	Sirmour	Shillai	GWSS Timbi	Distribution line 32 mm dia at Various RD's 150	30°37'52"N 77°39'52"E	Once the civil works are completed at this location, it will be permanently restored by the EPC contractor. Meanwhile, during the under progress of construction work, the EPC contractor has temporarily restored it to ensure the continued water supply to the local communities.
2.	Shimla	Nahan	Shillai	Sirmour	Shillai	GWSS Chareu	Distribution line 32 mm dia = 60 Rmt, 50mm dia =200 Rmt at Various RD's	30°39'10"N 77°39'48"E	Work Completed
3.	Shimla	Nahan	Shillai	Sirmour	Shillai	GWSS Timbi	Distribution line 25 mm dia = 300Rmt, 15mm dia =600 Rmt at Various RD's	30°39'15"N 77°39'01"E	On-going
4.	Shimla	Nahan	Shillai	Sirmour	Shillai	FIS Ishari	Main C.C Channel 60 Rmt, B/Wall 20mtr Length Damaged.	30°39'43"N 77°39'12"E	Work Completed
5.	Shimla	Nahan	Shillai	Sirmour	Shillai	GWSS Bhangi	Distribution line 25 mm dia = 600Rmt at Various RD's	30°39'41"N 77°39'11"E	Work Completed

6.	Shimla	Nahan	Shillai	Sirmour	Shillai	GWSS Gangtoli	Distribution line 32mm dia =1600Rmt at Various RD's	30°39'30"N 77°39'34"E		Work Completed
7.	Shimla	Nahan	Shillai	Sirmour	Shillai	FIS Gangtoli	Head weir & main C.C Channel at Various RD's 750 Rmt	30°40'14"N 77°39'52"E		Work Completed
8.	Shimla	Nahan	Shillai	Sirmour	Shillai	GWSS Lohara	Distribution line 32mm dia =60Rmt at Various RD's	30°40'27"N 77°40'01"E		Work Completed
9.	Shimla	Nahan	Shillai	Sirmour	Shillai	GWSS Kumarli	Distribution line 32mm dia =60Rmt at Various RD's	30°40'28"N 77°40'01"E		Work Completed
10.	Shimla	Nahan	Shillai	Sirmour	Shillai	LWSS Shillai & LWSS Sundrari	Rising main 125mm Dia 2 No's (M/G) = 120Rmt, Distribution line 50mm dia =1800Rmt, 65mm dia =1800Rmt, 100mm dia =60Rmt,	30°40'40"N 77°41'50"E		Work Completed

							80mm dia =120Rmt, 15mm dia =900Rmt Damaged at Various RD's			
11.	Shimla	Nahan	Shillai	Sirmour	Shillai	GWSS Bhankoli	Distribution line 25mm dia =900Rmt at Various RD's	30°40'53"N 77°42'01"E		These pipelines do not belong to the IPH Department. However, the EPC contractor has also restored these private pipelines.
12.	Shimla	Nahan	Shillai	Sirmour	Shillai	GWSS Shillai Village	Distribution line 40mm dia =260Rmt at Various RD's	30°40'45"N 77°42'30"E		Work Completed
13.	Shimla	Nahan	Shillai	Sirmour	Shillai	GWSS Shillai Colony	Distribution line 20mm dia =1300Rmt at Various RD's	30°41'38"N 77°42'42"E		These pipelines do not belong to the IPH Department. However, the EPC contractor has also restored these private pipelines.
14.	Shimla	Nahan	Shillai	Sirmour	Shillai	GWSS Bandli	Distribution line 25mm dia =550Rmt at Various RD's	30°41'03"N 77°42'32"E		Once the civil works of NH-707 are completed, it will be permanently restored by the EPC contractor.

15.	Shimla	Nahan	Shillai	Sirmour	Shillai	GWSS Pasta Bass	Distribution line 25mm dia =450Rmt at Various RD's	30°42'21"N 77°42'39"E		Work Completed
16.	Shimla	Nahan	Shillai	Sirmour	Shillai	GWSS Kando	Distribution line 40mm dia =350Rmt at Various RD's	30°40'15"N 77°41'57"E		Work Completed
17.	Shimla	Nahan	Shillai	Sirmour	Shillai	GWSS Dakker	Distribution line 25mm dia =250Rmt at Various RD's	30°42'55"N 77°41'22"E		Work Completed
18.	Shimla	Nahan	Shillai	Sirmour	Shillai	GWSS Khanner	Distribution line 25mm dia =600Rmt at Various RD's	30°43'15"N 77°41'51"E		Work Completed
19.	Shimla	Nahan	Shillai	Sirmour	Shillai	GWSS Hakaina Tapara	Distribution line 25mm dia =180Rmt at Various RD's	30°41'03"N 77°42'32"E		Work Completed

20.	Shimla	Nahan	Shillai	Sirmour	Shillai	GWSS Bagna	Distribution line 25mm dia =120Rmt at Various RD's	30°39'52"N 77°41'21"E		Work Completed
Detail of Handpump damaged due to Construction of NH-707 in respect of Jal Shakti Division Shillai										
21.	Shimla	Nahan	Shillai	Sirmour	Shillai	Handpump	Gangtoli	30°39'39"N 77°39'39"E		At this location hand pump is located beyond the ROW and this handpump has not been damaged and Handpump is in safe condition. However, the EPC contractor has been instructed to clean it.
22.	Shimla	Nahan	Shillai	Sirmour	Shillai	Handpump	Dharva	30°44'26"N 77°41'56"E	The local people stated that this hand pump was non-operational even before the construction work of NH-707 began. It had already been decommissioned. The local people do not have accurate information about the exact location of the hand pump. Different individuals mention different locations, all of which are outside the ROW.	
23.	Shimla	Nahan	Shillai	Sirmour	Shillai	Handpump	Jambli	30°44'40"N 77°41'54"E		
Sub Division Kaffota										
Sr. No.	**Zone**	**Circle**	**Division**	**District**	**Constituency**	**Name of Scheme**	**Components Damaged**	**Location & Coordinates**	**Remarks**	
1.	Shimla	Nahan	Shillai	Sirmour	Shillai	GWSS Devlan in GP Kamrau	Intake Damages & GMS Pipe 32 mm dia=100 Rmt	30°36'19"N 77°39'33"E		

2.	Shimla	Nahan	Shillai	Sirmour	Shillai	GWSS basog in GP Kamrau	GMS Pipe 25 mm dia=360 Rmt	30°36'26"N 77°39'34"E		Construction activities are currently ongoing. After the completion of the construction work at this location, It will be permanently restored by the EPC contractor.
3.	Shimla	Nahan	Shillai	Sirmour	Shillai	GWSS Parlo in GP Kamrau	GMS Pipe 25mm dia=300 Rmt & 20mm dia=300 Rmt	30°36'15"N 77°39'33"E		
4.	Shimla	Nahan	Shillai	Sirmour	Shillai	GWSS Rithog Shirog in GP Shilla	GMS Pipe 25mm dia=1000 Rmt	30°37'55"N 77°39'57"E		Work Completed
5.	Shimla	Nahan	Shillai	Sirmour	Shillai	GWSS Sataun in GP Sataun	GMS Pipe 100 mm dia=300 Rmt & GMS Pipe 80mm dia=280 Rmt	30°33'38"N 77°39'02"E		The location of the coordinates provided is 1.5 km away from the ROW of NH-707, which does not fall under our scope of work.
6.	Shimla	Nahan	Shillai	Sirmour	Shillai	GWSS Shimble Dhar	GMS Pipe 50 mm dia=1370 Rmt	30°38'11"N 77°40'11"E		Work Completed

7.	Shimla	Nahan	Shillai	Sirmour	Shillai	LWSS Kaffota	GMS Pipe 65 mm dia=1660 Rmt	30°37'19"N 77°41'35"E		Work under progress
8.	Shimla	Nahan	Shillai	Sirmour	Shillai	LWSS Bokala Pab (Feeder line)	GMS Pipe 40 mm dia=850 Rmt	30°38'13"N 77°40'33"E		Work Completed
9.	Shimla	Nahan	Shillai	Sirmour	Shillai	LWSS Dugana (Habitation Dabra)	GMS Pipe 20 mm dia=1020 Rmt	30°36'42"N 77°41'19"E		During the construction period, water supply is being maintained regularly through tankers. After the completion of the construction work, the permanent restoration of the water supply line will be carried out by the EPC contractor.
10.	Shimla	Nahan	Shillai	Sirmour	Shillai	GWSS Shirgaon	GMS Pipe 20 mm dia=650 Rmt	30°37'21"N 77°41'20"E		Construction activities are currently ongoing. After the completion of the construction work at this location, It will be permanently restored by the EPC contractor.
11.	Shimla	Nahan	Shillai	Sirmour	Shillai	LWSS Basog Chambyara	Rising Main	30°36'20"N 77°40'11"E		

12.	Shimla	Nahan	Shillai	Sirmour	Shillai	LWSS Kamrau	GMS Pipe 32 mm dia=750 Rmt	30°36'10"N 77°40'29"E		Work Completed
13.	Shimla	Nahan	Shillai	Sirmour	Shillai	GWSS Hewna (Temple line)	GMS Pipe 15 mm dia=1200 Rmt	30°34'55"N 77°39'27"E		Work under progress
14.	Shimla	Nahan	Shillai	Sirmour	Shillai	FIS Sataun	Main Channel at Various RD's	30°33'53"N 77°39'13"E		Work Completed
15.	Shimla	Nahan	Shillai	Sirmour	Shillai	FIS Maloun (Chadeu)	Diversion weir and Main Channel	30°57'53"N 77°39'54"E		Work Completed

16.	Shimla	Nahan	Shillai	Sirmour	Shillai	FIS Rithog Shirog	Diversion weir and Main Channel	30°37'56"N 77°39'57"E		Work Completed
Detail of Handpump damaged due to Construction of NH-707 in respect of Jal Shakti Division Shillai										
17.	Shimla	Nahan	Shillai	Sirmour	Shillai	Hand Pump	Hand Pump Near Bus stop Kaffota	30°37'19"N 77°42'01"E	The local people stated that this hand pump was non-operational even before the construction work of NH-707 began. It had already been decommissioned. The local people do not have accurate information about the exact location of the hand pump. Different individuals mention different locations, all of which are outside the Right of Way (ROW)	
18.	Shimla	Nahan	Shillai	Sirmour	Shillai	Hand Pump	Hand Pump Near Village Pab	30°37'15"N 77°41'50"E		
19.	Shimla	Nahan	Shillai	Sirmour	Shillai	Hand Pump	Hand Pump Near Bank Kamrau	30°36'08"N 77°40'30"E		
20.	Shimla	Nahan	Shillai	Sirmour	Shillai	Hand Pump	Hand Pump Near old Bus stop Kamrau	30°36'14"N 77°40'35"E	According to the local people, there has been no hand pump at this location for the last 10 years, and they are unsure if there was one before that. Therefore, NH-707 construction has no role in any such damage.	
21.	Shimla	Nahan	Shillai	Sirmour	Shillai	Hand Pump	Handpump near Shop of Layak Ram kamrau	30°36'12"N 77°40'28"E		
22.	Shimla	Nahan	Shillai	Sirmour	Shillai	Hand Pump	Hand Pump Near Khajjiyar Bus stop	30°36'28"N 77°39'36"E		
23.	Shimla	Nahan	Shillai	Sirmour	Shillai	Hand Pump	Hand Pump at Chalani (Barwas Bus stop)	30°36'08"N 77°39'31"E		
24.	Shimla	Nahan	Shillai	Sirmour	Shillai	Hand Pump	Hand Pump Near Tilordhar Bus stand	30°36'08"N 77°41'08"E		

25.	Shimla	Nahan	Shillai	Sirmour	Shillai	Hand Pump	Hand Pump Near old Bus stand Sataun	30°33'38.6"N 77°38'15.5"E	Hand pump location is outside the ROW, and the handpump is in operational condition.	
26.	Shimla	Nahan	Shillai	Sirmour	Shillai	Hand Pump	Hand Pump Near old JE residence	30°37'05"N 77°41'55"E	Given co-ordinates lies in the existing center of NH-707 but as per local people said that at this location no handpump from last 6-7 years.	
27.	Shimla	Nahan	Shillai	Sirmour	Shillai	Hand Pump	Hand Pump Near Nichla Bus stand	30°33'33.5"N 77°38'10.8"E	This hand pump was already no-operational even before the road construction work started	
28.	Shimla	Nahan	Shillai	Sirmour	Shillai	Hand Pump	Hand Pump Near Kanta (Weigh bridge) of Sh. Rajnish Pradhan	30°33'29.1"N 77°38'13.5"E	This hand pump location is outside the ROW, and the hand pump is in operational condition. Even though, the hand pump location was cleaned and the platform was restored, the private landowner has placed construction materials near the hand pump location.	

29.	Shimla	Nahan	Shillai	Sirmour	Shillai	Hand Pump	Hand Pump Near Bridge Sataun	30°33'30"N 77°38'00"E	Work Completed	
30.	Shimla	Nahan	Shillai	Sirmour	Shillai	Hand Pump	Hand Pump Near Bus Stand Hevna	30°34'52"N 77°39'23"E	The local people stated that this hand pump was non-operational even before the construction work of NH-707 began. It had already been decommissioned. The local people do not have accurate information about the exact location of the hand pump. Different individuals mention different locations, all of which are outside the Right of Way (ROW)	
31.	Shimla	Nahan	Shillai	Sirmour	Shillai	Hand Pump	Hand Pump Near Bus Stop Borad	30°37'51"N 77°39'52"E		
32.	Shimla	Nahan	Shillai	Sirmour	Shillai	Hand Pump	Hand Pump Near house of Ramesh Chand Maloun	30°38'14"N 77°39'48"E		
33.	Shimla	Nahan	Shillai	Sirmour	Shillai	Hand Pump	Hand Pump Near Bus Stop Chadeu	30°38'36"N 77°39'53"E		
34.	Shimla	Nahan	Shillai	Sirmour	Shillai	Hand Pump	Hand Pump Near Panchayat Ghar Dugana	30°37'00"N 77°41'48"E		
35.	Shimla	Nahan	Shillai	Sirmour	Shillai	Hand Pump	Hand Pump Near Bus Stop Shilla	30°37'44"N 77°40'58"E		

Dumping Site Details: -

There are a total of 43 disposal sites in the NH-707 project. Out of these, 12 dump sites are government-owned, and the remaining is private arranged by the Contractor.

Govt. Disposal site details:-

Contractor & package	Sr. No.	Name of the village	Chainage in km	Geographic coordinates	Original Capacity in CuM
RG Buildwell Engineers Ltd. Package-2	1.	Hewna	25+690	77.651582; 30.587095,	25000
	2.	Barwas	27+390	77.658456; 30.591011,	80000
	3.	Khajjiyar	30+180	77.661359; 30.606841	120000
	4.	Kamrau	32+930	77.679595; 30.604556	50000
	5.	Chareu	48+010	77.661468; 30.643672	36210
	6.	Chareu (Near School)	48+800	77.659504; 30.647210	91830
HES Infra Pvt. Ltd. Package-3	7.	Naya	60+080	77.684355; 30.668198,	137500
	8.	Shiri Kiyari	73+720	77.685035; 30.710144,	155000
M/S PRL Projects & Infrastructure Ltd. Dhatarwal Construction Company Pvt. Ltd. (JV), (Package 4)	9.	Drawil	78+220	77.694818; 30.725215,	150000
	10.	Near Gumma	90+070	30.775147; 77.718335,	78524
M/S Shivalik Buildtech Pvt. Ltd. (Package- 5)	11.	Bohi	96+220	30.809339; 77.73891,	271094
	12.	Kyarla	99+050	30.825269; 77.75335,	79771
Total Volume					**1274929**

Private Disposal site details:-

Contractor & package	Sr. No.	Name of the village	Chainage in km	Geographic coordinates	Capacity in CuM
ABCI Infrastructures Pvt. Ltd. Package-1	1.	Jwalapur	5+800	77.636610; 30.484184	5805
	2.	**Rajban (CCI Colony)**	**10+200**	**77.662788; 30.522848,**	**70000**
	3.	**Sataun**	**16+600**	**77.629830; 30.554339,**	**8500**
	4.	Sataun-Renuka Ji	18+500	77.633994; 30.560379,	9000
	5.	**Sataun Poka Road**	**19+450**	**77.647463; 30.555348,**	**23000**
	6.	Sataun (Village)	20+200	77.649755; 30.556571,	180000
	7.	**Chilaun**	**21+100**	**77.648560; 30.565135,**	**170000**
	8.	**Near Hewna**	**23+050**	**77.65337; 30.5730070**	**150000**
RG Buildwell Engineers Ltd. Package-2	9.	Hewna	25+450	77.652695; 30.584842,	88000
	10.	Khajjiyar	29+400	77.661905; 30.602423,	44000
	11.	Baldwa	33+950	77.684474; 30.600247	130339
	12.	Dugana	36+900	77.686143; 30.611000	22000
	13.	Titiyana	43+230	77.671510; 30.630983	210000
	14.	Titiyana	43+230	77.672511; 30.629650	180000
	15.	Chareu	47+030	77.664089; 30.640376	18000
HES Infra Pvt. Ltd. Package-3	16.	Gangtoli	52+200	77.653978; 30.658845	70000
	17.	Gangtoli	52+760	77.652987; 30.661907	6486
	18.	Gangtoli	54+020	77.660972; 30.660413	23500
	19.	Gangtoli	55+070	77.661687; 30.668298	28558
	20.	Gangtoli	55+420	77.664573; 30.669871	88040
	21.	Uttari	57+750	77.671698; 30.664385	341740
	22.	Pab Manal	59+150	77.679328; 30.663363	926677
	23.	Kando Dhar	68+950	77.705321; 30.699173,	183600
	24.	Kando	69+540	77.708434;	30530

		Dhar (Gimal Temple)		30.702402,	
	25.	Nayal	73+470	77.684906; 30.708265,	36414
	26.	Dharwa	81+220	77.701224; 30.735674,	148810
	27.	Jamli	83+250	77.695511; 30.743027,	223930
	28.	Jamli	84+420	77.700992; 30.749404,	79920
	29.	Rohana	89+750	30.774587; 77.715306,	171828
	30.	Near Gumma	90+670	30.779493; 77.716739,	172540
	31.	Gumma	93+710	30.795043; 77.726803,	79000
Total Volume					**3920217**

Remarks:-

1. **Rajban (CCI Colony):** This location was developed as a colony for the CCI Cement Factory. (Sr. No. 2 in the above table)
2. **Sataun:** This location has been developed by the Forest Department as "Sirmour Van Vihar." (Sr. No. 3 in the above table)
3. **Sataun Poka Road:** This location has been developed as a school playground with a temporary helipad. (Sr. No. 5 in the above table)
4. **Chilaun:** This disposal site was approved by the Forest Department. (Sr. No. 7 in the above table)
5. **Near Hewna:** This disposal site was approved by the Forest Department. (Sr. No. 8 in the above table)
6. Agreements for all private disposal sites have already been submitted. Please refer to the reply on page no. 1103 to 1678.

PACKAGE-1

ISO CERTIFICATION

SERTIFIKA | CERTIFICATE | ZERTIFIKAT

Certificate of Registration

This is to certify that

ABCI Infrastructures Private Limited

ABCI HOUSE, 7 ZAMRUDPUR COMMUNITY CENTER,
KAILASH COLONY, NEW DELHI – 110048 INDIA

has been assessed and Certified by Mapple Certification Services
as meeting the requirements of:

ISO 14001:2015

Environment Management System

For the following scope of activities:-

DESIGN AND EXECUTION OF CIVIL ENGINEERING, INDUSTRIAL, POWER, INFRASTRUCTURE PROJECTS SUCH AS IRRIGATIONS CANALS, DAMS, SPILLWAYS, TUNNELS, BRIDGES, ROADS, STORM WATER DRAINS, WATER SUPPLY NETWORK, SEWAGE NETWORK, BUILDINGS AND COMMUNITY DEVELOPMENT WORKS

Date Of Registration: 17/05/2022
1st Surveillance Due: 16/05/2023
2nd Surveillance Due: 16/05/2024
Recertification Due: 16/05/2025

Certificate No:- 1080551129
To Verify this certificate please visit at www.mapplecert.de

DAF
DEUTSCHE ACCREDITATION FORUM
CB 1583487

Authorised Signatory

Mapple Certification Services
Validity of this certificate is subject to Annual Surveillance audits done successfully
This Certificate of Registration remains the Property of Mapple Certification services
and shall be returned immediately upon request
Email: info@mapplecert.de | Website: www.mapplecert.de
Grafestr.4, 10967 Berlin, Germany

PROJECT MANAGER (Pkg. I)
M/s ABCI Infrastructures Pvt. Ltd.
NH-707, Paonta Sahib, H.P.

Environmental cum Water Conservation Expert
L.N.M. Infra Projects Pvt. Ltd.
NH-707, Paonta Sahib-HP

PACKAGE-2

QRO
QUALITY RESEARCH ORGANIZATION

Certificate of Registration

This is to certify that

R.G. BUILDWELL ENGINEERS LTD

B - 30, R.D.C., RAJ NAGAR, GHAZIABAD, UP - 201002 (INDIA)

has been independently assessed by QRO
and is compliant with the requirement of:

ISO 14001:2015

Environmental Management System

For the following scope of activities:

PROVIDING SERVICES OF NATIONAL & STATE HIGHWAYS CONSTRUCTION

Date of Certification: 19th April 2022
1st Surveillance Audit Due: 18th April 2023
2nd Surveillance Audit Due: 18th April 2024
Certificate Expiry: 18th April 2025

Certificate Number: 305022041943E

QRO QUALITY RESEARCH ORGANIZATION
EGAC CAB # 119005
IAF MEMBER OF MULTILATERAL RECOGNITION ARRANGEMENT

Head of Certification

Validity of this certificate is subject to annual surveillance audits to be done successfully on or before 365 days from date of the audit. (In case surveillance audit is not allowed to be conducted: this certificate shall be suspended / withdrawn).
The Validity of this certificate can be verified at www.qrocert.org
This certificate of registration remains the property of QRO Certification LLP, and shall be returned immediately upon request.

India Office : QRO Certification LLP
142, IInd Floor, Avtar Enclave, Near Paschim Vihar West Metro Station, Delhi-110063, (INDIA)
Website : www.qrocert.org, E-mail : info@qrocert.org

PACKAGE-3

SERTIFIKA | CERTIFICATE | ZERTIFIKAT | سرٹیفکیٹ

Certificate of Registration

This is to certify that

HES INFRA PRIVATE LIMITED

HES HOUSE, PLOT NO. 13, SHILPI ENCLAVE, MADHAPUR,
HYDERABAD – 500081, TELANGANA, INDIA

has been assessed and Certified by Mapple Certification Services
as meeting the requirements of:

ISO 14001:2015

Environment Management System

For the following scope of activities:-

DESIGN AND EXECUTION OF CIVIL ENGINEERING, INDUSTRIAL, POWER, INFRASTRUCTURE PROJECTS SUCH AS IRRIGATIONS CANALS, DAMS, SPILLWAYS, TUNNELS, BRIDGES, ROADS, STORM WATER DRAINS, WATER SUPPLY NETWORK, SEWAGE NETWORK, BUILDINGS AND COMMUNITY DEVELOPMENT WORKS

Date Of Registration: 17/05/2022
1st Surveillance Due: 16/05/2023
2nd Surveillance Due: 16/05/2024
Recertification Due: 16/05/2025

Certificate No:- 1080551124

To Verify this certificate please visit at www.mapplecert.de

DAF
DEUTSCHE ACCREDITATION FORUM
CB4583487

Authorised Signatory

Mapple Certification Services

Validity of this certificate is subject to Annual Surveillance audits done successfully

This Certificate of Registration remains the Property of Mapple Certification services and shall be returned immediately upon request

Email: info@mapplecert.de | Website: www.mapplecert.de

Grafestr.4, 10967 Berlin, Germany

PACKAGE-4

SERTIFIKA | CERTIFICATE | ZERTIFIKAT | سرٹیفکیٹ

Certificate of Registration

This is to certify that

DHATARWAL CONSTRUCTION COMPANY PRIVATE LIMITED
PLOT NO. DSB-17, SECTOR PANCHAYAT POCKET,
BHIWANI – 127021, HARYANA INDIA

has been assessed and Certified by Mapple Certification Services
as meeting the requirements of:

ISO 14001:2015

Environment Management System

For the following scope of activities:-

DESIGN AND EXECUTION OF CIVIL ENGINEERING, INDUSTRIAL, POWER, INFRASTRUCTURE PROJECTS SUCH AS IRRIGATIONS CANALS, DAMS, SPILLWAYS, TUNNELS, BRIDGES, ROADS, STORM WATER DRAINS, WATER SUPPLY NETWORK, SEWAGE NETWORK, BUILDINGS AND COMMUNITY DEVELOPMENT WORKS

Date Of Registration: 17/05/2022
1st Surveillance Due: 16/05/2023
2nd Surveillance Due: 16/05/2024
Recertification Due: 16/05/2025

Certificate No:- 1080551121
To Verify this certificate please visit at www.mapplecert.de

DAF
DEUTSCHE AKKREDITATION FORUM
CH4583487

Authorised Signatory

Mapple Certification Services
Validity of this certificate is subject to Annual Surveillance audits done successfully
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and shall be returned immediately upon request
Email: info@mapplecert.de | Website: www.mapplecert.de
Grafestr.4, 10967 Berlin, Germany

PACKAGE-5

Certificate of Registration

This is to Certify that
Environmental Management System of

SHIVALIK BUILDTECH PRIVATE LIMITED

SECOND FLOOR, A-1/A, SECTOR 16, NOIDA, GAUTAM BUDDHA NAGAR – 201301, UTTAR PRADESH, INDIA.

has been assessed and found to conform to the requirements of

ISO 14001:2015

for the following scope :

DEALS IN CONSTRUCTION OF ROAD, BUILDINGS RESIDENTIAL & COMMERCIAL. AND MANUFACTURE OF READY MIXED CONCRETE WITH DEDICATED BATCHING PLANT IN GOVERNMENT PROJECTS.

Certificate No	: **22EEIF18**		
Initial Registration Date	: 17/09/2022	Issuance Date	: 17/09/2022
Date of Expiry	: 16/09/2025		
1st Surve. Due	: 17/08/2023	2nd Surve. Due	: 17/08/2024

For Shivalik Buildtech Pvt. Ltd.

Authorised Signatory

Director

EGAC Accredited EMS Certification CAB # 118005

MEMBER OF MULTILATERAL RECOGNITION ARRANGEMENT IAF

Magnitude Management Services Pvt. Ltd.
B-55, Lower Ground Floor, Sector 02, Noida-201301, U.P, India
e-mail: info@mmscertification.com, website: www.mmscertification.com

* Subject to Successful Surveillance Audit and case surveillance audit is not allowed to be conducted, this certificate shall be suspended/withdrawal.

Certificate Verification: Please Re-check the validity of certificate at http://www.mmscertification... ...clients.aspx or www.mmscertification.com at Active Clients.

Certificate is the property of Magnitude Management Services Pvt. Ltd. and shall be ... ...diately when demanded

B-30
RDC
Raj Nagar
Ghaziabad (UP)

RDC
Raj Nagar
Ghaziabad (UP)

R.G. Buildwell Engineers Ltd. B-30 RDC Raj Nagar Ghaziabad (UP)

R G Bindlish Engineers Ltd
B-30
RDC
Raj Nagar
Ghaziabad (UP)

R G Construction Engineers Ltd. B-30 RDC Raj Nagar Ghaziabad (UP)

R G Builders & Engineers Pvt
B-30
RDC
Raj Nagar
Ghaziabad (U.P.)

R G Builtwell Engineers Ltd
B-30
RDC
Raj Nagar
Ghaziabad (UP)

R G Builtwell Engineers Pvt Ltd
B-30
RDC
Raj Nagar
Ghaziabad (U.P.)

R G Bansal Engineers Ltd
B-30
R D C
Raj Nagar
Ghaziabad (U.P.)

R G Builtwell Engineers Pvt Ltd
B-30
RDC
Raj Nagar
Ghaziabad (UP)

R G Buildwell Engineers Ltd
B-30
RDC
Raj Nagar
Ghaziabad (U.P.)

6305

TREE PLANTATION AT DUMPING YARD DT:-27 AUGUST 2025

SI No	Photographs		

6306

TREE PLANTATION AT DUMPING YARD DT:-27 AUGUST 2025

6307

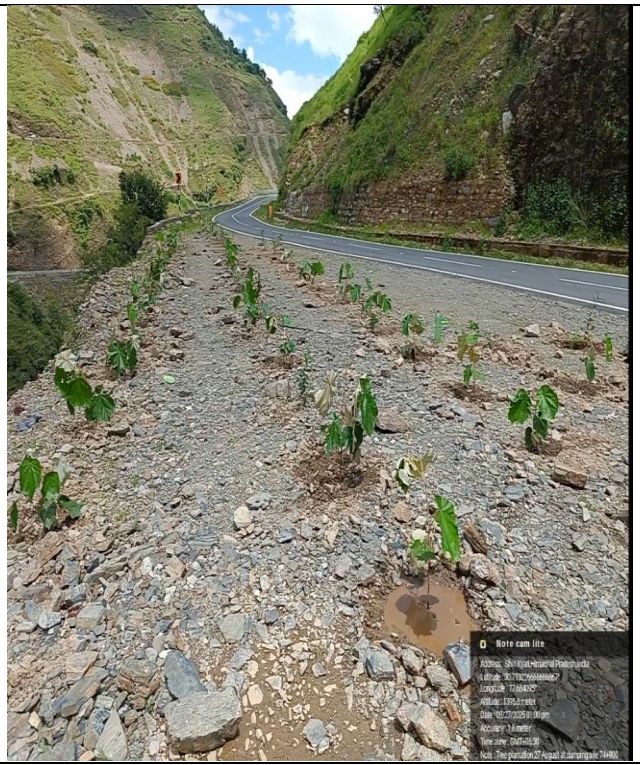
TREE PLANTATION AT DUMPING YARD DT:-27 AUGUST 2025

6308

TREE PLANTATION AT DUMPING YARD DT:-27 AUGUST 2025

6309

TREE PLANTATION AT DUMPING YARD DT:-27 AUGUST 2025



H.P Forest Department
Renukaji Forest Division
Email: [illegible]@gmail.com
Phone:- 01702-267321

6310

No. 2194 Dated Sri Renukaji, the 30/07/25

To :-

Project Director, M/o RT&H,
Project Implementation Unit, Paonta Sahib.
Distt. Sirmour Himachal Pradesh.

Subject:- Rehabilitation/ up-gradation of Paonta Sahib – Gumma section of NH-707 in the State of Himachal Pradesh- Request for providing estimate for the work of plantation at 8 Dumping sites along NH-707 reg.

Sir,

Kindly refer to your Office letter No. Morth PIU-P.S.F.C./Paonta Sahib-Gumma/2020-21/4064 dated 07/07/2025 on the subject cited above.

Enclosed herewith is the estimate for the plantation work at eight (08) dumping sites located along NH-707 as received from the concerned Forest Ranges Kafota and Shillai. The details are given as under:-

Sr. No.	Name of Range	Name of work	Name of site (Village)	Area in hac.	Amount	Remarks
1	Kafota	Plantation	Hewna	0.0674	11150	These dumping sites are situated on private land along NH-707.
2		Plantation	Barwas	0.4762	78770	
3		Plantation	Khajiyar	0.6448	106660	
4		Plantation	Kamraru	0.3654	62935	
5		Plantation	Chareu	0.2576	42610	
6		Plantation	Chareu	0.6674	107090	
7	Shillai	Plantation	Naya Chanage	1.297	219700	
8		Plantation	Shri Kiyari	0.819	138700	
Total Plantation cost (A)				4.5948	767615	
Total Maintenance 1 to 5 years cost (B)					208125	
G. Total (A+B)					**975740**	

Therefore, you are requested to deposited the an amount to the tune of Rs. 975740/- in the account of undersigned for above mentioned subject, the detail of bank account is given as under:-

Name of Bank	Uco Bank
Name of Branch	Rainka
Name of Bank Account holder	DFO Renuka Ji
Account No.	04230110045510
IFSC code	UCBA00004223

This is for your information and further necessary action please.

Encl; as above.

Divisional Forest Officer,
Renukaji Forest Division
District Sirmour (H.P).

30-07-25

Annexure-R10-1

No.119/KF
HP Forest Deptt.
Dated, Kaffota the 10/07/2025

6311

From: - RFO Kaffota. To: - DFO Sh. Renuka Ji.

Subject: - Submission of Estimates re-habilitation of dumping site in NH-707 (**Acquired land**).

Memo: -

Kindly find enclosed herewith the submission of following estimates for re-habilitation of dumping site in NH-707 (Acquired land) in respect of Kafota range: -

Sr no.	Name of Beat	Name of work	Name of Area/Village	Ha.	Amount
1	Sataun	Plantation	Hewna	0.0674	**11,150/-**
2	Sataun	Plantation	Barwas	0.4762	**78,770/-**
3	Sataun	Plantation	Khajiyar	0.6448	**1,06,660/-**
4	Sataun	Plantation	Kamrau	0.3654	**62,935/-**
5	Tatiyana	Plantation	Chareu	0.2576	**42,610/-**
6	Tatiyana	Plantation	Chareu	0.6674	**1,07,090/-**
				Total Rupees	**4,09,215/-**

This is for favour of your information and further financial approval please.

Encls: Estimates

Range Forest Officer
Forest Range Kaffota.

Divisional Forest Officer Renuka Ji
Receipt No 1974
Date 24/07/25

Sale
24/7/25

Annexure-R10-2

6312

Estimate for proposed new plantation for re-habilitation of dumping site in NH-707 acquired land at Hewna Chainage 25+650 to 25+700 area (**0.0674 Ha.**) of Sataun Beat of Sataun Block of Kaffota Forest Range(Norms of plants 800 Normal P/Bags plants per Ha. with RCC Fence posts)

Sr.No	Description of work	Qty	Unit	Rate	Amount	Remarks
A	**Survey, demarcation and fencing work**					
1	Survey and demarcation of plantation area	1	ha	268/ha	268/-	
2	Preparation/Purchase of RCC fence post @ rate of 580 per post i/c transportation to forest depot	50	No.	580/p	29000/-	Open market rate
3	Carriage of RCC fence post up to 165 cm long over a distance of 2km uphill/downhill	50	No.	178.65/p	8932.50	
4	Preparation/Digging of holes of 20x30x50cm in size	50	No.	24.16/p	1208.00	
5	Fixing of RCC fence posts i/c strutting	50	No.	19.12/p	956.00	
6	Carriage of B/wire over a distance of 2kms	1.44	qtl	394.66/q	568.00	
7	Stretching & fixing of barbed wire in 4 stands and 2 cross fencing	935	rmt	5.33/rmt	4984.00	
8	Interlacing of thorny bushes/live hedge along the fence	150	rmt	10.67/rmt	1600.00	
9	Cost of barbed wire	1.44	qtl	12000/ Qtl	17280.00	
	Total of A - Survey, Demarcation & Fencing work				**64,796.50**	
B	**Planting work:-**					
1	Digging of pits size 45x45x45cm	800	No.	25.45/p	20360.00	
2	Filling of pits size 45x45x45cm	800	No.	7.25/p	5800.00	
3	Carriage of plants raised in P/Bags over distance of 2km uphill/downhill side	800	No.	10.13/p	8104.00	
4	Planting of plants raised in P/Bags	800	No.	5.81/p	4648.00	
5	Construction of inspection path 60cm wide	100	Rmt	29.33/rmt	2933.00	
6	Cost of Sign board, Carriage & Fixing	1	No.	L/S	5000.00	
	Total of B- Planting works				**46,845.00**	
C	Nursey cost of plants	800	No.	23.47/plant	**18,776.00**	
D	Cost of planting of bioengineering species, herbs and shrups cutting i/c cutting, carriage and planting in strips	1	Ha.	35000/ha	**35,000.00**	
	G.Total of A+B+C+D				**1,65,417.00**	
	Or Say					
	Total area for plantation with cost			**0.0674 Ha.**	**11,149.10**	
	Or Say				**11,150/-**	

A B.O. Sataun

Annexure-R10-3

Estimate for proposed new plantation for re-habilitation of dumping site in NH-707 acquired land at Barwas Chainage 27+350 to 27+550 area (**0.4762 Ha.**) of Sataun Beat of Sataun Block of Kaffota Forest Range(Norms of plants 800 Normal P/Bags plants per Ha. with RCC Fence posts)

Sr.No	Description of work	Qty	Unit	Rate	Amount	Remarks
A	**Survey, demarcation and fencing work**					
1	Survey and demarcation of plantation area	1	ha	268/ha	268/-	
2	Preparation/Purchase of RCC fence post @ rate of 580 per post i/c transportation to forest depot	50	No.	580/p	29000/-	Open market rate
3	Carriage of RCC fence post up to 165 cm long over a distance of 2km uphill/downhill	50	No.	178.65/p	8932.50	
4	Preparation/Digging of holes of 20x30x50cm in size	50	No.	24.16/p	1208.00	
5	Fixing of RCC fence posts i/c strutting	50	No.	19.12/p	956.00	
6	Carriage of B/wire over a distance of 2kms	1.44	qtl	394.66/q	568.00	
7	Stretching & fixing of barbed wire in 4 stands and 2 cross fencing	935	rmt	5.33/rmt	4984.00	
8	Interlacing of thorny bushes/live hedge along the fence	150	rmt	10.67/rmt	1600.00	
9	Cost of barbed wire	1.44	qtl	12000/ Qtl	17280.00	
	Total of A - Survey, Demarcation & Fencing work				**64,796.50**	
B	**Planting work:-**					
1	Digging of pits size 45x45x45cm	800	No.	25.45/p	20360.00	
2	Filling of pits size 45x45x45cm	800	No.	7.25/p	5800.00	
3	Carriage of plants raised in P/Bags over distance of 2km uphill/downhill side	800	No.	10.13/p	8104.00	
4	Planting of plants raised in P/Bags	800	No.	5.81/p	4648.00	
5	Construction of inspection path 60cm wide	100	Rmt	29.33/rmt	2933.00	
6	Cost of Sign board, Carriage & Fixing	1	No.	L/S	5000.00	
	Total of B- Planting works				**46,845.00**	
C	Nursey cost of plants	800	No.	23.47/plant	**18,776.00**	
D	Cost of planting of bioengineering species, herbs and shrups cutting i/c cutting, carriage and planting in strips	1	Ha.	35000/ha	**35,000.00**	
	G.Total of A+B+C+D				**1,65,417.00**	
	Or Say					
	Total area for plantation with cost			**0.4762 Ha.**	**78,771.57**	
	Or Say				**78,770/-**	

वन परिक्षेत्राधिकारी
कफोट
जिला अल्मोड़ा (उत्तराखण्ड)

A.D.O. Sataun

Estimate for proposed new plantation for re-habilitation of dumping site in NH-707 acquired land at Khajiyar Chainage 30+100 to 30+600 area (**0.6448 Ha.**) of Sataun Beat of Sataun Block of Kaffota Forest Range(Norms of plants 800 Normal P/Bags plants per Ha. with RCC Fence posts)

Sr.No	Description of work	Qty	Unit	Rate	Amount	Remarks
A	**Survey, demarcation and fencing work**					
1	Survey and demarcation of plantation area	1	ha	268/ha	268/-	
2	Preparation/Purchase of RCC fence post @ rate of 580 per post i/c transportation to forest depot	50	No.	580/p	29000/-	Open market rate
3	Carriage of RCC fence post up to 165 cm long over a distance of 2km uphill/downhill	50	No.	178.65/p	8932.50	
4	Preparation/Digging of holes of 20x30x50cm in size	50	No.	24.16/p	1208.00	
5	Fixing of RCC fence posts i/c strutting	50	No.	19.12/p	956.00	
6	Carriage of B/wire over a distance of 2kms	1.44	qtl	394.66/q	568.00	
7	Stretching & fixing of barbed wire in 4 stands and 2 cross fencing	935	rmt	5.33/rmt	4984.00	
8	Interlacing of thorny bushes/live hedge along the fence	150	rmt	10.67/rmt	1600.00	
9	Cost of barbed wire	1.44	qtl	12000/ Qtl	17280.00	
	Total of A - Survey, Demarcation & Fencing work				**64,796.50**	
B	**Planting work:-**					
1	Digging of pits size 45x45x45cm	800	No.	25.45/p	20360.00	
2	Filling of pits size 45x45x45cm	800	No.	7.25/p	5800.00	
3	Carriage of plants raised in P/Bags over distance of 2km uphill/downhill side	800	No.	10.13/p	8104.00	
4	Planting of plants raised in P/Bags	800	No.	5.81/p	4648.00	
5	Construction of inspection path 60cm wide	100	Rmt	29.33/rmt	2933.00	
6	Cost of Sign board, Carriage & Fixing	1	No.	L/S	5000.00	
	Total of B- Planting works				**46,845.00**	
C	Nursey cost of plants	800	No.	23.47/plant	**18,776.00**	
D	Cost of planting of bioengineering species, herbs and shrups cutting i/c cutting, carriage and planting in strips	1	Ha.	35000/ha	**35,000.00**	
	G.Total of A+B+C+D				**1,65,417.00**	
	Or Say					
	Total area for plantation with cost			**0.6448 Ha.**	**1,06,660.88**	
	Or Say				**1,06,660/-**	

Estimate for proposed new plantation for re-habilitation of dumping site in NH-707 acquired land at Kamrau Chainage 32+800 to 33+050 area (**0.3654 Ha.**) of Sataun Beat of Sataun Block of Kaffota Forest Range(Norms of plants 800 Normal P/Bags plants per Ha. with RCC Fence posts)

Sr.No	Description of work	Qty	Unit	Rate	Amount	Remarks
A	**Survey, demarcation and fencing work**					
1	Survey and demarcation of plantation area	1	ha	268/ha	268/-	
2	Preparation/Purchase of RCC fence post @ rate of 580 per post i/c transportation to forest depot	50	No.	580/p	29000/-	Open market rate
3	Carriage of RCC fence post up to 165 cm long over a distance of 2km uphill/downhill	50	No.	178.65/p	8932.50	
4	Preparation/Digging of holes of 20x30x50cm in size	50	No.	24.16/p	1208.00	
5	Fixing of RCC fence posts i/c strutting	50	No.	19.12/p	956.00	
6	Carriage of B/wire over a distance of 2kms	1.44	qtl	394.66/q	568.00	
7	Stretching & fixing of barbed wire in 4 stands and 2 cross fencing	935	rmt	5.33/rmt	4984.00	
8	Interlacing of thorny bushes/live hedge along the fence	150	rmt	10.67/rmt	1600.00	
9	Cost of barbed wire	1.44	qtl	12000/ Qtl	17280.00	
	Total of A - Survey, Demarcation & Fencing work				**64,796.50**	
B	**Planting work:-**					
1	Digging of pits size 45x45x45cm	800	No.	25.45/p	20360.00	
2	Filling of pits size 45x45x45cm	800	No.	7.25/p	5800.00	
3	Carriage of plants raised in P/Bags over distance of 2km uphill/downhill side	800	No.	10.13/p	8104.00	
4	Planting of plants raised in P/Bags	800	No.	5.81/p	4648.00	
5	Construction of inspection path 60cm wide	100	Rmt	29.33/rmt	2933.00	
6	Cost of Sign board, Carriage & Fixing	1	No.	L/S	5000.00	
	Total of B- Planting works				**46,845.00**	
C	Nursey cost of plants	800	No.	32/plant	**25,600.00**	
D	Cost of planting of bioengineering species, herbs and shrups cutting i/c cutting, carriage and planting in strips	1	Ha.	35000/ha	**35,000.00**	
	G.Total of A+B+C+D				**1,72,241.00**	
	Or Say					
	Total area for plantation with cost			**0.3654 Ha.**	**62,936.86**	
	Or Say				**62,935/-**	

ABO. Sataun

Estimate for proposed new plantation for re-habilitation of dumping site in NH-707 acquired land at Chareu Chainage 47+800 to 48+000 area (**0.2576 Ha.**) of Tatiyana Beat of Kaffota Block of Kaffota Forest Range(Norms of plants 800 Normal P/Bags plants per Ha. with RCC Fence posts)

Sr.No	Description of work	Qty	Unit	Rate	Amount	Remarks
A	**Survey, demarcation and fencing work**					
1	Survey and demarcation of plantation area	1	Ha	268/ha	268/-	
2	Preparation/Purchase of RCC fence post @ rate of 580 per post i/c transportation to forest depot	50	No.	580/p	29000/-	Open market rate
3	Carriage of RCC fence post up to 165 cm long over a distance of 2km uphill/downhill	50	No.	178.65/p	8932.50	
4	Preparation/Digging of holes of 20x30x50cm in size	50	No.	24.16/p	1208.00	
5	Fixing of RCC fence posts i/c strutting	50	No.	19.12/p	956.00	
6	Carriage of B/wire over a distance of 2kms	1.44	Qtl	394.66/q	568.00	
7	Stretching & fixing of barbed wire in 4 stands and 2 cross fencing	935	Rmt	5.33/rmt	4984.00	
8	Interlacing of thorny bushes/live hedge along the fence	150	Rmt	10.67/rmt	1600.00	
9	Cost of barbed wire	1.44	Qtl	12000/ Qtl	17280.00	
	Total of A - Survey, Demarcation & Fencing work				**64,796.50**	
B	**Planting work:-**					
1	Digging of pits size 45x45x45cm	800	No.	25.45/p	20360.00	
2	Filling of pits size 45x45x45cm	800	No.	7.25/p	5800.00	
3	Carriage of plants raised in P/Bags over distance of 2km uphill/downhill side	800	No.	10.13/p	8104.00	
4	Planting of plants raised in P/Bags	800	No.	5.81/p	4648.00	
5	Construction of inspection path 60cm wide	100	Rmt	29.33/rmt	2933.00	
6	Cost of Sign board, Carriage & Fixing	1	No.	L/S	5000.00	
	Total of B- Planting works				**46,845.00**	
C	Nursey cost of plants	800	No.	23.47/plant	**18,776.00**	
D	Cost of planting of bioengineering species, herbs and shrups cutting i/c cutting, carriage and planting in strips	1	Ha.	35000/ha	**35,000.00**	
	G.Total of A+B+C+D				**1,65,417.00**	
	Or Say					
	Total area for plantation with cost			**0.2576 Ha.**	**42,611.41**	
	Or Say				**42,610/-**	

S/c Tatyanabeat.

Range Forest Officer
Kafota Range Kafota

Annexure-R10-7

Estimate for proposed new plantation for re-habilitation of dumping site in NH-707 Acquired Land at Chareu (Near School) Chainage 48+600 to 48+800 area (**0.6474 Ha.**) of Tatiyana Beat of Kaffota Block of Kaffota Forest Range(Norms of plants 800 Normal P/Bags plants per Ha. with RCC Fence posts)

Sr.No	Description of work	Qty	Unit	Rate	Amount	Remarks
A	**Survey, demarcation and fencing work**					
1	Survey and demarcation of plantation area	1	ha	268/ha	268/-	
2	Preparation/Purchase of RCC fence post @ rate of 580 per post i/c transportation to forest depot	50	No.	580/p	29000/-	Open market rate
3	Carriage of RCC fence post up to 165 cm long over a distance of 2km uphill/downhill	50	No.	178.65/p	8932.50	
4	Preparation/Digging of holes of 20x30x50cm in size	50	No.	24.16/p	1208.00	
5	Fixing of RCC fence posts i/c strutting	50	No.	19.12/p	956.00	
6	Carriage of B/wire over a distance of 2kms	1.44	qtl	394.66/q	568.00	
7	Stretching & fixing of barbed wire in 4 stands and 2 cross fencing	935	rmt	5.33/rmt	4984.00	
8	Interlacing of thorny bushes/live hedge along the fence	150	rmt	10.67/rmt	1600.00	
9	Cost of barbed wire	1.44	qtl	12000/ Qtl	17280.00	
	Total of A - Survey, Demarcation & Fencing work				**64,796.50**	
B	**Planting work:-**					
1	Digging of pits size 45x45x45cm	800	No.	25.45/p	20360.00	
2	Filling of pits size 45x45x45cm	800	No.	7.25/p	5800.00	
3	Carriage of plants raised in P/Bags over distance of 2km uphill/downhill side	800	No.	10.13/p	8104.00	
4	Planting of plants raised in P/Bags	800	No.	5.81/p	4648.00	
5	Construction of inspection path 60cm wide	100	Rmt	29.33/rmt	2933.00	
6	Cost of Sign board, Carriage & Fixing	1	No.	L/S	5000.00	
	Total of B- Planting works				**46,845.00**	
C	Nursey cost of plants	800	No.	23.47/plant	**18,776.00**	
D	Cost of planting of bioengineering species, herbs and shrups cutting i/c cutting, carriage and planting in strips	1	Ha.	35000/ha	**35,000.00**	
	G.Total of A+B+C+D				**1,65,417.00**	
	Or Say					
	Total area for plantation with cost			0.6474 Ha.	1,07,090.96	
	Or Say				1,07,090/-	

9/o Tatyana beat.

Range Forest Officer
Kafota Range Kaiuta

6318

H.P. Forest Department
Office of Shillai Forest Range
Email: rangeforestofficershillai@gmail.com

No. 218 /SH/2025-26/ Dated Shillai-173027, the 16/07/2025

From: R.O. Shillai To: D.F.O Sri Renuka ji.

Subject: **Estimate proposed for new plantation for re-habilitation of dumping site in NH-707 in Shillai Forest Range Sanction thereof.**

Memo:

Enclosed please find herewith the two estimates proposed for new plantation for re-habilitation of dumping site in NH-707 in Shillai Forest Range for sanction. This is for favour of your kind information and further necessary action please.

Encl:- As above.

Range Forest Officer
Range Forest Officer
Forest Range Shillai.

