

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT
FOR
EXTRACTION OF STONE, SAND AND BAJRI FALLING IN MAUZA ALAMPUR, MOHAL
BAGH, TEHSIL JAISINGHPUR , DISTRICT KANGRA, HIMACHAL PRADESH
PROPOSED PRODUCTION - 81000 MT/year (Excluding Waste)**

APPLICANT

**PROP. HEAD OF PROJECT, DHAULASIDH HYDROELECTRIC
PROJECT, (DSHEP) SJVNL**



BASELINE STUDY PERIOD: Dec' 2021-Feb' 2022



PMS

PRESERVING TOMORROW

**Prepared By
P AND M SOLUTION**



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Draft EIA/EMP REPORT

Extraction of Minor Mineral (Stone, Sand & Bajri) Measuring 04-83-07 Hectares (Private land, River Bed) Falling in Mauza Alampur, Mohal Bagh, Tehsil Jaisinghpur, District Kangra, Himachal Pradesh by Head of Project, Dhaulasidh Hydroelectric Project (DSHEP) SJVNL

Undertaking by Project Proponent

The Environmental Impact Assessment Report of “**Extraction of Stone, Sand and Bajri falling in Mauza Alampur, Mohal Bagh, Tehsil Jaisinghpur, District Kangra, Himachal Pradesh.**” prepared by our consultant has been reviewed thoroughly at our end before submission. I, on behalf of **Head of Project, Dhaulasidh Hydroelectric Project (DSHEP) SJVNL**, hereby undertake that the data and information provided in the report are correct to the best of our understanding, and we own responsibility for correctness of contents of the EIA report.

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Undertaking by the Head of the Accredited Consultant Organization

I, **Rahul Kumar**, hereby, confirm that the "Draft EIA Report of **Extraction of Stone, Sand and Bajri falling in Mauza Alampur, Mohal Bagh, Tehsil Jaisinghpur, District Kangra, Himachal Pradesh.**" has been prepared at P and M Solution.

I also confirm that I shall be fully accountable for any miss-leading information mentioned in this Report.

Signature

: 

Name

: Mr. Rahul Kumar

Designation

: CMD

Name of the EIA Consultant Organization : P and M Solution, C-88, Sector-65, Noida-201301, Uttar Pradesh

QCI/NABET Accredited EIA Consultant at S.No.163 as per List of Accredited consultant Organizations/ (Alphabetically) Rev. 19, Feb 14, 2022

NABL approved Laboratory- Noida Testing Laboratory.

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ToR COMPLIANCE

Point wise compliance of ToR issued by State Level Impact Assessment Authority, Himachal Pradesh vide letter no. HP/SEIAA/2022/935-570-577 dated 03.08.2022 (copy enclosed as Annexure-I) for the project mining of River bed mining. Compliance of TOR is discussed below:

ADDITIONAL TOR			
S No	Description	Responses	Citation
1.	The project proponent shall also assess the air quality of the area using Air Quality Models.	Complied in Chapter 4	Chapter 4
2.	The project proponent shall assess and provide comprehensive details of muck disposal in the Final EIA/ EMP report.	45000 MT of mine waste i.e., silt/clay will be generated during mining activity in five years; it will be used for maintenance of roads etc. and remaining material can be stacked at proper place for utilization of this material in future during road construction or some other uses as a levelling and filling material.	Chapter 2
3.	The project proponent shall provide details of labour, Its management	70 persons will be employed directly during mining operations.	Chapter 2
4.	The traffic/ vehicle flux assessment shall be Included In the EIA/ EMP.	The details of traffic analysis are discussed in the report. Refer Chapter II	Chapter 2
5.	The project proponent may use baseline data for EIA/ EMP reports from already formulated EIA/ EMP as per the provision of EIA notification 2006 with prior consent of the respective proponent and his undertaking to be submitted to the SEAC.	The details of baseline studies are discussed in the report. Refer Chapter III which includes details of Air quality in section 3.5, Noise environment in section 3.6, Water Environment in section 3.7 and soil environment in section 3.8.	Chapter 3
6.	The project proponent shall make provision to provide four plastic waste shredders, four plastic waste compactors to the concerned ULBs/ PRIs through Department of Environment, Science & Technology, GoHP,	There is provision to provide four plastic waste shredder & four plastic waste compactors. Detail has been given in table chapter 8.	Chapter 8

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7.	The project proponent shall Inform the public consultation & EIA process etc, to Department of Environment, Science & Technology, so that the official of the department could be associated in the EIA process.	Will be complied	--
STANDARD TOR			
1.	Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification 1994 came into force, w.r.t. the highest production achieved prior to 1994.	This is fresh LOI, Mine is yet to be opened. It will open only after getting environmental clearance.	
2.	A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given.	The letter of intent by the Department of Industries has been issued vide letter No. Udyog-Bhu(Khani-4) Laghu-7/2021(online-Kangra)-2018 dated 02-07-2021	
3.	All documents including approved mine plan, EIA and Public Hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management, mining technology etc. and should be in the name of the lessee.	All documents are synchronizing with one another in terms of mine lease area, production levels, waste generation, its management and mining technology. Both the scheme of mine and ML area in the name of Head of Project, Dhaulasidh Hydroelectric Project (DSHEP) SJVNL who is the lessee of this project.	--
4.	All corner coordinates of the mine lease area, superimposed on a High Resolution Imagery/ toposheet, topographic sheet, geomorphology and geology of the area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).	All of corner coordinates of the ML area are incorporated in chapter-2 of EIA report. Topographical map is given in Chapter-1 which depicts the sensitivity of the study area. Land use maps are also incorporated in Chapter no. 3.	Chapter- 2, Chapter- 1, Chapter- 3 respectively
5.	Information should be provided in Survey of India Toposheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and	All maps are provided and superimposed on toposheet of survey of India in 1:50,000 scale showing all land forms of the area, important water bodies, streams and rivers in chapter 1	Chapter-1

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	soil characteristics.		
6.	Details about the land proposed for mining activities should be given with information as to whether mining conforms to the land use policy of the State; land diversion for mining should have approval from State land use board or the concerned authority.	The mine lease area is 04-83-07 Ha which is a Pvt. waste land. Land diversion for mining is not applicable.	--
7.	It should be clearly stated whether the proponent Company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA Report with description of the prescribed operating process/ procedures to bring into focus any infringement/ deviation/ violation of the environmental or forest norms/ conditions? The hierarchical system or administrative order of the Company to deal with the environmental issues and for ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances/ violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large, may also be detailed in the proposed safeguard measures in each case should be provided.	Company has well laid down Environmental Policy approved by Board of directors.	-
8.	Issues relating to Mine Safety, including subsidence study in case of underground mining and slope study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided.	Mining will be carried out by opencast manual method as per approved mining plan. No drilling and blasting are envisaged. The mining will be carried out in the non-monsoon period with following proper sustainable sand mining guidelines.	Annexure-3 of Mining Plan
9.	The study area will comprise of 10 km zone around the mine lease from lease periphery and the data contained in the EIA such as waste generation etc. should be for the life of the mine/ lease period.	The proposed mine is having a lease area of 04-83-07 Ha which is water body on Private land. During mining, low-grade minerals like silt/clay as mine waste will be generated. Part of this mine waste will be used for maintenance of roads etc. and remaining	-

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		material can be stacked at proper place for utilization of this material in future during road construction or some other uses as a levelling and filling material	
10	Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.	A map delineating all the features such as Barren Land, Agricultural Land, Water Bodies, etc. has been prepared. Land use plan of the mine lease area at pre-operational, operational and post operational phases is water body.	Chapter- 3
11	Details of the land for any Over Burden Dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be given.	There is no overburden dump outside the mining lease. No R&R is envisaged.	-
12	A Certificate from the Competent Authority in the State Forest Department should be provided, confirming the involvement of forest land, if any, in the project area. In the event of any contrary claim by the Project Proponent regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the Expert Appraisal Committees.	The mine lease land is Private land and does not include any forest land within the lease area.	-
13	Status of forestry clearance for the broken up area and virgin forestland involved in the Project including deposition of net present value (NPV) and compensatory a forestation (CA) should be indicated. A	There is no forest land involved and hence no such clearance from forest department is required.	-

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	copy of the forestry clearance should also be furnished.		
14	Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated.	Not Applicable. There is no involvement of forest land in the project area.	-
15	The vegetation in the RF / PF areas in the study area, with necessary details, should be given.	Details of flora within the study area have been discussed in the EIA report.	Chapter-3
16	A study shall be got done to ascertain the impact of the Mining Project on wildlife of the study area and details furnished. Impact of the project on the wildlife in the surrounding and any other protected area and accordingly, detailed mitigative measures required, should be worked out with cost implications and submitted.	The dense plantation is proposed in riparian zone of the mining lease. The mining activities including pollution control measures especially for air and noise, which plays an important role in sustainable eco-friendly mining practices.	
17	Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/ Elephant Reserves/(existing as well as proposed), if any, within 10 km of the mine lease should be clearly indicated, supported by a location map duly authenticated by Chief Wildlife Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the Standing Committee of National Board of Wildlife and copy furnished.	National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/ Elephant Reserves is not fall within the study area.	-
18	A detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field	Details of flora within the study area have been discussed in the EIA report.	Chapter-3

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	<p>survey, clearly indicating the Schedule of the fauna present. In case of any scheduled I fauna found in the study area, the necessary plan along with budgetary provisions for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost.</p>		
19	<p>Proximity to Areas declared as 'Critically Polluted' or the Project areas likely to come under the 'Aravali Range', (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Dept. Should be secured and furnished to the effect that the proposed mining activities could be considered.</p>	<p>The project neither falls in any critically polluted area nor does it come under the Aravali Range.</p>	-
20	<p>Similarly, for coastal Projects, A CRZ map duly authenticated by one of the authorized agencies demarcating LTL, HTL, CRZ area, location of the mine lease w.r.t CRZ, coastal features such as mangroves, if any, should be furnished. (Note: The Mining Projects falling under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority).</p>	<p>The project does not attract clearance from Coastal Regulation Zone Management Authority.</p>	-
21	<p>R&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs /STs and other weaker sections of the society in the study area, a need based sample survey, family-wise,</p>	<p>The land is already in possession of the project proponent. Hence, the R&R plan is not involved.</p>	-

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	<p>should be undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line departments of the State Government. It may be clearly brought out whether the village(s) located in the mine lease area will be shifted or not. The issues relating to shifting of village(s) including their R&R and socio-economic aspects should be discussed in the Report.</p>		
22	<p>One season (non-monsoon) [i.e. March-May (Summer Season); October-December (post monsoon season) ; December-February (winter season)] primary baseline data on ambient air quality as per CPCB Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant Down wind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM₁₀, particularly for free silica, should be given.</p>	<p>Primary baseline data of study area within 10 Km radius of the project site has been collected for the winter season from Dec 2021-Feb 2022 for ambient air quality as per CPCB Notification of 2009, water quality, noise level, soil and flora and fauna. The locations of the monitoring stations were decided on the basis of prevailing meteorological condition (wind direction & wind speed) of the study area.</p>	Chapter-3
23	<p>Air quality modeling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of vehicles for transportation of mineral. The details of the model used and input</p>	<p>Prediction of impacts on air Environment has been carried out employing mathematical model by using Industrial Source Complex Short Term version 3 (ISCST3), of USEPA". was done and mentioned in EIA report. Wind rose map showing pre-dominant wind direction has been carried out and the results are shown in EIA report.</p>	Chapter-4 Chapter-3

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	parameters used for modeling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map.		
24	The water requirement for the Project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the Project should be indicated.	Water requirement for domestic, plantation and dust suppression will be 9.3 KLD, which shall be met through water tanker and permission of the same has been obtained from GP JOI. The water balance is given in chapter-2.	Chapter-2
25	Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided.	Not Applicable	-
26	Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.	The project do not consume any process water except for drinking, dust suppression & plantation. Plantation is proposed, which will increase the water holding capacity & help in recharging of ground water. No artificial rainwater harvesting is proposed for the present project in lease area, however if any such project proposed by State Government PP will help out for the above.	-
27	Impact of the Project on the water quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required, should be provided.	Mining activity will be done on Dry Bed of River so there is no impact on surface water. Mining will be up to 1 m below ground level or above the ground water table whichever comes first. This will not intersect the ground water table.	-
28	Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. In case the working will intersect groundwater table, a detailed Hydro Geological Study should be undertaken and Report	Mining will be up to 1 m below ground level or above the ground water table whichever comes first. This will not intersect the ground water table.	Chapter 4

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	<p>furnished. The Report inter-alia, shall include details of the aquifers present and impact of mining activities on these aquifers. Necessary permission from Central Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished.</p>		
29	<p>Details of any stream, seasonal or otherwise, passing through the lease area and modification/ diversion proposed, if any, and the impact of the same on the hydrology should be brought out.</p>	<p>The project site lies on Beas river. No diversion is proposed.</p>	-
30	<p>Information on site elevation, working depth, groundwater table etc. Should be provided both in AMSL and bgl. A schematic diagram may also be provided for the same.</p>	<p>The elevation of the applied area for the block is 509 m AMSL to 508 m AMSL in the stretch. Mining will be up to 1 m below ground level or above the ground water table whichever comes first.</p>	Chapter-2
31	<p>A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed up front on commencement of the Project. Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be covered under plantation and the species to be planted. The details of plantation already done should be given. The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with emphasis on local and native species and the species which are tolerant to pollution.</p>	<p>Detail of Green belt and plantation is given in Chapter -9</p>	Chapter-9
32	<p>Impact on local transport infrastructure due to the Project should be indicated.</p>	<p>Not much impact on local transport as only 8 (hours of shifts with effective 6.5 hrs of working) x 180 trips/hour (up and down) =</p>	Chapter 2

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Extraction of Minor Mineral (Stone, Sand & Bajri) Measuring 04-83-07 Hectares (Private land, River Bed) Falling in Mauza Alampur, Mohal Bagh, Tehsil Jaisinghpur, District Kangra, Himachal Pradesh by Head of Project, Dhaulasidh Hydroelectric Project (DSHEP) SJVNL

	Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered. Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines.	60 tipper/day will be required for transport of mineral from mine. The LOS value from the proposed mine may be "Very good" for district road. So, the additional load on the carrying capacity of the concern roads is not likely to have any significant adverse effect.	
33	Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.	Site facilities which will be provided by M/s. SJVN are given in the EIA report. The site services include mines office, rest shelter, first aid center, store room, water tank, public convenience, water-man-shed Road.	Chapter-2
34	Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report.	After mining the mine out area will replenish every year	
35	Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.	Occupational Health and Safety impacts and preventive measures are given in Chapter-4.	Chapter-4
36	Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.	Public health implications of the project and related activities for the population in the impact zone have been evaluated and there are as such no public health implications.	-

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Extraction of Minor Mineral (Stone, Sand & Bajri) Measuring 04-83-07 Hectares (Private land, River Bed) Falling in Mauza Alampur, Mohal Bagh, Tehsil Jaisinghpur, District Kangra, Himachal Pradesh by Head of Project, Dhaulasidh Hydroelectric Project (DSHEP) SJVNL

37	Measures of socio economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.	Socio economic measures with its significance and influence to the local community have been proposed under the separate head as Corporate Environmental Responsibility (CER).	Chapter-7.
38	Detailed environmental management plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project.	Environment Management Plan has been given in Chapter 9.	Chapter-9
39	Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project.	Public hearing will be incorporated during finalization of the report.	-
40	Details of litigation pending against the project, if any, with direction/ order passed by any Court of Law against the Project should be given.	No litigation is pending against the project.	-
41	The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out	The capital cost towards EMP and recurring cost has been given in chapter 9.	Chapter-9
42	A Disaster management Plan shall be prepared and included in the EIA/EMP Report.	Disaster Management Plan is given in chapter 7.	Chapter-7
43	Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.	Project benefits are given in chapter 8.	Chapter-8
44	Besides the above, the below mentioned general points are also to be followed:		
a.	All documents to be properly referenced with index and continuous page numbering.	Complied	-
b.	Where data are presented in	Complied	-

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Extraction of Minor Mineral (Stone, Sand & Bajri) Measuring 04-83-07 Hectares (Private land, River Bed) Falling in Mauza Alampur, Mohal Bagh, Tehsil Jaisinghpur, District Kangra, Himachal Pradesh by Head of Project, Dhaulasidh Hydroelectric Project (DSHEP)
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	the Report especially in Tables, the period in which the data were collected and the sources should be indicated.		
c.	Project Proponent shall enclose all the analysis/testing reports of water, air, soil, noise etc. using the MoEF&CC/NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the Project.	Complied	-
d.	Where the documents provided are in a language other than English, an English translation should be provided.	Complied	-
e.	The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted.	Will be submitted at the time of EC application submission	-
f.	While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF vide O.M. No. J-11013/41/2006-IA. II(I) dated 4th August, 2009, which are available on the website of this Ministry, should be followed.	The EIA report has been prepared and complying with the circular issued by MoEF vide O.M. No. J-11013/41/2006-IA.II (I) dated 4 th August, 2009.	-
g.	Changes, if any made in the basic scope and project parameters (as submitted in Form-I and the PFR for securing the TOR) should be brought to the attention of MoEF&CC with reasons for such changes and permission should be sought, as the TOR may also have to be altered. Post Public Hearing changes in structure and content of the draft EIA/EMP (other than modifications arising out of the P.H. process) will entail conducting the PH again with the revised documentation.	The project is itself at draft stage	-
h.	As per the circular no. J-11011/618/2010-IA.II(I) dated 30.5.2012, certified report of the status of compliance of the conditions stipulated in the environment	Not applicable	-

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Extraction of Minor Mineral (Stone, Sand & Bajri) Measuring 04-83-07 Hectares (Private land, River Bed) Falling in Mauza Alampur, Mohal Bagh, Tehsil Jaisinghpur, District Kangra, Himachal Pradesh by Head of Project, Dhaulasidh Hydroelectric Project (DSHEP) SJVNL

	clearance for the existing operations of the project, should be obtained from the Regional Office of Ministry of Environment, Forest and Climate Change, as may be applicable.		
i.	The EIA report should also include (i) surface plan of the area indicating contours of main topographic features, drainage and mining area, (ii) geological maps and sections and (iii) sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area.	All plans are included in the approved mining plan. The drainage map is given EIA report of Chapter-2.	Approved Mining plate Chapter-3.

1.1 Preamble

Environment Impact Assessment (EIA) is a process used to identify the environmental, social & economic impacts of a project prior to decision making. It is a decision-making tool, which guides the decision makers in taking appropriate decisions for proposed projects. It aims predicting environmental impacts at an early stage of project planning and design, find ways and means to reduce adverse impacts, shape projects to suit the local environment and present the predictions and options to decision makers. By using EIA, both environmental & economic benefits can be achieved. By considering environmental effects prediction & mitigation, early benefits in project planning, protection of environment, optimum utilization of resources, thus saving overall time & cost of the project.

EIA systematically examines both beneficial and adverse impacts of the proposed project over and above the prevailing conditions of environmental parameters and ensure that these impacts are taken into account during the project designing stage itself and the values of the combined impacts are never allowed to exceed and remain within the statutory norms. This process has been envisioned and set in motion by the Ministry of Environment and Forests for sustainable development and the final decision is arrived at only, when those who matter are made known of the salient features of the project being envisaged close to them and their opinion has been sought in a widely advertised Public Hearing Event under the chairmanship of the district authorities so that public could also express their opinion freely, without favour and fear.

1.0.1 Description of lease area

The proposed project activity will be carried out from mineral (Sand, Stone and Bajri) from the river bed of Beas River, Area 04-83-07 ha. (Pvt. Land). It has been proposed to collect 81000 MT/year (excluding mine waste) i.e. Sand = 18000 MT/yr, Boulders = 36000 MT/yr & Bajri = 27000 MT/yr which is located at at Khasra Nos. 744/1 & 748, Mauza Alampur, Mohal Bagh, Tehsil Jaisinghpur, District Kangra, Himachal Pradesh, Himachal Pradesh. As per EIA notification 2006 and its subsequent amendments later, the project activity has been categorized as “Category-B1” due to one lease exists in the 500 meters periphery of the lease area.

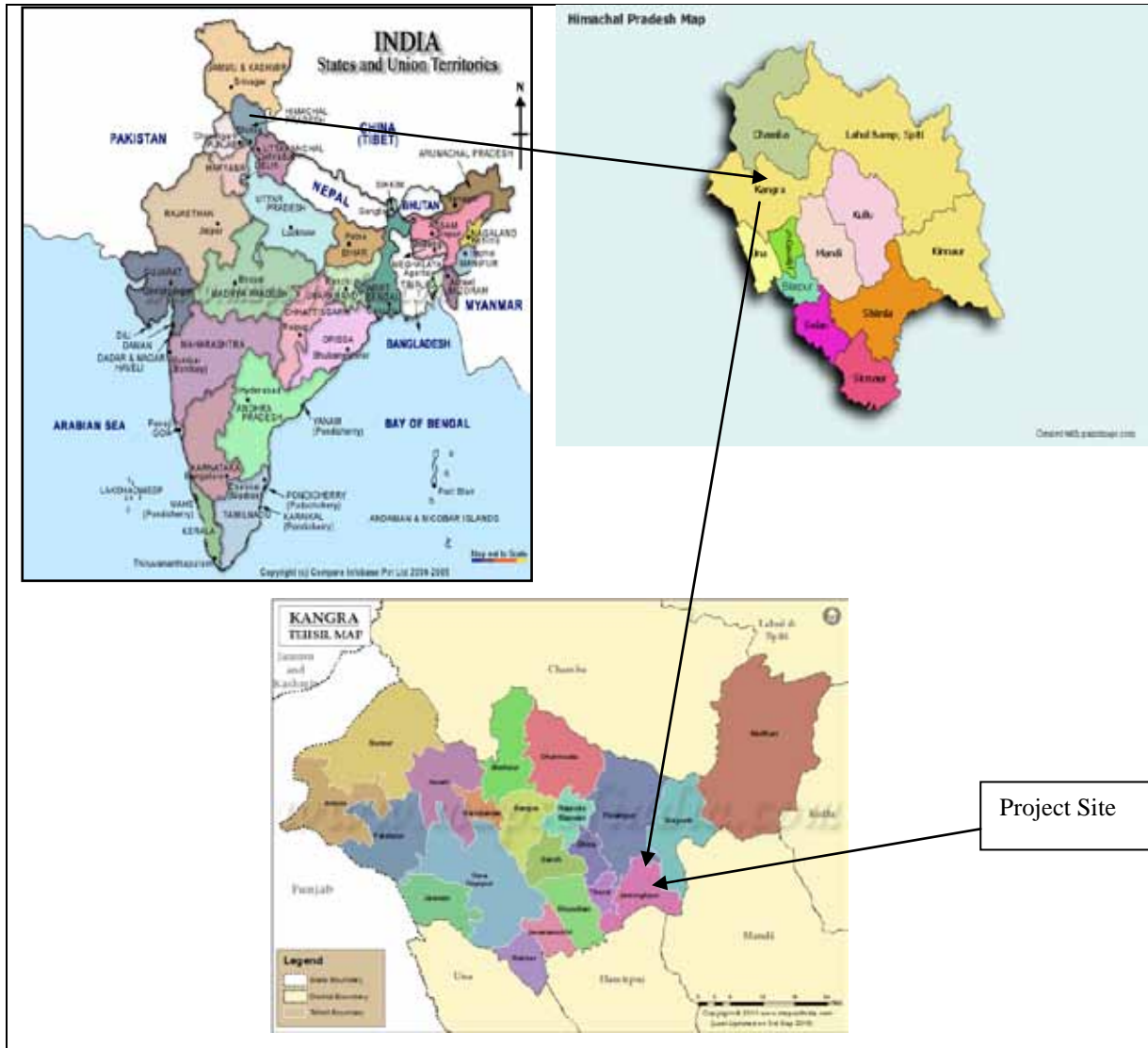


Figure-1.1 Location of the Project

1.2 Identification of Project & Project Proponent

The letter of Intent for the grant of mining lease issued in favours of Head of Project Dhaulasidh Hydroelectric Project (DSHEP) SJVNL, R/o House no.-21, Ward no.-1, Heera Nagar, District Hamirpur, Himachal Pradesh. .

The letter of intent by the Department of Industries has been issued vide letter No. Udyog-Bhu (Khani-4) Laghu-7/2021(online-Kangra)-2018 dated 02-07-2021 (Annexure-II) at the

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Extraction of Minor Mineral (Stone, Sand & Bajri) Measuring 04-83-07 Hectares (Private land, River Bed) Falling in Mauza Alampur, Mohal Bagh, Tehsil Jaisinghpur, District Kangra, Himachal Pradesh by Head of Project, Dhaulasidh Hydroelectric Project (DSHEP) SJVNL

Chapter-1
Introduction

Khasra Nos.744/1 & 748 measuring 04-83-07 Ha. (Pvt. Land, River Bed) falling in Mauza Alampur, Mohal Bagh, Tehsil Alampur, District Kangra, Himachal Pradesh. (Joint Inspection Report along with Jamabandi & Tatima Annexure-III).

Table 1.1: Brief Description of the project

S no.	Particulars	Detail		
A	Nature and size of the Project	Extraction of Stone, Sand and Bajri from the river bed of Beas River		
B	Location			
	Mauza & Mohal	Alampur & Bagh		
	Tehsil	Jaisinghpur		
	District	Kangra		
	State	Himachal Pradesh		
	Toposheet no.	H43E9		
C	Lease Area Detail			
	Lease Area	04-83-07 Ha.		
	Type of Land	Pvt. Land- River bed		
	Site elevation range			
D	Cost Detail			
	Cost of the Project	30 Lakh		
	Cost for EMP	4.99 Lakh- Capital and 6.139 Lakh for recurring cost		
	Cost of CER	12.5 Lakh- Capital and 0.6 Lakh for recurring cost; The cost will be decided as per requirement during public hearing		
	Cost of Occupational Health & safety	0.10 Lakh for capital cost and 1.75 Lakh for recurring cost		
E	Detail of Environmental Setting			
	Ecological Sensitive Areas (National Park, Sanctuary, Reserve/ Biosphere Protected etc.)within10km radius	S.No		
		Name of the forest		
		Distance and Direction		
		1	Open Forest	7.20 Km, NW
		2	Open Forest	3.2 Km, NW
		3	Open Forest	5.2 Km, NW
		4	Open Forest	6.8 Km, NW
		5	Dhardhur PF	6.5 Km, NW
		6	Har Balakrupi PF	5.1 Km, NW
		7	Bandaaur PF	7.3 Km, SW
		8	Jhin PF	9.0 Km, SW
		9	Karot PF	8.5 Km, SW
		10	Open Forest	5.1 Km, SE
		11	Open Forest	6.5 Km, SE
	12	Open Forest	5.8 Km, NE	
	13	Open Forest	9.6 Km, NE	
	14	Uttrapur PF	9.5 Km, NE	

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Extraction of Minor Mineral (Stone, Sand & Bajri) Measuring 04-83-07 Hectares (Private land, River Bed) Falling in Mauza Alampur, Mohal Bagh, Tehsil Jaisinghpur, District Kangra, Himachal Pradesh by Head of Project, Dhaulasidh Hydroelectric Project (DSHEP) SJVNL

Chapter-1 Introduction

Nearest Town	Sujanpur-Tihra approx. 1.54 Km in SW direction
Nearest Railway Station	Sulah Railway Station approx. 25.29 Km in NW Direction
Nearest National Highway	Maranda-HamirpurSujanpur Road SH-39 approx 0.6 Km West.
Nearest Airport	Dharamshala Airport approx 43 Km, NW
Seismic Zone	Zone-IV

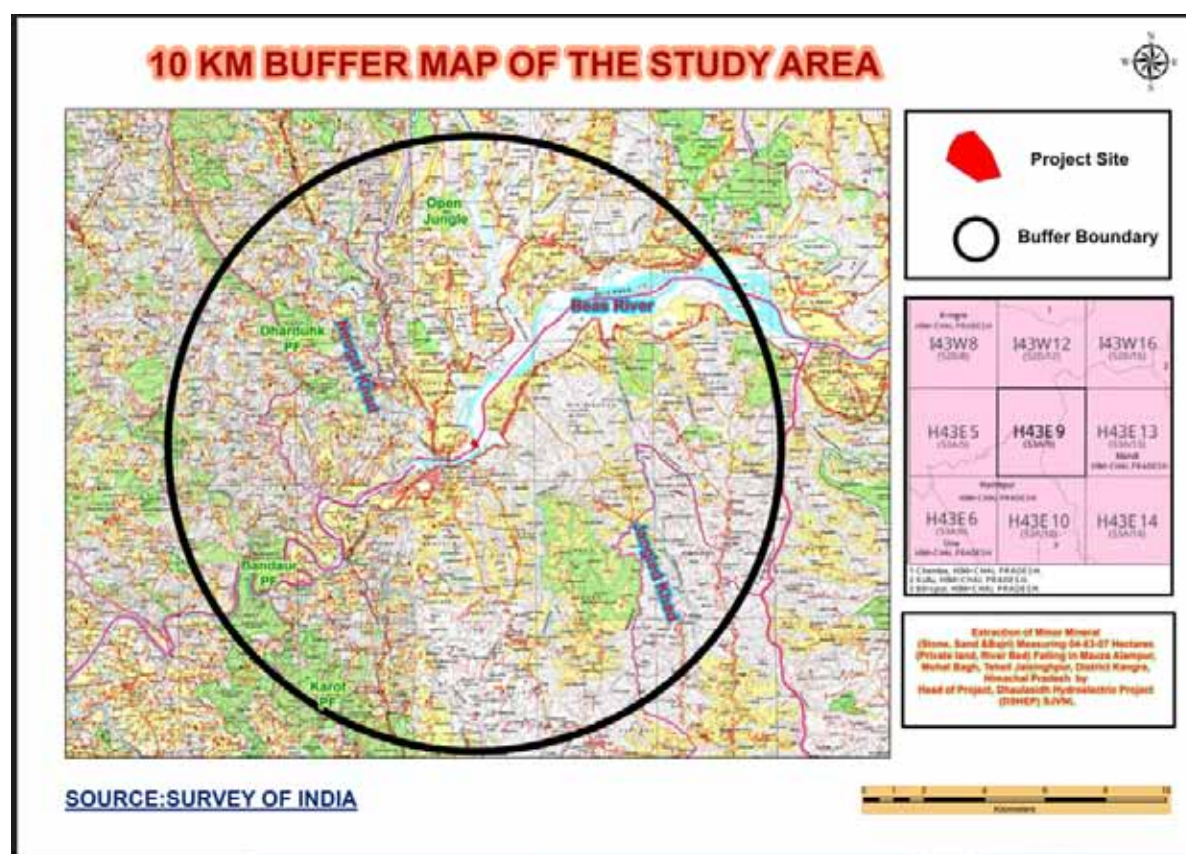


Figure 1.2 Buffer Map of the area

1.3 Scope of the Study

In line with the Terms of Reference (TOR) prescribed by SEIAA, Himachal Pradesh, the area comprising 10km radius around the proposed mine lease boundary is considered as the study area. The detailed studies have been conducted as per prescribed TOR. The study area map is shown in Figure-1.2.

The scope of study broadly covered:

- Literature review and collection of data relevant to the study area;
- Establish the baseline environmental aspects in and around the proposed project;
- Identify various existing pollution loads due to various mining activities;
- Predict incremental levels of pollutants in the study area due to the proposed operations.
- Evaluate the predicted impacts on various environmental attributes in the study area by using scientifically developed and widely accepted environmental impact assessment methodologies;
- Prepare a Environment Management Plan (EMP) outlining the measures for improving the environmental quality; and
- Identify critical environmental attributes that are required to be monitored in the post-project scenario.

2.0 General

The proposed project is located at River bed of Beas River in Mauza Alampur, Mohal Bagh, Tehsil Jaisinghpur, District Kangra, Himachal Pradesh. It has been proposed to collect 81000MT/year (excluding mine waste) i.e. Sand = 18000 MT/yr, Boulders = 36000 MT/yr & Bajri = 27000 MT/yr.

Identification of Project proponent

The letter of Intent for the grant of mining lease issued in favours of Head of Project Daulasidh Hydroelectric Project (DSHEP) SJVNL, R/o House no.-21, Ward no.-1, Heera Nagar, District Hamirpur, Himachal Pradesh.

2.1 Description of project

The proposed project is of extraction of Sand, Stone & Bajri over an area of 4.8307 ha at Mauza & Mohal- Alampur & Bagh, Distt. Kangra, (Himachal Pradesh). The project has been proposed by Head of Project Daulasidh Hydroelectric Project (DSHEP) SJVNL. The letter of intent by the Department of Industries has been issued vide letter No. Udyog-Bhu (Khani-4) Laghu-7/2021(online-Kangra)-2018 dated 02-07-2021 (Annexure-II) at the Khasra Nos.744/1 & 748 measuring 04-83-07 Ha. (Pvt. Land, River Bed) falling in Mauza Alampur, Mohal Bagh, Tehsil Alampur, District Kangra, Himachal Pradesh. (Joint Inspection Report along with Jamabandi & Tatima Annexure-III).

2.1.1 Location of the project

The proposed project is situated at Khasra no. - .744/1 & 748 in Mauza & Mohal- Alampur & Bagh, Distt. Kangra, Himachal Pradesh. Geo-graphically the ML area extends from East Longitude 76°31'14.87"E to 76°31'11.87"E and North Latitude 31°50'45.71"N to 31°50'44.96"N. The area falls in Survey of India Toposheet No. H43E09 or 53A09. The surface plan of the project is shown in **Figure-2.1**.

The nearest railway station is Sulah Railway Station which is at a distance of about 25.29 km in NW direction. The Nearest airport is Dharamshala Airport which is around 43 km towards

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Chapter-2
Project Description

NW direction from the mine. The area is well connected with SH 39 which is approx. 0.67 km towards West Direction.

2.1.2 Need of the Project

The river carries with it huge quantity of sediment consisting of stones and Sand during every monsoon. The sediment is in the form of river bed material (RBM) deposited since last many years had changed the shape of the river bed from a valley to a raised land. Because of this, every year during monsoon season, heavy and devastating floods damage large tracts of land lying on both the banks of the river. Hence, it is necessary to remove the materials so that the river gets channelized.

2.1.3 Size/Magnitude of Operation

Proposed extraction/collection of Sand, Stone & Bajri lease is presently spanning over an area of 04-83-7. The proposed rate of production is 81000 MTPA.

2.2 Lease hold area

The description of the lease hold area is as following.

Table-2.1: Description of the lease hold area

Khasra No	Owner	Kism	Mauza & Mohal	Area in Hects.	Name of the Panchayat
744/1	Pvt. Land	Gair Mumkin Dariya	Mauza Alampur, Mohal Bagh,	1-14-64 Ha.	Jol
748	Pvt. Land	Gair Mumkin Dariya	Mauza Alampur, Mohal Bagh,	3-68-43 Ha	Jol
TOTAL				04-83-07	Hectares
				48307	Sq.m.

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Chapter-2
Project Description

Table-2.2: Detail of lease hold area

Sr. No.	Parameter	Description
1	Name of the Mine	Extraction of Stone, Sand and Bajri from the river bed of Beas River at Mauza & Mohal Alampur & Bagh.
2	Mining Capacity	81,000 MTPA
3	Longitude Latitude	Latitude : 31°50'45.71"N to 31°50'44.96"N. Longitude: : 76°31'14.87"E to 76°31'11.87"E
4	Method of mining	Open cast Manual Mining
5	Total ML area	04-83-07 Ha
6	Drilling/Blasting	Not required
7	Manpower	70 persons
8	Water Requirement	9.29 ~ 9.30 KLD
9	Source of Water	2.1 KLD will be for drinking/domestic purpose which will be ground water source rest will be taken from private tanker.

2.3 Geology**Regional Geology**

The Siwalik Group mainly represents the rocks of the district and also of the catchment area. In addition to this at few places the newer alluvium of the Quaternary age are also present.

In the advent of Neocene a depression was formed in front of the rising mountains (PrtoHimalaya) This depression becomes a repository of a thick sequence of the molasses sediments of the Siwalik Group comprising conglomerates friable micaceous sandstone, siltstone and clay stone. The conglomerates in general are poorly cemented but at places they are very hard. These consist mainly of pebbles and cobbles of quartzite, the stray pebbles of granite, limestone, Sandstone, breccias and lumps of clay stone are also observed at places. Often the size of pebbles is large enough to be called as boulders.

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Chapter-2 Project Description

The conglomerates not only occur as regular band but also as lenticular bands alternative with micaceous sandstone and clay beds. The sediments were brought down 2 to 25 million years ago by the numerous fast flowing rivers issuing forth from rapidly rising mountain mass of the Himalaya in the north, The Siwalik group is divisible into three sub-groups country respectively the lower, Middle and upper on the basis of Lithostratigraphy.

Siwalik Group

The Siwalik Group in the Himachal Himalaya forms a parallel hill belt in the Sub-Himalayan zone, extending along the southern margin of the Palaeogene Sirmour Group belt from the Ravi to the Yamuna and forms part of the larger Sub-Himalayan mega belt extending from Potwar basin in NW to the Arunachal foot-hill in SE. In the Himachal Himalaya it has maximum width between Hoshiarpur and Jogindernagar.

The Siwalik sediments, though occurring as an independent structural belt, are also seen to overlie the Muree in the Jammu sector of the Kashmir Himalaya and the Kasauli in the Himachal Himalaya. Pilgrim (1910) recorded a gradual transition from Muree beds to Lower Siwalik in the Rawalpindi and Jhelum districts of Pakistan and from Kasauli to Lower Siwaliks (Nahan) in the Himachal Himalaya. This fact assumes importance because there is a tendency to ignore this normal relationship between the Siwalik and Sirmour Groups at Dharamsala, Sarkaghat and Nalagarh.

At Haritalyangar near Bilaspur, the Lower Siwalik is seen resting on the Dagshai with an unconformity, which is described as the most striking discordance in the whole sequence of freshwater deposits and evidently representing a period of considerable earth movements (Pascoe, 1964) The Siwalik Group is divisible into three subgroups respectively the Lower, Middle and Upper on the basis of lithostratigraphy.

The mine lease area lies in Siwaliks and forms part of the Beas which passes through many geological formations comprising mostly of granite quartzite, siltstone, shale and Phyllite. Therefore, the lease area has mainly boulders, sand and bajri of these formations. The

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Project Description**

overburden mainly consists of fluvial deposits, boulders, gravels, sand and silt of granite and quartzite and occasionally of limestone, gneisses and sand stone.

The Applied Area is situated in the river course of Beas and the stream course is occupied with river-borne deposits which comprise Boulders, Cobbles, Pebbles, Sand and Silt deposits forming channel deposits. The deposits above high flood level are categorized as terrace deposits which comprise Boulders, Cobbles, Pebbles, Sand and Silt. In the catchment area, rocks of Siwalik formation are exposed which comprises an alternate sequence of sandstone and clay/siltstone.

The followings table shows the classification of the rock according to age

Channel Deposits	Boulders, Cobbles, Pebbles, Sand silt and day
Terrace Deposits	Boulders, Cobbles, Pebbles, Sand silt and day

-----Unconformity-----

Dharmasala group- Sandstone, Clay /Siltstone

The area submerges during the monsoon season, therefore; no permanent vegetation is possible in the river bed, however, seasonal grass grows in the stable lands of the River. For calculation of the quantity of minerals, one-meter depth has been taken into consideration.

Profile of River Bed:-

Elevation at origin- 4361M

Elevation at Mining Area - 508 to 509 m

Total length of River up to Mining Area 200.3 Km

Cumulative Elevation Loss – 3853M

Area of water shed up to applied area 8890.85 Sq. Km

Average Slope- 1.72% i.e about 1.02°

Slope angle at applied area- 0.31% i.e about 0.19°

Total tributaries on right & left bank (27)**2.4 Quality of reserve****2.4.1 Method of estimation of reserve**

Mode of Excavation:

- Keeping in view the high replenishment factor every year, the whole block shall be explored every year.
- The mining shall be undertaken manually.
- The total available mineable area is almost 82% of the total applied Area. The non-mineable(i.e. 18%) area includes the area laying outside highest flood level, leaving 1/10th area and the area lies within the stream flow.

The Mineable reserves have been calculated as per the available reserves in the left out mineable area after leaving the no mining areas.

The average specific gravity of the minor mineral has been taken as 2.25 for calculation of reserves and one-meter depth is taken for calculation of reserves.

MINEABLE RESERVES UPTO 1MTR.	
Total mineable area available	40000 Sq.m
Depth	1mtr.
Avg specific gravity	2.25
Estimated Mineable reserves (In Mt)	90000

2.5 MINING**2.5.1 Proposed method of mining/extraction**

Extraction will be carried out by opencast manual/ mechanized method without adoption of drilling & blasting. The extraction will be confined to excavation of Sand from the River bed (Beas River). Excavation of minerals will be carried out only up to a depth of 1 m (No OB/ waste material will be produced in river bed. The sand shall be exploited upto depth of 1.0m bgl or above the groundwater whichever is comes first. An approach road having width 6.0m

& gradient 1:12 shall be provided for the movement of loading machineries & transportation of Sand, Stone & Bajri.

Mine development and plan of progressive mining

The purpose of lease is to use the material in the proposed stone crusher as the source of raw material for manufacturing of grit. As such, the primary raw material required for stone crusher is boulders and bajri. The river borne material contains boulders, sand, bajri and mixture of clay/ silt. The clay/silt does not have any market value and this material will be used for rehabilitation work, In order to calculate the mineable reserves, the following points are taken in to consideration.

1. A Geological map is prepared and main Litho-units were marked on the plan to know the surface spread of each unit.
2. The different constituents of river borne deposits such as boulder, bajri, sand and silt /clay based on size classification were considered for reserve calculation. Although it is not possible to mark these units separately on the geological map as such two pits at different locations in the lease area of 1 x1 x 1 meter were got dug in the mining lease area and material so excavated was separated into different size and their percentage was worked out and this percentage was taken in to account during calculation of reserves.
3. Keeping in view the replenishment factor, whole block that be explored every year.
4. The mining shall be under taken manually and mechanical mining may be under taken if allowed by the Government.
5. The Mineable reserves have been calculated as per the available reserves in the left out auctioned mineable area after leaving the no mining areas.
6. The total available area for mining purpose is 65% of the mining lease area after leaving no mining zone.

2.5.2 Production detail

Proposed production expected as in table below:

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Table 2.3, Year wise Production detail

Year	Quantity of Boulders(M.T.)	Quantity of Bajri (M.T.)	Quantity of Sand(M.T.)	Quantity of Silt/ Clay (M.T.)	Total (M.T.)
1 st year	36000	27000	18000	9000	90000
2 nd year	36000	27000	18000	9000	90000
3 rd Year	36000	27000	18000	9000	90000
4 th Year	36000	27000	18000	9000	90000
5 th Year	36000	27000	18000	9000	90000
Total	180000	135000	90000	45000	450000

2.5.3 Conceptual mine development

It is a river bed deposit and mined out area shall be replenished each year during monsoon period and depth of quarry shall be filled back by river Sand/gravel each year.

2.5.4 Life of mine

It is not practically forecast the anticipated life of mine as area shall be replenished each year.

2.5.5 Waste Management

The waste which is Clay/Silt mixed with sand will be used for the maintenance of the approach or for Plantation/Filling works etc. and, if required, the waste material shall be dumped in the appropriate place out of the river bed and this site shall be decided in consultation with the local concerned ram Panchayat and the local villagers.

Affidavit regarding waste disposal has been attached as Annexure- XIII.

Table 2.4, Production of mine waste During Five Years

Year	Silt/Clay
1 st	9000
2 nd	9000

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3 rd	9000
4 th	9000
5 th	9000
Total	45,000

2.5.6 Drilling and Blasting

Not required.

2.6 General Features

Surface Drainage Pattern

The Beas River exhibits dendritic type of drainage pattern.

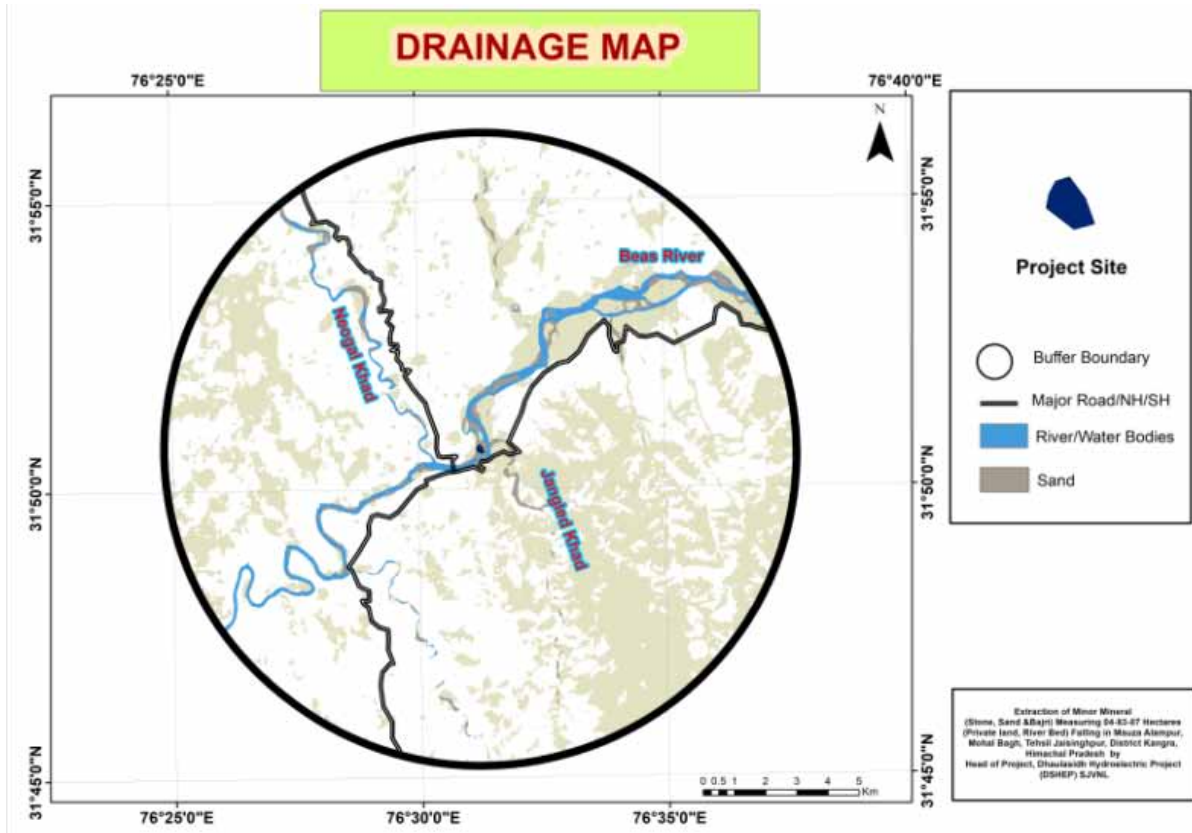


Figure 2.1- Drainage Pattern

2.6.4 Vehicular Traffic Density

Traffic study is carried out by understanding the existing carrying capacity of the road in the vicinity of site and flow towards Highway road in the area. Then depending on the capacity of the mine, the number of trucks that will be added to the present scenario will be compared to the carrying capacity as recommended by Indian Road Congress (IRC). The existing volume of traffic and, the Level of Service are given in **Table-2.5 (i)** and shown in traffic density map as **Figure 2.5**.

