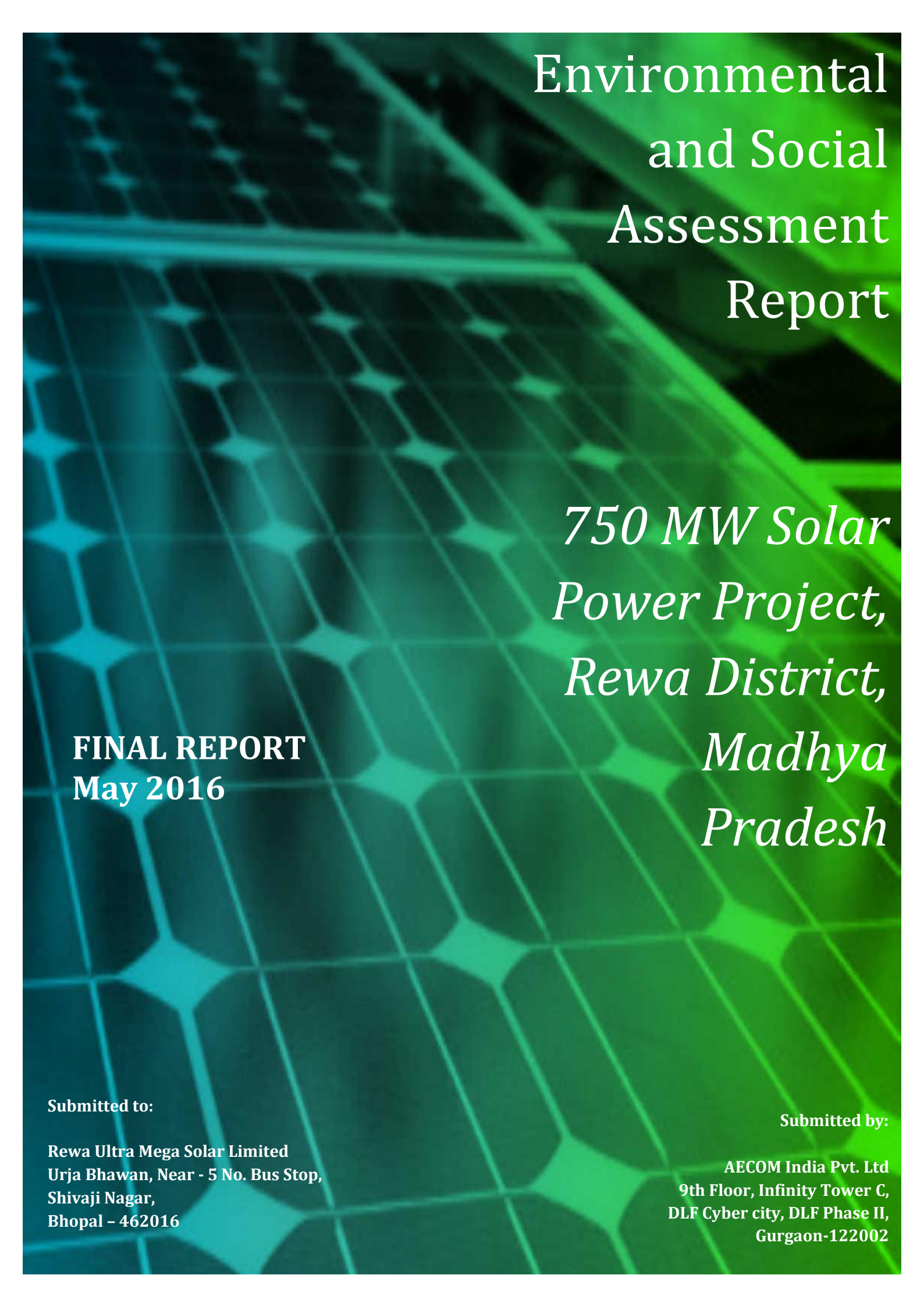




Environmental and Social Assessment Report

*750 MW Solar
Power Project,
Rewa District,
Madhya
Pradesh*

**FINAL REPORT
May 2016**

Submitted to:

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Quality Information

Report Preparation

The ESA report has been prepared by the following AECOM professionals from Gurgaon office, Haryana, India. Key responsibilities included Reconnaissance site survey, establishing the baseline conditions, assessing the flood risk, census survey of affected households, stakeholder consultations, impact assessment, preparation of management plans and categorizing the project.

Name of the Professionals	Responsibilities
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Deepti Bapat	Establishing Existing Ecological Conditions, Ecological Impact Prediction
Jayakrishna Vasam	GIS Mapping
Kuldeep Chawla	Development of Legal Framework, Analysis of Alternatives and Flood Risk Assessment
Rajshree Das	Establishing Environmental Baseline Condition, Development of Occupational Health and Safety Plan and Construction Labour Management Plan
Susan Vauquelin	Establishing Existing Social Baseline Conditions, Stakeholder Consultations, Social Impact Assessment and Social Management Plan and Report Compilation
Aditi Mohanty, Shivnath Chalka, Keshaw Kumar	Reconnaissance site survey, undertaking census survey at the project villages

Quality Control Review

A Quality Control Review of this report was conducted by the following professionals in AECOM's Gurgaon Office, Haryana, India office.

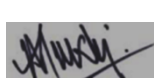
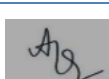
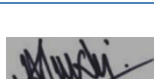
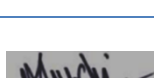
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List of Abbreviations

BPL	Below Poverty Line
CUF	Capacity Utilization Factor
CEA	Central Electricity Authority
CERC	Central Electricity Regulatory Commission
CGWA	Central Ground Water Authority
CPCB	Central Pollution Control Board
CDM	Clean Development Mechanism
CHC	Community Health Centre
CP	Contracting Party
DEM	Digital Elevation Modelling
EHS	Environment Health and Safety
EAP	Environment Action Plan
ESMP	Environment and Social Management Plan
EA	Environment Assessment
ESA	Environment Social Assessment
EPCO	Environmental Planning and Coordination Organisation
FGD	Focus Group Discussion
FCCC	Framework Convention on Climate Change
GoI	Government of India
GoMP	Government of Madhya Pradesh
GHG	Greenhouse Gas
GRM	Grievance Redressal Mechanism
HCV	Heavy Commercial Vehicles
IMD	Indian Meteorological Department
ICNIRP	International Commission on Non-Ionizing Radiation Protection
IEC	International Electro Technical Commission
IFC	International Finance Corporation
IPPE	Intensive Participatory Planning Exercise
ISTS	Intra-State Transmission System
JNNSM	Jawaharlal Nehru National Solar Mission
LCV	Light Commercial Vehicles
LILO	Loop-in-Loop-out
MPPCB	Madhya Pradesh Pollution Control Board
MPPMCL	Madhya Pradesh Power Management Company Limited
MPSDMA	Madhya Pradesh State Disaster Management Authority
MPUVNL	Madhya Pradesh Urja Vikas Nigam Limited
MPPT	Maximum Power Point Tracking
MSME	Micro, Small and Medium Enterprises
MoEFCC	Ministry of Environment, Forests and Climate Change
MNRE	Ministry of New and Renewable Energy
NAPCC	National Action Plan on Climate Change
NRED	New and Renewable Energy Department
NOC	No Objection Certificate
OHSP	Occupational Health and Safety Plan

OP	Operational Policy
O&M	Operations and Maintenance
PAH	Project Affected Households
PRA	Participatory Rural Appraisal
PCU	Passenger Car Unit
PS	Performance Standard
PPE	Personal Protective Equipment
PESO	Petroleum and Explosives Safety Organisation
PV	photovoltaic
PGCIL	Power Grid Corporation of India Limited
PPA	Power Purchase Agreements
PCA	Primary Census Abstract
RUMSL	Rewa Ultra Mega Solar Limited
ROW	Right of Way
SC	Scheduled Caste
ST	Scheduled Tribe
SHG	Self Help Group
SECI	Solar Energy Corporation of India
SPCB	State Pollution Control Board
VD	Village Directory
WMP	Waste Management Plan

EXECUTIVE SUMMARY

I. Introduction

Rewa Ultra Mega Solar Limited (hereinafter referred to as 'RUMSL'), a joint venture company through an agreement signed between Solar Energy Corporation of India (SECI) and Madhya Pradesh Urja Vikas Nigam Limited (MPUVNL) was incorporated in 2015 for implementation of solar park(s) and ultra mega solar power plant(s) in the State of Madhya Pradesh.

RUMSL intends to install the 750MW capacity in Gurh Tehsil, Rewa District, and Madhya Pradesh (hereinafter referred to as the 'Project'). The project is proposed to be developed in an area measuring approximately 1500 hectares, with 2MW capacity to be installed on one hectare of land.

The World Bank is proposed to fund 50% of project cost through SECI while the remaining amount would be raised through equity and commercial funding. International Finance Cooperation (hereinafter referred to as 'IFC') is providing advisory services to RUMSL on selection of bidder(s).

II. ESA process and methodology

Reconnaissance surveys were conducted to identify environmental and social issues in the project area. A detailed desk based literature survey was also undertaken and relevant information was collected for environmental and social baseline assessment.

Primary baseline monitoring was carried out by Netel India Limited (hereinafter referred to as 'Netel'), India for four weeks, i.e., one month starting from mid-December 2015 to mid-January, 2016 for air, water, noise and soil quality. Traffic survey for assessing the traffic volume in the project area and major roads in the project area was also undertaken. A primary ecological survey was also carried out for the project area to assess biodiversity, species richness and abundance. In addition, land use pattern study and flood risk assessment study was also carried out using latest satellite imagery.

Census surveys of project affected populations from villages (namely Badwar, Barsaita Desh, Barsaita Pahad, Etar Pahad and Ramnagar Pahad of Gurh Tehsil) in Phase I¹ was also conducted by AECOM and the project affected village was visited to collect information on the socio-economic status of the project affected families. Relevant government departments were contacted to gather information related to the project and the project area.

Based on the baseline and proposed activities, an impact analysis was carried out where potential direct and indirect impacts of the project activities have been considered. A detailed Environmental and Social Management Plan (ESMP) has been formulated for the Project where measures are proposed to mitigate adverse impacts along with recommended good practices.

III. Project Description

Site Location

The project area² comprises of open scrub wastelands with small parcels of land in between the site where agriculture is practised, located at an elevation of 370-400m above mean sea level (amsl). Species of plants like

¹ Land procurement is being conducted in two phases, Phase I refers to the phase wherein landowners are in the process of providing their consent for sale of their land (comprising of 164.231 hectares). While in Phase II, private land parcels (amounting to 138.616 hectares) have been identified, but the consent process is yet to commence for this phase. The process of taking consent from the private landowners would only commence once the entire consent process of Phase I is completed.

² Land identified for development of project

Acacia nilotica(babul),*Albizzia amara*(Krishna Siris), *Butea monosperma* (Tesu),*Diospyros melanoxylon*(tendu), *Holoptelea integrifolia*(chilbil)were observed to be speckled on the land identified for the project.

Site Settings

The land for the proposed site comprises majorly of scrub/barren rocky land use and is characterized by rural set up. Most of the land area in the study area is rock-strewn with limited potential for agriculture due to rain fed irrigation. The project area has an undulating slope with local population owning land parcels at both the slope and plain areas.

A seasonal channel of rain fed water which flows for few months locally termed as 'Aahri Nala', was observed to be present within the site limits which cross land parcels in the east to west direction and drains into Ban Sagar Lake, located at a distance of 30km in the south-west direction from the project site.

It was established that the land area in the study area was undulating. Areas under the slope terrain (falling within the project area) depended solely upon rainfall in order to undertake agricultural activities. During this one crop cycle, the local population sowed mainly rice or wheat. The location of the site favours the development of a solar park, as the site is situated in a rural setting with a suitable topography, it is located near existing grid connections and the area has a high level of solar insolation location.

Current Status

Currently, the project is in the planning phase. RUMSL officials has reported that the bidding process will be undertaken to invite national and international developers for construction of three (3) solar PV modules of either 250MW capacity each based on technical criteria set by SECI and MNRE. The bidding will be conducted for 250x 3 MW capacities.

Power Evacuation

The power from Solar PV plant is proposed to be evacuated to 220/ 400 KV Grid Sub-Station which will be constructed by PGCIL on 18 hectares of land procured from Barsaita Desh Village. The inverter output voltage would be at 380V which will be stepped up to 33kV and subsequently into 220 kV.

The power will be evacuated to 400 KV Vindhyachal – Jabalpur line owned by MPPMCL, Jabalpur located at an aerial distance of 30km towards the south of the site. PGCIL will hold the responsibility for finalizing the alignment and construction of transmission poles from Grid Sub-Station to the evacuation line³.

Construction Phase

All construction activities shall occur within the site boundary limits with the exception of those activities related to the interconnections between the site and the common infrastructures, which will be performed by the Developers engaged outside the boundary wall of the site. Developer only shall be responsible for site clearing and grading of the site as required for construction, operation, and maintenance of the plant.

Resource Requirement – Construction Phase

On an average, the labour demand is estimated to be about 250-270 workers for construction of one module of 250MW. The peak labour requirement for the one module will be about 300 persons. The labour camps for the Project will be provided within the site premises and will comprise of porta cabins. Adequate sanitation facilities

³Substation and 400 kV transmission line is out of scope of ESIA

will be provided for the labour. Temporary ablution facilities will be provided during construction phase (i.e. portable toilets).

The installation of the equipment's will not require water in any form. It is estimated that 200-250 kilo litres/day is required for the construction phase on daily basis (which includes water requirements for curing works, batching plant and domestic requirement of workers). Water will be required for piling and foundation work which will be sourced from authorised tankers. It will be the responsibility of the Developers of modules to arrange for Diesel Generators for power requirements during construction phase.

Resource Requirement – Operation Phase

During the operational phase it is estimated that PV panel cleaning will require approximately 3, 75,000 litres/MW/day (500 litres/MW/Day). The cleaning frequency will be once in ten (10) days, being a rocky terrain which tends to be less prone to dust. Drinking water and process water will also be supplied by boreholes and may require treatment for domestic use. It is estimated that there will be approx. 43-45 KL/ day⁴ of daily domestic water requirement. RUMSL officials have also apprised that prior permission for abstraction of ground water will be taken from District Collector. The manpower requirement for the operation phase of the Project has been estimated to be 20-30 staff including engineers, technicians, housekeeping, admin etc.

IV. Environmental Baseline

A study area of 5 km from the proposed project area was considered for the evaluation of environmental and social existing status and potential impacts. Activities that facilitated establishment of the baseline data include site survey, ecological surveys, social surveys and interviews, processing of satellite imagery and secondary data review from established sources such as Indian Meteorological Department and Census of India amongst others.

Ambient Air Quality

It was observed that there is no air polluting sources such as industries around the project area, and it can attribute to prevailing low pollutant concentration. Hence, it can be concluded that the level of air pollutants in the project area is not alarming.

Ground Water Quality

There is no risk of fecal contamination in the ground water samples. All the other parameters were observed to be within the Agreeable limits as specified in the drinking water standard of IS10500:2012.

Surface Water Quality

Presence of Total and E.Coli numbers in the water sample SWQ-1 from Badwar Nallah indicates the Fecal contamination indicative of contamination due to wastes from humans and other animals which includes many other pathogens and disease producing bacteria and viruses; water sample source from Badwar Nallah should therefore be avoided if used for drinking or other domestic purpose by villagers.

Water sample SWQ-2 from Etar Pahad Pond was found to be Turbid and exceeds the permissible limit of 5 NTU with Iron content and thus causing aesthetic impacts by affecting the flavor and color of water and reddish-brown staining of laundry, dishes and utensils; it is therefore, recommended to treat the water using an Ion exchange water softener if required to use it for drinking and other domestic purpose.

⁴300 Staff and 145 litres/ person/day is considered for the calculation

Soil Quality

pH of the soils samples ranged from 6.82-7.02, showing Normal to saline in nature; Sodium adsorption ratio (SAR), an index for characterizing soil sodicity, describing the proportion of sodium to calcium and magnesium in soil solution is calculated to be in the range of 2.5 to 5.74 in the soil samples. The soil samples shows presence of heavy metals such as Cadmium (in the range of 0.7 to 0.97 mg/kg) and Chromium (in the range of 3.42 to 4.17 mg/kg).

Noise Quality

It is observed that the noise levels at the monitoring locations ranged from 47.0 to 50.5 dB (A) during the daytime and 40.2 to 41.5 dB (A) during night time. The baseline noise levels at all the sampling locations were found to be within the prescribed noise standards for Residential Area.

Traffic Monitoring

The total hourly traffic volume indicates that the peak hour traffic is between 08:00 am to 11:00 am in the morning with slight increase around 03:00 pm to 05:00 pm in both ways. The composition of vehicles at this stretch indicates that out of the total vehicles observed, 38.4% and 32% of the vehicles are light commercial vehicles (to and fro). Heavy commercial vehicles constituted 52.8% and 34.8% (to and fro) of the observed traffic volume whereas 32% of vehicles are non-motorised vehicles.

Ecology

The study area represents a fairly degraded tract of dry deciduous forest, which has become reduced to tropical grassland, maintained anthropogenically, through intense grazing pressure and annual burning. The area provides habitats to a range of floristic and faunal species associated with deciduous scrub and stony grasslands. The area seems to be providing a small but limited range of ecosystem services to the communities living in and around it, chiefly in terms of natural sources of water and pastureland for the local communities (during monsoon season) to graze their livestock.

V. Socio- Economic Environment

The project is located approximately 30 km east of Rewa town. The list of villages falling within the project area (also known as the 'study area') has been defined as 'project affected villages' which area Badwar, Barsaita Desh, Barsaita Pahad, Etar Pahad and Ramnagar Pahad. The total population of all the project villages as per Census, 2011 is 10285 with literacy rate of 54.9%. The occupations of the local people are agriculture based such as cultivators and agricultural labourers.

Women in the area are mostly engaged in agricultural activities and household chores. There are no vocational centres catering to women however, women Self-Help Groups (SHGs) are prominent in the area. The funds from the SHGs are used in agricultural activities, procuring items for shops and cattle rearing purposes. The SHGs have bank account in branches of Union Bank of India and Madhyanchal Grameen Bank located at Gurh.

VI. Stakeholder Consultation

From the stakeholder consultations conducted by AECOM, it can be concluded that the landowners are aware about the proposed solar power project. They are also aware that the rates were decided by the Collector's office and a Collector Guideline Rate plus one time solatium would be paid to them. As most of the land parcels were

uncultivated and left barren due to decrease of rainfall in the past three years, the land owners were keen to sell their land parcels.

The land owners and local population do not have any concerns about the project. They expect that employment opportunities in the area would increase now with the proximity of the project to their area of residence. They were also of the opinion that land prices in the area would also see increase which would be beneficial for them indirectly. They expressed that welfare activities for the development of the communities should be rolled out by the project proponent so that the entire community would be benefitted.

VII. Review of Land Procurement Process

The proposed project involves procurement of revenue and private land from title holders located in five villages. Out of the approximate 1550 hectares, 164.231 and 138.758 hectares are private land (Phase I and Phase II) and the remaining land measuring approximately 1255.697 hectares is government revenue land. As per the revenue record, the land use of the parcels has been classified as barren rocky, scrub and fallow land.

The Consent Land Purchase Policy approved by the Government of Madhya Pradesh on 12th November, 2014, has been adopted to procure the private land for the project. Till date, as reported by NRED site officials, approximately 90% of the private land owners (Phase I) have provided their consent voluntarily for sale of their land for the proposed project.

VIII. Analysis of Alternatives

Under India's National Action Plan on Climate Change (NAPCC), the Jawaharlal Nehru National Solar Mission (JNNSM) was introduced with aggressive targets to achieve 1,00,000 MW of solar power by 2022. With these targets achieved, low carbon sustainable energy would become a substantial share contributor in the total energy requirements in India by 2020. The Government of India has been playing an encouraging role in promoting the production of solar energy in such scales with subsidies and facilitating the process.

With multiple benefits of clean energy production, employment generation and elevating the standards of rural economies, the project would prove to be advantageous to all realms of the society and nation. Hence, the project with all the chosen options such as site selection, mode of power generation, selections of technology, transmissions lines etc., is appropriate alternative and is beneficial for the region.

IX. Potential Impacts and Mitigation

S.No.	Aspects	Potential Impacts	Suggested Mitigation/Management Measures
CONSTRUCTION PHASE			
1.	Land Use	Change to industrial land use	- Clearing activities will be kept to a minimum (PV panel and road footprint). - If rains are expected, activities will be put on hold to reduce the risk of erosion.
2.	Loss of top soil, Compaction and Erosion	Contamination of Soil Dispersal of contaminants	- The removal of vegetation and soil cover will be restricted to only those areas necessary for the development. In particular, the unnecessary removal of groundcover vegetation from slopes will be prevented, especially on steep slopes. - The area to be cleared must be clearly demarcated and this footprint strictly maintained. - Soil conservation measures will be implemented such as stockpiling topsoil or gravel for the remediation of disturbed

S.No.	Aspects	Potential Impacts	Suggested Mitigation/Management Measures
			areas. • Stockpiles will be vegetated or appropriately covered to reduce soil loss as a result of wind or water erosion. • Work areas will be clearly defined and where necessary demarcated to avoid unnecessary disturbance of areas outside the development footprint. • Fuel, lubricating oil and used oil storage areas will be contained in bunds of 110 percent capacity of the stored material. • Spill containment and clean up kits will be available onsite and clean-up from any spill will be appropriately contained and disposed of. • Construction vehicles and equipment will be serviced regularly and off site. • Construction vehicles will remain on designated and prepared compacted gravel roads; • It is recommended to grow turf grass beneath solar panels to avoid soil erosion; • Storm water drains will be developed across the substation in all four directions to contain the run off and avoid it to reach NH-75; • Proper bunds are required to be created within the construction foot print of the proposed substation at Ramnagar and all the ponds lying in the catchment areas of Nallah will remain intact by provision of diversion berms or dykes around them; • Module Developers are recommended to follow environment codes on site preparation and installation of solar panels as provided in Annexure IX.
3.	Surface Hydrology and Drainage Pattern	Increased erosion and sediment load impounding of local depressions	• Since, the site area drains from north-east to south-west with slopes of around 2%, substantial runoff will be generated during extreme events. The runoff generated during the extreme rainfall events coupled with debris and sediments would acquire sufficient momentum force to damage the project assets if installed within the drainage features such as Naalas. The project proponent should avoid installing the project assets within the site drainage features such as Nallahs and drainage channels over the site. • All the local depressions within the site should be surveyed and extent of these local depressions should be analysed and marked. These local depressions would be prone to ponding in an event of rainfall. These areas should either be avoided for asset installations or filled up and levelled. • All the main drainage channels should be cleaned periodically especially before monsoons to ensure sufficient conveyance capacity is maintained so, that ponding of water does not occur. • Drainage lines or hydraulic corridors identified traversing the Site will remain intact by provision of diversion berms or dykes around them. • During clearing of area, the surfaces of all steep slopes will be deepened to retain water and increase infiltration. During construction of three proposed substations by RUMSL and Grid substation by PGCIL following measures will be implemented to mitigate the potential effects associated with drainage of tracks and Watercourse Crossings: • Access tracks will be kept as free as possible from excessive mud and silt deposits; • Drainage ditches on the upslope side of the site tracks will

S.No.	Aspects	Potential Impacts	Suggested Mitigation/Management Measures
			prevent runoff from flowing over the tracks and causing erosion; • Treatment of bunds and embankments adjacent to the track will reduce the rate and volume of runoff and minimise potential for erosion; • Drainage arrangements will be subject to routine inspection to ensure their efficacy and any accumulations of silt will be removed.
4.	Surface and Ground Water Quality	Improper sewage disposal from labour colonies Prevalence of construction debris at site Contamination of water due to waste water	• Module Developer shall inform all site staff to make use of supplied ablution facilities (toilets) and under no circumstances shall indiscriminate sanitary activities be allowed other than in supplied facilities. • The drainage pattern of the site will not be altered and the natural slope of the site will be maintained; • Adequate arrangement for storm water management during construction period will be made to avoid sediment runoff from the site. • The removal of vegetation and soil cover will be restricted to only those areas necessary for the development. • In particular, the unnecessary removal of groundcover vegetation from slopes will be prevented, especially on steep slopes
5.	Soil and Liquid Waste Generation, Storage and disposal	Prevalence of unhygienic conditions	• The construction contractor shall ensure that the campsites provided at site have adequate waste disposal facilities. • Arrangements for collection of garbage in dustbins and daily disposal to the nearest dumpsite shall be made. • Provision of segregated toilets for male and female workers (if any) in the ratio of 1:15 and 1:10 (toilet to workers).
6.	Ecology	Removal of natural vegetation cover Fragmentation of existing faunal habitat	• Conserve the current land-use of as much of the project area as possible. • Construction activities that require high levels of illumination be restricted to daylight hours to prevent disruption of the natural light period by artificial lighting.
7.	Traffic and Transport	Increased risk of traffic related accidents and injuries to community and to workers	• Only trained drivers with valid license shall be recruited by the construction contractor. • Training programs shall be conducted at regular intervals for all the drivers for raising awareness about road safety and adopting best transport and traffic safety procedures once in every six months. • A schedule for movement of solar panels shall be formulated by the respective Developers of Modules.
8.	Ambient Air Quality	Dust Generation	• Sprinkling of water is to be carried out by the Developer in areas where construction activities are underway within the project boundary. • Vehicles engaged for the project will be required to obtain "Pollution under Control" (PUC) certificates. Sufficient stack height needs to be provided to D.G. sets as per CPCB norms.
9.	Noise and Vibration	Potential disturbance to habitations	• The hours of operation for specific pieces of equipment or operations, especially mobile sources operating through community areas should be limited. • All loud and sudden noises will be avoided wherever possible and fixed noise sources shall be located at least 50m away from the site boundary.
10.	Occupational Health and Safety	Safety and Health Risks	• Formulate a site specific Emergency Preparedness and Response Procedure • Adequate training is provided to staff of the Developers about raising awareness for use of Personal Protection Equipment (PPE)

S.No.	Aspects	Potential Impacts	Suggested Mitigation/Management Measures
			and emergency response measures. • PPEs such as safety glasses with side shields, face shields, hard hats and safety shoes shall be mandatory at construction site. Ear plugs shall be provided for workers placed at high noise areas.
11.	Socio-Economic Conditions	Migrant and Contract Labour Engagement, Cumulative labour onsite	• The Developer shall ensure engagement of local population as workforce in the construction activity, as far as possible. • The Developer through the contractor agreement (of the developers) shall ensure that the construction contractors commit and adhere to social obligations including community relations, handling complaints and grievances, adherence to labour laws and international commitments etc. • The contractor shall provide adequate information to workers on expected social behaviour and hygiene practices to be followed at site. • The water usage amongst the labourers shall be monitored and controlled to minimize generation of wastewater. • The Developer shall ensure that no child or forced labour is engaged by contractors and all wage payments are done without any discriminations or delays by the contractors. • The Developers to ensure that adequate sanitation and waste disposal facility shall be provided at project site. • The Developers to ensure possible sourcing of construction labour from the local region to the extent possible. • The Developers to ensure local contracting and vendor opportunities as far as possible. • The Developers should undertake medical test of the contract workers prior to engagement to identify any communicable disease; • Developers should assess the location of labour camp, that it should not be constructed in immediate vicinity of any drainage channel; • It should be ensured that the labour camp (onsite) should have basic amenities such as electricity, drinking water, health & sanitation facility, kitchen and rest room; • All tanks used for the storage of drinking water are constructed and covered as to prevent water stored therein from becoming polluted or contaminated and all the migrant workers will be instructed accordingly; • Employers should ensure that accommodation which is provided is not overcrowded and does not pose a risk to the health and safety of workers; • The labour camp will be equipped with septic tanks and soak pits and avoid presence of stagnant water is a factor of proliferation of potential disease vectors such as mosquitoes; • Developers should ensure that the disruption of local communities is minimum, in particular local communities' transport infrastructures and if required limit the workers movements in near by areas; • Security staff have a clear mandate and have received clear instruction about their duties and responsibilities, in particular their duties not to harass, intimidate, discipline or discriminate against workers; • Developers should ensure that workers and members of the surrounding communities have specific means to raise concerns about security arrangement and staff;

S.No.	Aspects	Potential Impacts	Suggested Mitigation/Management Measures
			Where possible, an adequate transport system to surrounding communities will be provided. It is good practice to provide workers with free transportation to and from local communities.
12.	Loss of top soil, Compaction and Erosion	Contamination of Soil Dispersal of contaminants	- The unnecessary removal of groundcover vegetation from slopes will be prevented, especially on steep slopes. - Soil conservation measures will be implemented such as stockpiling topsoil or gravel for the remediation of disturbed areas.
OPERATION PHASE			
1.	Aesthetic and Visual Impact	Visual intrusion	The solar panels will be installed at a low height and will be kept closer to the ground.
2.	Soil Quality	Runoff from PV panels Broken Solar Panels	- Disturbance to soil from repair and maintenance activity will be limited and will ensure proper restoration of soil wherever excavation is undertaken. - RUMSL shall explore the option of buyback agreements for defunct panels and for replacement and disposal of transformer oil by the supplier, otherwise, arrangements shall be made for disposal of defunct panels and waste oil by MPPCB authorized recyclers. Fuel and used oil storage areas will be contained in bunds of 110 capacity of the stored material. - Waste Management Plan needs to be followed and complied
3.	Surface and Ground water Quality	Availability of the groundwater resources	- Meters shall be installed at the borewells to monitor the abstraction of water. - The plant site will be provided with adequate drainage facility to drain off wash wastewater and prevent any water-logging at site or in the surroundings. - Wastage of water during cleaning of panels shall be avoided. - The site office shall be provided with sewage line and the collected sewage shall be channelized to a septic tank with soak pit arrangement; - Water efficient cleaning methods should be applied for cleaning of modules like utilization of dust broom, brush trolley etc.
4.	Ecology	Usage of Herbicides	- The Developers shall ensure that there will be no use of herbicides in the facility and will opt for manual weeding to control plant growth in the solar panel area. - The Developer shall ensure that the use of such chemicals in the facility and opting for manual sprinkling of water to control dust in and around the solar panel area is avoided.
5.	Health and Safety	Electromagnetic Fields	- Workers handling electricity and related components will be provided with shock resistant gloves, shoes and other protective gears. - Adequate training regarding health and safety will be provided to the workers.
6.	Disaster Management	Risk of damage due to fire , natural disaster	- Fire Prevention Measures and Systems - Signage - Fire Detection & Alarm System - Fire Fighting System and devices

S.No.	Aspects	Potential Impacts	Suggested Mitigation/Management Measures
			• Evacuation Plan • Monitoring of tank provided for storage of High Speed Diesel Fuel. • Natural Disaster • Earthquake • Emergency Plan • Floods
7.	Substation and Proposed Transmission Lines	Unchecked growth of tall trees Electrocutation from direct contact with high-voltage electricity Occupational Hazards Bird Collisions through electrocution	Community Health and Safety • Right of Way (Row) for the transmission to be selected depending on the characteristics of existing vegetation, topographic features, and installed height of the transmission lines; • Regular maintenance of vegetation within the rights-of-way is necessary to avoid disruption to overhead power lines and towers; • Proper signs and barriers (e.g. locks on doors, use of gates, use of steel posts surrounding transmission towers, particularly in urban areas), and education / public outreach to prevent public contact with potentially dangerous equipment should be installed near Grid and Pooling Sub-Station; Occupational Health and Safety • The layout of the substation should optimise the use of space while still complying with all relevant building codes and standards. A safe working space should be provided around the substation for the operation and maintenance staff; • An earth mat is required to be provided to obtain safe step/touch potentials and earth system faults. Earth mats should be installed prior to setting the foundation. Lightning protection should be considered to alleviate the effect of lightning strikes on equipment and buildings present in the Grid Substation and Pooling substation; • An alarm system fitted to the Grid Sub-Station gate and the medium voltage station, metering station and to any portable cabins; and • A trench is required to be constructed as a means for easing the routing of power and data cables to the substation; • Consider installation of visibility enhancement objects such as marker balls, bird deterrents, or diverters on transmission lines in sufficient number; • The storage area of oils required for cooling of transformer should also have a roof to prevent precipitation from collecting in the storage area.
8.	Socio-Economic Conditions	Enhanced Economic Opportunities and Local Area Development Activities	• The Developer should wherever possible engage locals for unskilled jobs. • As part of the Local Area Development activities that would be undertaken by the Project Proponent, the project affected families should be provided first preference in any initiatives adopted by the project proponent before catering to the entire community as a whole. • The project proponent shall ensure that the developers while engaging (civil) contractors, sub contractors and vendors during the constructional and operational phase should encourage that agreements on priority basis be made with the local contractors and vendors.

S.No.	Aspects	Potential Impacts	Suggested Mitigation/Management Measures
			The purpose of developing local area development activities at an early stage of the project cycle is to outline the framework for enhancing the socio-economic status of the communities residing within the vicinity of the project.
DECOMMISSIONING PHASE			
9.	Health and Safety	Trip and Fall, electrical hazard	- The Developer shall inform the workers and local community about the duration of work; - The workers shall be clearly informed about the expected schedule and completion of each activity.
10.	Health and Safety	Waste Generation Disposal of solar panels and impact on drainage channels	- All necessary Personal Protection Equipment (PPE) shall be used by the workers during demolition work; and - The Developer will be committed to ensure that all health and safety measures are in place to prevent accidents and/or reduce the consequences of non-conformance events; - Disposal panels will be disposed off to authorized vendor through buy back agreements; - It is to be ensured that dismantling is carried out during non monsoon season and all the drainage channels will keep intact by creating bunds around them.

X. Conclusion

Based on the ESA study conducted and as per **World Bank** and **IFCs categorisation of project**, the proposed project can be categorized as **Category B** which specifies that the project can cause potential and limited adverse social or environmental impacts which are generally site-specific, largely reversible and readily addressed through mitigation measures.

1. INTRODUCTION

Rewa Ultra Mega Solar Limited (hereinafter referred to as 'RUMSL'), a joint venture company through an agreement signed between Solar Energy Corporation of India (SECI) and Madhya Pradesh Urja Vikas Nigam Limited (MPUVNL) was incorporated in 2015 for implementation of solar park(s) and ultra mega solar power plant(s) in the State of Madhya Pradesh. As an initial endeavour of the agreement, development of a 750MW Ultra Mega Power Plant has been proposed in Gurh Tehsil, Rewa District.

RUMSL intends to install the 750MW capacity in Gurh Tehsil, Rewa District, and Madhya Pradesh (hereinafter referred to as the 'Project'). The project is proposed to be developed in an area measuring approximately 1500 hectares, with 2MW capacity to be installed on one hectare of land.

RUMSL has been given the responsibility of identifying the required land for the proposed project. The development of the project will be undertaken as per package size of 250 MW each (x 3) through an open competitive bidding process conducted by the New and Renewable Energy Department (NRED) under the Government of Madhya Pradesh. Power evacuation would be transmitted to 33/220 kV pooling sub-stations linked to a 400/220 kV Power Grid sub-station to be set up within the project location by Power Grid Corporation of India Limited (PGCIL) through the Intra-State Transmission System (ISTS).

Project cost infrastructure work is proposed to be funded 50% by World Bank through MNRE, INR 75 Cr. as financial assistance from MNRE while the remaining amount would be raised through solar project developers. Each unit of 250 MW would be developed by solar project developer (SPD) under investment mode. SPD would be selected by e-bidding-auction process. International Finance Cooperation (hereinafter referred as 'IFC') is providing advisory services to RUMSL on selection of SPD(s).

In order to ensure that the project is established in a manner that is socially responsible and reflects sound environmental management practices, RUMSL intends to carry out an Environmental and Social Assessment (ESA) study for the Project, in accordance with World Bank's Operational Policies; IFC's Performance Standards (PS) on Social and Environmental Sustainability, 2012; and World Bank's Environment, Health and Safety Guidelines, 2007. The aim of the study is to provide an assessment of the ability of the project to comply with the requirements of the above mentioned guidelines as required by financial investors. This ESA report has been prepared on the basis of a reconnaissance survey, baseline environmental monitoring, review of secondary data and consultation with relevant stakeholders. Based on the requirements of the World Bank's Operational Policies and IFC PSs, adequate management plan are also expected to be developed as part of this assessment.

1.1 Project Background

The Project will be located within the administrative limit of Gurh Tehsil, Rewa District. The project site is spread across five villages, namely, Barsaita Pahad, Barsaita Desh, Badwar, Etar Pahad and Ramnagar Pahad under Gurh Tehsil, Rewa District. An indicative location of the project site is presented in **Figure 1-1**.

The Government of India (GoI) has launched the Jawaharlal Nehru National Solar Mission (JNNSM) on 11th January, 2010 with an ambitious target of deploying 1, 00,000MW of grid connected solar power by 2022. JNNSM aims to reduce the cost of solar power generation through (i) long term policy; (ii) large scale deployment goals; (iii) aggressive research and development; and (iv) domestic production of critical raw materials, components and products. The mission stipulates implementation and achievement of the target in three phases (Phase I up to

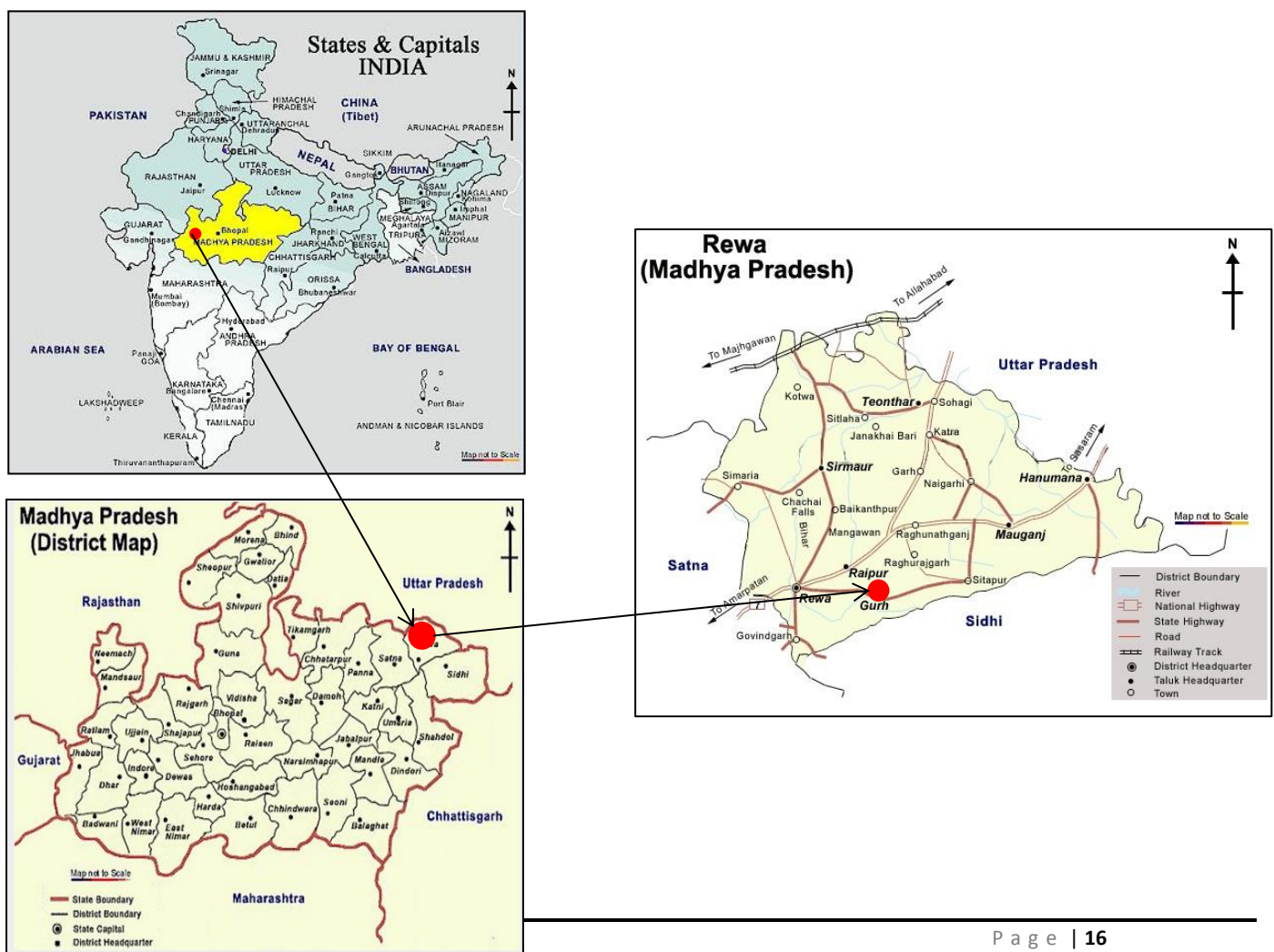
2012-13; Phase II from 2013 to 2017 and Phase III from 2017 and 2022) for various components including utility grid solar power.

To achieve the JNNISM aim, the Ministry of New and Renewable Energy (MNRE) under the Government of India has notified the administrative approval on 12th December, 2014 for implementation of a Scheme for development of Solar Parks and Ultra Mega Solar Power Projects in the country commencing from 2014-15 and onwards. Consequent to the notification, the Ministry received consent from the State of Madhya Pradesh for setting up of the 750 MW Ultra Mega Solar Power Project at Rewa District.

RUMSL has been given the responsibility of identifying the requisite land measuring approximately 1500 hectares for the project. As per the Guideline for Development of Solar Parks published by MNRE in October 2015, RUMSL has to prioritized to use the government waste/non-agricultural land and limit the use of private land. RUMSL will also be responsible for getting land related clearances, developing the approach roads to each plot, developing internal transmission system and maintaining it, making arrangement to connect to the grid, provide basic drainage and provide water supply.

Through the open competitive bidding process, developers will be responsible for development and operation and maintenance of the solar project(s) for a period of 25 years. The Solar PV Technology to be used by each developer would be based on their preference. The power generated through these solar project(s) would be purchased by Madhya Pradesh Power Management Company Limited (MPPMCL) and Delhi Metro Rail Corporation (DMRC).

Figure 1-1: Indicative Location of the Project Area



1.2 Purpose and Scope of Work

As part of the World Bank funding requirement, RUMSL is required to address the social and environmental issues related to the project.

1.2.1 Purpose

A Term of Reference (TOR) for conducting an Environment and Social Assessment (ESA) study was published by RUMSL. In lieu of this, AECOM India Private Limited (AECOM) was commissioned by RUMSL to undertake the ESA study for the proposed project as per the requirements of World Bank Operational Policies (OP 4.01 and others as applicable), IFC's Performance Standards and World Bank's Environment Health and safety (EHS) Guidelines.

The environmental and social assessment has been carried out against the following reference framework:

- Applicable local, national and international regulatory requirements;
- Applicable World Bank Operational Policies
 - Environmental Assessment (OP 4.01), Natural Habitats (OP 4.04), Involuntary Resettlement (OP 4.12), Physical Cultural Resources (OP 4.11), Indigenous Peoples (OP 4.10);
- World Bank Group's General EHS Guidelines;
- World Bank Group's EHS Guidelines for Electric Power Transmission and Distribution; and
- IFC Performance Standards on Environment and Social Sustainability, 2012.

1.2.2 Scope of Work

The scope of the project comprises of:

- Reconnaissance survey and primary field surveys to assess the existing environmental and socio-economic conditions in the project area, including the identification of the environment and social receptors;
- Consultations with project affected families and other key stakeholders of the project to understand public perception and their expectations from project;
- Collection of additional secondary environmental, social and demographic information;
- Collection of information on forestry, flora and fauna, and natural habitats and species of special conservation/scientific interest through primary ecological survey of the study area;
- Identification and review of the applicable standards and identification of key issues;
- Review of negotiated land acquisition, if any;
- Evaluation of potential social impacts of the Project and its components;
- Preparation of Environmental and Social Management Plan (ESMP) based on the findings of the ESA and develop procedures for mitigation and monitoring of environment and social impacts on an on-going basis and to identify any impacts/mitigation requirements that may occur subsequent to the completion of the ESA; and
- Suggest appropriate institutional arrangement and capacity building needs for proper implementation of environmental and social management plan during the pre-construction, construction and operation phase of the project.

1.3 Approach and Methodology adopted for the Study

The Environment and Social Assessment study for the project has been carried out as per the requirements of World Bank Operational Policies and IFC's Performance Standard related to environment and social aspects. The environmental assessment study considers an area of 5 km around the project site as study area. For assessment of the socio-economic impacts of the project, the five project villages have been considered. However, random interviews were also conducted in villages that fall within 5 km radius of the project area.

Reconnaissance surveys were conducted to identify environmental and social issues in the project area. A detailed desk based literature survey was also undertaken and relevant information was collected for environmental and social baseline assessment.

Primary baseline monitoring was carried out by Netel India Limited (hereinafter referred to as 'Netel'), India for four weeks, i.e., one month starting from mid-December 2015 to mid-January, 2016 for air, water, noise and soil quality. Traffic survey for assessing the traffic volume in the project area and major roads in the project area was also undertaken. A primary ecological survey was also carried out for the entire study area to assess biodiversity, species richness and abundance. In addition, land use pattern study and flood risk assessment study was also carried out using latest satellite imagery.

Social surveys were also conducted by AECOM and the project affected village was visited to collect information on the socio-economic and cultural aspects of the project affected families. Relevant government departments were contacted to gather information related to the project or the project area.

Based on the baseline and proposed activities, an impact analyses was carried out where potential direct and indirect impacts of the project activities have been considered. A detailed Environmental and Social Management Plan (ESMP) has been formulated for the Project where measures are proposed to mitigate adverse impacts along with recommended good practices.

Following plans have been developed for the project:

- Waste Management Plan;
- Stakeholder Engagement and Grievance Redressal Mechanism;
- Occupational Health and Safety Plan;
- Disaster Management Plan; and
- Construction Labour Management Plan;

1.4 Agencies Contacted

The following agencies were contacted during the course of the study:

- District Collectorate Office, Rewa;
- District Development Office, Rewa;
- Madhya Pradesh Urja Vikas Nigam Limited; and
- Panchayat Office of Barseta, Badwar and Ramnagar Pahad.

1.5 Limitations

The assessment study for the proposed project is largely based on the project information from client, discussion with local community and other stakeholders and observations from various surveys and investigations undertaken in the project area. Professional judgement and subjective interpretation of facts has been applied for this study. Any change in project location, orientation and proposed project activities is likely to result in variation of the impacts. It is to be noted that any technological advances during the course of construction and execution of the project will alter the extent and severity of impacts on the surroundings.

This report was prepared by AECOM in accordance with the agreed upon scope of work and generally accepted scientific practice in effect at the time of AECOM's assessment of the proposed project area. The statements, conclusions, and opinions contained in this report are only intended to give approximations of the environmental and social condition of the site. Moreover, there are several major limitations that are inherent in the conduct of this, or any other, environmental and social assessment.

- First, it is difficult to predict which, if any of the potential environmental and social issues identified will become actual problems in the future, environmental regulations continually change, as do the enforcement priorities of the applicable governmental agencies involved.
- Second, even for problems currently identified, it is often difficult and sometimes impossible to accurately estimate the liabilities that may be involved in mitigating the problem(s), for the legal and technological standards for evaluating, mitigating, and allocating liability for environmental issues are in a constant state of change. Moreover, the liability for mitigating environmental problems tends to be highly dependent upon agency negotiations and the sometimes arbitrary and unpredictable nature of agency officials charged with such negotiations.

This report was prepared by AECOM for the benefit of its client, RUMSL. AECOM's client may release the information to third parties, who may use and rely upon the information at their own discretion. However, any use of or reliance upon the information by a party other than specifically named above shall be solely at the risk of such third party and without legal recourse against AECOM, its parent, its subsidiaries and affiliates; or their respective employees, officers, or directors; regardless of whether the action in which recovery of damages is sought is based upon contract, tort (including the sole, concurrent, or other negligence and strict liability of AECOM), statute, or otherwise. This information shall not be used or relied upon by a party that does not agree to be bound by the above statement. Any information provided in the present report shall not be considered or construed as legal advice.

1.6 Report Layout

The layout of the report is as provided below:

Table 1-1: Report Layout

Chapter #	Name of the Chapter(s)	Description
1.	Introduction	The section provides description of project background, purpose, scope, approach & methodology and limitations of the study.
2.	Policy, Legal and Administrative Framework	This section provides information on Policy, Legal and Administrative framework applicable to the proposed solar project. The Section defines applicability of World Bank Operational Policies and IFC Performance Standards of the proposed project.

Chapter #	Name of the Chapter(s)	Description
3.	Project Description	This section deals with the various technology and specifications of the project. This also deals with the infrastructure development as a part of project during construction and operation phase and resources required.
4.	Environment Baseline	This Section presents the methodology and findings of field studies undertaken with respect to ambient air, water, soil, noise levels, ecology and traffic to define the various existing environmental status in the area.
5.	Socio-Economic Profile and Stakeholder Consultation	This Section presents the socio-economic profile of the study area based on primary and secondary information of the study area. This chapter also presents stakeholder identification process for the project, details of consultations held with key questions and responses extracted from the survey undertaken during site visit.
6.	Review of Land Acquisition Process	This section reviews the land acquisition process adopted by the Project Proponent in the acquisition of private land for the proposed project.
7.	Analysis of Alternatives	This chapter presents the analysis of alternatives considered for the proposed solar project considering no project scenario, alternate methods for power generation and technology and alternate routes for transmission line.
8.	Impact Assessment and Mitigation Measures	The potential impacts of the proposed project and allied activities, which could cause significant environmental and social concerns, are identified and discussed. This discussion will form the basis for environmental and social management activities.
9.	Environment and Social Management Plan	This Section provides recommendation for environmental and social management plan aimed at minimizing the negative environmental and social impacts of the project. Environmental and social monitoring requirements for effective implementation of mitigating measures during development as well as operation of the project have also been delineated along with requisite institutional arrangements for their implementation.
10.	Conclusion and Categorisation of the Project	This chapter encompasses category assigned to the proposed solar project based on IFC and World Bank Categorization. A brief conclusion drawn from the impact assessment study has also been presented.

Following appendixes have been attached to the report,

Annexure I: Record on transfer of Government Revenue Land for the project

Annexure II: Environment Sampling Location Map

Annexure III: Formulae used for calculations of quadrat study

Annexure IV: Questionnaires used for Census Survey

Annexure V: List of Landowners for Phase I

Annexure VI: List of Land Owners for Phase II

Annexure VII: List of Landowners who have given their Consent for Land Sale

Annexure VIII: Signature List of People Interviewed

Annexure IX: Environment Code of Practices and social exclusion list to be followed for various stages of the Project

2. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

This section highlights the environmental and social regulations applicable to the proposed solar power project. The section broadly focuses on the institutional framework, applicable environment, health & safety and social legislative requirements, World Bank Operational Policies and IFC Performance Standards relevant to the proposed Project.

2.1 Enforcement Agencies

All the permissions and the approvals have to be taken from the concerned ministries, line departments and the local civic bodies for any upcoming project in India. The environmental and social governance approach in the country consists of –

1. Regulatory and implementing entities;
2. Legal framework including policies, acts and laws; and
3. Permitting system.

In India, Ministry of New and Renewable Energy (MNRE) is the nodal agency to manage upcoming solar power projects and the environmental aspects are governed by Ministry of Environment, Forests and Climate Change (MoEFCC), Central Pollution Control Board (CPCB) Central Electricity Authority (CEA) and Central Electricity Regulatory Commission (CERC). The social governance aspects at the micro level are addressed by institutions like panchayats and municipal bodies.

A brief description of the relevant enforcement agencies with respect to the institutional framework is described in the following sub-sections.

2.1.1.1 Ministry of Environment, Forests and Climate Change

The Ministry of Environment, Forests and Climate Change (MoEFCC) is the nodal agency in the administrative structure of the Central Government for the planning, promotion, co-ordination and overseeing the implementation of India's environmental and forestry policies and programmes.

The primary concerns of the Ministry are implementation of policies and programmes relating to conservation of the country's natural resources including its lakes and rivers, its biodiversity, forests and wildlife, ensuring the welfare of animals, and the prevention and abatement of pollution. While implementing these policies and programmes, the Ministry is guided by the principle of sustainable development and enhancement of human well-being.

The specific functions of MoEFCC are as follows:

- Environmental policy planning;
- Effective implementation of legislation;
- Monitoring and control of pollution;
- Environmental Clearances for industrial and development projects covered under EIA notification;
- Promotion of environmental education, training and awareness; and
- Forest conservation, development, and wildlife protection.

MOEFCC is the apex body in India which has been formulated to plan, promote, co-ordinate and oversee the implementation of India's environmental and forestry policies and programmes. Various acts like The Environment (Protection) Act 1986, as amended in April 2003, The Air (Prevention and Control of Pollution) Act, 1981, amended in 1987 and The Water (Prevention and Control of Pollution) Act, 1974, amended in 1988 have been developed.

It is the responsibility of the apex body to ensure the compliance under the acts to maintain stipulated standards and environmental management through various supporting rules promulgated under the Acts.

2.1.1.2 Central Pollution Control Board (CPCB)

The Central Pollution Control Board (CPCB) was established in September 1974, for the purpose of implementing provisions of the Water (Prevention and Control of Pollution) Act, 1974. The executive responsibilities for the industrial pollution prevention and control are primarily executed by the CPCB at the Central level, which is a statutory body, attached to the MoEFCC. CPCB works towards control of water, air and noise pollution, land degradation and hazardous substances and waste management. The specific functions of CPCB are as follows:

- Prevent pollution of streams and wells;
- Advise the Central Government on matters concerning prevention, control and abatement of water and air pollution;
- Co-ordinate the activities of State Pollution Control Board's (SPCB's) and provide them with technical and research assistance;
- Establish and keep under review quality standards for surface and groundwater and for air quality;
- Planning and execution of national programme for the prevention, control and abatement of pollution through the Water and Air Acts; and
- The CPCB is also responsible for the overall implementation and monitoring of air and water pollution control under the Water Act, 1974, and the Air Act, 1981.

Central Pollution Control Board (CPCB) will direct MPPCB in case any violation is undertaken in complying with the conditions of Consent to Establish, Consent to Operation and Hazardous Waste Authorization.

2.1.1.3 Madhya Pradesh Pollution Control Board (MPPCB)

Madhya Pradesh Pollution Control Board (MPPCB) implements various environmental legislations in the State of Madhya Pradesh, mainly including Water (Prevention and Control of Pollution) Act, 1974; Air (Prevention and Control of Pollution) Act, 1981; Water (Cess) Act, 1977; some of the provisions under Environmental (Protection) Act, 1986 and the rules framed there under like, Biomedical Waste (Material and Handling) Rules, 1998; Hazardous Waste (Management, Handling and Transboundary Movement) Rules, 2008 and Municipal Solid Waste (Management and Handling) Rules, 2000 and E-Waste (Management and Handling) Rules, 2011. Some of the important functions of MPPCB are:

- To plan comprehensive program for the prevention, control or abatement of pollution and secure executions thereof;
- To collect and disseminate information relating to pollution and the prevention, control or abatement thereof;
- To inspect sewage or trade effluent treatment and disposal facilities, and air pollution control systems and to review plans, specification or any other data relating to the treatment plants, disposal systems and air pollution control systems in connection with the consent granted;
- Supporting and encouraging the developments in the fields of pollution control, wastes recycle reuse and eco-friendly practices;

- To educate and guide the entrepreneurs in improving environment by suggesting appropriate pollution control technologies and techniques; and
- Creation of public awareness about the clean and healthy environment and attending the public complaints regarding pollution.

The following Permits are required from MPCCB:

- *The Project is required to Obtain **Consent to Establish (CTE)** and **Consent to Operate (CTO)** from Madhya Pradesh Pollution Control Board before starting construction and operation phases. CPCB vide notification dated 29th February 2016 has notified solar plants under 'white category', which requires only intimation against CTE and CTO.*
- **Hazardous waste Authorization** is also required from MPCCB for collection, reception, storage, transportation and disposal of hazardous wastes generated from the site.

MPCCB will play the following Role:

- *Regular inspection of site to assess the fulfilment of conditions of Consent to Establish and Consent to Operate;*
- *Verification of Environment Statement that will be submitted to MPCCB;*
- *Assessment of hazardous waste management on project site and take appropriate actions if violation is undertaken of the provisions under Hazardous Wastes (Management Handling and Trans boundary Movement) Rules, 2008 as amended up to 2009 rule.*

2.1.1.4 Petroleum and Explosives Safety Organisation (PESO)

The PESO is under the Department of Industrial Policy & Promotion, Ministry of Commerce and Industry, Government of India. The Chief Controller of explosives is responsible to deal with provisions of

- The Explosive Act, 1884 and Rules, 1983,
- The Petroleum Act, 1934 and the Rules 2002,
- The Static and Mobile pressure vessels {Unfired} Rules, 1981 and amendment 2000, 2004;
- Manufacture, Storage and Import of Hazardous Chemical Rules, 1989 and amendment 2000

The site will store a small quantity of fuel at site. However, in case fuel storage exceeds the limit as stipulated in the Act, RUMSL is required to obtain a license from PESO.

2.1.1.5 Director Industrial Safety and Health

The main objective of the Director, Industrial Safety and Health is to ensure safety, health, welfare and working conditions of workers working in factories and in construction works by effectively enforcing the provisions of the Factories Act, the Building & Other Construction Workers Act and others labour legislations. It is also to ensure the protection of rights of workers and to redress their grievances.

Factory license is required as 'factory' means 'any premises having ten or more workers involved in a manufacturing process'. Factory License from the State Government or Chief Inspectorate of Factories, Madhya Pradesh is required to be obtained for the project.

RUMSL/ Construction contractor shall comply with all requirements of factories rules and participate in periodic inspection. It is also to be ensured that no child labour is engaged during construction or operation phases of the project.

2.1.1.6 Ministry of New & Renewable Energy (MNRE)

The MNRE is the nodal ministry of Government of India for all matters related to new and renewable energy. The broad aim is to develop and deploy new and renewable energy for supplementing the energy requirements of the country as stated on its website. The role of MNRE has been assuming importance in recent times with growing concerns of energy security. Energy self-sufficiency was identified as the major driver for new and renewable energy in the wake of the two oil shocks of 1970.

Ministry of New & Renewable Energy (MNRE) is of the nodal agency in establishing and implementing Nation Solar Mission in India. The State Government will first identify the nodal agency for the solar park and will also identify the land for proposed solar park. Thereafter it will send a proposal to MNRE for approval. After the solar park is approved by MNRE, the implementing agency may apply for a grant for preparing DPR, conducting surveys etc.⁵

The Ministry of New and Renewable Energy (MNRE) under the Government of India has notified the administrative approval on 12th December, 2014 for implementation of a Scheme for development of Solar Parks and Ultra Mega Solar Power Projects in the country commencing from 2014-15 and onwards. Consequent to the notification, the Ministry received consent from the State of Madhya Pradesh for setting up of the 750 MW Ultra Mega Solar Power Project at Rewa District.

Letter from MNRE confirming eligibility of the project for generation-based incentive is required before construction.

2.1.1.7 Madhya Pradesh Urja Vikas Nigam Limited

The Madhya Pradesh Urja Vikas Nigam Limited established in 1982 is the nodal agency for implementing various programs and policies of the Government of India and the State Government for the renewable energy sector. The objectives of Madhya Pradesh Urja Vikas Nigam Limited are:

- To promote and create awareness about the uses of Solar, Wind, Biomass, Biogas, Renewable Energy and Energy efficient products based various technologies among the public;
- To promote the policies and programs necessary for popularizing the applications of various new and renewable energy technologies in the State;
- To promote the installation of power plants based on renewable energy sources for Energy Security;
- To promote the energy conservation measures for efficient use of energy resources; and
- To promote green building design for efficient use of energy in housing, commercial and industrial sector.

Madhya Pradesh Urja Vikas Nigam limited is responsible for implementation of Madhya Pradesh Solar Policy, 2012 and will guide the procurement of various kinds of benefits under the policy to Project Proponent.

2.1.1.8 New and Renewable Energy Department, Madhya Pradesh

The New and Renewable Energy Department (NRED) is the nodal Ministry of the Government of Madhya Pradesh for all matters relating to new and Renewable Energy. The broad aim of the Department is to develop and deploy Renewable Energy, Energy Efficiency and Energy Conservation measures for supplementing the energy requirement of the state. The main objective of the Department relate to the following:

- Generation of awareness about new and Renewable Energy technologies;

⁵<http://mnre.gov.in/file-manager/UserFiles/Draft-Scheme-Solar-Park-and-Ultra-Mega-Solar-Power-Projects-for-comments.pdf>

- Promotion of the policies and programmes necessary for popularizing the applications of various new and Renewable Energy technologies in the state;
- Promotion of the installation of power plants based on Renewable Energy sources for energy security;
- Implementation of demonstration projects based on Energy Efficiency and Renewable Energy;
- Rural electrification through Renewable Energy (remote villages) under RVE programme;
- Promotion of Energy Conservation measures for efficient use of energy resources; and
- Promotion of green building design for efficient use of energy in houses, commercial and industrial sector.

New and Renewable Energy Department, Madhya Pradesh is a representative of MNRE at State Level. The Government of Madhya Pradesh (GoMP) through its New and Renewable Energy Department (NRED) has identified the potential site measuring an area of approximately 1500 hectares (2 MW per one hectare of land) for setting up of the proposed 750 MW solar power project. NRED's first priority was aimed at focusing on transfer of revenue land for the proposed project.

NRED is responsible for providing revenue land for the project and has dealt with the procedures related to transfer of land in the name of the project proponent.

2.1.1.9 Central Electricity Authority (CEA)

Central Electricity Authority (CEA) is a Statutory Body constituted under the erstwhile Electricity (Supply) Act, 1948, hereinafter replaced by the Electricity Act, 2003, where similar provisions exist, the office of the CEA is an "Attached Office" of the Ministry of Power. The CEA is responsible for the technical coordination and supervision of programmes and is also entrusted with a number of statutory functions.

As per Manual on Transmission Planning Criteria published by CEA January 2013, the solar farms shall maintain a power factor of 0.98 (absorbing) at their grid inter-connection point for all dispatch scenarios by providing adequate reactive compensation and the same shall be assumed for system studies⁶.

Start-up power and tie-in approval is required from Madhya Pradesh Electricity Board.

2.1.1.10 Central Electricity Regulatory Commission

The Commission intends to promote competition, efficiency and economy in bulk power markets, improve the quality of supply, promote investments and advise government on the removal of institutional barriers to bridge the demand supply gap and thus foster the interests of consumers. In pursuit of these objectives the Commission aims to –

- Improve the operations and management of the regional transmission systems through Indian Electricity Grid Code (IEGC), Availability Based Tariff (ABT), etc.;
- Formulate an efficient tariff setting mechanism, which ensures speedy and time bound disposal of tariff petitions, promotes competition, economy and efficiency in the pricing of bulk power and transmission services and ensures least cost investments; facilitate open access in inter-state transmission;
- Facilitate inter-state trading;
- Promote development of power market; and

⁶ http://cea.nic.in/reports/others/ps/pspa2/tr_plg_criteria_manual_jan13.pdf

- Improve access to information for all stakeholders.

The project proponent is required to obtain approval of the Electrical Inspector to energise the HV/EHV Overhead Transmission Lines and Underground Cables etc. under Rule 63 of the I.E.Rules, 1956 from Madhya Pradesh Electricity Regulatory Commission (MPERC).

Madhya Pradesh Solar Policy benefits like banking, wheeling etc. as brought out in this policy shall be applicable as per the provisions made out by CERC in this respect.

2.1.1.11 Central Ground Water Authority

Central Ground Water Authority (CGWA) was constituted under Sub-section (3) of Section 3 of the Environment (Protection) Act, 1986 for the purposes of regulation and control of ground water development and management. The authority is entrusted with powers of:

- To resort the penal provisions contained in section 15 to 21 of the said act;
- To regulate and control, management and development of ground water in the country and to issue necessary regulatory directions for the purpose; and
- Exercise of powers under section 4 of Environment (Protection) Act, 1986 for the appointment of Officers.

CGWA is regulating withdrawal of ground water by industries/ projects. CGWA has published guidelines/ criteria for evaluating proposals/ requests for ground water abstraction (with effect from 15th November, 2012). As per the guidelines, for non-notified areas, No Objection Certificate (NOC) for ground water withdrawal will be considered for Industries/ expansion projects which are either NEW or under EXPANSION as per criteria given in the notification. For the proposed project falling in safe category NOC will be required for ground water withdrawal if quantity of ground water abstraction exceeds 100m³/day.

Solar farms fall under list of Green Category Industries which require large amount of water for cleaning of modules during operation phase. Developers should ensure that NOC is obtained from CGWA if daily consumption of water exceeds limit of 100m³/day⁷.

2.1.1.12 Gram Panchayat

Gram Sabha or the Panchayats are the local bodies which have been defined by the 73rd Constitutional Amendment Act, 1992. Panchayats have to be consulted before making the acquisition of land in the Scheduled Areas for development projects and before re-settling or rehabilitating persons affected by such projects in the Scheduled Areas.

The responsibilities that have been entrusted upon Panchayats comprises of the preparation of plans for economic development and social justice and the implementation of such schemes for economic development and social justice, as may be assigned to them.

A Non- Objection Certificate (NOC) has been obtained for the project from the Gram Panchayat of Badwar, Barsaita Desh, Barsaita Pahad, Ramnagar Pahad and Etar Pahad Village for construction and operation of the project in the area.

⁷<http://cgwa-noc.gov.in/LandingPage/FAQ.htm>

2.1.1.13 Madhya Pradesh Power Management Company Limited

The Madhya Pradesh Power Management Company Limited (MPPMCL) is the main holding company for all the DISCOMS in the State of Madhya Pradesh. The objective of the Company is provided in the following:

- Provide innovative, efficient and tailored electricity products and services with a strong emphasis on risk management for itself and its consumer.
- Maximise the value of assets employed in MP power sector by optimising the utilisation of these assets, whether they are generating plants, transmission lines, distribution networks, or other resources.
- Create more business opportunities for other segments in MP power sector and enhance the profitability for each of those segments.

Developers will sign a power purchase agreement the procurers of the generated electricity from the project.

2.2 Applicable Environmental and Social Laws, Regulations and Policies

The emerging environmental scenario all for attention on conservation and judicious use of natural resources. There is a need to integrate the environmental consequences of the development activities and for planning suitable measures in order to ensure sustainable development of a region. The environmental considerations in any developmental process have become necessary for achieving sustainable development. To achieve such goals the basic principles to be adopted are:

- To enhance the quality of environment in and around the project area by adopting proper measures for conservation of natural resources;
- Prevention of adverse environmental and social impact to the maximum possible extent;
- To mitigate the possible adverse environmental and socio-economic impact on the project-affected areas.

The proposed Project is covered under several environmental legislations. This report has been prepared with reference to the World Bank Operational Policies on environment safeguard, national and state level Policy Statement and other laws and legislations applicable to the proposed

The relevant Acts and Rules pertaining to the proposed project is summarised in **Table 2-1**.

2.2.1 Overview of Applicable Policies of Government of India

Various policies released by the Government of India from time to time needs to be addressed while undertaking the projects. Some of the policies (including sector specific) have been discussed briefly in the subsequent sections.

2.2.1.1 National Electricity Policy 2005

The National Electricity Policy 2005 states that Environmental concerns would be suitably addressed through appropriate advance action by way of comprehensive Environmental Impact Assessment and implementation of Environment Action Plan (EAP). As per the policy, adequate safeguards for environmental protection with suitable mechanism for monitoring of implementation of Environment Action Plan and R&R Schemes should be put in place. Open access in transmission has been introduced to promote competition amongst the generating companies who can now sell to different distribution licensees across the country. This should lead to availability of cheaper power.

RUMSL has been formed as a joint venture between Solar Energy Corporation of India (SECI) and Madhya Pradesh Urja Vikas Nigam Limited (MPUVNL). As an initial endeavour of the agreement, development of a 750MW Ultra Mega Power Plant has been proposed in Gurh Tehsil, Rewa District. RUMSL has been entrusted with the responsibility of developing 750MW total Solar Power Projects.

2.2.1.2 National Solar Mission

The objective of the Jawaharlal Nehru National Solar Mission (JNNSM) under the brand 'Solar India' is to establish India as a global leader in solar energy, by creating the policy conditions for its diffusion across the country as quickly as possible. The Mission has set a target of 1,00,000 MW and stipulates implementation and achievement of the target in 3 phases (first phase up to 2012-13, second phase from 2013 to 2017 and the third phase from 2017 to 2022) for various components, including grid connected solar power.

The successful implementation of the JNNSM requires the identification of resources to overcome the financial, investment, technology, institutional and other related barriers which confront solar power development in India. The penetration of solar power, therefore, requires substantial support. The policy framework of the Mission will facilitate the process of achieving grid parity by 2022.

The National Solar Mission encourages development of solar power projects in the country.

2.2.1.3 National Environmental Policy, 2006

Government of India released the National Environment Policy in 2006. The present national policies for environmental management are contained in the National Forest Policy, 1988, the National Conservation Strategy and Policy Statement on Environment and Development, 1992; and the Policy Statement on Abatement of Pollution, 1992. Some sector policies such as the National Agriculture Policy, 2000; National Population Policy, 2000; and National Water Policy, 2002; have also contributed towards environmental management. All of these policies have recognized the need for sustainable development in their specific contexts and formulated necessary strategies to give effect to such recognition.

The dominant theme of this policy is that while conservation of environmental resources is necessary to secure livelihoods and well-being of all, the most secure basis for conservation is to ensure that people dependent on particular resources obtain better livelihoods from the fact of conservation, than from degradation of the resource.

The proposed project will comply with the requirements of the National Environment Policy.

2.2.1.4 Madhya Pradesh Solar Policy, 2012

The Government of Madhya Pradesh (GoMP) acknowledges the increasing concern related to climate change, global warming and has recognised the urgent need to address these issues. The promotion of Renewable Energy is one of the key measures taken by the GoMP in this direction. Today Renewable Energy is increasingly becoming an integral part of energy security initiative in the state. The state of Madhya Pradesh is endowed with high solar radiation with around 300 days of clear sun. The state offers good sites having potential of more than 5.5 kWh/sq. m/per day for installation of Solar based power projects. The GoMP has been promoting the setting up of Renewable Energy based power plants through various Policy initiatives and incentives for Investors/Developers.

As per the guiding principle of the policy the proposed project falls under Category I wherein through a competitive bidding process the developer is to sell the power to MPPMCL.

The Developers will sign the Power Purchase Agreement (PPAs) with the procurers of electricity directly. The PPA will continue to be in force for a period of 25 years from the Date of Operation.

Table 2-1: Applicable Environmental and Social Laws, Regulations and Policies

S. No.	Issues	Relevance	Applicable Legislation	Agency Responsible	Applicable Permits and Requirements	Applicability to Project Phase
1.	Environmental Protection	- Construction activities will generate air and noise emissions. - Scattering of debris and construction material can contaminate the soil, water and surroundings.	- The Environment (Protection) Act 1986, as amended in April 2003; - EPA Rules 1986, as amended in 2002.	MPPCB MoEFCC CPCB	Compliance under the rules to maintain stipulated standards and environmental management through various supporting rules promulgated under the Act.	During Construction and Operation Phase
2.	Prevention and Control of Water Pollution	Waste water generation from construction and operation of the Plant	The Water (Prevention and Control of Pollution) Act, 1974, amended in 1988	MPPCB	- Consent for Establishment - Compliance under the Water Act	During Construction Phase
3.	Prevention and Control of Water Pollution	Waste water generation from construction and operation of the Plant	The Water (Prevention and Control of Pollution) Act, 1974, amended in 1988	MPPCB	- Consent to Operate - Compliance under the Water Act	During Operation Phase
4.	Permisison for ground water abstraction	If the quantity of ground water withdrawal exceeds 100 m3/ day then NOC is required to be obtained.	--	CGWA	No Objection Certificate	During Operation Phase
5.	License under Factories Act, 1948	Factory license is required as 'factory' means ' <i>any premises having ten or more workers involved in a manufacturing process</i> '.	Chapter I of The Factories Act, 1948	Factories Inspectorate, Madhya Pradesh	Factory License from the State Government or Chief Inspectorate of Factories, Madhya Pradesh	During Operation phase
6.	Water Cess Collection (a tax on water use and water pollution caused)	Water use and waste water generation	The Water (Prevention and Control of Pollution) Cess Rules 1978, as amended through 16th July 1992and	MPPCB	- Filing of monthly returns for usage of water from well/ tube well as per prescribed format (Form I under the Act) - Compliance under the Act	During Construction and Operation Phase

S. No.	Issues	Relevance	Applicable Legislation	Agency Responsible	Applicable Permits and Requirements	Applicability to Project Phase
			Water (Prevention and Control of Pollution) Cess Act 1977, as amended through 6th May 2003			
7.	Prevention and Control of Air Pollution	Operation of diesel generators for power backup at project facilities.	- The Air (Prevention and Control of Pollution) Act, 1981, amended in 1987. - Movement of vehicles, Operation of diesel generators for power at campsite or other construction activities).	MPPCB	- Consent for Establishment - Consent to Operate - Compliance under the Act	During Construction and Operation Phase
8.	Noise Emissions	Noise generated from operation of construction machinery	- The Noise (Regulation & Control) Rules, 2000 as amended in October 2002. - As per the Environment (Protection) Act (EPA) 1986 the ambient noise levels are to be maintained as stipulated by CPCB for different categories of areas like, commercial, residential and silence zones etc.	MPPCB	- There will be generation of Noise during construction activities. - Compliance under the rules to maintain stipulated standards.	During Construction Phase
9.	Hazardous Wastes Management	The proposed project will generate waste oil from diesel generator and transformer oil from switchyard.	Hazardous Wastes (Management Handling and Trans boundary Movement) Rules, 2008 as	MPPCB	- Authorization for collection, reception, storage, transportation and disposal of hazardous wastes; - Filing of annual return under the rules ;	During Construction and Operation Phase

S. No.	Issues	Relevance	Applicable Legislation	Agency Responsible	Applicable Permits and Requirements	Applicability to Project Phase
		- Solvents and chemicals used or cleaning etc. - Defunct and broken solar panels	- amended up to 2009 under - Environment (Protection) Act, 1986		- Other compliance under the rules authorization by Central Pollution Control Boards to vendors accepting waste/used oil; - Liability of the occupier, transporter and operator of a facility: The occupier, transporter and operator of a facility shall be liable for damages caused to the environment resulting due to improper handling and disposal of hazardous waste listed in schedules to the Rules; - The occupier and operator of a facility shall also be liable to reinstate or restore damaged or destroyed elements of the environment; - The occupier and operator of a facility shall be liable to pay a fine as levied by the State Pollution Control Board with the approval of the Central Pollution Control Board for any violation of the provisions under these rules.	
10.	Storage of Petroleum products	There will be storage of Diesel at site for operation of generators during construction phase.	- The Petroleum Act 1934, as amended in August 1976 - The Petroleum Rules 1976, as amended in March 2002.	PESO (Chief Controller of Explosives)	The site will store a small quantity of fuel at site. However, in case fuel storage exceeds the limit as stipulated in the Act, RUMSL is required to obtain a license from PESO.	During Construction Phase
11.	Surface Transportation	Movement of construction vehicles and other vehicles for transportation of	The Motor Vehicles Act 1988, as amended by Motor Vehicles (Amendment) Act	State Transport Authority	- Compliance of stipulated standards under rule 115 - Safety compliance under the rules	During Construction Phase

S. No.	Issues	Relevance	Applicable Legislation	Agency Responsible	Applicable Permits and Requirements	Applicability to Project Phase
		workers	2000, dated 14th August 2000 The Central Motor Vehicles Rules 1989, as amended through 20th October 2004 by the Central Motor Vehicles (Fourth Amendment) Rules 2004.			
12.	Welfare and Work Environment	Engagement of workers for construction and operation of the plant	The Factories Act, 1948 and Madhya Pradesh Factories Rules, 1962	Deputy Chief Inspector of Factories.	- RUMSL/ Construction contractor shall comply with all requirement of factories rules and participate in periodic inspection. - RUMSL will ensure that no child labour is engaged.	During Construction Phase
13.	Labour	Engagement of Child Labour at site	The Child Labour (Prohibition and Regulation) Act, 1986	Department of Inspectorate of Factories, Madhya Pradesh	- The Act prohibits employment of children in certain occupation and processes. The Act also specifies conditions of work for children, if permitted to work. - RUMSL will ensure compliance	During Construction Phase
14.	Labour	Engagement of Bonded Labour at site	Bonded Labour (Abolition) Act 1976	Department of Inspectorate of Factories, Madhya Pradesh	- All forms of bonded labour is abolished - RUMSL will ensure compliance	During Construction Phase
15.	Labour	Provision of wages to labour engaged at the site	Minimum Wages Act, 1948	Department of Inspectorate of Factories, Madhya Pradesh	Requires the Government to fix minimum rates of wages and reviews this at an interval of not more than 5 years. Every employer shall be responsible for the payment to persons employed by him of all wages required to be paid under this	During Construction Phase

S. No.	Issues	Relevance	Applicable Legislation	Agency Responsible	Applicable Permits and Requirements	Applicability to Project Phase
					Act. RUMSL will ensure compliance	
16.	Labour	Equal wages to male and female workers at site	Equal Remuneration Act 1976	Department of Inspectorate of Factories, Madhya Pradesh	- It is the duty of an employer to pay equal remuneration to men and women workers for same work or work of a similar nature. - RUMSL will ensure compliance	During Construction Phase
17.	Labour	Engagement of Labour at site	Workmen's Compensation Act, 1923	Department of Inspectorate of Factories, Madhya Pradesh	- Requires if personal injury is caused to a workman by accident arising out of and in the course of his employment, his employer shall be liable to pay compensation in accordance with the provisions of this Act. - RUMSL will ensure compliance	During Construction Phase
18.	Labour	Engagement of Female Labour at site	Maternity Benefit Act, 1961	Department of Inspectorate of Factories, Madhya Pradesh	- No employer shall knowingly employ a woman in any establishment during the six weeks immediately following the day of her delivery or her miscarriage. - No pregnant woman shall, on a request being made by her in this behalf, be required by her employer to do during the period any work which is of an arduous nature or which involves long hours of standing, or which in any way is likely to interfere with her pregnancy or the normal development of the foetus, or is likely to cause her miscarriage or otherwise to adversely affect her health.	During Construction Phase

S. No.	Issues	Relevance	Applicable Legislation	Agency Responsible	Applicable Permits and Requirements	Applicability to Project Phase
					RUMSL will ensure compliance	
19.	Public Consultation and Local Grievances	The project is set in rural area surrounded by Barsaita Desh, Barsaita Pahad, Badwar, Etar Pahad and Ramnagar Pahad villages.	Madhya Pradesh Panchayat Act 1993	Panchayat Union	- Provides for application of consent from the respective panchayat body/village administrative officer etc during the project life cycle. - All grievances will be addressed by the developers during the construction and operation phase. For any unresolved grievances, the developer will forward the grievances to RUMSL who in turn will subsequently forward them to appropriate authority for redressal.	During Construction and Operation Phase
20.	Acquisition of Private land for the project.	Private Land measuring 164.231 hectares is in the process of being acquired and 138.758 hectares has been identified from Barsaita Desh, Barsaita Pahad, Badwar, Etar Pahad and Ramnagar Pahad villages.	The Consent of Land Purchase Policy, 2014	District Collectorate	- District Collector to ensure disbursement of payment to land owners and livelihood losers. - RUMSL is required to get consent of up to 100 per cent of people whose land is procured.	During Construction Phase
21.	Possession of valid license by the engaged contractor.	Contractors or third parties to be involved in the construction works for the proposed project, if required, will also be engaged only subject to availability of valid registration.	Building and Other Construction Workers (Regulation Of Employment And Conditions Of Service) Act, 1996 and Contract Labour (Regulation and Abolition) Act, 1970.	Registration Officer	RUMSL should ensure that contractor/ third party have a valid registration under the Building and Other Construction Works Act and Contract Labour (Regulation and Abolition) Act, 1970.	During Construction Phase
22.	Labour working at the site	Working conditions of contracted Labour working	Contract Labour (Regulations and Abolition)	The Commissioner of Labour, Madhya	RUMSL should ensure that all the contracted workers are provided with	During Construction Phase

S. No.	Issues	Relevance	Applicable Legislation	Agency Responsible	Applicable Permits and Requirements	Applicability to Project Phase
		at the site	Act, 1970	Pradesh	condition of services, rate of wages, holidays, hours of work as stipulated in the act and rules.	

2.3 World Bank Operational Policies

The World Bank follows an operational policy statement (updated in February 2011), which stipulates that all operations are carried out in an environmentally responsible manner and that projects must comply with all local environment legal obligations and appropriate World Bank guidelines⁸. The World Bank sets out its procedures and policies with regard to conducting environmental assessments on Operational Policy 4.01: Environmental Assessment (October 1991) and its updates and other pertinent Guidelines.

2.3.1 Applicability

World Bank Environmental and Social Safeguard Policies provide ten (10) potential issues that may need to be considered in an ESIA, depending on the specific characteristics of the project. **Table 2-2** summarizes the expected applicability of the potential Safeguard Policies for Rewa Solar Power Project.

Table 2-2: Potential World Bank Environmental Safeguard Policies and Applicability to Project

Safeguard Policy	Requirement	Policy Triggered	Applicability/ Compliance
Environment Assessment (OP 4.01)	The Bank requires environmental assessment (EA) of projects proposed for Bank financing to help ensure that they are environmentally sound and sustainable, and thus to improve decision making.	Yes	This policy applies to all projects requiring a Category (B) Environmental Assessment under OP 4.01. All environmental and social aspects included in the proposed project are adequately examined. The project is likely to have some modest risks and potential adverse environmental impacts in the constructional and operational phases regarding the natural environment, water, human health and safety.
Natural Habitats (OP 4.04)	The Bank requires borrowers to incorporate into their development and environmental strategies analyses of any major natural habitat issues, including identification of important natural habitat sites, the ecological functions they perform, the degree of threat to the sites, priorities for conservation, and associated recurrent-funding and capacity-building needs.	No	The project site is located among a mosaic of habitats with varying levels of anthropogenic activities like grazing. The site does not represent a pristine natural habitat and in fact, represents a degraded form of habitat. Hence, it is unlikely that the project would result in loss of natural habitats by cutting through natural habitats or by upsetting drainage/water supply of the area.
Pest Management (OP 4.09)	In appraising a project that will involve pest management, the Bank assesses the capacity of the country's regulatory	No	The proposed project involves generation of power from solar energy which is one of the cleanest sources of energy. The project activity would not require the use of pesticides in any way. There could be use of weedicide/ Pesticide for removal

⁸The World Bank Group General Environment, Health and Safety (EHS) Guidelines are expected to apply to the proposed project. The guidelines are available at www.ifc.org/ehsguidelines

Safeguard Policy	Requirement	Policy Triggered	Applicability/ Compliance
	framework and institutions to promote and support safe, effective, and environmentally sound pest management. As necessary, the Bank and the borrower incorporate in the project components to strengthen such capacity.		of undergrowth around the Panels.
Involuntary Resettlement (OP 4.12)	World Bank recognizes that Involuntary resettlement may cause severe long-term hardship, impoverishment, and environmental damage unless appropriate measures are carefully planned and carried out.	No	The land required for the project will be purchased through 100% consent as per Madhya Pradesh's Consent for Land Purchase Policy, 2014. The payment of the land will be based on the Collector Guideline Rate (based on the current market value) plus one time solatium.
Indigenous People (OP 4.10)	The Bank recognizes that the identities and cultures of Indigenous Peoples are inextricably linked to the lands on which they live and the natural resources on which they depend. Hence, A project proposed for Bank financing must be screened for presence of indigenous people.	No	Consultations with the communities indicate that there are five affected households(identified in Phase I) of Indigenous populations in the study area. Consent of the land acquired for the proposed project has been provided voluntarily by these families. The families do not practice any distinct belief and have merged themselves into the mainstream population. Hence, this policy does not get triggered as no adverse impact on these people is anticipated due to the project.
Forests (OP 4.36)	If a project involves significant conversion or degradation of natural forests or related natural habitats that the Bank determines are not critical, and the Bank determines that there are no feasible alternatives to the project and its siting, and comprehensive analysis demonstrates that overall benefits from the project substantially Outweigh the environmental costs; the Bank may finance the project provided that it incorporates appropriate	No	The proposed project does not comprise of any kind of forest land.

Safeguard Policy	Requirement	Policy Triggered	Applicability/ Compliance
	mitigation measures.		
Physical Cultural Resources (OP 4.11)	The borrower needs to addresses impacts on physical cultural resources in projects proposed for Bank financing, as an integral part of the environmental assessment (EA) process.	No	No tangible forms of cultural heritage having archaeological, paleontological, historical, cultural, artistic and religious significance were observed or practiced by the communities residing within the vicinity of the project area.
Safety of Dams (OP 4.37)	When the Bank finances a project that includes the construction of a new dam, it requires that the dam be designed and its construction supervised by experienced and competent professionals.	No	The project does not involve any construction of dam. The project is also not dependent on any existing dam.
Project in Disputed Areas (OP 7.60)	Projects in Disputed Areas may affect the relations between the Bank and its borrowers, and between the claimants to the disputed area. Therefore, the Bank will only finance projects in disputed areas when either there is no objection from the other claimant to the disputed area, or when the special circumstances of the case support Bank financing, notwithstanding the objection.	No	The proposed project is not situated in a disputed area. Any component likely to be financed as part of the project is not situated in a disputed area.
Projects on International Waterways (OP 7.50)	The Bank recognizes that the cooperation and goodwill of riparians is essential for the efficient use and protection of the waterway. Therefore, it attaches great importance to riparians' making appropriate agreements or arrangements for these purposes for the entire waterway or any part thereof.	No	The project area does not cover any international or national waterways. The project area is not riparian.

2.4 World Bank Categorization of Projects

The Bank screens the Private Sector Activity in order to determine the nature and extent of the environmental and social assessment needed, based on the type, location, sensitivity, and scale of the activity, as well as the nature and magnitude of its potential impacts. This screening also identifies any additional information required to complete the Bank's environmental and social review and determine whether to support the activity. The Private Sector Activity is categorized by the Bank as Category A, B, C, depending on the nature of the activity and financing mechanism, as follows:

Table 2-3: World Bank's Categorization for Projects

Category	Justification
Category A	Business activities with potential significant adverse environmental or social risks and/or impacts that are diverse, irreversible, or unprecedented;
Category B	Business activities with potential limited adverse environmental or social risks and/or impacts that are few in number, generally site-specific, largely reversible, and readily addressed through mitigation measures;
Category C	Business activities with minimal or no adverse environmental or social risks and/or impacts;
Category FI	Business activities that involve investment of Bank funds through a financial intermediary, in subprojects that may result in adverse environmental impacts.

2.5 IFC Performance Standards and their Applicability

The IFC Performance Standards stipulates that any proposed project shall meet the following requirements throughout the life of an investment by IFC or other relevant financial institution:

- Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts;
- Performance Standard 2: Labour and Working Conditions;
- Performance Standard 3: Resource Efficiency and Pollution Prevention;
- Performance Standard 4: Community Health, Safety, and Security;
- Performance Standard 5: Land Acquisition and Involuntary Resettlement;
- Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources;
- Performance Standard 7: Indigenous Peoples; and
- Performance Standard 8: Cultural Heritage

These performance standards and guidelines provide ways and means to identify impacts and affected stakeholders and lay down processes for management and mitigation of adverse impacts.

2.5.1 PS1 – Assessment and Management of Environmental and Social Risks and Impacts

PS 1 establishes the importance of:

- Integrated assessment to identify the environmental and social impacts, risks, and opportunities of projects;
- Effective community engagement through disclosure of project-related information and consultation with local communities on matters that directly affect them; and
- The project proponent's management of environmental and social performance throughout the life of the project.

Applicability- PS 1 is APPLICABLE for the project.

The PS 1 is applicable to projects with environment and/or social risks and/or impacts. The proposed project is a solar power project and will have environmental and social impacts such as stress on existing water resources, generation of noise, construction activities etc.

Requirements : Policy and Environment and Social Assessment and Management System

RUMSL, in coordination with other responsible government agencies and third parties as appropriate, will conduct a process of environmental and social assessment, and establish and maintain an ESMS appropriate to the nature and scale of the project. The client will also establish an overarching policy defining the environmental and social objectives and principles that guide the project to achieve sound environmental and social performance.

RUMSL has appointed AECOM for undertaking environment and social assessment study for the proposed 750MW solar project at Rewa. RUMSL is required to develop an Environmental and Social Management System for the solar project at the corporate level which shall include the following elements:

1. Environmental and Social Policy;
2. Organization Set up;
3. Management Programs;
4. Operation Control;
5. Emergency Preparedness and Response;
6. EHSS Training Provisions;
7. Monitoring and Audit; and
8. Communication

Requirements: Identification of Risks and Impacts and Management Programs.

RUMSL will establish and maintain a process for identifying the environmental and social risks and impacts of the project. Management Programs to be developed depending upon the nature and scale of the project.

Impacts as identified during construction and operation phase of the project have been detailed in chapter 8 of ESA report separately. Chapter 9 defines framework for environment and social management plan for the proposed project with the following plans to be formulated separately:

1. Construction Labour Management Plan;
2. Occupational Health and Safety Plan including risk assessment;
3. Disaster Management Plan; and
4. Waste Management Plan.

Requirements: Organizational Capacity and Competency

The Developers, in collaboration with appropriate and relevant third parties, will establish, maintain, and strengthen as necessary an organizational structure that defines roles, responsibilities in association with the project.

Organization structure for implementation of environment and social management plan has been detailed in section 9.2 of ESA report. It also reflects the interaction of Client Management with contractors engaged.

Training needs specific to components of ESMP has been specified in table dedicated to ESMP.

Requirements: Emergency Preparedness and Response

The Developer will establish emergency preparedness and response system to respond to accidental and emergency situations associated with the project in a manner appropriate to prevent and mitigate any harm to people and/or the environment.

The client is required to design emergency preparedness and response plans based on the risks to community health and safety identified during the risks and impacts identification process. The level of planning and communication should be commensurate with the potential impacts. A framework of the emergency preparedness and response has also been included.

Requirements: Monitoring and Review

RUMSL and the Developer will establish procedures to monitor and measure the effectiveness of the management program, as well as compliance with any related legal and/or contractual obligations and regulatory requirements.

Checklists as provided in ESA reported are to be utilized during construction and operation of the project towards the implementation of ESMP during different stages of the project.

Section 5.5 of the Report details the stakeholder identification and engagement related to the project. Details of consultations undertaken during ESA study will also be presented in Chapter 5.

2.5.2 PS2 – Labor and Working Conditions

Performance Standard 2 recognizes that the pursuit of economic growth through employment creation and income generation should be accompanied by protection of the fundamental rights of workers.

Applicability- PS 2 is APPLICABLE for the project.

The proposed project will involve employment of direct and contracted workers during construction and operation phases. The client will engage direct workers, workers engaged through third parties (contracted workers), as well as workers engaged by the developer's primary suppliers (supply chain workers).

Requirements: Working Conditions and Management of Worker Relationship

The Developers should provide workers with documented information that is clear and understandable, regarding their rights under national labor and employment law.

The Developers shall ensure measures to

- Prevent child labour, forced labour, and discrimination.
- Freedom of association and collective bargaining shall be provided.

- Wages, work hours and other benefits shall be as per the National labour and employment laws.

The Developers provide reasonable working conditions and terms of employment for both direct and contracted workers through contractor agreements which are to be provided. Construction Contractor should ensure that Terms of employment include wages and benefits, wage deductions, hours of work, breaks, rest days, overtime arrangements, and overtime compensation, medical insurance, pension, and leave for illness, vacation, maternity, or holiday are to be communicated to workers clearly.

Migrant workers should also be provided same working conditions equivalent to those of non-migrant workers performing the same type of work. It will be the responsibility of the Contractor to provide accommodation, transportation, and basic services including water, sanitation, and medical care for the workers working on that project in compliance with requirements of IFC PS2.

Requirements: Workers' Organizations

The Developers will not restrict workers from developing alternative mechanisms to express their grievances and protect their rights regarding working conditions and terms of employment.

The Developers will not discourage workers from forming or joining a workers' organization or discriminate or retaliate against workers who attempt to form or join workers' organizations.

Requirements: Non-Discrimination and Equal Opportunity

The Developers will not discriminate with respect to any aspects of the employment relationship, such as recruitment and hiring, compensation (including wages and benefits), working conditions and terms of employment, access to training, job assignment, and promotion, termination of employment or retirement, and disciplinary practices.

The developers should take appropriate measures to prevent any discriminatory treatment of migrant workers. Measures to prevent and not endorse any harassment, including sexual harassment or psychological mistreatment within the workplace will also be undertaken.

Requirements: Retrenchment

The developers should make certain that all workers receive notice of dismissal and severance payments mandated by law and collective agreements in a timely manner.

The developers should conduct proper consultations with the workers before the retrenchment, if any. Selection criteria for those to be laid off should be objective, fair, and transparent. The retrenchment should not be based on personal characteristics unrelated to inherent job requirements.

Requirements: Grievance Mechanism

The developers will provide a grievance mechanism for workers (and their organizations, where they exist) to raise workplace concerns.

In providing a grievance mechanism through which workers may raise workplace concerns, The developer should ensure that matters are brought to management's attention and addressed expeditiously. The Developer need to document all grievances and follow up on any corrective actions.

Requirements: Protecting the Work Force

The developer will not employ children in any manner that is economically exploitative, or is likely to be hazardous or to interfere with the child's education, or to be harmful to the child's health or physical, mental, spiritual, moral, or social development.

The developers to ensure that no child labour (as defined in IFC PS2), forced labour is employed by the contractor during construction and operation phase of the project. The developers should also exercise diligence with regard to key contractors and subcontractors so that they do not knowingly benefit from practices that lead to bonded or indentured status of workers.

Requirements: Occupational Health and Safety

The developers should provide a safe and healthy work environment, taking into account inherent risks in its particular sector and specific classes of hazards in the client's work areas, including physical, chemical, biological, and radiological hazards, and specific threats to women.

The Developers will extend a safe and healthy work environment to contracted workers and to any other workers who provide project-related work and services. The developers should provide training to all workers on relevant aspects of OHS associated with their daily work, including emergency arrangements and OHS briefing for visitors and other third parties accessing the premises. All occupational injuries, illnesses and fatalities are to be documented.

Requirements: Workers Engaged by Third Parties

The developers will establish policies and procedures for managing and monitoring the performance of such third party employers in relation to the requirements of this Performance Standard.

The developers should develop and implement procedures to manage and monitor performance of third parties. These procedures should be integrated in the day-to-day operations of the company and requirements should be clearly communicated to third parties, and if possible to workers engaged by these third parties.

2.5.3 PS3 - Resource Efficiency and Pollution Prevention

Performance Standard 3 recognizes that increased economic activity and urbanization often generate increased levels of pollution to air, water, and land, and consume finite resources in a manner that may threaten people and the environment at the local, regional, and global levels. The objectives of PS 3 are:

1. To avoid or minimize adverse impacts on human health and the environment by avoiding or minimizing pollution from project activities.
2. To promote more sustainable use of resources, including energy and water.
3. To reduce project-related GHG emissions.

Applicability- PS 3 is APPLICABLE for the project.

The proposed project is a clean energy project and will not have major pollution sources associated with it. The construction works for the development of project will entail generation of wastes like wastewater, waste oil and construction debris. The operation phase will result in generation of waste such as transformer oil and waste water from cleaning of solar panels, broken solar panels. During cleaning activities.