Divisional Forest Officer Renuka Ji
Receipt No. 1073
Date 24.7.25

Sale
24/7/25

Scanned with CamScanner

6319

Estimate for proposed new plantation for [illegible] dumping site in NH-707 at Naya Chanage 60+100 to 60+350 area (0.819 Ha.) of Shillai [illegible] Shillai Block of Shillai Forest Range (Norms of plants 800 Normal P/Bags plants per Ha. with RCC Fence posts)

Sr. No	Description of work	Qty	Unit	Rate	Remarks
A	**Survey, Demarcation & Fencing work**				
1	Survey and demarcation of plantation area	1	Ha.	268	
2	Preparation/Purchase of RCC fence post @ rate of 580 per post i/c transporation to forest depot	50	Nos	29000	At cost of open market rate
3	Carriage of RCC fence post upto 165 cm long over a distance of 2km uphill/downhill	50	Nos	8932.5	
4	Preparation/Digging of holes of 20x30x50cm in size	50	Nos	1208	
5	Fixing of RCC fence posts i/c strutting	50	Nos	956	
6	Carriage of B/wire over a distance of 2kms	1.125	Qtl.	444	
7	Stretching & fixing of barbed wire in 4 stands and 2 cross fencing	600	Rmt	3200.5	
8	Interlacing of thorny bushes/live hedge along the fence	150	Rmt	1600.5	
9	Cost of barbed wire	1.125	Qtl.	13500	At cost of open market rate
	Total of A - Survey, Demarcation & Fencing work			59109.5	
B.	**Planting work:-**				
1	Digging of pits size 45x45x45cm	800	Nos	20355	
2	Filling of pits size 45x45x45cm	800	Nos	5801	
3	Carriage of plants raised in P/Bags over distance of 2km uphill/downhill side	800	Nos	8105	
4	Planting of plants raised in P/Bags	800	Nos	4649	
5	Contruction of inspection path	100	Rmt	5865	
6	Cost of Sign board, Carriage & Fixing	1	No	5000	At cost of open market rate
	Total of B- Planting works			49775.00	
C	**Nursey cost of plants**	800	Nos	25600.00	
D	**Cost of planting of bioengineering species, herbs and shrups cutting i/c cutting, carriage and planting in strips**	1	Ha.	35000	
	G.Total of A+B+C+D			169484.50	
	Or Say			169400.00	
	Total area for plantation with cost	1.297	Ha.	219711.80	
	Or Say			219700.00	

Note:- It is certified that the rate has been charged as per the Departmental cost of norms for new plantation.

Range Forest Officer
Shillai Forest Range
Sirmour (H.P.)

4x outside
Shillai Beat
Addl. charge

Verified
Addl Charge Shillai/Miller

Scanned with CamScanner

Estimate for proposed new plantation for re-habilitation of dumping site in NH-707 at Shri Kiyari Chanage 73+615 to 73+725 area (0.819 Ha.) of Shillai Beat of Shillai Block of Shillai Forest Range(Norms of plants 800 Normal P/Bags plants per Ha. with RCC Fence posts)

Sr. No	Description of work	Qty	Unit	Rate	Remarks
A	**Survey, Demarcation & Fencing work**				
1	Survey and demarcation of plantation area	1	Ha.	268.00	
2	Preparation/Purchase of RCC fence post @ rate of 580 per post i/c transporation to forest depot	50	Nos	29000.00	At cost of open market rate
3	Carriage of RCC fence post upto 165 cm long over a distance of 2km uphill/downhill	50	Nos	8932.50	
4	Preparation/Digging of holes of 20x30x50cm in size	50	Nos	1208.00	
5	Fixing of RCC fence posts i/c strutting	50	Nos	956.00	
6	Carriage of B/wire over a distance of 2kms	1.125	Qtl.	444.00	
7	Stretching & fixing of barbed wire in 4 stands and 2 cross fencing	600	Rmt	3200.50	
8	Interlacing of thorny bushes/live hedge along the fence	150	Rmt	1600.50	
9	Cost of barbed wire	1.125	Qtl.	13500.00	At cost of open market rate
	Total of A - Survey, Demarcation & Fencing work			**59109.50**	
B.	**Planting work:-**				
1	Digging of pits size 45x45x45cm	800	Nos	20355.00	
2	Filling of pits size 45x45x45cm	800	Nos	5801.00	
3	Carriage of plants raised in P/Bags over distance of 2km uphill/downhill side	800	Nos	8105.00	
4	Planting of plants raised in P/Bags	800	Nos	4649.00	
5	Contruction of inspection path	100	Rmt	5865.00	
6	Cost of Sign board, Carriage & Fixing	1	No	5000.00	At cost of open market rate
	Total of B- Planting works			**49775.00**	
C	**Nursey cost of plants**	800	Nos	**25600.00**	
D	**Cost of planting of bioengineering species, herbs and shrups cutting i/c cutting, carriage and planting in strips**	1	Ha.	**35000.00**	
	G.Total of A+B+C+D			**169484.50**	
	Or Say			**169400.00**	
	Total area for plantation with cost	0.819	Ha.	138738.60	
	Or Say			**138700.00**	

Note: It is certified that the rate has been charged as per the departmental cost of norms for new plantation.

As worked
RFO Shillai Beat
Addl. charge

Verified
RFO
Addl 30 Shillai/Mdla.

Range Forest Officer
Shillai Forest Range
Sirmour (H.P.)

Scanned with CamScanner

6323

Time: 09-05-2025 15:58
Note: NH-707 plantation work Started in Shillai beat at Naya Chanage
Powered by NoteCam

Latitude: 30.66718
Longitude: 77.683657
Elevation: 1764.97±13.5 m
Accuracy: 4.325 m
Time: 09-05-2025 15:18
Note: NH-707 plantation work Started in Shillai beat at Naya Chanage
Powered by NoteCam

6325

Latitude: 30.667348
Longitude: 77.6841
Elevation: 1567.86±65.3 m
Accuracy: 8.2 m
Time: 09-05-2025 16:15
Note: NH-707 plantation work Started in Shillai beat at Naya Chanag -
Powered by NoteCam

Latitude: 30.667457
Longitude: 77.684032
Elevation: 1570.46±36.4 m
Accuracy: 4.0 m
Time: 09-05-2025 16:15
Note: NH-707 plantation work Started in Shillai beat at Naya Chandge
Powered by NoteCam

6328

Latitude: 30.667412
Longitude: 77.683939
Elevation: 1579.17±27.7 m
Accuracy: 3.0 m
Time: 09-05-2025 16:07
Note: NH-707 plantation work Started in Shillai beat at Naya Chanage
Powered by NoteCam

6329

Latitude: 30.667472
Longitude: 77.683975
Elevation: 1575.66±17.5 m
Accuracy: 2.54 m
Time: 09-05-2025 16:15
Note: NH-707 plantation work Started in Shillai beat at Naya Chanage
Powered by NoteCam

Latitude: 30.667348
Longitude: 77.6841
Elevation: 1567.86±65.3 m
Accuracy: 8.2 m
Time: 09-05-2025 16:15
Note: NH-707 plantation work Started In Shillai beat at Naya Chanag
Powered by NoteCam

Latitude: 30.667457
Longitude: 77.684032
Elevation: 1570.46±36.4 m
Accuracy: 4.0 m
Time: 09-05-2025 16:15
Note: NH-707 plantation work Started in Shillai beat at Naya Chainage
Powered by NoteCam

Government of India
Ministry of Earth Sciences (MoES)
India Meteorological Department
Meteorological Centre, Shimla

Monsoon Report 2023

1. Main Features:-

6335

I. Monsoon arrived in most part of Himachal Pradesh on 24th June 2023 earliest onset was on 09th June 2000 and most delayed onset on 05th July 2010.
II. The Southwest monsoon seasonal (June to September) rainfall had been Normal over the State with 884.8mm of actual rainfall during monsoon 2023 against its normal 734.4 mm with 20% departures.
III. Actual Rainfall in months of June, July, August and September was 121.7mm, 448.9mm, 247.6mm and 69.6mm respectively.
IV. Extremely heavy rainfall was observed in district Kangra, Hamirpur, Chamba, Una, Bilaspur, Sirmaur and Mandi at isolated places.
V. Himachal Pradesh faced number of landslides, flash floods, cloudbursts during the entire monsoon season (June-September) leading to extensive damage to material and human lives.
VI. For the period of 1901 to 2023, the state had received highest rainfall in the year 1922 with actual rainfall of 1314.6mm and State has received 36th highest rainfall during this year in monsoon.

2. Progress of Monsoon:-

I. Light to moderate rainfall occurred from 01st June to 21st June. First spell of heavy rainfall occurred on 06th June at Bijahi in Mandi district. With spell of Heavy to very heavy rainfall during 22nd to 24th June at few places.
II. **Very heavy rainfall**-Number of Spells in June, July, August and September are one, Seven, Five and Two respectively
III. **Extremely heavy rainfall**- Number of Spells in June, July, August and September are Nil, One, Two, Nil respectively.
IV. In the beginning of monsoon in June Month for 1st three weeks state had received deficient rainfall then in 4th week of June state had received excess rainfall due to spell of Heavy to very Heavy Rainfall as mentioned above. In the month of July, 08th July to 12th July State had received large excess rainfall. In the month of August, 11th August to 14th August and 23rd August State had witnessed Active to vigorous monsoon activity resulting in large excess rainfall. In month of September, state had received large excess in many places in 3rd week.

2.1. Time Series:-

Weekly Rainfall Departure Monsoon-2023

District	7-Jun-23	14-Jun-23	21-Jun-23	28-Jun-23	5-Jul-23	12-Jul-23	19-Jul-23	26-Jul-23	2-Aug-23	9-Aug-23	16-Aug-23	23-Aug-23	30-Aug-23	6-Sep-23	13-Sep-23	20-Sep-23	27-Sep-23
Bilaspur	-100	-21	-85	118	-6.0	412	7	-54	-64	4	219	206	-18	-56	-38	180	-46
Chamba	-90	-76	-34	114	-51.0	250	62	-2	-47	64	32	-60	-40	-50	-96	190	-96
Hamirpur	-100	-32	-81	180	-57.0	299	5	-32	-37	-31	196	85	-45	-77	-87	293	-91
Kangra	-97	-66	-34	73	-14.0	87	38	-29	-53	-31	158	-18	-33	-39	-63	219	-84
Kinnaur	-53	-18	-50	-23	-60.0	661	50	24	2	-81	-39	-97	9	-94	-83	18	-100
Kullu	23	-72	-73	132	-61.0	576	153	57	-31	-78	42	-67	-3	-98	-99	174	-88
Lahaul & Spiti	-100	-98	-85	-80	-99.0	439	-56	-79	-90	-98	-90	-98	-100	-98	-99	-25	-100
Mandi	-71	-49	-48	248	-56.0	173	63	-45	-17	-41	283	46	8	-55	-91	48	-80
Shimla	-37	-76	-49	161	-9.0	486	102	86	41	-64	201	5	10	-81	-81	21	-99
Sirmaur	-48	-84	-10	154	-8.0	475	103	120	-73	-46	-12	-56	-25	-85	-33	105	-99
Solan	-96	-67	-41	261	-16.0	501	22	81	-46	-12	133	162	19	-94	-91	17	-79
Una	-100	0	-88	-37	-26.0	291	-50	-45	-91	-54	82	4	-67	-99	-83	299	-20
Himachal Pradesh	-63	-67	-51	116	-37.0	320	46	-1	-45	-53	102	-16	-32	-71	-80	109	-89

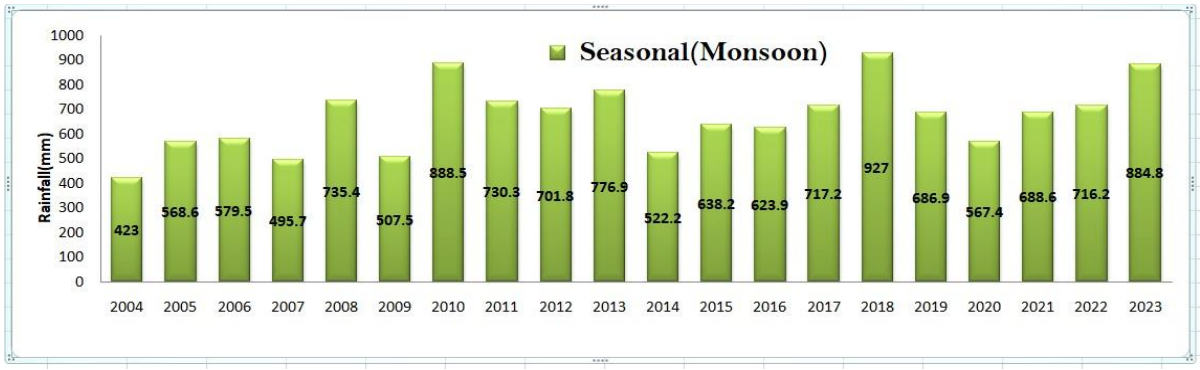
Cummulative Rainfall Departure Monsoon-2023																	
District	7-Jun-23	14-Jun-23	21-Jun-23	28-Jun-23	5-Jul-23	12-Jul-23	19-Jul-23	26-Jul-23	2-Aug-23	9-Aug-23	16-Aug-23	23-Aug-23	30-Aug-23	6-Sep-23	13-Sep-23	20-Sep-23	27-Sep-23
Bilaspur	-100	97	14	54	34	151	120	85	58	48	75	86	77	69	63	67	64
Chamba	-90	-26	-28	19	0	77	73	57	40	22	23	17	13	10	4	10	6
Hamirpur	-100	56	-6	64	19	105	81	59	40	28	61	63	54	47	41	47	43
Kangra	-97	3	-14	23	10	37	37	22	7	1	22	18	14	11	8	14	12
Kinnaur	-53	35	-2	-7	-17	156	135	115	100	76	60	44	41	29	21	21	12
Kullu	23	32	-9	27	6	175	170	148	119	90	83	71	66	57	49	53	47
Lahaul & Spiti	-100	-41	-59	-64	-74	97	58	28	10	-6	-15	-22	-29	-34	-38	-37	-41
Mandi	-71	-2	-21	81	44	84	79	54	41	29	63	61	58	52	46	46	43
Shimla	-37	32	0	48	33	154	144	133	119	94	107	98	93	82	72	70	64
Sirmaur	-48	7	0	56	33	168	151	145	110	88	76	64	58	49	45	46	42
Solan	-96	52	14	98	64	193	156	142	114	96	101	106	100	88	78	76	71
Una	-100	110	27	4	-8	92	56	35	12	1	15	14	8	0	-3	5	5
Himachal Pradesh	-63	7	-16	28	8	106	91	72	52	36	45	39	34	28	22	25	21

3. Monthly Rainfall:-

Rainfall / Month	Actual(mm)	Normal(mm)	Departure (%)
June	120.7	101.1	19
July	448.1	255.9	75
August	246.4	256.8	-4
September	69.6	120.5	-42
Season	884.8	734.4	20

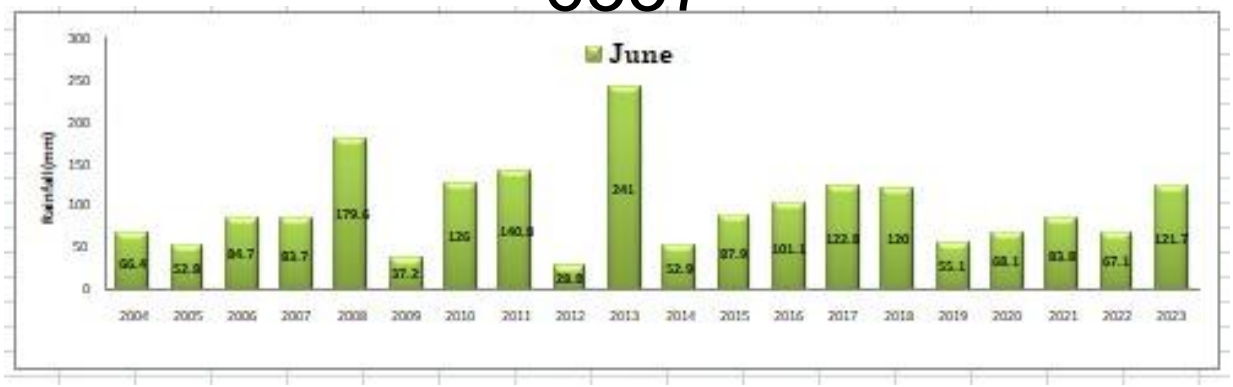
4. Monthly rainfall Departure (%) comparison from 2004-2023:-

Seasonal actual rainfall

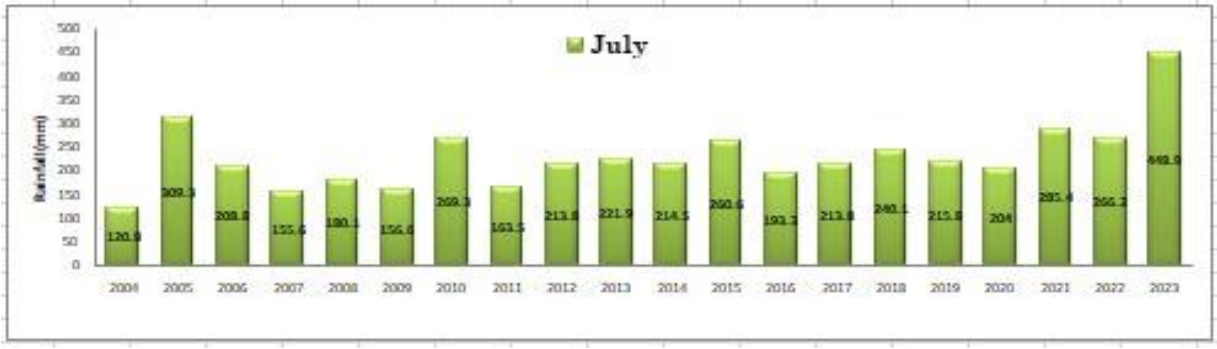


From 2000 onwards -State had received highest rainfall in 2018 (927.0mm) and 2023 has received 03rd highest rainfall.

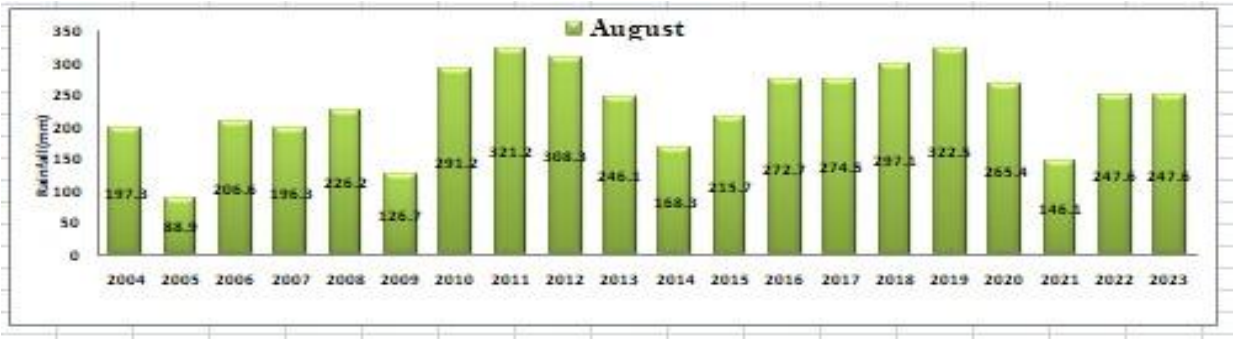
June Month Actual Rainfall



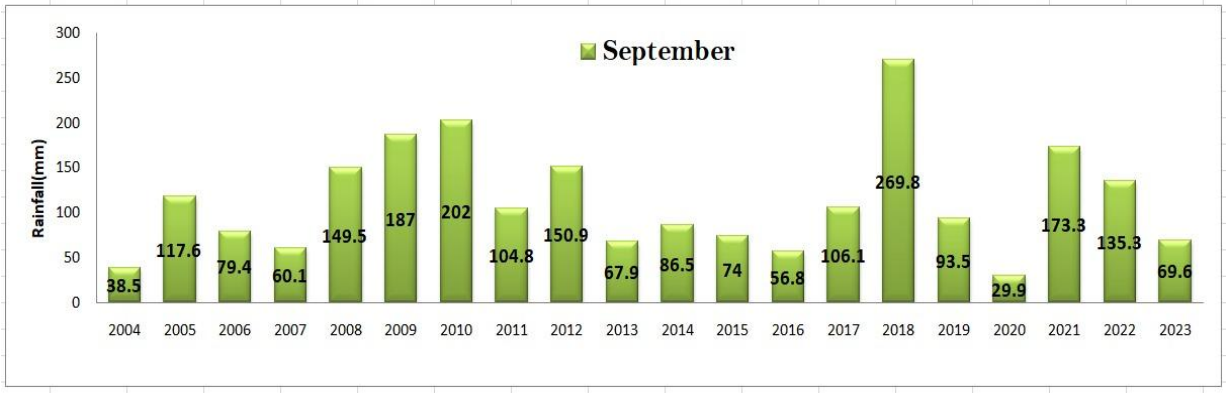
July Month Actual Rainfall



August Month Actual Rainfall



September Month Actual Rainfall



5. Extremely Heavy rainfall during Monsoon season:-

Date	Station	Amount	District
09-07-2023	**Una Rampur Aws**	**228.5**	**Una**
	R L Bbmb	**224.0**	**Bilaspur**
10-07-2023	**Pachhad**	**220.3**	**Sirmaur**
11-07-2023	**Nahan**	**250.0**	**Sirmaur**
	Jatton Barrage	**238.0**	**Sirmaur**
14.08.2023	**Kangra Aero**	**273.4**	**Kangra**
	Sujanpur Tira	**254.0**	**Hamirpur**
	Dharmsala	**250.2**	**Kangra**
	Chuari	**234.0**	**Chamba**
	Palampur	**220.0**	**Kangra**
23-08-2023	**Kahu**	**213.6**	**Bilaspur**
	Kataula	**210.2**	**Mandi**

6. District wise Cloud burst Events in HP during July and August 2023(Source-State Disaster Management Authority) Govt of HP:-

DISTRICT	**July**	**August**
CHAMBA	**2**	**-**
KANGRA	**-**	**-**
KINNAUR	**5**	**-**
KULLU	**26**	**-**
LAHAUL & SPITI	**1**	**-**
MANDI	**2**	**4**
SHIMLA	**8**	**-**
SIRMAUR	**-**	**2**
SOLAN	**1**	**1**

7. Records-

24 hours New Rainfall Records for Himachal Pradesh in July 2023

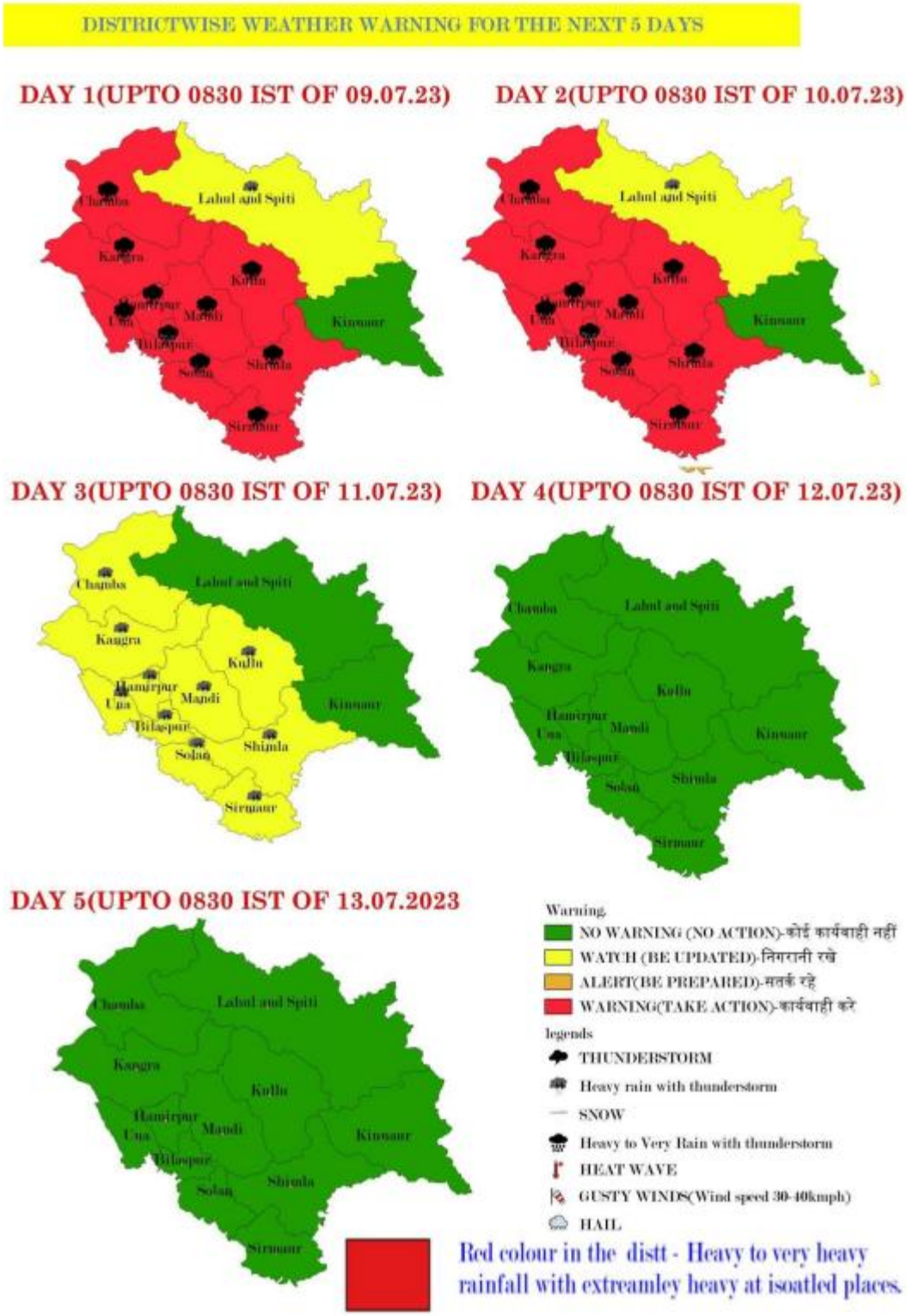
24 hours New Rainfall Records for July 2023 for Himachal Pradesh					
Station	**District**	**New All Time Record**		**Previous All time record**	
		Rainfall (in mm)	**Date of July 2023)**	**Rainfall (in mm)**	**Date**
Manali	Kullu	131.3	9	105.1	09 July, 1971
Una	Una	228.5 (AWS)	9	224	22 July, 1927
Keylong	Lahaul & Spiti	83 (AWS)	9	78	28 July, 1951
Rohru	Shimla	185	9	170	25 July, 1966
Ghamror	Kangra	166	9	164.8	19 July, 2021
Pachhad	Sirmaur	220	10	189.2	26 July, 1973
Nadaun	Hamirpur	160.5	9	146	30 July, 1996

24 hours New Rainfall Records for August 2023 for Himachal Pradesh:-

Stations	**New Record-Amount(Date)**	**Previous Record(Date)**
Bijahi	102.0(14thAug2023)	99.2(18th August, 2019)
Kataula	172.3(14 Aug2023) 210.2(23th Aug 2023)	165.0(20th August, 2022)
Pandoh	166.0 (14 Aug2023) 178.0(23thAug 2023)	137.0 (13th Aug2011)

8. Impact based weather forecast:- 6340

Whenever there are extreme weather events impact based forecast issued from time to time.
Forecast and alerts have been issued on timely basis are as follow.



Annexure-R12-7

Sender Name:	IMD Shimla	**Entry Date & Time:**	12 Aug 2023, 4:21 PM
Time of Issue:	12 Aug 2023, 4:00 PM	**Valid Upto:**	12 Aug 2023, 7:00 PM
Area Description	Districts of Himachal Pradesh		
Event Description:	Moderate Rain	**Urgency:**	Expected
Severity:	ALERT	**Certainty:**	Very Likely
Message Body:	Message in English:	Moderate Rain is very likely to occur over Bilaspur, Chamba, Hamirpur, Kangra, Kinnaur, Kullu, Mandi, Shimla, Sirmaur, Solan and Una with Heavy at isolated place during next 3 hours.	
	Message in Hindi:	अगले 3 घंटों के दौरान बिलासपुर, चंबा, हमीरपुर, कांगड़ा, किन्नौर, कुल्लू, मंडी, शिमला, सिरमौर, सोलन और ऊना में म ध्यम बारिश और कुछ स्थानों पर भारी बारिश होने की संभावना है।	
Forwarding Status:	Notified to Himachal Pradesh SDMA	**Dissemination Status:**	Pushed to Dissemination Media by concerned SDMA
Warning Generated By:	IMD Shimla	**User Contact No:**	9418932167
Instruction:	Check for traffic congestion on your route before journey.		
Warning Status:	VIEW		

REGENERATE WARNING

Date: August 13, 2023 **METEOROLOGICAL CENTRE, SHIMLA** **Time of Issue: 1800**
NOWCAST – HIMACHAL PRADESH **Validity: 1800-2100**

SHIMLA CITY NOWCAST

Light to moderate rainfall likely to occur with poor visibility condition.

Shrikhand Mahadev

Light rainfall and poor visibility condition.

CATCHMENT AREA NOWCAST

SATLUJ: Light to Moderate rainfall likely to Continue

BEAS: Light to Moderate rainfall likely to Continue with possibility of heavy rainfall in the catchment.

STATE NOWCAST

Light to moderate rainfall with thunder with Heavy to very Heavy Rainfall at isolated places in the districts of **CHAMBA**(Dalhousie, Sinhuta, Bhalai, Bhattiyat,Holi, Bharmaur and Chamba), **KANGRA**(Jawali, Shahpur, Kangra, Dharamshala, Baroh, Dhir, Palampur, Khundain, Thural, Baijnath and Jaisinghpur), **UNA**(Haroli, Una and Bangana), **BILASPUR**(Ghumarwin, Bilaspur,Jhandutta and Nainadevi), **SOLAN**(Nalagarh, Ramshahar, Arki and Kandaghat), **SIRMAUR**(Ponta, Dadahu,Nahan, Renuka, Kamrau and Pacchad) **SHIMLA**(Chaupal,Cheta, Nerua, Sunni, Shimla,Rampur,Chirgaon,Dodrakwar and Theog),**HAMIRPUR and MANDI.**

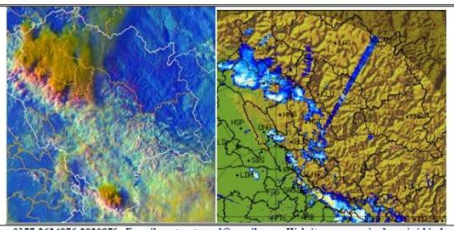
Light to Moderate Rainfall in Remaining Districts

WARNING CODES

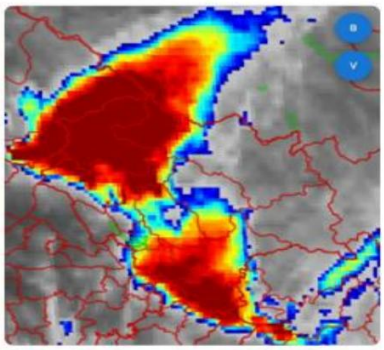
NO WARNING	BE UPDATED	BE PREPARED	TAKE ACTION

Impact Expected
Possibility of landslide..
Poor visibility conditions likely to prevail

Advisory
Drive cautiously.



Phone: 0177-2624976,2920976 E-mail: metcentresml@gmail.com Website: mausam.imd.gov.in/shimla



Moderate to heavy rainfall at many places very likely to continue over the state with very heavy to extremely heavy rainfall at isolated places in the district of Chamba Kangra Hamirpur Mandi Bilaspur Solan Shimla Kullu and Sirmaur

Very Heavy rainfall at many places and extremely heavy rainfall at isolated places in Beas, Ranjit sagar and pong dam catchment area
Heavy rainfall at many places with very heavy rainfall at isolated places in Sutlej catchment area

Extremely Heavy Rain Alert

Issued By IMD Shimla
08 Jul, 13:30

Highest Intensity

Himachal Pradesh

09 Jul, 13:30

Heavy to very heavy Rainfall is most likely to occur over Himachal Pradesh with Extremely Heavy Rain at isolated places in the districts of Bilaspur, Chamba, Hamirpur, Kangra, Kullu and Mandi during the next 24 to 48 hours.

Share | Map | Listen | Translate | Dos & Don'ts

"जरूरी सूचना"

07 जुलाई , 2023

भारत मौसम विज्ञान केंद्र, शिमला द्वारा जारी मौसम पूर्वानुमान के अनुसार दिनांक 07 से 10 जुलाई 2023 तक हिमाचल प्रदेश में अलग-अलग स्थानों पर भारी बारिश की चेतावनी (Yellow Alert) जारी की गयी है। उक्त चेतावनी को मद्देनज़र रखते हुए :-

- बारिश, हिमस्खलन एवं भूस्खलन संभावित क्षेत्रों में तथा ऊपरी/पहाड़ी भागों में जाने से परहेज़ रखें।
- ख़राब मौसम में Trekking करना तथा ऊंचाई वाले क्षेत्रों में जाना खतरनाक हो सकता है।
- बिजली चमकने की सूरत में कम से कम 30 मिनट तक घरों या सुरक्षित इमारतों के अंदर ही रहना चाहिए।
- नदी - नालों में न जायें, क्योंकि बरसात में अचानक जलस्तर बढ़ने का खतरा रहता है।
- मौसम विभाग द्वारा जारी चेतावनी पर धयान दें तथा Radio/Television पर मौसम बारे प्रसारित बुलेटिन को सुनें।
- ग्राम पंचायत प्रधानों, उप प्रधानों, गैर-सरकारी संगठनों, ट्रैकर्स एवं पैदल यात्रियों से अनुरोध है कि वह इस सन्देश को अधिक से अधिक लोगों तक पहुंचाएं।

"राष्ट्रीय आपदा प्रबंधन प्राधिकरण ने Sachet Mobile APP(http://bit.ly/3Fb3Osz) को बनाया है। यह App मौसम व अन्य आपदाओं की सटीक जानकारी मोबाइल पर भेजता है, जिससे समय पर भारी वर्षा, आंधी तूफान और अवधाव इत्यादि के बारे में सूचना मिलती है।"

राज्य आपदा प्रबंधन प्राधिकरण, हिमाचल प्रदेश सरकार द्वारा जनहित में जारी।

किसी भी आपातकाल की स्थिति मे राज्य आपदा प्रबंधन प्राधिकरण, शिमला के इन नम्बरों पर सूचित करें :-

0177-2629688, 2629439, 26299392628940 Toll Free-1070/1077
Email: seocshimla@gmail.com, sdma-hp@nic.in
Website: www.hpsdma.nic.in

Very Heavy Rain Alert

Issued By IMD Shimla
10 Jul, 08:30

Highest Intensity

HIMACHAL PRADESH

10 Jul, 11:30

कांगड़ा, कुल्लू, मंडी, शिमला, सिरमौर, ऊना, बिलासपुर, सोलन, हमीरपुर जिलों में अधिकांश स्थानों पर मध्यम से भारी वर्षा, गरज और एक दो स्थानों पर अत्यधिक भारी वर्षा, गरज होने की संभावना है|

Share | Map | Listen | Translate | Dos & Don'ts

"जरूरी सूचना"

08 जुलाई , 2023

भारत मौसम विज्ञान केंद्र, शिमला द्वारा जारी मौसम पूर्वानुमान के अनुसार दिनांक 08 से 09 जुलाई 2023 तक हिमाचल प्रदेश के जिला चम्बा,कुल्लू, काँगड़ा, मंडी, ऊना, बिलासपुर में और समीपवाले स्थानों पर भारी बारिश की चेतावनी (Orange Alert) जारी की गयी है। उक्त चेतावनी को मद्देनज़र रखते हुए :-

- बारिश, हिमस्खलन एवं भूस्खलन संभावित क्षेत्रों में तथा ऊपरी/पहाड़ी भागों में जाने से परहेज़ रखें।
- ख़राब मौसम में Trekking करना तथा ऊंचाई वाले क्षेत्रों में जाना खतरनाक हो सकता है।
- बिजली चमकने की सूरत में कम से कम 30 मिनट तक घरों या सुरक्षित इमारतों के अंदर ही रहना चाहिए।
- नदी - नालों में न जायें, क्योंकि बरसात में अचानक जलस्तर बढ़ने का खतरा रहता है।
- मौसम विभाग द्वारा जारी चेतावनी पर धयान दें तथा Radio/Television पर मौसम बारे प्रसारित बुलेटिन को सुनें।
- ग्राम पंचायत प्रधानों, उप प्रधानों, गैर-सरकारी संगठनों, ट्रैकर्स एवं पैदल यात्रियों से अनुरोध है कि वह इस सन्देश को अधिक से अधिक लोगों तक पहुंचाएं।

"राष्ट्रीय आपदा प्रबंधन प्राधिकरण ने Sachet Mobile APP(http://bit.ly/3Fb3Osz) को बनाया है। यह App मौसम व अन्य आपदाओं की सटीक जानकारी मोबाइल पर भेजता है, जिससे समय पर भारी वर्षा, आंधी तूफान और अवधाव इत्यादि के बारे में सूचना मिलती है।"

राज्य आपदा प्रबंधन प्राधिकरण, हिमाचल प्रदेश सरकार द्वारा जनहित में जारी।

किसी भी आपातकाल की स्थिति मे राज्य आपदा प्रबंधन प्राधिकरण, शिमला के इन नम्बरों पर सूचित करें :-

0177-2629688, 2629439, 2629939, 2628940 Toll Free-1070/1077
Email: seocshimla@gmail.com, sdma-hp@nic.in
Website: www.hpsdma.nic.in

9. Verification of LRF:-

6343

Seasonal rainfalls over Northwest India, Central India, South Peninsula and Northeast (NE) India were 101%, 100%, 92% and 82% of respective LPA. The forecasts for the rainfall over the country as whole during the season as a whole could be predicted well as the realized rainfall is 94% of LPA against the forecast of 96% ± 4%.

Region	Long Period Average (LPA)(mm)	Rainfall (mm)	Rainfall (% of LPA)
All India	868.6	820.0	94.4
Northwest India	587.6	593.0	101

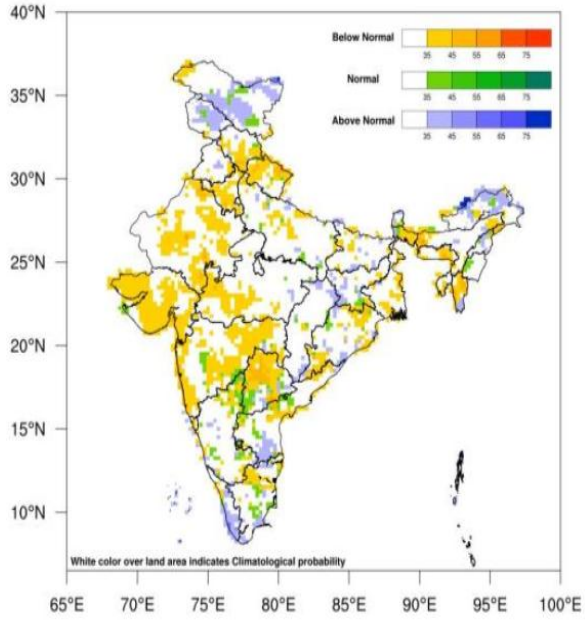


Fig- Tercile probability rainfall forecast

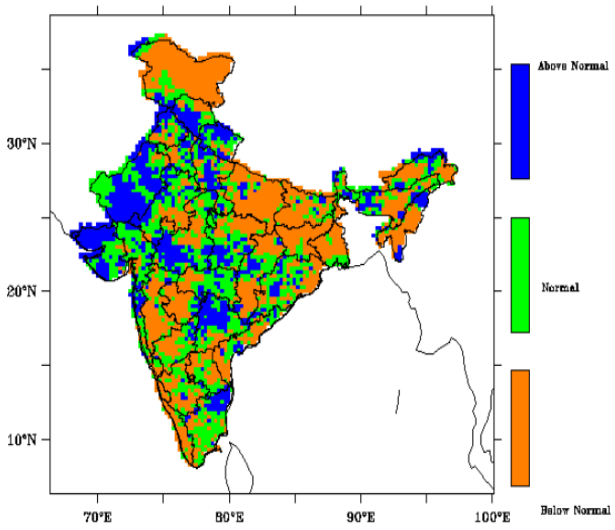


Fig-Observed rainfall Category

9.1 Rainfall in Northwest India rainfall :-

June	147%(Above rainfall)
July	125% (Above rainfall)
August	47% (Deficient rainfall)
September	75% (Below Normal)

10. Dissemination of extreme weather 6344

Extreme weather events, Flash flood information, quick weather messages were forwarded in our weather groups, district disaster groups. All the information were uploaded in official website and official account of our social media
groups like whatsapp, Instagram, twitter, facebook.

11. Impact in Himachal Pradesh during Monsoon Season:-

Heavy to Extremely heavy rainfall spells occurred during monsoon resulted in widespread damage to public and private properties via overflowing of major rivers, blockage of roads, landslides, flashfloods, damage to bridges, complete disruptions of electrical and communication system, including loss of human lives.

Heavy rain triggers landslides, blocking roads in Himachal

Heavy rain in Himachal Pradesh in the past 24 hours triggered landslides and uprooted trees, damaging houses and vehicles and blocking 150 roads. In a rain-related incident on Sunday, a conductor of a private bus was injured when a tree got uprooted and fell on the vehicle near ISBT here, officials said. A total of 452 roads, including a maximum of 236 in Mandi, 59 in Shimla and 40 in Bilaspur district are now closed for vehicular traffic, according to the emergency operation centre. A large number of heavy vehicles got stranded on the Shimla-Kalka highway due to continuous landslides. PTI

Shimla Airport road blocked at various RD Machinery deployed for removal of slips 9:21 AM

Totu bus stand

Road damage at Rd 14/00-14/030 on NH 05 at mahali road single lane due to damage of outer road edge due to sliding 11:39 AM

12. Conclusion:-

6346

Timely forecast and warning issued during monsoon season with continuous communication with DDMA and state authority during extreme weather led to significant lessening the loss and damage as much as possible.

13. Legends:-

Note: Forecast/Warning for any day is valid from 0830 hours IST of that day till 0830 hours IST of next day

WARNING

WARNING(TAKE ACTION)
ALERT (BE PREPARED)
WATCH (BE UPDATED)
NO WARNING (NO ACTION)

PROBABILISTIC FORECAST

Terms	Probability of Occurrence
Unlikely	<25%
Likely	25-50%
Very Likely	50-75%
Most Likely	>75%

SPATIAL

DRY	No Rainfall
ISOLATED	1-25%
FEW	26-50%
MANY	51-75%
MOST	76-100%

RAINFALL INTENSITY

Light	2.5-15.5 mm
Moderate	15.6-64.4 mm
Heavy	64.5-115.5 mm
Very Heavy	115.6-204.4 mm
Extremely Heavy	≥204.5 mm

For latest Weather Bulletin and warnings

kindly visit following links

Website:https://mausam.imd.gov.in/shimla/
Twitter-https://twitter.com/himachalmausam
Facebook-https://www.facebook.com/profile.php?id=100018411811087

FORCE MAJEURE

21.1 Force Majeure

As used in this Agreement, the expression "Force Majeure" or "Force Majeure Event" shall mean occurrence in India of any or all of Non-Political Event, Indirect Political Event and Political Event, as defined in Clauses 21.2, 21.3 and 21.4 respectively, if it affects the performance by the Party claiming the benefit of Force Majeure (the "Affected Party") of its obligations under this Agreement and which act or event (i) is beyond the reasonable control of the Affected Party, and (ii) the Affected Party could not have prevented or overcome by exercise of due diligence and following Good Industry Practice, and (iii) has Material Adverse Effect on the Affected Party.

21.2 Non-Political Event

A Non-Political Event shall mean one or more of the following acts or events:

(a) act of God, epidemic, extremely adverse weather conditions, lightning, earthquake, landslide, cyclone, flood, volcanic eruption, chemical or radioactive contamination or ionising radiation, fire or explosion (to the extent of contamination or radiation or fire or explosion originating from a source external to the Site);

(b) strikes or boycotts (other than those involving the Contractor, Sub-contractors or their respective employees/representatives, or attributable to any act or omission of any of them) interrupting supplies and services to the Project Highway for a continuous period of 24 (twenty-four) hours and an aggregate period exceeding 10 (Ten) days in an Accounting Year, and not being an Indirect Political Event set forth in Clause 21.3;

(c) any failure or delay of a Sub-contractor but only to the extent caused by another Non-Political Event;

(d) any judgement or order of any court of competent jurisdiction or statutory authority made against the Contractor in any proceedings for reasons other than (i) failure of the Contractor to comply with any Applicable Law or Applicable Permit, or (ii) on account of breach of any Applicable Law or Applicable Permit or of any contract, or (iii) enforcement of this Agreement, or (iv) exercise of any of its rights under this Agreement by the Authority;

(e) the discovery of geological conditions, toxic contamination or archaeological remains on the Site that could not reasonably have been expected to be discovered through a site inspection; or

(f) any event or circumstances of a nature analogous to any of the foregoing.

विपिन कुमार/VIPIN KUMAR
कार्यकारी अभियंता/Executive Engineer
सड़क परिवहन एवं राजमार्ग मंत्रालय
Ministry of Road Transport & Highways
भारत सरकार/Govt. of India
नई दिल्ली/New Delhi-110088

For SHIVALIK BUILDTECH PVT. LTD.

Authorised Signatory

सड़क परिवहन और राजमार्ग मंत्रालय
MINISTRY OF ROAD TRANSPORT & HIGHWAYS
सत्यमेव जयते भारत सरकार Government of India

(Ministry of Road Transport & Highways)
Government of India
Green National Highways Corridor Project (GNHCP)

S E L E C T I O N O F C O N S U L T A N T S

Request for Proposals

Procurement of

Consultancy Services for hazard and vulnerability assessment including detailed Geology, Geomorphology study, Geotechnical Investigations, Satellite Imagery and INSAR deformation study, Topographical survey, 3D mapping from Km 11.8 (Rajban) to Km 103.55 (Fediz) of NH-707 in State of Himachal Pradesh and Detailed Project report for cost effective and Suitable remedial measures for prevention of landslides/rock fall /river cut/ mass movement/bank erosion etc. at identified locations / sections in between above chainages of NH 707

GNHCP_VA_NH-707_2025

Issued on: 08.05.2025

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PART I

Section 1. Request for Proposal Letter

GOVERNMENT OF INDIA
MINISTRY OF ROAD TRANSPORT AND HIGHWAYS

Consulting Services - REQUEST FOR PROPOSAL (RFP)
(Selection through e-procurement)

Name of Assignment: Consultancy Services for hazard and vulnerability assessment including detailed Geology, Geomorphology study, Geotechnical Investigations, Satellite Imagery and INSAR deformation study, Topographical survey, 3D mapping from Km 11.8 (Rajban) to Km 103.55 (Fediz) of NH-707 in State of Himachal Pradesh and Detailed Project report for cost effective and Suitable remedial measures for prevention of landslides/rock fall /river cut/ mass movement/bank erosion etc. at identified locations / sections in between above chainages of NH 707

Loan No: Loan No. 9062-IN

Country: India

RFP Reference No.: GNHCP_ VA_NH-707_2025

Issued at: 08.05.2025

1. The Ministry of Road Transport and Highways (hereinafter called "Borrower") has Received financing from the International Bank for Reconstruction and Development (IBRD) (the "Bank") in the form of a "loan" (hereinafter called "loan" toward the cost of the Green National Highways Corridor Project (GNHCP). The Ministry of Road Transport and Highways which is also the implementing agency and herein after called "the Client" intends to apply a portion of the proceeds of this loan to eligible payments under the contract for which this Request for Proposals is issued. Payments by the Bank will be made only at the request of the Ministry of Road Transport and Highways and upon approval by the Bank, and will be subject, in all respects, to the terms and conditions of the loan agreement. The loan agreement prohibits a withdrawal from the loan account for the purpose of any payment to persons or entities, or for any import of goods, if such payment or import, to the knowledge of the Bank, is prohibited by a decision of the United Nations Security council taken under Chapter VII of the Charter of the United Nations. No party other than the Borrower shall derive any rights from the loan agreement or have any claims to the proceeds of the loan.

2. The Client now invites online proposals to provide the following consulting services (hereinafter called "Services"):

   "Consultancy Services for hazard and vulnerability assessment including detailed Geology, Geomorphology study, Geotechnical Investigations, Satellite Imagery and INSAR deformation study, Topographical survey, 3D mapping from Km 11.8 (Rajban) to Km 103.55 (Fediz) of NH-707 in State of Himachal Pradesh and Detailed Project report for cost effective and Suitable remedial measures for prevention of landslides/rock fall /river cut/ mass

movement/bank erosion etc. at identified locations / sections in between above chainages of NH 707 ”

The Consultant (Single entity/association/joint venture) selected as Project Management Consultant / Technical Audit Consultant/ Internal Audit Consultant/ RAPIC/ Authority Engineer/RUSS &GAP for GNHCP will not be allowed to participate / if already participated will not be considered for the above-mentioned services due to conflicting assignment.

More details on the Services are provided in the Terms of Reference (Section 7).

3. A firm will be selected under Quality and Cost Base Selection Method (QCBS) procedures and in a **Full Technical Proposal (FTP)** format as described in this RFP, in accordance with the Bank’s “Procurement Regulations for IPF Borrowers”[July 2016, revised November 2017, July2018 and Nov 2020.] (“Procurement Regulations”), which can be found at the following website: www.worldbank.org

The RFP includes the following documents:

Section 1 – Request for Proposals Letter

Section 2 - Instructions to Consultants and Data Sheet

Section 3 - Technical Proposal (FTP) - Standard Forms

Section 4 - Financial Proposal - Standard Forms

Section 5 – Eligible Countries

Section 6 – Fraud and Corruption

Section 7 - Terms of Reference

Section 8 - Standard Forms of Contract (Time-Based)

4. The RFP is available online at https://eprocure.gov.in/cppp/ for downloading by consultants. The interested consultant would be required to register on the website, which is free of cost, and would be responsible for ensuring that any addenda available on the website is also downloaded and incorporated prior to the submission of proposals. For submission of a proposal online at the web address indicated above, the Consultant is also required to have a Digital Signature (DSC) from one of the Government of India authorized Certifying Authorities. The list of the authorized Certifying Authorities can be found from the link http://www.cca.gov.in

5. The Consultants who wants to participate in e-procurement in this Project, may obtain the same from the website:https://eprocure.gov.in/cppp/.A non-refundable fee of Rs 5000/- (Five Thousands only) (inclusive of tax), is required to be paid through NTRP (https://bharatkosh.gov.in/).only, instead of Demand Draft and a copy of proof of payment shall be submitted along with above-mentioned documents. The relevant details of PAO and DDO are as follows.

Pay & Accounts Office (PAO) : 034415-PAO (NH), New Delhi
Drawing & Disbursing Office (DDO) : 205853-Superintending Engineer(EAP), New Delhi

Any Proposal or modifications to Proposal (including discount) received outside e-procurement system will not be considered.