Table 2.5 (i) Existing Traffic Scenario & LOS

Road	V	C	Existing V/C Ratio	LOS
NH-88	720	7000	0.10	A
Village metallic road connected to MDR	350	5200	0.06	A

V= Volume in PCU's/day & C= Capacity in PCU's/ day

The existing Level of Service near Village is "A" i.e. excellent and at highway is "A" i.e. excellent when compared with LOS recommended by IRC, as given in **Table-2.5 (ii)**.

Table 2.5 (ii) V/C Ratio & LOS

V/C	LOS	Performance
0.0 - 0.2	A	Excellent
0.2 - 0.4	B	Very Good
0.4 - 0.6	C	Good / Average / Fair
0.6 - 0.8	D	Poor
0.8 - 1.0	E	Very Poor

Note: Capacity as per IRC: 64-1990

During Mine operation

Total Capacity of mine : 81,000 TPA
 No. of working days : 300 days
 Total Capacity of mine/day : 270 tonnes
 Truck Capacity : 15 tonnes
 No. of truck/day : 18 trucks
 PCU/day (18*3) : 54

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Project Description**

The addition to traffic by the proposed project during its operation is given in

Table 2.5 (iii) Additional Traffic Scenario & LOS due to proposed project

Road	V	C	Existing V/C Ratio	LOS
NH-88	720 + 54 = 774	7000	0.11	A
Village metallic road connected to MDR	350 + 54 = 404	5200	0.07	A

From the above analysis it can be seen that the V/C ratio will be modified from 0.06 to 0.07 at Village metallic road connected to MDR with LOS being “A” and will remain same 0.10 at NH-88 with LOS remain from “A” to “B” respectively. So the additional load on the carrying capacity will be affected to a minimum level.

TRANSPORTATION ROUTE MAP

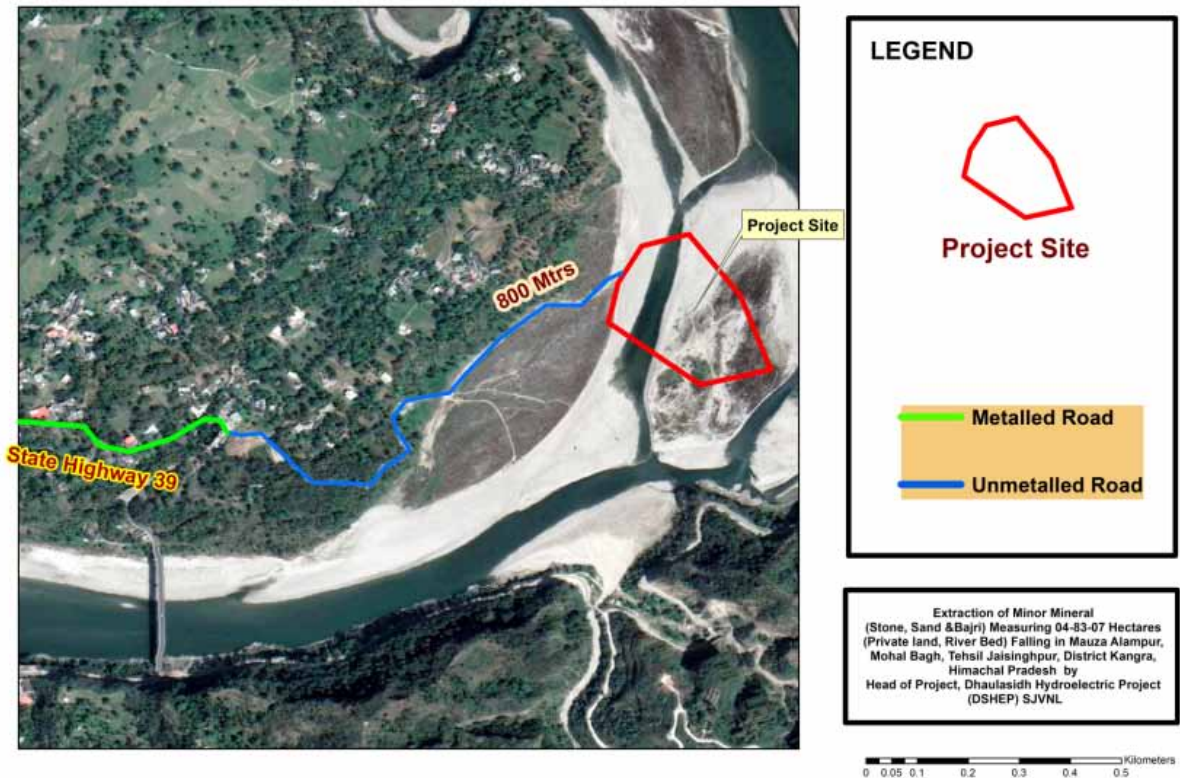


Figure 2.2 Traffic Route Map

2.6.5 Beneficiation/ Processing

No processing of mineral will be done in the mine.

2.6.4 Utilities

2.6.4.1 Water Requirement

Water consumption will be there mainly for dust suppression, green belt development, drinking and other domestic purpose during mining operations. The total requirement of water will be 9.29 ~ 9.30 KLD.

The breakup of total water requirement of the mines is given in **Table-2.8**.

Table-2.6: Water Calculation

Activity	Calculation	Round off Figure in KLD
Drinking	@ 30 lpcd per labor $70 \times 30 / 1000 = 2.1$ KLD	2.1 KLD
Dust suppression	Total haulage road to be water sprinkled = $800 \text{ m (L)} \times 6 \text{ m (w)} \times 0.5 \text{ lt} \times 2 \text{ times} / 1000 = 4.8$ KLD (Twice a day)	4.8 KLD
Plantation	2390 plants @ 1 L/plant/Day = $2390 \times 1 \text{ L/day} = 2390 / 1000 = 2.39$ KLD	2.39 KLD
Total		9.29 ~ 9.30 KLD

2.6.4.2 Power Supply

There is no requirement of power supply for the mining lease area.

2.6.4.3 Employment Generation

The employment of the mine is as below:

- General management and mines office.
- Time keeping, Personal welfare, Training and mines safety.
- Mining operations
- Stores, minor repairs and garage.

Management and Supervisory Personnel:

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The manpower requirement is given below:

Table 2.7, Manpower Requirement

SI. No	Qualification	No. of persons
1.	Mining Engineer	04
2	Geologist	01
3	Skilled workers	15
4	Unskilled workers	50
Total		70

2.6.4.4 Infrastructure:

The site services like rest room shelter, first aid box, drinking water & facilities will be provide to workers at the mine site.

Mining Equipments

Mining shall be carried out open cast manual/ semi-mechanized without adoption of drilling & blasting. For the removal of overburden, the excavator shall be deployed on hire basis as and when required.

CHAPTER 3 : DESCRIPTION OF THE ENVIRONMENT

3.1 GENERAL

Collection of baseline environmental data of the project influenced area helps to predict the magnitude of impacts that are likely to be caused due to proposed activity of project. It also helps to identify critical environmental attributes required to be monitored during and after the proposed improvements. This chapter presents a regional background to the baseline data at the very onset, which will help in better appreciation of micro-level field data, generated on several environmental and ecological attributes of the study area. The baseline status of the project on environment is described section wise for better understanding of the broad-spectrum conditions. The baseline environment quality represents the background environmental scenario of various environmental components such as Land, Water, Air, Noise, Biological and Socio-economic status of the study area. Field monitoring studies to evaluate the base line status of the project site were carried out covering December'2021 - February 2022 with CPCB guidelines.

The main objectives of describing the environment, which may be potentially affected, are (i) to assess present environmental quality and the environmental impacts and (ii) to identify environmentally significant factors that could preclude mine development. The chapter contains information on existing environmental scenario on the following parameters.

- Land Environment
- Water Environment
- Air Environment
- Noise Environment
- Soil Environment
- Biological Environment
- Socio-economic Environment

3.1.1 Study Period and Study area

To achieve these objectives, our team monitored the environmental baseline parameters within the study area (10 km. radial distance from the mine site) in accordance with the guidelines for ToR issued by the Ministry of Environment & Forests, Govt. of India.

This chapter and the related discussions contain the results of field studies carried out during the winterseason (i.e. December 2021 to February 2022).

3.1.1.1 Source of Environment Data

The baseline information on micro-meteorology, ambient air quality, water quality, noise levels, soil quality and floristic descriptions are largely drawn from the data generated by Environmental Laboratory-NABL Accredited Lab. Long term meteorological data recorded at the nearest IMD station, Hamirpur was also collected. Micrometeorological data at site was recorded using automatic weather station. Apart from these, secondary data have been collected from Census Handbook, Revenue Records, Statistical Department, Soil Survey and Land use Organization, District Industries Centre, Forest Department, Central Ground Water Authority, etc. The generation of primary data as well as collection of secondary data and information from the site and surroundings was carried out during winter season i.e. December 2021 to February 2022.

3.2 STUDY OF LAND USE PATTERN OF PROJECT AREA

The study was taken upto prepare current landuse/land cover within 10Km area around proposed River Bed minelocated at Mauza Alampur, Mohal Bagh, Tehsil Jaisinghpur, District Kangra, Himachal Pradesh. Area statistics of landuse classes has also been generated for area within 10Km radius of lease mine lease area.

A) Data Used

The methodology applied for the study involved obtaining satellite images from open source, and then using a range of software to process the images and also by GPS coordinates (ground truthing) for drawing observations. The detailed methodology is explained as below:

1. Software: The following software were applied to extract indicators and maps:

- **ERDAS Imagine:** The ERDAS imagine version 2016 is used to process Sentinel B satellite data and to extract the required indicators through spatial & spectral analysis.
- **ArcGIS:** The ArcGIS version 10.8 has been used to prepare the final Maps for indicators through the outcomes of ERDAS software.

Salient features of the adopted methodology for preparing land use maps of study area are given below:

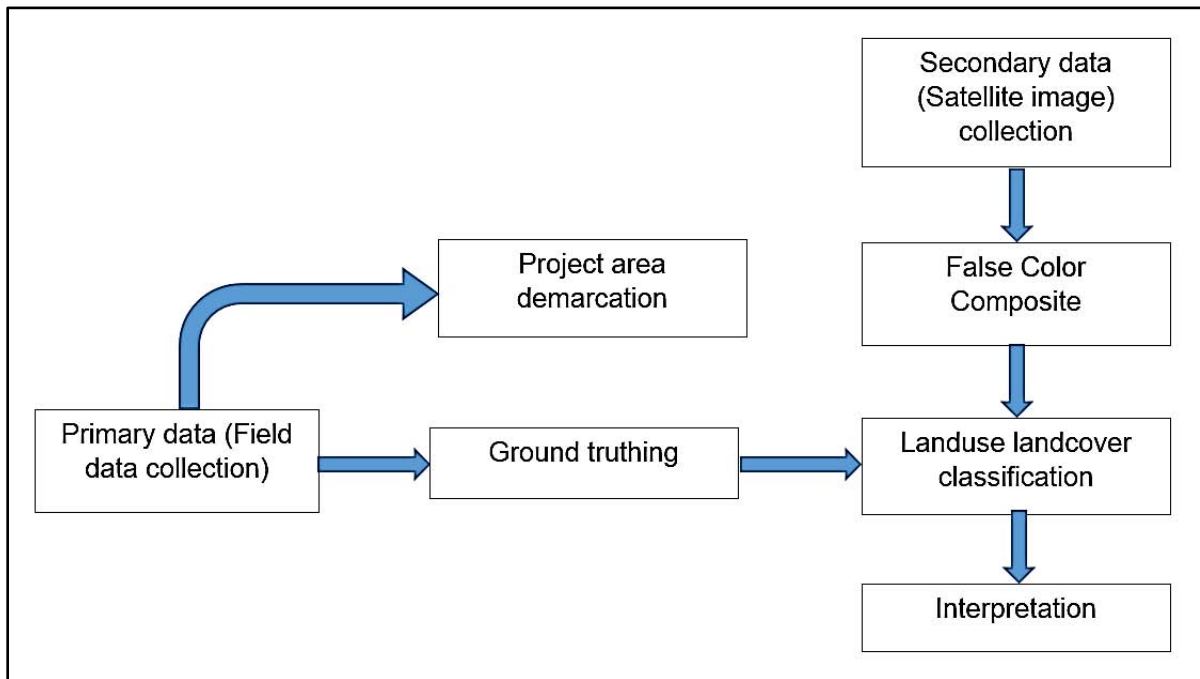


Figure 3-1: Methodology Use for Land use Classification & Mapping

- **Primary Data:** The coordinates along land features of project area is collected with the help of GPS device for ground truthing. This data is primary data. On the basis of this data, land-use, land-cover analysis is appropriate.
- **Secondary Data:** Satellite image (secondary data) is required to show the current land features of the project area and buffered area (10 km).
- **False Colour Composite (FCC):** False colour (or false colour) refers to a group of colour rendering methods used to display images in colour which were recorded in

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the visible or non-visible parts of the electromagnetic spectrum. A false-colour image is an image that depicts an object in colours that differ from those a photograph (a true-colour image) would show. False-colour image sacrifices natural colour rendition in order to ease the detection of features. Land use pattern of the study area

The existing land use pattern of the study area based on the latest satellite imagery is given in Table 3.1 as follows and pie chart representation is shown in Figure 3.3.

Table 3-1: Land Use details in the study area

Sr.No	Name	Area in Ha	Area in%
1	Scrub Land	9732.34	29.97
2	Forest	16470.17	50.76
3	River/Water Bodies	1004.92	3.09
4	Settlement	846.36	2.60
5	Vegetation	50.13	0.15
6	Sand	852.78	2.62
7	Agriculture	3510.09	10.81
	Total	32466.79	100.00

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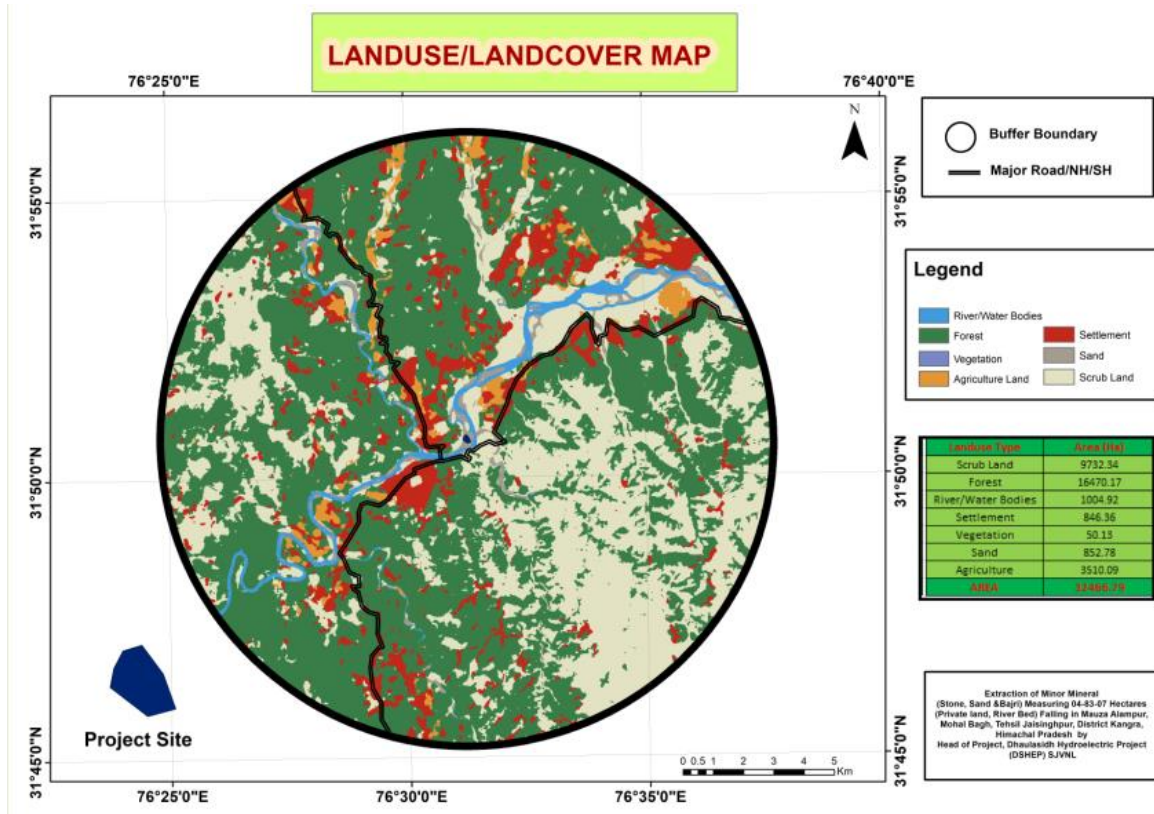


Figure 3-2: Land use map of the study area

3.3 SEISMICITY OF THE AREA

Many parts of the Indian subcontinent have historically high Seismicity. Seven catastrophic earthquakes of magnitude greater than 8 [Richter scale) have occurred in the western, northern and eastern parts of India and adjacent countries in the past 100 years. By contrast, peninsular India is relatively less seismic, having suffered only infrequent earthquakes of moderate strength. The main seismogenic belts are associated with the collision plate boundary between the Indian and Eurasian plates. The project site as well as study area lies in Zone-IV of Seismic Zoning Map, and thus can be said to be located in an area of very high damage risk zone by national standards.

3.4 HYDROGEOLOGY

There are two main geological horizons, namely post-tertiary and tertiary formations in Kangra district. The sequence of geological formation is given as follows

AGE	FORMATION	LITHOLOGY
Post-Tertiary (Quaternary)	Alluvium	Sand, Gravel, Pebble & Boulders and clay
Tertiary (Siwalik)	Upper	Conglomerates, Boulders and pebbly sandstone
	Middle	Micaceous sandstone and shale
	Lower	Hard, purple sandstone & shale

The mine lease area is situated in the Beas river and it is a river bed which is replenished during monsoon rains. The Beas river is one of the major rivers under the Indus basin. It originates in the upper Himalayas from Beas Khud 5871 meters above mean sea level, near Rohtang pass in Himachal Pradesh and flows in the east west direction in Himachal Pradesh till it emerges in the plains near village Talwara in Hoshiarpur District of the Punjab State. The total length of its course is 470km before it joins the Staluj River and up to Beas Dam at pong is about 230km. The catchment area of Beas river is about 12,560 sq.km out of which only 777 sq. km is under permanent snow. Its main tributaries are the Parbati, the Spin and Malana nala in the East: and the Solnag, the Manaslu, the Sujoin, the Phojal and the Sarvati streams in the west.

3.5 METEOROLOGY

3.5.1 Climate & Rainfall

The region has four distinct seasons. The area experiences severe winter from December to March followed by severe summer season lasting from April to June. The area receives rainfall under the influence of south-west monsoon from July to mid-September followed by post-monsoon season lasting up to November. The terrain in general has profound influence on the temperatures of a region. The temperature generally rises from the beginning of March till June, which is the hottest month of the year with mean minimum and maximum temperature of 25.6°C to 44°C respectively. With the onset of monsoons by the end of the June temperature begins to fall. The drop in day temperature is much more than the drop in night temperature. The night temperature falls rapidly after the withdrawal of monsoons by mid-September. The month of January is cooler month with the mean maximum and minimum temperature being 24°C and 1.7°C respectively. Under the influences of western disturbance, the temperature falls appreciably during winters and it may go even below 0° C. Humidity is generally low throughout the year. During summer season, humidity is lowest 36 %. During monsoon months, it goes as high as 80-90%. The highest levels of humidity are observed in the month of August. The average humidity during synoptic hours is 53% and 62% respectively. Snow fall is received in the higher reaches of Dhauladhar ranges. Average minimum and maximum temperature are 3°C and 45°C.

Rainfall varies significantly with altitude of the area. The catchment area receives rainfall due to western disturbances that pass over the north - western part of the country during winter months. Significant precipitation in form of snow is received at higher altitude and rainfall in valleys is received during the winter month. Rainy season generally starts from mid-July and extends up to mid-September. During winter the rains are scarce and extend in between 15th December to 15th February.

3.5.2 Wind Speed/Wind Rose Diagram

Wind speed and wind direction data recorded during the study period is useful in identifying the influence of meteorology on the air quality of the area. Based on the collected meteorological data, relative percentage frequencies of different wind directions are calculated and plotted as wind roses of Sixteen directions viz., N, NNE, NE, ENE, E, ESE, SE, SSE, S, SSW, SW, WSW, W, WNW, NW and NNW for eight hourly and twenty-four-

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hourdurationrespectively.Maximum and minimum temperatures including percentage relative humidity were recorded simultaneously.

The observed wind pattern during the study period is described below and is plotted for the study period.The predominant overall wind patterns for the study period is NE and NNE.

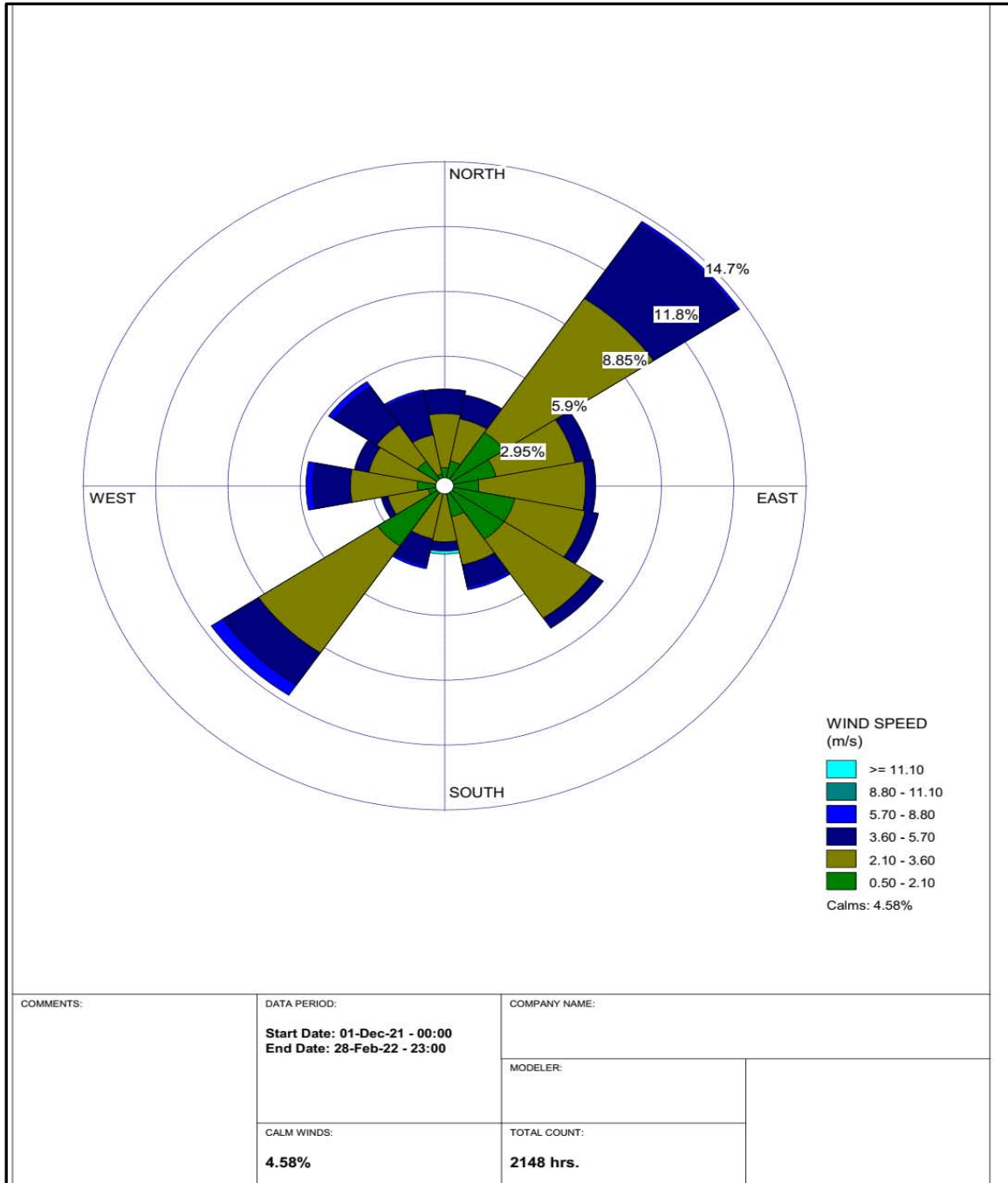


Figure 3-3: Windrose Diagram

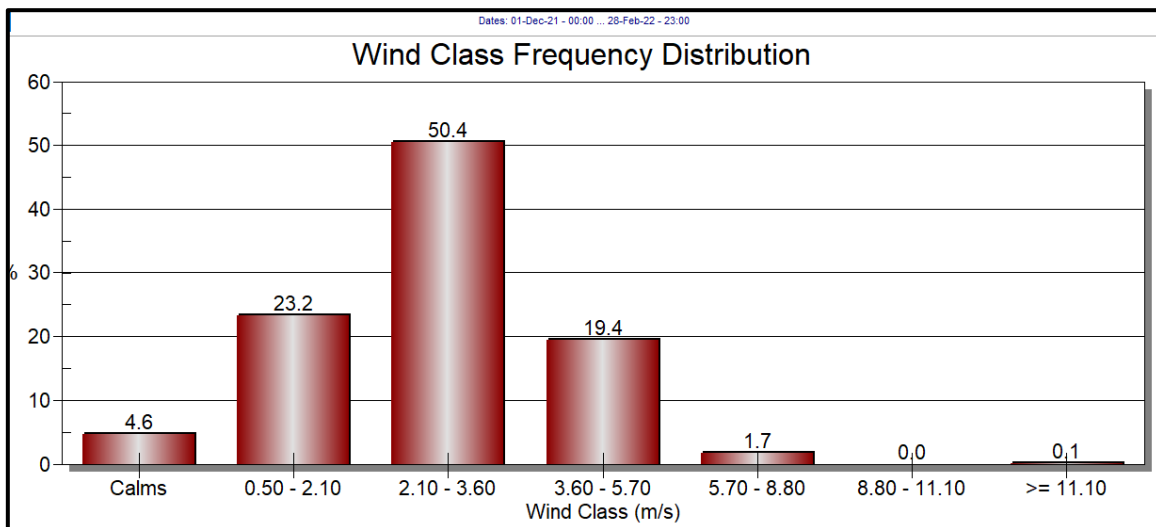


Figure 3-4: Wind Class frequency distribution

3.5.3 Ambient air quality

3.5.3.1 Selection of AAQ stations

A network of eight ambient air-sampling locations has been selected for assessment of the existing status of air environment within the study zone. The heights of the sampling stations were kept between 4 to 6 m from ground level. After reconnaissance of the area and observing the topographical features and review of the available meteorological data and local conditions the sampling sites were chosen which will be the representative of the local areas under study. Details of Air Monitoring Locations are given in Table-3.2.

Table 3-2: Ambient Air sampling stations

S. No	Stations	Latitude	Longitude	Direction	Distance (km)
AAQ1	Mine Site	31°50'48.36"N	76°31'41.93"E		0.00
AAQ2	Bagh	31°50'51.18"N	76°31'47.94"E	NE	0.12
AAQ3	Sujanpur Tira	31°50'2.57"N	76°30'21.29"E	SW	2.00
AAQ4	Marera	31°54'2.15"N	76°30'44.47"E	N	6.00
AAQ5	Bhadola	31°48'39.21"N	76°31'9.41"E	SSW	4.00
AAQ6	Alampur	31°50'38.83"N	76°30'26.69"E	E	1.50
AAQ7	Jangal Beri	31°52'13.67"N	76°33'49.88"E	ENE	5.00

3.5.3.2 Existing AAQstatus

Pollutants like PM₁₀, PM_{2.5}, SO₂, NO₂, CO were selected and analyzed. The methodology of sampling and analysis in detail are given in the following tables.

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Table 3-3: Parameters sampling duration

Attribute	Parameter	Frequency of Monitoring
AAQ	PM ₁₀ , PM _{2.5} , SO ₂ , NO ₂	24 hr sampling for PM ₁₀ , PM _{2.5} , SO ₂ , NO ₂ , Sampling height varies between 4-6 m above ground level.

Table 3-4: Ambient Air Quality - Methodology

S. No	Parameters	Units of Measurements	Prescribed Limits	Protocol
1.	Sulphur Di-oxide, SO ₂	µg/ m ³	80 (24 Hours)	IS: 5182 Part-II, 2001
2.	Nitrogen Di-oxide, NO ₂	µg/ m ³	80 (24 Hours)	IS: 5182 Part-VI, 2006
3.	Particulate Matter, PM ₁₀	µg/m ³	100 (24 Hours)	IS: 5182 Part- XXIII, 2006
4.	Particulate Matter, PM _{2.5}	µg/ m ³	60 (24 Hours)	EPA, 40 CFR Part- 50
5.	Ozone, O ₃	µg/ m ³	100 (08 Hours)	IS: 5182 Part-IX, Chemical Method, 2009
6.	Lead, Pb	µg /m ³	0.50 (Annual)	IS:5182 (P-22) 2004 (ICP-OES)
7.	Carbon Monoxide, CO	mg/m ³	2000 (08 Hours)	IS: 5182 Part-X, NDIR spectroscopy
8.	Ammonia, NH ₃	µg/ m ³	400 (24 Hours)	Indophenol Blue Method (CPCB Guideline)
9.	Benzene, C ₆ H ₆	µg/ m ³	05 (Annual)	IS:5182 (P-11) 2006 (Gas Chromatograph)
10.	Benzopyrene,	ng/ m ³	01	IS:5182 (P-12)

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	B[a]P		(Annual)	2004 (Gas Chromatograph)
11.	Arsenic, As	ng/ m ³	06 (Annual)	CPCB Guidelines, Vol-1 (May 2011) (ICP-OES)
12.	Nickel, Ni	ng/ m ³	20 (Annual)	CPCB Guidelines, Vol-1 (May 2011) (ICP-OES)
13.	Volatile Organic Compound, VOC	µg/ m ³	-	TO17-USEPA
14.	Vanadium, V	µg/ m ³	-	CPCB Guidelines, Vol-1 (May 2011) (ICP-OES)
15.	Total Hydrocarbon, THC	PPM	-	IS:5182 Part-XVII (Gas Chromatograph)

Installation

- Install at a place where representative results anticipated of the area and away from local activities.
- At least 15 m distance from local sources
- Sampling height: 4-6 m (free from obstructions).

Rota meter flow: 0.2 LPM

Impinger: Capacity 35 ml, 22 cm in length and 2.6 cm wide, impinging end of the tube 1 mm bore size.

Manometer: Average >1.1 cu.m/minute

Sampling duration

- 24 hr sampling for PM₁₀, PM_{2.5}, SO₂, NO₂ and 8 hr sampling for CO.
- During 3 month monitoring period each week 2 samples will be collected at each site during 4 week survey period.

MONITORING MAP OF THE STUDY AREA

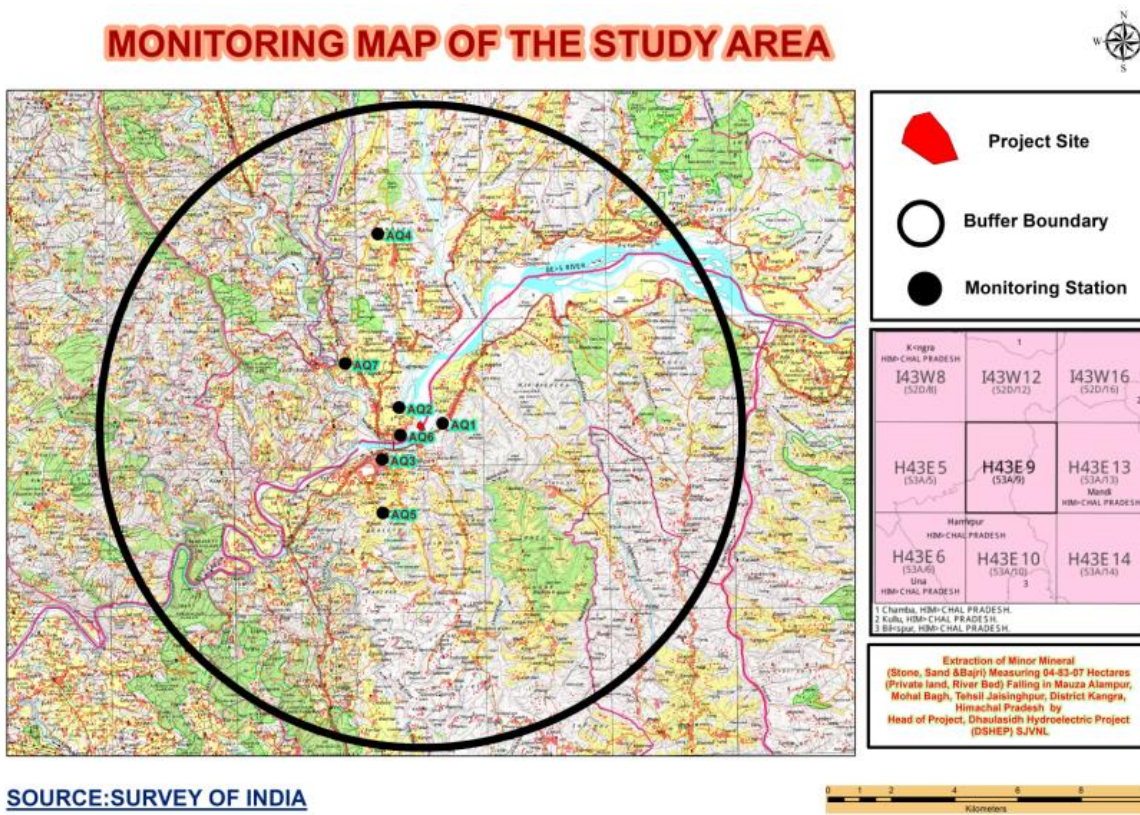


Figure 3-5: Map showing Air sampling locations

3.5.3.3 Results and Discussion

The AAQ survey has been carried out at eight locations within the study zone. Measurement of the actual, PM₁₀, PM_{2.5}, SO₂, NO₂, levels help to understand the existing environmental scenario. The results of SO₂, NO₂, PM₁₀ and PM_{2.5} are expressed in µg/m³. Various statistical parameters like standard deviation, geometric mean, minimum, maximum concentrations and different percentiles have been computed from the data generated during sampling in all stations.

Table 3-5: National Ambient Air Quality Standards

Sl. No.	Pollutant	Time Weighted Average	Concentration in Ambient Air		
			Industrial, Residential, Rural & other areas	Ecologically Sensitive Area	Methods of measurement

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1	Sulphur Dioxide (SO ₂)	Annual Average*	50 µg/m ³	20 µg/m ³	-Improved West and Gaeke
		24 hours**	80 µg/m ³	80 µg/m ³	-Ultraviolet Fluorescence
2	Oxides of Nitrogen as NO ₂	Annual Average*	40 µg/m ³	30 µg/m ³	-Modified Jacob & Hochheiser (Na-Arsenite)
		24 hours**	80 µg/m ³	80 µg/m ³	-Chemiluminiscence
3	Particulate Matter, Size < 10 µ	Annual Average*	60 µg/m ³	60 µg/m ³	-Gravimetric -TOEM
		24 hours**	100 µg/m ³	100 µg/m ³	-Beta attenuation
4	Particulate Matter, Size < 2.5 µ	Annual Average*	40 µg/m ³	40 µg/m ³	-Gravimetric -TOEM
		24 hours**	60 µg/m ³	60 µg/m ³	-Beta attenuation
5	Carbon Monoxide (CO)	8 hours**	2 mg/m ³	2 mg/m ³	-Non Dispersive Infra red (NDIR)
		1 hour	4 mg/m ³	4.0 mg/m ³	Spectroscopy

* Annual Arithmetic mean of minimum 104 measurements in a year taken twice a Week 24 hrs at uniform interval.

** 4 hourly/8 hourly values should be met 98% of the time in a year. However, 2% of the time, it may exceed but not on two consecutive days.

Whenever and wherever monitoring results on two consecutive days of monitoring exceed the limits specified above for the respective category, it shall be considered adequate reason to initiate regular or continuous monitoring and further investigation.

Table 3-6: Air monitoring Results

Station	Description	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO ₂ (µg/m ³)
AQ1	Max	70.26	47.92	8.12	17.13
	Min	45.74	31.78	4.65	9.01
	Avg	60.41	39.66	5.23	11.73

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	98 percentile	69.96	46.51	7.16	16.35
AQ2	Max	69.6	41.18	6.82	11.14
	Min	54.82	31.58	4.42	7.39
	Avg	62.03	36.78	5.56	9.26
	98 percentile	69.43	40.21	6.69	11.14
AQ3	Max	70.87	42.78	6.88	13.21
	Min	54.31	33.02	4.84	8.84
	Avg	61.27	36.67	5.75	10.79
	98 percentile	70.10	42.14	6.71	13.04
AQ4	Max	65.82	46.04	8.46	17.11
	Min	39.86	30.97	5.12	9.38
	Avg	55.05	40.50	6.16	11.67
	98 percentile	65.78	45.99	8.03	16.31
AQ5	Max	69.56	39.4	6.79	13.06
	Min	52.75	28.63	4.19	7.91
	Avg	59.20	34.13	5.26	10.19
	98 percentile	68.82	38.63	6.40	12.94
AQ6	Max	70.4	39.96	7.59	13.53
	Min	53.35	28.97	4.62	7.59
	Avg	59.88	34.57	5.86	9.85
	98 percentile	69.64	39.14	7.13	12.97
AQ7	Max	59	40.69	6.04	13.86
	Min	37.03	26.93	4.36	7.23
	Avg	48.98	33.67	4.86	9.44
	98 percentile	57.77	39.51	5.86	13.22

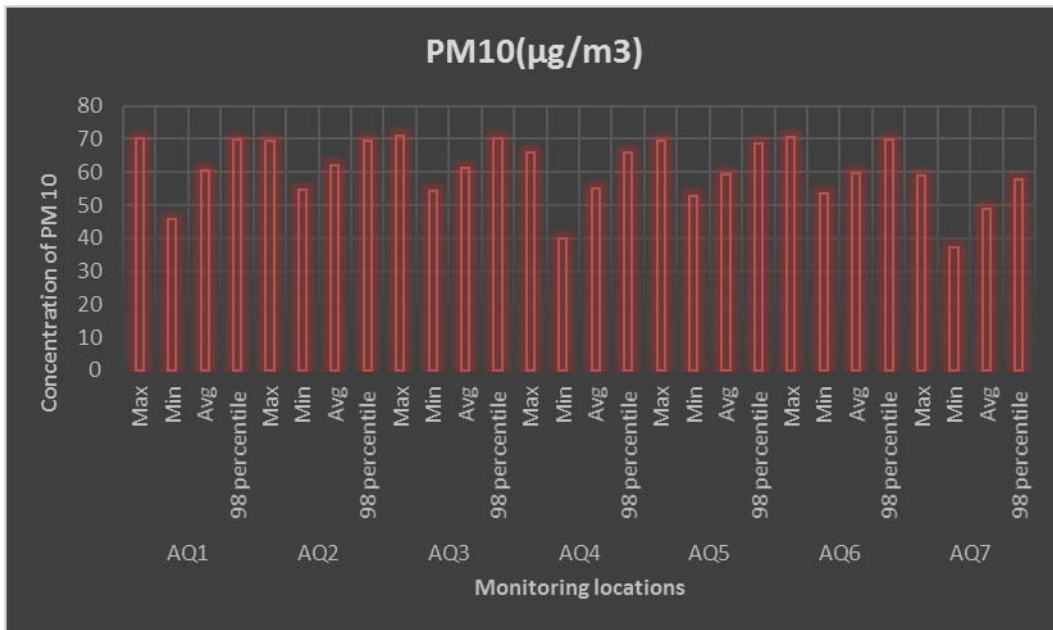


Figure 3-6: Graphical representation of PM₁₀ at all locations

Ambient Air quality monitoring results reveals that the minimum and maximum concentration of PM₁₀ for all 7 monitoring stations location was found to be 37.03 µg/m³ at Jangal Beri & Bakharla and 70.87 µg/m³ at Sujanjpur Tira respectively. As per NAAQ, 2009 standard, the analysis results are well within the limits.

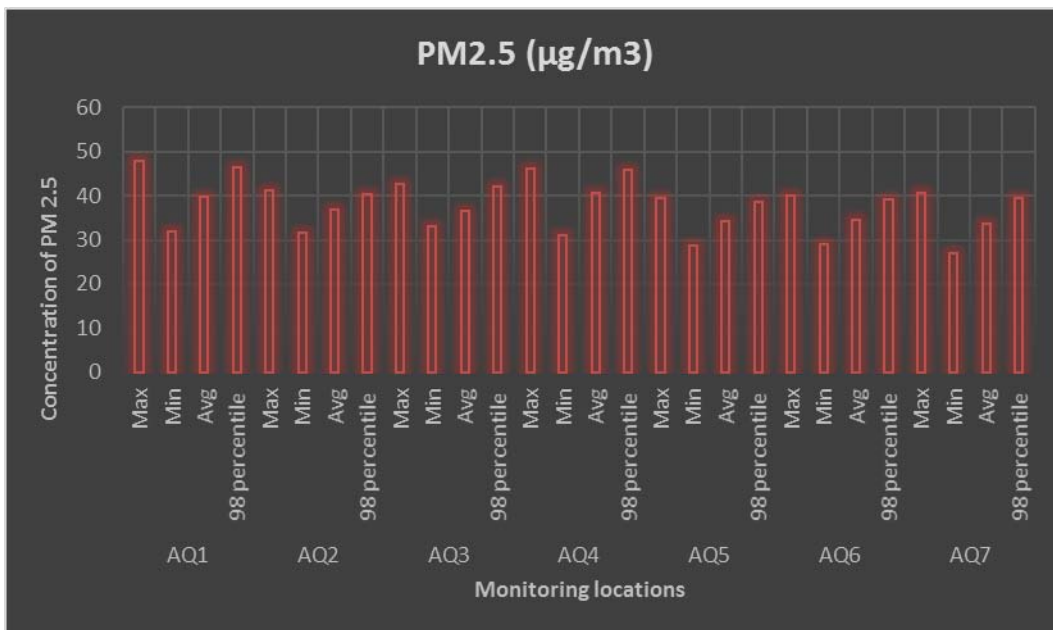


Figure 3-7: Graphical representation of PM_{2.5} at all locations

The minimum and maximum concentration of PM_{2.5} was 26.93 µg/m³ at Jangal Beri and 47.92 µg/m³ at mine site respectively which is well within the limits as per NAAQ, 2009 standard.

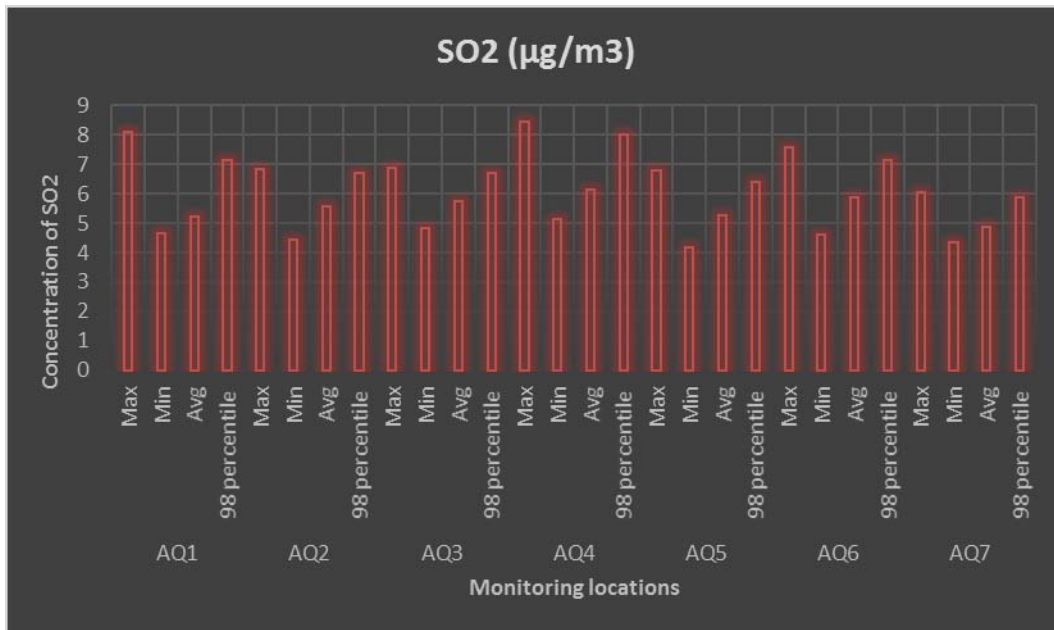


Figure 3-8: Graphical representation of SO₂ at all locations

The minimum and maximum concentrations for SO₂ were found 4.36 µg/m³ at Jangal Beri and 8.46 µg/m³ at Marera respectively which is well within the limits as per NAAQ, 2009 standard.