Requirements: Resource Efficiency

The developers should implement technically and financially feasible and cost effective measures for improving efficiency in its consumption of energy, water, as well as other resources and material inputs, with a focus on areas that are considered core business activities.

Requirements: Greenhouse Gases

The developers should consider alternatives and implement technically and financially feasible and cost-effective options to reduce project-related GHG emissions during the design and operation of the project.

Being a cleaner source of energy, greenhouse gases emissions will be comparatively less. Lifecycle CO₂ equivalent for Solar farm based on PV technology is lowest with 18 gCO₂ eq/Kwh as per Global warming potential of selected electricity sources, IPCC 2014.

Requirements: Water Consumption

When the project is a potentially significant consumer of water, in addition to applying the resource efficiency requirements of this Performance Standard, the client shall ensure that the developers adopt measures that avoid or reduce water usage so that the project's water consumption does not have significant adverse impacts on others.

Large quantities of water will be required for cleaning of solar panels. RUMSL will ensure that the developers reduce the project's water consumption by implementation of measures like rain water harvesting, proper channelization of waste water generated etc. It is also to be ensured that abstraction of large quantities of water will not cause adverse effects to locals of the area.

Requirements: Pollution Prevention

The developers avoid the release of pollutants or, when avoidance is not feasible, minimize and/or control the intensity and mass flow of their release.

Requirements: Impacts on Drainage Pattern

The site drainage shows dendritic pattern and various nallahs existing over the site drains most of the water during monsoons. The main nala draining the site is Aahri Nallah while Devdeh Nallah drains part of site drainage on the northeastern side. The carrying capacity of both the drainage channels seems to be sufficiently good to convey peak discharges. However, there might be some local depressions within the site which might suffer from local ponding. Hence, Developers will take proper measures to ensure that drainage lines remain intact like provision of diversion berms or dykes.

Requirements: Waste and Hazardous Materials Management

The developers should avoid the generation of hazardous and non-hazardous waste materials. Where waste generation cannot be avoided, the client will ensure that the developers reduce the generation of waste, and recover and reuse waste in a manner that is safe for human health and the environment.

The developers should investigate options for waste avoidance, waste recovery and/or waste disposal during the design and operational stage of the project. Material Safety Data Sheet (MSDS) for all the hazard chemicals to be used during construction and operation phase should be readily available.

2.5.4 PS4 – Community Health, Safety and Security

PS 4 recognizes that project activities, equipment, and infrastructure can increase community exposure to risks and impacts. Its main stress is to ensure that the safeguarding of personnel and property is carried out in accordance with relevant human rights principles and in a manner that avoids or minimizes risks to the Affected Communities.

Applicability- PS 4 is APPLICABLE for the project.

The proposed project will involve transportation of construction material and movement of construction machinery which may pose safety risks to the affected communities.

Requirements: Community Health and Safety and Community Exposure to Disease

Community health and safety considerations should be addressed through a process of environmental and social risks and impacts identification resulting in an Action Plan for disclosure to project Affected Communities.

The Developer is required to address Community health and safety associated with the construction and operation phase of the project.

The Developer should ensure that surface water drainage system during operation phase is not poorly designed and there is no creation of construction pits and depressions which can have potentially adverse impacts on adjacent local communities.

Requirements: Infrastructure and Equipment Design and Safety

For all projects with risks to workers and the public, the client should also build its internal capacity to monitor engineering and fire safety of its operations, including periodic monitoring and internal audits.

Being a solar farm, wherein solar panels are not mounted at a height. However, The Developer should ensure that the developers maintain adequate number of fire extinguishers to cater any emergency.

Requirements: Hazardous Materials Management and Safety

The Developer will avoid or minimize the potential for community exposure to hazardous materials and substances that may be released by the project.

The project will not use any hazardous chemicals. Limited amount of hazardous substances will be required such as diesel in Diesel Generators (DG sets), transformer oil etc. RUMSL will ensure that the developers undertake proper handling and storage procedures to minimize any contamination due to accidental spills of such substances.

Requirements: Ecosystem Services

The project's direct impacts on priority ecosystem services may result in adverse health and safety risks and impacts to Affected Communities.

Solar farm is a cleaner form of production of energy and there will be no significant change to the physical environment, such as natural vegetation cover, existing topography, and hydrologic regimes due to the project.

Requirements: Emergency Preparedness and Response

The Developer will also assist and collaborate with the Affected Communities, local government agencies, and other relevant parties, in their preparations to respond effectively to emergency situations, especially when their participation and collaboration are necessary to respond to such

emergency situations.

The Developer is required to design emergency response plans based on the risks to the health and safety of the Affected Community and other stakeholders. Emergency plans should be developed in close collaboration and consultation with potentially Affected Communities and other stakeholders and should include detailed preparation to safeguard the health and safety of workers and the communities in the event of an emergency.

Requirements: Security Personnel

When the client through the developers retains direct or contracted workers to provide security to safeguard its personnel and property, it will assess risks posed by its security arrangements to those within and outside the project site.

RUMSL is yet to engage a Security Service for provision of security during construction phase of the project. The client will make reasonable inquiries to ensure that those providing security are not implicated in past abuses; will train them adequately in the use of force (and where applicable, firearms), and appropriate conduct toward workers and Affected Communities.

2.5.5 PS5 – Land Acquisition and Involuntary Resettlement

PS 5 recognizes that project-related land acquisition and restrictions on land use can have adverse impacts on communities and persons that use this land. Its main aim is to anticipate and avoid, or where avoidance is not possible, minimize adverse social and economic impacts from land acquisition or restrictions on land use by providing compensation for loss of assets at replacement cost and ensuring that resettlement activities are implemented with appropriate disclosure of Information, consultation, and the informed participation of those affected.

Applicability- PS 5 is NOT APPLICABLE for the project.

For the proposed project, a total of 164.231 hectares of private land is proposed to be procured in the Phase I and 138.758 hectares in Phase II while 1232.697 hectares of government revenue land has been transferred for the proposed project.

The private land identified for the proposed project in Phase I comprises of 309 titleholders and Phase II comprises of 148 titleholders. As observed and reported by the project affected population (Phase I) during the consultation process, private land parcels falling under the project area is in a slope terrain. Because of the slope terrain, no irrigation was possible for these land parcels, therefore, as reported these parcels used to depend upon rainfall in order for agricultural activities to take place. A one crop cycle used to be practiced in these land parcels. However, in the last three years, due to the decrease in rainfall, these land parcels have been left barren and unused. It was also reported that all project affected families used to undertake agricultural activities on these land parcels around three years ago. Amongst the project affected households, farmers owning less than .5 hectares land holdings in the project area (comprising about 14% of landowners) used to cultivate their land and the agricultural produce were used for self consumption purposes. These farmers used to supplement their income by working as agricultural labourers in large farm lands (outside the project area) owned by farmers belonging to the same villages. Due to the discontinuation of cultivation activities on the land parcels delineated for the project due to the decrease of rainfall, the farmers who have .5 hectares land holdings have resorted to being engaged as non agricultural labourers in Rewa city as well as one member of the (farmer's) family have migrated to cities outside the state for work opportunities and have been sending back money for their family. The remaining farmers who had land within the

project area comprised of marginal and larger land holdings farmers that woned land falling outside the project area. These farmers used their agriculture produce both for self consumption and for sale in the market. Hence, as the project affected households did not earn any income from the land parcels identified for the project, there would be no loss in terms of land or livelihood to them due to the unproductive nature of the land.

Seasonal grazing by livestock owned by 31% of project affected population, used to be practiced in the government land (falling both within and outside the project area) during the monsoon season. Only 22.5 % of the 5467.26 hectares government land (falling under the five project villages) has been transferred to the project. However, this land has not been designated as grazing land and alternate grazing land is available within 500 m to 1 km of the proposed project area towards the east and west direction of project boundary. This transfer of land would not lead to loss of access to grazing area for the project affected population because of the abundance of open available land in the area.

The government land transferred to the project comprised of barren land wherein a portion of the land parcel approximately 1200 hectares falling under Badwar village was used by the Indian Army from 1990 to 2002 as a firing range. As reported during the consultations held with the local communities, the land parcel was not utilised for any activities (either as an income source or shelter) by the communities after the Army firing range was discontinued in the area.

The private land parcels are in the process of being acquired on the basis of Madhya Pradesh's Consent of Land Purchase Policy, 2014 wherein an undertaking of the land sellers consent will be taken prior to acquisition of the land. In cases wherein an objection arises over the land relating to dispute on ownership or people refuse to provide their consent, the Government will not go ahead with the acquisition of the land parcel as stated in the Consent Policy. In addition, it was also reported that contiguous land is desirable for the project however, if in some cases, some land owner do not provide his consent then his land will not be taken and the project will be accordingly structured around that parcel of land.

As observed from the above section, it can be concluded that PS 5 is not triggered as it is envisaged that all land parcels and associated facilities (in Phase I and Phase II including any additional land, if required) for the project will be acquired through the consent policy.

Requirements: Compensation and Benefits for Displaced Persons

When displacement cannot be avoided, the client will offer displaced communities and person's compensation for loss of assets at full replacement cost and other assistance.

Disbursement of payment for land and other assets has been calculated at the market value based on Collector Guideline Rate plus a one time solatium. During the consultations, it was reported that the procurement of land is based on 100 per cent consent of project affected families wherein affected titleholders/landowners voluntarily will be providing their consent to sell their property and assets. In addition, RUMSL is also following the norms: (i) the transaction being undertaken with the seller's informed consent; and (iii) the seller is provided with fair compensation (the Collector Guideline Rate and one time solatium) based on prevailing market values.

Requirements: Community Engagement

RUMSL will engage community for disclosure of relevant information and participation of Affected

Communities during the planning and implementation stage of the project and it will be ensure that fair consultation has taken place.

Requirements: Grievance Mechanism

A grievance mechanism consistent with Performance Standard 1 has been developed and provided in Section 9.4.2 of the report.

The Developer will ensure to resolve grievances at the community level. It is also to be ensured that designated staffs is trained and available to receive grievances and coordinate efforts to redress those grievances through the appropriate channels, taking into consideration any customary and traditional methods of dispute resolution within the Affected Communities. All grievances will be addressed by the developers during the construction and operation phase. For any unresolved grievances and grievances related to land, the developer will forward the grievances to RUMSL who in turn will subsequently forward them to appropriate authority for redressal.

Requirements: Economic Displacement

The land procurement is being based on Madhya Pradesh Consent for Land Purchase Policy, 2014 wherein consent of all project affected population is required to be undertaken prior to acquisition of land. Adequate disbursement of payment (based on Collector Guideline Rate plus one time Solatium) is to be provided by District Collector to the project affected people

2.5.6 PS6 – Biodiversity Conservation and Sustainable Management of Living Natural Resources

PS 6 recognizes that protecting and conserving biodiversity, maintaining ecosystem services, and sustainably managing living natural resources are fundamental to sustainable development. This standard is aimed at promoting the sustainable management of living natural resources through the adoption of practices that integrate conservation needs and development priorities.

Applicability- PS 6 is NOT APPLICABLE to the project.

The proposed project does not involve any diversion of forest land. The study area represents a fairly degraded tract of dry deciduous forest, which has become reduced to tropical grassland, through intense grazing pressure and annual burning. The area provides habitats to a range of floristic and faunal species associated with deciduous scrub and stony grasslands.

According to IFC Performance Standard 6, there are different Gradients Critical Habitats based on the relative vulnerability (degree of threat) and irreplaceability (rarity or uniqueness) of the site⁹. The project boundary does not fall under any legal protected or any internationally recognized area and has lower biodiversity value. As per substantive literature review and in field data collection during site visit, at least ten IUCN-designated Critically Endangered or Endangered species, seventy-four migratory species, three congregatory species and five endemic or restricted range species having recorded ranges that include either the study area, or water-bodies in the catchments of which the study area lies. Being a solar farm which will utilize solar energy for generation of electricity will have very limited impacts in terms of waste generation, fugitive emissions, and negligible noise emissions. The project site is located among a mosaic of habitats with varying levels of anthropogenic activities like grazing which is also depicted from Photos 3-1 to 3-4 from Chapter of Project Description. Hence, the project does not lead to measurable adverse impacts on biodiversity

⁹ Clause no 16 n on Critical Habitat of IFC Performance Standard 6.

values supporting the ecology of the project area.

Requirements: Protection and Conservation of Biodiversity

Project activities that have a bearing on the protection and conservation of biodiversity, on account of their potential to impact food-webs and cause loss, degradation or fragmentation of habitats, include:

- Conversion of the land-use profile of a large tract of land;
- Removal of natural vegetation towards clearance of the land for project activities;
- Levelling or grading of land;
- Laying of access roads;
- Movement of vehicles and operation of construction machinery over the land surface;
- Spillage/emanation of toxins from the project infrastructure, which are likely to leach into, and thereby, contaminate the soil and surface-water occupied/used by local flora and fauna;
- Use of artificial illumination during night-time, especially during the construction phase; and
- Increased traffic in the area, especially during the construction phase.

These foreseeable impacts will be sought to be mitigated through the following avoidance, minimization and restoration measures:

- Conserving the existing land-use of as much of the project area as possible;
- Conserving or restoring the ground cover of as much of the project area as possible, using native species;
- Conserving as much of the natural topography as possible and incorporating the natural topographical features of the area into the construction designs and layouts;
- Minimizing the number and size of access roads, maintaining the integrity of natural water-channels during road-laying and restoring the natural vegetation of any roads not required beyond the construction phase;
- Ensuring that vehicles and machinery used in the construction activities comply with the prescribed emission standards and their movement/speed are restricted to pre-designated routes/levels;
- Restricting construction activities that require high levels of illumination to daylight hours to prevent disruption of the natural night period by artificial lighting;
- Prohibiting the use of any avoidable toxic substances, such as herbicides and dust-settling chemicals, especially during the operational phase; and
- Ensuring effective spillage-containment and appropriate pre-discharge treatment of any hazardous wastes generated by the project.

Requirements: Management of Ecosystem Services

With respect to impacts on priority ecosystem services of relevance to Affected Communities and where the client has direct management control or significant influence over such ecosystem services, adverse impacts should be avoided.

Being a cleaner source of energy, there is no significant degradation and loss of ecosystem services can pose operational, financial and reputational risks to project sustainability. The area seems to be providing a small but limited range of ecosystem services to the communities living in and around it, chiefly in terms of natural sources of water and pastureland for the local communities to graze their livestock.

Requirements: Sustainable Management of Living Natural Resources

Clients who are engaged in industries (forestry, agriculture, animal husbandry, aquaculture, and fisheries) will manage living natural resources in a sustainable manner, through the application of industry-specific good management practices and available technologies.

This project does not directly involve any industry based on living natural resources. Hence, this requirement is not applicable to this project. However, any plantation activity undertaken in connection with this project, as a mitigative measure, shall be carried out in an ecologically sensitive manner and shall involve only native species.

2.5.7 PS7 – Indigenous People

Performance Standard 7 recognizes that Indigenous Peoples, as social groups with identities that are distinct from mainstream groups in national societies, are often among the most marginalized and vulnerable segments of the population. In many cases, their economic, social, and legal status limits their capacity to defend their rights to, and interests in, lands and natural and cultural resources, and may restrict their ability to participate in and benefit from development.

Applicability- PS 7 is APPLICABLE for the project.

The project area or its surroundings have very limited indigenous people. During Phase I, five families belonging to the ST Category (Kol Tribe) have been identified. As reported during consultations held, the members of these households do not follow any distinct cultural traits or beliefs and have mainstreamed themselves into the general society. They are legal titleholders of the land parcels owned by them and are engaged as cultivators (0.4%), agricultural labourers (0.6%), non agricultural labourers (0.6%), government service (0.2%), household work (2.7%) and student (2.2%) similar to the mainstream general society.

As the project area does not fall under scheduled area, the landowners belonging to the ST category are legal titleholders of their land. As reported during the consultation process, the ST category landowners have provided their consent voluntarily to sell their land for the proposed project without any force. They are aware that for the land contributed they would be receiving double payment in the form of a Collector Guideline Rate plus one time solatium based on the prevailing market value. They also affirmed that this was communicated to all affected households in the village.

On review of the private land owners identified for Phase II of land acquisition process through the consent policy, there are no households belonging to the ST category which would be affected. As the total number of ST category households affected by the project amounts to five (5), it shows that the presence of ST families is not substantial in the project area villages.

As noted during the census survey undertaken in Phase I of the land acquisition process, the tribal families belong to the mainstream society and are not economically or physically displaced or impacted by the project activities. With the compensation that they will receive based on the Collector Guideline Rate plus one time solatium, new ventures in the form of start-up for new business or investment of purchase of land in other parts of the district can be initiated by the landowners.

Hence, considering that the Indigenous People are mainstreamed and have legal titles to land, the only relevant mitigation measure in this case will be compensation for land and other lost assets. Adequate consultation and engagement has been undertaken in this project with the ST families to evaluate the compensation process which was noted as adequate.

2.5.8 PS8 – Cultural Heritage

For the purposes of this Performance Standard, cultural heritage refers to tangible forms of cultural heritage, such as tangible moveable or immovable objects, property, sites, structures, or groups of structures, having archaeological (prehistoric), paleontological, historical, cultural, artistic, and religious values.

Applicability- PS 8 is NOT APPLICABLE for the project.

As no such tangible forms of cultural heritage or objects were observed in and around the project area, hence, this PS is not applicable to the proposed project.

2.5.9 IFC's Categorisation of Projects

As part of its review of a project's expected social and environmental impacts, IFC uses a system of social and environmental categorization. This categorization is used to reflect the size of impacts understood as a result of the client's social and environmental assessment and to specify IFC's institutional requirements. The categories used by the IFC are:

1. **Category A Projects:** Projects with potential significant adverse social or environmental risks or/and impacts that are diverse, irreversible or unprecedented;
2. **Category B Projects:** Projects with potential limited adverse social or environmental risks or/and impacts that are few in number, generally site-specific, largely reversible and readily addressed through mitigation measures;
3. **Category C Projects:** Projects with minimal or no adverse social or environmental risks or/and impacts, including certain financial intermediary (FI) projects with minimal or no adverse risks;
4. **Category FI Projects:** All FI projects excluding those that are Category C projects.

IFC therefore categorizes the project primarily according to the significance and nature of its impacts. IFC defines the project's area of influence as the primary project site(s) and related facilities that the client (including its contractors) develops or controls; associated facilities that are not funded as part of the project (funding may be provided separately by a client or a third party including the government), and whose viability and existence depend exclusively on the project and whose goods or services are essential for the successful operation of the project; areas potentially impacted by cumulative impacts from further planned development of the project; and areas potentially affected by impacts from unplanned but predictable developments caused by the project that may occur later or at a different location. The area of influence does not include potential impacts that would occur without the project or independently of the project.

2.6 Gaps and Recommendations between IFC Performance Standards and Indian regulations

A gap analysis has been provided in table below detailing the applicable legal requirement against each Performance Standards. Recommendations has also been detailed to close the gap, if exist.

Table 2-4: Gap Analysis and Recommendations

S.No.	IFC Performance Standards	Legal and Policy Requirements	Gaps	Recommendations
Assessment and Management of Environmental and Social Risks and Impacts				
1.	Policy and Environment and Social Assessment and Management System	No Legal/Policy Requirement	Environment and Social Assessment and Management System and an overarching policy are to be developed.	ESMF tailoring to the requirement has been prepared by World Bank.
	Identification of Risks and Impacts and Management Programs	As per the EIA Notification 2006 as amended to date, projects or activities shall require prior environmental clearance from the concerned regulatory authority based on the project category given in the schedule.	Solar power projects do not require any environmental clearance from the state or central government	An environmental and social impact assessment study covering all the aspects of IFC PS1 including preparation of project specific environmental and social management system incorporating the elements such as policy, identification of risks and impacts, management programs, organizational capacity and competency, emergency preparedness and response, stakeholder engagement and monitoring and review has been conducted.
	Organizational Capacity and Competency	No Legal/Policy Requirement	Successful implementation of the management program calls for the commitment of Management and employees organization. This need has not been addressed by any rule or regulation in India.	An Organization Structure has been proposed for the project in section 9.2 of ESIA report comprising of roles and responsibilities allocated to RUMSL

S.No.	IFC Performance Standards	Legal and Policy Requirements	Gaps	Recommendations
				and Developer Management of each module has been provided. Training requirements have been detailed out in the respective plans.
	Emergency Preparedness and Response	As per Clause no 41 B, Every occupier shall, with the approval of the Chief Inspector, draw up an on-site emergency plan and detailed disaster control measures for his factory and make known to the workers employed therein and to the general public living in the vicinity of the factory the safety measures required to be taken in the event of an accident taking place.	No Gap	A disaster management plan has been developed to address the emergencies and associated evacuation procedures in section 9.7 of ESIA report.
	Monitoring and Review	Annual monitoring will be required for Consent to Operation that will be obtained by RUMSL.	There are no legal requirements for monitoring and review of Health and Safety and Social issues that can occur on site.	Reporting and review requirements have been detailed out in section 9.11 of ESIA report. A detail list of documents has also been provided which will be reviewed on six monthly basis.
	Stakeholder Engagement, Disclosure of	As per Madhya Pradesh Panchayat Act 1993, consent from the	There are no legal requirements pertaining to stakeholder engagement for timely and effective dissemination of relevant project information	Section 5.6 of ESIA report details summary of stakeholder participation and Consultations

S.No.	IFC Performance Standards	Legal and Policy Requirements	Gaps	Recommendations
	Information and Consultations	respective panchayat body/village administrative officer etc during the project life cycle.		which has been undertaken by AECOM and way forward to conduct consultation in different stages of project.
Labour and Working Conditions				
2.	Working Conditions and Management of Worker Relationship	Chapter V of Contract Labour (Regulation & Abolition) Act , 1970 and Rules specifies about Welfare And Health Of Contract Labour Building and Other Construction Workers (regulation of Employment and Conditions of Service) Act, 1996	No Gap	The legal obligations meet the requirements of clauses.
	Workers' Organizations	The Trade Unions Act, 1926 provides for registration of trade unions with a view to render lawful organisation of labour to enable collective bargaining. It also confers on a registered trade union certain protection and privileges.	No Gap	--
	Non-Discrimination and Equal Opportunity	Equal Remuneration Act 1976, Workmen's Compensation Act, 1923, Bonded Labour (Abolition) Act 1976 requires payment	No Gap	--

S.No.	IFC Performance Standards	Legal and Policy Requirements	Gaps	Recommendations
		of equal remuneration to men and women workers for same work or work of a similar nature, payment of compensation in case of any personal injury caused at work place, abolishment of all forms of Bonded labour		
	Retrenchment	Chapter – V of The Industrial Disputes Act, 1947 has provisions to prohibit strikes and lockouts, declaration of strikes and lockouts as illegal, and provisions relating to lay-off and retrenchment and closure.	No Gap	--
	Grievance Mechanism	No Legal/Policy Requirement	The act does not detail the necessity and mechanism of grievance redressal.	RUMSL and Developers should develop a GRM for the workers to address their grievances. All grievances will be addressed by the developers during the construction and operation phase. For any unresolved grievances and grievances related to land, the developer will forward the grievances to RUMSL who in turn will

S.No.	IFC Performance Standards	Legal and Policy Requirements	Gaps	Recommendations
				subsequently forward them to appropriate authority for redressal. Section 9.4.2 of ESIA report details Grievance redressal mechanism to be adopted for the project.
	Protecting the Work Force	The Factories Act, 1948 provides for the health, safety, welfare, service conditions and other aspects of workers in factories. It covers all workers employed in the factory premises or precincts directly or through an agency including a contractor directly involved.	No Gap	--
	Occupational Health and Safety			
	Workers Engaged by Third Parties			
Resource Efficiency and Pollution Prevention				
3.	Resource Efficiency	The Environment (Protection) Act, 1986 and EPA Rules 1986, as amended in 2002 necessitates the purpose of protecting and improving the quality of environment and preventing, controlling and abating environmental pollution.	There are no legal requirements which regulates water requirement during operation phase of Solar panels.	RUMSL is required to use minimum quantity of water for cleaning purposes.

S.No.	IFC Performance Standards	Legal and Policy Requirements	Gaps	Recommendations
	Greenhouse Gases	There are no legal regulations with bindings on greenhouse gases emissions.	No Gap	Being a cleaner source of energy, greenhouse gases emissions will be comparatively less. Lifecycle CO ₂ equivalent for Solar farm based on PV technology is lowest with 18 gCO ₂ eq/Kwh as per Global warming potential of selected electricity sources, IPCC 2014.
	Water Consumption	Water (prevention and control of pollution) act of 1974 aims to prevent and control water pollution and to maintain/restore wholesomeness of water by establishing central and state pollution control board to monitor and enforce the regulations.	No Gap	--
	Pollution Prevention	Air Pollution: Air (Prevention and Control of Pollution) Act, 1981 to provide for the prevention, control and abatement of air pollution. Movement of vehicles, Operation of diesel generators for power at campsite or other construction activities). Noise Pollution: The Noise	No Gap	There will be generation of Noise during construction activities. The obligations specified in legal citations are sufficient to meet requirements as per IFC framework.

S.No.	IFC Performance Standards	Legal and Policy Requirements	Gaps	Recommendations
		(Regulation & Control) Rules, 2000 as amended in October 2002. As per the Environment (Protection) Act (EPA) 1986 the ambient noise levels are to be maintained as stipulated by CPCB for different categories of areas like, commercial, residential and silence zones etc.		
	Waste and Hazardous Materials Management	Hazardous Wastes (Management Handling and Trans-boundary Movement) Rules, 2008 as amended up to 2009 provides authorisation to entities producing hazardous wastes and stipulates management measures of such wastes.	There are no legal citations for management of defunct solar panels	A waste management plan has been formulated in section 9.3 of ESIA report which addresses the handling of broken solar modules during operation phase of the project.
Community Health, Safety and Security				
4.	Community Health and Safety and Community Exposure to Disease	No Legal/Policy Requirement	There are no legal requirements for disclosure of information to community about the progress of the project and related health & safety issues.	Section 9.4.1 details the tools that can be utilized for community engagement and disclosure of information like public meetings, focussed group discussions etc.

S.No.	IFC Performance Standards	Legal and Policy Requirements	Gaps	Recommendations
	Infrastructure and Equipment Design and Safety	No Legal/Policy Requirement	RUMSL will design, construct, operate, and decommission the structural elements or components of the project in accordance with GIIP, taking into consideration safety risks to third parties or Affected Communities.	Section 9.5 of ESIA report details out Occupational Health and Safety Plan. As the proposed project involves risks to workers during installation and cleaning of solar panels, RUMSL should also build its internal capacity to monitor engineering and fire safety of its operations, including periodic monitoring and internal audits.
	Hazardous Materials Management and Safety	Hazardous Wastes (Management Handling and Trans-boundary Movement) Rules, 2008 as amended up to 2009 provides authorisation to entities producing hazardous wastes and stipulates management measures of such wastes.	There are no legal citations for management of defunct solar panels during operation phase of the project.	A waste management plan has been formulated in section 9.3 of ESIA report which addresses the handling of broken solar modules during operation phase of the project.
	Ecosystem Services	No legal citations	The installation of solar panels over a large tract of land can alter the drainage pattern of the project area. There are no legal citations to address the impacts on hydrology and drainage pattern	A flood risk assessment has been undertaken as a part of ESIA report which details the impact and mitigation measures on drainage pattern and identified nallahs in the project area.

S.No.	IFC Performance Standards	Legal and Policy Requirements	Gaps	Recommendations
	Emergency Preparedness and Response	As per Clause no 41 B, Every occupier shall, with the approval of the Chief Inspector, draw up an on-site emergency plan and detailed disaster control measures for his factory and make known to the workers employed therein and to the general public living in the vicinity of the factory the safety measures required to be taken in the event of an accident taking place. The Motor Vehicles Act 1988, as amended by Motor Vehicles (Amendment) Act 2000, dated 14th August 2000. The Central Motor Vehicles Rules 1989, as amended through 20th October 2004 by the Central Motor Vehicles (Fourth Amendment) Rules 2004. It stipulates need and concerns regarding road safety standards, transport of hazardous chemicals	No Gap	A disaster management plan has been developed to address the emergencies and associated evacuation procedures in section 9.7 of ESIA report. Since a national highway passes near the project site and the project area is spread across few inhabited villages, it necessary to check on the road safety of the community and population living nearby during Movement of construction vehicles and other vehicles for transportation of workers. RUMSL and the developers are required to obtain a license from PESO.

S.No.	IFC Performance Standards	Legal and Policy Requirements	Gaps	Recommendations
		and also pollution control. The Petroleum Act 1934, as amended in August 1976 and The Petroleum Rules 1976, as amended in March 2002 requires license from PESO for storage of Diesel at site.		
	Security Personnel	No Legal/Policy Requirement	When the client retains direct or contracted workers to provide security to safeguard its personnel and property, it will assess risks posed by its security arrangements to those within and outside the project site. There are no legal citations to address the security issues.	RUMSL and Developers should develop a GRM for the community and workers to address their grievances arising out of security issues. Requirements for provision of security have been detailed in section 9.6.6. of ESIA report.
Land Acquisition and Involuntary Resettlement				
5.	Compensation and Benefits for Displaced Persons	The Consent of Land Purchase Policy, 2014 requires District Collector to ensure payment to land owners and livelihood losers	No Gap	RUMSL is required to get consent of up to 100 per cent of people whose land is procured.
	Community Engagement	As per Madhya Pradesh Panchayat Act 1993, consent from the respective panchayat body/village administrative officer etc during the	There are no legal requirements pertaining to stakeholder engagement for timely and effective dissemination of relevant project information	Section 9.4.1 of ESIA report details the Disclosure of relevant information and participation of Affected Communities and persons will continue during the planning, implementation and monitoring.

S.No.	IFC Performance Standards	Legal and Policy Requirements	Gaps	Recommendations
		project life cycle.		
	Grievance Mechanism	As per Madhya Pradesh Panchayat Act 1993, RUMSL will ensure that all grievances raised by locals related to the project are addressed.	The act does not detail the necessity and mechanism of grievance redressal.	RUMSL and Developers should develop a GRM for the workers to address their grievances. All grievances will be addressed by the developers during the construction and operation phase. For any unresolved grievances and grievances related to land, the developer will forward the grievances to RUMSL who in turn will subsequently forward them to appropriate authority for redressal. Section 9.4.2 of ESIA report details Grievance redressal mechanism to be adopted for the project.
Biodiversity Conservation and Sustainable Management of Living Natural Resources				
6.	Protection and Conservation of Biodiversity	Forest (Conservation) Act, 1980 with Amendments till 1988 and Wildlife Protection Act, 1972 requires protection and conservation of Forest land and biodiversity	No Gap	There is no involvement of forest land and also the site comprises of mosaic of habitats due to anthropogenic activities.
	Management of	No Legal/Policy	No Gap	Being a cleaner source of energy,

S.No.	IFC Performance Standards	Legal and Policy Requirements	Gaps	Recommendations
	Ecosystem Services	Requirement		there is no significant degradation and loss of ecosystem services can pose operational, financial and reputational risks to project sustainability.
	Sustainable Management of Living Natural Resources			RUMSL and the developer should ensure sustainability by managing waste water coming out through cleaning of solar panels and hazardous waste generated.
Indigenous People -PS 7 is APPLICABLE for the project.				
The project area or its surroundings have very limited indigenous people. A total of five ST families who are legal titleholders are providing their consent for land for sale of their land. Adequate consultation has been undertaken with these families and compensation for the land will be provided to them. However, no material degradation or adverse impact is expected on land resources on which indigenous peoples are dependent.				
Cultural Heritage - PS 8 is NOT APPLICABLE for the project.				
As no such tangible forms of cultural heritage or objects were observed in and around the project area, hence, this PS is not applicable to the proposed project.				

2.7 Applicable Environmental Standards

The applicable environmental standards for the proposed project have been discussed in the subsequent sections. The ambient air quality standards will be applicable only during the construction phase of the project and the wastewater discharges from the project during both construction and operation phases shall be as per the general discharge standards as sector specific standards are not available for solar power projects.

2.7.1 Ambient Noise Standards

As per World Bank Group's General EHS guidelines, for residential, institutional and educational area, the one hourly equivalent noise level (Leq hourly) for day time is 55 dB (A) while the Leq hourly for night time is prescribed as 45 dB (A). Noise standards notified by the MoEFCC vide gazette notification dated 14 February 2000 based on the A- weighted equivalent noise level (Leq) are as presented in **Table2-5**.

Table2-5: Ambient Noise Standards

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

Note: * Day time is from 6 am to 10 pm, Night time is 10 pm to 6.00 am;

** Silence zone is defined as area up to 100 meters around premises of hospitals, educational institutions and courts. Use of vehicle horns, loud speakers and bursting of crackers are banned in these zones.

2.7.2 Noise Standards for Occupational Exposure

Noise standards in the work environment are specified by Occupational Safety and Health Administration (OSHA-USA) which in turn are being enforced by Government of India through model rules framed under the Factories Act.

No exposure in excess of 115 dB (A) is to be permitted. For any period of exposure falling in between any figure and the next higher or lower figure as indicated in column (1), the permissible level is to be determined by extrapolation on a proportionate scale.

Table 2-6: Standards for Occupational Noise Exposure

Total Time of Exposure per Day in Hours (Continuous or Short term Exposure)	Sound Pressure Level in dB(A)
8	90
6	92
4	95
3	97
2	100
3/2	102
1	105
¾	107

½	110
¼	115
Never	>115

2.8 Applicable International Conventions

Environmental problems which migrate beyond the jurisdiction (Trans-boundary) require power to control such issues through international co-operation by either becoming a Contracting Party (CP) i.e. ratifying treaties or as a Signatory by officially signing the treaties and agreeing to carry out provisions of various treaties on environment and social safeguards. The relevant international conventions are as provided in **Table 2-7**.

Table 2-7: Relevant International Conventions applicable to the Project

S. No.	International Conventions	Salient Features
1	Montreal Protocol on Substances That Deplete the Ozone Layer (and subsequent Amendments)	India signed the Montreal Protocol along with its London Amendment on 17-9-1992 and also ratified the Copenhagen, Montreal and Beijing Amendments on 3rd March, 2003.
2	UN (Rio) Convention on Biological Diversity	India is a party since: 1994-02-18 by: Ratification; Protocol - Party since: 2003-09-11
3	Conventions on the Conservation of Migratory species of wild animals and migratory species	India is contracting party to the convention on conservation of migratory species of wild animals and migratory species.
4	Kyoto Protocol	The Kyoto protocol was signed by India in August 2002 and ratified in February 2005. The convention pertains to the United Nations framework on Climate Change. The 3 rd Conference of the Parties to the Framework Convention on Climate Change (FCCC) in Kyoto in December 1997 introduced the Clean Development Mechanism (CDM) as a new concept for voluntary greenhouse-gas emission reduction agreements between industrialized and developing countries on the project level.
5	The Rotterdam Convention on the Prior Informed Consent (PIC) Procedure	The Rotterdam Convention on the Prior Informed Consent (PIC) Procedure for Certain Hazardous Chemicals & Pesticides in international Trade was adopted by India at the Conference of Plenipotentiaries at Rotterdam in 1998
6	International Labour Organization conventions	India has also ratified many of the International Labour Organization conventions that are relevant to the Project including: 1. C1 Hours of Work (Industry) Convention, 1919 (14:07:1921, ratified); 2. C5 Minimum Age (Industry) Convention, 1919 (09:09:1955, ratified); 3. C11 Right of Association (Agriculture) Convention, 1921 (11:05:1923, ratified); 4. C14 Weekly Rest (Industry) Convention, 1921 (11:05:1923, ratified); 5. C29 Forced Labour Convention, 1930 (30:11:1954, ratified) & C105 Abolition of Forced Labour Convention, 1957 (18:05:2000, ratified);

S. No.	International Conventions	Salient Features
		6. C100 Equal Remuneration Convention, 1951 (25:09:1958, ratified); 7. C107 Indigenous and Tribal Populations Convention, 1957 8. C111 discrimination (Employment and Occupation) Convention, 1958 (03:06:1960, ratified)

3. PROJECT DESCRIPTION

3.1 Project Location and Existing Land Use

This section of the report provides a description of the site settings and project components along with other associated facilities. Project activities and requirements for the construction and operation phase of the Solar Plant are discussed in this section.

3.1.1 Site Location

The proposed 750 MW solar power plant is proposed to be developed in Gurh Tehsil, Rewa District, and Madhya Pradesh. Rewa District is bounded by Uttar Pradesh in north, on the east and south-east by Sidhi, on the south by Shadol, and on the west by Satna District. Gurh Tehsil is located in southern region of Rewa District. The nearest highway is the National Highway – 75, which connects Gwalior in Madhya Pradesh with Parsora in Odisha, at a distance of about 6km from the site in south direction. Gurh is the nearest town located at a distance of about 5km from site in north-west direction. The site is also accessible by a road connecting NH-75 and Barsaita Desh Village, which runs across the site. The rail and air connectivity to the site is through Rewa Railway station and Allahabad Airport at a distance of 30km and 130km respectively. A village road (mud road) also traverses the site which connects Dwari Village to Etar Pahad Village. A temporary (made up of brick and stone walls with thatched/mud roof) structure comprising of a residence and two cattle sheds (with no boundary walls) in Ramnagar Pahad (away from the settlement area) will be acquired due to the proposed project in Phase I.

The project area¹⁰ comprises of open scrub wastelands with small parcels of land in between the site where rainfed agriculture is practised, located at an elevation of 370-400m above mean sea level (amsl). Species of plants like *Acacia nilotica* (babul), *Albizia amara* (Krishna Siris), *Butea monosperma* (Tesu), *Diospyros melanoxylon* (tendu), *Holoptelea integrifolia* (chilbil) were observed to be speckled on the land identified for the project. The land selected for the project has been identified based on the solar irradiation data, ease of land procurement, benefit and losses due to irradiation, distance from main substation, line construction length and complexity required for line construction. The average solar radiation in Rewa is 5.51 kWh/m²/day¹¹. This irradiance is generally suitable for reasonably good energy generation.

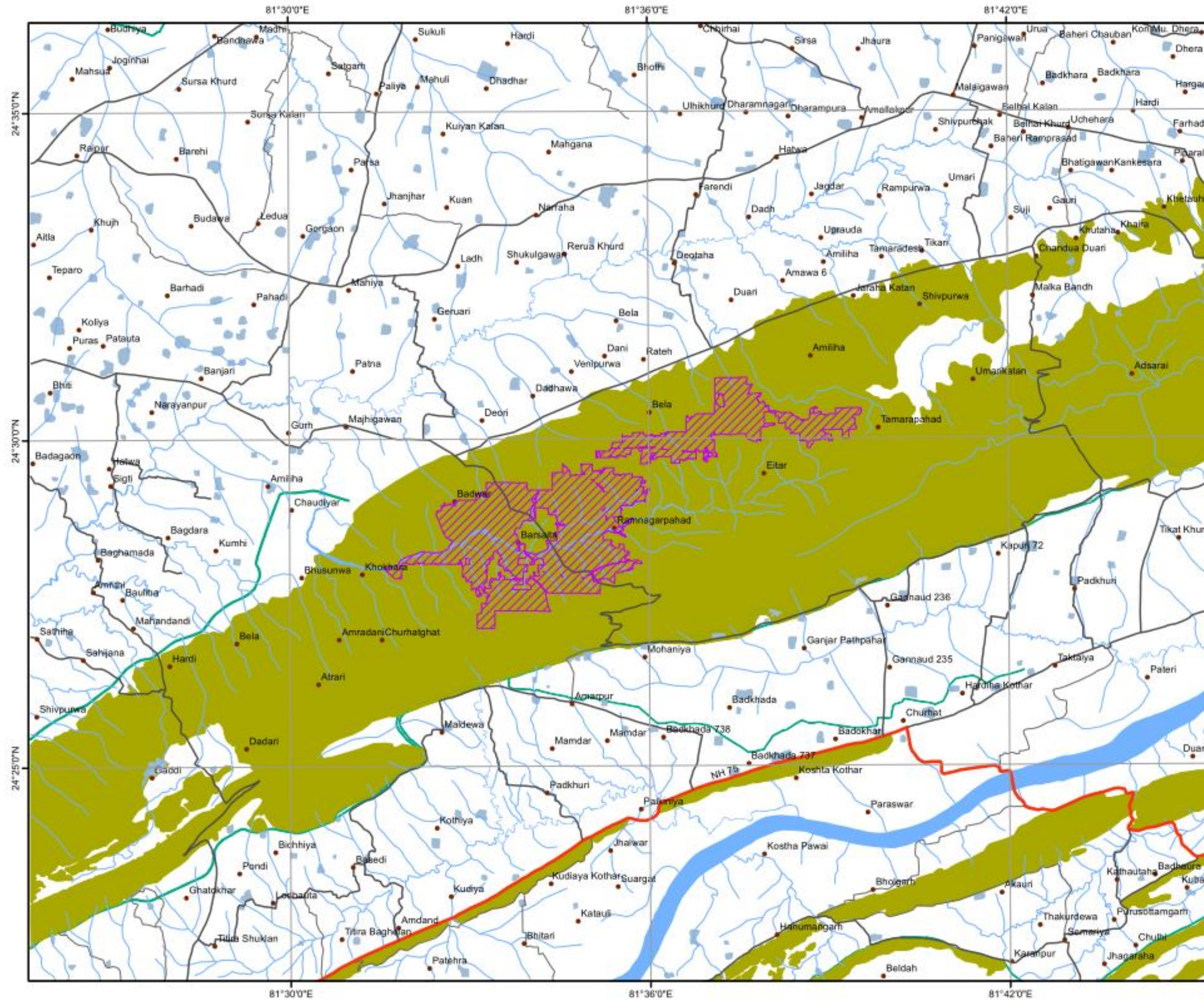
In Gurh Tehsil, approximately 22,000 hectares government revenue land was allotted to the India Army in 1990 to use the area as a firing range. This area was utilised as a firing range by the Army till 2002 after which permission of discontinuing the activity was given. This land (falling under the Badwar village) was later transferred to RUMSL for setting up of the proposed solar power plant, when left unused.

The surrounding area comprises of agricultural land and scattered villages which indicates a rural setup. The demarcated land and project boundary has been shown in **Figure 3-1** below,

¹⁰ Land identified for development of project

¹¹ http://niwe.res.in/assets/Docu/srra_data/MP_Rewa.pdf

Figure 3-1: Demarcated Boundary of the Proposed Project



Source: AECOM

3.1.2 Site Settings

The land for proposed site is majorly a scrub/barren rocky land use and is characterized by rural set up. Most of the land area in the project area is rock-strewn with limited potential for agriculture due to rain fed irrigation. The project area has an undulating slope with local population owning land parcels at both the slope and plain areas. The site comprises of scanty vegetation and is used by the community for the purpose of limited grazing livestock which is confined to rainy season only and which last for a short duration of time particularly from July to September¹²; and limited rain fed agricultural activities which has been discontinued in the past three years due to the limited rainfall in the area. The nearest habitations from the proposed project site include Etar Pahad Village which is located at a distance of approximately 900 m from the site in south-east direction.

It was established that the land in the project area was undulating. Area in the project area used to depend solely upon rainfall in order to undertake agricultural activities in the private land (delineated for the project) which have discontinued over the last three years due to limited rainfall in the area. During this one crop cycle which used to be undertaken three years ago, it was reported during consultations held with project affected private landowners that mainly rice or wheat was sowed. It was also reported that limited grazing activities was undertaken (in the entire land area beyond the project delineated area) which was confined to rainy season only lasting from July to September. It is envisaged that due to abundance of open land area beyond the project area, the accessibility and impact on grazing activities by the local communities will not be impacted by the project.

The government land transferred to the project comprised of barren land wherein a portion of the land parcel approximately 1200 hectares falling under Badwar village was used by the Indian Army from 1990 to 2002 as a firing range. As reported during the consultations held with the local communities, the land parcel was not utilised for any activities (either as an income source or shelter) by the communities after the Army firing range was discontinued in the area. Hence, the location of the project site favours the development of a solar park, as the site is situated in a rural setting with a suitable topography, the site is located near existing grid connections and the area has a high level of solar insolation location. Given the current land use of the site, and no other known potential land uses other than the proposed project, there would be no unacceptable opportunity costs should the Project go ahead.



¹²CGWB brochure for Rewa District



Photo 3-3: View of the site in centre, near Ramnagar Pahad Village

Photo 3-4: View of the site in centre of the site, near Etar Pahad Village

3.2 Project Overview

Solar energy systems produce energy by converting solar irradiation into electricity or heat. For the proposed PV power facility, RUMSL will utilise photovoltaic (PV) technology to generate electricity. PV technology consists of the following components:

3.2.1 Project Components

It is envisaged that the proposed Solar Plant will be grid-connected system which will also include monitoring of the system and the grid and switches which can off the system in case of faults. Developers will be scrutinized based on the technical guidelines of the proposal and with the best available technology.

Technology evaluation was performed by SECI in the preliminary stages of the project to assess the land requirement. SECI has shortlisted four commercially established solar PV technologies – Mono Crystalline, Poly Crystalline, Amorphous Silicon (a-Si) and Cadmium Telluride (CdTe) for the proposed site. Considering an initial assessment of about 1500 hectares of land, technologies requiring beyond 2 hectares/ MW may not be feasible for generating an output of 750 MW as proposed.

Table 3-1: Comparison of various Solar Panel Technologies

Technology	Lab Efficiency	Module Efficiency	Cost (\$/wp)	Approx. Area required/ MW (hectares)
Mono Si	25%	19-23%	1.1-1.3	1.72
Multi Si	20%	17-19%	0.55-1.0	1.97
Amorphous Si	12.5%	8-10%	0.8-0.9	3.7-3.9
Cd Te	16.7%	11%	0.9-1.0	2.5-3

Source: Draft Prefeasibility Report submitted by SECI

As per the evaluation, **Polycrystalline (or multi-crystal)** silicon panels are made by using polycrystalline wafers which is the most preferred technology. Crystalline technology has got a proven track record of over 30 years in commercial operation as compared to approximately 7 years for thin film technologies. Further, considering the mega-size of the proposed solar park, PV modules with a power rating of more than 240 Wp will be shortlisted.

Solar PV module mounting system can be expected to be either fixed tilt structures or trackers; irrespective of the same, the following minimum standards are required to be complied.

Table 3-2: List of Indian Standards to be complied by Module (250MW) Developer

IS 800: 2007	Code of Practice for General Construction in Steel
IS 801	Code of Practice for Cold formed light gauged Steel
IS 875: Parts I-V	Code of Practice for design loads
IS 808	Hot rolled steel beams, channels and angle sections
IS 1730	Dimensions for steel plates, sheets and strips for structural and General Engineering Purpose
IS 816	Code of practice for use of metal arc welding for general construction in mild steel
IS 822	Code of procedure for inspection of welds
IS 2062	Specification of Steel for General Structural Purposes
IS 2629	Recommended Practice for Hot-Dip Galvanizing of Iron and Steel
IS 4777	Performance Tests for Protective Schemes used in the protection of light gauge steel against corrosion
IS 9172	Recommended Design Practice for Corrosion Protection of Steel Structures
ISO 9223	Corrosion of Metals and Alloys – Corrosivity of atmospheres – Classification
ISO 9224	Corrosion of Metals and Alloys – Corrosivity of atmospheres – Guiding values for the corrosivity categories

3.2.1.1 Module Mounting System

The PV panels will be mounted on aluminium fixed frame structures. The prime consideration in the design of mounting structures is the nature of wind loads in the proposed location, taking into cognizance any seasonal /local winds that may exert additional load. Typically the mounting structure is designed to have a capability of withstanding wind load up-to 150 to 200 kmph. Accordingly, the concrete blocks are to be designed to counter balance the load. In addition, the material of the structure is to be selected in such a way that it serves at least for 20 years. In general “galvanized steel” or “anodized aluminium” are used to make the structures. Since the proposed site is prone to corrosion due to brackish water and salt, galvanized steel or anodized aluminium structures will be utilized.

3.2.1.2 Inverters

Inverters will convert incoming DC received from PV modules into AC with suitable power quality. The features of proposed inverter system comprises of:

- Unique Maximum Power Point Tracking (MPPT) algorithm adjusts the DC Link operating voltage to ensure that maximum power is extracted from the solar array in an efficient manner.
- Automatic “sleep” mode at night reduces standby losses.
- Local LCD (liquid crystal display) monitor and keypad for system control and monitoring instantaneous system data.
- Remote control and monitoring option using standard or GSM modem available.
- Communication based on LAN / WAN protocol is also available.

3.2.1.3 Cabling

DC cables will be utilized which should be double insulated and polarized. The minimum technical requirements for Cables laid down by MNRE states that they should conform to “General Test and Measuring Method PVC insulated cables for working voltage up to and including 1100 V and UV resistant for outdoor installation” (Standard: IEC 60227 / IS 694 IEC 60502 / IS 1554 (Pt. I & II). Positive cable length is taken as around 5m and negative cable length is taken as about 25 m per string. Hence, to achieve proposed string voltage drop, positive and negative cable area of cross-section is taken as 10mm².

In order to make the system more reliable and facilitate maintenance and management, output three phase AC cables from the inverter is connected to AC dis-connector unit. The voltage output of the inverter is further connected to the transformer using required rating LT cables to step up the voltage. From the transformer, the lines are connected to the grid. AC cables sizing are designed to achieve less than 1% of AC voltage drop from inverter to transformer. However, size of cable varies by relative position of inverter, transformer and grid supply lines.

3.2.1.4 Transformers

The output of the inverters will be connected to 2MVA 440V/33kV ONAN transformers and associated controls on Low Tension & High Tension side all housed in a single enclosure.

3.2.1.5 Pooling Sub-Station

Pooling station will come up at the solar plant premises and will be owned by RUMS. It will comprise of three 33/220 kV, 3X100 MVA step up transformers and a switchyard.

3.2.1.6 Earthing System

There will be dedicated earthing stations for the transformer, MV switch boards, PLC panels and high voltage panels. Maintenance free earthing stations have been considered for the designs. All the modules will be appropriately earthed in accordance to the NEC. Grounding of the modules may be done as recommended by the manufacturer.

3.2.1.7 Auxiliary Electrical Equipment

The following additional electrical equipment will be required for the project:

- Security system, electrical fence and 24 hour on site security access control;
- Fire detection system;
- Weather monitoring equipment (rainfall, wind speed/direction, solar irradiation, air moisture) will be located inside or in close proximity to the guard house; and
- PV power facility monitoring equipment and associated telecommunication links will be located inside the guard house.

3.3 Current Status

Currently, the project is in the planning phase. On the day of the site visit, 90% of private land owners from the five project villages(identified in Phase I¹³) have provided their consent to sell their land in the form of an undertaking. It was identified that one temporary structure (comprising of a room for residential purpose and two cattle sheds) belonging to a resident of Ramnagar Pahad is falling under the purview of project boundary. RUMSL officials has informed that the bidding process will be undertaken to invite national and international developers for construction of solar PV modules of either 3x 250MW based on technical criteria set by SECI and MNRE. The bidding will be conducted for modules of 250x 3 MW capacities.

¹³ Land acquisition is being conducted in two phases, Phase I refers to the phase wherein landowners are in the process of providing their consent for sale of their land (comprising of 164. 231hecatres). While in Phase II, private land parcels (amounting to 138.616 hectares) have been identified, but the consent process is yet to commence for this phase. The process of taking consent from the private landowners would only commence once the entire consent process of Phase I is completed.

3.4 Land Requirement

The Government of Madhya Pradesh (GoMP) through its NRED has identified the potential site measuring an area of approximately 1500 hectares (2 MW per one hectare of land) for setting up of the proposed 750 MW solar power project. Out of the approximate 1500 hectares, 302.847 hectares is private land and the remaining land measuring approximately 1232.697 hectares is government revenue land. As per the documents provided by NRED, the land required for the proposed project is spread across five villages, namely, Badwar, Barsaita Desh, Barsaita Pahad, Etar Pahad and Ramnagar Pahad under Gurh Tehsil, Rewa District.

3.4.1 Land for Site Development (Project Components)

Government Revenue Land:

The government revenue land measuring approximately 1232.697 hectares has been identified and transferred for the proposed project. As per the revenue record, the land use of the parcels has been classified as barren rocky, scrub and fallow land.

Private Land:

A total of 164.231 and 138.616 hectares of private land from five (5) villages has been identified for Phase I and Phase II of the proposed project. In the process of identifying the required land for the project, NRED's first priority was aimed at focusing on transfer of government revenue land. In areas where private land has been delineated, land parcels comprising of ongoing agricultural activities and house structures have been consciously avoided and not included within the proposed project boundary. Hence, NRED has limited the scope of any physical or economic displacement of the local population from taking place.

3.4.2 Process for Land Procurement

Procedure for Procurement of Revenue Land:

Initially, NRED had taken possession of government revenue land identified for the project. Subsequently permission has been provided to RUMSL for use of land for development of the proposed project. The document mentioning the transfer of government revenue land for the project has been attached as **Annexure I**.

Procedure for Procurement of Private Land:

The private land required for the proposed project is being acquired through Madhya Pradesh's Consent of Land Purchase Policy, 2014. The salient features of policy are detailed below:

- The District Collectorate is initially informed about the project including the total land area required for the project.
- Government Land is first taken into consideration for the project. In cases where adequate government land is not present, private land is then identified and shortlisted.
- The rate for the land is determined as per the Guideline issued by the Collectorate Office.
- The payment for the private land and asset(s) is then calculated based on the prevailing market value which is also known as the Collector Guideline Rate plus a one time solatium.
- The Collectorate Office will pay the amount directly to the landowners.
- The Project Proponent will undertake a land survey and demarcate the land to be acquired and will submit the information in the form of an application to the District Collector (DC) for verification.

- Once the Collector receives the application, he reviews it and issues statement to the Tehsildar, PWD or Forest Department to verify the land to be acquired and assess the impact on the value of the property.
- After verification, the Collector will issue a letter to the Project Proponent on the findings of the Tehsildar and land use pattern of the identified land. The Project Proponent is then required to submit details of the total land to be acquired by the Collector.
- The Collector will then take a receipt of undertaking from the landowners stating that the landowners are not forced to sell their land and that they are selling their land with their knowledge and consent. The undertaking is to be signed by the landowner.
- Once the undertakings from all landowners are received, the DC will publish a notification to the public, if any concern exists, that he can be approached within 15 days of publication. The publication will be placed on the notice boards of the District Collectorate Office, Tehsil Office, Village level administrative office and two newspapers (one national level and one local).
- If any objection is received from the landowners over the land including dispute on the ownership of the land, the DC will not acquire the land. If no objection is received, the DC will give his consent in proceeding with the acquisition process.

Based on the above mentioned clauses of the policy, the following steps have been undertaken till date;

- Till date, 90% of private land owners (in Phase I) from the five villages have provided their consent to sell their land in the form of an undertaking.
 - A copy of a land sale deed for Badwar village was provided by the NRED site official showcasing how the Collector Guideline Rate (land cost) was determined. Based on this Collector Guideline Rate (which has been determined for all five villages), a double payment (the Collectorate Guideline Rate plus one time solatium) is to be provided to each land seller.
- As per consultations undertaken during the census survey of the project affected population, it was noted that all landowners contacted were willing to sell their land voluntarily without any force. They have all provided their consent fully aware about the project and the payment that they would receive which would be in the form of a Collectorate Guideline rate plus one time solatium.

3.4.3 Land for Access Route

It will be responsibility of the developers to construct internal access roads (murram roads) as required with the premises of their respective modules location as reported by the Site Representative of RUMSL. The site has good connectivity to NH-7 from north of the site and to NH-75 from south of the site.

3.4.4 Land for Transmission Line

The land for pole line footings Right of Way (ROW) will also be required. A relatively small area of 6mx6m will be used by paying a one-time compensation. It will be the responsibility of PGCIL to procure ROW required for installing external 400 kV transmission line.

3.5 Power Purchase Arrangements

The Developer will execute the Power Purchase Agreements (PPA) with the procurers of electricity. The salient features of the agreements will depend upon:

- Validity of the PPA from the date of commercial operation which shall be defined;
- Agreed rate of tariff as agreed upon from the date of commercial operation;

- The project proponent at any time during validity of the agreement shall not add extra solar modules/ equipments more than the installed capacity at the time of commissioning;
- The solar power developer only shall own, operate and maintain Interconnection Facilities from Project to Sub-Station to be developed by RUMSL from time to time and necessary expenditure shall have to be borne by the Solar Power Developer; and
- The Solar Power Developer shall deploy components/ equipments for SPV complying with minimum requirements as per International Electro technical Commission (IEC) and Bureau of Indian Standards (BIS) or technical standards that are specified by Ministry of New and Renewable Energy (MNRE);

3.6 Estimated Annual Yield

For energy yield estimation, SECI has taken into consideration the following points:

- Sourced average monthly horizontal irradiation, wind speed and temperature data from sources including satellite imagery derived data and data from land based meteorological stations. These data have been assessed through energy yield simulation software;
- Calculated the global incident radiation on the tilted collector plane, taking into account the factor of shading;
- Calculated the losses, using details of the inverter specifications, PV module specifications, PV module characteristics, on-site conditions and plot layout;
- Applied downtime losses, ohmic losses, module degradation and temperature, inverter losses to obtain an energy yield that reflects a twenty-five year plant life;
- The output power of the PV system at STC is the number of modules multiplied by the rated power of the module that gets de-rated by number of factors like temperature, manufacturing tolerance and
- The temperature de-rating factor of module was calculated from module specification temperature condition at various site locations.

The system output from the proposed 750 MW plant in terms of annual energy generation is estimated to be about 1.25 billion units with corresponding annual capacity utilization factor (CUF) of 17-18 %.

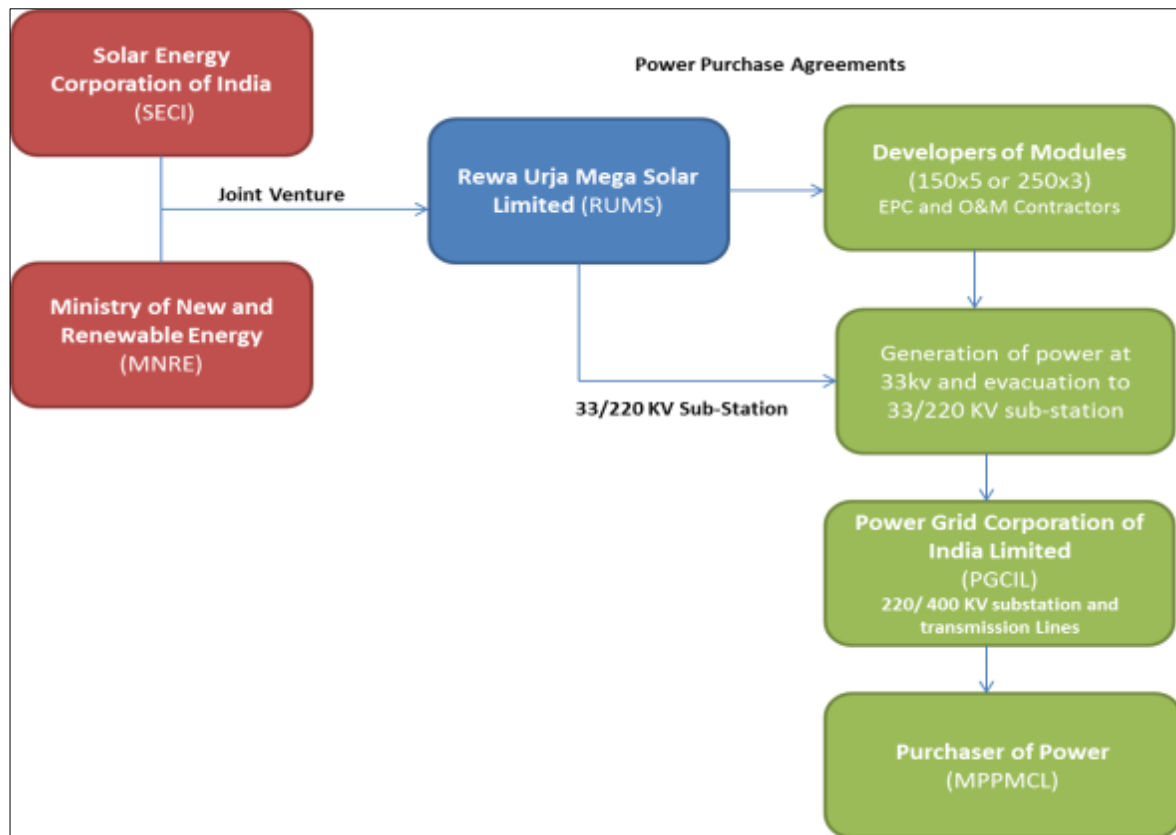
3.7 Implementation Schedule

RUMSL have undertaken site assessment based on solar radiation data available, identification of land and land procurement (revenue and private land) for the proposed project. After transfer of the land, RUMSL will carry out an open competitive bidding process to invite national and international developers based on technical criteria set by SECI and MNRE. The bidding will be conducted either for modules of 150x5 MW capacity or 250x3 MW capacities. After the evaluation of bidders on technical grounds, one or more bidders from the qualified bidders will be finalised based on the Financial Bid. Subsequently, RUMSL will engage the respective developers as EPC (Erection, Procurement and Construction) Contractor on turnkey basis for provision of construction works pertaining to the proposed project for different modules. The works will comprise of carrying out geotechnical investigations, foundation works, installation of switch yard, array yard installation, SCADA system, inverters modules and equipment installation.

RUMSL will construct a 33/220 KV pooling substation for evacuation of electricity generated at 33 kV from respective modules of the developers within the project boundary. RUMSL will also be responsible for construction of internal transmission lines for evacuation of power from 33/ 220 KV pooling substation to 220/ 400 KV Power Grid Station, which will be developed by Power Grid Corporation of India Limited (PGCIL). External transmission lines will be constructed by PGCIL.

RUMSL will enter into a Separate Operations and Maintenance (O&M) Agreement with respective developers of modules for twenty five (25) years period. RUMSL in tandem with O&M contractor will be the in-charge of project management which includes financial and administrative control, overall project co-ordination, manpower selection for operation and maintenance etc. The power from the sub-station will be evacuated to 400 KV Vindhychal – Jabalpur line owned by MPPMCL, Jabalpur. The broad project implementation mechanism for has been illustrated below in **Figure 3-2:**

Figure 3-2: Implementation Schedule of the Proposed Project



3.7.1 Schedule

The scheduled date of commissioning of the project is planned by end of October, 2017. The construction phase of the proposed project is envisaged to be of 18 months. First level of planning for project implementation is under process which includes procurement of land and rolling out of tender for inviting National and International Developers for the proposed project.

The Project Developer/s would be required to commission part of the capacity for each 250 MW Unit. For the Selected Bidder, the following commissioning schedule would be allowed across one or more Units awarded to the Selected Bidder.

Table 3-3: Commissioning Schedule

Scenarios	At the end of 13th month from the signing of the Project Agreements	At the end of 18th month from the signing of the Project Agreements
For the Selected Bidder, who is awarded one Unit	100 MW	250 MW
For the Selected Bidder, who is awarded two Units	175 MW	500 MW
For the Selected Bidder, who is awarded three Units	250 MW	750 MW

3.8 Construction Activities

3.8.1 Site Development

The site development activities for the proposed project will entail the following:

- soil investigations;
- site surveys;
- site levelling;
- construction of access roads;
- fencing of site; and
- laying of foundations.

All construction activities shall occur within the site boundary limits with the exception of those activities related to the interconnections between the site and the common infrastructures, which will be performed by the Developers engaged outside the boundary wall of the site. Developer only shall be responsible for site clearing and grading of the site as required for construction, operation, and maintenance of the plant.

3.8.2 Site Clearing

As on the day of the site visit, species of plant like *Acacia nilotica* (babul), *Albizia amara* (Krishna Siris), *Butea monosperma* (Tesu), *Diospyros melanoxylon* (tendu), *Holoptelea integrifolia* (chilbil) were observed to be speckled on the land identified for the project. Removal of vegetation with no ecological significance will be undertaken for installation of modules and construction of murram roads within the site.

3.8.3 Construction Labour

During the site preparation period, the workforce required for site security, manual labour, civil works, transportation of goods and other similar services will most likely be drawn from the local labour pool. Only skilled labour will involve migrant labour. It will be the responsibility of the Developer to meet the labour requirements for three (3) modules of 250 MW. On an average, the labour demand is estimated to be about 250-270 workers for construction of one module of 250MW. The peak labour requirement for the one module will be about 300 persons. The labour camps for the Project will be provided within the site premises and will comprise of porta cabins. Adequate sanitation facilities will be provided for the labour. Temporary ablution facilities will be provided during construction phase (i.e. portable toilets). The construction labour management plan in Section 9.6 of the report details out the necessary standards that are required to be implemented in the management of construction labour.

3.8.4 Water Requirement

In the proposed plant almost all the buildings will be prefabricated type, structures will be prefabricated type and all the equipment will be packed and shifted in completely assembled or partially assembled form. The installation of the equipment's will not require water in any form. It is estimated that 200-250 kilo litres/day is required for the construction phase on daily basis (which includes water requirements for curing works, batching plant and domestic requirement of workers). Water will be required for piling and foundation work which will be sourced from authorised tankers. A bore well will also be constructed within the site premises to cater to the domestic water requirement during construction phase. No –Objection Certificate for ground Water abstraction will be obtained by respective developers.

3.8.5 Construction Power

It will be the responsibility of the Developers of modules to arrange for Diesel Generators for power requirements during construction phase.

3.9 Operation and Maintenance

The operation of solar power plant is relatively simple and restricted to daylight hours. With automated functions of inverter and switchyard controllers, the maintenance will be mostly oriented towards better up keep and monitoring of overall performance of the system. The solar Photovoltaic system requires the least maintenance among all power generation facility due to the absence of fuel, intense heat, rotating machinery, waste disposal, etc. However, keeping the Photovoltaic panels in good condition, monitoring and correcting faults in the connected equipment and cabling are still required in order to get maximum energy from the plant. The maintenance functions of a typical solar PV power plant can be categorised as given.

- **Scheduled or Preventative Maintenance** – Planned in advance and aimed at preventing faults from occurring, as well as keeping the plant operating at its optimum level.
- **Unscheduled Maintenance** – Carried out in response to failures.

3.9.1 Scheduled Maintenance Activities

Day to day solar plant operations will involve both regular on site preventive and corrective maintenance tasks in order to keep the PV power plant in optimal working order throughout the operational period.

The Scheduled Maintenance includes the following activities:

- **Modules**- Visual inspection and replacement of damaged modules will be required. Cleaning of the module glass surface during long dry periods may be considered. Module cleaning needs to be carried out periodically to remove dust, bird dropping etc.
- **Junction or String Combiner Box**- Periodic checking of the junction boxes and string combiner boxes for water ingress, dirt or dust accumulation and integrity of the connections to avoid corrosion & short circuit.
- **Inverter Servicing** – Inverter faults are the most common cause of system downtime in PV power plants and therefore, the scheduled maintenance of inverters should be treated as a centrally important part of the O&M strategy.

3.9.2 Breakdown Maintenance

Breakdowns can occur due to lack of routine or preventive maintenance, bad climatic conditions, disturbance in utility grid etc. This kind of faults needs to be immediately corrected. Breakdown can occur at any part of the system between solar PV modules to substation end.

3.9.3 Resource Requirements

3.9.3.1 Water Requirement

The water requirements for the plant will be predominantly used for washing of solar PV modules periodically to remove bird droppings, dust and other dirt, and for domestic water consumption. During the operational phase it is estimated that PV panel cleaning will require approximately 3, 75,000 litres/MW/day (500 litres/MW/Day). The cleaning frequency will be once in ten (10) days, being a rocky terrain which tends to be less prone to dust. Drinking water and process water will also be supplied by boreholes and may require treatment for domestic use.

It is estimated that there will be approx. 43-45 KL/ day¹⁴ of daily domestic water requirement. Bore wells will be constructed during operation to cater the water requirements.

3.9.3.2 Man Power Deployment

The manpower requirement for the operation phase of the Project has been estimated to be 20-30 staff including engineers, technicians, housekeeping, admin etc. The organisation structure for one module (250 MW or 150MW) comprises of a Plant Head responsible for the day-to-day operations of the plant. The Project Manager of RUMSL will manage the Plant Head of the modules. The day-to-day operation / functions like planning the routine maintenance, safety and environmental control will be placed under the supervision of the Plant Head of respective module.

3.9.3.3 Training

It will be the responsibility of the Developer to deploy adequate staff for operation and maintenance of its respective module. Each Developer will assign a Manager who will be selected as an experienced person drawn from similar industry as far as possible. For each module of 250 MW, 10 Engineers, 20 Technicians and 50 staff for cleaning of solar panels are envisaged. Site Engineer will be responsible for all site related issues and will have to keep in coordination with security guards, operation contractor, and equipment service provider. A Site In-Charge will be appointed by RUMSL, who will continuously monitor the performance of the power plant with the support of the data monitoring system and will follow up with respective Plant Heads.

3.10 Associated Facilities

3.10.1 Power Evacuation

The power from Solar PV plant is proposed to be evacuated to 220/ 400 KV Grid Sub-Station which will be constructed by PGCIL on 18 hectares of land procured from Barsaita Desh Village. The inverter output voltage would be at 380V which will be stepped up to 33kV and subsequently into 220 kV. The details of 400kV transmission line and 400/220 kV Substation which will be developed by PGCIL is provided below:

Table 3-4: Power Evacuation Details

Transmission Element	Details
400 kV transmission line	- New Double Circuit line breaking into one of the existing Vindhyachal – Jabalpur 400 kV DC Line - Route length 32 Km from the T-off to the 400/220kV substation (27km 2xDC lines + 5km on multilane towers)
400/220 kV substations	3X 500 MVA transformers 1 X 125 MVAR bus reactor for reactive power 6 Nos. 220 kV line bays (two for each 220/33kV Unit substations)
Battery Limit / Metering for Power Sale	220 kV feederbreaker within the PGCIL 400/220kV substation connecting the individual 220/33kV substation for each of the PV Units

**The contract for construction of the substation and the transmission line has been awarded. The stipulated timeline to commission is 14 months from the date of award.*

RUMSL proposes to construct three 33/220 kV pooling substation located at Badhwar, Ramnagar and Barshetha desh Villages respectively. The 220/33kV substations and 220kV transmission lines from the individual 250MW

¹⁴ 300 Staff and 145 litres/ person/day is considered for the calculation

Unit to the PGCIL 400/220kV substation will be developed and owned by RUMSL. The Project Developer/s will be required to operate, maintain and insure at their cost over the Project Agreement term.

Table 3-5: Details of Substations Proposed by RUMSL

RUMSL's responsibility	Details
6 Nos. 220 kV transmission lines (three double circuits)	Badhwar substation distance is approximately 2.7 Km ¹⁵ Ramnagar substation distance is approximately 2.8 Km Barshetha substation distance is approximately 0.7 Km
220/33 kV substations of each Unit	Configuration of each substation; • 3 x 100 MVA transformers • 3 bus bar system (two main + transfer bus) • Each substation will have 17 (nos.) 1,250A, 33 kV, outdoor bays for each 250 MW PV Unit

The Project developer would be responsible for construction of interconnection arrangements for terminating the complete 250MW Solar PV module to the RUMSL provided 33kV outdoor bays within the 220/33kV substations.

The power transformers and associated protection equipment (e.g. circuit breakers) will be installed in the new 'loop-in loop-out' pooling sub-station. RUMSL will also be responsible for construction of transmission lines for evacuation of power from 33/220 KV pooling substation to 220/400 KV Power Grid Station, which will be developed by PGCIL. Transformers of capacity of 3x500 MVA will be installed at 220/400 KV Grid Sub-Station. Subsequently, the power will be evacuated to 400 KV Vindhyachal – Jabalpur line owned by MPPMCL, Jabalpur located at an aerial distance of 30km towards the south of the site. PGCIL will hold the responsibility for finalizing the alignment and construction of 400 kV transmission lines from Grid Sub-Station to the evacuation line.

3.10.2 Access Roads

Road connecting Gurh town to Badwar Village, located in north of the site which also connects to NH-7 provides connectivity to the site. The road will form an important access road during the construction phase for movement of construction equipments, material and personnel to the site. Site is also accessible by road connecting Gurh Town with NH-75, located in south of the site. It will be the responsibility of the Developers to construct internal access roads (murrum roads) as required within the premises of their respective modules location. Within the PV arrays, a minimum spacing of 6 m is required between each row to avoid shadowing of the panels by adjacent rows. These spaces will not be gravelled or paved.

¹⁵These are indicative distances from the PGCIL substation. The exact distance will be fixed based on the final alignment.

4. ENVIRONMENT BASELINE

4.1 Introduction

This section of the Environment and Social Assessment (ESA) presents information on the baseline condition of the physical, chemical, biological and social environment within the proposed project area.

The Environmental and Social baseline study helps determine existing environmental conditions. Local knowledge and scientific field work provided most of the site-specific information used in this report. Existing information from the scientific literature (both published and unpublished), engineering studies and test work results, technical reports, and community socioeconomic studies were used wherever available. These studies were used to validate the baseline information.

A study area of 5 km from the proposed project area was considered for the evaluation of environmental and social existing status and potential impacts. Activities that facilitated establishment of the baseline data include: site survey, ecological surveys, social surveys and interviews, processing of satellite imagery and secondary data review from established sources such as Indian Meteorological Department and Census of India amongst others.

This section covers the following topics:

- Physiography
- Geology
- Drainage
- Land Use
- Hydrogeology
- Ground Water Scenario
- Climate and Meteorology
- Natural Hazards
- Flood Risk Assessment
- Primary Monitoring
- Ecology
- Social Setting

4.2 Site Overview

The project is proposed to be developed in Gurh Tehsil, Rewa District, Madhya Pradesh. The surrounding area of project site comprises of agricultural land and scattered villages which indicates a rural setup. Details of habitations near the project site in all four directions are given below:

- **North**-Badwar village is located at a distance of 1000m in north direction from project site. The population of Badwar village is approximately 6000 people¹⁶. Barsaita village (Barsaita Desh and Barsaita Pahad combined) has population of 1500 people, is located at a distance of 1200m in north direction. Duari village is located at a distance of 2.16km in north direction.

¹⁶ 2011 Census Data

- **East**-The nearest habitations from the proposed project site include a cluster of houses belonging to Etar Pahad Village which is located at a distance of approximately 900 m from the site in south-east direction. It comprises of 10-11 households. Gaura village is located at a distance of 1.3km in north-east direction.
- **South**-Six (6) households were observed to be located near Etar Pahad Pond at a distance of 550m in south direction. Maldewa is located at a distance of 2.9km in south west direction. Amarpur village is at a distance of 2.11km while Mamdar village is located at a distance of 3.6km respectively.
- **West**-Ramanagar village is situated at a distance of 1000m in north-west direction with population of 37 people. Bhusunwa Village is located at a distance of 2.37km and Kumhi village is located at a distance of 3.94km respectively.

4.3 Physiography

Rewa district can be divided into the four natural parts namely, Kymore Pahad, Binjh Pahad, Rewa Plateau and Lower-Northern Plain. Rewa plateau decreases in height from the south to the north of the district. In the south, the height of Kymore Pahad range is more than 450 meters, whereas the height of alluvial plain is just 100 meters. The entire district has varied features such as dissected hills, ravines, plain plateau, scarp, water-fall and alluvial plain. The rain-water of the district is carried out by the two assisting rivers of the Ganga namely, Tons or Tamas and Son. Most of the rivers in the district initiate from the Kymore ridges which forms the watershed for the area. **Figure 4-1** below shows the Physiographical map of Madhya Pradesh with project location indicated on the Map.

The proposed site forms part of the plateau of Rewa and Panna, also known as Vindhyan plateau and lies to the northeast of the Bundelkhand plateau. The project area¹⁷ comprises of open scrub wastelands with small parcels of land in between the site where agriculture is practised during rainy season, located at an elevation of 370-400m above mean sea level (amsl). Species of plants like *Acacia nilotica* (babul), *Albizia amara* (Krishna Siris), *Butea monosperma* (Tesu), *Diospyros melanoxylon* (tendu), *Holoptelea integrifolia* (chilbil) were observed to be speckled on the land identified for the project.

4.4 Geology

The geological formation of the project district, Rewa is mainly of Vindhyan Formation. The area forms a part of the northern marginal belt of the peninsular, bordering the Indo - Gangetic plains. The quartzite, sandstones, shales and limestone, belonging to upper Vindhyan formation, generally underlie the district. The recent sediments form thin alluvium covers ranging in thickness from 15 to 45 m, in the valley of the major rivers and along their tributaries overlying the Vindhyan basement. The geological succession of the district is illustrated in the **Table 4-1** below:

Table 4-1: Geological succession of Rewa District

Age	Group	Series	Lithology	Nature and Characteristics
Quaternary	Alluvium			Unconsolidated Sand. Gravel & Clay
Neo – Proteozoic (late)		Bhander	Sirbu Shale	Purple & Olive Green in Colour Thinly laminated Silty Shale to Missive
			Nagod limestone	Fine grained hard Compact thinly bedded

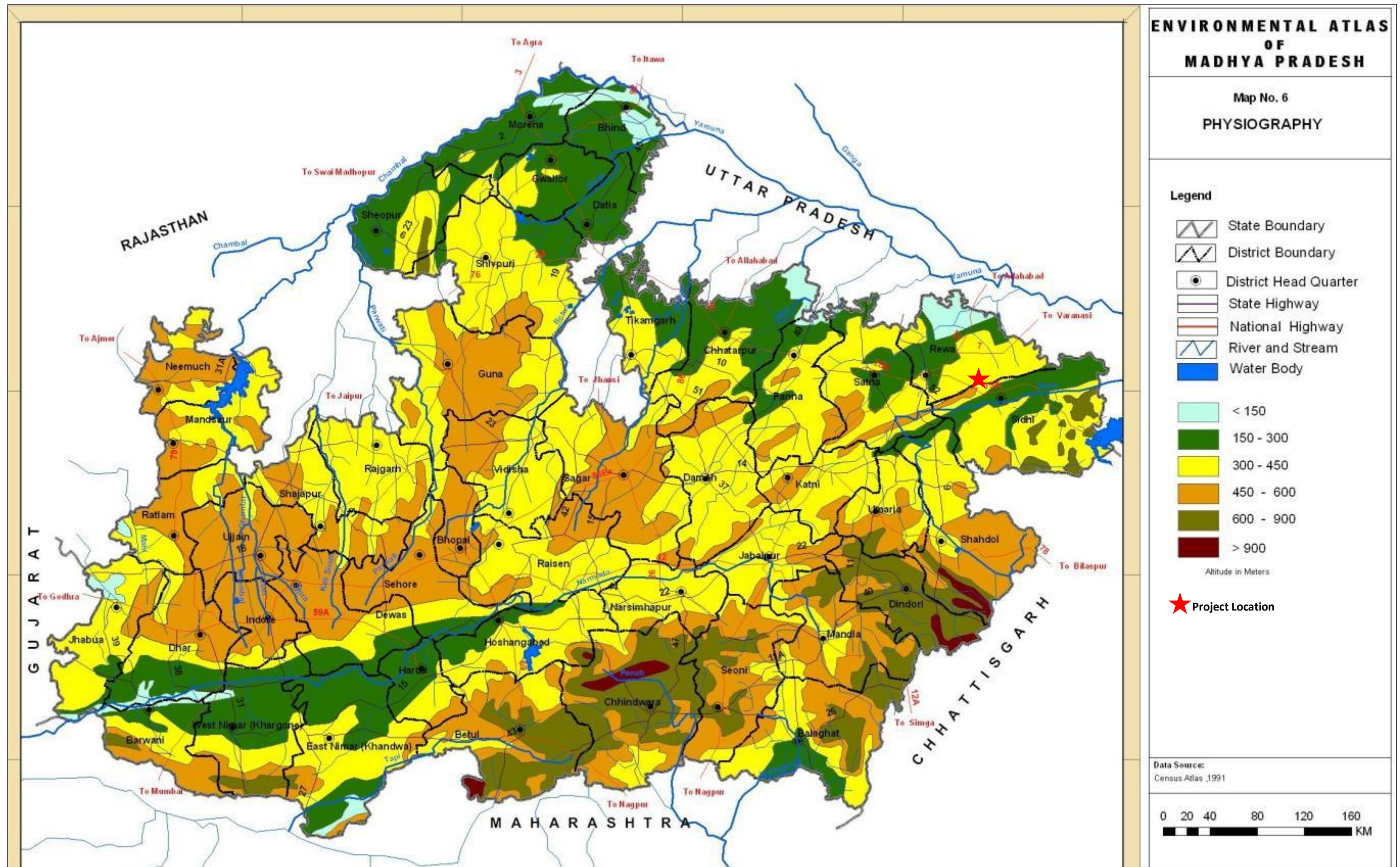
¹⁷ Land identified for development of project

Age	Group	Series	Lithology	Nature and Characteristics
				to Missive
			Gunurgarh or simrawal Shale	Soft purple and reddish brown thinly bedded to flaggy, calcareous with thin bands of Calcite and Gypsum
Neo – proteozoic (early)		Rewa	Uppar Rewa Sandstone	Reddish brown hard and missing coarse grained thinly bedded
			Jhiri or Kokah Shale	Soft reddish Splintery
Meso – Proteozoic (late)		Kaimur	- Dandraul quartzite - Bijingarh Shale	Fine Grained, hard Massi and thickly bedded

Source: District Ground Water Information Booklet, Ministry of Water Resource, CGWB, Bhopal, 2013

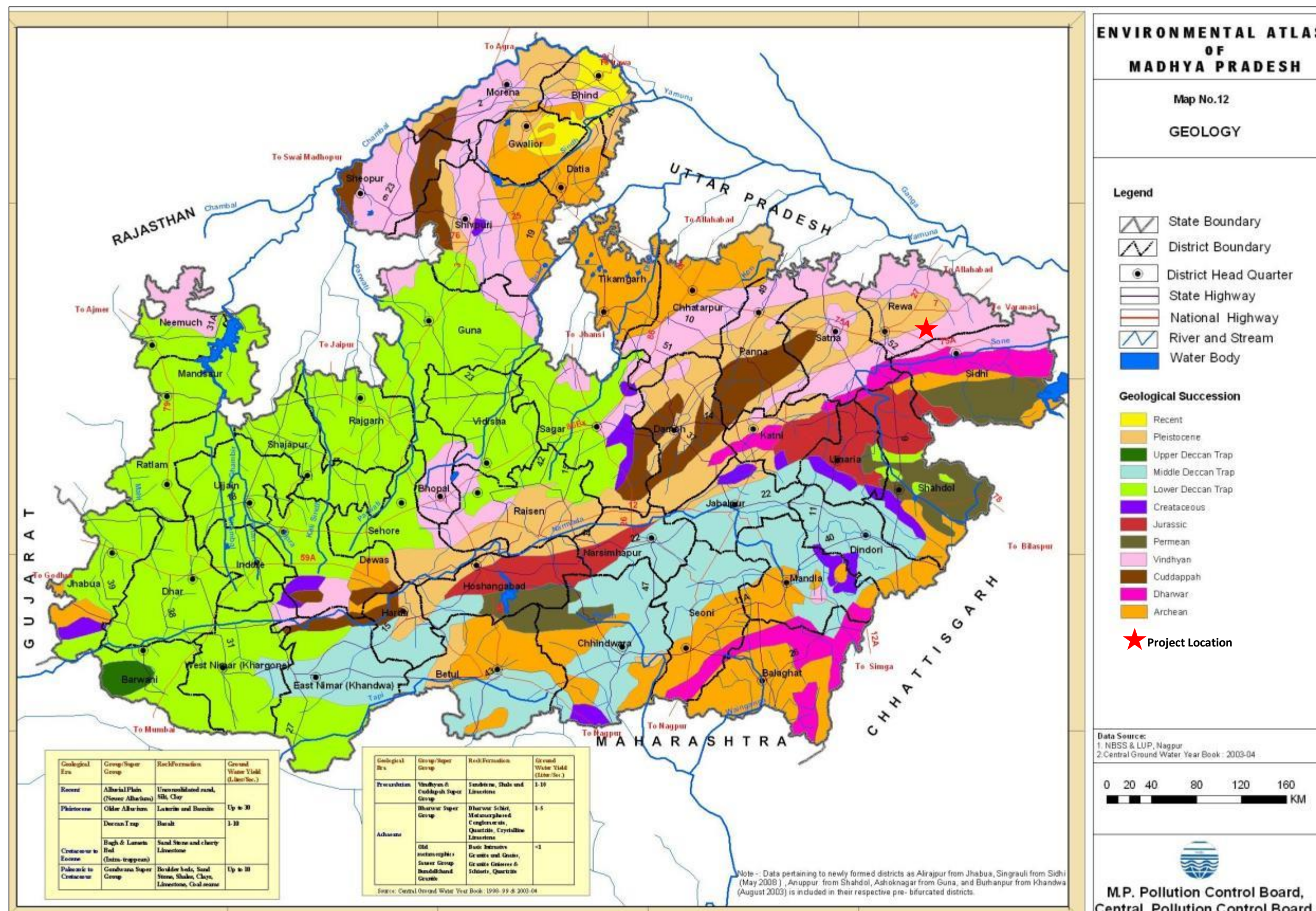
The proposed site lies in the southern part of the district, under the upper Rewa sandstone lithology category. The site is occupied by the rocks of the vindhyan supergroup of Mesoproterozoic to late neo –Proterozoic age which comprises of kaimur, rewra and bhandar group. The bearing capacity/ compressive strength range from medium to high (600-900 kg/cm) with good foundation characteristics.

Figure 4-1: Physiography Map of Madhya Pradesh



Source: Pollution Control Board, Madhya Pradesh

Figure 4-2: Geological Map of Madhya Pradesh

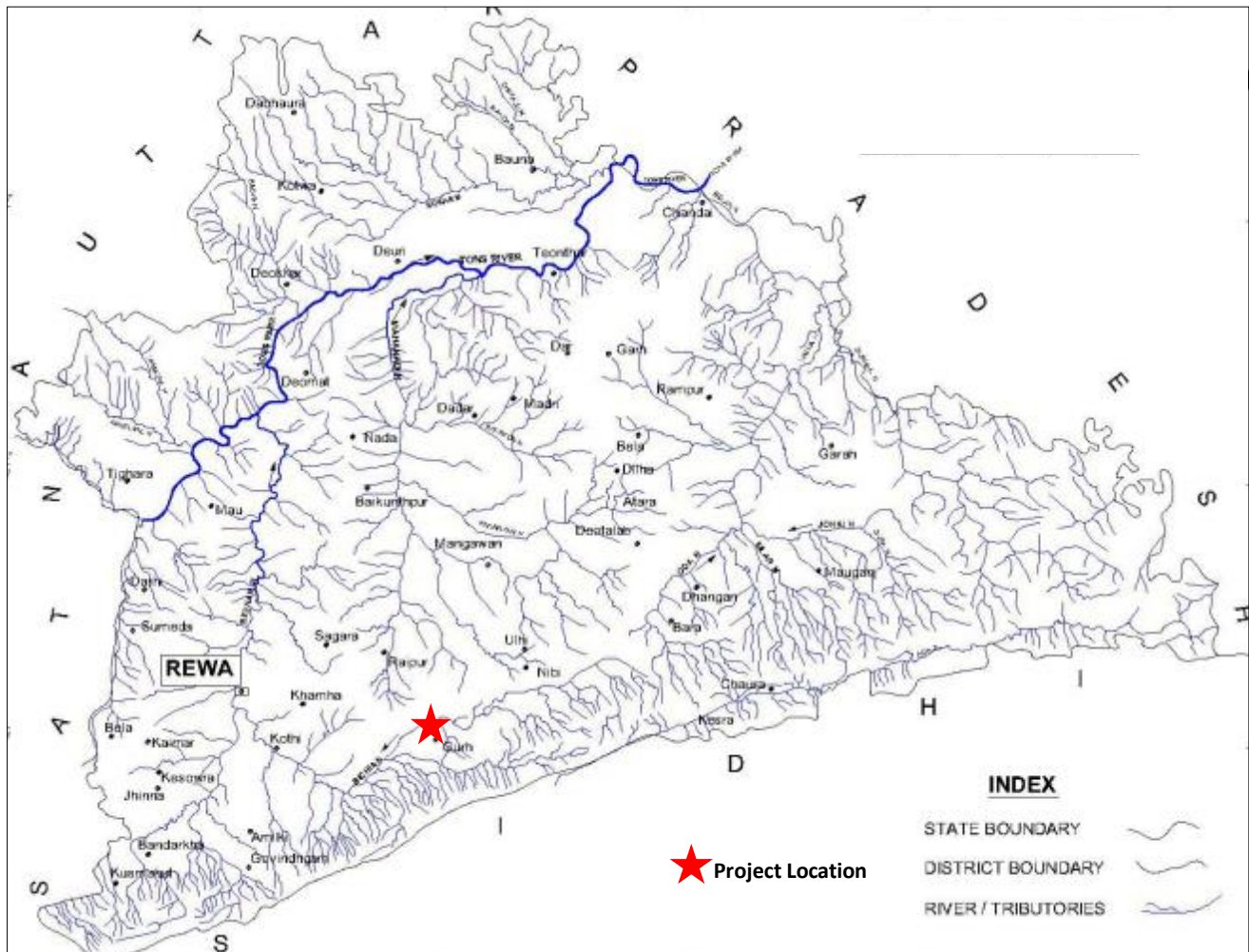


Source: Pollution Control Board, Madhya Pradesh

4.5 Drainage

Rewa district falls in the Ganga basin and there are two tributaries of Ganga river, namely Tons or Tamas and Son. Kymore Hill ranges from the division of water between these two rivers. Most of the rivers and nallahs of the district are seasonal & forms dendritic pattern.

Figure 4-3: Drainage Map of Rewa District



Source: District Ground Water Information Booklet, Ministry of Water Resource, CGWB, Bhopal, 2013

Local drainage pattern

The site drainage shows dendritic pattern and various nallahs existing over the site drains most of the water during monsoons such as Aahri Nallah, Devdeh Nallah etc. The site drainage nallahs (Aahri Nallah and Devdeh Nallah) are drained into Bichiya River at the North West of the site. The carrying capacity of both Nallahs is sufficiently good to convey such peak discharges. However, the Aahri Nallah in the downstream reaches has a wider channel and undulated terrain with high and low patches of land. Apart from the downstream reaches of the Aahri Nallah, there might be some local depressions within the site which might suffer from local ponding.

Historical records suggest that in 1997, there were heavy rains which created flood like situation in city of Rewa. Upon investigating about this event by interviews with the locals, it was known that even in 1997 rains event, the project site experienced high water levels in the site drainage channels but water level was restricted to the drainage channels only.

4.6 Land Use

The land use pattern of Rewa district is varied and characterized by cultivable area, forest area, land under non-agricultural use, pastures, waste, barren, uncultivable land and fallow land. While cultivable area dominates the other land types, about 5.47% of the district land is barren and uncultivable.

Table 4-2: Land Use/Land Cover of Rewa District

Land Use Category	Area (000 Ha)	Percentage (%)
Cultivable Area	352.2	56.01
Forest Area	85.7	13.63
Land under non-agricultural use	61.4	9.76
Permanent Pastures	26.9	4.28
Cultivable wasteland	5.5	0.87
Land under Misc. tree crops and groves	1.5	0.24
Barren and Uncultivable Land	34.4	5.47
Current fallows	37.6	5.98
Other fallows	23.6	3.75
Total	628.8	100

Source: Department of Agriculture, Cooperation and Farmers Welfare, GoI

Land use pattern in the vicinity of the project site is primarily barren land. No forest land lies within the periphery of the study area.

Based on the geographic coordinates of the project area, the satellite imagery were geo-registered and geo-referenced with respect to limited control points from GPS. Satellite images were processed in ERDAS Imagine for preparation of land use land cover using unsupervised classification technique. Linear features such as drainage lines and roads were digitized in ArcGIS 10.2 software. Major land use classes have been delineated as fallow land, agriculture land, barren land, settlements, canal, hillock, river, and water body. The digital classified map was verified for the accuracy assessment for major land-use classes present in the study area and accordingly, land use land cover map has been finalized.

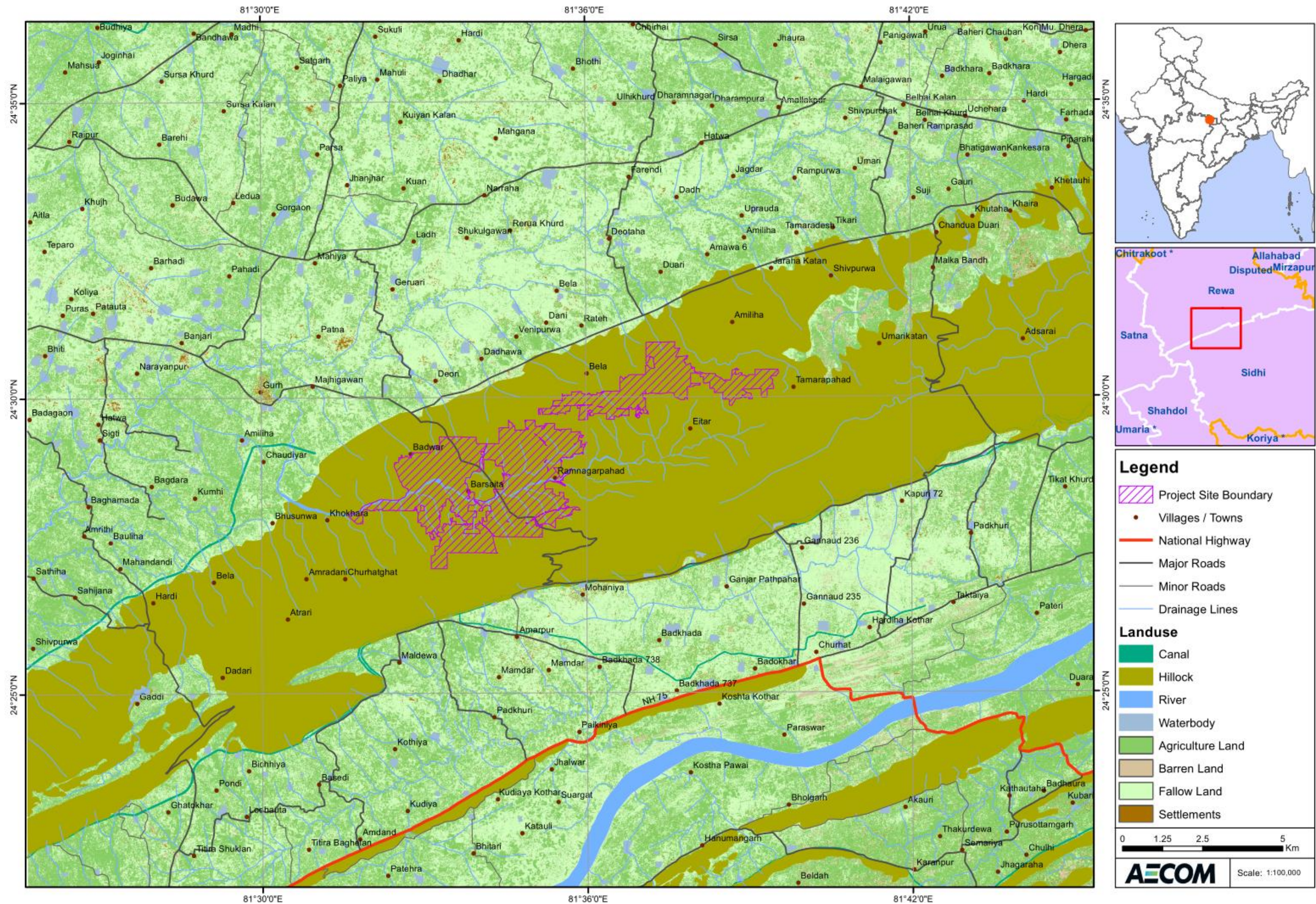
As per the land use classification carried out through the GIS, the study area constitutes 36.1% of fallow land followed by agricultural land with 31.9 %, hillock of 26.7% and barren land covering 1.5% of the land area. Settlements are scattered over an area of 8.2 Sq Km and constitute only 0.9% of the total study area. Water bodies and river cover 1.08% and 1.5% of the study area respectively. The land use land cover map of the study area is depicted in **Figure 4-4**.