Please inform us by **15.05.2025** through the e-procurement system or in writing at Office of the Superintendent Engineer (EAP), Ground Floor, Tower-1, Jeevan Bharti Building, 124, Connaught Place, New Delhi-110001, Phone: 011-23310036
E-mail: ravinder.morth@gov.in :

(a) that you have received this Request for Proposals; and

(b) whether you intend to submit a proposal alone or intend to enhance your experience by requesting permission to associate with other firm(s) (if permissible under Section 2, Instructions to Consultants (ITC), Data Sheet 14.1.1).

6. Attention is drawn to the Procurement Regulations requiring the Borrower to disclose information on the successful Consultant's beneficial ownership, as part of the Contract Award Notice, using the Beneficial Ownership Disclosure Form as included in the Request for Proposals

7. Details on the proposal's submission date, time and address are provided in ITC 17.4. The e-procurement system would not allow any late submission of proposals after due date & time, as per server time.

Yours sincerely,

Ravinder
Superintending Engineer (EAP)
Ministry of Road Transport and Highways,
Jeewan Bharti Building, 124,
Connaught Place, New Delhi – 110001 (India)
Phone- 011-23310036
Email: ravinder.morth@gov.in

Section 2. Instructions to Consultants and Data Sheet

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Instructions to Consultants

A. General Provisions

1. Definitions

(a) **"Affiliate(s)"** means an individual or an entity that directly or indirectly controls, is controlled by, or is under common control with the Consultant.

(b) **"Applicable Law"** means the laws and any other instruments having the force of law in the Client's country, or in such other country as may be specified in the **Data Sheet**, as they may be issued and in force from time to time.

(c) **"Bank"** means the International Bank for Reconstruction and Development (IBRD) or the International Development Association (IDA).

(d) **"Borrower"** means the Government, Government agency or other entity that signs the *[loan/financing/grant[1]]* agreement with the Bank.

(e) **"Client"** means the implementing agency that signs the Contract for the Services with the selected Consultant.

(f) "**Client's Personnel"** is as defined in Clause GCC 1.1(e).

(g) **"Consultant"** means a legally-established professional consulting firm or an entity that may provide or provides the Services to the Client under the Contract.

(h) **"Contract"** means a legally binding written agreement signed between the Client and the Consultant and includes all the attached documents listed in its Clause 1 (the General Conditions of Contract (GCC), the Special Conditions of Contract (SCC), and the Appendices).

(i) **"Contractor"** is as defined in Clause GCC 1.1.(h).

(j) **"Contractor's Personnel"** is as defined in Clause GCC

[1] *["loan agreement" term is used for IBRD loans; "financing agreement" is used for IDA credits; and "grant agreement" is used for Recipient-Executed Trust Funds administered by IBRD or IDA]*

1.1(i).

(k) **"Data Sheet"** means an integral part of the Instructions to Consultants (ITC) Section 2 that is used to reflect specific country and assignment conditions to supplement, but not to over-write, the provisions of the ITC.

(l) **"Day"** means a calendar day, unless otherwise specified as **"Business Day".** A Business Day is any day that is an official working day of the Borrower. It excludes the Borrower's official public holidays.

(m) **"ES"** means environmental and social (including Sexual Exploitation and Abuse (SEA) and Sexual Harassment (SH)).

(n) **"Experts"** means, collectively, Key Experts, Non-Key Experts, or any other personnel of the Consultant, Sub-consultant or Joint Venture member(s).

(o) **"Government"** means the government of the Client's country.

(p) **"in writing"** means communicated in written form (e.g. by mail, e-mail, fax, including, if specified in the Data Sheet, distributed or received through the electronic-procurement system used by the Client) with proof of receipt;

(q) **"Joint Venture (JV)"** means an association with or without a legal personality distinct from that of its members, of more than one Consultant where one member has the authority to conduct all business for and on behalf of any and all the members of the JV, and where the members of the JV are jointly and severally liable to the Client for the performance of the Contract.

(r) **"Key Expert(s)"** means an individual professional whose skills, qualifications, knowledge and experience are critical to the performance of the Services under the Contract and whose CV is taken into account in the technical evaluation of the Consultant's proposal.

(s) **"ITC"** (this Section 2 of the RFP) means the Instructions to Consultants that provides the shortlisted Consultants with all information needed to prepare

their Proposals.

(t) **"Non-Key Expert(s)"** means an individual professional provided by the Consultant or its Sub-consultant and who is assigned to perform the Services or any part thereof under the Contract and whose CVs are not evaluated individually.

(u) **"Proposal"** means the Technical Proposal and the Financial Proposal of the Consultant.

(v) **"RFP"** means the Request for Proposals to be prepared by the Client for the selection of consultants, based on the SPD - RFP.

(w) **"Services"** means the work to be performed by the Consultant pursuant to the Contract.

(x) **"Sexual Exploitation and Abuse" "(SEA)"*** means the following:

Sexual Exploitation is defined as any actual or attempted abuse of position of vulnerability, differential power or trust, for sexual purposes, including, but not limited to, profiting monetarily, socially or politically from the sexual exploitation of another.

Sexual Abuse is defined as the actual or threatened physical intrusion of a sexual nature, whether by force or under unequal or coercive conditions.

(y) **"Sexual Harassment" "(SH)"*** is defined as unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature by the Experts with other Experts, Contractor's or Client's Personnel.

(z) **"Site"** is as defined in Clause GCC 1.1 (z).

(aa) **"SPD - RFP"** means the Standard Procurement Document - Request for Proposals, which must be used by the Client as the basis for the preparation of the RFP.

(bb) **"Sub-consultant"** means an entity to whom the Consultant intends to subcontract any part of the Services while the Consultant remains responsible to the Client during the whole performance of the

Contract.

(cc) **"Terms of Reference (TORs)"** (this Section 7 of the RFP) means the Terms of Reference that explains the objectives, scope of work, activities, and tasks to be performed, respective responsibilities of the Client and the Consultant, and expected results and deliverables of the assignment.

*A non-exhaustive list of (i) behaviors which constitute SEA and (ii) behaviors which constitute SH is attached to the Code of Conduct form in Section3.

2. Introduction

2.1 The Client named in the **Data Sheet** intends to select a Consultant from those listed in the Request for Proposals (RFP), in accordance with the method of selection specified in the **Data Sheet**.

2.2 The shortlisted Consultants are invited to submit a Technical Proposal and a Financial Proposal, or a Technical Proposal only, as specified in the **Data Sheet**, for consulting services required for the assignment named in the **Data Sheet**. The Proposal will be the basis for negotiating and ultimately signing the Contract with the selected Consultant.

2.3 The Consultants should familiarize themselves with the local conditions and take them into account in preparing their Proposals, including attending a pre-proposal conference if one is specified in the **Data Sheet**. Attending any such pre-proposal conference is optional and is at the Consultants' expense.

2.4 The Client will timely provide, at no cost to the Consultants, the inputs, relevant project data, and reports required for the preparation of the Consultant's Proposal as specified in the **Data Sheet**.

3. Conflict of Interest

3.1 The Consultant is required to provide professional, objective, and impartial advice, at all times holding the Client's interests paramount, strictly avoiding conflicts with other assignments or its own corporate interests, and acting without any consideration for future work.

3.2 The Consultant has an obligation to disclose to the Client any situation of actual or potential conflict that impact sits capacity to serve the best interest of its Client. Failure to disclose such situations may lead to the disqualification of the Consultant or the termination of its Contract and/or

sanctions by the Bank.

3.2.1 Without limitation on the generality of the foregoing, the Consultant shall not be hired under the circumstances set forth below:

a. Conflicting Activities

(i) Conflict between consulting activities and procurement of goods, works or non-consulting services: a firm that has been engaged by the Client to provide goods, works, or non-consulting services for a project, or any of its Affiliates, shall be disqualified from providing consulting services resulting from or directly related to those goods, works, or non-consulting services. Conversely, a firm hired to provide consulting services for the preparation or implementation of a project, or any of its Affiliates, shall be disqualified from subsequently providing goods or works or non-consulting services resulting from or directly related to the consulting services for such preparation or implementation.

b. Conflicting Assignments

(ii) Conflict among consulting assignments: a Consultant (including its Experts and Sub-consultants) or any of its Affiliates shall not be hired for any assignment that, by its nature, may be in conflict with another assignment of the Consultant for the same or for another Client.

c. Conflicting Relationships

(iii) Relationship with the Client's staff: a Consultant (including its Experts and Sub-consultants) that has a close business or family relationship with a professional staff of the Borrower (or of the Client, or of implementing agency, or of a recipient of a part of the Bank's financing) who are directly or indirectly involved in any part of (i) the preparation of the Terms of Reference for the assignment, (ii) the selection process for the Contract, or (iii) the supervision of the Contract, may not be awarded a Contract, unless the conflict stemming from this relationship has been resolved in a manner acceptable to the Bank throughout the selection process and the execution of the Contract.

4. Unfair Competitive Advantage

4.1 Fairness and transparency in the selection process require that the Consultants or their Affiliates competing for a specific assignment do not derive a competitive advantage from having provided consulting services related to the assignment in question. To that end, the Client shall indicate in the **Data Sheet** and make available to all shortlisted Consultants together with this RFP all information that would in that respect give such Consultant any unfair competitive advantage over competing Consultants.

5. Fraud and Corruption

5.1 The Bank requires compliance with the Bank's Anti-Corruption Guidelines and its prevailing sanctions policies and procedures as set forth in the WBG's Sanctions Framework, as set forth in Section 6.

5.2 In further pursuance of this policy, Consultants shall permit and shall cause their agents (where declared or not), sub-contractors, sub consultants, service providers, suppliers, and personnel, to permit the Bank to inspect all accounts, records and other documents relating to any short listing process, Proposal submission, and contract performance (in the case of award), and to have them audited by auditors appointed by the Bank.

6. Eligibility

6.1 The Bank permits consultants (individuals and firms, including Joint Ventures and their individual members) from all countries to offer consulting services for Bank-financed projects.

6.2 Furthermore, it is the Consultant's responsibility to ensure that its Experts, joint venture members, Sub-consultants, agents (declared or not), sub-contractors, service providers, suppliers and/or their employees meet the eligibility requirements as established by the Bank in the applicable Procurement Regulations.

6.3 As an exception to the foregoing ITC 6.1 and ITC 6.2 above:

a. Sanctions

6.3.1 A Consultant that has been sanctioned by the Bank, pursuant to the Bank's Anti-Corruption Guidelines and in accordance with its prevailing sanctions policies and procedures as set forth in the WBG's Sanctions Framework as described in Section VI, Fraud and Corruption, paragraph 2.2 d., shall be ineligible to be shortlisted for, submit proposals for, or be awarded a Bank-financed contract or benefit

from a Bank-financed contract, financially or otherwise, during such period of time as the Bank shall have determined. The list of debarred firms and individuals is available at the electronic address specified **in the Data Sheet**.

b. Prohibitions

6.3.2 Firms and individuals of a country or goods manufactured in a country may be ineligible if so indicated in Section 5 (Eligible Countries) and:

(a) as a matter of law or official regulations, the Borrower's country prohibits commercial relations with that country, provided that the Bank is satisfied that such exclusion does not preclude effective competition for the provision of Services required; or

(b) by an act of compliance with a decision of the United Nations Security Council taken under Chapter VII of the Charter of the United Nations, the Borrower's Country prohibits any import of goods from that country or any payments to any country, person, or entity in that country.

c. Restrictions for State-Owned Enterprises

6.3.3 State-owned enterprises or institutions in the Borrower's country may be eligible to compete and be awarded a contract only if they can establish, in a manner acceptable to the Bank, that they: (i) are legally and financially autonomous, (ii) operate under commercial law, and (iii) are not under supervision of the Client.

d. Restrictions for Public Employees

6.3.4 Government officials and civil servants of the Borrower's country are not eligible to be included as Experts, individuals, or members of a team of Experts in the Consultant's Proposal unless:

(i) the services of the government official or civil servant are of a unique and exceptional nature, or their participation is critical to project implementation; and

(ii) their hiring would not create a conflict of interest, including any conflict with employment or other laws, regulations, or policies of the Borrower.

B. Preparation of Proposals

7. General Considerations

7.1 In preparing the Proposal, the Consultant is expected to examine the RFP in detail. Material deficiencies in providing the information requested in the RFP may result in rejection of the Proposal.

8. Cost of Preparation of Proposal

8.1 The Consultant shall bear all costs associated with the preparation and submission of its Proposal, and the Client shall not be responsible or liable for those costs, regardless of the conduct or outcome of the selection process. The Client is not bound to accept any proposal, and reserves the right to annul the selection process at any time prior to Contract award, without thereby incurring any liability to the Consultant.

9. Language

9.1 The Proposal, as well as all correspondence and documents relating to the Proposal exchanged between the Consultant and the Client, shall be written in the language(s) specified in the **Data Sheet**.

10. Documents Comprising the Proposal

10.1 The Proposal shall comprise the documents and forms listed in the **Data Sheet**.

10.2 If specified in the **Data Sheet**, the Consultant shall include a statement of an undertaking of the Consultant to observe, in competing for and executing a contract, the Client country's laws against fraud and corruption (including bribery).

10.3 The Consultant shall furnish information on commissions, gratuities, and fees, if any, paid or to be paid to agents or any other party relating to this Proposal and, if awarded, Contract execution, as requested in the Financial Proposal submission form (Section 4).

11. Only One Proposal

11.1 The Consultant (including the individual members of any Joint Venture) shall submit only one Proposal, either in its own name or as part of a Joint Venture in another Proposal. If a Consultant, including any Joint Venture member, submits or participates in more than one proposal, all such proposals shall be disqualified and rejected. This does not, however, preclude Sub-consultant, or the Consultant's staff from participating as Key Experts and Non-Key Experts in more than one

Proposal when circumstances justify and if stated in the **Data Sheet**.

12. Proposal Validity

12.1 Proposals shall remain valid until the date specified **in the Data Sheet** or any extended date if amended by the Client in accordance with ITC 13.1.1.

12.2 During this period, the Consultant shall maintain its original Proposal without any change, including the availability of the Key Experts, the proposed rates and the total price.

12.3 If it is established that any Key Expert nominated in the Consultant's Proposal was not available at the time of Proposal submission or was included in the Proposal without his/her confirmation, such Proposal shall be disqualified and rejected for further evaluation, and may be subject to sanctions in accordance with ITC 5.

a. Extension of Proposal Validity

12.4 The Client will make its best effort to complete the negotiations and award the contract prior to the date of expiry of the Proposal validity. However, should the need arise, the Client may request, in writing, all Consultants who submitted Proposals prior to the submission deadline to extend the Proposals' validity.

12.5 If the Consultant agrees to extend the validity of its Proposal, it shall be done without any change in the original Proposal and with the confirmation of the availability of the Key Experts, except as provided in ITC 12.7.

12.6 The Consultant has the right to refuse to extend the validity of its Proposal in which case such Proposal will not be further evaluated.

b. Substitution of Key Experts at Validity Extension

12.7 If any of the Key Experts become unavailable for the extended validity period, the Consultant shall seek to substitute another Key Expert. The Consultant shall provide a written adequate justification and evidence satisfactory to the Client together with the substitution request. In such case, a substitute Key Expert shall have equal or better qualifications and experience than those of the originally proposed Key Expert. The technical evaluation score, however, will remain to be based on the evaluation of the CV of the original Key Expert.

12.8 If the Consultant fails to provide a substitute Key Expert

with equal or better qualifications, or if the provided reasons for the replacement or justification are unacceptable to the Client, such Proposal will be rejected with the prior Bank's no objection.

c. Sub-Contracting

12.9 The Consultant shall not subcontract the whole of the Services.

13. Clarification and Amendment of RFP

13.1 The Consultant may request a clarification of any part of the RFP during the period indicated in the **Data Sheet** before the Proposals' submission deadline. Any request for clarification must be sent in writing, or by standard electronic means, to the Client's address indicated in the **Data Sheet**. The Client will respond in writing, or by standard electronic means, and will send written copies of the response (including an explanation of the query but without identifying its source) to all shortlisted Consultants. Should the Client deem it necessary to amend the RFP as a result of a clarification, it shall do so following the procedure described below:

13.1.1 At any time before the proposal submission deadline, the Client may amend the RFP by issuing an amendment in writing or by standard electronic means. The amendment shall be sent to all shortlisted Consultants and will be binding on them. The shortlisted Consultants shall acknowledge receipt of all amendments in writing.

13.1.2 If the amendment is substantial, the Client may extend the proposal submission deadline to give the shortlisted Consultants reasonable time to take an amendment into account in their Proposals.

13.2 The Consultant may submit a modified Proposal or a modification to any part of it at any time prior to the proposal submission deadline. No modifications to the Technical or Financial Proposal shall be accepted after the deadline.

14. Preparation of Proposals Specific Considerations

14.1 While preparing the Proposal, the Consultant must give particular attention to the following:

14.1.1 If a shortlisted Consultant considers that it may enhance its expertise for the assignment by associating with other consultants in the form of a Joint Venture or as Sub-consultants, it may do so with either (a) non-shortlisted Consultant(s), or

(b) shortlisted Consultants if permitted in the **Data Sheet**. In all such cases a shortlisted Consultant must obtain the written approval of the Client prior to the submission of the Proposal. When associating with non-shortlisted firms in the form of a joint venture or a sub-consultancy, the shortlisted Consultant shall be a lead member. If shortlisted Consultants associate with each other, any of them can be a lead member.

14.1.2 The Client may indicate in the **Data Sheet** the estimated Key Experts' time input (expressed in person-month) or the Client's estimated total cost of the assignment, but not both. This estimate is indicative and the Proposal shall be based on the Consultant's own estimates for the same.

14.1.3 If stated in the **Data Sheet**, the Consultant shall include in its Proposal at least the same time input (in the same unit as indicated in the **Data Sheet**) of Key Experts, failing which the Financial Proposal will be adjusted for the purpose of comparison of proposals and decision for award in accordance with the procedure in the **Data Sheet**.

14.1.4 For assignments under the Fixed-Budget selection method, the estimated Key Experts' time input is not disclosed. Total available budget, with an indication whether it is inclusive or exclusive of taxes, is given in the **Data Sheet**, and the Financial Proposal shall not exceed this budget.

15. Technical Proposal Format and Content

15.1 The Technical Proposal shall be prepared using the Standard Forms provided in Section 3 of the RFP and shall comprise the documents listed in the **Data Sheet.** The Technical Proposal shall not include any financial information. A Technical Proposal containing material financial information shall be declared non-responsive.

15.1.1 Consultant shall not propose alternative Key Experts. Only one CV shall be submitted for each Key Expert position. Failure to comply with this requirement will make the Proposal non-responsive.

15.2 Depending on the nature of the assignment, the Consultant is required to submit a Full Technical Proposal (FTP), or a Simplified Technical Proposal (STP)

as indicated in the **Data Sheet** and using the Standard Forms provided in Section 3 of the RFP.

16. Financial Proposal

16.1 The Financial Proposal shall be prepared using the Standard Forms provided in Section 4 of the RFP. It shall list all costs associated with the assignment, including (a) remuneration for Key Experts and Non-Key Experts, (b)reimbursable expenses indicated in the **Data Sheet**.

a. Price Adjustment

16.2 For assignments with a duration exceeding 18 months, a price adjustment provision for foreign and/or local inflation for remuneration rates applies if so stated in the **Data Sheet**.

b. Taxes

16.3 The Consultant and its Sub-consultants and Experts are responsible for meeting all tax liabilities arising out of the Contract unless stated otherwise in the **Data Sheet**. Information on taxes in the Client's country is provided in the **Data Sheet**.

c. Currency of Proposal

16.4 The Consultant may express the price for its Services in the currency or currencies as stated in the **Data Sheet**. If indicated in the **Data Sheet**, the portion of the price representing local cost shall be stated in the national currency.

d. Currency of Payment

16.5 Payment under the Contract shall be made in the currency or currencies in which the payment is requested in the Proposal.

C. Submission, Opening and Evaluation

17. Submission, Sealing, and Marking of Proposals

17.1 The Consultant shall submit a signed and complete Proposal comprising the documents and forms in accordance with ITC 10 (Documents Comprising Proposal). Consultants shall mark as "CONFIDENTIAL" information in their Proposals which is confidential to their business. This may include proprietary information, trade secrets or commercial or financially sensitive information. The submission can be done by mail or by hand. If specified in the **Data Sheet**, the Consultant has the option of submitting its Proposals electronically.

17.2 An authorized representative of the Consultant shall sign the original submission letters in the required format for both the Technical Proposal and, if applicable, the Financial Proposal and shall initial all pages of both. The

authorization shall be in the form of a written power of attorney attached to the Technical Proposal.

17.2.1 A Proposal submitted by a Joint Venture shall be signed by all members to be legally binding on all members, or by an authorized representative who has a written power of attorney signed by each member's authorized representative.

17.3 Any modifications, revisions, interlineations, erasures, or overwriting shall be valid only if they are signed or initialed by the person signing the Proposal.

17.4 The signed Proposal shall be marked "ORIGINAL", and its copies marked "COPY" as appropriate. The number of copies is indicated in the **Data Sheet**. All copies shall be made from the signed original. If there are discrepancies between the original and the copies, the original shall prevail.

17.5 The original and all the copies of the Technical Proposal shall be placed inside a sealed envelope clearly marked "**TECHNICAL PROPOSAL**", "[Name of the Assignment]", [reference number], [name and address of the Consultant], and with a warning "**DO NOT OPEN UNTIL [INSERT THE DATE AND THE TIME OF THE TECHNICAL PROPOSAL SUBMISSION DEADLINE]**."

17.6 Similarly, the original Financial Proposal (if required for the applicable selection method) and its copies shall be placed inside of a separate sealed envelope clearly marked "**FINANCIAL PROPOSAL**" "[Name of the Assignment], [reference number], [name and address of the Consultant]", and with a warning "**DO NOT OPEN WITH THE TECHNICAL PROPOSAL**."

17.7 The sealed envelopes containing the Technical and Financial Proposals shall be placed into one outer envelope and sealed. This outer envelope shall be addressed to the Client and bear the submission address, RFP reference number, the name of the assignment, the Consultant's name and the address, and shall be clearly marked "Do Not Open Before [insert the time and date of the submission deadline indicated in the **Data Sheet**]".

17.8 If the envelopes and packages with the Proposal are not sealed and marked as required, the Client will assume no responsibility for the misplacement, loss, or premature

opening of the Proposal.

17.9 The Proposal or its modifications must be sent to the address indicated in the **Data Sheet** and received by the Client no later than the deadline indicated in the **Data Sheet**, or any extension to this deadline. Any Proposal or its modification received by the Client after the deadline shall be declared late and rejected, and promptly returned unopened.

18. Confidentiality

18.1 From the time the Proposals are opened to the time the Contract is awarded, the Consultant should not contact the Client on any matter related to its Technical and/or Financial Proposal. Information relating to the evaluation of Proposals and award recommendations shall not be disclosed to the Consultants who submitted the Proposals or to any other party not officially concerned with the process, until the Notification of Intention to Award the Contract. Exceptions to this ITC are where the Client notifies Consultants of the results of the evaluation of the Technical Proposals.

18.2 Any attempt by shortlisted Consultants or anyone on behalf of the Consultant to influence improperly the Client in the evaluation of the Proposals or Contract award decisions may result in the rejection of its Proposal, and may be subject to the application of prevailing Bank's sanctions procedures.

18.3 Notwithstanding the above provisions, from the time of the Proposals' opening to the time of Contract award publication, if a Consultant wishes to contact the Client or the Bank on any matter related to the selection process, it shall do so only in writing.

19. Opening of Technical Proposals

19.1 The Client's evaluation committee shall conduct the opening of the Technical Proposals in the presence of the Consultants' authorized representatives who choose to attend (in person, or online if this option is offered in the **Data Sheet**). The opening date, time and the address are stated in the **Data Sheet**. The envelopes with the Financial Proposal shall remain sealed and shall be securely stored with a reputable public auditor or independent authority until they are opened in accordance with ITC 23.

19.2 At the opening of the Technical Proposals the following shall be read out: (i) the name and the country of the

Consultant or, in case of a Joint Venture, the name of the Joint Venture, the name of the lead member and the names and the countries of all members; (ii) the presence or absence of a duly sealed envelope with the Financial Proposal; (iii) any modifications to the Proposal submitted prior to proposal submission deadline; and (iv) any other information deemed appropriate or as indicated in the **Data Sheet**.

20. Proposals Evaluation

20.1 Subject to provision of ITC 15.1, the evaluators of the Technical Proposals shall have no access to the Financial Proposals until the technical evaluation is concluded and the Bank issues its "no objection", if applicable.

20.2 The Consultant is not permitted to alter or modify its Proposal in any way after the proposal submission deadline except as permitted under ITC 12.7. While evaluating the Proposals, the Client will conduct the evaluation solely on the basis of the submitted Technical and Financial Proposals.

21. Evaluation of Technical Proposals

21.1 The Client's evaluation committee shall evaluate the Technical Proposals on the basis of their responsiveness to the Terms of Reference and the RFP, applying the evaluation criteria, sub-criteria, and point system specified in the **Data Sheet**. Each responsive Proposal will be given a technical score. A Proposal shall be rejected at this stage if it does not respond to important aspects of the RFP or if it fails to achieve the minimum technical score indicated in the **Data Sheet**.

22. Financial Proposals for QBS

22.1 Following the ranking of the Technical Proposals, when the selection is based on quality only (QBS), the top-ranked Consultant is invited to negotiate the Contract.

22.2 If the Financial Proposals were invited together with the Technical Proposals, only the Financial Proposal of the technically top-ranked Consultant is opened by the Client's evaluation committee. All other Financial Proposals are returned unopened after the Contract negotiations are successfully concluded and the Contract is signed.

23. Public Opening of Financial Proposals (for QCBS, FBS, and LCS methods)

23.1 After the technical evaluation is completed and the Bank has issued its no objection (if applicable), the Client shall notify those Consultants whose Proposals were considered non-responsive to the RFP and TOR or did not meet the minimum qualifying technical score,

advising them the following:

(i) their Proposal was not responsive to the RFP and TOR or did not meet the minimum qualifying technical score;

(ii) provide information relating to the Consultant's overall technical score, as well as scores obtained for each criterion and sub-criterion;

(iii) their Financial Proposals will be returned unopened after completing the selection process and Contract signing; and

(iv) notify them of the date, time and location of the public opening of the Financial Proposals and invite them to attend.

23.2 The Client shall simultaneously notify in writing those Consultants whose Proposals were considered responsive to the RFP and TOR, and that have achieved the minimum qualifying technical score, advising them the following:

(i) their Proposal was responsive to the RFP and TOR and met the minimum qualifying technical score;

(ii) provide information relating to the Consultant's overall technical score, as well as scores obtained for each criterion and sub-criterion;

(iii) their Financial Proposal will be opened at the public opening of Financial Proposals; and

(iv) notify them of the date, time and location of the public opening and invite them for the opening of the Financial Proposals.

23.3 The opening date shall be no less than ten (10) Business Days from the date of notification of the results of the technical evaluation, described in ITC 23.1 and 23.2.However, if the Client receives a complaint on the results of the technical evaluation within the ten (10) Business Days, the opening date shall be subject to ITC 35.1.

23.4 The Consultant's attendance at the opening of the Financial Proposals (in person, or online if such option is

indicated in the **Data Sheet**) is optional and is at the Consultant's choice.

23.5 The Financial Proposals shall be opened publicly by the Client's evaluation committee in the presence of the representatives of the Consultants and anyone else who chooses to attend. Any interested party who wishes to attend this public opening should contact the client as indicated in the **Data Sheet**. Alternatively, a notice of the public opening of Financial Proposals may be published on the Client's website, if available. At the opening, the names of the Consultants, and the overall technical scores, including the break-down by criterion, shall be read aloud. The Financial Proposals will then be inspected to confirm that they have remained sealed and unopened. These Financial Proposals shall be then opened, and the total prices read aloud and recorded. Copies of the record shall be sent to all Consultants who submitted Proposals and to the Bank.

24. Correction of Errors

24.1 Activities and items described in the Technical Proposal but not priced in the Financial Proposal, shall be assumed to be included in the prices of other activities or items, and no corrections are made to the Financial Proposal.

a. Time-Based Contracts

24.1.1 If a Time-Based contract form is included in the RFP, the Client's evaluation committee will (a) correct any computational or arithmetical errors, and (b) adjust the prices if they fail to reflect all inputs included for the respective activities or items included in the Technical Proposal. In case of discrepancy between (i) a partial amount (sub-total) and the total amount, or (ii) between the amount derived by multiplication of unit price with quantity and the total price, or (iii) between words and figures, the former will prevail. In case of discrepancy between the Technical and Financial Proposals in indicating quantities of input, the Technical Proposal prevails and the Client's evaluation committee shall correct the quantification indicated in the Financial Proposal so as to make it consistent with that indicated in the Technical Proposal, apply the relevant unit price included in the Financial Proposal to the corrected quantity, and correct the total Proposal cost.

b. Lump-Sum

24.1.2 If a Lump-Sum contract form is included in the

Contracts		RFP, the Consultant is deemed to have included all prices in the Financial Proposal, so neither arithmetical corrections nor price adjustments shall be made. The total price, net of taxes understood as per ITC 25, specified in the Financial Proposal (Form FIN-1) shall be considered as the offered price.Where there is a discrepancy between the amount in words and the amount figures, the amount in words shall prevail.
25. Taxes	25.1	The Client's evaluation of the Consultant's Financial Proposal shall exclude taxes and duties in the Client's country in accordance with the instructions in the **Data Sheet**.
26. Conversion to Single Currency	26.1	For the evaluation purposes, prices shall be converted to a single currency using the selling rates of exchange, source and date indicated in the **Data Sheet**.
27. Combined Quality and Cost Evaluation		
a. Quality and Cost-Based Selection (QCBS)	27.1	In the case of QCBS, the total score is calculated by weighting the technical and financial scores and adding them as per the formula and instructions in the **Data Sheet**. The Consultant with the Most Advantageous Proposal, which is the Proposal that achieves the highest combined technical and financial scores, will be invited for negotiations.
b. Fixed-Budget Selection(FBS)	27.2	In the case of FBS, those Proposals that exceed the budget indicated in ITC 14.1.4 of the **Data Sheet** shall be rejected.
	27.3	The Client will select the Consultant with the Most Advantageous Proposal, which is the highest-ranked Technical Proposal that does not exceed the budget indicated in the RFP, and invite such Consultant to negotiate the Contract.
c. Least-Cost Selection	27.4	In the case of Least-Cost Selection (LCS), the Client will select the Consultant with the Most Advantageous Proposal, which is the Proposal with the lowest evaluated total price among those Proposals that achieved the minimum qualifying technical score, and invite such a Consultant to negotiate the Contract.

D. Negotiations and Award

28. Negotiations

28.1 The negotiations will be held at the date and address indicated in the Data Sheet with the Consultant's representative(s) who must have written power of attorney to negotiate and sign a Contract on behalf of the Consultant.

28.2 The Client shall prepare minutes of negotiations that are signed by the Client and the Consultant's authorized representative.

a. Availability of Key Experts

28.3 The invited Consultant shall confirm the availability of all Key Experts included in the Proposal as a pre-requisite to the negotiations, or, if applicable, a replacement in accordance with ITC 12. Failure to confirm the Key Experts' availability may result in the rejection of the Consultant's Proposal and the Client proceeding to negotiate the Contract with the next-ranked Consultant.

28.4 Notwithstanding the above, the substitution of Key Experts at the negotiations may be considered if due solely to circumstances outside the reasonable control of and not foreseeable by the Consultant, including but not limited to death or medical incapacity. In such case, the Consultant shall offer a substitute Key Expert within the period of time specified in the letter of invitation to negotiate the Contract, who shall have equivalent or better qualifications and experience than the original candidate.

b. Technical Negotiations

28.5 The negotiations include discussions of the Terms of Reference (TORs), the proposed methodology, the Client's inputs, the special conditions of the Contract, and finalizing the "Description of Services" part of the Contract. These discussions shall not substantially alter the original scope of services under the TOR or the terms of the contract, lest the quality of the final product, its price, or the relevance of the initial evaluation be affected.

c. Financial Negotiations

28.6 The negotiations include the clarification of the Consultant's tax liability in the Client's country and how it should be reflected in the Contract.

28.7 If the selection method included cost as a factor in the evaluation, the total price stated in the Financial Proposal

for a Lump-Sum contract shall not be negotiated.

28.8 In the case of a Time-Based contract, unit rates negotiations shall not take place, except when the offered Key Experts and Non-Key Experts' remuneration rates are much higher than the typically charged rates by consultants in similar contracts. In such case, the Client may ask for clarifications and, if the fees are very high, ask to change the rates after consultation with the Bank. The format for (i) providing information on remuneration rates in the case of Quality Based Selection; and (ii) clarifying remuneration rates' structure under this Clause, is provided in Appendix A to the Financial Form FIN-3: Financial Negotiations – Breakdown of Remuneration Rates.

29. Conclusion of Negotiations

29.1 The negotiations are concluded with a review of the finalized draft Contract, which then shall be initialed by the Client and the Consultant's authorized representative.

29.2 If the negotiations fail, the Client shall inform the Consultant in writing of all pending issues and disagreements and provide a final opportunity to the Consultant to respond. If disagreement persists, the Client shall terminate the negotiations informing the Consultant of the reasons for doing so. After having obtained the Bank's no objection, the Client will invite the next-ranked Consultant to negotiate a Contract. Once the Client commences negotiations with the next-ranked Consultant, the Client shall not reopen the earlier negotiations.

30. Standstill Period

30.1 The Contract shall not be awarded earlier than the expiry of the Standstill Period. The Standstill Period shall be ten (10) Business Days unless extended in accordance with ITC33. The Standstill Period commences the day after the date the Client has transmitted to each Consultant (that has not already been notified that it has been unsuccessful) the Notification of Intention to Award the Contract. Where only one Proposal is submitted, or if this contract is in response to an emergency situation recognized by the Bank, the Standstill Period shall not apply.

31. Notification of Intention to Award

31.1 The Client shall send to each Consultant (that has not already been notified that it has been unsuccessful) the Notification of Intention to Award the Contract to the successful Consultant. The Notification of Intention to

Award shall contain, at a minimum, the following information:

(a) the name and address of the Consultant with whom the client successfully negotiated a contract;

(b) the contract price of the successful Proposal;

(c) the names of all Consultants included in the short list, indicating those that submitted Proposals;

(d) where the selection method requires, the price offered by each Consultant as read out and as evaluated;

(e) the overall technical scores and scores assigned for each criterion and sub-criterion to each Consultant;

(f) the final combined scores and the final ranking of the Consultants;

(g) a statement of the reason(s) why the recipient's Proposal was unsuccessful, unless the combined score in (f) above already reveals the reason;

(h) the expiry date of the Standstill Period; and

(i) instructions on how to request a debriefing and/or submit a complaint during the Standstill Period.

32. Notification of Award

32.1 Upon expiry of the Standstill Period, specified in ITC 30.1 or any extension thereof, and upon satisfactorily addressing any complaint that has been filed within the Standstill Period, the Client shall, send a notification of award to the successful Consultant, confirming the Client's intention to award the Contract to the successful Consultant and requesting the successful Consultant to sign and return the draft negotiated Contract within eight (8) Business Days from the date of receipt of such notification. If specified in the **Data Sheet**, the client shall simultaneously request the successful Consultant to submit, within eight (8) Business Days, the Beneficial Ownership Disclosure Form.

Contract Award Notice

Within ten (10) Business Days from the date of notification of award such request, the Client shall publish the Contract Award Notice which shall contain, at a minimum, the following information:

(a) name and address of the Client;

(b) name and reference number of the contract being

awarded, and the selection method used;

(c) names of the consultants that submitted proposals, and their proposal prices as read out at financial proposal opening, and as evaluated;

(d) names of all Consultants whose Proposals were rejected or were not evaluated, with the reasons therefor;

(e) the name of the successful consultant, the final total contract price, the contract duration and a summary of its scope; and.

(f) Successful Consultant's Beneficial Ownership Disclosure Form, if specified in Data Sheet ITC 32.1.

32.2 The Contract Award Notice shall be published on the Client's website with free access if available, or in at least one newspaper of national circulation in the Client's Country, or in the official gazette. The Client shall also publish the contract award notice in UNDB online

33. Debriefing by the Client

33.1 On receipt of the Client's Notification of Intention to Award referred to in ITC 31.1, an unsuccessful Consultant has three (3) Business Days to make a written request to the Client for a debriefing. The Client shall provide a debriefing to all unsuccessful Consultants whose request is received within this deadline.

33.2 Where a request for debriefing is received within the deadline, the Client shall provide a debriefing within five (5) Business Days, unless the Client decides, for justifiable reasons, to provide the debriefing outside this timeframe. In that case, the standstill period shall automatically be extended until five (5) Business Days after such debriefing is provided. If more than one debriefing is so delayed, the standstill period shall not end earlier than five (5) Business Days after the last debriefing takes place. The Client shall promptly inform, by the quickest means available, all Consultants of the extended standstill period

33.3 Where a request for debriefing is received by the Client later than the three (3)-Business Day deadline, the Client should provide the debriefing as soon as practicable, and normally no later than fifteen (15) Business Days from the date of publication of Public Notice of Award of contract. Requests for debriefing received outside the

three (3)-day deadline shall not lead to extension of the standstill period.

33.4 Debriefings of unsuccessful Consultants may be done in writing or verbally. The Consultants shall bear their own costs of attending such a debriefing meeting

34. Signing of Contract

34.1 The Contract shall be signed prior to the expiry date of the Proposal validity and promptly after expiry of the Standstill Period, specified in ITC 30.1 or any extension thereof, and upon satisfactorily addressing any complaint that has been filed within the Standstill Period.

34.2 The Consultant is expected to commence the assignment on the date and at the location specified in the **Data Sheet**.

35. Procurement Related Complaint

35.1 The procedures for making a Procurement-related Complaint are as specified in the **Data Sheet**.

Section 2. Instructions to Consultants

E. Data Sheet

ITC Reference	A. General
1 (b)	India
1 (p)	**Electronic –Procurement System** The Client shall use the following electronic-procurement system to manage this Request for Proposal (RFP) process: https://eprocure.gov.in/cppp for ***issuing RFP, submissions of Proposals, opening of Proposals etc.*** Proposal must be submitted online only at https://eprocure.gov.in/cppp/ on or before **06.06.2025** (up to 11.30 hours IST). Proposal submitted through any other mode shall not be entertained.
2.1	**Name of the Client:** The Ministry of Road Transport &Highways, - Government of India **Method of selection**: Quality and Cost Based Selection Method (QCBS) as per the Procurement Regulations for IPF Borrowers" [July 2016, revised November 2017, July 2018 and November 2020 (available on www.worldbank.org)
2.2	**Financial Proposal to be submitted together with Technical Proposal**: Yes. Financial proposal shall be submitted online in the prescribed format and scanned copy of the same shall not be accepted The name of the assignment is: Consultancy Services for hazard and vulnerability assessment including detailed Geology, Geomorphology study, Geotechnical Investigations, Satellite Imagery and INSAR deformation study, Topographical survey, 3D mapping from Km 11.8 (Rajban) to Km 103.55(Fediz) of NH-707 in State of Himachal Pradesh and Detailed Project report for cost effective and Suitable remedial measures for prevention of landslides/rock fall /river cut/ mass movement/bank erosion etc. at identified locations / sections in between above chainages of NH 707 .

2.3	**A pre-proposal conference will be held**: Yes. On 20.05.2025 at 15:00 in Ground Floor, Tower-1, Jeevan Bharti Building, 124, Connaught Place, New Delhi-110001,Phone : 011-23310036]
2.4	**The project consists of Consultancy Services for hazard and vulnerability assessment including detailed Geology, Geomorphology study, Geotechnical Investigations, Satellite Imagery and INSAR deformation study, Topographical survey, 3D mapping from Km 11.8 (Rajban) to Km 103.55(Fediz) of NH-707 in State of Himachal Pradesh and Detailed Project report for cost effective and Suitable remedial measures for prevention of landslides/rock fall /river cut/ mass movement/bank erosion etc. at identified locations / sections in between above chainages of NH 707** **The scope of Consultancy Services is defined in TOR.**
4.1	*Not Applicable*
6.3.1	**A list of debarred firms and individuals is available at the Bank's external website***:* www.worldbank.org/debarr
B. Preparation of Proposals	
9.1	**This RFP has been issued in the English language.** **Proposals shall be submitted in English language only.** **All correspondence exchange shall be in English language.**
10.1	**The Proposal shall comprise the following. The Technical and Financial Proposals shall be submitted online in the e-procurement system in separate folders**: **For FULL TECHNICAL PROPOSAL (FTP):** (1) **The Technical Proposal comprising:** Power of Attorney to sign the Proposal (2) TECH-1 (3) TECH-2 (4) TECH-3 (5) TECH-4

	(6) TECH-5 (7) TECH-6 (8) TECH-7 Code of Conduct (ES): The Consultant shall submit its Code of Conduct that will apply to the Experts, to ensure compliance with the Consultant's Environmental and Social (ES) obligations under the Contract. The Consultant shall use for this purpose the Code of Conduct form in Section 3. No substantial modifications shall be made to this form, except that the Consultant may introduce additional requirements, including as necessary to take into account specific Contract issues/risks. OR AND **The Financial Proposal (if applicable) comprising:** (1) FIN-1 (2) FIN-2 (3) FIN-3 (4) FIN-4 (5) Statement of Undertaking (if required under Data Sheet 10.2 below)
10.2	**Statement of Undertaking is required** Yes
11.1	**Participation of Sub-consultants, Key Experts and Non-Key Experts in more than one Proposal is permissible** No
12.1	**Proposals shall be valid** for **120 calendar days** after the proposal submission deadline.
12.4	Replace second sentence of ITC 12.4 with the following: **"**However, should the need arise, any extension of validity period will be hosted on e-tendering portal of MoRTH at http://eprocure.gov.in/eprocure/app and also e-mail will be sent to each short-listed Consultant. The Consultants may send their response, if any, on the e-procurement portal and through e-mail at the e-mail ID given in **Data Sheet** against ITC 2.3.".
13	Replace ITC13 with the following: "13.1.The e-procurement system specified in ITC 1(p) provides for online

	clarifications. A Consultant may request an online clarification of any part of the RFP during the period indicated in the **Data Sheet** before the Proposals' submission deadline, or raise its inquiries during the pre-proposal conference, if provided for in accordance with ITC 2.3. Clarifications requested through any other mode shall not be considered by the Client.The Client will respond online by uploading the response (including an explanation of the query but without identifying its source) for information of all shortlisted Consultants. Should the Client deem it necessary to amend the RFP as a result of a clarification, it shall do so following the procedure described in ITC 13.1.1 and ITC 13.1.2 below.It is the consultant's responsibility to check on the e-procurement system, for any addendum/ amendment/ corrigendum to the RFP document. 13.1.1 At any time before the proposal submission deadline, the Client may amend the RFP by issuing an amendment online in accordance with the procedure described in the **Data Sheet**. The amendment shall be binding on all shortlisted Consultants. The Client shall not be liable for any information not received by the shortlisted Consultants. It is the shortlisted Consultants' responsibility to verify the website for the latest information related to the RFP. 13.1.2 If the amendment is substantial, the Client may extend the proposal submission deadline to give the shortlisted Consultants reasonable time to take an amendment into account in their Proposals, by amending the RFP in accordance with ITC13.1.1. 13.2 A Consultant may modify its Proposal in the following manner, by using the appropriate option for proposal modification on e-procurement portal, before the deadline for submission of proposals. No modifications to the Technical or Financial Proposal shall be accepted after the proposal submission deadline. (a) For proposal modification and consequential re-submission, the Consultant is not required to withdraw the proposal submitted earlier. The last modified proposal submitted by the consultant within the proposal submission time shall be considered as the 'Proposal'. (b) For this purpose, modification/withdrawal by other means will not be accepted. (c) The modification and consequential re-submission of proposals is allowed any number of times. (d) A consultant may withdraw its proposal by using the appropriate option for proposal withdrawal, before the deadline for submission of proposals. However, if the proposal is withdrawn, re-submission is ***not allowed***
13.1	**Clarifications may be requested no later than** 15 **days prior to the submission deadline.**

	All requests for clarifications shall be made online through the e-tendering portal of MORTH at http://eprocure.gov.in/eprocure/app. Clarifications sent through any other medium shall not be accepted. The Client will host the query without identifying the source and response thereto on the e-tendering portal of MoRTH at http://eprocure.gov.in/eprocure/app no later than 7 days prior to the submission deadline. The system will also send auto-e-mail regarding hosting of query and response to all the shortlisted Consultants. The shortlisted Consultants shall remain responsible to view query and response thereto
13.1.1	The Client will host the amendment to RFP on the e-tendering portal of MoRTH at http://eprocure.gov.in/eprocure/app if any at any time prior to the submission deadline. The system will also send auto-e-mail regarding hosting of amendment to RFP to all the shortlisted Consultants. The shortlisted Consultants shall remain responsible to view amendment to RFP
13.1.2	The Client will host extension of submission deadline on the e-tendering portal of MoRTH at http://eprocure.gov.in/eprocure/app
13.2	The Consultant may withdraw, substitute or modify its bid on the e-procurement portal of MoRTHhttp://eprocure.gov.in/eprocure/app in the following manner no later than the date and time specified there after: (a) A Consultant/Bidder may substitute one or more files containing documents comprising the Bid by first detaching it sold relevant file(s) from e-procurement portal of MoRTH and then submitting digitally signed fresh files any number of times. (b) Only the last modified documents comprising the Bid shall be available in the system at the time of opening of Bids. (d) A Consultant/Bidder may withdraw its Bid by clicking on withdrawal icon at e-procurement portal of MoRTH. (e) It may specifically be noted that after withdrawal of its Bid for any reason, the Consultant/Bidder cannot re-submit Bid again. (f) Modification/withdrawal of Bids by any other means shall not be permitted. Re-submission of the proposal is ***"not allowed"***, if withdrawn Date: **30.05.2024** Time: 11:30 hours IST

14.1.1	**Shortlisted Consultants may associate with** **(a) non-shortlisted consultant(s):** No **Or** **(b) other shortlisted Consultants:** No
14.1.2	**Estimated input of Key Experts' time-input: 33 man-months**
14.1.3 for time-based contracts only	**The Consultant's Proposal must include Key Experts' time-input of person-months as per the details prescribed in TOR.** For the evaluation and comparison of Proposals only: if a Proposal includes less than the required minimum time-input, the missing time-input (expressed in person-month) is calculated as follows: The missing time-input is multiplied by the highest remuneration rate for a Key Expert in the Consultant's Proposal and added to the total remuneration amount. Proposals that quoted higher than the required minimum of time-input will not be adjusted.
14.1.4 and 27.2 use for Fixed Budget method	*Not Applicable*
15.1	Delete from the first sentence of ITC 15.1, the following: 'and shall comprise the documents listed in the **Data Sheet**'.
15.2	The format of the Technical Proposal to be submitted is: **Full Technical Proposal (FTP)** Submission of the Technical Proposal in a wrong format may lead to the Proposal being deemed non-responsive to the RFP requirements.
16.1	Financial Proposal/Bids shall be submitted online i.e. on e-procurement portal (https://eprocure.gov.in/cppp/) in prescribed format made for this purpose only. Hard copy will not be accepted. The financial bids can be submitted in two currencies, if required, in the following manners: (i) In case of INR, the Financial Proposal/Bid shall be submitted in the

	Formats named Form FIN-2 (B), 3(B) & 4(B), available in e-procurement portal in the form of spread sheet (Excel sheet). (ii) In case of other than INR, the Financial Proposal/Bid shall be submitted in the Formats named Form FIN-2(A), 3(A) & 4(A) available in e-procurement portal in the form of PDF separately. First download this PDF File, fill the data and again upload the PDF file to the e-procurement portal Note: It shall be ensured that there should not be any duplication in the items/data uploaded in case (i) & (ii) above, otherwise the amount quoted against those items/data mentioned in case (i) will be considered.
16.2	**A price adjustment provision applies to remuneration rates:** Yes Payments for remuneration made in foreign and / or local currency shall be adjusted as follows: (1) Remuneration paid in foreign currency on the basis of the rates set forth in **Appendix C** shall be adjusted every 12 months (and, the first time, with effect for the remuneration earned in the 13th calendar month after the date of the Contract Effectiveness date) by applying the following formula: $R_f = R_{fo} \times \frac{I_f}{I_{fo}}$ {or $R_f = R_{fo} \times \left[0.1 + 0.9 \frac{I_f}{I_{fo}} \right]$} where R_f is the adjusted remuneration; R_{fo} is the remuneration payable on the basis of the remuneration rates (**Appendix C**) in foreign currency; I_f is the official index for salaries in the country of the foreign currency for the first month for which the adjustment is supposed to have effect; and I_{fo} is the official index for salaries in the country of the foreign currency for the month of the date of the Contract. The Consultant shall state here the name, source institution, and any necessary identifying characteristics of the official index for salaries corresponding to I_f and I_{fo} in the adjustment formula for remuneration paid in foreign currency: [*Insert the name, source institution, and necessary identifying characteristics of the index for foreign currency, e.g. "Consumer Price Index for all Urban Consumers (CPI-U), not seasonally adjusted; U.S. Department of Labor, Bureau of Labor Statistics"*]

	Payments for remuneration made in local currency (INR) shall be adjusted as follows: (2) Remuneration paid in local currency pursuant to the rates set forth in Appendix C shall be adjusted every 12 months (and, for the first time, with effect for the remuneration earned in the 13th the calendar month after the date of the Contract) by applying the following formula: $$Rl = Rlo \times [0.10 + 0.90\frac{Il}{Ilo}]$$ where Rl is the adjusted remuneration; Rlo is the remuneration payable on the basis of the remuneration rates (Appendix C) in local currency; Il is the official consumer price index maintained by Central Statistical Office, India for Urban (General) for the first month for which the adjustment is to have effect; and Ilo is the official consumer price index maintained by Central Statistical Office, India for Urban (General) for the month of the date of the Contract. (3) Any part of the remuneration that is paid in a currency different from the currency of the official index for salaries used in the adjustment formula, shall be adjusted by a correction factor X_0/X. $X_0$is the number of units of currency of the country of the official index, equivalent to one unit of the currency of payment on the date of the contract. X is the number of units of currency of the country of the official index, equivalent to one unit of the currency of payment on the first day of the first month for which the adjustment is supposed to have effect.
16.3	**Information on the Consultant's tax obligations in India can be found from the Ministry of Finance, Government of India website http://finmin.nic.in** Consultants (Foreign and Domestic) and their Sub-consultants and Experts are responsible for payment of all taxes as applicable in India. The Client will, however, reimburse on proof of submission with relevant Government Authority, the following indirect taxes/ duties**.** Statutory deductions of taxes at source (TDS), however, shall be made as applicable. a. Duties on imported equipment brought by foreign consultants to India to provide the required services; and b. Goods & Services Tax (GST) payable on the contract value by both

	foreign and domestic consultants, as per Applicable Law in India. The above only are to be shown separately in the financial proposal.
16.4	**The Financial Proposal shall be stated in the following currencies:** Consultant may express the price for their Services in any fully convertible currency, singly or in combination of up to three foreign currencies. **The Financial Proposal should state local costs in the Client's country currency (local currency):** Yes. In INR
C. Submission, Opening and Evaluation	
17	Replace ITC17 with the following: "17.1 The Consultant shall submit a digitally signed, encrypted, and complete Proposal comprising the documents and forms in accordance with ITC 10 (Documents Comprising Proposal). Consultants shall mark as "CONFIDENTIAL" information in their Proposals which is confidential to their business. This may include proprietary information, trade secrets or commercial or financially sensitive information. The submission shall be done electronically on the e-procurement system and in accordance with procedure specified in the **Data Sheet**. Proposals submitted by any other means will be rejected. Detailed guidelines for viewing proposals, and for online submission of proposals are given on the website. 17.2 An authorized representative of the Consultant shall digitally sign the original submission letters in the required format for both the Technical Proposal and, if applicable, the Financial Proposal and shall initial all pages of both. The authorization shall be in the form of a written power of attorney to be scanned and uploaded together with the Technical Proposal. 17.2.1 A Proposal submitted by a Joint Venture shall be signed by all members so as to be legally binding on all members, or by an authorized representative who has a written power of attorney signed by each member's authorized representative. The submission letters and the power of attorney shall then be scanned and uploaded together with the Technical Proposal. 17.3 Any modifications, revisions, interlineations, erasures, or overwriting shall be valid only if they are signed or initialed by the person signing the Proposal. 17.4 The Proposal or its modifications must be uploaded on the e-procurement portal specified in ITC 1(p), no later than the deadline indicated in the **Data Sheet**, or any extension to this deadline. The electronic system will not accept any Proposal or its modification for uploading after the deadline, as per server time.