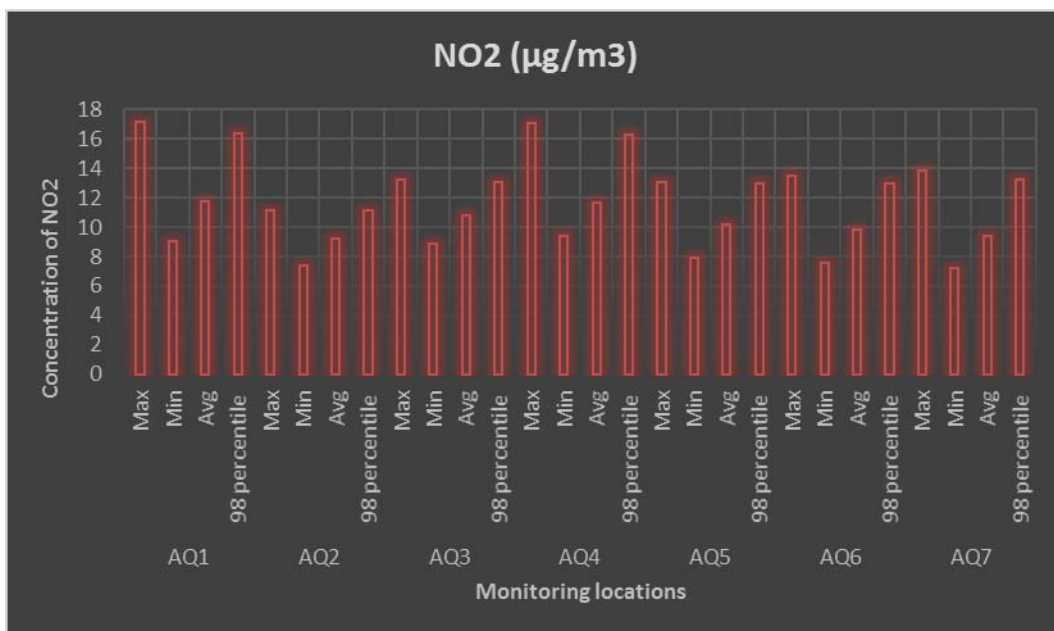


Figure 3-9: Graphical representation of NO₂ at all locations

The minimum and maximum concentrations for NO₂ were found 7.23 µg/m³ at Jangal Beri and 17.13 µg/m³ at Mine Site respectively which is well within the limits as per NAAQ, 2009 standard.

3.6 NOISE ENVIRONMENT

Noise in general we can say that the sound, which is composed of many frequency components of various loudness distributed over the audible frequency range. Various noise scales have been introduced to describe, in a single number, the response of an average human being to a complex sound made up various frequencies at different loudness levels. The most common and heavily favored of those scales is the A weighted decibel (dB (A)). This is more suitable for audible range of 20 to 20,000 Hertz. The scale has been designed to weigh various components of noise according to the response of a human ear. The main objective of the noise level monitoring is to assess the background noise levels in different zones viz., industrial, commercial, residential and silence zones within the study area. Noise levels were measured in residential areas, bus stands and other settlements located within 10 Km radius around the site.

3.6.1 Methods adopted for selection of noise monitoring

The monitoring was carried out at each location for a period of 24hrs, once in each season. The day levels of noise have been monitored during 6 am to 10 pm and the night levels during 10 pm to 6 am. The Ld, Ln and Ldn were calculated based on the hourly Leq values. Spot noise levels were measured using a precision noise level meter at residential areas and proposed project area, in all seven locations which were covered with in study zone. The noise levels include vehicular movement and local activities. The noise monitoring locations are shown in Table 3-7 and noise levels recorded stated in Table 3.8.

Table 3-7: Noise Monitoring Sampling Stations

S. No	Stations	Environmental Setting	Direction	Distance (Km)
NQ1	Mine Site	Industrial Area		0.00
NQ2	Bagh	Residential Area	NE	0.12
NQ3	Sujanpur Tira	Residential Area	SW	2.00
NQ4	Marera	Residential Area	N	6.00
NQ5	Bhadola	Residential Area	SSW	4.00
NQ6	Alampur	Residential Area	E	1.50
NQ7	Jangal Beri	Residential Area	ENE	5.00

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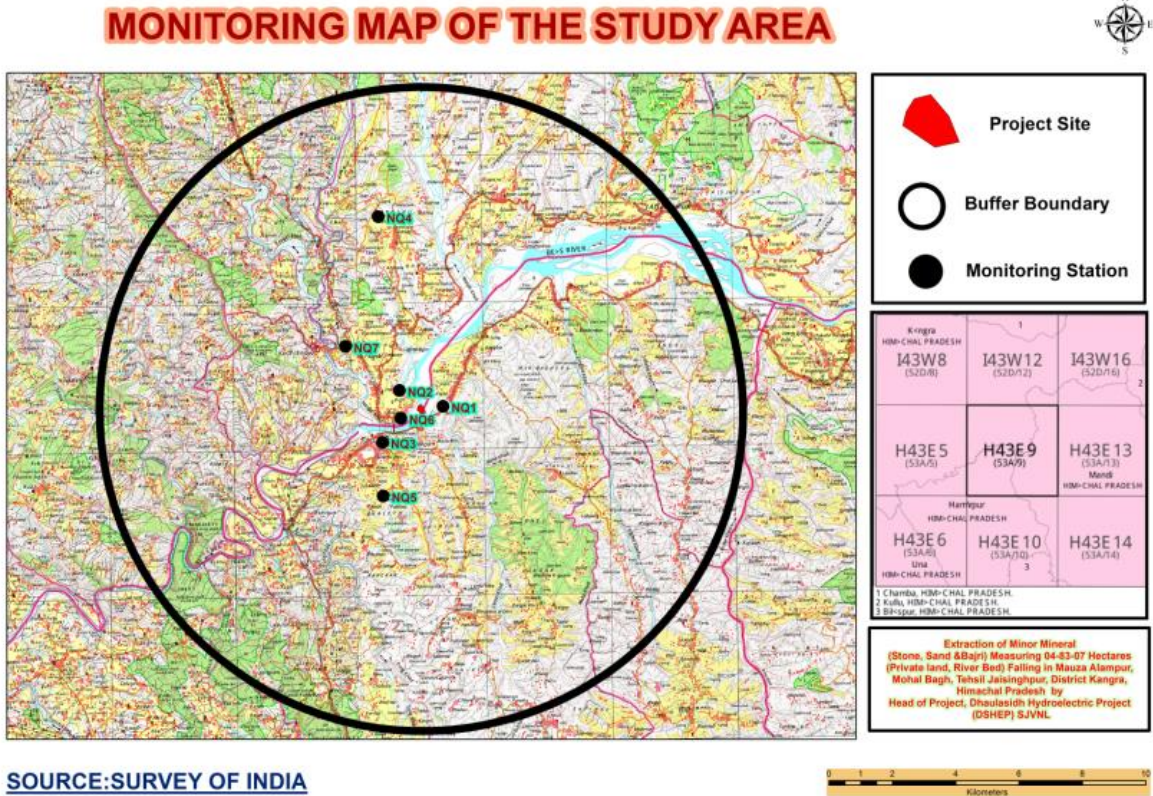


Figure 3-10: Noise monitoring sampling location

Table 3-8: Noise level Results in Study area

Sr. No.	Noise Location	Standards of Noise Level			Measured Noise Level db(A)	
		Category of Area	Day dB (A)	Night dB (A)	Day (Ld)	Night (Ln)
1	Mine Site	Industrial Area	75	70	58.7	47.5
2	Bagh	Residential Area	55	45	55.3	36.5
3	Sujanpur Tira	Residential Area	55	45	52.6	38.3
4	Marera	Residential Area	55	45	47.7	33.9
5	Bhadola	Residential Area	55	45	48.1	32.5
6	Alampur	Residential Area	55	45	49.6	35.2
7	Jangal Beri	Residential Area	55	45	46.4	32.6

3.6.2 Results

The minimum noise level of 46.4 L_d during day time was recorded at Jangal Beri, maximum at Mine site was 58.7 L_d. Minimum Noise level of 32.5 L_n during night time was at Bhadola maximum at project site 47.5 L_n.

It was observed that the values obtained were within the prescribed Ambient Noise Quality Standards with respect to Noise indicated no industrial activity in the study area.

3.7 WATER ENVIRONMENT

3.7.1 Sample collection and analysis

The water resource in the study area may be classified into two major categories. viz., surface and ground water source.

Water samples were collected at nine locations, out of which 6 samples from ground water sources and 3 samples from surface sources. All the samples were analyzed for parameters such as hardness, alkalinity, salts, conductivity, inorganic substance, heavy metals, coli forms (for Surface Water samplers) etc. Parameters like pH, conductivity, temperature and DO were analyzed at the time during collection. These parameters were analyzed as per the procedures specified in 'Standard Methods for Examination of Water and Wastewater' published by American Public Health Association (APHA). Ground water samples results were compared with IS: 10500 specification and surface water samples results were compared with IS: 2296 and both ground and surface water samples were compared with Water Quality Criteria, published by CPCB for its suitability to drinking, outdoor bathing, drinking water after treatment, propagation of wild life, fisheries and irrigation purpose.

Method of Water Sampling

The following procedures were used while sampling

- Washing the bottles/cans with distilled water prior to the sampling
- Before collection of water the bottles/cans are again washed 2-3 times with the same water
- For surface water, Bottles were lowered to a minimum depth of 30 cm below water surface
- At each point Different sets of water samples were collected so as to cover all the parameters
- Meticulous attention is taken in proper numbering at the site
- Sterilized bottles were used for the samples that are to be analyzed for bacteria

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- Civil supply water pipeline taps are sterilized before collection for bacteriological analysis. Parameters like pH, conductivity and temperature were analyzed in the field conditions. There are specific instruments for measuring EC and pH in the field. These are portable. These instruments will be calibrated at laboratory before use. The results were reconfirmed after getting to the laboratory. DO is fixed and titrated in the field itself.
- Appropriate preservatives are added, depending upon the elements to be analyzed and marked accordingly (IS: 3025 (part I) 1987).
- All the water samples collected in the ice box, were immediately transported to the laboratory and frozen at 5°C analysis.
- Field observations were noted in the field notebook.
- As far as possible photographs were taken in almost all sampling points.
- All the parameters have been analyzed as per APHA, 20th edition & IS: 3025.

Table 3-9: Parameters & Methodologies Adopted in Assessing Quality of Water

Quality	Parameters	Detection limit	Instrument Method	Instruments used	IS Method
Physico-chemical	pH	0.5	pH meter	pH electrode	IS 3025 (part-11)
	Electrical conductivity	1 $\mu\text{mhos}/\text{cm}$	Field Method Laboratory method	Tracer Conductivity meter	IS 3025 (part-14)
	Colour	Hazen	Visual Method	--	IS 3025 (part-04)
	Odour	--	Manual Method	--	IS 3025 (part-05)
	Taste	--	Taste Threshold Test	--	IS 3025 (Part 8)
	Temperature	1 $^{\circ}\text{C}$	Tracer	Thermometer	APHA, page 25-26
	Turbidity	1NTU	Nephelometric method	Turbiditymeter	IS 3025 (part-10)
	Salinity	g/l	Electrical Conductivity Method	Conductivity meter	APHA, page 99

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Quality	Parameters	Detection limit	Instrument Method	Instruments used	IS Method
	Total Suspended Solids	0.1 mg/l	Filtration & Evaporation method	Balance	IS 3025 (part-19)
	Total Dissolved Solids	0.1 mg/l	Evaporation method	Balance	IS 3025 (part-16)
	Total Alkalinity	1mg/l	Titration Method	Burettes	IS 3025 (part-23)
	Total Hardness	1mg/l	EDTA Titrimetric method	Burettes	IS 3025 (part-21)
	Ca Hardness	1mg/l	EDTA Titrimetric method	Burettes	IS 3025 (part-21)
	Mg Hardness	1mg/l	EDTA Titrimetric method	Burettes	IS 3025 (part-21)
	Chlorides	2mg/l	Argentometric method	Burettes	IS 3025 (part-32)
	Sulphates	1mg/l	Nephelometric method	Turbidity meter	IS 3025 (part-24)
	Sodium	1mg/l	Flame photometric method	Flame photometer	IS 3025 (part-45)
	Potassium	1mg/l	Flame photometric method	Flame photometer	IS 3025 (part-45)
	Copper	0.02mg/l	Atomic	AAS	IS 3025 (part-42)
	Manganese	0.02mg/l	Absorption		APHA, AAS
	Mercury	0.001mg/l	Spectrophotom		IS 3025 (part-48)
	Selenium	0.01mg/l	etermethod		APHA, AAS

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Quality	Parameters	Detection limit	Instrument Method	Instruments used	IS Method
	Arsenic	0.005mg/l			IS 3025 (part-37)
	Lead	0.05mg/l			IS 3025 (part-47)
	Zinc	0.01mg/l			IS 3025 (part-49)
	Chromium	0.1mg/l			APHA
	Nitrates	0.05 mg/l	U.V. Spectrophotometric method	Spectrophotometer	IS 3025 (part-34)
	Total Phosphates	0.1 mg/l		Spectrophotometer	IS 3025 (part-31)
	Total Nitrogen	1mg/l	Kjeldhal Method	Kjeldhal apparatus	IS 3025 (part-34)
	Total Phosphorus	0.01 mg/l	U.V. Spectrophotometric method	Spectrophotometer	IS 3025 (part-31)
	Pesticides	0.05 mg/l	GC-MS	GC-MS	APHA
	Anionic Detergents	0.5 mg/l	Spectroscopic Method	Spectrophotometer	APHA
	Dissolved Oxygen	0.1mg/l	Winkler's method	Burettes	IS 3025 (part-38)
	COD	4 mgO ₂ /l	Open reflux method	COD digester	APHA
	BOD ₅ , mg/l	1mgO ₂ /l	Dilution & DO by Winkler's method	BOD bottles and burette	IS 3025 (part-44)
Biological	Phytoplankton	1No/ml	Plankton net followed by	Microscope	APHA:1002
	Zooplankton	1No/ml	Microscopic Observation	Microscope	APHA:1002
Bacteriological	Coliforms	3MPN/100ml	MPN method	Microscope	APHA

Reference: Standard Methods for the Examination of Water and Wastewater by APHA Methods (American Public Health Association).

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The sampling was done both for surface and ground water. The samples were taken from the identified monitoring locations within the 10 Km radius of the study area. The water quality sampling locations are described in Table 3.10 and 3.11.

The water sampling results are given in Table 3.12 and Table 3.13.

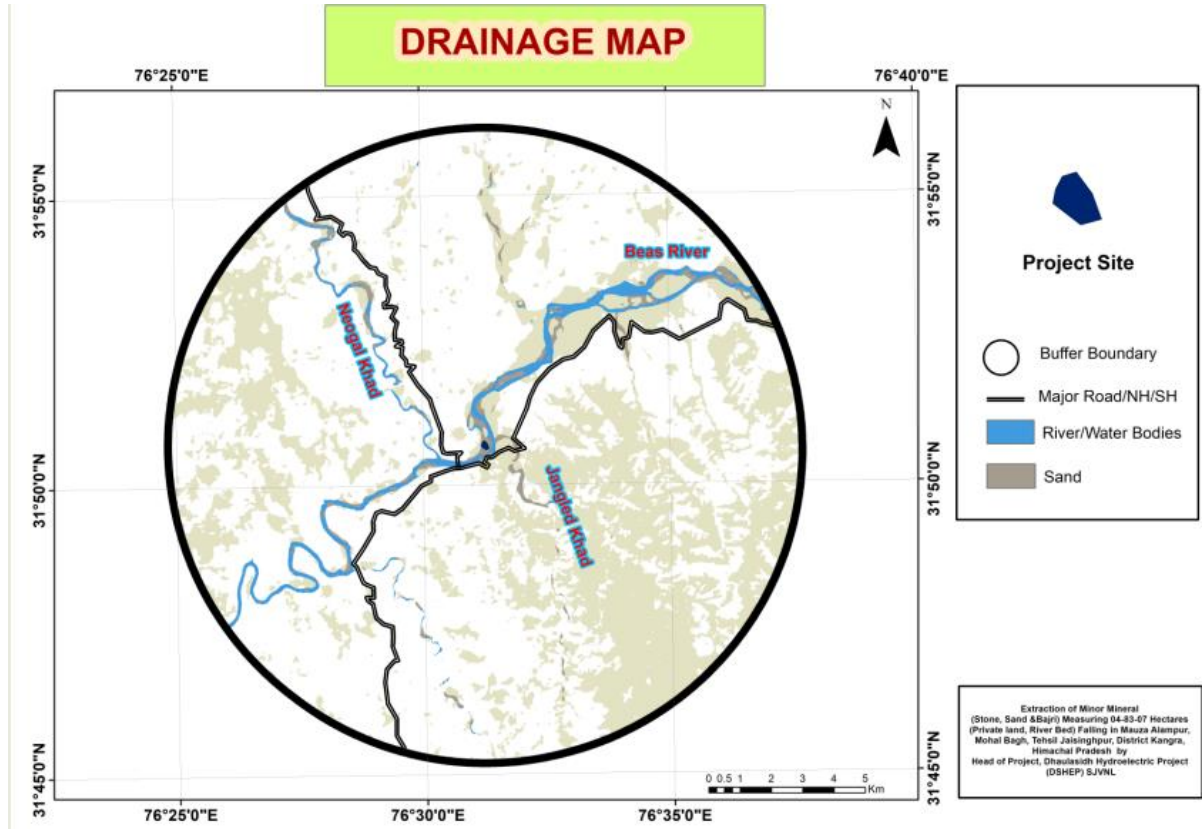


Figure 3-11: Drainage map of the Study area

Table 3-10: Surface Water monitoring Locations

S no.	Location code	Sampling Location	Latitude	Longitude
1.	SW 1	upstream of Beas river	31°51'41.35"N	76°31'27.78"E
2.	SW2	Downstream of Beas river of Sujanpur Tira	31°50'24.01"N	76°30'55.14"E
3.	SW3	Downstream of Beas river near Mehrlu	31°50'30.40"N	76°31'53.06"E

Table 3-11: Ground Water Monitoring Locations

S no.	Location code	Sampling Location	Latitude	Longitude	Distance (Km)	Direction from Project site

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1.	GW 1	Bagh	31°50'51.18"N	76°31'47.94"E	NE	0.12
2.	GW2	Sujanpur Tira	31°50'2.57"N	76°30'21.29"E	SW	2.00
3.	GW 3	Marera	31°54'2.15"N	76°30'44.47"E	N	6.00
4.	GW 4	Bhadola	31°48'39.21"N	76°31'9.41"E	SSW	4.00
5.	GW 5	Alampur	31°50'38.83"N	76°30'26.69"E	E	1.50
6.	GW 6	Jangal Beri	31°52'13.67"N	76°33'49.88"E	ENE	5.00

MONITORING MAP OF THE STUDY AREA

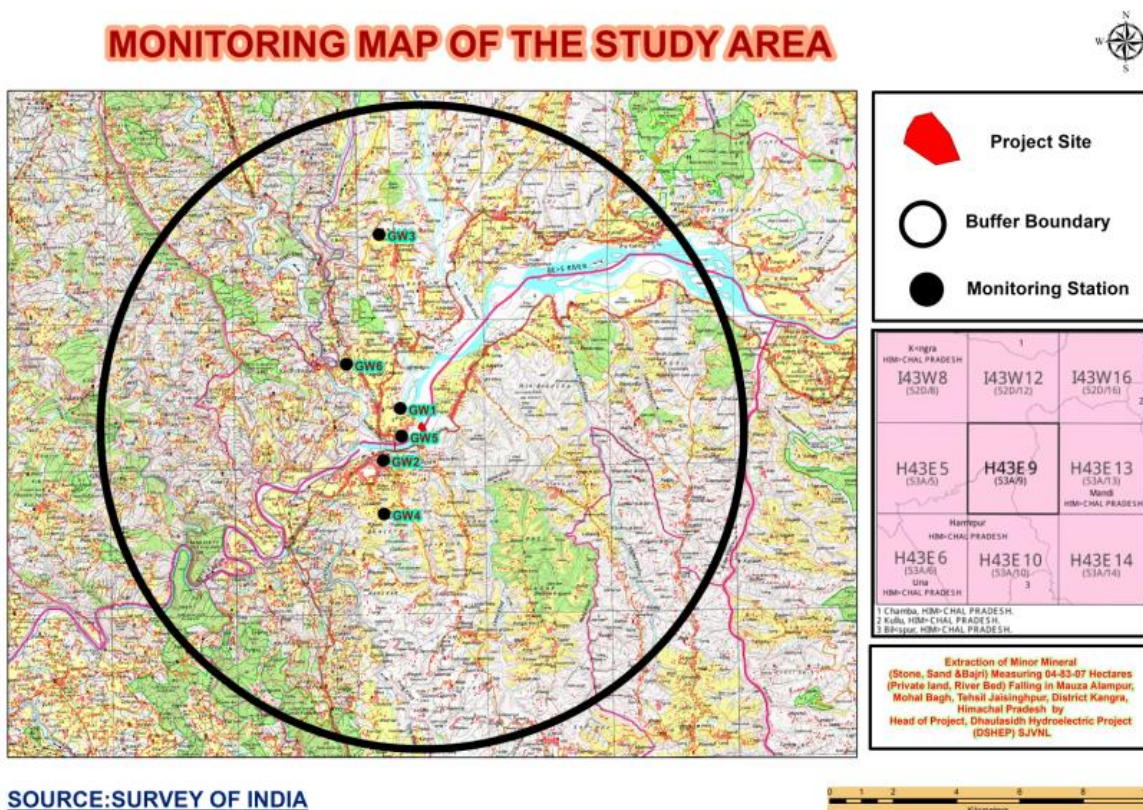


Figure 3-12: Location for Ground water monitoring sampling

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MONITORING MAP OF THE STUDY AREA

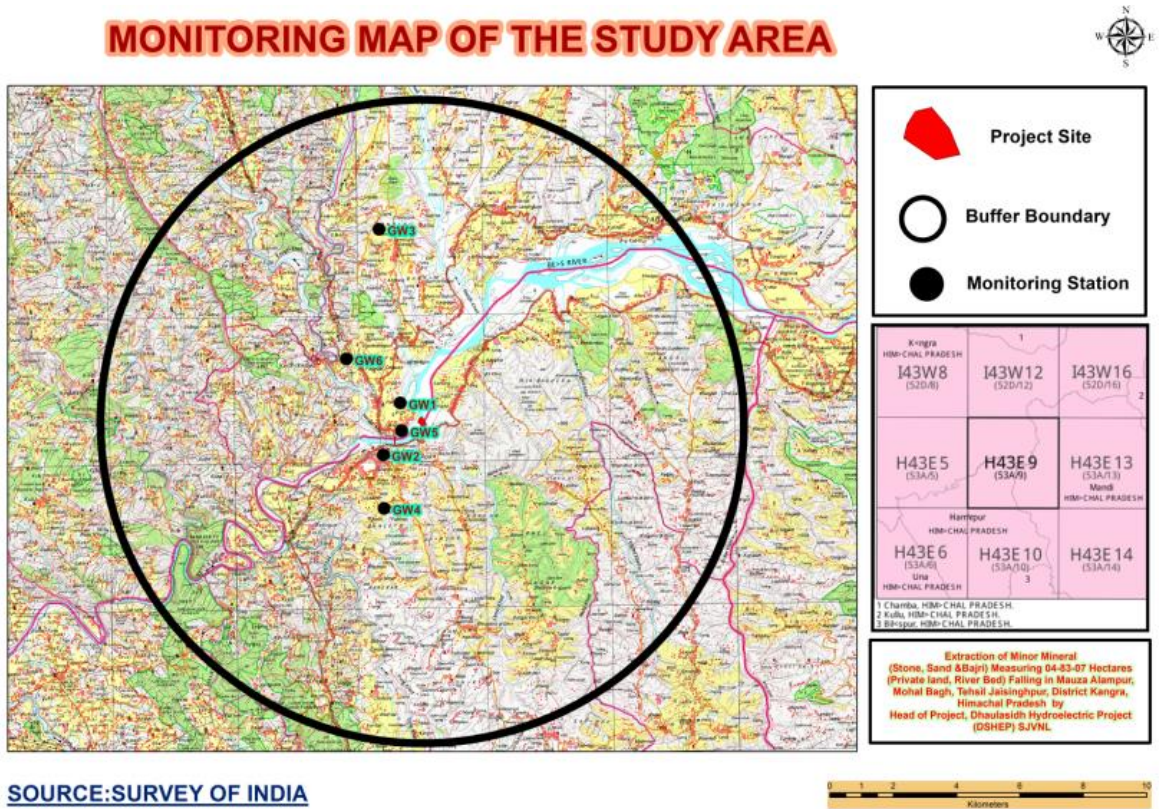


Figure 3 13: Location for Ground water monitoring sampling

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Table 3-12: Water analysis result (Surface water)

Sr.N o.	Parameters	Units	Designated Class D	Surface Water		
				upstream of Beas river	downstream of Beas river near Sujanpur Tira	downstream of Beas river near Mehrlu
1	pH (at 25 ⁰ C)	---	----	8.04	7.63	7.24
2	Temperature	⁰ C	----	20.0	19.0	21.0
3	Turbidity	NTU	----	4.2	3.1	4.6
4	Electric Conductivity @25 ⁰ C	μS/cm	----	380	272	328
5	Sulphate (SO ₄)	mg/l	6.5-8.5	23.0	16.0	30.0
6	Nitrate (NO ₃)	mg/l	----	1.99	2.52	3.08
7	Total Hardness (as CaCO ₃)	mg/l	----	179.0	141.0	155.0
8	Chloride (as Cl)	mg/l	----	50.6	40.6	53.0
9	Fluoride (as F)	mg/l	----	0.37	0.25	0.32
10	COD (as O ₂)	mg/l	----	25.0	26.0	40.0
11	Iron (as Fe)	mg/l	----	0.27	0.27	0.20
12	Dissolve Oxygen	mg/l	----	7.3	7.7	6.4
13	Total Dissolved Solid	mg/l	----	249	252	233
14	BOD (3 days at 27 ⁰ C)	mg/l	----	4.3	4.3	8.0
15	Calcium (as Ca)	mg/l	----	41.3	35.0	51.6

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16	Magnesium (as Mg)	mg/l	----	18.6	8.2	11.2
17	Arsenic (as As)	mg/l	----	BDL	BDL	BDL
18	Lead (as Pb)	mg/l	----	BDL	BDL	BDL
19	Copper (as Cu)	mg/l	----	BDL	BDL	BDL
20	Zinc (as Zn)	mg/l	----	BDL	BDL	BDL
21	Manganese (as Mn)	mg/l	----	BDL	BDL	BDL
22	Total Chromium (as Cr)	mg/l	----	BDL	BDL	BDL
23	Sodium (as Na)	mg/l	----	24.6	22.8	27.4
24	Potassium (as K)	mg/l	----	1.57	1.63	2.06
25	Total Alkalinity (as CaCO ₃)	mg/l	----	149	169	205
26	Phosphate (as P)	mg/l	----	0.23	0.22	0.18
27	Nitrite (as NO ₂)	mg/l	----	0.17	0.16	0.17
28	Total Suspended Solid	mg/l	----	8.2	8.0	12.0
29	Faecal Coliform	MPN/100 ml	----	0.74×10 ³	1.1×10 ³	1.1×10 ³
30	Total Coliform	MPN/100ML	----	1.1×10 ³	1.3×10 ³	1.3×10 ³

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Table 3-13: Water analysis result (Ground water)

Sr. No.	Parameters	Units	Bagh	Sujanpur Tira	Marera	Bhadola	Alampur	Jangal Beri	Requirement (Acceptable Limit)	Permissible Limit in absence of alternate source
MICROBIOLOGICAL REQUIREMENT										
1	<i>Escherichia coli</i>	MPN/100 ml	Absent	Absent	Absent	Absent	Absent	Absent	Absent/100ml	
2	<i>Coliform Bacteria</i>	MPN/100 ml	Absent	Absent	Absent	Absent	Absent	Absent	Absent/100ml	
ORGANOLEPTIC & PHYSICAL PARAMETERS										
3	Colour	Hazen	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	5	15
4	Odour	-	greeable	greeable	greeable	greeable	greeable	greeable	Agreeable	Agreeable
5	Taste	-	greeable	greeable	greeable	greeable	greeable	greeable	Agreeable	-
6	Turbidity	NTU	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1	5

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7	pH value	-	8.08	7.67	7.37	7.29	7.23	7.24	6.5-8.5	-
8	Total Dissolve Solid (TDS)	mg/l	241	249	247	245	248	247	500	2000
GENERAL PARAMETERS CONCERNING SUBSTANCES UNDESIRABLE IN EXCESSIVE AMOUNTS										
9	Aluminum (as Al)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.03	0.2
10	Total Ammonia	mg/l	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.5	No Relaxation
11	Anionic surface Detergents(as MBAS)	mg/l	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.2	1.0
12	Barium (as Ba)	mg/l	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.7	No Relaxation
13	Boron (as B)	mg/l	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.5	2.4
14	Calcium (as Ca)	mg/l	88.29	81.15	78.75	75.82	75.84	73.57	75	200
15	Chloramines (as Cl ₂)	mg/l	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	4.0	No Relaxation
16	Chloride (as Cl)	mg/l	23.92	24.14	25.14	27.25	26.37	27.54	250	1000
17	Copper (as Cu)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	1.5
18	Fluoride (as F)	mg/l	0.39	0.35	0.36	0.39	0.39	0.41	1.0	1.5

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19	Free Residual Chlorine	mg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	1.0
20	Iron (as Fe)	mg/l	0.160	0.14	0.17	0.19	0.20	0.21	1.0	No Relaxation
21	Magnesium (as Mg)	mg/l	37.13	39.12	35.94	33.27	40.73	42.24	30	100
22	Manganese (as Mn)	mg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.3
23	Mineral Oil	mg/l	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.5	No Relaxation
24	Nitrate (as NO ₃)	mg/l	0.47	0.50	0.72	0.67	0.62	0.67	45	No Relaxation
25	Selenium (as Se)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	No Relaxation
26	Silver (as Ag)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.1	No Relaxation
27	Sulphate (as SO ₄)	mg/l	11.85	12.92	12.94	11.87	12.20	11.79	200	400
28	Sulphide(as H ₂ S)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	No Relaxation

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										n
29	Alkalinity (as Ca CO ₃)	mg/l	165.00	168.00	170.00	159.00	163.00	161.00	200	600
30	Total Hardness (as CaCO ₃)	mg/l	125.42	120.27	114.69	109.09	116.57	115.81	200	600
31	Zinc (as Zn)	mg/l	0.221	0.23	0.28	0.24	0.25	0.32	5.0	15
Parameters Concerning Toxic Substances										
32	Cadmium (as Cd)	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.003	No Relaxation
33	Cyanide (as CN)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05	No Relaxation
34	Lead (as Pb)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	No Relaxation
35	Mercury (as Hg)	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	No Relaxation
36	Molybdenum (Mo)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.07	No Relaxation

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37	Nickel (as Ni)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	No Relaxation
38	Polynuclear Aromatic	mg/l	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	No Relaxation
39	Poly chlorinatedbiphenyl	mg/l	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0005	No Relaxation
40	Arsenic (as As)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	No Relaxation
41	Total Chromium (as Cr)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	No Relaxation

3.7.2 Results

Analysis results of Surface water:

The analysis results of surface water samples from 3 locations are presented in Tables 3.12, respectively. The tables include values observed during the three months of study together with mean of observed values and the surface water standards ie. CPCB classification is being used for comparison purpose.

- pH was observed in the range of 7.24 – 8.04 which meets with desirable norms.
- Total Dissolved Solid (TDS) were recorded in the range of 233 mg/L – 252 mg/L with minimum at downstream of Beas river near Mehru (SW3) maximum at downstream of Beas river near Sujampur Tira (SW2).
- Conductivity varies from 272 to 380 µmho/cm.
- Total Hardness was in the range of 141.0 mg/L to 179.0 mg/L with minimum at downstream of Beas river (SW2) and maximum at upstream of Beas river (SW1).
- Total Alkalinity was found in the range of 149- 205 mg/L with minimum at upstream of Beas river and maximum at downstream of Beas river near Mehru (SW3).
- Chloride was found in the range of 40.6 to 53.0 mg/L and Sulphate varies from 16.0 to 30.0 mg/L.
- Iron was found in the range of 0.20 -0.27 mg/L with minimum at downstream of Beas river (SW3) maximum at upstream of Beas river (SW1).
- DO was found in the range of 6.4 mg/L to 7.7 mg/L with minimum at downstream of Beas river (SW3) and maximum at downstream of Beas river (SW2).
- BOD and COD were found in the ranges of 4.3 mg/L to 8.0 mg/L and 25.0 mg/L to 40.0 mg/L respectively.

The classification of the water after analysis is tabulated below:

Designated Best Use	Class	
Drinking Water source without conventional treatment but after disinfection	A	
Outdoor Bathing (Organized)	B	
Drinking water source after conventional treatment & disinfection	C	
Propagation of wild life & Fisheries	D	√
Irrigation, Industrial cooling, Controlled Waste Disposal	E	
	Below	

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	E	
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Analysis results of Ground water;

The analysis results of ground water samples from 6 Villages are presented in Tables 3.13, respectively. The tables include values observed during the study and the drinking water standards (IS:10500) for comparison purpose.

- pH was observed in the range of 7.23 – 8.08 which meets with desirable norms.
- Total Dissolved Solid (TDS) were recorded in the range of 241 mg/L – 249 mg/L with minimum at Bagh village and maximum at Sujanpur Tira village.
- Total Hardness was in the range of 109.09mg/L to 125.42 mg/L with minimum at Bhadola village and maximum at Bagh village.
- Total Alkalinity was found in the range of 159.00 - 170.00 mg/L with minimum at Bhadola village and maximum at Marera village.
- Chloride was found in the range of 23.92 mg/L to 27.54 mg/L and Sulphate varies from 11.79 to 12.94 mg/L.
- Iron was found in the range of 0.14 - 0.21 mg/L.

Interpretation of Ground Water Quality Data:

All the results are above permissible limits as per IS:10500 standards for drinking water. It can be concluded from the sampling results that at majority of locations TDS, Hardness, Calcium, Total Alkalinity, Chloride and Magnesium are high and above permissible limits. From the results, it is can be concluded that due to over exploitation groundwater in this region cannot be used directly for drinking purpose and without proper treatments.

- The pH limit fixed for drinking water samples as per IS: 10500 is 6.5 to 8. During the study period, the pH of the groundwater was found varying between 7.23 – 8.08. The pH values for all the samples collected in the study area during study period were found to be within the acceptable limits.
- The desirable limit for total dissolved solids as per IS: 10500 are 500 milligrams per liter(mg/l). In groundwater samples collected from the study area, the total dissolved solids(TDS) were found to be varying between 241 mg/L – 249 mg/L. The TDS of all the samples were below the permissible limit of 2000 mg/l.

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- The desirable limit for Chloride is 250 mg/l as per IS: 10500. The Chloride levels in the groundwater samples collected in the study area were ranging from 23.92 mg/L to 27.54 mg/L.
- The desirable limit as per IS:10500 for hardness is 300 mg/l. In the groundwater samples collected from the study area, the hardness was found to be varying from 109.09mg/L to 125.42mg/L.
- In the groundwater samples of study area the fluoride values were found to be within a range of 0.35 mg/l to 0.41 mg/l.
- All the heavy metals in all samples were found to be below the permissible limits.

3.8 SOIL ENVIRONMENT

3.8.1 Soil profile of District

The nature of soil is medium black and shallow black soil.

3.8.2 Soil quality

Assessment of soil quality is an important aspect with reference to tree plantations, percolation of water, ground water impact etc. The information on soils has been collected from various secondary sources and also through primary soil sampling analysis of which is described in this section.

Table 3-14: Soil monitoring location details

S no.	Location code	Sampling Location	Latitude	Longitude	Distance (Km)	Direction
1.	SQ1	Mine Site	31°50'48.36"N	76°31'41.93"E		0.00
2.	SQ2	Bagh	31°50'51.18"N	76°31'47.94"E	NE	0.12
3.	SQ 3	Sujanpur Tira	31°50'2.57"N	76°30'21.29"E	SW	2.00
4.	SQ4	Marera	31°54'2.15"N	76°30'44.47"E	N	6.00
5.	SQ5	Bhadola	31°48'39.21"N	76°31'9.41"E	SSW	4.00
6.	SQ6	Alampur	31°50'38.83"N	76°30'26.69"E	E	1.50
7.	SQ7	Jangal Beri	31°52'13.67"N	76°33'49.88"E	ENE	5.00

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MONITORING MAP OF THE STUDY AREA

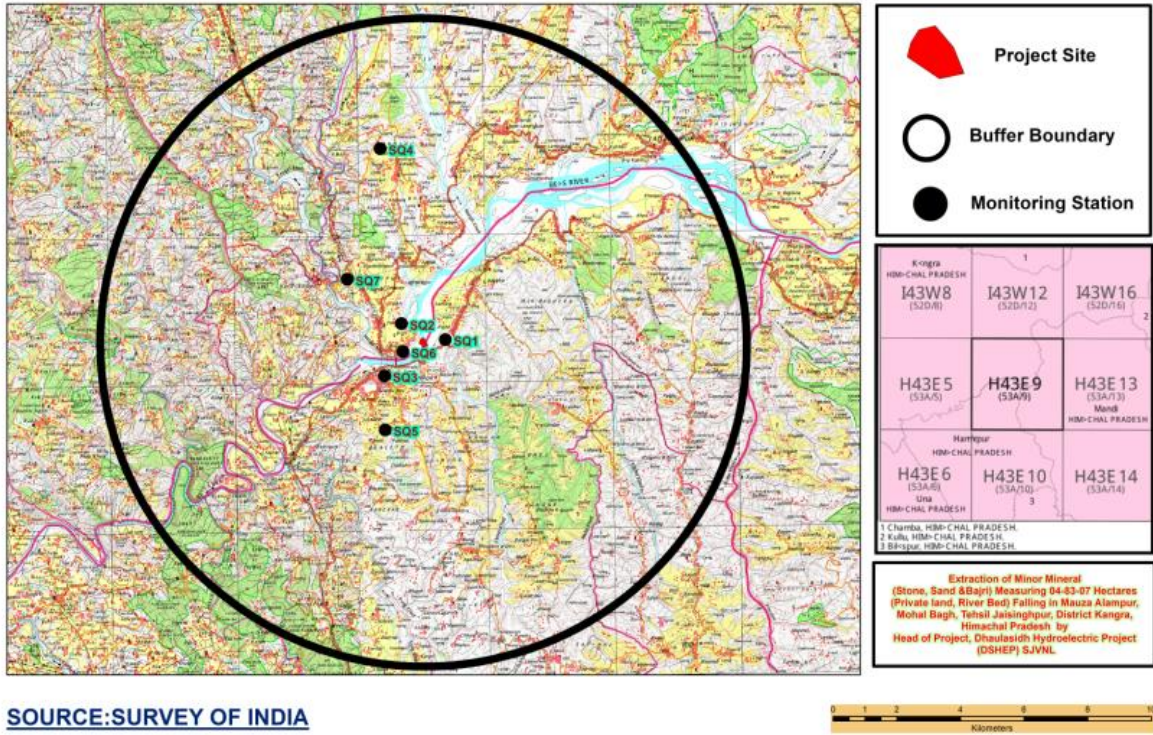


Figure 3-14: Map Showing Soil sampling stations

Table 3-15: Soil Quality Results

Sr. No	Parameters	SQ1	SQ2	SQ3	SQ4	SQ5	SQ6	SQ7
1	pH	7.53	7.27	7.34	7.45	7.71	7.48	7.21
2	Electrical Conductivity (µmhos/cm)	325.00	318.00	376.00	432.00	403.00	417.00	348.00
3	Sodium (as Na)(mg/kg)	46.57	53.15	57.43	54.00	57.06	50.20	49.78
4	Water holding capacity (%)	30.13	28.85	29.24	31.12	30.19	28.00	29.00
5	Potassium (as K) (mg/kg)	234.56	242.23	255.12	219.75	249.56	232.50	238.64
6	Texture							
	Sand (%)	66.00	56.00	64.00	60.00	54.00	68.00	68.00

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	by mass)							
	Clay (%)	15.00	26.00	22.0	26.00	28.00	18.00	18.00
	by mass)							
	Silt (% by mass)	19.00	18.00	14.0	14.00	18.00	14.00	14.00
7	Calcium (as Ca)(mg/kg)	452.0 0	378.0 0	345.00	482.00	379.00	252.00	375.00
8	Magnesium (as Mg) (mg/kg)	167.1 0	172.2 9	158.49	200.33	172.99	166.40	164.57
9	SAR	0.93	1.44	1.50	1.46	1.45	0.98	0.97
10	CEC (meq/100gm)	2.17	2.10	2.32	2.16	2.10	2.23	2.23
11	Available Phosphorus(as P),(mg/kg)	10.74	11.87	12.89	12.30	11.89	10.80	11.82
12	Organic carbon (%)	0.42	0.40	0.38	0.41	0.39	0.45	0.46
13	Porosity (% by mass)	37.00	34.69	42.7	33.8	40.34	37.00	37.00
14	Permeability (cm/hr)	1.85	1.62	1.92	1.74	1.56	1.86	1.80
15	Bulk Density (kg/cm ³)	1.40	1.40	1.38	1.42	1.42	1.42	1.43
16	TKN%	0.021 5	0.023 0	0.0300	0.0216	0.0310	0.0212	0.0208

3.8.3 Results

The analysis results show that soil is basic in nature as pH value ranges from 7.21 at Jangal Berito 7.71 at Bhadola. The organic carbon was found with minimum of 0.38 % at Sujampur Tira and maximum of 0.46% at Jangal Beri. The concentration of Phosphorus and Potassium has been found to be in good amount in the soil samples.

3.9 BIOLOGICAL ENVIRONMENT

3.9.1 Introduction

Biological diversity comprises the variability of genes, species and ecosystems and is very crucial for maintaining the basic processes on which the life depends. Broadly it can be

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divided into two types i.e. the floral diversity and faunal diversity. Conservation of the biodiversity is essential for the sustainable development as it not only provides the food, fodder and medicine but also contribute in improvement of essential environmental attributes like air, water, soil, etc.

Before starting any Environmental Impact Assessment study, it is necessary to identify the baseline of relevant environmental parameters which are likely to be affected as a result of operation of the proposed project. A similar approach has been adopted for conducting the study on Biological Environment for this Project. Both terrestrial and aquatic ecosystems have been studied to understand the biological environment.

3.9.2 General Vegetation Study of the area:

The vegetation of study area varies from dry scrub forests at lower elevation to alpine pasture at higher altitudes. Several tropical elements can be seen scattered in the area. Species of *Saccharum*, *Calotropis*, *Vitex*, *Zizyphus*, etc. are of common occurrence. Tree species viz. *Acacia catechu*, *Albizia lebbek*, *Dalbergia sissoo*, *Morus alba*, etc. are found planted along the boundary of the agricultural lands and along the road sides.

Ground vegetation mainly consists of grasses and small shrubs. Among the grasses, *Vetiveria Zizanioides*, *Cenchrus ciliaris* are very common in the area. Useful fodder grasses, *Cynodon dactylon*, *Eleusine indica*, *Trifolium alexandrinum*, etc. are present in the proposed project area.

The large weeds which infest uncultivated tracts are *aak* (*Calotropis procera*), *arind* (*Ricinus communis*), *dhatara* (*Datura metel*) and *thor* (*Opuntia stricta*). Other noxious weeds and those which appear in crops are *pohlior* thistle (*Carthamus oxyacantha*), *shialkanta* (*Argemone mexicana*), *kandyari* (*Solanum virginianum*) and *bhanga* (*Cannabis sativa*).