Table 4-3: Land Use/Land Cover of project's study area

Land Use Category	Area (in Sq km)	Percentage (%)
Fallow Land	326.8	36.1
Agriculture Land	288.4	31.9
Hillock	241.7	26.7
Barren Land	13.2	1.5
River	13.4	1.5
Water body	9.8	1.08
Settlements	8.2	0.9
Canal	3.3	0.4
Total	904.9	100

Source: AECOM

Figure 4-4: Land Use Land Cover of the study area



Source: AECOM

Project Area comprises of 97.98 % of hillrock/rocky areas and 2.02% of area is covered by Nallahs. The break up of land use of site area is given below:

Table 4-4: Land Use/Land Cover of Site Area

Land Use Category	Area (in Sq km)	Percentage (%)
Hillrock.Rocky	20.2816	97.98
Nallahs	0.4184	2.02
Total	904.9	100

Source: AECOM

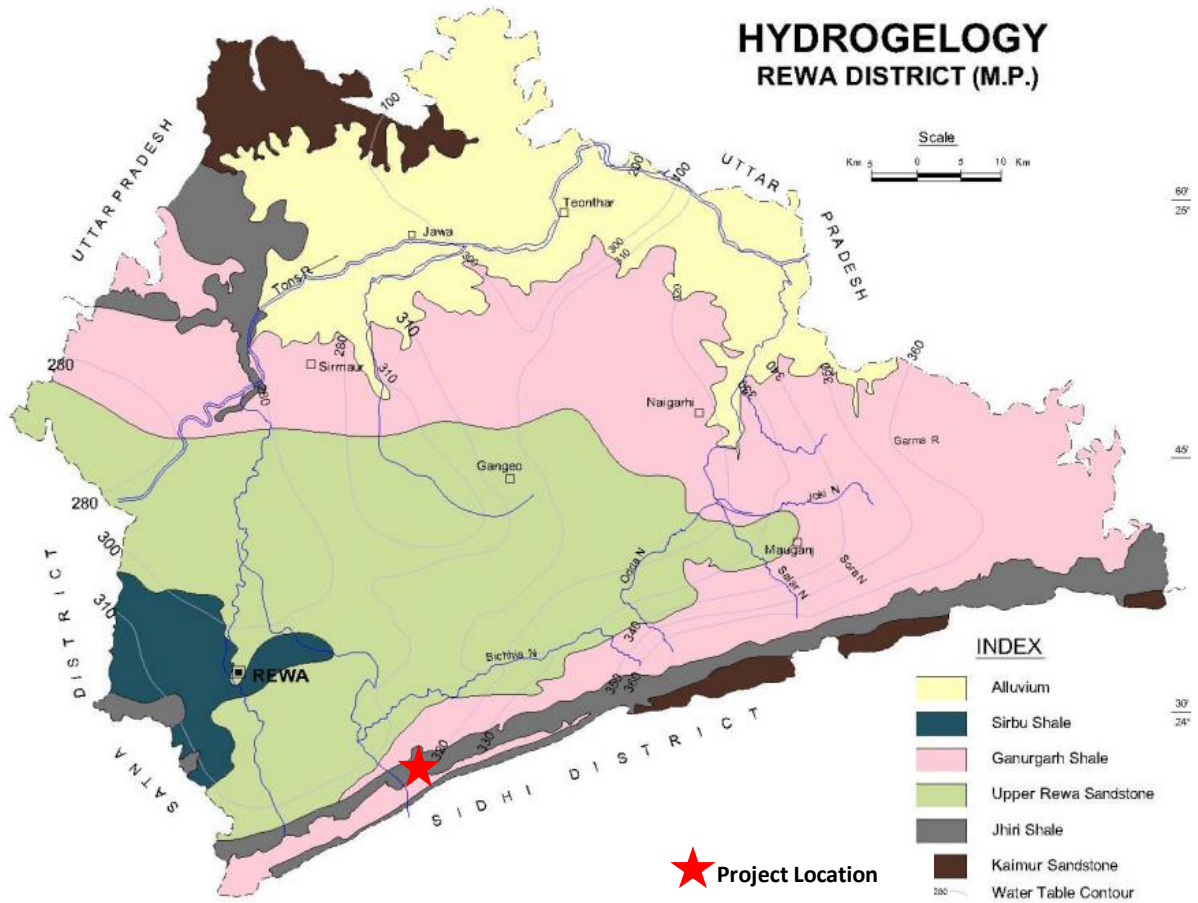
4.7 Hydrogeology

The occurrence, movement and recharge of ground water are governed by water bearing properties of the different litho units occurring in the area. The project district can be classified into four (4) different hydrogeological units namely, Kaimur, Rewa Series, Bhandar Series and Alluvium. This classification is based on the different water bearing properties of the units. As per the hydrogeological map of the district presented in

Figure 4-5, the project site is located in the Upper Rewa Sandstone unit under the Rewa series.

The Rewa sandstones are hard and compact with minimum porosity. The weathered and fractured sandstones control occurrence and movement of ground water. In the topographic low areas weathered residuum attains a maximum thickness of 5m. The yield of sandstones and shales ranges from 1 to 3 and <1 to 1.5 lps respectively.

Figure 4-5: Hydrogeology of Rewa District



Source: District Ground Water Information Booklet, Ministry of Water Resource, CGWB, Bhopal, 2013

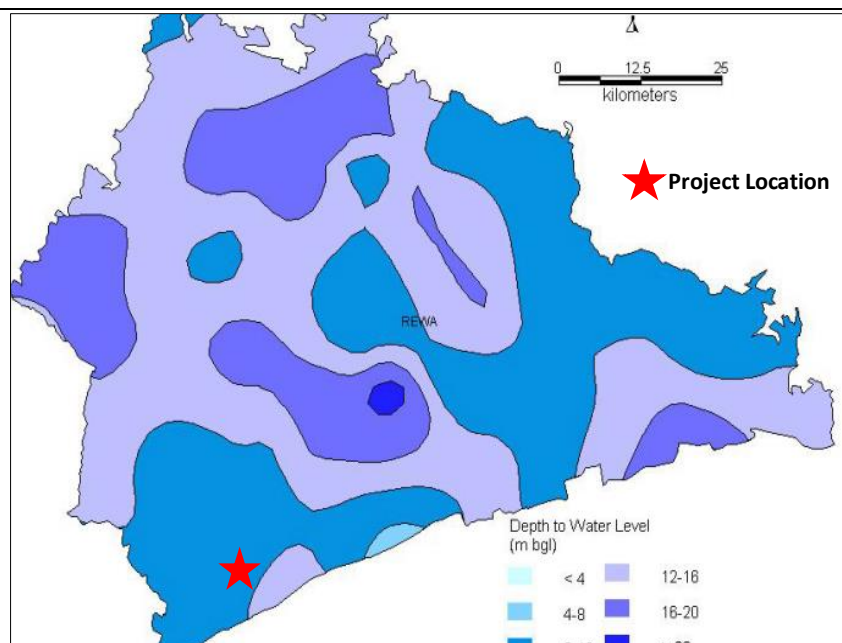
4.7 Ground Water Scenario

4.7.1 Depth to water level - Pre-monsoon (May 2012)

The pre-monsoon depth to water level in the district ranges between 4.85 mbgl and 29.32 mbgl. Major part of the district have water level in the range of 8-20 mbgl during the pre-monsoon season. As illustrated in

Figure 4-6, the project location has a pre-monsoon depth to water level in the range of 8 to 12 mbgl.

Figure 4-6: Depth to Water Level Pre-Monsoon (May 2012), Rewa District



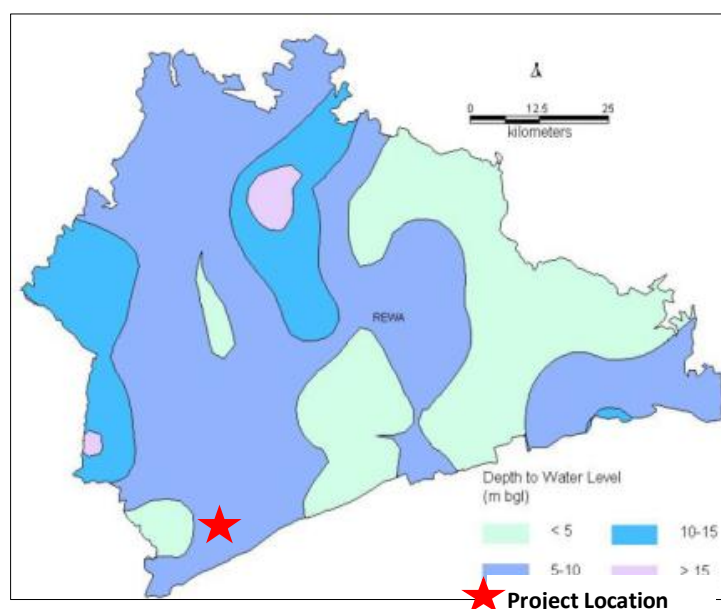
Source: District Ground Water Information Booklet, Ministry of Water Resource, CGWB, Bhopal, 2013

4.7.2 Depth to water level - Post-monsoon (November 2012)

During post-monsoon period, water level in the district varies from 1.60 mbgl to 17.7 mbgl. In major part of the district, water level lies between 5 to 10 mbgl. However, as illustrated in

Figure 4-7, the project location has a pre-monsoon depth to water level in the range of 5 to 10 mbgl.

Figure 4-7: Depth to Water Level Post-Monsoon (November 2012), Rewa District



Source: District Ground Water Information Booklet, Ministry of Water Resource, CGWB, Bhopal, 2013

4.7.3 Groundwater level trend (May 2003 to May 2012)

Analyses of Groundwater level data of pre-monsoon period indicate that there is declining trend in the range of 0.14 to 0.39 m/yr.

4.8 Climate and Meteorology

Rewa district has humid sub-tropical climate, which implies summers are immensely hot and winters are mild. During monsoons, the annual rainfall hovers around 860 mm, which can be termed as more than moderate. Summer season (March to mid of June) minimum temperature remains at 30°C and maximum at 40°C. The maximum temperature is witnessed during month of May. During winters (October to February) the average temperature remains about 25°C. During the south west monsoon season the relative humidity generally exceeds 83% during the month of August. The driest part of the year is the summer season, when relative humidity is less than 37%.

Climatological data published by Indian Meteorological Department (IMD), for Rewa district for the period of 1961 to 1990 is given below.

Table 4-5: Meteorological Data (based on observations from 1961 to 1990) for Rewa district

Month	Station Level Pressure (hpa)	Mean Temperature		Humidity	Rainfall (mm)	Mean Wind Speed (Kmph)
		Daily Max (°C)	Daily Min (°C)	Relative Humidity (%)	Total Monthly Rainfall	
Jan I	983.4	23.5	7.8	71	26.5	2.1
II	979.9			50		
Feb I	981.4	26.5	10.5	62	18.2	2.7
II	977.7			41		
Mar I	978.9	32.4	15.3	46	13.0	3.3
II	974.7			29		
Apr I	974.8	38.3	21.1	38	7.4	4.0
II	970.3			26		
May I	970.5	41.1	25.4	40	11.4	4.9
II	966.7			29		
Jun I	966.7	38.6	26.6	57	145.1	6.1
II	963.2			48		
Jul I	966.9	32.6	24.2	79	304.5	5.1
II	963.8			72		
Aug I	968.2	31.3	23.7	82	327.7	4.4
II	965.1			75		
Sep I	972.0	31.8	23.2	77	208.3	3.7
II	968.6			68		
Oct I	978.1	32.1	19.1	64	30.1	2.4
II	974.6			50		
Nov I	982.2	28.6	12.7	60	11.8	1.8
II	978.6			50		
Dec I	984.1	24.5	8.3	68	9.3	1.7
II	980.4			53		
Total Annual Mean I	975.6	31.8	18.2	62	1113.3	3.5
Mean II	972.0			49	26	26

Source: IMD Climatological Table

I-Morning

II-Evening

4.8.1 Rainfall

The rainfall data for Rewa district for the last five years from 2009 to 2013 is presented in the **Table 4-6** below.

Table 4-6: Average Annual Rainfall for Rewa district (2009-2013)

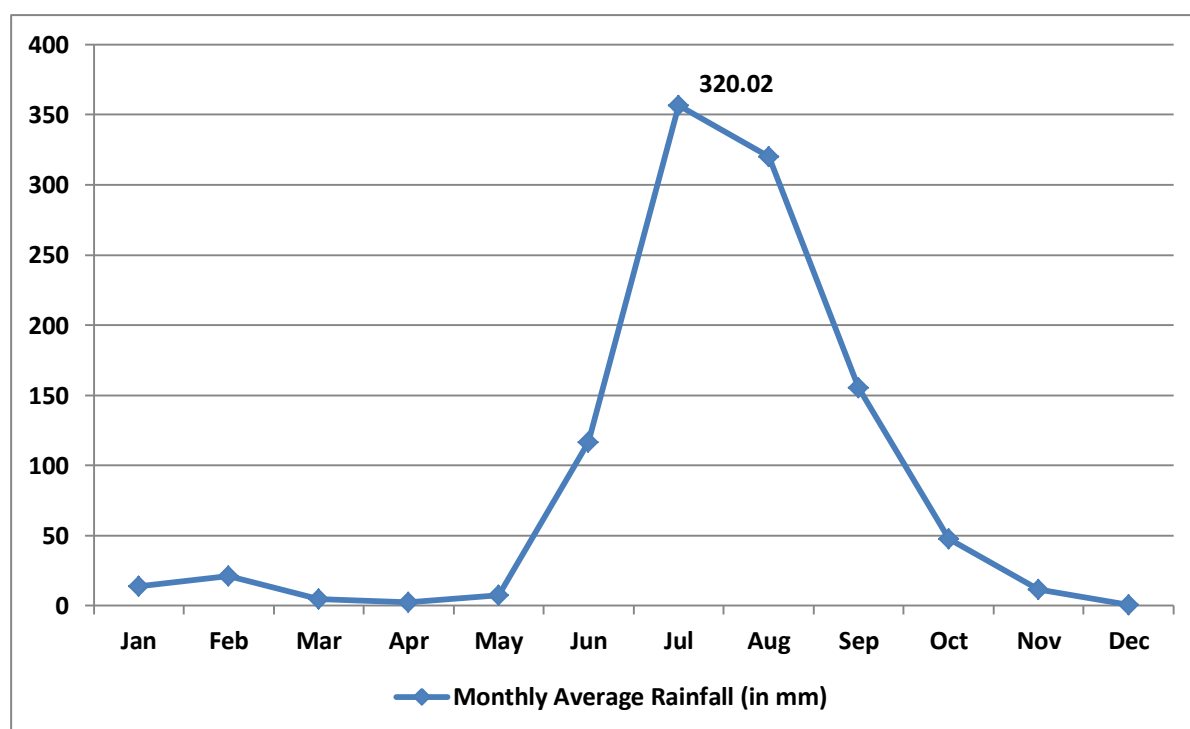
Year/ Months	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2009	40.6	0.0	0.0	7.0	0.0	14.6	250.0	104.2	130.0	72.4	46.9	2
2010	2.2	56.0	0.0	0.0	12.8	13.4	226.4	264.2	208.6	18.0	12.1	0.0
2011	0.0	3.6	0.0	1.4	25.4	362.1	179.6	348.0	186.8	0.0	0.0	0.0
2012	27.6	0.0	8.2	0.0	0.0	8.2	622.7	410.9	142.8	2.3	0.0	1.5
2013	0.0	46.5	15.4	3.1	0.0	183.4	503.8	472.8	108.8	145.4	0.0	0.0

Source: Hydromet Division, IMD, New Delhi

Note: The District Rainfall (mm.) shown are the arithmetic averages of Rainfall of Stations under the District.

The project district receives maximum rainfall in the months of July to September. According to the rainfall data for the last five years, the district's mean annual rainfall is about 1058.34 mm. In the last five years the rainfall pattern does not show any change in its pattern with respect to the IMD rainfall data during the period of 1961-1990. **Figure 4-8** illustrates the average monthly rainfall of Rewa district for 2009 to 2013.

Figure 4-8: Average Monthly Rainfall of Rewa District (2009 – 2013)



4.9 Natural Hazards

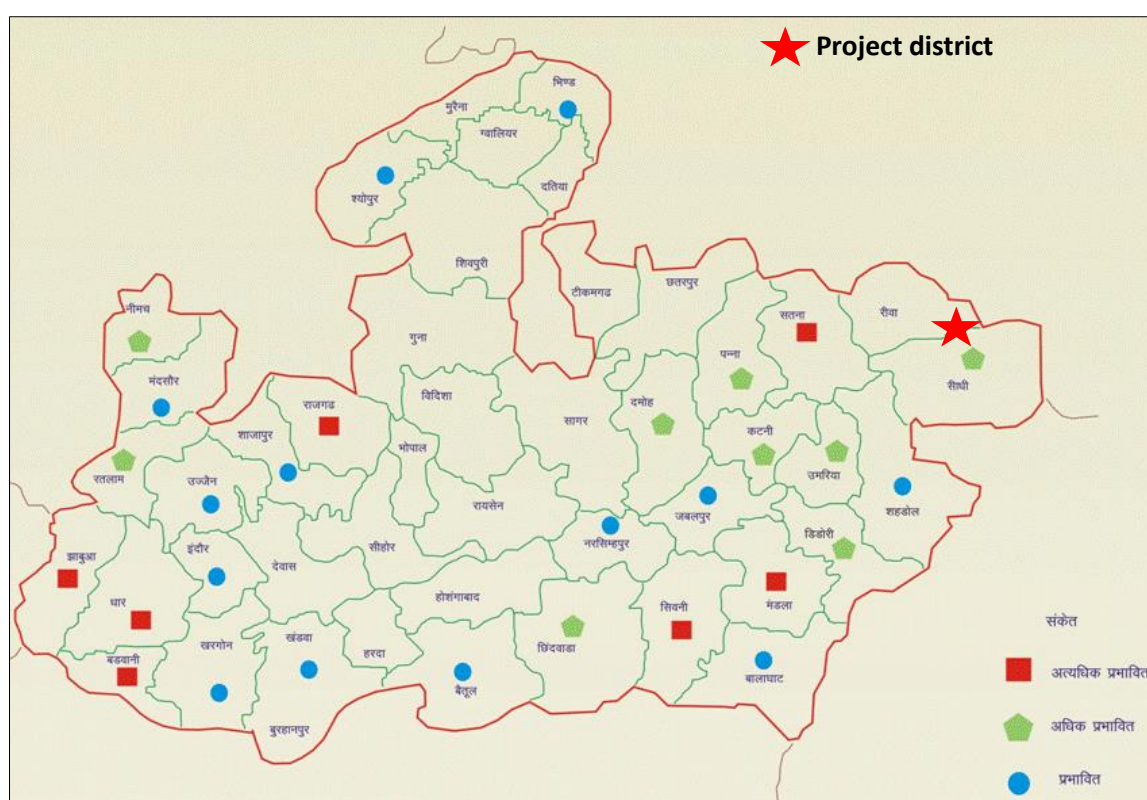
Natural hazards are severe and extreme weather and climate events that occur naturally at any place, although some regions are more vulnerable to certain hazards than others. Natural hazards become natural disasters when people's lives and livelihoods are destroyed. The section below describes the typical forms of Natural hazards and the frequently with which it occurs in the state.

- Drought
- Floods
- Earthquake

4.10 Drought

As per Madhya Pradesh State Disaster Management Authority (MPSDMA), many districts of Madhya Pradesh have been facing a drought situation every year. During 2007-08, 39 out of 50 districts (165 Tehsils) of Madhya Pradesh have been declared as drought affected. Though irrigated area has increased substantially, yet production in almost 70% of the agriculture area remains highly dependent on rainfall. Around 7 districts are highly affected from drought. **Figure 4-9** shows the entire project district, however, Rewa is not prone to Drought.

Figure 4-9: Map showing distribution of Drought in the State



Source: State Disaster Management Authority, Government of MP

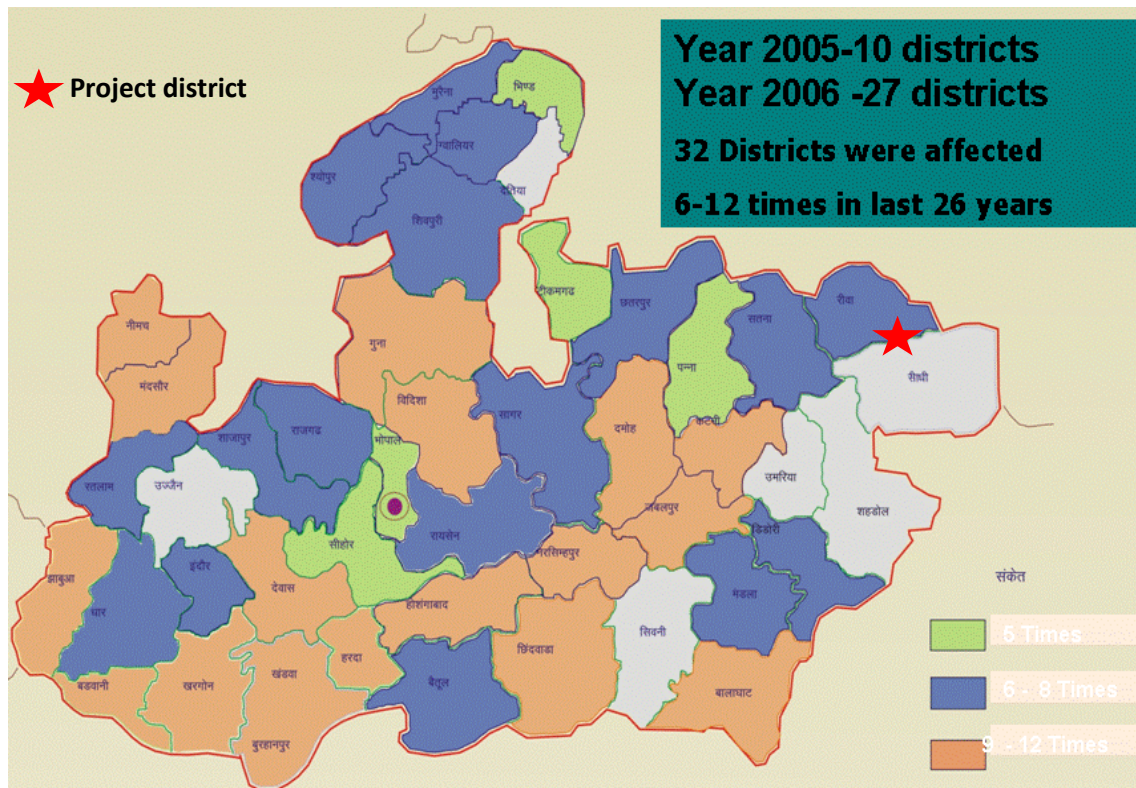
4.11 Flood

In the year 2005, near about 10 districts and in year 2006 about 27 districts were affected by flood. In last 26 years there are 32 districts affected from the flood in the state. Figure below shows the project district; Rewa has been affected by flood about 6-8 times in the past 26 years.

The flood risk assessment for the proposed site has been conducted considering various factors such as flooding of site due to heavy rainfall leading to runoff from the nearby catchment area and causing inundation of site and its associated facilities and lack of adequate drainage. The model simulation has been done to cater runoff generated under a 100 year extreme event over the site and associated facilities. It can be concluded that in case of extreme rainfall event, there might be

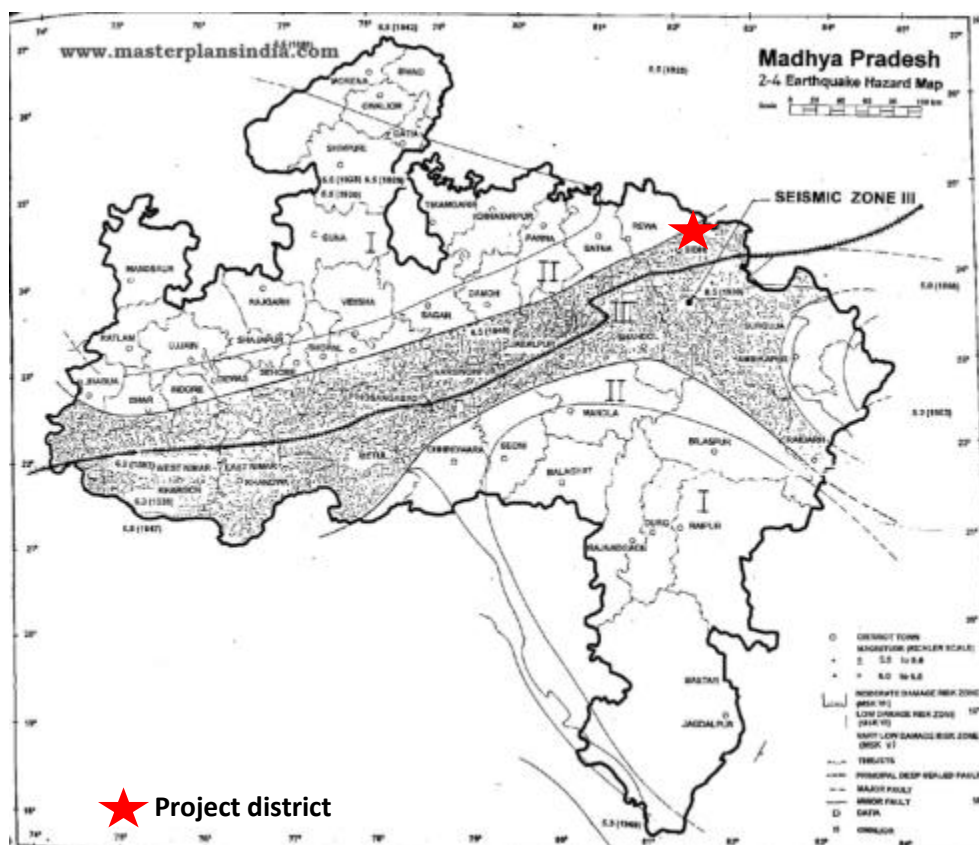
local flooding and local ponding in few areas of the site. However, the carrying capacities of both the Nallahs (Aahri and Devdeh) is good to hold peak discharges of $210\text{m}^3/\text{s}$.

Figure 4-10: Map showing Flood affected districts in the State



Source: State Disaster Management Authority, Government of MP

Figure 4-11: Map showing Minor Risk Zone of Seismic Activity of Rewa District



Source: State Disaster Management Authority, Government of MP

4.12 Earthquake

According to MPSDMA data, the state of Madhya Pradesh falls in Zone II and III (i.e. moderate to minor risks) seismic hazard. There are 28 districts that come under Zone –III and 22 districts come under Zone – II of Earthquake.

Figure 4-11 shows the project district, Rewa is located in minor risk zone of seismic activity.

4.13 Primary Monitoring

Primary monitoring was carried out in the month of December 2015 to January 2016 by Netel (India) Limited (a NABL Accredited and MoEFCC recognised laboratory) to evaluate the baseline environmental parameters. The monitoring was done for ambient air quality, water quality, soil quality, ambient noise levels and traffic survey of the study area.

4.13.1 Ambient Air Quality

Ambient Air Quality was carried out at a frequency of twice a week at four (4) locations. The air samples were analysed as per standard methods. The monitored parameters, sampling frequency and their analytical method adopted are given in

Table 4-7

Table 4-7: Monitored parameters, sampling frequency and analytical method

S.No.	Parameters	Sampling Frequency	Analytical Method	Code of Practice
1.	Particulate Matter (PM _{2.5})	24 hourly twice a week for 4 weeks	Gravimetric Method	IS-5182 (PART-23):2006 & CPCB Guidelines
2.	Particulate Matter (PM ₁₀)	24 hourly twice a week for 4 weeks		
3.	Sulphur dioxide (SO ₂)	24 hourly twice a week for 4 weeks	Improved West-Gaeke Method	IS-5182 (Part-II):2001 & CPCB Guidelines
4.	Oxides of Nitrogen (NOx)	24 hourly twice a week for 4 weeks	Modified Jacob &Hochheiser (Na-Arsenite)	IS-5182 (Part-VI): 2006 & CPCB Guidelines
5.	Carbon Monoxide (CO)	8 hourly twice a week for 4 weeks	Non Dispersive Infra-Red (NDIR) spectroscopy	IS: 5182 (Part-X) & CPCB Guidelines

Source: AECOM Survey

The ambient air quality monitoring locations are described in **Table 4-8**. The selection of the ambient air quality sampling locations was based on consideration of the size of the project site, predominant wind direction and meteorological data analysis of past years and topography of the project area. The wind is coming from west and south-west direction. Solar power project, being a green project does not envisage any impact on the ambient air quality of the area during its operation phase. However, construction phase of the project will entail impacts associated with construction activities such as dust generation and emission exhaustion.

Table 4-8: Details of Ambient Air Monitoring Stations

S. N.	Sampling Locations	Location Code	Direction from the site	Geographical Location	Justification for Site Selection
1.	Barseta Desh	AAQ1	N	24°30'20.50"N 81°34'15.00"E	Downwind Direction
2.	Itar Pahad	AAQ2	NE	24°30'29.90"N 81°34'38.60"E	Downwind Direction
3.	Badwar	AAQ3	W	24°30'19.70"N 81°33'09.00"E	Cross wind Direction
4.	Maldewa	AAQ4	S	24°25'38.15"N 81°32'27.16"E	Upwind Direction

Source: Netel

Table 4-9 provides the monitored ambient air quality results, which are compared with the standards specified under NAAQS, 2009.

Table 4-9: Observed Ambient Air Quality in the study area (in $\mu\text{g}/\text{m}^3$)

Location			AQ1	AQ2	AQ3	AQ4	NAAQS
Parameters	Test Duration (hrs)	Aspects					
PM₁₀ ($\mu\text{g}/\text{m}^3$)	24	Minimum	48.7	47.9	46.7	45.9	100
		Maximum	56.1	57.2	53.4	55.1	
		Average	52.0	51.9	50.0	51.1	
		98 th Percentile	55.8	56.9	53.3	54.9	
PM_{2.5} ($\mu\text{g}/\text{m}^3$)	24	Minimum	17.8	17.4	17.1	16.6	60
		Maximum	20.6	21.1	19.5	20.1	
		Average	18.9	18.9	18.2	18.6	
		98 th Percentile	20.5	20.9	19.5	20.0	
SO₂ ($\mu\text{g}/\text{m}^3$)	24	Minimum	7.6	7.2	7.6	7.8	80
		Maximum	8.7	8.5	8.8	8.5	
		Average	8.2	8.0	8.2	8.1	
		98 th Percentile	8.7	8.5	8.8	8.5	
NO_x ($\mu\text{g}/\text{m}^3$)	24	Minimum	14.7	14.1	14.7	15.1	80
		Maximum	17.2	16.7	16.9	16.7	
		Average	16.0	15.7	16.0	15.9	
		98 th Percentile	17.1	16.6	16.9	16.7	
CO	8	Minimum	0.7	0.6	0.6	0.5	2

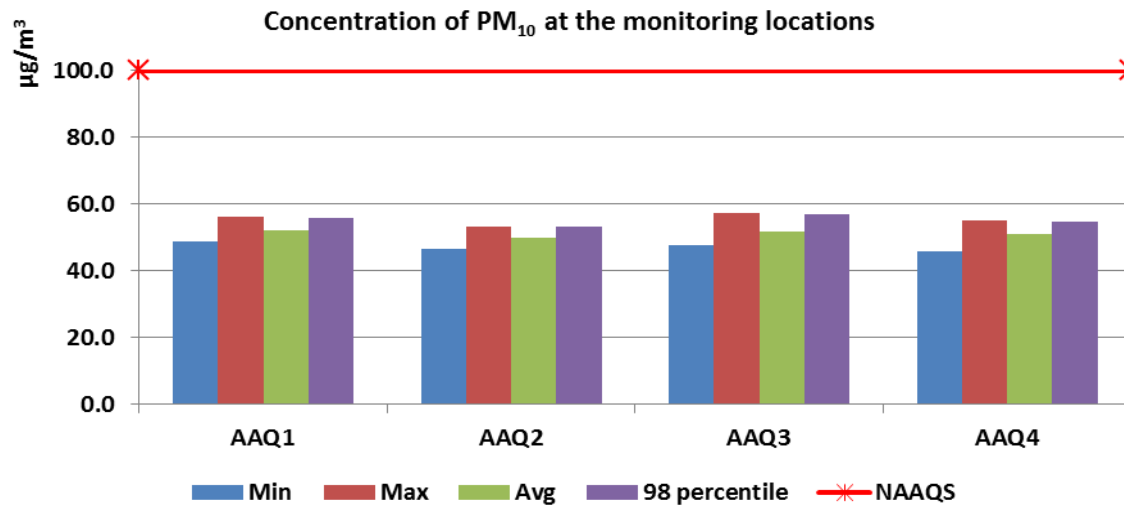
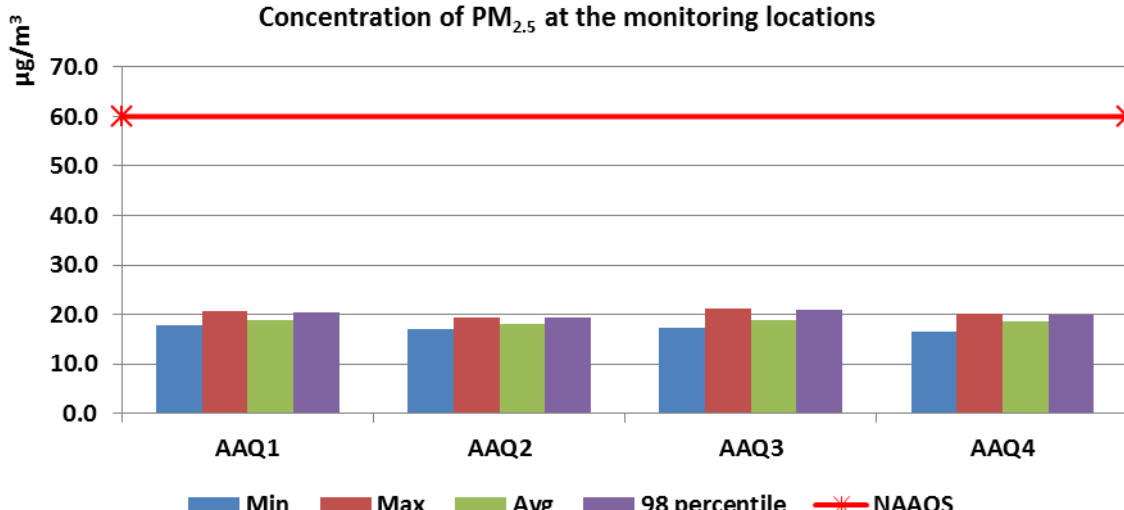
Location			AQ1	AQ2	AQ3	AQ4	NAAQS
Parameters	Test Duration (hrs)	Aspects					
(mg/m ³)		Maximum	0.8	0.8	0.8	0.8	
		Average	0.7	0.7	0.7	0.7	
		98 th Percentile	0.8	0.8	0.8	0.8	

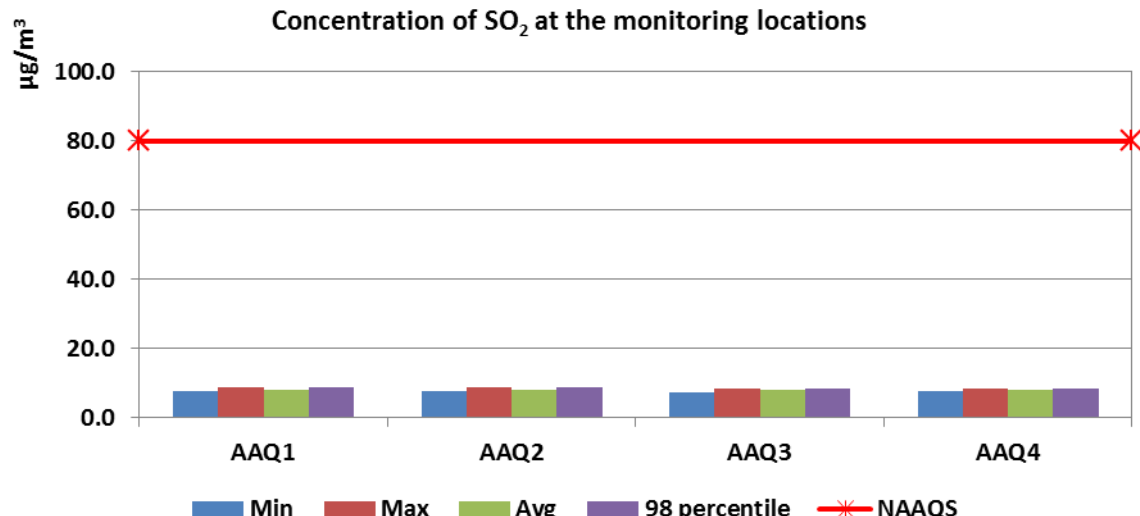
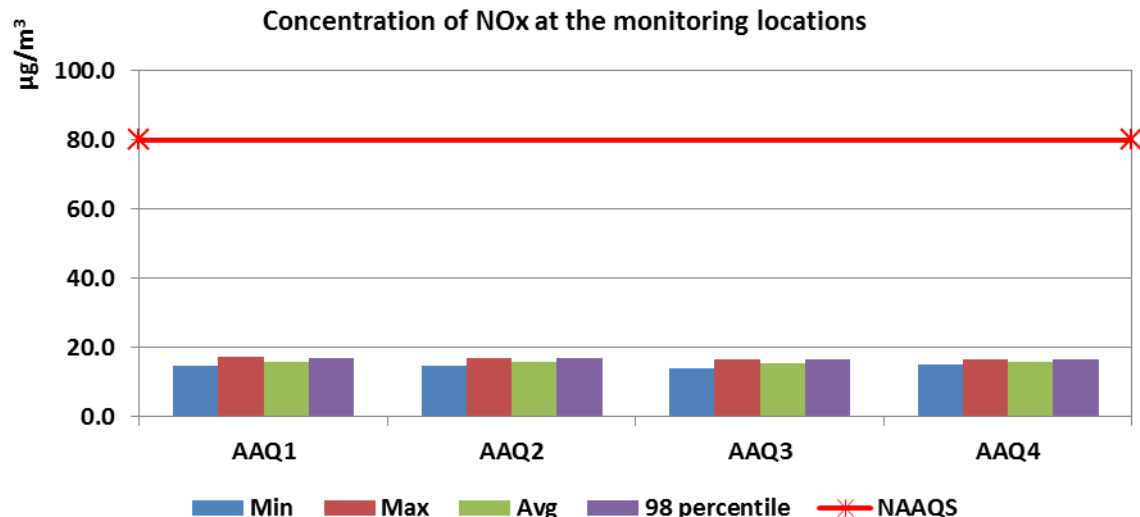
Source: Netel Lab Results

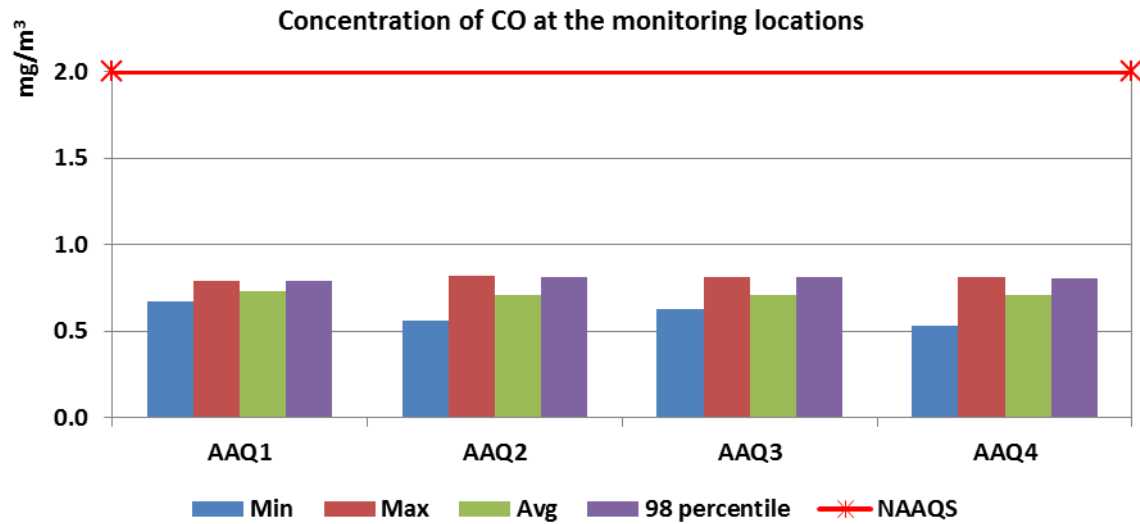
Inference

The summary of the analysis of the ambient air quality monitoring results are presented in the following **Table 4-10**.

Table 4-10: Summary of Analysis of Ambient Air Quality Monitoring

S.N	Parameters	Observations & Inferences	Graphical Representation of the Monitored Gaseous Pollutants In the Study Area																									
1.	Particulate Matter (PM ₁₀)	During the monitoring period, concentration of PM₁₀ was observed to be minimum (45.9 µg/m³) at Maldeva (AAQ4) and maximum (57.2 µg/m³) at Itarpahar (AAQ3). The average and 98 percentile concentration of PM₁₀ ranged from 50.0-52.0 µg/m³ and 53.3 - 56.9 µg/m³ respectively. All the observed values are much below the NAAQS (100 µg/m³) indicating low level of PM₁₀ pollutants at all the sampling locations.	Concentration of PM₁₀ at the monitoring locations  <table><caption>Approximate PM₁₀ Concentrations (µg/m³)</caption><thead><tr><th>Location</th><th>Min</th><th>Max</th><th>Avg</th><th>98 percentile</th></tr></thead><tbody><tr><td>AAQ1</td><td>48.0</td><td>55.0</td><td>52.0</td><td>56.0</td></tr><tr><td>AAQ2</td><td>47.0</td><td>53.0</td><td>51.0</td><td>54.0</td></tr><tr><td>AAQ3</td><td>48.0</td><td>57.0</td><td>52.0</td><td>56.0</td></tr><tr><td>AAQ4</td><td>46.0</td><td>54.0</td><td>51.0</td><td>55.0</td></tr></tbody></table>	Location	Min	Max	Avg	98 percentile	AAQ1	48.0	55.0	52.0	56.0	AAQ2	47.0	53.0	51.0	54.0	AAQ3	48.0	57.0	52.0	56.0	AAQ4	46.0	54.0	51.0	55.0
Location	Min	Max	Avg	98 percentile																								
AAQ1	48.0	55.0	52.0	56.0																								
AAQ2	47.0	53.0	51.0	54.0																								
AAQ3	48.0	57.0	52.0	56.0																								
AAQ4	46.0	54.0	51.0	55.0																								
2.	Particulate Matter (PM _{2.5})	Concentration of PM_{2.5}, during the monitoring period was observed to be in the range of 16.6 – 21.1 µg/m³ at Maldeva (AAQ4) and Itarpahar (AAQ3) respectively. The average and 98 percentile values of PM_{2.5} ranged from 18.2-18.9 µg/m³ and 19.5 – 20.9 µg/m³ respectively. All the observed values are below 60µg/m³, limit specified by NAAQS indicating low level of PM_{2.5} pollutants at all the sampling locations.	Concentration of PM_{2.5} at the monitoring locations  <table><caption>Approximate PM_{2.5} Concentrations (µg/m³)</caption><thead><tr><th>Location</th><th>Min</th><th>Max</th><th>Avg</th><th>98 percentile</th></tr></thead><tbody><tr><td>AAQ1</td><td>18.0</td><td>21.0</td><td>19.0</td><td>20.0</td></tr><tr><td>AAQ2</td><td>17.0</td><td>20.0</td><td>18.5</td><td>19.5</td></tr><tr><td>AAQ3</td><td>18.0</td><td>21.0</td><td>19.0</td><td>20.0</td></tr><tr><td>AAQ4</td><td>17.0</td><td>20.0</td><td>18.5</td><td>19.5</td></tr></tbody></table>	Location	Min	Max	Avg	98 percentile	AAQ1	18.0	21.0	19.0	20.0	AAQ2	17.0	20.0	18.5	19.5	AAQ3	18.0	21.0	19.0	20.0	AAQ4	17.0	20.0	18.5	19.5
Location	Min	Max	Avg	98 percentile																								
AAQ1	18.0	21.0	19.0	20.0																								
AAQ2	17.0	20.0	18.5	19.5																								
AAQ3	18.0	21.0	19.0	20.0																								
AAQ4	17.0	20.0	18.5	19.5																								

3.	Sulphur dioxide (SO ₂)	The SO₂ concentration observed during the monitoring period ranged from 7.2 – 8.8 µg/m³. Itarpahar (AAQ3) recorded the minimum concentration while the maximum concentration was recorded at Barseta (AAQ2). The average concentration values ranged from 8.0 – 8.2µg/m³ while 98 percentile values ranged from 8.5 – 8.8 µg/m³. All the observed values were within the NAAQS limit of 80 µg/m³ specified for Sulphur dioxide.	Concentration of SO₂ at the monitoring locations <table><caption>Approximate SO₂ Concentration Data (µg/m³)</caption><thead><tr><th>Location</th><th>Min</th><th>Max</th><th>Avg</th><th>98 percentile</th></tr></thead><tbody><tr><td>AAQ1</td><td>~8.0</td><td>~8.8</td><td>~8.2</td><td>~8.5</td></tr><tr><td>AAQ2</td><td>~8.0</td><td>~8.8</td><td>~8.2</td><td>~8.5</td></tr><tr><td>AAQ3</td><td>~7.2</td><td>~8.8</td><td>~8.2</td><td>~8.5</td></tr><tr><td>AAQ4</td><td>~8.0</td><td>~8.8</td><td>~8.2</td><td>~8.5</td></tr></tbody></table>	Location	Min	Max	Avg	98 percentile	AAQ1	~8.0	~8.8	~8.2	~8.5	AAQ2	~8.0	~8.8	~8.2	~8.5	AAQ3	~7.2	~8.8	~8.2	~8.5	AAQ4	~8.0	~8.8	~8.2	~8.5
Location	Min	Max	Avg	98 percentile																								
AAQ1	~8.0	~8.8	~8.2	~8.5																								
AAQ2	~8.0	~8.8	~8.2	~8.5																								
AAQ3	~7.2	~8.8	~8.2	~8.5																								
AAQ4	~8.0	~8.8	~8.2	~8.5																								
4.	Oxides of Nitrogen (NO _x)	The minimum and maximum NO_x concentration observed was 14.1 µg/m³ and 17.2 µg/m³ at Itarpahar (AAQ3) and Badwar (AAQ1) respectively. The average values measured were in the range of 15.7 – 16.0 µg/m³. The 98 percentile values ranged from 16.6 – 17.1 µg/m³. All the observed values were within the NAAQS limit of 80 µg/m³ specified for Sulphur dioxide.	Concentration of NO_x at the monitoring locations <table><caption>Approximate NO_x Concentration Data (µg/m³)</caption><thead><tr><th>Location</th><th>Min</th><th>Max</th><th>Avg</th><th>98 percentile</th></tr></thead><tbody><tr><td>AAQ1</td><td>~14.1</td><td>~17.2</td><td>~15.7</td><td>~16.6</td></tr><tr><td>AAQ2</td><td>~14.1</td><td>~17.2</td><td>~15.7</td><td>~16.6</td></tr><tr><td>AAQ3</td><td>~14.1</td><td>~17.2</td><td>~15.7</td><td>~16.6</td></tr><tr><td>AAQ4</td><td>~14.1</td><td>~17.2</td><td>~15.7</td><td>~16.6</td></tr></tbody></table>	Location	Min	Max	Avg	98 percentile	AAQ1	~14.1	~17.2	~15.7	~16.6	AAQ2	~14.1	~17.2	~15.7	~16.6	AAQ3	~14.1	~17.2	~15.7	~16.6	AAQ4	~14.1	~17.2	~15.7	~16.6
Location	Min	Max	Avg	98 percentile																								
AAQ1	~14.1	~17.2	~15.7	~16.6																								
AAQ2	~14.1	~17.2	~15.7	~16.6																								
AAQ3	~14.1	~17.2	~15.7	~16.6																								
AAQ4	~14.1	~17.2	~15.7	~16.6																								

5.	Carbon Monoxide (CO)	During the monitoring period, concentration of CO was observed to be minimum (0.5 mg/m³) at Maldeva (AAQ4) and maximum (0.8 mg/m³) at all the monitoring locations. The average and 98 percentile concentration of CO are observed to be 0.7 µg/m³ and 0.8 µg/m³ respectively. All the observed CO values were found to be less than the prescribed 8 hour NAAQS at all the locations.	Concentration of CO at the monitoring locations <table><caption>Approximate CO Concentration Data (mg/m³)</caption><thead><tr><th>Monitoring Location</th><th>Min</th><th>Max</th><th>Avg</th><th>98 percentile</th></tr></thead><tbody><tr><td>AAQ1</td><td>0.65</td><td>0.80</td><td>0.75</td><td>0.80</td></tr><tr><td>AAQ2</td><td>0.55</td><td>0.85</td><td>0.75</td><td>0.85</td></tr><tr><td>AAQ3</td><td>0.65</td><td>0.85</td><td>0.75</td><td>0.85</td></tr><tr><td>AAQ4</td><td>0.55</td><td>0.85</td><td>0.75</td><td>0.85</td></tr></tbody></table> Legend: Min (blue), Max (red), Avg (green), 98 percentile (purple), NAAQS (red line with asterisks)	Monitoring Location	Min	Max	Avg	98 percentile	AAQ1	0.65	0.80	0.75	0.80	AAQ2	0.55	0.85	0.75	0.85	AAQ3	0.65	0.85	0.75	0.85	AAQ4	0.55	0.85	0.75	0.85
Monitoring Location	Min	Max	Avg	98 percentile																								
AAQ1	0.65	0.80	0.75	0.80																								
AAQ2	0.55	0.85	0.75	0.85																								
AAQ3	0.65	0.85	0.75	0.85																								
AAQ4	0.55	0.85	0.75	0.85																								

It was observed that there is no air polluting sources such as industries around the project area, and it can attribute to prevailing low pollutant concentration. Hence, it can be concluded that the level of air pollutants in the project area is not alarming.

It was observed that there is no air polluting sources such as industries around the project area, and it can attribute to prevailing low pollutant concentration. Hence, it can be concluded that the level of air pollutants in the project area is not alarming.

4.13.2 Surface and Ground Water Quality

Five water samples were collected to assess the water quality of the project area. Samples of ground and surface water were examined for physico-chemical, heavy metals and biological parameters as per standard testing procedures. Three ground water and two surface water samples from Nallah and Village pond were collected for testing. Location details of the sampling locations are given in the **Table 4-11** and presented in **Annexure II**.

Table 4-11: Details of Water Quality Monitoring Locations

S. No.	Sampling Locations	Location Code	Geographical Location	Sample
1.	Ground water from Badwar Village	GWQ 1	24°28'55.5"N 81°33'40.1"E	GroundWater
2.	Ground water from Etar Pahad Village	GWQ 2	24°29'26.1"N 81°37'54.3"E	Ground Water
3.	Ground water from Barsaita Village	GWQ 3	24°30'20.5"N 81°34'15.1"E	Ground Water
4.	Surface water from Badwar Nallah	SWQ 1	24°28'22.8"N 81°34'27.8"E	SurfaceWater
5.	Surface water from Etar Pahad Pond	SWQ 2	24°29'24.2"N 81°37'20.0"E	Surface Water

Source: AECOM Survey

Table 4-12 present the results of analysis of the surface and ground water samples, which are compared with agreeable and permissible limits as specified in the drinking water standards IS10500:2012.

Table 4-12: Results of Inland Surface Water Quality Analysis

S.N	Parameters	Unit	SWQ 1	SWQ 2	SWQ 3	GWQ 1	GWQ 2	AL (PL)
1.	Colour	Hazen	<5.0	<5.0	<5.0	<5.0	5.5	5 (15)
2.	Odour		Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3.	Taste		Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4.	Turbidity	NTU	0.1	0.7	<0.1	0.6	11.3	1(5)
5.	pH		6.83	6.75	5.98	7.16	6.96	6.5-8.5 (NR)
6.	TDS	mg/l	163	159	69	94	81	500 (2000)
7.	Alkalinity	mg/l	62.5	80	17.5	42.5	15	200 (600)
8.	Total Hardness	mg/l	130.56	97.92	32.64	59.52	32.64	200 (600)
9.	Chloride	mg/l	17.99	13.99	10.0	10.99	8	250 (1000)
10.	Free residual chlorine	mg/l	<0.1	<0.1	<0.1	<0.1	<0.1	0.2 (1)
11.	Sulphate	mg/l	12.82	2.70	1.6	4.73	12.5	200 (400)
12.	Fluoride	mg/l	<0.2	<0.2	<0.2	0.99	0.72	1 (1.5)
13.	Nitrate	mg/l	<0.5	2.20	1.04	<0.5	<0.5	45 (NR)
14.	Phenolic compound	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	0.001 (0.002)
15.	Iron	mg/l	<0.1	0.15	<0.1	0.12	0.37	0.3 (NR)
16.	Manganese	mg/l	0.052	0.057	0.052	0.03	0.057	0.1 (0.3)
17.	Mercury	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	0.001 (NR)
18.	Cadmium	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	0.003 (NR)
19.	Selenium	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	0.01 (NR)
20.	Total Arsenic	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	0.01 (0.05)
21.	Cyanide	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	0.01 (NR)
22.	Lead	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	0.01 (NR)
23.	Zinc	mg/l	<0.1	0.13	<0.1	<0.1	<0.1	5 (15)
24.	Aluminium	mg/l	<0.03	<0.03	<0.03	<0.03	<0.03	0.03 (0.2)
25.	Copper	mg/l	<0.04	<0.04	<0.04	<0.04	<0.04	0.05 (1.5)
26.	Boron	mg/l	<0.4	<0.4	0.48	<0.4	<0.4	0.5 (1.0)
27.	Total Chromium	mg/l	<0.04	<0.04	<0.04	<0.04	<0.01	0.05 (NR)
28.	Nickel	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	0.02 (NR)

S.N	Parameters	Unit	SWQ 1	SWQ 2	SWQ 3	GWQ 1	GWQ 2	AL (PL)
29.	Silver	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	0.1 (NR)
30.	Magnesium	mg/l	14.75	5.1	5.81	<5.0	<5.0	30 (100)
31.	Calcium	mg/l	27.65	30.72	8.45	16.9	10.75	75 (200)
32.	Barium	mg/l	<0.5	<0.5	<0.5	<0.5	<0.5	0.7 (NR)
33.	Sulphide	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	0.05 (NR)
34.	Polynuclear aromatic hydrocarbons (PAH)	mg/l	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001 (NR)
35.	Anionic detergent	mg/l	<0.2	<0.2	<0.2	<0.2	<0.2	0.2 (1.0)
36.	Total Coliform	MPN/100 ml	0	23	0	23	0	Not Detected
37.	E Coli		Not Detected	Not Detected	Not Detected	Present	Not Detected	Not Detected

Source: Netel Lab Results

Note: AL- Agreeable Limit; PL – Permissible Limit; NR – No Relaxation

Inference

The summary of inferences of the analysis of the ground and surface water samples results are presented in the following **Table 4-13**.

Table 4-13: Summary of Analysis

S.No.	Parameters	Observations
1.	Ground Water Samples	- Three ground water samples from various project villages were collected and analyzed for drinking water parameters; - The pH value of the samples were observed to be within the prescribed range indicating neutral balance; - The water samples does not show presence of Escherichia coli (E.Coli), however Total coliform is detected in GWQ-2 from Etar Pahad Village which can be sourced from soil or vegetation and is generally harmless. - Therefore, it can be inferred that that there is no risk of fecal contamination in the ground water samples. - All the other parameters were observed to be within the Agreeable limits as specified in the drinking water standard of IS10500:2012
2.	Surface Water Samples	- Two surface water samples from a Nallah and Pond in the project villages were collected and analyzed for drinking water parameters; - The pH value of the river samples were observed to be within the prescribed range indicating neutral balance; - Presence of Total and E.Coli numbers in the water sample SWQ-1 from Badwar Nallah indicates the Fecal contamination indicative of contamination due to wastes from humans and other animals which includes many other pathogens and disease producing bacteria and viruses; - The presence of fecal contamination is an indicator that a potential health risks such as typhoid fever, viral and bacterial gastroenteritis exists for individuals exposed to this water; - Water sample source from Badwar Nallah should therefore be avoided if used for drinking or other domestic purpose by villagers. - Water sample SWQ-2 from Etar Pahad Pond was found to be Turbid and exceeds the permissible limit of 5 NTU; - Turbidity in open water such as this sample from a village pond can be due to Organisms like phytoplanktons; in drinking water the higher the level of turbidity, the higher the chance that those using it could develop gastrointestinal diseases; - Iron content in water sample SWQ-2 from Etar Pahad Pond exceeds the agreeable limit of 0.3 mg/l indicating presence of Iron in the form of ferric iron (Fe³⁺) which is insoluble upon exposure to air and thus causing the water sample color to be 5.5 Hazen unit;

S.No.	Parameters	Observations
		9. High Iron content in drinking water causes aesthetic impacts by affecting the flavor and color of water and it also causes reddish-brown staining of laundry, dishes and utensils; 10. It is therefore recommended to treat the water using an Ion exchange water softener if required to use it for drinking and other domestic purpose.

The graphical representation of the concentration of various parameters in the water samples is illustrated in the Figures below:

Figure 4-12: Graphical representation of TDS content in the water samples

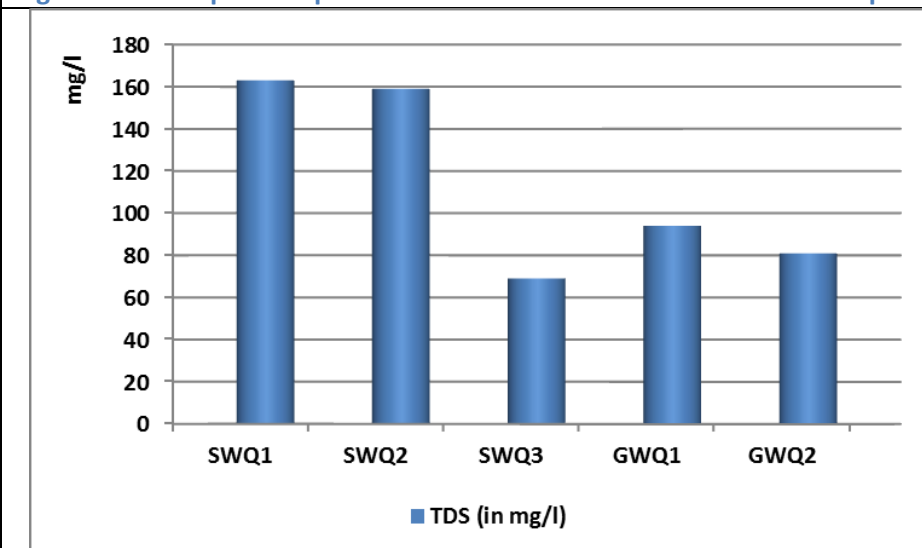


Figure 4-13: Graphical representation of Alkalinity content in the water samples

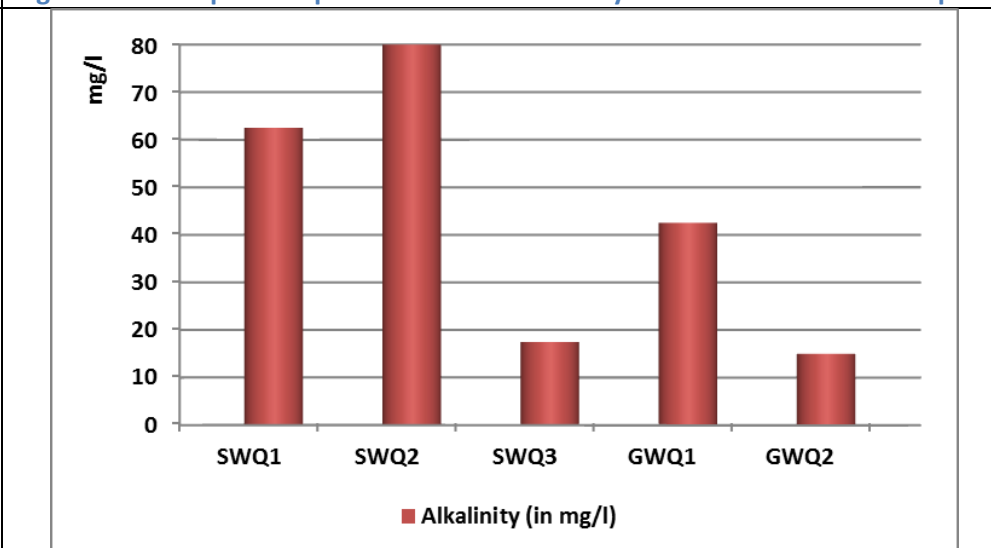


Figure 4-14: Graphical representation of Hardness in the water samples

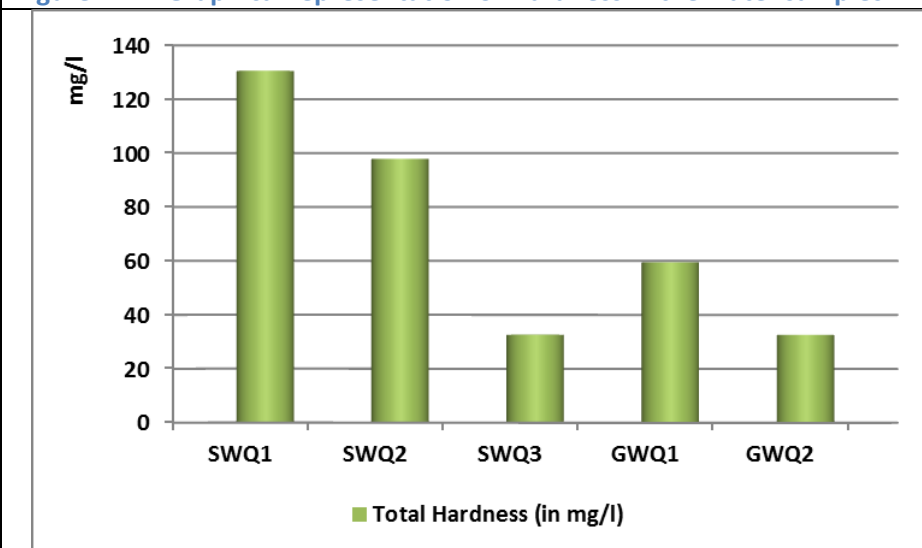


Figure 4-15: Graphical representation of Chloride content in the water samples

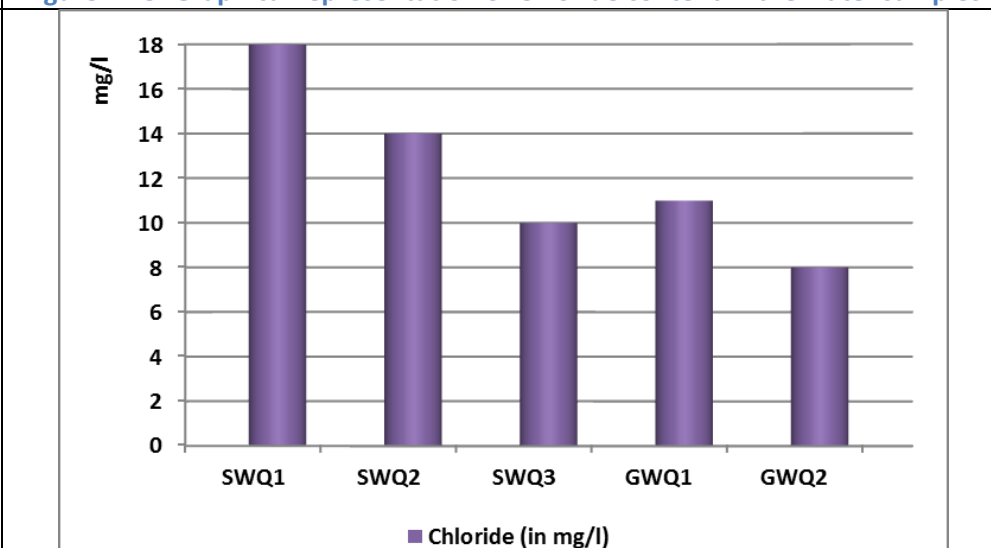


Figure 4-16: Graphical representation of Iron content in the ground water samples

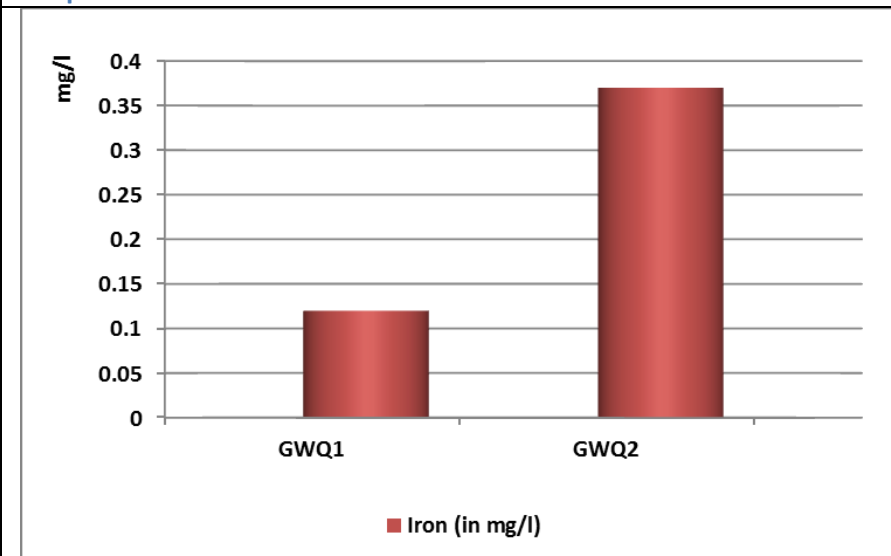


Figure 4-17: Graphical representation of Fluoride content in the ground water samples

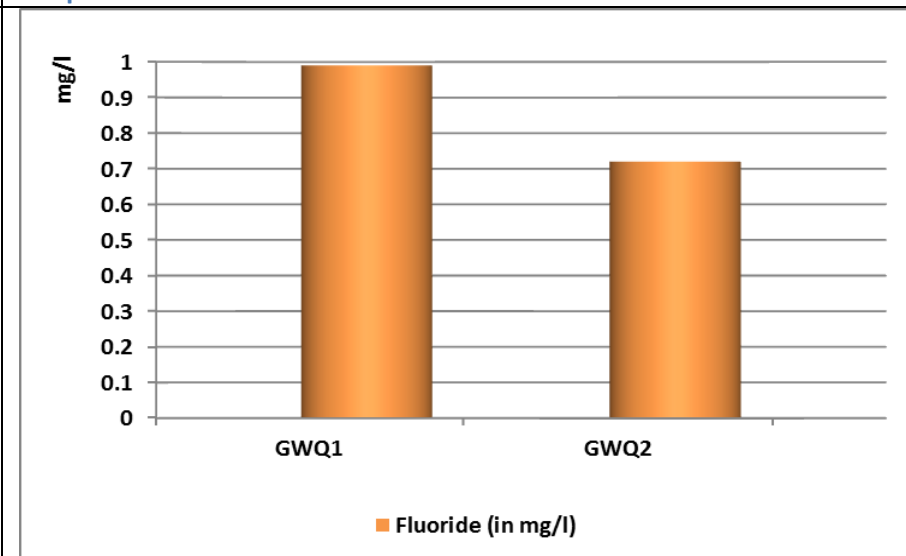


Figure 4-18: Graphical representation of Total Coliform count in the water samples

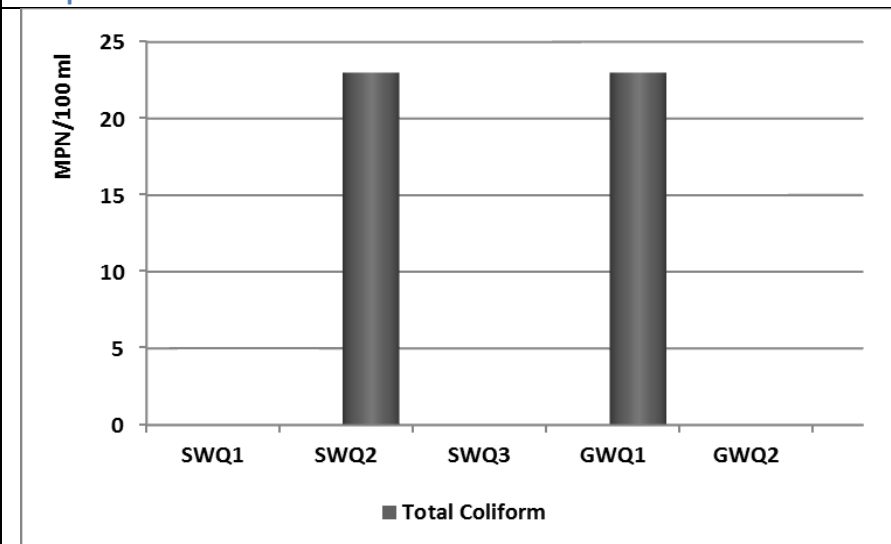
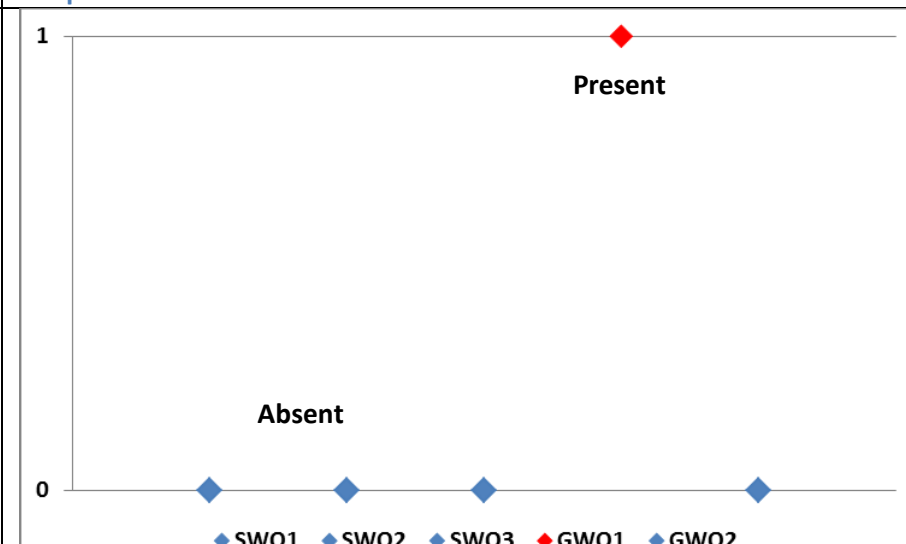


Figure 4-19: Graphical representation showing presence of E.Coli in water samples



4.13.3 Soil Quality

The soil quality of the project area was evaluated and samples from four locations were collected and analysed to determine the same. According to National Bureau of Soil Survey and Land Use Planning, Nagpur the project district (Rewa) is predominantly covered with Deep black soils (75.4%) followed by Shallow soils (15.7%) and medium deep black soil (8.8%). The details of the soil sampling locations are given in **Table 4-14** and presented in **Annexure II**.

Table 4-14: Details of the Soil sampling locations

Sample Code	Geographical Co-ordinates	Name of the Location
SQ1	24°30'20.7"N 81°34'15.2"E	Barsaita Village (North of the project site)
SQ2	24°29'26.1"N 81°37'53.2"E	Etarpahad Village (East of the project site)
SQ3	24°29'14.0"N 81°35'50.1"E	Ramnagar Pahad Village (West of the project site)
SQ4	24°30'00.9"N 81°33'19.0"E	Badwar Village (Centre of the project site)

Source: AECOM Survey

The soil samples were analyzed for various physical and chemical parameters of soil and the results of the soil quality analysis are given in **Table 4-15**.

Table 4-15: Results of the Soil Quality Analysis

S. N	Parameters	SQ-1	SQ-2	SQ-3	SQ-4
•	Particle Size Distribution				
	I) Sand, %	67.95	60.64	64.58	57.70
	II) Silt, %	15.54	17.89	12.95	27.53
	III) Clay, %	16.51	21.47	22.47	14.77
•	Texture	Sandy loam	Sandy clay loam	Sandy clay loam	Sandy clay loam
•	pH	6.82	6.95	6.88	7.02
•	Permeability, cm/sec	0.042	0.039	0.049	0.051
•	Porosity, %	51.0	48.3	59.7	39.4
•	Electrical Conductivity, mmhos/cm	0.000051	0.000136	0.000047	0.000057
•	Cation Exchange Capacity, Meq/100gm	79.35	88.24	84.64	55.09
•	Nitrite, mg/kg	1.02	0.61	0.48	0.82
•	Nitrate, mg/kg	1.8	4.69	2.99	10.73
•	Phosphate, mg/kg	36.77	42.94	62.55	76.23
•	Total Petroleum Hydrocarbon (TPH), mg/kg	<0.01	<0.01	<0.01	<0.01
•	Iron (Fe), mg/kg	8877	11950	8443	9034
•	Lead (Pb), mg/kg	12.19	16.82	10.99	11.32
•	Manganese (Mn), mg/kg	1907	237.4	183.6	98.67
•	Nickel (Ni), mg/kg	7.82	12.10	9.34	10.66
•	Barium (Ba), mg/kg	<0.1	<0.1	<0.1	<0.1
•	Zinc (Zn), mg/kg	22.51	17.97	22.62	12.82
•	Copper (Cu), mg/kg	19.13	19.89	19.29	12.77
•	Cadmium (Cd), mg/kg	0.7	0.97	0.91	0.72
•	Chromium (Cr), mg/kg	3.42	4.17	3.81	4.12
•	Arsenic (As), mg/kg	<0.01	<0.01	<0.01	<0.01
•	Mercury (Hg), mg/kg	<0.01	<0.01	<0.01	<0.01
•	Total hydrocarbon, mg/kg	<0.01	<0.01	<0.01	<0.01
•	Cation Exchange Capacity, Meq/100 gm	79.35	88.24	84.64	55.09
•	Sodium Adsorption ratio (SAR)	3.11	2.5	5.74	3.90

Source: Netel Lab Results

The results of the soil quality analysis were compared with the standard soil classification provided by the Indian Council of Agricultural Research (ICAR) and as given in **Table 4-16**.

Table 4-16: Standard Soil Classification

Soil Parameters	Classification	
pH	Normal to saline	6.0 to 8.5
	Tending to become alkaline	8.5-9.0
	Alkaline	Above 9.0
Electrical conductivity (mmhos/cm)	Up to 1.00 – Normal	
	1.01- 2.00 - Critical to germination	
	2.01-4.00 - Critical for growth of the sensitive crops	
	Above 4.00 – Injurious to most crops	

Source: Indian Council of Agricultural Research, New Delhi

Inference

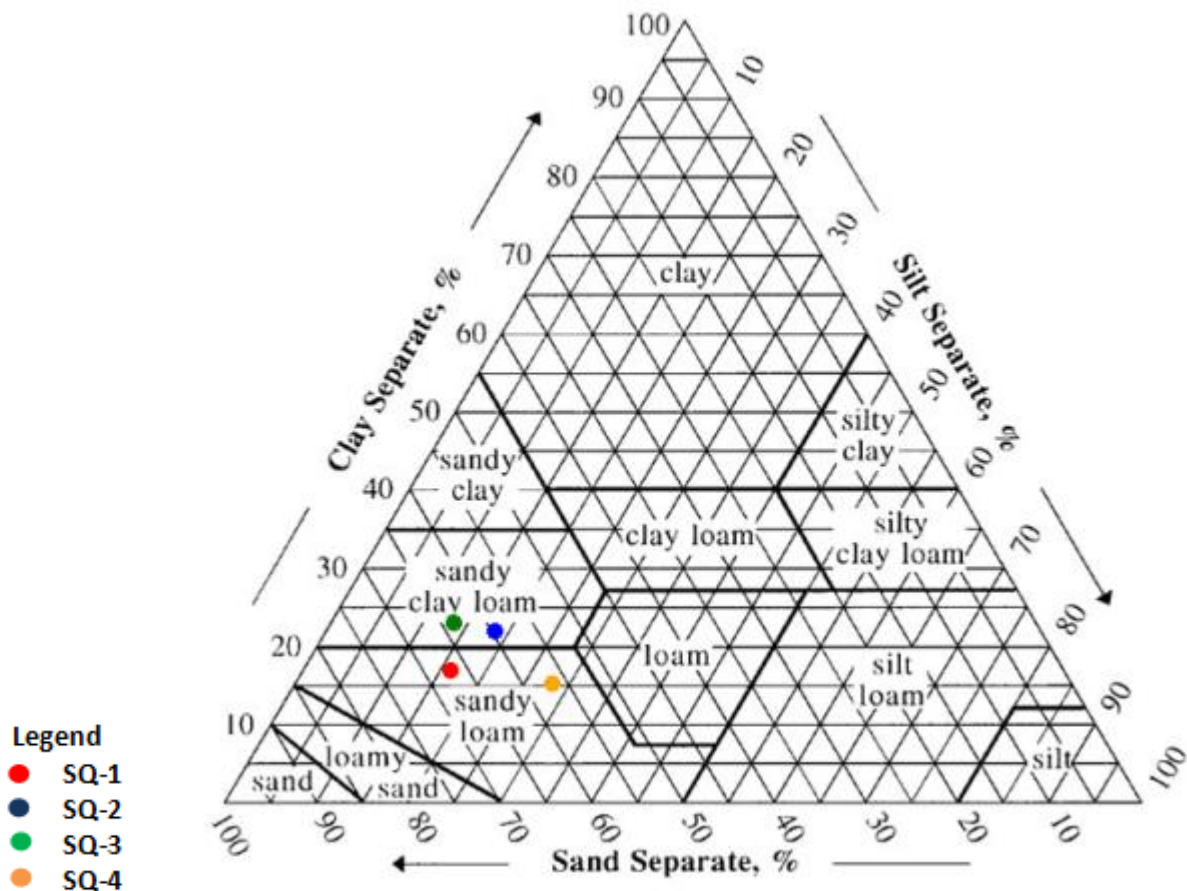
The summary of inference of the analysis of the soil and sediment sampling results are presented in the following **Table 4-17**.

Table 4-17: Summary of Analysis

S.No.	Aspect	Observations & Inferences
1.	Soil Quality	- pH of the soils samples ranged from 6.82-7.02, showing Normal to saline in nature; - Electrical conductivity of all the soil samples indicate Normal values; - Cation Ion Exchange capacity values ranges from 55.09 to 88.24 Meq/100gm; - Sodium adsorption ratio (SAR), an index for characterizing soil sodicity, describing the proportion of sodium to calcium and magnesium in soil solution is calculated to be in the range of 2.5 to 5.74 in the soil samples; - When SAR is greater than 13, the soil is called a sodic soil. Excess sodium in sodic soils causes soil particles to repel each other, preventing the formation of soil aggregates. This results in a very tight soil structure with poor water infiltration, poor aeration and surface crusting, which makes tillage difficult and restricts seedling emergence and root growth (Munshower, 1994; Seelig, 2000; Horneck et al., 2007). Therefore, the soils in the project area does not show sodic characteristics; - The soil samples shows presence of heavy metals such as Cadmium (in the range of 0.7 to 0.97 mg/kg) and Chromium (in the range of 3.42 to 4.17 mg/kg).

The Texture Triangle below illustrates the texture of soil samples collected;

Figure 4-20: Soil Samples Texture Triangle



Source: <http://www.nrcs.usda.gov/>

4.13.4 Noise Quality

Sound pressure level (SPL) measurements were recorded at six (6) locations around the project area. The readings were recorded; continuously for 24 hours for every hour for 24 hours. The day noise levels have been monitored during 6 am to 10 pm and night noise levels during 10 pm to 6 am at all the selected sampling locations. The sampling locations can be categorised as residential area. Therefore, the results of the ambient noise level monitoring presented in

Table 4-19 are compared with ambient air quality standards in respect of noise limits for day time and night time for residential area.

The details of noise monitoring locations are provided in **Table 4-18**.

Table 4-18: Details of the noise quality monitoring locations

Sample Code	Geo-graphical Coordinates	Sampling Location
NQ-1	24°30'20.5"N 81°34'15.0"E	BarsetaDesh
NQ-2	24°30'29.9"N 81°34'38.6"E	ItarPahad
NQ-3	24°30'19.7"N 81°33'09.0"E	Badwar
NQ-4	24°25'38.15" 81°32'27.16"	Maldewa
NQ-5	24°28'01.1"N 81°29'26.4"E	Bela
NQ-6	24°29'14.6"N 81°35'50.3"E	RamgarhPahad

Source: Netel

Table 4-19: Results of Noise level monitoring

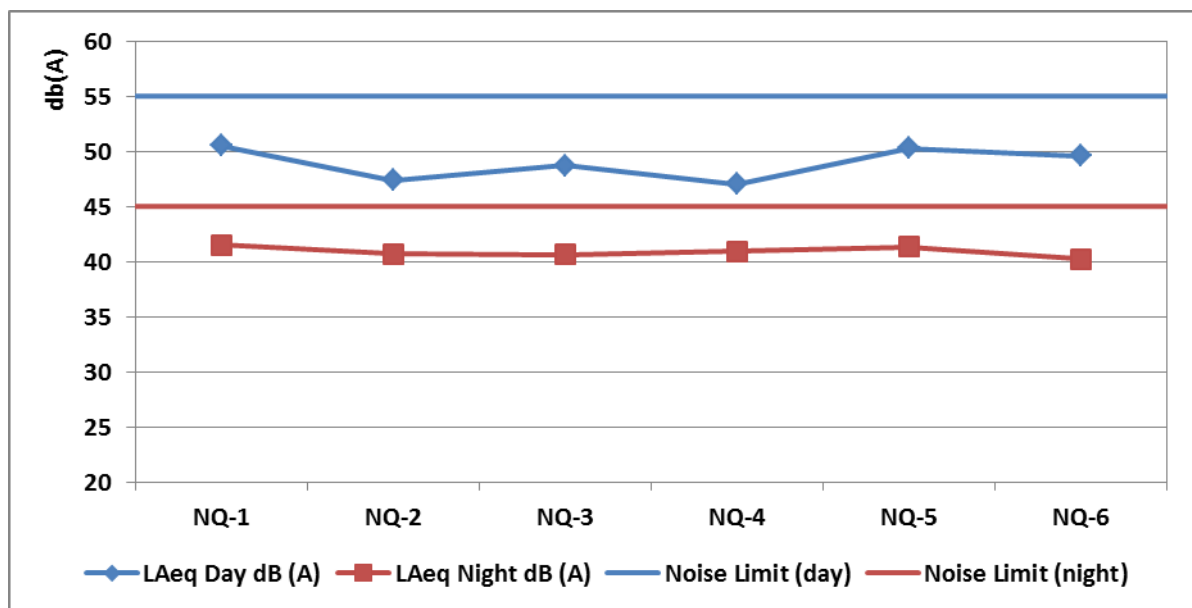
Location Code	Noise Standard (Residential Area)	NQ-1	NQ-2	NQ-3	NQ-4	NQ-5	NQ-6
LAeq Day dB (A)	55	50.5	47.4	48.7	47.0	50.3	49.6
LAeq Night dB (A)	45	41.5	40.7	40.6	40.9	41.3	40.2

Inference

It is observed that the noise levels at the monitoring locations ranged from 47.0 to 50.5 dB (A) during the daytime and 40.2 to 41.5 dB (A) during night time. The baseline noise levels at all the sampling locations were found to be within the prescribed noise standards for Residential Area.

The day and night time noise levels are graphically presented in **Figure 4-21**.

Figure 4-21: Noise Levels monitored in the study area



4.13.5 Traffic Monitoring

Road traffic survey was carried out within the project site at one location (to and fro) for 24 hours once during the monitoring period to assess the existing traffic characteristics with respect to type, category and number of vehicles plying on the road connecting the project site. The details of the traffic monitoring location have been provided in the following **Table 4-20** and presented in **Annexure II**.

Table 4-20: Traffic monitoring locations

S.No	Traffic monitoring location	Location ID	Geo-graphical Co-ordinates	Date of Monitoring
1.	Banwar to Sidhi	TM 1	24°28'58.77"N 81°33'40.30"E	28-12-2015
2.	Sidhi to Banwar	TM 2		28-12-2015

Traffic counted has been subdivided into four categories/classes viz.:

- Two Wheelers;
- Three Wheelers;
- Light Commercial Vehicles (LCV);
- Heavy Commercial Vehicles (HCV);
- Non-Motor Vehicle

Since the vehicles are of different types, a factor needs to be accounted for each of them in order to express them at par in single unit terms. The factors, commonly known as Passenger Car Unit (PCU) factors that have been adopted and are shown in **Table 4-21**.

Table 4-21: Passenger Car Unit (PCU) factors

Vehicle Type	PCU Factor
Two Wheelers	0.75
Three Wheelers	1.2
Light Commercial Vehicles (LCV)	1.0
Heavy Commercial Vehicles (HCV)	3.7
Non-Motor Vehicle	0.5

Source: The Indian Roads Congress Code – IRC 109-1990

The traffic volume counts have been tabulated in the **Table 4-22** and **Table 4-23** and illustrated in **Figure 4-22**.

Table 4-22: Hourly Traffic Volumes at TM1

Time	Two Wheelers	Three Wheelers	LCVs	HCVs	Non Motor Vehicle
06:00AM	7	1	19	10	0
07:00AM	10	0	27	11	0
08:00AM	15	0	31	17	0
09:00AM	27	2	43	22	0
10:00AM	23	0	37	19	0
11:00AM	18	1	25	14	1
12:00PM	35	1	12	4	2
01:00PM	21	0	15	8	0
02:00PM	9	0	8	13	0
03:00PM	17	1	10	18	2
04:00PM	28	0	16	22	0
05:00PM	20	0	21	10	1
06:00PM	15	0	14	13	0
07:00PM	10	0	12	8	0
08:00PM	9	0	16	12	0

Time	Two Wheelers	Three Wheelers	LCVs	HCVs	Non Motor Vehicle
09:00PM	6	0	9	13	0
10:00PM	4	0	6	11	0
11:00PM	1	0	5	7	0
12:00PM	0	0	0	2	0
01:00AM	0	0	0	4	0
02:00AM	0	0	0	0	0
03:00AM	0	0	0	0	0
04:00AM	0	0	2	0	0
05:00AM	3	0	7	8	0
Total	278	6	335	246	6

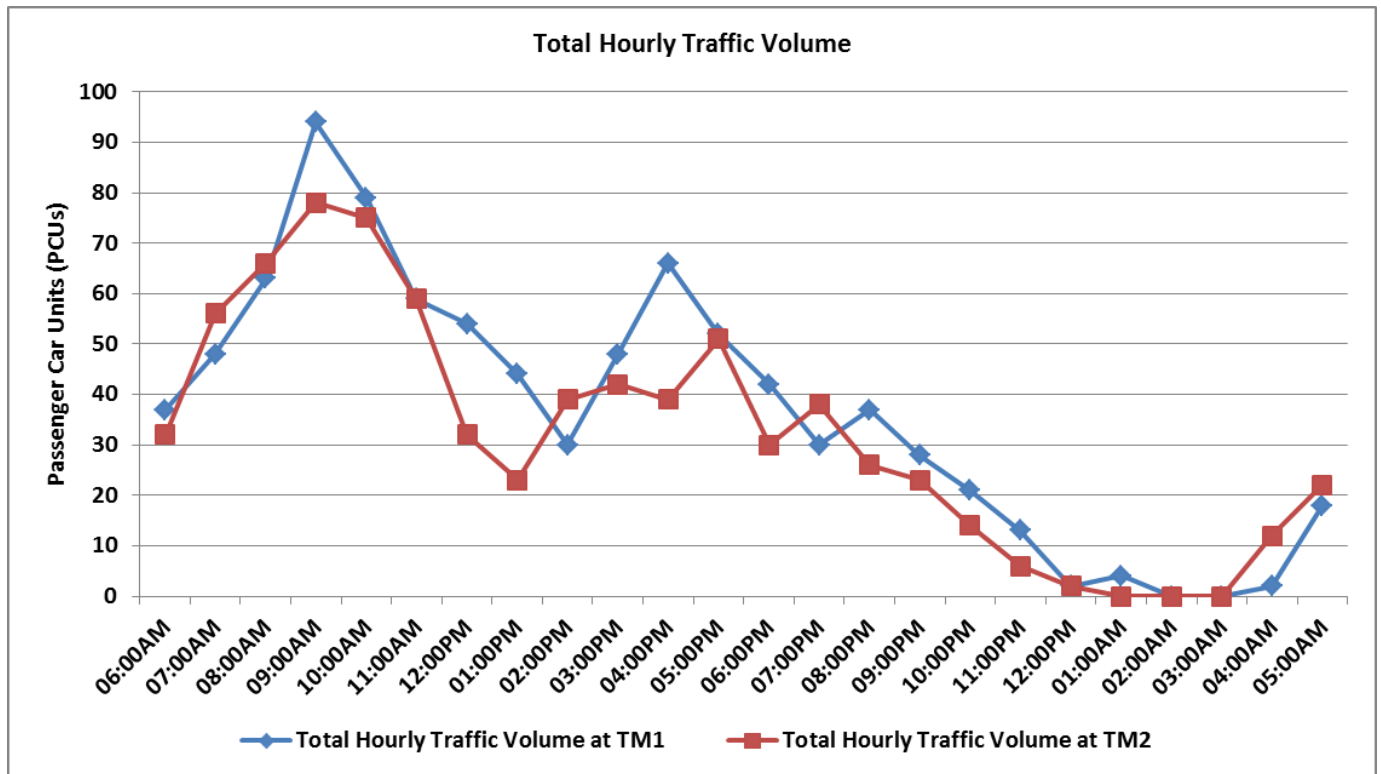
Source: Netel Survey Results

Table 4-23: Hourly Traffic Volumes at TM2

Time	Two Wheelers	Three Wheelers	LCVs	HCVs	Non Motor Vehicle
06:00AM	5	0	13	14	0
07:00AM	9	0	28	19	0
08:00AM	12	0	33	21	0
09:00AM	31	0	20	27	0
10:00AM	19	0	32	23	1
11:00AM	25	0	18	16	0
12:00PM	14	2	10	5	1
01:00PM	10	0	6	6	1
02:00PM	8	1	13	17	0
03:00PM	21	1	7	13	0
04:00PM	18	0	9	10	2
05:00PM	29	0	14	8	0
06:00PM	11	0	9	10	0
07:00PM	8	0	11	19	0
08:00PM	12	0	7	7	0
09:00PM	4	0	4	15	0
10:00PM	3	0	2	9	0
11:00PM	1	0	0	5	0
12:00PM	0	0	0	2	0
01:00AM	0	0	0	0	0
02:00AM	0	0	0	0	0
03:00AM	0	0	0	0	0
04:00AM	0	0	1	11	0
05:00AM	4	0	9	9	0
Total	244	4	246	266	5

Source: Netel Survey Results

Figure 4-22: Hourly traffic volume at TM1 and TM2



Inference

The total hourly traffic volume indicates that the peak hour traffic is between 08:00 am to 11:00 am in the morning with slight increase around 03:00 pm to 05:00 pm in both ways. The composition of vehicles at this stretch indicates that out of the total vehicles observed, 38.4% and 32% of the vehicles are light commercial vehicles (to and fro). Heavy commercial vehicles constituted 52.8% and 34.8% (to and fro) of the observed traffic volume whereas 32% of vehicles are non-motorised vehicles as illustrated in **Figure 4-23**.

Figure 4-23 : Vehicle composition at TM1

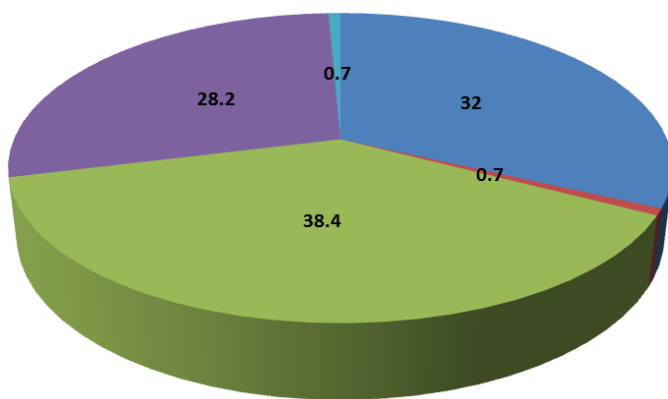
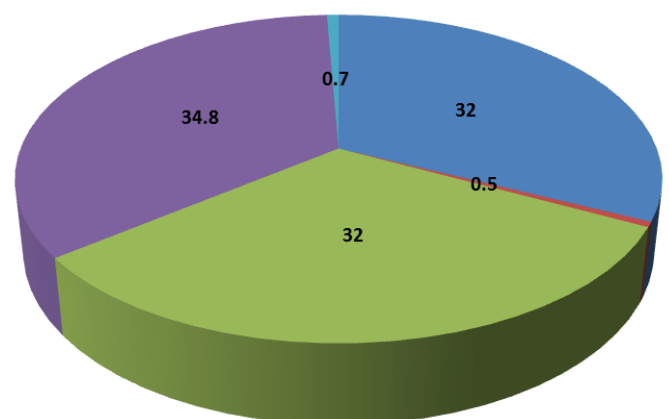


Figure 4-24 : Vehicle composition at TM2



■ TWO WHEELERS ■ THREE WHEELERS ■ LCV'S ■ HCV'S ■ NON MOTOR VEHICLE

4.14 Ecology

4.14.1 Description of the Study Area

The entire area delineated as the proposed project area, along with the area extending approximately 1 km outwards from the boundary of the project area, was subjected to an ecological assessment. This area is collectively referred to in the reportage that follows as the ‘**Study Area**’. The assessment was aimed at identifying the ecological receptors present in this study area and evaluating the potential ecological impacts of project-related structures or activities upon these receptors. The assessment also aimed at highlighting any significant known conservation concerns related to the study area.

Geographically, the study area is a part of the eastern section of the Rewa Plateau. It represents a large tract of land, mostly in the form of an extensive ridge-top plateau. The terrain is flat to gently undulating and drained by small, seasonal streams which have chiselled out shallow, barely discernible valleys in the peneplaned landscape. While some of the surface flows end in small scattered marshy ditches, most converge into the study area’s largest water channel, which follows the overall slope of the study area to flow more or less east-west. The water flows originating in the study area contribute to the region’s rivulets, predominantly the Bihar and Tons Rivers, which themselves eventually empty into the Ganga River located approximately 100 km north of the study area. Thus, the study area is effectively a part of the catchment of the massive Gangetic river-system.

4.14.2 Methodology

Primary Data

Primary data was collected through quadrat-studies at twelve sites distributed randomly across the study area, but selected to cover the different habitats and microhabitats represented in the study area.