	17.5 Once the Proposal is uploaded on the portal, the system will generate a unique identification number with the stamped submission time. The unique identification number with the time stamp represents an acknowledgement of the Proposal submission. Any other system's functionality requirements are specified in the **Data Sheet**." *[Note for Consultants: For online submission of proposals, the Consultants shall fill up online, the forms that are available for online filling on the e-portal. The rest of the forms shall be download by the Consultants and filled up. The filled-up pages shall then be digitally signed, scanned and uploaded on the e-procurement portal along with the scanned copies of the supporting documents.]*
17.6	**The electronic submission procedures shall be as follows:** The Consultants shall submit their Proposals (both Technical and Financial) electronically on the e-procurement portal specified in ITC 1(p), following the procedure given below. Detailed guidelines for viewing proposals and for online submission are given on the website: (a) To participate in the e-tendering process, it is mandatory for the consultants to have enrolment/registration in the website, and valid Class III*(DSC) with signing + Encryption]* Digital Signature Certificate (in the name of person who will sign the proposal) in the form of smart card/e-token, obtained from any of the licensed Certifying Agency authorized by the Government of India. Consultants can see the list of licensed CAs from the link https://eprocure.gov.in/cppp/ (b) The consultantshould register in the website using the relevant option available. Then the Digital Signature registration has to be done with the e-token, after logging into the website. The consultant can then login the website through the secured login by entering the password of the e-token & the user id/ password chosen during registration.
17.7	**The Proposals must be uploaded on the e-procurement portal specified in ITC 1(p)no later than:** **Date:**06.06.2025 **Time: 11.30Hrs** **The Consultant must submit:** (a) **Technical Proposal:** one (1) original shall be uploaded on e-procurement portal as mentioned above; (b) **Financial Proposal:** Consultant/Bidder shall submit Financial Proposal online on e-procurement portal mentioned above in prescribed format and scanned copy of the same shall not be submitted. In case scanned copy uploaded on procurement portal of submitted physically then bidder will be

	considered as Non-responsive. **The Proposal submission address is:** https://eprocure.gov.in/cppp/
17.8	None
19	Replace ITC19 with the following: "19.1The Client's evaluation committee shall conduct the opening of the Technical Proposals online following the procedure described in the **Data Sheet** and this could be viewed online by the shortlisted Consultants. The short-listed consultants or their authorized representatives may attend the online opening in person if this option is offered in the **Data Sheet**. The opening date, time and the address are stated in the **Data Sheet**. The folder with the Financial Proposal shall remain unopened, encrypted, in the e-procurement system until the subsequent public opening in accordance with ITC 23. 19.2At the opening of the Technical Proposals the following shall be read out and recorded online simultaneously: (i) the name and the country of the Consultant or, in case of a Joint Venture, the name of the Joint Venture, the name of the lead member and the names and the countries of all members; (ii) the presence or absence of the folder with the Financial Proposal in the portal; and (iii) any other information deemed appropriate or as indicated in the **Data Sheet**."
19.1	**The procedure for online opening of technical proposals shall be:** **An online option of the opening of the Technical Proposals is offered:** Yes * The consultancy firms may download the RFP document from**:** https://eprocure.gov.in/cppp/ , the official website of the Employer, w.e.f. 08.05.2025 to 06.06.2025 up to 1130 hrs. *Non-qualified Consultants/bidders would be informed regarding their non-qualification, without any explanation. *The proposal should be submitted by consultancy firms in two parts. The two parts of the proposal are Part1: Technical Proposal and Part2: Financial Proposal, Stage -1 of the Evaluation shall consider the evaluation of the Technical Proposal (i.e. Part 1). The firms scoring the qualifying marks (minimum 75%) as mentioned in RFP shall only be considered for further evaluation. Under stage 2, the financial proposal of such firms as selected above shall be opened and evaluated. Proposals will finally be ranked according to their combined technical and financial scores as specified in clause 5 of section 2. * The total time period for the assignment as consultant will be for Period as

	mentioned in TOR. * Consultants may apply either as a sole firm or forming Joint Venture with other consultants. In case of Joint Venture, the maximum number of Joint Venture partners is limited to 2 (i.e. one lead + 1 JV partners). Formulation of more than one JV/association with different partners for the same work is not allowed and all such proposal involving the firms shall be treated as non-responsive. If the Consultant submits bids as sole applicant and also in JV/Association with another consultant, both bids shall be summarily rejected. No Consultant shall submit more than one bid. * The Applicant whether a sole applicant or lead member with joint venture may include any number of Associate to provide technology in assignment (refer para 10 (iii) of data sheet). However, the Associate(s) cannot be common for 2 or more bidders. If any Associate is common with 2 or more bidders, all those bids shall be declared non-responsive. Hence, the bidder may ensure on his own that the associate proposed by him is not proposed by any other bidder participating in the same assignment and the bidder is solely responsible in this regard. * In addition, the applicant whether a sole applicant or lead member with joint venture may also include an Associate for providing key personnel. In such case, the applicant should submit an MOU/Joint Bidding Documents indicating share in execution of works of each member, role and responsibility of Associate Company. However, the maximum no. of key personnel from Associate firm during RFP proposal and implementation of contract should be limited to two (2). Technical Experience of Associate firm shall not be considered at the time of evaluation of bids except for to provide equipment as stated above. *Technical proposal will be opened on the e-procurement portal by the Client's Evaluation Committee at the date and time indicated below.* ***Date:****06.06.2025* ***Time:****16:30Hrs* ***Consultants have an option to attend the opening of the Technical Proposals in person.*** **The opening shall take place at:** Ministry of Road Transport & Highways, Ground Floor, Tower-1, Jeevan Bharti Building, 124, Connaught Place, New Delhi-110001,Phone : 011-23310036] *[In the event of the specified date of proposal opening being declared a holiday for the Client, the proposals will be opened at the appointed time and location on the next working day]*
19.2	**In addition, the following information will be read aloud at the opening**

of the Technical Proposals - *N/A*

21.1
(for FTP)

Criteria, sub-criteria, and point system for the evaluation of the Full Technical Proposals:

A. First stage evaluation – eligibility requirement
B. Second stage technical evaluation

First Stage Evaluation: Eligibility Requirements

Sr. No.	Minimum experience in similar work	Minimum Annual average turnover
1	A Firm applying for the project should have Experience of carrying out Vulnerability including Risk assessment of minimum 100 Km length cumulative and 40 Km in single project. Further, the firm should have carried out Detailed Project Report/ Feasibility Study of counter measures for large sale landslide* for at least 2 projects. Note: The Firm shall submit the details of project work involving large scale landslide including extensive studies along with experience certificate for successful completion of Detailed Project Report/ Feasibility Study of counter measures for such large sale landslide.	Annual average turnover for last 5 years of the firm should be equal to or more than **Rs.25.00Crores.**

(i) The sole applicant shall fulfill all the requirements given in Table-1.

(ii) In case of JV, the Lead Partner should fulfill at least 75% of all eligibility requirements and the other partner shall fulfill at least 50% of all eligibility requirements.

(iii) If the applicant firm has / have carried out Vulnerability including Risk assessment and prepared the DPR/FS projects solely on its own, 100% weightage shall be given. However, If the applicant firm has / have carried out Vulnerability including Risk assessment and prepared the DPR/FS projects as a lead partner in a JV, 75% weightage shall be given. If the applicant firm has / have carried out Vulnerability including Risk assessment and prepared the DPR/FS projects as the other partner (not lead partner) in a JV 50% weightage shall be given. If the applicant firm have carried out the work as an associate, 25% weightage shall be given.

<table>
<tr><td></td><td>

Second stage technical evaluation

<table>
<tr><th>S. No.</th><th>Description</th><th>Points</th></tr>
<tr><td>1</td><td>Firm's relevant experience in last 7 years</td><td>40</td></tr>
<tr><td>2</td><td>Material testing, survey & investigation, equipment and software proposedto be used</td><td>10</td></tr>
<tr><td>3</td><td>Qualification and Relevant experience of the proposed key personnel</td><td>40</td></tr>
<tr><td>4</td><td>Adequacy and quality of proposed methodology and work plan in responding to the Terms of Reference (TORs)</td><td>10</td></tr>
<tr><td></td><td>Total</td><td>100</td></tr>
</table>

Detailed evaluation criteria which is to be used for evaluation of technical bids is as indicated at Appendix-A of Data Sheet

</td></tr>
<tr><td></td><td>Not Applicable</td></tr>
<tr><td>22.2</td><td>Replace second sentence of ITC 22.2 with the following:
“All other Financial Proposals shall not be unopened”</td></tr>
<tr><td></td><td>Public Opening of Financial Proposals</td></tr>
<tr><td>23</td><td>Replace ITC 23.1 with the following:
“23.1 After the technical evaluation is completed and the Bank has issued its no objection (if applicable), the Client shall notify online /through e-procurement portal those Consultants whose Proposals were considered non-responsive to the RFP and TOR or did not meet the minimum qualifying technical score, advising them the following:
(i) their Proposal was not responsive to the RFP and TOR or did not meet the minimum qualifying technical score;
(ii) provide information relating to the Consultant’s overall technical score, as well as scores obtained for each criterion and sub-criterion, as mentioned in clause 21.1 (for FTP) of Data Sheet;
(iii) their Financial Proposals will not be opened; and
(iv) notify them of the date, time and location of the online public opening of the Financial Proposals and invite them to attend.”
Replace ITC 23.2 with the following:
23.2 The Client shall simultaneously notify in writing online /through e-procurement portal those Consultants whose Proposals were considered responsive to the RFP and TOR, and that have achieved the minimum</td></tr>
</table>

	qualifying technical score, advising them the following: (v) their Proposal was responsive to the RFP and TOR and met the minimum qualifying technical score; (v) provide information relating to the Consultant's overall technical score, as well as scores obtained for each criterion and sub-criterion, as mentioned in clause 21.1 (for FTP) of Data Sheet; (vi) their Financial Proposal will be opened at the public opening of Financial Proposals; and (vii) notify them of the date, time and location of the public opening and invite them for the opening of the Financial Proposals. Replace ITC 23.4 with the following: "23.4 The Consultant's attendance at the opening of the Financial Proposals (in person, or online) is optional and is at the Consultant's choice" Replace ITC 23.5 with the following: "The Financial Proposals shall be publicly opened online by the Client's evaluation committee in the presence of the representatives of the Consultants and anyone else who chooses to attend. Any interested party who wishes to attend this public opening should contact the client as indicated in the Data Sheet. Alternatively, a notice of the public opening of Financial Proposals may be published on the Client's website, if available. At the opening, the names of the Consultants, and the overall technical scores, including the break-down by criterion, shall be read aloud and recorded online simultaneously. The Financial Proposals shall be then opened, and the total prices read aloud and recorded online simultaneously. The records of the opening shall remain on the e-procurement portal for the information of all Consultants who submitted Proposals and the Bank, unless the Data Sheet provides for other means of sending notifications and the results of the financial opening."
23.5	Following the completion of the evaluation of the Technical Proposals, the Client will notify online through e-procurement portal, all Consultants of the location, date and time of the public opening of Financial Proposals. Any interested party who wishes to attend this public opening should contact Mr. Ravinder, Superintendent Engineer (EAP) - MoRTH and request to be notified of the location, date and time of the public opening of Financial Proposals. The request should be made before the deadline for submission of Proposals, stated above. Alternatively, a notice of the public opening of Financial Proposals may be published on the Client's website, if available. In the event that the specified date of proposal opening is declared a public holiday for the Client, the proposals will be opened at the appointed time and

	location on the next working day.
25.1	For the purpose of the evaluation, the Client will exclude: (a) all local identifiable indirect taxes such as sales tax, excise tax, GST, or similar taxes levied on the contract's invoices; and (b) all additional local indirect tax on the remuneration of services rendered by non-resident experts in the Client's country. If a Contract is awarded, at Contract negotiations, all such taxes will be discussed, finalized (using the itemized list as a guidance but not limiting to it) and added to the Contract amount as a separate line, also indicating which taxes shall be paid by the Consultant and which taxes are withheld and paid by the Client on behalf of the Consultant.
26.1	The single currency for the conversion of all prices expressed in various currencies into a single one is: **INR** **The official source of the selling (exchange) rate is**: **Reserve Bank of India** **The date of the exchange rate is: 28 Days prior to Proposal Submission Due Date**
27.1 **(QCBS only)**	**The lowest evaluated Financial Proposal (Fm) is given the maximum financial score (Sf) of 100.** **The formula for determining the financial scores (Sf) of all other Proposals is calculated as following:** Sf = 100 x Fm/ F, in which "Sf" is the financial score, "Fm" is the lowest price, and "F" the price of the proposal under consideration. *[or replace with another inversely proportional formula acceptable to the Bank]* **The weights given to the Technical (T) and Financial (P) Proposals are**: **T** = 80%, and **P** = 20% Proposals are ranked according to their combined technical (St) and financial (Sf) scores using the weights (T = the weight given to the Technical Proposal; P = the weight given to the Financial Proposal; T + P = 1) as following: S = St x T% + Sf x P%.
	D. Negotiations and Award
28.1	**Expected date and address for contract negotiations:**

	Date: *25.06.2025* **Address:** Ministry of Road Transport & Highways, Ground Floor, Tower-1, Jeevan Bharti Building, 124, Connaught Place, New Delhi-110001,Phone : 011-23310036
32.1	The successful Consultant **shall** submit the Beneficial Ownership Disclosure Form.
32.2	At the end of the first sentence of ITC 32.2 after the words 'official gazette' insert the following: 'and on e-procurement portal.'
34.2	**Expected date for the commencement of the Services:** **Date**: 15 Days from the Date of Agreement.
35.1	The procedures for making a Procurement-related Complaint are detailed in the "Procurement Regulations for IPF Borrowers (Annex III)." If a Consultant wishes to make a Procurement-related Complaint, the Consultant shall submit its complaint following these procedures, In Writing (by the quickest means available, such as by email or fax), to: **For the attention**: Mr. Ravinder **Title/position**: The Superintendent Engineer (EAP) **Client**: Ministry of Road Transport & Highways, Govt. of India **Email address***:* ravinder.morth@gov.in **Phone number**: 011-23310036 In summary, a Procurement-related Complaint may challenge any of the following: **1.** the terms of this Request for Proposal; **2.** the Client's decision to exclude a Consultant from the procurement process prior to the award of contract; and **3.** the Client's decision to award the contract.

Appendix-A of Data Sheet

S. No.	Description	Points
1	Firm's relevant experience in last 7 years	40
2	Material testing, survey & investigation, equipment and software proposedto be used	10
3	Qualification and Relevant experience of the proposed key personnel	40
4	Adequacy and quality of proposed methodology and work plan in responding to the Terms of Reference (TORs)	10
	Total	100

A. Firm's relevant experience in last 7 years (40)

The following is the break-up:

S. No.	Description	Maximum Points	Sub-Points
1	Experience of firm for carrying out Vulnerability assessment/ Susceptibility mapping and Risk assessment for Highway/ Railway/Hydel projects	10	
	100 Km		7
	1 mark for every additional 50 Kms		3
2	Detailed Project Report/ Feasibility Study of counter measures for large sale landslide*	15	
2.1	2 projects		10
2.2	Additional 2.5 marks for each additional project carried out in developed country		5
3	**Specific experience of firms in terms of turnover**	10	
3.1	Firm's Average Turnover of last 5 years > 100 crore		10
3.2	Firm Average Turnover of last 5 years 50 - 100 crore		8
3.3	Firm Average Turnover of last 5 years > 25 but < 50 crore		6
4	**Firms carrying out any research work on landslide for Government shall be given additional marks**	5	

Note: Weightage to be given when experience by a Firm as Sole Firm/Lead Partner in a JV/Other Partner in a JV/ Associate:

No.	Status of the firm in carrying out DPR/ Feasibility Study	Weightage for experience
1	Sole firm	100 %
2	Lead partner in a JV	75%
3	Other partner in a JV	50 %
4	As Associate	25%

B. Material testing, survey and investigation, equipment and softwareproposed to be used (10)

S. No.	Description	Maximum Points
1	**Availability of NABL Accredited Material Testing Facilities with persons/resources having operational skills of the equipment** Owned* (Available In House)/ Outsourced (Hire basis/through Associate)	2
2	**Availability of Field Investigation Facilities (like Hydraulic rigs: minimum 3 no's. and digital borehole logging) with persons/resources havingoperational skills of the equipment** Owned* (Available In House)/ Outsourced (Hire basis/through Associate)	2
3	**Availability of Office Equipment, Slope stability Software with persons/resources having operational skills of the equipment- like Slide 2 for limit Equilibrium analysis & RS 2 for Finite Element Analysis, Geo5, plaxis and Geomatics software with persons/resources having operational skills of ERDAS IMAGINE 2022 with LPS & SAR Interferometry + IMAGINE UAV Modules/ESRI software bundle for Education and Research (ArcGIS Dekstop 10.8.2/Pro 3.1.0 and ENVI 5.6.1 + IDL(10), ENVI FX(2), ENVI ACM(2), ENVI DL(2)/ Pix4D)**	2
4	**Availability of Drone/LIDAR or better technology and 3D modeling software for topographic survey(Infrastructure sector)** Owned* (Available In House)/ Outsourced (Hire basis/through Associate)	2
5	**Availability of ERT/SRT equipment**	2

Note:- The experience of firm in Drone survey, Geomatics, ERT and SRT Lidar shall be supported by experience certificate. Acquisition for private concessionaire/contractor shall be considered only if the experience certificate is authenticated by the concerned competent Government department/authority. In case of overseas experience the weightage to be assigned to the certificate for experience in use of the equipment, a self-certificate followed by the client certificate may be accepted.

C. Qualification and relevant experience of the proposed key personnel (40)

S. No.	Key personnel	Points
1	Team Leader cum Cum Landslide expert	12
2	Senior Geologist	8
3	Senior Geotechnical Engineer	8
4	Senior Geomatics Expert	6
5	Senior Hydrology and Hydraulic Expert	6
	Total	40

The number of points assigned during the evaluation of qualification and competence of key staff are as given below:

S. No.	Description	MaximumPoints	Sub-Points
1	**General Qualification**	**25**	
1.1	Essential education qualification		20
1.2	Desirable education qualification		5
2	**Relevant experience and adequacy for the project**	**70**	

2.1	Total professional experience		15
2.2	Experience in Similar Projects		25
2.3	Experience in Similar Capacity		30
3	**Employment with the Firm**	**5**	
3.1	Less than 1 Year		0
3.2	1 year		3
3.3	Add 0.5 marks for each subsequent year subject to maximum of 2 marks		

For detailed evaluation criteria for each Key personnel, kindly refer to Annexure-I of Appendix A of Data Sheet

D. Adequacy and quality of proposed methodology and work plan in responding to the Terms of Reference (TORs) (10)

Sr. No.	Details	Marks
1	Site Appreciation	3
2	Proposed Methodology	3
3	Detailed Presentation on the remedial measures for similar types of problems to be included in the proposal	4

The Consultant should carryout self-evaluation based on the detailed evaluation criteria (refer to Annexure-I of Appendix A). While submitting the self-evaluation along with bid, Consultant shall make references to the documents submitted in their proposal which have been relied upon in self-evaluation

Annexure-I of Appendix A

Detailed Evaluation criteria

1. First Stage Evaluation -Proof of Eligibility

1.1 Eligibility criteria for applicant firm.

The sole applicant firm shall satisfy the following 2 Nos. of criteria.

(a) A Firm applying for the project should have Experience of carrying out Vulnerability including Risk assessment of minimum 100 Km length cumulative and 40 Km in single project. Further, the firm should have carried out Detailed Project Report/ Feasibility Study of counter measures for large sale landslide* for at least 2 projects.

* The Firm shall submit the details of project work involving large scale landslide including extensive studies along with experience certificate for successful completion of Detailed Project Report/ Feasibility Study of counter measures for such large sale landslide.

(b) Annual Average Turn Over for the last 5 years {In cases where, Audited/Certified copy of Balance Sheet for the FY 2024-25 is available, last five years shall be counted from 2019-20 to 2024-25. However, where audited/certified copy of the Balance Sheet for the FY 2024-25 is not available (as certified by the Statutory auditor) then in such cases last five years shall be considered from 2018-19 to 2023-24} of the firm from Consultancy services should be equal to more than Rs. 25 crore.

Note:

(i) The sole applicant shall fulfill all the requirements of (a) & (b).

(ii) In case of JV, the Lead Partner should fulfill at least 75% of all eligibility requirements and the other partner shall fulfill at least 50% of all eligibility requirements.

(iii) If the applicant firm has / have carried out Vulnerability including Risk assessment and prepared the DPR/FS projects solely on its own, 100% weightage shall be given. However, If the applicant firm has / have carried out Vulnerability including Risk assessment and prepared the DPR/FS projects as a lead partner in a JV, 75% weightage shall be given. If the applicant firm has / have carried out Vulnerability including Risk assessment and prepared the DPR/FS projects as the other partner (not lead partner) in a JV 50% weightage shall be given. If the applicant firm have carried out the work as an associate, 25% weightage shall be given.

2. Second Stage Evaluation -Technical Evaluation

A. Firm's Relevant Experience in last 7 years (40)

The following is the break-up:

S. No.	Description	Maximum Points	Sub-Points
1	Experience of firm for carrying out Vulnerability assessment/ Susceptibility mapping and Risk assessment for Highway/ Railway/Hydel projects	10	
	100 Km		7
	1 mark for every additional 50 Kms		3
2	Detailed Project Report/ Feasibility Study of counter measures for large sale landslide*	15	
2.1	2 projects		10
2.2	Additional 2.5 marks for each additional project carried out in developed country		5
3	**Specific experience of firms in terms of turnover**	10	
3.1	Firm's Average Turnover of last 5 years > 100 crore		10
3.2	Firm Average Turnover of last 5 years 50 - 100 crore		8
3.3	Firm Average Turnover of last 5 years > 25 but < 50 crore		6
4	**Firms carrying out any research work on landslide for Government shall be given additional marks**	5	

Note: Weightage to be given when experience by a Firm as Sole Firm/Lead Partner in a JV/Other Partner in a JV/ Associate:

No.	Status of the firm in carrying out DPR/ Feasibility Study	Weightage for experience
1	Sole firm	100 %
2	Lead partner in a JV	75%
3	Other partner in a JV	50 %
4	As Associate	25%

B Material testing, survey and investigation, equipment and software proposed to be used (10)

S. No.	Description	Maximum Points
1	**Availability of NABL Accredited Material Testing Facilities with persons/resources having operational skills of the equipment** Owned* (Available In House)/ Outsourced (Hire basis/through Associate)	2
2	**Availability of Field Investigation Facilities (like Hydraulic rigs: minimum 3 no's. and digital borehole logging) with persons/resources havingoperational skills of the equipment** Owned* (Available In House)/ Outsourced (Hire basis/through Associate)	2

S. No.	Description	Maximum Points
3	Availability of Office Equipment, Slope stability Software with persons/resources having operational skills of the equipment- like Slide 2 for limit Equilibrium analysis & RS 2 for Finite Element Analysis, Geo5, plaxis and Geomatics software with persons/resources having operational skills of ERDAS IMAGINE 2022 with LPS & SAR Interferometry + IMAGINE UAV Modules/ESRI software bundle for Education and Research (ArcGIS Dekstop 10.8.2/Pro 3.1.0 and ENVI 5.6.1 + IDL(10), ENVI FX(2), ENVI ACM(2), ENVI DL(2)/ Pix4D)	2
4	Availability of Drone/LIDAR or better technology and 3D modeling software for topographic survey(Infrastructure sector) Owned* (Available In House)/ Outsourced (Hire basis/through Associate)	2
5	Availability of ERT/SRT equipment	2

Note:- The experience of firm in Drone survey, Geomatics, ERT and SRT Lidar shall be supported by experience certificate. Acquisition for private concessionaire/contractor shall be considered only if the experience certificate is authenticated by the concerned competent Government department/authority. In case of overseas experience the weightage to be assigned to the certificate for experience in use of the equipment, a self-certificate followed by the client certificate may be accepted.

C. Qualification and Competence of the Key Staff for adequacy of the Assignment (40)

Break up of points assigned to each Key personnel:

S. No.	Key personnel	Points
1	Team Leader cum Landslide expert	12
2	Senior Geologist	8
3	Senior Geotechnical Engineer	8
4	Senior Geomatics Expert	6
5	Senior Hydrology and Hydraulic Expert	6
	Total	40

1. TEAM LEADER CUM LANDSLIDE EXPERT

S. No.	Description		Max. Points
I	**General Qualification**		**25**
i)	Degree in Civil Engineering or equivalent / M. Sc. in Geology [AICTE Approved or equivalent certification for degree outside India]		20
ii)	Post graduate in Civil Engineering (Geotechnical Engineering) {AICTE Approved} or PHD in Geology/landslide		5
II	**Relevant Experience & Adequacy for the Project**		**70**
a)	**Total Professional Experience**		**15**
	<20 years	0	
	≥20 but <25 years	11	

	≥25 but <30 years	13	
	≥ 30 years	15	
(b)	**Experience in carrying out Vulnerability assessment of hill slope, Landslide/Rock fall investigation & design experience in Planning, project preparation and design of remedial measures for prevention of landslide/rockfall on Highways/Airport/Railways in mountainous region**		**25**
(i)	**Years of experience**		**11**
	<12 years	0	
	≥12 but <15 years	6	
	≥15 but <18 years	7	
	≥18 but < 20 years	8	
	≥20 but <22 years	9	
	≥22 but <25 years	10	
	≥ 25 years	11	
(ii)	**Experience with respect to number of projects**		14
	(A) Experience in carrying out Vulnerability assessment of hill slope		**7**
	< 2 projects	0	
	2 projects	5	
	3 projects	6	
	4 projects	7	
	(B) Design experience in Planning, project preparation and design of remedial measures		**7**
	< 2 projects	0	
	2 projects	5	
	3 projects	6	
	4 projects	7	
c)	**Experience in Similar Capacity**		**30**
(i)	**Experience in carrying out Vulnerability assessment of hill slope** on Highways/Airport/Irrigation/Hill roads/Hydel projects		10
	< 100km	0	
	≥100 km but <150km	8	
	≥150 km but <200km	9	
	≥200 km	10	
(ii)	**Design experience in Planning, project preparation and design of remedial measures** for critical landslide locations on Highways/Airport/Irrigation/Hill roads/Hydel projects - **Number of Projects***		20
	< 1 projects	0	
	1 projects	6	

	2-3 projects	9	
	4-5 projects	12	
	> 5 projects	15	
	Additional marks for projects outside India	**5**	
III	**Employment with Firm**		**5**
	< 1 Year	0	
	1 year	3	
	Add 0.5 marks for each subsequent year subject to maximum of 2 marks		
	Total		**100**

* Note: The case study of each claimed project shall be submitted by the Key personnel describing in detail the project, planning/design, Key challenges and measures adopted to address the same. These case studies shall be signed by the concerned Key Personnel and countersigned by the Consultant at the time of bid submission. In case, no such case study is submitted in the bid no marks shall be assigned in respect of II(c)(ii)

2. SENIOR GEOLOGIST

S. No.	Description		Max. Points
I	**General Qualification**		**25**
i)	Post Graduate Degree in Geology or related field [AICTE Approved or equivalent certification for degree outside India]		20
ii)	PhD in Geology or related field [AICTE Approved or equivalent certification for degree outside India]		5
II	**Relevant Experience & Adequacy for the Project**		**70**
a)	**Total Professional Experience**		**15**
	<15 years	0	
	15-20 years	11	
	>20-25 years	13	
	>25 years	15	
b)	**Experience in Vulnerability assessment/ Susceptibility mapping and Risk assessment for Highway/ Railway/Hydel projects**		**25**
	<12 years	0	
	12-14 years	19	
	>14 -15 years	22	
	>15 years	25	

c)	**Experience as Senior Geologist/ Geologist** on **Landslide/Rock fall investigation & design experience in Planning, project preparation and design of remedial measures for prevention of landslide/rockfall on Highways/Airport/Railways in mountainous region of similar magnitude and nature**		**30**
	<2 projects	0	
	2 projects	15	
	5 marks For each additional projects subject to maximum 30 marks	15	
III	**Employment with Firm**		**5**
	Less than 1 Year	0	
	1 year	3	
	Add 0.5 marks for each subsequent year subject tomaximum of 2 marks		
	Total		**100**

3. SENIOR GEOTECHNICAL ENGINEER

S. No.	**Description**		**Max. Points**
I	**General Qualification**		**25**
i)	Degree in Civil Engineering /engineering Geology[AICTE Approved or equivalent certification for degree outside India]		20
ii)	Post graduation in Foundation Engineering / Soil Mechanics / Geo Tech Engineering/ Rock mechanics or equivalent [AICTE Approved or equivalent certification for degree outside India]		5
II	**Relevant Experience & Adequacy for the Project**		**70**
a)	**Total Professional Experience**		**15**
	<15 years	0	
	15-20 years	11	
	>20-25 years	13	
	>25 years	15	
b)	**Experience in Vulnerability assessment/ Susceptibility mapping and Risk assessment for Highway/ Railway/Hydel projects**		**25**
	<12 years	0	
	12-14 years	19	
	>14 -15 years	22	
	>15 years	25	
c)	**Experience as Geo-technical Engineer Landslide/Rock fall investigation & design experience in Planning, project preparation and design of remedial measures for prevention of landslide/rockfall on Highways/Airport/Railways in mountainous region of similar magnitude**		**30**

	and nature		
	<2 projects	0	
	2 projects	15	
	5 marks For each additional projects subject to maximum 30 marks	15	
III	**Employment with Firm**		**5**
	Less than 1 Year	0	
	1 year	3	
	Add 0.5 marks for each subsequent year subject tomaximum of 2 marks		
	Total		**100**

4. SENIOR GEOMATICS EXPERT

S. No.	Description		Max. Points
I	**General Qualification**		**25**
i)	Degree in Civil Engineering, Geomatics, Geography, Surveying, or a related field [AICTE Approved or equivalent certification for degree outside India]		20
ii)	Post graduation in Geomatics, Geography, Surveying, or a related field [AICTE Approved or equivalent certification for degree outside India]		5
II	**Relevant Experience & Adequacy for the Project**		**70**
a)	**Total Professional Experience**		**20**
	<12 years	0	
	≥12 but <14 years	12	
	≥14 but <16 years	14	
	≥16 but < 18 years	16	
	≥18 but <20 years	18	
	≥ 20 years	20	
b)	**Experience as Geomatics expert in Vulnerability assessment/ Susceptibility mapping and Risk assessment for Highway/ Railway/Hydel projects - No. of years**		**20**
	<10 years	0	
	≥10 but <12 years	13	
	≥12 but <14 years	15	
	≥14 but < 16 years	17	
	≥16 but <18 years	19	
	≥ 18 years	20	

c)	**Experience as similar capacity for similar magnitude and nature of project involving Landslide/Rock fall investigation & design experience in Planning, project preparation and design of remedial measures for prevention of landslide/rockfall on Highways/Airport/Railways in mountainous region - No. of projects**		**30**
	<2 projects	0	
	2 projects	15	30
	5 marks For each additional projects subject to maximum 30 marks	15	
III	**Employment with Firm**		**5**
	Less than 1 Year	0	
	1 year	3	
	Add 0.5 marks for each subsequent year subject tomaximum of 2 marks		
	Total		**100**

5. SENIOR HYDROLOGY AND HYDRAULIC EXPERT

S. No.	**Description**		**Max. Points**
I	**General Qualification**		**25**
i)	Degree in Civil Engineering, environmental engineering, or a related science like geology or earth science [AICTE Approved or equivalent certification for degree outside India]		20
ii)	Post graduation in hydrology, water resources engineering, or a related field. [AICTE Approved or equivalent certification for degree outside India]		5
II	**Relevant Experience & Adequacy for the Project**		**70**
a)	**Total Professional Experience**		**20**
	<12 years	0	
	≥12 but <14 years	12	
	≥14 but <16 years	14	
	≥16 but < 18 years	16	
	≥18 but <20 years	18	
	≥ 20 years	20	
b)	**Experience as hydrology and hydraulics expert in Vulnerability assessment/ Susceptibility mapping and Risk assessment for Highway/ Railway/Hydel projects - No. of years**		**20**
	<10 years	0	
	≥10 but <12 years	13	
	≥12 but <14 years	15	
	≥14 but < 16 years	17	

	≥16 but <18 years	19	
	≥ 18 years	20	
c)	**Experience as similar capacity for similar magnitude and nature of project involving Landslide/Rock fall investigation & design experience in Planning, project preparation and design of remedial measures for prevention of landslide/rockfall on Highways/Airport/Railways in mountainous region - No. of projects**		**30**
	<2 projects	0	
	2 projects	15	30
	5 marks For each additional projects subject to maximum 30 marks	15	
III	**Employment with Firm**		**5**
	Less than 1 Year	0	
	1 year	3	
	Add 0.5 marks for each subsequent year subject tomaximum of 2 marks		
	Total		**100**

D. Adequacy and quality of proposed methodology and work plan in responding to the Terms of Reference (TORs) (10)

Sr. No.	Details	Marks
1	Site Appreciation	3
2	Proposed Methodology	3
3	Detailed Presentation on the remedial measures for similar types of problems to be included in the proposal	4

Section 3. Technical Proposal – Standard Forms

{Notes to Consultant shown in brackets { } throughout Section 3 provide guidance to the Consultant to prepare the Technical Proposal; they should not appear on the Proposals to be submitted.}

CHECKLIST OF REQUIRED FORMS

Required for FTP or STP ✓		FORM	DESCRIPTION	*Page Limit*
FTP	**STP**			
✓	✓	TECH-1	Technical Proposal Submission Form.	
✓If applicable		TECH-1 Attachment	If the Proposal is submitted by a joint venture, attach a letter of intent or a copy of an existing agreement.	
✓If applicable		Power of Attorney	No pre-set format/form. In the case of a Joint Venture, several are required: a power of attorney for the authorized representative of each JV member, and a power of attorney for the representative of the lead member to represent all JV members	
✓		TECH-2	Consultant's Organization and Experience.	
✓		TECH-2A	A. Consultant's Organization	
✓		TECH-2B	B. Consultant's Experience	
✓		TECH-3	Comments or Suggestions on the Terms of Reference and on Counterpart Staff and Facilities to be provided by the Client.	
✓		TECH-3A	A. On the Terms of Reference	
✓		TECH-3B	B. On the Counterpart Staff and Facilities	
✓	✓	TECH-4	Description of the Approach, Methodology, and Work Plan for Performing the Assignment	
✓	✓	TECH-5	Work Schedule and Planning for Deliverables	
✓	✓	TECH-6	Team Composition, Key Experts Inputs, and attached Curriculum Vitae (CV)	
✓	✓	TECH-7	Code of Conduct (ES)	

All pages of the original Technical and Financial Proposal shall be initialed by the same authorized representative of the Consultant who signs the Proposal.

FORM TECH-1

TECHNICAL PROPOSAL SUBMISSION FORM

{Location, Date}

To: *[Name and address of Client]*

Dear Sirs:

We, the undersigned, offer to provide the Consultancy Services for hazard and vulnerability assessment including detailed Geology, Geomorphology study, Geotechnical Investigations, Satellite Imagery and INSAR deformation study, Topographical survey, 3D mapping from Km 11.8 (Rajban) to Km 103.55 (Fediz) of NH-707 in State of Himachal Pradesh and Detailed Project report for cost effective and Suitable remedial measures for prevention of landslides/rock fall /river cut/ mass movement/bank erosion etc. at identified locations / sections in between above chainages of NH 707 in accordance with your Request for Proposals(RFP) dated _____ and our Proposal. We are hereby submitting our Proposal, which includes this Technical Proposal and a Financial Proposal sealed in a separate envelope.

{If the Consultant is a joint venture, insert the following*:* We are submitting our Proposal a joint venture with: {Insert a list with full name and the legal address of each member, and indicate the lead member}.We have attached a copy {insert: "of our letter of intent to form a joint venture" or, if a JV is already formed, "of the JV agreement"} signed by every participating member, which details the likely legal structure of and the confirmation of joint and severable liability of the members of the said joint venture.

{OR

If the Consultant's Proposal includes Sub-consultants, insert the following: We are submitting our Proposal with the following firms as Sub-consultants: {Insert a list with full name and address of each Sub-consultant.}

We hereby declare that:

a) All the information and statements made in this Proposal are true and we accept that any misinterpretation or misrepresentation contained in this Proposal may lead to our disqualification by the Client and/or may be sanctioned by the Bank.

(b) Our Proposal shall be valid and remain binding upon us until **120 calendar days** after the proposal submission deadline.

(c) We have no conflict of interest in accordance with ITC 3.

(d) We meet the eligibility requirements as stated in ITC 6, and we confirm our understanding of our obligation to abide by the Bank's policy in regard to Fraud and Corruption as per ITC 5.

(e) We, along with any of our sub-consultants, sub-contractors, suppliers, or service providers for any part of the contract, are not subject to, and not controlled by any entity or individual that is subject to, a temporary suspension or a debarment imposed by the World Bank Group or a debarment imposed by the World Bank Group in accordance with the Agreement for Mutual Enforcement of Debarment Decisions between the World Bank and other development banks. Further, we are not ineligible under the Client's country laws or official regulations or pursuant to a decision of the United Nations Security Council;

(f) In competing for (and, if the award is made to us, in executing) the Contract, we undertake to observe the laws against fraud and corruption, including bribery, in force in the country of the Client.]

(g) Except as stated in the Data Sheet, ITC 12.7, we undertake to negotiate a Contract on the basis of the proposed Key Experts. We accept that the substitution of Key Experts for reasons other than those stated in ITC 12 and ITC 28.4 may lead to the termination of Contract negotiations.

(h) Our Proposal is binding upon us and subject to any modifications resulting from the Contract negotiations.

We undertake, if our Proposal is accepted and the Contract is signed, to initiate the Services related to the assignment no later than the date indicated in ITC 34.2 of the Data Sheet.

We understand that the Client is not bound to accept any Proposal that the Client receives.

We remain,

Yours sincerely,

_____

Signature (of Consultant's authorized representative) {In full and initials}:

Full name: {insert full name of authorized representative}
Title: {insert title/position of authorized representative}
Name of Consultant (company's name or JV's name):
Capacity: {insert the person's capacity to sign for the Consultant}
Address: {insert the authorized representative's address}
Phone/fax: {insert the authorized representative's phone and fax number, if applicable}
Email: {insert the authorized representative's email address}_____

{For a joint venture, either all members shall sign or only the lead member, in which case the power of attorney to sign on behalf of all members shall be attached}

FORM TECH-2 (FOR FULL TECHNICAL PROPOSAL ONLY)

CONSULTANT'S ORGANIZATION AND EXPERIENCE

Form TECH-2: a brief description of the Consultant's organization and an outline of the recent experience of the Consultant that is most relevant to the assignment. In the case of a joint venture, information on similar assignments shall be provided for each partner. For each assignment, the outline should indicate the names of the Consultant's Key Experts and Sub-consultants who participated, the duration of the assignment, the contract amount (total and, if it was done in a form of a joint venture or a sub-consultancy, the amount paid to the Consultant), and the Consultant's role/involvement.

A - Consultant's Organization

1. Provide here a brief description of the background and organization of your company, and – in case of a joint venture – of each member for this assignment.

2. Include organizational chart, a list of Board of Directors, and beneficial ownership. *[If required under Data Sheet ITC 32.1, the successful Consultant shall provide additional information on beneficial ownership, using the Beneficial Ownership Disclosure Form.]*

B - Consultant's Experience

1. List only previous similar assignments successfully completed in the last *7* years i.e. from 01st April 2018 to 31st March 2025.

2. List only those assignments for which the Consultant was legally contracted by the Client as a company or was one of the joint venture members. Assignments completed by the Consultant's individual experts working privately or through other consulting firms cannot be claimed as the relevant experience of the Consultant, or that of the Consultant's partners or sub-consultants, but can be claimed by the Experts themselves in their CVs. The Consultant should be prepared to substantiate the claimed experience by presenting copies of relevant documents and references if so requested by the Client.

Duration	Assignment name/& brief description of main deliverables/outputs	Name of Client & Country of Assignment	Approx. Contract value (in INR or USD equivalent)/ Amount paid to your firm	Role on the Assignment
{e.g., Jan.2009–Apr.2010}	{e.g., "Improvement quality of.....": designed master plan for rationalization of .....; }	{e.g., Ministry of ....., country}	{e.g.,INR ….. Crore or USD equivalent}	{e.g., Lead partner in a JV A&B&C}
{e.g., Jan-May 2008}	{e.g., "Support to sub-national government....." : drafted secondary level regulations on.....}	{e.g., municipality of....., country}	{e.g., INR ….. Crore or USD equivalent }	{e.g., sole Consultant}

FORM TECH-3 (FOR FULL TECHNICAL PROPOSAL)

COMMENTS AND SUGGESTIONS ON THE TERMS OF REFERENCE, COUNTERPART STAFF, AND FACILITIES TO BE PROVIDED BY THE CLIENT

Form TECH-3: comments and suggestions on the Terms of Reference that could improve the quality/effectiveness of the assignment; and on requirements for counterpart staff and facilities, which are provided by the Client, including: administrative support, office space, local transportation, equipment, data, etc.

A - On the Terms of Reference

{Improvements to the Terms of Reference, if any}

B - On Counterpart Staff and Facilities

{Comments on counterpart staff and facilities to be provided by the Client. For example, administrative support, office space, local transportation, equipment, data, background reports, etc., if any}

FORM TECH-4 (FOR FULL TECHNICAL PROPOSAL ONLY)

DESCRIPTION OF APPROACH, METHODOLOGY, AND WORK PLAN IN RESPONDING TO THE TERMS OF REFERENCE

Form TECH-4: a description of the approach, methodology and work plan for performing the assignment, including a detailed description of the proposed methodology and staffing for training, if the Terms of Reference specify training as a specific component of the assignment.

{Suggested structure of your Technical Proposal (in FTP format):

a) Technical Approach and Methodology
b) Work Plan
c) Organization and Staffing}

a) ***Technical Approach and Methodology.*** {Please explain your understanding of the objectives of the assignment as outlined in the Terms of Reference (TORs), the technical approach, and the methodology you would adopt for implementing the tasks,(including on the Environmental and Social(ES) aspects)to deliver the expected output(s), and the degree of detail of such output. Please do not repeat/copy the TORs in here.}

b) ***Work Plan.*** {Please outline the plan for the implementation of the main activities/tasks of the assignment, their content and duration, phasing and interrelations, milestones (including interim approvals by the Client), and tentative delivery dates of the reports. The proposed work plan should be consistent with the technical approach and methodology, showing your understanding of the TOR and ability to translate them into a feasible working plan. A list of the final documents (including reports) to be delivered as final output(s) should be included here. The work plan should be consistent with the Work Schedule Form.}

c) ***Organization and Staffing.*** {Please describe the structure and composition of your team, including the list of the Key Experts, Non-Key Experts and relevant technical and administrative support staff.}

FORM TECH-5(FOR FTP AND STP)

WORK SCHEDULE AND PLANNING FOR DELIVERABLES

N°	Deliverables [1] (D-..)	Months											
		1	2	3	4	5	6	7	8	9	.....	n	TOTAL
D-1	{e.g., Deliverable #1: Report A												
	1) data collection												
	2) drafting												
	3) inception report												
	4) incorporating comments												
	5) delivery of final report to Client}												
D-2	{e.g., Deliverable #2:.....}												

1 List the deliverables with the breakdown for activities required to produce them and other benchmarks such as the Client's approvals. For phased assignments, indicate the activities, delivery of reports, and benchmarks separately for each phase.

2 Duration of activities shall be indicated in a form of a bar chart.

3. Include a legend, if necessary, to help read the chart.

FORM TECH-6(FOR FTP AND STP)

TEAM COMPOSITION, ASSIGNMENT, AND KEY EXPERTS' INPUTS

N°	Name	Expert's input (in person/month) per each Deliverable (listed in TECH-5)										Total time-input (in Months)		
		Position		D-1	D-2	D-3	.....	D-...				Home	Field	Total
KEY EXPERTS														
K-1	{e.g., Mr. Abbbb}	[Team Leader]	[*Home*]	NIL	NIL	NIL	NIL	NIL	NIL					
			[*Field*]	[0.5 m]	[2.5]	[0]								
K-2														
K-3														
n														
								Subtotal						
NON-KEY EXPERTS														
N-1			[*Home*]	NIL	NIL	NIL	NIL	NIL	NIL					
			[*Field*]											
N-2														
n														
								Subtotal						
								Total						

1 For Key Experts, the input should be indicated individually for the same positions as required under the Data Sheet ITC21.1.

2 Months are counted from the start of the assignment/mobilization. One (1) month equals twenty-two (22) working (billable) days. One working (billable) day shall be not less than eight (8) working (billable) hours.

3 "Home" means work in the office in the expert's country of residence. "Field" work means work carried out in the Client's country or any other country outside the expert's country of residence.

Full time input
Part time input

FORM TECH-6
(CONTINUED)

CURRICULUM VITAE (CV)

Position Title and No.	{e.g., K-1, TEAM LEADER
Name of Expert:	{Insert full name}
Date of Birth:	{day/month/year}
Country of Citizenship/Residence	

Education: {List college/university or other specialized education, giving names of educational institutions, dates attended, degree(s)/diploma(s) obtained}

Employment record relevant to the assignment: {Starting with present position, list in reverse order. Please provide dates, name of employing organization, titles of positions held, types of activities performed and location of the assignment, and contact information of previous clients and employing organization(s) who can be contacted for references. Past employment that is not relevant to the assignment does not need to be included.}

Period	**Employing organization and your title/position. Contact information for references**	**Country**	**Summary of activities performed relevant to the Assignment**
[e.g., May 2005-present]	[e.g., Ministry of ……, advisor/consultant to… For references: Tel……/e-mail……; Mr…., deputy minister]		

Membership in Professional Associations and Publications:

Language Skills (indicate only languages in which you can work): _____

Adequacy for the Assignment:

Detailed Tasks Assigned on Consultant's Team of Experts:	Reference to Prior Work/Assignments that Best Illustrates Capability to Handle the Assigned Tasks
{List all deliverables/tasks as in TECH- 5 in which the Expert will be involved)	

Experts contact information: (e-mail……. phone……)

Certification:
I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes myself, my qualifications, and my experience, and I am available, as and when necessary, to undertake the assignment in case of an award. I understand that any misstatement or misrepresentation described herein may lead to my disqualification or dismissal by the Client, and/or sanctions by the Bank.

{Day/month/year}

Name of Expert | Signature | Date

{Day/month/year}

Name of authorized Representative of the Consultant (the same who signs the Proposal) | Signature | Date

FORM TECH-7 (FOR FTP AND STP))
CODE OF CONDUCT FOR EXPERTS (ES) FORM

Note to the Consultant:

The minimum content of the Code of Conduct form as set out by the Client shall not be substantially modified. However, the Consultant may add requirements as appropriate, including to take into account Contract-specific issues/risks.

The Consultant shall initial and submit the Code of Conduct form as part of its Proposal

CODE OF CONDUCT FOR EXPERTS

We are the Consultant, [*enter name of Consultant*]. We have signed a contract with The Ministry of Road Transport & Highways for consultancy Services for "Road User Satisfaction Survey And Preparation of Gender Action Plan" for the projects under Green National Highways Corridor Project (GNHCP) with the loan assistance of World Bank on EPC mode. These Services will be carried out at Delhi and in the above states. Our contract requires us to implement measures to address environmental and social risks related to the Services, including the risks of sexual exploitation, sexual abuse and sexual harassment.

This Code of Conduct is part of our measures to deal with environmental and social risks related to the Services. It applies to all Experts at the Site or other places where the Services are being carried out.

This Code of Conduct identifies the behavior that we require from all Experts.

Our workplace is an environment where unsafe, offensive, abusive or violent behavior will not be tolerated and where all persons should feel comfortable raising issues or concerns without fear of retaliation.

REQUIRED CONDUCT

Experts shall:

1. carry out his/her duties competently and diligently;
2. comply with this Code of Conduct and all applicable laws, regulations and other requirements, including requirements to protect the health, safety and well-being of other Experts and any other person;
3. maintain a safe working environment including by:
    a. ensuring that workplaces, equipment and processes under each person's control are safe and without risk to health;
    b. wearing required personal protective equipment; and

c. following applicable emergency operating procedures.