3.9.3 FLORA OF THE STUDY AREA

Table 3-16: Flora of the study area

Sl. No	Species	Family	Habit
1	<i>Abutilon indicum</i>	Malvaceae	Herb
2	<i>Acacia catechu</i>	Fabaceae	Tree
3	<i>Acacia nilotica</i>	Fabaceae	Tree
4	<i>Achyranthes aspera</i>	Amaranthaceae	Herb
5	<i>Adhatoda vasica</i>	Acanthaceae	Shrub

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Sl. No	Species	Family	Habit
6	<i>Ageratum conyzoides</i>	Asteraceae	Herb
7	<i>Albizia procera</i>	Mimosaceae	Tree
8	<i>Barleria cristata</i>	Acanthaceae	Herb
9	<i>Bauhinia variegata</i>	Fabaceae	Tree
10	<i>Boerhavia diffusa</i>	Nyctaginaceae	Herb
11	<i>Bombax ceiba</i>	Bombacaceae	Tree
12	<i>Carissa carandas</i>	Apocynaceae	Shrub
13	<i>Cassia fistula</i>	Fabaceae	Tree
14	<i>Cedrela toana</i>	Meliaceae	Tree
15	<i>Cissampelos pareira</i>	Menispermaceae	Climber
16	<i>Cordia dichotoma</i>	Boraginaceae	Tree
17	<i>Cryptolepis buechanani</i>	Asclepiadaceae	Climber
18	<i>Dalbergia sissoo</i>	Fabaceae	Tree
19	<i>Datura stramonium</i>	Solanaceae	Shrub
20	<i>Dicliptera bupleuroides</i>	Acanthaceae	Herb
21	<i>Dodonaea viscosa</i>	Sapindaceae	Shrub
22	<i>Eugenia jambolana</i>	Myrtaceae	Tree
23	<i>Eucalyptus sp.</i>	Myrtaceae	Tree
24	<i>Eupatorium sp.</i>	Asteraceae	Herb
25	<i>Euphorbia royleana</i>	Euphorbiaceae	Shrub
26	<i>Ficus benghalensis</i>	Moraceae	Tree
27	<i>Ficus palmata</i>	Moraceae	Tree
28	<i>Ficus religiosa</i>	Moraceae	Tree
29	<i>Ficus rumphii</i>	Moraceae	Tree
30	<i>Jasminum dispersum</i>	Oleaceae	Shrub
31	<i>Lantana camara</i>	Verbenaceae	Shrub
32	<i>Mallotus philippensis</i>	Euphorbiaceae	Tree
33	<i>Mangifera indica</i>	Anacardiaceae	Tree
34	<i>Malva parviflora</i>	Malvaceae	Shrub
35	<i>Morus alba</i>	Moraceae	Tree
36	<i>Murraya koenigii</i>	Anacardiaceae	Shrub

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Sl. No	Species	Family	Habit
37	<i>Phoenix sylvestris</i>	Arecaceae	Tree
38	<i>Populus deltoides</i>	Salicaceae	Tree
39	<i>Sida acuta</i>	Malvaceae	Herb
40	<i>Solanum nigrum</i>	Solanaceae	Herb
41	<i>Terminalia arjuna</i>	Combretaceae	Tree
42	<i>Terminalia bellirica</i>	Combretaceae	Tree
43	<i>Terminalia chebula</i>	Combretaceae	Tree
44	<i>Tinospora cordifolia</i>	Menispermaceae	Climber
45	<i>Urena lobata</i>	Malvaceae	Shrub
46	<i>Xanthium strumarium</i>	Asteraceae	Shrub
47	<i>Ziziphus mauritiana</i>	Rhamnaceae	Shrub

3.9.4 FAUNA OF THE STUDY AREA

Table 3-17: Fauna of the study area

Sl.No	Common Name	Scientific name	Wildlife Schedule	IUCN Red List Status
Mammals				
1	Leopard Cat	<i>Prionailurus bengalensis</i>	I	LC
2	Jungle Cat	<i>Felis Chaus</i>	II	LC
3	Barking Deer	<i>Mutiacus muntjak</i>	III	LC
4	Indian Fox	<i>Valpus bengalensis</i>	II	LC
5	Jackal	<i>Canis aureus</i>	II	LC
6	Rhesus Monkey	<i>Macaca mulatta</i>	II	LC
7	Langur	<i>Semnopithecus entellus</i>	II	Vu
8	Indian Porcupine	<i>Hystrix indica</i>	IV	LC
9	Indian Hare	<i>Lepis negricolis</i>	IV	LC
10	Spotted Deer	<i>Axis axis</i>	III	LC
11	Sambar	<i>Rusa unicolor</i>	III	Vu
12	Flying squirrel	<i>Hylopetes fimbriatus</i>	II	CE
13	Indian Loopard	<i>Panthera pardus fusca</i>	II	Vu
14	Common palm Civet	<i>Paradoxurus</i>	II	LC

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Sl.No	Common Name	Scientific name	Wildlife Schedule	IUCN Red List Status
		<i>hermaphroditus</i>		
15	Great Himalayan leaf nosed Bat	<i>Hipposideros armiger</i>	-	LC
16	Himalayan Masked Palm Civet	<i>Paguma larvata</i>	II	LC
Domestic Animals:				
1	Cow	<i>Bos indicus</i>		NA
2	Buffalo	<i>Bos bubalis</i>		DD
3	Goat	<i>Capra aegagrushircus</i>		DD
Avian fauna (Birds)				
1	Peacock	<i>Pavo cristatus</i>	IV	LC
2	Common Myna	<i>Acridotheres tristis</i>	IV	LC
3	Black Kite	<i>Milvus migrants</i>	IV	LC
4	Asian Koel	<i>Endynamys scolopacca</i>	IV	LC
5	Blue Jay	<i>Cyanocitta cristata</i>	IV	LC
6	Eurasian sparrowhawk	<i>Accipiter nisus</i>	IV	LC
7	Black patridge	<i>Melanoperdix niger</i>	IV	LC
8	Grey patridge	<i>Perdix perdix</i>	IV	LC
9	Common quail	<i>Coturnix coturnix</i>	IV	LC
10	Chakor	<i>Alectoris chukar</i>	IV	LC
11	Crow	<i>Corvus splendons</i>	V	LC
12	Parrot	<i>Psittaciformes</i>	IV	LC
13	Fulvous breasted woodpecker	<i>Dendrocopos macei</i>	IV	LC
14	Ring Dove	<i>Streptopelia capicola</i>	IV	LC
15	Spotted Dove	<i>Spilopelia chinensis</i>	IV	LC
16	Shikra	<i>Accipiter badius</i>	I	LC
17	Tawny Eagle	<i>Aquila rapax</i>	I	Vu
18	Green Pigeon	<i>Dacula bicolor</i>	IV	Vu

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Sl.No	Common Name	Scientific name	Wildlife Schedule	IUCN Red List Status
19	Rufous-naped tit	<i>Periparus rufonuchalis</i>	IV	LC
20	Black Naped woodpecker	<i>Picus guerini</i>	IV	LC
21	House sparrow	<i>Passer domesticus</i>	IV	LC
22	Himalayan Yello-breasted Green Finch	<i>Chloris spinoides</i>	IV	LC
23	White Rumped Vulture	<i>Gyps bengalensis</i>	I	CE
Reptiles				
1	Common Toad	<i>Bufo melanostictus</i>	IV	LC
2	Skipping frog	<i>Bufo stomaticus</i>	IV	LC
3	Krait	<i>Bungarus caeruleus</i>	IV	NA
4	Banded krait	<i>Bungarus multicinctus</i>	-	NA
5	Kashmir Rock Agama	<i>Laudakia tuberculata</i>	-	NA
6	Bronze Grass Skink	<i>Eutropis macularia</i>		NA
7	Garden lizard	<i>Calotes versicolor</i>	-	NA
8	House lizard	<i>Hemidactylus frenatus</i>	-	LC
9	Cobra	<i>Naja naja</i>	II	LC
10	Rat snakes	<i>Ptyas mucosus</i>	-	NA

LC: Least Concern, NA: Not Assessed, DD: Data deficient., CE: Critically Endangered

Table 3-18: List of endemic / Local flora & fauna authenticated by Range Forest Officer, Kangra

S.NO	Local Name	Botanical Name	Local Name	Botanical Name
	Flora		Fauna	
1	Chil	<i>Pinus roxburghi</i>	Peacock	<i>Pavocristatus</i>
2	Kachnar	<i>Bauhina veriegata</i>	Kakar	<i>Muntiacus</i>
3	Gandela	<i>Murraya kaengii</i>	Suar	<i>Sus scrofa</i>
4	Garna	<i>Carissa opaca</i>	Khargose	<i>Oryctolagus cuniculus</i>

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5	Aakhe	<i>Rubus ellipticus</i>	Jungli Murga	<i>Gallus gullus</i>
6	Kamal	<i>Mallotus philippensis</i>	Fox	<i>Vulpes bengalensis</i>
7	Bamboo	<i>Dendro calamus strictus</i>	Brown Sparrow	<i>Emberiza citrinella</i>
8	Congress grass	<i>Parthenium</i>	Goh	<i>Varanus komodoerisis</i>
9	Mango	<i>Mangi ferainolica</i>	Nevla	<i>Herpestes edwardsi</i>

3.10 SOCIO ECONOMIC ENVIRONMENT

3.10.1 Introduction

The proposed project is a River Bed mining project for the extraction of Stone, Sand and Bajri that shall be used in to be established Stone Crusher Unit for manufacturing of Grits which will be used for construction of 70.75-meter-high concrete gravity dam. The project site is located at Khasra Nos. 744/1, 748 measuring 04-83-07ha.

(Pvt. Land, River Bed) Mauza Alampur, Mohal Bagh, Tehsil Jaisinghpur, District Kangra, Himachal Pradesh. The letter of Intent for the grant of mining lease issued in favor of Head of Project, Dhaulasidh Hydroelectric Project (DSHEP) SJVNL, R/o House No.-21, Ward No.-1, Heera Nagar, District Hamirpur, Himachal Pradesh.

3.10.2 Nature for the Project

The Proposed mine area is 04-83-07 ha (Pvt. Land, River Bed) falling in Mauza Alampur, Mohal Bagh, Tehsil Jaisinghpur, District Kangra, Himachal Pradesh. It has been proposed to collect 81000MT/year (excluding mine waste) i.e. Sand = 18000 MT/yr, Boulders = 36000 MT/yr & Bajri = 27000 MT/yr. 450000MT of mine waste i.e. silt/clay will be generated during mining activity.

The proposed project is having area of 04-83-07ha. (Pvt. Land, River Bed) and falls under Category-“B1” as per EIA Notification 2006 of the Ministry of Environment and Forests, New Delhi and amended thereof.

3.10.3 Need of the Project

The project involves collection of Stone, Sand and Bajri to be used for the construction of 70.75-meter-high gravity dam. For the construction this dam large quantities of construction material like cement coarse and fine aggregates/sand will be required. To fulfil the requirement of construction material for concrete aggregates the naturally available material in the river bed was found suitable from techno-economic consideration for the construction of various structures like dam intake, diversion tunnel, pressure shaft and power house. Moreover, the mining lease area is at a suitable distance with plenty of construction material from the project site. During mining, low grade minerals like silt/clay as mine waste will be generated. Part of this mine waste will be used for maintenance of roads etc. and remaining material can be stacked at proper place for utilization of this material in future during road construction or some other uses as a levelling and filling material.

3.10.4 Demography & Socio-economic Features

3.10.5 Demography

Demography is one of the important indicators of environmental health of an area. It includes population, sex ratio, number of households, literacy, population density, etc. In order to assess the Demographic & Socio-economic features of the area, Census data 2011, for the concerned District Hamirpur and Kangra of Himachal Pradesh state was compiled and placed in the form of tabulation and graphical representation.

3.10.6 Demography of the District Hamirpur, Himachal Pradesh

As per the census records 2011, the total population of Hamirpur district is 4, 54,768 comprising of 2, 17,070 males and 2, 37,698 females. Out of the total population of the district 93.1% lives in rural areas while 6.9% lives in urban area

The decadal growth rate of district comes 10.2%. The growth rates for the rural and urban areas of the district are 10.7 & 4.1%, respectively. The density of population in Hamirpur district comes to 407 persons per sq.km against the state density of 123 persons.

There are 1,095 females for every thousand males in Hamirpur district. The sex ratios for rural and urban areas of the district are 1,109 and 926, respectively. It is observed that the sex ratio in the age group of 0-6 years is much lower in relation to the overall sex ratio figures of the district. It comes to 887 for total population in the age group of 0-6 years. In rural areas the sex ratio in this age group is 886 and in urban areas it is 907 only.

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According to 2011 Census, the total workers including main and marginal workers constitute 53.2% of the total population of the district. In which males and females are 54.7 & 51.8%, respectively. Of the total workers the share of main workers is 27.7% and the marginal workers is 25.5%. The remaining 46.8% of population belongs to the category of non-workers.

As per Census 2011 Hamirpur district reported 3, 58,091 persons as literates constituting 88.2% of the total population. The proportion of male and female literates in the district is 94.4 & 82.6%, respectively. The total literacy rates of rural and urban areas are 87.8% & 92.5%, respectively.

Of the 4, 54,768 total population of the district, 24.0% belongs to Scheduled Castes and 0.7% to Scheduled Tribes.

Demography of the District Kangra, Himachal Pradesh

As per the census records 2011, the total population of Kangra district is 15, 10,075 comprising of 7, 50,591 males and 7, 59,484 females respectively. The decadal growth rate of district comes to 12.8%. The growth rates for the rural and urban areas of the district are 12.4 & 19.4%, respectively.

The density of population in Kangra district is 263 persons per sq. km. against the state average of 123 persons. There are 1,012 females for every thousand males in Kangra district. The sex-ratio figures for rural and urban areas of the district are 1,019 and 908, respectively. It is also observed that, the proportion of females in rural areas is higher than that of urban areas.

As per Census 2011 in Kangra district 11, 52,640 persons were reported as literates constituting 85.7% of the total population excluding 0-6 age-group population. The proportion of male and female literates in the district is 91.5% & 80.0%, respectively. The literacy rate of males is much higher than that of females. Of the 15, 10,075 total population of the district, 21.2% of the total population belongs to the Scheduled Castes and 5.6% to Scheduled Tribes. The percentage of Scheduled Castes population constitutes 21.4% in rural population and 16.9% in urban population of the district.

Religion

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During Census 2011 out of the total population of 4, 54,768 of the district, 4,49,412 (98.8%) have reported their religion as Hindu followed by 3,711 (0.8%) as Muslim. Remaining Sikhs, Buddhist, Christian, Jain and other religions have a negligible representation in the district.

Mother Tongue

During Census 2011 the district has reported as 98.0% population have reported their mother tongue as Hindi and remaining mother tongues are negligible.

Methodology

In order to assess the Demographic & Socio-economic features along with the 10km distance based on field surveys and public consultations undertaken during the baseline field study period and Census records 2011, for the concerned district namely Hamirpur and Kangra of Himachal Pradesh state was compiled and placed in the form of tabulation and graphical representation. Entire study area is observed predominantly rural.

Purpose of the Study

Socio-economic study was conducted to establish the baseline demographic features and impacts due to this Stone, Sand & Bajri mining project, as operation phase of any project invariably leads to Socio-economic changes. The proposed project could lead to unplanned and haphazard development of slums of various size and description with little or rudimentary.

3.10.7 Description of Social Environment

As per the Census Records 2011, the study area has a total of 246 revenue villages and 1 Town i.e. Tira Sujampur (NP) under two Districts namely Hamirpur and Kangra of Himachal Pradesh state respectively.

Overall study area revenue villages are falling mainly under total twelve (12) tehsils namely Tira Sujampur, Nadaun, Galore, Hamirpur & Bhoranj of Hamirpur district and Nurpur, Shahpur, Baroh, Dera Gopipur, & Khundian, Thural & Jaisinghpur of Kangra district respectively in Himachal Pradesh and Punjab State respectively.

Population Distribution within 10 km Study Zone

As per the Census Records 2011, the total population of 10 km study zone was recorded as 68723 persons of 247 revenue villages/towns of Himachal Pradesh state. Male-female wise

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total population was recorded as 32321 males (47.0%) and 36402 (53.0%) females respectively.

Total number of 'Households' was observed as 16481 in the 10 km radius study zone. Scheduled Caste ('SC') population was observed as 16524 persons consisting of 8098 males and 8426 females in the 10km study zone. Scheduled Tribes ('ST') population was also observed as 381 persons consisting of 205 males and 176 females in the 10 km study zone. The child population of the study area is recorded as 7486 and comprising of 3930 (52.5%) males & 3556 (47.5%) females respectively.

Village wise details of population distribution are given below.

Table 3-19: Village-wise Population Distribution (10km Study Zone)

Name of the Village / Town (Census code)	No of Households	Total Population			Child Population (0-6 Years)		
		Total	Male	Female	Total	Male	Female
1. District Hamirpur, Himachal Pradesh							
Bairi (63/24)	136	533	220	313	59	29	30
Bhatpura (63/18)	50	200	95	105	19	11	8
Chamarrakra (63/23)	19	100	53	47	18	11	7
Kodana (63/27)	124	490	210	280	63	29	34
Poi (63/20)	18	69	25	44	6	3	3
Chaptehr (63/22)	30	118	42	76	16	6	10
Jhataur (63/21)	35	133	56	77	12	5	7
Bahru (63/19)	32	127	59	68	14	10	4
Poar (63/1)	75	291	119	172	27	13	14
Bagehrah Upperla (63/14)	110	456	211	245	56	30	26
Bagehrah Buhla (63/6)	199	772	340	432	81	44	37
Jol (63/4) – I	77	365	171	194	41	23	18
Samona (63/16)	60	258	116	142	30	11	19
Bagh (63/3)	30	146	68	78	25	15	10
Dera (55/6)	12	36	12	24	1	1	0
Pakkhar (55/27)	16	57	32	25	4	3	1
Tikru (55/4)	36	138	63	75	17	7	10

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Chaklah (55/34)	15	82	39	43	12	7	5
Charot (55/44)	56	216	107	109	17	14	3
Ludiana (55/2)	8	23	13	10	0	0	0
Darla (55/19)	134	587	278	309	55	26	29
Meharpura (55/24)	96	415	204	211	41	23	18
Kharsal (55/17)	27	123	49	74	10	6	4
Deryal (55/23)	33	142	68	74	16	9	7
Gahlian (55/11)	14	64	29	35	7	3	4
Nihari Upperli (54/20)	5	22	13	9	0	0	0
Bhog (54/4)	16	82	43	39	8	4	4
Kajoti (55/5)	26	122	57	65	26	19	7
Karot Khas (54/10)	120	532	248	284	54	21	33
Dhaner (54/17)	19	79	39	40	10	10	0
Laungni (54/22)	60	278	141	137	20	11	9
Pairian (54/7)	20	97	43	54	16	8	8
Puneh Attru (54/8)	16	68	36	32	7	6	1
Khairru (54/16)	30	163	76	87	16	11	5
Paneh Sih (54/9)	20	88	47	41	10	6	4
Bari (54/3)	42	182	85	97	26	13	13
Salghun Hira (54/12)	20	85	40	45	8	3	5
Salghun-Lachho (54/14)	9	42	24	18	6	6	0
Garoru Ghuman (53/7)	15	60	25	35	8	3	5
Bandhar (53/13)	12	60	28	32	5	3	2
Rih (53/12)	199	796	374	422	110	57	53
Chabutra Khas (53/14)	237	1072	504	568	112	53	59
Baliana (54/5)	16	78	35	43	9	3	6
Chamarrhri (57/17)	39	168	74	94	23	12	11
Bhagol (57/4)	23	118	48	70	14	7	7
Chakariana (57/7)	27	124	54	70	15	7	8
Jehr (57/6)	26	127	64	63	9	2	7
Patlandar (57/5)	78	392	202	190	33	19	14

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Kot (57/19)	4	11	6	5	1	0	1
Chail (57/20)	15	53	27	26	5	5	0
Nalahi (57/18)	79	330	144	186	41	22	19
Gahla (57/8)	6	26	11	15	3	0	3
Chamiana (57/10)	17	68	31	37	7	4	3
Lambri (60/4)	91	416	193	223	56	31	25
Duhak (61/9)	118	521	251	270	60	26	34
Rangar (58/15)	141	612	280	332	69	36	33
Bhati (58/1)	12	33	15	18	5	2	3
Drati (58/14)	5	15	6	9	2	2	0
Sanwin Kalan (58/7)	8	30	15	15	0	0	0
Sanwin Khurd (58/10)	3	13	6	7	0	0	0
Bhatiana Brahmana (58/2)	6	16	6	10	0	0	0
Pakhi (58/4)	6	19	7	12	0	0	0
Gadi (57/15)	59	266	115	151	18	8	10
Barog (57/2)	40	173	86	87	17	9	8
Jagarial (57/9)	15	69	30	39	4	2	2
Bharthun (56/2)	43	192	88	104	15	5	10
Ukhli (56/1)	20	66	30	36	6	2	4
Garoru Buhla (56/7)	18	77	40	37	7	4	3
Taryamli (60/13)	26	117	56	61	12	6	6
Jateru (60/14)	4	17	10	7	2	2	0
Garoru (60/7)	8	32	11	21	0	0	0
Dhel Khas (59/2)	40	163	76	87	17	9	8
Nag Lamber (59/3)	18	54	25	29	1	0	1
Thana (63/5)	19	89	37	52	14	7	7
Mehlaru (63/10)	30	129	58	71	15	10	5
Thathi (63/13)	18	74	29	45	11	5	6
Jandru (63/11)	48	191	81	110	29	17	12
Shukhani (63/9)	34	142	56	86	24	13	11
Than Tikkar (63/31)	45	196	83	113	23	9	14
Palbhu (64/14)	49	178	74	104	22	11	11

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Bajrol (64/6)	151	625	244	381	72	40	32
Mahesh Kowal (64/7)	50	189	66	123	27	14	13
Thathi Gurdwalan (64/3)	49	211	102	109	14	7	7
Bhat Lamber (64/1)	42	170	70	100	26	21	5
Jangal Khas (64/16)	327	129 1	583	708	140	74	66
Kheri (64/5)	228	953	418	535	117	58	59
Bajahar (64/9)	67	283	132	151	15	8	7
Kakkar (63/29)	168	692	308	384	75	40	35
Tira Sujampur (NP)	1769	794 3	426 2	3681	781	410	371
Jangal (24/4)	49	232	108	124	29	18	11
Andara (22/2)	33	142	66	76	14	8	6
Punjyal (23/6)	10	49	24	25	7	3	4
Bumbloo (23/17)	20	98	49	49	7	5	2
Salasi (23/3)	3	10	6	4	0	0	0
Kotlu (28/12) – I	47	195	82	113	25	15	10
Gahli (36/35)	105	493	248	245	58	31	27
Bharahian Di Dhar (62/22)	50	194	85	109	16	9	7
Lambran Di Dhar (62/25)	40	142	61	81	15	8	7
Bhatwara (37/9)	42	190	84	106	25	10	15
Duhak (43/27)	57	219	102	117	16	7	9
2. District Kangra, Himachal Pradesh							
Tikkar (361)	33	171	84	87	20	11	9
Garan (311)	261	118 5	609	576	111	65	46
Tharu (64)	220	998	497	501	105	52	53
Sanani (585)	33	155	79	76	11	6	5
Garh (171)	327	131 7	633	684	139	70	69
Badehr (818)	32	177	85	92	28	12	16
Sarohi (887)	50	276	143	133	34	16	18

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Sialkar (884)	60	318	145	173	50	20	30
Mannu (880)	21	93	44	49	17	8	9
Kuri (885)	14	79	42	37	8	6	2
Balra (886)	15	53	25	28	3	2	1
Manera (899)	7	39	21	18	3	1	2
Marhana (898)	58	336	171	165	41	21	20
Harbah (889)	17	90	45	45	13	6	7
Dhakhar (890)	49	255	135	120	30	15	15
Bhadrun (864)	17	81	46	35	9	5	4
Kud (863)	9	41	19	22	7	3	4
Bhadrol (837)	23	92	45	47	5	3	2
Galoti (852)	35	145	63	82	15	6	9
Gahli (855)	27	122	64	58	16	10	6
Chihar (853)	36	137	71	66	20	10	10
Chanarri (851)	13	77	39	38	8	4	4
Phihar (839)	38	164	76	88	19	9	10
Pihri (838)	62	261	118	143	30	15	15
Uk Lahr (850)	14	68	45	23	7	6	1
Khaliyana (854)	31	127	57	70	11	3	8
Naloti (857)	39	179	89	90	23	12	11
Dhariatu (849)	3	14	5	9	0	0	0
Makar (848)	24	109	53	56	10	2	8
Khola (847)	10	44	22	22	5	3	2
Samehl (845)	17	76	39	37	9	6	3
Chaunki (846)	28	114	66	48	11	8	3
Tihri (861)	8	42	20	22	2	1	1
Jhaura (891)	33	137	71	66	12	9	3
Jarundi (892)	42	174	72	102	29	14	15
Kasar (897)	7	36	17	19	8	3	5
Dahd (896)	12	55	21	34	11	5	6
Tipri (904)	28	118	53	65	10	5	5
Kior (903)	39	186	93	93	23	16	7

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Gharthoon (431)	69	273	124	149	33	17	16
Salghuni (430)	27	128	60	68	18	6	12
Tamber (433)	56	220	85	135	22	12	10
Kauna (432)	82	289	131	158	33	22	11
Duhak Khurd (461)	156	619	292	327	68	29	39
Dhaniara (460)	128	531	229	302	62	33	29
Bhuhli Pakhi (465)	27	117	56	61	11	5	6
Balh Bhurian (467)	65	268	120	148	31	17	14
Leora (466)	26	96	41	55	8	4	4
Ghandera (493)	55	249	117	132	26	13	13
Bairghatta (464)	70	305	160	145	46	23	23
Saidoon (463)	114	436	182	254	63	25	38
Chula Buhla (499)	3	15	8	7	0	0	0
Chula (498)	11	40	19	21	3	1	2
Chula Uparla (500)	81	345	166	179	50	26	24
Bhanuh (501)	34	127	57	70	16	8	8
Thural Khas (504)	91	395	191	204	40	26	14
Ghumarnu (505)	20	102	53	49	9	6	3
Bhanwar (506)	67	246	119	127	24	13	11
Thana (507)	67	247	105	142	35	24	11
Tikkri (508)	42	161	85	76	18	8	10
Nalehar (509)	94	363	173	190	21	19	2
Dridh (512)	53	231	102	129	19	13	6
Phagurta (517)	87	345	152	193	38	17	21
Saman (511)	34	137	54	83	10	4	6
Sanhoon (518)	108	415	184	231	44	21	23
Badarta (520)	22	87	43	44	13	10	3
Kelan (570)	47	205	91	114	28	15	13
Panjlehr (571)	64	259	100	159	40	24	16
Bansu (572)	24	78	33	45	7	4	3
Koru (573)	25	90	33	57	6	3	3
Chohla (605)	57	198	98	100	23	14	9

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Kohala (606)	33	133	65	68	11	7	4
Barla (603)	39	151	56	95	18	10	8
Lahri (602)	68	257	102	155	35	19	16
Bhatwara (601)	83	297	131	166	32	17	15
Siara (576)	21	87	40	47	9	5	4
Kudana (575)	23	106	51	55	11	8	3
Kotlu (513) - II	89	368	173	195	34	17	17
Santal (515)	31	120	53	67	9	7	2
Ban Banjar (574)	13	48	23	25	3	1	2
Paplah (516)	84	303	137	166	29	16	13
Jol (519) -II	45	169	67	102	24	13	11
Rirkal (494)	27	95	37	58	11	7	4
Bandahu Khas (497)	57	239	107	132	33	10	23
Kalhun (514)	53	206	89	117	28	9	19
Odri (496)	55	194	89	105	14	9	5
Umri (489)	53	224	105	119	32	11	21
Marera (495)	151	595	293	302	65	34	31
Gandar (488)	119	466	208	258	48	26	22
Bar (487)	28	104	46	58	7	3	4
Barram Khurd (486)	100	384	155	229	45	18	27
Karonthi (478)	60	249	119	130	30	16	14
Jandera (477)	27	108	46	62	10	6	4
Kalhera (491)	17	64	23	41	9	5	4
Andrana (490)	86	379	177	202	34	18	16
Tikkar Jihan (492)	63	256	109	147	31	18	13
Tina Jamaitar (459)	29	112	56	56	6	4	2
Har Balak Rupi (458)	163	687	342	345	80	42	38
Koal (457)	54	198	93	105	19	7	12
Och Kalan (442)	84	352	161	191	53	31	22
Sadda (444)	62	243	104	139	19	9	10
Kuhn Khas (448)	93	364	145	219	50	26	24
Bir (470)	190	815	383	432	92	52	40

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Jangal (469)	39	173	89	84	16	9	7
Malodhan (468)	44	164	66	98	25	10	15
Alampur (472)	406	168 2	827	855	181	107	74
Bagh (473)	77	328	156	172	41	22	19
Jagrup Nagar (474)	141	554	277	277	45	26	19
Dehru (475)	59	221	88	133	25	11	14
Dhar Brahmपुरi (476)	95	346	139	207	34	18	16
Mashwar (479)	26	110	51	59	11	6	5
Shakoh (480)	44	163	74	89	18	8	10
Liunda (481)	88	353	167	186	35	20	15
Gahli (482)	42	167	77	90	15	8	7
Barram Kalan (483)	44	191	87	104	28	15	13
Garh (484)	136	645	286	359	90	43	47
Jamula (485)	42	160	57	103	25	13	12
Kutwalla (581)	33	138	58	80	16	6	10
Daslon (582)	48	165	63	102	7	3	4
Pandehr (588)	129	452	205	247	36	18	18
Lower Lamba Graon (589)	290	117 1	585	586	102	62	40
Lahr (583)	153	573	275	298	58	32	26
Kaluhi (584)	37	150	71	79	19	10	9
Bhati (580)	31	130	58	72	13	8	5
Hardon (579)	72	282	139	143	34	16	18
Talwar (578)	142	514	239	275	56	27	29
Har (577)	124	489	209	280	50	24	26
Saul Banehr (585)	113	456	196	260	50	21	29
Maniar (595)	106	429	189	240	52	28	24
Jagni Jar (596)	32	123	58	65	16	8	8
Dandel (600)	53	191	80	111	22	10	12
Nihara (599)	35	118	49	69	11	5	6
Drup Kayara (617)	68	267	121	146	20	8	12

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Chambe Da Lahr (593)	31	122	57	65	23	12	11
Ropri (594)	22	86	37	49	9	5	4
Julah Pat (624)	24	88	35	53	9	4	5
Jaleht (591)	27	105	45	60	11	6	5
Sandroa (592)	37	115	49	66	15	9	6
Bhati (623)	50	187	74	113	20	10	10
Kamand (628)	106	414	189	225	43	25	18
Gujrera (627)	30	139	65	74	17	8	9
Tikri (918)	87	363	170	193	47	21	26
Kotahan (920)	70	250	113	137	20	9	11
Bag Kuljan (921)	61	241	112	129	26	17	9
Kachhal Bhadarian (919)	104	467	224	243	44	24	20
Jaisinghpur (922)	390	153	1	729	802	172	104
Buhara (924)	26	94	54	40	13	6	7
TOTAL (10km)	16481	687	23	323	3640	7486	3930
<i>Source-Census of India, 2011</i>							

Table 3-20: Village-wise SC & ST Population Distribution (10km Study Zone)

Name of the Village/Town (Census code)	Scheduled Castes			Scheduled Tribes		
	Persons	Males	Persons	Males	Persons	Males
1. District Hamirpur, Himachal Pradesh						
Bairi (63/24)	39	14	25	0	0	0
Bhatpura (63/18)	26	12	14	0	0	0
Chamarrakra (63/23)	16	8	8	0	0	0
Kodana (63/27)	187	83	104	0	0	0
Poi (63/20)	20	8	12	0	0	0
Chaptehr (63/22)	0	0	0	0	0	0
Jhataur (63/21)	5	2	3	0	0	0
Bahru (63/19)	0	0	0	0	0	0
Poar (63/1)	27	10	17	0	0	0

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Bagehrah Upperla (63/14)	244	115	129	0	0	0
Bagehrah Buhla (63/6)	292	133	159	0	0	0
Jol (63/4) - I	285	141	144	0	0	0
Samona (63/16)	19	11	8	0	0	0
Bagh (63/3)	0	0	0	0	0	0
Dera (55/6)	0	0	0	0	0	0
Pakkhar (55/27)	19	11	8	0	0	0
Tikru (55/4)	128	58	70	0	0	0
Chaklah (55/34)	0	0	0	0	0	0
Charot (55/44)	60	29	31	7	3	4
Ludiana (55/2)	0	0	0	0	0	0
Darla (55/19)	159	79	80	0	0	0
Meharpura (55/24)	183	92	91	0	0	0
Kharsal (55/17)	0	0	0	0	0	0
Deryal (55/23)	0	0	0	0	0	0
Gahlia (55/11)	0	0	0	0	0	0
Nihari Upperli (54/20)	0	0	0	0	0	0
Bhog (54/4)	0	0	0	0	0	0
Kajoti (55/5)	42	24	18	0	0	0
Karot Khas (54/10)	125	54	71	0	0	0
Dhaner (54/17)	0	0	0	0	0	0
Laungni (54/22)	70	40	30	0	0	0
Pairian (54/7)	4	1	3	9	5	4
Puneh Attru (54/8)	25	14	11	0	0	0
Khairru (54/16)	0	0	0	0	0	0
Paneh Sih (54/9)	55	31	24	0	0	0
Bari (54/3)	37	20	17	1	1	0
Salghun Hira (54/12)	0	0	0	0	0	0
Salghun-Lachho (54/14)	7	4	3	0	0	0
Garoru Ghuman (53/7)	0	0	0	0	0	0
Bandhar (53/13)	19	9	10	0	0	0
Rih (53/12)	306	148	158	0	0	0

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Chabutra Khas (53/14)	537	253	284	0	0	0
Baliana (54/5)	0	0	0	0	0	0
Chamarrabri (57/17)	5	3	2	0	0	0
Bhagol (57/4)	6	2	4	0	0	0
Chakariana (57/7)	0	0	0	0	0	0
Jehr (57/6)	92	48	44	0	0	0
Patlandar (57/5)	146	81	65	0	0	0
Kot (57/19)	0	0	0	0	0	0
Chail (57/20)	19	9	10	0	0	0
Nalahi (57/18)	136	68	68	0	0	0
Gahla (57/8)	0	0	0	0	0	0
Chamiana (57/10)	0	0	0	0	0	0
Lambri (60/4)	35	15	20	0	0	0
Duhak (61/9)	301	158	143	0	0	0
Rangar (58/15)	335	167	168	0	0	0
Bhati (58/1)	0	0	0	0	0	0
Drati (58/14)	0	0	0	0	0	0
Sanwin Kalan (58/7)	9	6	3	0	0	0
Sanwin Khurd (58/10)	0	0	0	0	0	0
Bhatiana Brahmana (58/2)	0	0	0	0	0	0
Pakhi (58/4)	0	0	0	0	0	0
Gadi (57/15)	27	14	13	0	0	0
Barog (57/2)	9	5	4	0	0	0
Jagarial (57/9)	0	0	0	0	0	0
Bharthun (56/2)	134	63	71	0	0	0
Ukhli (56/1)	24	11	13	0	0	0
Garoru Buhla (56/7)	36	21	15	0	0	0
Taryamli (60/13)	111	53	58	0	0	0
Jateru (60/14)	0	0	0	0	0	0
Garoru (60/7)	0	0	0	0	0	0
Dhel Khas (59/2)	0	0	0	0	0	0
Nag Lamber (59/3)	0	0	0	0	0	0

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Thana (63/5)	26	12	14	0	0	0
Mehlaru (63/10)	5	3	2	0	0	0
Thathi (63/13)	0	0	0	0	0	0
Jandru (63/11)	0	0	0	0	0	0
Shukhani (63/9)	0	0	0	0	0	0
Than Tikkar (63/31)	18	6	12	0	0	0
Palbhu (64/14)	0	0	0	0	0	0
Bajrol (64/6)	16	7	9	0	0	0
Mahesh Kowal (64/7)	17	7	10	0	0	0
Thathi Gurdwalan (64/3)	0	0	0	0	0	0
Bhat Lamber (64/1)	0	0	0	0	0	0
Jangal Khas (64/16)	411	190	221	2	2	0
Kheri (64/5)	265	123	142	0	0	0
Bajahar (64/9)	61	32	29	0	0	0
Kakkar (63/29)	204	100	104	0	0	0
Tira Sujanpur (NP)	1851	961	890	44	39	5
Jangal (24/4)	76	34	42	0	0	0
Andara (22/2)	0	0	0	0	0	0
Punjyal (23/6)	0	0	0	0	0	0
Bumbloo (23/17)	13	6	7	0	0	0
Salasi (23/3)	0	0	0	0	0	0
Kotlu (28/12) - I	0	0	0	0	0	0
Gahli (36/35)	98	48	50	0	0	0
Bharahian Di Dhar (62/22)	6	4	2	0	0	0
Lambran Di Dhar (62/25)	5	2	3	0	0	0
Bhatwara (37/9)	0	0	0	0	0	0
Duhak (43/27)	67	29	38	0	0	0
2. District Kangra, HP						
Tikkar (361)	0	0	0	0	0	0
Garan (311)	144	71	73	0	0	0
Tharu (64)	339	175	164	166	83	83
Sanani (585)	0	0	0	0	0	0

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Garh (171)	263	138	125	7	3	4
Badehr (818)	0	0	0	0	0	0
Sarohi (887)	0	0	0	0	0	0
Sialkar (884)	0	0	0	0	0	0
Mannu (880)	0	0	0	0	0	0
Kuri (885)	0	0	0	0	0	0
Balra (886)	0	0	0	0	0	0
Manera (899)	8	4	4	0	0	0
Marhana (898)	48	29	19	0	0	0
Harbah (889)	0	0	0	0	0	0
Dhakhar (890)	0	0	0	0	0	0
Bhadrun (864)	0	0	0	0	0	0
Kud (863)	7	3	4	0	0	0
Bhadrol (837)	0	0	0	0	0	0
Galoti (852)	0	0	0	0	0	0
Gahli (855)	121	63	58	0	0	0
Chihar (853)	65	32	33	0	0	0
Chanarri (851)	76	38	38	0	0	0
Phihar (839)	0	0	0	0	0	0
Pihri (838)	1	0	1	0	0	0
Uk Lahr (850)	48	32	16	0	0	0
Khaliyana (854)	9	4	5	0	0	0
Naloti (857)	0	0	0	0	0	0
Dhariatu (849)	0	0	0	0	0	0
Makar (848)	0	0	0	0	0	0
Khola (847)	0	0	0	0	0	0
Samehl (845)	0	0	0	0	0	0
Chaunki (846)	36	21	15	0	0	0
Tihri (861)	0	0	0	0	0	0
Jhaura (891)	0	0	0	0	0	0
Jarundi (892)	0	0	0	0	0	0
Kasar (897)	0	0	0	0	0	0

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Dahd (896)	0	0	0	0	0	0
Tipri (904)	73	37	36	0	0	0
Kior (903)	167	81	86	0	0	0
Gharthoon (431)	105	47	58	0	0	0
Salghuni (430)	0	0	0	0	0	0
Tamber (433)	8	4	4	0	0	0
Kauna (432)	45	22	23	0	0	0
Duhak Khurd (461)	178	85	93	0	0	0
Dhaniara (460)	106	58	48	0	0	0
Bhuhli Pakhi (465)	0	0	0	0	0	0
Balh Bhurian (467)	46	26	20	0	0	0
Leora (466)	47	24	23	0	0	0
Ghandera (493)	36	14	22	0	0	0
Bairghatta (464)	23	16	7	0	0	0
Saidoon (463)	41	20	21	0	0	0
Chula Buhla (499)	0	0	0	0	0	0
Chula (498)	5	3	2	0	0	0
Chula Uparla (500)	32	13	19	0	0	0
Bhanuh (501)	0	0	0	0	0	0
Thural Khas (504)	71	39	32	0	0	0
Ghumarnu (505)	87	44	43	0	0	0
Bhanwar (506)	22	9	13	0	0	0
Thana (507)	33	18	15	0	0	0
Tikkri (508)	9	5	4	0	0	0
Nalehar (509)	41	24	17	0	0	0
Dridh (512)	36	16	20	0	0	0
Phagurta (517)	31	12	19	0	0	0
Saman (511)	0	0	0	0	0	0
Sanhoon (518)	71	33	38	0	0	0
Badarta (520)	0	0	0	0	0	0
Kelan (570)	7	1	6	0	0	0
Panjlehr (571)	16	7	9	0	0	0

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Bansu (572)	2	1	1	0	0	0
Koru (573)	20	8	12	0	0	0
Chohla (605)	36	18	18	6	2	4
Kohala (606)	2	1	1	0	0	0
Barla (603)	0	0	0	0	0	0
Lahri (602)	0	0	0	0	0	0
Bhatwara (601)	66	31	35	0	0	0
Siara (576)	0	0	0	0	0	0
Kudana (575)	5	2	3	0	0	0
Kotlu (513) - II	162	77	85	0	0	0
Santal (515)	70	31	39	0	0	0
Ban Banjar (574)	29	15	14	0	0	0
Paplah (516)	44	19	25	6	3	3
Jol (519) -II	5	3	2	0	0	0
Rirkal (494)	7	3	4	0	0	0
Bandahu Khas (497)	70	35	35	0	0	0
Kalhun (514)	7	3	4	0	0	0
Odri (496)	67	32	35	49	23	26
Umri (489)	80	35	45	0	0	0
Marera (495)	60	30	30	82	39	43
Gandar (488)	199	91	108	0	0	0
Bar (487)	0	0	0	0	0	0
Barram Khurd (486)	130	52	78	0	0	0
Karonthi (478)	191	96	95	0	0	0
Jandera (477)	49	22	27	0	0	0
Kalhera (491)	0	0	0	0	0	0
Andrana (490)	114	57	57	0	0	0
Tikkar Jihan (492)	105	52	53	0	0	0
Tina Jamaitar (459)	3	2	1	0	0	0
Har Balak Rup (458)	258	132	126	0	0	0
Koal (457)	70	40	30	0	0	0
Och Kalan (442)	121	65	56	0	0	0

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Sadda (444)	30	12	18	0	0	0
Kuhn Khas (448)	51	24	27	0	0	0
Bir (470)	177	86	91	0	0	0
Jangal (469)	40	20	20	0	0	0
Malodhan (468)	9	5	4	0	0	0
Alampur (472)	665	335	330	0	0	0
Bagh (473)	103	51	52	0	0	0
Jagrup Nagar (474)	125	68	57	0	0	0
Dehru (475)	12	4	8	0	0	0
Dhar Brahmipuri (476)	33	12	21	0	0	0
Mashwar (479)	54	24	30	0	0	0
Shakoh (480)	36	14	22	0	0	0
Liunda (481)	185	91	94	0	0	0
Gahli (482)	57	29	28	0	0	0
Barram Kalan (483)	32	14	18	0	0	0
Garh (484)	109	46	63	0	0	0
Jamula (485)	0	0	0	0	0	0
Kutwalla (581)	20	7	13	0	0	0
Daslon (582)	22	6	16	0	0	0
Pandehr (588)	250	115	135	0	0	0
Lower Lamba Graon (589)	465	225	240	2	2	0
Lahr (583)	278	141	137	0	0	0
Kaluhi (584)	62	32	30	0	0	0
Bhati (580)	3	2	1	0	0	0
Hardon (579)	0	0	0	0	0	0
Talwar (578)	150	75	75	0	0	0
Har (577)	64	29	35	0	0	0
Saul Banehr (585)	7	2	5	0	0	0
Maniar (595)	90	40	50	0	0	0
Jagni Jar (596)	42	18	24	0	0	0
Dandel (600)	105	49	56	0	0	0
Nihara (599)	0	0	0	0	0	0

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Drup Kayara (617)	125	57	68	0	0	0
Chambe Da Lahr (593)	122	57	65	0	0	0
Ropri (594)	8	3	5	0	0	0
Julah Pat (624)	73	28	45	0	0	0
Jaleht (591)	0	0	0	0	0	0
Sandroa (592)	12	5	7	0	0	0
Bhati (623)	38	17	21	0	0	0
Kamand (628)	83	41	42	0	0	0
Gujrera (627)	0	0	0	0	0	0
Tikri (918)	62	33	29	0	0	0
Kotahan (920)	68	30	38	0	0	0
Bag Kuljan (921)	29	18	11	0	0	0
Kachhal Bhadarian (919)	173	97	76	0	0	0
Jaisinghpur (922)	445	202	243	0	0	0
Bhuhara (924)	37	21	16	0	0	0
TOTAL (10km)	16524	8098	8426	381	205	176
<i>Source-Census of India, 2011</i>						

3.10.8 Sex Ratio

The 'Sex Ratio' of the study area is a numeric relationship between females and males of an area and bears paramount importance in the presentday scenario where the un-ethnic pre-determination of sex and killing of female foetus during pregnancy is practiced by unscrupulous medical practitioners against the rule of the law of the country. It is evident that by contrast the practice of female foeticide is not prevalent in the study area.

The 'Sex Ratio' was observed as 1095 females per 1000 males in the District. The same was recorded as higher as 1126 females for every 1000 males in the study area. The child (0-6 year age) sex ratio of the study area was observed as 905 female children per 1000 male children. The village wise male-female population distribution for the study area is depicted and shown by graphical representation in **Figure3-15**

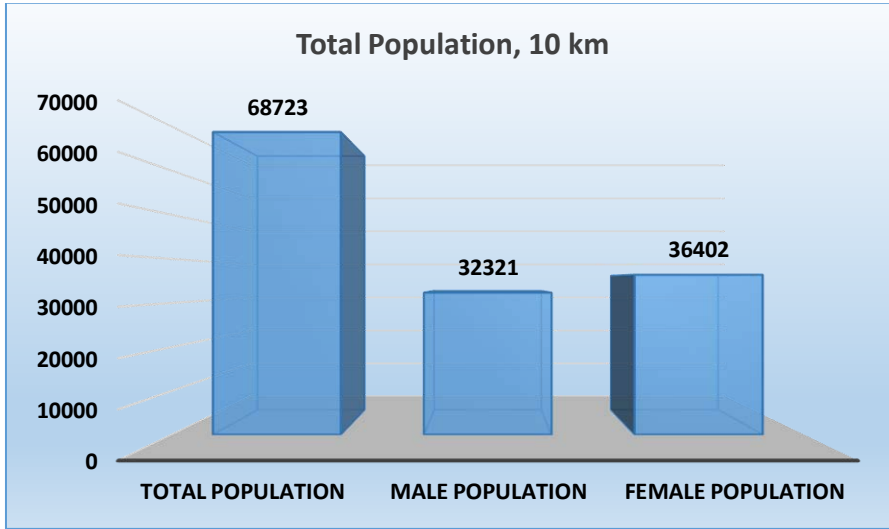


Figure 3-15: Male-Female wise Population Distribution

3.10.9 Scheduled Caste & Scheduled Tribe Population

On the basis of the village wise SC & ST population distribution of the study area during 2011, the ‘Scheduled Castes’ population was observed as 16524 persons consisting of 8098 males and 8426 females respectively in the study area which accounts as 24% to the total population (as 68723 persons) of the study area. Scheduled Tribes (‘ST’) population was observed as 381 person’s accounts as 0.6% to the total population of the study zone consisting of 205 males and 176 females in the 10 km study zone. It implies that the rest 75.4% of the total population belongs to the general category. Male-female wise distribution of ‘SC’ & ‘ST’ population in the study area is graphically shown in **Figure 3-16 & 3-17** as follows.