At each site, a study of floristic diversity was carried out using quadrats of 20 m x 20 m for recording trees, large shrubs and large woody climbers, 5 m x 5 m for small shrubs and 1 m x 1 m for herbs. In each case, the different species, as well as the number of individuals of each species, falling within the quadrat area were noted.

At each site, faunal diversity was studied through both, direct evidence, in the form of visual sightings, and indirect evidence, such as calls, nests, burrows, droppings, scats, moults and tracks, observed during a brief walk-over of the site. Following the walk-over study, the site was scanned with standard bird-watching binoculars for approximately fifteen-minutes to record bird-species in particular. While recording primary data on fauna, only occurrence of a species at a given site was noted, without seeking to enumerate the individuals sighted.

The quadrat-studies were conducted during most of the diurnal faunal activity-period, from mid-morning till early evening. In view of time and resource constraints, and given the preliminary nature of this survey, the emphasis of the studies was kept limited to the higher flora, and amongst the fauna, to the higher and diurnal fauna.

The quantitative floristic data recorded through the quadrat studies was processed to arrive at measurable values such as percentage-frequency, abundance and density per hectare of each plant-species, as also, the species richness of the woody and non-woody floras. The quantitative avifaunal data recorded during the walkover survey of the quadrat-sites was processed to get the percentage frequency of each bird-species recorded. The formulae used for these calculations are given in **Appendix III** to this report.

Secondary Data

Additional information was sourced from available published literature, governmental institutions and local residents of the study-area. The main sources quoted in this report are mentioned at the pertinent places in the report, besides all sources being separately listed under Section 8.0 of this report.

Details of Quadrat Sites

The details of the twelve sites at which primary data regarding flora and fauna was recorded are as follow,

Table 4-24: Details of Co-ordinates used for Primary Data Collection

Sr. No.	Location Co-ordinates	Elevation (m)	Nearest Village(s)
1	N 24° 29' 39.8", E 81° 33' 17.4"	369	Badwar
2	N 24° 30' 24.1", E 81° 34' 09.9"	340	Barsaita Gaon
3	N 24° 28' 33.0", E 81° 34' 33.8"	375	Barsaita Pahad, Badwar
4	N 24° 30' 09.2", E 81° 34' 56.5"	387	Barseta Pahad, Etar Pahad
5	N 24° 28' 33.0", E 81° 34' 58.6"	386	Devdha
6	N 24° 29' 33.3", E 81° 35' 35.1"	423	Etar Pahad
7	N 24° 29' 04.7", E 81° 35' 41.0"	390	Ramnagar Pahad
8	N 24° 29' 15.6", E 81° 35' 50.0"	406	Ramnagar Pahad
9	N 24° 29' 42.6", E 81° 36' 33.6"	430	Ramnagar Pahad
10	N 24° 29' 19.0", E 81° 37' 54.6"	434	Barsaita Pahad, Pokhra
11	N 24° 29' 59.0", E 81° 38' 08.7"	459	Etar Pahad
12	N 24° 30' 34.9", E 81° 39' 54.6"	435	Etar Pahad, Tamra Pahad

4.14.3 Habitat Profile of the Study Area

4.14.3.1 Modified Habitats

The modified habitats of the study area comprise traditional habitations, a few scattered rain-fed farmlands, fenced in plantations, open pasturelands and a few dirt roads.

4.14.3.2 Natural Habitats

The natural habitats of the study area comprise a few remnant patches of forest, natural secondary grasslands formed by the degradation of deciduous forest by lopping, grazing and burning, a few shallow, seasonal streams and small marshy wetlands formed in naturally water-logged ditches.

4.14.3.3 Critical Habitats

Habitats critical to the survival of IUCN-designated Critically Endangered (CR) or Endangered (EN) species, migratory species, congregatory species and endemic or restricted range species are considered to be critical habitats. Secondary data indicates that 10 IUCN-designated CR/ EN species, 74 migratory species, 3 congregatory species and 5 endemic/restricted range species have reported ranges that include the study area, as listed in the tables that follow in this section. However, the study area is unlikely to be critical to the survival of any of these species.

Of the species listed in the tables that follow, the ones sighted in the study area during the field visit by the ecologist appear in **bold font**.

Critically Endangered or Endangered Species

Table 4-25 lists the species designated by the IUCN as either Critically Endangered or Endangered and having recorded ranges that include the study area or waterbodies having catchments that include the study area.

Table 4-25: Critically Endangered/Endangered Species of the Study Area

Sr. No.	Scientific Name	Common Name	IUCN Status*	WPA Schedule
Mammals				
1	<i>Manis crassicaudata</i>	Indian Pangolin	EN	I
Birds				
1	<i>Neophron percnopterus</i>	Egyptian Vulture	EN	IV
2	<i>Gyps bengalensis</i>	White-rumped Vulture	CR	I
3	<i>Gyps indicus</i>	Indian Vulture	CR	I
4	<i>Sarcogyps calvus</i>	Red-headed Vulture	CR	IV
5	<i>Aquila nipalensis</i>	Steppe Eagle	EN	IV
6	<i>Sypheotides indicus</i>	Lesser Florican	EN	I
7	<i>Sterna acuticaudata</i>	Black-bellied Tern	EN	-
Reptiles				
1	<i>Chitra indica</i>	Narrow-headed Softshell Turtle	EN	-
Fishes				
1	<i>Tor khudree</i>	Yellow Mahseer	EN	-

* Status assigned by the International Union for Conservation of Nature and Natural Resources, where - CR – Critically Endangered; EN – Endangered

Migratory Species

Table 4-26 lists the migratory birds having recorded ranges that include the study area.

Table 4-26: Migratory Birds of the Study Area

Sr. No.	Scientific Name	Common Name	IUCN Status*	WPA Schedule
1	<i>Coturnix coturnix</i>	Common Quail	LC	IV
2	<i>Coturnix coromandelica</i>	Rain Quail	LC	IV
3	<i>Anas formosa</i>	Baikal Teal	LC	IV
4	<i>Anas crecca</i>	Common Teal	LC	IV
5	<i>Podiceps cristatus</i>	Great Crested Grebe	LC	IV
6	<i>Mycteria leucocephala</i>	Painted Stork	NT	IV
7	<i>Ciconia nigra</i>	Black Stork	LC	IV
8	<i>Ciconia ciconia</i>	White Stork	LC	IV
9	<i>Leptoptilos javanicus</i>	Lesser Adjutant	VU	IV
10	<i>Pseudibis papillosa</i>	Red-naped Ibis	LC	IV
11	<i>Nycticorax nycticorax</i>	Black-crowned Night Heron	LC	IV
12	<i>Egretta garzetta</i>	Little Egret	LC	IV
13	<i>Anhinga melanogaster</i>	Darter	NT	IV
14	<i>Phalacrocorax fuscicollis</i>	Indian Cormorant	LC	IV
15	<i>Phalacrocorax carbo</i>	Great Cormorant	LC	IV
16	<i>Falco tinnunculus</i>	Common Kestrel	LC	IV
17	<i>Falco peregrinus</i>	Peregrine Falcon	LC	I
18	<i>Milvus (migrans) lineatus</i>	Black-eared Kite	LC	IV
19	<i>Pandion haliaetus</i>	Osprey	LC	I
20	<i>Gyps fulvus</i>	Griffon Vulture	LC	IV
21	<i>Circus aeruginosus</i>	Eurasian Marsh Harrier	LC	IV
22	<i>Circus melanoleucos</i>	Pied Harrier	LC	IV
23	<i>Circus macrourus</i>	Pallid Harrier	NT	IV
24	<i>Aquila clanga</i>	Greater Spotted Eagle	VU	IV
25	<i>Aquila nipalensis</i>	Steppe Eagle	EN	IV

Sr. No.	Scientific Name	Common Name	IUCN Status*	WPA Schedule
26	<i>Hieraaetus pennatus</i>	Booted Eagle	LC	IV
27	<i>Grus virgo</i>	Demoiselle Crane	LC	IV
28	<i>Grus grus</i>	Common Crane	LC	IV
29	<i>Himantopus himantopus</i>	Black-winged Stilt	LC	IV
30	<i>Charadrius alexandrinus</i>	Kentish Plover	LC	IV
31	<i>Gallinago stenura</i>	Pin-tailed Snipe	LC	IV
32	<i>Gallinago gallinago</i>	Common Snipe	LC	IV
33	<i>Tringa nebularia</i>	Common Greenshank	LC	IV
34	<i>Tringa ochropus</i>	Green Sandpiper	LC	IV
35	<i>Tringa glareola</i>	Wood Sandpiper	LC	IV
36	<i>Actitis hypoleucos</i>	Common Sandpiper	LC	IV
37	<i>Calidris minuta</i>	Little Stint	LC	IV
38	<i>Calidris temminckii</i>	Temminck's Stint	LC	IV
39	<i>Streptopelia orientalis</i>	Oriental Turtle Dove	LC	IV
40	<i>Clamator jacobinus</i>	Jacobin Cuckoo	LC	IV
41	<i>Cuculus micropterus</i>	Indian Cuckoo	LC	IV
42	<i>Coccyzus passerinus</i>	Grey-bellied Cuckoo	LC	IV
43	<i>Asio flammeus</i>	Short-eared Owl	LC	IV
44	<i>Merops philippinus</i>	Blue-tailed Bee-eater	LC	-
45	<i>Jynx torquilla</i>	Eurasian Wryneck	LC	IV
46	<i>Pitta brachyuran</i>	Indian Pitta	LC	IV
47	<i>Coracina melaschistos</i>	Black-winged Cuckooshrike	LC	IV
48	<i>Coracina melanoptera</i>	Black-headed Cuckooshrike	LC	IV
49	<i>Lanius cristatus</i>	Brown Shrike	LC	-
50	<i>Dicrurus leucophaeus</i>	Ashy Drongo	LC	IV
51	<i>Hirundo rustica</i>	Barn Swallow	LC	IV
52	<i>Calandrella brachydactyla</i>	Greater Short-toed Lark	LC	IV
53	<i>Acrocephalus stentoreus</i>	Clamorous Reed Warbler	LC	-
54	<i>Acrocephalus dumetorum</i>	Blyth's Reed Warbler	LC	-
55	<i>Iduna rama</i>	Sykes's Warbler	LC	-
56	<i>Phylloscopus collybita</i>	Common Chiffchaff	LC	-
57	<i>Phylloscopus humei</i>	Hume's Leaf Warbler	LC	-
58	<i>Phylloscopus trochiloides</i>	Greenish Warbler	LC	-
59	<i>Luscinia svecica</i>	Bluethroat	LC	IV
60	<i>Phoenicurus ochruros</i>	Black Redstart	LC	IV
61	<i>Saxicola torquatus</i>	Common Stonechat	LC	IV
62	<i>Monticola solitarius</i>	Blue Rock Thrush	LC	IV
63	<i>Ficedula parva</i>	Red-breasted Flycatcher	LC	IV
64	<i>Ficedula albicilla</i>	Taiga Flycatcher	LC	IV
65	<i>Eumyias thalassinus</i>	Verditer Flycatcher	LC	IV
66	<i>Cyornis tickelliae</i>	Tickell's Blue Flycatcher	LC	IV
67	<i>Culicicapa ceylonensis</i>	Grey-breasted Canary Flycatcher	LC	IV
68	<i>Motacilla flava</i>	Yellow Wagtail	LC	-
69	<i>Motacilla citreola</i>	Citrine Wagtail	LC	-
70	<i>Motacilla cinerea</i>	Grey Wagtail	LC	-
71	<i>Motacilla alba</i>	White Wagtail	LC	-
72	<i>Anthus trivialis</i>	Tree Pipit	LC	IV
73	<i>Anthus hodgsoni</i>	Olive-backed Pipit	LC	IV
74	<i>Carpodacus erythrurus</i>	Common Rosefinch	LC	IV

* Status assigned by the International Union for Conservation of Nature and Natural Resources, where - CR – Critically Endangered; EN – Endangered; LC – Least Concern; NT – Near Threatened; VU – Vulnerable

Sources: R. Grimmett, C. Inskipp & T. Inskipp, Birds of the Indian Subcontinent(2011); Salim Ali, Book of Indian Birds; IUCN Red Data List

Congregatory Species

Table 4-27 lists the congregatory species having recorded ranges that include the study area.

Table 4-27: Congregatory Species of the Study Area

Sr. No.	Scientific Name	Common Name	IUCN Status*	WPA Schedule
1	<i>Phalacrocorax niger</i>	Little Cormorant	LC	IV
2	<i>Phalacrocorax fuscicollis</i>	Indian Cormorant	LC	IV
3	<i>Phalacrocorax carbo</i>	Great Cormorant	LC	IV

* Status assigned by the International Union for Conservation of Nature and Natural Resources, where LC – Least Concern

Sources: R. Grimmett, C. Inskipp & T. Inskipp, *Birds of the Indian Subcontinent*(2011); Salim Ali, *Book of Indian Birds*; IUCN Red Data List

Endemic or Restricted Range Species

Table 4-28 lists the endemic or restricted range species with recorded ranges that include the study area.

Table 4-28: Endemic/Restricted Range Species of the Study Area

Sr. No.	Scientific Name	Common Name	Range
Birds			
1	<i>Galloperdix spadicea</i>	Red Spurfowl	Peninsular India
2	<i>Galloperdix lunulata</i>	Painted Spurfowl	Peninsular India
3	<i>Aquila hastate</i>	Indian Spotted Eagle	Northern Indian subcontinent
4	<i>Grus Antigone</i>	Sarus Crane	Northern Indian subcontinent
Mammals			
1	<i>Hipposideros fulvus</i>	Fulvous Leaf-nosed Bat	Indian subcontinent

Sources: Vivek Menon, *A Field Guide to Indian Mammals*; R. Grimmett, C. Inskipp & T. Inskipp, *Birds of the Indian Subcontinent*; Salim Ali, *Book of Indian Birds*; Indraneil Das, *Snakes & other Reptiles of India*; Romulus Whitaker & Ashok Captain, *Snakes of India*

4.14.4 Species Profile of the Study Area

4.14.4.1 Floristic Profile

Forest Type of the Study Area

According to the Champion and Seth Classification of Indian Forests, the natural vegetation of the survey area represents the following forest-type:

Type 5B/C2 [Sub-type C2 – Northern Dry Mixed Deciduous Forest of Sub-group 5B – Northern Tropical Dry Deciduous Forests]

This type occurs throughout northern India and is found in Punjab, Uttar Pradesh, Bihar, Madhya Pradesh, Chhattisgarh, Jharkhand and Odisha. The forest canopy is light but may be fairly even and continuous in the climax form, and is composed entirely of deciduous tree species. There is considerable intermixture of relatively smaller trees contributing to the canopy. There is usually a thin shrubby undergrowth, which may contain some evergreen, xerophytic species. Only one species of bamboo occurs. Grass is always present, but is usually burnt off annually and does not include any large forms.

Species typically associated with this type include trees like *Acacia spp.*, *Adina cordifolia*, *Aegle marmelos*, *Albizia spp.*, *Anogeissus latifolia*, *Bauhinia spp.*, *Bombax ceiba*, *Bridelia retusa*, *Butea monosperma*, *Cassia fistula*, *Dalbergia spp.*, *Diospyros melanoxylon*, *Emblia officinalis*, *Feronia limonia*, *Holoptelea integrifolia*, *Madhuca indica*, *Milusa tomentosa* and *Soymida febrifuga*, the bamboo *Dendrocalamus strictus*, shrubs like *Adhatoda*

vasica, Balanites aegyptica, Calotropis procera, Capparis decidua, Carissa congesta, Flacourtia indica, Grewia spp., Holarrhena pubescens, Maytenus spp. and Ziziphus spp., herbs like *Achyranthes aspera, Barleria prionitis, Cassia tora, Peristrophe bicalyculata* and *Xanthium indicum*, and grasses like *Aristida spp., Cymbopogon martini, Heteropogon contortus, Sehima nervosum* and *Themeda quadrivalvis*.

Flora Recorded in Quadrat Studies

The tables that follow present the floristic species recorded in the twelve quadrats studied

Woody Species

Table below presents the details of the woody species have been presented below,

Table 4-29: Details of Woody Species

Sr. No.	Name	Habit	% Frequency	Abundance	Density (per hectare)
1	<i>Acacia sp.</i>	Tree	8.33	1	2.08
2	<i>Acacia nilotica</i>	Tree	16.66	2	8.33
3	<i>Albizia amara</i>	Tree	25	1	6.25
4	<i>Anona squamosa</i>	Tree	8.33	1	2.08
5	<i>Azadirachta indica</i>	Tree	33.33	2.25	18.74
6	<i>Butea monosperma</i>	Tree	33.33	3	24.99
7	<i>Calotropis procera</i>	Shrub	16.66	1	66.66
8	<i>Calycopteris floribunda</i>	Climber	8.33	1	2.083
9	<i>Carissa congesta</i>	Shrub	8.33	1	33.33
10	<i>Croton bonplandianus</i>	Shrub	8.33	1	33.33
11	<i>Dalbergia sissoo</i>	Tree	8.33	1	2.083
12	<i>Dendrocalamus strictus</i>	Bamboo	16.66	1	4.166
13	<i>Diospyros melanoxylon</i>	Tree	16.66	3.5	14.58
14	<i>Embllica officinalis</i>	Tree	8.33	1	2.083
15	<i>Eucalyptus sp.</i>	Tree	16.66	1	4.166
16	<i>Euphorbia sp.</i>	Shrub	8.33	1	33.33
17	<i>Ficus benghalensis</i>	Tree	8.33	1	2.083
18	<i>Ficus glomerata</i>	Tree	8.33	1	2.083
19	<i>Ficus religiosa</i>	Tree	33.33	1	8.332
20	<i>Flacourtia indica</i>	Tree	8.33	1	2.083
21	<i>Holoptelea integrifolia</i>	Tree	41.66	1.4	14.58
22	<i>Ipomoea carnea</i>	Shrub	58.33	1.428571	333.3
23	<i>Jatropha curcas</i>	Shrub	8.33	1	33.33
24	<i>Jatropha gossypifolia</i>	Shrub	8.33	1	33.33
25	<i>Kirganellia reticulata</i>	Shrub	8.33	1	33.33
26	<i>Lantana camara</i>	Shrub	50	1.5	299.97
27	<i>Madhuca indica</i>	Tree	16.66	1	4.166
28	<i>Mangifera indica</i>	Tree	41.66	1	10.41
29	<i>Neolamarckia cadamba</i>	Tree	8.33	1	2.083
30	<i>Prosopis chilensis</i>	Tree	8.33	1	2.083
31	<i>Prosopis cineraria</i>	Tree	16.66	1	4.166
32	<i>Ricinus communis</i>	Shrub	8.33	1	33.33
33	<i>Sida acuta</i>	Shrub	8.33	1	33.33
34	<i>Syzygium cumini</i>	Tree	8.33	1	2.083
35	<i>Tectona grandis</i>	Tree	8.33	1	2.083
36	<i>Terminalia sp.</i>	Tree	8.33	1	2.083
37	<i>Vitex negundo</i>	Tree	16.66	1.5	6.249
38	<i>Woodfordia fruticosa</i>	Shrub	8.33	1	33.33
39	<i>Ziziphus mauritiana</i>	Tree	33.33	1	8.332

Sr. No.	Name	Habit	% Frequency	Abundance	Density (per hectare)
40	<i>Ziziphus oenoplia</i>	Shrub	25	1	6.249

Non-woody Species:

Table below presents the quantitative data on the non-woody floristic species recorded in the quadrats studied.

Table 4-30: Details of Non- Woody Species

Sr. No.	Name	Habit	% Frequency	Abundance	Density (per hectare)
1	<i>Achyranthes aspera</i>	Herb	8.33	1	833.33
2	<i>Ageratum conyzoides</i>	Herb	8.33	2	1666.66
3	<i>Argemone mexicana</i>	Herb	8.33	1	833.33
4	<i>Aristida sp.</i>	Grass	58.33	1.428	8333.3
5	<i>Blainvillea acmella</i>	Herb	8.33	1	833.33
6	<i>Blumea sp.</i>	Herb	8.33	1	833.33
7	<i>Canscora diffusa</i>	Herb	8.33	1	833.33
8	<i>Cassia tora</i>	Herb	16.66	1	1666.66
9	<i>Cenchrus sp.</i>	Grass	8.33	1	833.33
10	<i>Crotalaria sp.</i>	Herb	8.33	1	833.33
11	<i>Chrysopogon fulvus</i>	Grass	16.66	1	1666.66
12	<i>Cymbopogon martini</i>	Grass	16.66	1	1666.66
13	<i>Cyperus sp.</i>	Herb	8.33	1	833.33
14	<i>Desmodium sp.</i>	Herb	8.33	1	833.33
15	<i>Digitaria sp.</i>	Grass	16.66	1	1666.66
16	<i>Eragrostis sp.</i>	Grass	16.66	1	1666.66
17	<i>Eragrostis sp.</i>	Grass	25	1	2499.99
18	<i>Euphorbia sp.</i>	Herb	8.33	1	833.33
19	<i>Evolvulus alsinoides</i>	Herb	16.66	1	1666.66
20	<i>Geissaspis sp.</i>	Herb	8.33	1	833.33
21	<i>Gomphrena serrata</i>	Herb	8.33	1	833.33
22	<i>Heteropogon contortus</i>	Grass	25	1	2499.99
23	<i>Hygrophila auriculata</i>	Herb	8.33	1	833.33
24	<i>Hyptis suaveolens</i>	Herb	41.66	1	4166.65
25	<i>Indigofera linifolia</i>	Herb	8.33	1	833.33
26	<i>Lepidagathis cristata</i>	Herb	16.66	1	1666.66
27	<i>Ludwigia perennis</i>	Herb	16.66	1	1666.66
28	<i>Monochoria vaginalis</i>	Herb	8.33	1	833.33
29	<i>Ocimum canum</i>	Herb	8.33	1	833.33
30	<i>Parthenium hysterophorus</i>	Herb	8.33	1	833.33
31	<i>Peristrophe bicalyculata</i>	Herb	8.33	1	833.33
32	<i>Polygonum glabrum</i>	Herb	8.33	1	833.33
33	<i>Rungia sp.</i>	Herb	8.33	1	833.33
34	<i>Solanum surattense</i>	Herb	8.33	1	833.33
35	<i>Tridax procumbens</i>	Herb	25	1	2499.99
36	<i>Vernonia cinerea</i>	Herb	16.66	1	1666.66
37	<i>Unidentified Specimen 1</i>	Herb	8.33	1	833.33

4.14.4.2 Faunal Species

This section presents the details on the higher fauna, namely avifauna, mammals, reptiles, amphibians and fishes, associated with the study area.

Avifauna

The section that follows deals with the resident and migratory bird species associated with the study area. It also presents the quantitative data on the bird species recorded at the twelve quadrat sites during the quadrat studies.

Resident Avifauna

Table 4-31 lists the resident bird species having recorded ranges that include the study area. The species sighted in the study area during the field visit by the ecologist appear in **bold font**.

Table 4-31: Resident Birds of the Study Area

Sr. No.	Scientific Name	Common Name	IUCN Status*	WPA Schedule
1	<i>Francolinus francolinus</i>	Black Francolin	LC	IV
2	<i>Francolinus pictus</i>	Painted Francolin	LC	IV
3	<i>Francolinus pondicerianus</i>	Grey Francolin	LC	IV
4	<i>Perdica asiatica</i>	Jungle Bush Quail	LC	IV
5	<i>Galloperdix spadicea</i>	Red Spurfowl	LC	IV
6	<i>Galloperdix lunulata</i>	Painted Spurfowl	LC	IV
7	<i>Pavo cristatus</i>	Indian Peafowl	LC	I
8	<i>Tachybaptus ruficollis</i>	Little Grebe	LC	IV
9	<i>Anastomus oscitans</i>	Asian Openbill	LC	IV
10	<i>Ciconia episcopus</i>	Woolly-necked Stork	VU	IV
11	<i>Butorides striata</i>	Striated Heron	LC	IV
12	<i>Ardeola grayii</i>	Indian Pond Heron	LC	IV
13	<i>Ardea cinerea</i>	Grey Heron	LC	IV
14	<i>Ardea purpurea</i>	Purple Heron	LC	IV
15	<i>Bubulcus ibis</i>	Cattle Egret	LC	IV
16	<i>Casmerodius albus</i>	Great Egret	LC	IV
17	<i>Mesophoyx intermedia</i>	Intermediate Egret	LC	IV
18	<i>Phalacrocorax niger</i>	Little Cormorant	LC	IV
19	<i>Falco chicquera</i>	Red-necked Falcon	NT	I
20	<i>Falco jugger</i>	Laggar Falcon	NT	I
21	<i>Elanus caeruleus</i>	Black-winged Kite	LC	IV
22	<i>Milvus migrans</i>	Black Kite	LC	IV
23	<i>Haliastur indus</i>	Brahminy Kite	LC	IV
24	<i>Haliaeetus leucoryphus</i>	Pallas's Fishing Eagle	VU	IV
25	<i>Pernis ptilorhynchus</i>	Oriental Honey Buzzard	LC	IV
26	<i>Neophron percnopterus</i>	Egyptian Vulture	EN	IV
27	<i>Gyps bengalensis</i>	White-rumped Vulture	CR	I
28	<i>Gyps indicus</i>	Indian Vulture	CR	I
29	<i>Sarcogyps calvus</i>	Red-headed Vulture	CR	IV
30	<i>Circaetus gallicus</i>	Short-toed Snake Eagle	LC	IV
31	<i>Spilornis cheela</i>	Crested Serpent Eagle	LC	IV
32	<i>Accipiter badius</i>	Shikra	LC	I
33	<i>Butastur teesa</i>	White-eyed Buzzard	LC	IV
34	<i>Aquila hastata</i>	Indian Spotted Eagle	LC	IV
35	<i>Aquila rapax</i>	Tawny Eagle	LC	IV
36	<i>Aquila fasciata</i>	Bonelli's Eagle	LC	IV
37	<i>Nisaetus cirrhatu</i>	Crested Hawk Eagle	LC	IV
38	<i>Sypheotides indicus</i>	Lesser Florican	EN	I
39	<i>Amaurornis phoenicurus</i>	White-breasted Waterhen	LC	IV

Sr. No.	Scientific Name	Common Name	IUCN Status*	WPA Schedule
40	<i>Amaurornis akool</i>	Brown Crake	LC	IV
41	<i>Turnix sylvaticus</i>	Small Buttonquail	LC	IV
42	<i>Turnix tanki</i>	Yellow-legged Buttonquail	LC	IV
43	<i>Turnix suscitator</i>	Barred Buttonquail	LC	IV
44	<i>Porphyrio porphyrio</i>	Purple Swamphe	LC	IV
45	<i>Gallinula chloropus</i>	Common Moorhen	LC	IV
46	<i>Fulica atra</i>	Eurasian Coot	LC	IV
47	<i>Grus antigone</i>	Sarus Crane	VU	IV
48	<i>Burhinus (oedinemus) indicus</i>	Indian Thick-knee	LC	-
49	<i>Esacus recurvirostris</i>	Great Thick-knee	NT	-
50	<i>Hydrophasianus chirurgus</i>	Pheasant-tailed Jacana	LC	IV
51	<i>Metopidius indicus</i>	Bronze-winged Jacana	LC	IV
52	<i>Vanellus malabaricus</i>	Yellow-wattled Lapwing	LC	IV
53	<i>Vanellus indicus</i>	Red-wattled Lapwing	LC	IV
54	<i>Charadrius dubius</i>	Little Ringed Plover	LC	IV
55	<i>Cursorius coromandelicus</i>	Indian Courser	LC	-
56	<i>Glareola lactea</i>	Small Pratincole	LC	-
57	<i>Sterna aurantia</i>	River Tern	NT	-
58	<i>Sterna acuticaudata</i>	Black-bellied Tern	EN	-
59	<i>Chlidonia hybrid</i>	Whiskered Tern	LC	-
60	<i>Pterocles exustus</i>	Chestnut-bellied Sandgrouse	LC	IV
61	<i>Pterocles indicus</i>	Painted Sandgrouse	LC	IV
62	<i>Columba livia</i>	Common Pigeon	LC	-
63	<i>Streptopelia decaocto</i>	Eurasian Collared Dove	LC	IV
64	<i>Streptopelia tranquebarica</i>	Red Collared Dove	LC	IV
65	<i>Stigmatopelia chinensis</i>	Spotted Dove	LC	IV
66	<i>Stigmatopelia senegalensis</i>	Laughing Dove	LC	IV
67	<i>Treron phoenicopterus</i>	Yellow-footed Green Pigeon	LC	IV
68	<i>Psittacula eupatria</i>	Alexandrine Parakeet	LC	IV
69	<i>Psittacula krameri</i>	Rose-ringed Parakeet	LC	IV
70	<i>Psittacula cyanocephala</i>	Plum-headed Parakeet	LC	IV
71	<i>Hierococcyx varius</i>	Common Hawk Cuckoo	LC	IV
72	<i>Eudynamis scolopaceus</i>	Asian Koel	LC	IV
73	<i>Taccocua leschenaultia</i>	Sirkeer Malkoha	LC	IV
74	<i>Centropus (sinensis) parroti</i>	Southern Coucal	LC	IV
75	<i>Tyto alba</i>	Barn Owl	LC	IV
76	<i>Otus bakkamoena</i>	Indian Scops Owl	LC	IV
77	<i>Glaucidium radiatum</i>	Jungle Owlet	LC	IV
78	<i>Athene brama</i>	Spotted Owlet	LC	IV
79	<i>Bubo bubo</i>	Eurasian Eagle Owl	LC	IV
80	<i>Bubo coromandus</i>	Dusky Eagle Owl	LC	IV
81	<i>Ketupa zeylonensis</i>	Brown Fish Owl	LC	IV
82	<i>Caprimulgus indicus</i>	Jungle Nightjar	LC	IV
83	<i>Caprimulgus macrurus</i>	Large-tailed Nightjar	LC	IV
84	<i>Caprimulgus asiaticus</i>	Indian Nightjar	LC	IV
85	<i>Caprimulgus affinis</i>	Savanna Nightjar	LC	IV
86	<i>Cypsiurus balasensis</i>	Asian Palm Swift	LC	-
87	<i>Hemiprocne coronata</i>	Crested Tree Swift	LC	-
88	<i>Apus affinis</i>	Little Swift	LC	-
89	<i>Upupa epops</i>	Common Hoopoe	LC	IV
90	<i>Coracias benghalensis</i>	Indian Roller	LC	IV
91	<i>Pelargopsis capensis</i>	Stork-billed Kingfisher	LC	IV
92	<i>Halcyon smyrnensis</i>	White-throated Kingfisher	LC	IV
93	<i>Alcedo atthis</i>	Common Kingfisher	LC	IV

Sr. No.	Scientific Name	Common Name	IUCN Status*	WPA Schedule
94	<i>Ceryle rudis</i>	Pied Kingfisher	LC	IV
95	<i>Merops orientalis</i>	Green Bee-eater	LC	-
96	<i>Ocyrceros birostris</i>	Indian Grey Hornbill	LC	-
97	<i>Megalaima zeylanica</i>	Brown-headed Barbet	LC	IV
98	<i>Megalaima haemacaphala</i>	Coppersmith Barbet	LC	IV
99	<i>Dendrocopos nanus</i>	Brown-capped Pygmy Woodpecker	LC	IV
100	<i>Dendrocopos mahrattensis</i>	Yellow-crowned Woodpecker	LC	IV
101	<i>Dinopium benghalense</i>	Lesser Goldenback	LC	IV
102	<i>Chrysocolaptes festivus</i>	White-naped Woodpecker	LC	IV
103	<i>Tephrodornis pondicerianus</i>	Common Woodshrike	LC	IV
104	<i>Coracina macei</i>	Large Cuckooshrike	LC	IV
105	<i>Aegithina tiphia</i>	Common Iora	LC	IV
106	<i>Pericrocotus cinnamomeus</i>	Small Minivet	LC	IV
107	<i>Lanius vittatus</i>	Bay-backed Shrike	LC	-
108	<i>Lanius schach</i>	Long-tailed Shrike	LC	-
109	<i>Dicrurus macrocercus</i>	Black Drongo	LC	IV
110	<i>Dicrurus caerulescens</i>	White-bellied Drongo	LC	IV
111	<i>Oriolus (oriolus) kundoo</i>	Indian Golden Oriole	LC	IV
112	<i>Oriolus xanthornis</i>	Black-hooded Oriole	LC	IV
113	<i>Rhipidura aureola</i>	White-browed Fantail	LC	-
114	<i>Hypothymis azurea</i>	Black-naped Monarch	LC	-
115	<i>Dendrocitta vagabunda</i>	Rufous Treepie	LC	IV
116	<i>Corvus (macrorhynchos) culminatus</i>	Indian Jungle Crow	LC	IV
117	<i>Corvus splendens</i>	House Crow	LC	V
118	<i>Riparia paludicola</i>	Plain Martin	LC	-
119	<i>Ptyonoprogne concolor</i>	Dusky Crag Martin	LC	-
120	<i>Petrochelidon fluvicola</i>	Streak-throated Swallow	LC	-
121	<i>Hirundo smithii</i>	Wire-tailed Swallow	LC	-
122	<i>Cecropis daurica</i>	Red-rumped Swallow	LC	-
123	<i>Mirafra erythroptera</i>	Indian Bushlark	LC	IV
124	<i>Ammomanes phoenicura</i>	Rufous-tailed Lark	LC	IV
125	<i>Eremopteryx griseus</i>	Ashy-crowned Sparrow Lark	LC	IV
126	<i>Alauda gulgula</i>	Oriental Skylark	LC	IV
127	<i>Pycnonotus cafer</i>	Red-vented Bulbul	LC	IV
128	<i>Prinia hodgsonii</i>	Grey-breasted Prinia	LC	-
129	<i>Prinia sylvatica</i>	Jungle Prinia	LC	-
130	<i>Prinia socialis</i>	Ashy Prinia	LC	-
131	<i>Prinia inornata</i>	Plain Prinia	LC	-
132	<i>Cisticola juncidis</i>	Zitting Cisticola	LC	-
133	<i>Orthotomus sutorius</i>	Common Tailorbird	LC	-
134	<i>Dumetia hyperythra</i>	Tawny-bellied Babbler	LC	IV
135	<i>Turdoides caudata</i>	Common Babbler	LC	IV
136	<i>Turdoides malcolmi</i>	Large Grey Babbler	LC	IV
137	<i>Turdoides striata</i>	Jungle Babbler	LC	IV
138	<i>Chrysomma sinense</i>	Yellow-eyed Babbler	LC	IV
139	<i>Zosterops palpebrosus</i>	Oriental White-eye	LC	IV
140	<i>Sitta castanea</i>	Indian Nuthatch	LC	IV
141	<i>Salpornis spilonotus</i>	Spotted Creeper	LC	IV
142	<i>Acridotheres tristis</i>	Common Myna	LC	IV
143	<i>Gracupica contra</i>	Asian Pied Starling	LC	IV
144	<i>Sturnia malabarica</i>	Chestnut-tailed Starling	LC	IV
145	<i>Sturnia pagodarum</i>	Brahminy Starling	LC	IV

Sr. No.	Scientific Name	Common Name	IUCN Status*	WPA Schedule
146	<i>Copsychus saularis</i>	Oriental Magpie Robin	LC	IV
147	<i>Saxicoloides fulicatus</i>	Indian Robin	LC	IV
148	<i>Saxicola caprata</i>	Pied Bushchat	LC	IV
149	<i>Chloropsis jerdoni</i>	Jerdon's Leafbird	LC	IV
150	<i>Dicaeum agile</i>	Thick-billed Flowerpecker	LC	IV
151	<i>Dicaeum erythrorhynchos</i>	Pale-billed Flowerpecker	LC	IV
152	<i>Cinnyris asiaticus</i>	Purple Sunbird	LC	IV
153	<i>Passer domesticus</i>	House Sparrow	LC	-
154	<i>Gymnoris xanthicollis</i>	Chestnut-shouldered Petronia	LC	-
155	<i>Ploceus philippinus</i>	Baya Weaver	LC	IV
156	<i>Euodice malabarica</i>	Indian Silverbill	LC	IV
157	<i>Amandava amandava</i>	Red Avadavat	LC	IV
158	<i>Lonchura punctulata</i>	Scaly-breasted Munia	LC	IV
159	<i>Motacilla maderaspatensis</i>	White-browed Wagtail	LC	-
160	<i>Anthus rufulus</i>	Paddyfield Pipit	LC	IV

* Status assigned by the International Union for Conservation of Nature and Natural Resources, where - CR – Critically Endangered; EN – Endangered; LC – Least Concern; NT – Near Threatened; VU – Vulnerable

Sources: R. Grimmett, C. Inskipp & T. Inskipp, *Birds of the Indian Subcontinent*; Salim Ali, *Book of Indian Birds*; IUCN Red Data List

Migratory Avifauna: The migratory birds having recorded ranges that include the study-area are listed in **Table 4-26**.

Avifauna Recorded at Quadrat Sites

Table 4-32 gives the quantitative data on the bird species recorded at the twelve quadrat sites.

Table 4-32: Birds of the Quadrat Sites

Sr. No.	Scientific Name	Common Name	Status	% Frequency
1	<i>Francolinus pondicerianus</i>	Grey Francolin	Resident	8.333333
2	<i>Pseudibis papillosa</i>	Red-naped Ibis	Migratory	8.333333
3	<i>Ardeola grayii</i>	Indian Pond Heron	Resident	8.333333
4	<i>Bubulcus ibis</i>	Cattle Egret	Resident	16.66667
5	<i>Falco tinnunculus</i>	Common Kestrel	Migratory	8.333333
6	<i>Milvus migrans</i>	Black Kite	Resident	8.333333
7	<i>Accipiter badius</i>	Shikra	Resident	8.333333
8	<i>Vanellus indicus</i>	Red-wattled Lapwing	Resident	8.333333
9	<i>Actitis hypoleucos</i>	Common Sandpiper	Migratory	8.333333
10	<i>Columba livia</i>	Common Pigeon	Resident	8.333333
11	<i>Stigmatopelia senegalensis</i>	Laughing Dove	Resident	16.66667
12	<i>Psittacula krameri</i>	Rose-ringed Parakeet	Resident	8.333333
13	<i>Coracias bengalensis</i>	Indian Roller	Resident	16.66667
14	<i>Halcyon smyrnensis</i>	White-throated Kingfisher	Resident	8.333333
15	<i>Ceryle rudis</i>	Pied Kingfisher	Resident	8.333333
16	<i>Merops orientalis</i>	Green Bee-eater	Resident	8.333333
17	<i>Lanius schach</i>	Long-tailed Shrike	Resident	8.333333
18	<i>Dicrurus macrocercus</i>	Black Drongo	Resident	16.66667
19	<i>Corvus (macrorhynchos) culminatus</i>	Indian Jungle Crow	Resident	8.333333
20	<i>Corvus splendens</i>	House Crow	Resident	8.333333
21	<i>Cecropis daurica</i>	Red-rumped Swallow	Resident	16.66667
22	<i>Calandrella brachydactyla</i>	Greater Short-toed Lark	Migratory	16.66667
23	<i>Eremopteryx griseus</i>	Ashy-crowned Sparrow Lark	Resident	8.333333

Sr. No.	Scientific Name	Common Name	Status	% Frequency
24	<i>Pycnonotus cafer</i>	Red-vented Bulbul	Resident	8.333333
25	<i>Prinia sylvatica</i>	Jungle Prinia	Resident	8.333333
26	<i>Turdoides strita</i>	Jungle Babbler	Resident	25
27	<i>Acridotheres tristis</i>	Common Myna	Resident	16.66667
28	<i>Saxicoloides fulicatus</i>	Indian Robin	Resident	8.333333
29	<i>Saxicola torquata</i>	Common Stonechat	Migratory	8.333333
30	<i>Saxicola caprata</i>	Pied Bushchat	Resident	8.333333
31	<i>Cinnyris asiatica</i>	Purple Sunbird	Resident	8.333333
32	<i>Passer domesticus</i>	House Sparrow	Resident	8.333333
33	<i>Motacilla maderaspatensis</i>	White-browed Wagtail	Resident	8.333333

Other Higher Fauna

The higher fauna, other than avifauna, associated with the study area is listed in the tables that follow. Of the species listed in the tables that follow, the ones sighted in the study area during the field visit by the ecologist appear in **bold font**.

Mammals

Table 4-33 lists the mammalian species having recorded ranges that include the study area.

Table 4-33: Mammals of the Study Area

Sr. No.	Scientific Name	Common Name	IUCN Status*	WPA Schedule
1	<i>Macaca mulatta</i>	Rhesus Macaque	LC	II
2	<i>Semnopithecus entellus</i>	Hanuman Langur	LC	II
3	<i>Axis axis</i>	Spotted Deer	LC	III
4	<i>Boselaphus tragocamelus</i>	Nilgai	LC	III
5	<i>Antelope cervicapra</i>	Blackbuck	NT	I
6	<i>Tetracerus quadricornis</i>	Four-horned Antelope	VU	I
7	<i>Gazella bennettii</i>	Indian Gazelle	LC	I
8	<i>Sus scrofa</i>	Wild Pig	LC	III
9	<i>Melursus ursinus</i>	Sloth Bear	LC	I
10	<i>Canis aureus</i>	Jackal	LC	II
11	<i>Hyaena hyaena</i>	Striped Hyena	NT	III
12	<i>Canis lupus</i>	Wolf	LC	I
13	<i>Vulpes bengalensis</i>	Indian Fox	LC	II
14	<i>Panthera pardus</i>	Common Leopard	NT	I
15	<i>Felis chaus</i>	Jungle Cat	LC	II
16	<i>Prionailurus bengalensis</i>	Leopard Cat	LC	I
17	<i>Mellivora capensis</i>	Honey Badger	LC	I
18	<i>Paradoxurus hermaphroditus</i>	Common Palm Civet	LC	II
19	<i>Herpestes edwardsii</i>	Grey Mongoose	LC	II
20	<i>Herpestes javanicus</i>	Small Indian Mongoose	LC	II
21	<i>Manis crassicaudata</i>	Indian Pangolin	EN	I
22	<i>Lepus nigricollis</i>	Indian Hare	LC	IV
23	<i>Suncus murinus</i>	House Shrew	LC	-
24	<i>Suncus etruscus</i>	Pygmy Shrew	LC	-
25	<i>Hystrix indica</i>	Indian Porcupine	LC	IV
26	<i>Funambulus pennantii</i>	Five-striped Palm Squirrel	LC	IV
27	<i>Bandicota indica</i>	Large Bandicoot-rat	LC	V
28	<i>Bandicota bengalensis</i>	Lesser Bandicoot-rat	LC	V
29	<i>Tatera indica</i>	Indian Gerbil	LC	V
30	<i>Rattus rattus</i>	House Rat	LC	V

Sr. No.	Scientific Name	Common Name	IUCN Status*	WPA Schedule
31	<i>Millardia meltada</i>	Soft-furred Field Rat	LC	V
32	<i>Cremnomys blanfordi</i>	White-tailed Wood Rat	LC	V
33	<i>Golunda ellioti</i>	Indian Bush Rat	LC	V
34	<i>Vandeleuria oleracea</i>	Long-tailed Tree Mouse	LC	V
35	<i>Mus musculus</i>	House Mouse	LC	V
36	<i>Mus booduga</i>	Little Indian Field Mouse	LC	V
37	<i>Mus platythrix</i>	Spiny Field Mouse	LC	V
38	<i>Mus terricolor</i>	Pygmy Field Mouse	LC	V
39	<i>Mus saxicola</i>	Elliot's Brown Spiny Mouse	LC	V
40	<i>Pteropus giganteus</i>	Indian Flying Fox	LC	V
41	<i>Rousettus leschenaultia</i>	Fulvous Fruit Bat	LC	V
42	<i>Cynopterus sphinx</i>	Short-nosed Fruit Bat	LC	V
43	<i>Rhinopoma microphyllum</i>	Greater Mouse-tailed Bat	LC	-
44	<i>Taphozous melanopogon</i>	Black-bearded Tomb Bat	LC	-
45	<i>Taphozous longimanus</i>	Long-winged Tomb Bat	LC	-
46	<i>Taphozous perforates</i>	Egyptian Tomb Bat	LC	-
47	<i>Rhinolophus Lepidus</i>	Blyth's Horseshoe Bat	LC	-
48	<i>Hipposideros fulvus</i>	Fulvous Leaf-nosed Bat	LC	-
49	<i>Megaderma lyra</i>	Greater False Vampire	LC	-
50	<i>Myotis formosus</i>	Hodgson's Bat	LC	-
51	<i>Myotis blythii</i>	Lesser Mouse-eared Bat	LC	-
52	<i>Scotophilus heathii</i>	Asiatic Greater Yellow House Bat	LC	-
53	<i>Pipistrellus pipistrellus</i>	Indian Pipistrelle	LC	-
54	<i>Pipistrellus tenuis</i>	Indian Pygmy Bat	LC	-
55	<i>Pipistrellus javanicus</i>	Javan Pipistrelle	LC	-
56	<i>Pipistrellus affinis</i>	Chocolate Pipistrelle	LC	-
57	<i>Scotoecus pallidus</i>	Yellow Desert Bat	LC	-

* Status assigned by the International Union for Conservation of Nature and Natural Resources, where - EN – Endangered; LC – Least Concern; NT – Near Threatened; VU – Vulnerable

Sources: Vivek Menon, A Field Guide to Indian Mammals (2014); IUCN Red Data List

Reptiles

Table 4-34 lists the reptilian species having recorded ranges that include the study area.

Table 4-34: Reptiles of the Study Area

Sr. No.	Scientific Name	Common Name	IUCN Status*	WPA Schedule
1	<i>Ramphotyphlops braminus</i>	Common Worm Snake	NA	IV
2	<i>Gryptotyphlops acutus</i>	Beaked Worm Snake	NA	IV
3	<i>Python molurus molurus</i>	Indian Python	NA	I
4	<i>Gongylophis conicus</i>	Common Sand Boa	NA	IV
5	<i>Eryx johnii</i>	Red Sand Boa	NA	IV
6	<i>Coelognathus helena helena</i>	Indian Trinket Snake	NA	IV
7	<i>Ptyas mucosa</i>	Indian Rat Snake	NA	II
8	<i>Argyrogena fasciolata</i>	Banded Racer	NA	IV
9	<i>Oligodon taeniolatus</i>	Streaked Kukri Snake	LC	IV
10	<i>Oligodon arnensis</i>	Banded Kukri Snake	NA	IV
11	<i>Lycodon striatus</i>	Barred Wolf Snake	NA	IV
12	<i>Lycodon aulicus</i>	Common Wolf Snake	LC	IV
13	<i>Sibynophis subpunctatus</i>	Common Black-headed Snake	NA	IV
14	<i>Xenochrophis piscator</i>	Checkered Keelback Water	NA	II

Sr. No.	Scientific Name	Common Name	IUCN Status*	WPA Schedule
		Snake		
15	<i>Amphiesma stolatum</i>	Buff-striped Keelback	NA	IV
16	<i>Macropisthodon plumbicolor</i>	-	NA	IV
17	<i>Boiga trigonata</i>	Indian Gamma Snake	LC	IV
18	<i>Ahaetulla nasuta</i>	Common Vine Snake	NA	IV
19	<i>Bungarus caeruleus</i>	Indian Krait	NA	IV
20	<i>Naja naja</i>	Spectacled Cobra	NA	II
21	<i>Daboia russelii</i>	Russell's Viper	LC	II
22	<i>Echis carinatus</i>	Saw-scaled Viper	NA	IV
23	<i>Calotes versicolor</i>	Indian Garden Lizard	NA	-
24	<i>Sitana ponticeriana</i>	Fan-throated Lizard	LC	-
25	<i>Hemidactylus brookii</i>	Brooke's House Gecko	NA	-
26	<i>Hemidactylus flaviviridis</i>	Yellow-green House Gecko	NA	-
27	<i>Ophisops leschenaultii</i>	Leschenault's Lacerta	NA	-
28	<i>Lygosoma punctata</i>	Spotted Supple Skink	NA	-
29	<i>Mabuya carinata</i>	Keeled Grass Skink	LC	-
30	<i>Mabuya macularia</i>	Bronze Grass Skink	NA	-
31	<i>Varanus bengalensis</i>	Bengal Monitor	LC	I
32	<i>Geoclemys hamiltonii</i>	Spotted Pond Turtle	NA	I
33	<i>Kachuga kachuga</i>	Painted Roofed Turtle	NA	-
34	<i>Melanochelys trijuga</i>	Indian Black Turtle	NT	-
35	<i>Pangshura tecta</i>	Indian Roofed Turtle	LC	-
36	<i>Pangshura tentoria</i>	Indian Tent Turtle	LC	-
37	<i>Aspideretes gangeticus</i>	Indian Softshell Turtle	VU	I
38	<i>Aspideretes hurum</i>	Indian Peacock Softshell Turtle	VU	I
39	<i>Chitra indica</i>	Narrow-headed Softshell Turtle	EN	-
40	<i>Lissemys punctata</i>	Indian Flapshell Turtle	LC	I

* Status assigned by the International Union for Conservation of Nature and Natural Resources, where - EN – Endangered; LC – Least Concern; NA – Not Assessed; NT – Near-threatened; VU – Vulnerable

Sources: Indraneil Das, Snakes & other Reptiles of India; Romulus Whitaker & Ashok Captain, Snakes of India; IUCN Red Data List

Amphibians

Table 4-35 lists the amphibian species having recorded ranges that include the study area or waterbodies in the catchments of which the study area is situated.

Table 4-35: Amphibians of the Study Area

Sr. No.	Scientific Name	Common Name	IUCN Status*	WPA Schedule
1	<i>Duttaphrynus melanostichus</i>	Asian Common Toad	LC	-
2	<i>Duttaphrynus scaber</i>	Ferguson's Toad	LC	-
3	<i>Euphlyctis cyanophlyctis</i>	-	LC	IV
4	<i>Euphlyctis hexadactylus</i>	Indian Green Frog	LC	IV
5	<i>Fejervarya limnocharys</i>	Asian Grass Frog	LC	IV
6	<i>Hoplobatrachus crassus</i>	Jerdon's Bullfrog	LC	IV
7	<i>Hoplobatrachus tigerinus</i>	Indian Bullfrog	LC	IV
8	<i>Sphaerotheca breviceps</i>	-	LC	IV

* Status assigned by the International Union for Conservation of Nature and Natural Resources, where - LC – Least Concern

Sources: R. J. Ranjit Daniels, Amphibians of Peninsular India (2005); Bed Prakash Tiwari et al (2013), Role of Amphibians in Healthcare of Gond Tribals of Madhya Pradesh, Indian Journal of Life Sciences 3(1):55-56; IUCN Red Data List

Fishes

Table 4-36 lists the fish species having recorded ranges that include the study area or waterbodies in the catchments of which the study area is situated.

Table 4-36: Fishes of the Study Area

Sr. No.	Scientific Name	Common Name	IUCN Status*	WPA Schedule
1	<i>Anguilla bengalensis</i>	Indian Long-fin Eel	NT	-
2	<i>Gudusia chapra</i>	Indian River Shad	LC	-
3	<i>Gonialosa manmina</i>	Ganges River Gizzard Shad	LC	-
4	<i>Setipinna phasa</i>	Gangetic Hairfin Anchovy	LC	-
5	<i>Catla catla</i>	Catla	NA	-
6	<i>Cirrhinus mrigala</i>	Mrigal	LC	-
7	<i>Cirrhinus reba</i>	Reba Carp	LC	-
8	<i>Labeo angra</i>	Angra Labeo	LC	-
9	<i>Labeo calbasu</i>	Kalbasu	LC	-
10	<i>Puntius conchonus</i>	Rosy Barb	LC	-
11	<i>Puntius sophore</i>	Spotfin Barb	LC	-
12	<i>Puntius ticto</i>	Ticto Barb	LC	-
13	<i>Puntius vittatus</i>	Kooli Barb	LC	-
14	<i>Tor khudree</i>	Yellow Mahseer	EN	-
15	<i>Tor tor</i>	Tor Mahseer	NT	-
16	<i>Chela laubuca</i>	Indian Glass Barb	NA	-
17	<i>Barilius bendelisis</i>	Hamilton's Baril	NA	-
18	<i>Brachydanio rerio</i>	Zebra Danio	NA	-
19	<i>Danio aequipinnatus</i>	Blue Danio	LC	-
20	<i>Esomus danricus</i>	Glass Barb	LC	-
21	<i>Parluciosoma daniconius</i>	Blackline Rasbora	LC	-
22	<i>Nemacheilus denisoni</i>	Day's Loach	LC	-
23	<i>Botia lohachata</i>	Reticulated Loach	NA	-
24	<i>Aorichthys seenghala</i>	Giant River Catfish	NA	-
25	<i>Mystus cavasius</i>	Gangetic Mystus	LC	-
26	<i>Mystus gulio</i>	Long-whiskered Catfish	LC	-
27	<i>Mystus vittatus</i>	Striped Dwarf Catfish	LC	-
28	<i>Rita rita</i>	Rita	LC	-
29	<i>Ompok bimaculatus</i>	Indian Butter Catfish	NT	-
30	<i>Wallago attu</i>	Boal	NT	-
31	<i>Eutropiichthys vacha</i>	Batchwa Vacha	LC	-
32	<i>Pangasius pangasius</i>	Pungas	LC	-
33	<i>Clarias batrachus</i>	Magur	LC	-
34	<i>Heteropneustes fossilis</i>	Stinging Catfish	LC	-
35	<i>Hyporhamphus limbatus</i>	Congaturi Halfbeak	LC	-
36	<i>Oryzias melastigma</i>	Ricefish	LC	-
37	<i>Aplocheilus panchax</i>	Panchax Minnow	LC	-
38	<i>Pseudambassis ranga</i>	Glassfish	LC	-
39	<i>Nandus nandus</i>	Mottled Nandus	LC	-
40	<i>Glossogobius giurus</i>	Goby	NA	-
41	<i>Anabas testudineus</i>	Climbing Perch	DD	-
42	<i>Macropodus cupanus</i>	Indian Paradise Fish	LC	-
43	<i>Channa marulius</i>	Giant Snakehead	LC	-
44	<i>Channa orientalis</i>	Asiatic Snakehead	NA	-
45	<i>Channa punctatus</i>	Spotted Snakehead	NA	-
46	<i>Channa striatus</i>	Striped Snakehead	NA	-
47	<i>Mastacembelus</i>	Tyre-track Spiny Eel	LC	-

Sr. No.	Scientific Name	Common Name	IUCN Status*	WPA Schedule
	<i>armatus</i>			

* Status assigned by the International Union for Conservation of Nature and Natural Resources, where – DD – Data Deficient; EN – Endangered; LC – Least Concern; NA – Not Assessed; NT – Near Threatened

Sources: R. J. Ranjit Daniels, Freshwater Fishes of Peninsular India (2002); IUCN Red Data List

Invasive Alien Species

Table 4-37 lists the invasive alien species recorded in the study area.

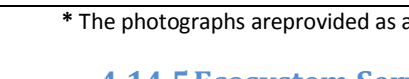
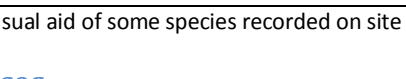
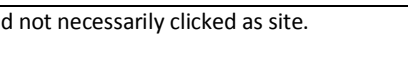
Table 4-37: Invasive Alien Species of the Study Area

Sr. No.	Scientific Name	Common Name	Habit / Class
Floristic Species			
1	<i>Ageratum conyzoides</i>	Tropical Whiteweed	Herb
2	<i>Lantana camara</i>	Lantana	Shrub
3	<i>Leucaena latisiliqua</i>	Leucaena	Tree
4	<i>Parthenium hysterophorus</i>	Parthenium	Herb
5	<i>Prosopis chilensis</i>	Mesquite	Tree
6	<i>Ricinus communis</i>	Castor	Shrub
Faunal Species			
1	<i>Columba livia</i>	Common Pigeon	Bird

Source: www.issg.org (IUCN Global Invasive Species Database)

		
<i>Diospyros melanoxylon</i>	<i>Flacourtia indica</i>	<i>Anona squamosa</i>
		
<i>Holoptelea integrifolia</i>	<i>Carissa congesta</i>	<i>Azadirachta indica</i>
		

<i>Ipomoea carnea</i>	<i>Jatropha curcas</i>	<i>Calotropis procera</i>
		
<i>Evolvulus alsinoides</i>	<i>Cassia tora</i>	<i>Solanum surattense</i>
		
<i>Tridax procumbens</i>	<i>Cyperus sp.</i>	<i>Hygrophila auriculata</i>
		
<i>Passer domesticus</i> (House Sparrow)	<i>Ardeola grayii</i> (Indian Pond Heron)	<i>Psittacula krameri</i> (Rose-ringed Parakeet)
		
<i>Halcyon smyrnensis</i> (White-throated Kingfisher)	<i>Motacilla maderaspatensis</i> (White-browed Wagtail)	<i>Eremopteryx griseus</i> (Ashy-crowned Sparrow Lark)
		

<i>Merops orientalis</i> (Green Bee-eater)	<i>Cinnyris asiaticus</i> (Purple Sunbird)	<i>Saxicola torquata</i> (Common Stonechat)
		
<i>Dicrurus macrocercus</i> (Black Drongo)	<i>Acridotheres tristis</i> (Common Myna)	<i>Accipiter badius</i> (Shikra)
		
<i>Pycnonotus cafer</i> (Red-vented Bulbul)	<i>Cecropis daurica</i> (Red-rumped Swallow)	<i>Lanius schach</i> (Long-tailed Shrike)
		

* The photographs are provided as a visual aid of some species recorded on site and not necessarily clicked at site.

4.14.5 Ecosystem Services

4.14.5.1 Provisioning Services

The communities living in and around the study area tap the natural water-channels and water-storages of the study area to obtain water for their domestic and irrigation needs. They also harvest wild foods, traditional medicines, crops, fodder, fuel-wood, fibres, fertilizer and timber from the study area. Thus, the natural physical features of the study area, as well as, the plants and animals of the study area, provide a range of materials that are directly utilized by the local communities.

4.14.5.2 Regulating Services

The natural functioning of the ecosystems in the study-area, and the very physical presence of their components, lead to the following processes that benefit the communities living in and around the study-area:

Ground Water Recharge

The natural water-flow of the study-area recharges the wells, ponds and lakes of the area, providing for the freshwater needs of the local populace. The natural vegetation cover also helps slow down the surface run-off, thereby increasing the percolation of water into sub-surface layers and aiding the recharge of the groundwater in the area. Thus, the survey-area contributes to the regulation of the water-regime of the area.

Surface Water Purification

The natural vegetation cover of the study-area filters the surface and sub-surface run-off, while the life-forms inhabiting the water-bodies of the area, including producers, consumers and detritus feeders, recycle the organic waste in the water. Thus, the survey-area contributes to the regulation of the water-quality of the area.

Erosion Control

The natural vegetation of the study-area reduces the impact of precipitation on the soil-surface, while the natural ground-cover it creates slows down the surface run-off, thereby reducing erosion of the soil.

Pollination

The natural vegetation of the study-area creates habitats for a range of fauna that include pollinator-species like bugs, bees, butterflies, moths, birds and bats. Thus, the survey-area provides pollinator-services to natural as well as agricultural plants in the area.

4.14.5.3 Supporting Services

The natural functioning of the ecosystems of the study-area lead to the following processes that create or maintain the basic natural resources, like soil-nutrients and photosynthetic production, that support human life-sustaining activities like farming, food-gathering, hunting, cooking and grazing of livestock.

Nutrient Capture and Recycling

The flora and fauna of the study-area, through the countless food-chains they constitute, capture, transfer and recycle a range of nutrients in the environment. Such nutrients primarily include the carbon, nitrogen and oxygen, and their natural compounds, in the environment of the area. Biomass generated by the study-area and transferred by water and wind helps recharge the soil-fertility in the surrounding area. Thus, the natural vegetation and topography of the study-area contribute to the natural productivity of area.

Primary Production

The photosynthetic organisms of the study-area act as primary producers, creating food-reserves that support the fauna of the area. This primary production, amongst other food-materials, includes grass blades and leaves consumed by grazing and browsing animals like grasshoppers, bugs, beetles, snails, goats and sheep, flowers, pollen and flower-nectar consumed by butterflies, moths, bees and sunbirds, seeds consumed by seed and grain-eaters like ants, sparrows, larks, pipits and mice, and fruits consumed by birds and bats.

4.14.6 Designated Areas

There are no legally protected areas within the study area. The nearest protected area is a Reserve Forest situated about 2 km due south of the study area. There is no Important Bird Areas or Ramsar Site within 10 km of the study area.

4.14.7 Inferences

The study area represents a fairly degraded tract of dry deciduous forest, which has become reduced to a tropical grassland, maintained anthropogenically, through intense grazing pressure and annual burning.

The area provides habitats to a range of floristic and faunal species associated with deciduous scrub and stony grasslands. Though the area is part of the recorded ranges of some globally threatened and several migratory species, it is unlikely to be critical to the survival of any of these species, and thus, is unlikely to be a critical habitat. It is, however, situated in the catchment of the Ganga River, and thus, has a bearing on the ecological health of the massive river-system and the thousands of species associated with it.

The area seems to be providing a small but limited range of ecosystem services to the communities living in and around it, chiefly in terms of natural sources of water used for domestic purposes and irrigation, as also, pastureland for the local communities to graze their livestock.

5. SOCIO-ECONOMIC PROFILE AND STAKEHOLDER CONSULTATION

This section presents the baseline status of the socio-economic aspects in the Project area and the details of the stakeholder consultations carried out for the project.

5.1 Approach and Methodology

The scope of work as detailed out in the ToR has been the guiding criteria for undertaking this Social Assessment study. The project area is spread across five villages, namely, Badwar, Barsaita Desh, Barsaita Desh, Etar Pahad and Ramnagar Pahad under Gurh Tehsil, Rewa District, Madhya Pradesh.

A structured questionnaire was prepared to undertake the focus group discussions and socio-economic (census) survey of the project affected families (private land owners). Besides the affected families, other stakeholder groups were also consulted to understand the concerns, issues and interest that they might have on the project. Consultations were also undertaken for randomly selected villages that fall within 5 km of the project area.

The approach that was adopted to conduct the Social Assessment study has been based on the following elements:

5.1.1 Review of Secondary Information

A detailed review and assessment of the secondary information for the district was undertaken. Review of documents was undertaken in order to attain a comprehensive understanding of the area in relation to its socio-economic characteristics. The following documents were assessed to supplement the desk based research,

- Primary Census Abstract (PCA) 2001;
- Primary Census Abstract (PCA) 2011;
- Village Directory (VD) 2001;
- District Census Handbook of Rewa, 2011;
- Brief Industrial Profile of Rewa District, Micro, Small and Medium Enterprises (MSME), Government of India;
- Education Statistics of Districts in Madhya Pradesh, 2013-14; and
- Published reports, papers and articles available in the public domain on agriculture, health, local governance in the area.

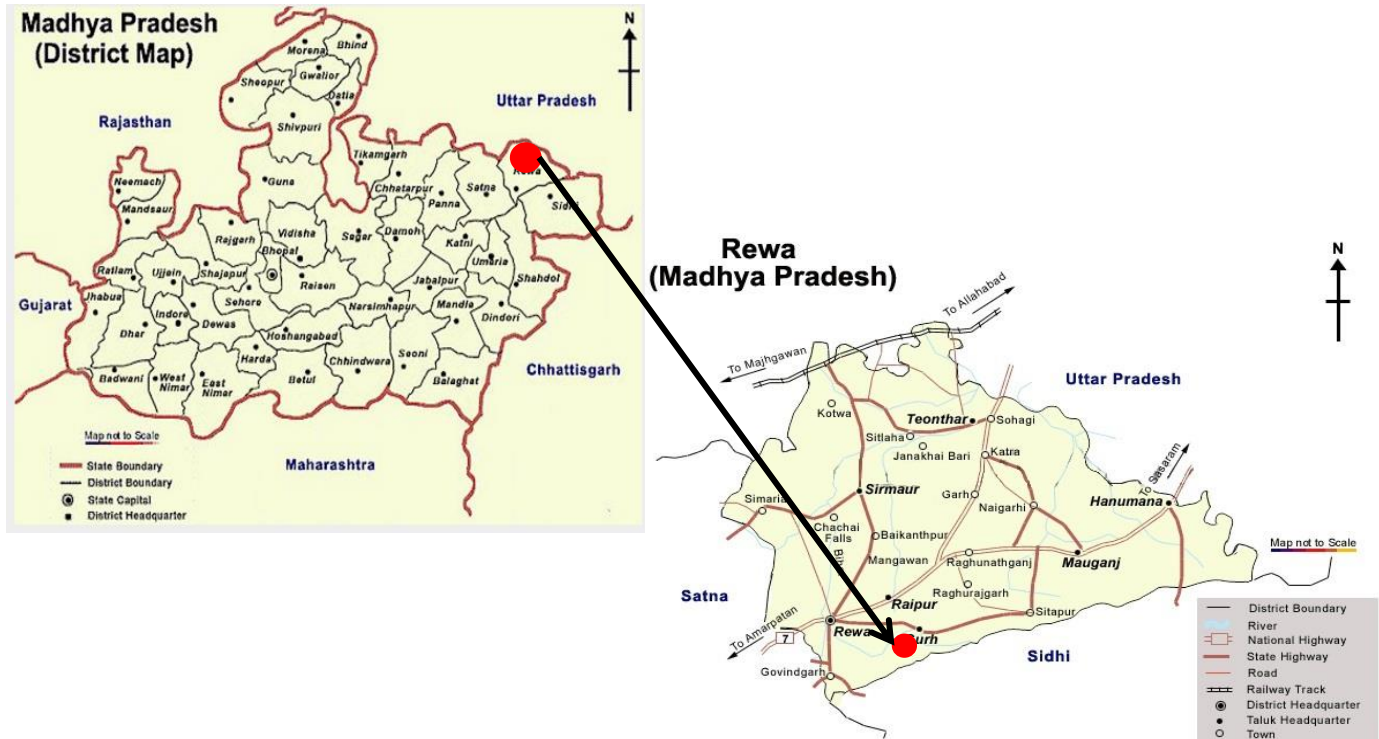
5.1.2 Primary Data Collection, Stakeholder Identification and Consultation

Primary data (for Phase I) on socio-economic status was collected from project affected families and local community belonging to the project area villages where the proposed project is to be located. Apart from the baseline information, stakeholders were also broadly identified and consulted during this activity to outline their concerns and interest in the project. Interviews were conducted with local influential people, project affected families and site representatives of the Project Proponent.

5.2 Project Affected Villages

The project area falls within the administrative limits of Gurh Tehsil, Rewa District. The project location has been presented in **Figure 5-1**,

Figure 5-1: Location Map for the Proposed Project



The project is located approximately 30 km east of Rewa town. The list of villages falling within the project area (also known as the 'study area') have been defined as 'project affected villages' which have been provided below in **Table 5-1**;

Table 5-1: List of Project Affected Villages

S.No.	District	Tehsil	Village Name	Distance	Direction
1	Rewa	Gurh	Badwar	1000m	North-West
2			Barsaita Desh	1200m	North
3			Barsaita Pahad	1200m	North
4			Etar Pahad	900m	South/South East
5			Ramnagar Pahad	1000m	North/North West

5.3 Socio Economic Profile of the Study Area

This section presents the parameters that would be broadly covered in the socio-economic profile of the study area which have been provided below;

- Community history and background;
- Administrative set-up;
- Demographic Profile;
- Poverty Levels;

- Social Stratification;
- Workforce participation, employment and diversity profile; and
- Existing Public Amenities

5.3.1 Community History and Background

Rewa district is one the northern districts of Madhya Pradesh located between latitude 24°18' and 25°12'N; longitudes 81°02' and 82°18'E and covers an area of about 6314 sq.kms. The district falls in the survey of India sheet numbers 63G, H and 63L and is bordered by Uttar Pradesh state in the north, on the east and south east by Sidhi district (Madhya Pradesh) and Amarpatan and Raghurajnagar tehsils of Satna district (Madhya Pradesh) in the west. The district is well connected by NH-7 with the adjacent district headquarters and other major towns.

Rewa town is connected to Satna through the 50 kms Satna-Rewa branch railway line which is part of the Howrah-Allahabad-Mumbai Line. Rewa is also connected to Allahabad and Varanasi through NH-7 and Sidhi and Satna districts through NH-27. The nearest airports are at Khajuraho and Jabalpur in the State of Madhya Pradesh and Allahabad and Varanasi in the State of Uttar Pradesh.

Major industries in the region are cement (Jaypee Cements), cable (VTL), power generation plants (Jaypee power and 435 MW Bansagar hydropower project), pharmaceuticals, paper and plastic industries.

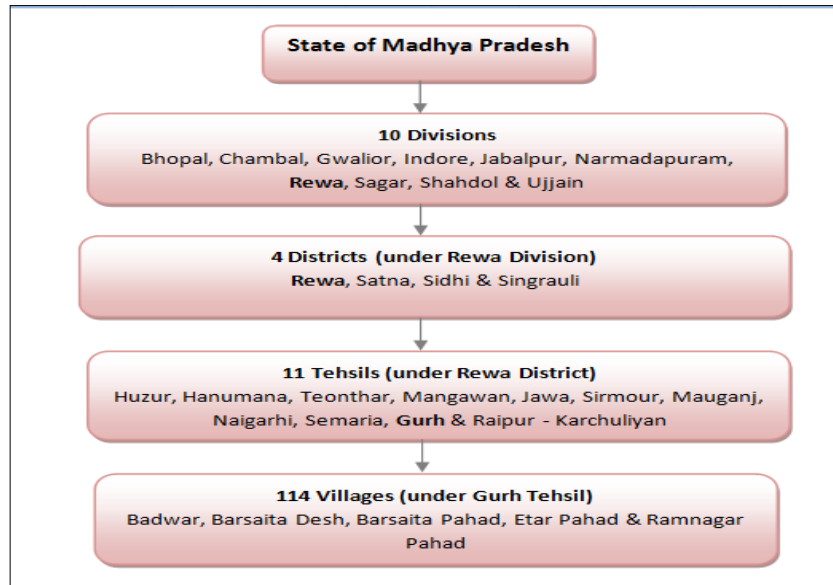
In Gurh Tehsil, approximately 22,000 hectares government revenue land was allotted to the India Army in 1990 to use the area as a firing range. This area was utilised as a firing range by the Army till 2002 after which permission of discontinuing the activity was given. A portion of the government revenue land (falling under the Badwar village) measuring approximately 1200 hectares was later transferred to RUMSL for setting up of the proposed solar power park. As reported during the consultations with the community, this land was not utilised for any activities by the communities (either as an income source or shelter) after the Army firing range was discontinued in the area.

No tangible forms of cultural heritage having archaeological significance are within 5 km (ground distance) of the proposed project site. A small temple dedicated to a giant statue of Shiva lying horizontal known as 'Bhairon Baba' is approximately at an aerial distance of 5kms south-west of the proposed project area.

5.3.2 Administrative Setup

Gurh tehsil is amongst the 11 tehsils in the district of Rewa. The administrative set up of project affected villages within the State of Madhya Pradesh have been provided in figure below.

Figure5-2: Administrative set up of Project Affected Villages



Source: Census Atlas Map 2011

5.3.3 Demographic Profile of the Study Area

The villages within the study area fall under the administrative jurisdiction of one tehsil, namely, Gurh. Details concerning the socio-economic and demographic profile of the study area will include the one (01) district, one (01) tehsil and five (05) villages which have been elaborated in the following sections of the report.

5.3.3.1 Population

District and Tehsil

The decadel growth of population in the district and tehsil of the study area has been provided in **Table5-2**,

Table5-2: Decadel Population Growth of Rewa District and Gurh Tehsil

Location	2001			2011			Decadel Growth Rate (in %)
	Total Population	Total Male Population	Total Female Population	Total Population	Total Male Population	Total Female Population	
Rewa	1973306	1016687	956619	2365106	1225100	1140006	19.85
Gurh	107952	55162	52790	127323	65690	61633	17.94

Source: 2001 and 2011 Census Data

As observed from the table above, there has been a decadel growth of population in both Rewa District (19.85%) and Gurh Tehsil (17.94%) respectively. The total households also have increased in both areas as per the Census data wherein Rewa District has shown the number of households (in 2011) as 526065 from (in 2001) 362657. This trend can be visible in Gurh tehsil as well with the number of households (in 2011) as 20787 from (in 2001) 30171.

Villages

The details of decadel population growth in the study area villages have been provided below **Table 5-3**,

Table 5-3: Decadel Population Growth of Study Area Villages

Tehsil	Village Name	2001			2011			Decadel Growth Rate (in
		Total Population	Total Male Population	Total Female Population	Total Population	Total Male Population	Total Female Population	

								%)
Gurh	Badwar	5271	2649	2622	6168	3133	3035	17
	Barsaita*	1646	824	822	1595	791	804	(-) 3
	Etar Pahad	1644	828	816	2485	1300	1185	51
	Ramnagar Pahad	38	22	16	37	19	18	(-) 2

*As per Census, Barsaita Desh and Barsaita Pahad are primarily taken as Barsaita village as Barsaita Pahad village is uninhabited.

Source: 2001 and 2011 Census Data

As shown in the table above, Etar Pahad village has shown a 51% population growth between the time period of 2001 and 2011. Badwar village during the same period has shown a 17% population growth. Barsaita and Ramnagar Pahad villages however, have shown negative growth rate between the years at (-) 3% and (-)2% respectively. This could be due to the fact that majority of the male population migrate to bigger cities like Mumbai, Gujarat, Rewa, Bhopal etc. for seeking employment purposes due to the lack of employment opportunities in the villages as expressed by the local population at the time of the consultation process. The total households in these villages as per the 2011 Census were Badwar (1543), Barsaita (488), Etar Pahad (623) and Ramnagar Pahad (9).

5.3.3.2 Sex Ratio

District and Tehsil

According to the 2011 Census records, the sex ratio of Rewa district was 930 females to every 1000 males while in Gurh tehsil it was 938 females to every 1000 males.

Villages

The **Table5-4** below shows the sex ratio as per the 2011 Census data that is present in the study area villages.

Table5-4: Sex Ratio in the Study Area Villages

Tehsil	Village Name	Sex Ratio (to every 1000 males)
Gurh	Badwar	969
	Barsaita	1016
	Etar Pahad	911
	Ramnagar Pahad	947

Source: 2011 Census Data

As presented in the table above, Barsaita has the highest sex ratio at 1016 females to every 1000 males as compare to Badwar (969), Etar Pahad (911) and Ramnagar Pahad (947).

5.3.3.3 Religious Demography

As per the consultations undertaken in the study area villages, the population in the villages all follow the Hindu faith.

5.3.4 Poverty Level

The level of poverty in an area highlights the economic status of the people and whether they are able to afford certain amenities for their survival. The Below Poverty Level (BPL) status is taken by the Government of India as an economic benchmark and poverty threshold to indicate the economic disadvantage and identify individuals in

need of government assistance and aid.¹⁸ As per the District wise Poverty Estimates for Madhya Pradesh published by the State Planning Commission, in 2005, 67.41% of the total population in Rewa District (rural) has been estimated to be below the poverty line.

The Ministry of Rural Development, Government of India in 2014-15 initiated the Intensive Participatory Planning Exercise (IPPE) to determine the backwardness index in sub districts across the country. As per the published findings, Gurh Tehsil has a backwardness index of 0.66434896 and a ranking of 1909 amongst the other tehsils in the country.¹⁹

5.3.5 Literacy Level

District and Tehsil

The details of the literacy level as per the 2001 and 2011 Census Data have been provided in **Table5-5**,

Table5-5: Literacy Level of Population in Rewa District and Gurh Tehsil

Location	2001			2011		
	Total Literate Population	Total Male Literates	Total Female Literates	Total Literate Population	Total Male Literates	Total Female Literates
Rewa	991410	621967	369443	1441757	845572	596185
Gurh	50922	32634	18288	75483	44607	30876

Source: 2001 and 2011 Census Data

As observed from the table above, there has been an increase in total literate population in both Rewa district (60.95%) and Gurh tehsil (59.28%) in 2011 as compared to 2001 wherein the literate population of Rewa district was 47.17% and Gurh tehsil was 50.24% of the total population. In 2011, 69.02% of the males were recorded to be literates in Rewa district while in Gurh tehsil, 67.90% of the males were literates. Out of the total female population, 52.29% and 50.09% of female literates were recorded in Rewa district and Gurh tehsil respectively.

Villages

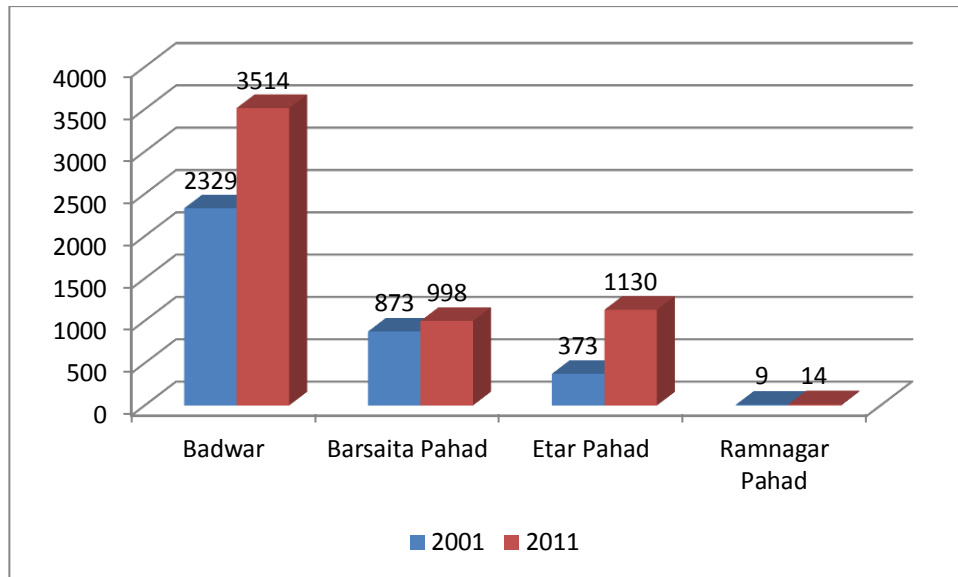
As per the 2001 and 2011 Census Data, the literate population in the study area villages have been presented in figure below.

Figure5-3: Decadel Growth of Literate Population in Study Area Villages

¹⁸ Poverty: All India (Per capita per month) Rural Rs. 356.30; All India (Pre Capital per month) Urban Rs. 538.60

* The poverty line (implicit) at all-India level is worked out from the expenditure class-wise distribution of persons (based on URP consumption i.e. consumption collected from 30 day recall period for all items) and the poverty ratio at All-India level. The poverty ratio at all is obtained as the weighted average of the state-wise poverty ratio.

¹⁹ The backwardness index has 10 criteria carrying equal weightage: (i) monthly per capita consumption expenditure, (ii) education, (iii) health, (iv) house hold amenities, (v) poverty rate, (vi) female literacy, (vii) per cent of SC-ST population, (viii) urbanization rate, (viii) financial inclusion, and (x) connectivity. States and sub districts that score above 0.6 in the index will be categorized as "least developed", below 0.6 and above 0.4 score means a state is "less developed" and a score below 0.4 means a state is "relatively developed".



Source: 2001 and 2011 Census Data

As presented in the figure above, in all the study area villages, it can be observed that there has been an increase of literate population during the period of 2001 and 2011. Etar Pahad village has shown a higher rate of literate population from 373 individuals to 1130 during 2001 and 2011 following by Badwar village from 2329 to 3514 literates.

The decadal growth of literate male and female population in the study area villages have been provided in **Table 5-6**,

Table 5-6: Decadal Growth of Literate Males and Females in the Study Area Villages

Tehsil	Village Name	2001		2011	
		Total Male Literates	Total Female Literates	Total Male Literates	Total Female Literates
Gurh	Badwar	1524	805	2101	1413
	Barsaita	534	339	556	442
	Etar Pahad	247	126	665	465
	Ramnagar Pahad	8	1	10	4

Source: 2001 and 2011 Census Data

The table above shows that in Badwar village, 46.65% (1413) of the females are literate in 2011 as compared to 30.70% (805) of the population (female) in 2001. In Etar Pahad village, the female literates have increased 39.24% (465) in 2011 from 15.44% (126) in 2001. This data signifies that female literacy population is still yet to grow as compared to the number of male literates in the study area villages.

5.3.6 Social Stratification

Social stratification is a concept which classifies people into groups based on the hierarchical structures of class and status in any society. In India, the society is stratified along caste and tribe lineage. The terminology of Scheduled Caste (SC) and Tribe (ST) has been adopted in the Constitution of India and a sizeable amount of people fall within both these categories. These categories of people highlight the disadvantaged and oppressed classes.

The main groups of ST category population comprises of primarily Kol and Kamar tribal groups. In addition, a sizeable percentage (exact number could not be ascertained) of families in the study area villages fall within the Other Backward Classes (OBCs) group. The OBCs comprise of Patel, Kurmi, Kushwaha, Vishwakarma, Yadav, Dhariya and Bhatiyara groups respectively.

District and Tehsil

The details of the SC and ST population in the district and tehsil have been presented below **Table 5-7**,

Table 5-7: SC and ST Population in Rewa District and Gurh Tehsil

Location	2001		2011	
	Total SC Population	Total ST Population	Total SC Population	Total ST Population
Rewa	307235	132058	383508	311985
Gurh	15035	14034	18301	17411

Source: 2001 and 2011 Census Data

As provided in the table, the SC and ST population in Rewa district (2011) comprised of 16.21% and 13.19% of the total population. In Gurh tehsil, in 2011 the SC and ST population were 14.37% and 13.67% respectively.

Villages

The details of the SC and ST population in the study area villages have been provided in **Table5-8**,

Table5-8: SC and ST Population in the Study Area Villages

Tehsil	Village Name	2001		2011	
		Total SC Population	Total ST Population	Total SC Population	Total ST Population
Gurh	Badwar	390	535	576	616
	Barsaita	56	224	50	193
	Etar Pahad	151	937	373	1337
	Ramnagar Pahad	0	0	0	0

Source: 2001 and 2011 Census Data

As observed from the table above, in 2011 amongst the study area villages, the highest SC population (as against the total population) can be found at Etar Pahad village at 15% (373) as compared to 9.3% (576) in Badwar village. The highest ST population gain is reported to be the highest (as per the total population in the village) in Etar Pahad at 53.80% followed by Badwar at 9.98%. As observed during the site visit and consultations conducted, the indigenous people do not practice any distinct belief and have merged themselves into the mainstream community.

5.3.7 Land Use Pattern

The details of the land use classification of study area villages have been provided in **Table 5-9**,

Table 5-9: Land Use Classification of Study Area Villages

Village Name	District	Total Land Area (in hectares)	Forest Land (in hectares)	Total Irrigated Area (in hectares)	Unirrigated Area (in hectares)	Cultivable Waste land (in hectares)	Area not available for cultivation (in hectares)
Badwar	Rewa	2726	1039	163	708	130	686
Barsaita	Rewa	1070	58	61	309	62	580
Etar Pahad	Rewa	3695	675	0	206	241	308

Village Name	District	Total Land Area (in hectares)	Forest Land (in hectares)	Total Irrigated Area (in hectares)	Unirrigated Area (in hectares)	Cultivable Waste land (in hectares)	Area not available for cultivation (in hectares)
Ramnagar Pahad	Rewa	779	23	0	0	1132	1888

Source: Village Directory 2001

The table above highlights that agricultural activities takes place in both irrigated and unirrigated areas. As per the consultation process, it was established that the land area in the study area was undulating. The local population in the study area villages owed land parcels at both the slope (comprising of the land parcels in the project area) and plain areas (not falling within the project area). Areas under the slope terrain depend solely upon rainfall in order to undertake agricultural activities which have reduced in the last three years due to scanty rainfall in the area. A one crop cycle used to be practised in the slope areas with the local population sowing mainly rice, wheat, potato and sesame. While for families owning land holding in the plain areas (outside the project area), water accessibility is not an issue and due to availability of water through natural springs in the area, the families are able to connect motor pumps and irrigate the fields during the dry season as well. Here a two crop cycle is practiced wherein in addition to rice, sesame, potato, wheat is also cultivated. As reported by the project affected population, rainfed agriculture used to be practiced by all families on the private land parcels which have been identified for the proposed project which has been discontinued three years ago due to minimal rainfall. These land parcels have at present been left barren and uncultivated.

The average yield of the main crops like rice is 30-35 quintal per hectare in areas which are irrigated (in the plain areas which falls outside the project area). The price of the yield depends upon the Government Market Rate which was INR 1430 per quintal during the time of the site visit. While the average yield of wheat is 20 -25 quintal per hectare (in the irrigated plain areas outside the project area) with the market price as INR 1200 per quintal. It is to be noted that for the project affected population with smaller land holdings (in the project area), the agricultural produce was used mainly for self-consumption while for cultivators having larger land parcels (both in and outside the project area) the agricultural produce was sold in the market.

5.3.8 Workforce Participation, Employment and diversity Profile

5.3.8.1 Workforce Participation

District and Tehsil

Work force participation rate is defined as the percentage of total workers (main and marginal) as compared to the total population. Details of the workforce participation in the district and tehsil within the study area as per the Census Data of 2001 and 2011 has been presented in **Table5-10**,

Table5-10: Details of Workforce Participation in Rewa District and Gurh Tehsil

Location	2001			2011		
	Total Working Population	Total Male Working Population	Total Female Working Population	Total Working Population	Total Male WorkingPopulation	Total Female Working Population
Rewa	862959	502107	360852	991946	617184	374762
Gurh	54300	29550	24750	57609	33644	23965

Source: 2001 and 2011 Census Data

As shown in the table above, the total working population (as compared to the total population growth) in 2011 has shown a slight decrease in both the district and tehsil at 41.94% and 45.24% as compared to 2001 at 43.70% and 50.30% respectively. The female working population in 2011 in Rewa district was reported to be 32.8% and Gurh tehsil, 38.88% as compared to the total female population in both these areas. This reduction in workforce participation can be attributed to the fact of out migration of the local population due to limited employment opportunities in the area as reported during the consultation process. As reported during the consultation process with the communities of the 'study area villages' approximately 60% of men migrate from the villages as labourers and semi skilled workers to Rewa, Bhopal, Maharashtra and Gujarat.

Main workers are considered as those workers who have been engaged in any economically productive activity for 183 days or more while marginal workers are those that have worked for less than 183 days in a year. The break-up of main and marginal workers in the districts as per the 2001 and 2011 Census Data have been provided in **Table 5-11**,

Table 5-11: Break-up of Main and Marginal Workers in Rewa District and Gurh Tehsil

Location	2001			2011		
	Total Working Population	Total Main Workers	Total Marginal Workers	Total Working Population	Total Main Workers	Total Marginal Workers
Rewa	862959	585034	277925	991946	630251	361695
Gurh	54300	33208	21092	57609	34717	22892

Source: 2001 and 2011 Census Data

As presented in the table above, the main workers in 2011 in Rewa district comprised 63.53% and in Gurh tehsil, 60.26% of the total working population. Marginal workers during the same period comprised 36.46% in Rewa district and 39.73% in Gurh tehsil respectively.

Villages

Details of workforce participation in the study area villages have been provided in

Table 5-12,

Table 5-12: Details of workforce participation in the Study Area Villages

Tehsil	Village Name	2001			2011		
		Total Working Population	Total Male Workers	Total Female Workers	Total Working Population	Total Male Workers	Total Female Workers
Gurh	Badwar	2204	1227	977	2782	1572	1210
	Barsaita	1047	531	516	621	381	240
	Etar Pahad	885	446	439	1176	678	498
	Ramnagar Pahad	22	13	9	31	16	15

Source: 2001 and 2011 Census Data

As observed from the table above, the total working population in the period of 2011 amongst the study area villages was reported to be the highest in Ramnagar Pahad village at 83.78% followed by Etar Pahad village at 47.32%, Badwar at 45.10% and Barsaita at 38.93%.

The break-up of main and marginal workers in the study area villages have been presented in **Table 5-13**,

Table 5-13: Break-up of Main and Marginal Workers in the Study Area Villages

Tehsil	Village Name	2001			2011		
		Total Working Population	Total Main Workers	Total Marginal Workers	Total Working Population	Total Main Workers	Total Marginal Workers
Gurh	Badwar	2204	1592	612	2782	1797	985
	Barsaita	1047	228	819	621	233	388
	Etar Pahad	885	85	800	1176	917	259
	Ramnagar Pahad	22	16	6	31	16	15

Source: 2001 and 2011 Census Data

As presented in the table above, in 2011, in Badwar village, there were 1797 individuals engaged as main workers and 985 as marginal workers. In Barsaita village, the marginal workers were recorded to be higher at 388 individuals than the main workers at 233 individuals. In Etar Pahad village, the marginal workers were comparatively less at 259 individuals as compared to the main workers at 917 main workers.

5.3.8.2 Occupational Pattern

The population in the study area is mainly dependent upon agricultural activities for their livelihood. The land areas which are at slope terrain (falling in the project area) are mostly rain-fed and practice a one crop cycle with paddy, wheat, potato and sesame cultivation being the crops sown here. The cultivation activities in the slope terrain have been discontinued three years ago as reported by the local communities due to the scanty rainfall in the area. Land areas which are at plain areas (falling outside the project area) usually have a two crop cycle and are irrigated through mechanised motors which are fixed to natural springs. The main crops cultivated in these areas range from paddy, sesame, potatoes and wheat.

District and Tehsil

The occupational pattern of the population refers to the choice of sector of employment that workers are dependent upon.²⁰ The occupational pattern of the population as recorded during the 2001 and 2011 Census of the District and Tehsil have been provided in the following **Table5-14**,

Table5-14 : Details of Occupational Pattern of Rewa District and Gurh Tehsil

Location	Main Workers				Marginal Workers			
	Cultivators	Agricultural Labourers	Household Activities	Other Workers	Cultivators	Agricultural Labourers	Household Activities	Other Workers
2001								
Rewa	247163	178637	30216	129018	126515	123188	10559	17663
Gurh	13574	11753	2766	5115	8686	9688	1795	923
2011								

²⁰ As per the Census data, a cultivator is defined as a person whose major share of yearly income comes from farming their own land while an agricultural labour is defined as a person between 15 and 59 years old whose major share of income is from wages earned by working on other's farms. Household Industry is referred as an industry conducted by one or more members of the household at home or within the village in rural areas and only within the precincts of the house where the household lives in urban areas. The larger proportion of workers in the household industry consists of members of the household. Some of the typical industries that can be conducted on a household industry basis are: Foodstuffs, Beverages, Tobacco Products, Textile cotton, Jute, Wool or Silk, Manufacture of Wood and Wood Products, Paper and Paper Products, Leather and Leather Products, Petroleum and Coal Products, Service and Repairing of Transport Equipments etc. While all workers, i.e., those who have been engaged in some economic activity during the last one year, but are not cultivators or agricultural labourers or in Household Industry, are 'Other Workers (OW)'. The type of workers that come under this category of 'OW' include all government servants, municipal employees, teachers, factory workers, plantation workers, those engaged in trade, commerce, business, transport banking, mining, construction, political or social work, priests, entertainment artists, etc.

Rewa	189670	241629	30654	168298	68651	221877	20224	50943
Gurh	9198	16813	2284	6431	3267	14411	2912	2302

Source: 2001 and 2011 Census Data

As shown in the table above, in 2011, amongst the main workers, majority of the working population in Rewa district were engaged as agricultural labourers and cultivators. In Gurh tehsil also, most workers were engaged as agricultural labourers. This trend was visible amongst the marginal workers as well during the same time period.

Villages

The details of the main and marginal workers in the study area villages have been provided in Table below,

Table 5-15: Details of Occupational Pattern in Study Area Villages

Tehsil	Village Name	Main Workers				Marginal Workers			
		Cultivators	Agricultural Labourers	Household Activities	Other Workers	Cultivators	Agricultural Labourers	Household Activities	Other Workers
	2001								
Gurh	Badwar	926	318	66	282	79	469	25	39
	Barsaita	117	4	5	102	444	353	10	12
	Etar Pahad	22	6	45	12	2	794	4	0
	Ramnagar Pahad	0	0	0	16	5	0	0	1
	2011								
Gurh	Badwar	489	822	50	436	43	752	65	125
	Barsaita	153	22	7	51	85	271	11	21
	Etar Pahad	91	750	42	34	28	214	3	14
	Ramnagar Pahad	9	0	0	7	0	13	9	2

Source: 2001 and 2011 Census Data

As observed from the table above, most of the workforce (main and marginal) in 2011 in the study area villages work as cultivators and agricultural labourers. As per the consultation held, most of the project affected families (PAFs) are dependent upon agriculture for their livelihood. Only 1-2% of the consulted PAFs are engaged in government services and as labourers. Amongst the main workers (in 2011), Badwar recorded of having the highest agricultural labourers at 822 workers followed by Etar Pahad at 750 workers. Amongst the marginal workers (in 2011), all the study area villages recorded higher engagement of agricultural workers. It was reported that the agricultural labourers work in the plain areas (falling outside the project area) which are irrigated for an average 5-10 days in one season comprising of three months duration. At times, the Cultivators engage them on a day to day basis depending upon the type of activities and requirements. The labourers earn an average wage rate of INR 200 per day and mostly belong to the village of residence.

5.3.9 Existing Public Amenities

Availability and non-availability of social infrastructure/amenities/facilities indicate development pattern of an area and also provides an insight into the well-being and quality of life of the population. The particulars of the existing public amenities in Rewa district, Gurh tehsil and villages in study area have been mentioned below:

5.3.9.1 Educational Facilities

As per the consultations undertaken with the local communities in the study area villages, the following responses were recorded relating to the presence of educational facilities:

In Badwar village, there is a primary till high school level which is co-educational and government run. To pursue higher education, students travel to Gurh (4km) and Rewa (30km).

In Barsaita Village, there are two primary schools, one middle level and one high school, all co-educational and run by the government. In order to pursue higher secondary education and technical studies, students have to travel to Gurh and Dwari which are 8 km from the village. In addition, there is a Skill Development Centre based in Gurh which provides 3 to 6 month courses in electrician, welding, plumbing, motor mechanic etc. There are two aaganwadi within the village housed in rented accommodations. One aaganwadi workers manages both the aaganwadi centres and is assisted by two helpers each in both aaganwadi.

In Etar Pahad village, there is a primary and middle level school, co-educational and run by the government. Students travel to Badwar, Gurh or Rewa to pursue education at the high school level and beyond.

There are no educational facilities in Ramnagar Pahad village and children travel to Barsaita village (5km) to pursue their education.



Photo 5-1: A view of the primary school at Etar Pahad village; Date: December, 2015



Photo 5-2: A view of High School at Barsaita village; Date: November, 2015

5.3.9.2 Healthcare Facilities

The consultations held with the community members of the study area villages have revealed the following information about healthcare facilities available in the area:

In Badwar village, there is one primary health sub centre wherein one female doctor has been stationed. However, her availability is irregular and the local population usually travel to Gurh and Rewa. There is a Community Health Centre (CHC) located in Gurh which is 8 km from the village. A pharmacist and staff nurses engaged with the CHC provides health services to adjoining villages. The 108 ambulance services and Janani Express (local ambulance) services operated by the Government of Madhya Pradesh for emergencies connects the study area to the District Hospital based at Rewa City.

In Barsaita village, there are no healthcare facilities in the study area. Health workers associated with the CHC visit the village twice in a week in the aaganwadi which is housed at a rented accommodation.

In Etar Pahad and Ramnagar Pahad villages, there are no healthcare facilities.