4. report work situations that he/she believes are not safe or healthy and remove himself/herself from a work situation which he/she reasonably believes presents an imminent and serious danger to his/her life or health;
5. treat other people with respect, and not discriminate against specific groups such as women, people with disabilities, migrant workers or children;
6. not engage in Sexual Harassment, which means unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature with other Experts, Contractor's Personnel or Client's Personnel;
7. not engage in Sexual Exploitation, which means any actual or attempted abuse of position of vulnerability, differential power or trust, for sexual purposes, including, but not limited to, profiting monetarily, socially or politically from the sexual exploitation of another;
8. not engage in Sexual Abuse, which means the actual or threatened physical intrusion of a sexual nature, whether by force or under unequal or coercive conditions;
9. not engage in any form of sexual activity with individuals under the age of 18, except in case of pre-existing marriage;
10. complete relevant training courses that will be provided related to the environmental and social aspects of the Contract, including on health and safety matters, Sexual Exploitation and Abuse (SEA), and Sexual Harassment (SH);
11. report violations of this Code of Conduct; and
12. not retaliate against any person who reports violations of this Code of Conduct, whether to us or the Client, or who makes use of grievance mechanism for Experts or the project's Grievance Redress Mechanism.

RAISING CONCERNS

If any person observes behavior that he/she believes may represent a violation of this Code of Conduct, or that otherwise concerns him/her, he/she should raise the issue promptly. This can be done in either of the following ways:

1. Contact [*enter name of the Consultant's social expert with relevant experience in handling sexual exploitation, sexual abuse and sexual harassment cases, or if such person is not required under the Contract, another individual designated by the Consultant to handle these matters*] in writing at this address [ ] or by telephone at [ ] or in person at [ ]; or
2. Call [ ] to reach the Consultant's hotline *(if any)* and leave a message.

The person's identity will be kept confidential, unless reporting of allegations is mandated by the country law. Anonymous complaints or allegations may also be submitted and will be given all due and appropriate consideration. We take seriously all reports of possible misconduct and will investigate and take appropriate action. We will provide warm referrals

to service providers that may help support the person who experienced the alleged incident, as appropriate.
There will be no retaliation against any person who raises a concern in good faith about any behavior prohibited by this Code of Conduct. Such retaliation would be a violation of this Code of Conduct.

CONSEQUENCES OF VIOLATING THE CODE OF CONDUCT

Any violation of this Code of Conduct by Experts may result in serious consequences, up to and including termination and possible referral to legal authorities.

FOR EXPERT:

I have received a copy of this Code of Conduct written in a language that I comprehend. I understand that if I have any questions about this Code of Conduct, I can contact [*enter name of Consultant's contact person(s) with relevant experience*] requesting an explanation.

Name of Expert: [insert name]

Signature: _____

Date: (day month year): _____

Countersignature of authorized representative of the Consultant:

Signature: _____

Date: (day month year): _____

ATTACHMENT 1: Behaviors constituting Sexual Exploitation and Abuse (SEA) and behaviors constituting Sexual Harassment (SH)

ATTACHMENT 1 TO THE CODE OF CONDUCT FORM

BEHAVIORS CONSTITUTING SEXUAL EXPLOITATION AND ABUSE (SEA) AND BEHAVIORS CONSTITUTING SEXUAL HARASSMENT (SH)

The following non-exhaustive list is intended to illustrate types of prohibited behaviors:

(1) **Examples of sexual exploitation and abuse** include, but are not limited to:

- An Expert tells a member of the community that he/she can get them jobs related to the work site (e.g. cooking and cleaning) in exchange for sex.
- An Expert that is connecting electricity input to households says that he can connect women headed households to the grid in exchange for sex.
- An Expert rapes, or otherwise sexually assaults a member of the community.
- An Expert denies a person access to the Site unless he/she performs a sexual favor.
- An Expert tells a person applying for employment under the Contract that he/she will only hire him/her if he/she has sex with him/her.

(2) **Examples of sexual harassment in a work context**

- An Expert comment on the appearance of another Expert (either positive or negative) and sexual desirability.
- When An Expert complains about comments made by another Expert on his/her appearance, the other Expert comment that he/she is "asking for it" because of how he/she dresses.
- Unwelcome touching of an Expert or Employer's Personnel by another Expert.
- An Expert tells another Expert that he/she will get him/her a salary raise, or promotion if he/she sends him/her naked photographs of himself/herself.

Section 4. Financial Proposal - Standard Forms

{*Notes to Consultant* shown in brackets { } provide guidance to the Consultant to prepare the Financial Proposals; they should not appear on the Financial Proposals to be submitted.}

Financial Proposal Standard Forms shall be used for the preparation of the Financial Proposal according to the instructions provided in Section 2.

Form FIN-1	Financial Proposal Submission Form
Form FIN-2(A)	Summary of Costs (Foreign Currency only)
Form FIN-3(A)	Breakdown of Remuneration & Reimbursable expenses (Foreign Currency only), including Appendix A "Financial Negotiations - Breakdown of Remuneration Rates" in the case of QBS method
Form FIN-4(A)	Reimbursable expenses (Foreign Currency only)
Form FIN-2(B)	Summary of Costs (INR only)
Form FIN-3(B)	Breakdown of Remuneration & Reimbursable expenses (INR only), including Appendix A "Financial Negotiations - Breakdown of Remuneration Rates" in the case of QBS method
Form FIN-4(B)	Reimbursable expenses (INR only)

(When used for Lump-Sum contract assignment, information to be provided in this Form shall only be used to demonstrate the basis for calculation of the Contract ceiling amount, to calculate applicable taxes at contract negotiations and, if needed, to establish payments to the Consultant for possible additional services requested by the Client. This form shall not be used as a basis for payments under Lump-Sum contracts)

FORM FIN-1
FINANCIAL PROPOSAL SUBMISSION FORM

{Location, Date}

To: [Name and address of Client]

Dear Sirs:

We, the undersigned, offer to provide the "Consultancy Services for hazard and vulnerability assessment including detailed Geology, Geomorphology study, Geotechnical Investigations, Satellite Imagery and INSAR deformation study, Topographical survey, 3D mapping from Km 11.8 (Rajban) to Km 103.55(Fediz) of NH-707 in State of Himachal Pradesh and Detailed Project report for cost effective and Suitable remedial measures for prevention of landslides/rock fall /river cut/ mass movement/bank erosion etc. at identified locations / sections in between above chainages of NH 707" in accordance with your Request for Proposal dated [Insert Date] and our Technical Proposal.

Our attached Financial Proposal is for the amount of {Indicate the corresponding to the amount(s) currency (ies)} {Insert amount(s) in words and figures}, *excluding of all indirect local taxes in accordance with ITC 25.1 in the Data Sheet.* The estimated amount of local indirect taxes is {Insert currency} {Insert amount in words and figures} which shall be confirmed or adjusted, if needed, during negotiations. {Please note that all amounts shall be the same as in Form FIN-2

Our Financial Proposal shall be valid and remain binding upon us, subject to the modifications resulting from Contract negotiations, for the period of time specified in the Data Sheet, ITC 12.1.

Commissions and gratuities paid or to be paid by us to an agent or any third party relating to preparation or submission of this Proposal and Contract execution, paid if we are awarded the Contract, are listed below:

Name and Address of Agents	Amount and Currency	Purpose of Commission or Gratuity

{If no payments are made or promised, add the following statement: "No commissions or gratuities have been or are to be paid by us to agents or any third party relating to this Proposal and Contract execution."}

We understand you are not bound to accept any Proposal you receive.

We remain,

Yours sincerely,

_____

Signature (of Consultant's authorized representative) {In full and initials}:

Full name: {insert full name of authorized representative}
Title: {insert title/position of authorized representative}
Name of Consultant (company's name or JV's name):
Capacity: {insert the person's capacity to sign for the Consultant}
Address: {insert the authorized representative's address}
Phone/fax: {insert the authorized representative's phone and fax number, if applicable}
Email: {insert the authorized representative's email address}_____

{For a joint venture, either all members shall sign or only the lead member/consultant, in which case the power of attorney to sign on behalf of all members shall be attached}

FORM FIN-2(A):
SUMMARY OF COSTS (FOREIGN CURRENCY ONLY)

No.	Description	Amount ({*Insert Foreign Currency*}.)
I	Remuneration for Key Professional Staff	
II	Remuneration for Non Key Professional/ Supporting Staff	
III	Transportation	
IV	Duty Travel to Site	
V	Office Rent	
VI	Office Furniture and Equipment	
VII	Office Supplies, Utilities and Communication	
VIII	Reports and Document Printing	
	Total	
	{insert type of tax. e.g., GST or sales tax}	
	{e.g., income tax on non-resident experts}	
	{insert type of tax}	
	Total Estimate for Indirect Local Tax:	

Note: Payments will be made as per stipulations of the Conditions of Contract.

FORM FIN-3(A):
BREAKDOWN OF REMUNERATION EXPENSES (FOREIGN CURRENCY ONLY)

I. REMUNERATION FOR KEY AND NON-KEY EXPERTS (LOCAL PROFESSIONAL STAFF)

No.	Position	Name	Rate	No. of man-months*	Amount ({*Insert Foreign Currency*})
	Key Experts				
1.	Team Leader Cum Landslide expert			9	
2.	Senior Geologist			6	
3.	Senior Geotechnical Engineer			6	
4.	Senior Geomatics Expert			6	
5.	Senior Hydrology and Hydraulics expert			6	
	Sub – Total			**33.00**	
	Non-Key Experts				
1.	Landslide Engineer/expert			9	
2.	Geologist (2 no.)			18	
3.	Geotechnical Engineer			9	
4.	Surveyor			6	
5.	Quantity Engineer			6	
6.	Environment Engineer			4	
7.	Hydrology/Hydraulics Engineer			6	
8.	Land Acquisition Expert			6	
9.	CAD expert			9	
10.	RS and GIS Expert			9	
	Sub Total			**82.00**	
	Total			**115.00**	

FORM FIN-4(A):
BREAKDOWN OF REIMBURSABLE EXPENSES (FOREIGN CURRENCY ONLY)

III. Transportation (Fixed rate on rental basis)

The vehicles provided by the Consultants shall include the cost for rental, drivers, operation, maintenance, repairs, insurance, etc. for all complete approx. 3000km/month run

Sr. No	Description of Vehicles	No of Vehicles	No of Months	Rate/ Vehicle- Month	Amount
1	Innova/Scorpio or equivalent (not more than 1 year old) (02 nos.)	2	9		
2	Swift Dezire / Indica or equivalent (not more than 1 years old)	3	9		
	Total				

IV. Duty Travel to Site (Fixed Costs) (For all Project Sites) :By Key and Non-Key Experts

Type of Experts	Number of Trips	Rate*	Amount ({*Insert Foreign Currency*})
Key Experts	60		
Non Key Experts	40		

* Rate quoted includes Hotel charges, travel cost by Air (for Key Experts only) or any other mode etc. complete.

V. Office Rent (Fixed Costs)– Minimum 200 sqm area of office shall be rented to manage the projects.

The rent cost includes electricity and water charges, maintenance, cleaning, repairs, etc. complete.

Nos. of Months	Rate/month	Amount
9		

VI. Office Furniture and Equipment (Rental)

The cost shall include rental charges towards all such furniture and equipment as required for proper functioning of office. Office furniture shall include executive tables, chairs, visitor chairs, steel almirahs, computer furniture, conference table etc. Office equipment shall include as a minimum of telephone (2 external & 10 internal lines), photocopier (15ppm, 12000 copies per month with A3 & A4 input) fax machine, PCs(5 No., Intel Core 2 Duo E8300, 19'' colour TFT, Cache-6MB, RAM-2 GB, HDD-250 GB, DVD Writer, Key board, optical scroll mouse, MS-Windows Vista Business, pre-loaded anti-virus etc.), laser printers (2 no., 14 ppm, 266 MHZ, 5000 pages per month, 600x600 dpi or better etc., Engineering Plan printer (1 no.), binding machine (1 no.), plotter A0 size, overhead projector, AC (4 no., 1.5 Ton), Water Coolers (as required)etc.

Nos. of Months	**Rate/month**	**Amount** ({*Insert Foreign Currency*}
9		

The rent cost includes electricity and water charges, maintenance, cleaning, repairs, etc. complete

VII. Office Supplies, Utilities and Communication (Fixed Costs)

No	**Item**	**Months**	**Monthly Rate**	**Amount** (**{***Insert Foreign Currency***}.**)
1.	Office Supplies	9		
2.	Drafting Supplies	9		
3.	Computer Running Costs	9		
4.	Domestic and International Communication	9		

VIII. Reports and Document Printing

No.	Description	Total Nos. of copies	Rate per Copy ( )	Amount ({*Insert Foreign Currency*}.)
1	All reports	12		
		Total		

Note: Payments will be made as per stipulations of the Conditions of Contract.

FORM FIN-2(B): SUMMARY OF COSTS (INR only)

No.	Description	Amount (in Rs.)
I	Remuneration for Key Professional Staff	
II	Remuneration for Non Key Professional/ Supporting Staff	
III	Transportation	
IV	Duty Travel to Site	
V	Office Rent	
VI	Office Furniture and Equipment	
VII	Office Supplies, Utilities and Communication	
VIII	Reports and Document Printing	
	Total	
	Goods and Services Tax Payable in India	
	Total Costs (Including Tax)	

Note: Payments will be made as per stipulations of the Conditions of Contract.

FORM FIN-3(B): BREAKDOWN OF LOCAL CURRENCY COSTS (INR only)

I. REMUNERATION FOR KEY AND NON-KEY EXPERTS (LOCAL PROFESSIONAL STAFF)

Expected Key Personnel	Name	No of Personnel	Input required (Man Months)	Total estimated Input (Man Months)	Rate	Amount (In Rs.)
1. Team Leader Cum Landslide expert		1	9	9		
2. Senior Geologist		1	6	6		
3. Senior Geotechnical Engineer		1	6	6		
4. Senior Geomatics Expert		1	6	6		
5. Senior Hydrology and Hydraulics expert		1	6	6		
Estimated Input for Key personnel		5		**33**		
Non Key Personnel & Supporting Staff						
1. Landslide Engineer/expert		1	9	9		
2. Geologist		2	9	18		
3. Geotechnical Engineer		1	9	9		
4. Surveyor		1	6	6		
5. Quantity Engineer		1	6	6		
6. Environment Engineer		1	4	4		
7. Hydrology/Hydraulics Engineer		1	6	6		
8. Land Acquisition Expert		1	6	6		
9. CAD expert		1	9	9		
10. RS and GIS Expert		1	9	9		
Estimated Inputs for Non Key Personnel & Supporting Staff.				**82**		
Estimated Inputs for nominated Key Personnel and Non Key Personnel /Supporting Staff.				**115**		

FORM FIN-4(B):

BREAKDOWN OF REIMBURSABLE EXPENSES (INR ONLY)

III. Transportation (Fixed rate on rental basis)

The vehicles provided by the Consultants shall include the cost for rental, drivers, operation, maintenance, repairs, insurance, etc. for all complete approx. 3000km/month run

Sr. No	Description of Vehicles	No of Vehicles	No of Months	Rate/ Vehicle- Month	Amount
1	Innova/Scorpio or equivalent (not more than 1 year old) (02 nos.)	2	9		
2	Swift Dezire / Indica or equivalent (not more than 1 years old)	3	9		
	Total				

IV. Duty Travel to Site (Fixed Costs) (For all Project Sites) : By Key and Non-Key Experts

Type of Experts	Number of Trips	Rate*	Amount (in Rs.)
Key Experts	60		
Non Key Experts	40		

* Rate quoted includes Hotel charges, travel cost by Air (for Key Experts only) or any other mode etc. complete.

V. Office Rent (Fixed Costs)– Minimum 200 sqm area of office shall be rented to manage the projects.

The rent cost includes electricity and water charges, maintenance, Cleaning, repairs, etc. complete.

Nos. of Months	Rate/month	Amount (in Rs.)
9		

VI. Office Furniture and Equipment (Rental)

The cost shall include rental charges towards all such furniture and equipment as required for proper functioning of office. Office furniture shall include executive tables, chairs, visitor chairs, steel almirahs, computer furniture, conference table etc. Office equipment shall include as a minimum of telephone (2 external & 10 internal lines), photocopier (15ppm, 12000 copies per month with A3 & A4 input) fax machine, PCs(5 No., Intel Core 2 Duo E8300, 19'' colour TFT, Cache-6MB, RAM-2 GB, HDD-250 GB, DVD Writer, Key board, optical scroll mouse, MS-Windows Vista Business, pre-loaded anti-virus etc.), laser printers (2 no., 14 ppm, 266 MHZ, 5000 pages per month, 600x600 dpi or better etc., Engineering Plan printer (1 no.), binding machine (1 no.), plotter A0 size, overhead projector, AC (4 no., 1.5 Ton), Water Coolers (as required)etc.

Nos. of Months	Rate/month	Amount (in Rs.)
9		

The rent cost includes electricity and water charges, maintenance, cleaning, repairs, etc. complete

VII. Office Supplies, Utilities and Communication (Fixed Costs)

No	Item	Months	Monthly Rate	Amount (in Rs.)
1.	Office Supplies	9		
2.	Drafting Supplies	9		
3.	Computer Running Costs	9		
4.	Domestic and International Communication	9		

VIII. Reports and Document Printing

No.	Description	Total Nos. of copies	Rate per Copy ( )	Amount (in Rs.)
1	All reports	12		
		Total		

Section 5. Eligible Countries

In reference to ITC6.3.2, for the information of shortlisted Consultants, at the present time firms, goods and services from the following countries are excluded from this selection:

Under the ITC 6.3.2 (a): None

Under the ITC 6.3.2 (b): None

Section 6. Fraud and Corruption

(This Section 6, Fraud and Corruption shall not be modified)

1. Purpose

1.1 The Bank's Anti-Corruption Guidelines and this annex apply with respect to procurement under Bank Investment Project Financing operations.

2. Requirements

2.1 The Bank requires that Borrowers (including beneficiaries of Bank financing); bidders (applicants/proposers), consultants, contractors and suppliers; any sub-contractors, sub-consultants, service providers or suppliers; any agents (whether declared or not); and any of their personnel, observe the highest standard of ethics during the procurement process, selection and contract execution of Bank-financed contracts, and refrain from Fraud and Corruption.

2.2 To this end, the Bank:

a. Defines, for the purposes of this provision, the terms set forth below as follows:

i. "corrupt practice" is the offering, giving, receiving, or soliciting, directly or indirectly, of anything of value to influence improperly the actions of another party;

ii. "fraudulent practice" is any act or omission, including misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain financial or other benefit or to avoid an obligation;

iii. "collusive practice" is an arrangement between two or more parties designed to achieve an improper purpose, including to influence improperly the actions of another party;

iv. "coercive practice" is impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party;

v. "obstructive practice" is:

(a) deliberately destroying, falsifying, altering, or concealing of evidence material to the investigation or making false statements to investigators in order to materially impede a Bank investigation into allegations of a corrupt, fraudulent, coercive, or collusive practice; and/or threatening, harassing, or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation; or

(b) acts intended to materially impede the exercise of the Bank's inspection and audit rights provided for under paragraph 2.2 e. below.

b. Rejects a proposal for award if the Bank determines that the firm or individual recommended for award, any of its personnel, or its agents, or its sub-consultants, sub-contractors, service providers, suppliers and/ or their employees, has, directly or indirectly, engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices in competing for the contract in question;

c. In addition to the legal remedies set out in the relevant Legal Agreement, may take other appropriate actions, including declaring mis procurement, if the Bank determines at any time that representatives of the Borrower or of a recipient of any part of the proceeds of the loan engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices during the procurement process, selection and/or execution of the contract in question, without the Borrower having taken timely and appropriate action satisfactory to the Bank to address such practices when they occur, including by failing to inform the Bank in a timely manner at the time they knew of the practices;

d. Pursuant to the Bank's Anti- Corruption Guidelines and in accordance with the Bank's prevailing sanctions policies and procedures, may sanction a firm or individual, either indefinitely or for a stated period of time, including by publicly declaring such firm or individual ineligible (i) to be awarded or otherwise benefit from a Bank-financed contract, financially or in any other manner;[1] (ii) to be a nominated[2] sub-contractor, consultant, manufacturer or supplier, or service provider of an otherwise eligible firm being awarded a Bank-financed contract; and (iii) to receive the proceeds of any loan made by the Bank or otherwise to participate further in the preparation or implementation of any Bank-financed project;

e. Requires that a clause be included in bidding/request for proposals documents and in contracts financed by a Bank loan, requiring (i) bidders (applicants/proposers),, consultants, contractors, and suppliers, and their sub-contractors, sub-consultants, service providers, suppliers, agents personnel, permit the Bank to inspect[3] all accounts, records and other documents relating to the procurement process, selection and/or contract execution, and to have them audited by auditors appointed by the Bank.

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1 For the avoidance of doubt, a sanctioned party's ineligibility to be awarded a contract shall include, without limitation, (i) applying for pre-qualification, expressing interest in a consultancy, and bidding, either directly or as a nominated sub-contractor, nominated consultant, nominated manufacturer or supplier, or nominated service provider, in respect of such contract, and (ii) entering into an addendum or amendment introducing a material modification to any existing contract.

2 A nominated sub-contractor, nominated consultant, nominated manufacturer or supplier, or nominated service provider (different names are used depending on the particular bidding document) is one which has been: (i) included by the bidder in its pre-qualification application or bid because it brings specific and critical experience and know-how that allow the bidder to meet the qualification requirements for the particular bid; or (ii) appointed by the Borrower.

3 Inspections in this context usually are investigative (i.e., forensic) in nature. They involve fact-finding activities undertaken by the Bank or persons appointed by the Bank to address specific matters related to investigations/audits, such as evaluating the veracity of an allegation of possible Fraud and Corruption, through the appropriate mechanisms. Such activity includes but is not limited to: accessing and examining a firm's or individual's financial records and information, and making copies thereof as relevant; accessing and examining any other documents, data and information (whether in hard copy or electronic format) deemed relevant for the investigation/audit, and making copies thereof as relevant; interviewing staff and other relevant individuals; performing physical inspections and site visits; and obtaining third party verification of information.

Section 7. Terms of Reference

TERMS OF REFERENCE (TOR)

1. **Consultancy Services for detailed vulnerability assessment including detailed Geology, Geomorphology study, Geotechnical Investigations, Satellite Imagery and INSAR deformation study, Topographical survey, 3D mapping from Km 11.8 (Rajban) to Km 103.55(Fediz) of NH-707 in State of Himachal Pradesh and Detailed Project report for cost effective and Suitable remedial measures for prevention of landslides/rock fall /river cut/ mass movement/bank erosion etc. at identified locations / sections in between above chainages of NH 707. The work is funded and monitored by World Bank.**

1.1 The EAP Zone of Ministry of Road Transport and Highways has been entrusted with the assignment of Consultancy Services for detailed vulnerability assessment including detailed Geology, Geomorphology study, Geotechnical Investigations, Satellite Imagery and INSAR deformation study, Topographical survey, 3D mapping from Km 11.8 (Rajban) to Km 103.55(Fediz) of NH-707 in State of Himachal Pradesh and Detailed Project report for cost effective and Suitable remedial measures for prevention of landslides/rock fall /river cut/ mass movement/bank erosion etc. at identified locations / sections in between above chainages of NH 707 now invites proposal from Technical consultants for carrying out detailed project report as per details given in **Annexure-1.**

1.2 MoRT&H will be the employer and executing agency for the consultancy services and the standards of output required from the appointed consultants are of international level both in terms of quality and adherence to the agreed time schedule. The consultancy firm will solely be responsible for submission of quality work in stipulated period.

1.3 Roadside slopes are critical components of transportation networks, providing stability and protection against natural forces. However, these slopes face increasing threats due to environmental changes, anthropogenic activities, and inadequate maintenance. Climate change, deforestation, and poorly planned construction exacerbate inherent geological weaknesses, leading to heightened vulnerability. Failures of these slopes not only disrupt transportation systems but also pose risks to human lives, economic activities, and the environment.

1.4 There are several vulnerable slopes already identified on the highway. Some of those are critical in nature and recurring during almost every monsoon. However, there may be many other neighboring slopes and banks of streams/nalas which are also of vulnerable category but not yet yielded or are dormant in nature. It is also required to identify such slopes and provide the mitigation and management schemes for their prevention/protection/stabilization as well.

1.5 To effectively assess vulnerability, it is essential to first identify the hazards (susceptible slopes in this case) and elements at risk, as these form the basis for a comprehensive vulnerability and risk assessment. The vulnerability assessment focuses on evaluating the **degree of potential damage** that may occur to road infrastructure if a hazard event such as a landslide occurs. Risk assessment integrates hazard likelihood, exposure, and vulnerability to quantify and prioritize areas requiring intervention.

1.6 **Definitions of Key Components**

1. **Landslide Susceptibility**: Susceptibility refers to the spatial possibility of occurrence of landslides of a specific type and volume.
2. **Hazard**: A potentially damaging physical event or condition (e.g., landslides, rockfalls, debris flows) with a defined probability of occurrence.

3. **Vulnerability**: The **degree of potential damage** to infrastructure, ecosystems, and social systems, determined by their intrinsic characteristics and capacity to resist or adapt.

4. **Exposure (element at Risk):** The presence of assets, infrastructure, people, or ecosystems in areas that could be affected by hazards.

5. **Risk**: The combined measure of hazard, vulnerability, and exposure, representing the potential for loss or damage.

6. **Critical Landslides**: In addition to the already identified historical and critical landslide, there might be some more of such landslides identified during the vulnerability assessment. The same must be coupled for detailed investigation and design of short as well as long term measures.

1.7 Highways constructed without anticipated vulnerabilities tend to develop frequent problems for slope stability and therefore cannot be disaster resilient. Therefore, to maintain the highways in a sustainable manner, it is necessary to identify the highway slopes based on their degree of susceptibility, vulnerability and anticipated risk.

1.8 Though the widening of highways (NH707) alongside of which the vulnerability assessment being proposed is mostly completed, the landslide vulnerability assessment was not carried out. In view of the large number of landslides/slope failure incidences occurred during the last monsoon in the region including on the NH707, it was thought appropriate and needed to undertake such exercise to help identifying vulnerable areas which can pose threat to the commuting public as well as the highway.

1.9 The vulnerable (susceptible) areas identified will help to undertake the vulnerability assessment (**degree of potential damage**) to the highway infrastructure which in turn will help to develop a right strategy for long term maintenance of the highways. This will make the highways disaster resilient and sustainable ensuring all weather least risk transportation

1.10 In absence of identification of susceptible areas and vulnerability assessment the proactive handling of the vulnerable slopes cannot be ensured after completion of widening and during maintenance. As a result, there might be serious consequences which include economic losses, disruptions of highway operations influencing developmental activities, societal issues, hardships and risk to the people, loss of life etc.

1.11 This becomes more important when due to global climate change the extreme rainfall events have already increased and are also projected to be increased further. This has already been experienced in the region including on NH707.

1.12 There are large landslides which have already been identified and are mostly active requiring long-term measures for their prevention/mitigation and management. Such landslides need to be coupled with the vulnerability assessment of whole identified corridors with added objectives of detailed investigation and design of preventive/mitigation measures for long term stability.

1.13 The list of critical landslides is given in Annexure-I. Consultant, during vulnerability assessment, has to bring out if any other landslide/slope of critical nature is identified. Such landslides/slope must also be investigated in detail for design of preventive/mitigation measures for long term stability (…..).

1.14 Long term measures need to be proposed after detailed geological, geotechnical, and geophysical investigation.

1.15 The vulnerability assessment shall also be useful for ascertaining the efficacy of the short-term/ long term measures (restoration works) already taken and /or come out with

strengthening measure to the already implemented measures. Besides, it aims to provide mechanism to give advance warning and more to suggest preventive measures during the operation. Consultant is required to assess the requirement of slope stability augmentation measures

1.16 The already identified critical historical landslides as given in the annexure 1, must be investigated in all details as mentioned above and design short term as well as long term measures which can be readily implemented on the ground.

2.0 OBJECTIVES & SCOPE OF THE CONSULTANCY

2.1 Objective(s) of the Consultancy:

2.1.1 The primary objective of the consultancy services is to establish the technical, economical, and financial viability of the project and preparation of detailed project reports to assess the vulnerability of highway slopes to potential landslide hazards and develop risk profile to inform mitigation and adaptation strategies Km 11.8 (Rajban) to Km 103.55 (Fediz) of NH-707 in State of Himachal Pradesh and design of remedial measures for longterm stability of identified critical landslides/slopes.

2.1.2 **Specific Objectives**

1. **Vulnerability Assessment**:
   - Assess the degree of damage likely to occur to roads, communities under specific hazard scenarios.
   - Develop a vulnerability framework incorporating physical, environmental, and socio-economic dimensions.
2. **Risk Assessment**:
   - Combine hazard likelihood (hazard/susceptibility), exposure (element at risk-highway, its infrastructure, population) and vulnerability to quantify the risk.
   - Identify and prioritize high-hazard/risk zones for intervention.
   - Identify critical landslides or probable critical landslides in addition to already identified critical locations given in Annexure 1
   - Propose actionable recommendations for mitigating vulnerabilities and reducing risks.
3. **Prevention of Critical Landslides:** Develop a design scheme of short term as well as long term measures for protection/ prevention of critical landslides based on detailed topographic, geological, geotechnical and geophysical investigation and analysis.
4. **Monitoring and management of vulnerable slopes:** Develop a strategy for sustainable monitoring and management of vulnerable slopes for long term.

3.0 Scope of Consultancy Services:

The Scope of Services shall cover but be not limited to the following major tasks.

3.1 Hazard Assessment

1. **Data Collection and coalition**:
   - Gather and review existing data on existing and historical landslides, rainfall, seismic activity, and anthropogenic influences.
   - Prepare a database and inventory of existing and past historical landslides (annex)

- Collect geospatial datasets to generate various factor maps e.g., topography, geology, geomorphology, slope, slope aspect, landslide, drainage, landuse, climate, vegetation etc..

2. **Hazard (susceptibility) Mapping:**
    - Use GIS and remote sensing tools to map/model high-hazard/susceptible zones using gathered dataset/maps and appropriate methodology (IRC/ BIS/ISI).
    - Map reading and slope inspection (refer draft JICA handbook to be provided by Authority)
    - Analyze triggers type slope failure and underlying factors.

3. **Hazard(susceptibility) Classification**:
    - Categorize landslide susceptibility potential based on their degree of propensity, possible intensity, frequency, and spatial extent and types.

3.2 **Vulnerability Assessment**

Vulnerability is the degree of damage to elements (e.g., buildings, infrastructure) within the region affected by landslides. Landslide vulnerability assessment is a crucial process to understand and mitigate the risks associated with landslides. It involves evaluating the susceptibility of an area to landslides and the potential impact on people, infrastructure, and the environment.

1. **Framework Development:**
    - Establish a framework to assess the degree of damage (vulnerability) to infrastructure under various landslide hazard scenarios.
    - Consider intrinsic (physical), socio-economic, and environmental factors influencing damage potential (depending on availability of data).
2. **Field Investigations**:
    - In addition to the factor maps, conduct geotechnical surveys to evaluate soil strength, slope conditions, and drainage systems.
    - In rock slopes conduct geo-mechanical survey to evaluate the condition of discontinuities, rock strength, RMR, SMR etc.
    - Assess the structural integrity of roadside infrastructure.
3. **Dimensions of Vulnerability**:
    - **Physical Vulnerability**: Degree of potential structural damage from the probable landslide.
    - **Environmental Vulnerability**: Sensitivity of ecosystems to slope instability (e.g., deforestation, erosion).
    - **Socio-Economic Vulnerability**: Impact on communities, including economic loss, accessibility, and social disruption.
4. **Quantification of Vulnerability**:
    - Develop a vulnerability index using quantitative and qualitative metrics.
    - Use tools such as numerical models and scoring systems to assess the potential damage levels.

3.3 **Exposure Analysis**

1. **Mapping Exposed Elements**:
    - Identify roads, communities and their facilities, infrastructure, and ecosystems in hazard-prone areas and prepare an inclusive infrastructure map.

- Using GIS to spatially overlay exposure data with hazard/susceptibility zonation map to identify the assets at probable risk.

2. **Level of Exposure and criticality**:
    - Estimate the value and criticality of exposed elements.
    - Classify exposure levels (e.g., low, medium, high).

3.4 **Risk Assessment**

Landslide risk assessment involves evaluating the potential for landslides in a given area and understanding the associated risks. This process typically includes combining hazard and vulnerability assessments to estimate the potential impact of landslides on the infrastructure, community and environment.

1. **Integration of Components**:
    - Combine hazard likelihood, vulnerability (degree of damage), and exposure to compute risk levels.
2. **Risk Quantification**:
    - Use risk matrices and probabilistic models to evaluate the potential for losses in economic, environmental, and social terms.
3. **Prioritization**:
    - Rank high-risk zones for mitigation planning.

3.5 **Prevention of Critical Landslides**

To individually and holistically understand the critical slopes/landslides, consultant must develop a plan/scheme of large scale survey, mapping, and investigation to design the control measures for long term stability in tune with the investigations. The type of investigations must be preceded with the historic evidences, past experiences, documented literature, unpublished reports, and studies on the reoccurring threats of landslides and the steadily mounting losses on the designated stretch of the highway.

3.6 **Monitoring and management of vulnerable slopes**

The consultant must develop a comprehensive plan for Monitoring and Management of vulnerable slopes, integrating with the outcome of vulnerability and risk analysis.

4. Methodology

The methodology briefly described below is just a general guiding factor for the consultant to broadly follow, however not limited to the given details. The consultant must follow the relevant IRC, BIS as well as the international code/guidelines.

A. Hazard, Vulnerability and Risk Assessment

The study will employ a stepwise, multidisciplinary approach:

4.1 **Database and inventory:**

Landslide database/ inventory mapping is one of the simplest qualitative approaches of landslide susceptibility and successive vulnerability and risk assessment. It is also known as ‘distribution analyses which starts with the collection, collation and updating of the digital database and inventory of all the known unstable slopes/Landslides along the highways. The landslide inventory portrays spatial and temporal distribution of landslide patterns, type of movement, type of displaced material (earth, debris or rock), rate of movement etc. Landslide details are obtained through historical records, field survey mapping, aerial photo interpretation and satellite images. Such database and inventory prior to construction/widening of highway is prerequisite because the area can be said susceptible or not susceptible to landslides, when the terrain conditions are

comparable to those where a slide has already occurred/not occurred. Following is the general methodology and several key steps involved in preparation of the database.

1. **Collection of Data**: collection of data from various sources including satellite imagery, aerial photographs, field surveys, and historical records. This data includes information on past landslide events, topography, geology, land use, and climate etc.
2. **Data Validation**: Validation of the data by conducting field verification and/or using large resolution satellite data or cross references.
3. **Data Integration**: Integrate data from different sources into a unified database to remove ambiguity and promote uniformity.
4. **Data Analysis**: Analyze the data to identify patterns and trends in landslide occurrences. This can involve statistical analysis, spatial analysis, and the use of machine learning algorithms.
5. **Database Management system**: develop a GIS web-based database management system to store, organize, and retrieve data efficiently. This includes setting up data storage, indexing, and backup procedures.
6. **Contributing factors for landslide occurrence**: Analysing the database of historical/past landslides/slope failure, the most prominent factors responsible for landslide occurrences must be identified and listed and prioritized for further steps in the process of landslide vulnerability and risk assessment.

4.2 **Hazard Identification (susceptibility mapping)**

To identify areas prone to landslides including creating landslide hazard maps that highlight vulnerable zones, the historical data analysis as well geological surveys are important. The role of triggering factors such as heavy rainfall, earthquakes, volcanic activity, and human activities like deforestation and construction also becomes very important. This in turn will help in Identifying substandard (susceptible) slopes with probable degree of vulnerability (e.g., high, moderate and low vulnerable slopes/areas) as well as large landslides of critical nature and could also prove to an effective tool to design most appropriate measures and plan for future management of the vulnerable slopes.

- Conduct the mapping/surveys/investigations of the identified landslide induced factors such as topographic, geological, structural, geomorphological, geohydrological, geotechnical etc. to identify/map hazard-prone areas
- Use remote sensing tools and high-resolution satellite imagery for hazard visualization.
- Simulate climatic impacts using historical data and predictive models.

4.3 **Exposure Analysis**

Exposure analysis involves identifying and assessing the elements at risk in areas prone to landslides which includes evaluating the physical and social elements that could be affected by landslides, such as roads/highways, neighboring population and their settlements and other facilities like health, education, agriculture etc. The aim is identifying the assets that may be vulnerable to the different projected landslide hazard severities and provide information to policymakers, decision-makers, and planners for mitigation interventions.

- Map critical infrastructure, population centers, and economic assets within the possible influence of identified hazard zones and predicated possible landslides.
- Overlay hazard maps with exposure data to identify elements exposed to the hazard intersections.

4.4 **Vulnerability Assessment**

- **Multi-Criteria Decision Analysis (MCDA):** Multi-Criteria Decision Analysis (MCDA) approach to assess landslide vulnerability by integrating various factors that contribute to landslide susceptibility helps in identifying and mapping landslide-prone areas, which is crucial for disaster risk reduction and land-use planning. MCDA typically involves analyzing multiple factors geotechnical, structural, topographical and environmental factors which includes such as slope, elevation, aspect, rainfall, drainage density, soil type, land use/land cover, and proximity to roads and stream etc. (refer to the list of factor maps)
- **Soil and Rock Testing:** Conduct shear strength and permeability tests to assess material stability.
- **Drainage and Vegetation Analysis:** Examine the effectiveness of drainage systems and the stabilizing role of vegetation.
- **Climate Modeling:** Assess long-term impacts of changing rainfall patterns and extreme weather events.
- **Stakeholder Inputs:** Incorporate local knowledge and observations to refine vulnerability analysis.
- **Vulnerability Index Development:** Normalize scores and classify slopes into categories (low, moderate, high vulnerability).

4.5 **Risk Profiling**

- Combine vulnerability, hazard, and exposure data to create integrated risk maps.
- Use scenario-based modeling to understand potential outcomes of slope failures.

4.6 **Tools and Techniques**

- GIS and remote sensing for spatial analysis.
- Numerical and Probabilistic models for slope stability analysis.
- CAD for modeling, simulation, and visualization and integration with GIS
- Community surveys for socio-economic data collection.
- Participatory workshops to validate findings and refine strategies.

4.7**. Deliverables**

Expected deliverables (Reports/maps):

1. **Primary**

- Topographic maps
- Digital Elevation Model (DEM) @1x1m pixel size
- Landslide/slope failure database and inventory report
- Landslide/Slope failure Distribution map
- List of Identified factors and their prioritization based on their contribution in inducing the slope stability.
- Analytical factorial maps for each of the selected factors and their classes such as:
    - Topographic Data/map developed using LiDAR, Topographic drone or any better technology :
        - Elevation (DEM - Digital Elevation Model)
        - Slope angle
        - Slope aspect
        - Profile curvature
    - Geological Data/map:

- Lithology (rock type)
- Rock strength
- Faulting and jointing patterns
- RMR/SMR

- Geotechnical Data/report
  - Shear Strength Properties
  - Index properties
  - Stability analysis
- Geomorphological data/Map
  - cliff/vertical scars, crown of landslide/failed slope, cracks/crevasses, subsidence, upheaval, back tilted trees, stream beds, ephemeral streams, abandoned channels, wet land, natural springs, gullies, water pounds, colluvial fans, alluvial fans, terraces etc., incision, toe cutting
- Drainage and watershed map:
  - Drainage watershed and network map
  - Drainage density
  - Drainage flow path map
- Vegetation Cover map:
  - Vegetation type
  - Vegetation density
  - (Normalized Differential Vegetation Index) NDVI
- Hydrological Data:
  - Rainfall intensity and duration
  - Groundwater level
  - Stream erosion patterns
- Landslide Characteristics:
  - Landslide type (e.g., rotational, translational, debris flow)
  - Landslide size and volume
  - Movement direction
  - Failure mechanism
  - Triggering event (e.g., rainfall, earthquake)
- Land Use Data/map:
  - Land cover type (e.g., forest, agriculture, urban)
  - Human activities (construction, mining)
- Infrastructure data/map
  - Highway and its infrastructure
  - Communities with their shelters and properties

Monitoring Data (if applicable):

- Displacement measurements (using extensometers, inclinometers)
- Ground deformation monitoring

- Rainfall monitoring data

2. **Resultant maps/reports:** the following reports and maps must be shared as and when prepared for information, discussion, clarification, updating etc.
    - Inspection Report
    - Geological report
    - Geomorphological report
    - Geo-hydrological reports
    - Geotechnical report
    - Geophysical report
    - Database and inventory of landslides and vulnerable slopes
    - Landslide Hazard zonation (Susceptibility) map and report
    - Exposure Analysis Report: Detailed identification of elements at risk
    - Vulnerability Assessment map and Report: Comprehensive evaluation of slope susceptibilities.
    - Vulnerability and Risk assessment report
    - Risk Profiles and Maps: Integrated risk assessments with visual overlays.
    - Scheme of remedial measures
    - Separate Design report of short term medium term and long term remedial measures.
    - Proposal/ report for Monitoring of critical slopes
    - A report/proposal with plan/scheme for Management of Highway slopes post construction

B. Prevention of Critical Landslides

4.8 **Identification**

There are several critical landslides already selected (Annex 1). However, during hazard identification and vulnerability assessment, additional critical landslides may emerge. Consultant with approval of Authority shall carry out all requisite tests, investigations and DPR for these emerged landslide locations , as expected for landslide locations mentioned in Annexure-I.

4.9 **Historical account of the selected/suggested landslides/slopes:**

The slopes which are already suffered due to landslides can be better understood if the historical records on when, where, why and what (when- records of temporalty of the events – details of the events -may be one time, few times, many times etc.; where- spatiality in terms of geographic position; why – probable causes of the failures What- what action was taken/initiated and what are the results etc i.e., what investigation, mapping, survey, prevention etc.) are provided. In case such records are not available, more detailed work in the field is required on following aspects.

4.10 **Mapping/Survey/Investigation**

The present investigation includes detailed site-specific landslide investigation comprising geological, geomorphological, hydrogeological mapping, and geotechnical investigation including collection of samples for determination of geotechnical properties/parameters in geotechnical lab and geotechnical evaluation, which would provide useful inputs in designing the civil structures, assessment/study of slope stability and to suggest suitable remedial measures.

4.11**Topographic Map**

Topographic map is generally used as a base map for any subsequent survey, mapping, investigation analysis and interpretation because all the components on the slope and their interaction have direct relation with topography of any area. Therefore, the first and foremost is to develop a topographic map on suitable scale (depending on the purpose). In this case the purpose is to design the remedial measures for landslide prevention/slope stability, the contour map should preferably be on 1:500 scale (1cm of map represent the 5m of the ground) so that even the micro morphological features/details which are connected with the stability can be identified on the map/sections and taken into consideration on all stages of the study.

4.12 **Geological mapping**

The regional as well as the local geological features should be adequately known, because the site-specific geological setup is influenced by the regional setup. Geological mapping/investigation mainly includes: the lithological formation with mapping of all type of rocks with their attitudes like the dip/strike of their bedding/foliation with respect to the specific slope being investigated; the geological structures like fault, shear zones, litho contacts, folds, fractures, joints and their attitudes with respect to the slope; In case of the rock slopes, in addition to the above, the detailed discontinuity study – rock mechanical study is required to be undertaken to understand the relationship between the joints/fractures and the failure of the rock slopes. The Consultant shall prepare geological maps at an appropriate scale (e.g., 1:5,00 or more detailed as needed for critical sections), clearly depicting the spatial distribution of different geological formations and structural features. Understanding the geological framework is fundamental to identifying the underlying causes of slope instability and predicting potential failure mechanisms in the mountainous terrain of Himachal Pradesh. Different rock types exhibit varying material properties and behaviors, and the presence of geological structures can significantly influence slope stability.

4.13 **Geomorphological mapping:**

The landslide itself is the manifestation of the changes of dynamic morphological processes. each slope is made up of variety of components which are interconnected and responsible for establishing equilibrium on the slope which keeps it stable and safe. The morphological mapping and investigation therefore becomes extremely important to understand the landslide/ slope failure and the causes for it. Generally, slope morphology map includes: slope angle, slope direction, slope form categories (convex, concave, rectilinear, and compound), relative relief etc. Micro morphological features indicating dynamic changes like the active and passive slide boundary, scarp, cliff, subsidence/sinking, up-heaving, cracking, tilting, rills, gullies, erosion/weathering etc. are also considered. While preparing the geomorphological map the whole affected area from the lowest part of the slope to the top should also include a considerable area beyond the active slide boundary, depending upon the slope condition. Because, the activity on the affected area is also connected with the surrounding of its active boundary which might have also influenced the activity and will continue to influence. .

4.14 **Hydrological Investigations**

Hydro-geology of mountainous slopes is critically important because poor slope drainage is often the root cause of slope failures. Watershed characteristics including identification of water bodies, confined and unconfined aquifers, drainage network, flow pattern, discharge points, seepage points, dormant/seasonal spring points, water table and pore water pressure etc. should be investigated for their role in existing landslide problems or possible contribution in inducing future slope failures. The hydrological and hydraulic studies shall be carried out in accordance with IRC. These investigations shall be carried out for all existing and required drainage measures at the site including uphill, downhill, roadside and across the affected slopes.

4.15 **Geophysical Investigation:**

Resistivity survey and/or Seismic exploration to be done on selective large-scale landslide/slopes as per ground requirement, for identifying the depth and degree of week layer/ bedrock /sliding surface/water table and identifying geological anomalies such as fault/cavities/sinkhole etc.,. The results so obtained from the Geo-physical investigations need to be combined/compared with the Geo-logical investigations like borehole investigations so that a complete image can be obtained for interpreting the geological structures and other details with the stability of slope/landslide

- **Seismic Refraction Tomography (SRT):** In order to characterize the subsurface geologic conditions and geologic structure, SRT is done selectively. SRT is useful for getting valuable information about the stratification, depth and shape of bedrock, location of faults/shear zones, and geotechnical parameters such as rippability and the P-wave modulus. The method is commonly used in geological, geotechnical, and hydrologic investigations
- **Electrical Resistivity Tomography (ERT):** Electrical resistivity mapping is crucial for landslide slopes because it helps in understanding the subsurface conditions that contribute to slope instability. It is useful in identifying areas with high water content or weak soil layers that are prone to sliding. It also helps in mapping the geometry of the landslide body, including its depth and lateral extent

4.16 **Land use and Infrastructure Mapping –** Landuse practices including various infrastructures development on or near the hill slopes carried out without careful planning and sustainable methods not only promotes instability but also the risk to the people and their properties. Therefore, landuse and infrastructure mapping is important to identify the element (people and their properties, various infrastructure etc.) at risk from the potential slope failures/ landslides and assess the degree of risk to the elements. .

4.17 **Hydro-meteorological Data Collection:** The data on precipitation for last 50/100year are required to be collected for correlated with the occurrences of listed major landslides. This data has to be used for prediction/forecasting the probability of new and/ or reactivation of old landslides with specific range of precipitation coupled with other inherent and anthropogenic factors.

4.18 **Geotechnical Investigation**

- **Purpose of Geotechnical Investigations:** The principal objects of the investigation are:
  - To determine the sequence, thicknesses and lateral extent of the soil strata and, where appropriate, the level of bedrock.
  - To obtain representative samples of the soils (and rock) for identification and classification and, if necessary, for use in laboratory tests to determine relevant soil parameters.
  - To identify the groundwater conditions.

The investigation scheme depends on the nature of the strata and the degree of variability of the ground conditions but will normally involve the excavation of trial pits or conducting boreholes.

- To evaluate the subsurface lithology up to a depth of exploring from existing ground level at the proposed locations, so as to develop recommendations for Slope Stabilization and Rehabilitation. To accomplish this purpose, the investigation needs to be conducted in following phases.
  - Drilling of a number of boreholes at each location of proposed critical site to determine subsoil condition as well as to obtain representative samples for laboratory testing.
  - Testing of representative subsoil/rock samples in the laboratory to evaluate their index and engineering properties.
  - Performing engineering analysis of all the field and laboratory data to arrive at the safe bearing capacity & nature of sub soil/rock strata.
  - **Improvement of Core Boring on Hill Slope**

Improving core boring technologies to target (i) Improvement of core recovery ratio and (ii) improvement of transporting and setting hydraulic drilling machines on steep hill slope, shall be ensured by arrangement with qualified firms having requisite machines and skilled manpower in India/Abroad

The detailed scope of work includes the following:

- Making a number of standard geotechnical boreholes though soil/rocks (to be specified as per site requirements in consultation with the MoRTH) along the hill slope section area
- Conducting Standard Penetration Test in boreholes as per Indian Standard Specifications (IS: 2131).
- Collecting disturbed/undisturbed soil samples/rock cores from the bore holes, sealing, numbering and preserving them as per the requirement.
- Conducting relevant field and laboratory tests.
- Recording ground water table, if met.
- Carrying out following Laboratory tests on the Soil/Rock specimens in order to establish their engineering characteristics.

(a) Soil

- Sieve analysis
- Hydrometer analysis
- Natural moisture content
- Bulk density
- Specific gravity
- Atterberg limits
- Shear strength test
- Free Swell Index
- Chemical Analysis
- Bearing capacity

(b) Rock

- Water absorption
- Specific gravity
- Compressive Strength
- RMR
- SMR
- Kinematics
- Bearing capacity

(c) Water

- Chemical Analysis

Preparation of final Geotechnical investigation report inclusive of the following aspects.

- Engineering Analysis
- Lab test results of soil/rock/water samples.
- Recommendation of allowable bearing pressure, depth and type of foundation in soil as well as rock slopes.

- Submitting comprehensive geotechnical report which covering all field works, Laboratory test results and recommendations for the foundation system.

Stability evaluation and design of remedial measures: The most important part of the consultancy in this case would be to arriving at the cost effective and eco-friendly long term package of control measures. The base for framing remedial action/mitigation plan should essentially align with the detailed site investigations of geological, geotechnical, geophysical and other aspects and requisite geotechnical tests and engineering analysis to identify the causes and extent of landslides. The stability evaluation of each identified critical landslide/slope must be based on the critical longitudinal cross sections at every 5m/10m and requisite data so obtained using engineering analysis of various investigations. Diagnosis achieved through stability evaluation of individual critical slopes, thereby, helps in designing the remedial measures. Therefore, the outcome of the stability evaluation and design of measures must be in line with the details of the topographic, geological, geotechnical, Geohydrological, geophysical, meteorological and other investigations and data analysis.

4.19 Design of remedial measure

Consultant is expected to design the scheme of remedial measures using latest methods, techniques and the software. There must be provisions for alternative measures for every critical slope and each alternative must also be backed with proper design. Consultant must provide the design measures with design drawings, their cost, timelines and suggest alternatives having inter-se merit.