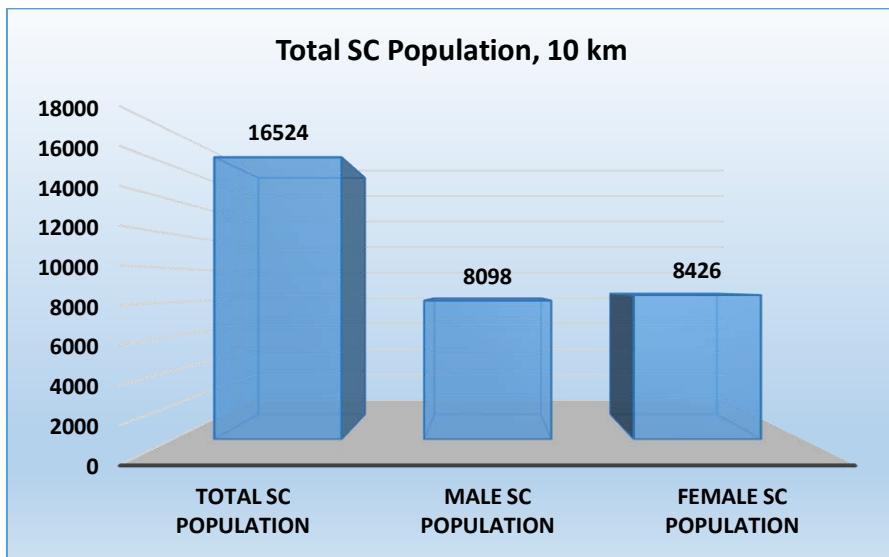


Figure 3-16: Scheduled Caste Population in the Study Area

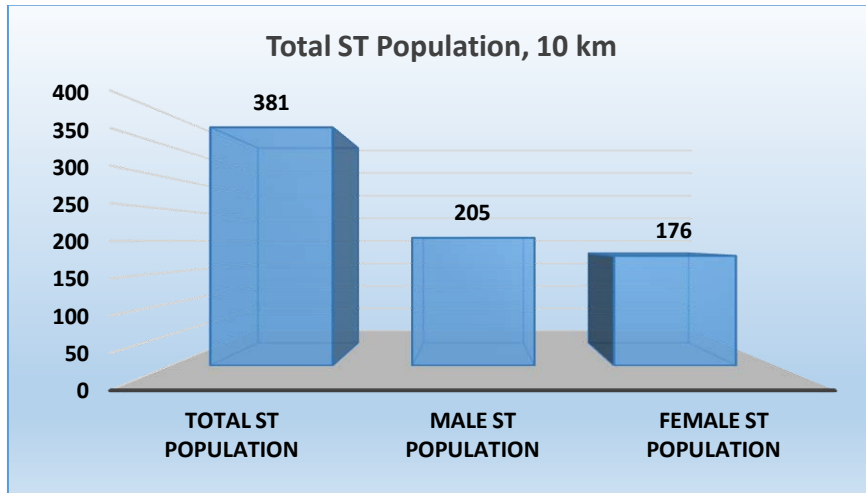


Figure3-17:Scheduled Tribes Population in the Study Area

3.10.10 Literacy Rate

Literacy level is quantifiable indicator to assess the development status of an area or region. Male-Female wise literates and illiterates population is represented in Table 3.22. Total literates population was recorded as 52,676 persons (76.6%) in the study area. Table 3.22 reveals that Male-Female wise literates are observed as 26,348 & 26,328 persons respectively, implies that the 'Literacy Rate' is recorded as 76.6% with male-female wise percentages being 38.3% & 38.3% respectively.

The Male-Female wise graphical representation of literates & illiterates population in study area villages/town is shown in Figure 3-18

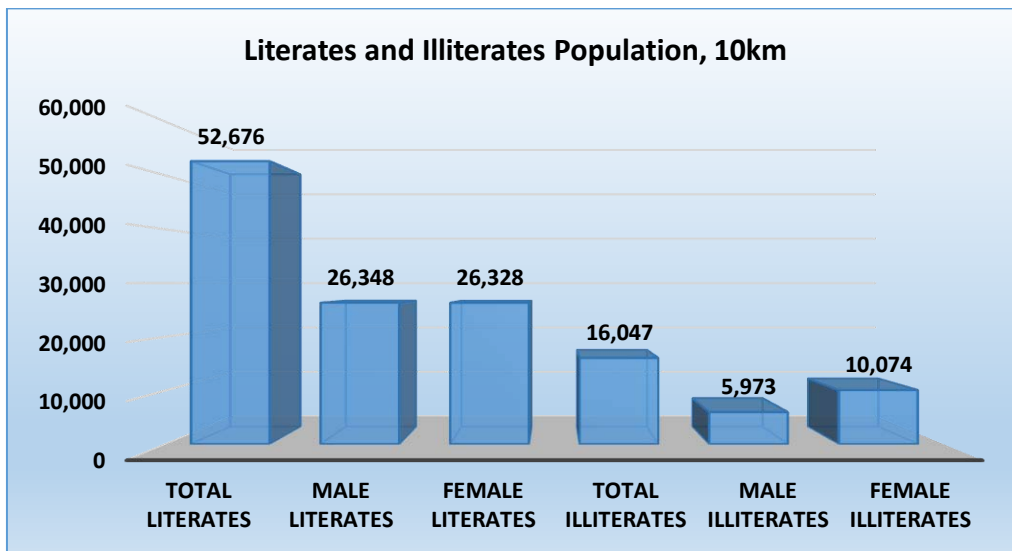


Figure 3-18: Male-Female wise Distribution of Literates & Illiterates

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Table 3-21 : Male-Female wise Literates and Illiterates in 10km Study Zone

Name of the Village/Town (Census code)	Total Population	Literates			Illiterates		
		Persons	Males	Females	Persons	Males	Females
1. District Hamirpur, HP							
Bairi (63/24)	533	389	172	217	144	48	96
Bhatpura (63/18)	200	149	76	73	51	19	32
Chamarrahra (63/23)	100	55	27	28	45	26	19
Kodana (63/27)	490	359	174	185	131	36	95
Poi (63/20)	69	55	21	34	14	4	10
Chaptehr (63/22)	118	78	33	45	40	9	31
Jhataur (63/21)	133	101	48	53	32	8	24
Bahru (63/19)	127	97	47	50	30	12	18
Poar (63/1)	291	223	99	124	68	20	48
Bagehrah Upperla (63/14)	456	334	165	169	122	46	76
Bagehrah Buhla (63/6)	772	609	285	324	163	55	108
Jol (63/4) - I	365	272	137	135	93	34	59
Samona (63/16)	258	203	100	103	55	16	39
Bagh (63/3)	146	108	50	58	38	18	20
Dera (55/6)	36	32	11	21	4	1	3
Pakkhar (55/27)	57	44	27	17	13	5	8
Tikru (55/4)	138	107	55	52	31	8	23
Chaklah (55/34)	82	53	26	27	29	13	16
Charot (55/44)	216	172	87	85	44	20	24
Ludiana (55/2)	23	16	10	6	7	3	4
Darla (55/19)	587	477	243	234	110	35	75
Meharpura (55/24)	415	336	171	165	79	33	46
Kharsal (55/17)	123	102	42	60	21	7	14
Deryal (55/23)	142	114	58	56	28	10	18

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Gahlian (55/11)	64	50	25	25	14	4	10
Nihari Upperli (54/20)	22	21	13	8	1	0	1
Bhog (54/4)	82	66	38	28	16	5	11
Kajoti (55/5)	122	82	36	46	40	21	19
Karot Khas (54/10)	532	420	216	204	112	32	80
Dhaner (54/17)	79	60	29	31	19	10	9
Laungni (54/22)	278	219	117	102	59	24	35
Pairian (54/7)	97	55	25	30	42	18	24
Puneh Attru (54/8)	68	51	28	23	17	8	9
Khairru (54/16)	163	118	56	62	45	20	25
Paneh Sih (54/9)	88	66	38	28	22	9	13
Bari (54/3)	182	137	69	68	45	16	29
Salghun Hira (54/12)	85	68	36	32	17	4	13
Salghun-Lachho (54/14)	42	31	17	14	11	7	4
Garoru Ghuman (53/7)	60	50	22	28	10	3	7
Bandhar (53/13)	60	49	23	26	11	5	6
Rih (53/12)	796	578	292	286	218	82	136
Chabutra Khas (53/14)	1072	845	422	423	227	82	145
Baliana (54/5)	78	57	30	27	21	5	16
Chamarrabri (57/17)	168	132	60	72	36	14	22
Bhagol (57/4)	118	90	39	51	28	9	19
Chakariana (57/7)	124	95	46	49	29	8	21
Jehr (57/6)	127	103	59	44	24	5	19
Patlandar (57/5)	392	321	176	145	71	26	45
Kot (57/19)	11	9	6	3	2	0	2
Chail (57/20)	53	44	22	22	9	5	4
Nalahi (57/18)	330	244	112	132	86	32	54
Gahla (57/8)	26	21	11	10	5	0	5
Chamiana (57/10)	68	57	26	31	11	5	6
Lambri (60/4)	416	308	147	161	108	46	62
Duhak (61/9)	521	383	202	181	138	49	89
Rangar (58/15)	612	435	218	217	177	62	115

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Bhati (58/1)	33	23	12	11	10	3	7
Drati (58/14)	15	9	4	5	6	2	4

Sanwin Kalan (58/7)	30	26	14	12	4	1	3
Sanwin Khurd (58/10)	13	11	6	5	2	0	2
Bhatiana Brahmana (58/2)	16	12	5	7	4	1	3
Pakhi (58/4)	19	18	7	11	1	0	1
Gadi (57/15)	266	213	100	113	53	15	38
Barog (57/2)	173	137	75	62	36	11	25
Jagarial (57/9)	69	51	25	26	18	5	13
Bharthun (56/2)	192	144	74	70	48	14	34
Ukhli (56/1)	66	51	27	24	15	3	12
Garoru Buhla (56/7)	77	61	34	27	16	6	10
Taryamli (60/13)	117	90	47	43	27	9	18
Jateru (60/14)	17	12	8	4	5	2	3
Garoru (60/7)	32	25	9	16	7	2	5
Dhel Khas (59/2)	163	131	64	67	32	12	20
Nag Lamber (59/3)	54	41	21	20	13	4	9
Thana (63/5)	89	54	27	27	35	10	25
Mehlaru (63/10)	129	92	44	48	37	14	23
Thathi (63/13)	74	52	24	28	22	5	17
Jandru (63/11)	191	124	55	69	67	26	41
Shukhani (63/9)	142	86	38	48	56	18	38
Than Tikkar (63/31)	196	143	69	74	53	14	39
Palbhu (64/14)	178	128	59	69	50	15	35
Bajrol (64/6)	625	449	195	254	176	49	127
Mahesh Kowal (64/7)	189	134	50	84	55	16	39
Thathi Gurdwalan (64/3)	211	169	90	79	42	12	30
Bhat Lamber (64/1)	170	121	45	76	49	25	24
Jangal Khas (64/16)	1291	961	468	493	330	115	215

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Kheri (64/5)	953	703	339	364	250	79	171
Bajahar (64/9)	283	229	117	112	54	15	39
Kakkar (63/29)	692	524	250	274	168	58	110
Tira Sujanpur (NP)	7943	6570	3664	2906	1373	598	775
Jangal (24/4)	232	180	85	95	52	23	29
Andara (22/2)	142	109	52	57	33	14	19
Punjyal (23/6)	49	39	20	19	10	4	6
Bumbloo (23/17)	98	76	36	40	22	13	9
Salasi (23/3)	10	9	5	4	1	1	0
Kotlu (28/12) - I	195	135	63	72	60	19	41
Gahli (36/35)	493	377	206	171	116	42	74
Bharahian Di Dhar (62/22)	194	137	65	72	57	20	37
Lambran Di Dhar (62/25)	142	101	48	53	41	13	28
Bhatwara (37/9)	190	149	74	75	41	10	31
Duhak (43/27)	219	172	87	85	47	15	32
2. District Kangra, HP							
Tikkar (361)	171	138	69	69	33	15	18
Garan (311)	1185	944	499	445	241	110	131
Tharu (64)	998	711	389	322	287	108	179
Sanani (585)	155	102	61	41	53	18	35
Garh (171)	1317	1045	520	525	272	113	159
Badehr (818)	177	104	57	47	73	28	45
Sarohi (887)	276	199	118	81	77	25	52
Sialkar (884)	318	218	116	102	100	29	71
Mannu (880)	93	66	34	32	27	10	17
Kuri (885)	79	53	30	23	26	12	14
Balra (886)	53	39	22	17	14	3	11
Manera (899)	39	29	17	12	10	4	6
Marhana (898)	336	258	138	120	78	33	45
Harbah (889)	90	64	37	27	26	8	18

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Dhakhar (890)	255	180	110	70	75	25	50
Bhadrun (864)	81	64	38	26	17	8	9
Kud (863)	41	25	13	12	16	6	10
Bhadrol (837)	92	74	41	33	18	4	14
Galoti (852)	145	120	57	63	25	6	19
Gahli (855)	122	90	46	44	32	18	14
Chihar (853)	137	95	53	42	42	18	24
Chanarri (851)	77	56	31	25	21	8	13
Phihar (839)	164	129	65	64	35	11	24
Pihri (838)	261	197	97	100	64	21	43
Uk Lahr (850)	68	55	36	19	13	9	4
Khaliyana (854)	127	99	48	51	28	9	19
Naloti (857)	179	146	75	71	33	14	19
Dhariatu (849)	14	12	5	7	2	0	2
Makar (848)	109	85	46	39	24	7	17
Khola (847)	44	33	18	15	11	4	7
Samehl (845)	76	59	32	27	17	7	10
Chaunki (846)	114	89	54	35	25	12	13
Tihri (861)	42	32	19	13	10	1	9
Jhaura (891)	137	91	50	41	46	21	25
Jarundi (892)	174	118	52	66	56	20	36
Kasar (897)	36	19	12	7	17	5	12
Dahd (896)	55	34	14	20	21	7	14
Tipri (904)	118	89	42	47	29	11	18
Kior (903)	186	130	65	65	56	28	28
Gharthoon (431)	273	209	97	112	64	27	37
Salghuni (430)	128	90	48	42	38	12	26
Tamber (433)	220	167	67	100	53	18	35
Kauna (432)	289	233	104	129	56	27	29
Duhak Khurd (461)	619	498	250	248	121	42	79
Dhaniara (460)	531	385	175	210	146	54	92
Bhuhli Pakhi (465)	117	91	49	42	26	7	19

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Balh Bhurian (467)	268	210	100	110	58	20	38
Leora (466)	96	76	33	43	20	8	12
Ghandera (493)	249	181	87	94	68	30	38
Bairghatta (464)	305	189	105	84	116	55	61
Saidoon (463)	436	283	129	154	153	53	100
Chula Buhla (499)	15	12	7	5	3	1	2
Chula (498)	40	31	17	14	9	2	7
Chula Uparla (500)	345	218	111	107	127	55	72
Bhanuh (501)	127	88	42	46	39	15	24
Thural Khas (504)	395	299	145	154	96	46	50
Ghumarnu (505)	102	61	34	27	41	19	22
Bhanwar (506)	246	186	96	90	60	23	37
Thana (507)	247	177	75	102	70	30	40
Tikkri (508)	161	122	63	59	39	22	17
Nalehar (509)	363	300	151	149	63	22	41
Dridh (512)	231	183	81	102	48	21	27
Phagurta (517)	345	255	117	138	90	35	55
Saman (511)	137	110	49	61	27	5	22
Sanhoon (518)	415	305	145	160	110	39	71
Badarta (520)	87	61	28	33	26	15	11
Kelan (570)	205	147	71	76	58	20	38
Panjlehr (571)	259	185	69	116	74	31	43
Bansu (572)	78	57	27	30	21	6	15
Koru (573)	90	70	28	42	20	5	15
Chohla (605)	198	154	82	72	44	16	28
Kohala (606)	133	104	54	50	29	11	18
Barla (603)	151	117	45	72	34	11	23
Lahri (602)	257	197	81	116	60	21	39
Bhatwara (601)	297	230	106	124	67	25	42
Siara (576)	87	65	31	34	22	9	13
Kudana (575)	106	76	39	37	30	12	18
Kotlu (513) - II	368	287	145	142	81	28	53

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Santal (515)	120	94	43	51	26	10	16
Ban Banjar (574)	48	40	19	21	8	4	4
Paplah (516)	303	232	115	117	71	22	49
Jol (519) -II	169	126	54	72	43	13	30
Rirkal (494)	95	77	29	48	18	8	10
Bandahu Khas (497)	239	185	95	90	54	12	42
Kalhun (514)	206	156	77	79	50	12	38
Odri (496)	194	139	75	64	55	14	41
Umri (489)	224	176	94	82	48	11	37
Marera (495)	595	455	239	216	140	54	86
Gandar (488)	466	367	170	197	99	38	61
Bar (487)	104	82	42	40	22	4	18
Barram Khurd (486)	384	298	129	169	86	26	60
Karonthi (478)	249	187	96	91	62	23	39
Jandera (477)	108	88	39	49	20	7	13
Kalhera (491)	64	48	18	30	16	5	11
Andrana (490)	379	294	144	150	85	33	52
Tikkar Jihan (492)	256	184	80	104	72	29	43
Tina Jamaitar (459)	112	91	50	41	21	6	15
Har Balak Rupi (458)	687	526	285	241	161	57	104
Koal (457)	198	154	82	72	44	11	33
Och Kalan (442)	352	236	119	117	116	42	74
Sadda (444)	243	186	89	97	57	15	42
Kuhn Khas (448)	364	270	114	156	94	31	63
Bir (470)	815	665	319	346	150	64	86
Jangal (469)	173	134	73	61	39	16	23
Malodhan (468)	164	128	55	73	36	11	25
Alampur (472)	1682	1364	690	674	318	137	181
Bagh (473)	328	245	122	123	83	34	49
Jagrup Nagar (474)	554	434	234	200	120	43	77
Dehru (475)	221	171	74	97	50	14	36
Dhar Brahmipuri (476)	346	271	117	154	75	22	53

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Mashwar (479)	110	89	43	46	21	8	13
Shakoh (480)	163	138	65	73	25	9	16
Liunda (481)	353	271	134	137	82	33	49
Gahli (482)	167	131	62	69	36	15	21
Barram Kalan (483)	191	138	67	71	53	20	33
Garh (484)	645	479	224	255	166	62	104
Jamula (485)	160	115	41	74	45	16	29
Kutwalla (581)	138	102	48	54	36	10	26
Daslon (582)	165	133	54	79	32	9	23
Pandehr (588)	452	357	168	189	95	37	58
Lower Lamba Graon (589)	1171	915	473	442	256	112	144
Lahr (583)	573	428	221	207	145	54	91
Kaluhi (584)	150	115	59	56	35	12	23
Bhati (580)	130	98	48	50	32	10	22
Hardon (579)	282	224	122	102	58	17	41
Talwar (578)	514	391	199	192	123	40	83
Har (577)	489	374	166	208	115	43	72
Saul Banehr (585)	456	359	171	188	97	25	72
Maniar (595)	429	336	154	182	93	35	58
Jagni Jar (596)	123	90	45	45	33	13	20
Dandel (600)	191	144	64	80	47	16	31
Nihara (599)	118	88	40	48	30	9	21
Drup Kayara (617)	267	202	103	99	65	18	47
Chambe Da Lahr (593)	122	84	44	40	38	13	25
Ropri (594)	86	62	28	34	24	9	15
Julah Pat (624)	88	64	28	36	24	7	17
Jaleht (591)	105	84	37	47	21	8	13
Sandroa (592)	115	89	40	49	26	9	17
Bhati (623)	187	143	59	84	44	15	29
Kamand (628)	414	319	150	169	95	39	56
Gujrera (627)	139	122	57	65	17	8	9

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Tikri (918)	363	279	142	137	84	28	56
Kotahan (920)	250	188	91	97	62	22	40
Bag Kuljan (921)	241	191	89	102	50	23	27
Kachhal Bhadarian (919)	467	378	187	191	89	37	52
Jaisinghpur (922)	1531	1167	572	595	364	157	207
Buhara (924)	94	58	36	22	36	18	18
TOTAL (10km)	68723	52676	26348	26328	16047	5973	10074
<i>Source-Census of India, 2011</i>							

3.10.11 Economic Resources in the District:

As per the Census records 2011, the economic resources are an important means of subsistence for the working people of the district. The details about economic resources of important sectors are given below in brief.

The economy of the district basically depends on agriculture hence majority of the workers are engaged in agricultural activities. Agriculture is the main Occupation of the people of Himachal Pradesh. It provides direct employment to 70% of the total workers of the state. It also is a premier source of state income (GSDP). About 17% of GSDP comes from agriculture and its allied sectors. Similarly agriculture is also the main occupation of the people of Hamirpur & Kangra district.

3.10.12 Workers Scenario:

‘Occupational Pattern’ was studied to assess the skills of people in the study area. Occupational pattern helps in identifying major economic activities of the area. In the study area the Main and Marginal Workers population was observed as 14480(21.0%) and 17843(26.0%) respectively of the total population (68723) while the remaining 36400(53.0%) persons were recorded as non-workers. Thus it implies that the semi-skilled and non-skilled work-force required in study area for the project is available in aplenty. The village-wise main and marginal workers population with further classification as casual, agricultural, households and other workers is shown as follows:

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Table 3-22: Village-wise Occupational Pattern in the Study Area (10km Study Zone)

Name of the Village/Town (Census Code)	MAIN WORK_P	MAIN_CL_P	MAIN_AL_P	MAIN_HH_P	MAIN_OT_P	MARG WORK_P	MARG_CL_P	MARG_AL_P	MARG
1. District Hamirpur, HP									
Bairi (63/24)	34	3	0	3	28	284	269	2	
Bhatpura (63/18)	44	0	0	0	44	62	57	0	
Chamarrakra (63/23)	17	0	0	0	17	28	18	7	
Kodana (63/27)	47	4	0	0	43	176	123	28	
Poi (63/20)	7	1	0	0	6	30	28	0	
Chaptehr (63/22)	10	0	0	0	10	64	63	0	
Jhataur (63/21)	17	0	0	0	17	73	72	0	
Bahru (63/19)	18	0	0	0	18	68	65	1	
Poar (63/1)	43	6	2	2	33	87	74	4	
Bagehrah Upperla (63/14)	42	3	0	0	39	36	22	1	
Bagehrah Buhla (63/6)	288	91	77	4	116	54	15	11	
Jol (63/4) - I	66	4	0	2	60	102	93	0	
Samona (63/16)	42	2	0	1	39	80	69	0	
Bagh (63/3)	20	0	0	0	20	49	23	0	
Dera (55/6)	26	1	1	1	23	2	0	2	

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Pakkhar (55/27)	19	5	1	1	12	10	2	3	
Tikru (55/4)	102	13	20	5	64	3	2	0	
Chaklah (55/34)	48	22	1	0	25	18	1	3	
Charot (55/44)	109	17	18	5	69	47	5	19	
Ludiana (55/2)	19	15	0	0	4	3	2	0	
Darla (55/19)	252	156	0	0	96	159	131	0	
Meharpura (55/24)	153	32	5	2	114	4	2	0	
Kharsal (55/17)	15	1	0	0	14	41	38	0	
Deryal (55/23)	27	0	1	0	26	40	34	0	
Gahlian (55/11)	10	0	0	0	10	41	33	0	
Nihari Upperli (54/20)	2	0	0	0	2	20	18	0	
Bhog (54/4)	15	8	0	0	7	48	45	0	
Kajoti (55/5)	22	2	0	2	18	46	45	0	
Karot Khas (54/10)	120	5	0	18	97	219	213	3	
Dhaner (54/17)	11	6	2	0	3	43	40	3	
Laungni (54/22)	64	35	13	0	16	154	139	15	
Pairian (54/7)	50	29	0	0	21	24	24	0	
Puneh Attru (54/8)	34	23	0	0	11	22	21	0	
Khairru (54/16)	73	36	0	0	37	61	61	0	
Paneh Sih (54/9)	39	23	0	0	16	31	30	0	
Bari (54/3)	45	26	1	0	18	98	96	1	

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Salghun Hira (54/12)	48	30	0	0	18	25	24	0	
Salghun-Lachho (54/14)	16	10	0	0	6	16	16	0	
Garoru Ghuman (53/7)	2	2	0	0	0	40	40	0	
Bandhar (53/13)	12	5	0	0	7	38	34	0	
Rih (53/12)	98	0	0	0	98	437	346	0	
Chabutra Khas (53/14)	347	112	2	1	232	269	238	1	
Baliana (54/5)	3	0	0	0	3	46	38	5	
Chamarrabri (57/17)	81	48	0	0	33	53	51	0	
Bhagol (57/4)	76	52	0	0	24	22	22	0	
Chakariana (57/7)	76	60	0	0	16	22	20	0	
Jehr (57/6)	75	51	0	0	24	40	39	0	
Patlandar (57/5)	242	137	0	0	105	108	106	0	
Kot (57/19)	7	5	0	0	2	3	2	0	
Chail (57/20)	28	16	0	0	12	14	14	0	
Nalahi (57/18)	173	121	0	0	52	79	69	0	
Gahla (57/8)	12	10	0	0	2	6	5	0	
Chamiana (57/10)	39	32	0	0	7	15	14	0	
Lambri (60/4)	259	201	0	3	55	68	65	0	
Duhak (61/9)	77	0	0	0	77	210	16	1	
Rangar (58/15)	269	152	2	6	109	139	123	1	
Bhati (58/1)	0	0	0	0	0	26	24	0	

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Drati (58/14)	0	0	0	0	0	11	10	0	
Sanwin Kalan (58/7)	2	0	0	0	2	22	17	0	
Sanwin Khurd (58/10)	0	0	0	0	0	10	9	0	
Bhatiana Brahmana (58/2)	1	0	0	0	1	9	6	0	
Pakhi (58/4)	0	0	0	0	0	11	9	0	
Gadi (57/15)	39	1	0	0	38	121	116	0	
Barog (57/2)	37	0	0	0	37	79	79	0	
Jagarial (57/9)	11	0	1	0	10	30	30	0	
Bharthun (56/2)	110	71	0	3	36	0	0	0	
Ukhli (56/1)	45	31	0	1	13	0	0	0	
Garoru Buhla (56/7)	67	55	0	1	11	1	1	0	
Taryamli (60/13)	6	0	0	0	6	24	5	2	
Jateru (60/14)	1	0	0	0	1	11	8	0	
Garoru (60/7)	4	1	0	0	3	15	8	1	
Dhel Khas (59/2)	0	0	0	0	0	106	105	0	
Nag Lamber (59/3)	0	0	0	0	0	35	31	3	
Thana (63/5)	20	2	0	0	18	2	0	0	
Mehlaru (63/10)	15	0	0	0	15	15	0	0	
Thathi (63/13)	8	0	0	0	8	12	0	0	
Jandru (63/11)	16	0	0	0	16	41	0	0	

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Shukhani (63/9)	21	0	0	0	21	7	0	0	
Than Tikkar (63/31)	16	0	0	0	16	37	0	0	
Palbhu (64/14)	13	0	0	0	13	116	110	1	
Bajrol (64/6)	34	3	0	8	23	339	329	0	
Mahesh Kowal (64/7)	17	0	0	0	17	3	0	0	
Thathi Gurdwalan (64/3)	34	4	5	0	25	45	38	4	
Bhat Lamber (64/1)	5	0	0	0	5	8	1	0	
Jangal Khas (64/16)	204	85	0	1	118	557	522	31	
Kheri (64/5)	165	31	3	4	127	232	178	2	
Bajahar (64/9)	39	0	0	0	39	104	63	1	
Kakkar (63/29)	294	2	0	0	292	50	19	1	
Tira Sujanpur (NP)	1811	20	2	25	1764	741	292	11	
Jangal (24/4)	121	82	0	1	38	4	0	0	
Andara (22/2)	73	60	1	1	11	52	48	1	
Punjyal (23/6)	9	0	0	0	9	19	16	0	
Bumbloo (23/17)	52	41	0	0	11	18	16	1	
Salasi (23/3)	5	3	0	0	2	3	3	0	
Kotlu (28/12) - I	69	44	6	0	19	80	80	0	
Gahli (36/35)	272	256	0	1	15	4	3	0	
Bharahian Di Dhar	57	6	2	4	45	45	35	2	

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(62/22)									
Lambran Di Dhar									
(62/25)	50	9	0	0	41	13	13	0	
Bhatwara (37/9)	13	0	0	0	13	0	0	0	
Duhak (43/27)	21	1	0	0	20	25	12	0	
2. District Kangra, HP									
Tikkar (361)	36	2	0	2	32	52	11	4	
Garan (311)	195	83	7	5	100	213	69	77	
Tharu (64)	95	1	0	1	93	220	71	9	
Sanani (585)	18	0	0	2	16	82	78	0	
Garh (171)	357	48	3	5	301	551	441	39	
Badehr (818)	35	26	0	0	9	92	91	1	
Sarohi (887)	108	86	0	2	20	67	57	0	
Sialkar (884)	67	25	0	0	42	87	85	1	
Mannu (880)	13	1	0	0	12	26	26	0	
Kuri (885)	16	4	0	0	12	14	14	0	
Balra (886)	5	0	0	0	5	29	29	0	
Manera (899)	1	0	0	0	1	21	21	0	
Marhana (898)	15	4	0	0	11	171	169	2	
Harbah (889)	4	1	0	0	3	58	57	0	
Dhakhar (890)	45	19	0	0	26	56	32	0	

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Bhadrun (864)	18	0	0	0	18	25	24	1	
Kud (863)	3	0	0	0	3	20	19	0	
Bhadrol (837)	7	1	0	0	6	47	39	6	
Galoti (852)	22	1	1	1	19	7	0	3	
Gahli (855)	11	5	0	0	6	52	16	0	
Chihar (853)	24	0	0	0	24	60	49	0	
Chanarri (851)	10	5	1	0	4	21	6	6	
Phihar (839)	36	1	0	0	35	1	0	1	
Pihri (838)	36	1	1	0	34	22	1	12	
Uk Lahr (850)	2	1	0	0	1	32	11	0	
Khaliyana (854)	7	0	0	0	7	74	50	2	
Naloti (857)	26	0	0	0	26	85	70	0	
Dhariatu (849)	1	0	0	0	1	7	7	0	
Makar (848)	17	1	0	0	16	47	47	0	
Khola (847)	5	0	0	0	5	18	18	0	
Samehl (845)	8	0	0	0	8	36	0	36	
Chaunki (846)	20	0	0	0	20	55	2	53	
Tihri (861)	8	1	0	0	7	0	0	0	
Jhaura (891)	75	56	13	1	5	45	45	0	
Jarundi (892)	67	41	7	1	18	74	73	0	
Kasar (897)	10	6	4	0	0	17	17	0	

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Dahd (896)	1	0	0	0	1	27	27	0	
Tipri (904)	15	2	0	0	13	50	50	0	
Kior (903)	45	3	0	0	42	55	50	0	
Gharthoon (431)	38	0	0	0	38	45	15	0	
Salghuni (430)	11	7	0	0	4	68	68	0	
Tamber (433)	12	0	0	0	12	187	183	2	
Kauna (432)	36	0	0	1	35	45	32	0	
Duhak Khurd (461)	100	16	0	1	83	119	58	0	
Dhaniara (460)	66	0	0	0	66	165	130	3	
Bhuhli Pakhi (465)	10	0	0	0	10	60	49	0	
Balh Bhurian (467)	20	0	0	1	19	22	3	0	
Leora (466)	2	0	0	0	2	21	1	0	
Ghandera (493)	13	0	0	0	13	51	3	1	
Bairghatta (464)	72	3	0	0	69	88	60	0	
Saidoon (463)	93	21	1	1	70	168	145	1	
Chula Buhla (499)	2	0	0	0	2	8	8	0	
Chula (498)	8	0	0	0	8	7	7	0	
Chula Uparla (500)	13	0	0	0	13	80	0	0	
Bhanuh (501)	22	11	0	0	11	62	46	0	
Thural Khas (504)	57	3	0	0	54	41	6	11	
Ghumarnu (505)	19	2	0	0	17	9	0	0	

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Bhanwar (506)	40	2	1	0	37	65	56	2	
Thana (507)	32	3	1	1	27	59	53	0	
Tikkri (508)	98	0	2	0	96	2	0	0	
Nalehar (509)	233	74	9	0	150	2	0	0	
Dridh (512)	22	1	0	0	21	97	86	2	
Phagurta (517)	24	1	3	0	20	130	111	2	
Saman (511)	9	0	0	0	9	9	1	0	
Sanhoon (518)	57	3	1	1	52	155	121	1	
Badarta (520)	7	1	0	0	6	40	36	0	
Kelan (570)	29	0	0	1	28	82	74	7	
Panjlehr (571)	28	0	0	1	27	101	101	0	
Bansu (572)	9	0	0	0	9	30	30	0	
Koru (573)	12	2	0	0	10	6	3	1	
Chohla (605)	38	0	0	1	37	77	67	8	
Kohala (606)	24	0	0	0	24	15	11	0	
Barla (603)	6	0	1	0	5	14	1	9	
Lahri (602)	22	0	6	0	16	40	1	38	
Bhatwara (601)	37	0	13	0	24	14	0	9	
Siara (576)	8	2	0	1	5	30	23	5	
Kudana (575)	8	2	0	2	4	17	13	4	
Kotlu (513) - II	31	12	3	4	12	131	128	1	

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Santal (515)	7	0	0	0	7	21	2	5	
Ban Banjar (574)	7	0	0	0	7	7	0	1	
Paplah (516)	42	0	0	0	42	31	12	5	
Jol (519) -II	29	8	0	0	21	38	24	0	
Rirkal (494)	17	9	0	1	7	21	14	0	
Bandahu Khas (497)	46	9	0	1	36	90	77	7	
Kalhun (514)	36	7	1	0	28	81	78	1	
Odri (496)	26	1	0	1	24	68	28	33	
Umri (489)	50	7	3	3	37	24	17	3	
Marera (495)	95	6	1	2	86	90	2	2	
Gandar (488)	109	2	0	0	107	34	0	0	
Bar (487)	17	9	0	0	8	19	18	0	
Barram Khurd (486)	38	1	0	0	37	110	77	0	
Karonthi (478)	16	0	0	0	16	93	41	0	
Jandera (477)	11	0	0	0	11	23	18	0	
Kalhera (491)	7	1	0	0	6	1	0	0	
Andrana (490)	101	36	0	0	65	21	0	1	
Tikkar Jihan (492)	37	3	0	0	34	10	2	0	
Tina Jamaitar (459)	32	15	2	2	13	27	12	0	
Har Balak Rupi (458)	96	20	0	1	75	93	58	21	
Koal (457)	25	4	0	1	20	80	31	0	

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Och Kalan (442)	82	13	0	1	68	103	101	0	
Sadda (444)	8	0	1	0	7	133	129	1	
Kuhn Khas (448)	15	0	0	0	15	186	184	0	
Bir (470)	167	38	4	2	123	264	245	7	
Jangal (469)	17	0	0	0	17	22	13	4	
Malodhan (468)	20	0	0	0	20	21	14	0	
Alampur (472)	301	24	2	5	270	768	569	53	
Bagh (473)	31	1	0	6	24	187	160	3	
Jagrup Nagar (474)	84	1	1	3	79	225	200	0	
Dehru (475)	34	11	0	0	23	60	56	0	
Dhar Brahmpuri (476)	59	15	0	1	43	61	49	2	
Mashwar (479)	20	12	0	0	8	20	20	0	
Shakoh (480)	46	0	0	0	46	5	0	0	
Liunda (481)	106	7	0	0	99	52	0	0	
Gahli (482)	62	0	0	0	62	5	0	0	
Barram Kalan (483)	28	1	0	5	22	67	47	0	
Garh (484)	85	2	9	2	72	212	207	2	
Jamula (485)	12	0	1	0	11	64	53	0	
Kutwalla (581)	28	0	0	0	28	50	32	0	
Daslon (582)	87	68	2	5	12	3	2	0	
Pandehr (588)	223	192	3	1	27	22	15	0	

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Lower Lamba Graon (589)	293	7	3	70	213	73	34	0	
Lahr (583)	52	1	0	1	50	78	5	0	
Kaluhi (584)	7	1	0	1	5	21	6	0	
Bhati (580)	15	0	0	0	15	7	0	0	
Hardon (579)	34	0	0	0	34	110	89	7	
Talwar (578)	79	0	0	2	77	119	77	3	
Har (577)	53	9	1	6	37	51	12	9	
Saul Banehr (585)	110	57	0	0	53	8	0	0	
Maniar (595)	29	0	0	0	29	193	174	2	
Jagni Jar (596)	10	0	0	0	10	76	68	1	
Dandel (600)	24	0	0	0	24	94	60	0	
Nihara (599)	13	0	0	0	13	64	56	1	
Drup Kayara (617)	21	0	0	0	21	167	133	1	
Chambe Da Lahr (593)	41	18	0	0	23	27	26	0	
Ropri (594)	19	8	0	0	11	26	24	0	
Julah Pat (624)	20	3	0	1	16	38	35	0	
Jaleht (591)	23	7	0	0	16	38	35	0	
Sandroa (592)	14	0	0	0	14	67	67	0	
Bhati (623)	26	5	0	3	18	100	87	0	
Kamand (628)	54	0	0	2	52	32	0	0	

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Gujrera (627)	24	2	0	0	22	54	47	0	
Tikri (918)	44	2	0	3	39	217	216	1	
Kotahan (920)	38	0	0	0	38	122	120	0	
Bag Kuljan (921)	28	0	0	4	24	124	124	0	
Kachhal Bhadarian (919)	58	2	0	18	38	270	263	5	
Jaisinghpur (922)	436	4	0	5	427	105	35	5	
Bhuhara (924)	37	0	0	0	37	12	0	2	
TOTAL (10km)	14480	3661	278	301	10240	17843	13493	720	1

Source-Census of India, 2011

ABBREVIATIONS:

MAIN WORKERS POPULATION: **MAIN_WORK_P** : Main workers total population, **MAIN_CL_P** : Main cultivated labour population, **MAIN_AL_P** : population, **MAIN_HH_P** : Main workers population involved in household industries, **MAIN_OT_P** : Main other workers population

MARGINAL WORKERS POPULATION:

MARG_WORK_P : Marginal workers total population, **MARG_CL_P** : Marginal cultivated labors total population, **MARG_AL_P** : Marginal agric

MARG_HH_P : Marginal workers involved in household industries, **MARG_OT_P** : Marginal other workers Population

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Distribution of work participation rate of the study area population is shown as follows;

Table 3-23: Distribution of Work Participation Rate in 10km Study Area

Occupation Class	Year , 2011
Main Workers	14480 (21.0%)
Male	9884(68.3%)
Female	4596(31.7%)
Marginal Workers	17843(26.0%)
Male	6582(36.9%)
Female	11261 (63.1%)
Non-Workers	36400 (53.0%)
Male	15855 (43.6%)
Female	20545(56.4%)
Total Population (10km)	68723

Source: Census of India Records, 2011

Graphical representation of Workers Scenario is given below:

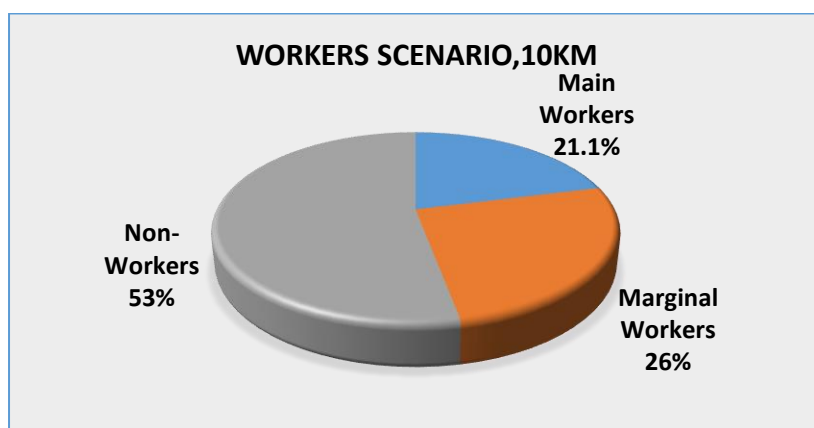


Figure 3-19: Workers Scenario of Study Area

3.10.13 Composition of Main Workers:

The 'Main Workers' were observed as 14480 persons (21.0%) to the total population (68723) of the study area and its composition is made-up of Casual laborers as 3661 (25.3%), Agricultural laborers as 278(2.0%), Household workers 301(2.0%) and other workers as 10240 (70.7%) respectively. Composition of Main workers is shown below as **Figure 3.20**.

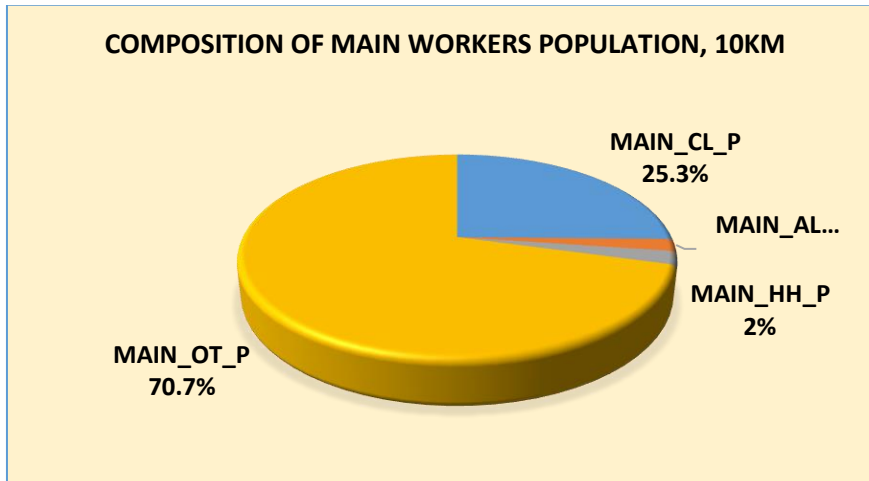


Figure 3-20: Composition of Main Workers Population

3.10.14 Composition of Marginal Workers:

The total marginal workers are observed as 17843 which constitute 26.0% of the total population (68723) comprise of Marginal Casual Laborers as 13493 (75.6%), Marginal Agricultural Laborers as 720(4.0%), Marginal Household laborers as 179 (1.0%) and marginal other workers were also observed as 3451 (19.4%) of the total marginal workers respectively. Details about marginal workers in the study area are tabulated in Table Composition of Marginal workers is shown in **Figure 3.21** as follows.

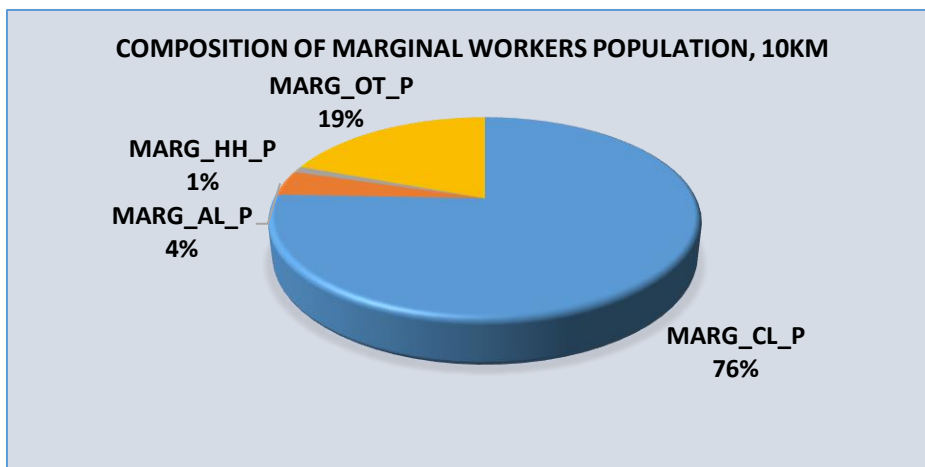


Figure 3-21: Composition of Marginal Workers

3.10.15 Composition of Non-Workers:

The total Non-workers population was observed as 36400 which constitute 53.0% to the total population (68723) of the study area. Male-female wise Non-workers population was recorded as 15855 Males (43.6%) and 20545 Females (56.4%) respectively. Details about

Total Non-workers in the study area are compiled in Table 3.25. Graphical representation of Non-workers population is shown as follows in **Figure 3.22**

Table 3-24: Composition of Non-Workers

Non-Workers Population		
Persons	Males	Females
36400	15855 (43.6%)	41298 (56.4%)

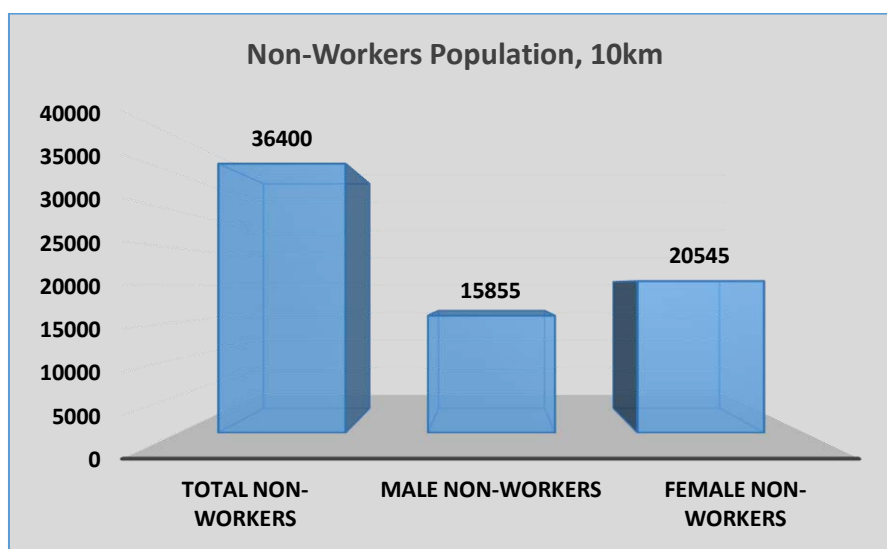


Figure 3-22: Composition of Non-Workers

Basic Infrastructure Facilities Availability (as per the census records of 2011)

A review of basic infrastructure facilities (Amenities) available in the study area has been done on the basis of the field survey and Census records, 2011 for the study area inhabited revenue villages of Hamirpur District in H.P. The study area has average level of basic infrastructure facilities like educational, medical, potable water, power supply, and transport & communication network.

As per the Census Records 2011, the study area has a total of 246 revenue villages and 1 Town i.e. Tira Sujampur (NP) under two Districts namely Hamirpur and Kangra of Himachal Pradesh state respectively.

Overall study area revenue villages are falling mainly under total twelve (12) tehsils namely Tira Sujampur, Nadaun, Galore, Hamirpur & Bhoranj of Hamirpur district and Nurpur, Shahpur, Baroh, Dera Gopipur, & Khundian, Thural & Jaisinghpur of Kangra district respectively in Himachal Pradesh and Punjab State respectively.