Photo 5-3: A view of the primary health sub centre in Badwar village; Date: December, 2015



Photo 5-4: A view of road of Badwar village; Date: December, 2015

5.3.9.3 Access to Road and Transport Facilities

The study area villages are connected through NH-75 wherein private buses and vehicles ply. The road connecting Badwar, Barsaita and Etar Pahad villages are a paved road. The closest railway station to the study area is situated in Rewa City.

Ramnagar Pahad village is not connected by any direct road. The closest road to the village is at a distance of 4km.

5.3.9.4 Communication and Banking Facilities

Communication Facilities

As per the 2010-2011 statistics report published by MSME department of Madhya Pradesh on Rewa District, there are 25414 total telephone connections, 338 post offices and 495 rural PCOs in the District. During consultations with residents of the study area villages, it was understood that a large percentage of families have cellphone connections (although the exact percentage of cell phone connectivity in the villages was not communicated). Badwar and Barsaita villages have one post office each.

Banking Facilities

Most of the population in the study area villages have bank accounts in branches of Central Madhya Pradesh Grameen Bank, Union Bank of India, Madhyanchal Grameen Bank which are located in Gurh. Badwar Village has a branch of Madhyanchal Grameen Bank within the village.



Photo 5-5: A view of the post office in Badwar village. Date: December, 2015



Photo 5-6: A view of Madhyanchal Grameen Bank in Badwar village; Date: December, 2015

5.3.9.5 Drinking Water and Sanitation Facilities

Drinking Water Facilities

As per the consultations conducted in the study area villages, it was informed that water is provided to the local population through hand pumps, wells and streams that flow near the villages. The local population reported that water is not an issue in the area as natural springs in the area supplements the water supply.

Sanitation Facilities

As per the consultation conducted, it was reported stated that 60% of households in Badwar village, 20% households in the Barsaita village and Etar Pahad village (percentage not available) had sanitation facilities. One primary school in Barsaita village and the high school in Badwar village also had sanitation facility present. However, households in Ramnagar Pahad villages practised open defecation and had no sanitation facilities.

	
Photo 5-7: A view of the hand pump in Badwar village. Date: December, 2015	Photo 5-8: A view of pipes connected to the natural spring that supplements the village with water Date: November, 2015

5.3.9.6 Electricity and Cooking Fuel Usage

Electricity Supply

About 90% of the households in Badwar, Barsaita and Etar Pahad villages are connected with electricity supply. As per consultations conducted during the site visit, it was informed by the local population that electricity supply is provided for domestic purpose. However, load shedding is a common concern in the area. The households in Ramnagar Pahad village are not connected with electricity supply and instead depend upon kerosene lamps.

Cooking Fuel Usage

Fuel in the form of firewood and cow dung was the primary choice of fuel used for domestic purposes amongst the households in the study area villages.



Photo 5-9: View of the water collected in a reservoir that flows from the natural spring in Barsaita village.
Date: November 2015



Photo 5-10: Source of fuel used in Barsaita village.
Date: December 2015.



Photo 5-11 : View of house structures in Barsaita Village; Date: December 2015



Photo 5-12 : View of the Kuldevi Mandir near the Water Reservoir; Date: November 2015

5.4 Socio-Economic Survey of Affected Population

This section of the report details out the findings of the census survey undertaken on the socio-economic conditions of the project affected population residing in the study area villages.

A reconnaissance survey and census survey (Phase I) was undertaken of the study area villages from 19th -21st November 2015 and 13th – 18th December 2015. Details of activities undertaken during the site visits have been provided below in **Table 5-16**,

Table 5-16: Site Visits and Consultations undertaken for the Proposed Project

Sl.No.	Date of Site Visit	Activities Undertaken
1	19 th -21 st November 2015	Initial Social Assessment: • Undertook consultations with Barsaita Desh Panchayat members and local community members; • Undertook consultations with land owners (a sample size of 25%) who provided their consent for land purchase (Barsaita Desh and Barsaita Pahad); • Interviewed the District Collectorate; • Interviewed the District Development Officer; and • Undertook consultations with representative of RUMSL
2	13 th -18 th December 2015	Census Survey and consultations for Phase I of the Project: • Undertook a census survey of the land owners as per the list provided by RUMSL officials;

Sl.No.	Date of Site Visit	Activities Undertaken
		- Undertook consultations with Panchayat members and local community members of Badwar and Ramnagar Pahad Panchayat; - Undertook consultations in randomly selected villages falling within 5km of the project area;and - Undertook consultations with representative of RUMSL

5.4.1 Objectives of the Socio-Economic Survey

The objectives of the socio-economic survey were:

- To attach actual values to key indicators of the Project Affected Families social and economic status and their vulnerability to socio-economic change due to the project;
- To assess the use/dependence of the population on any common property resource;
- To provide a benchmark for any further information required to be monitored and evaluated by the Project Proponent in the future; and
- To provide inputs in the preparation of Livelihood Restoration Plan, if required.

5.4.2 Coverage of Census and Socio-Economic Household Survey of Affected Persons

A detailed socio-economic survey was conducted in conjunction with the census and verification of the affected persons to profile the impacted project area and provide a baseline against which mitigation measures and support will be measured. The survey, *inter alia*, has assessed the impacts of the project, the socio-economic conditions, and living standards of affected persons due to the project implementation. The following details were collected during the survey:

- Socio economic conditions of the affected persons
- Family structure and number of family members
- Literacy levels
- Occupational type and income levels
- Inventory of household assets
- Loss of immovable assets due to the project by type and degree of loss
- Accessibility to the community resources
- Perceptions on the resettlement and rehabilitation measures
- Perceived income restoration measures
- Grievances of affected persons and its redressal
- Willingness to participate in the project

It is to be noted here that due to the small-medium land holdings of the Khatedars (titleholders), the Khatedars are the landowners or future generation who primarily live in joint family system. The survey targeted all the available Khatedars (as mentioned in the Phase I²¹ list provided by RUMSL Site Official) households of the study area villages. A household is considered as a unit which includes the affected landowner along with his/her dependents and have a separate kitchen. Census data was collected from all the affected households identified for Phase I of the project. In total, 309 Khatedars land has been delineated for the project in Phase I, out of which 250

²¹Phase I refers to the private land parcels (comprising 164. 231 hecatres) wherein landowners are in the process of providing their consent for sale of their land. Land parcels have been identified for Phase II comprising of 138.616 hectares of private land. The consent process is yet to be commenced for this phase.

Khatedars were covered for the survey, 33 Khatedars name have been repeated and 26 were not available during the site visits as information was provided that some of the Khatedars do not reside in the study area villages.

5.4.2.1 Qualitative Survey

Qualitative surveys may not always reveal the facts. Qualitative surveys were however, conducted for evaluation of both affected population and implementation capacities. The qualitative survey includes inputs from focus group discussions and in depth interviews with various sections of the population such as women, influential persons and community leaders to elicit their expectations and suggestions, which will support and provide additional information collected through qualitative survey.

5.4.2.2 Assessment of Livelihood Losses

The study has made an attempt to identify people losing their livelihood (partially or totally) directly or indirectly. In order to assess the strategies for losses incurred by the affected persons by way of training requirements for income generation and other remedial and restoration measures, consultations were conducted with the following:

- People being affected (direct) by the project
- Sarpanch of the Gram Panchayats
- Opinion Leaders of the study area villages

5.4.2.3 Review of Legal Policy Provisions and Implementation Capacity

Relevant National and State legislations and regulations pertinent to land acquisition were reviewed. To study implementation arrangements of these policies, in-depth interviews with officials from RUMSL were conducted. Details of this have been provided in section 5.6.4 of the report.

5.4.2.4 Analysis of Data

The information collected through primary survey through questionnaires has been systematically coded, validated, analysed and tabulated. Wherever required, observations have been supported by the information collected through desk research/documentation review.

5.4.2.5 Preparation of Social Impact Assessment Section

The social impact assessment section has been prepared on the basis of the above activities which provide an understanding of the socio economic risks involved and strategy to minimise the risks of the programme particularly on the vulnerable and develop participative monitoring mechanism.

5.4.2.6 Research Techniques Applied for the Study

Various social research techniques have been applied to undertake this study which includes desk research through review of information available domain, concerned government departments and project proponents. Structured and semi-structured interviews, group discussions with the affected people and relevant government agencies and community were undertaken.

The study used various instruments to collect information for the different stakeholders involved under the project. The Questionnaires for the focus group discussions are presented in **Annexure IV**.

5.4.2.7 Details of Land Required for the Project

The total land required for the proposed project comprises of approximately 1500 hectares, out of which 302.98 hectares (164.231 hectares identified for acquisition in Phase I and 138.758 hectares identified for acquisition in Phase II) is private land and remaining approximately 1232.697 hectares is government revenue land. No forest land has been taken for the proposed project. The details of the private land proposed to be acquired for the project have been provided in **Table 5-17** and **Table 5-18**,

Table 5-17: Details of Private Land to be acquired for Phase I of the Project

S.No.	Village Name	Total Private Land (in hectares)	Total Private Khatedars (titleholders)
1	Badwar*	58.700	131
2	Barsaita Desh*	74.604	116
3	Barsaita Pahad	3.441	10
4	Etar Pahad	3.593	8
5	Ramnagar Pahad	23.893	44
Total		164.231	309

*The List of private land identified initially for Badwar and Barsaita Desh Village had 134 and 118 khatedars (titleowners) respectively, out of which 3 rows from Badwar List and 2 rows from Barsaita Desh List were left empty. Site Officials of NRED confirmed that as per the final records Badwar list has a total of 131 Khatedars and Barsaita Desh has 116 Khatedars.

Table 5-18: Details of Private Land to be acquired for Phase II of the Project

S.No.	Village Name	Total Private Land (in hectares)	Total Private Khatedars (titleholders)
1	Badwar	31.064	54
2	Barsaita Desh	37.763	45
3	Barsaita Pahad	11.183	8
4	Etar Pahad	11.958	7
5	Ramnagar Pahad	46.790	34
Total		138.758	148

As per land records provided by RUMSL site official, only one temporary structure (within the boundary of Ramnagar Pahad village) belonging to a resident of Ramnagar Pahad is being affected by the proposed project in Phase I. Details of this have been provided in Section 6.2 of the report. No population of the study area villages are being physically displaced (either in the privately owned land or government revenue land) because of the proposed project activities. RUMSL has used the Madhya Pradesh's Consent of Land Purchase Policy, 2014 for acquisition of private land. As per the Policy, the District Collectorate is responsible in acquiring the required land from the private landowners based on their consent voluntarily to sell their land parcels. Till date, 90% of private land owners from the five study area villages have provided their consent to sell their land in the form of an undertaking in Phase I of the project. The lists of landowners who have provided their consent to sell their land in Phase I have been provided as **Annexure VII**. In addition, as the landowners and local communities are not undertaking any economic activities in the private land and government revenue land identified in the project area, no economic displacement is envisaged for the project affected families.

In order to assess the socio-economic status of the landowners whose land has been delineated for the project, the census survey was conducted. The list of private land holdings and landowners for Phase I of the Project have been provided in **Annexure V**. The list of private land holdings and landowners identified for Phase II of the Project has been provided in **Annexure VI**.

5.5 Results of the Socio-Economic Survey undertaken for the Affected Population

The results of the survey for Phase I of the project has been tabulated and analysed as per the Khatedars in each of the study area villages (as per the list provided by RUMSL site official). It is to be noted here that even though as per Census Data, both Barsaita Desh and Barsaita Pahad villages come under one village name, Barsaita. In the following section, both villages have been tabulated separately.

5.5.1 Socio-Demographic Profile of Affected Population

5.5.1.1 Demography

The details of the demographic profile of the Affected Population have been presented in **Table5-19**,

Table5-19: Demographic Profile of the Affected Population

Sl. No.	Item	No. of Households
1	Number of Affected Household Surveyed	250 (80.9%)
2	Total Population Affected	1288
3	Total Number of Males	751 (58.30%)
4	Total Number of Females	537 (41.69%)
5	Sex Ratio (female to every males)	715
6	Average household size	5.59
7	Children below 18 years	179 (13.89%)
8	Adults 18 years and above	1109 (86.10%)
9	Women headed affected households	20

As observed from the table above, the total affected households surveyed (in Phase I) are 250 comprising of 1288 individuals. Out of the total population, 58.30% comprises of males and the remaining 41.69% are females. The sex ratio (female to every 1000 males) of the affected population is 715 which are lesser than the district's figure of 930. The average household size is 5.59 persons. Children below the age of 18 years make up 13.89% of the total affected population while adults comprise 86.10%. A total of 20 affected households (11 – Barsaita Desh; 9 – Badwar) are women headed.

The break-up of affected households and persons in each of the study area villages have been provided below in **Table5-20**,

Table5-20: Number of Affected Households and Persons in each Study Area Villages

Sl. No.	Tehsil	Village Name	Total Number of Households	Total Affected Persons
1	Gurh	Badwar	96 (38.4%)	479 (37.1%)
2		Barsaita Desh	96 (38.4%)	441 (34.2%)
3		Barsaita Pahad	8 (3.2%)	49 (3.8%)
4		Etar Pahad	8 (3.2%)	52 (4%)
5		Ramnagar Pahad	42 (16.8%)	267 (20.7%)
Total			250	1288

5.5.1.2 Social Group

All the households surveyed follow Hinduism. Hindus in the study area is based on the traditional four-fold caste system of Brahmin, Kshatriya, Vaishyas and Shudras. The first three categories belong to higher caste whereas the last category generally belongs to scheduled population. Detail break-up of the affected population as per caste have been presented below in **Table 5-21**,

Table 5-21: Social Grouping of the Affected Households and Persons

Sl. No	Caste	Affected Households	Affected Persons
1	Brahmin	64 (25.6%)	438 (34%)
2	Rajput	4 (1.6%)	25 (1.9%)
3	OBC (Patel)	177 (70.8%)	794 (61.6%)
4	Scheduled Tribe (Kol Tribe)	5 (2%)	31 (2.4%)
	Total	250	1288

The table above shows that the social group belonging to the OBC category (Patel) are the most affected with 177 households (70.8%) comprising of 794 (61.6%) individuals. The Scheduled Tribe category primarily comprising of the Kol Tribe consisting of 5 affected households (2%) and 31 (2.4%) individuals are also being affected. As reported during consultations held with the ST families, the members of the ST category do not practice any distinct traits and culture and have mainstreamed into the general society. It is to be noted that the project area does not fall under any scheduled area. The ST members are legal titleholders of their respective land parcels and undertake agricultural activities similar to the occupational pattern of the rest of the general population.

The break-up of social groups as per each study villages has been provided below in **Table5-22**,

Table5-22: Social Grouping of Affected Households and Persons in Study Area Villages

Village Name	Brahmin (HH/PAP)	Rajput (HH/PAP)	OBC (HH/PAP)	ST (HH/PAP)
Badwar	-	-	96/479 (38.4%/37.18%)	
Barsaita Desh	20/173 (8%/13.4%)	4/25(1.6%/1.9%)	67/212 (26.4%/16.45%)	5/31 (2%/ 2.4%)
Barsaita Pahad	2/21 (0.8%/1.6%)	-	6/28 (2.4%/2.17%)	
Etar Pahad	7/41 (2.7%/3.18%)	-	1/11 (0.4%/ 0.85%)	-
Ramnagar Pahad	35/203 (14%/15.7%)	-	7/64 (2%/4.96%)	-
Total	64/438 (25.6%/34%)	4/25 (1.6%/1.9%)	177/794 (70.8%/61.6%)	5/31 (2%/2.4%)

The table above presents the social grouping of each households and affected persons in each of the study area villages. Barsaita Desh village is the only village which has all four social groups residing as compared to the other villages where only Brahmin and OBC categories make up the social structure of the society. Around 38.4% of the project affected households of Badwar village fall within the OBC category.

The following **Table5-23** details out the family type amongst the affected households.

Table5-23: Details of Family Type of Affected Households

Village Name	Family Type as per Affected Households		
	Joint	Nuclear	Individual
Badwar	4	90	2
Barsaita Desh	9	86	3
Barsaita Pahad	1	8	-
Etar Pahad	1	7	-
Ramnagar Pahad	7	32	
Total	22 (8.8%)	223 (89.2%)	5 (2%)

The table above demonstrates that nuclear families (89.2%) dominate the size of the family in the study area villages. About 8.8% of the households surveyed still live in joint family system, while 2% of households comprise of individual members.

5.5.1.3 Literacy Level

The details of literacy level of the affected population in each of the study area villages have been presented below in **Table 5-24**,

Table 5-24: Literacy level of the Affected Population in the Study Area Villages

Sl. No.	Literacy Level	Badwar		Barsaita Desh		Barsaita Pahad		Etar Pahad		Ramnagar Pahad		Total	
		Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
1	Illiterate	169	35.2	154	34.9	17	34.6	6	11.5	59	22	405	31.4
2	Primary Level	114	23.7	107	24.2	8	16.3	4	7.6	46	17.2	279	21.6
3	Middle Level	91	18.9	73	16.5	11	22.4	22	42.3	76	28.4	273	21.1
4	High School Level	68	14.1	59	13.3	8	16.3	11	21.1	56	20.9	202	15.6
5	Senior Secondary Level	23	4.8	3	0.6	2	4	-	-	-	-	28	2.17
6	Graduate	14	2.9	35	7.9	-	-	9	17.3	30	11.2	88	6.83
7	Technical	-	-	10	2.2	3	6.1	-	-	-	-	13	1

As observed from the table above, approximately 60% and above of the total population in the study area villages are found to be literate. Around 31.4% of the project population fall within the illiterate category. Among the literates, majority of them have attended primary (21.6%) and middle (21.1%) school level. Graduate level education has been attained by 6.83% of the project affected population. . Pursuance of technical education is minimal amongst the affected population with only 1% attaining it.

5.5.2 Economic Profile

5.5.2.1 Occupation Pattern

The occupational pattern of the affected population have been provided in **Table 5-25**,

Table 5-25: Occupational Pattern of the Affected Population

Sl.No.	Occupation	Badwar	Barsaita Desh	Barsaita Pahad	Etar Pahad	Ramnagar Pahad	Total
1	Agriculture	124 (25.8%)	159 (36%)	7 (14.2%)	16 (30.7%)	97(36.2%)	403 (31.2%)
2	Agriculture Labour	65 (13.5%)	40 (9%)	2 (4%)	-	6 (2.2%)	113 (8.7%)
3	Non Agriculture Labour	12 (2.5%)	10 (2.2%)	-	-	-	22 (1.7%)
5	Private Service	4 (0.8%)	12 (2.7%)	-	2 (3.8%)	-	18 (1.3%)
6	Government Service	-	1 (0.2%)	-	-	-	1 (0.07%)
6	Trade & Business	-	-	-	-	-	-
7	Self Employed	-	-	-	-	2 (0.7%)	2 (0.1%)

Sl.No.	Occupation	Badwar	Barsaita Desh	Barsaita Pahad	Etar Pahad	Ramnagar Pahad	Total
8	Unemployed	-	-	-	-	-	-
9	Student	59 (12.3%)	10 (2.2%)	15 (30.6%)	11 (21.1%)	54 (20.2%)	149 (11.5%)
10	Household Work	108 (22.5%)	131 29.7%)	16 (32.6%)	16 (30.7%)	60 (24%)	331 (25.6%)
11	Old/Retired	107 (22.3%)	78 (17.68%)	9 (18.3%)	7 (13.4%)	48 (19.2%)	249 (19.3%)

From the table above, it can be inferred that around 31.2 % of the affected population depend upon agriculture to sustain themselves. It is to be noted that the occupational pattern takes into account agricultural activities undertaken by the project affected population on land parcels owned both for the land delineated for the project as well as land falling outside the project area. It was reported during the consultation process that the agricultural activities undertaken on the land parcels falling within the project area comprised of land in the slope terrain wherein a one crop cycle was cultivated depending upon rainfall during the monsoon season. This however, has been discontinued three years ago due to limited rainfall in the area. The farmers (including farmers owning land less than 0.5 hectares) owning land in the project area mainly used the crops for their own self consumption and worked as agricultural labourers in large farm holdings (falling outside the project area) within the village for their livelihood. Due to the discontinuation of agricultural activities in the project area, these farmers have resorted to working as daily wage labourers (non agricultural labourers) in Rewa city. In addition, it was also mentioned that usually one adult male member belonging to the small and marginal farmer families migrate outside the state for work and send back money to their families.

Agricultural labourers make up 8.7% of the affected population. As reported during the consultations, these agricultural labourers work on land which is in the plain areas falling outside the project area. No agricultural labourers were engaged on the lands falling within the project area, reportedly. The women usually are involved in household activities and at times, assist in agricultural activities as well. The population group belonging to 58 years and above category have been placed in the section of old/retired comprising of 19.3% of the project affected population. Non workers usually refer to individuals below 16 years and are placed in the category of students which make up for 11.5% of the project affected population. Two individuals residing in Etar Pahad village are self employed in a small dairy farm owned by them.

5.5.2.2 Land Holding

The **Table 5-26** below provides details of the land holding pattern of the 250affected households.

Table 5-26: Land Holdings details of Affected Households

Sl. No.	Village Name	Land Holdings (Hectares)			
		< 0.5	0.5 to 1	1 to 2	>2
1	Badwar	21 (8.4%)	20 (8%)	28 (11.2%)	27 (10.8%)
2	Barsaita Desh	10 (4%)	28 (11.2%)	29 (11.6%)	29 (11.5%)
3	Barsaita Pahad	-	2 (0.8%)	4 (1.6%)	2 (0.8%)
4	Etar Pahad	-	-	2 (0.8%)	6 (2.4%)
5	Ramnagar Pahad	4 (1.6%)	1 (0.4%)	9 (3.6%)	28 (11.2%)
Total		35 (14%)	51 (20.4%)	72 (28.8%)	92 (36.6%)

The land holdings as shown in the table above refers to the project affected families that own land both within and outside the project area. As observed, out of the 250 landowners, 20.4% are marginal farmers (up to one hectare of land holding), 28.8% are small farmers (upto 1 to 2 hectares land) and 36.6% are large farmers. As reported during the consultation process, 14% of landowners had land holdings less than 0.5 hectares of land falling within the project area. The agricultural produce was used for self consumption purposes while the landowners were engaged as agricultural labourers in large farm within the villages for their livelihood. Due to the discontinuation of agricultural activities over the last three years because of minimal rainfall, these landowners besides working as agricultural labourers have resorted to working as daily wage labourers and migrated outside the state to sustain themselves and their families.

5.5.2.3 Asset Ownership

Any development project brings about a change in the life style and the standard of living of the Project Affected Persons. Apart from immovable properties such as land and house, it also has an impact on movable properties. Any improvement in the economic conditions of the families is usually reflected in acquisition of these assets and similarly any adverse economic situation results in selling of these assets. The asset structure is an indicator of the economic strength of a particular family and its capacity to sustain the impact.

Table 5-27 and **Table 5-28** below provide the details of asset ownerships amongst the project affected population.

Table 5-27: Ownership of House and Availability of Other Amenities

Sl. No.	Item	Description	No. of Households	% to total
1	Type of House	Pucca	92	36.8
		Semi Pucca	72	28.8
		Kutcha	86	34.4
		Total	250	100
2	Electricity Connection	Yes	146	58.4
		No	104	41.6
		Total	250	100
3	Drinking Water Facility	Tap	12	4.8
		Streams/Nallahs	67	26.8
		Tube Well	52	20.8
		Hand pump	75	30
		Wells	44	17.6
		Total	250	100
4	Toilet Facility	Yes	131	52.4
		No	119	47.6
		Total	250	100
5	BPL Card Holder	Yes	129	51.6
		No	121	48.4
		Total	250	100
6	Bank Account	Total	250	100

Table 5-28: Domestic Durable Asset Ownership

Sl. No.	Asset	No. of Households	%
1	Electric Fan	89	35.6
2	Furniture	108	43.2
3	Television	32	12.8
4	Cell Phone	111	44.4
5	Bicycle	64	25.6
6	Two Wheeler (Scooter/motorbike)	37	14.8

7	Refrigerator	6	2.4
8	Car	10	4
9	Tractor	3	1.2

The tables above show that all the project affected population own their own houses. Out of the houses surveyed, 36.8% were found to be pucca (permanent) houses, 28.8% were semi pucca structures and 34.4% were kutcha (temporary) structures. About 58.4% of the households are electrified. Handpump were the major source of water supply accounting for 30% of the households followed by natural stream/nallahs. Of the 250 households, 52.4% have toilet facilities. Of the total surveyed population, 51.6% were BPL card holders. Of the durable assets, about 44.4% of the households had a cell phone followed by furniture (43.2%), electric fan (35.6%) and bicycle (25.6%).

5.5.2.4 Livestock Ownership

Details of livestock ownership amongst the affected households have been presented below in **Table 5-29**,

Table 5-29: Livestock Ownership among the Affected Households

Sl. No.	Category	No. Owned	No. Of Households	%
1	Cows	362	124	49.6
2	Bullocks	44	8	3.2
3	Buffaloes	130	76	30.4
4	Goats	129	10	4
5	Sheeps	85	3	1.2
6	Oxen	92	29	11.6

As shown in the table above, cows, buffaloes and oxen are the major livestock that a household possess in the affected area. About 49.6% of the households own cows, 30.4% own buffaloes and 11.6% own oxens. VVery few households have other animals such as sheeps (1.2%), goats (4%) and bullocks (3.2%). As observed from the occupational pattern of the affected population and the number of livestock in possession, it can be inferred that the project affected population do not practice livestock rearing as a major occupation in the area. The livestock owned are usually used in agricultural activities or for self consumption milking purposes.

5.5.2.5 Income Levels

Annual income helps in identifying families below the poverty line. During the survey, income of a household was recorded as presented in the **Table 5-30** below,

Table 5-30: Income level of Affected Households

Sl. No.	Village Name	Income Level (annual)			
		<60000 INR	60000 – 100000 INR	100000 – 240000 INR	> 240000 INR
1	Badwar	60	13	8	15
2	Barsaita Desh	19	29	37	11
3	Barsaita Pahad	2	-	5	1
4	Etar Pahad	-	1	2	5
5	Ramnagar Pahad	10	7	15	10
	Total	91 (36.4%)	50 (20%)	67 (26.8%)	42 (16.8%)

As observed from the table above, 36.4% of the affected households earn less than INR 60000 annually and mostly comprise of population engaged as agricultural labourers and daily wage labourers (non agricultural labourers). None of the project affected population is engaged as sharecroppers. About 20% of the affected population earn between INR 60,000 – 1,00,000 and 26.8% of the affected households earn between INR 100000 – 240000 in a year. A total of 16.8% of the affected households earn more than INR 2,40,000 in a year and mainly

comprise of farmers with large land holdings. It is to be noted that as reported during the consultation process, most of the project affected population have family members who have migrated outside the village to other states and send back money earned to their families.

5.5.3 Vulnerable Affected Persons

Development induced displacement has lot of consequential impact and bring changes in the lives of Project Affected Persons. These changes are economic, social and cultural in nature. The adverse changes will negatively affect certain vulnerable sections of the society like women, children, tribal, poor, etc. While social and cultural impacts are the results of the societies and communities within it, due to livelihood restoration, the economic effects are the outcome of the changes in the production system. Therefore, it is imperative to study the socio-cultural and economic aspects of such underprivileged sections of the society, among the affected community particularly in the light of their vulnerability to changed situation. Past experience shows that vulnerable section of the affected community is generally not aware of their rights and privileges or even of their entitlements.

5.5.4 Vulnerable Persons from the Project

Table 5-31 details the vulnerable section of the affected population.

Table 5-31: Details of Village Wise number of Affected Vulnerable Persons/ Households

Vulnerable Persons	Badwar	Barsaita Desh	Barsaita Pahad	Etar Pahad	Ramnagar Pahad	Total
Widows	7 (1.4%)	14 (3.1%)	-	1 (1.9%)	2 (0.7%)	24 (1.86%)
> 58 years	107 (22.3%)	78 (17.6%)	9 (18.3%)	7 (13.4%)	53 (19.8%)	254 (19.7%)
BPL HHs	9 (9.3%)	69 (71.8%)	5 (62.5%)	7 (87.5%)	39 (92.8%)	129 (51.6%)

Vulnerable Persons	Badwar	Barsaita Desh	Barsaita Pahad	Etar Pahad	Ramnagar Pahad	Total
Widows	7 (1.4%)	14 (3.1%)	-	1 (1.9%)	2 (0.7%)	24 (1.86%)
> 58 years	107 (22.3%)	78 (17.6%)	9 (18.3%)	7 (13.4%)	53 (19.8%)	254 (19.7%)
BPL HHs	9 (9.3%)	69 (71.8%)	5 (62.5%)	7 (87.5%)	39 (92.8%)	129 (51.6%)

As shown in the table above, a total of 1.86% of the project affected population comprises of widows while 19.7% of the affected population are above the age of 58 years. In addition, 51.6% of project affected households are below poverty card holders and live below the poverty line.

As per consultations conducted, it was established that land belonging to 5 project affected households of the Scheduled Tribe (Kol tribe) category have been identified for the project in Phase I. These five households belong to Barsaita Desh village. Details of the socio-demographic characteristics of the ST affected households have been provided below:

Table 5-32: Socio-demographic features of ST Category Households

Sl. No.	Item	Total Household
1	Population	

Sl. No.	Item	Total Household
	Male	16 (3.6%)
	Female	15 (3.4%)
2	<i>Family Type</i>	
	Nuclear	5 (5.8%)
3	<i>Religious Group</i>	
	Hindu	5
4	<i>Age Group</i>	
	0- 5 years	2 (0.4%)
	6-14 years	6 (1.3%)
	15-18 years	6 (1.3%)
	19-25 years	5 (1.1%)
	26-35 years	2 (0.4%)
	36-59 years	10 (2.2%)
5	<i>Literacy Level</i>	
	Illiterate	6 (1.3%)
	Primary School	9 (2%)
	Middle School	5 (1.1%)
	High School	8 (1.8%)
	Senior Secondary Level	3 (0.6%)
6	<i>Occupation</i>	
	Cultivator	2 (0.4%)
	Agriculture Labour	3 (0.6%)
	Non-Agriculture Labour	3 (0.6%)
	Government Service	1 (0.2%)
	Household Work	12 (2.7%)
	Student	10 (2.2%)

As observed from the table above, a total of 7.02% of project affected population in Barseta Desh belong to the ST category. The households comprise of nuclear family system and all members follow the Hindu faith. A total of 2% of the members of this tribe have attained education upto primary school level while 1.8% has attended high school level education. It was noted during the consultation process that the members of these households do not follow any distinct cultural traits or beliefs and have mainstreamed themselves into the general society. They are legal titleholders of the land parcels owned by them and are engaged as cultivators (0.4%), agricultural labourers (0.6%), non agricultural labourers (0.6%), government service (0.2%), household work (2.7%) and student (2.2%) similar to the mainstream general society.

As the project area does not fall under scheduled area, the landowners belonging to the ST category are legal titleholders of their land. The land acquisition process followed for the private land in the project also encompasses the land owned by these landowners belonging to the ST category. As reported during the consultation process, the ST category landowners have provided their consent voluntarily to sell their land for the proposed project without any force. They are aware that for the land contributed they would be receiving double payment in the form of a Collector Guideline Rate plus one time solatium based on the prevailing market value. They also affirmed that this was communicated to all affected households in the village.

On review of the private land owners identified for Phase II of land acquisition process through the consent policy, there are no households belonging to the ST category which would be affected. As the total number of ST category households affected by the project amounts to five (5), it shows that the presence of ST families is not substantial in the study area villages.

As noted during the census survey and consultations undertaken in Phase I of the land acquisition process, the tribal families belong to the mainstream society and are not economically or physically displaced or impacted by the project activities hence, no Indigenous Peoples Development Plan is envisaged for the project.

5.6 Gender Issues and Actions

Though women comprise half of the total population, gender discrimination still prevails in the society. Status of women in India with regard to their access to knowledge, economic resources, political power, and personal autonomy in decision making is quite low. Women still lack access to and control over productive resources. Women in all social groups and regions have been proven as more disadvantaged than their male counterpart and even among women widows, separated, divorced and women headed households are particularly vulnerable. Similarly, women in all groups due to their limited access to economic resources and livelihood options can equally be classified as vulnerable who are at permanent risk for facing severe poverty.

One tangible measure of women's status was their educational attainment. Although the constitution offers women equal educational opportunities, many social, economic, and cultural factors contributed to lower enrollment and higher dropout rates for girls. Illiteracy imposed the greatest hindrance to enhancing equal opportunity and status for women. They were caught in a vicious circle imposed by the patriarchal society. Their lower status hindered their education, and the lack of education, in turn, constricted their status and position. Although the female literacy rate has improved noticeably over the years, the level still fall far short of the male literacy levels.

To comprehend the existing living pattern of the local population residing across the study area, a look at the socio-economic status of women and the role that women have been playing both at the domestic and economic level needs to be taken into consideration. As the patriarchal values are entrenched in Indian society, women often play a more subordinated and dependent role. Even though they constitute almost half the population, various indicators pertaining to literacy level, labour force participation, mortality rate etc. reveal the dismal status of women to that of men.

While interacting with the women of the study area villages, information relating to the gender profile in the area was also gathered. All the respondents were unison in their reply that no government schemes for women have been introduced in any of the villages. The main activities undertaken by women were mostly in the form of engagement of agriculture activities and household chores. As per their opinion, there are no healthcare facilities catering to maternity health in the study area. The CHC in Gurh provides healthcare services and most of the women travel to Rewa in case of emergencies. There are no vocational centres catering to women however, women Self-Help Groups (SHGs) are prominent in the area. The funds from the SHGs are used in agricultural activities, procuring items for shops and cattle rearing purposes. The SHGs have bank account in branches of Union Bank of India and Madhyanchal Grameen Bank located at Gurh.

On asking whether girl's in the study area are allowed to pursue higher education, the members were of the view that girl's usually discontinue their education after middle and high school as to attend higher studies they have to travel to Gurh which is 8 km from the village. As distance is an issue many of the parents decide to discontinue their ward's education.

The respondents were of the view that the need of the hour should be development of health care centres and employment opportunities for women. Medical health camps catering to women health issues should be held regularly to impart information and steps for necessary actions at times of emergencies. In addition, vocational

centres catering to skills like stitching, knitting, handicraft making, pickle making etc. should be established so that women while sitting at their homes can take up steps to supplement their economic condition and raise their family income accordingly.

5.6.1 Participation of women in decision making

Since women are located in different households, castes, communities and regions and are bound by distinct rituals, practices and structures of power, they rarely view themselves as a group with similar demands and needs. They are often governed by decisions that others take on their behalf which are followed unquestionably. Table below presents the involvement of women in decision making as percentage of PAHs. It is observed that the participation of women in decision making process is highest (49%) in deciding the financial matters and lowest (25%) in matters related to land & property.

Table 5-33: Women participation in decision making

Sr No	Subject	Women participation in Decision Making (HH percentage)
1	Financial Matter	49%
2	Child Education	37%
3	Healthcare Child	37%
4	Assets Purchase	34%
5	HH Activities	33%
6	Social Functions	32%
7	Earning Women	29%
8	Land & Property	25%

Little over one third of the women in the project area participate in decision making at the household level. As the analysis above indicates that women play an important role in the society, yet they have a very low status in the society coupled with little control over household resources; considerable health hazard; and poverty.

5.6.2 Schemes run by State Government for girl child

There are various schemes run by state government as described below. Project will ensure that these schemes are dovetailed in the project for the benefit of women PAPs.

Beti Bachao Abhiyan is an initiative taken by the Government of Madhya Pradesh aimed at arresting the declining sex ratio, which is a serious problem with far reaching social ramifications and at eliminating discrimination against girls in the society. Many activities have been carried out under this campaign for educating people about the importance of saving the girl child for a healthy gender balance in the society.

Ladli Laxmi Yojna: This scheme was started in the year 2006 with an objective to lay strong foundation of girls' future through improvement in their educational and economic status and to bring about a positive change in social mind set towards birth of a girl. Under the scheme, National Savings Certificates worth Rs. 6 thousand are purchased by the State Government in the name of a girl every year after she is born till the amount reaches Rs. 30,000. The girl covered under the scheme is given Rs. 2 thousand on getting admission in class VI, Rs. four thousand on getting admission in class IX and Rs. 7,500 on admission in class XI. A girl child is given Rs. 200 per month during her studies in class XI and XII. When the girl attains the age of 21 and has not married before 18 years of age, she will be paid the amount at one time, which comes to Rs. one lakh. The benefit of the scheme is

extended to the parents, who adopt family planning after two alive children and are registered in anganwadi centre and are not income tax payers.

Mukhyamantri Kanyadan Yojna: The scheme has been launched at the initiative of Chief Minister Shri Shivraj Singh Chouhan. The objective is to provide financial help to poor, needy, destitute families for marrying off their daughters/widows/divorcees. Under the scheme, assistance of Rs. 15,000 is given for house hold items and the mass marriage expenditure. This assistance is given in mass marriages with the condition that the girl must have attained the age of 18 years.

5.6.3 Women Participation in The Project

Though women play an important role in the society, yet they have a very low status in the society coupled with little control over household resources; considerable health hazard; and poverty. During consultation the female investigators interacted with the women residing in the affected area on the issues of their living, health care civic amenities and employment. The major concerns expressed by the women include employment opportunities for women who are going to be deprived of agricultural labour works due to the project; access to safe drinking water facilities and power; and access to common property resources. The development experience shows that it is equally necessary to consult women and offer them choices in enabling them to make informed choices and decide for their own development. Participation of women has been envisaged specifically in the following areas as shown in Table below:

Table 5-34: Women's Participation in Project

Key Indicators	Steps taken by project
Representation and presence of women from different socio-economic groups in all meetings	All meetings that took place, has representation of women. The meetings/consultations are organized at a time when women find it convenient to attend, so that maximum participation can be ensured.
Venue for meetings is based on discussions with the women so they can feel free and uninhibited in their discussions.	The meeting venue was generally selected by the participants. The meetings took place within the close vicinity of the residential areas in the villages.
Women facilitators or work through women's groups or networks—formal or informal.	Women Investigators were engaged for survey and FGD
Women's involvement in preparation and review of social documents.	The SMP will be disclosed in a mixed group as well as separately for men and women members. The women specific activities to be carried out were finalized in consultation with women members.
Ensure women's involvement and participation in implementation and	In order to preempt situations where women are mere tokens in decision-making processes, women are being encouraged to participate in prioritization of activities and monitoring of its implementation. For monitoring and evaluation, there will be scope for women's participation. Monitoring of project inputs concerning benefit to women should invite their participation that will make the process more transparent to them. Women will be encouraged to evaluate the project outputs from their point of view and their useful suggestions should be noted for taking necessary actions for further modifications in the project creating better and congenial situation for increasing participation from women.

Inclusion of women in the socio-economic survey	Gender-segregated data for each household has been collected and analysed with regard to ownership and use of resources; decision making regarding finance and resource use; women's formal and informal income-earning activities; extent of women's dependence on water bodies in the villages; and Women's skills.
Income-restoration programs to address gender issues	During social impact assessment survey, existing levels of women's skills and their occupation were assessed. Women's participation will be initiated through Self-Help Group formation for interested women participants. Special orientation meetings will be arranged with the women members to help form self- help groups. Training will be provided to the SHG groups along with the exposure visits. The NGO during implementation will also explore the opportunities for augmenting existing income

5.6.4 INVOLVEMENT OF WOMEN IN PROJECT ACTIVITIES

The developers will set up their solar power plants on identified locations where labor force required for the construction activities will be provided with temporary residential accommodation in the initial stages of the project and other necessary infrastructure facilities. The labor force required for the setting up the solar power plant will predominantly involve skilled/ semi-skilled workforce, which is predominantly going to come from outside the project area. In addition, there will be requirement of unskilled labor where women from the local villages will certainly contribute. However, post construction / installation of solar power plant, certain percentage of skilled/ semi-skilled workforce of the developer would continue to be based for the operations phase of the project, whereas large number of activities in the operations phase would require semi-skilled/ unskilled workforce on continuing basis, which would create avenues for employment generation for women through participation in such activities. Foreseeing the involvement of women both directly and indirectly in the construction and operation phases in the project, certain measures are required to be taken towards issues related to women and children in particular during the construction and operations phase.

5.6.5 Specific Provisions during Construction And Operation Stages

In addition to the local women working on the project, there could be several women dependent members along with the male member of the family who may be engaged in the construction work and stay in temporary construction camps. They are likely to face many adverse conditions and realizing this, a number of welfare provisions mentioned under this section have been planned directed to cover all the women and children living in the construction camps as well as the local women who work as labour during the construction stages.

Temporary Housing

During the construction work phase, the families of laborers/workers should be provided with residential accommodation suitable to nuclear families.

Health Centre

Health problems of the workers should be taken care of by providing basic health-care facilities through health centers temporarily set up for the construction camp. The health centre should have at least a visiting doctor, nurses, general duty staff, free medicines and minimum medical facilities to tackle first-aid requirements or minor accidental cases, linkage with nearest higher order hospital to refer patients of major illnesses and critical cases. Apart from this, the health centre should be provided with regular vaccinations required for children. The access to these facilities shall be extended for local village population also as part of the CSR initiatives.

Day Crèche Facilities

It is expected that among the women workers there will be mothers with infants and small children. Provision of a day crèche may solve the problems of such women who can leave behind their children in such crèche and work for the day in the construction activities. The crèche should be provided with at least a trained worker to look after the children. The worker, preferably women, may take care of the children in a better way. In cases of emergency, she, being trained, can tackle the health problems of the children and can organize treatment linking the nearest health centre. This component would also be very critical for local women workers engaged on project activities.

Proper Scheduling of Construction Works

Owing to the demand of a fast construction work it is expected that a 24 hours long work schedule would be in operation. Women should be exempted from night shifts works as far as possible.

Sanitation Facilities

The construction sites for solar parks shall be provided with toilet facilities with separate facilities for women working on the project either during construction or operation stages.

5.6.6 Special Measures for Controlling Std And Aids

Though during consultation process, no issues related to STD and AIDS have been reported in the area. However, the Solitary adult males usually dominate the labor force of construction camps. They play a significant role in spreading sexually transmitted diseases. In the construction camps as well as in the neighboring areas they are found to indulge in physical relations with different women.

This unhealthy sexual behavior gives rise to STDs and AIDS. While it is difficult to stop such activities, it is wise to make provisions for means of controlling the spread of such diseases. Awareness camps for the target people, both in the construction camp and neighboring villages as well, and supply of condoms at concession rate to the male workers may help to a large extent in this respect for controlling the deadly disease.

5.6.7 Addressing Gender Issues In Project Cycle

The plan seeks to address the various gender related issues through a set of activities and programs. The implementation mechanism specifying the roles of different institutional players, the indicators for further assessment and the means of verification have been specified. To make the gender development plan a time bound initiative, a time frame for implementation of each activity has also been specified as given in table below.

Table 5-35: Addressing Gender Issues in Project Cycle

Issue	Activity	Responsibility	Indicator	Action taken/means of verification	When
Planning Phase					
Women in project area informed about the project	Information campaign about the Project (Public Consultation, written materials, and newspapers) reaches the women at all levels	Project	Women familiar with main elements of the Project	Women consultation were carried out as mentioned in SMP	During census survey
Women at all levels participate in the Project planning process	Project meets Women PAPs on regular basis	Project team	Number of Women consultations held Women's comments and suggestions are reflected in the plans and designs or they understand reasons why suggestions not incorporated	Records from community meetings. Minutes of the meeting includes voices of women	Through out the project preparation
Key stakeholders fully aware of important roles women play in the Project	Gender awareness / sensitization of key stakeholders	Project	Gender Actions Identified	Gender actions identified as given in next section	To be implemented during project implementation
Project Implementation stage					
Women participate in management and monitoring of implementation and are equal partners in solving issues	Information desks at Project office with information on; developer persons responsible for supervision, those responsible in Project, work schedule, and where to raise issues.	Project and M&E Consultants	Women members in M&E team and project team. Number of women participating in consultations	Progress reports by M&E consultant, Feed-back through local community	Starts at the beginning of project and continues through the implementation Phase
Assessment of socio-economic impacts	Develop simple monitoring format based on the household survey Gather gender	Project Team and M&E Consultant	Number of women given employment opportunities Number of women specific	Impact assessment reports by M&E consultant	Baseline prior to implementation. Subsequent assessments at agreed intervals

	disaggregated information on Project impacts		SHGs formed. Number of women trained in income generation activities		
Operation Phase					
Assessment of socio-economic impacts	Gather gender disaggregated information on Project impacts	Project	Number of active SHGs Number of women engaged in economically productive activities Increase in annual income of WHH Increase in households assets of WHH	Impact assessment reports by Project Team	Impact assessment on regular intervals during operations phase

5.6.8 Possible Areas Of Women Involvement

The villagers, particularly the women folk can be encouraged to take-up the activities related to dairy functions by providing cow/buffalo and some training under the CSR activities. Literacy rate in the project area is quite high. The willing women can be trained to provide the services of unskilled/ semi-skilled jobs in the solar project. The additional areas could also be explored for livelihood generation opportunities for women as part of the implementation of gender actions with the changing demands for services in context of the project interventions.

Formation and / or Strengthening Women Self Help Groups

This can be taken up by project under their CSR program wherein efforts can be made to increase awareness amongst women on various schemes and programs run by the State Government to enable them to avail the benefits provided. The project management consultants /NGO will assist the project team in the process of identifying the interested women for forming the SHGs. The women SHGs will be formed as per the norms formulated by the Government. The skill development program and financial assistance will be distributed through the SHGs.

Besides, the following measures need to be undertaken to ensure that women's livelihoods are restored or even improved compared to what existed before project implementation.

- Income generating program will be designed to ensure that women derive a reliable income by engaging in activities that are within their capacity, taking into account the availability of resources and the type of enterprises that they are already engaged in;
- The women will also be provided training for employment with the support from project developers to train these women for the skills needed by the developers specific to operational phase of the project such as cleaning of solar panels, security guards, etc;
- Social awareness campaigns and training opportunities will be organized to increase women's integration into social and economic mainstream; and

- Project will strengthen Women's Community based organizations by providing training and advisory supports during construction period and subsequently take adequate measures to strengthen them during project operations phase.
- The project developers shall also be encouraged to hire services through these SHGs in order to ensure continuing income opportunities for these SHGs

Training for Self-Employment

In addition, capacity enhancing assistance will be provided that improve the access of women to skills training for off-farm employment such as tailoring and weaving, small goods shops; marketing - buying and selling local produce; processing of locally produced products, which can act as supplementary source of income for women as well as meet the needs of the project staff posted in the area. Vocational training would be imparted to the women PAPs. These training programs would be imparted through the existing government schemes specifically meant for the development and welfare of the women community and supplementary funds will be allocated from the project towards facilitating the setting-up of the activities as part of the training allowance.

The project management consultant / NGO appointed for the project will identify preferred training areas and ascertain the interest of the women PAPs before preparing a proposal to project for implementation of the training programme. The selection of eligible PAPs for training will take into account the age group, education level, existing skills, family responsibilities, time flexibility and the interest of the women PAP etc. for a particular trade/ income generating activities.

Improved Access to Health and Sanitation Facilities:

The consultation with the women groups brought out two critical issues of water quality and sanitation facilities in the villages. The water quality issue shall be addressed as part of the SMP through proposed CSR head of financing the SMP and women group can be entrusted the responsibility of managing the water treatment facility, which shall be operated and maintained on cost basis. The sanitation facilities shall be improved in the villages through convergence of resources available under the various programs of the GoI and the CSR budget allocation for SMP which shall be supported with awareness.

5.7 Stakeholder Participation and Consultations

Stakeholder participation and consultations is an important process through which a two way dialogue is created between the project proponent and the stakeholders. The consultation process provided opportunities for the affected communities to express their views on the planned project, whilst providing key information on issues faced by the land sellers. Comprehensive planning is required to assure that local government, host population and project staff interacts regularly, frequently and purposefully throughout the various stages of the project cycle. The following section presents the consultative and participatory mechanisms adopted and the outputs of these consultations.

5.7.1 Consultation Process and Participation

The consultation process established during preparation stage of the project uses different types of consultations such as in-depth interviews with key informants, focus group discussions including those who are not directly affected and individual consultations during social impact assessment study. As part of the consultation process undertaken by AECOM as part of the ESA study, women were given the opportunity to voice their views as well. The consultation program included the following:

- **Heads of households likely to be impacted:** These were identified based on the verification exercise conducting in identifying the affected persons as per the list provided by RUMSL site representative.
- **Household members:** These were part of the affected households and include the affected land owners and their family members.
- **Villagers:** These were consulted by way of public meetings and small group meetings and included the directly and indirectly affected persons.
- **Village Panchayats:** These were consulted through public meetings as well as in small group meetings.
- **Government Departments:** Two government departments, namely, the District Collectorate and District Development Office were contacted as part of the study requirements.
- **RUMSL Site Representatives:** The site representatives were consulted to understand the project components and consent process being undertaken from the landowners.

As reported during the consultation process, the local population were informed about the project through a notice that was published by the District Collectorate Office in November 2015 when the private land was identified for the project. Thereafter, consultations were held by AECOM during November and December 2015 as part of the ESA study. It was also reported by the local population that informal consultations were also held in between these months after the notice was published and prior to the consent process wherein the local population were informed about the land consent process and basis of payments calculated. The project affected

population were aware that the identified land for the project could get acquired only after 'consent' was provided by the landowners out of their own volition.

5.7.2 Consultations held with Local Population

The study team carried out local level consultations in the project affected villages. The objectives of the local level consultations were to inform the affected persons and indirectly affected population about the project and to understand their perception about the project in terms of both negative and positive impacts. Below are the details of the consultations undertaken with the local population in the study area villages.

Consultations held at Barsaita Desh Village: Consultations were held at Barsaita Gram Panchayat Office on 20th November 2015. The meeting was attended by 45 individuals in total out of which 6 were women. Details of consultations with local population held at Barsaita Village have been presented below,

Table 5-36: Details of Responses received from Barsaita Village

S. No	Questions Discussed	Responses
1	Awareness and information about the Project?	The respondents knew limited details about the project. Their knowledge was limited to what it is meant for and that it was not detrimental to the environment as most 'industries' are. The villagers became aware of the project approximately 3 months ago when the information was published in a local newspaper. Subsequently, the list of names and land parcels was provided to the Gram panchayat by the Tehsildar approximately 15 days later and the land owners were informed.
2	Status of Land prior to acquisition	The land was either barren, left uncultivated, or used for growing crops (rice and wheat) depending upon the availability of the water during the rainy season. The area is still used for grazing of animals. Most of the land is from Barsaita Pahad and it is rain dependent for crops. Since the village is uninhabited, it becomes a tedious task for them to give time to the land there. Therefore, it has not been used as the main cropping area by the land owners.
3	Process of deciding the land rates, negotiations, and comparison with existing market rates	All of the respondents were aware of the fact that the rates were decided by the Collector's office and a one time payment based on the Collector Guideline Rate plus a one time solatium would be provided as payment for sale of the consented land. Most were, however, not aware of what the existing market rates are, or if the Collectorate rates are higher or lower in comparison to those. No negotiations were reported, and no intermediaries or middlemen are involved in the process so far.
4	Status of disbursement of payment	The payment is based on the prevailing market value (known as the Collector Guideline Rate) plus a one time solatium which is yet to be disbursed.
5	Intended use of the compensation amount	The land owners intend to use the amount for purposes such as purchase of more land, property, construction or repair of their houses, marriages, business investment or just save, and to pay off their debts.
6	Other project associated benefits promised by the authorities	No promises have been made by the authorities. However, during the consultation exercise, the RUMSL representatives clarified that while no mandatory employment shall be provided, the local persons would be encouraged to take up employment for any project related work.
7	Presence and details of any archaeological and/ or place of	No such sites were reported to be within or near to the project area.

S. No	Questions Discussed	Responses
	religious/ cultural importance which falls within the project area or has access through it	
8	Details of land appreciation after project inception	The respondents were unaware of this aspect.
9	Expectations from the project	- The land owners are keen to gain employment in the project activities. - Subsidised electricity and vocational training are two other expectations from the project management. - Last, the respondents expect an overall development to take place because of the project, such as in infrastructure, roads and health facilities.
10	Apprehensions and concerns, if any	The land owners donot have any apprehensions as such, except that they feel other parcels of their land near the project area should also be acquired for the project.
11	If consent was Informed and un – coerced.	The land owners were made aware of the project prior to the consent being sought, and they reported that their consent was not forced in any manner.



Photo 5-13: Consultations undertaken with Barsaita Gram Panchayat members and local population; Date: November, 2015



Photo 5-14: Consultations with Barsaita Gram Panchayat members ; Date: November, 2015

Consultations held at Badwar Village: Consultations were held at Badwar Gram Panchayat Office on 16th December 2015. The meeting was attended by 23 individuals in total out of which 3 were women. Details of consultations with local population held at Badwar Village have been presented below.

Table 5-37: Details of Responses received from Badwar Village

S. No	Questions Discussed	Responses
1	Awareness and information about the Project?	The respondents affirmed that they were aware about the project. Most of the respondents related that they have not seen a solar plant but have heard that it does not generate any pollution. The villagers became aware of the project approximately 4 months ago when the information was published in a local newspaper. Subsequently, the list of names and land parcels was provided to the Gram panchayat by the Tehsildar approximately 15 days later and the land owners (<i>Khatedars</i>) were informed.
2	Status of Land prior to acquisition	The land was either barren, left uncultivated, or used for growing crops (rice and wheat). As the crops are dependent on rainfall, agriculture used to be carried out only when there was a good rain spell. As there has been erratic rainfall in the last three years, most of the area has been left uncultivated.

S. No	Questions Discussed	Responses
3	Process of deciding the land rates, negotiations, and comparison with existing market rates	All of the respondents were aware of the fact that the rates were decided by the Collector's office and besides the Collector Guide Rate, plus a one time solatium would be provided as payment. Most were, however, not aware of what the existing market rates are, or if the Collectorate rates are higher or lower in comparison to those. No negotiations were reported, and no intermediaries or middlemen have been involved in the process.
4	Status of disbursement of payment	The payment is based on the prevailing market value (known as the Collector Guideline Rate) plus one time solatium which is yet to be disbursed.
5	Intended use of the compensation amount	The land owners intend to use the amount for purposes such as purchase of more land, property, construction or repair of their houses, marriages, business investment or just save, and to pay off their debts.
6	Other project associated benefits promised by the authorities	No promises have been made by the authorities.
7	Presence and details of any archaeological and/ or place of religious/ cultural importance which falls within the project area or has access through it	No such sites were reported to be within or near to the project area.
8	Details of land appreciation after project inception	The respondents did feel that there has been a slight increase in the land price because of the project.
9	Expectations from the project	- The land owners are keen to gain employment in the project. - The respondents feel that with the project, land prices in the area would increase which would benefit them indirectly. - The respondents were of the opinion that certain welfare activities should be rolled out by the project proponent which would help the society at large. One suggestion that was put forward by the Sarpanch was setting up of a Rehabilitation Centre for Alcoholics as he was of the opinion that there was a higher rate of alcoholics amongst the younger generation.
10	Apprehensions and concerns, if any	The land owners and local population do not have any concerns about the project.
11	If consent was Informed and un – coerced.	The land owners were made aware of the project prior to the consent being sought, and they reported that their consent was not forced in any manner.



Photo 5-15: Household surveys undertaken for Ramnagar Pahad Village; Date: December, 2015



Photo 5-16: Household Survey undertaken for Etar Pahad village; Date: December, 2015



Photo 5-17: Focus Group Discussions undertaken at Barsaita Village; Date: December, 2015



Photo 5-18: Focus Group Discussions undertaken at Badwar Village; Date: December, 2015

Consultations held at Ramnagar Village: Consultations were held at Ramnagar Gram Panchayat Office on 17th December 2015. The meeting was attended by 18 individuals in total out of which 2 were women. Details of consultations held at Ramnagar Pahad Village have been presented below,

Table 5-38: Details of Responses received from Ramnagar Pahad Village

S. No	Questions Discussed	Responses
1	Awareness and information about the Project?	The respondents affirmed that they were aware about the project only after the list of names and land parcels was provided to the Gram panchayat by the Tehsildar.
2	Status of Land prior to acquisition	The land was either barren, left uncultivated, or used for growing crops (rice and wheat). As the crops are dependent on rainfall, agriculture used to be carried out only when there was a good rain spell. As there has been erratic rainfall in the last three years, most of the area has been left uncultivated.
3	Process of deciding the land rates, negotiations, and comparison with existing market rates	All of the respondents were aware of the fact that the rates were decided by the Collector's office and besides the Collector Guideline Rate, plus one time solatium would be provided as payment. Most were, however, not aware of what the existing market rates are, or if the Collectorate rates are higher or lower in comparison to

S. No	Questions Discussed	Responses
		those. No negotiations were reported, and no intermediaries or middlemen have been involved in the process.
4	Status of disbursement of payment	The payment is based on the prevailing market value (known as the Collector Guideline Rate) plus one time solatium which is yet to be disbursed.
5	Intended use of the compensation amount	The land owners intend to use the amount for purposes such as construction or repair of their houses, marriages and to pay off their debts.
6	Other project associated benefits promised by the authorities	No promises have been made by the authorities.
7	Presence and details of any archaeological and/ or place of religious/ cultural importance which falls within the project area or has access through it	No such sites were reported to be within or near to the project area.
8	Details of land appreciation after project inception	The respondents did not feel that there was any change in the land prices in the area.
9	Expectations from the project	- The land owners are keen to gain employment in the project. - The land owners are contented that they would be receiving compensation for their land parcels.
10	Apprehensions and concerns, if any	The land owners and local population do not have any concerns about the project.
11	If consent was Informed and un – coerced.	The land owners were made aware of the project prior to the consent being sought, and they reported that their consent was not forced in any manner.

5.7.3 Consultation held with District Officials

Consultations were also held with the District Collector and District Development Officer (also known as Chief Executive Officer of the Zilla Panchayat) of Rewa District on 21st November 2015 to understand their views about the proposed project. The views expressed by them have been presented below,

Views expressed by District Collector, Mr. Rahul Jain: The District Collector while discussing about the proposed project and its current status mentioned that private land for the proposed project is being acquired as per Madhya Pradesh's Consent of Land Purchase Policy wherein priority is given to the people's consent. He mentioned that till date about 80% of the local population in the project villages have provided their consent. He was of the view that the people are willing to give their consent due to the fact that the land parcels are basically barren and less agricultural activities are being carried on. Once the entire list of land owners provides their consent for the land, registry of the land would be undertaken. Another reason he felt why people are willing to provide their consent is due to the fact that the land parcels were used by the Indian Army as a firing range till 2002. The local population had no use of the land parcels and did not undertake any activity in this area. In conclusion, he stated that the policy guideline would be strictly adhered to and only after receiving 100% of consent from the local population would the land parcels be registered for the proposed project. He felt that the district would be benefitted by this project as it would send a message to the private investors to invest in the area on new projects that would eventually develop the area.

Views expressed by District Development Officer (CEO), Mr. Neeraj Pareek: On discussing about the government development schemes being implemented in the project area, Mr. Pareek mentioned that all schemes implemented at the State level like Indira Awaas Yojna, Nirmal Bharat Abhiyan, Rural Employment Generation Scheme, Integrated Rural Development Programme etc. area also implemented in Gurh. He was of the view that

there are no major challenges in implementing these schemes. However, he felt that new ventures like introduction of smokeless chulhas for schools in the preparation of mid day meals would help in reducing the use of firewood for preparing the meals. In addition, he stated that as most of the local population owe livestock, a biogas plant in the vicinity of the project area would be beneficial for the local villages as connections from the biogas plant to the households would be beneficial for them.



Photo 5-19: Interview with Mr. Rahul Jain, District Collector of Rewa District; Date: November, 2015



Photo 5-20: Interview with Mr. Neeraj Pareek, District Development Officer of Rewa District; Date: November, 2015

5.7.4 Consultations with RUMSL Representatives

The RUMSL representatives were also interviewed during the site visit in order to understand the current status of the project and learn about the project in details. The excerpts of the interview have been presented below in **Table 5-39**.

Table 5-39: Key Questions and Responses from RUMSL Representative

S. No.	Questions Discussed	Response
1	Land Procurement Process: - What type of land has been procured for the project activities? - Is any forest land going to be used for any of the project activities? - What guideline has been followed in the acquisition of private land? - What is the current status of the consent of land owners? - How has the price for the land purchase determined? - What will be the next step once all land owners provide their consent? - Is the local population content in selling their land for the project? - Has No Objection Certificates (NOCs) from the respective Gram Panchayats taken for the project activities?	- Priority has been given to procuring government revenue land for the proposed project to the extent possible. A small part of the land area shortlisted belongs to private land owners. The land under these land owners are mostly barren and not much agricultural activities takes place in these parcels. - No forest land is envisaged to be transferred for the project activities. - The private land is in the process of being acquired as per the Consent of Land Purchase Policy. - About 90% of the land owners have already provided their consent for the land sale in Phase I. - The price for the land purchase is being determined based on the prevailing market value. - Once all the landowners provide their consent, the land would be registered by the District Collectorate. - The local population have expressed their happiness that they would not only be receiving double payment in the form of a one-time Collector Guideline Rate plus a one time solatium after selling their land. - No Objection Certificates (NOC) from the respective

S. No.	Questions Discussed	Response
		Gram Panchayats has been obtained for the project activities.
2	Community Engagement: - How was the community informed about the proposed project? - Has any prior meeting been undertaken by NRED with the local community? - Was an information disclosure meeting conducted with the local authority?	- The local population learnt about the project activity through newspaper and eventually through RUMSL when the officials visited the Gram Panchayat to apprise the local population about the land required for the proposed project. - RUMSL officials have had meetings with the Gram Panchayat, first to apprise them of the project and land required and second, when consent of the land owners were undertaken. However, no formal records of the same have been maintained by RUMSL. - Informal discussions about the project and its activities have taken place with members of the local authority and the members are well aware of the project.

5.7.5 Consultations with Villages falling within 5km of Project Area

Consultations and focus group discussions were also undertaken in randomly selected villages falling within 5 km radius of the project area during 13th – 16th February 2016. The villages where discussions consultations were held were Maldewa, Amarpur, Mamdar, Mohaniya, Bela, Dadhawa, Bandhi, Podi, Rateh, Duari, Gaura, Jaraha, Amiliha, Bhusunwa and Kumhi. Questions relating to knowledge about the project, concerns and issues (if any) were asked. It was noted through consultations that the residents of these villages were not aware of the project and did not have any concerns or issues relating to the project. As the villages fall within a distance of 1.3 km to 4 km from the project area, no impact of the project on marginalized or indigenous community's residing in these villages is envisaged.

5.7.6 Expectations from the Local Communities Consulted

A need assessment was undertaken amongst the project affected households to highlight their expectations from the proposed project. These views were collated in order to comprehend the need of the locals so that prioritising of welfare activities by the project proponent can be better chalked out in the future in the form of implementation of Local Area Development activities.

Badwar Village: Priority wise the population of Badwar village were of the opinions that roads, electricity supply and women empowerment needed attention. Skill development, agricultural improvement and transport facilities were also areas which required consideration.

Barsaita Village: As per views collected agricultural improvement, health centres, employment opportunities, transport facilities, women empowerment, skill development, educational facilities and infrastructure were areas which needed improvement.

Ramnagar Pahad: Educational facilities, agricultural improvement, health centres and employment opportunities were areas which were of utmost importance.

Etar Pahad: Health centres, employment opportunities and women empowerment were areas which required attention.

The detail of the areas wherein utmost priority needs to be given is provided below,

Employment Opportunities: Almost all households expected that with the proposed project, employment opportunities would increase for the local population. They were of the opinion that the project should not only provide unskilled work opportunities for majority of the population but also entrepreneurship opportunities such as contractor, shop owners, vehicle suppliers etc. which they felt would increase as it is likely that more projects would come up in the area.

Healthcare Facilities: The population expressed their hope that healthcare facilities in the area should be developed due to lack of health centres in the area. They voiced that this would help the local population to a considerable extent as it will save time and expense of the people in travelling to Gurh and Rewa city for treatment of ailments.

Transport Services: The members felt that transport services to and fro from the area should be improved because of the project activities. Efforts should be made in developing the transport services so that the local population would be benefitted to a considerable extent.

Agricultural Improvement: Most households consulted felt that efforts should be made in providing scientific knowledge which would increase the agricultural productivity in the area.

Women Empowerment: Most households felt that women should be provided opportunities in the form of jobs and vocational trainings so that their empowerment could take place.

Skill Development: Skill development was also mentioned which should be provided to the local population so that they could gain employment opportunities in areas which have manpower requirement.

Road Conditions: Most households were of the opinion that road conditions leading to the villages should be improved and maintained regularly.

5.7.7 Efforts Initiated by RUMSL

On 24th September 2015, Madhya Pradesh Urja Vikas Nigam Limited (MPUVNL) provided a letter to the Collector, Rewa District and Chief Administrative Officer, Zila Panchayat on Solar Skill Development Programme. As per the letter, it was stated that with the development of the proposed solar power project to be set up at Rewa, a 'Solar Skill Development Programme' has been initiated wherein the programme encourages all Industrial Training Institute (ITI) and Diploma Holders to join the course on for Solar PV Technician. The course will be for a period of three (03) months duration and will be completely free of cost (tuition fee and accommodation to be provided). Women and reserved candidates are encouraged to apply for the course. The programme's target is to train 4000 individuals for a period of five (05) years. National Institute of Solar Energy (NISE) will monitor the implementation of this programme.

For the programme to be initiated, ITI's/ Polytechnic would be shortlisted. The course would be of 300 hours/3 months. For each batch an amount of INR 12.84 lakhs would be disbursed. A request to the addressee was given stating that dissemination of information about this programme be provided to ITI/Polytechnic Diploma holders.

As reported by the RUMSL site representative, 24 institutes (12 ITIs and 12 Polytechnics) have been shortlisted by NISE to undertake this programme, out of which 6 institutes have students enrolled for the training programme which will commence in January 2016. An advertisement of the programme has been published on the website of MPUVNL calling for applications of enrolment.

5.7.8 Local Area Development Activities

Based on the need assessment undertaken during the census survey, the project proponent shall plan and initiate local area development activities in the communities within the vicinity of the project area as part of social welfare activities. The following activities have been suggested as per the consultations conducted during the site visit.

Employment Opportunities: The construction and operation phase will throw open a varied set of job opportunities for the population belonging to the study area. Unskilled and semi skilled jobs including civil construction jobs, security guards, drivers, solar panel cleaners, weed remover etc. will need to be filled. Once the construction phase commences, local communities around the vicinity of the project area should be given priority in employment (both, skilled and unskilled) opportunities that will arise.

Work opportunities will not be limited to employment at the construction area only. Instead, job opportunities will also be created to those individuals who are interested in providing services as local contractors for small work.

Skill Development: Vacancies will be made available in the construction and operation phase for the population belonging to the study area. Unskilled and semi skilled jobs including construction jobs will need to be filled. With these vacancies, skill development will be a major factor in making the population employable. The project proponent should be responsible in training individuals in the area to make them eligible to take up jobs in the solar plants.

Educational Services: With the trickling down of development effect to other sectors, educational services in the area would be eventually developed. As part of the local area development activities, the project proponent can provide services and aid to the existing schools in the area in terms of infrastructural aid, reading room, science camps, health camps, environmental camps and in addition, encourage the Government to open schools of high school level in the area.

Healthcare Facilities: The project proponent should aid the local communities in developing a healthcare facility in the area. In addition, mobile health vans can be introduced in the area with a set of medical professionals accompanying it so that the study area and its neighbouring population can be benefitted by this step.

Vocational Centres for Women: Vocational centres providing skills like tailoring, pickle making, handicraft making etc. can be introduced in the area to give a platform to the women population to engage themselves in other areas besides household activities. This step will bring about women empowerment wherein effects will be noticed in areas like employability, education and health aspects thus, bringing them at equal par with their male counterpart. The prospects of women becoming decision makers by being financially independent will change the gender role in the community and secure their place in the workplace and family alike.

Transport Facilities: The project proponent can initiate steps in the development of transport facilities in the area. They can initiate a program wherein low interest loans can be provided by small banks to interested individuals who are interested in investing in autorickshaws or smaller vehicles which can be used as a public transport system in the area.

Agricultural Improvement: Knowledge on agricultural improvement or new technology can be imparted through a program for the farmers in the area to adopt steps in improving their agricultural productivity.

The proposed local area development activities should be planned every year along with the proposed budget detailing out the activities to be undertaken. These activities should be undertaken in collaboration with Non-Governmental Organizations (NGOs) working in Rewa District.

5.7.9 Financing Arrangements For The Income Restoration Plan And Social Development Activities

Provision Under The Agreement As Per Mnre Guidelines

As per the MNRE guidelines, 1% of the total investment made for setting up solar power project in the solar park is to be kept aside by the SPD for the local area development, under solar park development fund account". In context of the project blocks, the total investment for setting-up the power plan of 600 MW capacity is estimated at ₹. 4200 Crores (₹. 7 Crore per MW). The budget to be earmarked as per MNRE Guideline @ 1% of the total investment for Local Area Development is ₹. 42 Crores. In addition, there are 10 other solar power blocks with capacity of additional 500 MW within these two village's, the additional resources available would be of the tune of ₹. 35 Crore.

5.7.10 Provision For CSR Under The Companies Act

In addition to the above one time financial provisions that the Developers would be required to make as per the MNRE guidelines and conditions of the agreement, the other source on continuing annual basis available for Local Area Development would include the mandatory at least 2% of average net profits of the company in the three immediately preceding financial years are spent in every financial year on such activity, where the preference to be given to the local area and areas around the company operates for CSR spending.

Schedule VII of the Companies Bill 2012 prescribes activities that may be included by companies in their CSR policies:

1. Eradicating extreme hunger and poverty;
2. Promotion of education;
3. Promoting gender equality and empowering women
4. Reducing child mortality and improving maternal health;
5. Combating human immunodeficiency virus, acquired immune deficiency syndrome, malaria and other diseases;
6. Ensuring environmental sustainability;
7. Employment enhancing vocational skills;
8. Social business projects;
9. Contribution to the Prime Minister's National Relief Fund or any other fund set up by the Central Government or the State Governments for socioeconomic development and relief and funds for the welfare of the Scheduled Castes, the Scheduled Tribes, other backward classes, minorities and women; and;
10. Other matters as may be prescribed.

5.7.11 Implementation Arrangement

The training and capacity building activities including support for implementation of Gender Action Plan and Local Area Development Activities shall be facilitated as part of the project for which the RUMSL could hire the services of NGO in addition to have a social expert.

As there are going to be multiple developers operating in the area, it is proposed that project shall be responsible for facilitating the income generation and social Development activities and pool the resources from different

developers to a common account to be utilized for social development activities as prioritized by the villagers for which it could also hire the services of the NGO.

As per the provisions of the agreement, Local area development would comprise of a) Development of Village Panchayat and b) Development of areas other than Village Panchayat. A Committee, headed by the District Collector, will be constituted with the representative of RUMSL as Member Secretary. Member Secretary of this committee will be responsible for handling funds, maintain records of all accounts, and develop transparent policies for carrying and developmental activities in the stated Panchayat areas.

6. REVIEW OF LAND ACQUISITION PROCESS

The proposed project involves acquisition of government revenue and private land from titleholders located in 5 villages. An attempt has been made in this chapter to review the land acquisition process adopted for the project and assess the impact of land acquisition and other assets on the Project Affected Persons/Families.

6.1 Land required for the Proposed Project

The Government of Madhya Pradesh (GoMP) through its New and Renewable Energy Department (NRED) has identified the potential site measuring an area of approximately 1500 hectares (2 MW per one hectare of land) for setting up of the proposed 750 MW solar power project. Out of the approximate 1500 hectares, 302.989 hectares is private land and the remaining land measuring 1232.697 hectares is government revenue land.

The Consent Land Purchase Policy approved by the Government of Madhya Pradesh on 12th November, 2014, has been adopted to acquire the private land for the project. Till date, as reported by NRED site officials, approximately 90% of the private land owners in Phase I have provided their consent voluntarily for sale of their land for the proposed project while land parcels for Phase II of the project have been identified. In addition, it was also reported that contiguous land is desirable for the project however, if in some cases, some land owner do not provide his consent then his land will not be taken and the project will be accordingly structured around that parcel of land.

6.1.1 Loss of Land

Government Revenue Land:

As per documents provided by NRED Representatives, the government revenue land measuring approximately 1232.697 hectares has been identified and transferred for the proposed project which accounts to 30.4% of the government land. As per the revenue record, the land use of the parcels has been classified as barren rocky, scrub and fallow land. As reported by the District Collectorate, the government land was not used by the local communities for any economic activities nor was there any local population residing on these land parcels. Due to the abundance of available land, during the rainy season, local communities usually take their livestock to these land parcels for grazing purposes. This however, last only for a few months and due to availability of land in the area, this activity would not be impacted by the project.

The break- up of the government revenue land has been provided below in **Table 6-1**,

Table 6-1: Details of Government Land transferred for the Project

S.N o.	Village Name	Total Government Land available (in hectares)	Total Revenue Land (in hectares)	% of tranferred land
1	Badwar	1707.743	547.381	32
2	Barsaita Desh	617.949	367.630	59
3	Barsaita Pahad	457.282	24.545	5.3
4	Etar Pahad	2366.89	119.384	5
5	Ramnagar Pahad	317.404	173.76	54

Private Land:

The break-up of the private land for the proposed project has been detailed below in **Table 6-2**,

Table 6-2: Details of Private Land to be acquired for the Project

S.No.	Village Name	Total Private Land (in hectares)	Total Private Khatedars
1	Badwar	89.764	185
2	Barsaita Desh	112.367	163
3	Barsaita Pahad	14.624	16
4	Etar Pahad	15.551	21
5	Ramnagar Pahad	70.683	77
	Total	302.989	462

As reported by the NRED site official, no forest land is acquired for the proposed project. In the process of identifying the required land for the project, NRED's first priority was aimed at focusing on transfer of revenue land. In areas where private land has been delineated, land parcels comprising of ongoing agricultural activities and house structures have been consciously avoided and not included within the proposed project boundary. As the Consent Policy has been adopted for the land acquisition process, land parcels will be acquired for the project only when the landowners provide their consent to do so. If in cases where the landowners refuse to provide their consent, their land would not be acquired and the project will be accordingly structured around that parcel of land through the adoption of this Consent Policy. NRED has limited the scope of any physical or economic displacement of the local population from taking place.

One temporary structure (comprising of a room for residential purpose and two cattle sheds) belonging to a resident of Ramnagar Pahad will however, be affected in Phase I of the project. Details of this structure have been provided in section 1.2.2 of the report.

6.2 Usage of (Government and Private) Land under Acquisition

The type of land usage in the project area is presented in **Table 6-3**,

Table 6-3: Usage of Land under Acquisition

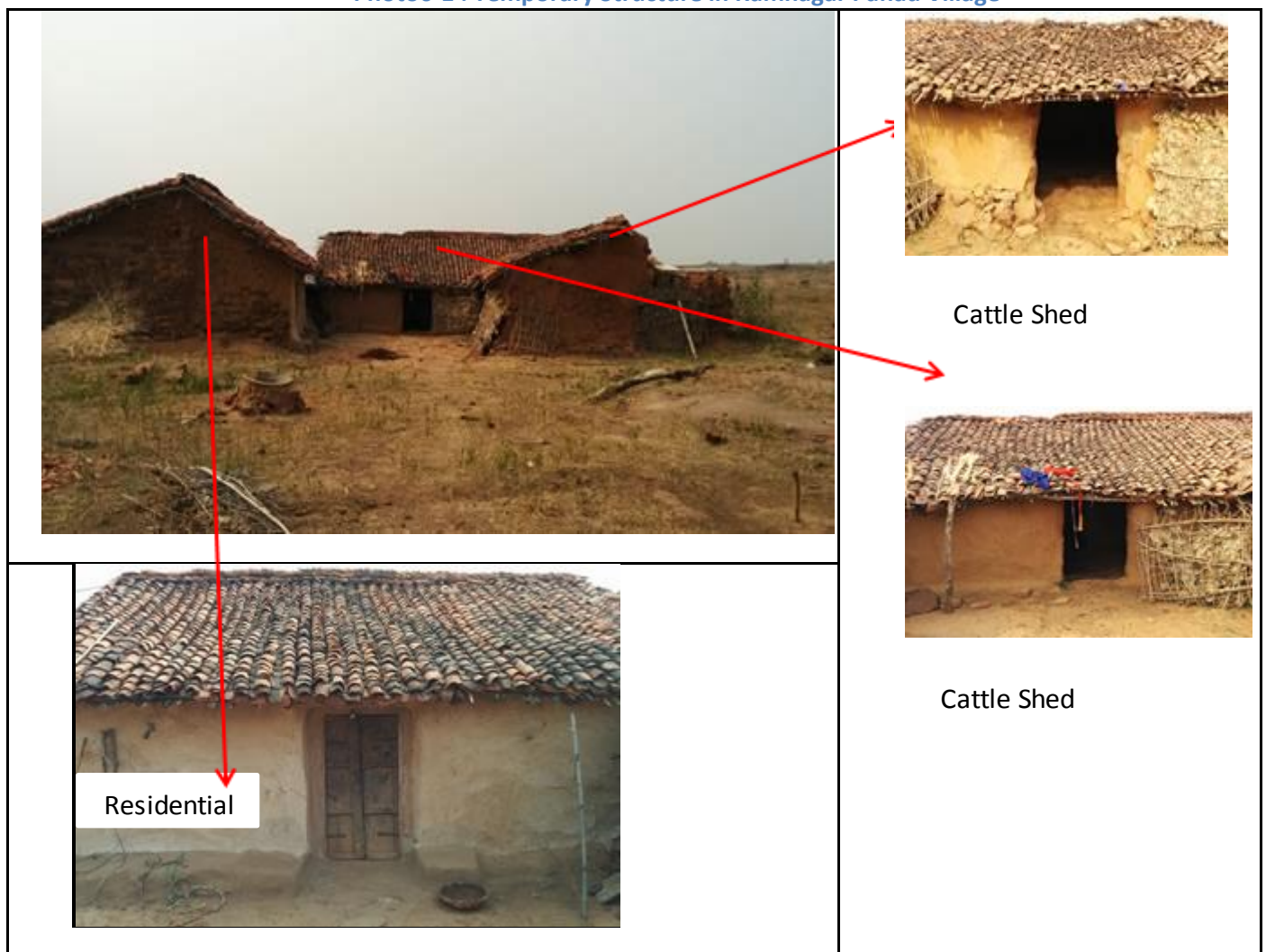
S.No	LU Name	Area in Sq.km	%
1	Hillock/Rocky	20.2816	97.98
2	Nallah	0.4184	2.02
	Total	20.7	100

As observed from the table above, the land use of the project area comprises of 97.9% of hillock/rocky terrain while 2% is under the category of Nallah. A seasonal channel of rain fed water which flows for few months locally termed as 'Devdah Nala' is referred to as 'river' here. It was observed to be present within the site limits and crosses the land parcels in the east to west direction and drains into Ban Sagar Lake, located at a distance of 30km in the south-west direction from the project site. The natural drainage pattern will remain untouched during the project construction and implementation phase as reported by NRED Officials.

6.2.1 Loss of Structures

A temporary (made up of brick and stone walls with thatched/mud roof) structure comprising of a residence and two cattle sheds (with no boundary walls) in Ramnagar Pahad²² (away from the settlement area) will be acquired due to the proposed project in Phase I. On consultations with the landowner (Siya Sharan: Khasra No. 107,108,128 & 130), it was established that these structures were in the landowner's family for about 25 years and measured approximately 0.009 hectares area wise. It was reported that these structures do not have a boundary wall and are not used on a regular basis as the landowner and his family reside in a permanent structure located within Ramnagar Pahad Village. On the day of the site visit, the structures (as shown in the pictures below) were vacant with no presence of any activity being carried out. The landowner confirmed that he is aware that the structure would be affected by the proposed project and that he would be receiving payment as per the amount that will be provided by the District Collector Office.

Photo6-1 : Temporary Structure in Ramnagar Pahad Village



²² Coordinates of Temporary Structure- 24°29'19.80"N, 81°35'36.60"E

Source: Site Visit undertaken by AECOM

Details of the family members of the affected household have been provided in **Table 6-4**,

Table 6-4: Details of members of Affected Household

Sl. No.	Item	Total No.
1	<i>Population</i>	
	Male	6
	Female	5
2	<i>Age Group</i>	
	26-35 years	3
	36-59 years	7
	59 years and above	1
3	Marital Status	Married
4	Religion	Hindu
5	Social Stratification	OBC
6	<i>Literacy Level</i>	
	Illiterate	2
	Middle School	2
	High School	4
	Senior Secondary Level	2
7	<i>Occupation</i>	
	Cultivator	6
	Household Work	5
8	Annual (approx.) Income	INR 80,000

As observed from the table above, the affected household comprises of 11 family members. The household is dependent upon agriculture for their livelihood.

6.3 Land Owners and Extent of Land Holding Impacted by Acquisition

Based on the data collected from the survey in Phase I, the following details pertaining to land holdings before and after acquisition have been presented below in **Table 6-5**,

Table 6-5: Status of Land Holdings before and after land acquisition

Village Name	Status of Land Holding	<0.5 hectares	Marginal Farmers (upto 1 hectare)	Small Farmers (upto 2 hectares)	> 2 hectares
Badwar	Before acq.	21	20	28	27
	After acq.	35	35	7	19
Barsaita Desh	Before acq.	10	28	29	29
	After acq.	18	40	22	16
Barsaita Pahad	Before acq.	-	2	4	2
	After acq.	-	2	4	2
Etar Pahad	Before acq.	-	-	2	6
	After acq.			7	1
Ramnagar Pahad	Before acq.	4	1	9	28
	After acq.	6	5	10	21

As shown in the table above, landowners having lesser than 0.5 hectares of land plots have increased in all three villages of Badwar, Barsaita Desh and Ramnagar Pahad. The number of marginal farmers has increased while small farmers have decreased in Badwar and Barsaita Desh villages.

6.4 Consent of Land Purchase Policy, 2014

Government of Madhya Pradesh developed and implemented The Consent to Land Purchase Policy in November 2014, in order to acquire private land only for infrastructural projects in the State in consensus with the land owners (title holder). As per the policy, the compensation of the land will be determined based on the prevailing market value of the land by calculating the 'Collector Guideline Rate' plus value of immovable assets on the land (trees, well, house etc. which will be determined by the State Public Works Department) and an equivalent rehabilitation grant (one-time solatium equivalent to the cost of land as per the Collector Guideline Rates). In total, the land owner receives an amount double the prevalent value of the land in addition to the cost of the immovable asset.

Form I of the Policy permits consent based compensation (as defined above) to the land owner(s). Additionally, land procurement and associated compensation will be paid on verification of title holder and receipt of consent. As per the Policy, in case of any objection raised during notification period (of fifteen days) by any land owner (dispute on the ownership), the District Collector would not acquire the land.

Policy implementation, scope and associated details were verified by AECOM professional and the following was noted:

1. The Consent Policy has been implemented only for a year now and there has been no precedence of it being implemented in other projects of renewable sector within the State. This is the first (renewable) project where this policy has been implemented. However, this policy was implemented in an infrastructural project, namely, 'Deewanganj Sichai Yojana' which is located in Sanchi District and initiated under the Samrat Ashoka Sagar Irrigation Project of Water Resources Department of Madhya Pradesh in 2014. The project is spread across a total area of 13.480 hectares comprising of four (04) villages namely, Sarar, Narkhoda, Dahida and Khoa. Out of 13.480 hectares, 1.603 hectares comprises of private land owned by a total of 16 land titleholders, for which this policy has been implemented, which was further verified by review of two sample consent undertakings.
2. During consultations with NRED Representatives, it was reported that if any case of 'no consent' is encountered during the process, that land parcel is not acquired. The Undertaking which is to be signed by the landowner (i.e. titleholder) will not be signed unless the landowner provides his consent for sale of the land.
3. Based on the consultations undertaken during the census survey in the project area, it was noted that all land owners have provided their consent voluntarily and have not done so under any force or pressure. No cases of 'no consent' were encountered during the census survey undertaken.

Till date, 90% of private land owners from the five villages in Phase I have provided their consent to sell their land in the form of an undertaking.

The list of the number of landowners that have provided their consent voluntarily for the proposed project has been given below in **Table 6-6**,

Table 6-6: List of Private Landowners that have provided consent for sale of land in Phase I

S.No.	Village Name	Total Private Khatedars	Total Private Land (in hectares)
1	Badwar	101	45.801
2	Barsaita Desh	114	71.173
3	Barsaita Pahad	10	3.441
4	Etar Pahad	8	3.593

S.No.	Village Name	Total Private Khatedars	Total Private Land (in hectares)
5	Ramnagar Pahad	43	23.893
	Total	276	147.901

As per Clause 4 of the Policy, the payment amount for the private land has been calculated based on the prevailing market value which is also known as the Collector Guideline Rate. A copy of a land sale deed for Badwar village was provided by the RUMSL site representative showcasing how the Collector Guideline Rate (land cost) was determined. Based on this Collector Guideline Rate (which has been determined for all five villages), compensation the Collectorate Guideline Rate plus one time solatium) is to be provided to each land seller. For each of the five villages, the Collector Guideline Rate per hectare has been provided below in **Table 6-7**,

Table 6-7 : Collectorate Guideline Rate for the Five Project Villages

S.No.	Village Name	Collectorate Guideline Rate (in INR)
1	Badwar	6,90,000 per hectare
2	Barsaita Desh	6,44,000 per hectare
3	Barsaita Pahad	7,16,000 per hectare
4	Etar Pahad	6,38,000 per hectare
5	Ramnagar Pahad	7,35,000 per hectare

As per Clause 11 of the Policy, once the District Collector receives a receipt of undertaking from all landowners on their consent to sell the land, the Collectorate office will publish a notification for the public to raise concerns if any, within 15 days from the date of publication. If any objection arises regarding any land parcels (in terms of dispute on the ownership), the District Collector will not acquire that land parcel. In the case of no objections raised, the District Collector will give his consent to go ahead with the acquisition process. If within a year the land parcel is not acquired, the compensation that has been provided will increase (depending upon the span of time) and the amount would be provided to the landowner.

6.5 Views expressed by Landowners

According to the consultations undertaken with the landowners, it was established that all the landowners consulted were aware about the proposed project. They were aware that they would receive double payment in the form of Collector Guideline rate plus one time solatium once the land purchase would be undertaken.

The land owners expressed that most of the land in the proposed project area was at a slope (*pahadi*) and hence too far from the area of residence. They rarely travelled to the *pahadi* area to cultivate due to lack of irrigation facilities and instead preferred the land parcels in the plain areas near their residence to undertake agricultural activities. Thus, the land parcels (within the project boundary) were mostly left barren and uncultivated.

In addition, as cultivation is dependent upon rainfall and was based on a 'one crop cycle', most land owners stated that due to the infrequent rainfalls during the past three years, agricultural activities have not been taking place (and have been left barren) on the land parcels which has been delineated for the proposed project. The output that they received from these land parcels was also very meagre and most landowners confirmed that approximately 60% majority of men (including their kin) tend to migrate to towns and cities for employment opportunities.

The landowners were positive in their responses about the proposed project and felt that this would open up avenues for employment opportunities for the local population. They were of the opinion that development in terms of health services and infrastructure would also be given priority once the project becomes operational. They were contented that they would be receiving a Collector Guideline rate including a one time solatium based

on the prevailing market value. During consultations, it was ascertained that some landowners also requested the RUMSL site officials to purchase the remaining portion of their land parcels lying outside the proposed project boundary so that they could receive monetary payment which could be utilised for enterprising opportunities.

7. ANALYSIS OF ALTERNATIVES

This section of the report presents the analysis of the alternatives considered for the proposed solar power project. The following scenarios have been considered:

- No Project Scenario;
- Alternate Location for the Proposed Project;
- Alternate Methods of Power Generation;
- Alternate Technology for Proposed Project; and
- Alternate Routes for Transmission Lines.

7.1 No Project Scenario

As per the Load Generation Balance Report, Ministry of Power, Government of India, the anticipated energy requirement for the state of Madhya Pradesh is 65,675 MU against the availability of 70,890 MU for the year 2015-2016. The power requirement and availability for the year 2015-2016 has been estimated as 10,489 MW and 11,672 MW respectively indicating a power surplus of 1,183 MW which is around 11%. Although these figures suggest that Madhya Pradesh is an energy surplus state but looking at the aggressive growth targets of setting up solar power plants of around 1,00,000 MW across India by 2020 under Jawaharlal Nehru National Solar Mission, there seems to be a progressive deficit.

The current energy scenario of the state of Madhya Pradesh as per Central Electricity Authority (CEA)²³ have been presented in **Table 7-1**,

Table 7-1: Power Forecasts for Madhya Pradesh (2015-16)

Parameter	Requirement	Availability	Surplus(+)/Deficit (-)	Surplus(+)/Deficit (-)%
Electrical Energy Requirement (GWh)	65,675 MU	70,890 MU	5,215 MU	7.9 %
Peak Electric Load (MW)	10,489 MW	11,672 MW	1,183 MW	11.3 %

Source: Central Electricity Authority

In order to bridge this gap between the current capacity and targets, renewable/non-conventional sources of power are required to supplement the conventional sources. The proposed project being a non-conventional source of power generation intends to contribute towards bridging the demand supply deficit as projected.

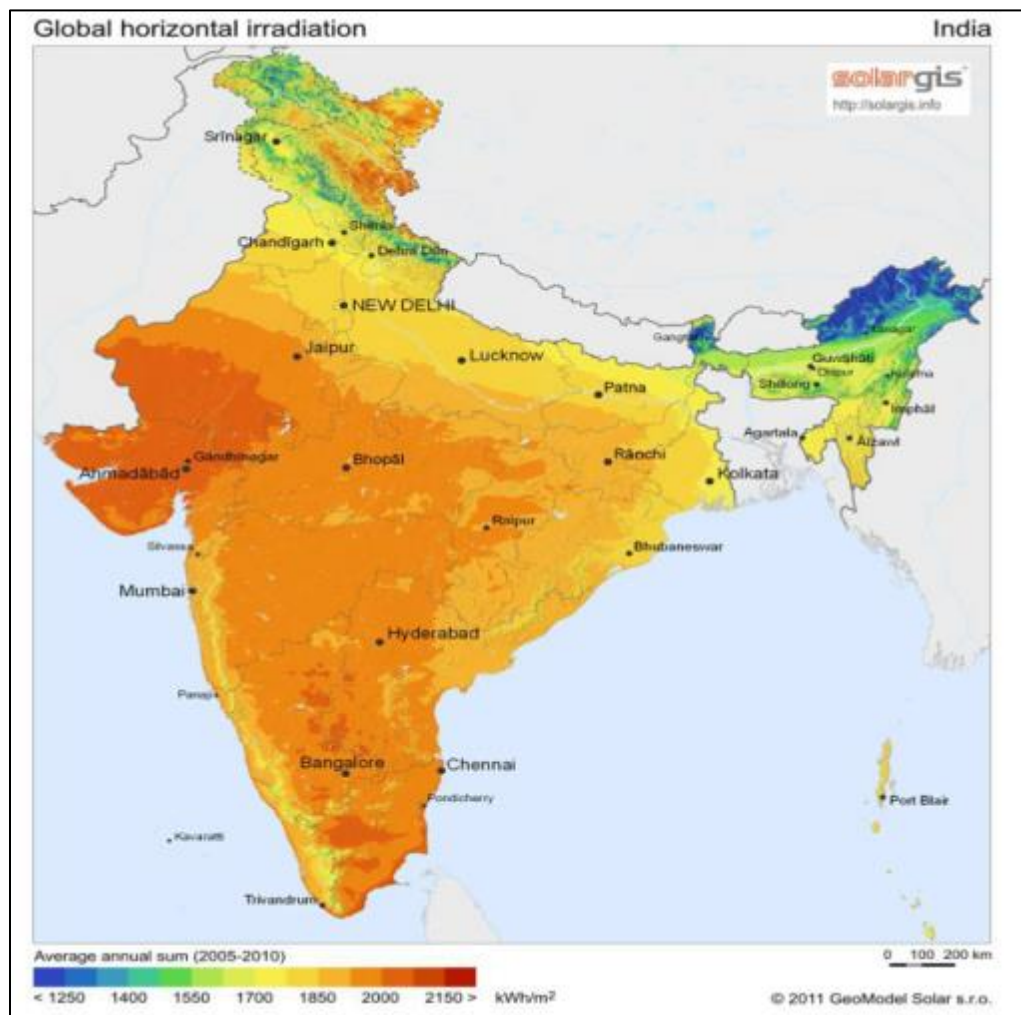
India is located in the equatorial sun belt of the earth, thereby receiving abundant radiant energy from the sun. The Meteorological Department of India maintains a nationwide network of radiation stations, which measure solar radiation, and also the daily duration of sunshine. In most parts of India, clear sunny weather is experienced 250 to 300 days a year. The annual global radiation varies from 1600 to 2400 kWh/m², which is comparable with radiation received in the tropical and sub-tropical regions. The equivalent energy potential is about 6,000 million GWh of energy per year. **Figure 7-1** below shows the map of India with solar radiation levels in different parts of the country. It can be observed that highest annual global radiation is received in Rajasthan, northern Gujarat, parts of Andhra Pradesh, Madhya Pradesh, Maharashtra, Rajasthan and Ladakh region which also receive fairly large amounts of radiation as compared to many parts of the world especially Japan, Europe and the United States.

²³ 17th Electric Power Survey

states, where development and deployment of solar technologies are maximum. Theoretically, a square piece of land, 55 kilometres each side, in the empty desert, is enough to meet India's current energy demand. With more than 300 sunny days each year, large parts of Rajasthan, Gujarat, Rajasthan, Andhra Pradesh, Tamil Nadu and Madhya Pradesh can produce 4.0-6.4 kilowatts per square metre. Sparsely populated, these areas are ideal for solar energy.

The proposed project is an opportunity to utilize the solar potential of the state for power generation. A "No Project Scenario" will not address the issue of power shortage in the country and economic development. An alternative without the project is undesirable, as it would worsen the power supply-demand scenario, which would be a constraint on economic growth.

Figure 7-1: Solar Power Potential Map of India



To evaluate further, both the options of 'Proposed Project' and 'No- Project' Alternative have been assessed against potential environment and social impacts that are envisaged. Going forward with the proposed project alternative is considered the best possible option as opposed to 'No Project' since the proposed project is considered green and solution to meet energy requirements. Solar energy is also considered as renewable clean technology with no emissions as well as the global and local trend for energy generation.

Table 7-2: Comparison of overall environmental impacts as a result of the Proposed Project against the 'No-Project' Alternative

Environmental and Social	Proposed Project	No-Project Alternatives
Terrestrial Ecology	S-	*
Air Quality	*	*
Noise Generation	*	*
Wastewater Generation	S-	*
Waste Generation / Disposal	S-	*
Soil & Groundwater	X	*
Health & Safety	S-	*
Socio-economic Impacts	S+	X
Traffic Disturbance	X	*
Land Use	S+	S-
Archaeology / Cultural Property	*	*
Energy Production	S+	S-
Employment and Job Opportunity	S+	*

Notes:

X: Denotes potential for impact, which is not considered significant

S-: Denotes Potential Significant Adverse Impact

S+: Denotes Significant Beneficial Impact

**: Denotes no change to the existing situation*

7.2 Alternate Location for the Project Site

Solar power projects are non polluting energy generation projects and are dependent on the availability of sufficient solar irradiation. The whole of India and particularly the state of Madhya Pradesh receives good amount of solar irradiation. The project proponent has carried out assessment studies in order to understand the power generation potential of the site. Mean global daily irradiation on a horizontal plane was observed to be in the range of 3.94 - 6.67 kWh/m²/day for the proposed site using different solar irradiation data sources. The following additional criteria have been considered for site selection:

- The sites are located away from major settlements;
- The sites do not fall under any reserved or protected forests;
- The land procured for the sites mainly comprises of mainly revenue land which is barren in nature and practically unusable for any other purpose; and
- No environmentally sensitive features such as water bodies, forests, archaeological sites are located in the immediate site surroundings.