4.20 **RoW limitation and requirement Vs remedial measures**

The consultant must demarcate the active as well as passive boundary of each critical slopes/landslides. Active landslide boundaries refer to the zones where a landslide is currently undergoing displacement/movement. These areas are generally characterized by the existence of cracks, sharp scars, tilted trees, or exposed earth etc. While passive landslide boundaries may refer to peripheral area surrounding the active boundaries which may become vulnerable to destabilization due to changes in the landscape, external triggers like rainfall, earthquakes, or human activities. They are significant in understanding the potential expansion of the landslide area and long-term risks. According to the demarcation of both the boundaries, the area required to be treated for long term stability of slopes must be worked out irrespective of limitation of the existing RoW. The justification backed by the technical reasons must be detailed so that the same is placed before the competent authority, if required for excess RoW.

4.21 Consultant is also required to carry out the vulnerability assessment and DPR for critical landslide locations as per OM dated 28.11.2024 of MoRT&H regarding expert committee report on cost effective long term remedial measures for landslide prone areas in hilly region and provide a report separately. Carry out comparison with the methods listed in IRC and JICA guidelines and methods given in aforesaid OM and give detailed comments in form of report as a way forward for carrying out the vulnerability assessment in future for PAN INDIA highways in Hilly terrain.

4.22 **Monitoring of landslides**

By definition, landslides are characterized by movement. Knowledge of the movement magnitude and velocity, that is, movement distribution along the slope, are the most important data for critical landslide analysis. Monitoring is required to observe the changing conditions that may lead to total failure of the slope where slope movement is occurring. Therefore, the consultant, based on the existing as well as generated data, must consider if any active critical slopes/landslides require monitoring, even post implementation of remedial measures. The selection of measurement, instrumentation and methods or the planning and design of a desirable monitoring system depends on the movement types and deformation etc. Therefore, the consultant must propose the modes of monitoring (e.g. satellite and remote sensing techniques,

photogrammetric techniques, geodetic or observational techniques, and geotechnical or instrumentation or physical techniques) with justification of such recommendation, their objective and scope of the activity including methodology and BOQ etc.

4.23 **Provision of avoiding the risk**

Based on the proposed study, if the consultant find it economically and socially not viable or/and difficult to control the landslides, suitable alternate option of avoiding the risk can be proposed. This may be through the Provisions of C&C tunnels/ full tunnel/viaduct/ bypasses etc., with justification, objective, scope, Design and Drawing as well as BOQ as per the relevant specifications of IRC/MoRTH and other international specifications.

4.24 Socio-economic Impact of landslide occurrences

In case of identified critical slopes, the landslide events of large scale may cause direct losses on repair and maintenance, restoration, rehabilitation or the replacement of the damaged highway; and also indirect losses which include damage to property (if any), loss of life (if any), permanent danger and hardships to the people living in the vicinity (if any) of landslide areas including environmental problems. The consultant, therefore, must do the socio-economic analysis of such events to understand the importance of long-term landslide/slope protection. This analysis can be done utilizing the database prepared from the available information on the activity of landslides and on indirect and direct losses for individual historic/critical/large scale landslides as well as landslide activity on the whole stretch of highways.

4.25 Warranted landuse changes

There may be cases where existing RoW is not enough to accommodate the suggested measures. In such cases, landuse changes may be required due to limited space for implementation of suggested remedial measures for longterm stability. Consultant must earmark the required area in the relevant drawings over the existing RoW with clear cut background, justification and detailed proposal with socioeconomic analysis etc in consultation with MoRTH.

4.25.1 Role and Responsibilities at different stages of Land Acquisition, if any.

4.25.1.1With regard to land acquisition, tree felling, utility shifting across the highway slopes, if required, Ministry's Guidelines issued vide letter no. NH-15017/21/2018-P&Mdated10thMay, 2018, or any amendment thereof, may be adhered to.

4.25.1.2The excess area must be demarcated on all the relevant GIS base maps and the cadastral/ land revenue maps for the purpose of land acquisition activities.

4.25.1.3Identify and list all land details that need to be acquired for implementing the designed stabilization measures for landslide/ slope protection/ prevention. Conduct Joint measurement survey in conjunction with CALA, the Executing Agency and the Land Revenue Department to verify land records and assist them till the completion of land acquisition process.

4.25.1.4Clear identification and preparation of an inventory of the assets attached to the land under acquisition (e.g. Structures, trees, crops or any such assets which should be valued for payment of compensation); and, co-ordination with offices of various relevant departments like Land Revenue Office, Registrar office and other State departments for evaluation of assets attached to the land and liaison with respective State authority for authentication of the valuation.

4.25.2 Deliverables

- Topographic map of each landslide 1:500

- Digital Elevation Model (DEM) @1x1m pixel size and derivative maps
- Landslide/slope failure database and inventory
- Landslide/Slope failure Distribution map
- Geological Data/map:
  - Lithology (rock type)
  - Rock strength properties
  - Faulting and jointing patterns
  - RMR/SMR
- Geotechnical Data/report
  - Shear Strength Properties
  - Index properties
  - Stability analysis
- Geomorphological data/Map
  - cliff/vertical scars, crown of landslide/failed slope, cracks/crevasses, subsidence, upheaval, back tilted trees, stream beds, ephemeral streams, abandoned channels, wet land, natural springs, gullies, water pounds, colluvial fans, alluvial fans, terraces etc., incision, toe cutting
- Drainage and watershed map:
  - Drainage map, natural as well as manmade drains, seepage/springs/damp are etc.
  - Drainage flow path map
- Vegetation Cover map:
  - Vegetation type
  - Vegetation density
- Hydrological Data:
  - Rainfall intensity and duration
  - Groundwater level
  - Stream erosion patterns
- Landslide Characteristics:
  - Landslide type (e.g., rotational, translational, debris flow, debris/rockfall)
  - Landslide size and volume
  - Movement direction
  - Failure mechanism
  - Triggering event (e.g., manmade, rainfall, earthquake)
- Land Use Data/map (in and around the landslide/slope):
  - Land cover type (e.g., forest, agriculture, urban)
  - Human activities (construction, mining)
- Infrastructure data/map (in and around the landslide/slope):
  - Highway and its infrastructure
  - Communities with their shelters and properties
- Rainfall monitoring data:
  - Daily, Monthly and hourly data of last 50-100 years
  - Correlation of rainfall amount, intensity and duration with landslide occurrence in the area
  - Vulnerable slope map based on rainfall and landslide occurrence
- Monitoring proposal (if applicable):
  - Background, need and objective of Monitoring
  - Type, methodology and execution/implementation plan of Monitoring
  - Detailed monitoring plan
  - Consequences of not monitoring
  - Economic viability and risk
  - BOQ etc.
- Design scheme of Remedial measures
  Short term, Medium term and Long term

The reports: The following reports must be shared as and when prepared for information, discussion, clarification, updating etc.

1. Inspection Report
2. Geological report
3. Geomorphological report
4. Geo-hydrological reports
5. Geotechnical report
6. Geophysical report
7. Database and inventory of landslides and vulnerable slopes
8. Vulnerability and Risk assessment report
9. Separate Design report of short term medium term and long term remedial measures.
10. Proposal report for Monitoring of critical slopes
11. A report with plan/scheme for Management of Highway slopes post construction

5. Quality Assurance Plan (QAP)

1. QAP

(i) The Consultants should have detailed Quality Assurance Plan (QAP) for all field studies including all surveys, investigations, design and documentation activities. The quality assurance plans/procedures for different field studies, engineering surveys and investigation, design and documentation activities should be presented as separate sections like engineering surveys and investigations, material geo-technical and sub-soil investigations, environment and R&R assessment, economic & financial analysis, drawings and documentation, preparation, checking, approval and filing of calculations, identification and tractability of project documents etc. Further, additional information as per format shall be furnished regarding the details of personal who shall be responsible for carrying out/preparing and checking/verifying various activities forming part of feasibility study and project preparation, since inception to the completion of work. The detailed Draft QAP Document must be discussed and finalized with the Authority immediately upon the award of the Contract and submitted as part of the inception report.

(ii) It is imperative that the QAP is approved by Ministry of Road Transport & Highways before the Consultants start the field work.

2. Data formats for report and investigation results

(i) Required data formats for some reports, investigations and documents are discussed in ENCLOSURE-IV

(ii) Formats for submission of Reports and Documents.

(iii) The consultants will need to propose data formats for use in all other field studies and investigations not covered in enclosure IV.

(iv) The proposed data forms will need to be submitted for the approval of HPPWD after the commencement of services.

6. Detailed Project Report: Final DPR report

6.1 Deliverables: The following are the deliverables which should be achieved during the course of DPR preparation and shared for implementation:

1. The following are the set of deliverables related to survey which should be submitted after completion of survey:

   (a). Raw DGPS data for the affected locations and adjoining areas of interest

   (b). Point cloud data or equivalent for the affected locations and adjoining areas of interest in a format/ platform as per industry good practice which shall be amenable to operations by Ministry of Road Transport & Highways / Consultant. Ministry of Road Transport & Highways may decide about format/ platform of point cloud data

   (c). Topographic map of scale 1:500 of the affected locations and adjoining areas of interest with 0.5 m counter interval and cross Sections of every 5m.

   Topographic map of scale 1:5000 for entire highway

   (d). Topographic map of scale 1:5000 for vulnerability assessment with 1.0 m counter interval and cross Sections of every 10m-15m for entire highway from Km 11.8 to km 103.55, however, the consultant can vary the contour interval and the interval of cross section as per the requirement of the terrain based on natural slope conditions.

   (e). Develop a digital elevation/surface model (bare earth model from survey data) digital terrain model combining topographic data from LiDAR, road inventory and other available sources of data for use while modeling area of study.

   For land based surveys, Mobile LiDAR (Light Detection and Ranging) or better technology that can meet above requirements shall be adopted. For aerial based surveys, Aerial Mobile LiDAR (Light Detection and Ranging) or better technology that can meet above requirements shall be adopted. Where possible, mobile/terrestrial LiDAR and total station or better studies should be used to supplement aerial LiDAR for the study of affected locations. Aerial based surveys shall be used as the primary source of topographical data only in cases where it is necessary to significantly increase the survey corridor beyond the capabilities of mobile LiDAR. In shadow areas such as invert levels below culverts, Terrestrial LiDAR shall be used where LiDAR or better technologies cannot survey accurately, traditional methods of Total Station/ Auto Level shall be used to complete the study.

   (f). In case of mobile LiDAR or better technology, 360 degree panoramic images of the affected locations and adjoining areas of interest shall be submitted. In case of aerial LiDAR or better technology, ortho-images of the affected locations and adjoining areas of interest shall be submitted.

2. **The width of survey corridor will generally be as given under:**

The width of the survey corridor should take into account the layout of the existing highway alignment including the extent of affected locations and the general ground profile. While carrying out the field surveys, the proposed remedial measures should be taken into consideration so that the topographic surveys cover sufficient width. Area of study shall include the extent of survey in required width across the highway for assessing the hazard adequately. For example in certain instances it can be from top of mountain to bottom (river/stream).

3. Once the topographic base map has been prepared, the same shall be used for preparation of subsequent analytical factor/thematic maps of landslide induced factors and sub factors or classes as discussed under the section 4.7 of 4 A and 4.24.2 of 4B. This means that all the factor maps of the highway slopes from Rajban to Fediz must be of 1:5000 scale and all the maps as listed in 4.24.2 of 4B of critical slopes/landslides must be of 1:500 scale.

6.2 Longitudinal and Cross-Sections for critical Landslides

1. Consultants shall also develop an as-is map of the road including:

   i. Geo-referenced digital map of as-is project highway

   ii. Earth surface, road layers, geological, geomorphological and geotechnical data of the affected locations and trees with feature data extracted and mapped in layers, marked on the map and tabulated data provided separately.

   iii. All surface, sub surface inventory, investigation and soil survey data to be super-imposed as layers using geo-referencing data.

2. The data should be collected in sufficient detail. The data should be compiled and presented in tabular as well as graphical form. The inventory data would be stored in computer files using simple utility packages, such as EXCEL.

7. **Standards and Codes of Practices**

(i) All activities related to field studies, design and documentation shall be done as per the latest guidelines/ circulars of MoRT&H and relevant publications of the Indian Roads Congress (IRC) and Bureau of Indian Standards (BIS). For aspects not covered by IRC and BIS, international standards practices, may be adopted. The Consultants, upon award of the Contract, may finalize this in consultation with MORTH and reflect the same in the inception report.

(ii) All notations, abbreviations and symbols used in the reports, documents and drawings shall be as per IRC:71.

(iii) The Consultant shall evolve Design Standards and material specifications for the Study primarily based on IRC publications, MORT&H Circulars and relevant recommendations of the international standards for hill roads for approval by MORTH.

(iv) The consultant shall be guided in its assignment by the Model Concession/ Contract Agreements for EPC projects, and the Manual of Specifications and Standards for two laning of highways published by IRC (IRC:SP:73) along with relevant IRC codes such as IRC:52, IRC:SP-19, IRC :SP:42, IRC:SP:48, IRC:SP:106, IRC:SP-108, IRC:SP-113, IRC:SP-116, Highway Research Board Publication HRB SR S.No. 23,2014, HRB SR no. 24. Guidelines for planning of hill roads, slope protection and embankment with advance technology, O&M of hill roads prepared by MoRT&H in association with JICA & published by IRC in 2023, OM dated

28.11.2024 of MoRT&H regarding expert committee report on cost effective long term remedial measures for landslide prone areas in hilly region and other relevant codes and research papers.

(v) Draft/Manual for slope reading and slope inspection developed by JICA.

8. Estimation of Quantities and Project Costs

1. The Consultants shall prepare detailed estimates for quantities (considering designs and mass haul diagram) and project cost for counter measures for each critical landslides, including the cost of environmental and social safeguards proposed based on MoRT&H's Standard Data Book and market rate for the inputs. The estimation of quantities shall be based on detailed design of various components of country measures. The estimation of quantities and costs would have to be worked out separately for civil work Package as defined in this TOR.

2. The Consultants shall make detailed analysis for computing the unit rates for the different items of works. The unit rate analysis shall duly take into account the various inputs and their basic rates, suggested location of plants and respective lead distances for mechanized construction. The unit rate for each item of works shall be worked out in terms of manpower, machinery and materials.

3. The project cost estimates so prepared are to be checked against rates for similar on-going works in India under MoRTH & its implementing agencies projects.

4. The Consultant should work out the quantity of various items including cement, bio engineering measures etc likely to be used in the project and indicate in the summary sheet.

5. Work out approximate cost for short and long term measures on the basis of hazard vulnerability assessment based on most economic counter measures suitable as per site requirement. For clarity purpose for detailed cost estimate shall be carried out for critical landslide locations

8.1 Bidding process

8.2.1 Consultant shall assist the authority in preparing the required bid documents for civil works for countermeasures for each landslide location, or as per direction of Authority and support the authority through the bidding process

8.2 Preparation of documents

1. The consultant shall prepare and technical schedules required for the bidding of the project

2. The Consultants shall prepare separate documents for each package of the DPR assignment

3. The DPR consultant may be required to prepare the Bid Documents, based on the feasibility report, due to exigency of the project for execution if desired by Ministry of Road Transport & Highways.

4. Provide any other documents and details w.r.t. the Bid Documents.

8.3. Support during the bidding process

1. During the bid process for a project, the consultant shall support the authority in responding to pre-bid technical queries

2. The consultant shall assist Ministry of Road Transport & Highways and its functionaries as needed in the evaluation of technical bids

9. Time period for the service

1. Time period envisaged for the study of the project is indicated in Annex-I to LOI. The final reports, drawings and documentation shall be completed within this time schedule.

2. Ministry of Road Transport & Highways shall arrange to give approval on all sketches, drawings, reports and recommendations and other matters and proposals submitted for decision by the Consultant in such reasonable time so as not to delay or disrupt the performance of the Consultant's services.

10. Project Team and Project Office of the Consultant

1. The Consultants shall be required to form a multi-disciplinary team for this assignment. The consultants' team shall be manned by adequate number of experts with relevant experience in the execution of similar detailed design assignments.

2. List of suggested key personnel to be fielded by the consultant with appropriate man- month of consultancy services is given in Enclosure-I as per client's assessment.

3. A Manning Schedule for key personnel mentioned above is enclosed as Enclosure-I along with broad job- description and qualification as Enclosure-II. The information furnished in Enclosures-I & II are to assist the Consultants to understand the client's perception about these requirements and shall be taken by the Consultants for the purpose of Financial Proposal and deployment schedule etc. in technical proposal to be submitted by them. Any deviation proposed may be recorded in the comments on TOR. All the key personnel mentioned will be evaluated at the time of evaluation of technical proposal. Consultants are advised in their own interest to frame the technical proposal in an objective manner as far as possible so that these could be properly assessed in respect of points to be given as part of evaluation criteria as mentioned in Data sheet. The bio-data of the key personnel should be signed on every sheet by the personnel concerned and the last sheet of each bio-data should also be signed by the authorized signatory of the Consultants.

4. The Consultants shall establish an office at the project site manned by senior personnel during the course of the surveys and investigations. All the project related office work shall be carried out by the consultant in their site office unless there are special reasons for carrying out part of the office work elsewhere for which prior approval of Ministry of Road Transport & Highways shall be obtained. The address of the site office including the personnel manning it including their Telephone and email will be intimated by the Consultant to Ministry of Road Transport & Highways before commencement of the services.

5. All key personnel and sub professional staff of the DPR Consultants shall use the

Attendance shall be marked at least once a day and anytime during the day. Biometric Attendance System shall be installed by the DPR Consultants at its own cost at the site office and design office in order to facilitate the attendance marking. A copy of attendance records shall be attached at the time of submission of their bills to the Ministry of Road Transport & Highways from time to time. Proper justification shall be provided for cases of absence of key personnel/ sub-professional staff which do not have prior approval from Project Director of

Concerned stretch. If Ministry of Road Transport & Highways so desires, it shall facilitate electronic linking of the attendance system with the Central Monitoring System of Ministry of Road Transport & Highways.

11. Submission of reports

Reports to be submitted by the Consultant to Ministry of Road Transport & Highways.

11.1 Formats for submission of Reports and Documents

1. Standard formats for deliverables

i. During the course of the assignment to prepare detailed project report, several reports, drawings and documents will need to be submitted by the consultants to PIU, Paonta Sahib & Regional Office, Shimla MoRTH.

ii. For the purposes of submission, format requirements have been laid out for some of the reports and drawing deliverables in this enclosure, which shall be adhered to strictly.

iii. In addition, consultants are to align and agree with PIU, Paonta Sahib & Regional Office, Shimla, MORTH officials the format of submission for all reports, during the inception stage as mentioned in clause 10.2 of these terms of reference.

2. Format for submission of report deliverables

2.1 Printed hard copies of reports

i. All reports and documents shall be submitted in both printed hard copy and digital formats.

ii. For hard copies, the consultant shall submit bound volumes (and not in spiral binding form) after completion of each stage of work as per the schedule and in the number of copies as given in Enclosure III.

2.2 Digital copies of reports

i. Every report shall also be submitted in digital format to the authority in the following formats:

ii. The final report shall be submitted in the portable document format (.pdf)

iii. An editable document in the relevant Open Document Format for Office Applications (ODF) and if available the relevant Microsoft Office document format (MS Office).

iv. All tables and models used to and referred to in the reports shall also be submitted as spread-sheets in the relevant ODF format and MS Office format.

v. The digital copies of reports shall be submitted in the form of removable storage devices (CD or USB pen drive) and also hosted on a secured online document storage and retrieval platform as described in clause 2 Data products.

vi. The removable storage device submitted at each deliverable stage shall contain:

vii. Reports for that stage

viii. All draft and final reports previously submitted

ix. Correspondence with MoRTH

x. Clients' comments on submitted reports

xi. Any communication, letters and approvals to and from other government and local

agencies and any other relevant body.

xii. An updated index of all the contents on the removable storage device.

xiii. Every submission will be accompanied by a table of contents and index of all documents submitted for ease of reference

2.3 Data products

1. During the course of the assignment, the consultant shall perform several surveys and collect data that will be used for the design of the road and delivered to the client.
2. Consultants are encouraged to keep commonly available software and data packages, and typical uses for data while deciding final formats of data within the constraints of this document or where a format has not been defined
3. As required in clause Error! Reference source not found. Error! Reference source not found., consultants are required to agree with MoRTH all actual data formats proposed to be used for the project.
4. In order to standardize data formats and simplify hand over and re-use of data, some requirements for minimum content and format are laid down below.

Sr. No.	Data Product	Contents required (definition) >as applicable<	Data format
1	Images	360 Deg/ ortho images of entire project	Geographic Tagged Image File Format (GeoTIFF)
2	Video	360-degree panoramic images and videography of the terrain, In case of aerial LiDAR or better technology, ortho-images of the entire highway length and adjoining areas of interest shall be submitted.	Audio video interleave (.avi) or MPEG-4 file (.mp4)
3	Topographic map + contours	1:500/1:5000 scale maps with 50 cm contours with highway as well as all landslides including vulnerable slopes	Contours: geo-referenced shape files (.shp) or .dxf files,.dwg/.dgn files Options
4	Digital elevation model	Digital terrain modeled from aerial and ground surveys	Digital elevation model in USGS Spatial Data transfer standard (SDTS) format
5	Thematic maps	Thematic maps of each component as discussed under the TOR	geo-referenced shape files (.shp) or .dxf files,.dwg/.dgn files options
6	Landslide inventory, Landslide hazard, Vulnerability and Risk maps	A landslide inventory map with hazard, vulnerability and risk maps. Database of the landslides and the vulnerable slopes to be provided separately in .xls format	geo-referenced shape files (.shp) or .dxf files, .dwg/.dgn files options

7	Longitudinal cross sections	Location of cross sections, lat, long, Cross section drawings	.dxf files, .dwg/.dgn files options
8	Stability analysis	Stability analysis of each landslide/ vulnerable slope of moderate to large size through the best available software (latest version of Slide, RS2 by Rocscience, Geo 5 etc.) incorporating all geological and geotechnical parameters along with data.	. dxf files, .dwg/.dgn files options.
9	Scheme of measures for protection of landslides/ sloes	Each slope measures must be provided both in separate drawings and combined on a georeferenced map of the particular slope/ landslide/ area	dxf files, .dwg/.dgn files options and geo-referenced shape files (.shp

11.2 Online hosting and archival of deliverables

1. Hosting deliverables online

i. The consultant shall store all deliverables from this assignment on a secure online file hosting platform that is remotely accessible by authorized users on the World Wide Web.

ii. The consultant shall provide read only access to all relevant officers of MoRTH and provide further access to additional users as and when requested by MoRTH.

iii. Consultant shall provide a point of contact for access to these files, solving any technical issues and shall respond to all requests in a timely manner.

iv. Consultant shall ensure that the files are hosted in a platform that conforms to any file hosting and file sharing security standards as may be laid down by the government of India.

2. Deliverables to be hosted

Data and deliverables to be hosted in an online accessible format shall include but not be limited to:

v. All draft and final deliverables in the digital formats prescribed in this TOR and in file formats in wide use where formats are not specified.

vi. Data, images and videos from all surveys and investigations conducted of this enclosure.

vii. All correspondence to and from MoRTH including clients' comments on submitted reports.

viii. Any communication, letters and approvals to and from other government local agencies and any other relevant body.

ix. The platform shall also contain an index and table of contents of information being hosted for ease of access and use.

3. Time period and costs

i. Access to above mentioned files will be provided till the end of construction (final commercial operations date of contractor/ concessionaire of all packages that form a part of this assignment at the cost of the consultant.

ii. Access to additional users shall also be at no additional cost to the authority.

11.3 Timelines for the submission of reports and documents

Consultant shall be required to complete, to the satisfaction of the client, all the different stages of study within the time frame indicated in the schedule of submission given in bid document pertaining to Reports and Documents for becoming eligible for payment for any part of the next stage.

11.4 Schedule for submission of Reports and Documents

Stage No.	Activity	No. of hard copies in addition to soft copies		Time Period in days from date of commencement
		At MORTH HQ	At Regional office of MORTH Shimla and PD PIU Paonta Sahib	
1	**Monthly Reports**	**1**	**2**	By 10th day of every month
2	**Inception Report**			
	(i) Draft Inception Report including QAP Document	**1**	**2**	**21**
	(ii) Inception Report including QAP Document	**1**	**2**	**(MORTH comment will be submitted in 10 days)** **35**
PART A (Hazard, vulnerability and risk assessment) 35%				
	Submission of Draft report for stretch from Km 11.8 to Km 50			120 **(MORTH comment will be submitted in 15 days)**
	Submission of Draft report for stretch from Km 51 to Km 103.55			150 **(MORTH comment will be submitted in 10 days)**
	Submission of complete Report for entire project stretch			180
PART B (DPR for counter measures for critical landslide locations)				
	Preliminary assessment and way forward for critical landslide locations			30 **(MORTH comment will be submitted in**

					15 days)
		Feasibility report for the critical landslide locations			120 **(MORTH comment will be submitted in 21 days)**
		Draft DPR report for the critical landslide locations			150 days **(MORTH comment will be submitted in 15 days)**
		Submission of Final DPR Report for entire critical landslide locations			180
		Submission of Land Acquisition Report : 3 (a) and 3 (A)			Between 150-200
		Submission of Land Acquisition Report : 3 (D) and 3 (G)			3D by 230 days 3G by 270 days
		Submission of stage I forest clearance documents			180

12. Reports and Documents to be submitted by the Consultant to Ministry of Road Transport & Highways

1. The Consultant shall submit to the client the reports and documents in bound volumes (and not spiral binding form) after completion of each stage of work as per the schedule and in the number of copies as given in Enclosure-III. Further, the reports shall also be submitted in pendrive/hard disk in addition to the hardcopies as mentioned in Enclosure-III. Consultant shall submit all other reports mentioned specifically in the preceding paras of the TOR.

2. The time schedule for various submissions prescribed at Sl. No.1 above shall be strictly adhered to. No time overrun in respect of these submissions will normally be permitted. Consultant is advised to go through the entire terms of reference carefully and plan his work method in such a manner that various activities followed by respective submissions as brought out at Sl.No.1 above are completed as stipulated. Consultant is, therefore, advised to deploy sufficient number of supporting personnel, both technical and administrative, to undertake the project preparation activities in construction package (Section) simultaneously. As far as possible, the proposal should include complete information such as number of such persons, name, position, period of engagement, remuneration rate etc. The Consultant is also advised to start necessary survey works from the beginning so as to gain time in respect of various other activities in that stage.

3. DPR Deliverables in each stage of project

1. The key stages, activities and deliverables for the detailed project report are as described in these documents
2. The following section describes the detailed requirements for each report that needs to be submitted
3. Consultants are also advised to refer to table referred at section 2.3 above
4. Formats for submission of Reports and Documents to understand any additional format and content requirements
5. All reports must be submitted along with the relevant checklist form completed and signed off by the consultant

13. Checklist of reports

13.1 Inception Report

13.2 Feasibility Report

13.3 Detailed Project Report

13.4 Technical Schedules

13.1 (i) Preliminary Assessment and way forward for critical L/s locations

(a) Executive summary

(b) Preliminary assessment of each l/s location

(c)Test/visual inspection, local enquiry done

(d) Detailed description of activities to be carried out for each site with Gantt chart

(e) Conclusion

13.2 (ii) Feasibility Report

1. The consultant shall commence the Feasibility Study of the project in accordance with the accepted IR and the report shall contain the following:

i. Executive summary

ii. Overview of Ministry of Road Transport & Highways organization and activities

iii. Project description including possible measures for prevention of landslide/rockfall at affected locations

iv. Methodology adopted for the feasibility study

v. Socioeconomic profile of the project areas

vi. Indicative design standards, methodologies and specifications

vii. Cost estimates based on preliminary rate analysis and bill of quantities,

viii. Cost analysis of all alternate identified remedial measures

ix. Economic and financial analysis

x. Conclusions and recommendations

2. In view of para 1 above the consultant has to submit the following documents in six sets:

i. **Rate Analysis:** This volume will present the analysis of rates for all items of works. The details of unit rate of materials at source, carriage charges, any other applicable charges, labour rates, and machine charges as considered in arriving at unit rates will be included in this volume.

ii. **Cost Estimates:** This volume will present the each item of work as well as a summary of total cost.

iii. **Bill of Quantities:** This volume shall contain the detailed Bill of Quantities for all items of works

3. The data obtained from the field studies and investigations shall be submitted in a separate volume as an Appendix to Feasibility Report.

13.3 Draft Detailed Project Report (DPR)

A. DPR on Hazard, vulnerability and risk assessment:

As detailed in TOR, including executive summary (?).

B. DPR on for critical L/s locations:

C. DPR on Monitoring and Management of Landslides:

The DPR report must be submitted separately on each major task as indicated above as A., B., and C as well as a combine report.

1. The draft DPR Submission (of major tasks as A.B.C items above) shall consist of Main Report with respective details (as per ToR) on the work accomplished against each task/activity and the outputs and outcomes including Design Report, Materials Report, Engineering Report, Drainage Plan, Drainage Design Report, critical landslide wise-wise bid Documents and Drawings as well as bid documents on hazard, vulnerability and risk assessment and Monitoring and Management.

2. The Report volumes shall be submitted as tabulated in para 13 above.

3. The Documents and Drawings shall be submitted for the Package/chainage and shall be in the following format:

Reports

i. **Volume-I, Main Report:** This report will present the project background, social analysis of the project, details of surveys and investigations carried out, analysis and interpretation of survey and investigation data, cost estimation, environmental aspects, economic and commercial analyses and conclusions. The report shall include Executive Summary giving brief accounts of the findings of the study and recommendations. A sample executive summary has been enclosed in Appendix II.

The Report shall also include maps, charts and diagrams showing locations and details of existing features and the essential features of improvement and upgrading.

The socioeconomic and Environmental Impact Assessment (EIA) Report for contract package shall be submitted as a part of the main report.

The basic data obtained from the field studies and investigations and input data used for the preliminary design shall be submitted in a separate volume as an Appendix to Main Report.

ii. **Volume - II, Design Report:** This volume shall contain design calculations, supported by computer printout of calculations wherever applicable. The Report shall clearly bring out the various features of design standards adopted for the study. The design report will be in two parts. Part-I shall primarily deal with the design of cost effective remedial measures for prevention of landslide/rockfall at affected locations while Part-II shall deal with the design of drainage system and others as applicable. The sub-soil exploration report including the complete details of boring done, analyses and interpretation of data and the selection of design parameters shall be included as an Appendix to the Design Report.

The detailed design for all features should be carried out as per the requirements of the Design Standards for the project. However, there may be situations wherein it has not been possible to strictly adhere to the design standards due to the existing site conditions, restrictions and other considerations. The report should clearly bring out the details of these aspect and the standards adopted.

iii. **Volume - III, Test and investigation and finding and analysis report:** Details of test and investigations conducted and based on finding the analysis carried out for each critical landslide locations:.

iv. **Volume-IV, Technical Specifications:** The MORT&H's Technical Specifications for Road and Bridge works shall be followed for this study. However, Volume IV: Technical Specifications shall contain the special technical specifications which are not covered by MOST Specifications for Roads and Bridges (latest edition / revision) and also specific quality control norms for the construction of works. Hill Road Manual and Standards and Specifications for design of suitable remedial measures for prevention of landslides/rockfall of globally accepted guidelines only..

v. **Volume - V, Rate Analysis:** This volume will present the analysis of rates for all items of works. The details of unit rate of materials at source, carriage charges, any other applicable charges, labour rates, machine charges as considered in arriving at unit rates will be included in this volume.

vi. **Volume - VI, Cost Estimates:** This volume will present the contract package wise cost of each item of work as well as a summary of total cost.

vii. **Volume - VII, Bill of Quantities:** This volume shall contain the package-wise detailed Bill of Quantities for all items of works.

viii. **Volume - VIII, Drawing Volume:** All drawings forming part of this volume shall be 'good for construction' drawings. All plan and profile drawings will be prepared in appropriate scale The consultant shall also provide digital versions of all drawings stated in para 1 above in the format proposed in Enclosure IV

The draft Detailed Project report of specialized projects will be scrutinized by the Peer Review expert appointed by Ministry of Road Transport & Highways and /or by World Bank representative/s. The peer Review expert will be retired professional in the field, drawn from the various Central/State Highway/Road Work departments having adequate knowledge in the field.. The Peer Review expert will scrutinize the draft DPR within 15 days of submission and the observations will be complied with and incorporated in the final DPR.

13.4 Final Detailed Project Report, Documents and Drawings (6 Sets)

1. The Final package-wise DPR consisting of Main Report, Design Report, Drainage Design Report and investigation Report, incorporating all revisions deemed relevant following receipt of the comments from Ministry of Road Transport & Highways on the draft DPR shall be submitted as per the schedule given in Enclosure-III.

13.5 Bid documents and Technical Schedules

1. Bid documents

a. The consultant shall prepare bid documents for EPC, PPP or other modes of contracting as suggested by Ministry of Road Transport & Highways

b. Individual bid documents will be submitted for each mode suggested and for each individual package or section identified for execution

c. Consultant shall assemble and provide all supporting documents from the DPR assignment that will be required for the bid, in the format required by the contracting SOP in force at the time of bidding or as maybe required by the authority

2. Technical Schedules

a. The consultant shall submit a Draft Contract/Concession Agreement derived from the Master Contract/Concession Agreement maintained by the authority with all required modifications and inclusions made with reference to the

b. The agreement submitted shall contain all required technical schedules updated with the pertinent project details and data required

c. Draft agreement and schedules shall be finalised in consultation with the authority and submitted for further processing and use with the contractor/concessionaire awarded the bid packages

14. Interaction with Ministry of Road Transport & Highways

1. During entire period of services, the Consultant shall interact continuously with Ministry of Road Transport & Highways and provide any clarification as regards methods being followed and carryout modification as suggested by Ministry of Road Transport & Highways. A programme of various activities shall be provided to Ministry of Road Transport & Highways and prior intimation shall be given to Ministry of Road Transport & Highways regarding start of key activities such as boring, survey etc. so that inspections of Ministry of Road Transport & Highways officials could be arranged in time. During the assignment the consultant are required to present the status and finding through power point presentations as and when required by the Authority.

2. The Ministry of Road Transport & Highways officers and other Government officers may visit the site at any time, individually or collectively to acquaint/ supervise the field investigation and survey works. Ministry of Road Transport & Highways may also appoint a Proof Consultant to supervise the work of the DPR consultant including inter-alia field investigation, survey work, Design work and preconstruction activities

3. The consultant shall be required to send 3 copies of concise monthly Progress Report by the 10th th day of the following month to the designated officer at his Head Quarter so that progress could be monitored by the Ministry of Road Transport & Highways. These reports will indicate the dates of induction and de-induction of various key personnel and the activities performed by them. Frequent meetings with the consultant at site office or in Delhi are foreseen during the currency of project preparation.

4. All equipment, software and books etc. required for satisfactory services for this project shall be obtained by the Consultant at their own cost and shall be their property.

15. Payment Schedule

1. The Consultant will be paid consultancy fee as a percentage of the contract values as per the schedule given in the Draft Contract Agreement.

16. Data and Software

1. a. Consultants shall also deliver to Ministry of Road Transport & Highways all basic as well as the processed data from all field studies and investigations, report, appendices, annexure, documents and drawings in a digital format as described in section 11 above over the course of this assignment and at the submission of the final report in the form of a removable storage device (USB pen drive/ hard disk) and hosted in a secure online file hosting platform

   b. If required by Ministry of Road Transport & Highways the consultant shall arrange at their own cost necessary software for viewing and measurement of imagery/ point cloud data.

      i. **Engineering Investigations and Traffic Studies:** Road Inventory, landslide investigations rock testing and other investigations/test required DPR for critical landslide

      ii. **Topographic Surveys and Drawings:** All topographic data would be supplied in (agreed format along with complete reference so that the data could be imported into any standard highway design software. The drawing files would be submitted in dxf or dwg format.

      iii. **Rate Analysis:** The Consultant shall submit the rate analysis for various works items including the data developed on computer in this relation so that it could be used by the Authority later for the purpose of updating the cost of the project.

      iv. Economic and Financial Analysis

2. **Software**: The Consultant shall also hand-over to Ministry of Road Transport & Highways hard disk/pen drive containing any general software including the financial model which has been specifically developed for the project.

3. The pendrive/hard drive should be properly indexed and a catalogue giving contents of all floppies/CD's and print-outs of the contents (data from field studies topographic data and drawings) should be handed over to Ministry of Road Transport & Highways at the time of submission of the Final Report.

4. Consultant shall include editable soft copies of the final versions of all documents, including but not limited to the strip plan, plan & profile drawings, cross sections of

right of way and details of structures as well as any cost workings. The data shall be provided in MS office platform, drawing, shape files and all raw data in format acceptable to Authority

Note:

In addition to the design for landslide control/protection/prevention/mitigation measures, preventive measures for other vulnerable slopes identified during vulnerability assessment should also be done.

The consultant should also clearly lay some guidelines to manage and maintain the slopes after the implementation of the suggested schemes of remedial measures is done.

There may be historical/critical/ large landslides requiring of instrumented monitoring after implementation of suggested scheme of remedial measure- should clearly identify and suggest the scheme of instrumentation

There may be landslides which may not be economical to treat, instead of avoiding- the means by which the same can be done must be elaborately highlighted. In case a bypass or a viaduct or a tunnel or any other structures are suggested, a comprehensive scheme of the same including design etc. must be given.

There may be instances where both the above options are not possible (the treatment and the avoidance)-consultant should clearly suggest other possible means of dealing with the landslides.

The vulnerability assessment is being suggested so that not only the existing but also the possible future failures can be avoided. This is possible when such slopes are identified.

It is preferable to involve green solutions including bioengineering in major way so that environmental issues can be addressed effectively, provided such measures serve the purpose efficiently.

ENCLOSURE-I

MANNING SCHEDULE.

A. Key personnels

Sr. No.	Key personals	Total Time Period (man month)
1	Team Leader Cum Landslide expert	9
2	Senior Geologist	6
3	Senior Geotechnical Engineer	6
4	Senior Geomatics Expert	6
5	Senior Hydrology and Hydraulics expert	6

B. Support personnels

Sl.No.	Support Staff	No.	Man month
1	Landslide Engineer/expert	1	9
2	Geologist	2	9
3	Geotechnical Engineer	1	9
4	Surveyor	1	6
5	Quantity Engineer	1	6
6	Environment Engineer	1	4
7	Hydrology/Hydraulics Engineer	1	6
8	Land Acquisition Expert	1	6
9	CAD expert	1	9
10	RS and GIS Expert	1	9

1. Consultants have to provide a certificate that all the key personnel as envisaged in the Contract Agreement have been actually deployed in the projects. They have to furnish the certificate at the time of submission of their bills to Ministry of Road Transport & Highways from time to time.

2. The requirement of tunnel/s is to be assessed strictly as per site requirement during the detailed study after mobilisation of Consultant on site.

   In case Tunnels are to be constructed, necessary input of Tunnel Experts shall be provided in addition to above mentioned Manpower requirement.

   Tunnel expert, if required, the remuneration may be provided equivalent to Team Leader remuneration and time period shall be decided by Regional Officer, concerned, Ministry of Road Transport & Highways.

ENCLOSURE-II

Qualification and Experience Requirement of Key Personnel

Team Leader cum Landslide Expert

i)	**Edu. Qualification**	
	Essential	Graduate in Civil Engineering or equivalent or M.Sc. Geology as approved by AICTE
	Desirable	Post graduate in Civil Engineering (Geotechnical Engineering) {AICTE Approved} or PHD in Geology/landslide
ii)	**Essential Experience**	
	a)Total Professional Experience	Min 20 years
	b) Experience in Landslide/rockfall investigation & design	Min. 12 years in Hazard/susceptibility mapping, vulnerability and risk assessment and/or DPR/feasibility studies for landslides for Roads/Railways projects.
	c) Experience in similar capacity (Either as Team Leader or in Similar capacity)	Hazard/susceptibility mapping, vulnerability and risk assessment for minimum 100 km length and/or DPR/feasibility studies for minimum 2 projects for counter measures for landslide in Roads/Railways projects
	d) Desirable	Experience in Hazard/susceptibility mapping, vulnerability and risk assessment and/or DPR/feasibility studies for counter measures for landslides in Roads/Railways projects in developed countries or expatriate from developed countries having similar experience in developed/ developing countries.
iii)	**Age Limit**	**Less than 70 years on the date of submission of proposal**

Senior Geologist

i)	**Educational Qualification**	
	Essential	Post Graduate Degree in Geology/Related field.
	Desirable	Ph.d in Geology/Related fields.
ii)	**Essential Experience**	
	a)Total Professional Experience	Min. 15 years
	b) Experience in Landslide/rockfall investigation & design	Minimum 15 years of professional experience and should have involved in Hazard/susceptibility mapping, vulnerability and risk assessment and/or DPR/feasibility studies for landslides for Roads/Airport/Railways/Irrigation /Hydel projects.

		for minimum 12 years being atleast 2 projects.
	c) Experience in similar capacity	Minimum 05 years of experience in similar capacity in Hazard/susceptibility mapping, vulnerability and risk assessment for Roads/Airport/Railways/Irrigation /Hydel projects.
iii)	**Age Limit**	**65 years on the date of submission of Proposal**

Senior Geotechnical Engineer

I	**Educational Qualification**		
	Essential		Graduate in Civil Engineering/Mining Engineering / Engineering Geology
	Desirable		Geotechnical Engineering /Foundation Engineering/Rock equivalent Engineering Mechanics/Geo science or
II	**Essential Experience**		
	a) Total Professional Experience		Min. 15 years
	b) Experience i		Minimum 15 years of professional experience and should have involved in Hazard/susceptibility mapping, vulnerability and risk assessment and/or DPR/feasibility studies for landslides for Roads/Airport/Railways/Irrigation /Hydel projects for minimum 12 years being atleast 2 projects .
	c) Experience capacity	in simil ar	Minimum 05 years of experience in similar capacity in DPR/feasibility studies for landslides for Roads/Airport/Railways/Irrigation /Hydel projects
III	**Age Limit**		65 years on the date of submission of proposal

Senior Geomatics Expert

i)	**Educational Qualification**	
	Essential	Graduate in Civil Engineering/M.Sc. Geology or equivalent as approved by AICTE
	Desirable	Post graduate in Civil Engineering (Geomatics/ Geoinformation Technology/ Geodesy and Geoinformatics/ Geospatial Information Sciences) {AICTE Approved}
ii)	**Essential Experience**	

	a) Total Professional Experience	Min. 12 years
	b) Experience in Landslide/rockfall investigation & design	Min. 10 years in Planning, surveying, remote sensing, GIS, project preparation on Highways/Airport/ Railways/IrrigationHydel projects
	c) Experience in similar capacity (Either as Team Leader or in Similar capacity)	Minimum 03 years of Experience as Senior Geomatics Expert in Hazard/susceptibility mapping, vulnerability and risk assessment and/or DPR/feasibility studies for landslides for Roads/Airport/Railways/Irrigation /Hydel projects
iii)	**Age Limit**	60 **years on the date of submission of proposal**

Senior Hydrology and Hydraulics expert

i)	**Educational Qualification**	
	Essential	Graduate in Civil Engineering or equivalent as approved by AICTE
	Desirable	Post graduate in Civil Engineering (hydraulic/hydrogeology/ water resource/water technology) {AICTE Approved}
ii)	**Essential Experience**	
	a) Total Professional Experience	Min. 12 years
	b) Experience in Landslide/rockfall investigation & design	Min. 10 years in Hazard/susceptibility mapping, vulnerability and risk assessment and/or DPR/feasibility studies for landslides for Roads/Airport/Railways/Irrigation /Hydel projects
	c) Experience in similar capacity (Either as Team Leader or in Similar capacity)	Minimum 05 years of Experience as Senior Hydrology or Hydraulics expert in Hazard/susceptibility mapping, vulnerability and risk assessment and/or DPR/feasibility studies for landslides for Roads/Airport/Railways/Irrigation /Hydel projects
iii)	**Age Limit**	65 **years on the date of submission of proposal**

ENCLOSURE-III

Schedule for submission of Reports and Documents for landslides & Sinking zones;

Stage No.	Activity	No. of hard copies in addition to soft copies		Time Period in days from date of commencement
		At MoRTH	Office of PIU	
1	**Monthly Reports**	**2**	**2**	By 10th day of every month
2	**Inception Report** (i) Draft Inception Report including QAP document (ii) Inception Report including QAP document	 **2** **2**	 **2** **2**	 **15** **25**
3	**F.S. REPORT**) (i) Draft Feasibility Study Report including proposed engineering solution with final model in 3D for each landslide and sinking location. (ii)Final Feasibility Study Report incorporating compliance of comments of Client.	 **2** **2**	 **2** **2**	 **60 (MoRTH's comment will be submitted in 12 days)** **90**
4	**Detailed Project Report**) (i) Draft DPR (including draft EIA, EMP and RAP)) (ii) Final DPR incorporating compliance of comments of Client	 **2** **3**	 **2** **3**	 **120(MoRTH's comment will be submitted in 15 days)** **150**
5	**Technical Schedules and Bidding documents** (i) Draft Technical Schedules and Bidding documents (ii) Final Technical Schedules and Bidding documents	**2** **3**	**2** **3**	**160 (MoRTH's comment will be submitted in 10 days)** **180**

The checklist for different stages of submission of report has been enclosed as under and the same shall be appended with proper references and page numbering. The checklist shall be appended with the report without which no payment shall be made.

Schedule for approval of Reports and Documents by ED after submission by consultant.

Stage No.	Activity	Time Period in days from date of submission of Comment and acceptance by RO
1	**Inception Report**	7 days
2	**Feasibility Study Report** i) **Draft Feasibility Study Report including draft 3(a) report** ii) **Final feasibility Study report**	 15 days 7 days
3	**Detailed Project Report** i) Draft DPR (including draft EIA, EMP and RAP) ii) Final DPR incorporating compliance of comments of Client	 30 days 7 days
4	**Technical Schedules and Bidding documents** i) Draft Technical Schedules and Bidding documents iii) Final Technical Schedules and Bidding documents	 30 days 7 days

The checklist for different stages of submission of report has been enclosed as under and the same shall be appended with proper references and page numbering. The checklist shall be appended with the report without which no payment shall be made.