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3.10.16 Educational Facilities

There is a total no. of 125 Primary schools existing in the radius study area. Fifty eight (58) Middle schools are recorded in the study area. Thirty one (31) no's of Higher Secondary Schools (SS) are available in the study area. Only nineteen (19) Senior Secondary School (SSS) facility is available in the revenue villages of the study area. The educational facilities have been further strengthening now and a number of private public schools and colleges are also functioning in the surroundings of the study area. Besides, there are Engineering and Medical colleges available in Towns and District headquarters only. Higher education facilities are available in Towns of the district. There is a considerable improvement in educational facility. The villages of the study area have no such facilities can reach within 5.0 to 10.0km range. There are mainly eleven (11) towns i.e. Tira Sujanpur (NP), Nadaun, Hamirpur, Sarkaghat, Nurpur, Dharmsala, Kangra, Dera Gopipur, Jawalamukhi, Palampur available in the range of 2 to 66kms from the villages of 10 km radial study zone.

3.10.17 Availability of University Education

Palampur Agriculture University is located in Kangra district which not only caters to the needs of this area but also other parts of the state. Besides this University, R.P. Medical College at Tanda and Ayurvedic Medical College at Paprola are important institutions imparting medical education to the students of the state. Govt. Degree College of education at Dharmsala provides education in teaching. In addition to these professional colleges, district has 20 other degree colleges both in private and public sectors. This district has, therefore, sufficient number of degree colleges in both rural and urban areas providing education of degree and above level.

3.10.18 Mother Tongue

During Census 2011 the district recorded as 98.0% people have reported their mother tongue as Hindi and remaining mother tongues are negligible.

3.10.19 Religion

During Census 2011 out of the total population of 4, 54,768 of Hamirpur district, 4, 49,412 (98.8%) have reported their religion as Hindu followed by 3,711 (0.8%) as Muslim. Remaining Sikhs, Buddhist, Christian, Jain and other religions have a negligible representation in the district.

3.10.20 Medical Facilities

The medical facilities are provided by different agencies like Govt. & Private individuals and voluntary organizations in the study area. As per the district census handbook information of 2011, Six (6) no's of primary health centers are available in the study area; most of the study area villages depend upon the towns / district HQ of the study area having such facility. Only 09 no's of Primary Health Sub-centers are exists in the rural part of the study area. Mother & Child Welfare Centers are available in 3 villages of the study area. Allopathic Hospital exists only in two villages of the study area and two Family Welfare Center found in the study area. Dispensary facility was observed in 71 villages (29.0%) of the study area. Overall villages of the study area are served by medium level medical facilities. Specialized medical facilities are available only in towns and District Headquarter (HQ) only.

3.10.21 Potable Water Facilities

Potable water facility is available in most of the villages/towns of the study area. The entire study area has poor level of potable water facilities. Hand Pump (HP) water facility is commonly observed in the study area as potable water facility. Out of total 247 revenue villages/towns, only 28 (11.3%) villages are served with River/Canal water in the study area. As per the census records of 2011, only 9 villages being served with Tank/Pond/Lake in the study area.

3.10.22 Communication, Road & Transport Facilities

Apart from Post & Telegraph (P & T) services, transport is the main communication linkage in the study area. Only 40 villages (16.2%) were found serving with Post Office facilities in the study area, remaining villages are depending upon towns of the study area. The study area has average rail and road network, passes from the area. Only one (01) village named Bhat Lamber of Tira Sujanpur tehsil of Hamirpur District in Himachal Pradesh state falling in the 10 km radius study area was observed with railway station facility in the study area. Nearest town is Tira Sujanpur (NP) at about 2.3km of the mine lease area. Dharmasala airport is located at 42.6km from the lease area. No Forest land is involved.

Road transport is the main stay of economic activity in Himachal Pradesh as other means of transport mainly Railways and Airways are negligible. The district fully depends upon road transport. Though private buses also ply in the state but the passenger transport services to the people of Himachal Pradesh within and outside state are being mainly provided by Himachal Road Transport Corporation.

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3.10.23 Banking Facility

The banking services have a great role in economic growth. The study area has almost all the schedule commercial banks with ATM facility at urban areas and the district HQ. The district Hamirpur has adequate banking facilities, most of the banks are situated at district, sub-district and block HQ.

3.10.24 Power Supply

It is revealed from the compiled information on Amenities availability as per the census record of 2011; most of the villages and towns are electrified for Domestic, Agriculture, and Commercial & for all purposes. Almost all (about 100%) villages and towns of the study area are electrified.

Village/town wise Basic Infrastructure and Amenities availabilities data for the entire study area is compiled and presented as follows;

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Table 3-16: Village wise Basic Amenities Availability

Name of Village/Town (Census Code)	Educational				Medical				Drinking Water				C T	Communication & Transport				Approach to the Village				Power Supply				Nearest Town & Distance, km			
	P	M	S	S	C	P	P	M	H	D	F	W		H	TW	R	T	P	P	B	R	P	K	N	F		E	E	E
			S	S	C	C	C	S	W		C		P			k	O	&	S	S	R	R	W	P	D	A	C	A	
1. District Hamirpur, HP																													
Bairi (63/24)	1	1	0	0	0	0	0	0	0	0	0	2	1	2	2	2	2	2	1	2	1	1	2	1	1	2	1	1	Tira Sujanpur,10km
Bhatpura (63/18)	0	0	0	0	0	0	0	0	0	0	0	2	1	2	2	2	2	2	1	2	1	1	2	1	1	2	1	1	Tira Sujanpur,11km
Chamarrahra (63/23)	1	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	1	2	2	1	2	1	1	2	1	1	Tira Sujanpur,13km
Kodana (63/27)	0	0	0	0	0	0	0	0	1	0	0	2	1	2	2	2	2	2	1	2	1	1	2	1	1	2	1	1	Tira Sujanpur,12km
Poi (63/20)	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	1	2	1	1	2	1	1	2	1	1	Tira Sujanpur,10km
Chaptehr (63/22)	0	0	0	0	0	0	0	0	0	0	0	2	1	2	2	2	2	2	1	2	1	1	2	1	1	2	1	1	Tira

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Gahlian (55/11)	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	1	2	1	2	2	2	1	2	2	2	Tira Sujanpur,7km
Nihari Upperli (54/20)	0	0	0	0	0	0	0	0	0	0	0	0	2	1	2	2	2	2	2	2	1	2	1	2	2	1	1	2	2	2	Tira Sujanpur,10km
Bhog (54/4)	1	0	0	0	0	0	0	0	0	0	0	0	2	1	2	2	2	2	2	2	1	2	1	2	2	1	1	2	2	2	Tira Sujanpur,9km
Kajoti (55/5)	0	0	0	0	0	0	0	0	0	0	0	0	2	1	2	2	2	2	2	2	2	2	1	2	2	1	1	1	1	1	Tira Sujanpur,8km
Karot Khas (54/10)	1	1	1	1	0	0	1	0	0	0	0	0	2	1	2	2	2	2	1	2	1	2	1	1	2	1	1	2	2	2	Tira Sujanpur,8km
Dhaner (54/17)	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	1	2	1	1	2	1	1	2	2	2	Tira Sujanpur,7km
Laungni (54/22)	1	0	0	0	0	0	0	0	0	0	0	0	2	1	2	2	2	2	2	2	2	2	1	2	2	1	1	2	2	2	Tira Sujanpur,10km
Pairian (54/7)	0	0	0	0	0	0	0	0	0	0	0	0	2	1	2	2	2	2	2	2	1	2	1	2	2	1	1	1	2	2	Tira Sujanpur,11km
Puneh Attru (54/8)	1	1	0	0	0	0	0	0	0	0	0	0	2	1	2	2	2	2	2	2	1	2	1	2	2	1	1	2	2	2	Tira Sujanpur,11km
Khairru (54/16)	0	0	0	0	0	0	0	0	0	0	0	0	2	1	2	2	2	2	2	2	1	2	1	2	2	1	1	2	2	2	Tira Sujanpur,12km
Paneh Sih (54/9)	0	0	0	0	0	0	0	0	0	0	0	0	2	1	2	2	2	2	2	2	1	2	1	1	2	1	1	2	2	2	Tira Sujanpur,10km
Bari (54/3)	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	2	2	2	Tira Sujanpur,9km
Salghun Hira (54/12)	0	0	0	0	0	0	0	0	0	0	1	0	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	2	2	2	Tira Sujanpur,11km

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Patlandar (57/5)	0	0	0	0	0	1	0	0	0	0	1	0	2	2	2	2	2	2	1	1	1	2	1	1	2	1	1	1	1	1	1	Tira Sujanpur,10km
Kot (57/19)	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	1	2	2	1	2	1	1	1	1	1	1	Tira Sujanpur,14km
Chail (57/20)	1	1	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	1	2	1	1	2	1	1	1	1	1	1	Tira Sujanpur,10km	
Nalahi (57/18)	1	1	0	0	0	0	0	0	0	0	1	0	2	2	2	2	2	2	1	2	1	2	1	1	2	1	1	1	1	1	1	Tira Sujanpur,14km
Gahla (57/8)	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	1	2	2	1	2	2	2	2	2	1	1	1	1	1	Tira Sujanpur,17km
Chamiana (57/10)	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	1	2	2	2	2	2	2	2	2	1	1	1	1	1	Tira Sujanpur,16km
Lambri (60/4)	1	1	0	0	0	0	0	0	0	0	0	0	2	1	2	2	2	1	1	2	1	2	1	1	2	1	1	1	1	1	1	Tira Sujanpur,20km
Duhak (61/9)	2	0	0	0	0	0	1	0	0	0	0	0	2	2	2	2	2	2	2	2	1	2	1	1	2	1	1	2	2	2	2	Tira Sujanpur,24km
Rangar (58/15)	1	1	1	0	0	0	0	0	0	0	1	0	2	1	2	2	2	2	1	2	1	2	1	1	2	1	1	1	1	1	1	Tira Sujanpur,17km
Bhati (58/1)	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	1	2	1	1	2	1	1	1	1	1	1	Tira Sujanpur,20km

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Drati (58/14)	1	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	Tira Sujanpur,20km
Sanwin Kalan (58/7)	1	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	Tira Sujanpur,20km
Sanwin Khurd (58/10)	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	Tira Sujanpur,20km	
Bhatiana Brahmana (58/2)	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2	2	1	1	2	1	1	1	1	1	Tira Sujanpur,20km	
Pakhi (58/4)	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2	2	1	1	2	1	1	1	1	1	Tira Sujanpur,20km	
Gadi (57/15)	1	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	1	2	1	1	2	1	1	1	1	1	Tira Sujanpur,8km	
Barog (57/2)	0	0	1	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	1	2	1	1	2	1	1	1	1	1	Tira Sujanpur,9km	
Jagarial (57/9)	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	1	2	1	1	2	1	1	1	1	1	Tira Sujanpur,12km	
Bharthun (56/2)	1	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	1	2	1	2	2	1	1	1	1	1	Tira Sujanpur,9km	
Ukhli (56/1)	0	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	Tira Sujanpur,9km	
Garoru Buhla (56/7)	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	1	2	2	1	2	1	1	1	1	1	Tira Sujanpur,9km	
Taryamli (60/13)	2	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	1	2	1	2	2	1	2	1	1	1	1	1	Tira Sujanpur,6km	
Jateru (60/14)	1	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2	2	2	1	2	1	1	1	1	1	Tira Sujanpur,9km	
Garoru (60/7)	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2	2	2	1	2	1	1	1	1	1	Tira	

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Mahesh Kowal (64/7)	1	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2	2	1	2	2	1	1	2	2	2	Tira Sujanpur, 14km
Thathi Gurdwalan (64/3)	1	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	1	2	1	1	2	1	1	2	2	1	Tira Sujanpur, 16km	
Bhat Lamber (64/1)	2	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	1	1	2	2	1	1	2	1	1	Tira Sujanpur, 15km		
Jangal Khas (64/16)	1	1	1	1	0	1	1	0	0	1	0	2	1	2	2	2	2	1	2	1	2	1	2	2	1	1	2	2	2	Tira Sujanpur, 12km		
Kheri (64/5) - 1	1	1	0	0	0	0	1	0	0	1	0	2	1	2	2	2	2	1	2	2	2	1	2	2	1	1	2	2	2	Tira Sujanpur, 19km		
Bajahar (64/9)	0	0	0	0	0	0	0	0	0	1	0	2	1	2	2	2	2	2	2	1	2	1	2	2	1	1	2	2	2	Tira Sujanpur, 19km		
Kakkar (63/29)	1	1	1	1	0	0	1	0	0	1	0	2	2	2	2	2	2	1	2	1	2	1	1	2	1	1	2	2	2	Tira Sujanpur, 19km		
Tira Sujanpur (NP)	Urban Part																											Tira Sujanpur (NP)				
Jangal (24/4)	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	2	2	2	2	2	1	2	1	1	2	1	1	1	1	1	Nadaun, 15km	
Andara (22/2)	0	0	0	0	0	0	0	0	0	0	0	2	1	2	2	2	2	2	2	2	1	2	2	1	2	1	1	1	1	1	Nadaun, 10km	
Punjyal (23/6)	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2	2	2	2	1	2	1	1	1	1	1	Nadaun, 13km	
Bumbloo (23/17)	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	1	2	1	1	2	1	1	1	1	1	1	Nadaun, 16km	
Salasi (23/3)	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	1	2	1	1	2	1	1	1	1	1	1	Nadaun, 16km	

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Kotlu (28/12)	0	0	0	0	0	0	0	0	0	0	0	0	2	1	2	2	2	2	2	2	1	2	1	2	2	1	1	2	2	1	Hamirpur,26km	
Gahli (36/35)	1	1	0	0	0	1	0	0	0	0	0	0	2	1	2	2	2	2	2	2	1	2	1	1	2	1	1	2	2	1	Hamirpur,25km	
Bharahian Di Dhar (62/22)	1	1	0	0	0	0	0	0	0	0	0	0	1	2	2	2	2	2	2	2	1	2	1	2	2	1	1	2	2	2	Hamirpur,35km	
Lambran Di Dhar (62/25)	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2	2	1	2	2	1	1	2	2	1	Hamirpur,30km	
Bhatwara (37/9)	1	0	0	0	0	0	0	0	0	0	0	0	2	1	2	2	2	2	2	2	2	2	1	1	2	1	1	2	2	1	Hamirpur,12km	
Duhak (43/27)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	2	2	2	2	2	1	2	1	1	2	1	1	2	2	1	Sarkaghat,18km	
District Kangra, HP																																
Tikkar (361)	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	1	2	1	1	2	1	1	1	1	1	Nurpur,24km	
Garan (311)	1	1	1	1	0	0	0	0	0	0	0	0	2	1	1	2	1	2	2	2	1	2	2	2	2	1	1	1	1	1	Nurpur,16km	
Tharu (64)	1	1	1	1	0	0	0	0	0	0	1	0	1	1	2	2	2	2	1	2	2	2	1	1	2	1	1	1	1	1	Dharmasala,14km	
Sanani (585)	1	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	Kangra,21km
Garh (171)	1	1	1	0	0	1	0	1	0	1	0	0	2	2	2	2	1	2	1	1	2	2	1	1	2	1	1	1	1	1	Dera Gopipur,12km	
Badehr (818)	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	Jawalamukhi,16km
Sarohi (887)	1	0	0	0	0	0	0	0	0	0	0	0	2	1	2	2	2	2	2	2	1	2	1	1	2	1	1	1	1	1	Nadaun,13km	
Sialkar (884)	1	1	1	0	0	0	0	0	0	0	0	0	2	1	2	2	2	2	1	2	1	2	2	1	2	1	1	1	1	1	Nadaun,20km	
Mannu (880)	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	Nadaun,21km
Kuri (885)	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	Nadaun,21km
Balra (886)	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	Nadaun,22km

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Manera (899)	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	Nadaun,23km
Marhana (898)	1	1	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	1	2	2	2	1	2	2	1	1	1	1	1	Nadaun,23km	
Harbah (889)	0	0	0	0	0	0	0	0	0	0	0	0	2	1	2	2	2	2	2	2	2	1	2	2	1	1	1	1	1	Nadaun,20km	
Dhakhar (890)	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2	1	2	2	1	1	1	1	1	Nadaun,21km	
Bhadrun (864)	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2	2	1	2	1	1	1	1	1	Nadaun,23km	
Kud (863)	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	1	2	1	1	2	1	1	1	1	1	Nadaun,20km	
Bhadrol (837)	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	1	2	2	1	2	1	1	1	1	1	Jawalamukhi,29km	
Galoti (852)	0	0	0	0	0	0	0	0	0	0	0	0	2	1	2	2	2	2	1	2	1	2	1	2	2	1	1	1	1	Jawalamukhi,31km	
Gahli (855)	1	0	0	0	0	0	0	0	0	0	0	0	2	1	2	2	2	2	2	2	1	2	1	1	2	1	1	1	1	Jawalamukhi,31km	
Chihar (853)	1	0	0	0	0	0	0	0	0	0	0	0	2	1	2	2	2	2	2	2	1	2	1	2	2	1	1	1	1	Jawalamukhi,31km	
Chanarri (851)	0	0	0	0	0	0	0	0	0	0	0	0	2	1	2	2	2	2	2	2	2	2	2	1	2	1	1	1	1	Jawalamukhi,32km	
Pihhar (839)	1	1	0	0	0	0	0	0	0	0	0	0	1	1	2	2	2	2	2	2	1	2	2	1	2	1	1	1	1	Jawalamukhi,31km	
Pihri (838)	1	1	1	1	0	0	0	0	0	0	1	0	2	1	2	2	2	2	2	2	1	2	1	1	2	1	1	1	1	Jawalamukhi,35km	
Uk Lahr (850)	0	0	0	0	0	0	0	0	0	0	0	0	2	1	2	2	2	2	2	2	1	2	1	2	2	1	1	1	1	Jawalamukhi,33km	
Khaliyana (854)	0	0	0	0	0	0	0	0	0	0	0	0	2	1	2	2	2	2	2	2	1	2	1	2	2	1	1	1	1	Jawalamukhi,33km	
Naloti (857)	1	0	0	0	0	0	0	0	0	0	0	0	2	1	2	2	2	2	2	2	2	2	1	1	2	1	1	1	1	Jawalamukhi,33km	
Dhariatu (849)	1	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2	2	2	1	2	1	1	1	1	Jawalamukhi,33km	
Makar (848)	1	1	0	0	0	0	0	0	0	0	0	0	2	1	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	Jawalamukhi,33km	
Khola (847)	1	1	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	Jawalamukhi,33km	
Samehl (845)	1	1	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2	2	2	1	2	1	1	1	1	Jawalamukhi,33km	

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Chaunki (846)	1	1	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2	2	2	2	1	2	1	1	1	1	1	1	Jawalamukhi,33km			
Tihri (861)	0	0	0	0	0	0	0	0	0	0	0	0	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	Jawalamukhi,38km		
Jhaura (891)	1	0	0	0	0	0	0	0	0	0	0	0	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	Jawalamukhi,32km		
Jarundi (892)	1	0	0	0	0	0	0	0	0	0	0	0	2	1	2	2	2	2	1	2	2	2	2	2	2	2	2	1	1	1	1	1	1	Jawalamukhi,38km		
Kasar (897)	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	Jawalamukhi,34km	
Dahd (896)	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	Jawalamukhi,35km	
Tipri (904)	0	0	0	0	0	0	0	0	0	0	0	0	2	1	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	Jawalamukhi,35km	
Kior (903)	0	0	0	0	0	0	0	0	0	0	0	0	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	Jawalamukhi,35km	
Gharthoon (431)	1	0	0	0	0	0	0	0	0	0	1	0	2	1	2	2	2	2	2	2	2	1	2	2	2	2	2	1	1	1	1	1	1	1	Palampur,28km	
Salghuni (430)	0	0	0	0	0	0	0	0	0	0	0	0	2	1	2	2	2	2	2	2	1	2	1	2	2	2	2	1	1	1	1	1	1	1	Palampur,32km	
Tamber (433)	1	0	0	0	0	0	0	0	0	0	0	0	1	1	2	2	2	2	2	2	1	2	1	2	2	2	2	1	1	1	1	1	1	1	Palampur,38km	
Kauna (432)	1	1	1	0	0	0	0	0	0	0	1	0	2	1	2	2	2	2	1	2	1	2	1	2	2	2	2	1	1	1	1	1	1	1	Palampur,31km	
Duhak Khurd (461)	1	1	1	0	0	0	0	0	0	0	1	0	2	1	2	2	2	2	1	2	1	2	1	2	2	2	2	1	1	1	1	1	1	1	Tira Sujanpur,22km	
Dhaniara (460)	0	0	0	0	0	0	0	0	0	0	0	0	2	1	2	2	2	2	2	2	1	2	1	2	2	2	2	1	1	1	1	1	1	1	Tira Sujanpur,20km	
Bhuhli Pakhi (465)	0	0	0	0	0	0	0	0	0	0	1	0	2	1	2	1	2	2	2	2	1	2	1	2	2	2	2	1	1	1	1	1	1	1	Palampur,37km	
Balh Bhurian (467)	1	0	0	0	0	0	0	0	0	0	0	0	2	1	2	1	2	2	2	2	2	2	2	1	2	2	2	1	1	1	1	1	1	1	Palampur,37km	
Leora (466)	0	0	0	0	0	0	0	0	0	0	1	0	2	1	2	2	2	2	2	2	1	2	2	2	2	2	2	2	1	1	1	1	1	1	Palampur,37km	
Ghandera (493)	0	0	0	0	0	0	0	0	0	0	1	0	2	1	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	1	1	1	1	1	1	Palampur,37km

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Bairghatta (464)	1	1	1	0	0	0	0	0	0	0	1	0	2	1	2	1	2	2	1	1	1	2	2	2	2	1	1	1	1	1	Palampur,35km
Saidoon (463)	1	0	0	0	0	0	0	0	0	0	0	0	2	1	2	1	2	2	1	2	1	2	1	2	2	1	1	1	1	1	Palampur,34km
Chula Buhla (499)	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	1	2	2	2	2	1	2	2	1	2	1	1	1	1	1	Palampur,34km
Chula (498)	1	0	0	0	0	0	0	0	0	0	0	0	2	2	2	1	2	2	2	2	1	2	2	1	2	1	1	1	1	1	Palampur,37km
Chula Uparla (500)	1	0	0	0	0	0	0	0	0	0	0	0	2	1	2	1	2	2	2	2	1	2	1	2	2	1	1	1	1	1	Palampur,35km
Bhanuh (501)	0	0	0	0	0	0	0	0	0	0	0	0	2	1	2	1	2	2	2	2	1	2	1	2	2	1	1	1	1	1	Palampur,34km
Thural Khas (504)	1	0	0	0	0	0	0	0	0	1	0	0	2	1	2	2	2	2	2	2	1	2	1	2	2	1	1	1	1	1	Palampur,25km
Ghumarnu (505)	0	0	0	0	0	0	0	0	0	0	0	0	2	1	2	1	2	2	2	2	1	2	2	2	2	1	1	1	1	1	Palampur,31km
Bhanwar (506)	1	0	0	0	0	0	0	0	0	0	0	0	2	1	2	2	2	2	2	2	1	2	1	2	2	1	1	1	1	1	Palampur,25km
Thana (507)	0	0	0	0	0	0	0	0	0	0	0	0	2	1	2	1	1	2	2	2	1	2	1	2	2	1	1	1	1	1	Palampur,25km
Tikkri (508)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	2	2	2	2	2	1	2	1	2	2	1	1	1	1	1	Palampur,25km
Nalehar (509)	0	0	0	0	0	0	0	0	0	0	0	0	2	1	2	2	2	2	2	2	1	2	2	1	2	1	1	1	1	1	Palampur,25km
Dridh (512)	1	0	0	0	0	0	0	0	0	0	0	0	2	1	2	2	2	2	2	2	1	2	1	1	2	1	1	1	1	1	Palampur,21km
Phagurta (517)	0	0	0	0	0	0	0	0	0	0	0	0	2	1	2	2	2	2	2	2	2	2	1	1	2	1	1	1	1	1	Palampur,35km
Saman (511)	1	0	0	0	0	0	0	0	0	0	0	0	2	1	2	2	2	2	2	2	1	2	1	1	2	1	1	1	1	1	Palampur,20km
Sanhoon (518)	1	1	1	1	0	0	0	0	0	0	0	0	2	1	2	1	2	2	1	2	2	2	1	1	2	1	1	1	1	1	Palampur,24km
Badarta (520)	1	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2	2	1	2	2	1	1	1	1	1	Tira Sujanpur,20km
Kelan (570)	1	0	0	0	0	0	0	0	0	0	0	0	2	2	2	1	2	2	2	2	1	2	2	1	2	1	1	1	1	1	Tira Sujanpur,20km

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Panjlehr (571)	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	1	2	2	2	2	1	2	2	1	2	1	1	1	1	1	Tira Sujanpur, 16km	
Bansu (572)	0	0	0	0	0	0	0	0	0	0	1	0	2	2	2	1	2	2	2	2	1	2	2	1	2	1	1	1	1	1	Tira Sujanpur, 16km	
Koru (573)	1	0	0	0	0	0	0	0	0	0	0	0	2	2	2	1	2	2	2	2	1	2	2	1	2	1	1	1	1	1	Tira Sujanpur, 16km	
Chohla (605)	0	0	0	0	0	0	0	0	0	0	1	0	2	2	2	1	2	2	2	2	1	2	1	2	1	1	1	1	1	1	Tira Sujanpur, 16km	
Kohala (606)	1	0	0	0	0	0	0	0	0	0	1	0	2	1	2	2	2	2	2	2	1	2	1	2	2	1	1	1	1	1	Tira Sujanpur, 16km	
Barla (603)	0	0	0	0	0	0	0	0	0	0	1	0	2	2	2	2	2	2	2	2	1	2	2	2	2	2	1	1	1	1	1	Tira Sujanpur, 20km
Lahri (602)	0	0	0	0	0	0	0	0	0	0	1	0	2	1	2	1	2	2	2	2	1	2	1	2	1	1	1	1	1	1	1	Tira Sujanpur, 20km
Bhatwara (601)	1	0	0	0	0	0	0	0	0	0	0	0	2	1	2	1	2	2	2	2	1	2	1	2	2	1	1	1	1	1	1	Tira Sujanpur, 19km
Siara (576)	1	0	0	0	0	0	0	0	0	0	1	0	2	2	2	1	2	2	2	2	2	2	2	1	2	1	1	1	1	1	1	Tira Sujanpur, 13km
Kudana (575)	1	0	0	0	0	0	0	0	0	0	0	0	2	2	2	1	2	2	2	2	2	2	2	1	2	1	1	1	1	1	1	Tira Sujanpur, 16km

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Kotlu (513) -II	0	0	0	0	0	0	0	0	0	0	0	0	2	1	2	2	2	2	2	2	1	2	2	2	2	1	1	1	1	1	Palampur,32km
Santal (515)	0	0	0	0	0	0	0	0	0	1	0	2	1	2	2	2	2	2	2	1	2	2	2	2	1	1	1	1	1	Palampur,34km	
Ban Banjar (574)	0	0	0	0	0	0	0	0	0	1	0	2	1	2	2	2	2	2	2	1	2	1	1	2	1	1	1	1	1	Palampur,25km	
Paplah (516)	1	1	1	1	0	0	0	0	0	0	0	2	1	2	2	2	2	2	1	1	2	1	1	2	1	1	1	1	1	Palampur,29km	
Jol (519)	0	0	0	0	0	0	0	0	0	1	0	2	1	2	2	2	2	2	2	1	2	1	1	2	1	1	1	1	1	Palampur,27km	
Rirkal (494)	1	0	0	0	0	0	0	0	0	0	0	2	1	2	1	2	2	2	2	2	2	2	1	2	1	1	1	1	1	Palampur,32km	
Bandahu Khas (497)	1	1	0	0	0	0	0	0	0	1	1	2	1	2	1	2	2	1	2	1	2	1	1	2	1	1	1	1	1	Tira Sujanpur,12km	
Kalhun (514)	0	0	0	0	0	0	0	0	0	0	0	2	1	2	1	2	2	2	2	1	2	1	1	2	1	1	1	1	1	Palampur,66km	
Odri (496)	0	0	0	0	0	0	0	0	0	0	0	2	1	2	2	2	2	2	2	1	2	1	1	2	1	1	1	1	1	Palampur,66km	
Umri (489)	1	1	1	1	0	0	0	0	0	1	0	2	1	2	2	2	2	1	1	1	2	1	2	2	1	1	1	1	1	Palampur,66km	
Marera (495)	1	0	0	0	0	0	0	0	0	0	0	2	1	2	2	2	2	2	2	1	2	1	2	2	1	1	1	1	1	Palampur,18km	
Gandar (488)	1	1	1	1	0	0	0	0	0	1	0	2	1	2	2	2	2	1	1	1	2	1	1	2	1	1	1	1	1	Palampur,18km	
Bar (487)	0	0	0	0	0	0	0	0	0	1	0	2	1	2	2	2	2	2	2	1	2	1	1	2	1	1	1	1	1	Palampur,19km	
Barram Khurd (486)	1	1	1	1	0	0	0	0	0	1	0	2	1	2	2	2	2	1	2	1	2	1	1	2	1	1	1	1	1	Palampur,18km	
Karonthi (478)	0	0	0	0	0	0	0	1	0	0	0	2	1	2	2	2	2	2	2	1	2	1	2	2	1	1	1	1	1	Palampur,18km	
Jandera (477)	1	0	0	0	0	0	0	0	0	1	0	2	2	2	2	2	2	2	2	1	2	1	2	2	1	1	1	1	1	Palampur,18km	
Kalhera (491)	0	0	0	0	0	0	0	0	0	1	0	2	2	2	2	2	2	2	2	1	2	1	2	2	1	1	1	1	1	Palampur,19km	
Andrana (490)	2	0	0	0	0	0	0	0	1	0	2	1	2	2	2	2	2	2	2	1	2	1	2	2	1	1	1	1	1	Palampur,19km	
Tikkar Jihan (492)	2	0	0	0	0	0	0	1	0	1	0	2	1	2	2	2	2	2	2	1	2	1	2	2	1	1	1	1	1	Palampur,20km	

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Tina Jamaitar (459)	0	0	0	0	0	0	0	0	0	0	1	0	2	2	2	2	2	2	2	2	1	2	1	1	2	1	1	1	1	1	Tira Sujanpur,10km
Har Balak Rupi (458)	1	1	1	1	0	0	1	0	0	1	0	2	1	2	2	2	2	1	2	1	2	1	1	2	1	1	1	1	1	1	Tira Sujanpur,9km
Koal (457)	0	0	0	0	0	0	0	0	0	1	0	2	2	2	2	2	2	2	2	1	2	2	2	2	1	1	1	1	1	1	Tira Sujanpur,10km
Och Kalan (442)	0	0	0	0	0	0	0	0	0	1	0	2	1	2	2	2	2	2	2	1	2	1	1	2	1	1	1	1	1	1	Tira Sujanpur,13km
Sadda (444)	0	0	0	0	0	0	0	0	0	1	0	2	1	2	2	2	2	2	2	1	2	1	1	2	1	1	1	1	1	1	Tira Sujanpur,16km
Kuhn Khas (448)	1	1	0	0	0	0	0	0	0	1	0	2	1	2	2	2	2	1	2	1	2	1	1	2	1	1	1	1	1	1	Tira Sujanpur,17km
Bir (470)	0	0	0	0	0	0	0	0	0	1	0	2	1	2	1	2	2	2	2	1	2	1	1	2	1	1	1	1	1	1	Tira Sujanpur,4km
Jangal (469)	1	1	0	0	0	0	0	0	0	1	0	2	1	2	1	2	2	2	2	1	2	1	2	2	1	1	1	1	1	1	Tira Sujanpur,5km
Malodhan (468)	1	0	0	0	0	0	0	0	0	1	0	2	2	2	1	2	2	2	2	1	2	2	1	2	1	1	1	1	1	1	Tira Sujanpur,6km
Alampur (472)	1	1	1	1	0	0	0	0	0	0	0	2	2	2	2	2	2	1	1	1	2	1	2	2	1	1	1	1	1	1	Tira Sujanpur,6km
Bagh (473)	0	0	0	0	0	0	0	0	0	1	0	2	2	2	1	2	2	2	2	1	2	1	2	2	1	1	1	1	1	1	Tira Sujanpur,3km
Jagrup Nagar (474)	0	0	0	0	0	0	0	0	0	0	0	2	1	2	2	1	2	1	2	1	2	1	1	2	1	1	1	1	1	1	Tira Sujanpur,6km
Dehru (475)	1	1	0	0	0	0	0	0	0	1	0	2	2	2	2	2	2	2	2	1	2	1	2	2	1	1	1	1	1	1	Tira Sujanpur,8km
Dhar Brahmpuri (476)	0	0	0	0	0	0	0	0	0	0	0	2	1	2	2	2	2	2	2	1	2	1	2	2	1	1	1	1	1	1	Tira Sujanpur,8km
Mashwar (479)	1	0	0	0	0	0	0	0	0	0	0	2	2	2	2	1	2	2	2	1	2	1	2	2	1	1	1	1	1	1	Palampur,32km

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Shakoh (480)	1	1	0	0	0	0	0	0	0	1	0	2	1	2	2	1	2	1	2	1	2	2	1	1	1	1	1	Palampur,32km	
Liunda (481)	0	0	0	0	0	0	0	0	0	1	0	2	1	2	2	1	2	2	2	1	2	1	2	2	1	1	1	1	Palampur,32km
Gahli (482)	0	0	0	0	0	0	0	0	0	1	0	2	1	2	2	2	2	2	2	1	2	1	2	2	1	1	1	1	Palampur,32km
Barram Kalan (483)	1	1	0	0	0	0	0	0	0	1	0	2	1	2	2	2	2	2	2	2	2	1	2	2	1	1	1	1	Palampur,35km
Garh (484)	1	1	1	0	0	0	0	0	0	1	0	2	1	2	2	1	2	2	2	1	2	1	2	2	1	1	1	1	Palampur,35km
Jamula (485)	0	0	0	0	0	0	0	0	0	1	0	2	1	2	2	2	2	2	2	1	2	1	2	2	1	1	1	1	Palampur,35km
Kutwalla (581)	1	0	0	0	0	0	0	0	0	1	0	2	1	2	2	2	2	2	2	1	2	1	2	2	1	1	1	1	Palampur,35km
Daslon (582)	0	0	0	0	0	0	0	0	0	1	0	2	1	2	2	2	2	2	2	1	2	1	1	2	1	1	1	1	Palampur,35km
Pandehr (588)	1	0	0	0	0	0	0	0	0	0	0	2	1	2	2	2	2	2	2	1	2	1	1	2	1	1	1	1	Palampur,35km
Lower Lamba Graon (589)	1	1	1	1	0	1	0	0	0	1	0	2	1	2	2	2	2	2	1	1	2	1	1	2	1	1	1	1	Palampur,35km
Lahr (583)	1	1	0	0	0	0	1	0	0	1	0	2	1	2	2	2	2	2	2	1	2	1	2	2	1	1	1	1	Palampur,75km
Kaluhi (584)	0	0	0	0	0	0	0	0	0	1	0	2	1	2	2	2	2	2	2	1	2	2	2	2	1	1	1	1	Palampur,63km
Bhati (580)	0	0	0	0	0	0	0	0	0	1	0	2	1	2	2	2	2	2	2	1	2	2	2	2	1	1	1	1	Palampur,40km
Hardon (579)	0	1	0	0	0	0	0	0	0	0	0	2	1	2	2	2	2	2	2	1	2	1	1	2	1	1	1	1	Palampur,40km
Talwar (578)	0	0	0	0	0	0	1	0	0	0	0	2	1	2	2	2	2	1	2	1	2	1	2	2	1	1	1	1	Palampur,50km
Har (577)	1	1	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	1	2	2	2	2	1	1	1	1	Palampur,45km
Saul Banehr (585)	1	1	0	0	0	0	0	0	0	1	0	2	1	2	2	2	2	2	2	1	2	1	2	2	1	1	1	1	Palampur,40km
Maniar (595)	1	0	0	0	0	0	0	0	0	1	0	2	1	2	2	2	2	2	2	1	2	2	2	2	1	1	1	1	Palampur,45km
Jagni Jar (596)	1	0	0	0	0	0	0	0	0	0	0	2	1	2	2	2	2	2	2	1	2	2	2	2	1	1	1	1	Palampur,35km

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Source-<http://www.censusindia.gov.in/2011census/dchb/DCHB.html>

Abbreviations:

Educational Facilities: P-Primary School, M-Middle School, SS-Higher Secondary Schools, SSS- Senior Secondary School

Medical Facilities: CHC- Community Health Centre, PHC-Primary Health Centre, PHSC-Primary Health Sub-Centre, MCWC-Maternity and Child Welfare Centre, H-Hospital, D- Dispensary, FWC-Family Welfare Centre

Drinking Water Facilities: T-Tap Water, W-Well Water, HP-Hand Pump, TW-Tube Well Water, R-River Water, Tk-Tank Water, O-Other Drinking Water Facility, CT-Community Toilet

Communication and Transport Facilities: PO-Post Office, SPO-Sub-Post Office, PTO- Post & Telegraph Office, Tel. - Telephone Connection, Mob.- Mobile Phone Coverage, BS-Bus Services, RS-Railways Services

Approach to Village: PR- Paved Roads, KR-Kuchha Road, FP-Foot Path

Power Supply: ED-Power Supply for Domestic use, E Ag.- Power Supply for Agricultural use, EC- Power supply for Commercial use, EA-Electricity for All Purposes

Nearest Town & Distance, km : a for < 5 Kms, b for 5-10 Kms and c for 10+ kms of nearest place where facility is available is given.

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Brief Description of Places of Religious, Historical or Archaeological Importance and Tourist interest in Villages and Towns of the District:

Place of Historical and Tourist Importance

There are not many places of historical and archaeological importance in the district except tira sujanpur and to some extent nadaun both of which are the headquarters of the respective tehsils;

Tira sujanpur - tira sujanpur has been the picturesque town on the left bank of river beas 26 km away from the district headquarters hamirpur. It was founded by raja abhey chand the king of ruling katoch dynasty of kangra in 1748 a.d.

Nadaun - nadaun is another town situated on the left bank of river beas on hamirpur-kangra road. In the princely days, it used to be the headquarters of the nadaun jagir. Maharaja sansar chand of kangra used to hold his court here during the summer for a number of years during his reign.

Hamirpur -hamirpur town situated on dharmsala-bilaspur road is the headquarters of district administration. It was said to have been founded by raja hamir chand of kangra who built a fort here.

Temple of Deothsidh Baba Balak Nath - Deoth- sidh Baba Balak Nath temple is located bordering Bilaspur district in Bhoranj tehsil of the district. It is a very ancient temple and almost round the year hundreds of people as far as from other states of the country to offer their prayers at this famous temple of Baba Balak Nath.

State Government has taken the management of this temple for its proper development and for providing adequate facilities to the devotees. Besides, more bus services have been introduced for the visitors and devotees from Hamirpur and other parts of the state.

Major Social and Cultural events, Natural and Administrative developments and significant activities during the decade.

Social and Cultural Events

Fairs and Festivals:

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The people of Hamirpur district celebrate a good number of fairs and festivals round the year which have, by and large, religious sanctity. Some of the important fairs and festivals held in the district are as follows;

- ❖ Gasota Mahadev Fair
- ❖ Holi Fair
- ❖ Baba Deothsidh Fair
- ❖ Gashian Fair
- ❖ Awah Devi Fair
- ❖ Chaniari Devi Fair
- ❖ Tauni Devi Fair, Markanda Fair, Dei-ka-Naon

3.10.25 Rehabilitation & Resettlement (R & R)

Policy to be adopted (central/state) in respect of the project affected persons including home/land oustees and landless labours. Hence, any planning with respect to rehabilitation & resettlement is not applicable.

CHAPTER 4 : ANTICIPATED IMPACT AND MITIGATION MEASURES

4.1 INTRODUCTION

Environment and development should be considered as mutually complementary, interdependent, and an instrument of reinforcing the quality of life. Environmental Impact Assessment (EIA) is the important aspect of overall environmental management strategy and an important tool for sustainable development. It identifies major impacts of mining and associated activities on environment and provides guideline to prepare the necessary control measure termed as Environmental Management Plan (EMP). Alteration or modification of the above attributes may cause hazardous impact on ecological equilibrium of site. Besides this there will be some other reasons which will affect the environment viz. traffic network, and other vehicular movements, impacts on flora & fauna of that area, surface drainage, and change in air, water and soil quality. While for the purpose of development and economic up-liftment of people, there is need for establishment of industries and mining, but these have to be environmentally friendly. Therefore, it is essential to assess the impacts of mining on different environmental parameters, before starting the mining operations, so that abatement measures could be planned in advance for eco-friendly mining in the area. The increasing awareness among the people about ecological imbalance and environmental degradation has raised many apprehensions.

4.1.1 Construction Phase

There will be no impacts as no construction stage is involved in this project

4.1.2 Operation phase

Some of the impacts identified in various phases of operation are insignificant and do not warrant much attention where as some others are important specially with respect to the present context. Therefore, objective is to identify those impacts, which are significant and require a detailed analysis for decision making or formulating adequate management measures. This section deals with an assessment of impact of various mining activities on the existing environmental conditions. The methodology of assessment is based upon identification and description of the existing project activities as well as environmental components followed by evaluating the impact of mining and associated activities on the environment. The environmental

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components that are likely to be influenced or modified by the continuation of project activities are:

- Land Environment
- Water Environment
- Air Environment
- Soil Environment
- Noise Environment
- Biological Environment
- Socio-Economic Environment
- Solid Waste
- Traffic Environment

Table 4-1: Impact Assessment Matrix

	Physical Environment						Biological Environment					Socio-Economic Environment							
	Aesthetics & Visual impacts	Air Quality	Noise Quality	Soil Quality	Local Drainage & Physiography	Surface water quality	Ground water quality	Natural Resources viz. clearance of vegetation	Endangered Flora & Fauna	Aquatic Habitat and resources	Agriculture	Domesticated Animals	Influx of Population	Common Property & Cultural Resources	Job & Economic Opportunity	Cultural & Behavioral Conflict	Land & Infrastructure Use	Community Safety	Occupational Health Hazards
Operation Phase																			
<i>Site preparation</i>	L	L	L	L	L										M			L	M
<i>Excavation of mineral</i>		L	L												M				L
<i>Transportation</i>		L	L												M				L
<i>Surface run-off discharge</i>					L	L													
<i>Disposal of domestic solid waste</i>				L	L	L													

*L=Low, *M=Medium

4.2 LAND ENVIRONMENT

4.2.1 Anticipated Impact

The Mining Lease area falls within Pvt. Land on the river bed of Beas River and there is no reserves forest or protected forest land within the lease area.

On the River bed, the river mining does not carry any overburden/ waste. If any, Waste generated will be used to refill the mined out area or pits in the haul road. There is no waste left to manage at the end of mining activity. Further, there is un-mined area left between the two blocks to avoid runoff and soil erosion of main land into the block, which is strengthened by development of plantation / green area between the two blocks. It is assumed that land will be reclaimed its original land-use after replenishment in monsoon season.

Land contamination (by diesel, oil etc.) due to movement of site vehicles

4.2.2 Mitigation Measures

Since, the entire operation will be restricted within the mining lease area which is recommended in DSR. Mining operation will be done by leaving safe zone from river channel or river side, therefore the topography of the surrounding of the lease area will not have any impact, no mitigation measures suggested. The change in topography within the lease area due to excavation of mineral will replenish during the next monsoon season naturally with flow of water. Hence, no mitigation measure suggested.

Equipment's will be regularly serviced and inspected to make sure that there are no leakage of oil, diesel, fuel, detergents or hydraulic fluids.

Servicing and maintenance of vehicles as far as possible will occur outside of the boundaries of mining lease area/River Bed. If maintenance does occur on site due to breakdown, all steps will be undertaken to avoid hydrocarbon spills/leakages.

if any oil and lubricant leak out from the any vehicle, the it will be collected in separate containers /bins provided at the site and given to the approved vendors by CPCB or UPPCB. Under no circumstances will oil or diesel to be stored and disposed off at the site.

4.3 WATER ENVIRONMENT

4.3.1 Anticipated Impact

- **Water Quality:**
- Spillage and leakage of oil and grease from light machineries and transport vehicles operating on river bed will cause contamination of the river water leading to water pollution.
- Dumping of waste including food waste, plastic waste and other wastes by labors will cause contamination of river water leading to water pollution. Assuming 50 gm of solid waste generation per head, the total quantity of waste generated is expected to be 6 kg per day.
- Open defecation by labors will cause contamination of river water leading to water pollution
- Washing of vehicles on river bed will contaminate river water leading to water pollution.
- In case of overturning of vehicles due to rough driving or in case of accident, the entire sand/murum will be dumped into the road, leading to physical and environmental damage to the surrounding.
- Leakage of oil and grease from light machineries and transport vehicles on land will ground water contamination leading to ground water pollution. Since, most of the water supply in the region is from ground water as source, the leaching of oil and grease in ground water may lead to health impact to the users.

4.3.2 Mitigation measures

- No vehicles/ light machineries will be allowed to enter the river bed if found leakage of oil and grease. In addition, iron sheets/checker plates will be used for movement of vehicles will also enable identification/detection and any kind of spillage and leakage of oil and grease from the transport vehicle on river bed, while prohibiting leaching to the river bed.
- Two bin systems will be used while placing a number of bins (Blue and Green) at various locations of the work place. The blue bins will be used for storing organic waste while green bins will be used to store other wastes like plastic/wrappers etc. Smoking and consumption of

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alcohol and tobacco will strictly be prohibited. The labours will be made aware of the system prior to engagement and start of work. The stored waste will be collected everyday and disposed off at not less than 1 km away from the river bank or 500 m from any other water body. Very small amount of waste water will be generated due to washing of hands during lunch time. This waste water will be collected separately in a container and it will be used in sprinkling & spraying of haulage road.