While majority of land selected for the project is revenue land, a small portion of the land is privately owned by the residents of five (5) villages, namely, Badwar, Barsaita, Barsaita Desh, Etar Pahad and Ram Nagar Pahad. There have been efforts taken up to minimise impacts, including issues related to titleholders. Avoidance of government lands that are seasonally cultivated and used for grazing purposes has been carried out. Therefore, considering all the above details of the location and site settings, the identified site was chosen as a suitable option for the project.

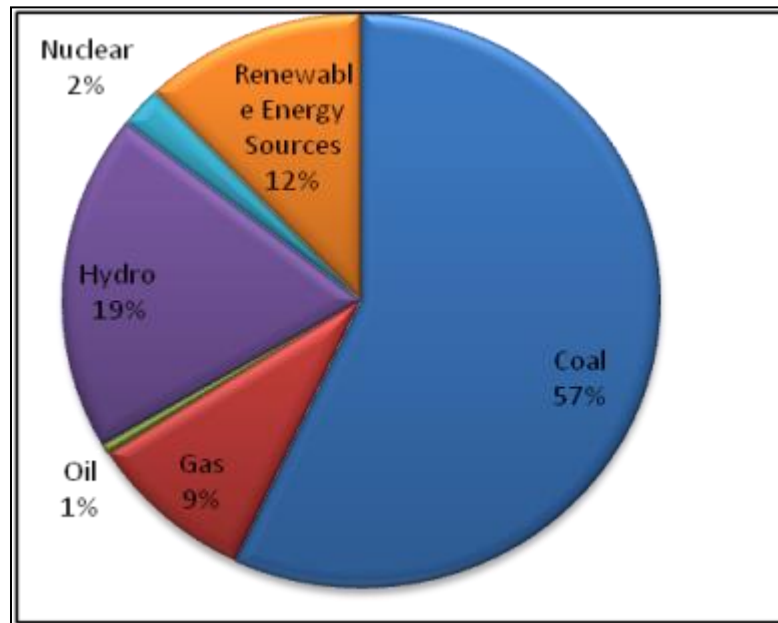
7.3 Alternative Methods of Power Generation

7.3.1 Sources of Electricity Generation

India has an installed capacity of 225.793GW of track change as of 31st July, 2013. In terms of fuel, coal-fired plants account for 57% of India's installed electricity capacity followed by hydropower which accounts for 19%,

renewable energy for 12% and natural gas for about 9%. The source wise installed capacity in India is presented in **Figure 7-2**.

Figure 7-2: Source wise Installed Capacity



Source: Ministry of Power, 2012

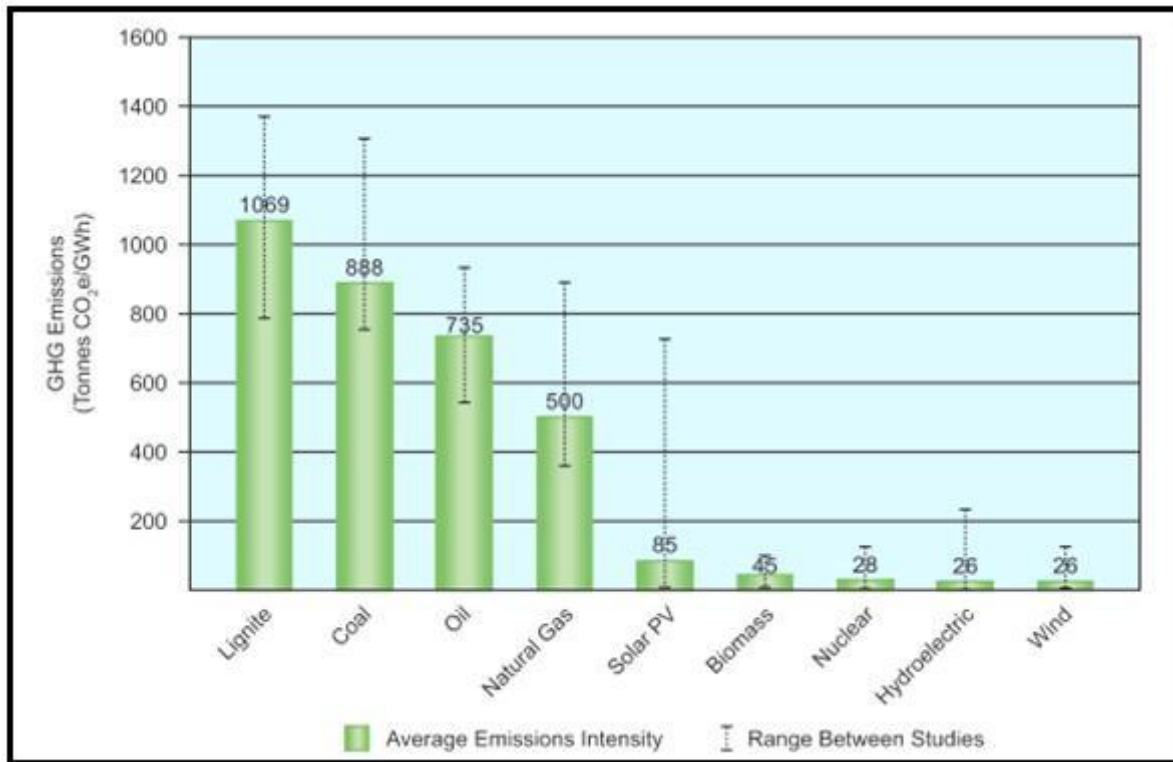
The various power generation options as discussed in the earlier section can be evaluated on the levelised cost of power generation which includes the capital and O&M costs, reliability of power generation in terms of plant load factor and the greenhouse gas (GHG) emission. The comparative analysis of various power generation options based on these factors has been presented in **Table 7-3**. The power generation options using conventional sources offer advantages such as lower levelised costs of power generation and higher plant load factors. The operation and maintenance of solar power projects does not typically involve air emissions or effluent discharges.

7.3.2 Greenhouse Gas Emissions

Coal fired power plants have the highest Greenhouse Gas (GHG) emission intensities on a lifecycle basis. Although natural gas, and to some degree oil, have noticeably lower GHG emissions, biomass, nuclear, hydroelectric, wind, and solar photovoltaic all have lifecycle GHG emission intensities that are significantly lower than fossil fuel based generation.

World Nuclear Association (WNA)'s report places solar energy's 85 tonnes CO₂e/GWh emission intensity at 17% of the emission intensity of natural gas, and only 9.5% of the emission intensity of coal fired power plants. In addition, the lifecycle GHG emission intensity of solar power generation is consistent with renewable energy sources including biomass, hydroelectric and nuclear. Among other non conventional sources, only, nuclear power is better than solar power with respect to emissions. However, nuclear power is not a viable option in the identified site and require longer gestation period.

Figure 7-3: Lifecycle GHG Emissions Intensity of Electricity Generation Methods



Source: World Nuclear Association Report, July 2011

Greenhouse gas emissions resulting from the provision of energy services have contributed significantly to the historic increase in atmospheric GHG concentrations. The IPCC Fourth Assessment Report (AR4) concluded that “Most of the observed increase in global average temperature since the mid-20th century is very likely due to the observed increase in anthropogenic greenhouse gas concentrations.

The

Figure 7-3 above indicates that the GHG emissions for Solar is significantly lower than that of coal or gas based technologies. Considering the significance in difference of CO₂ equivalent generated from various stages of setting up and operation of a solar power plant, it can be easily concluded that it reduces the potential for climate change.

7.3.3 Cost and Reliability of Power Generation

The various power generation options can be evaluated on the levelled cost of power generation which includes the capital and O&M costs and reliability of power generation in terms of plant load factor. The GHG emission intensities of various sources have already been discussed in the above sub section. The comparative analysis of various power generation options based on these factors has been presented in **Table 7-3**

Table 7-3: Comparative analysis of Various Power Generation Options

Alternative	Cost (₹/kWh) *	Plant Load Factor **	Average Lifecycle GHG Emission (tonnes CO ₂ e/GWh)***
Coal	2.5	65-85%	888
Natural Gas	3.9	70-85%	500
Hydro	3.8	30-50%	26
Nuclear power	2.5-5.7	65-85%	28
Wind Energy	4.2	25-40%	26
Solar	15.3-17.1	10-15%	85

Source: * - LBNL, CERC, CSTEP & NPCIL

** - Renewable UK

*** - World Nuclear Association Report

Although power generation options using conventional sources offer advantages such as lower levelled costs of power generation and higher plant load factors, the operation and maintenance of solar power projects does not involve air emissions or effluent discharges. There are no fuel requirements or large quantities of water required for the operation of the plant. Other environmental pollution (stack emissions, ash management etc) issues are also insignificant. Also, there are no significant social issues associated with solar power projects.

7.3.4 Statutory and Policy Requirements

India being a signatory to the United Nations Framework Convention on Climate Change (UNFCCC) has formulated a National Action Plan on Climate Change (released in June 2008) to promote the development of renewable energy in the country. The Ministry of New and Renewable Energy (MNRE), GOI has been promoting new and renewable energy sources in a big way in India. The Government of India envisages 14,000 MW capacity additions during the 11th five year plan (2007-12) from renewable power generation. While about 10,000 MW is expected to be generated from wind power, the balance is to be realized by solar and other renewable energy systems. The Electricity Act 2003 clearly mandates state electricity boards to adopt a minimum percentage for the procurement of electricity from renewable energy sources.

Accordingly, about 13 state electricity regulatory commissions (SERC) have initiated action to meet this requirement. MNRE has formulated the Guidelines on Generation-Based Incentive (GBI) for grid interactive solar power projects. Presently various states like Orissa, Gujarat, Rajasthan, Madhya Pradesh, Maharashtra etc. have declared their solar policies which are in line with GBI Policy of MNRE. The benefits of the Jawaharlal Nehru National Solar Mission (JNNSM) which is part of the eight mission documents under India's National Action Plan on Climate Change (NAPCC), and a significant contribution to low carbon sustainable development strategy for the Indian economy are as follows:

- To create an enabling policy framework for the deployment of 20,000 MW of solar power by 2022;
- To create favourable conditions for solar manufacturing capability, particularly solar thermal for indigenous production and market leadership;
- To promote programmes for off-grid applications, reaching 1000 MW by 2017 and 2000 MW by 2022;
- To achieve 15 million sq. meters solar thermal collector area by 2017 and 20 million by 2022; and
- To deploy 20 million solar lighting systems for rural areas by 2022.

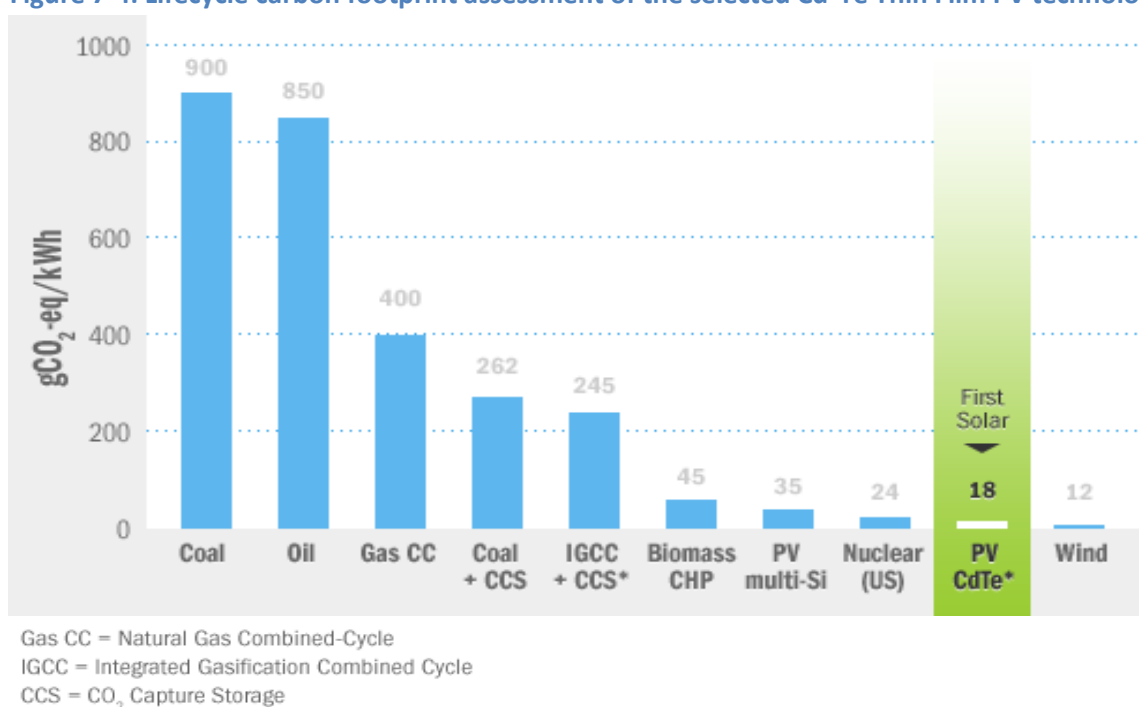
Therefore, considering various factors such as favorable environmental and social settings; low GHG emissions during the entire project life cycle; availability of appropriate lands, solar power generation is the most appropriate alternative in the project area.

7.4 Alternate Technology for the Project

There are different types of solar panels available for accumulation of solar energy, the proposed project intends to utilise tandem structure/thin film solar PV technology. The production of current generation photovoltaics is an energy intensive process, especially the poly crystalline and the mono-crystalline modules. They also require large quantities of bulk materials. Thin film modules have less primary energy requirement per W than poly crystalline or mono-crystalline modules.

Thin film materials include Copper Indium, Diselenide, Cadmium Telluride, and Gallium Arsenide, etc., typically a few μm or less in thickness is directly deposited on glass, stainless steel, ceramic or other compatible substrate materials. Some of these metals are considered hazardous metal as per Schedule II of the Hazardous Waste Rules 2008. Based on lifecycle assessment, the Cd-Te thin film technology selected for the proposed project of First Solar make has one of the smallest carbon footprints as compared to any other PV technology

Figure 7-4: Lifecycle carbon footprint assessment of the selected Cd-Te Thin Film PV technology



Source: <http://www.firstsolar.com/en/technologies-and-capabilities/pv-modules/first-solar-series-3-black-module/cdte-technology>

RUMSL will give the discretion to the developers to use technologies which are sustainable. Till date, no specification regarding the use of technology has been decided as the open competitive bidding process is yet to get underway.

The energy accumulated from the solar panels will be converted from DC to suitable AC power for feeding to the grid. This process is environmentally advanced than creating battery bank for storage of energy, which minimises the hazards related to handling and disposal of batteries. A comparison of the characteristics of the most popular cell technologies have been presented in **Table 7-4**.

Table 7-4: Characteristics of some PV Technology Classes

Technology	Crystalline Silicon	Amorphous Silicon	Cd Te	Copper Indium Gallium Di-Selenide
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Technology	Crystalline Silicon	Amorphous Silicon	Cd Te	Copper Indium Gallium Di-Selenide
Cost(USD/Wp)	1.6-1.75	1-1.3	1.4-1.5	1.4-1.6
Percentage of global installed capacity	82%	18%		
Current Commercial Efficiency	12-19%	5-7%	8-13%	8-12%
Temperature Co-efficient of Power (Typical)	-0.45%/°C	-0.21%/°C	-0.45%/°C	-0.45%/°C

7.5 Alternate routes of transmission lines

The power evacuation of 750 MW Power is envisaged to be carried out at 400 kV level and interconnection with the 400 kV networks of CTU can be achieved through Loop-In-Loop-Out (LILO) arrangement for which is located at approximately 20 km from the Project Site. The route for the transmission line has been selected based on the following factors:

- To avoid any habitations along the route;
- No house or community structures are located under the transmission line;
- Areas requiring extensive clearing of vegetation have been avoided;
- Selection of the transmission route avoids any environmental sensitive site, if identified;
- Right of way/access roads will be shared with the common user of the substation.

Conclusion

Under India's National Action Plan on Climate Change (NAPCC), the Jawaharlal Nehru National Solar Mission (JNNSM) was introduced with aggressive targets to achieve 1,00,000MW of solar power by 2022. With these targets achieved, low carbon sustainable energy would become a substantial share contributor in the total energy requirements in India by 2020. The Government of India has been playing an encouraging role in promoting the production of solar energy in such scales with subsidies and facilitating the process.

With multiple benefits of clean energy production, employment generation and elevating the standards of rural economies, the project would prove to be advantageous to all realms of the society and nation. Hence, the project with all the chosen options such as site selection, mode of power generation, selections of technology, transmissions lines etc., is appropriate alternative and is beneficial for the region.

8. IMPACT ASSESSMENT AND MITIGATION MEASURES

This chapter describes various environmental and social impacts identified by accessing information gathered through primary and secondary sources. Impacts have been identified based on review of available project information; discussions conducted with the local community; representatives of the project and other sector specific professionals. Impacts during construction and operation phases have been included and are classified as per impact type.

Additionally, this section presents the identified impacts within a severity range to assess overall significance of impacts on environment, ecology, socio-economic resources, demographics, and livelihoods. Subsequently, mitigation measures have also been suggested for impacts outlined in this section.

8.1 Impact Appraisal Criteria

Identified impacts have been appraised through social and environmental components and have been presented in **Table 8-1** below. The appraisal criteria are classified according to spread, duration, intensity and nature of the impact. Severity levels have been sub classified under each criterion with specifics outlining the limits of each severity level.

Table 8-1: Impact Appraisal Criteria

Criteria	Sub-Classification	Defining Limit	Remarks
Spread: refers to area of direct influence from the impact of a particular project activity.	Insignificant / Local spread	Impact is restricted within the foot prints of the Project boundary.	except for ecology (which is defined as loss of vegetation only at site)
	Medium Spread	Impact is spread up to 2 km from the boundary of the Project	except for ecology (which is defined as loss of vegetation at site including large trees with limited disturbance to adjoining flora & fauna)
	High spread	impact is spread up to 2 km to 5 km from boundary of the Project area	except for ecology (which is defined as loss of vegetation at site and/or damage to adjoining flora and fauna)
Duration: based on duration of impact and the time taken by an environmental component to recover back to current state	Insignificant / Short Duration	when impact is likely to be restricted for duration of less than 2 year;	the anticipated recovery of the effected environmental component is within 2 years
	Medium Duration	when impact extends up to 5 years;	With an anticipated recovery of the effected environmental component is within 5 years
	Long Duration	when impact extends beyond 5 years;	with anticipated recovery of prevailing condition to happen within 6 years or beyond or upon completion of the project life
Intensity: defines the magnitude of Impact	Insignificant intensity	when resulting in minimal changes in the environmental baseline conditions;	However, it shall be reconsidered where the baseline values are already high.
	Low intensity	when resulting in changes in the baseline conditions in the immediate surroundings	for ecology it refers to minimal changes in the existing ecology in terms of their reproductive capacity, survival or habitat change
	Moderate	when resulting in changes in	for ecology, it refers to changes that

Criteria	Sub-Classification	Defining Limit	Remarks
	intensity	the baseline conditions alter the baseline conditions in the surrounding area	are expected to be recoverable
	High intensity	when change resulting in the baseline conditions are significantly modified	While for ecology, high intensity refers to changes that result in serious destruction to species, productivity or their habitat.
<i>Nature: refers to whether the effect is considered beneficial or adverse</i>	Beneficial	-	Useful to Environment and Community
	Adverse	-	Harmful to Environment and Community

A “significance assessment matrix” has been adopted in order to assess impacts appraised as per criteria mentioned in the above table. The **Table 8-2** provides the impact significance criteria adopted for the assessment.

Table 8-2: Impact Significance Criteria

Spread	Duration	Intensity	Overall Significance	
			Adverse	Beneficial
Local	Short	Low	Insignificant	Insignificant
Local	Short	Moderate	Minor	Minor
Local	Medium	Low		
Local	Medium	Moderate		
Medium	Short	Low		
Local	Long	Low		
Local	Short	High	Moderate	Moderate
Local	Medium	High		
Local	Long	Moderate		
Medium	Short	Moderate		
Medium	Medium	Low		
Medium	Medium	Moderate		
Medium	Long	Low		
Medium	Long	Moderate		
High	Short	Low		
High	Short	Moderate		
High	Medium	Low		
High	Medium	Moderate		
High	Long	Low	Major	Major
Local	Long	High		
Medium	Short	High		
Medium	Long	High		
High	Short	High		
High	Medium	High		
High	Long	Moderate		
High	Low	Low		
High	Low	High		

8.2 Impact Identification

Based on the activities involved, an impact interaction matrix for construction and operation phases has been prepared for the project. Impacts have been categorized based on Environment and Social Aspects. The impact identification matrices are presented below in the respective sections.

8.3 Impacts on Environment, Health and Safety

Table 8-3 below presents the impact identification matrix for construction and operation phases of the project, based on environmental and occupational health and safety variables. Each of the impacts identified has been further discussed and corresponding mitigation measures have been proposed.

Table 8-3: Impact Identification Matrix - Construction and Operation Phase

Environment, Health & Safety impact assessment variables	Construction Phase	Operation and Maintenance Phase	Decommissioning Phase
Land Use and Visual Aesthetics			
Site Preparation and Grading	•		
Site/ Vegetation Clearance	•		•
Laying of Transmission Lines	•		
Ecology			
Site Preparation and vegetation Clearance	•		
Waste Management	•	•	•
Power Transmission	•	•	
Water Resources and Water Quality			
Material Handling and Storage	•	•	•
Hazardous and Non- Hazardous Material and Waste Management	•	•	•
Washing of Solar Panels		•	
Water Requirement for workers	•	•	•
Ambient Air Quality/ Atmospheric Emissions			
Material Handling and Storage	•		•
Operation of construction equipments	•		
De-mobilization of construction equipments	•		•
Ambient Noise Quality			
Material Handling and Storage	•		
Repair and Maintenance Works of solar panels		•	•
Demobilization of construction equipments	•		
Traffic & Transport			
Material Handling and Storage	•		
Demobilization of construction equipments	•		
Soil Resources			
Site Preparation and vegetation clearance	•		
Demobilization of construction equipments	•		
Hazardous and Non- Hazardous Material and Waste Management	•	•	•
Material Handling and Storage	•	•	•
Occupational Health and Safety			
Employment of Workers	•	•	
Material Handling and Storage	•	•	•
Construction works	•	•	
Laying of transmission lines	•	•	
Electrical hazard during solar power generation		•	
Repair and Maintenance Works of solar panels		•	

8.3.1 Impacts during Construction Phase

During the construction phase, the following activities may have impacts on environment:

1. Site preparation;

2. Excavation and levelling;
3. Hauling of earth materials and wastes;
4. Cutting and filling;
5. Erection of concrete and steel structures;
6. Painting and finishing;
7. Clean up operations; and
8. Landscaping.

8.3.1.1 Land Use

Impacts

A total of 1500 hectares of land has been identified for the proposed project comprising of government revenue land measuring 1232.697 hectares and private land measuring 302.989 hectares. As per the revenue record, the land use of the land parcels in the project area has been classified as barren rocky, scrub and fallow land.

The government land transferred to the project comprise of barren land wherein a portion of the land parcel approximately 1200 hectares falling under Badwar village was used by the Indian Army from 1990 to 2002 as a firing range. As reported during the consultations held with the local communities, the land parcel was not utilised for any activities (either as an income source or shelter) by the communities after the Army firing range was discontinued in the area. Seasonal grazing by livestock owned by 31% of project affected population used to be practiced in the government land (falling both within and outside the project area) during the monsoon season. Only 22.5% of 5467.26 hectares of government land (falling under five project villages) has been transferred to the project. However, this land has not been designated as grazing land and alternate grazing land is available within 500 m to 1 km of the proposed project area towards the east and west direction of the project boundary. This transfer of land would not lead to loss of access to grazing area for the project affected population because of the abundance of open available land in the area.

Land parcels having homesteads and undertaking active agricultural activities has not been included within the project area. The land parcels under private ownership identified for the project is instead in a slope terrain. Because of the slope terrain, no irrigation is possible for these land parcels, therefore, as reported by the local communities these parcels used to depend upon rainfall in order for agricultural activities to take place. A one crop cycle used to be practiced in these land parcels. However, in the last three years, due to the decrease in rainfall, these land parcels have been left barren and unused.

Through consultations undertaken, it was reported that all project affected families used to undertake agricultural activities on these land parcels around three years ago. Amongst the project affected households, farmers with less than .5 hectares land holdings within the project area (comprising about 14%) used to cultivate their land and the agricultural produce were used for self consumption purposes. These farmers used to supplement their income by working as agricultural labourers in large farm lands (both within and outside the project area) owned by farmers belonging to the same villages. Due to the discontinuation of cultivation activities on the land parcels delineated for the project due to the decrease of rainfall, the farmers who have .5 hectares land holdings (within the project area) have resorted to being engaged as non agricultural labourers in Rewa city as well as one members of (each of the small farmer) their family have migrated to cities outside the state for work opportunities and have been sending back money for their family.

Around 36.4% of the affected households earn less than INR 60000 annually and mostly comprise of population engaged as agricultural labourers (on land parcels falling outside the project area) and daily wage labourers (non

agricultural labourers). About 20% of the affected population earn between INR 60,000 – 1,00,000 and 26.8% of the affected households earn between INR 100000 – 240000 in a year. A total of 16.8% of the affected households earn more than INR 2,40,000 in a year and mainly comprise of farmers with large land holdings (owning land parcels both within and outside the project area).

With the development of the proposed project, the land use of the site will alter to industrial land use but will have very limited impact on agriculture. As the actively cultivated fields are precluded from the development layout, the overall impact of the PV power plant on the area's agricultural potential and production will be low.

Past land use as Firing Range

In Gurh Tehsil, approximately 22,000 hectares government revenue land was allotted to the India Army in 1990 to use the area as a firing range. This area was utilised as a firing range by the Army till 2002 after which permission of discontinuing the activity was given. This land (falling under the Badwar village) was later transferred to RUMSL for setting up of the proposed solar power plant, when left unused.

Heavy metals can be introduced into the environment because of usage of bullets in one or more of the following ways. Out of these metals, lead is the predominant one which can transfer and tend to accumulate²⁴.

- Lead oxidizes when exposed to air and dissolves when exposed to acidic water or soil;
- Lead bullets, bullet particles, or dissolved lead can be moved by storm water runoff; and
- Dissolved lead can migrate through soils to groundwater.

As per the analysis of ground and surface water samples taken from different location of the site, the concentration of lead is assessed to be less than 0.01 mg/l. Soil Quality analysis indicates that the level of lead in the samples collected was in the range of 10.99-16.82 mg/kg. Background concentrations of lead that occur naturally in surface agricultural soils ranges between 7 to 20 ppm with average concentration of 10 parts per million (ppm)²⁵.

Mitigation Measures

The project proponent has considered all aspects of siting and design prior to selection of the proposed site. The construction activities will be restricted within the boundary of the solar plant and will not alter the land use of the adjacent areas. As the government land transferred to the project is barren and unused, no impact on government land is envisaged. Also, the abundance of available open land minimises the impact of grazing area used by the local communities in grazing their livestock. Similarly, the private land parcels have been unused and left barren for the last three years due to decrease of rainfall in the area. Hence, impact on private land owners due to the acquisition process is also envisaged to be negligible as the landowners have not been dependent (either as a source of income or shelter) on the land parcels identified for the project.

- Clearing activities will be kept to a minimum (PV panel and road footprint).
- If rains are expected, activities will be put on hold to reduce the risk of erosion.

Impact Significance

²⁴ <https://www.princeton.edu/~rmizzo/firingrange.htm>

²⁵ www.extension.umn.edu/garden/yard-garden/soils/lead-in-home-garden/

Impact due to change of land use will have low intensity with a local spread for a long duration which will result in an overall minor impact without mitigation, which will remain a minor impact owing to permanent change in land use.

Table 8-4: Impact Significance – Land Use

Aspect	Scenario	Spread	Duration	Intensity	Overall
Land Use	Without Mitigation	Local	Long	Low	Minor
	With Mitigation	Local	Long	Low	Minor

8.3.1.2 Loss of Topsoil, Soil Compaction and Erosion

Impacts

Preparation of the site for the establishment of PV arrays, internal access road(s), temporary laydown area and buildings (control and accommodation) during the construction phase will require vegetation clearance, some site levelling and grading and soil compaction. The area required for the PV array locations, buildings and access tracks linking infrastructure (PV Footprint) is considerable which approximates to 1500 hectares. The construction activities will result in loss of vegetation cover which includes trees, grass and shrubs and topsoil within the site boundary and will not affect adjoining land.

Further, the transport of materials and equipment will involve additional movement of vehicles; construction machinery which will also lead to some degree of compaction within the site premises. No adverse impact on soil in the surrounding area is anticipated. However, in order to minimize such impacts, appropriate soil erosion control measures would be undertaken by Developers of Modules to appease the chances of soil erosion.

The project will also involve use of paints for solar panels and switch yard structures during construction which if not handled and used properly, may lead to contamination of soil. Improper disposal of hydraulic fluids, lubricating oils and other used oils can also result in contamination of soil. Improper storage of construction material can also result in unwanted dispersal of contaminants into adjoining areas.

Construction of Substations and transmission lines

RUMSL proposes to construct three 33/220 kV pooling substation located at Badhwar, Ramnagar and Barshetha desh Villages respectively. The 220/33kV substations and 220kV transmission lines from the individual 250MW Unit to the PGCIL 400/220kV substation will be developed and owned by RUMSL. External 400 kV transmission line will be developed by PGCIL

The proposed location for Badhwar substation is approx. 140m from NH-75 at an elevation of 385m. The site selected for substation is strewn with rocky outcrops and support minimum vegetation. The distance from proposed 220/ 400 KV Grid Sub-Station to be constructed by PGCIL is approximately 2.7 Km. the drainage of the location of the proposed substation at Badwar will be from north-east to south-west due to elevation difference in both the directions. Storm water drains will be developed across the substation in all four directions to contain the run off and avoid it to reach NH-75.

The site for proposed Ramnagar substation is apporixmately 400m from Aahri Nalla crossing from the site in north direction. The location is locally undulating and regionally sloping towards South-westward. The distance from proposed 220/ 400 KV Grid Sub-Station to be constructed by PGCIL is approximately 2.8 Km. As per the site assessment, the site is located within downstream reaches of the Aahri Nallah, there might be some local depressions which might suffer from local ponding. Proper bunds are required to be created within the

construction foot print of the proposed substation at Ramnagar and all the ponds lying in the catchment areas of Nallah will remain intact by provision of diversion berms or dykes around them.

The site selected for substation proposed in Barsetha Desh village is at elevation of 370m, at a distance of 200m from Aahri Nallah in south direction. The site is adjacent to NH-75 and comprises of flat topography. The distance with PGCIL substation is approximately 0.7 Km. Route length 32 Km from the T-off to the 400/220kV substation (27km 2xDC lines + 5km on multilane towers) are proposed for the project. The site selected is relatively flat and lies in down reaches of Aahri Nallah which minimizes the chances of modification of drainage pattern. The project site forms dendritic drainage pattern which is an irregular branching arrangement with tributaries joining larger streams at acute angles (less than 90°). Dendritic patterns tend to develop in areas where the rocks have a roughly equal resistance to weathering and erosion and are not intensely jointed.²⁶ This feature will make project site less vulnerable to impact on drainage pattern.

Construction of the proposed substations will involve a series of activities including: •

- A detailed site survey to allow detailed structure and substation design; •
- Vegetation clearing; •
- Access track formation (and upgrading); •
- Earthwork and levelling for the substation platform; •
- Site fencing;
- Installation of a site drainage system; •
- Installation of a substation cable trench and conduit system; •
- Installation of the substation earthing mat; •
- Installation of the substation structure and building foundations; •
- Buildings, structure and electrical equipment erection;

The construction of the transmissions line will require the creation of some temporary access roads to the transmission line construction sites. The construction of the transmission towers themselves will require some localised vegetation clearance. Materials arising from the excavation for the tower foundations (soil, rock etc.) would either be spread in appropriate areas surrounding the line or removed to another site as agreed. The foundations will be in filled with cement supplied via readymix-cement trucks or alternatively mixed on site. Following tower erection, conductor stringing, which may involve the use of a mobile crane, will occur and may result in the need for clearance of local vegetation along the Right of Way (RoW). The line routing will be attempted as far as possible to avoid human settlement. Once constructed, the transmission line will require minimal maintenance. Yearly visual inspection of the towers and conductors is expected.

Access to the substation sites is one of the criteria in selection and finalization which is to be undertaken via NH-75. The suitability of the accesses to enable heavy vehicle access to the substation locations for construction purposes has already been evaluated.

Mitigation Measures

- The removal of vegetation and soil cover will be restricted to only those areas necessary for the development. In particular, the unnecessary removal of groundcover vegetation from slopes will be prevented, especially on steep slopes.
- The area to be cleared must be clearly demarcated and this footprint strictly maintained;

²⁶ http://www.cengage.com/resource_uploads/downloads/0495555061_137187.pdf

- Soil conservation measures will be implemented such as stockpiling topsoil or gravel for the remediation of disturbed areas.
- Stockpiles will be vegetated or appropriately covered to reduce soil loss as a result of wind or water erosion.
- Work areas will be clearly defined and where necessary demarcated to avoid unnecessary disturbance of areas outside the development footprint.
- Fuel, lubricating oil and used oil storage areas will be contained in bunds of 110 percent capacity of the stored material.
- Spill containment and clean up kits will be available onsite and clean-up from any spill will be appropriately contained and disposed of.
- Construction vehicles and equipment will be serviced regularly and off site.
- Construction vehicles will remain on designated and prepared compacted gravel roads;
- It is recommended to grow turf grass beneath solar panels to avoid soil erosion;
- Storm water drains will be developed across the substation in all four directions to contain the run off and avoid it to reach NH-75;
- Proper bunds are required to be created within the construction foot print of the proposed substation at Ramnagar and all the ponds lying in the catchment areas of Nallah will remain intact by provision of diversion berms or dykes around them;
- Module Developers are recommended to follow environment codes on site preparation and installation of solar panels as provided in **Annexure IX**.

Significance of Impacts

The impact on soil compaction and erosion will have moderate intensity with a local spread for a short duration which will result in an overall minor impact without mitigation. However, with proper implementation of suggested mitigation measures the overall impact will be insignificant.

Table 8-5: Impact Significance – Loss of top soil, soil compaction and erosion

Aspect	Scenario	Spread	Duration	Intensity	Overall
Loss of top soil, soil compaction and erosion	Without Mitigation	Local	Short	Moderate	Minor
	With Mitigation	Local	Short	Low	Insignificant

8.3.1.3 Surface Hydrology and Drainage Pattern

The occurrence and movement of water is governed by drainage pattern of the site area which has been evaluated through a flood risk assessment study.

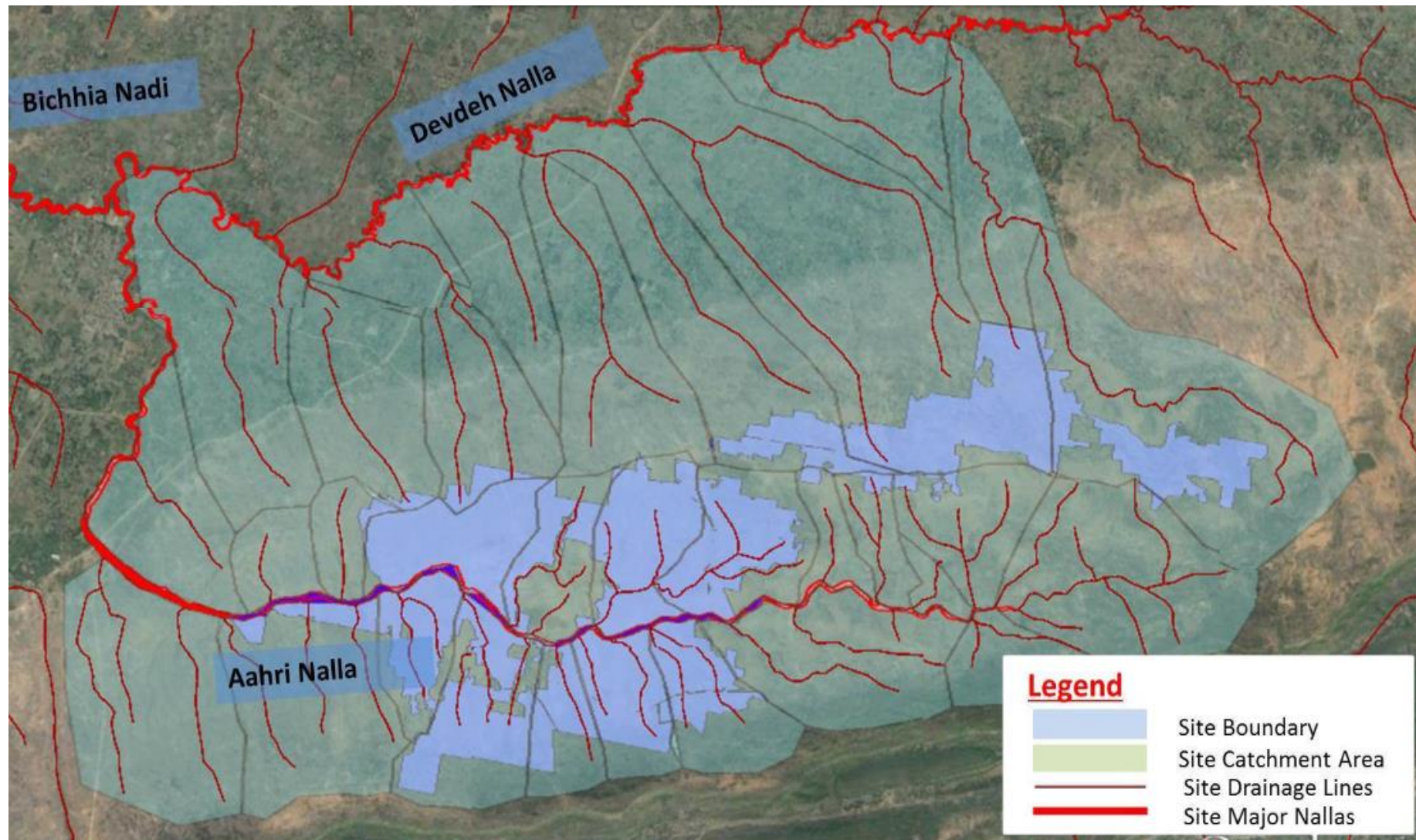
Flood Risk Assessment

The city of Rewa, Madhya Pradesh experiences humid subtropical climate with three main seasons, winters (November-March), summers (April –June) and monsoons (July-September). The annual rainfall over the city of Rewa is between 950-1000mm. However the monsoon has been feeble in the last few years and there have a drought like conditions with severe loss to agriculture and shortage of water.

The project site is situated on barren lands of 5 villages namely Badwar, Barsaita Pahad, Barsaita Desh, Etar Pahad and Ramnagar Pahad. The project site is mainly non-agricultural land which was previously used by Indian Army

as a firing practice range for many years. The topography of the site is locally undulating and regionally sloping towards South-westward. The site drainage shows dendritic pattern and various nallahs existing over the site drains most of the water during monsoons. The main nala draining the site is Aahri Nallah while Devdeh Nallah drains part of site drainage on the northeastern side. The site drainage nallahs (Aahri Nallah and Devdeh Nallah) are drained into Bichiya River at the North West of the site. The main site drainage features are presented in the figure below.

Figure 8-1: Project Site Drainage Features



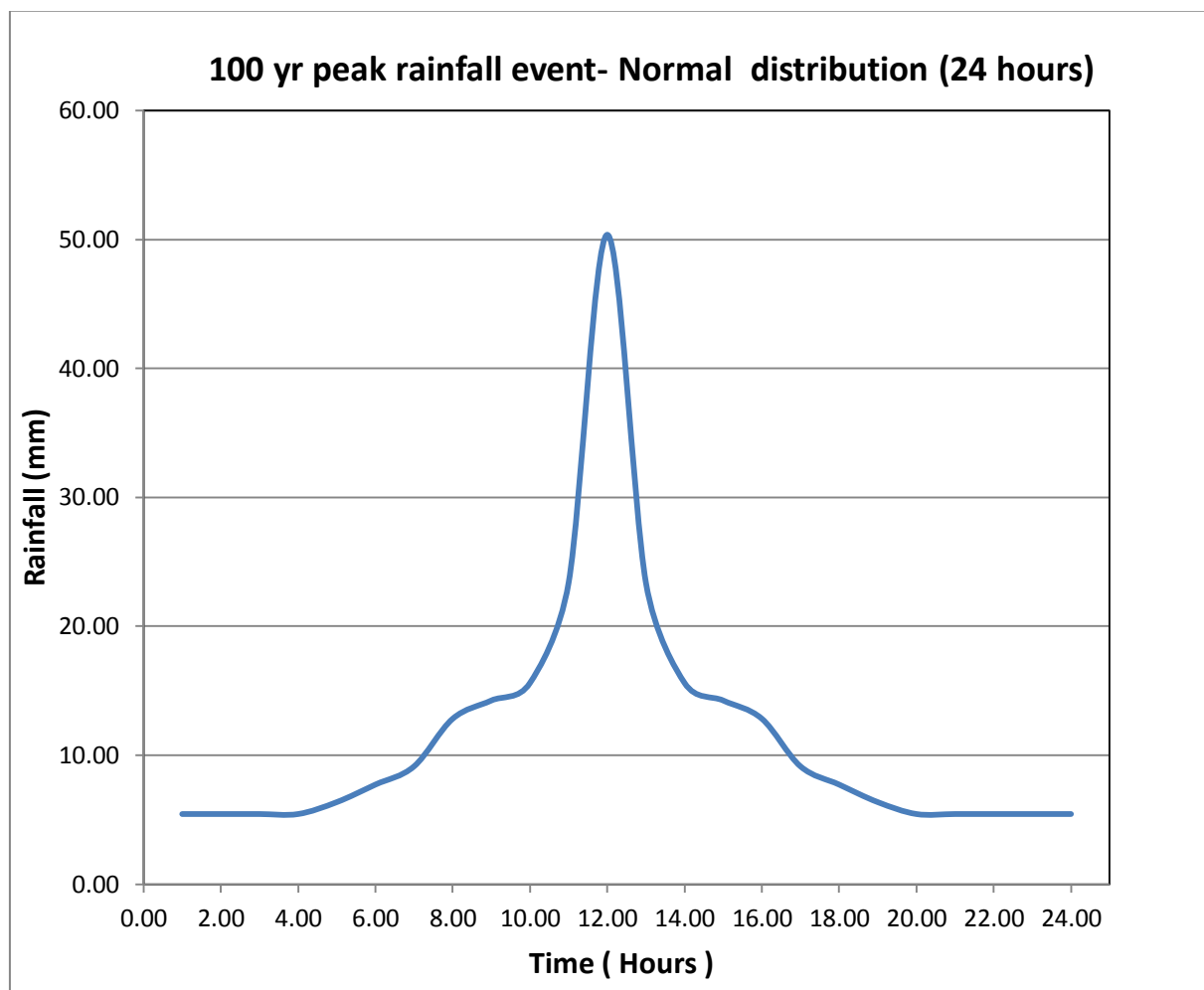
Assessment of the Site

The flood risk assessment for the proposed site has been conducted considering various factors such as flooding of site due to heavy rainfall leading to runoff from the nearby catchment area and causing inundation of site and its associated facilities and lack of adequate drainage.

The physiographic factors attributing to assessment of flood risk such as topography, slope, drainage pattern, soil type and land use pattern are considered for evaluation of risks and the extent of its severity. The Digital Elevation Modelling (DEM) has been used for representing a spatially referenced continuous surface representing the topography of the area. It is further used for a number of natural hazard risk management applications including flood inundation modelling and probability of rainfall runoff from the nearby catchments.

The flood risk assessment is based on 100 years rainfall data from the nearest IMD station at Rewa is used for estimation of rainfall runoff potential and flood inundation mapping using Surface Drainage Modelling Software- HEC HMS. The peak rainfall event that had occurred in the last 100 years is used as the extreme event for the site drainage. The peak rainfall event is distributed into the normal distribution over 24 hours and time series hyetograph for the site has been devised as shown in the Figure below.

Figure 8-2: 100 years peak rainfall event

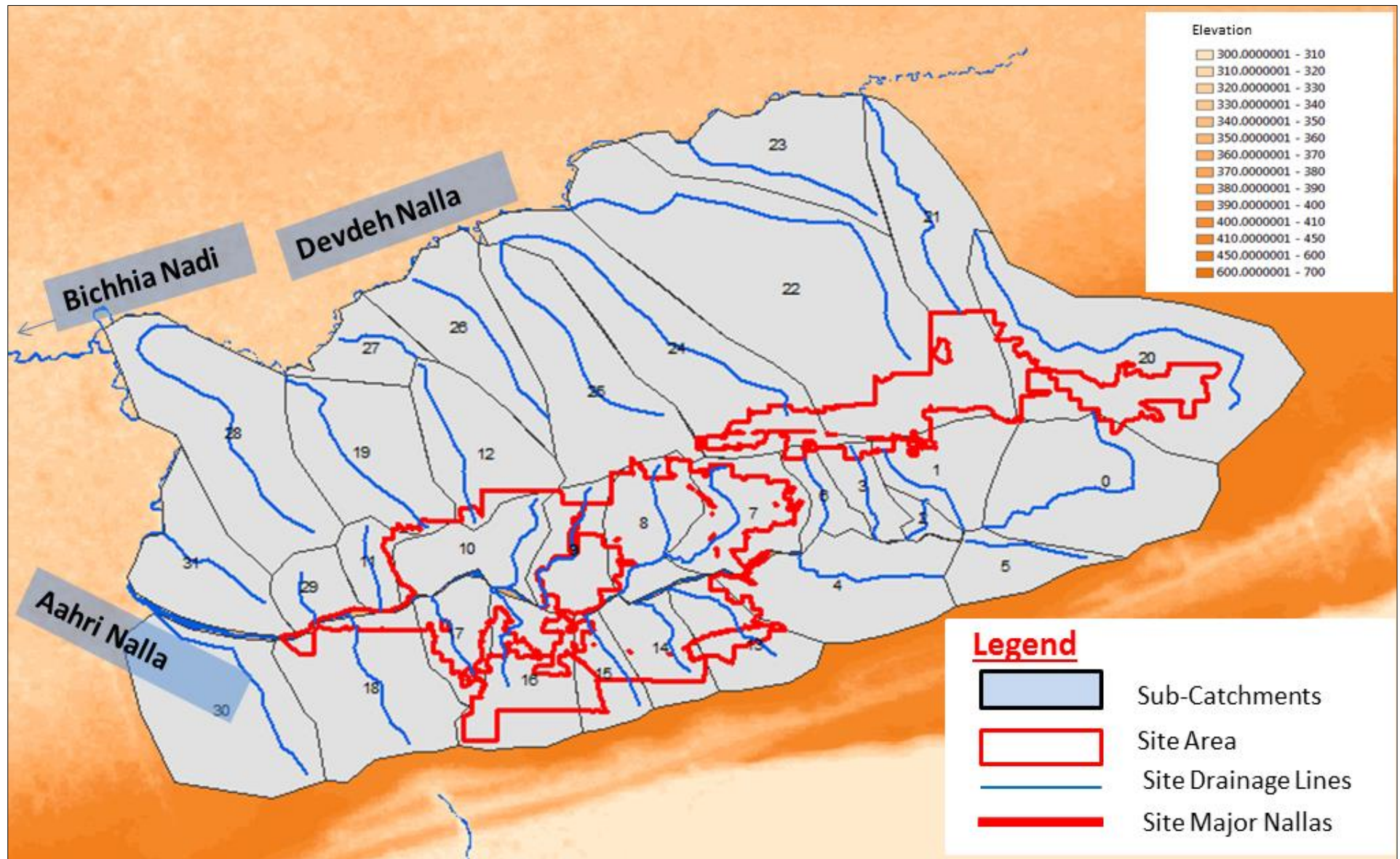


Rainfall Runoff Analysis

A rainfall runoff modelling tool 'HEC HMS' was used to model the discharge and volume of water generated in an extreme rainfall event. The hydrological modelling software 'HEC HSM' was used to simulate the rainfall runoff for the local catchments around the proposed project site and for mapping extent of flood inundation. The above software package is designed by The U.S. Army Corps of Engineers (USACE) Hydrologic Engineering Center and is used worldwide to simulate the complete hydrologic processes of dendritic watershed systems.

The site characteristics were estimated based on the site land use pattern, soil type and hydrological conditions. The peak rainfall event was used from the rainfall data provided in "Climatological Normal" issued by Indian Meteorological Department, Government of India. In order to assess the flood risk potential of the site area at Rewa, the catchment area was divided into smaller sub-basins based on the existing drainage patterns as shown in Figure below. The hydrological modelling was used to estimate the runoffs at various points of the catchment and for providing peak discharges and volumes of water generated under the given peak rainfall event.

Figure 8-3: Existing Drainage Pattern of the Project Area



Conclusion

Although the city of Rewa have experience of feeble rains in the last few years and have been experiencing drought like conditions but under this current exercise, attempt have been made to simulate an extreme event. Historical records suggest that in 1997, there were heavy rains which created flood like situation in city of Rewa. Upon investigating about this event by interviews with the locals, it was known that even in 1997 rains event, the project site experienced high water levels in the site drainage channels but water level was restricted to the drainage channels only.

To simulate such an extreme event a rainfall-runoff model is generated. The site catchments have been sub-divided into sub-catchments or sub-basins based on the site drainage. The project site has been subdivided into 32 sub-basin. The schematic diagram of the sub-basins as fed into the hydrological model is presented in the Figure Below. The figure shows various sub-basins as it is fed to the hydrological model HEC HMS to simulate the extreme event. The junctions represent the point of interactions between subbasins as required under the hydrological model.

The sub-basin areas and longest length of flow for every sub-basin was assessed using the DEM. The catchment characteristics are taken using DEM and google earth and other secondary sources. The model simulated results represents the runoff generated under a 100 year extreme event over the site and associated facilities. The results from the rainfall runoff modelling are presented in Table below.

Table 8-6: Runoff results from the HEC HMS modelling

Drainage Feature	Hydraulic Elements	Drainage Area (km ²)	Peak Discharge m ³ /s	Volume (1000 m ³)
Downstream Devdeh Nalla*	Junction-17	60.6837	213.4	4592.5
Downstream Aahri Naala*	Junction-16	52.3321	212	3960.4
Bichchia Nadi*	Junction-29	113.0158	414.4	8552.9

*above mentioned calculations are based on the site area and site catchment area only. The peak discharge and volume of water generated might be higher due to contributions from other sources.

The carrying capacity of the drainage both the drainage channels seems to be sufficiently good to convey such peak discharges. However, the Aahri Nallah in the downstream reaches has a wider channel and undulated terrain with high and low patches of land. This area seems to be prone to flooding in a peak discharge event. The same is shown in Figure below.

Figure 8-4: Schematic Diagram of the sub-basins

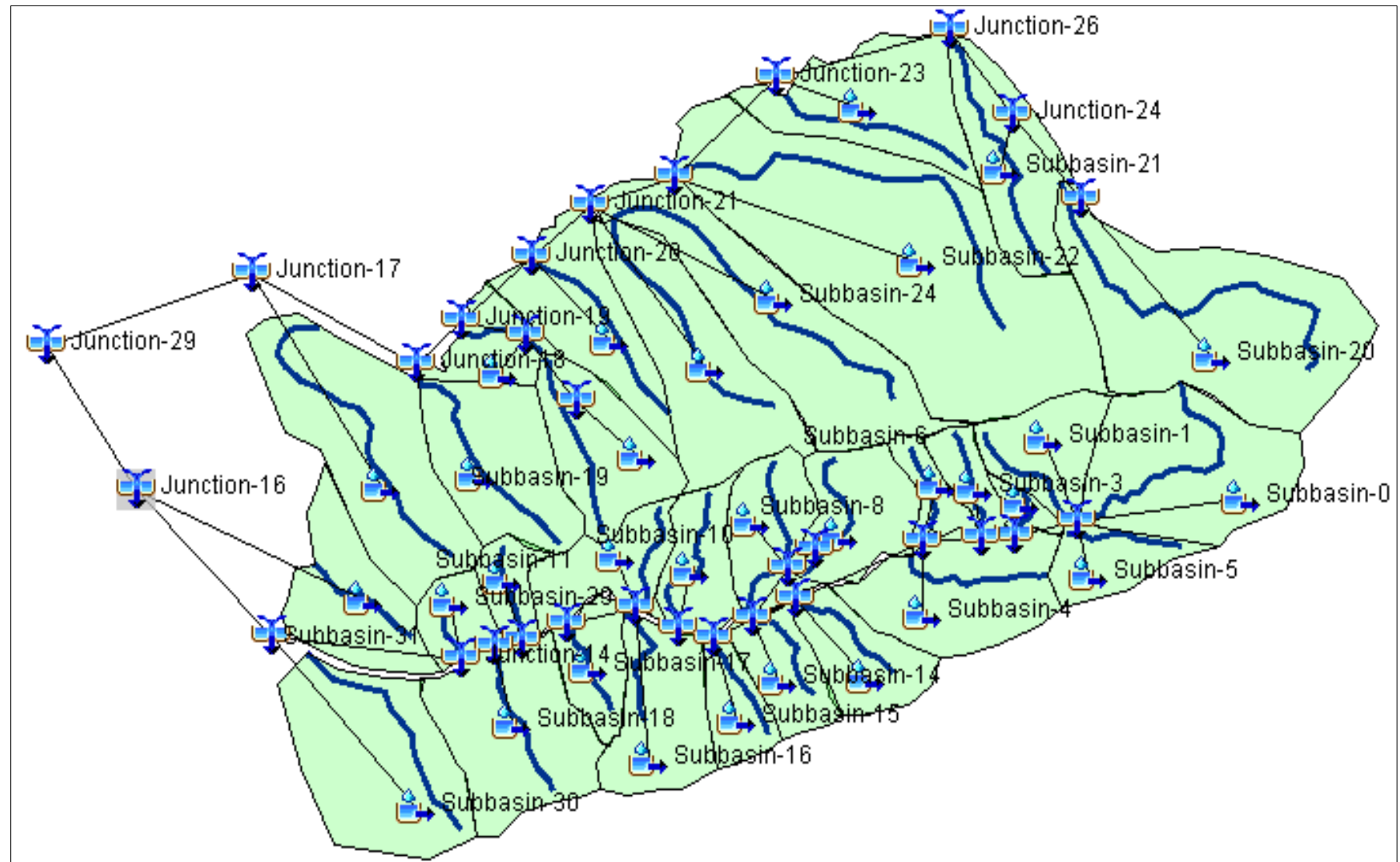
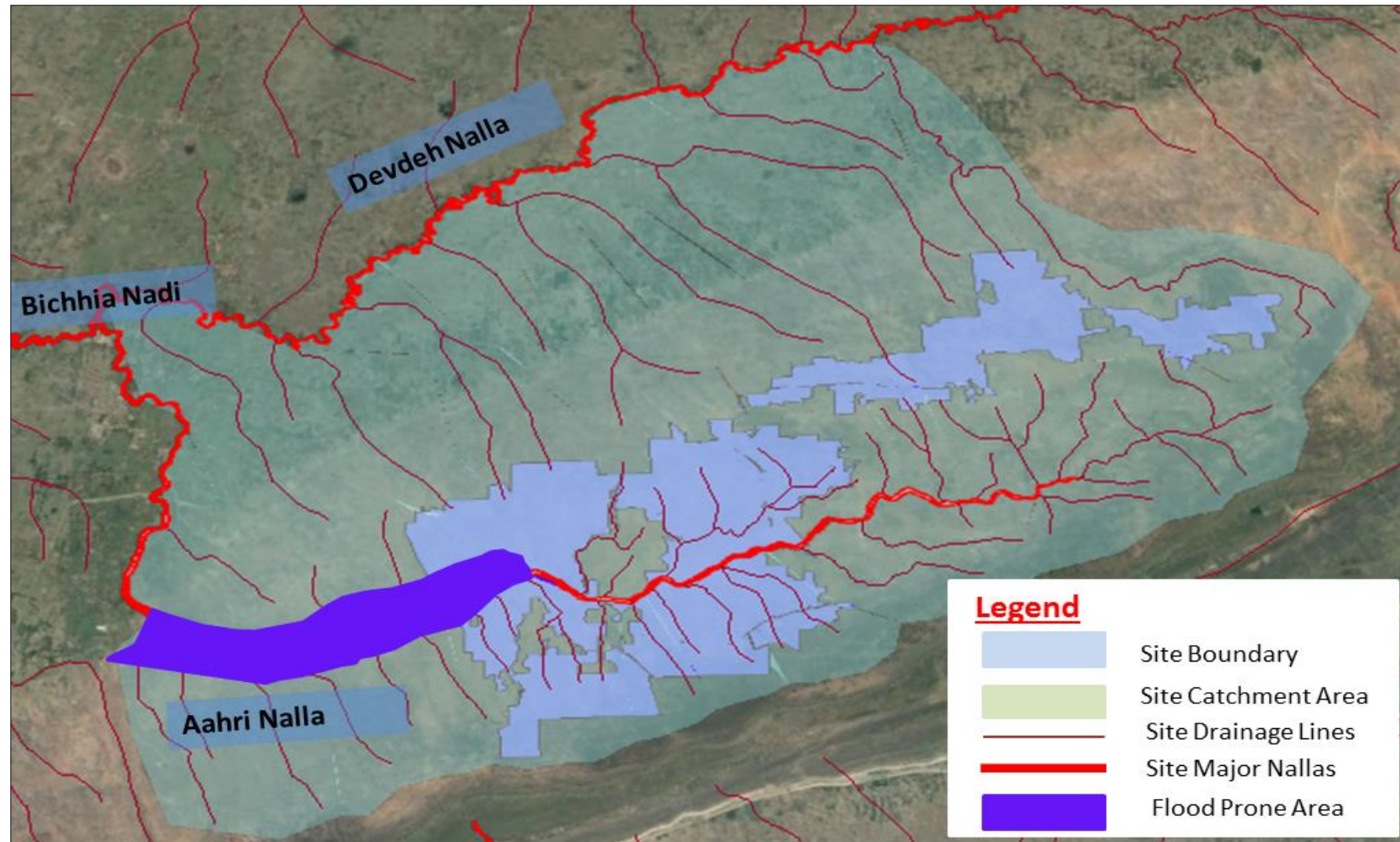


Figure 8-5: Downstream reaches of Aahri Nallah



Apart from the downstream reaches of the Aahri Nallah, there might be some local depressions within the site which might suffer from local ponding.

Recommendations

Although the site area has experienced low rainfall in the last few years and there has been a shortage of water for agricultural purposes but in case of extreme rainfall event, there might be local flooding and local ponding in few areas of the site. However natural slope of the site and sufficient discharge capacity of the site nallahs will help the site area drain quite quickly but few areas should be avoided for installation of solar panels and associated facilities to bear minimum losses.

- Since, the site area drains from north-east to south-west with slopes of around 2%, substantial runoff will be generated during extreme events. The runoff generated during the extreme rainfall events coupled with debris and sediments would acquire sufficient momentum force to damage the project assets if installed within the drainage features such as Naalas. The project proponent should avoid installing the project assets within the site drainage features such as Nallahs and drainage channels over the site.
- All the local depressions within the site should be surveyed and extent of these local depressions should be analysed and marked. These local depressions would be prone to ponding in an event of rainfall. These areas should either be avoided for asset installations or filled up and levelled.
- All the main drainage channels should be cleaned periodically especially before monsoons to ensure sufficient conveyance capacity is maintained so, that ponding of water does not occur.
- Drainage lines or hydraulic corridors identified traversing the Site will remain intact by provision of diversion berms or dykes around them.
- During clearing of area, the surfaces of all steep slopes will be deepened to retain water and increase infiltration.

During construction of three proposed substations by RUMSL and Grid substation by PGCIL following measures will be implemented to mitigate the potential effects associated with drainage of tracks and Watercourse Crossings:

- Access tracks will be kept as free as possible from excessive mud and silt deposits;
- Drainage ditches on the upslope side of the site tracks will prevent runoff from flowing over the tracks and causing erosion;
- Treatment of bunds and embankments adjacent to the track will reduce the rate and volume of runoff and minimise potential for erosion;
- Drainage arrangements will be subject to routine inspection to ensure their efficacy and any accumulations of silt will be removed.

Significance of Impact

The impact on surface hydrology will have moderate intensity with a medium spread for a short duration which will result in an overall moderate impact without mitigation. However, with proper implementation of suggested mitigation the impact will be reduced to minor.

Table 8-7: Impact Significance – Surface Hydrology and Drainage Pattern

Aspect	Scenario	Spread	Duration	Intensity	Overall
Surface Hydrology	Without Mitigation	Local	Short	High	Moderate
	With Mitigation	Local	Short	Moderate	Minor

8.3.1.4 Surface and Ground Water Quality

Impacts

During the construction phase, the primary water use requirement will be for dust control. However, water may also be required to moisture condition the soils for proper compaction of internal roads and foundations within the site premises. Temporary ablution facilities will be required during construction (i.e. portable toilets). It is estimated that 200-250 kilo litres/ day is required for the construction phase on daily basis (which includes water requirements for, batching plant and domestic requirement of workers). Water will be required for foundation work which will be sourced from authorised tankers. bore well(s) will also be constructed within the site premises to cater to the domestic water requirement during construction phase.

The ground water availability in Rewa Block has been evaluated to be at safe levels as per the data extracted from Rewa District, Ground Water Information Booklet, and CGWA. The weathered and fractured sandstones control occurrence and movement of ground water on a limited scale in the area. The Rewa sandstones are hard and compact with minimum porosity. In the topographic low areas weathered residuum attains a maximum thickness of 5m. The yield of sandstones and shales ranges from 1 to 3 and <1 to 1.5 lps respectively.

The major surface water feature is a seasonal channel carrying rain fed water locally termed as 'Devdah Nallah and Aahri Nallah', which traverses from east to west in the centre of the site. The PV Footprint will tend to avoid the drainage lines within the site which is towards south-east, and therefore will have minimal impact on them. However, soil compaction and vegetation clearance may increase the intensity and volume of surface water runoff. This may impact drainage lines within the site by increasing erosion, and increasing the sediment load of the water entering the channel of water. Also, increased run off could result in the creation of impoundments within the site. There is potential of contamination of low lying areas within the site due to sediment runoff from construction activities. Improper disposal of sewage and wastewater from labour camp and construction debris can contaminate the ground water resources in the area.

Mitigation Measures

Water for construction activities, flushing and washing purpose will be met from bore well which will be installed at the site. It is to be ensured that pre-treatment is provided to ground water which will be utilized for drinking. It is also suggested that the quality of water from the bore wells is monitored regularly to check the contamination levels. The other mitigation measures to be implemented are:

- Module Developer shall inform all site staff to make use of supplied ablution facilities and under no circumstances shall indiscriminate sanitary activities be allowed other than in supplied facilities.
- The drainage pattern of the site will not be altered and the natural slope of the site will be maintained;
- Adequate arrangement for storm water management during construction period will be made to avoid sediment runoff from the site.

- The removal of vegetation and soil cover will be restricted to only those areas necessary for the development.
- In particular, the unnecessary removal of groundcover vegetation from slopes will be prevented, especially on steep slopes.

Significance of Impact

The impact on water quality will have moderate intensity with a medium spread for a short duration which will result in an overall moderate impact without mitigation. However, with proper implementation of suggested mitigation the impact will be reduced to minor.

Table 8-8: Impact Significance – Surface and Ground Water Quality

Aspect	Scenario	Spread	Duration	Intensity	Overall
Surface and Ground Water Quality	Without Mitigation	Local	Short	High	Moderate
	With Mitigation	Local	Short	Moderate	Minor

8.3.1.5 Soil and Liquid Waste Generation, Storage and Disposal

The construction activities such as site clearance, excavation works, setting up of labour camps, installation of modules will generate different types of solid and hazardous wastes. The construction demobilization which will entail removal of machinery, workers, campsite and other temporary structures will also result in generation of waste. The following types of wastes will be generated due to construction of the project:

1. Domestic solid waste and sewage from labour colonies;
2. Waste oil from generator and other construction machinery;
3. Packaging waste such as gunny bags, plastics, etc.;
4. Empty paint containers, metal scrap, etc.; and
5. Construction debris.

Impacts

The construction debris generated due to the construction activities will have the potential for spread to areas outside the project boundary during construction. The dust particles from debris generated during construction activities can be carried along with the wind into nearby areas, thereby increasing the particulate matter in the area. However, this will happen only for a temporary period as the construction activities will be for small duration only. Improper disposal of solid waste from the labour camps at site and lack of proper sanitation facility for labour can lead to unhygienic conditions due to open defecation and spread of diseases in the area. It can also lead to discontent of local community and result in conflicts with the labour engaged at site.

Improper disposal of packaging materials, boxes, plastics, ropes etc. can lead to littering in the construction site and surrounding areas. Hazardous wastes such as waste oil, lubricants, hydraulic oil etc. can cause contamination of soil and water bodies if adequate precautions for management and handling are not undertaken. Use of chemicals such as paints, curing chemicals can lead to contamination of soil.

Mitigation Measures

The quantity of domestic waste generated daily from the labour camps will be small and limited as most of the workers will be hired locally. However, the construction contractor shall ensure that the campsites provided at

site have adequate waste disposal facilities. Arrangements for collection of garbage in dustbins and daily disposal to the nearest dumpsite shall be made.

Provision of segregated toilets for male and female workers (if any) in the ratio of 1:15 and 1:10 (toilet to workers) respectively shall be made at the campsites in order to maintain hygienic and clean surroundings. Washing and bathing areas will be provided with proper drainage system so that wastewater is not accumulated in the campsites. Disposal of sewage shall be made through a septic tank – soak pit arrangement.

Waste/used oil generated from generators and construction machinery and equipment will be stored on paved surface in a secure location at the project site. Appropriate secondary containment capable of containing the 110 percent of the largest tank is to be provided. The waste oil, which is characterized as hazardous according to Hazardous Waste (Management, Handling and Transboundary Movement) Rules, 2008, will be sold to MPPCB approved vendors at frequent intervals. Empty fuel containers will also be stored at a secured area designated for scrap and sold to authorized vendors. All packaging material will also be collected at the storage area and sold to scrap dealers.

Construction debris and excavated material will be stored in a confined area to prevent spread by wind or water. The construction debris will be used for backfilling of excavated areas and for foundation works at site.

Significance of Impact

The impact due to waste disposal will have moderate intensity with a local spread for a short duration which will result in an overall minor impact without mitigation. However, with proper implementation of suggested mitigation measures the overall impact will be insignificant.

Table 8-7: Impact Significance – Waste Storage and Disposal

Aspect	Scenario	Spread	Duration	Intensity	Overall
Waste Storage and Disposal	Without Mitigation	Local	Short	High	Moderate
	With Mitigation	Local	Short	Moderate	Minor

8.3.1.6 Ecology

Impacts

Land-use Change of Large Area:

The extensive spread of the proposed project entails conversion of the existing, mainly traditional pastoral, land-use profile of an extremely large tract of land. A sudden change in the traditional land-use of an area is liable to disrupt well-established ecological flows and inter-relationships, leading to degradation of food-webs and ecosystem services associated with the area. This impact could be mitigated by attempting to conserve the current land-use of as much of the project area as possible.

Removal of Natural Vegetation Cover:

Clearance of the site for construction purposes entails removal of the trees, bamboos, shrubs, climbers and herbs (both forbs and grasses) that make up the natural vegetation cover of the project area. Removal of this natural vegetation leads to limited loss of habitat features and microhabitats for the several macro and micro-faunal species associated with the area. It exposes the soil to desiccation by wind and sunlight. It also leads to loss of soil anchorage, leaving the soil vulnerable to erosion by wind and water. All these impacts individually and collectively lead to loss or degradation of habitats and ecosystem services.

These impacts could be mitigated by conserving or restoring the ground cover of as much of the area as possible using native species of trees, shrubs and herbs as listed in Section 4.6.1.17 describing the natural forest type of the study area.

Levelling or Grading of Land Surface:

Levelling or grading of the land leads to alteration of the natural topography of the area, thereby altering the natural drainage pattern of the area. Such alterations lead to changes in the natural ecological flows of the area increasing or reducing the natural subsidies hitherto available to different parts of the area. It could lead to drying up of existing wetlands or water-logging of hitherto dry areas. It is also liable to change the existing light, shade, insolation or moisture conditions in different parts of the area. It also involves excavation and land-filling, which alters the natural soil-profile. All these impacts individually and collectively lead to loss or degradation of habitats and ecosystem services.

These impacts could be mitigated by conserving as much of the natural topography as possible and planning the construction by incorporating the natural topographical features of the area.

Laying of Access Roads:

Laying of roads inevitably involves removal of the natural vegetation, disruption of hitherto continuous habitat areas, disturbances to natural water-channels by creation of embankments or culverts. Such disruptions cause fragmentation of existing faunal habitats and effectively reduce faunal access to habitats and habitat features such as roosts, feeding grounds, nest sites, tools and nesting materials.

This impact could be mitigated by minimising the number and size of access roads, maintaining the integrity of natural water-channels and restoring the natural vegetation of any roads not required beyond the construction phase.

Movement of Vehicles:

The movement of vehicles and operation of construction machinery over the land surface not only exposes the natural environment to vehicular emissions and unnatural levels of noise, light and vibrations, but also dislodges fine soil particles creating dust and causes compaction of the soil substrates. These effects lead to pollution of natural resources, injury or death of soil organisms, reduced percolation of rainwater into sub-soil layers and increased surface run-off. All these impacts individually and collectively lead to loss or degradation of habitats and ecosystem services.

These impacts could be mitigated by ensuring that vehicles and machinery used in the construction activities comply with the prescribed emission standards and their movement is restricted to pre-designated routes. It is recommended that construction activities that require high levels of illumination be restricted to daylight hours to prevent disruption of the natural night period by artificial lighting.

Installation of Solar Panels:

The advent of the large, geometrically arranged, reflective surfaces of solar panning into a natural area can cause considerable disturbance to the natural fauna associated with the area through visual obstruction or visual irritation. The overall visual effect of the solar panning is also known to degrade the aesthetic qualities of the natural landscape, thus affecting the cultural services hitherto proffered by the area.

Installation of Transmission Cables:

Installation of over-ground transmission systems disrupts the aerial habitat space of the area, while under-ground systems are apt to disturb sub-soil ecosystems.

Mitigation Measures

Land-use Change of Large Area:

The impact on land use change shall be mitigated by attempting to conserve the current land-use of as much of the project area as possible.

Levelling or Grading of Land Surface:

The impact on levelling and grading of land surface could be mitigated by conserving as much of the natural topography as possible and planning the construction by incorporating the natural topographical features of the area.

Laying of Access Roads:

The impact on laying of access roads could be mitigated by minimising the number and size of access roads, maintaining the integrity of natural water-channels and restoring the natural vegetation of any roads not required beyond the construction phase.

Movement of Vehicles and Heavy Machinery:

The developer shall ensure that vehicles and machinery used in the construction activities comply with the prescribed emission standards and their movement is restricted to pre-designated routes. It is recommended that construction activities that require high levels of illumination be restricted to daylight hours to prevent disruption of the natural night period by artificial lighting.

Significance of Impact

Table 8-9: Impact Significance - Ecology

Aspect	Scenario	Spread	Duration	Intensity	Overall
Ecology	Without Mitigation	Local	Short	High	Moderate
	With Mitigation	Local	Short	Moderate	Minor

8.3.1.7 Traffic and Transport

Impact

The construction phase shall involve transportation of construction materials, solar modules and mounting structures. The proposed project is accessible from National High Way – 75 and National High Way – 7 which will be utilized for transportation of machines and solar modules. The project construction activities will lead to additional traffic and increased risk of traffic related accidents and injuries to community and to workers. The increase in traffic due to the project is however, going to be marginal. The traffic density along the National Highway is low and has adequate carrying capacity to accommodate the additional traffic due to the construction activities.

Mitigation Measures

For minimizing the impacts due to the increased traffic, it is recommended that the proposed internal access road is constructed prior to movement of solar panels to the site. Only trained drivers with valid license shall be recruited by the construction contractor. Training programs shall be conducted at regular intervals for all the drivers for raising awareness about road safety and adopting best transport and traffic safety procedures once in every six months.

Mitigation measures such as emphasizing on safety amongst drivers, adopting limits for trip duration and arranging driver roster to avoid overtiredness and avoiding dangerous routes and times of day to reduce risk of accident shall also be implemented. Regular maintenance of vehicles and use of manufacturer approved parts should be adopted to minimize potentially serious accidents caused by equipment malfunction or premature failure. A schedule for movement of solar panels shall be formulated by the respective Developers of Modules which will be shared by RUMSL. The villagers will be made aware about the schedule prior to the movement of trucks and transportation of solar panels in the project area.

Significance of Impact

The impact due to traffic and transport will have moderate intensity with a medium spread for a short duration which will result in an overall moderate impact without mitigation. However, with proper implementation of suggested mitigation the impact will be reduced to minor.

Table 8-10: Impact Significance: Traffic and Transport

Aspect	Scenario	Spread	Duration	Intensity	Overall
Traffic/ Transportation	Without Mitigation	Medium	Short	Moderate	Moderate
	With Mitigation	Medium	Short	Low	Minor

8.3.1.8 Ambient Air Quality

The solar PV plant will entail extensive construction activities for short duration; hence, the impact during construction is expected to be moderate due to foot print of the area.

Impact

The main impacts associated with construction activities will be:

- 1) **Dust Generation:** resulting from earthworks such as levelling, grading, excavation works and movement of vehicles across dirt/unpaved roads, especially during windy conditions.
- 2) **Exhaust Emissions:** Exhaust emissions of SO₂, NO_x, CO, CO₂, and PM₁₀ will be attributed predominantly to the construction of the plant and road vehicles such as movement of trucks and vehicles during construction works. These emissions will be restricted to the project area and are anticipated to be generated in medium concentration, however; it will be dispersed rapidly within the area leading to an impact of low significance. This implies the effects to be of localized nature and temporary which indicates that any deterioration in air quality at project location is unlikely to be significant and is expected to be transient.

Mitigation Measures

Developer shall ensure that reduction and control of air emissions from construction activities by minimizing dust from material handling sources. Sprinkling of water is to be carried out by the respective Module Developer to suppress dust from construction, stock piles and transport movement. It shall be ensured that all stock piles are

covered and storage areas provided with enclosures to minimize dust from open area source. Stock piling and storage of construction material will be oriented after considering the predominant wind direction. Vehicles engaged for the project will be required to obtain “Pollution under Control” (PUC) certificates. Sufficient stack height needs to be provided to D.G. sets as per CPCB norms²⁷.

Significance of Impact

The impact on ambient air quality will have a local spread, moderate intensity and will last for a short duration primarily limited to construction related activities which will result in an overall minor impact without mitigation.

Table 8-11: Impact Significance – Ambient Air Quality

Aspect	Scenario	Spread	Duration	Intensity	Overall
Ambient Air Quality	Without Mitigation	Local	Short	High	Moderate
	With Mitigation	Local	Short	Moderate	Minor

8.3.1.9 Noise and Vibration

Impact

Noise and vibration will be caused by the operation of earth moving and excavation equipment, concrete mixers, cranes and the transportation of equipment, materials and people. There is potential for disturbance to habitations in proximity of construction site. Movement of traffic during night hours can also disturb the local community. Approximately 90-92 dB (A) of noise is expected to be generated from construction activity which will attenuate to less than 45dB (A) i.e. night time prescribed noise level at about 80m. The nearest habitations from the proposed project site include Etar Pahad Village which is located at a distance of approximately 900 m from the site in the south-east direction.

Mitigation Measures

Most of the construction activities involving excavation and foundation for solar panels will be done manually and therefore will have limited noise. Mobile noise sources such as cranes, earth moving equipment and HGVs shall be routed in such a way that there is minimum disturbance to receptors. Developer shall instruct their Safety Officers to arrange for inherently quiet construction equipment and machines to maintain the noise level to minimum. Only limited construction activities shall be carried out during night-time. The hours of operation for specific pieces of equipment or operations, especially mobile sources operating through community areas should be limited. It is also to be ensured that no village road will be utilized for movement of equipments.

All loud and sudden noises will be avoided wherever possible and fixed noise sources shall be located at least 50m away from the site boundary. Rubber padding/noise isolators will be used for construction equipment/machinery. Temporary noise barriers shall be provided surrounding the high noise generating construction equipment. The personnel involved in high noise generating activities shall be provided with personal protective devices to minimize their exposure to high noise levels. Construction vehicles and machinery will be well maintained and not kept idling when not in use.

Significance of Impact

²⁷<http://cpcb.nic.in/Industry-Specific-Standards/Emission/DieselGeneratorSets.pdf>

The impact due to noise and vibration will have moderate intensity with a local spread for a short duration which will result in an overall minor impact without mitigation. However, with proper implementation of suggested mitigation the impact will be reduced to insignificant.

Table 8-12: Impact Significance – Noise and Vibration

Aspect	Scenario	Spread	Duration	Intensity	Overall
Noise and Vibration	Without Mitigation	Local	Short	High	Moderate
	With Mitigation	Local	Short	Moderate	Minor

8.3.1.10 Occupational Health and Safety Hazards

Impacts

The construction activities include site preparation, infrastructure utilities installation and building structures. Therefore, there will be potential impacts on workers' health and safety due to exposure to risks through construction activities that lead to accidents causing injuries and death. The most frequent risks causes of accidental death and injury are:

Safety Risks:

1. Tripping due to uneven surfaces, obstacles, trailing cables;
2. Falling during working at height due to fall from fragile surfaces, roof edges and ladders;
3. Fire due to hot works, smoking, failure in electrical installations;
4. Mobile plant and vehicles; and
5. Electrical shocks.

Health Risks:

1. **Manual handling and musculoskeletal disorders:** typical construction activities that can cause injury such as lifting, lowering, pushing, pulling and carrying
2. **Hand-arm vibration:** people work with hand-held or hand-guided power-tools and machines, such as: concrete breakers, pokers and compactors, sanders, grinders and disc cutters, hammer drills, chipping hammers, chainsaws, scrabbles and needle guns.
3. Temporary or permanent hearing loss which usually comes from noise generated from machinery used for excavation or piling work and from compressors and concrete mixers etc.
4. Heat stress and working during high temperatures

Mitigation Measures

All the developers will be committed to ensure that all health and safety measures are in place to prevent accidents and/or reduce the consequences of non-conformance events under their supervision. RUMS shall formulate a site specific Emergency Preparedness and Response Procedure which shall provide details of the anticipated emergencies, the emergency organization, facilities, emergency procedures and roles and responsibilities. Developers shall ensure that adequate training is provided to staff about raising awareness for use of Personal Protection Equipment (PPE) and emergency response measures.

Developers shall introduce administrative controls into work processes such as job rotation, rest and stretch breaks etc. to reduce overexertion. Work site layout will be well planned to avoid manual transfer of heavy loads.

It shall also be ensured that good housekeeping at the construction site is maintained to avoid slips and falls. Excessive waste debris and liquid spills will be cleaned up regularly, while electrical cords and ropes will be placed along identified corridors marked for attention of everyone at site. Use of personal fall arrest system, such as full body harnesses as well as fall rescue procedures to deal with workers whose fall has been successfully arrested shall also be carried out.

Dropping/lowering of construction material or tool will be restricted and undertaken only under strict supervision, if required. PPEs such as safety glasses with side shields, face shields, hard hats and safety shoes shall be mandatory at construction site. Ear plugs shall be provided for workers placed at high noise areas.

Significance of Impact

The health and safety impacts will have high intensity with a local spread for a short duration which will result in an overall moderate impact without mitigation. However, with proper implementation of suggested mitigation the intensity can be reduced to minor.

Table 8-13: Impact Significance - Health and Safety

Aspect	Scenario	Spread	Duration	Intensity	Overall
Health and Safety	Without Mitigation	Local	Short	High	Moderate
	With Mitigation	Local	Short	Moderate	Minor

8.3.2 Impacts during Operation Phase

8.3.2.1 Aesthetics and Visual Impacts

Impacts

Site visits were undertaken to source information regarding land use, vegetation cover, topography and general visual quality of the affected environment. The visibility or visual exposure of any structure stands to reason that if the proposed solar facility and associated infrastructure were not visible, no impact would occur.

The project area is characterised by undulating topography with rocky outcrops. The mean elevation of the proposed site is 430 to 450m.

The land owners expressed that most of the land in the proposed project area was at a slope (*pahadi*) and hence too far from the area of residence. They rarely travelled to the *pahadi* area to cultivate due to lack of irrigation facilities and instead preferred the land parcels in the plain areas near their residence to undertake agricultural activities. Thus, the land parcels (within the project boundary) were mostly left barren and uncultivated.

Mitigation Measures

The solar panels will be installed at a low height and will be kept closer to the ground so that it does not pop out of the general landscape of the area. The panels will be arranged in a systematic manner which will give an aesthetic sense to it. The proposed project would include a boundary wall around the perimeter of the project to further obscure the peripheral view of the project and any indirect reflection. Impacts from glare would be minor.

Significance of Impact

The impact on aesthetics and visual aspects will have low intensity with a local spread for a long duration which will result in an overall minor impact without mitigation. The residual minor impact, even after control of intensity and spread, will remain minor owing to the duration of project.

Table 8-14: Impact Significance- Aesthetics and Visual

Aspect	Scenario	Spread	Duration	Intensity	Overall
Aesthetics and Visual	Without Mitigation	Local	Long	Low	Minor
	With Mitigation	Local	Short	Low	Insignificant

8.3.2.2 Soil Quality

Impacts

Compaction of soils from increased levelling and grading of areas within the site will result in lower permeability and therefore, decreased infiltration and increased runoff. Without appropriate measures, runoff from PV panels, compacted areas and hard standing areas in addition to erosion by wind may increase erosion and increase the sediment load in run-off.

Once the plant is commissioned there will be limited disturbance to soil, however, repair and maintenance of underground cables and associated utilities will lead to generation of hazardous wastes such as used transformer oil. The defunct/damaged photo voltaic cells will also be generated and storage/disposal on unpaved ground can lead to contamination of soil being a hazardous waste.

Mitigation Measures

Disturbance to soil from repair and maintenance activity will be limited and will ensure proper restoration of soil wherever excavation is undertaken. RUMSL shall explore the option of buyback agreements for defunct panels and for replacement and disposal of transformer oil by the supplier, otherwise, arrangements shall be made for disposal of defunct panels and waste oil by MPPCB authorized recyclers. Fuel and used oil storage areas will be contained in bunds of 110 capacity of the stored material.

Broken Solar Panels

First of all, inspection of PV modules for defects that can appear in the form of burn marks, discoloration, delamination, or broken glass is to be undertaken. An authorised person will walk the site to confirm that there are no broken modules (shattered glass) and broken modules should not be sprayed with water.

Broken or damaged solar panels are required to be immediately shifted to a designated area in scrap yard to avoid any type of land contamination. A photograph is to be taken of the broken panel at the site to cater to Insurance settlement claims. In accordance with the Consent to establish to be given by MPPCB, these cells once collected to a certain number are to be sent back to the manufacturer with the photographs taken for proper and safe disposal²⁸.

Significance of Impact

The impact on soil will have moderate intensity with a local spread for a short duration (of activity) which will result in an overall minor impact without mitigation

²⁸ <http://mnre.gov.in/file-manager/UserFiles/report-on-developmental-impacts-of-RE.pdf>

Table 8-15: Impact Significance- Waste Disposal

Aspect	Scenario	Spread	Duration	Intensity	Overall
Waste Disposal	Without Mitigation	Local	Short	Moderate	Minor
	With Mitigation	Local	Short	Low	Insignificant

8.3.2.3 Surface and Ground Water Availability and Quality

Impacts

The water requirements for the plant during operations will be predominantly for washing of solar PV modules to remove bird droppings, dust and other dirt, and for domestic water consumption. During the operational phase it is estimated that PV panel cleaning will require approximately 3, 75,000 litres/MW/day (500 litres/MW/Day). The cleaning frequency will be once in ten (10) days, being a rocky terrain which tends to be less prone to dust. Drinking water and process water will also be supplied by borewells and may require treatment for domestic use. It is estimated that there will be approx. 43-45 KL/ day²⁹ of daily domestic water requirement.

Frequency of module cleaning

The frequency of module cleaning will depend on local site conditions and the time of year. Weather pattern will also take into account for example; cleaning during rainy periods is less likely to be required.

Various options to meet the water requirement during operation phase of the plant that are present in the project area have been analysed to provide a glimpse of best available option depending upon the criteria of availability, local dependence, conveyance and impact on drainage pattern. Table below presents the comparative analysis undertaken for various identified options.

S.No	Source of Ground Water	Factor Considered	Analysis
1.	Ground Water	Availability	The ground water availability in Rewa Block has been evaluated to be at safe levels as per the data extracted from Rewa District, Ground Water Information Booklet, and CGWA. The project location has a pre-monsoon depth to water level in the range of 8 to 12 mbgl and post-monsoon depth to water level in the range of 5 to 10 mbgl respectively. Net annual gross ground water availability is 5225 ham.
		Dependence	Bore wells drilled in in Rewa block are recorded in artesian condition and a few are free flowing with a free flow of about 100 liters/minutes ³⁰ . Locals are dependent upon bore well for meeting their daily water requirements. Bore wells were observed to constructed within the project villages to cater the daily requirements. Locals utilize buckets for conveyance of water from constructed bore wells to their households.
		Conveyance	Similarly, bore well can be constructed to meet the water requirements for the project. Respective Module developers can install bore well in their premises of site boundary. Number of bore well will be finalized only after further ground investigations by the Module developers.
		Impact on drainage pattern	The site for construction of bore well will be selected in such a

²⁹ 300 Staff and 145 litres/ person/day is considered for the calculation

³⁰ District Brochure, CGWA

S.No	Source of Ground Water	Factor Considered	Analysis
			way where the ground surrounding the well is sloped away from the well to prevent any surface run off from collecting or ponding. The well is up-slope and as far as possible from potential contamination sources such as septic systems.
2.	Aahri and Devdah Nallah, Bichia River	Availability	The main nallah draining the site is Aahri Nallah while Devdeh Nallah drains part of site drainage on the north-eastern side. Bichia River is also located in north-west direction at a distance of 6km from site. The carrying capacity of both the drainage channels seems to be sufficiently good to convey such peak discharges of 213.4 m ³ /s and 212 m ³ /s. Bichia River has a capacity to carry a peak discharge of 414.4 m ³ /s.
		Dependence	Both the Nallahs are seasonal channels and water is available only for one or two months after monsoon season.
		Conveyance	Water can be transported to site through local water tankers. However, water taken from the river or Nallahs will require prior treatment before its use.
		Impact on drainage pattern	The site drainage nallahs (Aahri Nallah and Devdeh Nallah) are drained into Bichiya River at the North West of the site. The topography of the site is locally undulating and regionally sloping towards South-westward. The site drainage shows dendritic pattern and various nallahs existing over the site drains most of the water during monsoons.
3.	Catchment Rain Water	Availability	The annual rainfall over the city of Rewa is between 950-1000mm.
		Dependence	The monsoon has been feeble in the last few years and there have a drought like conditions with severe loss to agriculture and shortage of water. Also water present in the catchment areas support local drainage basin.
		Conveyance	The runoff generated during the extreme rainfall events coupled with debris and sediments. There might be local flooding and local ponding in few areas of the site which will require prior treatment before its use.
		Impact on drainage pattern	Consumption of water from catchment area can lead to widening of depression, rendering them to prone to erosion and modifying the angles at which Nallahs join the main river (generally the angles are acute angles), affecting overall drainage pattern of the project area.

After evaluation of all the options, availability of ground water appears to be most suitable one to meet the water requirement during different stages of the proposed project. Module Developers is required to assess the number of bore well to be constructed after taking prerequisite clearances from Central Ground Water Board. Ground water in Rewa block occurs under phreatic and semi confined & confined conditions and falls in **‘Safe category’** with net annual gross water availability of 5225 ham.

However, the water requirement for agricultural purposes in the study area is also met through bore well and hand pumps. The extraction of the groundwater for the project activities can have an impact the availability of the groundwater resources.

Impact on ground water availability

As per social survey conducted in project affected villages during December 2015- January 2016, it was assessed that 68.4 % of drinking water requirement is met by ground water through tube wells/wells and hand pumps. Considering 70% of total population of project affected villages utilizing ground water resources at a 45 litres per capita/day for drinking purposes, the total water requirement is calculated to be 0.027 ham. On yearly basis, the water ground water usage is assessed to be 9.855 ham (0.027×365 days).

The utilization of ground water required for cleaning of solar panels during operation phase is evaluated to be 0.0375 ham at a time (with a cleaning frequency of once in 10 days). Hence the water requirement on yearly basis is calculated to be 1.35 ham.

As per a report of Central Ground Water Board, Ministry of Water Resources 2013, the net ground water availability in Rewa district is 46,801 ham and ground water draft for all uses is 24,289 ham. The stage of ground water development in District is 52 %. The report also assess that there will be availability of ground water for future irrigation would be 21,079 ham after making allocation for future domestic and industrial supply for next 25 years. Therefore, it can be concluded that the requirement of ground water for operation phase of the project can be met without negotiating competitive users (drinking water requirement of villages and irrigation purposes) based on ground water availability.

Mitigation Measures

Various factors such as tilt angle, orientation and tracking are required to be monitored for efficient cleaning of modules. Water efficient cleaning methods should be applied for cleaning of modules like utilization of dust broom, brush trolley etc.

Meters shall be installed at the borewells to monitor the abstraction of water. The plant site will be provided with adequate drainage facility to drain off wash wastewater and prevent any water-logging at site or in the surroundings. Wastage of water during cleaning of panels shall be avoided.

The site office shall be provided with sewage line and the collected sewage shall be channelized to a septic tank with soak pit arrangement. Developers should ensure that rain water collected from the project site will be utilized to recharge the ground water through onsite rain water harvesting tank/pits.

Significance of Impact

The impact on water resources will have moderate intensity with a local spread for a long duration which will result in an overall minor impact without mitigation.

Table 8-16: Impact Significance – Surface and Ground Water Quality

Aspect	Scenario	Spread	Duration	Intensity	Overall
Surface and Ground Water Quality	Without Mitigation	Local	Long	Moderate	Moderate
	With Mitigation	Local	Long	Low	Minor

8.3.2.4 Ecology

Impacts

Use of Herbicides:

Herbicidal chemicals tend to be employed throughout the operation phase to prevent or control the growth of plants which may cut off sunlight from the solar panelling. Herbicidal chemicals are invariably toxic to most organisms and may have a tendency to persist or bio-accumulate. Thus, herbicides sprayed in the project area could contaminate the soil, surface water, groundwater and food-chains of the area.

These hazardous impacts could be prevented by strictly prohibiting the use of herbicides in the facility and opting for manual weeding to control plant growth in the solar panel area.

Physical Presence of Installations:

The physical presence of the various installations is likely to act as an obstacle and hinder or curtail faunal movement and ecological flows within and through the area. There is also a likelihood of death or injury to animals, especially aerially moving fauna, through contact with the over-ground installations.

Mitigation Measures

Use of Herbicides:

RUMSL shall ensure that usage of herbicides in the facility is prohibited and manual weeding to control plant growth in the solar panel area is opted.

Significance of Impact

The impact on ecology will have high intensity with a local spread for a short duration which will result in an overall moderate impact without mitigation.

Table 8-17: Impact Significance - Ecology

Aspect	Scenario	Spread	Duration	Intensity	Overall
Ecology	Without Mitigation	Local	Short	High	Moderate
	With Mitigation	Local	Short	Moderate	Minor

8.3.2.5 Health and Safety

Impacts

Possible impacts to health and safety during operations include exposures to electromagnetic fields (EMF) and accidental injury or death to workers during operation and maintenance activities. In addition, worker health and safety issues include working in potential weather extremes, and possible contact with natural hazards, such as uneven terrain.

Electromagnetic Fields (EMF) emanate from any wire carrying electricity. Possible effects associated with the electric and magnetic fields from transmission lines (or similar electrical sources) fall into two categories:

- Short-term effects that can be perceived and may represent a nuisance; and
- Possible long-term health effects.

The issue of whether there are long-term health effects associated with exposure to fields from transmission lines and other sources has been investigated for several decades. There is little evidence that electric fields cause long-term health effects. Estimates of magnetic-field exposures have been associated with certain health effects in studies of residential and occupational populations. Research in this area is continuing to determine whether such associations might reflect a causal relationship.

Mitigation Measures

The lists of exposure limits for general public/occupational exposure to electric and magnetic fields published by the International Commission on Non-Ionizing Radiation Protection (ICNIRP) is as given in **Table8-18** and **Table8-19**.

Table8-18: ICNIRP exposure limits for general public exposure

Frequency	Electric Field (V/m)	Magnetic Field (μT)
50 Hz	5000	100
60 Hz	4150	83

Source: ICNIRP (1998): "Guidelines for limiting exposure to time-varying electric, magnetic, and electromagnetic fields (up to 300 GHz).

Table8-19: ICNIRP exposure limits for occupational exposure

Frequency	Electric Field (V/m)	Magnetic Field (μT)
50 Hz	10,000	500
60 Hz	8300	415

There are no specific standards or guidance on EMF in India however, the Indian Electricity Act and Rules clearly stipulate the minimum clearances required. Hence, the ICNIRP standards and guidelines have been considered. For the general public (up to 24 hours a day) an exposure level of 1,000 mG or 100 μT is suggested. The EMF generated by 33 KV units will be lesser than the suggested value. Underground cables will be constructed to minimize the exposure of EMF.

Workers handling electricity and related components will be provided with shock resistant gloves, shoes and other protective gears. Adequate training regarding health and safety will be provided to the workers. The switchyard building will be provided with fire extinguishers and sand buckets at all strategic locations to deal with any incident of fire. Safety incidents will be recorded and monitored with an aim that numbers are never significant, and gradually reduce.

Workers at site handling broken solar panels shall be provided with adequate PPEs (safety gear, goggles, and gloves). The workers at site are also on regular basis shall be appraised about the potential health risks associated with handling of solar panels.

Significance of Impact

The impact on health and safety will have high intensity with a local spread for a long duration which will result in an overall major impact without mitigation. However, with proper health and safety measures the intensity of impact can be reduced to low resulting in an overall minor impact.