APPENDIX-I

DPR Checklist – Stage 1 **–** Inception Report
DPR Checklist – Stage 2 – Feasibility Report
DPR Checklist – Stage 3 – Detailed Project Report
DPR Checklist – Stage 4 – Technical Schedules

DPR Checklist – Stage 1 – Inception Report

General Details	
Project Name	
Consultant's Name	
Date of Review	

S. No	SECTION OF THE REPORT	YES/NO/NA	Details / Specifications	Remarks
1	**Executive Summary**	Yes ☐ No ☐ NA ☐		
2	**Project Appreciation**	Yes ☐ No ☐ NA ☐		
2.1	Location of site office	Yes ☐ No ☐ NA ☐		
2.2	Review of scope of ToR and gap identification	Yes ☐ No ☐ NA ☐		
2.3	Key departments identified for various documents	Yes ☐ No ☐ NA ☐		
2.4	Start and end location of project verified with client (Mention details)	Yes ☐ No ☐ NA ☐		
2.5	Project description • Start and End of each Chainage • Locational data	Yes ☐ No ☐ NA ☐		
2.6	Project location map • On State Map • On District Map	Yes ☐ No ☐ NA ☐		

2.7	Site photos and data of project and its elements	Yes ☐ No ☐ NA ☐		
2.8	Overview of land use plans	Yes ☐ No ☐ NA ☐		
2.9	Overview of existing landslides and slope conditions ● Number of landslides ● Their types ● Other details	Yes ☐ No ☐ NA ☐		
2.10	Existing Highway network with location of landslides	Yes ☐ No ☐ NA ☐		
2.11	Number/ Location of major and minor bridges near landslides	Yes ☐ No ☐ NA ☐		
2.12	Number/ Location of settlements villages/town/cities connected with landslides	Yes ☐ No ☐ NA ☐		
2.13	Name and location of infrastructures vs landslides	Yes ☐ No ☐ NA		
2.14	Any other details relevant to the project	Yes ☐ No ☐ NA ☐		
3	**Approach Methodology**	Yes ☐ No ☐ NA ☐		
3.1	Engineering survey and investigations	Yes ☐ No ☐ NA ☐		
3.2	Environment and social impact assessment	Yes ☐ No ☐ NA ☐		
3.3	Estimation of project cost, viability and financing options	Yes ☐ No ☐ NA ☐		
3.4	Any other details relevant to the project	Yes ☐ No ☐ NA ☐		
4	**Task Assignment and Manning Schedule**	Yes ☐ No ☐ NA ☐		

4.1	Number of key personnel provided	Yes ☐ No ☐ NA ☐		
4.2	Specific tasks assigned to each key personnel	Yes ☐ No ☐ NA ☐		
4.3	Manning schedule for key personnel	Yes ☐ No ☐ NA ☐		
4.4	Number of key personnel deployed at site	Yes ☐ No ☐ NA ☐		
5	**Performa for data collection**	Yes ☐ No ☐ NA ☐		
6	**Indicative design standards and cross sections**	Yes ☐ No ☐ NA ☐		
7	**Development plan**s	Yes ☐ No ☐ NA ☐		
7.1	Overview of development plans being implemented/ proposed by local bodies	Yes ☐ No ☐ NA ☐		
7.2	Overview of impact of such development plans	Yes ☐ No ☐ NA ☐		
8	**Quality Assurance Plan**	Yes ☐ No ☐ NA ☐		
8.1	Engineering surveys and investigation	Yes ☐ No ☐ NA ☐		
8.2	Material geo-technical and sub-soil investigations	Yes ☐ No ☐ NA ☐		
8.3	Investigation and design of bridges and structures	Yes ☐ No ☐ NA ☐		
8.4	Environment and R&R assessment	Yes ☐ No ☐ NA ☐		
8.5	Economic and financial analysis	Yes ☐ No ☐ NA ☐		

8.6	Drawing and documentation	Yes ☐ No ☐ NA ☐		
8.7	Any other details relevant to the project	Yes ☐ No ☐ NA ☐		
8.8	Discussion of draft QAP document with client	Yes ☐ No ☐ NA ☐		
8.8	Approval of final QAP document by client	Yes ☐ No ☐ NA ☐		
9	**Draft design Standards**	Yes ☐ No ☐ NA ☐		
10	**Conclusions and recommendation**s	Yes ☐ No ☐ NA ☐		
10.1	Conclusions and recommendations	Yes ☐ No ☐ NA ☐		
10.2	Report fulfils project objectives and scope as per RFP	Yes ☐ No ☐ NA ☐		
10.3	Report reviewed for errors and omissions	Yes ☐ No ☐ NA ☐		
10.4	Compliance report prepared on client observations	Yes ☐ No ☐ NA ☐		

DPR Checklist – Stage 2 – Feasibility Report

General Details	
Project Name	
Consultant's Name	
Date of Review	

S. No	SECTION OF THE REPORT	YES/ NO/ NA	Details / Specifications	Remarks
1	**Executive Summary**	Yes ☐ No ☐ NA ☐		
2	**Overview of client organization / activities**	Yes ☐ No ☐ NA ☐		
3	**Methodology adopted for feasibility study**	Yes ☐ No ☐ NA ☐		
4	**Socioeconomic profile of the project areas**	Yes ☐ No ☐ NA ☐		
4.1	Regional economic profile basis last 10 years data as per IRC	Yes ☐ No ☐ NA ☐		
4.2	Economic profile of project influence area basis last 10 years data as per IRC	Yes ☐ No ☐ NA ☐		
4.3	Socio Economic status of project influence area	Yes ☐ No ☐ NA ☐		
5	**Indicative design standards, methodologies, and**	Yes ☐ No ☐ NA		

	specifications	☐		
6	Any other details relevant to the project	Yes ☐ No ☐ NA ☐		
7	**Reconnaissance survey**	Yes ☐ No ☐ NA ☐		
7.4	Geological Survey • Geological Map of the Area • Seismicity	Yes ☐ No ☐ NA ☐		
7.5	Climatic Conditions • Temperature • Rainfall • Wind	Yes ☐ No ☐ NA ☐		
8.0	**Detailed topographic and Geological survey/mapping**	Yes ☐ No ☐ NA ☐		
8.1	Topographical survey of each stretch of highway as • Contour maps • DTM	Yes ☐ No ☐ NA ☐		
8.2	Topographical survey of each large landslide using Drone/ LiDAR • Contour maps • DTM	Yes ☐ No ☐ NA ☐		
8.3	Derivative maps such as slope, aspect, drainage, morphology, land use land cover, etc. 1:1000 scale each stretch and 1:500 scale each moderate/ large landslide	Yes ☐ No ☐ NA ☐		
8.4	Review of topographical survey by client	Yes ☐ No ☐ NA ☐		
8.5	Geological Mapping of the area and all major landslides	Yes ☐ No ☐ NA ☐		

8.6	Inventory of infrastructures including bridges, culverts and other structures under the threat of landslides	Yes ☐ No ☐ NA ☐		
8.7	Database and Inventory of landslides	Yes ☐ No ☐ NA ☐		
8.8	Any other details relevant to the project	Yes ☐ No ☐ NA ☐		
9.0	**Geo-mechanical Investigation of Rock slopes**			
9.1	RMR, SMR, Kinematic stability analysis	Yes ☐ No ☐ NA ☐		
10.0	**Geotechnical Survey**	Yes ☐ No ☐ NA ☐		
10.1	Geo-technical and sub-soil explorations	Yes ☐ No ☐ NA ☐		
10.2	Bore holes details	Yes ☐ No ☐ NA ☐		
10.3	Review of geo-technical and sub-soil explorations by client	Yes ☐ No ☐ NA ☐		
10.4	Field testing, soil sampling, laboratory testing in accordance with BIS/ AASHTO/ BS	Yes ☐ No ☐ NA ☐		
10.5	Any other details relevant to the project	Yes ☐ No ☐ NA ☐		
11.0	**Hydraulic and Hydrological Survey**	Yes ☐ No ☐ NA ☐		
11.1	Hydraulic and hydrological investigations as per IRC: SP:13 and IRC:5	Yes ☐ No ☐ NA ☐		

11.2	High Flood Level wherever required	Yes ☐ No ☐ NA ☐		
11.3	Depth of Water Table at each moderate/major landslide	Yes ☐ No ☐ NA ☐		
11.4	Watershed and Drainage map of whole stretches as well as each major landslide	Yes ☐ No ☐ NA ☐		
11.5	Any other details relevant to the project	Yes ☐ No ☐ NA ☐		
11.6	Review of hydrological investigations by client	Yes ☐ No ☐ NA ☐		
12.0	**Vulnerability Assessment**	Yes ☐ No ☐ NA ☐		
12.1	Identification of existing landslides and risk assessment	Yes ☐ No ☐ NA ☐		
12.2	Identification of vulnerable slopes	Yes ☐ No ☐ NA ☐		
13.0	**Materials Survey**	Yes ☐ No ☐ NA ☐		
13.1	Materials Survey conducted	Yes ☐ No ☐ NA ☐		
13.2	Sources of Naturally Occurring Aggregates for implementation of measures ● Details of Borrow Pits with Distance from Project Site ● Cost of Material/ Transportatio	Yes ☐ No ☐ NA ☐		

	n			
13.3	Sources of Manufactured Items specified • Details of suppliers with distance from project site • Cost of material/ transportation	Yes ☐ No ☐ NA ☐		
13.4	Sources of water for construction specified as per IS: 456	Yes ☐ No ☐ NA ☐		
13.5	Any other details relevant to the project	Yes ☐ No ☐ NA ☐		
14.0	**Environmental screening/ preliminary environmental Assessment**	Yes ☐ No ☐ NA ☐		
14.1	Analysis basis Initial Environment Examination	Yes ☐ No ☐ NA ☐		
14.2	Recommended feasible mitigation measures	Yes ☐ No ☐ NA ☐		
15.0	**Initial social assessment/ preliminary LA resettlement plan, if required**	Yes ☐ No ☐ NA ☐		
15.1	Analysis basis Initial Environment Examination	Yes ☐ No ☐ NA ☐		
15.2	Details of consultation with potentially affected persons	Yes ☐ No ☐ NA ☐		

15.3	Names/ Details of consultation with local NGOs	Yes ☐ No ☐ NA ☐		
15.4	Names/ Details of consultation with municipal authorities	Yes ☐ No ☐ NA ☐		
15.5	Preliminary resettlement plan	Yes ☐ No ☐ NA ☐		
15.6	Any other details relevant to the project	Yes ☐ No ☐ NA ☐		
16.0	**Cost estimates**	Yes ☐ No ☐ NA ☐		
16.1	Item rates and rate analysis	Yes ☐ No ☐ NA ☐		
16.2	Escalation	Yes ☐ No ☐ NA ☐		
17.0	**Economic and financial analysis**	Yes ☐ No ☐ NA ☐		
17.1	Estimated cost details	Yes ☐ No ☐ NA ☐		
17.2	Projected revenues details	Yes ☐ No ☐ NA ☐		
17.3	Assumptions stated	Yes ☐ No ☐ NA ☐		
17.4	Analysis and results (IRR, Sensitivity Analysis, Financial Viability)	Yes ☐ No ☐ NA ☐		
18.0	**Strip plan if required**	Yes ☐ No ☐ NA ☐		

18.1	Details about ownership of land to be acquired	Yes ☐ No ☐ NA ☐		
18.2	Strip plan basis reconnaissance and topographic surveys	Yes ☐ No ☐ NA ☐		
18.2	Strip plan reviewed and approved by the client	Yes ☐ No ☐ NA ☐		
21	**Conclusions and recommendations**	Yes ☐ No ☐ NA ☐		
21.1	Conclusions and recommendations	Yes ☐ No ☐ NA ☐		
21.2	Report fulfills project objectives and scope as per RFP	Yes ☐ No ☐ NA ☐		
21.3	Report reviewed for errors and omissions	Yes ☐ No ☐ NA ☐		
21.4	Compliance report prepared on client observations	Yes ☐ No ☐ NA ☐		

DPR Checklist – Stage 3– Detailed Project Report

General Details	
Project Name	
Consultant's Name	
Date of Review	

S. No	SECTION OF THE REPORT	YES/NO/NA	Details / Specifications	Remarks
1	**Main Report**	Yes ☐ No ☐ NA ☐		
2	**Introduction and project background**	Yes ☐ No ☐ NA ☐		
2.1	Overview of project location, project objectives etc.	Yes ☐ No ☐ NA ☐		
2.2	Overview of report structure, objective, scope and deliverables etc.	Yes ☐ No ☐ NA ☐		
3	**Social analysis of the project**	Yes ☐ No ☐ NA ☐		
3.1	Project impact on stakeholders such as local people	Yes ☐ No ☐ NA ☐		
3.2	Project impact on residential, commercial and public properties	Yes ☐ No ☐ NA ☐		
3.3	Any other details relevant to the project	Yes ☐ No ☐ NA		

		☐		
4	**Reconnaissance survey**	Yes ☐ No ☐ NA ☐		
4.1	General description of topographic, geological, morphological, climatic, seismic, landslide distribution, drainage, vegetation, population affected, possible causative factors etc. climatic setup	Yes ☐ No ☐ NA ☐		
5.0	**Detailed Survey, Mapping and Investigation**	Yes ☐ No ☐ NA ☐		
5.1	Topographical Survey using LiDAR (or equivalent technology) Contour Map DTM	Yes ☐ No ☐ NA ☐		
5.2	All derivative maps from DTM and verified from filed investigation such as: slope, aspect, morphology, drainage, land use, land cover etc.	Yes ☐ No ☐ NA ☐		
5.3	Infrastructure map	Yes ☐ No ☐ NA ☐		
5.4	Landslide database inventory maps	Yes ☐ No ☐ NA ☐		
5.5	Vulnerability assessment maps	Yes ☐ No ☐ NA ☐		
6.0	**Geo-technical sub-soil and explorations**	Yes ☐ No ☐ NA ☐		

6.1	Number of Bore holes dug, digital bore log details	Yes ☐ No ☐ NA ☐		
6.2	Soil/rock sampling, laboratory testing	Yes ☐ No ☐ NA ☐		
6.3	Slope Material type and characteristic map	Yes ☐ No ☐ NA ☐		
7.0	**Hydrological investigations**	Yes ☐ No ☐ NA ☐		
7.1	Watershed/ Catchment characteristics, drainage network, seepage/ springs, discharge, runoff characteristics,	Yes ☐ No ☐ NA ☐		
7.2	High Flood Level, where connected with landslides/ slopes,	Yes ☐ No ☐ NA ☐		
7.3	Depth of Water Table and PWP	Yes ☐ No ☐ NA ☐		
8.0	**Geo-mechanical investigation of rock slopes**	Yes ☐ No ☐ NA ☐		
8.1	Data collection, RMR, SMR, RQD, Kinematic analysis			
9.0	**Geophysical investigation**	Yes ☐ No ☐ NA ☐		
9.1	Electrical resistivity, SRT seismic refraction test etc.			

10.0	**Source of Aggregate/ water etc. for implementation of recommended measures**	Yes ☐ No ☐ NA ☐		
10.1	Sources of Naturally Occurring Aggregates, if required ● Details of Borrow Pits with Distance from Project Site ● Cost of Material/ Transportation	Yes ☐ No ☐ NA ☐		
10.2	Sources of environmentally friendly construction materials identified as per MoRT&H Circular	Yes ☐ No ☐ NA ☐		
10.3	Sources of Manufactured Items specified ● Details of Suppliers with Distance from Project Site ● Cost of Material/ Transportation	Yes ☐ No ☐ NA ☐		
10.4	Source of Water for construction	Yes ☐ No ☐ NA ☐		
10.5	Any other details relevant to the project	Yes ☐ No ☐ NA ☐		
11	**Cost estimates**	Yes ☐ No ☐ NA ☐		
11.	Project costing as per latest	Yes ☐ No ☐		

1	SoR	NA ☐		
12	**Environmental aspects**	Yes ☐ No ☐ NA ☐		
13	**Economic and commercial analysis**	Yes ☐ No ☐ NA ☐		
14.1	Estimated cost details	Yes ☐ No ☐ NA ☐		
14.2	Assumptions stated	Yes ☐ No ☐ NA ☐		
14.3	Analysis and results (IRR, Sensitivity Analysis, Financial Viability)	Yes ☐ No ☐ NA ☐		
14.4	Conclusions and recommendations	Yes ☐ No ☐ NA ☐		
14.3	Financial model shared with client and reviewed	Yes ☐ No ☐ NA ☐		
15	**Conclusions and recommendations**	Yes ☐ No ☐ NA ☐		
15.1	Report fulfills project objectives and scope as per RFP	Yes ☐ No ☐ NA ☐		
15.2	Report reviewed for errors and omissions	Yes ☐ No ☐ NA ☐		
15.3	Compliance report prepared on client observations	Yes ☐ No ☐ NA ☐		

1	**Design Report**	Yes ☐ No ☐ NA ☐		
17	**Technical Specifications**	Yes ☐ No ☐ NA ☐		
17.1	MoRTH technical specifications for slopes/landslides and Bridge works (if required) followed	Yes ☐ No ☐ NA ☐		
17.2	Details of technical specifications	Yes ☐ No ☐ NA ☐		
18	**Rate Analysis**	Yes ☐ No ☐ NA ☐		
18.1	Rate analysis for all relevant items as per latest SoR	Yes ☐ No ☐ NA ☐		
19	**Cost Estimates**	Yes ☐ No ☐ NA ☐		
19.1	Cost estimates for all relevant items as per latest SoR	Yes ☐ No ☐ NA ☐		
20	**Bill of quantities**	Yes ☐ No ☐ NA ☐		
21	**Drawing Volume**	Yes ☐ No ☐ NA ☐		
22	**Digital drawings**			

1. DPR Checklist – Stage 4 – Technical Schedules

General Details	
Project Name	
Consultant's Name	
Date of Review	

S. No	SECTION OF THE REPORT	YES/NO/NA	Details / Specifications	Remarks
1	**Bid documents- EPC**	Yes ☐ No ☐ NA ☐		
2	**Bid documents- BOT/ PPP**	Yes ☐ No ☐ NA ☐		
3	**Bid documents- other, if any**	Yes ☐ No ☐ NA ☐		
4	**Draft concession agreement**	Yes ☐ No ☐ NA ☐		
4	**Schedule D - Specifications and standards**	Yes ☐ No ☐ NA ☐		
5	**Any other relevant details**	Yes ☐ No ☐ NA ☐		

APPENDIX II
Sample Executive Summary of Detailed Project Report

<Name & Logo of the Agency> (Ministry of Road Transport & Highways) Government of India

[Name and logo of consulting agency]

The table of contents given below, may be expanded depending upon the task/ activities/ methodology/ results/ analysis/ interpretations/ outcomes/ outputs/ recommendation/ conclusion etc.

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S. No.	DESCRIPTION	PAGE NO.
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2.	Salient features of the project	
3.	Executive summary	
4.	Abstract of Cost	
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1.1	Introduction	
1.2	History	
1.3	Background and Location	
1.4	Climate	
1.5	Description of the project area	
1.6	Previous works	
1.7	Objectives, Scope and Deliverables of the project	
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2.1	Geology, Physiography and Seismicity of the Area	
2.1.1	Regional Geology	
2.1.2	Geology of the Area	
2.1.3	Physiography of the area	
2.1.4	Seismicity	
CHAPTER 3	**DETAILED SITE-SPECIFIC LANDSLIDE INVESTIGATIONS**	
3.1	Description of landslide	
3.2	History of landslide	
3.3	Topographic Map	
3.3.1	Topographic map at 1:500 scale	
3.3.2	DEM/ DTM/ DSM of landslide	
3.4	Geological Investigation	
3.4.1	Geology of landslide area	
3.4.2	Geomorphology of landslide area	
3.4.3	Hydrology of landslide area	
3.4.4	Land use and Land cover of landslide area	
3.4.5	Hydro- meteorological data and analysis	
3.4.6	Characterisation of landslide	
3.4.7	Geological profiles	
3.4.8	Cross sections	
CHAPTER 4	**GIS BASED LANDSLIDE DATABASE AND INVENTORY**	
3.1	Database and inventory of existing landslides as per annexure	

3.2	Location	
3.3	History	
3.4	Geometrical details	
3.5	Typological details	
3.6	Topographic, geological, geotechnical, geohydrological and other details	
3.5	Causative factors	
CHAPTER 5	**GIS BASED VULNERABILITY ASSESSMENT**	
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5.2	Identification of Probable vulnerable slopes	
5.3	Identification of elements at risk	
5.4	Approximate run out distance	
5.5	Landslide risk assessment	
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6.2	Collection of disturbed and undisturbed samples	
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6.4	Analysis and Interpretation	
6.5	Stability analysis	
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7.4	Slope Mass Rating	
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11.4	Involuntary Resettlement	
11.5	Implementation period	
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CHAPTER 12	**DESIGN, DETAILED ESTIMATE AND DRAWINGS OF THE PROPOSED STRUCTURES**	
CHAPTER 13	**BOREHOLE DRILLING REPORT**	
CHAPTER 14	**SOIL SAMPLE TESTING REPORT**	
14.1	Soil sample test results	
14.2	Soil sample location details	
CHAPTER 15	**GEOMECAHANICAL REPORT OF ROCK SLOPES**	
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	All cross sections to the scale	
	Vulnerability assessment report	
	Database and inventory of landslides and vulnerable slopes	

Annexure-I

List of critical Landslides (to be attached)

Critical Landslide locations @ NH-707					
Sr.No.	Package	Chainage		Length(in mtr.)	Name of the village
		From	To		
1	I	15+280	15+580	300	Kachi Dhang
2	I	23+800	23+900	100	Hewna
3	II	27+200	27+450	**250**	Kali Dhang
4	II	44+280	44+330	50	Simialdhar
5	III	57+450	57+850	400	Lohran
6	III	71+750	72+020	270	Bhatnol
7	III	72+850	73+950	100	Feduwala

PART II

Section 8. Conditions of Contract and Contract Forms

S T A N D A R D F O R M O F C O N T R A C T

Consultant's Services

Lump-Sum

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CONTRACT FOR CONSULTANT'S SERVICES

Lump-Sum

Project Name _____

[Loan/Credit/Grant] **No.**_____

Contract No. _____

Assignment Title: _____

between

_____

[Name of the Client]

and

_____

[Name of the Consultant]

Dated: _____

I. Form of Contract

LUMP-SUM

(Text in brackets [ ] is optional; all notes should be deleted in the final text)

This CONTRACT (hereinafter called the "Contract") is made the *[number]* day of the month of *[month]*, *[year]*, between, on the one hand, *[name of Client or Recipient]* (hereinafter called the "Client") and, on the other hand, *[name of Consultant]* (hereinafter called the "Consultant").

[If the Consultant consist of more than one entity, the above should be partially amended to read as follows: "…(hereinafter called the "Client") and, on the other hand, a Joint Venture (name of the JV) consisting of the following entities, each member of which will be jointly and severally liable to the Client for all the Consultant's obligations under this Contract, namely, *[name of member]* and *[name of member]* (hereinafter called the "Consultant").*]*

WHEREAS

(a) the Client has requested the Consultant to provide certain consulting services as defined in this Contract (hereinafter called the "Services");

(b) the Consultant, having represented to the Client that it has the required professional skills, expertise and technical resources, has agreed to provide the Services on the terms and conditions set forth in this Contract;

(c) the Client has received [*or* has applied for] a loan [*or* credit *or* grant] from the [*insert as relevant, International Bank for Reconstruction and Development (IBRD) or International Development Association (IDA)]:* toward the cost of the Services and intends to apply a portion of the proceeds of this [loan/credit/grant] to eligible payments under this Contract, it being understood that (i) payments by the Bank will be made only at the request of the Client and upon approval by the Bank; (ii) such payments will be subject, in all respects, to the terms and conditions of the [loan/financing/grant] agreement, including prohibitions of withdrawal from the [loan/credit/grant] account for the purpose of any payment to persons or entities, or for any import of goods, if such payment or import, to the knowledge of the Bank, is prohibited by the decision of the United Nations Security council taken under Chapter VII of the Charter of the United Nations; and (iii) no party other than the Client shall derive any rights from the [loan/financing/grant] agreement or have any claim to the [loan/credit/grant] proceeds;

NOW THEREFORE the parties hereto hereby agree as follows:

1. The following documents attached hereto shall be deemed to form an integral part of this Contract:

   (a) The General Conditions of Contract (including Attachment 1 "Fraud and Corruption");
   (b) The Special Conditions of Contract;
   (c) Appendices:

   Appendix A: Terms of Reference
   Appendix B: Key Experts
   Appendix C: Breakdown of Contract Price
   Appendix D: Form of Advance Payments Guarantee

   In the event of any inconsistency between the documents, the following order of precedence shall prevail: the Special Conditions of Contract; the General Conditions of Contract, including Attachment 1; Appendix A; Appendix B; Appendix C; Appendix D, and Appendix E. Any reference to this Contract shall include, where the context permits, a reference to its Appendices.

2. The mutual rights and obligations of the Client and the Consultant shall be as set forth in the Contract, in particular:

   (a) the Consultant shall carry out the Services in accordance with the provisions of the Contract; and
   (b) the Client shall make payments to the Consultant in accordance with the provisions of the Contract.

IN WITNESS WHEREOF, the Parties hereto have caused this Contract to be signed in their respective names as of the day and year first above written.

For and on behalf of *[Name of Client]*

_____

[Authorized Representative of the Client – name, title and signature]

For and on behalf of *[Name of Consultant or Name of a Joint Venture]*

_____

[Authorized Representative of the Consultant – name and signature]

[For a joint venture, either all members shall sign or only the lead member, in which case the power of attorney to sign on behalf of all members shall be attached.

For and on behalf of each of the members of the Consultant *[insert the Name of the Joint Venture]*

[Name of the lead member]

_____

[Authorized Representative on behalf of a Joint Venture]

[add signature blocks for each member if all are signing]

II. General Conditions of Contract

A. General Provisions

1. Definitions

1.1. Unless the context otherwise requires, the following terms whenever used in this Contract have the following meanings:

(a) **"Applicable Law"** means the laws and any other instruments having the force of law in the Client's country, or in such other country as may be specified in the **Special Conditions of Contract (SCC)**, as they may be issued and in force from time to time.

(b) **"Bank"** means the International Bank for Reconstruction and Development (IBRD) or the International Development Association (IDA).

(c) **"Borrower"** means the Government, Government agency or other entity that signs the financing agreement with the Bank.

(d) **"Client"** means the implementing agency that signs the Contract for the Services with the Selected Consultant.

(e) **"Client's Personnel"** refers to the staff, labor and other employees (if any) of the Client engaged in fulfilling the Client's obligations under the Contract; and any other personnel identified as Client's Personnel, by a notice from the Client to the Consultant.

(f) **"Consultant"** means a legally-established professional consulting firm or entity selected by the Client to provide the Services under the signed Contract.

(g) **"Contract"** means the legally binding written agreement signed between the Client and the Consultant and which includes all the attached documents listed in its paragraph 1 of the Form of Contract (the General Conditions (GCC), the Special Conditions (SCC), and the Appendices).

(h) **"Day"** means a working day unless indicated otherwise.

(i) **"Effective Date"** means the date on which this Contract comes into force and effect pursuant to Clause GCC 11.

(j) **"Experts"** means, collectively, Key Experts, Non-Key Experts, or any other personnel of the Consultant, Sub-consultant or JV member(s) assigned by the Consultant to perform the Services or any part thereof under the Contract.

(k) **"Foreign Currency"** means any currency other than the

currency of the Client's country.

(l) **"GCC"** means these General Conditions of Contract.

(m) **"Government"** means the government of the Client's country.

(n) **"Joint Venture (JV)"** means an association with or without a legal personality distinct from that of its members, of more than one entity where one member has the authority to conduct all businesses for and on behalf of any and all the members of the JV, and where the members of the JV are jointly and severally liable to the Client for the performance of the Contract.

(o) **"Key Expert(s)"** means an individual professional whose skills, qualifications, knowledge and experience are critical to the performance of the Services under the Contract and whose Curricula Vitae (CV) was taken into account in the technical evaluation of the Consultant's proposal.

(p) **"Local Currency"** means the currency of the Client's country.

(q) **"Non-Key Expert(s)"** means an individual professional provided by the Consultant or its Sub-consultant to perform the Services or any part thereof under the Contract.

(r) **"Party"** means the Client or the Consultant, as the case may be, and "Parties" means both of them.

(s) **"SCC"** means the Special Conditions of Contract by which the GCC may be amended or supplemented but not over-written.

(t) **"Services"** means the work to be performed by the Consultant pursuant to this Contract, as described in Appendix A hereto.

(u) **"Sub-consultants"** means an entity to whom/which the Consultant subcontracts any part of the Services while remaining solely liable for the execution of the Contract.

(v) **"Third Party"** means any person or entity other than the Government, the Client, the Consultant or a Sub-consultant.

2. Relationship between the Parties

2.1. Nothing contained herein shall be construed as establishing a relationship of master and servant or of principal and agent as between the Client and the Consultant. The Consultant, subject to this Contract, has complete charge of the Experts and Sub-consultants, if any, performing the Services and shall be fully responsible for the Services performed by them

or on their behalf hereunder.

3. Law Governing Contract

3.1. This Contract, its meaning and interpretation, and the relation between the Parties shall be governed by the Applicable Law.

4. Language

4.1. This Contract has been executed in the language specified in the **SCC**, which shall be the binding and controlling language for all matters relating to the meaning or interpretation of this Contract.

5. Headings

5.1. The headings shall not limit, alter or affect the meaning of this Contract.

6. Communications

6.1. Any communication required or permitted to be given or made pursuant to this Contract shall be in writing in the language specified in Clause GCC 4. Any such notice, request or consent shall be deemed to have been given or made when delivered in person to an authorized representative of the Party to whom the communication is addressed, or when sent to such Party at the address specified in the **SCC**.

6.2. A Party may change its address for notice hereunder by giving the other Party any communication of such change to the address specified in the **SCC**.

7. Location

7.1. The Services shall be performed at such locations as are specified in **Appendix A** hereto and, where the location of a particular task is not so specified, at such locations, whether in the Government's country or elsewhere, as the Client may approve.

8. Authority of Member in Charge

8.1. In case the Consultant is a Joint Venture, the members hereby authorize the member specified in the **SCC** to act on their behalf in exercising all the Consultant's rights and obligations towards the Client under this Contract, including without limitation the receiving of instructions and payments from the Client.

9. Authorized Representatives

9.1. Any action required or permitted to be taken, and any document required or permitted to be executed under this Contract by the Client or the Consultant may be taken or executed by the officials specified in the **SCC.**

10. Fraud and Corruption

10.1. The Bank requires compliance with the Bank's Anti-Corruption Guidelines and its prevailing sanctions policies and procedures as set forth in the Bank's Sanctions

Framework, as set forth in Attachment 1 to the GCC.

a. Commissions and Fees

10.2. The Client requires the Consultant to disclose any commissions, gratuities or fees that may have been paid or are to be paid to agents or any other party with respect to the selection process or execution of the Contract. The information disclosed must include at least the name and address of the agent or other party, the amount and currency, and the purpose of the commission, gratuity or fee. Failure to disclose such commissions, gratuities or fees may result in termination of the Contract and/or sanctions by the Bank.

B. COMMENCEMENT, COMPLETION, MODIFICATION AND TERMINATION OF CONTRACT

11. Effectiveness of Contract

11.1. This Contract shall come into force and effect on the date (the "Effective Date") of the Client's notice to the Consultant instructing the Consultant to begin carrying out the Services. This notice shall confirm that the effectiveness conditions, if any, listed in the **SCC** have been met.

12. Termination of Contract for Failure to Become Effective

12.1. If this Contract has not become effective within such time period after the date of Contract signature as specified in the **SCC**, either Party may, by not less than twenty two (22) days written notice to the other Party, declare this Contract to be null and void, and in the event of such a declaration by either Party, neither Party shall have any claim against the other Party with respect hereto.

13. Commencement of Services

13.1. The Consultant shall confirm availability of Key Experts and begin carrying out the Services not later than the number of days after the Effective Date specified in the **SCC**.

14. Expiration of Contract

14.1. Unless terminated earlier pursuant to Clause GCC 19 hereof, this Contract shall expire at the end of such time period after the Effective Date as specified in the **SCC**.

15. Entire Agreement

15.1. This Contract contains all covenants, stipulations and provisions agreed by the Parties. No agent or representative of either Party has authority to make, and the Parties shall not be bound by or be liable for, any statement, representation, promise or agreement not set forth herein.

16. Modifications or Variations

16.1. Any modification or variation of the terms and conditions of this Contract, including any modification or

variation of the scope of the Services, may only be made by written agreement between the Parties. However, each Party shall give due consideration to any proposals for modification or variation made by the other Party.

16.2. In cases of substantial modifications or variations, the prior written consent of the Bank is required.

17. Force Majeure

a. Definition

17.1. For the purposes of this Contract, "Force Majeure" means an event which is beyond the reasonable control of a Party, is not foreseeable, is unavoidable, and makes a Party's performance of its obligations hereunder impossible or so impractical as reasonably to be considered impossible under the circumstances, and subject to those requirements, includes, but is not limited to, war, riots, civil disorder, earthquake, fire, explosion, storm, flood or other adverse weather conditions, strikes, lockouts or other industrial action confiscation or any other action by Government agencies.

17.2. Force Majeure shall not include (i) any event which is caused by the negligence or intentional action of a Party or such Party's Experts, Sub-consultants or agents or employees, nor (ii) any event which a diligent Party could reasonably have been expected to both take into account at the time of the conclusion of this Contract, and avoid or overcome in the carrying out of its obligations hereunder.

17.3. Force Majeure shall not include insufficiency of funds or failure to make any payment required hereunder.

b. No Breach of Contract

17.4. The failure of a Party to fulfill any of its obligations hereunder shall not be considered to be a breach of, or default under, this Contract insofar as such inability arises from an event of Force Majeure, provided that the Party affected by such an event has taken all reasonable precautions, due care and reasonable alternative measures, all with the objective of carrying out the terms and conditions of this Contract.

c. Measures to be Taken

17.5. A Party affected by an event of Force Majeure shall continue to perform its obligations under the Contract as far as is reasonably practical, and shall take all reasonable measures to minimize the consequences of any event of Force Majeure.

17.6. A Party affected by an event of Force Majeure shall

notify the other Party of such event as soon as possible, and in any case not later than fourteen (14) calendar days following the occurrence of such event, providing evidence of the nature and cause of such event, and shall similarly give written notice of the restoration of normal conditions as soon as possible.

17.7. Any period within which a Party shall, pursuant to this Contract, complete any action or task, shall be extended for a period equal to the time during which such Party was unable to perform such action as a result of Force Majeure.

17.8. During the period of their inability to perform the Services as a result of an event of Force Majeure, the Consultant, upon instructions by the Client, shall either:

(a) demobilize, in which case the Consultant shall be reimbursed for additional costs they reasonably and necessarily incurred, and, if required by the Client, in reactivating the Services; or

(b) continue with the Services to the extent reasonably possible, in which case the Consultant shall continue to be paid under the terms of this Contract and be reimbursed for additional costs reasonably and necessarily incurred.

17.9. In the case of disagreement between the Parties as to the existence or extent of Force Majeure, the matter shall be settled according to Clauses GCC 49 & 50.

18. Suspension

18.1. The Client may, by written notice of suspension to the Consultant, suspend part or all payments to the Consultant hereunder if the Consultant fails to perform any of its obligations under this Contract, including the carrying out of the Services, provided that such notice of suspension (i) shall specify the nature of the failure, and (ii) shall request the Consultant to remedy such failure within a period not exceeding thirty (30) calendar days after receipt by the Consultant of such notice of suspension.

19. Termination

19.1. This Contract may be terminated by either Party as per provisions set up below:

a. By the Client

19.1.1. The Client may terminate this Contract in case of the occurrence of any of the events specified in paragraphs (a) through (f) of this Clause. In such an occurrence the Client shall give at least thirty (30) calendar days' written notice of termination to the Consultant in case of the events referred to in (a) through (d); at least sixty (60) calendar days' written notice in case of the event referred to in (e);

and at least five (5) calendar days' written notice in case of the event referred to in (f):

(a) If the Consultant fails to remedy a failure in the performance of its obligations hereunder, as specified in a notice of suspension pursuant to Clause GCC 18;

(b) If the Consultant becomes (or, if the Consultant consists of more than one entity, if any of its members becomes) insolvent or bankrupt or enter into any agreements with their creditors for relief of debt or take advantage of any law for the benefit of debtors or go into liquidation or receivership whether compulsory or voluntary;

(c) If the Consultant fails to comply with any final decision reached as a result of arbitration proceedings pursuant to Clause GCC 50.1;

(d) If, as the result of Force Majeure, the Consultant is unable to perform a material portion of the Services for a period of not less than sixty (60) calendar days;

(e) If the Client, in its sole discretion and for any reason whatsoever, decides to terminate this Contract;

(f) If the Consultant fails to confirm availability of Key Experts as required in Clause GCC 13.

19.1.2. Furthermore, if the Client determines that the Consultant has engaged in Fraud and Corruption in competing for or in executing the Contract, then the Client may, after giving fourteen (14) calendar days written notice to the Consultant, terminate the Consultant's employment under the Contract.

b. By the Consultant

19.1.3. The Consultant may terminate this Contract, by not less than thirty (30) calendar days' written notice to the Client, in case of the occurrence of any of the events specified in paragraphs (a) through (d) of this Clause.

(a) If the Client fails to pay any money due to the Consultant pursuant to this Contract and not subject to dispute pursuant to Clause GCC 45.1 within forty-five (45) calendar days after receiving written notice from the Consultant that such payment is overdue.

(b) If, as the result of Force Majeure, the Consultant is unable to perform a material portion of the Services for a period of not less than sixty (60) calendar days.

(c) If the Client fails to comply with any final decision reached as a result of arbitration pursuant to Clause GCC 50.1.

(d) If the Client is in material breach of its obligations pursuant to this Contract and has not remedied the same within forty-five (45) days (or such longer period as the Consultant may have subsequently approved in writing) following the receipt by the Client of the Consultant's notice specifying such breach.

c. Cessation of Rights and Obligations

19.1.4. Upon termination of this Contract pursuant to Clauses GCC 12 or GCC 19 hereof, or upon expiration of this Contract pursuant to Clause GCC 14, all rights and obligations of the Parties hereunder shall cease, except (i) such rights and obligations as may have accrued on the date of termination or expiration, (ii) the obligation of confidentiality set forth in Clause GCC 22, (iii) the Consultant's obligation to permit inspection, copying and auditing of their accounts and records set forth in Clause GCC 25 and to cooperate and assist in any inspection or investigation, and (iv) any right which a Party may have under the Applicable Law.

d. Cessation of Services

19.1.5. Upon termination of this Contract by notice of either Party to the other pursuant to Clauses GCC 19a or GCC 19b, the Consultant shall, immediately upon dispatch or receipt of such notice, take all necessary steps to bring the Services to a close in a prompt and orderly manner and shall make every reasonable effort to keep expenditures for this purpose to a minimum. With respect to documents prepared by the Consultant and equipment and materials furnished by the Client, the Consultant shall proceed as provided, respectively, by Clauses GCC 27 or GCC 28.

e. Payment upon Termination

19.1.6. Upon termination of this Contract, the Client shall make the following payments to the Consultant:

(a) payment for Services satisfactorily performed prior to the effective date of termination; and

(b) in the case of termination pursuant to paragraphs (d) and (e) of Clause GCC 19.1.1, reimbursement of any reasonable cost incidental to the prompt and orderly termination of this Contract, including the cost of the return travel of the Experts.

C. OBLIGATIONS OF THE CONSULTANT

20. General

a. Standard of Performance

20.1. The Consultant shall perform the Services and carry out the Services with all due diligence, efficiency and economy, in accordance with generally accepted professional standards and practices, and shall observe sound management practices, and employ appropriate technology and safe and effective equipment, machinery, materials and methods. The Consultant shall always act, in respect of any matter relating to this Contract or to the Services, as a faithful adviser to the Client, and shall at all times support and safeguard the Client's legitimate interests in any dealings with the third parties.

20.2. The Consultant shall employ and provide such qualified and experienced Experts and Sub-consultants as are required to carry out the Services.

20.3. The Consultant may subcontract part of the Services to an extent and with such Key Experts and Sub-consultants as may be approved in advance by the Client. Notwithstanding such approval, the Consultant shall retain full responsibility for the Services.

b. Law Applicable to Services

20.4. The Consultant shall perform the Services in accordance with the Contract and the Applicable Law and shall take all practicable steps to ensure that any of its Experts and Sub-consultants, comply with the Applicable Law.

20.5. Throughout the execution of the Contract, the Consultant shall comply with the import of goods and services prohibitions in the Client's country when

(a) as a matter of law or official regulations, the Borrower's country prohibits commercial relations with that country; or

(b) by an act of compliance with a decision of the United Nations Security Council taken under Chapter VII of the Charter of the United Nations, the Borrower's Country prohibits any import of goods from that country or any payments to any country, person, or entity in that country.

20.6. The Client shall notify the Consultant in writing of relevant local customs, and the Consultant shall, after such

notification, respect such customs.

21. Conflict of Interest

21.1. The Consultant shall hold the Client's interests paramount, without any consideration for future work, and strictly avoid conflict with other assignments or their own corporate interests.

a. Consultant Not to Benefit from Commissions, Discounts, etc.

21.1.1 The payment of the Consultant pursuant to GCC F (Clauses GCC 43 through 47) shall constitute the Consultant's only payment in connection with this Contract and, subject to Clause GCC 21.1.3, the Consultant shall not accept for its own benefit any trade commission, discount or similar payment in connection with activities pursuant to this Contract or in the discharge of its obligations hereunder, and the Consultant shall use its best efforts to ensure that any Sub-consultants, as well as the Experts and agents of either of them, similarly shall not receive any such additional payment.

21.1.2 Furthermore, if the Consultant, as part of the Services, has the responsibility of advising the Client on the procurement of goods, works or services, the Consultant shall comply with the Bank's Applicable Regulations, and shall at all times exercise such responsibility in the best interest of the Client. Any discounts or commissions obtained by the Consultant in the exercise of such procurement responsibility shall be for the account of the Client.

b. Consultant and Affiliates Not to Engage in Certain Activities

21.1.3 The Consultant agrees that, during the term of this Contract and after its termination, the Consultant and any entity affiliated with the Consultant, as well as any Sub-consultants and any entity affiliated with such Sub-consultants, shall be disqualified from providing goods, works or non-consulting services resulting from or directly related to the Consultant's Services for the preparation or implementation of the project.

c. Prohibition of Conflicting Activities

21.1.4 The Consultant shall not engage, and shall cause its Experts as well as its Sub-consultants not to engage, either directly or indirectly, in any business or professional activities that would conflict with the activities assigned to them under this Contract.

d. Strict Duty to Disclose Conflicting Activities

21.1.5 The Consultant has an obligation and shall ensure that its Experts and Sub-consultants shall have an obligation to disclose any situation of actual or potential conflict that impacts their capacity to serve the best interest of their Client, or that may reasonably be perceived as having this

effect. Failure to disclose said situations may lead to the disqualification of the Consultant or the termination of its Contract.

22. Confidentiality

22.1. Except with the prior written consent of the Client, the Consultant and the Experts shall not at any time communicate to any person or entity any confidential information acquired in the course of the Services, nor shall the Consultant and the Experts make public the recommendations formulated in the course of, or as a result of, the Services.

23. Liability of the Consultant

23.1. Subject to additional provisions, if any, set forth in the **SCC**, the Consultant's liability under this Contract shall be provided by the Applicable Law.

24. Insurance to be taken out by the Consultant

24.1. The Consultant (i) shall take out and maintain, and shall cause any Sub-consultants to take out and maintain, at its (or the Sub-consultants', as the case may be) own cost but on terms and conditions approved by the Client, insurance against the risks, and for the coverage specified in the **SCC,** and (ii) at the Client's request, shall provide evidence to the Client showing that such insurance has been taken out and maintained and that the current premiums therefore have been paid. The Consultant shall ensure that such insurance is in place prior to commencing the Services as stated in Clause GCC 13.

25. Accounting, Inspection and Auditing

25.1. The Consultant shall keep, and shall make all reasonable efforts to cause its Sub-consultants to keep, accurate and systematic accounts and records in respect of the Services and in such form and detail as will clearly identify relevant time changes and costs.

25.2. Pursuant to paragraph 2.2 e. of Attachment 1 to the General Conditions, the Consultant shall permit and shall cause its agents (where declared or not), subcontractors, subconsultants, service providers, suppliers, and personnel, to permit, the Bank and/or persons appointed by the Bank to inspect the site and/or the accounts, records and other documents relating to the procurement process, selection and/or contract execution, and to have such accounts, records and other documents audited by auditors appointed by the Bank. The Consultant's and its Subcontractors' and subconsultants' attention is drawn to Clause GCC 10.1 (Fraud and Corruption) which provides, inter alia, that acts intended to materially impede the exercise of the Bank's inspection and audit rights constitute a prohibited practice

subject to contract termination (as well as to a determination of ineligibility pursuant to the Bank's prevailing sanctions procedures).

26. Reporting Obligations

26.1. The Consultant shall submit to the Client the reports and documents specified in **Appendix A**, in the form, in the numbers and within the time periods set forth in the said Appendix.

27. Proprietary Rights of the Client in Reports and Records

27.1. Unless otherwise indicated in the **SCC**, all reports and relevant data and information such as maps, diagrams, plans, databases, other documents and software, supporting records or material compiled or prepared by the Consultant for the Client in the course of the Services shall be confidential and become and remain the absolute property of the Client. The Consultant shall, not later than upon termination or expiration of this Contract, deliver all such documents to the Client, together with a detailed inventory thereof. The Consultant may retain a copy of such documents, data and/or software but shall not use the same for purposes unrelated to this Contract without prior written approval of the Client.

27.2. If license agreements are necessary or appropriate between the Consultant and third parties for purposes of development of the plans, drawings, specifications, designs, databases, other documents and software, the Consultant shall obtain the Client's prior written approval to such agreements, and the Client shall be entitled at its discretion to require recovering the expenses related to the development of the program(s) concerned. Other restrictions about the future use of these documents and software, if any, shall be specified in the **SCC**.

28. Equipment, Vehicles and Materials

28.1. Equipment, vehicles and materials made available to the Consultant by the Client, or purchased by the Consultant wholly or partly with funds provided by the Client, shall be the property of the Client and shall be marked accordingly. Upon termination or expiration of this Contract, the Consultant shall make available to the Client an inventory of such equipment, vehicles and materials and shall dispose of such equipment, vehicles and materials in accordance with the Client's instructions. While in possession of such equipment, vehicles and materials, the Consultant, unless otherwise instructed by the Client in writing, shall insure them at the expense of the Client in an amount equal to their full replacement value.

28.2. Any equipment or materials brought by the

Consultant or its Experts into the Client's country for the use either for the project or personal use shall remain the property of the Consultant or the Experts concerned, as applicable.

29. Code of Conduct

Not used

30. Forced Labor

30.1. The Consultant, including its Subconsultants, shall not employ or engage forced labor. Forced labor consists of any work or service, not voluntarily performed, that is exacted from an individual under threat of force or penalty, and includes any kind of involuntary or compulsory labor, such as indentured labor, bonded labor or similar labor-contracting arrangements.

No persons shall be employed or engaged who have been subject to trafficking. Trafficking in persons is defined as the recruitment, transportation, transfer, harboring or receipt of persons by means of the threat or use of force or other forms of coercion, abduction, fraud, deception, abuse of power, or of a position of vulnerability, or of the giving or receiving of payments or benefits to achieve the consent of a person having control over another person, for the purposes of exploitation.

31. Child Labor

31.1. The Consultant, including its Subconsultants, shall not employ or engage a child under the age of 14 unless the national law specifies a higher age (the minimum age).

The Consultant, including its Subconsultants, shall not employ or engage a child between the minimum age and the age of 18 in a manner that is likely to be hazardous, or to interfere with, the child's education, or to be harmful to the child's health or physical, mental, spiritual, moral, or social development.

The Consultant, including its Subconsultants, shall only employ or engage children between the minimum age and the age of 18 after an appropriate risk assessment has been conducted by the Consultant with the Client's consent. The Consultant shall be subject to regular monitoring by the Client that includes monitoring of health, working conditions and hours of work.

Work considered hazardous for children is work that, by its nature or the circumstances in which it is carried out, is likely to jeopardize the health, safety, or morals of children. Such work activities prohibited for children include work:

(a) with exposure to physical, psychological or sexual abuse;

(b) underground, underwater, working at heights or in confined spaces;

(c) with dangerous machinery, equipment or tools, or involving handling or transport of heavy loads;

(d) in unhealthy environments exposing children to hazardous substances, agents, or processes, or to temperatures, noise or vibration damaging to health; or

(e) under difficult conditions such as work for long hours, during the night or in confinement on the premises of the employer.

32. Non-Discrimination and Equal Opportunity

32.1. The Consultant shall not make decisions relating to the employment or treatment of Experts on the basis of personal characteristics unrelated to inherent job requirements. The Consultant shall base the employment of Experts on the principle of equal opportunity and fair treatment, and shall not discriminate with respect to any aspects of the employment relationship, including recruitment and hiring, compensation (including wages and benefits), working conditions and terms of employment, access to training, job assignment, promotion, termination of employment or retirement, and disciplinary practices.

Special measures of protection or assistance to remedy past discrimination or selection for a particular job based on the inherent requirements of the job shall not be deemed discrimination. The Consultant shall provide protection and assistance as necessary to ensure non-discrimination and equal opportunity, including for specific groups such as women, people with disabilities, migrant workers and children (of working age in accordance with Clause GCC 31).

33. Training of Experts

33.1. The Consultant shall provide appropriate sensitization to the Experts on social aspects of the Contract, including on prohibition of SEA and SH.

The Consultant shall provide training on SEA and SH, including its prevention, to any of its Experts who has a role to supervise other Experts.

D. CONSULTANT'S EXPERTS AND SUB-CONSULTANTS

34. Description of Key

34.1. The title, agreed job description, minimum

Experts

qualification and estimated period of engagement to carry out the Services of each of the Consultant's Key Experts are described in **Appendix B.**

35. Replacement of Key Experts

35.1. Except as the Client may otherwise agree in writing, no changes shall be made in the Key Experts.

35.2. Notwithstanding the above, the substitution of Key Experts during Contract execution may be considered only based on the Consultant's written request and due to circumstances outside the reasonable control of the Consultant, including but not limited to death or medical incapacity. In such case, the Consultant shall forthwith provide as a replacement, a person of equivalent or better qualifications and experience, and at the same rate of remuneration.

36. Removal of Experts or Sub-consultants

36.1. If the Client finds that any of the Experts or Sub-consultant:

(a) persists in any misconduct or lack of care;

(b) carries out duties incompetently or negligently;

(c) fails to comply with any provision of the Contract;

(d) based on reasonable evidence, is determined to have engaged in Fraud and Corruption during the execution of the Services;

the Consultant shall, at the Client's written request, provide a replacement.

36.2. In the event that any of Key Experts, Non-Key Experts or Sub-consultants is found by the Client to be incompetent or incapable in discharging assigned duties, the Client, specifying the grounds therefore, may request the Consultant to provide a replacement.

36.3. Any replacement of the removed Experts or Sub-consultants shall possess better qualifications and experience and shall be acceptable to the Client.

36.4. Subject to the requirements in Clause GCC 36.3, and notwithstanding any requirement from the Client to request a replacement, the Consultant shall take immediate action as appropriate in response to any violation of (a) through (e) above. Such immediate action shall include removing (or causing to be removed) from carrying out the Services, any Expert who engages in (a) to (e) above.

36.5. The Consultant shall bear all costs arising out of or incidental to any removal and/or replacement of such Experts.

E. OBLIGATIONS OF THE CLIENT

37. Assistance and Exemptions

37.1. Unless otherwise specified in the **SCC**, the Client shall use its best efforts to:

(a) Assist the Consultant with obtaining work permits and such other documents as shall be necessary to enable the Consultant to perform the Services.

(b) Assist the Consultant with promptly obtaining, for the Experts and, if appropriate, their eligible dependents, all necessary entry and exit visas, residence permits, exchange permits and any other documents required for their stay in the Client's country while carrying out the Services under the Contract.

(c) Facilitate prompt clearance through customs of any property required for the Services and of the personal effects of the Experts and their eligible dependents.

(d) Issue to officials, agents and representatives of the Government all such instructions and information as may be necessary or appropriate for the prompt and effective implementation of the Services.

(e) Assist the Consultant and the Experts and any Sub-consultants employed by the Consultant for the Services with obtaining exemption from any requirement to register or obtain any permit to practice their profession or to establish themselves either individually or as a corporate entity in the Client's country according to the applicable law in the Client's country.

(f) Assist the Consultant, any Sub-consultants and the Experts of either of them with obtaining the privilege, pursuant to the applicable law in the Client's country, of bringing into the Client's country reasonable amounts of foreign currency for the purposes of the Services or for the personal use of the Experts and of withdrawing any such amounts as may be earned therein by the Experts in the execution of the Services.

(g) Provide to the Consultant any such other assistance as may be specified in the **SCC**.

38. Access to Project Site

38.1. The Client warrants that the Consultant shall have, free of charge, unimpeded access to the project site in respect of which access is required for the performance of the Services. The Client will be responsible for any damage to the project site or any property thereon resulting from such access and will indemnify the Consultant and each of the experts in respect of liability for any such damage, unless such damage is caused by the willful default or negligence of the Consultant or any Sub-consultants or the Experts of either of them.

39. Change in the Applicable Law Related to Taxes and Duties

39.1. If, after the date of this Contract, there is any change in the applicable law in the Client's country with respect to taxes and duties which increases or decreases the cost incurred by the Consultant in performing the Services, then the remuneration and reimbursable expenses otherwise payable to the Consultant under this Contract shall be increased or decreased accordingly by agreement between the Parties hereto, and corresponding adjustments shall be made to the Contract price amount specified in Clause GCC 39.1.

40. Services, Facilities and Property of the Client

40.1. The Client shall make available to the Consultant and the Experts, for the purposes of the Services and free of any charge, the services, facilities and property described in the Terms of Reference (**Appendix A)** at the times and in the manner specified in said **Appendix A.**

41. Counterpart Personnel

41.1. The Client shall make available to the Consultant free of charge such professional and support counterpart personnel, to be nominated by the Client with the Consultant's advice, if specified in **Appendix A**.

41.2. Professional and support counterpart personnel, excluding Client's liaison personnel, shall work under the exclusive direction of the Consultant. If any member of the counterpart personnel fails to perform adequately any work assigned to such member by the Consultant that is consistent with the position occupied by such member, the Consultant may request the replacement of such member, and the Client shall not unreasonably refuse to act upon such request.

42. Payment Obligation

42.1. In consideration of the Services performed by the Consultant under this Contract, the Client shall make such payments to the Consultant for the deliverables specified in **Appendix A** and in such manner as is provided by GCC F

below.

F. PAYMENTS TO THE CONSULTANT

43. Contract Price

43.1. The Contract price is fixed and is set forth in the **SCC.** The Contract price breakdown is provided in **Appendix C**.