- Mobile toilets will be provided by the project proponent at the project site, but not on the river bed. All labours will be made mandatory to use these toilets. Cleanliness of the mobile toilet will be checked at every four hourly basis so that the users are encouraged to use the toilets. Open defecation will strictly be prohibited.
- Washing and cleaning of vehicles on river bed and using river water will strictly be prohibited.
- All the drivers of transport vehicles will be instructed to drive vehicles at a speed not more than 20 km/hr along Basaria village road, necessary action will be intimated soon and remediation of sand from the road be initiated in presence of the panchayat.
- All the drivers of transport vehicles will be instructed to drive vehicles at a speed not more than 20 km/hr through the stretch of village.
- No vehicles/ light machineries will be allowed to operate if found leakage of oil and grease.
- Oil and lubricants will not be stored on mining site. It will be ensured that the scraper, hydraulic excavator and front-end loader are properly maintained. Equipments will be regularly serviced and inspected to make sure there are no leaks of oil, diesel, fuel, detergents or hydraulic fluids. Servicing and maintenance of vehicles as far as possible will occur outside of the boundaries of mining lease area. If maintenance does occur on site due to breakdown, all steps will be undertaken to avoid hydrocarbon spills/ leakages. Under no circumstances will oil or diesel to be disposed off at the site.
- The mining will be carried out up to a depth of 3.0 m or water level, whichever is less. Therefore there will be no interfacing of the activity to the ground water.
- No pumps/ bore well will be constructed at the project site. Water demand will be met through tanker water supply by private vendors from nearby villages.

- As Per SSMMG, 2016 MoEFCC , GOI, one Dug well will be installed near the project site and monitoring of water level carried out monthly.
- Twice in a Year monitoring of water samples will be done as precautionary measures.

4.4 AIR ENVIRONMENT

4.4.1 Impact through mathematical modeling for mining projects

The proposed project includes various activities like development of benches, approach roads, haul roads, excavation and transportation of sand. These operations generally result in generation of dust and thereby pose health hazards. However, it is proposed that adequate control measures will be provided at every stage of operation such as, water sprinkling at loading, unloading points and on haul roads before transportation to reduce the fugitive dust emissions.

The mining is proposed to be carried out by opencast manual method. The air borne particulate matter (PM₁₀) generated by sand handling operations, transportation is the main respirable air pollutant. The emissions of Sulphur dioxide (SO₂), Nitrogen Oxides (NO₂) contributed by vehicles plying on haul roads will be marginal. Prediction of impacts on air environment has been carried out taking into consideration proposed production and net increase in emissions.

Emissions Details

Loading and transportation of sand, wind erosion of the exposed area and movement of light vehicles will be the main polluting source in the proposed mining activities releasing Particulate Matter (PM₁₀) affecting Ambient Air of the area. Emission during, Loading was calculated by the area sources. It was assumed that truck will carry 10 Tonnes of ore/over burden. Details of emission during loading/unloading and transportation on the approach road, wind erosion of the exposed area and road maintenance were discussed and combined impact was predicted in the worst-case scenario under worst meteorological condition given as follows:

Loading and Unloading - US EPA, 2008, revision of emission factor for AP-42 was used to calculate emission of particulate matter released into the atmosphere during loading and unloading separately. Emission of PM₁₀ during loading was calculated and found to be 0.30×10^7

⁵ g/s/m² based on moisture content 10-20% mine. It is assumed that moisture content was 10% and further moisture content will be increased to 10-20% to reduce emission of PM10 during unloading and average wind speed was 2.58 m/s as observed with site data with low calm conditions 4.58 % as shown in wind rose and discussion of local meteorology of the area.

Approach road- US EPA, 2006, revision of emission factor for **AP-42** was used to calculate emission of particulate matter released into the atmosphere during transportation of sand by trucks operated per hour on haul road. Emission of PM10 due to transportation of sand on approach road was 0.09×10^{-6} g/s/m² based on assumption that silt content spread on road surface was 5%, and efficiency of PM10 emission control 90%. Truck will be fully covered with tarpaulin material and emission of PM10 during on the haul road will be insignificant.

Based on the above consideration that there was low emission of PM10 during transportation of sand, however during loading, transportation of sand over the approach road, emission of PM10 of the exposed area due to wind erosion and movement of light vehicles on the road were not considered and combined with mining activities. US EPA based Dispersion ISCST-3 model was used for prediction of impact with 24-h meteorological data of the study period for the assessment of GLC.

4.4.2 Meteorological Data

The meteorological data recorded at hourly interval during the month of December to February 2022 on wind speed 2.58 m/s, wind direction, dry & wet bulb temperature, humidity, cloud cover and rainfall was processed to extract hourly mean meteorological data as per the guidelines of CPCB/MoEF for prediction of impacts from the area source. Stability was computed by Turner's method and mixing height was obtained from publication of IMD "Atlas of Hourly Mixing Height in India, 2008.

Data recorded from authorized source/Govt. agency were used as meteorological input for Dispersion Model which was stored in the computer for further analysis and interpretation to study the local meteorology of the study area. It was observed that westerly & north westerly was pre-dominant wind during summer as shown in wind rose (**Figure 3.4**) with low wind speed and 4.58 % calm condition was observed during study period at the site which was very much close and cumbersome with long term meteorological data of IMD. Average wind speed was

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2.58 m/s. Impact of the pollutants was anticipated in southeast sector under influence of northeasterly & South westerly winds. Ambient air quality locations were selected based on the long term wind rose pattern of the area. Air quality sampling locations were finalized to study the baseline status around the proposed site and to study impact at various locations. 24-h maximum impact of PM₁₀ was envisaged in southeast sector at very short distance from the site due to moderate to low wind speed.

Stable atmospheric condition E & F dominates in early morning and night hours and B, C & D in day hours were observed. Pollutants were dispersed from the proposed source under influence of local meteorology and dispersed on the ground in downwind direction close (~100 m) to the source under influence of moderate to low wind speed. High temperature and low humidity were observed at site with high temperature in day hours and low during night. There was no significant rain fall received and sky was clear of clouds in most of the days.

4.3.2.1 Mitigation Measures

- The speed of trucks on haul road will be controlled to reduce dust emissions.
- Water sprinkling will be done on all haul road and unpaved roads to suppress dust emission.
- Overloading of transport vehicles will be avoided.
- Masks will be provided to workers.
- Regular preventive maintenance of equipment will be carried out on contractual basis.
- Green belt of adequate width will be developed around the periphery.

IMPACTS OF AIR POLLUTION AND MITIGATION MEASURES		
Impact	Mitigation Measure	Budget
Dust generation due to loading and unloading of mineral and due to transportation can also	Water sprinkling will be done on unpaved roads to avoid dust generation during transportation.	0.50 Lakh per year Rs. 0.02 Lakhs for PPE.

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<p>affect the workers as well as nearby villagers.</p>	<p>As Tar road is passing through the mine lease, there will be limited transportation on haul road (unpaved). This will reduce generation of dust emissions.</p> <p>The trucks will be covered by tarpaulin.</p> <p>Overloading of trucks will be avoided to minimize mineral leaked.</p> <p>It is proposed to develop green belt along the riparian zone of mine lease, along the haul roads as well as plantation will be done in nearby villages to prevent the impact of dust in the nearby village.</p>	<p>Rs. 6.2 Lakh capital cost</p> <p>Rs. 0.63 Lakhs/ Yr (recurring budget for plantation)</p>
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4.5 SOIL ENVIRONMENT

4.5.1 Anticipated Impact

No major impact on soil of the study area is envisaged due to mining activities as there is no waste water, heavy metal and fugitive emission shall remain confined locally within working area.

4.5.2 Mitigation measures

- There is no waste water & toxic water will be generated.
- Water sprinkling and plantation will be carried out on haul road.

4.6 NOISE ENVIRONMENT

4.6.1 Anticipated Impact

- Transportation vehicles used for the transportation of mineral are a source of noise pollution at the site.
- Loading & unloading of minerals also source of noise pollution.

4.6.2 Mitigation measures

Periodical monitoring of ambient noise will be done as per CPCB guidelines:

- No other equipment except the transportation vehicles will be allowed.
- Proper maintenance of the vehicle will be carried out which help in reducing noise during operations.
- Plantation will be taken up along the approach roads and side. The plantation minimizes propagation of noise and also arrests dust.

4.7 BIOLOGICAL ENVIRONMENT

The area has quite sizable number of forests & local khads having flowing water. These have natural flora & fauna flourishing in the area. The mining activity doesn't involve any blasting & drilling activity; therefore, the project will not disturb habitat of any flora & fauna. Since, there is no liquid waste, so the aquatic life in the area is not likely to be affected in any manner. Thus, the existing ecology & biodiversity of the area shall be maintained & will not be affected.

4.8 SOCIO-ECONOMIC ENVIRONMENT

1. Impact on Demographic Composition

There will be no significant increase in overall population of the study area as preferably local people will be recruited for employment. Hence, there will be no significant impact on the population composition in the study area. Since there will be no significant change in population, the overall sex ratio will remain more or less same.

2. Impact on Employment Opportunities

The mining project will generate direct & indirect employment. About 70 people will get employment with allied and related industries, such as transportation, maintenance, etc. The benefits of employment to the job seekers are expected to include, at a household and individual level, an increase in socio-economic and health status, improvement to their quality of life & living condition, and the benefits from greater household expenditure on education & healthcare resources.

3. Impact on Law & Order

No major law & order problem is envisaged due to the proposed project. It is expected that the workers will attend to their duties from their residences and return to their homes after the day's work.

4.8.1 Conclusion

By following the environmental guidelines related to the project, this project would be beneficial for the people by generating employment opportunities. This would lead to income generation and improve the socio-economic status of the household. It will help in the revenue generation and the overall economic development of the state.

4.9 SOLID WASTE MANAGEMENT

- The wastage material in the form of slit/clay excavated along with mineral shall be separated by screening and washing and dumped at the appropriate dumping site. The waste material (slit) shall be used for the maintenance of the approach road to the various access roads of the project components in road filling. Granular sub-base for works and plantation works etc.

4.9.1 Anticipated Impact

- Impact of runoff from on water bodies (siltation, contamination etc) shall be negligible.
- Impact of hazardous wastes and liquids is not anticipated so that the mine waste is negligible.

4.9.2 Mitigation measures

- Precaution will be taken for siltation control.

- The waste material (Silt/Clay) shall be used for the maintenance of the approach road to the various access roads of the project components in road filling, Granular sub-base for road works and plantation works etc.

4.10 TRAFFIC DENSITY

4.10.1 Anticipated Impacts

Not much impact on local transport as only 8 (hours of shifts with effective 6.5 hrs of working) x 180 trips/hour (up and down) = 60 tipper/day will be required for transport of mineral from mine. The LOS value from the proposed mine may be “Very good” for district road. So, the additional load on the carrying capacity of the concern roads is not likely to have any significant adverse effect.

4.10.2 Mitigation measures

- It is being ensured that all transportation vehicles will carry a valid PUC certificate.
- Speed limit of the vehicles will be followed. To avoid accidents, the speed of vehicles will be low near habitation areas.
- Un- necessary blowing of horn will be avoided.

4.11 OCCUPATIONAL HEALTH & SAFETY

Occupational health and safety (OHS) are a cross-disciplinary area concerned with protecting the safety, health and welfare of people engaged in work or employment. The goal of all occupational health and safety programs is to foster a safe work environment.

Occupational health hazards at mine site:

Mining activity experiences risk of a number of hazards. Some examples of such hazards are as under:

- Ø Exposure to dust;
- Ø Noise exposure;
- Ø Physical Hazards;
- Ø Vehicular movements' accidents.

These mainly impact on those working within the mine although health hazards can also impact on local communities. Therefore, protective measures are required for health and safety of the employed persons. The health of workers and the persons around the lease area will be regularly monitored. All the personal protective equipments will be provided to employed persons. The mining in the area will be got done with all safety measures.

Implementation of Occupational health and safety measures:

Occupational Health & Safety measures result in improving the conditions under which workers are employed and work. It improves not only their physical efficiency, but also provides protection to their life and limb. Company will implement the following safety measures:

- Ø Safety clauses in contract order
- Ø Inspection and maintenance of equipments and accessories
- Ø Pre placement and periodic health check up
- Ø Removal of unsafe conditions and prevention of unsafe acts
- Ø Detailed analysis of each and every incident
- Ø To provide standard PPEs and ensure their uses
- Ø Periodic inspection by internal and external safety experts
- Ø Celebrations of various safety events for awareness

An effective and clearly audible means of giving warning, in case of accident, to every person shall be provided at the site. A free passage-way giving access to each means of escape shall be maintained for the use of all workers in the mine.

- Ø Medical facilities & first aid boxes will be established in the mine premises.
- Ø Pits, Sumps, openings in floor etc. which may be a source of danger, shall be either securely covered or securely fenced. Securely fencing a pit means covering or fencing it in such a way that it ceases to be a source of danger.

Pre-placement Medical Examination and Periodical Medical Examination Schedules

- Ø The fresh employees when inducted will be thoroughly medically examined under initial medical examination and thereafter during continuation of employment; the periodic medical examination will be conducted.

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- Ø The examination will include apart from the general observation like Chest X-ray, Lung function Test, Spirometry, Audiometry and the record of the same will be maintained and submitted to the concerned authorities.

Table 4-2: Budget allocated for Occupation Health and Safety

S. No	Activities	Capital Cost in Rs.	Recurring cost in Rs.
1	Personal Protective Equipment (PPE) will be provided viz. gloves, safety shoes, dust mask, safety jackets, helmet etc.	10,000	5,000
2	General awareness training about the occupational health hazards due to mining activities to avoid any incident will be provided to the workers and other mining associated personnel	-	20,000
3	Pre-placement health checkup will be made mandatory and periodic health checkup will be done quarterly.	-	150,000
Total cost in Rs.		10,000	1,75,000

CHAPTER-5: ANALYSIS OF ALTERNATIVES

Prop. Head of Project Dhaulasidh Hydroelectric Project (DSHEP) SJVNL intends to mine Stone, Bajri and Sand from the applied area to be used in the proposed stone crusher unit for captive use of Project construction works.

The application has been prepared and submitted the case for grant of mining lease with the Department of Industries. The case was referred to the Joint Inspection Committee to conduct the joint inspection of the area for the grant of mining lease. The committee inspected the site and found that area is suitable for mining and recommended the same for the grant of mining lease. Based on the recommendations of the Joint Inspection Committee, the case was forwarded to the Govt, of H.P. to obtain approval for the issuance of a Letter of Intent in favour of the applicant.

Accordingly, the department vide letter no. Udyog-Bhu (Khani-4) Laghu-7/2021(online-Kangra)2018 dated 02.07.21 issued a Letter of Intent (LoI) for the grant of mining lease for the extraction/collection of stone, bajri and sand over an area measuring 04-83-07 hec. Kanals comprising of Khasra nos. 744/1, 748 situated in Mauza Alampur, Mohal Bagh, Tehsil Jaisinghpur, District Kangra, and Himachal Pradesh.

No alternative site had been considered.

1.1 ALTERNATIVE TECHNOLOGY

The mining will be carried out open cast manual method as per Sustainable Sand Mining Management Guidelines 2016 and Enforcement & Monitoring Guidelines for Sand Mining 2020.

chapter 6 : ENVIRONMENTAL MONITORING PROGRAMME

6.1 GENERAL

Regular monitoring of environmental parameters is of immense importance to assess the status of environment during project operation. With the knowledge of baseline conditions, the monitoring programme will serve as an indicator for any deterioration in environmental conditions due to operation of the project, which will enable to take suitable mitigatory steps in time to safeguard the environment.

Monitoring is important to measure the efficiency of control measures. An environmental impact assessment study is carried over for a specified period of time and the data generated for that specific period cannot bring out all variations induced by the natural or human activities. Therefore, regular monitoring programme of the environmental parameters is essential to take into account the changes in the environmental quality. The objectives of monitoring are to:-

- Verify effectiveness of planning decisions;
- Measure effectiveness of operational procedures;
- Confirm statutory and corporate compliance; and
- Identify unexpected changes.

6.2 IDENTIFY UNEXPECTED CHANGES, ENVIRONMENTAL MONITORING & REPORTING PROCEDURE

Monitoring will confirm that emissions are within the prescribed limits. This will take the form of direct measurement and recording of quantitative information, such as quantity and concentrations of emissions and wastes for measurement against corporate or statutory standards, consent limits or targets. It may also require measurement of ambient environmental quality in the vicinity of a site using ecological/ biological, physical and chemical indicators.

The preventive approach by management may also require monitoring of process inputs, for example, type and method used, resource consumption, equipment and pollution control performance etc. Monitoring will also be required to meet compliance with statutory and corporate requirements. Finally, monitoring results will provide the basis for auditing.

6.3 ENVIRONMENTAL MONITORING SCHEDULE

Post project monitoring will be carried out as per conditions stipulated in Environmental Clearance Letter issued by MoEF&CC, Consent issued by SPCB as well as according to CPCB guidelines. Details of the proposed environmental monitoring schedule, which will be undertaken for various environmental components, are detailed below in Table 6.1.

Table 6-1: Proposed Environment monitoring Programme

	Activity	Schedule
Air Pollution Monitoring		
1	Ambient air monitoring of parameters specified by CPCB in their air consents from time to time within the mining lease	Twice in a year except monsoon season
2	Ambient air monitoring of parameters specified by CPCB in their air consents from time to time at stations outside the mining lease	Twice in a year except monsoon season
Water Quality Monitoring		
3	Monitoring of Ground Water sample as per IS: 10500	Twice in a year except monsoon season
4	Monitoring of Sur face Water sample as per IS: 2296	Twice in a year except monsoon season
Noise Quality Monitoring		
5	Noise in the ambient atmosphere near the mine lease area	Twice in a year except monsoon season
Greenbelt Maintenance		
6	Monitor schedule for Greenbelt development as per approved mining plan	Once in a year
Soil Quality Monitoring		
7	Soil quality analysis from the samples collected from the mine site and nearby areas	Twice in a year except monsoon season
Occupational Health and Safety Monitoring		

8	Occupational health and safety monitoring	Once in in a five year
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6.4 MONITORING OF VARIOUS PARAMETERS

6.4.1 Area to be monitored

The Mine site is considered as core zone and the area lying within 10 km radius from the mine site is considered as buffer zone.

6.4.2 Liquid Effluent

This is no liquid effluent generation from the proposed operation. However, the domestic effluents are collected by sewerage system and biological treatments are adopted by means of septic tanks followed by the soak pits.

6.4.3 Air Quality Monitoring

Ambient air quality should be monitored both upwind & downwind directions along with adequate meteorological measurement for proper interpretation of data of PM₁₀, PM_{2.5}, SO₂ and NO₂. The number of monitoring stations, air pollutants and frequency of monitoring will be decided as per the CPCB guidelines in 2009.

6.4.4 Water Quality Monitoring

Monitoring of surface run-off and ground infiltration will be done once in every season except monsoon. Quality of ground water and surface water samples will be analyzed for all the parameters as per IS-10500 and IS-2296 respectively.

6.4.5 Noise Quality Monitoring

Noise level monitoring will be done at the work zone to assess the occupational noise exposure levels. Noise levels will also be monitored at the noise generating sources like mineral handling arrangements, vehicle movements and also nearby villages for studying the impact due to higher noise levels for taking necessary control measures at the source.

6.4.6 Occupational Health & Safety

Health check-up for the workers will be conducted at regular intervals in a year. The health camps status will be monitored and the information will be furnished to the approving authority.

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Environment Management Cell will also coordinate with general public, regulatory authorities, local administration to appraise environmental performance of the mine.

6.5 REPORTING SCHEDULE OF MONITORING DATA

The frequency of reporting of monitored data will be on six monthly bases to the State PCB and to Regional Office of MoEF&CC, Himachal Pradesh. Compliance report will be submitted twice in a year for 6months interval. The Environmental statement will be prepared for the entire year of operations and will be regularly submitted to regulatory authorities.

Chapter 7 : ADDITIONAL STUDIES

7.1 INTRODUCTION

Mining is associated with several hazards that pose impacts on employees & surrounding areas necessitating adequate implementation of Safety and health measures. Hence, mine safety is one of the most essential aspects of any working mine. It is necessary to consider specific issues as applicable to the individual projects to take precautions against these issues. A worker in a mine should be able to work under condition, which are adequately safe and healthy.

7.2 PUBLIC HEARING

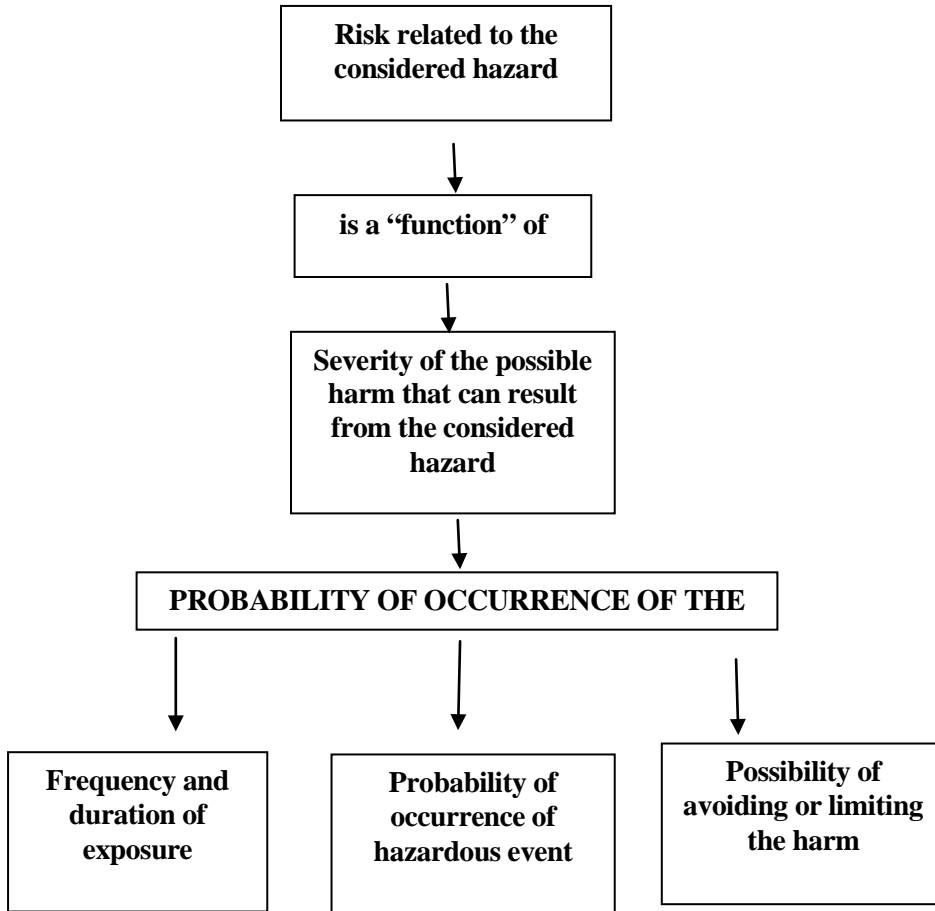
The public hearing will be conducted after submission of Draft EIA report to Pollution Control Board.

7.3 RISK ANALYSIS AND PREVENTIVE/CORRECTIVE MEASURES

7.3.1 Risk Analysis

A) RISK

- Risk concerns the deviation of one or more results of one or more future events from their expected value.



Tolerable risk: Risk which is accepted in a given context based on the current values of society

Protective measure: The combination of risk reduction strategies taken to achieve at least the tolerable risk. Protective measures include risk reduction by inherent safety, protective devices, and personal protective equipment, information for use and installation and training.

Severity: Severity is used for the degree of something undesirable.

Risk Analysis: A systematic use of available information to determine how often specified events may occur and the magnitude of their likely consequences.

The different steps of risk assessment procedure are as given below:

Step I: Hazard Identification

The purpose of hazard identification is to identify and develop a list of hazards for each job in the organization that are reasonably likely to expose people to injury, illness or disease if not effectively

controlled. Workers can then be informed of these hazards and controls put in place to protect workers prior to them being exposed to the actual hazard.

Step II: Risk Assessment

Risk assessment is the process used to determine the likelihood that people exposed to injury, illness or disease in the workplace arising from any situation identified during the hazard identification process prior to consideration or implementation of control measures.

Risk occurs when a person is exposed to a hazard. Risk is the likelihood that exposure to a hazard will lead to injury or health issues. It is a measure of probability and potential severity of harm or loss.

Step III: Risk Control

Risk control is the process used to identify, develop, implement and continually review all practicable measures for eliminating or reducing the likelihood of an injury, illness or diseases in the workplace.

Step IV: Implementation of risk controls

All hazards that have been assessed should be dealt in order of priority in one or more of the following hierarchy of controls

The most effective methods of control are:

- i. Elimination of hazards
- ii. Substitute something safer
- iii. Use engineering/design controls
- iv. Use administrative controls such as safe work procedures
- v. Protect the workers i.e. By ensuring competence through supervision and training, etc.

Each measure must have a designated person and date assigned for the implementation of controls. This ensures that all required safety measures will be completed.

Step V: Monitor and Review

Hazard identification, risk assessment and control are an on-going process. Therefore, regularly review the effectiveness of your hazard assessment and control measures. Make sure that you undertake a hazard and risk assessment when there is change to the workplace including when work systems, tools, machinery or equipment changes. Provide additional supervision when the new

employees with reduced skill levels or knowledge are introduced to the workplace.

B) RISK ANALYSIS

The risk assessment portion of the process involves three levels of site evaluation:

- a) Initial Site Evaluation,
- b) Detailed Site Evaluation,
- c) Priority Site Investigations and Recommendations.

The risk assessment criteria used for all levels of site evaluation take into account two basic factors:

- The existing site conditions
- The level of the travelling public's exposure to those conditions.

The Initial Site Evaluation and Detailed Site Evaluation both apply weighted criteria to the existing information and information obtained from one site visit. The Initial Site Evaluation subdivides the initial inventory listing of sites into 5 risk assessment site groups. The Detailed Site Evaluation risk assessment is then performed on each of the three highest risk site groups in order of the group priority level of risk. The result of the Detailed Site Evaluation process is a prioritized listing of the sites within each of the three highest risk site groups.

Risk analysis is done for:

- § Forecasting any unwanted situation
- § Estimating damage potential of such situation
- § Decision making to control such situation
- § Evaluating effectiveness of control measures

C) ACCEPTABLE RISK

Risk that is acceptable to regulatory agency and also to the public is called acceptable risk. There are no formally recognized regulatory criteria for risk to personnel in the mining industry. Individual organizations have developed criteria for employee risk and the concepts originally arising from chemical process industries and oil and gas industries. Because of the uncertainties linked with

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probabilistic risk analysis used for quantification of the risk levels the general guiding principle is that the risk be reduced to a level considered

As Low as Reasonably Practicable (ALARP). The risk acceptability criteria are given in following Table. It can be seen that there are three tiers:

- a. A tolerable region where risk has been shown to be negligible and comparable with everyday risks such as travel to work.
- b. A middle level where it is shown the risk has been reduced to As Low As Reasonably Practicable level and that further risk reduction is either impracticable or the cost is grossly disproportionate to the improvement gained. This is referred as the ALARP region.
- c. An intolerable region where risk cannot be justified on any grounds. The ALARP region is kept sufficiently extensive to allow for flexibility in decision making and allow for the positive management initiatives which may not be quantifiable in terms of risk reduction.

Table 7-1: Risk acceptability criteria

1	Risk un acceptance and must be reduced. The actions may include equipments and people or procedural measures. If risk cannot be reduced to ALARP level, operating philosophy must be fundamentally reviewed by the management.	Intolerable Region
2	Efforts must be made to reduce risk further and to as low as reasonably practicable, without expenditure that is grossly disproportionate to the benefit gained	ALARP Region (As Low as Reasonably Practicable)
3	Risk level is so low as to not require actions to reduce its magnitude further.	Tolerable Region

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Table 7-2: Risk Likelihood Table for Guidance

Step 1: Assess the Likelihood				Step 2: Assess the Consequences		
L1	Happens every time we operate	Almost Certain	Common or repeating occurrence	C1	Fatality	Catastrophic
L2	Happens regularly (often)	Likely	Known to have occurred "has happened"	C2	Permanent disability	Major
L3	Has happened (occasionally)	Possible	Could occur or "heard of it happening"	C3	Medical/hospital or lost time	Moderate
L4	Happens irregularly (almost never)	Unlikely	Not likely to occur	C4	First aid or no lost time	Minor
L5	Improbable (never)	Rare	Practically impossible	C5	No injury	Insignificant

A logical systematic process is usually followed during a qualitative risk assessment to identify the key risk events and to assess the consequences of the events occurring and the likelihood of their occurrence (TABLE-7.2)

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Risk Rank Likelihood x Consequence	L1 Almost certain	L2 Likely	L3 Possible	L4 Unlikely	L5 Rare
C1Catastrophic	1	2	4	7	11
C2Major	3	5	8	12	16
C3Moderate	6	9	13	17	20
C4Minor	10	14	18	21	23
C5Insignificant	15	19	22	24	25

RISK RATING:

- **HIGH RISK 1-6**
- **MEDIUM RISK 7-15**
- **LOW RISK 16-25**

7.3.2 POTENTIAL HAZARDS & 'ALARP' CONDITION

Mining and allied activities are associated with several potential hazards and risk to both the employees and the public at large. A worker in a mine should be able to work under "ALARP" conditions (as stated above), which are adequately safe and healthy. At the same time the environmental conditions should be such as not to be impair his working efficiency. This is possible only when there is adequate safety in mines.

7.3.3 RISK PRIORITISATION BASED ON HAZARDS

There are various factors, which can create unsafe working conditions/hazards in mining of minor minerals from river bed.

The key risk (hazard x probability) event **rating** associated with sand bed mining and to assess its consequences of such events occurring and the likelihood based on above Table-7.2 are as:-

The Risk rating of such hazards is as follows:

- Inundation / Flooding (C1 x L3=4)
- Quick Sand Condition (C2 x L3=8)

- c) Drowning.(C5 xL5=25)
- d) Accident due to vehicular movement.(C3 xL3=13)
- e) Accident during sand loading, transporting and dumping=14.

(i.e., C4 xL2=14)

7.3.4 Accident during sand/mineral loading, transportation and dumping

The risk rating assigned to this activity is assigned as “14 i.e. it is likely event with minor consequences”, as frequency of this operation is more but the predicted/assumed intensity(Based on experience) is less like minor cuts, abbration, fall due to river bank collapse & falling of cattles, if not under proper supervision to bring under ALARP ZONE.

- a. The minerals are loaded in the trucks using hand shovels. There is possibility of injury in the hands during loading with shovels.
- b. There is possibility that the workers standing on the other side of loading may get injury due to over thrown sand with pebbles.
- c. There is possibility of workers getting injured during opening of side covers to facilitate loading.
- d. There is possibility of riverbank collapse.
- e. There are chances of falling of cattle/children into pits in river bed by overlooking of fenced area near worksite or improper supervision.

7.3.5 Accident due to vehicular movement

The risk rating assigned to this activity is assigned as 13 i.e., it is possible event with moderate consequences as frequency of this operation is more but the predicted/assumed intensity(Based on experience) is less like minor cuts, bodily injury due to rackless or untrained driver. However, a strict control to be exercised to deploy trained drivers with valid driving license with a helper. A strict supervision/control to be exercised to avoid drunken driving or driving by unauthorized person to bring under ALARP ZONE.

The minerals loaded in 10-12 T trucks are being sent to through public roads.

- a. All possibilities of road accidents are possible due to rash driving.
- b. Accident may also occur during movement in the mine, in case pathway is not compacted suitably or movement is at the embankment.
- c. There are possibilities that due to overloading. Some pebbles or big boulder may injure the passerby public. In case Traffic & vehicle load bearing licensed capacity is neglected.

7.1.1 Inundation/Flooding

The risk rating assigned to this activity is assigned as 4(C1 x L3=4) i.e., it is only possible, if warnings are neglected and work started without assessment of the river bed condition specially during monsoon season, the event will be catastrophic with major consequences as frequency of this operation is possible. However, the event has to be brought under 'ALARP' Zone by strict supervision based on river water and other metrological data.

- a. The possibility of inundation/flooding of the mines are very high during monsoon or during heavy rains as the mine area lies in the riverbed.
- b. There is danger to the trucks and other machineries due to flooding.
- c. There is danger to the workers working in the mines.

Inundation or flooding is expected and beneficial for these mines as during this time only the mineral reserve gets replenished.

7.3.6 Quick Sand Condition

The risk rating assigned to this activity is assigned as 8 (C2 x L3 =5) i.e., it is likely event with major consequences as frequency of this operation is likely but the predicted/assumed intensity (Based on experience) is major.

Hence data of water table must be collected and the mining work must be above the water table (about 1.5 m above to bring under ALARP ZONE.) to avoid dangerous condition to vehicles playing over sand dunes.

This condition occurs when the working crosses the water table at a certain depth and the permeability of the strata is very high. This condition occurs when the effective stress in the sand becomes zero due to influx of water i.e.

$$i = i_{cr} = y'/y_w;$$

Where, i = Hydraulic gradient,

i_{cr} = Critical Hydraulic gradient,

y' = submerged unit weight,

y_w = unit weight of water.

This creates danger condition to the trucks and other machineries plying over the sand dunes on the river banks.

7.3.7 Drowning

The risk rating assigned to this activity is assigned as 25 i.e., it is insignificant due to dry season mining.

There are no possibilities of drowning in the river, since mining operations are carried out only in the dry seasons. All mining activities will be stopped during the monsoon season.

7.3.8 ADDITIONAL MITIGATION MAJORS TO BRING HAZARDS UNDER “ALARP” ZONE

7.3.8.1 Measures to Prevent Accidents during Loading

1. The truck should be brought to a lower level so that the loading operation suits to the ergonomic condition of the workers.
2. The loading should be done from one side of the truck only.
3. The workers should be provided with gloves and safety shoes during loading.
4. Opening of the side covers (pattas) should be done carefully and with warning to prevent injury to the loaders.
5. Operations during daylight only.
6. No foreign material should be allowed to remain/spill in river bed and catchment area, or no pits/pockets are allowed to be filled with such material.

7. Stockpiling of harvested material on the river bank should be avoided.

7.3.8.2 Measures to Prevent Accidents during Transportation

1. All transportation within the main working should be carried out directly under the supervision and control of the management.
2. The Vehicles must be maintained in good repairs and checked thoroughly at least once a week by the competent person authorized for the purpose by the Management.
3. To avoid danger while reversing the trackless vehicles especially at the embankment and tipping points, all areas for reversing of lorries should as far as possible be made man free, and.
4. A statutory provision of the fences, constant education, training etc. will go a long way in reducing the incidents of such accidents.
5. Generally, overloading should not be permitted.
6. The truck should be covered and maintained to prevent any spillage.
7. The maximum permissible speed limit should be ensured.
8. The truck drivers should have proper driving license.

7.3.8.3 Measures to prevent Dangerous Incidents during Inundation/Flooding

Inundation of flooding is expected and beneficial for these mines as during this time only the mineral reserve gets replenished.

1. During monsoon months and heavy rains the mining operations are ceased.
2. There should be mechanism/warning system of heavy rains and discharges from the upstream dams.

7.3.8.4 Measures to Prevent Quick Sand Condition

1. The only way to avoid quick sand condition is by avoiding mineral lifting below water table.
2. The critical hydraulic gradient (i_{cr}) should be maintained at less than 1 to prevent high artesian pressure in a coarse sand area.
3. At least 0.5 m sand bed should be left in-situ while harvesting sand from riverbed.

7.3.8.5 Measure to Prevent Drowning

1. The mining should be done under strict supervision and only during the dry season.
2. Deep water areas must be identified.
3. No go zones should be clearly marked and made aware to the mine workers.

7.4 NATURAL RESOURCE CONSERVATION

Mineral extraction at the concave side of the river channel should be avoided to prevent bank erosion. Similarly meandering segment of a river should be selected for mining in such a way as to avoid natural eroding banks and to promote mining on naturally building (aggrading) meander components.

7.5 REHABILITATION & RESETTLEMENT

The mine lease area is designated as Government waste land and has no human settlements and hence, no R & R is envisaged. However Social development of village will be considered as per social activities. Provision and maintenance of protective works like drains, parapet walls, retaining walls, check dams, Management of Air and water quality, Management of Waste, top soil, infrastructure and mining machinery disposal, Safety and security. The resources required for management of these operations will be supervision, raw materials (mainly stone available at mines), gates, fencing, transport and Communication. All the above operations will be carried out in three months' time.

7.6 CORPORATE SOCIAL RESPONSIBILITY

Corporate Social Responsibility (CSR) is a Strategic Business Management concept through which a company integrates social & environmental concerns in their business operations and can achieve a balance of economic, environmental & social imperatives. Furthermore, at the same time attends to the expectations of shareholders & stakeholders. Through it the company can make valuable contribution to poverty reduction. The CSR refers to responsibility of a company to ensure positive impact on environment, consumers, employees, communities,

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stakeholders and all other members of public sphere. In India, it is comparatively a new but rising concept and the companies are going through the learning curve. The CSR activities are increasingly being taken up by the project proponents not only as fulfilling of mandatory provisions but also for formation and enhancement of brand image. Besides all, CSR is seen more as a responsibility towards society rather than a business philosophy. It is the need of the time for expansion of occupational welfare. Keeping in mind these codes of belief, we have identified some activities which may propose to undertake for the benefits of the people living in the study area. This will not only improve the socio-economic status of the people but also enhance the reputation of the project proponent among the community. The following activities are proposed to be taken up for the benefits of the local community:

- Providing employment opportunities.
- Vocational training for skill development to the local youth.
- Educational scholarships and study materials to the meritorious students belonging to BPL.
- Providing drinking water facilities to nearby schools.
- Providing medical assistance/medicines to the local people.

Other activities as Corporate Environmental Responsibility (CER) will be incorporated in Final EIA based on the request of locals during public hearing.

Chapter 8 : PROJECT BENEFITS

8.1 GENERAL

The operation of the project will protect against widening of river channel and flooding of adjoining areas due to non removal of sediments, bring overall improvement in the locality, neighborhood and the state by bringing industry, roads, water supply, electricity, employment, living standard and economic growth.

8.1 BENEFIT OF MINING

- Protecting banks
- Reducing submergence of adjoining agricultural lands due to flooding.
- Reducing aggradation of river level.
- Generating useful economic resource for construction.
- Generating employment and improvement of socio-economic conditions of nearby habitats.

8.2 EMPLOYMENT

The socio-economic conditions of the surrounding villages indicate that employment generation is seasonally. The occupational activities are agriculture, cattle rearing and employment in mines but on daily wages. The mining activity will provide employment to local people which will increase socio- economic status of the area.

The total direct manpower requirement for the proposed mining operation will be around 120 significant indirect employments are also expected due to the associated activities. This project operation will provide livelihood to the poorest section of the society. Depending upon the General shifts working, following will be the proposed manpower.

8.3 IMPROVEMENTS IN PHYSICAL AND SOCIAL INFRASTRUCTURE

The opening of the proposed project will enhance the socio-economic activities in the adjoining areas. This will result in following benefits: -

- Improvements in physical infrastructure.
- Improvements in Social Infrastructure.

- Increase in Employment Potential
- Contribution to the Exchequer.
- Prevention of illegal mining.
- During and Post-mining enhancement of green cover.

8.4 IMPROVEMENTS IN PHYSICAL INFRASTRUCTURE

The proposed project will improve the physical infrastructure of the adjoining areas. This will include the following: -

- Improved road communication due to opening of the proposed project.
- Strengthening of existing community facilities through the Community Development Programme.
- Creation of community assets (infrastructure) like provision for drinking water, construction of school buildings, village roads/ linked roads, dispensary & health centre, community centre, market place etc.
- Skill development & capacity building like vocational training, income generation programs and entrepreneurship development program.
- Literacy program, adult education, assists formation of Village Working Group (VWG), Mahila Mandal etc.
- Awareness program and community activities, like health camps, medical aids, family welfare programs, immunization camp sports & cultural activities, plantation etc.

8.5 IMPROVEMENTS IN SOCIAL INFRASTRUCTURE

There will be some obvious changes in various environmental parameters due to mining activity. Increase socio-economic activities, creation of new employment opportunities, infra-structural development, better educational and health facilities.

Following are the specific impacts:-

Socio-Economic: - There will be positive impact in socio-economic area due to increased economic activities, creation of new employment opportunities, infrastructural development and better educational and health facilities.

Table 8.1: Budget for Corporate Environmental Responsibility (CER)

S.No	Activities	Capital cost (Lakh)	Recurring Cost (lakh)
1	Donation of 4 plastic waste shredder machine @ Rs. 1.5 lakh/ machine	6.0	0.1
2	Donation of 4 plastic waste compactor machine @ Rs. 1.5 lakh/ machine	6.0	0.1
3	Distribution of 2 solar lights in nearby village @ Rs. 0.25 lakh/ light	0.5	0.4
	Total	12.5	0.60

Table- 8.2, Budget for Occupational Health

Particulars	Recurring Cost per year (Rs.)
For routine checkup	3,00,000
Medical aid as per ESI Scheme	3,00,000
Training	2,00,000
Total	8,00,000

Population dynamics: - Due to the direct and indirect employment potential, there is a scope of migration of people into project area and in the peripheral regions; from nearby areas.

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Health Care facilities: - Lessee will undertake awareness program and community activities like health, camps, medical aids, family welfare camps, AIDS awareness program etc.

Employment Potential: - There is a possibility of creation of direct and indirect employment opportunities due to working of this mine.

The mine will also contribute to the Exchequer of State and Central Government.

8.6 PLANTATION

The management will provide free saplings of fruit and other trees, etc. to local during rain for plantation. This will increase the consciousness in workers and near-by villagers for greenery. Fruit trees can contribute towards their financial gains.

8.7 HEALTH

Periodic medical checkups as per Mines Act/ Rules and other social development and promotional activities will be undertaken. All this will lift the general health status of the residents of the area around mines.

CHAPTER-9: ENVIRONMENTAL MANAGEMENT PLAN

9.1 INTRODUCTION

Environmental Management Plan details the environmental quality control measures which are proposed for this project to achieve the production of 81000 MT/year by complying with the stipulated standard limits specified by State Pollution Control Board and CPCB. The environmental management plan includes all preventive as well as mitigation measures to minimize impact on environment for the mined out stone.

Environmental Management Plan, which is to be implemented in the project has detailed under the following heads:

- Land use pattern and environment
- Air Environment
- Noise Environment
- Water Management
- Solid Waste Management
- Biological Environment including Plantation Development
- Implementation of EMP and Monitoring Program

The mining in the area has been proposed with time bound Management Plan so that impacts on different environmental parameters are least at every stage of mining. Environment Policy approved by Board of Director of Company has been proposed which will deal for the Environment Management cell under the supervision of Manager of Environment Health System. The hierarchy of Environment Monitoring cell is given below

Table 9-1: Environment monitoring cell

S.No.	Designation	Proposed responsibility
1.	Director (Environment, Health & Safety))	Environmental policy and directions
3.	Senior Manager- Environment	Overall in-charge of operation of environment management facilities; Ensuring legal compliance by properly undertaking activities as laid down by various regulatory agencies from time to time and interacting with the same
4.	Engineer – Environment	Secondary responsibility for environment management and decision making for all environmental issues & ensure environmental monitoring as per appropriate procedures.

9.2 LAND USE PATTERN

For environmentally friendly mining the following control/abatement measures will be followed:

- Extraction of stone, sand and bajri will be carried out by opencast manual mining and as per approved mining plan.
- After mining operation, the mined-out pit will be used for rain water harvesting.
- Green belt shall be developed with aim to overall improvement of environmental conditions of the area.

9.3 AIR ENVIRONMENT

In order to minimize impacts of mining on air and to maintain it within the prescribed limits of CPCB/SPCB, an Environmental Management Plan (EMP) has been prepared. This will help in resolving all environmental and ecological issues likely to cause due to mining in the area.

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- During the course of mining no toxic substances are released into the atmosphere as such there seems to be no potential threat to health of human beings.
- In the mining activities, the only source of gaseous emissions is from the engines of vehicles. Proper maintenance of engines will improve combustion process and brings reduction in pollution
- The un-metalled haul roads should be adequately compacted before being put into use.
- Water should be sprinkled on these roads periodically every-day (twice in a day), to wet the surface.
- Over loading of transport equipments should be avoided to prevent spillage.
- During the transportation covered vehicles to prevent fugitive dust emission.
- Regular checking and maintenance of vehicles should be conducted once in every two months and Pollution Under Control (PUC) certificate to be obtained.
- It will be ensured that all transportation vehicles carry a valid PUC certificate.

9.4 NOISE ENVIRONMENT

- Proper maintenance of all machines will be carried out, which help in reducing generation of noise during operations.
- No other equipments except the transportation vehicles - tractors/tippers/trucks to bring mineral to the stone crusher site which shall be kept under control by proper lubrication and the working would only be done during day time to keep noise level below the permissible limit prescribed.
- Ear plugs will be provided to workers during the operational hours of mine.
- Periodical monitoring of noise will be done to adopt corrective actions wherever needed.
- Plantation will be taken up along the approach roads. The plantation minimizes propagation of noise and also arrests dust.

9.5 WATER ENVIRONMENT

During the operational phase of mine no waste water or industrial effluent will be generated. The environmental management for water pollution control includes:

- Water requirements for drinking, plantation and dust suppression will be met by tanker supply on the daily basis. During the phase of operation: No waste water and industrial effluent will be generated.

The following mitigation measures should be in application on project site:

- Local people will be employed and no permanent housing will be done on the project site so no permanent drainage pattern for sewerage system is required as domestic sewage shall be disposed off into septic tank followed by soak pits.
- Mining activities will not intersect the ground water level.
- Monitoring of water quality of nearby surface water, ground water and domestic water will be conducted once in every season except monsoon to evaluate the performance of the mitigation measures.

9.6 BIOLOGICAL ENVIRONMENT

To study the floral and faunal diversity of the 10 km radius a detailed biological study has been carried out and suggested mitigation measures are proposed therein so that there will be no impact on the biological diversity of the forests falling in the proximity of the site.

9.7 GREENBELT DEVELOPMENT

The greenbelt development plan aims to overall improvement in the Environmental conditions of the region. The plan with a five-fold objective addresses issues such as prevention of land degradation due to activities during construction phase, enhancing the forest cover for increasing the biodiversity of the region; providing aesthetic value to the project area, combating soil erosion and enhancing the ecological equilibrium of the area.