Table 8-20: Impact Significance – Health and Safety

Aspect	Scenario	Spread	Duration	Intensity	Overall
Health and Safety	Without Mitigation	Medium	Long	Moderate	Moderate
	With Mitigation	Local	Long	Low	Insignificant

8.3.2.6 Substation and Proposed Transmission line

RUMSL proposes to construct three 33/220 kV pooling substation located at Badhwar, Ramnagar and Barshetha desh Villages respectively. The 220/33kV substations and 220kV transmission lines from the individual 250MW Unit to the PGCIL 400/220kV substation will be developed and owned by RUMSL. Subsequently, the power will be evacuated to 400 KV Vindhyachal – Jabalpur line owned by MPPMCL, Jabalpur located at an aerial distance of 30km towards the south of the site. The geographical coordinates of the proposed Sub station are provided below:

Badhwar Substation is at distance of approximately 2.7 Km from PGCIL substation		
A	24°28'57.57"	81°33'35.45"
B	24°28'56.10"	81°33'28.80"
C	24°29'2.35"	81°33'26.98"
D	24°29'3.88"	81°33'33.92"
Ramanagar Substation is at distance of approximately 2.8 Km from PGCIL substation		
A	24°28'49.31"	81°35'18.48"
B	24°28'49.83"	81°35'25.45"
C	24°28'43.36"	81°35'26.13"
D	24°28'42.87"	81°35'19.02"
Barsehtha Desh Substation is at distance of approximately 0.7 Km from PGCIL substation		
A	24°28'16.05"	81°34'29.07"
B	24°28'19.14"	81°34'35.33"
C	24°28'13.38"	81°34'38.67"
D	24°28'10.32"	81°34'32.48"
400/220kV substation of PGCIL		
A	24°28'19.69"	81°34'23.79"
B	24°28'12.79"	81°34'11.52"
C	24°28'0.32"	81°34'19.86"
D	24°28'07.22"	81°34'31.98"

Source: RUMSL

Impacts

Community Health and Safety

- During operation of transmission lines, unchecked growth of tall trees and accumulation of vegetation within rights-of-way may result in power outages through contact of branches and trees with transmission lines and towers; and
- Electrocutation from direct contact with high-voltage electricity or from contact with tools, vehicles, ladders, or other devices that are in contact with high-voltage electricity.

Occupational Health and Safety

- Workers may be exposed to occupational hazards from contact with live power lines during construction, maintenance, and operation activities;

- The transmission towers and the electricity carried by transmission and distribution lines can pose potentially fatal risk to birds through collisions and electrocutions;
- Usage of highly-refined, mineral insulating oils (e.g. Polychlorinated Biphenyls [PCB] and sulfur hexafluoride [SF6], are used to cool transformers and provide electrical insulation between live components which are hazardous in nature;

Mitigation Measures

Community Health and Safety

- Right of Way (Row) for the transmission to be selected depending on the characteristics of existing vegetation, topographic features, and installed height of the transmission lines;
- Regular maintenance of vegetation within the rights-of-way is necessary to avoid disruption to overhead power lines and towers;
- Proper signs and barriers (e.g. locks on doors, use of gates, use of steel posts surrounding transmission towers, particularly in urban areas), and education / public outreach to prevent public contact with potentially dangerous equipment should be installed near Grid and Pooling Sub-Station;

Occupational Health and Safety

- The layout of the substation should optimise the use of space while still complying with all relevant building codes and standards. A safe working space should be provided around the substation for the operation and maintenance staff;
- An earth mat is required to be provided to obtain safe step/touch potentials and earth system faults. Earth mats should be installed prior to setting the foundation. Lightning protection should be considered to alleviate the effect of lightning strikes on equipment and buildings present in the Grid Substation and Pooling substation;
- An alarm system fitted to the Grid Sub-Station gate and the medium voltage station, metering station and to any portable cabins; and
- A trench is required to be constructed as a means for easing the routing of power and data cables to the substation;
- Consider installation of visibility enhancement objects such as marker balls, bird deterrents, or diverters on transmission lines in sufficient number;
- The storage area of oils required for cooling of transformer should also have a roof to prevent precipitation from collecting in the storage area.

Significance of Impact

The impact on substation and transmission lines will have high intensity with a local spread for a long duration which can result in an overall major impact without mitigation. However, with proper mitigation measures the intensity of impact can be reduced to low resulting in an overall minor impact.

Table 8-21: Impact Significance – Substation and Proposed Transmission Lines

Aspect	Scenario	Spread	Duration	Intensity	Overall
Sub-Station and Transmission Lines	Without Mitigation	Medium	Long	Moderate	Moderate
	With Mitigation	Local	Long	Low	Insignificant

8.3.3 Impacts during Decommissioning Phase

Impacts

The key issues associated with the demobilization phase will include:

- Issue of loss of job when the workers will be asked to leave;
- Improper disposal of demolition waste and obsolete machineries will lead to contamination of soil and discontent of community;
- Demolition activity is anticipated to generate dust and exhaust emissions which can be carried downwind to habitations;
- Risks associated with health and safety issues such as trip and fall, electrical hazard etc.;
- The decommissioning activities of dismantling the solar power plant and removing the ancillary facilities can lead to increased noise levels;
- Generation of broken panels which is hazardous waste;
- Contamination of drainage channels due to release of hazardous waste; and
- During the dismantling of the solar power plant, with the removal of ancillary facilities, visual intrusions will be likely but their consequence will be negligible due to fact that such impact would be temporary (over a short period).

Damage to Solar Panels:

Depending on the type used, photovoltaic cells may contain toxic substances such as gallium arsenide, copper-indium-gallium-diselenide and cadmium telluride. If any solar panel is damaged during dismantling of the facility, these toxins are likely to spill and leach into the soil and water of the area, posing serious threat to environmental and public health.

Unsafe Disposal of Solar Panels:

If the solar panels are not handled or disposed of properly during the decommissioning phase, any toxic substances contained within them are likely to escape into the surrounding air, water or soil, creating serious environmental and public health risks.

Mitigation Measures

Demobilization will require removal of machinery, workers and other structures. The mitigation measures for decommissioning shall include:

- The proponent shall inform the workers and local community about the duration of work;
- The workers shall be clearly informed about the expected schedule and completion of each activity;
- A transparent mechanism shall be prepared wherever choice is to be made between individuals of similar capability;
- All waste generated from decommissioning phase shall be collected and disposed off at the nearest identified disposal site;
- All necessary Personal Protection Equipment (PPE) shall be used by the workers during demolition work;
- Disposal panels will be disposed off to authorized vendor through buy back agreements;
- It is to be ensured that dismantling is carried out during non monsoon season and all the drainage channels will keep intact by creating bunds around them.

- RUMSL will be committed to ensure that all health and safety measures are in place to prevent accidents and/or reduce the consequences of non-conformance events.

Significance of Impact

Impact value for decommissioning is assessed to be moderate without mitigation and minor with preventive measures.

Table8-22: Impact Value – Decommissioning Phase

Aspect	Scenario	Spread	Duration	Intensity	Overall
Decommissioning	Without Mitigation	Short	Short	Medium	Moderate
	With Mitigation	Medium	Short	Low	Minor

8.4 Impacts related to Socio-Economic Aspect

This section describes the potential socio-economic impacts during various phases of the project cycle on the study area and recommends their subsequent mitigation measures.

8.4.1 Impacts during Construction Phase

Impacts

The impacts identified on socio-economic conditions of the area can be related to the following aspects:

- Loss of Land;
- Loss of Livelihood;
- Migrant Labour Engagement; and
- Cumulative Labour onsite

Loss of Land:

The private land identified for the proposed project in Phase I comprises of 164.231 hectares owned by a total of 309 titleholders. The census survey undertaken for the ESA study gathered information of 250 affected households (titleholders) comprising of 1288 project affected population. Out of 250 affected households, after the land acquisition process, it is estimated that 23.6% of the project affected households would have land holdings less than 0.5 hectares, 32.8% would have land holdings upto 1 hectare, 20% would have land holdings upto 2 hectares and 23.6% would have land holdings more than 2 hectares.

Consultations held with the landowners revealed that the private land parcels falling under the project area is in a slope terrain. Because of the slope terrain, no irrigation was possible for these land parcels, therefore, as reported these parcels used to depend upon rainfall in order for agricultural activities to take place. A one crop cycle used to be practiced in these land parcels. However, in the last three years, due to the decrease in rainfall, these land parcels have been left barren and unused. It was also reported that all project affected families used to undertake agricultural activities on these land parcels around three years ago. Amongst the project affected households, farmers with less than .5 hectares land holdings within the project area (comprising about 14%) used to cultivate their land and the agricultural produce were used for self consumption purposes. These farmers used to supplement their income by working as agricultural labourers in large farm lands (outside the project area) owned

by farmers belonging to the same villages. Due to the discontinuation of cultivation activities on the land parcels delineated for the project due to the decrease of rainfall, the farmers who have .5 hectares land holdings have resorted to being engaged as non agricultural labourers in Rewa city as well as one members of (each of the small farmer) their family have migrated to cities outside the state for work opportunities and have been sending back money for their family. Farmers with medium and larger land holdings (falling outside the project area) used their agriculture produce both for self consumption and for sale in the market. Hence, as the project affected households did not earn any income from the land parcels identified for the project, there would be no loss in terms of land to them due to the unproductive nature of the land.

Seasonal grazing by livestock owned by 31% of project affected population used to be practiced in the government land (falling both within and outside the project area) during the monsoon season. Only 22.5% of 5467.26 hectares of government land (falling in all five project villages) has been transferred to the project. However, this land has not been designated as grazing land and alternate grazing land is available within 500 m to 1 km of the proposed project area towards the east and west direction of project boundary. This transfer of land would not lead to loss of access to grazing area for the project affected population because of the abundance of open available land in the area.

As the government land delineated for the project was barren and rocky and not used for any activities (either as an income source or shelter) by the local communities, there would be no impact on non-titleholders.

Loss of Livelihood:

Through consultations undertaken, it was reported that all project affected families used to undertake agricultural activities on the private land parcels identified for the project around three years ago. Amongst the project affected households, farmers with less than .5 hectares land holdings within the project area (comprising about 14%) used to cultivate their land and the agricultural produce were used for self consumption purposes. These farmers used to supplement their income by working as agricultural labourers in large farm lands (both within and outside the project area) owned by farmers belonging to the same villages. Due to the discontinuation of cultivation activities on the land parcels delineated for the project because of the decrease of rainfall, the farmers who have .5 hectares land holdings (within the project area) have resorted to being engaged as non agricultural labourers in Rewa city as well as one member of (each of the small farmer) their family have migrated to cities outside the state for work opportunities and have been sending back money for their family. Farmers with medium and larger land holdings (falling outside the project area) used their agriculture produce both for self consumption and for sale in the market.

Around 36.4% of the affected households earn less than INR 60000 annually and mostly comprise of population engaged as agricultural labourers (on land parcels falling outside the project area) and daily wage labourers (non agricultural labourers). About 20% of the affected population earn between INR 60,000 – 1,00,000 and 26.8% of the affected households earn between INR 100000 – 240000 in a year. A total of 16.8% of the affected households earn more than INR 2,40,000 in a year and mainly comprise of farmers with large land holdings (owning land parcels both within and outside the project area). As observed from the details provided above, the project affected households have not been dependent on the land parcels falling under the project area and the land parcels have been left unused and barren. Hence, there has been no loss of livelihood for the project affected households due to the unproductive nature of the land.

Migrant Labour and Contract Labour Engagement:

It is anticipated that during the construction phase, the labour requirement will range from 250-270 workers for construction of one module of 250 MW. The peak labour requirement for the one module will be about 300

persons. As construction labours will be hired by the developers, the developers might engage a Contractor which hires migrant labour. Engagement of migrant labourers might lead to an increase of issues with the local population if proper orientation is not provided.

The basic issues related with migrant labour may include:

- Conflict amongst workers, and between workers and local community, based on cultural, religious or behavioural practices.
- Discontent amongst local community on engagement of outsiders.
- Mild outbreaks of certain infectious diseases due to interactions between the local and migrant populations. The most common of these are respiratory (TB), vector borne (Malaria, Dengue), water borne (Stomach infections, typhoid) and sexually transmitted diseases (HIV, Syphilis and Hepatitis).
- Security issues to local women from migrant workforce.
- Use of community facilities such as health centres, temples, transport facility etc. by migrant labour may lead to discontent with local community.
- Wherein contractors would be bringing in unskilled migrant labour, there stands the risk of exploitation of a labourer. This can happen in the form of hiring underage labourers, low and unequal wage payments, forced labour and discrimination on basis of the basis of caste, religion or ethnicity.

Impacts due to cumulative labour at site

The project plan to maximize local involvement in the employment during the construction phase, however migrant labours will also be recruited. It will be the responsibility of Developer of module for provision of labour camp to accommodate migrant labour. The construction of all three modules can start simultaneously which can lead to increase in migrant labour. This could result in stress on local resources, disruption in community relations, and movement of labours. The other impacts are:

Community Infrastructure

Influx of migrant workers may strain existing infrastructure of local community. Drinking water arrangement for labour camps will be met through prevailing ground water in the area which is also a potential water source for local community. Workers can also utilize local transport for commutation to near by areas thereby increasing risks such as road accidents, and other detrimental consequences of increased traffic generated by the project (dust, noise, and pollution).

Community Service and Facilities

There can also be increase in stress on medical or recreational facilities prevailing in near by villages if appropriate services are not provisioned in the project area itself.

Local Business

Local businesses such as shops are likely to benefit from their proximity to labour camps that will be provided to accommodate migrant workers. However there can be negative issues due to different lifestyles or cultural backgrounds of migrant workers.

Mitigation Measures

Loss of Land:

The project will have low impact due to loss of land as the project affected households did not earn any income from the land parcels identified for the project due to its unproductive nature. The project affected households would receive payments based on the Collector Guideline Rate plus one time solatium once the entire land acquisition is completed phase wise. With the payment that the landowners would receive, initiatives in the form of start-up of new entrepreneurship venture or investment of purchase of land in other parts of the district could be contemplated upon by the landowners.

Loss of Livelihood:

Due to the discontinuation of cultivation activities on the land parcels delineated for the project because of the decrease of rainfall, the farmers who have 0.5 hectares land holdings within the project area have resorted to being engaged as non agricultural labourers in Rewa city as well as one member of (each of the small farmer) their family have migrated to cities outside the state for work opportunities and have been sending back money for their family. Farmers with medium and larger land holdings (falling outside the project area) use their agriculture produce both for self consumption and for sale in the market. Hence, the project affected households have not been dependent on the land parcels falling under the project area and the land parcels have been left unused and barren. There has been no loss of livelihood for the project affected households due to the unproductive nature of the land.

Payments based on the Collector Guideline Rate plus one time solatium would be provided to all landowners who have provided their consent voluntarily for sale of land. With the payment received, the PAFs will have more purchasing power in hand to start up a new entrepreneurship venture of their own or invest in the purchase of land in some other area within the district.

Migrant Labour Engagement:

- The project proponent shall encourage the Developers to engage local population as workforce in the construction activity, as far as possible. Community expectations for employment and other local benefits should be addressed and managed. Regular updates on opportunities and skill requirements shall be provided to the community.
- RUMSL through the contractor agreement (of the developers) shall ensure that the construction contractors commit and adhere to social obligations including community relations, handling complaints and grievances, adherence to labour laws and international commitments etc.
- The contractor shall provide adequate information to workers on expected social behaviour and hygiene practices to be followed at site.
- The water usage amongst the labourers shall be monitored and controlled to minimize generation of wastewater.
- The Developers shall ensure that no child or forced labour is engaged by contractors and all wage payments are done without any discriminations or delays by the contractors.
- The Developers to ensure that adequate sanitation and waste disposal facility shall be provided at project site.
- The Developers to ensure possible sourcing of construction labour from the local region to the extent possible.
- The Developers to ensure local contracting and vendor opportunities as far as possible.
- The Developers should undertake medical test of the contract workers prior to engagement to identify any communicable disease.

Cumulative Labour at site

The accommodation to be provided by the developers shall be appropriate for its location and be clean, safe and, at a minimum, meet the basic needs of workers.

- Developers should assess the location of labour camp, that it should not be constructed in immediate vicinity of any drainage channel;
- It should be ensured that the labour camp (onsite) should have basic amenities such as electricity, drinking water, health & sanitation facility, kitchen and rest room;
- All tanks used for the storage of drinking water are constructed and covered as to prevent water stored therein from becoming polluted or contaminated and all the migrant workers will be instructed accordingly;
- Employers should ensure that accommodation which is provided is not overcrowded and does not pose a risk to the health and safety of workers;
- The labour camp will be equipped with septic tanks and soak pits and avoid presence of stagnant water is a factor of proliferation of potential disease vectors such as mosquitoes;
- Developers should ensure that the disruption of local communities is minimum, in particular local communities' transport infrastructures and if required limit the workers movements in near by areas;
- Security staff have a clear mandate and have received clear instruction about their duties and responsibilities, in particular their duties not to harass, intimidate, discipline or discriminate against workers;
- Developers should ensure that workers and members of the surrounding communities have specific means to raise concerns about security arrangement and staff;
- Where possible, an adequate transport system to surrounding communities will be provided. It is good practice to provide workers with free transportation to and from local communities.

Significance of Impact

The impact on socio-economic components from land use and livelihood will have a localised impact with medium duration and a low intensity after mitigation measures are employed.

The impact on community issues like migrant labour engagement is expected to be of local spread, short duration and low intensity with mitigation measures and the overall impact is assessed to be minor as listed below:

Table 8-23: Social Impact Value - Construction Phase

Aspect	Scenario	Spread	Duration	Intensity	Overall
Social/Livelihood Pattern	Loss of Land				
	Without Mitigation	Local	Medium	Low	Minor
	With Mitigation	Local	Medium	Low	Minor
	Loss of Livelihood				
	Without Mitigation	Local	Medium	Low	Minor
	With Mitigation	Local	Medium	Low	Minor
	Migrant Labour Engagement				
	Without Mitigation	Medium	Short	Moderate	Moderate

	With Mitigation	Medium	Short	Low	Minor
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8.4.2 Impacts during Operation Phase

Impacts

Potential impacts have been identified to be associated with the operation phase of the project:

- Enhanced Economic Opportunities; and
- Local Area Development Activities

Enhanced Economic Opportunities:

Contribution of jobs through the project is an important aspect of social enhancement. During consultation, it was understood from the project affected households that employment opportunities should be created for the local population and that the developers should create initiatives for integrating the locals for project oriented works.

No direct physical and economic displacement is envisaged to take place as a result of land procurement. The local population however, would lose their traditional skill set which would not be of any use with the changing scenario of land use pattern.

Mitigation Measures

- The developers should wherever possible engage the locals for unskilled jobs.
- As part of the Local Area Development activities that would be undertaken by the Project Proponent, the project affected families should be provided first preference in any initiatives adopted by the project proponent before catering to the entire community as a whole.
- The project proponent shall ensure that the developers while engaging (civil) contractors, sub contractors and vendors during the constructional and operational phase should encourage that agreements on priority basis be made with the local contractors and vendors.

Local Area Development Activities:

The purpose of developing local area development activities at an early stage of the project cycle is to outline the framework for enhancing the socio-economic status of the communities residing within the vicinity of the project. This will allow for effective disclosure to key affected stakeholders, and subsequent feedback and inputs, prior to the project commencement.

Significance of Impact

The Impact value for probable impacts during the Operation phase has been presented below:

Table 8-24: Impact Significance – Livelihood Arrangements

Aspect	Scenario	Spread	Duration	Intensity	Overall impact
Local Area Development Activities	Without Mitigation	Local	Long	Short	Minor
	With Mitigation	Local	Short	Low	Positive

8.4.3 Impacts during Decommissioning Phase

Impacts

The key issues associated with decommissioning phase will include:

- Improper disposal of construction waste and debris from deconstruction of storage area, etc. will lead to contamination of soil and discontentment with the local surrounding communities.
- Deconstruction activity will lead to generation of dust to the nearby habitations.
- Deconstruction activities are associated with health and safety issues such as structural collapse, trip and fall hazard, electrical hazard etc.

Mitigation Measures

The decommissioning phase will require removal of machinery, workers and other temporary structures. The mitigation measures for demobilisation shall include the following:

- The contractor shall inform the workers and local community about the duration of work.
- Reduction of worker will be done phase wise and corresponding to completion of each activity.
- All waste generated from demobilisation shall be collected and disposed off at the nearest municipal disposal site. Structures that can be reused will be carried back by the contractors or sold to vendors.

Significance of Impact

The Impact value for probable impacts during the decommissioning phase has been presented below:

Table8-25: Social Impact Value - Decommissioning Phase

Aspect	Scenario	Spread	Duration	Intensity	Overall
Social Impact	Without Mitigation	Local	Short	Moderate	Minor
	With Mitigation	Local	Short	Low	Insignificant

9. ENVIRONMENT AND SOCIAL MANAGEMENT PLAN

9.1 Introduction

The purpose of an Environmental and Social Management Plan (hereinafter referred as ESMP) is to ensure that social and environmental impacts, risks and liabilities identified during the ESA process are effectively managed during the construction, operation and closure of the proposed project. The ESMP specifies the mitigation and management measures to which the Proponent is committed and shows how the Project will mobilize organizational capacity and resources to implement these measures. The ESMP also shows how mitigation and management measures will be scheduled.

The key objectives of the ESMP are to:

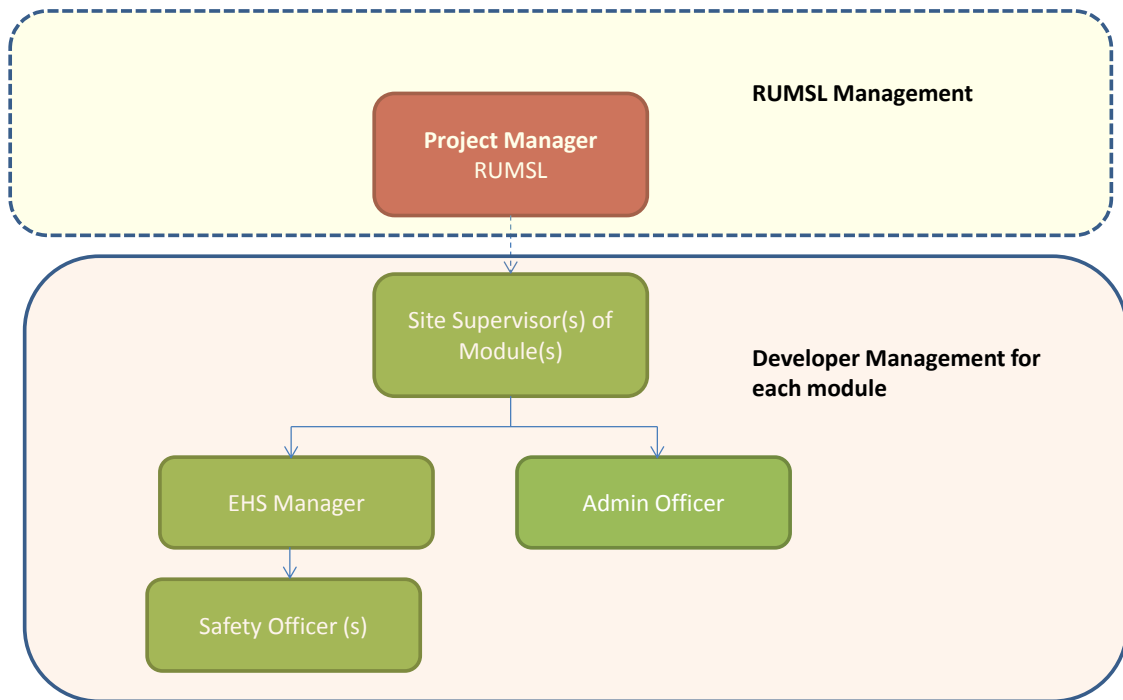
- Formalize and disclose the program for environmental and social management;
- Provide a framework for the implementation of environmental and social management initiatives.

The ESMP describes the mitigation measures for all the identified potential impacts associated with the proposed project during its construction and operation phases. The environment and social management plan (ESMP) delineates the monitoring and management measures to avoid and/or minimize such impacts by allocating management responsibility and suggesting skill requirement for implementation of these measures. Also the ESMP shall ensure a continuous communication process between RUMS, their module Developers, workers (including sub-contractors), local community and other stakeholders. RUMS have an obligation to ensure compliance to all the commitments towards Environment, Social, Health and Safety Standards while executing all the project related activities for the proposed project.

9.2 Organizational Structure (Environment, Social, Health and Safety)

The organizational structure of RUMSL with respect to management of EHSS issues across the project life cycle is shown in Figure below. The overall management and coordination of the Project will be the responsibility of Project Manager of RUMSL. The project level activities will be managed at the Site Supervisor(s) of respective Modules. At project level, implementation of management plans and corrective actions are the responsibilities of Site Supervisor in coordination with EHS Manager, hired by the Module Developer. In construction and operational phase, EHS Manager of each respective module will supervise the Contractor HSE Engineer's performance to implement the management action plans in coordination with Site Supervisor.

Figure 9-1: Organisation Structure of the Proposed Project



As the project is being developed on some private land also; It is envisaged that Module Developer need to appoint an onsite Admin officer to manage social (including labour and community) issues. The name and contact number of the appointed person should be displayed at the site office.

9.2.1 Roles and Responsibilities

This section describes the roles and responsibilities of the key persons responsible for management of onsite activities for the proposed project:

Project Manager

The Project Manager of RUMSL is responsible for overall management of the project and ESMP implementation during construction and operation phase. The following tasks will fall within his/her responsibilities:

- Monitor site activities on a daily basis for compliance during construction phase and weekly during operation phase;
- Conduct internal audits of the construction site against the ESMP;
- Confine the construction site to the demarcated area;
- Reporting EHSS related issues & incidents in respective area to Chairman of RUMSL;
- Conducting meetings with Site Supervisor of Module Developers regarding EHSS issues;
- The person will oversee activities of Site Supervisor and will coordinate with him for updates on the project; Reviewing and updating of ESMP for its effective implementation; and
- The person will be responsible for supervising the progress of Local Area Development activities.

Site Supervisor

Site Supervisor will be appointed by the Module Developer for its respective module and will be responsible for the following scope of work:

- The person will be responsible to meet the labour requirements during construction phase of the module;
- The person will be responsible for hiring and management of different contractors for civil, mechanical and electrical works;
- He will supervise the daily activities occurring on the site during construction and operation phase;
- He will plan the traffic route for movement of material and solar panels and will communicate the same to RUMSL Officials; and
- The person will be involved in Grievance Redressal Committee and will actively participate in addressing of issues raised by workers and community.

EHS Manager

EHS Manager as appointed by Module Developer shall be responsible for checking compliance of the contractor(s) with the requirements of this EMP and any other relevant environmental legislation for all activities associated with the contract. The general duties of the EHS Manager are as follows:

- Be familiar with the environmental management requirements contained in this EMP;
- Regular auditing of the contractor(s) with the view of ensuring that all activities on the site are undertaken in accordance with the EMP;
- Issuing regular audit reports to the Site Supervisor and contractor(s) regarding compliance with this EMP with help of Safety Officers; and
- Advising on environmental legal requirements regarding issues that may arise during the project to the Site Supervisor and the contractor(s).

Safety Officers

Safety Officers appointed by Module Developer will also be responsible for conducting of an EHS audit during the construction phase of the project on a weekly basis according to the provisions of the Environmental Management Plan. The major responsibilities will be:

- The person will stay at ground levels on daily basis and will coordinate with Contractor's representatives for all construction activities;
- The person will provide tool box trainings to labour and will also issue relevant PPEs to them;
- The person will develop formats for work permit system and will ensure its implementation;
- Conduct independent environmental audits; and
- Submit audit reports to the EHS Manager and Site Supervisor of respective Modules.

Admin Officer

Admin Officer engaged by respective Module Developer will have the following responsibilities:

- Acting as a point of contact for local residents and community members;
- Admin Officer will develop a code of conduct to guide the employees on how to behave with the community to avoid conflicts and will circulate the same to all Developers of Modules;
- Conducting periodic meetings with local community for understanding their grievances;
- Address training needs of Developers and other employees for social and community issues; and
- He will inform the local community about the Grievance Redressal Mechanism and ensuring effective implementation

Contractor's HSE Engineer

The Contractor(s) HSE officer shall be responsible for implementation of this EMP and any other environmental requirements that may be identified by the Site Supervisor during the course of the contract. The Contractor(s) HSE officer shall have received basic HSE training either as part of the contract or previously. In addition to any other responsibilities, the general duties of the Contractor's HSE officer shall be:

- Ensuring that all personnel (including sub-contractors) are duly informed of the requirements contained in this EMP, and the associated responsibilities and implications of this EMP;
- Consulting with the Safety Officer of Module Developer regarding interpretation of the EMP and any other aspects of the contract that may impact significantly on the environment; and
- Ensuring that all records needed to demonstrate compliance with the EMP requirements are obtained, filed and readily available for inspection by the Site Supervisor of Module or the Project Manager of RUMSL.

9.3 Waste Management Plan

All project generated wastes will need to be managed and disposed of in a manner to prevent potential impacts on the environment and risks to human health. A Waste Management Plan (WMP) for the proposed project has been developed.

9.3.1 Objectives

The construction and operation of the proposed project will generate various type of waste which will need appropriate collection, transportation, primary treatment and disposal. Hence, to serve the purpose, a Waste Management Plan has been formulated to demonstrate:

- Inventorisation of waste in different type of categories like garbage, rubbish, hazardous, waste etc.;
- Maintain the site in a clean and tidy state to reduce the attraction of pest species, impacts on the local environment and negative impacts on visual amenity; and
- Suggestion of options for waste handling and disposal during construction and operation phase of the project.

9.3.2 Scope

This plan shall be applicable to the Module Developers engaged by RUMSL for the construction phase of the proposed project. The elements of the plan will be directly implemented by the Module Developers and contractors hired by the Developers while overall management and responsibility will lie with RUMSL. The Plan also identifies the individuals currently assigned to the various roles designated in this Plan.

9.3.3 Applicable Standards and Legislations

The **Hazardous Waste Management Rules 2008** as amended till date is applicable. The salient features are:

- Developer of Module has to apply to Madhya Pradesh Pollution Control Board (MPPCB) in Form-I for grant of authorization for generation, storage and disposal of Hazardous Waste generated on site;
- Maintain records of Hazardous Waste generation, disposal as per Form-3 of the rules;
- Dispose of Hazardous waste like used oil, oily rags to recycler who is authorized from MPPCB as well as registered with CPCB;

- Submit Annual Returns to MPPCB in the prescribed Form-4 on or before 30th of June every year on an annual basis; and
- Provide the transporter with the relevant information in Form-11 (TREM Card), regarding the hazardous nature of the wastes.

9.3.4 Roles and Responsibilities

Site Supervisor of Developer

Site Supervisor will be responsible for the following activities:

- Management of on-site waste generation associated with construction work to help avoid excessive generation where practicable;
- Maintaining of all records of waste type which are construction waste and debris, hazardous waste;
- Liaisoning with Madhya Pradesh Pollution Control Board (MPPCB) approved vendors for disposal of hazardous waste generated;
- Renewal and Management of Buy Back Agreements for defunct solar panels with the Manufacturers; and
- To have authorization for hazardous waste generation and storage granted by MPCCB in place.

EHS Manager of Developer

The following responsibilities are entrusted to the EHS Manager:

- Demarcation of area within the module area for keeping of segregated wastes;
- Labelling of the drums containing hazardous wastes like used oil;
- Maintaining of receipts for hazardous waste management records;
- Notifying the Site Supervisor of any activity that may generate a large amount of waste to allow appropriate controls to be put in place to manage waste generated; and
- Ensure safe transportation of defunct solar panels as per specified procedures.

9.3.5 Waste Types and Quantities Generated

All wastes generated from the project will be categorised as either non-hazardous or hazardous following an assessment of the hazard potentials of the material, in line with local and national requirements.

9.3.5.1 Construction Phase

The waste will generate from construction activities like site clearing, levelling etc. Other categories of waste will be produced daily and comprise of the following:

- Scrap metal;
- Soil waste;
- Food waste from kitchen premises of labour camps;
- Construction debris; and
- Sewage from temporary toilets;

The construction and decommissioning phases will require the use of hazardous materials such as diesel or petrol to cater the fuel equipment and vehicles and maintain equipment. The following hazardous wastes will also be produced from construction activities.

- Oily rags;
- Used oil and oil filters - from generators or vehicle maintenance; and
- Scrap and packaging material.

9.3.5.2 Operation Phase

Operations and maintenance of the PV power facility is not expected to generate any significant amount of waste. PV panels, array enclosures and inverter/transformer enclosures will not produce waste during operation except the following:

- Defunct solar panels;
- Broken solar panels generated during cleaning and other maintenance activities;
- Fuel requirements like greasing, transformer oil etc.
- Used oil; and
- Oily rags

9.3.6 Waste Handling, Management and Disposal

Construction Phase

All wastes produced from the project activities on site will be temporarily stored in designated waste storage areas. All wastes that cannot be reused or recycled will be collected by approved waste contractors and transferred to an appropriately licensed waste management facility for treatment and disposal. Following steps will be taken to manage the waste generation during construction phase:

- Fuel will be stored on site in temporary aboveground storage tanks and will be stored in a locked container within a fenced and secure temporary staging area;
- Trucks and construction vehicles will be serviced off site;
- All concrete mixing be undertaken on impermeable plastic lining to prevent contamination of the soils and surrounding areas;
- Food waste and other refuse are to be adequately deposited in sealable containers and removed from the kitchen frequently to avoid accumulation;
- The use, storage, transport and disposal of hazardous materials used for the project will be carried out in accordance with all applicable regulations;
- All hazardous waste to be disposed off to MPCCB approved vendors;
- Material Safety Data Sheets for all applicable materials present on site will be readily available to on-site personnel;
- All construction debris will be placed in appropriate on-site storage containers and periodically disposed of by a licensed waste contractor;
- The construction contractor will remove refuse collected from the designated waste storage areas at the site at least once a week;
- It is proposed that the Module Developer will supply the required temporary ablution facilities and be responsible for the removal and treatment thereof; and

- Empty fuel containers will also be stored at a secured area designated for scrap and sold to authorized vendors. All packaging material will also be collected at the storage area and sold to scrap dealers.

Operation Phase

Damaged cells would need to be characterized and managed as hazardous waste. Following measures to be taken for management of waste:

- Module Developers need to have buy back agreements for defunct solar panels;
- A designated area needs to be demarcated within the module premises for storage of defunct and broken solar panels with restricted access and on impervious surface;
- All fuel storage should be equipped with secondary containment and spillage trays;
- It is to be ensured that authorization for hazardous waste storage and generation has been taken from MPCCB;
- All used oil is required to send off to MPCCB approved vendors and recyclers; and
- Transportation of defunct solar panels is required to be undertaken as per the procedures specified by the Manufacture of Solar Panels.

Handling of Broken Solar Modules generated due to cleaning and other maintainance activities

Impact	Mitigation Action	Monitoring Frequency	Responsibility
Land Contamination (Soil Quality)	• Broken or damaged solar panels are required to be shifted to a designated area in scrap yard to avoid any type of land contamination. • The designated area should be isolated and to be established on a impervious surface. • A photograph is to be taken of the broken panel at the site to cater to Insurance settlement claims	Continous A separate storage yard to store broken solar panels is required to be established	EHS Team of Developer (EHS Manager and Safety Officer (s))
Risk on health of workers	• Proper PPE are provided to the workers handling the broken solar panels. • The workers at site are also on regular basis apprised about the potential health risks associated with handling of solar panels.	Continous	EHS Team of Developer (EHS Manager and Safety Officer (s))

9.4 Community/Stakeholder Engagement and Grievance Redressal

Stakeholders are persons or groups who are directly or indirectly affected by a project, as well as those who may have interests in a project and/or the ability to influence its outcome, either positively or negatively. They can comprise individuals, communities, social groups, organizations etc. It is often observed that the poor and the marginalized are often ignored either due to the fact that they are unaware or do not have a forum to voice their opinion.

The purpose of the Stakeholder Engagement Plan (SEP) is to ensure that the direct and indirect impacted stakeholders of the project are regularly apprised of the project activities. The plan has been developed in order to draw out an outline wherein the communication process associated with the activities of the project cycle is to be undertaken.

9.4.1 Stakeholder Engagement

The stakeholders in the project were identified based on their level of interest and influence over the project activities. The stakeholders were primarily divided into direct and indirect and further regrouped as internal and external. In **Table9-1**, the types of stakeholders as per their level of interest and influence have been provided.

Table9-1: Types of Stakeholders as per their interest and influence

S. No.	Types of Stakeholders	Description	Groups + Individuals
1	Direct Internal Stakeholders	Direct internal stakeholders comprise the parent company or the project proponent and the employees of the company that are directly controlled by the parent company including the developers of the individual project(s).	- RUMSL - Developer(s)
2	Direct External Stakeholders	Direct external stakeholders comprise the project affected people/families, contractors, supply chain and financial intermediary who are directly affected by the project activities but are not directly controlled by the project proponent.	- Project Affected Persons/Families (Land Owners) - Power Grid Corporation of India Limited - Madhya Pradesh Power Management Company Limited (MPPMCL) - Financial Intermediary - Solar Energy Corporation of India - Madhya Pradesh Urja Vikas Nigam Limited - Contractors - Vendors
3	Indirect Internal Stakeholders	Indirect internal stakeholders consist of the secondary stakeholders who would have a more indirect interest but within the direct influence of the project.	Families of Direct Employees
4	Indirect External Stakeholders	Indirect external stakeholders comprise of those stakeholders who might be not be involved directly in the day to day operation of the project but have an interest in the activities of the project.	- Local Community residing within the 5 study area villages of the project area - Opinion Leaders of local communities residing within the 5 study area villages of the project area - Local Government Institutions of 5 Villages - Madhya Pradesh State Pollution Control Board

S. No.	Types of Stakeholders	Description	Groups + Individuals
			- New & Renewable Energy Department of Madhya Pradesh - Local Media

9.4.1.1 Stakeholder Analysis

Stakeholder analysis takes a more comprehensive view of the stakeholder's group interests, how they would be affected and to what extent and influence they could have on the project. These aspects cumulatively provide the basis for constructing the stakeholder engagement strategy. The key stakeholders identified in the previous section have been categorised into four major groups: Government Agencies, Positively Influenced Stakeholders, Critical to Engage and Funders. The categorisation list of key stakeholders has been provided in the following table.

Table 9-2: Categorisation List of Key Stakeholders

Categorisation	Key Stakeholders
Government Agencies	- RUMSL - Power Grid Corporation of India Limited - Madhya Pradesh Power Management Company Limited (MPPMCL) - Solar Energy Corporation of India - Madhya Pradesh Urja Vikas Nigam Limited - Madhya Pradesh State Pollution Control Board - New & Renewable Energy Department Corporation of Madhya Pradesh
Positively Influenced Stakeholders	- Project Affected Persons/Families (Land Owners)³¹ - Families of Direct Employees - Developer(s) - Local Community residing within the 5 villages of the project area - Contractors - Vendors
Critical to Engage	- Opinion Leaders of local communities residing within the 5 villages of the project area - Women in the project area (5) villages - Local Government Institutions of 5 Villages - Local Media
Lenders	Financial Intermediary

In order to map the interest/influence of the stakeholders on the project activities, a matrix showcasing the stakeholders and their interest/influence has been developed. This step is to assess the interest/influence into high, medium and low levels. In **Table 9-3** the interest matrix has been provided.

Table 9-3: Interest Matrix of Stakeholders

Categorisation	Key Stakeholders	Influence Power to facilitate or impede project	Interest in the Project
Government Agencies	RUMSL	High	High
	Madhya Pradesh Power Management Company Limited	High	High

³¹ The Project Affected Persons/families have been categorized as positively affected stakeholders due to the fact that they are not impacted by the loss of private land due to its unproductive nature. As the land parcels were unused and left barren, payments received through the sale of the land would be beneficial for them to undertake various entrepreneurial activities as well as providing them opportunities to purchase land parcels in other part of the district.

Categorisation	Key Stakeholders	Influence Power to facilitate or impede project	Interest in the Project
	• Power Grid Corporation of India Limited	High	High
	• Solar Energy Corporation of India	High	High
	• Madhya Pradesh Urja Vikas Nigam Limited	High	High
	• Madhya Pradesh State Pollution Control Board	High	High
	• New & Renewable Energy Department	High	High
Positively Influenced Stakeholders	• Project Affected Persons/Families (Land Owners)	High	High
	• Families of Direct Employees	Low	High
	• Developer(s)	High	High
	• Local Community residing within the 5 villages of the project area	Medium	High
	• Contractors	Low	High
	• Vendors	Low	High
Critical to Engage	• Opinion Leaders of local communities residing within the 5 villages of the project area	Low	High
	• Women in the project area (5) villages	Low	High
	• Local Government Institutions of 5 Villages	Low	High
	• Local Media	Low	Medium
Lenders	• Financial Intermediary	High	High

9.4.1.2 Communicative Methods

Stakeholder engagement becomes a successful exercise when proper and participatory communicative methods are used. This ensures that the stakeholders are kept engaged and well informed of the project development at every stage. A combination of communicative methods is usually used to engage with the stakeholders. To determine which option is best suited to the various stakeholders, a benefit analysis of each option has been carried out. The communicative methods are:

- General Information consisting of the project's various activities, the operation stage and impacts that might arise shall be made available:
 - on information board of the Gram Panchayat's office within the project area
 - on information board of RUMSL's site office
 - on RUMSL's website
 - in local newspaper

- Detailed information including documents like ESIA report; Environment, Health & Safety and Social Policy, Environment Management Plan, Social Management Plan including environmental decisions shall be in hard copies and disseminated to:
 - RUMSL's site office at Rewa
 - Electronic version of these documents will be made available at RUMSL's website.
- In addition to this, a host of tools and techniques can be adopted to engage with the stakeholders in a transparent and accountable manner. Below a list of the tools and techniques which can be adopted are mentioned:
 - Public Meeting: This tool can be used to disclose information on a large scale involving the stakeholders of a particular village. A schedule of the meeting can be circulated well in advance and discussions can involve feedback session from the stakeholders. The meeting can be conducted in the premise of the village school for proximity and familiarity purposes. Once the meeting concludes, minutes of the same should be kept as a record with the site office and a copy given to the village head. Schedules of future meetings should be discussed and finalised so that the stakeholders can gauge the seriousness of the project proponent in continuing the engagement process.
 - Focus Group Discussion (FGDs): FGDs are important when gauging with a particular group of stakeholder on issues related to the project activities. It can be used to understand the needs, perceptions and concerns of the group. The discussion will give space for the members to voice their concerns and suggestions. The moderator of the discussion should be impartial in his/ her view and should encourage everyone present to participate in the discussion. Records of the FGDs should be maintained and updated regularly.
 - Participatory Workshops: Participatory workshops are meetings which enable local people to analyse, share and enhance their knowledge to plan, manage and evaluate development projects and programmes. Visual aids – such as mapping, videos, illustrations, timelines, card sorting and ranking, Venn diagrams, seasonal calendar diagramming and body maps are often used in participatory workshops to engage participants and capture knowledge. They are often an effective means of getting participants to reflect on issues and their own personal experiences. These workshops also pay particular attention to group dynamics and breaking down distinctions between 'uppers' – those with power, standing, influence etc within a community – and 'lowers' – those with less power, influence and standing within a community. To initiate such a workshop, an expert familiar with participatory tools and conducting such workshops shall be engaged.
 - Participatory Rural Appraisal (PRA) Techniques: PRA techniques are usually adopted to emphasize local knowledge by enabling local people to make their own appraisal, analysis and plan. PRA uses group animation and exercises to facilitate information sharing, analysis and action among stakeholders. This process can be useful when the project proponent initiates any developmental activities in the area and uses the local knowledge to plan and strategise so that they feel responsible for delivery of the objectives.

The communicative methods that shall be adopted for each stakeholder have been provided below,

Table 9-4: Communicative methods to be adopted for identified Stakeholders

S.No.	Stakeholder	Communicative Methods
1	Project Affected	• Verbal communication

S.No.	Stakeholder	Communicative Methods
	Population	- Information Board of Gram Panchayat Office - Information Board of RUMSL's site office - On RUMSL's website - Local Newspaper - Public Meeting
2	Local Community, Opinion Leaders, women in the project villages, Local Media at Project Site	- Information Board of Gram Panchayat Office - Information Board of RUMSL's site office - On RUMSL's website - Local Newspaper
3	Government Authorities	- Information meetings and consultations - Monitoring Reports - Permits and Approvals
4	Direct Employees	- Internal meetings of direct employees and managers - Day to day contact - Trainings/Workshops
5	Contractors (Third Party)	- Meetings with contractors and their respective managers - Trainings/ Workshops
6	Lenders	- Reporting - Direct Meeting with lenders

9.4.1.3 Stakeholder Engagement Program

The consultation with the stakeholders will be conducted with the Admin Officer who will also look at the social aspects who will work in collaboration with the nominated (Grievance Officer) and Site Supervisor (Developer) and at the site level. Any grievances from the community relating to any issues that might arise from the project activities will be managed by the nominated Grievance Officer based at the Site Office. All grievances will be addressed by the developers during the construction and operation phase. For any unresolved grievances and grievances related to land, the developer will forward the grievances to RUMSL who in turn will subsequently forward them to appropriate authority for redressal.

Consultations with the government agencies will be conducted as per the schedule that will be created with the Site Supervisor of the Developer and Project Manager of RUMSL. These stakeholders will be informed in advance of the planned project activities. The development of the facilities will be based on the ESA procedures and mitigation issues once an ESA study has been completed.

Consultations with the direct internal stakeholders will involve meetings, information boards announcements and an Intranet system to apprise the direct employees of Developers regarding the procedures of emergency response system, incident/accident reporting, grievance redressal mechanism, Human Resources Policies and Procedures, welfare measures etc. In addition, communication of general employment conditions, company's code of conduct for work site, EHS concerns, use of PPEs, information and awareness about the requirements of labour laws and minimum wages, working hours, grievance redressal, retrenchment process etc. should be also be conducted with workers engaged with contractors.

Project related information will be posted on the informational boards at the site office as well as at the Corporate Level. Information on the project milestones will be published in advance on the company's website to be available for the public and non-governmental organizations in the area to comprehend the attitude of the external stakeholders. In addition, the company will publish information on the project in the local newspapers.

In turn, if any issues are raised by the stakeholders, the project proponent management comprising of the Grievance Redressal Committee at the Site Level will respond accordingly in the shortest possible time. Details of which have been provided in the Grievance Redressal Mechanism section of the report.

The responsibility for the SEP implementation will be held by the Admin Officer and he will be supported by ProjectManager (RUMSL)Site Supervisor (Developer) and EHS Manager (Developer) and nominated Grievance Officerat the site level.

A summary of the consultation activities that the project proponent shall undertake as part of the Engagement Plan pertaining to the villages around the project area and other stakeholders have been provided in (**Table 9-5**),

Table 9-5: Summary of the Consultation Activities

Stakeholder	Information to be shared	Proposed Timeline	Responsibility
Project Affected Population	- Information on impacts of the project - Information on job opportunities - Information on tenders for petty contractors and vendors - Grievance Mechanism - Local Area Development Activities	Ongoing, throughout the project	Project Manager
Local Community,Opinion Leaders, Women in the Project villages, Local Media at Project Site	- Progress of the work under each phase. - Information on job opportunities - Tenders for petty contractors and evndors - Local Area Development Activities - Grievance Mechanism	On going, throughout the Project	Project Manager and Local Leaders of the 5 villages.
Government Authorities	- Permits and Approvals - Grievances related to land issues and unresolved grievances - Environment Monitoring reports	On-going,throughout the project	Company: Project Manager
Direct Employees	- Trainings on dealings with local communities - Grievance Mechanism	On-going process throughout the project	- Developers: Site Supervisor - EHS Manager &Admin Officer

		On-going on a permanent basis	
Contractors (Third Party)	- Trainings on dealing with local communities - Other EHS trainings	On-going, throughout the project	EHS Manager & Site Supervisor
Lenders	- Information on project status - Submission of annual reports, information on any project-related events that could potentially create an increased risk of the project	On-going process on a permanent basis	Company: Project Manager and designated person from RUMSL.

The stakeholder engagement process should be carried out at two levels, namely, local community and local governing bodies. A summary of the proposed plans that is to be initiated by the developer(s) and RUMSL have been described below in Table below.

Table9-6: Summary of the Proposed Plan of Activities

S.N	Key Stakeholders	Proposed Plan of Activities
1	Positively Influenced Stakeholders/ Local Communities	- Announcement of vacancies (skilled/unskilled) at proposed site; - Announcement of contract work for small scale work associated with the proposed project; - Local Area Development Activities as per RUMSL Plan of Action for Community Development; - Consultation with village panchayats about movement of heavy vehicles; - Information on route and timing of vehicle movement to be provided to village administrations; - Set up a grievance redress mechanism and inform the community about the procedure; and - Discuss the management plan with the community and incorporate the comments.
2	Local Governing Bodies	- Compliance with legal requirements; and - Involvement of various Local Area Development Activities.
3	Lenders	- Compliance with International Guidelines (World Bank Operational Policies, IFC Sustainability Framework & other national and local legal requirements) - Regular Reporting

It is to be noted that the proposed plan of activities relating to the stakeholder engagement can change as per the future planning of activities by Developer(s) and RUMSL.

9.4.1.4 Monitoring and Reporting

Monitoring: Monitoring of project activities is necessary to cater to the stakeholder's concerns by ensuring transparency in guaranteeing the project proponent's commitment in implementing the mitigation measures that addresses the environmental and social impacts arising from the project.

Through this information flow, the local stakeholders feel the sense of responsibility for the environment and welfare in relation to the project and feel empowered to act on issues that might affect their lives.

Internal monitoring of project related activities as well as associated activities involving the local communities should be contemplated upon on a regular yearly basis (by identified staff from the Corporate level) to bring in openness in RUMSL's commitment. In addition, external monitoring of a company's environmental and social commitments can strengthen stakeholder engagement processes by increasing transparency and promoting trust between the project and its key stakeholders.

RUMSL should undertake a commitment in undertaking internal audits once every quarter. All related information shall be readily maintained at the site office and produced at the time of the audits.

Audit reports shall be accordingly created after every quarterly audit and submitted to ProjectManager of RUMSL. All records of these reports shall be maintained at the site office as well as the Corporate Office. In addition, an external auditor shall be engaged every six monthly to assess the activities of the project and its mitigation measures. The auditor shall accordingly submit a report to the company for review and this should be forwarded to the lender financing the project as well.

Reporting: Performance of Developers and RUMSL will be reviewed yearly against the Stakeholder Engagement Plan. The report will include, but not be limited to, the following:

- Informative materials disseminated, its types, frequency, and location;
- Place and time of formal engagement events and level of participation;
- Activities of community welfare undertaken;
- Feedback on Local Area Development initiatives;
- Other interactions with the community; and
- Numbers and types of grievances (both from the community and workers) and the nature and timing of their resolution.

9.4.2 Grievance Redressal Mechanism

This section describes the need of establishment of a grievance redress mechanism to receive and facilitate resolution of complainant's (project affected people, local community and workers³²) concerns and grievances regarding the project's performance in the constructional, operational and decommissioning phases. The mechanism should be able to address the aggrieved parties concerns and complaints promptly by using an understandable and transparent grievance addressal process which is readily accessible by all segments of the population including workers in a workplace environment.

The GRM has been developed with an intention of it being an effective tool for early identification, assessment and resolution of complaints during project entire life cycle. It is a means through which acceptance, assessment and resolution of community and workers complaints concerning the performance or behaviour of the project proponent are ascertained and addressed.

There can be range of issues arising during a project phase. Some of these issues could be related to (i) compensation payment, (ii) failure to fulfil commitments, (iii) poor management of construction activities, (iv) accidents due to inappropriate planning of vehicle movement, (v) cultural conflicts between migrant workers and local communities, (vi) disturbance due to excessive noise or other nuisance during construction or operation to

³² Including indirect workers engaged by the developers through contractors or other intermediaries to work on the project site or perform work directly related to the project's core functions.

unfair treatment of workers or unsafe working conditions. Hence, a robust GRM is required that is gender responsive, culturally appropriate and readily accessible to the affected persons at no costs and without retribution.

9.4.2.1 Steps for Developing a Grievance Mechanism

The Developers while developing the Grievance Mechanism are required to adhere to the following steps:

- **Development of Procedures:** the developers should ensure that procedures for lodging and registering of grievances are in place before the plan is implemented at the site level. The procedures of Grievance Mechanism should comprise of identifying the personnel (Grievance Officer at Site level) who will be responsible for receiving and addressing the grievances at the site level and handle the cases at the escalation level. The procedures to be developed should include assessment procedures, procedure to determine the appropriate resolution process, procedures for making decisions on proposed settlements, appropriate time frames for each step in the grievance resolution process and notification procedure to the complainant about eligibility, assessment results, proposed settlements and the like.
- **Develop Resolution Options and Response:** Once Developers developed procedures, formal and informal resolution options should also be developed along with preparation of formulating a response. General approaches to grievance resolution many include proposing a solution, reaching a resolution through discussion or negotiation, using a third party to either informally or formally resolve the matter through mediation and through traditional and customary practices.
- **Publicise the Grievance Mechanism:** Once the procedures for Grievance Mechanism has been developed by the developers, it has to be publicised through various stakeholder engagement activities as detailed out in the Stakeholder Engagement Plan and should be disseminated to the developer(s) as well. The Developers should inform the local community in the first instance and then on remind them of this mechanism on a regular basis during the project construction and operation phases. Various communicative methods can be adopted in disseminating the information like printed materials, displays, face to face meetings and website updation. The grievances redress mechanism (GRM) shall be documented in English and Hindi and copies shall be kept at the project site office and corporate office. The GRM is also to be displayed at notice board at the project site office and training on the GRM shall also be provided during induction. Developer(s) is to ensure that the contractor would keep the workers informed about the grievance mechanism at the time of recruitment and make it easily accessible to them. All the relevant contact numbers to be made available to them.
- **Training/ Workshops on Grievance Redressal Mechanism:** A separate training/ workshop should be undertaken by the Developers at the community and worker level to discuss the process of how a grievance gets registered, the local contact person's/grievance officer details of receiving grievances, the significance of grievance boxes, the timelines for addressing the grievances and the personnels involved in the redressal process. These trainings should be held every half yearly and feedback/suggestions from the community should be acknowledged and changes to the GRM should accordingly be undertaken to make it more user friendly.
- **Recording of Grievances:** Once the stakeholders are aware of the mechanism and access it to raise grievances, developer(s) is required to acknowledge the same and keep the complainant's identity anonymous. Consequently, developer(s) is required to collect grievances by checking the grievance boxes once every fifteen days, record and register the grievances that have come in as per the identified formats and track them throughout the redressal process to reflect on their status and

important details. A Grievance Log or database emphasising the records and status of the grievance is to be maintained by the identified Grievance Officer at the site level. The Grievance Log can be used to analyze information about grievance and conflict trends, community issues and project operations to anticipate the kinds of conflicts that the project proponents might expect in the future both to ensure that the grievance mechanism is set up to handle such issues and to propose organizational or operational changes.³³

- **Appeal:** If the grievance redressal solution is not acceptable or agreed by the complainant, the complainant should be offered to an appeal process. Circumstance revolving around when an appeal can be made should be set by the developers so that accountability and transparency is promoted by them in every step. National Court or convening of a senior and independent panel of individuals to seek appropriate resolution of the case with representation from both government and civil society is often encouraged. This panel may also play the role of providing strategic oversight and assurance of the mechanism through review monitoring and tracking data.
- **Resolve and Follow Up:** Once the corrective action has been agreed upon, a good practice is to collect proof of those actions in terms of taking photographs, documentary evidence, getting confirmation from the complainant and filing the same within the case documentation. In addition, monitoring and follow up on the resolution agreed upon should be conducted once to close the case accordingly. Developers are required to provide regular (yearly) reports to the RUMSL that track the number of complaints received, resolved, not resolved and referred to a third party. In addition, the funding agency also needs to be constantly apprised of the yearly reports in order to support identification of developing risks.

9.4.2.2 Proposed Grievance Redressal Mechanism for RUMSL/Developer

The Grievance Redressal Mechanism outlines the process for lodging of grievances, steps to be taken for subsequent action and the time limit within which the issue would be resolved to the satisfaction of the complainant (community members, project affected persons and workers). All complaints shall be recorded and addressed in a uniform and consistent manner. The GRM for the proposed project is presented below with time-bound schedules and specific persons to address grievances.

Grievance Redressal Committee

A site level approach is proposed to be developed for redressal of all cases of grievances. All grievances are to be redressed at this stage. The representatives proposed for the grievance committee is provided below,

- EHS Manager
- Admin Officer
- Site Supervisor and
- Safety Officer.

The functions of GRC are as follows:

- To provide support to affected communities on problems arising from environmental or social impacts;
- To record grievances of the affected community by categorizing and prioritizing them, and provide solutions within a stipulated time period; and
- To report to the aggrieved parties, developments regarding their grievances and decisions of the GRC.

³³ A Guide to Designing and Implementing Grievance Mechanisms for Development Projects by The Office of the Compliance Advisor/Ombudsman for IFC and MIGA, 2008.

The steps of grievance redressal for Developer have been provided below:

Receive and Register a Complaint

The developers in order to implement the Grievance Redressal Mechanism is required to nominate a Grievance Officer for registering the grievances, initiating the process of registering and action taken thereon for the resolution of the grievance and the timeline required in each step.. The contact details of the Grievance Officer shall be maintained and updated in the following format displayed at prominent places available to public and the project area.

Table 9-7: Contact Details of Grievance Officer

S.No.	Name of the Grievance Officer	Telephone No. and Email Ids

- Any stakeholder such as worker, person from local community or any other stakeholder with concerns pertaining to onsite work such as community health and safety, local employment, community risk, migrant labour or any issues regarding compensation etc. may register their complaint in writing to the nominated person/grievance officer at site level.;
- All grievances will be addressed by the developers during the construction and operation phase. For any unresolved grievances and any grievances related to land, the developer will forward the grievances to RUMSL who in turn will subsequently forward them to appropriate authority for redressal;;
- Secured grievance boxes shall be placed at the entrance of the site office ;
- If any stakeholder or community member wishes to remain anonymous, he/she can write down the grievances and drop in the available complaint box; and
- Once a complaint has been received it shall be recorded in the grievance log register or data system.

Details of grievance received shall be maintained by the Grievance Officer in a register as per the following format.

Table 9-8: Records of Grievance Received

S.No.	Date of Receipt	Particulars of Complainant				Particulars of Grievance			
		Name	Address	Landline/ Mobile	Whether acknowledgement given at time of receipt	Subject of the Grievance	Office	Brief Description	Date of acknowledgement/ Date of redress

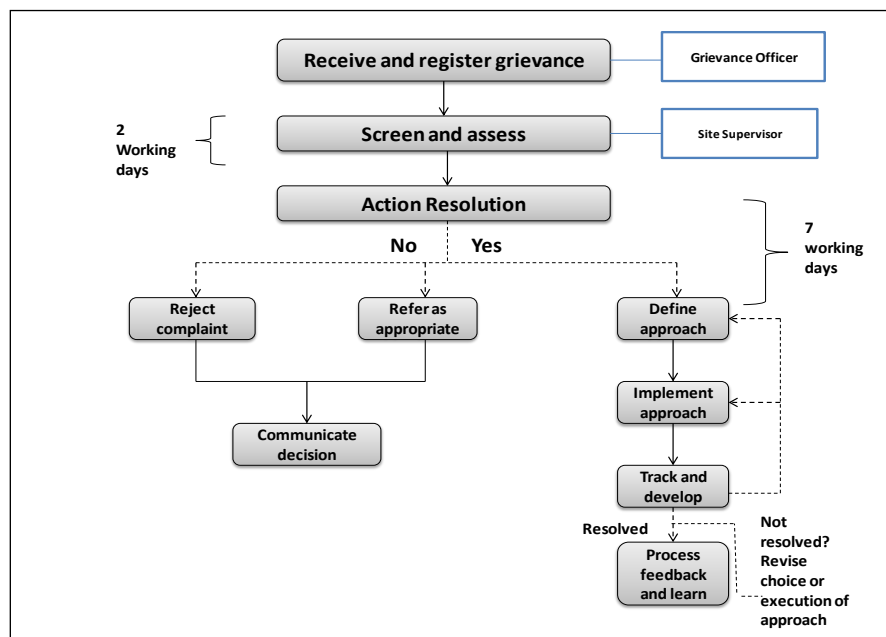
Assessment and Addressal of Complaint

- The Grievance Officer will open the grievance boxes once every week and register the grievance in the Grievance Log Register as per the format provided above;
- The Grievance Officer will then forward the grievances after registration to the Site Supervisor for further action;
- The grievance will be assessed by the Site Supervisor within two (2) working days to determine if the issues raised by the complaint fall within the mandate of the grievance mechanism or not;
- During the assessment of complaints, the GRC team (, EHS ManagerAdmin Officer, Site Supervisor &Safety Officer) will gather information about the key issues and concerns and helps determine whether and how the complaint might be resolved;

- The grievances will be redressed at the Site Level by the GRC within seven (7) working days;
- If the grievance fails to be addressed at this level the complainant will have the option to approach the appropriate court of laws for redress; and
- The complainant will have the opportunity to be present at the committee meetings and discuss the grievance faced by him/her.

The Grievance Mechanism proposed for Developer to consider and implement has been provided in figure below.

Figure 9-2: Proposed Grievance Mechanism Structure for Developer



Source: Adapted from CAO's Guide to Designing and Implementing Grievance Mechanisms for Development Projects

Documentation

- The Grievance Redressal Mechanism will be documented in English and Hindi and copies will be kept at the project site office;
- The GRM will also be displayed at notice board at the project site office and labour camp sites and will be included in worker documentation;
- The developers should inform the local community and workers about Grievance Redressal Mechanism during the project construction and operation phases. Various communicative methods can be adopted in disseminating the information like printed materials, displays and face to face meetings;
- The Contractor or Admin Officer will inform the workers about the grievance mechanism at the time of recruitment or induction training and make it easily accessible to them;
- The Grievance Officer's contact number will be made available to them. The project office phone number will be posted in public areas within the project area;
- The mechanism will address concerns promptly, using an understandable and transparent process and provide timely feedback to the concerned stakeholder;
- Verifiable records of implementation of corrective action like dated photographs, documentary evidence, getting confirmation from the complainant and filing the same within the case documentation should be kept;

- A Grievance Log or database emphasising the records and status of the grievance shall be maintained by the Grievance Officer at the site level.

9.4.2.3 Resources Required for Grievance Mechanism Implementation

A Grievance Mechanism becomes successful if adequate resources are assigned in its implementation. Adequate resources here refer to people, systems and processes and associated financial resources. In order to incorporate the responsibility of designing, implementing and monitoring the grievance mechanism, the senior management of the Developers at the corporate level should be involved in executing the various tasks.

For a grievance mechanism to function effectively, it is important to establish a governance structure and assign responsibilities for the mechanism's implementation. The following roles and responsibilities have been identified for grievance mechanism implementation:

9.4.2.4 Nominated Grievance Officer

Admin Officer based at the Site Level is to be nominated as the Grievance Officer. The incumbent is to work in tandem with the Site Supervisor, EHS Manager and Safety Officer. They cumulatively form the Grievance Committee at the site level.

9.4.2.5 Engagement of Third Party

To maintain ultimate transparency and accountability for the grievance mechanism process, third parties such as local governments, local community etc. can at times be involved in the grievance redressal process. These parties can serve as process organizers, places to bring a complaint to be passed on to the company or as facilitators, witnesses, advisors or mediators. Third parties can assist in enhancing the trust level from communities as well as overcome limitations of project-level mechanism.

Through the involvement of third parties as facilitators, the community's confidence in project level grievance mechanism can be increased and the project proponent can gain a better reputation with and greater trust from stakeholders. In addition, cost-efficiency and supplement of internal resources can also be achieved if this step is contemplated upon.

9.4.2.6 Monitoring and Reporting

Monitoring and reporting are requisite tools of measuring the effectiveness of the grievance mechanism, the efficient use of resources, determining broad trends and acknowledging recurring problems so that they can be resolved before they reach a higher level of contention. They also create a base level of information that can be used by the project proponent to report back to the stakeholders.³⁴

Monitoring: Depending on the extent of project impacts and the volume of grievances, monitoring measures like internal (by identified Developers Corporate level staff) and external audits (third party consultants) every once in a year based on the complexity of the nature of grievances can be adopted by the Developers. Grievance records maintained should provide the background information for these regular monitoring exercises. Through the review of each grievance and analysis of its effectiveness and efficiency, Developers can draw on the complaints to evaluate systematic deficiencies. In addition, monitoring of the grievance mechanism helps to ensure that the

³⁴ IFC's Good Practice Note on Addressing Grievances from Project-Affected Communities

design and implementation of the mechanism is adequately responding to stakeholder's comments in a cost effective manner.

Reporting: All grievances registered have to be recorded and regularly updated. The site management or Grievance Officer is responsible to discharging this responsibility and he should be able to produce this document whenever any audits take place. All minutes of meetings with stakeholders, complainants and Grievance Committee are to be recorded and documented regularly for reference purposes. In addition, through the process of monitoring and the reports produced thereafter, assurance of continual improvement of the company's operations is guaranteed. The company can also use these monitoring reports to report back to the community on its implementation of the mechanism and the modification/ changes proposed to make it more user-friendly.

9.5 Occupational Health and Safety Plan

The section below presents an overview of the potential occupational health and safety risks including the potential disasters on the proposed project. It defines the various risks involved during the construction and operation phase of the project. The occupational health and safety plan (OHSP) will address the following:

- Evaluation and Identification of hazards;
- Elimination and removal of hazards;
- Control of Hazards which cannot be eliminated; and
- Recovery from accidents.

9.5.1 Purpose and Scope

This OHSP is provided as a guidance document for identifying the potential risks involved during construction and operation phase of the proposed project. This plan provides guidance with respect to occupational risks and disasters which aims to achieve the following:

- Identification of hazards, associated risks and control measures for each activity;
- Defining responsibilities to ensure effective implementation of health and safety (H&S) risk control measures;
- Avoid and/or minimise the impacts on workers and local communities' health due to various project activities;
- Provide and maintain safe working procedures and operations for workers; and
- Reduce human injury and damage to property and environment in case of an emergency.

9.5.2 Definitions

Competent Person: any person having the knowledge, training and experiences specific to the work or task being performed.

Confined Space: "Confined space" means a compartment of small size and limited access which by its small size and confined nature can readily create or aggravate a hazardous exposure.

Emergency: An unforeseen occurrence, a sudden and urgent occasion for action

First aider: A person who has received training and who holds a current first aid certificate from an organization or employer whose training and qualification for firstaiders are approved by authority.

Hazard: A source, situation or act with a potential for harm in terms of:

- Ill Health
- Damage to property, plant, ships etc
- Production losses or increased liabilities

Hazardous Substance: The term “hazardous substance” means a substance which by reason of being explosive, flammable, poisonous, corrosive, oxidizing, irritant, or otherwise harmful is likely to cause injury.

Health and Safety Plan: A documented plan which addresses hazards identified and includes safe work procedures to mitigate, reduce or control the hazards identified.

Hot Work: The term “hot work” means riveting, welding, burning or other fire or spark producing operations.

Incident: An event or occurrence occurring at work or arising out of or in connection with the activities of persons at work, or in connection with the use of plant or machinery.

Risk: the probability that injury or damage will occur

Safe: free from any hazard

9.5.3 Roles and Responsibilities

Site Supervisor of Developer

The Site Supervisor is responsible for overall management of the project and ESMP implementation. The following tasks will fall within his/her responsibilities:

- Monitor site activities on weekly basis for compliance;
- Supervise the performance of the work being carried out within the project boundary;
- Conduct internal audits of the construction site against the ESMP;
- Confine the construction site to the demarcated area; and
- Keeping a check on operation and maintenance services of solar project components required during operation phase.

EHS Manager of Developer

The duties of an EHS Manager shall include the following:

- Ensure that the operations at the facility are in compliance with EHS requirements at all times;
- Conducting HS&E Audits on regular basis & advice management for necessary action;
- Maintaining first aid facilities and personal protective equipment as demanded by the nature of the work/Material Safety Data Sheets;
- Review of investigation of all type of accidents & Reporting to Site Supervisor;
- Training of workers and ensuring that they are issued with adequate instructions and creating awareness of safe work practice among them;
- Carrying out Job Safety Analysis to determine “Hazard of the operations/activity” and facilitating suitable solutions;
- Liaisoning with members of EHS on a regular basis to ensure that all Local/State Health & Safety requirements are met; and
- Participate in the preparation of, all Safety instructions, procedures and activities.

Safety Officer(s)

The developer shall ensure appointment of safety officer(s) for employees and workers working at site, to:

- review the effectiveness of health and safety measures;
- identify potential hazards and potential major incidents;
- in collaboration with his employer, examine the causes of incidents;
- investigate complaints by any employee /workers relating to that their health or safety on the site;
- inspect the site with a view to, the health and safety of employees, at regular intervals;
- participate in consultations with inspectors at the workplace and accompany inspectors on inspections of the workplace; and
- Participate in any internal health or safety audit.

The client shall ensure provision of necessary assistance, facilities and training to carry out the functions of a health and safety representatives established above.

First Aider

- Initial emergency response resuscitation and stabilization of critically ill or injured personnel;
- First Aid of non-emergency medical conditions;
- Management and administration of medical services, supplies, nurse activities and patient records;
- Implementation of site health plans and preventive medicine activities including first aid training of employees and workers; and
- Undertake regular health and hygiene inspections.

Employees/Workers

- Use the correct tools and equipment for the job; use Safety equipment and protective equipment/clothing supplied, e.g. Safety helmets, shoes, harness, goggles, etc.; and
- Report all defects in plant or equipment to health and safety representatives.

9.5.4 Creating and maintaining a safe and healthy work environment

The developer shall with respect to the site and the construction works that are contemplated:

- cause a preliminary hazard identification to be performed by a competent person before commencing any physical construction activity;
- evaluate the risks associated with such work constituting a hazard to the health and safety of such employees and the steps that need to be taken; and
- As far as is practicable, prevent the exposure of such employees to the hazards concerned or, where prevention is not reasonably practicable, and minimize such exposure.

The client shall ensure that:

- all practicable steps are taken to prevent the uncontrolled collapse of any new or existing structure or any part thereof, which may become unstable or is in a temporary state of weakness or instability due to the carrying out of construction work; and
- no structure or part of a structure is loaded in a manner which would render it unsafe.

The client shall carry out regular inspections and audits to ensure that the works are being performed in accordance with the requirements of this specification.

9.5.5 Risk assessment

Developers shall before the commencement of any work on site and during construction work, cause a risk assessment to be performed by a competent person appointed in writing. Such an assessment shall as a minimum:

- identify the risks and hazards to which persons may be exposed to;
- analyse and evaluate the identified risks and hazards;
- document a plan of safe work procedures, including the use of any personal protective equipment or clothing and the undertaking of periodic “tool box talks” or inductions before undertaking hazardous work, to mitigate, reduce or control the risks and hazards that have been identified;
- provide a monitoring plan; and
- Provide a review plan.

Risk assessment is an important step in protecting workers. It helps to focus on the potential risks in a particular workplace. Workers and others have a right to be protected from harm caused by a failure to take reasonable control measures. The following four steps are recommended:

1. Identify the hazards by expected harm, discuss with workers and employees actually working at site, check manufacturer's instructions or data sheets for chemicals and equipment, review accident and ill-health records, long-term hazard to health (e.g. high levels of noise or exposure to harmful substances) as well as safety hazards etc.;
2. Identify who may be harmed and how by identifying how employees/workers might be harmed i.e. what type of injury or ill health might occur;
3. Evaluate the risks and decide on precautions to protect people from harm
Consider if the hazard can be eliminated, and controlled so that harm is unlikely, organise work to reduce exposure to the hazard ; provide personal protective equipment (e.g. clothing, footwear, goggles etc.);
4. Provide welfare facilities (e.g. First aid and washing facilities for removal of contamination); and
5. Record the findings by writing down the findings of the risk assessment.

9.5.6 Training

Site Supervisor of Developer shall ensure that every employee/worker (direct or contractual) is aware of the EHS risks associated with the work being carried out at the site and is trained and competent in the relevant work practices and maintenance procedures.

Developers should establish procedures to identify training needs and provide adequate safety training for all levels of employees including contractors. The safety training should provide staff with the knowledge and skills necessary for organising and managing occupational safety and health programmes; team leaders with leadership skills and knowledge to lead, implement and apply occupational safety and health activities; and workers with the knowledge, skills and right attitudes to enable them to work safely.

Table 9-9: Proposed Training Modules

S.No.	Training	Frequency	Description	Responsibility
1.	Induction Training on Health and Safety	-	All staff and contractor workers	EHS Manager of

S.No.	Training	Frequency	Description	Responsibility
	covering the following: 1. HSE policy; 2. Hazards and risks associated with operation and workplace; 3. Control measure to eliminate or minimise HSE risks, including safe working systems and procedures; use of personal protective equipment; action to be carried out during emergency; 4. Emergency response procedures, such as firefighting and evacuation procedure		at the time of joining/engagement	the Developer
2.	Tool Box Training or pre-task briefings, highlighting hazards and the method of dealing with them	Daily	Held at each work location by head of contractor to discuss day's activities and specific hazards	Contractor Supervisor
3.	Worker Safety Training	Fortnightly	Review safety performance for week Discuss safety for upcoming operations	Contractor Supervisor
4.	Group Training	Monthly	Presentation of significant safety issues	EHS Manager
5.	Special Job Hazard Training including entry into confined space and other hazardous environment	Half Yearly	Training about safety measures to be incorporated related to specific jobs	EHS Manager
6.	Safety Bulletins	Weekly	Specific issues Visible through jobsite for constant awareness	EHS Manager
7.	Fire Safety	Half Yearly	Presentation of fire safety measures	EHS Manager
8.	Emergency Response	Half Yearly	For emergency preparedness	EHS Manager
9.	First Aid	Half Yearly	For emergency preparedness	EHS Manager
10.	Use of Personal Protective Equipment	Half Yearly	For workplace safety	EHS Manager and Contractor Supervisor

9.5.7 Documentation and Record Keeping

Site Supervisor of the Developer should maintain data and records concerning the identification of hazards, assessment and control of risks of the ongoing activities. The document should establish and maintain procedures for controlling all relevant EHS documents and data. Such documents can include but not limited to:

- EHS Policy;
- Hazard Identification Records;
- Risk Register;
- Legal Register;
- Licenses, Certificates, Permits;
- Control Methods including process control and machine design, safe work procedures, in-house work rules;
- Design Drawings;
- Organisation Structure;
- HSE group meeting records;
- Training Records;
- Drill Reports;
- Inspection and Audit Records; and

- Medical and Health Surveillance Records.

9.5.8 Communication and Information Dissemination

Developer(s) should communicate and inform any persons affected by the risks about:

- The nature of the risks involved; and
- The control measures or safe work procedures to be taken to address the risks involved.

Review

The risk assessment should be reviewed and revised upon the occurrence of any injuries to any person as a result of exposure to a hazard in the workplace; or where there is a significant change in work practices or procedures.

9.5.9 Safe Work Practices

Construction and operation of a solar power project involves many on job hazards which needs to be identified and eliminated or minimised to an expectable level in order to achieve a safe and healthy work environment. For a solar power plant involved in generation of clean and green electricity, safe working practices should be established for works including but not limited to the following:

- Falls
- Lockout/Tagout (LOTO)
- Crane and Hoist Safety
- Electrical
- Heat/Cold Stress
- Personal Protective Equipment

Falls

Workers, who install and/or maintain solar panels often work on roofs, use ladders and scaffolding, are in proximity of ledges, and are exposed to fall hazards. As more solar panels are installed on the surface of a roof, the walking area which may once have been available may no longer be available to workers. This may force workers to squeeze by or walk very close to skylights and/or roof hatches. To protect workers from these potential fall hazards through skylights, roof edges and roof hatches, employers must make sure that skylights are guarded or that workers near skylights use personal fall protection.

Construction workers involved in the installation of solar panels exposed to fall distances of 6 feet or more must be protected from falls by using one of the following methods:

- Guardrail Systems
- Safety net Systems
- Personal fall arrest systems

Workers should never be allowed to climb ladders while carrying solar panels. Lifting equipment, such as ladder hoists, swing hoists, or truck-mounted cranes/conveyors, should be used wherever possible.

Maintenance workers working on solar panels when exposed to fall hazards of 4 feet or more must be protected by a standard railing. If such a railing is not possible then the workers must be protected by a fall protection device such as a personal fall arrest system or a safety net.

Lockout/Tagout (LOTO)

LOTO refers to specific practices and procedures to safeguard employees from start-up of machinery and equipment, or the release of hazardous energy during service or maintenance activities.

Many workers face the greatest risk of injury if lockout/tagout is not properly implemented. Compliance with the lockout/tagout standard prevents an estimated 120 fatalities and 50,000 injuries each year. In a study conducted by the United Auto Workers (UAW), 20% of the fatalities (83 of 414) that occurred among their members between 1973 and 1995 were attributed to inadequate hazardous energy control procedures specifically, lockout/tagout procedures.

Solar energy equipment can generate electrical energy and may be connected to electrical circuits. Workers may be exposed to electrical hazards from solar panels and from electrical circuits. While installing or servicing solar panels, employers should assure that workers cover the solar panels, in addition to protecting workers from electrical circuits. Workers performing servicing or maintenance of solar panels may be exposed to injuries from the unexpected energization or release of stored energy in the equipment.

The following are some of the significant requirements of a Lockout/Tagout procedure required under a Lockout/Tagout program.

- Only authorized employees may lockout or tagout machines or equipment in order to perform servicing or maintenance;
- Lockout devices (locks) and tagout devices (tags) shall not be used for any other purposes and must be used only for controlling energy;
- Lockout and Tagout devices (locks and tags) must identify the name of the worker applying the device;
- All energy sources to equipment must be identified and isolated;
- After the energy is isolated from the machine or equipment, the isolating device(s) must be locked out or tagged out in safe or off position only by the authorized employees;
- Following the application of the lockout or tagout devices to the energy isolating devices, the stored or residual energy must be safely discharged or relieved;
- Prior to starting work on the equipment, the authorized employee shall verify that the equipment is isolated from the energy source, for example, by operating the on/off switch on the machine or equipment;
- Lock and tag should not be removed from the machine until the work is completed; and
- Only the authorized employee who placed the lock and tag must remove his/her lock or tag.

Electrical

Solar energy workers are exposed to potential electrical hazards present in their work environment, which makes them more vulnerable to the danger of electrocution and arc flash hazards. Workers may be exposed to electric shocks and burns when hooking up the solar panels to an electric circuit.

Workers must pay attention to overhead power lines and stay at least 10 feet away because they carry extremely high voltage. Fatal electrocution is the main hazard, but burns and falls from elevations can occur while installing solar panels. Another hazard is from using tools and equipment that can contact power lines.

Heat/Cold Stress

Solar energy workers often work in very hot weather where hazards include dehydration, heat exhaustion, heat stroke, and death. Employers should monitor employees and workers should be trained to identify and report early symptoms of any heat-related illness. Workers may also be exposed to extreme cold weather conditions and should be protected from such conditions.

Heat Stroke occurs when the body's system of temperature regulation fails and body temperature becomes abnormally high. Some of the signs and symptoms of heat stroke are:

- Confusion;
- Loss of consciousness;
- Convulsions;
- Lack of sweating (usually) hot, dry skin; and
- Very high body temperature

If a worker shows signs of possible heat stroke, medical treatment should be obtained immediately. While waiting for medical help, the worker should be:

- Placed in a shady area and the outer clothing should be removed;
- The worker's skin should be wetted and air movement around the worker should be increased; and
- Fluids should be replaced as soon as possible.

The signs and symptoms of heat exhaustion are:

- Headache;
- Nausea;
- Vertigo;
- Weakness;
- Thirst; and
- Giddiness.

Workers suffering from heat exhaustion should be removed from the hot environment and given fluid replacement. They should also be encouraged to get adequate rest.

Personal Protective Equipment (PPE)

Using personal protective equipment is often essential, but it is generally the last line of defence after engineering controls, work practices, and administrative controls. Solar energy employers must assess their workplace to determine if hazards are present that require the use of protective equipment. Solar energy workers can be exposed to many hazards that may require the use of safety glasses, hard hats, gloves, respirators, or other personal protective equipment used to protect against injuries and illnesses. Workers exposed to potential electrical hazards must be provided with appropriate electrical protective equipment, and workers must use them. Electrical protective equipment must be maintained in a safe and reliable condition. They must be periodically inspected or tested for their workability.

9.5.10 General Working Conditions

Housekeeping

- Work areas should be maintained in a neat and orderly condition;

- Scrap material, such as rags, bolts and wedges should not be allowed to accumulate in the site area;
- Spills of oil, grease, paint and other slippery substances should be cleaned up immediately;
- Walkways should be kept clear of tripping hazards at all times;
- All personal protective equipment required for a procedure or production area must be properly fitted and worn;
- Maintain a free access to all safety equipment including firefighting equipment, electrical panels and boxes, etc.;
- Scaffolding and ladders; etc. must be secured;
- Proper barricades, safety rings and safety wires should be used for openings, manholes, etc. Barricades must be properly lighted for visibility;
- Operating equipment, tools or machinery without proper guards and/or signalling devices is prohibited;
- Observe all warning signs in the yard; and
- Before leaving the job, always check the area for any sparks or smouldering materials.

Ventilation

- Adequate Local Ventilation (with filtration/mitigation arrangements where required) is to be arranged in connection with all types of works involving injurious or irritating gases/smoke/ fumes, which may occur or may form while the work is going on; and
- Ventilation is to start up before work commences; a check is to be made by the EHSManger;

First Aid

- All work areas must be provided with adequate first aid facilities with a trained first aider during working hours; and
- Developer(s) must provide or ensure that there is provision of adequate and appropriate facilities for enabling first aid to be rendered to their employees if they are injured or become ill at work.

9.6 Construction Labour Management Plan

The proposed 750 MW solar power project is in its preliminary phase of execution. It is envisaged that during construction phase of the project, labourers for various jobs such as civil, mechanical and electrical works will be hired through authorised manpower agencies. The labour requirement will range from 250-270 workers during normal operations which can reach upto 300 workers during peak construction activities. Therefore, it is also envisaged that many of the labourers will be employed from outside the region and will therefore, be migrant labourers and hence, accommodation will be provided. These migrant labourers will be accommodated in a temporary campsite within the project area. The construction of all three modules can start simultaneously which can lead to increase in migrant labour at a given point of time. This could result in stress on local resources, disruption in community relations, and movement of labours (*detailed impacts have been discussed in Section 8.4.1*).

9.6.1 Objectives

The influx of migrant labour will have both negative and positive impacts on the nearby community and local environment. The labour will be accommodated in temporary campsite within the project boundary which can have significant interface with the nearby community. However, the influx of migrant workers would lead to a

transient increase of population in the immediate vicinity of the project area for a limited time. This would put pressure on the local resources such as roads, fuel wood, water etc.

Hence, a plan has been designed to demonstrate the:

- Potential impacts associated with influx on the host population and receiving environment are minimized;
- Provision of safe and healthy working conditions, and a comfortable environment for migrant labour; and
- To ensure compliance with the IFC PS 2 and 4 and national labour laws;

9.6.2 IFC Performance Standards

International Finance Cooperation (IFC) Performance Standard 2- Labour and Working Conditions is specific to labour and working conditions. This Standard focuses on the protection of the basic rights of workers, fostering constructive worker-management relationships, as well as promoting fair treatment and the provision of a safe and healthy workplace. The basic provisions for migrant workers under PS 2 are enumerated below:

- As per the provisions of PS 2, the client shall identify migrant workers engaged through third party and ensure that they are engaged on substantially equivalent terms and conditions to non-migrant workers carrying out similar work (if any);
- The Developer shall ensure provision of adequate accommodation, transportation, and basic services including water, sanitation, and medical care for the workers working on that project;
- The compensation paid to the migrant workers should be non-discriminatory and the principle of equal opportunity and fair treatment to be followed; and
- Wastewater, sewage, food and any other waste materials are to be properly handled, in compliance with local standards– whichever is more stringent – and without causing any significant impacts to the biophysical environment or surrounding communities.

IFC PS 4 – Community Health, Safety and Security carries health and safety through to the community environment. The objectives of the Performance Standard are:

- To minimise and manage health and safety risks to local communities; and
- To ensure that the project does not harm community health and safety.

9.6.3 General Requirements

All migrant workers are envisaged to be accommodated in temporary campsite within the project area. If migrant workers are accompanied by their families, provisions should be made accordingly. Guidance on Workers Accommodation developed by IFC and EBRD is also referred for inclusion of requirements for labour camp to be established by developers during construction phase of the project³⁵. Developer(s) shall ensure implementation of the following measures to minimise the potential negative impacts of worker accommodation and workers on local communities:

Cleanliness: Pest extermination, vector control and disinfection are to be carried out throughout the living facilities in compliance with local requirements and/or good practice.

³⁵http://www.ebrd.com/downloads/about/sustainability/Workers_accomodation.pdf

Complaints and incident reporting: A formal Complaints Procedure will be implemented to ensure timely and transparent response to complaints as received from labour.

Labour education: The workforce will be sensitized to local social and cultural practices through provision of an induction course for all employees that stipulates expected behaviour;

Labour behaviour in campsite provided: A Code of Behaviour governing appropriate behaviour in the accommodation facilities to be kept in place and to be strictly enforced. The Developer shall ensure implementation of the “rules of engagement” between labours living in campsite and community and shall be implemented by construction contractors for all engaged labours. A code of conduct has been developed and has been annexed with the report.

Labour Compensation and Accommodation: Client shall ensure that labours are provided with benefits such as annual leave, weekly rest day, etc. Accommodation to be provided for the construction labour which cover facilities (including catering facilities, dining areas, washing and laundry facilities etc.) and supporting utilities.

9.6.4 Hiring and Recruitment Procedure

The manpower contractor shall, wherever possible, locally recruit the available workforce and shall provide appropriate and requisite on job and EHS training as necessary. The following general measures shall be considered for the workforce during their employment tenure:

- RUMS should include a code of conduct relating to the accommodation to be signed with the contract Document of developers.
- The contractor shall not employ any person below the age of 18 years nor will have any forced labour;
- The construction labourers will be provided with documented information regarding their rights under national labour and employment law such as but not limited to Factories Act, Minimum Wages Act, Trade Unions Act and Workmen’s Compensation Act;
- First priority for employment of labour should be given those impacted by the project such as landowners who have lost land;
- No discrimination shall be done by the construction contractor with respect to recruitment and hiring, compensation (including wages and benefits), working conditions and terms of employment, access to training, job assignment, termination of employment or retirement, and disciplinary practices;
- The contractor to ensure that work hours are set at eight hours a day, 48 hours a week, with a weekly rest day for all engaged labours;
- Every labour is entitled for maximum of only two hours a day as Overtime (OT) work. OT pay is twice the hourly remuneration;
- Client shall ensure equal wages for male and female workers for work of equal nature or value is maintained;
- A grievance redress mechanism for workers shall be put in place by the contractor to raise workplace concerns. The workers will be informed about the grievance mechanism at the time of recruitment; and
- The Developer shall ensure that their contractors develop and implement a procedure to review the performance of their sub-contractors.
- The procedure developed should include regular inspection of the camp sites, maintaining information pertaining to labours sourced by sub contractors;

9.6.5 Worker's Accommodation

The Developer will supervise and monitor the activities performed by their contractor and accommodation facilities provided in campsite. The following measures shall be provided:

- The labour will be provided with accommodation on twin sharing basis made of insulated material and locally available building material, etc.;
- The migrant workers with families shall be provided with individual accommodation comprising bedroom, sanitary and cooking facilities;
- The units will be supported by common latrines and bathing facilities duly segregated for male and female labour;
- Adequate number of toilets shall be provided in the accommodation facilities. A minimum of 1 unit to 15 males and 1 unit for 10 females shall be provided;
- The contractor shall provide a canteen facility for the construction workers and the food will be of appropriate nutritional value and will take into account religious/cultural backgrounds;
- All doors and windows shall be lockable and mobile partitions/curtains shall be provided for privacy;
- Facilities for the storage of personal belongings for workers shall be provided within the campsite only;
- Dustbins shall be provided for collection of garbage and will be removed on a daily basis;
- It is also required to provide first aid box in adequate numbers; and
- Ventilation should be appropriate for the climatic conditions and provide workers with a comfortable and healthy environment to rest and spend their spare time.

9.6.6 Security

The contractors shall put in place the following security measures to ensure the safety of the workers. The following measures shall be incorporated:

- Access to the campsite shall be limited to the residing workforce;
- The contractor shall be responsible for deploying adequate number of guards;
- Adequate, day-time night-time lighting shall be provided;
- The security personnel shall be provided with training to respect the community traditions and in dealing with, use of force etc.; and
- The rental accommodation shall be provided with firefighting equipment and portable fire extinguishers.

9.6.7 Provisions for Drinking Water

Access to an adequate and convenient supply of free potable water is necessity for workers. The domestic water supply shall be made available by the contractor.

- Safe drinking water conforming to the IS 10500:2012 for drinking water shall be provided;
- Private tanks can be utilized for provision of drinking water for the migrant labours;
- The direct usage of water from bore well should not be allowed and water shall be adequately treated;
- The Developer(s) should regularly monitor the quality of drinking water available. In case of non-compliance with the Drinking Water Specifications, additional treatment shall be provided or alternative sources of water supply shall be arranged; and

- All tanks used for the storage of drinking water are constructed and covered as to prevent water stored therein from becoming polluted or contaminated.

9.6.8 Cooking Arrangements

The construction phase will involve engagement of large number of migrant people in the project area for a limited time. Hence, there shall be requirement of provision of cooking facilities (kitchen) as listed below:

- Places for food preparation are designed to permit good food hygiene practices, including protection against contamination between and during food preparation;
- Adequate personal hygiene including a sufficient number of washbasins designated for cleaning hands with clean, running water; and
- All kitchen floors, ceiling and wall surfaces adjacent to or above food preparation and cooking areas are built using durable, non-absorbent, easily cleanable, non-toxic materials;
- Food preparation tables are equipped with a smooth, durable, easily cleanable, non-corrosive surface made of non-toxic materials.

To ensure that the fuel need of labourers in the project area does not interfere with the local requirements, necessary arrangements for supply of fuel wood to the labourers shall be done by the contractor. Fuel requirement for cooking purposes are only to be met by fuel wood that to be purchased only from authorized vendors only.

9.6.9 Wastewater Generation

There will of generation of wastewater from the campsite. About 80% of water used shall be generated as sewage/wastewater. Developers shall ensure that the campsite are equipped with septic tank and soak pit for disposal of sewage. It is also recommended that the storm water and sewage system should be separate. The surface water drainage shall include all necessary gutters, down pipes, gullies, traps, catch pits, manholes etc. Sanitary and toilet facilities are constructed of materials that are easily cleanable. Sanitary and toilet facilities are required to be cleaned frequently and kept in working condition.

9.6.10 Solid Waste Management

The municipal solid waste generated from campsite will mostly comprise of compostable wastes like vegetable matters (kitchen waste) and combustible waste like paper, cans, plastic and some non-degradable waste like glass/glass bottles. Improper disposal of solid waste will lead to environmental degradation and health hazards to labour as well as nearby community.

The following measures shall be adopted by contractors for ensuring effective management of solid waste:

- The solid wastes of domestic nature generated shall be collected and stored separately in appropriate containers with proper sealing on them;
- Separate bins with proper markings in terms of recyclable or non-recyclable waste shall be provided in the houses and kitchen premises in sufficient numbers for collection of garbage;
- Food waste and other refuse are to be adequately deposited in sealable containers and removed from the kitchen frequently to avoid accumulation; and
- The contractor shall identify the nearest municipal solid waste storage facility and tie up with the concerned urban local body for disposal of waste at frequent intervals.

9.6.11 Medical Facilities

Effective health management is necessary for preventing spread of communicable diseases among labour and within the adjoining community. The following medical facilities shall be provided by contractors for the construction workers:

- A first aid centre shall be provided for the labour within the construction site equipped with medicines and other basic facilities;
- Adequate first aid kits shall be provided in the campsite in accessible place. The kit shall contain all type of medicines and dressing material;
- Contractor shall identify and train an adequate number of workers to provide first aid during medical emergencies;
- Regular health check-ups shall be carried out for the construction labourers every six month and health records shall be maintained;
- Labours should have easy access to medical facilities and first aider; where possible, nurses should be available for female workers;
- First aid kits are adequately stocked. Where possible a 24/7 first aid service/facility is available.
- An adequate number of staff/workers is trained to provide first aid; and
- Information and awareness of communicable diseases, AIDS etc. shall be provided to workers.

9.6.12 Recreation Facilities

- Basic collective social/rest spaces are provided to workers.;
- Facilities like a common television can be provided in labour camps

9.6.13 Inspection of Accommodation Facilities

Campsite shall be inspected at frequent intervals to ensure that the facilities are well organized and maintained to acceptable and appropriate standards by the Developer. The key areas are:

- Daily sweeping of rooms and houses shall be undertaken;
- Regular cleaning of sanitary facilities shall be undertaken;
- The kitchen and canteen premises shall be established under good hygiene conditions;
- Daily meal times shall be fixed for the labour;
- Smoking and alcohol consumption shall be prohibited in the workplace;
- Water logging shall be prevented at areas near the accommodation facilities and adequate drainage is to be provided; and
- Checklists pertaining to the daily housekeeping schedule shall be maintained and displayed at houses, toilets and kitchen.

To limit the impact due to cumulative labour onsite during construction phase, developers shall provide adequate labor camp which should be appropriate for its location and be clean, safe and, at a minimum, meet the basic needs of workers.

- Developers should assess the location of labour camp, that it should not be constructed in immediate vicinity of any drainage channel;
- It should be ensured that the labour camp (onsite) should have basic amenities such as electricity, drinking water, health & sanitation facility, kitchen and rest room;

- All tanks used for the storage of drinking water are constructed and covered as to prevent water stored therein from becoming polluted or contaminated and all the migrant workers will be instructed accordingly;
- Employers should ensure that accommodation which is provided is not overcrowded and does not pose a risk to the health and safety of workers;
- The labour camp will be equipped with septic tanks and soak pits and avoid presence of stagnant water is a factor of proliferation of potential disease vectors such as mosquitoes;
- Developers should ensure that the disruption of local communities is minimum, in particular local communities' transport infrastructures and if required limit the workers movements in near by areas;
- Security staff have a clear mandate and have received clear instruction about their duties and responsibilities, in particular their duties not to harass, intimidate, discipline or discriminate against workers;
- Developers should ensure that workers and members of the surrounding communities have specific means to raise concerns about security arrangement and staff;
- Where possible, an adequate transport system to surrounding communities will be provided. It is good practice to provide workers with free transportation to and from local communities.

9.6.14 Grievance Redress Mechanism

A Grievance Redress Mechanism (GRM) shall be formulated for the construction labourers (local and migrant) comprising of a review committee including representatives elected by labour and management representatives. RUMSL can extend the grievance mechanism proposed in Section 9.4.2 of the report for the project to the Developers also. A documented GRM shall have the following elements:

- Proper system for lodging grievances;
- Provision for raising anonymous complaints;
- Appropriate level of management for addressing concerns;
- Workers and members of the surrounding communities have specific means to raise concerns about security arrangement and staff;
- Provision for timely action and feedback;
- Monitoring and review of grievances raised and action taken; and
- Scope for continual improvement of the system.

9.7 Framework for Emergency Preparedness and Response Plan

The primary objective of formulating framework of Emergency Preparedness and Response Plan (EPRP) is to undertake immediate rescue and relief operations and stabilize the mitigation process as quickly as possible. The main parameters of a response plan based on such mechanism include:

- Identification and declaration of potential emergencies;
- Signal/warning mechanism;
- Activities and their Levels;
- Command and control structure;
- Individual roles and responsibilities of each specified authority to achieve the activation as per response time;
- Emergency procedures; and
- Alternate plans & contingency measures;

- Coordination with External parties

9.7.1 Identification of Emergencies

Identification of all the hazards and risks associated with each activity which may lead to an emergency and anticipate the actions to be taken before or after the emergency arises. This section identifies the hazardous areas and activities in both construction and operation phases. Probable emergencies that might arise due to these hazards for the duration of the project have been listed below.