43.2. Any change to the Contract price specified in Clause GCC 43.1 can be made only if the Parties have agreed to the revised scope of Services pursuant to Clause GCC 16 and have amended in writing the Terms of Reference in **Appendix A**.

44. Taxes and Duties

44.1. The Consultant, Sub-consultants and Experts are responsible for meeting any and all tax liabilities arising out of the Contract unless it is stated otherwise in the **SCC**.

44.2. As an exception to the above and as stated in the **SCC**, all local identifiable indirect taxes (itemized and finalized at Contract negotiations) are reimbursed to the Consultant or are paid by the Client on behalf of the Consultant.

45. Currency of Payment

45.1. Any payment under this Contract shall be made in the currency (ies) of the Contract.

46. Mode of Billing and Payment

46.1. The total payments under this Contract shall not exceed the Contract price set forth in Clause GCC 43.1.

46.2. The payments under this Contract shall be made in lump-sum instalments against deliverables specified in **Appendix A**. The payments will be made according to the payment schedule stated in the **SCC**.

46.2.1 *Advance payment:* Unless otherwise indicated in the **SCC**, an advance payment shall be made against an advance payment bank guarantee acceptable to the Client in an amount (or amounts) and in a currency (or currencies) specified in the **SCC**. Such guarantee (i) is to remain effective until the advance payment has been fully set off, and (ii) is to be in the form set forth in **Appendix D**, or in such other form as the Client shall have approved in writing. The advance payments will be set off by the Client in equal portions against the lump-sum installments specified in the **SCC** until said advance payments have been fully set off.

46.2.2 *The Lump-Sum Installment Payments.* The

Client shall pay the Consultant within sixty (60) days after the receipt by the Client of the deliverable(s) and the cover invoice for the related lump-sum installment payment. The payment can be withheld if the Client does not approve the submitted deliverable(s) as satisfactory in which case the Client shall provide comments to the Consultant within the same sixty (60) days period. The Consultant shall thereupon promptly make any necessary corrections, and thereafter the foregoing process shall be repeated.

46.2.3 *The Final Payment*. The final payment under this Clause shall be made only after the final report have been submitted by the Consultant and approved as satisfactory by the Client. The Services shall then be deemed completed and finally accepted by the Client. The last lump-sum installment shall be deemed approved for payment by the Client within ninety (90) calendar days after receipt of the final report by the Client unless the Client, within such ninety (90) calendar day period, gives written notice to the Consultant specifying in detail deficiencies in the Services, the final report. The Consultant shall thereupon promptly make any necessary corrections, and thereafter the foregoing process shall be repeated.

46.2.4 All payments under this Contract shall be made to the accounts of the Consultant specified in the **SCC**.

46.2.5 With the exception of the final payment under 46.2.3 above, payments do not constitute acceptance of the whole Services nor relieve the Consultant of any obligations hereunder.

47. Interest on Delayed Payments

47.1. If the Client had delayed payments beyond fifteen (15) days after the due date stated in Clause GCC 46.2.2, interest shall be paid to the Consultant on any amount due by, not paid on, such due date for each day of delay at the annual rate stated in the **SCC.**

G. FAIRNESS AND GOOD FAITH

48. Good Faith

48.1. The Parties undertake to act in good faith with respect to each other's rights under this Contract and to adopt all reasonable measures to ensure the realization of the objectives of this Contract.

H. SETTLEMENT OF DISPUTES

49. Amicable Settlement

49.1. The Parties shall seek to resolve any dispute amicably by mutual consultation.

49.2. If either Party objects to any action or inaction of the other Party, the objecting Party may file a written Notice of Dispute to the other Party providing in detail the basis of the dispute. The Party receiving the Notice of Dispute will consider it and respond in writing within fourteen (14) days after receipt. If that Party fails to respond within fourteen (14) days, or the dispute cannot be amicably settled within fourteen (14) days following the response of that Party, Clause GCC 50.1 shall apply.

50. Dispute Resolution

50.1. Any dispute between the Parties arising under or related to this Contract that cannot be settled amicably may be referred to by either Party to the adjudication/arbitration in accordance with the provisions specified in the **SCC**.

II. General Conditions
Attachment 1
Fraud and Corruption

(Text in this Attachment shall not be modified)

1. Purpose

1.1 The Bank's Anti-Corruption Guidelines and this annex apply with respect to procurement under Bank Investment Project Financing operations.

2. Requirements

2.1 The Bank requires that Borrowers (including beneficiaries of Bank financing); bidders (applicants/proposers), consultants, contractors and suppliers; any sub-contractors, sub-consultants, service providers or suppliers; any agents (whether declared or not); and any of their personnel, observe the highest standard of ethics during the procurement process, selection and contract execution of Bank-financed contracts, and refrain from Fraud and Corruption.

2.2 To this end, the Bank:

a. Defines, for the purposes of this provision, the terms set forth below as follows:

i. "corrupt practice" is the offering, giving, receiving, or soliciting, directly or indirectly, of anything of value to influence improperly the actions of another party;

ii. "fraudulent practice" is any act or omission, including misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain financial or other benefit or to avoid an obligation;

iii. "collusive practice" is an arrangement between two or more parties designed to achieve an improper purpose, including to influence improperly the actions of another party;

iv. "coercive practice" is impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party;

v. "obstructive practice" is:

(a) deliberately destroying, falsifying, altering, or concealing of evidence material to the investigation or making false statements to investigators in order to materially impede a Bank investigation into allegations of a corrupt, fraudulent, coercive, or collusive practice; and/or threatening, harassing, or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation; or

(b) acts intended to materially impede the exercise of the Bank's inspection and audit rights provided for under paragraph 2.2 e. below.

b. Rejects a proposal for award if the Bank determines that the firm or individual recommended for award, any of its personnel, or its agents, or its sub-consultants, sub-contractors, service providers, suppliers and/ or their employees, has, directly or indirectly, engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices in competing for the contract in question;

c. In addition to the legal remedies set out in the relevant Legal Agreement, may take other appropriate actions, including declaring misprocurement, if the Bank determines at any time that representatives of the Borrower or of a recipient of any part of the proceeds of the loan engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices during the procurement process, selection and/or execution of the contract in question, without the Borrower having taken timely and appropriate action satisfactory to the Bank to address such practices when they occur, including by failing to inform the Bank in a timely manner at the time they knew of the practices;

d. Pursuant to the Bank's Anti- Corruption Guidelines and in accordance with the Bank's prevailing sanctions policies and procedures, may sanction a firm or individual, either indefinitely or for a stated period of time, including by publicly declaring such firm or individual ineligible (i) to be awarded or otherwise benefit from a Bank-financed contract, financially or in any other manner;[1] (ii) to be a nominated[2] sub-contractor, consultant, manufacturer or supplier, or service provider of an otherwise eligible firm being awarded a Bank-financed contract; and (iii) to receive the proceeds of any loan made by the Bank or otherwise to participate further in the preparation or implementation of any Bank-financed project;

e. Requires that a clause be included in bidding/request for proposals documents and in contracts financed by a Bank loan, requiring (i) bidders (applicants/proposers), consultants, contractors, and suppliers, and their sub-contractors, sub-consultants, service providers, suppliers, agents personnel, permit the Bank to inspect[3] all accounts, records and other documents relating to the procurement process, selection and/or contract execution, and to have them audited by auditors appointed by the Bank.

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1 For the avoidance of doubt, a sanctioned party's ineligibility to be awarded a contract shall include, without limitation, (i) applying for pre-qualification, expressing interest in a consultancy, and bidding, either directly or as a nominated sub-contractor, nominated consultant, nominated manufacturer or supplier, or nominated service provider, in respect of such contract, and (ii) entering into an addendum or amendment introducing a material modification to any existing contract.

2 A nominated sub-contractor, nominated consultant, nominated manufacturer or supplier, or nominated service provider (different names are used depending on the particular bidding document) is one which has been: (i) included by the bidder in its pre-qualification application or bid because it brings specific and critical experience and know-how that allow the bidder to meet the qualification requirements for the particular bid; or (ii) appointed by the Borrower.

3 Inspections in this context usually are investigative (i.e., forensic) in nature. They involve fact-finding activities undertaken by the Bank or persons appointed by the Bank to address specific matters related to investigations/audits, such as evaluating the veracity of an allegation of possible Fraud and Corruption, through the appropriate mechanisms. Such activity includes but is not limited to: accessing and examining a firm's or individual's financial records and information, and making copies thereof as relevant; accessing and examining any other documents, data and information (whether in hard copy or electronic format) deemed relevant for the investigation/audit, and making copies thereof as relevant; interviewing staff and other relevant individuals; performing physical inspections and site visits; and obtaining third party verification of information.

III. Special Conditions of Contract

[Notes in brackets are for guidance purposes only and should be deleted in the final text of the signed contract]

Number of GC Clause	Amendments of, and Supplements to, Clauses in the General Conditions of Contract
1.1(a)	**The Contract shall be construed in accordance with the law of** India
4.1	**The language is:** English.
6.1 and 6.2	**The addresses are** *[fill in at negotiations with the selected firm]***:** Client : _____ _____ Attention : _____ Facsimile : _____ E-mail (where permitted):_____ Consultant : _____ _____ Attention : _____ Facsimile : _____ E-mail (where permitted) :_____
8.1	*[Note: If the Consultant consists only of one entity, state "N/A";* *OR* *If the Consultant is a Joint Venture consisting of more than one entity, the name of the JV member whose address is specified in Clause SCC 6.1 should be inserted here.]* **The Lead Member on behalf of the JV is** _____ _____ *[insert name of the member]*
9.1	**The Authorized Representatives are:** **For the Client:** *[name, title]*_____ **For the Consultant:** *[name, title]*_____
11.1	**The effectiveness conditions are the following**: Signing of Contract by both the parties, after due approvals.

12.1	**Termination of Contract for Failure to Become Effective:** **The time period shall be 30 days.**
13.1	**Commencement of Services:** **The number of days shall be 10 days.** Confirmation of Key Experts' availability to start the Assignment shall be submitted to the Client in writing as a written statement signed by each Key Expert.
14.1	**Expiration of Contract:** **The time period shall be** 9 months *[insert time period, e.g.: twelve months]*.
21 b.	**The Client reserves the right to determine on a case-by-case basis whether the Consultant should be disqualified from providing goods, works or non-consulting services due to a conflict of a nature described in Clause GCC 21.1.3** Yes_____ No _____

23.1	The following limitation of the Consultant's Liability towards the Client can be subject to the Contract's negotiations: **"Limitation of the Consultant's Liability towards the Client:** **(a) Except in the case of gross negligence or willful misconduct on the part of the Consultant or on the part of any person or a firm acting on behalf of the Consultant in carrying out the Services, the Consultant, with respect to damage caused by the Consultant to the Client's property, shall not be liable to the Client:** **(i) for any indirect or consequential loss or damage; and** **(ii) for any direct loss or damage that exceeds [insert a multiplier, e.g.: one, two, three] times the total value of the Contract;** **(b) This limitation of liability shall not** **(i) affect the Consultant's liability, if any, for damage to Third Parties caused by the Consultant or any person or firm acting on behalf of the Consultant in carrying out the Services;** **(ii) be construed as providing the Consultant with any limitation or exclusion from liability which is prohibited by the Applicable Law in India".**
24.1	**The insurance coverage against the risks shall be as follows:** **(a) Professional liability insurance, with a minimum coverage of** ____100% of the Contract amount_____ (b) Third Party motor vehicle liability insurance in respect of motor vehicles operated in the Client's country by the Consultant or its Experts or Sub-consultants, with a minimum coverage as per the latest Amended Motor Vehicles Act, India; (c) Third Party liability insurance, with a minimum coverage *in accordance with the applicable law in India* (d) employer's liability and workers' compensation insurance in respect of the experts and Sub-consultants in accordance with the relevant provisions of the applicable law in the Client's country, as well as, with respect to such Experts, any such life, health, accident, travel or other insurance as may be appropriate; and

	(e) insurance against loss of or damage to (i) equipment purchased in whole or in part with funds provided under this Contract, (ii) the Consultant's property used in the performance of the Services, and (iii) any documents prepared by the Consultant in the performance of the Services.
27.2	[**The Consultant shall not use the data, documents and software for purposes unrelated to this Contract without the prior written approval of the Client**.
43.1	**The Contract price is:** Rs. _____ *[insert amount] [indicate:* **inclusive** *or* **exclusive***]* **of local indirect taxes.** **Any indirect local taxes chargeable in respect of this Contract for the Services provided by the Consultant shall be paid by the Consultant.** The Client shall only reimburse Goods & Services Tax (GST) payable on the contract value by the consultants, as per Applicable Law in India subject to the Client, performing such duties in regard to the deduction of taxes as may be lawfully imposed. However, Consultant shall have to produce to the Client, all relevant documents establishing the proof of payment/ filing of return to the tax authority etc. The consultant shall register itself for GST with appropriate authority in India & shall provide the Registration Number to the Client. **The amount of such taxes is _____** *[insert the amount as finalized at the Contract's negotiations on the basis of the estimates provided by the Consultant in Form FIN-2 of the Consultant's Financial Proposal.]*
44.1 and 44.2	**The consultants, sub-consultants and the Personnel shall pay** the taxes, taxes, duties, fees, levies and other impositions levied under the existing, amended or enacted laws during life of this contract and the client shall perform such duties in this regard to the deduction of such taxes as may be lawfully imposed. **The Client shall only reimburse the Goods and Services Tax (GST)** payable on the contract value by the consultants, as per Applicable Law in India, subject to the Client, performing such duties in regard to the deduction of taxes as may be lawfully imposed. However, Consultant shall have to produce to the Client, all relevant documents establishing the proof of payment/ filing of return to the tax authority etc.
46.2	**The payment schedule: All payments shall be made in Rs.** **Time schedule for important Deliverables (the "Key Dates") of the Consultancy and the payment schedule linked to the specified Deliverables are given below:**

Time Schedule

Sl No.	Description of Key activity	Duration	Payment
01	ɔmission and approval of inception reports	35 days from the date mentioned in the notice to proceed with the work.	10%
02	ɔmission and approval of Draft report for stretch from Km 11.8 to Km 50	Within 120 days	20%
03	ɔmission and approval of Draft report for stretch from Km 51 to Km 103.55	Within 150 days	20%
04	ɔility report for the critical landslide	Within 120 days	20%
05	ssion of Draft DPRs	Within 150 days	10%
06	ission of Final DPRs	Within 180 days	10%
07	ssion of Land Acquisition/ Forest clearance documents/ Report :	3 (a) and 3 (A) 3 (D) and 3 (G) Stage I forest clearance documents	3% 3% 4%

If the LA and Forest activities are not required, then the associated amount may be claimed in the Final DPR.

46.2.1 The following provisions shall apply to the advance payment and the advance bank payment guarantee:

(1) An advance payment of Rs…. *[insert amount]* shall be made within *[insert number]* days after the receipt of an advance bank payment

	guarantee and the invoice by the Client. The advance payment will be set off by the Client in equal portions against *[list the payments against which the advance is offset]*. (2) The advance bank payment guarantee shall be in the amount of the advance payment. (3) The bank guarantee will be released when the advance payment has been fully set off.
46.2.4	**The account is:** *[insert account]* for Rs.
47.1	**The interest rate is**: *State Bank of India prime lending rate, as applicable.*
50.1	**Disputes shall be settled by arbitration in accordance with the following provisions:** 1. Selection of Arbitrators. Each dispute submitted by a Party to arbitration shall be heard by a sole arbitrator or an arbitration panel composed of three (3) arbitrators, in accordance with the following provisions: (a) Where the Parties agree that the dispute concerns a technical matter, they may agree to appoint a sole arbitrator or, failing agreement on the identity of such sole arbitrator within thirty (30) days after receipt by the other Party of the proposal of a name for such an appointment by the Party who initiated the proceedings, either Party may apply to *Indian Council of Arbitration* for a list of not fewer than five (5) nominees and, on receipt of such list, the Parties shall alternately strike names therefrom, and the last remaining nominee on the list shall be the sole arbitrator for the matter in dispute. If the last remaining nominee has not been determined in this manner within sixty (60) days of the date of the list, *Indian Council of Arbitration* shall appoint, upon the request of either Party and from such list or otherwise, a sole arbitrator for the matter in dispute. (b) Where the Parties do not agree that the dispute concerns a technical matter, the Client and the Consultant shall each appoint one (1) arbitrator, and these two arbitrators shall jointly appoint a third arbitrator, who shall chair the arbitration panel. If the arbitrators named by the Parties do not succeed in appointing a third arbitrator within thirty (30) days after the latter of the two (2) arbitrators named by the Parties has been appointed, the third arbitrator shall, at the request of either Party, be appointed by *Indian Council of Arbitration*.

	(c) If, in a dispute subject to paragraph (b) above, one Party fails to appoint its arbitrator within thirty (30) days after the other Party has appointed its arbitrator, the Party which has named an arbitrator may apply to the *Indian Council of Arbitration* to appoint a sole arbitrator for the matter in dispute, and the arbitrator appointed pursuant to such application shall be the sole arbitrator for that dispute.
	2. Rules of Procedure. Arbitration proceedings shall be conducted in accordance with the procedure of the Arbitration & Conciliation Act 1996, of India. 3. Substitute Arbitrators. If for any reason an arbitrator is unable to perform his/her function, a substitute shall be appointed in the same manner as the original arbitrator. 4. Nationality and Qualifications of Arbitrators. The sole arbitrator or the third arbitrator appointed pursuant to paragraphs 1(a) through 1(c) above shall be a recognized legal or technical expert with extensive experience in relation to the matter in dispute.
	5. Miscellaneous. In any arbitration proceeding hereunder: (a) proceedings shall, unless otherwise agreed by the Parties, be held in the city where the contract is signed; (b) the English language shall be the official language for all purposes; (c) the decision of the sole arbitrator or of a majority of the arbitrators (or of the third arbitrator if there is no such majority) shall be final and binding and shall be enforceable in any court of competent jurisdiction, and the Parties hereby waive any objections to or claims of immunity in respect of such enforcement. (d) Where the value of the contract is Rs.50 million and below, the disputes or differences arising shall be referred to the Sole Arbitrator. The Sole Arbitrator should be appointed by agreement between the parties; failing such agreement, by the appointing authority, namely the Indian Council of Arbitration/ *Chairman of the Executive Committee of the Indian Roads Congress* . (e) The Arbitrator should give final award within 180 days of starting of the proceedings. (f) Performance under the contract shall continue during the arbitration proceedings and payments due to the consultant by the Client shall not be withheld, unless they are the subject matter of the arbitration proceedings.

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IV. Appendices

APPENDIX A – TERMS OF REFERENCE

[This Appendix shall include the final Terms of Reference (TORs) worked out by the Client and the Consultant during the negotiations; dates for completion of various tasks; location of performance for different tasks; detailed reporting requirements and list of deliverables against which the payments to the Consultant will be made; Client's input, including counterpart personnel assigned by the Client to work on the Consultant's team; specific tasks or actions that require prior approval by the Client.

Insert the text based on the Section 7 (Terms of Reference) of the ITC in the RFP and modified based on the Forms TECH-1 through TECH-5 of the Consultant's Proposal. Highlight the changes to Section 7 of the RFP]

……

APPENDIX B - KEY EXPERTS

[Insert a table based on Form TECH-6 of the Consultant's Technical Proposal and finalized at the Contract's negotiations. Attach the CVs (updated and signed by the respective Key Experts) demonstrating the qualifications of Key Experts.]

……

APPENDIX C – BREAKDOWN OF CONTRACT PRICE

[Insert the table with the unit rates to arrive at the breakdown of the lump-sum price. The table shall be based on [Form FIN-3 and FIN-4] of the Consultant's Proposal and reflect any changes agreed at the Contract negotiations, if any. The footnote shall list such changes made to [Form FIN-3 and FIN-4] at the negotiations or state that none has been made.]

When the Consultant has been selected under Quality-Based Selection method, also add the following:

> *"*The agreed remuneration rates shall be stated in the attached Model Form I. This form shall be prepared on the basis of Appendix A to Form FIN-3 of the RFP "Consultants' Representations regarding Costs and Charges" submitted by the Consultant to the Client prior to the Contract's negotiations.
>
> Should these representations be found by the Client (either through inspections or audits pursuant to Clause GCC 25.2 or through other means) to be materially incomplete or inaccurate, the Client shall be entitled to introduce appropriate modifications in the remuneration rates affected by such materially incomplete or inaccurate representations. Any

such modification shall have retroactive effect and, in case remuneration has already been paid by the Client before any such modification, (i) the Client shall be entitled to offset any excess payment against the next monthly payment to the Consultants, or (ii) if there are no further payments to be made by the Client to the Consultants, the Consultants shall reimburse to the Client any excess payment within thirty (30) days of receipt of a written claim of the Client. Any such claim by the Client for reimbursement must be made within twelve (12) calendar months after receipt by the Client of a final report and a final statement approved by the Client in accordance with Clause GCC 46.2.3 of this Contract.*"]*

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APPENDIX D – REIMBURSABLE EXPENSES COST ESTIMATES

1. *[Insert the table with the reimbursable expenses rates. The table shall be based on [Form FIN-4] of the Consultant's Proposal and reflect any changes agreed at the Contract negotiations, if any. The footnote shall list such changes made to [Form FIN-4] at the negotiations or state that none has been made.*

2. All reimbursable expenses shall be reimbursed at actual cost, unless otherwise explicitly provided in this Appendix, and in no event shall reimbursement be made in excess of the Contract amount.]

APPENDIX E - FORM OF ADVANCE PAYMENTS GUARANTEE

[See Clause GCC 53.1(a) and SCC 53.1(a)]

{Guarantor letterhead or SWIFT identifier code}

Bank Guarantee for Advance Payment

Guarantor: _____ *[insert commercial Bank's Name, and Address of Issuing Branch or Office]*

Beneficiary: _____ *[insert Name and Address of Client]*

Date: _____*[insert date]*____

ADVANCE PAYMENT GUARANTEE No.: _____*[insert number]*_____

We have been informed that _____ *[name of Consultant or a name of the Joint Venture, same as appears on the signed Contract]* (hereinafter called "the Consultant") has entered into Contract No. _____ *[reference number of the contract]* dated ___*[insert date]*_____ with the Beneficiary, for the provision of _____ *[brief description of Services]* (hereinafter called "the Contract").

Furthermore, we understand that, according to the conditions of the Contract, an advance payment in the sum of _____ *[insert amount in figures]* () *[amount in words]* is to be made against an advance payment guarantee.

At the request of the Consultant, we, as Guarantor, hereby irrevocably undertake to pay the Beneficiary any sum or sums not exceeding in total an amount of _____ *[amount in figures]* () *[amount in words]*[1] upon receipt by us of the Beneficiary's complying demand supported by the Beneficiary's ~~a~~ written statement, whether in the demand itself or in a separate signed document accompanying or identifying the demand, stating that the Consultant is in breach of its obligation under the Contract because the Consultant:

(a) has failed to repay the advance payment in accordance with the Contract conditions, specifying the amount which the Consultant has failed to repay;
(b) has used the advance payment for purposes other than toward providing the Services under the Contract.

It is a condition for any claim and payment under this guarantee to be made that the advance payment referred to above must have been received by the Consultant on its account number _____ at _____ *[name and address of bank]*.

[1] The Guarantor shall insert an amount representing the amount of the advance payment and denominated either in the currency(ies) of the advance payment as specified in the Contract, or in a freely convertible currency acceptable to the Client.

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The maximum amount of this guarantee shall be progressively reduced by the amount of the advance payment repaid by the Consultant as indicated in certified statements or invoices marked as "paid" by the Client which shall be presented to us. This guarantee shall expire, at the latest, upon our receipt of the payment certificate or paid invoice indicating that the Consultant has made full repayment of the amount of the advance payment, or on the __ day of _*[month]*_____, *[year]*__,[2] whichever is earlier. Consequently, any demand for payment under this guarantee must be received by us at this office on or before that date.

This guarantee is subject to the Uniform Rules for Demand Guarantees (URDG) 2010 revision, ICC Publication No. 758.

_____

[signature(s)]

{Note: All italicized text is for indicative purposes only to assist in preparing this form and shall be deleted from the final product.}

[2] Insert the expected expiration date. In the event of an extension of the time for completion of the Contract, the Client would need to request an extension of this guarantee from the Guarantor. Such request must be in writing and must be made prior to the expiration date established in the guarantee. In preparing this guarantee, the Client might consider adding the following text to the form, at the end of the penultimate paragraph: "The Guarantor agrees to a one-time extension of this guarantee for a period not to exceed [six months][one year], in response to the Client's written request for such extension, such request to be presented to the Guarantor before the expiry of the guarantee."

APPENDIX F - CODE OF CONDUCT

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APPENDIX G - DETAILED EVALUATION CRITERIA

Detailed Evaluation criteria

1. First Stage Evaluation -Proof of Eligibility

1.1 Eligibility criteria for applicant firm.

The sole applicant firm shall satisfy the following 2 Nos. of criteria.

(a) A Firm applying for the project should have Experience of carrying out Vulnerability including Risk assessment of minimum 100 Km length cumulative and 40 Km in single project. Further, the firm should have carried out Detailed Project Report/ Feasibility Study of counter measures for large sale landslide* for at least 2 projects.

* The Firm shall submit the details of project work involving large scale landslide including extensive studies along with experience certificate for successful completion of Detailed Project Report/ Feasibility Study of counter measures for such large sale landslide.

(b) Annual Average Turn Over for the last 5 years {In cases where, Audited/Certified copy of Balance Sheet for the FY 2024-25 is available, last five years shall be counted from 2019-20 to 2024-25. However, where audited/certified copy of the Balance Sheet for the FY 2024-25 is not available (as certified by the Statutory auditor) then in such cases last five years shall be considered from 2018-19 to 2023-24} of the firm from Consultancy services should be equal to more than Rs. 25 crore.

Note:

(iv) The sole applicant shall fulfill all the requirements of (a) & (b).

(v) In case of JV, the Lead Partner should fulfill at least 75% of all eligibility requirements and the other partner shall fulfill at least 50% of all eligibility requirements.

(vi) If the applicant firm has / have carried out Vulnerability including Risk assessment and prepared the DPR/FS projects solely on its own, 100% weightage shall be given. However, If the applicant firm has / have carried out Vulnerability including Risk assessment and prepared the DPR/FS projects as a lead partner in a JV, 75% weightage shall be given. If the applicant firm has / have carried out Vulnerability including Risk assessment and prepared the DPR/FS projects as the other partner (not lead partner) in a JV 50% weightage shall be given. If the applicant firm have carried out the work as an associate, 25% weightage shall be given.

2. Second Stage Evaluation -Technical Evaluation

B. Firm's Relevant Experience in last 7 years (40)

The following is the break-up:

S. No.	Description	Maximum Points	Sub-Points
1	Experience of firm for carrying out Vulnerability assessment/ Susceptibility mapping and Risk assessment for Highway/ Railway/Hydel projects	10	
	100 Km		7
	1 mark for every additional 50 Kms		3
2	Detailed Project Report/ Feasibility Study of counter measures for large sale landslide*	15	
2.1	2 projects		10
2.2	Additional 2.5 marks for each additional project carried out in developed country		5
3	**Specific experience of firms in terms of turnover**	10	
3.1	Firm's Average Turnover of last 5 years > 100 crore		10
3.2	Firm Average Turnover of last 5 years 50 - 100 crore		8
3.3	Firm Average Turnover of last 5 years > 25 but < 50 crore		6
4	**Firms carrying out any research work on landslide for Government shall be given additional marks**	5	

Note: Weightage to be given when experience by a Firm as Sole Firm/Lead Partner in a JV/Other Partner in a JV/ Associate:

No.	Status of the firm in carrying out DPR/ Feasibility Study	Weightage for experience
1	Sole firm	100 %
2	Lead partner in a JV	75%
3	Other partner in a JV	50 %
4	As Associate	25%

B Material testing, survey and investigation, equipment and software proposed to be used (10)

S. No.	Description	Maximum Points
1	**Availability of NABL Accredited Material Testing Facilities with persons/resources having operational skills of the equipment** Owned* (Available In House)/ Outsourced (Hire basis/through Associate)	2
2	**Availability of Field Investigation Facilities (like Hydraulic rigs: minimum 3 no's. and digital borehole logging) with persons/resources havingoperational skills of the equipment** Owned* (Available In House)/ Outsourced (Hire basis/through Associate)	2

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S. No.	Description	Maximum Points
3	Availability of Office Equipment, Slope stability Software with persons/resources having operational skills of the equipment- like Slide 2 for limit Equilibrium analysis & RS 2 for Finite Element Analysis, Geo5, plaxis and Geomatics software with persons/resources having operational skills of ERDAS IMAGINE 2022 with LPS & SAR Interferometry + IMAGINE UAV Modules/ESRI software bundle for Education and Research (ArcGIS Dekstop 10.8.2/Pro 3.1.0 and ENVI 5.6.1 + IDL(10), ENVI FX(2), ENVI ACM(2), ENVI DL(2)/ Pix4D)	2
4	Availability of Drone/LIDAR or better technology and 3D modeling software for topographic survey(Infrastructure sector) Owned* (Available In House)/ Outsourced (Hire basis/through Associate)	2
5	Availability of ERT/SRT equipment	2

Note:- The experience of firm in Drone survey, Geomatics, ERT and SRT Lidar shall be supported by experience certificate. Acquisition for private concessionaire/contractor shall be considered only if the experience certificate is authenticated by the concerned competent Government department/authority. In case of overseas experience the weightage to be assigned to the certificate for experience in use of the equipment, a self-certificate followed by the client certificate may be accepted.

C. Qualification and Competence of the Key Staff for adequacy of the Assignment (40)

Break up of points assigned to each Key personnel:

S. No.	Key personnel	Points
1	Team Leader cum Landslide expert	12
2	Senior Geologist	8
3	Senior Geotechnical Engineer	8
4	Senior Geomatics Expert	6
5	Senior Hydrology and Hydraulic Expert	6
	Total	40

2. TEAM LEADER CUM LANDSLIDE EXPERT

S. No.	Description		Max. Points
I	**General Qualification**		**25**
i)	Degree in Civil Engineering or equivalent / M. Sc. in Geology [AICTE Approved or equivalent certification for degree outside India]		20
ii)	Post graduate in Civil Engineering (Geotechnical Engineering) {AICTE Approved} or PHD in Geology/landslide		5
II	**Relevant Experience & Adequacy for the Project**		**70**
a)	**Total Professional Experience**		**15**
	<20 years	0	
	≥20 but <25 years	11	

	≥25 but <30 years	13	
	≥ 30 years	15	
(b)	**Experience in carrying out Vulnerability assessment of hill slope, Landslide/Rock fall investigation & design experience in Planning, project preparation and design of remedial measures for prevention of landslide/rockfall on Highways/Airport/Railways in mountainous region**		**25**
(i)	**Years of experience**		**11**
	<12 years	0	
	≥12 but <15 years	6	
	≥15 but <18 years	7	
	≥18 but < 20 years	8	
	≥20 but <22 years	9	
	≥22 but <25 years	10	
	≥ 25 years	11	
(ii)	**Experience with respect to number of projects**		14
	(A) Experience in carrying out Vulnerability assessment of hill slope		**7**
	< 2 projects	0	
	2 projects	5	
	3 projects	6	
	4 projects	7	
	(B) Design experience in Planning, project preparation and design of remedial measures		**7**
	< 2 projects	0	
	2 projects	5	
	3 projects	6	
	4 projects	7	
c)	**Experience in Similar Capacity**		**30**
(i)	**Experience in carrying out Vulnerability assessment of hill slope** on Highways/Airport/Irrigation/Hill roads/Hydel projects		10
	< 100km	0	
	≥100 km but <150km	8	
	≥150 km but <200km	9	
	≥200 km	10	
(ii)	**Design experience in Planning, project preparation and design of remedial measures** for critical landslide locations on Highways/Airport/Irrigation/Hill roads/Hydel projects - **Number of Projects***		20
	< 1 projects	0	
	1 projects	6	

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	2-3 projects	9	
	4-5 projects	12	
	> 5 projects	15	
	Additional marks for projects outside India	**5**	
III	**Employment with Firm**		**5**
	< 1 Year	0	
	1 year	3	
	Add 0.5 marks for each subsequent year subject to maximum of 2 marks		
	Total		**100**

* Note: The case study of each claimed project shall be submitted by the Key personnel describing in detail the project, planning/design, Key challenges and measures adopted to address the same. These case studies shall be signed by the concerned Key Personnel and countersigned by the Consultant at the time of bid submission. In case, no such case study is submitted in the bid no marks shall be assigned in respect of II(c)(ii)

2. SENIOR GEOLOGIST

S. No.	Description		Max. Points
I	**General Qualification**		**25**
i)	Post Graduate Degree in Geology or related field [AICTE Approved or equivalent certification for degree outside India]		20
ii)	PhD in Geology or related field [AICTE Approved or equivalent certification for degree outside India]		5
II	**Relevant Experience & Adequacy for the Project**		**70**
a)	**Total Professional Experience**		**15**
	<15 years	0	
	15-20 years	11	
	>20-25 years	13	
	>25 years	15	
b)	**Experience in Vulnerability assessment/ Susceptibility mapping and Risk assessment for Highway/ Railway/Hydel projects**		**25**
	<12 years	0	
	12-14 years	19	
	>14 -15 years	22	
	>15 years	25	

c)	**Experience as Senior Geologist/ Geologist** on **Landslide/Rock fall investigation & design experience in Planning, project preparation and design of remedial measures for prevention of landslide/rockfall on Highways/Airport/Railways in mountainous region of similar magnitude and nature**		**30**
	<2 projects	0	
	2 projects	15	
	5 marks For each additional projects subject to maximum 30 marks	15	
III	**Employment with Firm**		**5**
	Less than 1 Year	0	
	1 year	3	
	Add 0.5 marks for each subsequent year subject tomaximum of 2 marks		
	Total		**100**

3. SENIOR GEOTECHNICAL ENGINEER

S. No.	**Description**		**Max. Points**
I	**General Qualification**		**25**
i)	Degree in Civil Engineering /engineering Geology[AICTE Approved or equivalent certification for degree outside India]		20
ii)	Post graduation in Foundation Engineering / Soil Mechanics / Geo Tech Engineering/ Rock mechanics or equivalent [AICTE Approved or equivalent certification for degree outside India]		5
II	**Relevant Experience & Adequacy for the Project**		**70**
a)	**Total Professional Experience**		**15**
	<15 years	0	
	15-20 years	11	
	>20-25 years	13	
	>25 years	15	
b)	**Experience in Vulnerability assessment/ Susceptibility mapping and Risk assessment for Highway/ Railway/Hydel projects**		**25**
	<12 years	0	
	12-14 years	19	
	>14 -15 years	22	
	>15 years	25	
c)	**Experience as Geo-technical Engineer Landslide/Rock fall investigation & design experience in Planning, project preparation and design of remedial measures for prevention of landslide/rockfall on Highways/Airport/Railways in mountainous region of similar magnitude**		**30**

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	and nature		
	<2 projects	0	
	2 projects	15	
	5 marks For each additional projects subject to maximum 30 marks	15	
III	**Employment with Firm**		**5**
	Less than 1 Year	0	
	1 year	3	
	Add 0.5 marks for each subsequent year subject tomaximum of 2 marks		
	Total		**100**

4. SENIOR GEOMATICS EXPERT

S. No.	Description		Max. Points
I	**General Qualification**		**25**
i)	Degree in Civil Engineering, Geomatics, Geography, Surveying, or a related field [AICTE Approved or equivalent certification for degree outside India]		20
ii)	Post graduation in Geomatics, Geography, Surveying, or a related field [AICTE Approved or equivalent certification for degree outside India]		5
II	**Relevant Experience & Adequacy for the Project**		**70**
a)	**Total Professional Experience**		**20**
	<12 years	0	
	≥12 but <14 years	12	
	≥14 but <16 years	14	
	≥16 but < 18 years	16	
	≥18 but <20 years	18	
	≥ 20 years	20	
b)	**Experience as Geomatics expert in Vulnerability assessment/ Susceptibility mapping and Risk assessment for Highway/ Railway/Hydel projects - No. of years**		**20**
	<10 years	0	
	≥10 but <12 years	13	
	≥12 but <14 years	15	
	≥14 but < 16 years	17	
	≥16 but <18 years	19	
	≥ 18 years	20	

c)	**Experience as similar capacity for similar magnitude and nature of project involving Landslide/Rock fall investigation & design experience in Planning, project preparation and design of remedial measures for prevention of landslide/rockfall on Highways/Airport/Railways in mountainous region - No. of projects**		**30**
	<2 projects	0	
	2 projects	15	30
	5 marks For each additional projects subject to maximum 30 marks	15	
III	**Employment with Firm**		**5**
	Less than 1 Year	0	
	1 year	3	
	Add 0.5 marks for each subsequent year subject tomaximum of 2 marks		
	Total		**100**

5. SENIOR HYDROLOGY AND HYDRAULIC EXPERT

S. No.	**Description**		**Max. Points**
I	**General Qualification**		**25**
i)	Degree in Civil Engineering, environmental engineering, or a related science like geology or earth science [AICTE Approved or equivalent certification for degree outside India]		20
ii)	Post graduation in hydrology, water resources engineering, or a related field. [AICTE Approved or equivalent certification for degree outside India]		5
II	**Relevant Experience & Adequacy for the Project**		**70**
a)	**Total Professional Experience**		**20**
	<12 years	0	
	≥12 but <14 years	12	
	≥14 but <16 years	14	
	≥16 but < 18 years	16	
	≥18 but <20 years	18	
	≥ 20 years	20	
b)	**Experience as hydrology and hydraulics expert in Vulnerability assessment/ Susceptibility mapping and Risk assessment for Highway/ Railway/Hydel projects - No. of years**		**20**
	<10 years	0	
	≥10 but <12 years	13	
	≥12 but <14 years	15	
	≥14 but < 16 years	17	

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	≥16 but <18 years	19	
	≥ 18 years	20	
c)	**Experience as similar capacity for similar magnitude and nature of project involving Landslide/Rock fall investigation & design experience in Planning, project preparation and design of remedial measures for prevention of landslide/rockfall on Highways/Airport/Railways in mountainous region - No. of projects**		**30**
	<2 projects	0	
	2 projects	15	30
	5 marks For each additional projects subject to maximum 30 marks	15	
III	**Employment with Firm**		**5**
	Less than 1 Year	0	
	1 year	3	
	Add 0.5 marks for each subsequent year subject tomaximum of 2 marks		
	Total		**100**

D. Adequacy and quality of proposed methodology and work plan in responding to the Terms of Reference (TORs) (10)

Sr. No.	Details	Marks
1	Site Appreciation	3
2	Proposed Methodology	3
3	Detailed Presentation on the remedial measures for similar types of problems to be included in the proposal	4

PART III

Section 9. Notification of Intention to Award and Beneficial Ownership Forms

Notification of Intention to Award

[*This Notification of Intention to Award shall be sent to each Consultant whose Financial Proposal was opened. Send this Notification to the authorized representative of the Consultant].*

For the attention of Consultant's authorized representative
Name: *[insert authorized representative's name]*
Address: *[insert authorized representative's address]*
Telephone/Fax numbers: *[insert authorized representative's telephone/fax numbers]*
Email Address: *[insert authorized representative's email address]*

[IMPORTANT: insert the date that this Notification is transmitted to all Consultants. The Notification must be sent to all Consultants simultaneously. This means on the same date and as close to the same time as possible.]

DATE OF TRANSMISSION: This Notification is sent by: [*email/fax*] on [*date*] (local time)

Notification of Intention to Award

Client: *[insert the name of the Client]*
Contract title: *[insert the name of the contract]*
Country: *[insert country where RFP is issued]*
Loan No. /Credit No. /Grant No.: *[insert reference number for loan/credit/grant]*
RFP No: *[insert RFP reference number from Procurement Plan]*

This Notification of Intention to Award (Notification) notifies you of our decision to award the above contract. The transmission of this Notification begins the Standstill Period. During the Standstill Period you may:

a) request a debriefing in relation to the evaluation of your Proposal, and/or

b) submit a Procurement-related Complaint in relation to the decision to award the contract.

1. The successful Consultant

Name:	[*insert nameof successful Consultant*]
Address:	[*insert addressof the successful Consultant*]
Contract price:	[*insert contract priceof the successful Consultant*]

2. **Short listed Consultants** ***[INSTRUCTIONS: insert names of all short listed Consultants and indicate which Consultants submitted Proposals. Where the selection method requires it, state the price offered by each Consultant as read out, and as evaluated. Include overall technical scores and scores assigned for each criterion and sub-criterion. Select Full Technical Proposal (FTP) or Simplified Technical Proposal (STP) in the last column below.]***

Name of Consultant	**Submitted Proposal**	**[*use for FTP*] Overall technical scores**	**[*use for STP*] Overall technical scores**	**Financial Proposal price (if applicable)**	**Evaluated Financial Proposal price (if applicable)**	**Combined score and ranking (if applicable)**
[*insert name*]	[*yes/no*]	**Criterion (i):** [*insert score*] **Criterion (ii):** [*insert score*] **Criterion (iii):** [*insert score*] Sub-criterion a: 1: [*insert score*] 2: [*insert score*] 3: [*insert score*] Sub-criterion b: 1: [*insert score*] 2: [*insert score*] 3: [*insert score*] Sub-criterion c: 1: [*insert score*] 2: [*insert score*] 3: [*insert score*] **Criterion (iv):** [*insert score*] **Criterion (v):** [*insert score*] **Total score: [*insert score*]**	**Criterion (i):** [*insert score*] **Criterion (ii):** [*insert score*] Sub-criterion a: [*insert score*] Sub-criterion b: [*insert score*] Sub-criterion c: [*insert score*] **Total score: [*insert score*]**	[*Proposal price*]	[*evaluated price*]	**Combined Score:** [*combined score*] **Ranking:** [*ranking*]
[*insert name*]	[*yes/no*]	**Criterion (i):** [*insert score*] **Criterion (ii):** [*insert score*] **Criterion (iii):** [*insert score*] Sub-criterion a: 1: [*insert score*] 2: [*insert score*]	**Criterion (i):** [*insert score*] **Criterion (ii):** [*insert score*] Sub-criterion a: [*insert score*] Sub-criterion b: [*insert score*] Sub-criterion c: [*insert*	[*Proposal price*]	[*evaluated price*]	**Combined Score:** [*combined score*] **Ranking:** [*ranking*]

Name of Consultant	Submitted Proposal	[*use for FTP*] Overall technical scores	[*use for STP*] Overall technical scores	Financial Proposal price (if applicable)	Evaluated Financial Proposal price (if applicable)	Combined score and ranking (if applicable)
		3: [*insert score*] Sub-criterion b: 1: [*insert score*] 2: [*insert score*] 3: [*insert score*] Sub-criterion c: 1: [*insert score*] 2: [*insert score*] 3: [*insert score*] **Criterion (iv):** [*insert score*] **Criterion (v):** [*insert score*] **Total score: [*insert score*]**	*score*] **Total score: [*insert score*]**			
[*insert name*]	[*yes/no*]	**Criterion (i):** [*insert score*] **Criterion (ii):** [*insert score*] **Criterion (iii):** [*insert score*] Sub-criterion a: 1: [*insert score*] 2: [*insert score*] 3: [*insert score*] Sub-criterion b: 1: [*insert score*] 2: [*insert score*] 3: [*insert score*] Sub-criterion c: 1: [*insert score*] 2: [*insert score*] 3: [*insert score*] **Criterion (iv):** [*insert score*] **Criterion (v):** [*insert score*]	**Criterion (i):** [*insert score*] **Criterion (ii):** [*insert score*] Sub-criterion a: [*insert score*] Sub-criterion b: [*insert score*] Sub-criterion c: [*insert score*] **Total score: [*insert score*]**	[*Proposal price*]	[*evaluated price*]	**Combined Score:** [*combined score*] **Ranking:** [*ranking*]

Name of Consultant	Submitted Proposal	[*use for FTP*] Overall technical scores	[*use for STP*] Overall technical scores	Financial Proposal price (if applicable)	Evaluated Financial Proposal price (if applicable)	Combined score and ranking (if applicable)
		Total score: [*insert score*]				
[*insert name*]	…					
…	…					

3. Reason/s why your Proposal was unsuccessful [*Delete if the combined score already reveals the reason*]

[INSTRUCTIONS; State the reason/s why <u>this</u> Consultant's Proposal was unsuccessful. Do NOT include: (a) a point by point comparison with another Consultant's Proposal or (b) information that is marked confidential by the Consultant in its Proposal.]

4. How to request a debriefing [*This applies only if your proposal was unsuccessful as stated under point (3) above*]

DEADLINE: The deadline to request a debriefing expires at midnight on [*insert date*] (local time).

You may request a debriefing in relation to the results of the evaluation of your Proposal. If you decide to request a debriefing your written request must be made within three (3) Business Days of receipt of this Notification of Intention to Award.

Provide the contract name, reference number, name of the Consultant, contact details; and address the request for debriefing as follows:

Attention: [*insert full name of person, if applicable*]

Title/position: [*insert title/position*]

Agency: [*insert name of Client*]

Email address: [*insert email address*]

Fax number: [*insert fax number*] ***delete if not used***

If your request for a debriefing is received within the 3 Business Days deadline, we will provide the debriefing within five (5) Business Days of receipt of your request. If we are unable to provide the debriefing within this period, the Standstill Period shall be extended by five (5) Business Days after the date that the debriefing is provided. If this happens, we will notify you and confirm the date that the extended Standstill Period will end.

The debriefing may be in writing, by phone, video conference call or in person. We shall promptly advise you in writing how the debriefing will take place and confirm the date and time.

If the deadline to request a debriefing has expired, you may still request a debriefing. In this case, we will provide the debriefing as soon as practicable, and normally no later than fifteen (15) Business Days from the date of publication of the Contract Award Notice.

5. How to make a complaint

DEADLINE: The deadline for submitting a Procurement-related Complaint challenging the decision to award the contract expires on midnight, [*insert date*] (local time).

Provide the contract name, reference number, name of the Consultant, contact details; and address the Procurement-related Complaint as follows:

Attention: [*insert full name of person, if applicable*]

Title/position: [*insert title/position*]

Agency: [*insert name of Client*]

Email address: [*insert email address*]

Fax number: [*insert fax number*] ***delete if not used***

[At this point in the procurement process] [Upon receipt of this notification] you may submit a Procurement-related Complaint challenging the decision to award the contract. You do not need to have requested, or received, a debriefing before making this complaint. Your complaint must be submitted within the Standstill Period and received by us before the Standstill Period ends.

Further information:

For more information see the "Procurement Regulations for IPF Borrowers (Procurement Regulations) (Annex III)." You should read these provisions before preparing and submitting your complaint. In addition, the World Bank's Guidance "How to make a Procurement-related Complaint" provides a useful explanation of the process, as well as a sample letter of complaint.

In summary, there are four essential requirements:

1. You must be an 'interested party'. In this case, that means a Consultant who has submitted a Proposal in this selection process, and is the recipient of a Notification of Intention to Award.
2. The complaint can only challenge the decision to award the contract.
3. You must submit the complaint within the deadline stated above.
4. You must include, in your complaint, all of the information required by the Procurement Regulations (as described in Annex III).

6. Standstill Period

DEADLINE: The Standstill Period is due to end at midnight on [*insert date*] (local time).

The Standstill Period lasts ten (10) Business Days after the date of transmission of this Notification of Intention to Award.

The Standstill Period may be extended. This may happen where we are unable to provide a debriefing within the five (5) Business Day deadline. If this happens we will notify you of the extension.

If you have any questions regarding this Notification, please do not hesitate to contact us.

On behalf of [*insertthe name of the Client*]:

Signature: _____

Name: _____

Title/position: _____

Telephone: _____

Email: _____

Beneficial Ownership Disclosure Form

INSTRUCTIONS TO CONSULTANTS: DELETE THIS BOX ONCE YOU HAVE COMPLETED THE FORM

This Beneficial Ownership Disclosure Form ("Form") is to be completed by the successful Consultant. In case of joint venture, the Consultant must submit a separate Form for each member. The beneficial ownership information to be submitted in this Form shall be current as of the date of its submission.

For the purposes of this Form, a Beneficial Owner of a Consultant is any natural person who ultimately owns or controls the Consultant by meeting one or more of the following conditions:

- *directly or indirectly holding 25% or more of the shares*
- *directly or indirectly holding 25% or more of the voting rights*
- *directly or indirectly having the right to appoint a majority of the board of directors or equivalent governing body of the Consultant*

Request for Proposal reference No.: [*insert identification no*]
Name of the Assignment: *[insert name of the assignment]*

To: **[*insert complete name of Client*]**

In response to your notification of award dated *[insert date of notification of award]* to furnish additional information on beneficial ownership: *[select one option as applicable and delete the options that are not applicable]*

(i) we hereby provide the following beneficial ownership information.

Details of beneficial ownership

Identity of Beneficial Owner	Directly or indirectly holding 25% or more of the shares (Yes / No)	Directly or indirectly holding 25 % or more of the Voting Rights (Yes / No)	Directly or indirectly having the right to appoint a majority of the board of the directors or an equivalent governing body of the Consultant (Yes / No)
[include full name (last, middle, first),			

nationality, country of residence]			

OR

(ii) *We declare that there is no Beneficial Owner meeting one or more of the following conditions:*

- directly or indirectly holding 25% or more of the shares
- directly or indirectly holding 25% or more of the voting rights
- directly or indirectly having the right to appoint a majority of the board of directors or equivalent governing body of the Consultant

OR

(iii) We declare that we are unable to identify any Beneficial Owner meeting one or more of the following conditions. [If this option is selected, the Consultant shall provide explanation on why it is unable to identify any Beneficial Owner]

- directly or indirectly holding 25% or more of the shares
- directly or indirectly holding 25% or more of the voting rights
- directly or indirectly having the right to appoint a majority of the board of directors or equivalent governing body of the Consultant]"

Name of the Consultant: *[*insert complete name of the Consultant*]_____

Name of the person duly authorized to sign the Proposal on behalf of the Consultant: ** [*insert complete name of person duly authorized to sign the Proposal*]_____

Title of the person signing the Proposal: [*insert complete title of the person signing the Proposal*]_____

Signature of the person named above: [*insert signature of person whose name and capacity are shown above*]_____

Date signed [*insert date of signing*] **day of** [*insert month*], [*insert year*]_____

* In the case of the Proposal submitted by a Joint Venture specify the name of the Joint Venture as Consultant. In the event that the Consultant is a joint venture, each reference to "Consultant" in the Beneficial Ownership Disclosure Form (including this Introduction thereto) shall be read to refer to the joint venture member.

** Person signing the Proposal shall have the power of attorney given by the Consultant. The power of attorney shall be attached with the Proposal Schedules.