Further, trees are guard of nature and perform many ecological functions including maintaining soil moisture, restricting soil erosion, regulating the temperature. Greenbelts are an effective mode of control of air pollution, wherein large foliage surface is capable of absorbing air pollutants and forming a sink for pollutants. Leaves with their vast canopy, absorb pollutants on their surface, thus effectively reduce pollutant concentration in the ambient air.

In a mining project, plantation and greenbelt is one of the important methods for environmental improvement and to mitigate air and noise pollution. Plants act as a barrier to break the wind

speed as well as allow the dust and other particulates to settle on the leaves. It also helps to reduce the noise level at large extent.

Table 9-2: Details of number of plantation under various components

S.No	Particulars	Area
1	Mine lease area	4.8307 Ha
4	33% of the mine lease area	1.59Ha
5	Life of mine	Replenish every year
6	Total Number of Plant to be planted@ 1500 plant/ ha	2390Nos.
7	Survival @ of 90%	2151Nos.

9.7.1 Selection of Plant Species for Green Belt Development

The selection of plant species for the greenbelt development depends on various local factors such as soil condition, water availability, climate, elevation, etc. The selected plant species for plantation would exhibit following characteristics:

The species should be fast growing and providing optimum penetrability.

- The species should be deep rooted and wind-firm.
- As far as possible, the species should be indigenous and locally available.
- Species tolerance to air pollutants likes PM, SO₂ and NO₂ should be preferred.
- Trees with high foliage density, larger leaf area and hairy on both the surfaces should be preferred.
- Ability to with stand adverse conditions like inundation, high wind speed and drought.
- Soil improving plants (Nitrogen fixing, rapidly decomposable leaf litter).
- Attractive appearance with good flowering and fruit bearing.
- Birds and insects attracting tree species.
- Sustainable green cover with minimal maintenance.
- The plantation will be undertaken with the local plant species for maximum survival. The region experiences scanty rainfall. Therefore, sapling of plants requiring less water will be elected.

9.7.2 Recommended plant species for Green Belt and Plantation

Based on the assessment and environmental conditions, suitable plant species has been proposed for plantation and green belt development. The lists of recommended tree species are given in the Table 10.3.

Table 9-3: Recommended plant species for Green Belt and Plantation

Scientific Name	Common Name	Family	Habitat
<i>Dalbergia Sissoo</i>	Shisham	Fabaceae	Tree
<i>Albizia Lebbeck</i>	Siris	Fabaceae	Tree
<i>Senegalia Catechu</i>	Khair	Fabaceae	Tree
<i>Syzygium Cumini</i>	Jamun	Myrtaceae	Plant
<i>Citrus X sinensis</i>	Orange	Rutaceae	Tree
<i>Chamaedorea Seifrizii</i>	Seifrizii Bamboo	Poaceae	Plant

Plantation operations and practices

Plantation operations and practices for greenbelt involves certain strategy such as, procurement /development of seedlings/saplings of the plant species, Land/site preparation for transplanting/seeding, Transplanting, and Post-transplanting maintenance under the guidance of a field -oriented professional or field staff of the Forest Department.

(A)Development of planting material: The seedlings and saplings could be raised in nursery in poly bags of standard size. The healthy certified seed material should be used for this purpose. These materials can also be arranged on demand from the nurseries owned by Forest Department or private organizations. Healthy and disease-free planting material is pre-requisite for success of the plantation.

(B) Site preparation: This activity need be undertaken well in advance before monsoon. Thorny bushes and weeds need to be removed completely from the site. For planting seedling/sapling, pits of appropriate size (1×1×1m for tree species, 0.5×0.5×0.5 m for shrub species) need be prepared well in advance. The top soil of 30 cm depth need be kept aside for mixing with manure/ fertilizer. After digging, the pit must be kept unfilled and uncovered so that sterilization

through sun rays could occur. It should follow by filling stone -free soil (3 part) and well-decomposed weed-free compost (1 part). For improving soil fertility, neem/castor/ground cake can be used. The basal dressing of urea, ammonium phosphate, potassium sulphate or DAP could be applied.

(C) Seeding and Transplanting: This operation must be done after rain showers. The plantation should be done in rows following 3m×3m spacing both row to row and plant to plant using healthy seedling/sapling. While planting, the poly bag should be moistened first. The planted material should be watered slowly to avoid soil disturbances.

(D) Post-planting maintenance: The transplanted saplings need attentive care for complete one year at least, followed by care during stressful seasons particularly. The maintenance operations include watering, removal of weeds, prevention and control of diseases and pests using bio-pesticides preferably, trimming and fertilization. No specific amount could be mentioned for watering etc., as it is selective to species, hence, based on field conditions, the maintenance activities should be done. The gaps caused on account of mortality, should be filled by replanting the same species.

Table 9-4: Budget for Green Belt

Particulars	No. of plants	Capital Cost (in Rs.)	Recurring Cost(in Rs.)
Capital cost@100/ plant (The budget includes cost of digging of pits, fertilizers, saplings and maintenance)	2390	239000	23900
	Total Cost	239000	23900

9.8 OCCUPATIONAL HEALTH & SAFETY

As regards occupational health and safety are concerned, the employed staff would be provided with adequate safety implements and also be periodically trained in the TV programmes to observe and use them. Strict vigilance would be maintained as is our usual practice for

observance of safety aspects in working atmosphere. Health of workers is of primary concern in our organization. Regular medical checkup for the workers will be conducted as per statutory requirements.

9.9 SOCIAL-ECONOMIC ENVIRONMENT

Study on Socio-economic status has already been carried out using primary socioeconomic survey for generating the baseline data of Socio-economic status.

9.9.1 Human Settlement

There is no habitation within the lease area. Therefore, neither villages nor any settlement will get disturbed during the entire life of the mine. As the mining operations will not disturb or relocate any village or settlement, no adverse impact is anticipated on any human settlement.

9.9.2 Employment

The mining operations will provide employment to local people. Various indirect employment opportunities will also be generated. Such as employment through contractors, running of jeeps, trucks, tractors and buses on hire different kind of shops and transport related business avenues.

9.9.3 Development of Region

The project will provide impetus to industrialization of the area. Company will follow its community development policies for the region. Training of employed workers to improve their skills for safe workings will be given. Free medical camp will be organized for the villagers. Company will co-operate with the Government for the development of the area, nearby schools and basic amenities.

9.10 SOLID WASTE MANAGEMENT

- The wastage material in the form of slit/clay excavated along with mineral shall be separated by screening and washing and dumped at the appropriate dumping site. The waste material (slit) shall be used for the maintenance of the approach road to the various

access roads of the project components in road filling. Granular sub-base for works and plantation works etc.

- There is no toxic element present in the mineral which may contaminate the soil

9.11 ENVIRONMENTAL MANAGEMENT SYSTEM

Company shall conduct all its operations in a manner that is protective of the environment and health & safety of employees, customers and the community. In fulfillment of this commitment, they shall maintain continuing efforts to:

- Ø Comply with all applicable safety, health and environment laws and regulations.
- Ø Enhance Safety, Health and Environment (SHE) awareness among employees and associated stakeholders through effective communication and training.
- Ø Investigate all workplace incidents and illness in order to promptly correct any unsafe conditions or practices.
- Ø Integrate SHE considerations into business planning and decision making.
- Ø Champion SHE responsibility among our employees in their practices, and promote & value their involvement in achieving the goals of this policy.

9.11.1 Cost of Environment Control measures

As a part of responsibility towards protection of environment, project proponent has allocated budget for regular Environment monitoring and Environmental management. The same is detailed in Table 9.5.

Table 9-5: Environmental Monitoring cost

Components	Schedule and duration of monitoring	Implementing agency	Approx. unit cost (per location)	Total cost (per year in Rs.)
Air	Twice a year except monsoon (at 5 stations) for PM ₁₀ , SO ₂ , NO ₂	SJVN	5000	50000

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Water	Twice in a year (at 5 stations)	SJVN	3000	30,000
Noise	Twice in a year (at 5 stations)	SJVN	3000	30,000
Soil	Twice in a year (at 5 stations)	SJVN	3000	30,000
Total				140,000

The breakup for Environment Management Plan for capital cost of Rs.4.99 Lakhs and Recurring cost of Rs. 6.139 Lakhs given below.

Table 9-6: Cost of Environmental Management Plan

S.No	Title	Capital Cost (Rs in Lakhs)	Recurring Cost in Lakhs)	Time line
1.	Monitoring of Air, Water, Soil, etc. twice in a year.	--	1.40	Once in a six month (As per CPCB guideline)
2	Green Belt Development	2.39	0.239	As per norms recurring cost for next three years
3	Occupational Health Measures Provision of PPE, First Aid and other, miscellaneous expenditure.	0.10	1.75	As per requirement
4	Road Maintenance Cost (0.800 km)	2	0.50	During mining period
5	Environmental Training /awareness campaign	0.5	0.75	Twice in a year
6	Pollution abatement-Water	0	1.5	Twice a day during

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	sprinkling			mining
Total		4.99	6.139	----

Chapter 10 : SUMMARY & CONCLUSION

10.1 GENERAL

The chapter discussed about the summary of whole EIA/EMP report along with recommendation and conclusion. The proposed mining lease area falls in India Toposheet No. H43E9 restricted. The lease area located near Mauza Alampur, Mohal Bagh, Tehsil Jaisinghpur, District Kangra, Himachal Pradesh.

Table 10-1: Detail of the project

S no.	Particulars	Detail
A	Nature and size of the Project	Extraction of Stone, Sand and Bajri falling in Mauza Alampur, Mohal Bagh, Tehsil Jaisinghpur, District Kangra, Himachal Pradesh.
B	Location	
	Mouza & Mohal	Alampur & Bagh
	Tehsil	Jaisinghpur
	District	Kangra
	State	Himachal Pradesh
	Toposheet no.	H43E9
C	Lease Area Detail	
	Lease Area	04-83-07 Ha.
	Type of Land	Pvt. Land
	Site elevation range	509 m AMSL to 508m AMSL
D	Cost Detail	
	Cost of the Project	30Lakh
	Cost for EMP which includes conservation of Sch-I, CER and OHS	4.99 Lakh- Capital and 6.139 Lakh for recurring cost
	Cost of CER	12.5 Lakh- Capital and 0.6 Lakh for recurring cost; The cost will be decided as per requirement during

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	public hearing																																													
Cost of Occupational Health & safety	0.10 Lakh for capital cost and 1.75 Lakh for recurring cost																																													
E	Detail of Environmental Setting																																													
Ecological Sensitive Areas (National Park, Sanctuary, Reserve/ Protected Forest etc.) within 10km radius	<table border="1"> <thead> <tr> <th>S.No</th> <th>Name of the forest</th> <th>Distance and Direction</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Open Forest</td> <td>7.20 Km, NW</td> </tr> <tr> <td>2</td> <td>Open Forest</td> <td>3.2 Km, NW</td> </tr> <tr> <td>3</td> <td>Open Forest</td> <td>5.2 Km, NW</td> </tr> <tr> <td>4</td> <td>Open Forest</td> <td>6.8 Km, NW</td> </tr> <tr> <td>5</td> <td>Dhardhur PF</td> <td>6.5 Km, NW</td> </tr> <tr> <td>6</td> <td>Har Balakrupi PF</td> <td>5.1 Km, NW</td> </tr> <tr> <td>7</td> <td>Bandaaur PF</td> <td>7.3 Km, SW</td> </tr> <tr> <td>8</td> <td>Jhin PF</td> <td>9.0 Km, SW</td> </tr> <tr> <td>9</td> <td>Karot PF</td> <td>8.5 Km, SW</td> </tr> <tr> <td>10</td> <td>Open Forest</td> <td>5.1 Km, SE</td> </tr> <tr> <td>11</td> <td>Open Forest</td> <td>6.5 Km, SE</td> </tr> <tr> <td>12</td> <td>Open Forest</td> <td>5.8 Km, NE</td> </tr> <tr> <td>13</td> <td>Open Forest</td> <td>9.6 Km, NE</td> </tr> <tr> <td>14</td> <td>Uttrapur PF</td> <td>9.5 Km, NE</td> </tr> </tbody> </table>	S.No	Name of the forest	Distance and Direction	1	Open Forest	7.20 Km, NW	2	Open Forest	3.2 Km, NW	3	Open Forest	5.2 Km, NW	4	Open Forest	6.8 Km, NW	5	Dhardhur PF	6.5 Km, NW	6	Har Balakrupi PF	5.1 Km, NW	7	Bandaaur PF	7.3 Km, SW	8	Jhin PF	9.0 Km, SW	9	Karot PF	8.5 Km, SW	10	Open Forest	5.1 Km, SE	11	Open Forest	6.5 Km, SE	12	Open Forest	5.8 Km, NE	13	Open Forest	9.6 Km, NE	14	Uttrapur PF	9.5 Km, NE
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Nearest Town	Sujanpur-Tihra approx. 1.54 Km in SW direction																																													
Nearest Railway Station	Sulah Railway Station approx. 25.29 Km in NW Direction																																													
Nearest National Highway	Maranda-Hamirpur Sujanpur Road SH-39 approx 0.6 Km West.																																													
Nearest Airport	Dharamshala Airport approx 43 Km, NW																																													
Seismic Zone	Zone-IV																																													

10.1.1 Introduction

As per MoEF&CC, New Delhi Gazette dated 14th September 2006 and amended thereof, the proposed mining project is categorized as category 'B1'.

10.2 PROJECT DESCRIPTION

Extraction of Stone, Sand and Bajri falling in Mauza Alampur with production of 81000 MT/year(Excluding waste) (ROM) in the mine lease area (MLA) of 04-83-07 Ha. Mining in general will be carried out by open cast manual mining method. The mine lease area is located in Mauza - Alampur, Tehsil - Jaisinghpur and district - Kangra, Himachal Pradesh. The MLA is covered in the Survey of India Toposheet No. H43E9.

Water requirement for Drinking /Domestic purpose, plantation and dust suppression will be 9.3KLD, which shall be met from water tanker after getting permission Gram Panchayat, Jol.

Production-81000 MT/year (Excluding waste)

Life of Mine - Continuously replenished.

10.3 DESCRIPTION OF ENVIRONMENT

Environmental data has been collected in relation to proposed mining for Air, Noise, Water, Soil, Socio-economic and Ecology & Biodiversity. The generation of primary data as well as collection of secondary data and information from the site and surroundings was carried out during winter season i.e. December' 2021 to February' 2022. The EIA study is being done for the Mine Lease (core zone) and area within 10 Km distance from mine lease boundary (buffer zone), both of which together comprise the study area. The project site falls under seismic zone V.

10.3.1 Air Environment

The AAQ survey has been carried out at 7 locations within the study zone. Measurement of the actual, PM₁₀, PM_{2.5}, SO₂, NO₂, levels help to understand the existing environmental scenario. The results of SO₂, NO₂, PM₁₀ and PM_{2.5} & are expressed in µg/m³, expressed in mg/m³. Various statistical parameters like standard deviation, geometric mean, minimum, maximum

concentrations and different percentiles have been computed from the data generated during sampling in all stations.

- Ambient Air quality monitoring results reveals that the minimum and maximum concentration of PM10 for all 7 monitoring stations location was found to be 37.03 $\mu\text{g}/\text{m}^3$ at Jangal Beri & Bakharla and 70.87 $\mu\text{g}/\text{m}^3$ at Sujanpur Tira respectively.
- The minimum and maximum concentration of PM2.5 was 26.93 $\mu\text{g}/\text{m}^3$ at Jangal Beri and 47.92 $\mu\text{g}/\text{m}^3$ at mine site respectively.
- The minimum and maximum concentrations for SO₂ were found 4.36 $\mu\text{g}/\text{m}^3$ at Jangal Beri and 8.46 $\mu\text{g}/\text{m}^3$ at Marera respectively.
- The minimum and maximum concentrations for NO₂ were found 7.23 $\mu\text{g}/\text{m}^3$ at Jangal Beri and 17.13 $\mu\text{g}/\text{m}^3$ at Mine Site respectively.

10.3.2 Water environment

Analysis result of Surface water:

- pH was observed in the range of 7.24 – 8.04 which meets with desirable norms.
- Total Dissolved Solid (TDS) were recorded in the range of 233 mg/L – 252 mg/L with minimum at downstream of Beas river near Mehru (SW3) maximum at downstream of Beas river near Sujanpur Tira (SW2).
- Total Hardness was in the range of 141.0 mg/L to 179.0 mg/L with minimum at downstream of Beas river (SW2) and maximum at upstream of Beas river (SW1).
- Total Alkalinity was found in the range of 149- 205 mg/L with minimum at upstream of Beas river and maximum at downstream of Beas river near Mehru (SW3).
- Chloride was found in the range of 40.6 to 53.0 mg/L and Sulphate varies from 16.0 to 30.0 mg/L.
- Iron was found in the range of 0.20 - 0.27 mg/L with minimum at downstream of Beas river (SW3) maximum at upstream of Beas river (SW1).
- DO was found in the range of 6.4 mg/L to 7.7 mg/l with minimum at downstream of Beas river (SW3) and maximum at downstream of Beas river (SW2).

- BOD and COD were found in the ranges of 4.3 mg/L to 8.0 mg/L and 25.0 mg/L to 40.0 mg/L respectively.

Analysis results of Ground water;

All the results are above permissible limits as per IS:10500 standards for drinking water. It can be concluded from the sampling results that at majority of locations TDS, Hardness, Calcium, Total Alkalinity, Chloride and Magnesium are high and above permissible limits. From the results, it is can be concluded that due to over exploitation groundwater in this region cannot be used directly for drinking purpose and without proper treatments.

- pH was observed in the range of 7.23 – 8.08 which meets with desirable norms.
- Total Dissolved Solid (TDS) were recorded in the range of 241 mg/L – 249 mg/L with minimum at Bagh village and maximum at Sujanpur Tira village.
- Total Hardness was in the range of 109.09 mg/L to 125.42 mg/L with minimum at Bhadola village and maximum at Bagh village.
- Total Alkalinity was found in the range of 159.00 - 170.00 mg/L with minimum at Bhadola village and maximum at Marera village.
- Chloride was found in the range of 23.92 mg/L to 27.54 mg/L and Sulphate varies from 11.79 to 12.94 mg/L.
- Iron was found in the range of 0.14 - 0.21 mg/L

Soil environment

The analysis results show that soil is basic in nature as pH value ranges from 7.21 at Jangal Beri to 7.71 at Bhadola. The organic matter found within the study area with minimum 0.38 % at Sujanpur Tira and maximum of 0.46% at Jangal Beri. The concentration of Phosphorus and Potassium has been found to be in good amount in the soil samples.

10.3.3 Noise environment

The minimum noise level of 46.4 L_d during day time was recorded at Jangal Beri, maximum at Mine site was 58.7 L_d. Minimum Noise level of 32.5 L_n during night time was at Bhadola maximum at project site 47.5 L_n.

It was observed that the values obtained were within the prescribed Ambient Noise Quality Standards with respect to Noise indicated no industrial activity in the study area.

10.3.4 Socio-economic Environment

The implementation of the Sand, Stone & Bajri extraction project on Beas river will throw opportunities to local people for both direct and indirect employment.

The study area is still lacking in education, health, housing, water, electricity etc. It is expected that same will improve to a great extent due to proposed mining project and associated industrial and business activities.

10.3.5 Biological Environment

Flora of the Core Zone

The core zone comprises of river sand bed by the side of water channel of Beas river basin, where extraction is proposed. No ecologically sensitive plant species has been reported from this area.

Flora of the Buffer Zone

The study area comprise of Sub-Tropical Dry Deciduous Vegetation. Several tropical elements can be seen scattered in the area. Species of *Saccharum*, *Calotropis*, *Vitex*, *Zizyphus*, etc. are of common occurrence. Tree species viz. *Acacia catechu*, *Albizia lebbek*, *Dalbergia sissoo*, *Morus alba*, etc. are found planted along the boundary of the agricultural lands and along the road sides. Ground vegetation mainly consists of grasses and small shrubs. Among the grasses, *Vetiveria Zizanioides*, *Cenchrus ciliaris* are very common in the area. Useful fodder grasses, *Cynodon dactylon*, *Eleusine indica*, *Trifolium alexandrinum*, etc. are present in the proposed project area.

The large weeds which infest uncultivated tracts are *aak* (*Calotropis procera*), *arind* (*Ricinus communis*), *datura* (*Datura metel*) and *thor* (*Opuntia stricta*). Other noxious weeds and those which appear in crops are *pohlior* thistle (*Carthamus oxyacantha*), *shialkanta* (*Argemone mexicana*), *kandyari* (*Solanum virginianum*) and *bhanga* (*Cannabis sativa*).

Fauna reported in Core zone:

During the faunal survey in the area no wildlife corridor or movement of animals was recorded from proposed project area. No established habitats of any mammals or birds are noticed in river bed and along the banks. No bird's habitats like nesting, breeding and forging patterns are

noticed in the core zone. Local birds are noticed crossing over the banks in search of food. No fixed pattern in migratory behaviour is noticed.

Many domesticated mammal species are reported from buffer zone during the field survey. Common domestic animals like Buffalo, cow, goat etc. can be noticed in open grass fields while grazing. Small mammals like Indian hare (*Lepus nigricollis*), Indian Palm Squirrel (*Funambulus palmarum*) and field mouse (*Apodemus sylvaticus*) are noticed in vicinity of the village.

Birds like Jungle Myna (*Acridotheres fuscus*), Common Myna (*Acridotheres tristis*), Spotted Owl (*Athene brama*), Cattle Egret (*Bubulcus ibis*), Pied kingfisher (*Ceryle rudis*) etc are of common occurrence.

The reptilians species commonly reported are Common Toad (*Bufo melanostictus*) in settlement area, Garden lizard (*Calotes versicolor*) and Krait (*Bungarus caeruleus*) along shady places in agricultural field or where growth of bushes is noticed.

10.4 ANTICIPATED ENVIRONMENT IMPACT AND MITIGATION MEASURES

10.4.1 Land Environment

The lease area is a government waste land and falls in Mauza Alampur. The highest elevation is 509 m AMSL and lowest elevation is 508 m AMSL within the lease area.

The Mining Lease area falls within Gair Mumkin Dariya and Pvt. Waste Land and there is no reserves forest or protected forest land within the lease area.

Mitigation Measures

- A substantial plantation program was carried out undertaken along the public road and riparian zone of the mine lease area.

10.4.2 Water Environment

Anticipated Impact

- No water is discharged to environment from Stone, sand and bajri mining at the project site.
- The mining will not intersect ground water table (aquifer) thus avoiding a major impact on water regime.

Mitigation Measure

- No waste water will be generated from the mine.
- No toxic water will be generated.
- Water monitoring will be done on time to time basis.

10.4.3 Air Environment

Anticipated Impacts

- Mining Operation carried out by opencast manual methods generate dust particles due to loading & unloading of stone, sand and bajri and during transportation.
- The dust liberated in mining and other related operations is injurious to health if inhaled in sufficient quantity.
- Gases, such as, Sulphur Dioxide, Oxides of Nitrogen etc. from vehicular exhaust.

Mitigation Measures

- Proper mitigation measures like water sprinkling will be adopted to control dust emissions.
- Masks will be provided to workers.
- To control the emissions regular preventive maintenance of equipment will be carried out on contractual basis.
- Mineral transportation will be carried out by covering the mineral from tarpaulin to avoid the spillage and creation of dust pollution.

10.4.4 Soil Environment

Anticipated Impact

No major impact on soil of the study area is envisaged due to mining activities as there is no waste water, heavy metal, and fugitive emission shall remain confined locally within working area and emission at haul roads will be controlled by water sprinkling and plantation.

Mitigation for Soil Environment

There is no waste water & toxic water will be generated.

10.4.5 Noise Environment

Anticipated Impact

- Transportation vehicles used for the transportation of mineral are a source of noise pollution at the site.
- Loading & unloading of minerals also source of noise pollution.

Mitigation Measures

- No other equipment except the transportation vehicles will be allowed.
- Noise generated by these equipments shall be intermittent and does not cause much adverse impact.
- Proper maintenance of all transport vehicle will be carried out which help in reducing noise during operations.
- Dense plantation will be taken up along the approach roads and boundary of the mine lease area. The plantation minimizes propagation of noise and also arrests dust.

10.4.6 Biological Environment

Anticipated Impact

- Disturbance to free movement / living of wild fauna viz. Birds, Reptiles etc.
- Impact on upstream and downstream water quality

Mitigation Measures for minimizing the impacts on the Biological Environment

The impact of the mining activities on the biological environment could be mitigated to a large extent by adopting suitable scientific and technological interventions. Scientific mining operations accompanied by ecological restoration and regeneration of mined wastelands are the solutions for environmental improvement. Following measures will be implemented to minimize the impact of mining on flora and fauna of the study area:

- ✓ Dust is mainly generated due to unpaved roads and fugitive dust emissions by various mining activities. To mitigate the impact, regular water sprinkling will be carried out within the mine lease area as well as unpaved roads.

- ✓ Green belt development will be carried out in the demarcated area for plantation which will help in minimizing adverse impact of dust and noise.
- ✓ Use of plastic bags shall be strictly prohibited in the project area.
- ✓ If birds are noticed crossing the core zone, they will not be disturbed at all;
- ✓ Labours will not be allowed to discard food, plastic etc., which can attract animals/birds near the core site;
- ✓ Only low polluting vehicles having PUC will be allowed for carrying mining materials.
- ✓ Noise level will be maintained within permissible limit (silent zone-50dB (A) during day time or residential zone 55dB (A)) as per noise pollution (regulation and control), rules, 2000, CPCB norms
- ✓ The riparian ecosystem or the wetlands will not be destroyed by the mine owners
- ✓ Water quality will be monitored from upstream and downstream area to assess the impact on water quality and plankton and mining activity will be controlled to maintain the clean water conditions.

10.4.7 Impacts on Socio-Economic Environment

1. Impact on Demographic Composition

There will be no significant increase in overall population of the study area as preferably local people will be recruited for employment. Hence, there will be no significant impact on the population composition in the study area. Since there will be no significant change in population, the overall sex ratio will remain more or less same.

2. Impact on Employment Opportunities

The mining project will generate direct & indirect employment. About 120 people will get employment with allied and related industries, such as transportation, maintenance, etc. The benefits of employment to the job seekers are expected to include, at a household and individual level, an increase in socio-economic and health status, improvement to their quality of life & living condition, and the benefits from greater household expenditure on education & healthcare resources.

3. Impact on Law & Order

No major law & order problem is envisaged due to the proposed project. It is expected that the workers will attend to their duties from their residences and return to their homes after the day's work.

By following the environmental guidelines related to the project, this project would be beneficial for the people by generating employment opportunities. This would lead to income generation and improve the socio-economic status of the household. It will help in the revenue generation and the overall economic development of the state.

10.4.8 Solid Waste

During mining, low-grade minerals like silt/clay as mine waste will be generated. Part of this mine waste will be used for maintenance of roads etc. and remaining material can be stacked at proper place for utilization of this material in future during road construction or some other uses as alevelling and filling material

Anticipated Impact

- No loss of vegetation and wildlife habitat is anticipated.
- Impact on surrounding agricultural land shall be negligible.
- Impact on groundwater quality due to leachate shall be negligible.
- Impact of hazardous wastes and liquids is not anticipated so that the mine waste is in the form of silt and clay.

Mitigation measures

- Mine waste will be used for maintenance of roads
- Plantation program will be carried out.
- Precaution will be taken for landslide control and slope also maintained.

10.4.9 Traffic Density

Not much impact on local transport as only 8 (hours of shifts with effective 6.5 hrs of working) x 180 trips/hour (up and down) = 60 tipper/day will be required for transport of mineral from mine. The LOS value from the proposed mine may be "Very good" for district road. So, the additional

load on the carrying capacity of the concern roads is not likely to have any significant adverse effect.

Mitigation measures

- It is being ensured that all transportation vehicles will carry a valid PUC certificate.
- Speed limit of the vehicles will be followed. To avoid accidents the speed of vehicles will be low near habitation areas.
- Un- necessary blowing of horn will be avoided

10.5 ANALYSIS OF ALTERNATIVES

No alternative site had been considered since proposed as, it is site specific.

10.6 ENVIRONMENTAL MONITORING PROGRAMME

Company has formulated well laid-out Environmental Policy, wherein preservation of environment has been accorded a most strategic and prime position. The various protocol procedures in connection with communication channels upwards and downwards, for dealing with violations or departures in environmental standards involvement of Board of Directors as well as shareholders about such incidences, etc.

Regular monitoring of implementation of various control measures in respect of air quality, meteorology, water quality, noise levels, biological status, land environment, socioeconomic factors, occupational health, etc. is most important to ensure that the project operations do not deteriorate the environmental status of the area at any point of time and environmental quality in respect of above parameters are kept well within the statutorily sustainable levels, as prescribed by CPCB, MoEF&CC and State Pollution Control Board.

A full-fledged environment cell is operating in the Company. This cell will undertake effective monitoring and implementation of various environmental control measures promptly and effectively and to oversee various environmental management schemes for air quality control, water quality status, noise level control, plantation programmes, social development schemes, etc. in the working mines in the area.

The total costs for environmental Management Plan, excluding man power cost, work out to Rs.4.99 lakhs for capital cost and Rs. 6.139Lakh recurring cost.

10.7 ADDITIONAL STUDIES

M/s Company has formulated a disaster management plan for Emergency Preparedness & Responses.

Risk assessment with respect to high accidents like landslides, subsidence, flood, inundation, fire seismic activities, tailing dam failure etc.

II. Disaster Management Plan:

The Disaster Management Plan (DMP) is a guide, giving general considerations, directions, and procedures for handling emergencies likely to arise from planned operations. The copy of DMP well be kept at Lessee's Mines office for ready reference.

The objective of on-site disaster management plan for the captive mine is to be in a state of perpetual readiness through training development to immediately control and arrest any emergency situation so as to avert a full-fledged disaster and the consequence of human and property damage and in the event of a disaster still occurring, to manage the same so that the risk of the damage to life and property is minimized.

Care and maintenance during temporary discontinuance:

No major care and maintenance will be required for mining activities during temporary discontinuance, however working pits will be fenced/secured properly and also depute one security guard for watch the area and look after plantation.

10.8 PROJECT BENEFITS

Project has positive impact to the local people as direct and indirect employment opportunity have been generated.

10.9 ENVIRONMENTAL MANAGEMENT PLAN

10.9.1 Air Quality Management

- Proper mitigation measures like water sprinkling on haul roads will be adopted to control dust emissions.
- To control the emissions regular preventive maintenance of equipments will be carried out on contractual basis.
- Plantation will be carried out along approach roads & mine premises.
- It shall be ensured that all transportation vehicles carry a valid PUC certificate.

10.9.2 Water Management

No waste water will be generated from the mining activity of minor minerals as the project only involves lifting of over burden from mine site.

10.9.3 Noise Management

- Periodical monitoring of noise will be done.
- No other equipments except the Transportation vehicles and Excavator (as & when required) for loading will be allowed at site.
- Noise generated by these equipments shall be intermittent and does not cause much adverse impact.
- Plantation will be carried out along approach roads. The plantation minimizes propagation of noise and also arrest dust.

10.9.4 Solid Waste Management

- The wastage material in the form of slit/clay excavated along with mineral shall be separated by screening and washing and dumped at the appropriate dumping site. The waste material (slit) shall be used for the maintenance of the approach road to the various access roads of the project components in road filling. Granular sub-base for works and plantation works etc.

10.10 OCCUPATIONAL HEALTH & SAFETY

- Dust masks will be provided as additional personal protection equipment to the workers working in the dust prone area.
- Workers are informed, kept aware and trained about occupational health hazards, due to such activities and preventive measures.
- Workers health related problem if any, will be properly addressed.

10.10.1 Plantation Development and Program

The green belt plantation programme will be continued till the end of the mining operation in the area. In framing out this programme on a sustainable and scientific base, due consultation and coordination with the forest department will be sought. The plantation will be developed in 1.59Ha (33% of the project area). The overall plantation will be developed at the rate of 1500 saplings /Ha. Plants are chosen to provide aesthetic, ecological and economical value. Trees will help to arrest propagation of noise and help to lessen dust pollution due to dust arresting action

Total cost for green belt development will be Rs. 2.39 lakh as capital cost and Rs 0.239 Lakh as recurring cost.

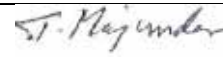
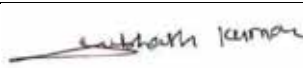


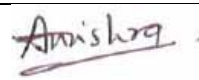
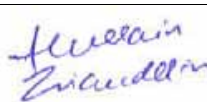

10.11 CONCLUSION

The project has positive impact to the local people as direct and indirect employment opportunity have been generated. There will be no significant pollution of air, water, soil and noise. Regular monitoring of all the components of environment will be done. Increased social welfare measures taken by the company. All possible environment aspects have been adequately assessed and necessary control measures have been formulated to meet statutory requirement.

CHAPTER – 11**DISCLOSURE OF CONSULTANTS ENGAGED**


Name of the Consultant	P and M Solution
Address	C-88, Sector 65, Noida -201301 – U.P
Credentials	Accredited by QCI/NABET valid till Dec. 10, 2022
Laboratory	Noida Testing Laboratory
Address	GT-20 Sector 117 Noida

EXPERTS ENGAGED

S No	Name	EC/FAE	DETAILS	Signatures
1	Subhash Kumar	EC	EC	
2	Tapan Majumdar	FAE	HG, GEO	
3	Subhash Kumar	FAE	SC	
4	Jatin Kumar Srivastava	FAE	EB	
5	R K Tiwary	FAE	RH,AP	
6	Rahul Kumar	FAE	AQ	
7	Neha Singh	FAE	NV	
8	Abhay Nath Mishra	FAE	SE	
9	Hussain Ziauddin	FAE	WP	
10	Poonam Kumari Mangalam	FAE	LU	


Draft EIA/EMP REPORT

Extraction of Minor Mineral (Stone, Sand & Bajri) Measuring 04-83-07 Hectares (Private land, River Bed) Falling in Mauza Alampur, Mohal Bagh, Tehsil Jaisinghpur, District Kangra, Himachal Pradesh by Head of Project, Dhaulasidh Hydroelectric Project (DSHEP) SJVNL

	Quality Council of India National Accreditation Board for Education & Training			
CERTIFICATE OF ACCREDITATION				
<u>P and M Solution</u> First Floor, C-88, Sector-65, Noida, Uttar Pradesh- 201301				
Accredited as Category -A organization under the QCI-NABET Scheme for Accreditation of EIA Consultant Organizations: Version 3 for preparing EIA/EMP reports in the following sectors:				
Sl. No	Sector Description	Sector (as per)		Cat.
		NABET	MoEFCC	
1.	Mining of minerals including opencast / underground mining	1	1 (a) (i)	A
2.	River Valley projects	3	1 (c)	B
3.	Metallurgical industries (ferrous & non-ferrous)	8	3 (a)	B
4.	Highways,	34	7 (f)	A
5.	Building and construction projects	38	8 (a)	B
6.	Townships and Area development projects	39	8 (b)	B

Note: Names of approved EIA Coordinators and Functional Area Experts are mentioned in IA AC Minutes dated December 20, 2019 on QCI-NABET website.

The Accreditation shall remain in force subject to continued compliance to the terms and conditions mentioned in NABET's letter of accreditation bearing no. QCI/NABET/ENV/ACO/20/1223 dated February 3, 2020. The accreditation needs to be renewed before the expiry date by P and M Solution, Noida following due process of assessment.


Sr. Director, NABET
Dated: February 3, 2020

Certificate No.
NABET/EIA/1922/IA0053

Valid till
Dec 10, 2022

For the updated List of Accredited EIA Consultant Organizations with approved Sectors please refer to QCI-NABET website.

Consultant Contact Details:

P and M Solution

Address –C-88, Sector 65 Noida

Mobile no. - +91 8377871554, 8826287364



**National Accreditation Board for
Testing and Calibration Laboratories**

CERTIFICATE OF ACCREDITATION

NOIDA TESTING LABORATORIES

has been assessed and accredited in accordance with the standard

ISO/IEC 17025:2017

**"General Requirements for the Competence of Testing &
Calibration Laboratories"**

for its facilities at

GT - 20, SECTOR - 117, NOIDA, GAUTAM BUDDH NAGAR, UTTAR PRADESH, INDIA

in the field of

TESTING

Certificate Number: TC-6814

Issue Date: 05/12/2019

Valid Until:

02/12/2021

This certificate remains valid for the Scope of Accreditation as specified in the annexure subject to continued satisfactory compliance to the above standard & the relevant requirements of NABL.
(To see the scope of accreditation of this laboratory, you may also visit NABL website www.nabl-india.org)

Signed for and on behalf of NABL



N. Venkateswaran
Chief Executive Officer

Draft EIA/EMP REPORT

Extraction of Minor Mineral (Stone, Sand & Bajri) Measuring 04-83-07 Hectares (Private land, River Bed) Falling in Mauza Alampur, Mohal Bagh, Tehsil Jaisinghpur, District Kangra, Himachal Pradesh by Head of Project, Dhaulasidh Hydroelectric Project (DSHEP) SJVNL

List of Laboratories Accredited in Accordance with the Standard ISO/IEC 17025:2017						
S. No.	Name of the Laboratory & Full address	Certificate No	Discipline	Issue Date	Validity Date	Validity Extended Upto
821	GLRLaboratories Pvt.Ltd., Chennai, 444, GokulamStreet, Mathur, Near Asisi =Nagar, Madhavaram, Chennai, Tamil Nadu-600068 Mob: 9841212596 Email: info@glrlabs.com Contact Person: Sh.K.R.Navaneethakrishnan	TC-6251	Biological	03.10.2019	02.10.2021	02.10.2022
822	EASTERN CENTRAL LABORATORY, EASTERN CONDIMENTS PVT. LTD., EASTERN VALLEY, Adimaly, Kerala-685561 Mob: 9447432403 Email: parasuraman@eastern.in Contact Person: PARASURAMAN	TC-5995	Biological Chemical	21.07.2019	20.07.2021	20.07.2022
823	Accurate Analyzer Pvt. Ltd., F-20, Ambad MIDC, Nashik, Maharashtra-422010 Mob: 9423175381 Email: qm@accurateenviro.in Contact Person: Sameer Patwa	TC-6804	Chemical	12.03.2020	11.03.2022	11.03.2023
824	ENVIRONMENT TESTING LABORATORY OF RAMANS ENVIRO SERVICES PVT LTD, SF-23 & 24, CAMPS CORNER, PRAHLADNAGAR, Ahmedabad, Gujarat-380015 Mob: 9712976724 Email: ramans.consultancy@gmail.com Contact Person: SAMIR C CHOKSI	TC-5091	Chemical	10.01.2019	09.01.2021	09.01.2022
825	Noida Testing Laboratories, GT-20, Sector-117, G. B. Nagar, Noida, Uttar Pradesh-201306 Mob: 09313611642 Email: noida.laboratory@gmail.com Contact Person: Mr. PANKAJ KUMAR SHARMA	TC-6814	Biological Chemical	05.12.2019	02.12.2021	02.12.2022
826	RCA Laboratories, CCA Building, IIInd Floor , Ward No. 12/B, Plot No. 272 , Gandhidham, Gujarat-370201 Mob: 9924711144 Email: narendra@rcalaboratories.com Contact Person: Mr. Narendra Limbachiya	TC-7023	Chemical	25.02.2020	24.02.2022	24.02.2023
827	Material Testing Laboratory, 510 Army Base Workshop, 510 Army Base Workshop, Meerut , Meerut, Uttar Pradesh-250001 Mob: 9897301684 Email: udasha.39540@gov.in Contact Person: DINESH KUMAR	TC-5153	Mechanical	16.10.2019	15.10.2021	15.10.2022
828	PAC SHIPPING & ALLIED SERVICES PVT. LTD., FLAT NO.108, 1ST FLOOR, KHALAP MANSION, VASCO-DA-GAMA, Mormugao, Goa-403802 Mob: 9765167442 Email: goa@paclabs.in Contact Person: BRIAN FARIAS	TC-5541	Chemical	24.04.2019	23.04.2021	23.04.2022
829	A.D.ELECTRO STEEL CO. PVT. LTD., BALTIKURI SURKIMIL, Howrah, West Bengal-711101 Mob: 9163399177 Email: adecwork2012@gmail.com Contact Person: S P DEY	TC-5706	Chemical Mechanical	28.06.2019	27.06.2021	27.06.2022



भारत का राजपत्र The Gazette of India

असाधारण

EXTRAORDINARY

भाग II—खण्ड 3—उप-खण्ड (ii)

PART II—Section 3—Sub-section (ii)

प्रधिकार से प्रकाशित

PUBLISHED BY AUTHORITY

सं. 2487] नई दिल्ली, बुधवार, अगस्त 31, 2017/भाद्र 9, 1939
No. 2487] NEW DELHI, THURSDAY, AUGUST 31, 2017/BHADRA 9, 1939

MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE NOTIFICATION

New Delhi, the 30th August, 2017

S.O. 2836(E).—In exercise of the powers conferred by clause (b) of sub-section (1) of section 12 and section 13 of the Environment (Protection) Act, 1986 (29 of 1986), read with rule 10 of the Environment (Protection) Rules, 1986, the Central Government hereby makes the following further amendments in the notification of the Government of India in the erstwhile Ministry of Environment and Forests, number S.O. 1174(E), dated the 18th July, 2007, namely:—

In the said notification, in the Table, after serial number 156 and the entries relating thereto, the following serial numbers and entries shall be inserted, namely:—

(1)	(2)	(3)	(4)
157	M/s. Devansh Testing & Research Laboratory Pvt. Ltd. 94, Shiv Ganga Industrial Estate, Lakeshari, Bhagwanpur-247661, Roorkee, Dist-Haridwar, Uttarakhand.	(i) Ms. Archana Singh (ii) Shri. Arvind Kharkwal (iii) Dr. H.S. Chauhan.	09.08.2017 to 08.08.2022
158	M/s. Noida Testing Laboratories, GT-20, Sector-117, NOIDA-201304, Uttar Pradesh.	(i) Shri. Gopal Das Verma (ii) Shri. Pankaj Kumar Sharma (iii) Shri. Rajesh Kumar Singh.	09.08.2017 to 08.08.2022
159	M/s. Sai Universal Mining Services Plot No. 15-DP2, KIADB, Sankalpura Industrial Area, Near Water Tank, Bellary Main Road, Hospet-583201, Dist. Bellary, Karnataka.	(i) Shri. Pavan Kumar GVK (ii) Shri. D. Sudharshan Reddy (iii) Shri. A. Nagaraju.	09.08.2017 to 08.08.2022
160	M/s. B.S. Envi-Tech Pvt. Ltd. 12-13 1270/71/73, Amity Ville, 4 th Floor, St. Ann's Road, Tarnaka, Secunderabad-500017, Telangana.	(i) Shri. A.V. Hanumantha Rao (ii) Ms. CH. V. Tulasi (iii) Shri. B.S. Chandra Murthy.	09.08.2017 to 08.08.2022
161	M/s. Nichrome Testing Laboratory and Research Pvt. Ltd. 170, Judges Bungalow Road, Narayanpur, Dharwad-580008, Karnataka.	(i) Shri Krishna Narayan Kulkarni (ii) Shri Ambarish S. Sindagi (iii) Dr. Manjula S. Patil.	09.08.2017 to 08.08.2022
162	M/s. Go Green Mechanisms Pvt. Ltd. Dayal Estate, National Highway No. 8, Opp. APMC Market, Gate-1 (Deer Dayal Grain Market), Bareja Road, Jetalpur, Dist-Ahmedabad-382426, Gujarat.	(i) Shri Amit Badlani (ii) Shri Khambata Cyrus Hosang (iii) Ms. Trupti Padhya.	09.08.2017 to 08.08.2022.

[F. No. Q. 15018/21/2017-CPW]
DR. MANORANJAN HOTA, Advisor

Note.—The principal notification was published in the Gazette of India, Extraordinary vide number S.O. 1174 (E), dated the 18th July, 2007 and subsequently amended vide notification numbers S.O. 1539 (E), dated the 13th September, 2007, S.O. 1811(E), dated the 24th October, 2007, S.O. 55(E), dated the 9th January, 2008, S.O. 428(E), dated the 4th March, 2008, S.O. No. 865(E), dated the 11th April, 2008, S.O. No. 1894(E), dated the 31st July, 2008, S.O. No. 2728(E), dated the 25th November, 2008, S.O. 1356(E), dated the 27th May, 2009, S.O.No. 1802(E), dated the 22nd July, 2009, S.O. No.2399(E), dated the 18th September, 2009, S.O. No.3122(E), dated the 7th December, 2009, S.O. No. 3123(E), dated the 7th December, 2009, S.O. No. 142(E), dated the 21st January, 2010, S.O. 619 (E), dated the 19th March, 2010, S.O. No.1662(E), dated the 13th July, 2010, S.O. No. 2390(E), dated the 30th September, 2010, S.O. No. 2904 (E), dated the 8th December, 2010, S.O. No. 181(E), dated the 28th January, 2011, S.O.No. 692(E) dated the 5th April, 2011, S.O. No. 1754 (E), dated the 28th July, 2011, S.O. No. 2609, dated the 22nd November, 2011, S.O. No. 264(E), dated the 13th February, 2012, S.O. No. 1150 (E) dated the 22nd May, 2012, S.O. No. 1295(E), dated the 6th June, 2012, S.O. No. 2039 (E), dated the 5th September, 2012, S.O. No. 2850 (E), dated the 7th December, 2012, S.O. No. 592 (E), dated the 8th March, 2013, S.O. No. 945(E), dated the 8th April, 2013, S.O. No. 2287 (E), dated the 26th July, 2013, S.O. No. 3489(E) dated the 26th November, 2013, S.O. No. 21(E), dated the 3rd January, 2014, S.O. No. 561 (E), dated the 26th February, 2014, S.O. No. 1190(E), dated the 1st June, 2014, S.O. No. 2003(E), dated the 9th August, 2014, S.O. No. 137 (E), dated the 12th January, 2015, S.O. No. 1783(E), dated the 30th June, 2015, S.O. No. 2453(E), dated the 7th September, 2015, S.O. No. 1953(E), dated the 2nd June, 2016 and S.O. No. 388(E), dated the 10th February, 2017.