Hazardous areas

Following potentially hazardous areas and activities have been identified at the construction site:

- Fuel storage areas
- Kitchen premises in labour camps
- Electrical installations – improper laying of cables
- Scaffolds
- Confined spaces

The potentially hazardous areas and activities during project operations will be storage area of broken panels, hazardous waste such as used oil, oily rags etc.

Emergency Situations

The possible emergency situations identified for the construction and operation phases of the Project are as listed below:

Fire and Explosion

- Leakage of fuel from storage areas;
- Short-circuit at campsite/project site; and

Mechanical and Electrical Hazards

- Structural Collapse;
- Accidentally dropped object;
- Loss of stability; and
- Electrocutation.

Occupational Hazards

- Outbreak of Disease / Illness;
- Handling of chemicals;
- Accidents due to vehicle movement; and
- Vandalism.

9.7.2 Declaration of Emergencies

Level 1 (Minor Emergency)

All events with no escalation potential and which can be controlled and contained by the action of Safety Officer at the site will be considered as Level 1. In such cases of local alert, EHS Manager of Developer will be notified only. Some typical incidents are:

- Vehicle collision (involving no loss of life);
- Equipment damage;
- Medical Evacuation (not very serious cases);
- Minor fires.

Level 2 (Serious Emergency)

All events with escalation potential, depending on the effectiveness of the local response will be considered as Level 2. These incidents may impact the entire construction activity/ project operations or have cascading effect. For such type of incidents Site Supervisor of Developer will take the lead. Some typical incidents are:

- Substantial security incident / Vandalism;
- Structural collapse;
- Minor Flooding;
- Serious damage to structures;
- Substantial fire; and
- Cultural conflict.

Level 3 (Major Emergency)

The crisis that requires assistance from external resources in order to save lives, minimize damage and to bring the abnormal situation back under control are Level 3 emergencies. These incidents have the potential to impact beyond the project footprints and affect the community. In such cases appropriate Government / regulatory authorities. Some typical Level 3 incidents are:

- Major fire/explosion;
- Fatality ;
- Severe flooding;

Personnel on site will know that a Major Emergency has been declared if the site fire alarm siren and /or the local fire alarm systems are activated. The Emergency Siren Modes will be demonstrated and shared with all workers to identify with them.

Level 2 and level 3 will be declared using emergency siren and evacuation shall be done

9.7.3 Emergency Equipments

The following points should be implemented to tackle emergency situations:

- Onsite emergency equipments such as first aid boxes, firefighting equipment, PPEs etc. shall be maintained at project site;
- The adequacy and availability of emergency equipments shall be assessed at periodic intervals by the EHS Manager of Developer.
- Inventory and locations of respective emergency equipments shall be displayed at project office building, construction areas and other work areas;
- It is to be ensured that the staff of developers is trained on usage of each type of emergency equipment.

First Aid Boxes

First aid boxes shall be provided at identified locations throughout the plant premises. A first aid box shall contain, but not limited to the following articles:

- Cotton wool
- Sterile gauze
- Antiseptic lotion
- Box of adhesive dressing (Plasters) for small wounds
- Blunt-ended scissors
- Tweezers for removing splinters
- Triangular bandages (for making a sling or emergency bandage)
- Safety pins
- Sterile eye dressings
- Crepe bandages
- Aspirin/ Paracetamol tablets
- Skin creams for treating burns
- Anti-histamine cream for insect bites and stings

Fire Fighting Equipments

During construction phase, fire extinguishers and sand buckets will be provided at critical areas such as fuel storage area, waste storage area, labour camps, kitchens, first aid centre, areas with electrical installations and project office.

Other firefighting systems to be installed should include:

- Heavy-duty ABC powder type fire extinguishers kept at important electrical equipment areas;
- Portable CO₂ extinguishers provided throughout the plant;

Provision of Personal Protective Equipments

Onsite workers and the team deployed by respective developer should be provided with adequate number of personal protective equipments (PPEs) to deal with emergency situations. The PPEs shall be stored at the designated Emergency Control Centre in the plant premises and will be easily accessible during times of emergency. Training of proper use of PPEs shall be provided to all working personnel on periodic basis.

Assembly Areas

- Considering the area of the plant, three Sub-Assembly Zones and one Main Assembly Zone should be identified and finalized. The assembly zones shall be marked accordingly and employees will be mandated to gather at the zones during emergencies;
- In cases of minor emergencies when evacuation is not required, the employees/ workers and contractors shall gather at the Sub Assembly Zones nearest to their working area;
- In case the facility is to be evacuated, assembly from sub assembly zones is undertaken at Main Assembly Area where the final headcount is undertaken and finally workers can be routed to evacuate the premises.

Codification of Sirens

The following codes of sirens will be followed during emergencies:

Sl.No	Sirens	Indicates	Authority
1	120 seconds Continuous Whelming Sound	ON SITE EMERGENCY (ALERT) for evacuation	EHS Manager
2	30 + 30 + 30 seconds Sound with an interval of 5 seconds each	EMERGENCY CONTROLLED	EHS Manager

Below points shall be noted during prevalence of emergency situation:

- Emergency siren to be sounded only if required.
- All staff shall be prior informed of use of emergency sirens during mock drills.
- All employees in areas other than affected to continue work unless disaster siren is blown.
- No worker will leave the emergency spot unless 'all clear' siren blown.

9.7.4 Coordination with External Agencies

During emergency situations, Safety Officer and EHS Manager of Developers shall form the Emergency Control Centre (ECC). Safety Officer shall coordinate with the following departments:

- Fire brigade;
- Police department;
- Hospitals/Ambulance Services;
- Utility departments (electricity and water);
- Technical departments such as Madhya Pradesh Pollution Control Board, Factory Inspectorate etc.
- Local Authorities and District Administration
- District Disaster Control Room, Rewa

9.7.5 Emergency Response Team

- The Emergency Response Team (ERT) will be set up immediately for construction phase and the same will be revised for commencement of plant operations.
- Each personnel identified as part of the ERT shall be designated specific roles and responsibilities for handling emergency situations.
- The ERT at the operating site under its control will have following role:
 - Control the emergency and render the facility premises safe by the application of local resources; and
 - Support the local response effort by co-ordinating additional equipment, personnel, and other external resources for the direct response effort.
- The ERT will comprise of the following personnel:
 - Site Supervisor;
 - EHS Manager;
 - Safety Officer(s);
 - Evacuation Officer;
 - Employee/Workers

9.7.6 Response Procedures

Effective command and control starts with a clear definition of the overall command and control structure, and description of the duties of key personnel with specific responsibilities for emergency response. The control of emergencies will consider the minimum number of persons required to provide an adequate response to emergencies.

All emergencies occurring as a result of project activities shall be managed according to the following order of priorities:

- Preservation of Life (self, team, community);
- Protection of the Environment;
- Protection of Property/assets; and,
- Preservation of Evidence.

9.7.7 Reporting and Documentation

The following aspects need to be communicated for the emergency reporting:

- While witnessing or receiving notification of an emergency, as much information as possible should be taken and/or conveyed to the relevant emergency activation authority;
- Where possible, all information should be logged in written form with time and date included and provided to EHS Manager of Developers;
- Personnel working on the site may, at any time, be exposed to an emergency which could take many forms, for example (but not limited to):
 - Injuries and/or fatalities
 - Fires and/or explosions
 - Extreme weather
- When an emergency occurs, an appropriate and prompt response is required, providing precise action to control, correct and return the site to a safe condition. Timely action will also be required to protect people, the environment and property from damage;
- All near misses and unsafe acts will be written in logbooks / reported in the 'Near miss, unsafe acts, hazards and sub-standard conditions report' and verbally communicated to the concerned Site Supervisor within a reasonable time. All accidents and incidents will be immediately reported to the EHS Manager, and requisite forms completed.

9.8 Disaster Management Plan

The following Disaster Management Plan (DMP) is developed on framework of EPRP (as detailed in section 9.7) and outlines procedures essential for effectively responding to any natural and man-made accidental and emergency situations for operations and activities during construction, operation and decommissioning phases of the project. The procedures will include plans for addressing training, resources, responsibilities, communication and all other aspects required to effectively respond to emergencies associated with their respective hazards.

9.8.1 Objectives

This DMP has the following objectives:

- Protect the employees, contractors, assets, communities and the environment through the development of disaster response strategies and capabilities;
- Set out the framework for hazard identification in order to define procedures for response to the situations including the development of contingency measures;
- Structure a process for rapid and efficient response to and manage emergency situations during the construction, operational and decommissioning phases of the project; and
- Assign responsibilities for responding to emergency situations.

9.8.2 Definitions

- **Accident** – an unintended incident which results in injury to persons and/or damage to property, the environment, third party or which leads to production loss.
- **Contractors** – persons working for external companies (or employed by an employment agency) that are under contract to carry out work for the project.
- **Emergency** – a serious, unexpected and often dangerous situation which poses an immediate threat to, personals, processes, assets, environment and communities and requiring an immediate action.
- **Incident** – a sudden accident or near miss.
- **Medical Treatment Case** – injury at work (other than a lost-time injury and restricted work case) requiring treatment by a doctor, or nurse in consultation with a doctor, before the injured person's resumes normal work.
- **Natural Disasters** - are types of disasters that cause material and physical damages and human losses. These include: drought, water rise, earthquake, flood, storms, epidemics and others.
- **Unnatural Disasters** - disasters causing material and physical damage and destruction and human losses. These include: explosions, plane crash, fire accidents due to human negligence and other human generated disasters.

9.8.3 IFC Performance Standards

Performance Standard 4 (Community Health, Safety and Security)

IFC PS 4 aims to avoid adverse impacts on the health and safety of affected community during the project life from both routine and non-routine circumstances. Furthermore, the standard ensures that the safeguarding of personnel and property is carried out in accordance with relevant human rights principles and in a manner that avoids or minimises risks to the affected communities.

The United Nations Environment Programme (UNEP) requires that all projects will have a Disaster Management Plan that is commensurate with the potential risks of the project and that includes the following basic elements:

- Administration (purpose, definitions, etc.);
- General information including location, primary and alternate disaster response coordinator, physical description of the site and personnel responsible for the development of the contingency plan for the facility;
- Organization of emergency areas (assembly points, medical stations, etc.);
- Roles and responsibilities;
- Communication systems (such as a notification flow chart);
- Disaster response procedures to be used as guidelines to follow when an incident or other catastrophic event occurs;
- Emergency resources;

- Site Evacuation Plan;
- Training and updating requirements for site operational and disaster response personnel;

9.8.4 Roles and Responsibilities

Site Supervisor of Developer

The Site Supervisor is responsible for overall management of the project and ESMP implementation. The following tasks will fall within his/her responsibilities:

- Review monthly and annual incident reporting;
- Review disaster response drill outcomes and work with EHS Manager and safety officers to identify necessary improvements;
- Appoint a Disaster Response Coordinator tasked with responding to emergencies.

EHS Manager of Developer

The duties of an EHS Manager shall include the following:

Distribution of the DMP to all parties with responsibilities in implementing the plan (including contractors);

- Review monthly incident report;
- Review quarterly report of accidents/incidents and reviews of contractor practices;
- Plan disaster response drills;
- Develop response Training;
- Receive all notifications of incidents/accidents and ensure proper response is being followed including reporting and review.

Safety Officer(s)

The developer shall ensure appointment of safety officer(s) for employees and workers working at site, to:

- Support the EHS Manager as required in disaster response planning and in development of training and management plans to ensure environmental concerns are addressed;
- Provide regular incident reporting;
- Schedule monthly inspections and audits and resolve issues identified;
- Schedule emergency response training sessions for relevant staff;
- Prepare monthly incident reports.

Evacuation Officers

- Ensure they are easily recognizable to their colleagues/visitors and the emergency services during any evacuation;
- Responsible for all occupants' safety during evacuation and to ensure the safety for personnel to re-enter the site;
- Keep an updated list of employees and visitors on site and carry the name list with them during evacuation;
- Ensure all occupants have evacuated the area where the incident has taken place (including people in rest rooms, site office rooms etc.);
- To be fully trained in the provision of first aid.

Employees/Workers

- All persons employed or under service contract (e.g. contractor, transporter etc.), who witnesses or cause an incident are responsible for immediate reporting of the incident to his/her supervisor.

9.8.5 Hazard Vulnerability profile of the project area

The project site is situated on barren lands of Five (5) villages namely Badwar, Barsaita Pahad, Barsaita Desh, Etar Pahad and Ramnagar Pahad. The project site is mainly non-agricultural land. The project district receives maximum rainfall in the months of July to September. According to IMD's rainfall data for the last five years, the district's mean annual rainfall is about 1058.34 mm. However, according to the discussion with the land owners and locals residing in the project village the project site or the lands identified for the project is experiencing severe shortage of water for agriculture in the recent years.

Secondary data research on the natural hazards associated with the project state of Madhya Pradesh indicates the following:

- the entire project district, Rewa is not prone to Drought;
- Rewa is located in minor risk zone (Zone – II) of seismic activity; and
- Rewa has been affected by flood about 6-8 times in the past 26 years.

The topography of the project site is undulating and sloping towards South-westward. The site drainage shows dendritic pattern and various nallahs existing over the site drains most of the water during monsoons. The main nala draining the site is Aahri Nallah while Devdeh Nallah drains part of site drainage on the north eastern side. The site drainage nallahs (Aahri Nallah and Devdeh Nallah) are drained into Bichiya River at the North West of the site located at a distance of 6km from site.

The flood risk assessment study of the project site suggests that in case of extreme rainfall, there might be local flooding and local ponding in few areas of the site. However natural slope of the site and sufficient discharge capacity of the site nallahs will help the site area drainout quickly.

Therefore, it can be concluded that the project site is prone to hydro-meteorological hazards such as floods (a natural disaster), technological hazards such as Fires, site office building collapse.

9.8.6 Emergency Procedures

The event of the following disasters, the emergency procedures to be followed are:

Flooding	• The Disaster Response Coordinator must be notified; • All personnel onsite, including the designated Evacuation personnel must be immediately notified; • All equipment must be safely shutdown and all electrical equipment must be isolated.
Fire	• The Disaster Response Coordinator must be notified; • Personnel in the immediate vicinity of the fire, including the designated Evacuation personnel must be immediately notified; • All persons located in the area in which the fire is located must be evacuated. Evacuation must be carried out as per the Evacuation Procedure; • The fire must be contained with the correct extinguisher only by those trained to do so; • Those requiring assistance must be assisted and first aid must be rendered only by those trained to do so; • Those confined to an area where there is smoke, must move under the level of the smoke and cover their nose/mouth.
Site office building	• The Disaster Response Coordinator must be notified;

collapse	• Personnel in the immediate vicinity of the collapsed building move away from the building to a safe location - there could be a secondary collapse; • Enter and rescue others only by those trained to do so; • If you know the identity or location of someone who is trapped, notify emergency personnel; • All persons located in the area must be evacuated. Evacuation must be carried out as per the Evacuation Procedure.
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9.8.7 Evacuation Procedure

All staff must be aware of the possible escape routes prior to the emergency situation. Always assure safety of the assembly point prior to evacuation. The procedure associated with an evacuation event is detailed below:

- The Disaster Response Coordinator will give instruction or the alarm sound to evacuate specific assembly areas;
- All staff appointed as Evacuation Officers must assist with the evacuation;
- All personnel onsite must follow the instructions of the Evacuation Officer;
- Personnel must follow the directional pointers to the nearest assembly points;
- Evacuation must be undertaken in accordance to the emergency lay out plan;
- Mobile employees must be the first to be evacuated followed by the frail and the injured;
- Evacuation personnel must work in pairs where possible to assist one another lifting injured employee (if any);
- Mobile employees who are struggling or appear unsure must be assisted;
- Personnel must evacuate by walking briskly and must not run;
- Evacuating personnel must stay calm and must not panic. Panic can spread and cause unnecessary chaos;
- Evacuating personnel must always keep left along the evacuation routes;
- In the case where the emergency situation results in fire or smoke, evacuating personnel must consider crawling, as this may be better than walking;
- Visitors that are not familiar with the evacuation procedure must be assisted;
- A daily record of staff and visitors must be kept;
- The task of the professional Emergency Services must not be obstructed;
- If necessary, a search / check for all unaccounted personnel must be undertaken before leaving the area;
- The evacuation officer must be the last one to leave the area;
- All personnel onsite must report directly to the allocated assembly point;
- Personnel must not leave the assembly point until it has been deemed safe to do so.

9.8.8 Verification and Monitoring

The EHS Manager has been tasked with the responsibility for auditing the project and implementation of emergency response procedures associated with all phases of the project. The execution of disaster response drills will include the following:

- Fire Drills;
- Flooding Drills;
- Medical Drills; and
- Emergency Evacuation Drills.

Reporting and monitoring requirements for the DMP will include:

- Monthly inspections and audits;
- Quarterly report of accidents/incidents;
- Reporting at the time of any incidents;
- Bi-annual disaster response drills; and
- Annual reporting on trainings.

Disaster response drills and reporting maintained by the EHS Managers will provide information regarding required revisions to training or the disaster response actions. Each incident reported will be reviewed and investigated upon occurring. Actions will be identified where possible to improve the site's overall response to disasters.

9.8.9 Training

All employees and contractors will be trained in disaster response procedures within one month of their start-date. The EHS Manager shall distribute the DMP (together with the associated Evacuation Plan) to all parties in charge of ensuring the plans implementation. All relevant information in the DMP shall be communicated to employees and contractors. This information shall include information on potential emergency risks/threats, appropriate first person response/contact to incidents/emergencies and notification procedures.

All site personnel, including contractors, are to be trained in the appropriate responses for possible disasters. The training is mandatory and is to be conducted on a regular basis. The frequency and timing of training is to take place at least quarterly.

Awareness programs for community should also be arranged to apprise them about the potential emergencies that can arise in construction and operation phase.

Training is to include, but not limited to the following:

- Firefighting;
- First Aid;
- Emergency Evacuation; and
- Medical Emergencies.

9.9 Environment and Social Management Plan (ESMP) Review and Amendments

The ESMP shall be reviewed half yearly to address changes in the project design, life cycle processes and activities, organisation and regulatory requirements. Subsequently, the revised ESMP will be shared with respective Module Developers for its further implementation on yearly basis.

9.10 Inspections, Monitoring and Audit

The on-site team of Module Developer should implement the ESMP as per mitigation measures provided for identified environmental and social impacts. This ESMP will have to be monitored on a regular basis, half-yearly and all outcomes would need to be audited.

Inspection and monitoring of the environmental and social impacts of construction and operation phase activities will increase the effectiveness of suggested mitigations. The monitoring process will cover all stakeholders

including contractors, labourers, suppliers and the local community impacted by the project activities and associated facilities. Through the process of inspection, audit, and monitoring each Module Developer shall ensure that all the contractors comply with the requirements of conditions for all applicable permits including suggested action plans. The inspections and audits shall be done by RUMSL team and external agencies/experts. The entire process of inspections and audits will be documented. The inspection and audit findings will be implemented by the contractors in their respective areas.

9.11 Reporting and Review

Reporting is the process of measuring actual performance or how well the mitigation measures have been implemented, including the format, timing and responsibility for reporting of the monitoring results. This needs to be undertaken in form of environmental, health, safety and social check list, incident record register, environmental, health, safety and social performance reports. RUMSL shall develop and implement a programme of reporting through all stages of the project construction and commissioning, operation and decommissioning.

9.11.1 External Reporting and Communication

All complaints and enquiries are to be appropriately dealt with and records be maintained in a Complaint/Enquiry Register by Admin Officer of the Developer.

9.11.2 Internal Reporting and Communication

Inspection and audit observations along with their improvement program are to be regularly reported to the senior management for their consideration. The same are also to be communicated within the staff working on the project. To maintain open communication between the staff and management on EHS&S issues the following shall be used:

- Team Briefings,
- Tool Box Talks;
- On-site work group meetings;
- Key Incidents/accidents and lessons learnt
- Work Specific Instructions; and
- Meeting with stakeholders.

9.12 Documentation and Record keeping

The Developers are required to establish documentation and record keeping system to ensure updating and recording of requirements specified in ESMP. Responsibilities have to be assigned to relevant personnel for ensuring that the ESMP documentation system is maintained and that document control is ensured through access by and distribution to identified personnel in form of the following:

- Legal Register with compliance for proposed project;
- Operation control procedures for each activity starting from site clearing and vehicle movement;
- Work instructions and Trainings like Tool box, usage of PPEs;
- Incident and Accident reports;
- Emergency preparedness and response procedures with contact numbers;
- Training records for both aspects (Environment and Social);

- Monitoring reports;
- Auditing reports; and
- Complaints register and issues attended/closed from Grievance Boxes.

All the documents mentioned above will be reviewed on a six monthly basis.

9.13 Proposed Environment and Social Management Monitoring Plan

Table 9-10 details out the proposed environment and social management monitoring plan that has been developed for the project. In addition, **Anexxure IX** details out the environment code of practices and social exclusion list that needs to be followed during various stages such as planning, construction and operation & maintenance phases of the project. **RUMSL** has the major responsibility of procurement of land and facilitation of clearances required from government bodies, district administration and Gram Panchayats. RUMSL would provide necessary clearances to provide water to the Project Developer/s. It will also undertake additional water assessment studies and will make it available to the Project Developer/s in the Data Room. The 220/33kV substations and 220kV transmission lines from the individual 250MW Unit to the PGCIL 400/220kV substation will be developed and owned by RUMSL.

Table 9-10: Proposed Environment and Social Management Monitoring Plan

Environment/ Social Attribute	Aspect, Potential impact/ Land Use	Specific Actions/ Mitigation Measures	Responsibility for ensuring implementation of mitigation measures	Verification of Mitigation Measure	Budget Allocation per module of 250MW (Capital)	Budget Allocation (Recurring on annual basis)	Main Responsibility
Construction Phase							
Land Use	Change to industrial land use Past land use as Firing Range	- Clearing activities will be kept to a minimum (PV panel and road footprint). - If rains are expected, activities will be put on hold to reduce the risk of erosion.	EPC Developer for each module of 250 MW EHS Manager and Safety Officer of the Developer	Visual inspection	--	--	Developer will take the Site Clearance Activities RUMSL will facilitate NOCs from Gram Panchayat for setting up of the project.
Loss of top soil, Compaction and Erosion	Contamination of Soil Dispersal of contaminants	- The removal of vegetation and soil cover will be restricted to only those areas necessary for the development. In particular, the unnecessary removal of groundcover vegetation from slopes will be prevented, especially on steep slopes. - The area to be cleared must be clearly demarcated and this footprint strictly maintained; - Soil conservation measures	EPC Developer for each module EHS Manager and Safety Officer of the Developer	Visual inspection	5,00,000	--	All the soil conservation measures will be undertaken by Developer. RUMSL will obtain hazardous waste management authorization from MPPCB

Environment/ Social Attribute	Aspect, Potential impact/ Land Use	Specific Actions/ Mitigation Measures	Responsibility for ensuring implementation of mitigation measures	Verification of Mitigation Measure	Budget Allocation per module of 250MW (Capital)	Budget Allocation (Recurring on annual basis)	Main Responsibility
		will be implemented such as stockpiling topsoil or gravel for the remediation of disturbed areas. • Stockpiles will be vegetated or appropriately covered to reduce soil loss as a result of wind or water erosion. • Work areas will be clearly defined and where necessary demarcated to avoid unnecessary disturbance of areas outside the development footprint. • Fuel, lubricating oil and used oil storage areas will be contained in bunds of 110 percent capacity of the stored material. • Spill containment and clean up kits will be available onsite and clean-up from any spill will be appropriately contained and disposed of. • Construction vehicles and equipment will be serviced					

Environment/ Social Attribute	Aspect, Potential impact/ Land Use	Specific Actions/ Mitigation Measures	Responsibility for ensuring implementation of mitigation measures	Verification of Mitigation Measure	Budget Allocationper module of 250MW (Capital)	Budget Allocation (Recurring on annual basis)	Main Responsibility
		regularly and off site. • Construction vehicles will remain on designated and prepared compacted gravel roads; • It is recommended to grow turf grass beneath solar panels to avoid soil erosion; • Storm water drains will be developed across the substation in all four directions to contain the run off and avoid it to reach NH-75; • Proper bunds are required to be created within the construction foot print of the proposed substation at Ramnagar and all the ponds lying in the catchment areas of Nallah will remain intact by provision of diversion berms or dykes around them; • Module Developers are recommended to follow					

Environment/ Social Attribute	Aspect, Potential impact/ Land Use	Specific Actions/ Mitigation Measures	Responsibility for ensuring implementation of mitigation measures	Verification of Mitigation Measure	Budget Allocation per module of 250MW (Capital)	Budget Allocation (Recurring on annual basis)	Main Responsibility
		environment codes on site preparation and installation of solar panels as provided in Annexure IX .					
Surface Hydrology and Drainage Pattern	Increased erosion and sediment load impounding of local depressions	Since, the site area drains from north-east to south-west with slopes of around 2%, substantial runoff will be generated during extreme events. The runoff generated during the extreme rainfall events coupled with debris and sediments would acquire sufficient momentum force to damage the project assets if installed within	EPC Developer for each module EHS Manager and Safety Officer of the Developer	Visual Inspection and maintaining records	5,00,000	2,00,000 (for monitoring)	All the conservation measures to avoid impact on drainage channels will be undertaken by Developer.

Environment/ Social Attribute	Aspect, Potential Impact/ Land Use	Specific Actions/ Mitigation Measures	Responsibility for ensuring implementation of mitigation measures	Verification of Mitigation Measure	Budget Allocation per module of 250MW (Capital)	Budget Allocation (Recurring on annual basis)	Main Responsibility
		the drainage features such as Naalas. - The project proponent should avoid installing the project assets within the site drainage features such as Nallahs and drainage channels over the site. - All the local depressions within the site should be surveyed and extent of these local depressions should be analysed and marked. - These local depressions would be prone to ponding in an event of rainfall. These areas should either be avoided for asset installations or filled up and levelled. - All the main drainage channels should be cleaned periodically especially (monthly) before monsoons to ensure sufficient conveyance capacity is maintained so, that ponding of water does					

Environment/ Social Attribute	Aspect, Potential Impact/ Land Use	Specific Actions/ Mitigation Measures	Responsibility for ensuring implementation of mitigation measures	Verification of Mitigation Measure	Budget Allocation per module of 250MW (Capital)	Budget Allocation (Recurring on annual basis)	Main Responsibility
		not occur and shall be retained. • Drainage lines or hydraulic corridors identified traversing the Site will remain intact by provision of diversion berms or dykes around them. • During clearing of area, the surfaces of all steep slopes will be deepened to retain water and increase infiltration. During construction of three proposed substations by RUMSL and Grid substation by PGCIL following measures will be implemented to mitigate the potential effects associated with drainage of tracks and Watercourse Crossings: • Access tracks will be kept as free as possible from excessive mud and silt deposits; • Drainage ditches on the upslope side of the site					The 220/33kV substations and 220kV transmission lines from the individual 250MW Unit to the PGCIL 400/220kV substation will be developed and owned by RUMSL. All the measures pertaining to construction of substation will be undertaken by RUMSL

Environment/ Social Attribute	Aspect, Potential impact/ Land Use	Specific Actions/ Mitigation Measures	Responsibility for ensuring implementation of mitigation measures	Verification of Mitigation Measure	Budget Allocationper module of 250MW (Capital)	Budget Allocation (Recurring on annual basis)	Main Responsibility
		tracks will prevent runoff from flowing over the tracks and causing erosion; • Treatment of bunds and embankments adjacent to the track will reduce the rate and volume of runoff and minimise potential for erosion; • Drainage arrangements will be subject to routine inspection to ensure their efficacy and any accumulations of silt will be removed.					
Surface and Ground Water Quality	Improper sewage disposal from labour colonies Prevelnace of construction debris at site	• Module Developer shall inform all site staff to make use of supplied ablution facilities (toilets) and under no circumstances shall indiscriminate sanitary activities be allowed other than in supplied facilities. • The drainage pattern of the site will not be altered and the natural slope of the site will be maintained;	EPC Developer for each module EHS Manager and Safety Officer of the Developer	Internal audits and maintaining of records	Toilets installation cost will be part of financial disclosure by Bidder	--	Labour camps will be established by the Developer. All the measures pertaining to storm water management will be undertaken by Developer. NOC from CGWA will be

Environment/ Social Attribute	Aspect, Potential impact/ Land Use	Specific Actions/ Mitigation Measures	Responsibility for ensuring implementation of mitigation measures	Verification of Mitigation Measure	Budget Allocation per module of 250MW (Capital)	Budget Allocation (Recurring on annual basis)	Main Responsibility
		- Adequate arrangement for storm water management during construction period will be made to avoid sediment runoff from the site. - The removal of vegetation and soil cover will be restricted to only those areas necessary for the development. - In particular, the unnecessary removal of groundcover vegetation from slopes will be prevented, especially on steep slopes					undertaken by RUMSL NOC from Gram Panchayat will be obtained by RUMSL
Soil and Liquid Waste Generation, Storage and disposal	Prevalence of unhygienic conditions	- The construction contractor shall ensure that the campsites provided at site have adequate waste disposal facilities. - Arrangements for collection of garbage in dustbins and daily disposal to the nearest dumpsite shall be made.	EPC Developer for each module EHS Manager and Safety Officer of the Developer	Visual Inspection and maintaining records for hazardous waste generation	Campsite and toilets installation cost will be part of financial disclosure by Bidder	--	Installation of septic tanks and soak pits will be done by Developer.

Environment/ Social Attribute	Aspect, Potential impact/ Land Use	Specific Actions/ Mitigation Measures	Responsibility for ensuring implementation of mitigation measures	Verification of Mitigation Measure	Budget Allocation per module of 250MW (Capital)	Budget Allocation (Recurring on annual basis)	Main Responsibility
		- Provision of segregated toilets for male and female workers (if any) in the ratio of 1:15 and 1:10 (toilet to workers). - Washing and bathing areas will be provided with proper drainage system so that wastewater is not accumulated in the campsites. - Disposal of sewage shall be made through a septic tank – soak pit arrangement.					
Ecology	Removal of natural vegetation cover Fragmentation of existing faunal habitat	- Conserve the current land-use of as much of the project area as possible. - Native species of trees, shrubs and herbs can maintain the vegetation in the area. - Construction activities that require high levels of illumination be restricted to daylight hours to prevent disruption of the natural light period by artificial lighting.	EPC Developer for each module EHS Manager and Safety Officer of the Developer	Visual Inspections	2,00,000	--	Maintenance of vegetation and illuminations will be done by Developer

Environment/ Social Attribute	Aspect, Potential impact/ Land Use	Specific Actions/ Mitigation Measures	Responsibility for ensuring implementation of mitigation measures	Verification of Mitigation Measure	Budget Allocationper module of 250MW (Capital)	Budget Allocation (Recurring on annual basis)	Main Responsibility
Traffic and Transport	Increased risk of traffic related accidents and injuries to community and to workers	- Only trained drivers with valid license shall be recruited by the construction contractor. - Training programs shall be conducted at regular intervals for all the drivers for raising awareness about road safety and adopting best transport and traffic safety procedures once in every six months. - Regular maintenance of vehicles and use of manufacturer approved parts should be adopted - A schedule for movement of solar panels shall be formulated by the respective Developers of Modules which will be shared by RUMSL. - The villagers will be made aware about the schedule prior to the movement of trucks and transportation of solar panels in the project area.	EPC Developer for each module EHS Manager and Safety Officer of the Developer	Awareness among drivers, training records Minutes of Meetings held with villagers to apprise them regarding traffic movement	--	--	Traffic and transport management will be done the Developer

Environment/ Social Attribute	Aspect, Potential Impact/ Land Use	Specific Actions/ Mitigation Measures	Responsibility for ensuring implementation of mitigation measures	Verification of Mitigation Measure	Budget Allocation per module of 250MW (Capital)	Budget Allocation (Recurring on annual basis)	Main Responsibility
Ambient Air Quality	Dust Generation	- Sprinkling of water is to be carried out. - All stock piles are covered and storage areas provided with enclosures to minimize dust from open area source. - Stock piling and storage of construction material will be oriented after considering the predominant wind direction. - Vehicles engaged for the project will be required to obtain "Pollution under Control" (PUC) certificates. - Sufficient stack height needs to be provided to D.G. sets as per CPCB norms.	EPC Developer for each module EHS Manager and Safety Officer of the Developer	Visual inspection and PUC certificates	3,00,000	--	All the mitigation measures pertaining to air quality will be undertaken by the Developer RUMSL will obtain Consent to Establish for the project
Noise and Vibration	Potential disturbance to habitations	The hours of operation for specific pieces of equipment or operations, especially mobile sources operating through community areas should be limited.	EPC Developer for each module EHS Manager and Safety Officer of the Developer	Visual inspections and internal audits	5,00,000	1,00,000	All the noise abatement measures will be undertaken by the Developer.

Environment/ Social Attribute	Aspect, Potential impact/ Land Use	Specific Actions/ Mitigation Measures	Responsibility for ensuring implementation of mitigation measures	Verification of Mitigation Measure	Budget Allocation per module of 250MW (Capital)	Budget Allocation (Recurring on annual basis)	Main Responsibility
		- All loud and sudden noises will be avoided wherever possible and fixed noise sources shall be located at least 50m away from the site boundary. - Rubber padding/noise isolators will be used for construction equipment/machinery. - Temporary noise barriers shall be provided surrounding the high noise generating construction equipment. The personnel involved in high noise generating activities shall be provided with personal protective devices to minimize their exposure to high noise levels. - Construction vehicles and machinery will be well maintained and not kept idling when not in use.					
Occupational Health and Safety	Safety and Health Risks	Formulate a site specific Emergency Preparedness and Response Procedure	EPC Developer for each module EHS Manager and	Internal Audits and records	To be included in Financial bidding by the Module Developer	--	All the measures will be undertaken by the Developer

Environment/ Social Attribute	Aspect, Potential Impact/ Land Use	Specific Actions/ Mitigation Measures	Responsibility for ensuring implementation of mitigation measures	Verification of Mitigation Measure	Budget Allocation per module of 250MW (Capital)	Budget Allocation (Recurring on annual basis)	Main Responsibility
		- Adequate training is provided to staff of the Developers about raising awareness for use of Personal Protection Equipment (PPE) and emergency response measures. - Administrative controls into work processes such as job rotation, rest and stretch breaks etc. to reduce overexertion - Good housekeeping at the construction site is maintained to avoid slips and falls. - Dropping/lowering of construction material or tool will be restricted and undertaken only under strict supervision, if required. - PPEs such as safety glasses with side shields, face shields, hard hats and safety shoes shall be mandatory at construction site. Ear plugs shall be	Safety Officer of the Developer				

Environment/ Social Attribute	Aspect, Potential impact/ Land Use	Specific Actions/ Mitigation Measures	Responsibility for ensuring implementation of mitigation measures	Verification of Mitigation Measure	Budget Allocationper module of 250MW (Capital)	Budget Allocation (Recurring on annual basis)	Main Responsibility
		provided for workers placed at high noise areas.					
Socio-Economic Conditions	Loss of Land	The project affected households would receive payments based on the Collector Guideline Rate plus one time solatium once the entire land acquisition is completed phase wise	RUMSL	Records of Compensation provided	Inbuilt in Project cost	--	RUMSL holds the responsibility of disbursement of payment to the project affected people.
	Loss of livelihood	There has been no loss of livelihood for the project affected households due to the unproductive nature of the land.	RUMSL	Payments based on the Collector Guideline Rate	Inbuilt in Project cost	--	RUMSL holds the responsibility of disbursement of payment to the project affected people.
	Migrant Labour and Contract Engagement	- The Developer shall ensure engagement of local population as workforce in the construction activity, as far as possible. - The Developer through the contractor agreement (of the developers) shall ensure that the construction contractors commit and adhere to social obligations including community relations,	EPC Developer for each module Admin Officer of the Developer	Consultation with Labours. Internal audits to assess regulatory compliance. Medical records and awareness programmes. Employment records of labours	Inbuilt in Project cost	--	Developer will ensure the engagement of local labour.

Environment/ Social Attribute	Aspect, Potential impact/ Land Use	Specific Actions/ Mitigation Measures	Responsibility for ensuring implementation of mitigation measures	Verification of Mitigation Measure	Budget Allocationper module of 250MW (Capital)	Budget Allocation (Recurring on annual basis)	Main Responsibility
		handling complaints and grievances, adherence to labour laws and international commitments etc. The contractor shall provide adequate information to workers on expected social behaviour and hygiene practices to be followed at site.		Construction phase accident and incident records			
	Cumulative labour at site	- Developers should assess the location of labour camp, that it should not be constructed in immediate vicinity of any drainage channel; - It should be ensured that the labour camp (onsite) should have basic amenities such as electricity, drinking water, health & sanitation facility, kitchen and rest room; - All tanks used for the storage of drinking water are constructed and covered as to prevent water stored therein from	EPC Developer for each module Admin Officer of the Developer	Details of labour camps and associated facilities provided	Inbuilt in Project cost	--	Each Developer of module will ensure least disturbance to community due to presence of migrant workers onsite

Environment/ Social Attribute	Aspect, Potential Impact/ Land Use	Specific Actions/ Mitigation Measures	Responsibility for ensuring implementation of mitigation measures	Verification of Mitigation Measure	Budget Allocation per module of 250MW (Capital)	Budget Allocation (Recurring on annual basis)	Main Responsibility
		becoming polluted or contaminated and all the migrant workers will be instructed accordingly; - Employers should ensure that accommodation which is provided is not overcrowded and does not pose a risk to the health and safety of workers; - The labour camp will be equipped with septic tanks and soak pits and avoid presence of stagnant water is a factor of proliferation of potential disease vectors such as mosquitoes; - Developers should ensure that the disruption of local communities is minimum, in particular local communities' transport infrastructures and if required limit the workers movements in near by areas; - Security staff have a clear mandate and					

Environment/ Social Attribute	Aspect, Potential impact/ Land Use	Specific Actions/ Mitigation Measures	Responsibility for ensuring implementation of mitigation measures	Verification of Mitigation Measure	Budget Allocationper module of 250MW (Capital)	Budget Allocation (Recurring on annual basis)	Main Responsibility
		have received clear instruction about their duties and responsibilities, in particular their duties not to harass, intimidate, discipline or discriminate against workers; • Developers should ensure that workers and members of the surrounding communities have specific means to raise concerns about security arrangement and staff; • Where possible, an adequate transport system to surrounding communities will be provided. It is good practice to provide workers with free transportation to and from local communities.					

Environment/ Social Attribute	Aspect, Potential impact/ Land Use	Specific Actions/ Mitigation Measures	Responsibility for ensuring implementation of mitigation measures	Verification of Mitigation Measure	Budget Allocation per module of 250MW (Capital)	Budget Allocation (Recurring on annual basis)	Main Responsibility
	Labour Camp	- The water usage amongst the labourers shall be monitored and controlled to minimize generation of wastewater. - The Developer shall ensure that no child or forced labour is engaged by contractors and all wage payments are done without any discriminations or delays by the contractors. - The Developer to ensure that adequate sanitation and waste disposal facility shall be provided at project site. - The Developer to ensure possible sourcing of construction labour from the local region to the extent possible. - The Developer to ensure local contracting and vendor opportunities as far as possible. - The Developer should	EPC Developer for each module Admin Officer of the Developer	Consultation with Labours. Visual inspection of labour camp	To be included in Financial bidding by the Module Developer	--	

Environment/ Social Attribute	Aspect, Potential impact/ Land Use	Specific Actions/ Mitigation Measures	Responsibility for ensuring implementation of mitigation measures	Verification of Mitigation Measure	Budget Allocation per module of 250MW (Capital)	Budget Allocation (Recurring on annual basis)	Main Responsibility
		undertake medical test of the contract workers prior to engagement to identify any communicable disease.					
Operation Phase							
Aesthetic and Visual Impact	Visual intrusion	- The solar panels will be installed at a low height and will be kept closer to the ground. - The panels will be arranged in a systematic manner which will give an aesthetic sense to it.	EPC Developer for each module EHS Manager and Safety Officer of the Developer	Internal Audits and records	--	--	Developers will hold the responsibility of placement of solar panels.
Soil Quality	Runoff from PV panels Broken Solar Panels	- Disturbance to soil from repair and maintenance activity will be limited and will ensure proper restoration of soil wherever excavation is undertaken. - Developers shall explore the option of buyback agreements for defunct panels and for replacement and disposal of transformer oil by the supplier, otherwise,	EPC Developer for each module EHS Manager and Safety Officer of the Developer	Internal Audits and records	In built cost quoted by Module Developer	3,00,000 (for periodic waste management)	Developer will be responsible for storage areas of hazardous waste and tie ups with authorized vendors of MPPCB. RUMSL will obtain Consent to Operate and Authorization of Hazardous waste generation from

Environment/ Social Attribute	Aspect, Potential impact/ Land Use	Specific Actions/ Mitigation Measures	Responsibility for ensuring implementation of mitigation measures	Verification of Mitigation Measure	Budget Allocation per module of 250MW (Capital)	Budget Allocation (Recurring on annual basis)	Main Responsibility
		arrangements shall be made for disposal of defunct panels and waste oil by MPPCB authorized recyclers. Fuel and used oil storage areas will be contained in bunds of 110 capacity of the stored material. Waste Management Plan needs to be followed and complied.					MPPCB.
Surface and Ground water Quality	availability of the groundwater resources	- Meters shall be installed at the borewells to monitor the abstraction of water. - The plant site will be provided with adequate drainage facility to drain off wash wastewater and prevent any water-logging at site or in the surroundings. - Wastage of water during cleaning of panels shall be avoided. - The site office shall be provided with sewage line and the collected sewage	EPC Developer for each module EHS Manager and Safety Officer of the Developer	Visual inspection and records of reading of bore well	In built cost quoted by Module Developer	2,00,000 (for monitoring and maintainance of septic tank and soak pit)	Developer will ensure timely compliance with mitigation measures RUMSL will obtain NOC from CGWA

Environment/ Social Attribute	Aspect, Potential impact/ Land Use	Specific Actions/ Mitigation Measures	Responsibility for ensuring implementation of mitigation measures	Verification of Mitigation Measure	Budget Allocation per module of 250MW (Capital)	Budget Allocation (Recurring on annual basis)	Main Responsibility
		shall be channelized to a septic tank with soak pit arrangement. Water efficient cleaning methods should be applied for cleaning of modules like utilization of dust broom, brush trolley etc.					
Ecology	Usage of Herbicides	- The Developer shall ensure sprinkling of water to control dust in and around the solar panel area. - The Developers shall ensure that there is no usage of herbicide to control weeds in the solar panel area.	EPC Developer for each module EHS Manager and Safety Officer of the Developer	Visual inspections	3,00,000	--	Developer will ensure compliance.
Health and Safety	Electromagnetic Fields	- Workers handling electricity and related components will be provided with shock resistant gloves, shoes and other protective gears. - Adequate training regarding health and safety will be provided to the workers. - The switchyard building	EPC Developer for each module EHS Manager and Safety Officer of the Developer	Internal audits, meeting with technicians and other staff. Records verifications	5,00,000	--	Developer will take Permission for laying power evacuation lines by chief electrical inspector. Inspection and charging approval for the electrical system from the concerned

Environment/ Social Attribute	Aspect, Potential impact/ Land Use	Specific Actions/ Mitigation Measures	Responsibility for ensuring implementation of mitigation measures	Verification of Mitigation Measure	Budget Allocation per module of 250MW (Capital)	Budget Allocation (Recurring on annual basis)	Main Responsibility
		will be provided with fire extinguishers and sand buckets at all strategic locations to deal with any incident of fire. • Safety incidents will be recorded and monitored with an aim that numbers are never significant, and gradually reduce. • Occupational Health and Safety Plan as detailed in ESIA report is required to be followed.					Electrical Inspectorate for the electrical system is the responsibility of Developer
Disaster Management and Compliance with EPRP Framework	Risk of damage due to fire , natural disaster	• Fire Prevention Measures and Systems • Signage • Fire Detection & Alarm System • Fire Fighting System and devices • Evacuation Plan • Monitoring of tank provided for storage of High Speed Diesel Fuel. • Natural Disaster • Earthquake • Emergency Plan	EPC Developer for each module EHS Manager and Safety Officer of the Developer	Training, Drills and workshops	In built cost quoted by Module Developer	In built cost quoted by Module Developer	Developer will ensure the allocation of responsibilities as per DMP

Environment/ Social Attribute	Aspect, Potential impact/ Land Use	Specific Actions/ Mitigation Measures	Responsibility for ensuring implementation of mitigation measures	Verification of Mitigation Measure	Budget Allocationper module of 250MW (Capital)	Budget Allocation (Recurring on annual basis)	Main Responsibility
		Floods					
Susbtation and Proposed Transmission Lines	Unchecked growth of tall trees Electrocutation from direct contact with high-voltage electricity Occupational Hazards Bird Collisions through electrocution	Community Health and Safety - Right of Way (Row) for the transmission to be selected depending on the characteristics of existing vegetation, topographic features, and installed height of the transmission lines; - Regular maintenance of vegetation within the rights-of-way is necessary to avoid disruption to overhead power lines and towers; - Proper signs and barriers (e.g. locks on doors, use of gates, use of steel posts surrounding transmission towers, particularly in urban areas), and education / public outreach to prevent public contact with potentially dangerous equipment should be installed near Grid and Pooling Sub-Station;	RUMSL	Internal audits, meeting with technicians and other staff. Records verifications	5,00,000	2,00,000	RUMSL has the responsibility of construction of three substations and internal transmission lines. All the mitigation measures pertaining to its construction will be abide by RUMSL

Environment/ Social Attribute	Aspect, Potential Impact/ Land Use	Specific Actions/ Mitigation Measures	Responsibility for ensuring implementation of mitigation measures	Verification of Mitigation Measure	Budget Allocation per module of 250MW (Capital)	Budget Allocation (Recurring on annual basis)	Main Responsibility
		Occupational Health and Safety - The layout of the substation should optimise the use of space while still complying with all relevant building codes and standards. A safe working space should be provided around the substation for the operation and maintenance staff; - An earth mat is required to be provided to obtain safe step/touch potentials and earth system faults. Earth mats should be installed prior to setting the foundation. Lightning protection should be considered to alleviate the effect of lightning strikes on equipment and buildings present in the Grid Substation and Pooling substation; - An alarm system fitted to the Grid Sub-Station gate and the medium voltage					

Environment/ Social Attribute	Aspect, Potential Impact/ Land Use	Specific Actions/ Mitigation Measures	Responsibility for ensuring implementation of mitigation measures	Verification of Mitigation Measure	Budget Allocation per module of 250MW (Capital)	Budget Allocation (Recurring on annual basis)	Main Responsibility
		station, metering station and to any portable cabins; and • A trench is required to be constructed as a means for easing the routing of power and data cables to the substation; • Consider installation of visibility enhancement objects such as marker balls, bird deterrents, or diverters on transmission lines in sufficient number; • The storage area of oils required for cooling of transformer should also have a roof to prevent precipitation from collecting in the storage area. •					
Socio- Economic Conditions	Enhanced Economic Opportunities and Local Area Development Activities	• The Developer should wherever possible engage locals for unskilled jobs. • As part of the Local Area Development activities that would be undertaken	EPC Developer for each module Admin Officer of the Developer	Progress of Local Area Development activities and records of grievances received from workers and community.	In built in project cost	--	Developer will ensure compliance

Environment/ Social Attribute	Aspect, Potential impact/ Land Use	Specific Actions/ Mitigation Measures	Responsibility for ensuring implementation of mitigation measures	Verification of Mitigation Measure	Budget Allocationper module of 250MW (Capital)	Budget Allocation (Recurring on annual basis)	Main Responsibility
		by the Project Proponent, the project affected families should be provided first preference in any initiatives adopted by the project proponent before catering to the entire community as a whole. • The project proponent shall ensure that the developers while engaging (civil) contractors, sub contractors and vendors during the constructional and operational phase should encourage that agreements on priority basis be made with the local contractors and vendors. • The purpose of developing local area development activities at an early stage of the project cycle is to outline the framework for enhancing the socio-economic status of the communities residing		Follow up on implementation of local area development activities			

Environment/ Social Attribute	Aspect, Potential impact/ Land Use	Specific Actions/ Mitigation Measures	Responsibility for ensuring implementation of mitigation measures	Verification of Mitigation Measure	Budget Allocation per module of 250MW (Capital)	Budget Allocation (Recurring on annual basis)	Main Responsibility
		within the vicinity of the project.					
Decommissioning Phase							
Health and Safety	Trip and Fall, electrical hazard	- The Developer shall inform the workers and local community about the duration of work; - The workers shall be clearly informed about the expected schedule and completion of each activity; - A transparent mechanism shall be prepared wherever choice is to be made between individuals of similar capability;	EPC Developer for each module EHS Manager and Safety Officer of the Developer	Vehicle maintenance records, accident records Awareness Programme and community safety	--	--	Developer will ensure compliance
	Waste Generation, disposal of solar panels and impact on drainage channels	- All waste generated from decommissioning phase shall be collected and disposed off at the nearest municipal disposal site; - All necessary Personal Protection Equipment (PPE) shall be used by the workers during demolition work;	EPC Developer for each module EHS Manager and Safety Officer of the Developer	Visual inspection Details of vendors and disposal facility	In builtcost quoted by Module Developer	--	Developer will ensure compliance

Environment/ Social Attribute	Aspect, Potential impact/ Land Use	Specific Actions/ Mitigation Measures	Responsibility for ensuring implementation of mitigation measures	Verification of Mitigation Measure	Budget Allocationper module of 250MW (Capital)	Budget Allocation (Recurring on annual basis)	Main Responsibility
		- Disposal panels will be disposed off to authorized vendor through buy back agreements; - It is to be ensured that dismantling is carried out during non monsoon season and all the drainage channels will keep intact by creating bunds around them. and - The Developer will be committed to ensure that all health and safety measures are in place to prevent accidents and\or reduce the consequences of non-conformance events.					

Table 9-11: Proposed Environment and Social Monitoring Plan

Environment/ Social Attribute	Aspect, Potential impact/ Land Use	Verification of Mitigation Measure	Frequency of monitoring	Reporting Requirements
Construction Phase				
Land Use	Change to industrial land use	Visual inspection of mitigation measures	During Construction phase	Details of construction activities
Loss of top soil, Compaction and Erosion	Contamination of Soil Dispersal of contaminants	Visual inspection and internal audits	Fortnightly	Records of spills and leaks Details of oils contained at site
Surface Hydrology and Drainage Pattern	Increased erosion and sediment load impounding of local depressions	Visual inspection and verification of records maintained	Fortnightly	Records and design drawings
Surface and Ground Water Quality	Increased erosion and sediment load Contamination of water due to waste water	Visual Inspection and maintaining records	Monthly	Details of water extracted from the bore well Records of internal audits of labour camps
Soil and Liquid Waste Generation, Storage and disposal	Prevalence of unhygienic conditions	Visual Inspection and maintaining records for hazardous waste generation	Fortnightly	Details of hazardous waste generated List of approved vendors for disposal of hazardous waste Authorization received from MPPCB
Ecology	Removal of natural vegetation cover Fragmentation of existing faunal habitat	Visual Inspections	Monthly	--
Traffic and Transport	Increased risk of traffic related accidents and injuries to community and	Awareness among drivers, training records Minutes of Meetings	Monthly	Training records of Drivers PUC Certificates of vehicles

Environment/ Social Attribute	Aspect, Potential impact/ Land Use	Verification of Mitigation Measure	Frequency of monitoring	Reporting Requirements
Construction Phase				
	to workers	held with villagers to apprise them regarding traffic movement		Schedule of traffic movement
Ambient Air Quality	Dust Generation	Visual inspection and PUC certificates	Monthly	PUC Certificates and details sprinkling schedule
Noise and Vibration	Potential disturbance to habitations	Visual inspections and internal audits	Monthly	List of PPE provided. Details of construction equipments coming at the site
Occupational Health and Safety	Safety and Health Risks	Internal Audits and records	Monthly	On site and Off site emergency procedures Details of PPE used. Details of firefighting equipment Training records
Socio-Economic Conditions	Migrant and Contract Labour Engagement	Consultation with Labours. Internal audits to assess regulatory compliance. Medical records and awareness programmes. Employment records of labours Construction phase accident and incident records	Monthly	Records of facilities provided to the labour Details of grievance received from labours Monitor contractor/supervisors for compliance on labour laws Maintaining records of health check-ups and trainings conducted. Monthly internal records of incidents and accidents with follow up corrective and preventive action
	Labour Camp	Consultation with Labours.	fortnightly	Records of facilities provided to the labour

Environment/ Social Attribute	Aspect, Potential impact/ Land Use	Verification of Mitigation Measure	Frequency of monitoring	Reporting Requirements
Construction Phase				
		Visual inspection of labour camp		
Operation Phase				
Aesthetic and Visual Impact	Visual intrusion	Internal Audits and records	Once in six months	Details of boundary walls Records of grievance reported regarding visual intrusion
Soil Quality	Runoff from PV panels Broken Solar Panels	Internal Audits and records	quarterly	Hazardous waste records and permits and its compliance Details of broken solar panels
Surface and Ground water Quality	availability of the groundwater resources	Visual inspection and records of reading of bore well	Monthly	Details of rain water harvesting system Weekly meter reading of bore wells. Records of grievance
Ecology	Usage of Herbicides	Visual inspections	Monthly	Training records of cleaning staff in this regard.
Health and Safety	Electromagnetic Fields	Internal audits, meeting with technicians and other staff. Records verifications	Monthly	Details of PPEs, Work permit systems Onsite Emergency Plan with contact numbers Safe Assembly zones Details of firefighting systems And first aid provisions Incident and Accident Records
Disaster Management	Risk of damage due	Details of Fire Extinguishers and	Quarterly	Incident and Accident Records

Environment/ Social Attribute	Aspect, Potential impact/ Land Use	Verification of Mitigation Measure	Frequency of monitoring	Reporting Requirements
Construction Phase				
	to fire , natural disaster	other emergency preparedness plan		
Substation and Proposed Transmission Lines	Unchecked growth of tall trees Electrocution from direct contact with high-voltage electricity Occupational Hazards Bird Collisions through electrocution	Details of route of transmission lines Survey of transmission lines and construction and operation of substation during internal and external audits	Monthly	Internal
Socio-Economic Conditions	Enhanced Economic Opportunities and Local Area Development Activities	Progress of Local Area Development activities and records of grievances received from workers and community. Follow up on implementation of local area development activities	Once in Three months	Details of persons provided with skill development and employment Records of Grievances received Details of local area development activities
Grievance Redress Mechanism	Grievances lodged by employees, workers and community	Grievance records Filled forms and grievance Register	Once in a year	Records of Grievance reported Root cause Analysis
Decommissioning Phase				
Health and Safety	Trip and Fall, electrical hazard	Vehicle maintenance records, accident records Awareness Programme and community safety	During Decommissioning phase	Maintaining records of training and awareness programmes Records of Grievances
	Waste Generation	Visual inspection Details of vendors and disposal facility	During Decommissioning phase	Details of waste generated and its disposal mechanism

10. CONCLUSION AND CATEGORISATION OF THE PROJECT

The Environmental and Social Assessment study for the proposed 750 MW solar power project in Rewa district of Madhya Pradesh has been undertaken in accordance with the World Bank Operational Policies (OP 4.01 and others as applicable), IFC's Performance Standards and World Bank's Environment Health and Safety (EHS) Guidelines.

The ESA study aimed to identify and evaluate potential environmental impacts associated with all aspects of the proposed project. The conclusion and recommendations of this study are result of on-site inspections, the evaluation of impacts identified by specialists, and the process of stakeholder consultation.

The impacts due to the project is minimal, site specific and has reversible impacts on the micro environment of the project site owing to the construction activities and procurement of most of government revenue land for project development.

The project is assessed to generate limited environmental and social impacts owing to construction related activity which will not extend beyond Solar PV Foot Prints, procurement of 90% of Government Revenue Land for project development, water resource requirement and movement of traffic. Mitigation measures for potential impacts on various environmental and socio-economics have been specified through:

- Follow up of best practice of compensation, stakeholder engagement, and grievance management;
- Planning & designing of Solar Power plant, site preparation and access route, construction, drainage, traffic movement etc.;
- Application of standards for Health and Safety; and
- Clearances and permits required for each sub activity

The proposed Environmental and Social Management Plan describe implementation mechanism for recommended mitigation measures together with monitoring to verify overall project performance. The implementation of the mitigation measures including monitoring schedule will provide a basis for ensuring that the potential positive and negative impacts associated with the establishment of the Power Plant are taken care off. This ESA study together with mitigation measures and follow up of recommendations on management actions will help RUMSL and the module Developers in complying with the environmental standards and meet the IFC performance standards.

The Project is a renewable energy project which uses solar energy for power generation. Renewable energy projects are considered to be cleaner compared to fossil fuel based energy projects. In accordance to the screening criteria of World Bank and IFC, AECOM has categorized Project as **Category B**, which specifies that the project can cause potential and limited adverse social or environmental impacts which are generally site-specific, largely reversible and readily addressed through mitigation measures.

The rationale for categorisation being:

- The potential environmental impacts on surface and groundwater due to a change in drainage network on the site and potential spills of contaminants is assessed to be of negligible significance;
- Only 10% of private land is required for the proposed project which would be acquired through Madhya Pradesh's Consent of Land Purchase Policy, 2014 and payment will be provided to the land owners based on Collection Guideline Rate and one time solatium;

- The project will bring positive impacts through the creation of direct employment and training opportunities which will induce economic benefits;
- The duration and extent of construction activities will also be limited; thereby resulting in minimal environmental and social impacts;
- Village road will not be used for movement of project components and access to the roads will not be restricted during construction and operation phase of the project; and
- Any adverse environmental and social impacts may be readily addressed through mitigation measures as outlined in the Environmental and Social Management Plan (ESMP).

ANNEXURE I

Record on Transfer of Government Revenue Land for the Project

ESA Study for Rewa Solar Power Project,
Madhya Pradesh, India

Rewa Ultra Mega Solar Limited (RUMSL)

January 2016

32/अ-19/मूल/2013-2014

न्यायालय कलेक्टर, जिला रीवा (म०प्र०)

प्रकरण क्रमांक 32/अ-19/मूल/2013-2014



म०प्र० शासन,

नवीन एवं नवकरणीय ऊर्जा विभाग भोपाल.....आवेदक.

बनाम

शासन म०प्र०

अनावेदक

आ दे श:

(पारित दिनांक 13 जून, 2014)

आवेदक म०प्र० नवीन एवं नवकरणीय ऊर्जा विभाग द्वारा कार्यालयीन पत्र क्रमांक एनआईई/सोलर/2012/115 भोपाल दिनांक 20.12.2012 द्वारा म०प्र० शासन की सौर ऊर्जा नीति 2012 के निहित प्रावधानों के अन्तर्गत सौर संयंत्र स्थापना हेतु मेसर्स साई प्रकाश पावर इंडिया लिमिटेड के लिये ग्राम बदवार तहसील गुड जिला रीवा में 100 मेगावाट हेतु 275 हेक्टेयर भूमि की मांग की गई है। उक्त भूमि नवीन एवं नवकरणीय ऊर्जा विभाग को शीघ्र आवंटित करने का अनुरोध किया।

2. अनुविभागीय अधिकारी एवं तहसीलदार तहसील गुड जिला रीवा से प्रश्नाधीन भूमि के संबंध में प्रतिवेदन प्राप्त किया गया। अनुविभागीय अधिकारी तहसील गुड की अनुशंसा एवं तहसीलदार के प्रतिवेदन एवं प्रकरण में संलग्न अभिलेखों के आधार पर तहसीलदार तहसील गुड जिला रीवा ने प्रकरण में प्रश्नाधीन भूमि के संबंध में आम इशतहार जारी कर स्थानीय दैनिक समाचार पत्र नव स्वदेश दैनिक भास्कर में भी इशतहार का प्रकाशन कराया जाकर ग्राम पंचायत बदवार जनपद पंचायत रायपुरकुर्छु जिला रीवा से ग्राम सभा का प्रस्ताव एवं सहमति प्राप्त किया गया। ग्राम पंचायत बदवार द्वारा प्रश्नाधीन भूमि को सौर ऊर्जा संयंत्र स्थापना हेतु सहमति दी गई है। तहसीलदार तहसील गुड जिला रीवा ने प्रस्तुत प्रतिवेदन दिनांक 21.02.2013 द्वारा प्रतिवेदित किया है कि निस्तार पत्रक को छोड़कर ग्राम बदवार तहसील गुड जिला रीवा की शासकीय राजस्व भूमि ग्राम बदवार की भूमि खसरा नम्बर 6326, 6327, 6380, 6337, 6340, 5

6342, 6343, 6348, 6351, 6353, 6355, 6369, 6370, 6371, 6379, 6380, 6386, 6389, 6392, 14
6398, 6400, 6401, 6412, 6420, 6429, 6430, 6431, 6441, 6442, 6449, 6801, 6802, 12
6811, 6814, 6815, 6818, 6820, 6821, 6832, 6853, 6854, 6872, 6873, 6874, 6878, 12
6893, 6894, 6895, 6976, 6901, 6902, 6924, 6928, 6929, 6930, 6931, 6937, 6941, 13
6943, 6946, 6947, 6951, 6969, 6974, 6975, 6984, 6990, 6992, 7000, 7001, 7003, 7006, 14
7007, 7008, 7009, 7010, 7013, 7015, 7016, 7017, 7018, 7019, 7031, 7032, कमरा: रकबा 12
0.069, 3.165, 0.227, 11.675, 0.761, 0.102, 1.289, 0.898, 2.861, 0.486, 0.983, 0.283, 1.
408, 2.924, 0.490, 2.136, 5.856, 3.861, 0.555, 1.179, 0.121, 0.198, 2.719, 0.158, 3.549,
6.495, 0.206, 1.469, 0.202, 1.732, 2.233, 0.510, 13.972, 0.547, 0.239, 0.121, 0.154, 0.
182, 0.295, 1.210, 1.011, 0.502, 0.020, 2.424, 0.494, 4.132, 4.735, 2.812, 0.482, 1.615,
1.157, 0.583, 0.692, 1.400, 0.101, 3.193, 0.749, 1.088, 4.945, 0.388, 0.020, 5.050, 9.389,
3.569, 0.073, 0.065, 0.425, 0.664, 9.427, 15.000, 1.263, 3.000, 0.263, 23.502, 0.433, 0.
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150, 0.008, 0.202, 34.460, 24.105, 11.878, 17.129, 3.000, 1.500 हेक्टेयर कुल किता 85 रकबा 275.109 हेक्टेयर शासकीय राजस्व भूमि सार्वजनिक निस्तार भूमि से पृथक है जिसे सौर ऊर्जा संयंत्र स्थापित किये जाने हेतु आवंटन किया जाना उचित प्रतीत होता है। सौर ऊर्जा संयंत्र स्थापित किये जाने हेतु प्रस्तावित क्षेत्र से हवाई पट्टी, हवाई अड्डा 45 कि.मी. दूर है। रेलमार्ग 40 कि.मी. दूर है। मुख्य सड़क मार्ग राष्ट्रीय राजमार्ग क्रमांक 75 प्रस्तावित क्षेत्र है। 1/2 कि.मी. दूर है। देवदह नाला प्रस्तावित क्षेत्र के दूसरी भाग से बहता है।

3. महाप्रबंधक जिला व्यापार एवं उद्योग केंद्र रीवा के पत्र क्रमांक जि.व्या.उ.के. रीवा अधोसंवि/2012/400 रीवा दिनांक 29.01.2013 द्वारा आपत्ति की गई है कि ग्राम बरसैता पहाड़, इटार पहाड़, बदवार, रामनगर पहाड़ एवं बरसैता की कुल 1381.781 हेक्टेयर शासकीय भूमि आद्योगिक प्रयोजन हेतु उद्योग विभाग को हस्ताक्षर हेतु कार्यालयीन पत्र क्रमांक 245/रामोशा/2010 रीवा दिनांक 11 जनवरी 2010 एवं कमिश्नर रीवा द्वारा अपने पत्र क्रमांक राजस्व/4/3/एक-3/10/2882 रीवा दिनांक 31.05.2010 द्वारा प्रमुख सचिव राजस्व को भेजा गया। अतः यह भूमि में 0 साई प्रकाश पावर इण्डिया लिमिटेड के पक्ष में हस्तांतरण करने पर आपत्ति दर्ज कराई गई।

चूंकि नवीन एवं नवकरणीय ऊर्जा विभाग के द्वारा 100 मेगावाट प्लाट डालने की योजना बना ली गई है और उद्योग विभाग के पास इस तरह की कोई योजना नहीं है। अतः दोनों विभागों में से नवीन एवं नवकरणीय ऊर्जा विभाग को प्राथमिकता दी जायगी जिसके पास उद्योग स्थापित करने की योजना है।

4. अनुविभागीय अधिकारी एवं तहसीलदार तहसील गुढ के प्रस्तावानुसार कार्यालयीन पत्र क्रमांक 123/रीडर/2013 दिनांक 09.04.2013 द्वारा कमिश्नर रीवा सम्भाग रीवा के माध्यम से उनके पत्र क्रमांक रा0 4/3/एफ-90/2013/2219 रीवा दिनांक 27.04.2013 द्वारा प्रमुख सचिव म0प्र0 शासन राजस्व विभाग मंत्रालय बल्लभ भवन भोपाल को ग्राम बदवार की भूमि रकबा 275.109 हेक्टेयर भूमि नवीन एवं नवकरणीय ऊर्जा विभाग को आवंटित किये जाने का प्रस्ताव अनुशासा सहित अग्रप्रेषित किया गया।

5. म0प्र0 शासन राजस्व विभाग मंत्रालय बल्लभ भवन भोपाल द्वारा कार्यालयीन पत्र क्रमांक एफ-59/2013/सात/2-ए भोपाल दिनांक 25.03.2014 के माध्यम से मूल प्रकरण वापिस कर लेख किया गया है कि राजस्व विभाग द्वारा राजस्व पुस्तक पं० पत्र खण्ड चार क्रमांक-1 के अन्तर्गत चहुमुखी विकास के लिये निजी पूजी निवेश के मामले में सरकारी दखल रहित भूमि के आवंटन के संबंध में दिनांक 30 मई 2013 को परिपत्र जारी किया गया था उक्त परिपत्र की कण्डिका 3(4) में दिनांक 04.03.2014 को पुनः कतिपय संशोधन जारी किया गया है जिसमें नवीन एवं नवकरणीय ऊर्जा विभाग के भूमि आवंटन संबंधी प्रकरण को इसके दायरे से बाहर रखा गया है उक्त नियम के अन्तर्गत आवश्यक कार्यवाही करने का कष्ट करे।

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6. म0प्र0 शासन नवीन एवं नवकरणीय ऊर्जा विभाग मंत्रालय भोपाल के ज्ञाप क्रमांक एफ-3-36/2013/सात भोपाल दिनांक 2014 द्वारा मेसर्स साई प्रकाश पावर इण्डिया लि. द्वारा ग्राम बदवार तहसील गुड जिला सीवा में 100 मेगावाट क्षमता के सौर संयंत्र स्थापित करने हेतु कुल 275 हेक्टेयर राजस्व भूमि नवीन एवं नवकरणीय ऊर्जा विभाग को आवंटित करने का अनुरोध किया गया है। राजस्व विभाग द्वारा जारी परिपत्र क्रमांक एफ 16-14/2013/सात/2ए के अनुसार विकासक को भूमि उपयोग की अनुमति परियोजना विकास हेतु अनबंध के आधार पर दी जानी है। उक्त राजस्व भूमि म0प्र0 सौर ऊर्जा नीति 2012 एवं राजस्व विभाग द्वारा जारी परिपत्र क्रमांक एफ 16-14/2013/सात2ए दिनांक 04.03.2014 में निहित प्रावधानों के अन्तर्गत नवीन एवं नवकरणीय ऊर्जा विभाग को आवंटित करने का कष्ट करे।
7. अपर मुख्य सचिव म0प्र0 शासन नवीन एवं नवकरणीय ऊर्जा विभाग भोपाल के अर्द्धशासकीय पत्र क्रमांक 753/2014/60 भोपाल दिनांक 05.06.2014 में उल्लेखित प्रावधानों के अनुसार राजस्व विभाग के परिपत्र दिनांक 30.05.2013 के अनुसार विभागीय परियोजनाओं (पवन ऊर्जा, सौर ऊर्जा, बायोमास आधारित परियोजना एवं लघु जल आधारित परियोजना) की स्थापना हेतु राजस्व विभाग के उक्त परिपत्र के अनुसार भूमि आवंटन संबंधी प्रस्ताव जिलों को प्रेषित किये गये हैं। मन्त्रि-परिषद् के आदेश अनुसार दिनांक 04.03.2014 को राजस्व विभाग द्वारा परिपत्र दिनांक 30.05.2013 में संशोधन कर दिया गया था तथा अब राजस्व भूमि का आवंटन हस्तांतरण विकासक के स्थान पर नवीन एवं नवकरणीय ऊर्जा विभाग को किया जाना है। उक्त आवंटित/हस्तांतरित राजस्व भूमि अनुबंध के आधार पर उपयोग हेतु विकासक को दी जावेगी। अतः नवीन एवं नवकरणीय ऊर्जा विभाग से प्रेषित किये गये भूमि आवंटन के प्रस्ताव राजस्व विभाग के संशोधित परिपत्र दिनांक 04.03.2014 के अनुसार भूमि आवंटन संबंधी आदेश त्वरित प्रसारित करना सुनिश्चित करे।
8. प्रकरण राजस्व विभाग से प्राप्त होने पर अनुविभागीय अधिकारी तहसील गुड से कार्यालयीन पत्र क्रमांक 355/रीडर कले/2014 सीवा दिनांक 29.04.2014 एवं कार्यालयीन पत्र क्रमांक 405/रीडर कले/2014 सीवा दिनांक 27.05.2014 द्वारा विस्तृत प्रतिवेदन एवं वर्ष 2014-2015 की गाइड लाइन के अनुसार प्रस्तावित रकवा का दर सिंचित व असिंचित निर्धारण करते हुए वस्तुस्थिति का प्रतिवेदन मगाया गया। अनुविभागीय अधिकारी तहसील गुड जिला सीवा ने प्रतिवेदन दिनांक 31.05.2014 द्वारा उप पंजीयक सीवा के प्रतिवेदन अनुसार वर्ष 2014-2015 के गाइड लाइन के अनुसार प्रस्तावित भूमि का कुल रकवा 275.109 हेक्टेयर के असिंचित की दर से 6,90,000.00 के मान से 18,98,25,210.00 तथा सिंचित की दर से 12,42,000.00 रुपये की दर से प्रति हेक्टेयर की मान से 275.109 हेक्टेयर का कुल मूल्य 34,16,85,378.00 रुपये होती है, जो सौर ऊर्जा संयंत्र स्थापना हेतु नवीन एवं नवकरणीय ऊर्जा विभाग को हस्तान्तरित करने की अनुशंसा की गई है।
9. सचिव म0प्र0 शासन राजस्व विभाग मंत्रालय बल्लभ भवन के पत्र क्रमांक एफ 6-7/2013/सात/2बी भोपाल दिनांक 13 फरवरी 2013 राजस्व पुस्तक परिपत्र खण्ड चार क्रमांक एक की वर्तमान कण्डिका 36 के स्थान पर नई कण्डिका 36 प्रतिस्थापित की गई है। "6(एक)

कृ०प०३०

ऐसे सभी मामलों में जिनमें राज्य शासन के किसी विभाग को भूमि आवश्यकता है ऐसे विभाग का विभागाध्यक्ष कलेक्टर को अपनी आवश्यकता प्रतिपादित करते हुए भूमि हस्तांतरण के लिए कलेक्टर को आवेदन करेगा और कलेक्टर स्थायी पट्टों के मामलों में अपनाई जाने वाली कार्य प्रणाली अपनाएगा अर्थात् स्थानीय निकायों मुख्य नगर निवेशक, अन्य शासकीय विभागों से परामर्श करेगा। विभाग की योजना के लिए भूमि का न्यूनतम आवश्यकता क्षेत्र का आकलन किया जाएगा। ऐसे आकलन के समय इस बात का भी ध्यान रखा जाएगा कि यथासम्भव भूमि का उपयोग क्षितिजीय रूप में कम से कम और उर्ध्वाधर रूप में अधिक से अधिक किया जा सके इस प्रकार आकलन करते हुए मामला उसी प्रकार तैयार किया जाएगा जिस प्रकार कि स्थायी पट्टों के मामले तैयार किए जाते हैं। इस प्रकार तैयार किए गए मामले में यदि ऐसी भूमि रक्षित भू-खण्ड का कोई भाग नहीं है तो कलेक्टर आवेदक विभाग/विभागाध्यक्ष को भूमि हस्तांतरण कर सकेगा। परन्तु सम्भागीय मुख्यालयों में भूमि का ऐसा हस्तांतरण सम्भागायुक्त के अनुमोदन से तथा राजपधारी परियोजना क्षेत्र भोपाल तथा इन्दौर जबलपुर ग्वालियर एवं उज्जैन के विकास योजना क्षेत्र मास्टर प्लान एरिया में राज्य शासन के अनुमोदन से किया जाएगा।

म0प्र0 शासन राजस्व विभाग मंत्रालय बल्लभ भवन भोपाल के कार्यालयीन पत्र क्रमांक एफ-16-14/2013/सात/2-ए भोपाल दिनांक 04.03.2014 द्वारा लेख किया गया है कि राज्य सरकार एतद द्वारा राजस्व पुस्तक परिपत्र खण्ड चार क्रमांक-1 के अन्तर्गत चहुमुखी विकास के लिये निजी पूंजी निवेश के मामलों में सरकारी दखल रहित भूमि के आवंटन के लिए जारी समसंख्या नीति दिनांक 30.05.2013 की कण्डिका 3(4) के स्थान पर उक्त नीति परिपत्र की संशोधित कण्डिका 3(4) में दर्शाया गया है कि "इस प्रकार मध्यप्रदेश राज्य औद्योगिक भूमि एवं औद्योगिक भवन प्रबंधन नियम 2008 के अन्तर्गत औद्योगिक विकास केन्द्रों के भीतर तथा बाहर वाणिज्य, उद्योग एवं रोजगार विभाग द्वारा और सूचना प्रौद्योगिकी पार्क (आई.टी. पार्क) में स्थित शासकीय भूमि को सूचना प्रौद्योगिकी विभाग के परिपत्र क्रमांक एफ 7-8/2012/56 दिनांक 23 मार्च 2013 के अन्तर्गत सूचना प्रौद्योगिकी विभाग द्वारा निवेशकों को भूमि आवंटन के मामलों तथा नवकरणीय ऊर्जा विभाग की अनुमोदित नीतियों के अन्तर्गत विकास को परियोजना विकास हेतु पूर्ण पारदर्शिता अपनाते हुए नवीन एवं नवकरणीय ऊर्जा विभाग द्वारा उनके विभाग को आवंटित भूमि के उपयोग की अनुमति अनुबध के आधार पर देने के मामलों को छोड़कर राज्य की विभिन्न नीतियों के अन्तर्गत दी जाने वाली सुविधाओं के अनुक्रम में भूमि आवंटन के लिए इस परिपत्र के द्वारा प्रक्रिया विहित की जाती है।"

10. म0प्र0 शासन राजस्व विभाग मंत्रालय बल्लभ भवन भोपाल के पत्र क्रमांक एफ-6-7/2013/सात/2बी भोपाल दिनांक 13 फरवरी 2013 एवं राजस्व विभाग के परिपत्र क्रमांक एफ 16-14/2013/सात/2ए दिनांक 04.03.2014 के प्रशवधानों के तहत अनुविभागीय अधिकारी एवं तहसीलदार तहसील गुड के प्रतिवेदनो एवं अनुशंसा के आधार पर ग्राम बदवार की भूमि खसरा नम्बर 6326, 6327, 6389, 6337, 6340, 6342, 6343, 6348, 6351, 6353, 6355, 6369, 6370, 6371, 6379, 6380, 6386, 6389, 6392, 6398, 6400, 6401, 6412, 6420, 6429, 6430, 6431, 6441, 6442, 6449, 6801, 6802, 6811, 6814, 6815, 6818, 6820, 6821,



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6832, 6853, 6854, 6872, 6873, 6874, 6878, 6893, 6894, 6895, 6970, 6901, 6902, 6924, 6928, 6929, 6930, 6931, 6937, 6941, 6943, 6946, 6947, 6951, 6969, 6974, 6975, 6984, 6990, 6992, 7000, 7001, 7003, 7006, 7007, 7008, 7009, 7010, 7013, 7015, 7016, 7017, 7018, 7019, 7031, 7032 क्रमशः रकबा 0.069, 3.165, 0.227, 11.675, 0.761, 0.102, 1.289, 0.898, 2.861, 0.486, 0.983, 0.283, 1.408, 2.924, 0.490, 2.136, 5.856, 3.861, 0.555, 1.179, 0.121, 0.198, 2.719, 0.158, 3.549, 6.495, 0.206, 1.469, 0.202, 1.732, 2.233, 0.510, 13.972, 0.547, 0.239, 0.121, 0.154, 0.182, 0.295, 1.210, 1.011, 0.502, 0.020, 2.424, 0.494, 4.132, 4.735, 2.812, 0.482, 1.615, 1.157, 0.583, 0.692, 1.400, 0.101, 3.193, 0.749, 1.088, 4.945, 0.388, 0.020, 5.050, 9.389, 3.569, 0.073, 0.065, 0.425, 0.664, 9.427, 15.000, 1.263, 3.000, 0.263, 23.502, 0.433, 0.150, 0.008, 0.202, 34.460, 24.105, 11.878, 17.129, 3.000, 1.500 हेक्टेयर कुल किता 85 रकबा 275.109 हेक्टेयर भूमि म0प्र0 शासन नवीन एवं नवकरणीय ऊर्जा विभाग को राज्य में सौर परियोजना स्थापित करने हेतु निम्न शर्तों के साथ हस्तांतरित की जाती है:-

1. उक्त शासकीय भूमि राजस्व अभिलेख (खसरे) में म0प्र0 शासन ही अंकित रहेगी किन्तु खसरे के कोफियत कालम में नवीन एवं नवकरणीय ऊर्जा विभाग को उक्त आदेश क्रमांक एवं दिनांक का उल्लेख करते हुए दर्ज की जाय।
2. नवीन एवं नवकरणीय ऊर्जा विभाग यह सुनिश्चित करेगा कि परियोजना के लिये आवश्यक न्यूनतम शासकीय भूमि के उपयोग की ही अनुमति शासन के नियमों एवं नीति के तहत दें।
3. उक्त भूमि का उपयोग प्रस्तावित परियोजना एवं उसके सीधे अनुषांगिक प्रयोजन के अतिरिक्त अन्य किसी प्रयोजन के लिये नहीं किया जावेगा।
4. उक्त भूमि का वर्णित प्रयोजनो के लिये उपयोग न होने अथवा अन्य प्रयोजन होने अथवा प्रयोजन बन्द हो जाने की स्थिति में भूमि स्वयमेव ही शासन (राजस्व विभाग) में निहित हो जावेगी।
5. ग्राम वासियों के निस्तार में कोई अवरोध उत्पन्न नहीं किया जाय।

13-6-14
(एस0एन0 रूपला)

कलेक्टर
जिला रेवा (म0प्र0)
Distt. Rewa (M.P.)

न्यायालय कलेक्टर, जिला रीवा (म0प्र0)

प्रकरण क्रमांक 28/अ-19/मूल/2014-2015



म0प्र0 शासन,

नवीन एवं नवकरणीय ऊर्जा विभाग भोपाल.....

आवेदक

बनाम

शासन म0प्र0.....

अनावेदक

:आ दे श:

(पारित दिनांक 17 जुलाई, 2015)

आवेदक कार्यपालन यंत्री जिला अक्षय ऊर्जा अधिकारी रीवा का पत्र क्रमांक ऊ.विनि./रीवा/2015/346 दिनांक 16.03.2015 द्वारा लेख किया है कि आल्ट्रा मेगा सोलर पावर परियोजना गुड जिला रीवा हेतु ग्राम बदवार, इटार पहाड़, बरसैता देश एवं बरसैता पहाड़ के कुल खसरा नम्बर 446 में कुल भूमि 1232.697 हेक्टेयर भूमि को नवीन एवं नवकरणीय ऊर्जा विभाग के नाम करने हेतु हस्तान्तरण की मांग की गई है।

2. आवेदक का उक्त पत्र तहसीलदार तहसील गुड जिला रीवा की ओर कार्यालयीन पत्र क्रमांक 131/प्रवा.कले./2015 रीवा दिनांक 20 मार्च 2015 द्वारा भेजकर विधि अनुसार कार्यवाही पूर्ण कर विस्तृत प्रतिवेदन हेतु लेख किया गया। तहसीलदार तहसील गुड जिला रीवा ने न्यायालयीन प्रकरण क्रमांक 02/अ-19/2014-2015 प्रतिवेदन दिनांक 15.07.2015 अनुविभागीय अधिकारी तहसील गुड की अनुशंसा सहित प्रस्तुत किया। तहसीलदार तहसील गुड ने प्रस्तुत प्रतिवेदन दिनांक 15.07.2015 द्वारा प्रतिवेदित किया है कि ग्राम बदवार तहसील गुड जिला रीवा की शासकीय भूमि खसरा क्रमांक 6141, 6145, 6149, 6152, 6157, 6158, 6176, 6180, 6181, 6194, 6196, 6204, 6206, 6209, 6210, 6211, 6214, 6218, 6219, 6224, 6226, 6227, 6228, 6231, 6233, 6236, 6237, 6244, 6245, 6247, 6249, 6252, 6253, 6256, 6258, 6260, 6261, 6262, 6263, 6267, 6270, 6275, 6277, 6278, 6279, 6282, 6319, 6323, 6336, 6434, 6435, 6439, 6450, 6451, 6458, 6459, 6460, 6461, 6462, 6470, 6471, 6475, 6477, 6492, 6493, 6497, 6500, 6504, 6541, 6551, 6555, 6558, 6560, 6561, 6564, 6565, 6572, 6573, 6575, 6578, 6585, 6586, 6592, 6593, 6594, 6596, 6597, 6598, 6600, 6601, 6605, 6609, 6610, 6611, 6615, 6619, 6621, 6622, 6623, 6624, 6625, 6626, 6627, 6632, 6634, 6635, 6636, 6645, 6654, 6656, 6659, 6660, 6661, 6672, 6677, 6685, 6696, 6701, 6702, 6800, 6810, क्रमशः रकवा 0.454, 1.143, 2.319, 0.101, 2.104, 2.570, 2.051, 0.963, 10.041, 0.065, 0.065, 0.214, 3.023, 1.048, 4.590, 0.162, 0.146, 0.004, 0.725, 0.478, 3.153, 5.208, 2.934, 3.027, 0.854, 3.476, 6.556, 0.311, 5.552, 1.740, 0.089, 0.841, 0.458, 0.174, 0.093, 0.146, 0.454, 0.069, 1.623, 2.618, 7.184, 0.089, 0.113, 3.468, 7.256, 3.035, 8.377, 3.403, 0.466, 0.619, 0.073, 0.463, 0.971, 1.927, 0.356, 0.539, 0.214, 0.267, 0.158, 0.328, 10.368, 1.651, 1.999, 0.441, 0.206, 0.575, 0.159, 19.980, 7.467, 4.614, 0.603, 1.003, 1.684, 0.279, 0.825, 0.134, 8.481, 0.105, 0.065, 0.012, 0.364, 4.022, 0.989, 1.291, 4.590, 0.316, 4.784, 6.827, 1.011, 3.368, 0.801, 2.533, 0.097, 1.736, 0.450, 1.901, 0.559, 1.870, 0.324, 1.396, 0.644, 0.486, 1.469, 0.283, 1.267, 0.324, 0.741, 0.198, 3.941, 0.417, 4.205, 12.634, 0.174, 17.572, 0.077, 11.999, 5.467, 6.063, 4.618, 0.040, 11.809 कुल किता 121 रकवा 295.256 हेक्टेयर का आम कृ०प०उ०

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प्रकरण क्रमांक 28 / अ-19 / मूल / 2014



इशतहार प्रकाशन कराया गया। कोई आपत्ति नहीं आयी। ग्राम पंचायत बदवार से अनापत्ति प्रमाण पत्र प्राप्त किया गया। ग्राम पंचायत को भूमि देने में कोई आपत्ति नहीं है। ग्राम का मूल खसरा लिया गया जो म0प्र0 शासन पटपर चट्टान दर्ज अभिलेख है। पटवारी प्रतिवेदन के आधार पर भूमि वन विभाग की सीमा में नहीं है। पूर्व में आवंटित भूमि रकबा 251.923 हेक्टेयर एवं आवंटित होने वाली भूमि रकबा 295.256 हेक्टेयर कुल रकबा 547.179 हेक्टेयर का गाईड लाईन 2015-2016 के अनुसार बाजार मूल्य 37,75,53,510.00 (सैंतीस करोड़ पचहत्तर लाख तिरपन हजार पांच सौ दस रुपये) होता है। प्रश्नाधीन भूमि नवीन एवं नवकरणी ऊर्जा विभाग को आवंटन करने की अनुशंसा की गई है।

3. वन मण्डलाधिकारी वन मण्डल रीवा ने कार्यालयीन पत्र क्रमांक मा.चि./4925 रीवा दिनांक 15.07.2015 द्वारा प्रतिवेदित किया है कि ग्राम बदवार, बरसैता देश, बरसैता पहाड़, इटार पहाड़ रामनगर पहाड़ की संलग्न इशतहार प्रति में अंकित भूमि आल्ट्रा मेगा सोलर पावर परियोजना के आवंटन हेतु उप वनमण्डलाधिकारी रीवा के द्वारा खसरो का स्थल सत्यापन कर जांच कराई गई। उक्त क्षेत्र वन सीमा से बाहर होने के कारण ग्राम बदवार का राजस्व क्षेत्र 547.381 हेक्टेयर ग्राम बरसैता पहाड़ का राजस्व क्षेत्र 24.545 हेक्टेयर, ग्राम रामनगर पहाड़ का राजस्व क्षेत्र 173.760 हेक्टेयर ग्राम बरसैता देश का राजस्व क्षेत्र 367.630 हेक्टेयर तथा ग्राम इटार पहाड़ का राजस्व क्षेत्र 119.384 हेक्टेयर भूमि औद्योगिक प्रयोजन हेतु उद्योग स्थापित होने पर वनमार्ग का उपयोग नहीं किया जावेगा, राजस्व क्षेत्र के चारो ओर लगे वनक्षेत्र में 10 मीटर चौड़ी पट्टी में प्लांटेशन कराया जाय, वनक्षेत्र के किनारे किसी प्रकार का श्रमिक कैम्प नहीं लगाया जायेगा।, उक्त भूमि पूर्व में चारो तरफ की वनभूमि के साथ फील्ड फायरिंग रेंज हेतु प्रस्तावित व विचाराधीन रही है। वनक्षेत्र के बैकल्पिक वृक्षारोपण राशि 3,07,10,157.00 (तीन करोड़ सात लाख दस हजार एक सौ सन्तावन रुपये मात्र) भारत सरकार सेना द्वारा जमा कराया गया है। यदि उक्त राजस्व क्षेत्र उनके मांग अनुसार अनुपयुक्त/अनुपलब्ध है तो यह राजस्व भूमि अट्रामेगा सोलर पावर परियोजना को देने में वन विभाग को कोई आपत्ति नहीं है। तथा संयुक्त संचालक नगर तथा ग्राम निवेश रीवा के पत्र क्रमांक 364/नग्रानि/तक./2015 रीवा दिनांक 17.07.2015 द्वारा अनापत्ति प्रमाण पत्र पेश किया गया है।

4. सचिव म0प्र0 शासन राजस्व विभाग मंत्रालय बल्लभ भवन के पत्र क्रमांक एफ 6-7/2013/सात/2बी भोपाल दिनांक 13 फरवरी 2013 राजस्व पुस्तक परिपत्र खण्ड चार क्रमांक एक की वर्तमान कण्डिका 36 के स्थान पर नई कण्डिका 36 प्रतिस्थापित की गई है। "6(एक) ऐसे सभी मामलों में जिनमें राज्य शासन के किसी विभाग को भूमि आवश्यकता है ऐसे विभाग का विभागाध्यक्ष कलेक्टर को अपनी आवश्यकता प्रतिपादित करते हुए भूमि हस्तांतरण के लिए कलेक्टर को आवेदन करेगा और कलेक्टर स्थायी पट्टो के मामलों में अपनाई जाने वाली कार्य प्रणाली अपनाएगा अर्थात् स्थानीय निकायो मुख्य नगर निवेशक, अन्य शासकीय विभागों से परामर्श करेगा। विभाग की योजना के लिए भूमि का न्यूनतम आवश्यकता क्षेत्र का आंकलन किया जाएगा। ऐसे आंकलन के समय इस बात का भी ध्यान रखा जाएगा कि यथासंभव भूमि का उपयोग क्षितिजीय रूप में कम से कम और उर्ध्वाधर रूप में अधिक से अधिक किया जा सके इस प्रकार आंकलन करते हुए मामला उसी प्रकार तैयार किया जाएगा जिस प्रकार कि स्थायी पट्टो के

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प्रकरण क्रमांक 28/अ-19/मूल/2014-2015

मामले तैयार किए जाते हैं। इस प्रकार तैयार किए गए मामले में यदि ऐसी भूमि रक्षित भू-खण्ड का कोई भाग नहीं है तो कलेक्टर आवेदक विभाग/विभागाध्यक्ष को भूमि हस्तांतरण कर सकेगा। परन्तु सम्भागीय मुख्यालयों में भूमि का ऐसा हस्तांतरण सम्भागायुक्त के अनुमोदन से तथा राजपधारी परियोजना क्षेत्र भोपाल तथा इन्दौर जबलपुर, ग्वालियर एवं उज्जैन के विकास योजना क्षेत्र मास्टर प्लान एरिया में राज्य शासन के अनुमोदन से किया जाएगा।

म0प्र0 शासन राजस्व विभाग मंत्रालय बल्लभ भवन भोपाल के कार्यालयीन पत्र क्रमांक एफ-16-14/2013/सात/2-ए भोपाल दिनांक 04.03.2014 द्वारा लेख किया गया है कि राज्य सरकार एतद द्वारा राजस्व पुस्तक परिपत्र खण्ड चार क्रमांक-1 के अन्तर्गत चहुमुखी विकास के लिये निजी पूंजी निवेश के मामले में सरकारी दखल रहित भूमि के आवंटन के लिए जारी समसंख्या नीति दिनांक 30.05.2013 की कण्डिका 3(4) के स्थान पर उक्त नीति परिपत्र की संशोधित कण्डिका 3(4) में दर्शाया गया है कि "इस प्रकार मध्यप्रदेश राज्य औद्योगिक भूमि एवं औद्योगिक भवन प्रबंधन नियम 2008 के अन्तर्गत औद्योगिक विकास केन्द्रों के भीतर तथा बाहर वाणिज्य, उद्योग एवं रोजगार विभाग द्वारा और सूचना प्रौद्योगिकी पार्क (आई.टी. पार्क) में स्थित शासकीय भूमि को सूचना प्रौद्योगिकी विभाग के परिपत्र क्रमांक एफ 7-8/2012/56 दिनांक 23 मार्च 2013 के अन्तर्गत सूचना प्रौद्योगिकी विभाग द्वारा निवेशको को भूमि आवंटन के मामले तथा नवकरणीय ऊर्जा विभाग की अनुमोदित नीतियों के अन्तर्गत विकास को परियोजना विकास हेतु पूर्ण पारदर्शिता अपनाते हुए नवीन एवं नवकरणीय ऊर्जा विभाग द्वारा उनके विभाग को आवंटित भूमि के उपयोग की अनुमति अनुबंध के आधार पर देने के मामले को छोड़कर राज्य की विभिन्न नीतियों के अन्तर्गत दी जाने वाली सुविधाओं के अनुक्रम में भूमि आवंटन के लिए इस परिपत्र के द्वारा प्रक्रिया विहित की जाती है।"

5. म0प्र0 शासन राजस्व विभाग मंत्रालय बल्लभ भवन भोपाल के पत्र क्रमांक एफ-6-7/2013/सात/2बी भोपाल दिनांक 13 फरवरी 2013 एवं राजस्व विभाग के परिपत्र क्रमांक एफ 16-14/2013/सात/2ए दिनांक 04.03.2014 के प्रावधानों के तहत अनुविभागीय अधिकारी एवं तहसीलदार तहसील गुड के प्रतिवेदनो एवं अनुशंसा के आधार पर कण्डिका 2 में अंकित ग्राम बदवार की भूमि कुल किता 121 रकवा 314.584 हेक्टेयर में से 295.256 हेक्टेयर भूमि म0प्र0 शासन नवीन एवं नवकरणीय ऊर्जा विभाग को राज्य में सौर परियोजना स्थापित करने हेतु निम्न शर्तों के साथ हस्तांतरित की जाती है:-

1. उक्त शासकीय भूमि राजस्व अभिलेख (खसरे) में म0प्र0 शासन ही अंकित रहेगी किन्तु खसरे के केफियत कालम में नवीन एवं नवकरणीय ऊर्जा विभाग को उक्त आदेश क्रमांक एवं दिनांक का उल्लेख करते हुए दर्ज की जाय।
2. नवीन एवं नवकरणीय ऊर्जा विभाग यह सुनिश्चित करेगा कि परियोजना के लिये आवश्यक न्यूनतम शासकीय भूमि के उपयोग की ही अनुमति शासन के नियमों एवं नीति के तहत दें।
3. उक्त भूमि का उपयोग प्रस्तावित परियोजना एवं उसके सीधे अनुशांगिक प्रयोजन के अतिरिक्त अन्य किसी प्रयोजन के लिये नहीं किया जावेगा।

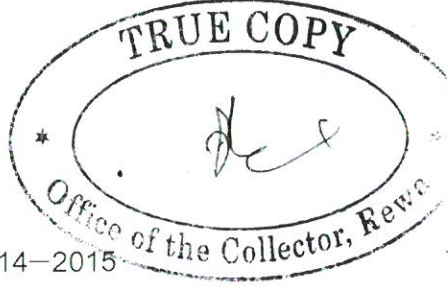
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4. उक्त भूमि का वर्णित प्रयोजनो के लिये उपयोग न होने अथवा अन्य प्रयोजन होने अथवा प्रयोजन बन्द हो जाने की स्थिति में भूमि स्वयमेव ही शासन (राजस्व विभाग) में निहित हो जावेगी।
5. ग्राम वासियो के निस्तार में कोई अवरोध उत्पन्न नहीं किया जाय।



(कै०पी० राही)
जिला राँची (म०प्र०)

पृ०प्र०क० 28 / अ-19 / मूल / 2014-2015

रीवा दिनांक 20 जुलाई 2015

प्रतिलिपि,

1. सचिव, म०प्र० शासन राजस्व विभाग मंत्रालय बल्लभ भवन भोपाल।
- ✓ 2. अपर मुख्य सचिव, म०प्र० शासन नवीन एवं नवकरणीय ऊर्जा विभाग भोपाल।
3. कमिश्नर, रीवा सम्भाग रीवा।
4. कार्यपालन यंत्री जिला अश्रय ऊर्जा अधिकारी, जिला रीवा।
5. अनुविभागीय अधिकारी तहसील गुड जिला रीवा।
6. तहसीलदार तहसील गुड जिला रीवा।

की ओर सूचनार्थ एवं आवश्यक कार्यवाही हेतु।

प्रभासी अधिकारी
न्यायालय कार्यालय, कलेक्टर रीवा (म०प्र०)
जिला रीवा (म.प्र.)

न्यायालय कलेक्टर, जिला रीवा (म0प्र0)

प्रकरण क्रमांक 29/अ-19/मूल/2014-2015

म0प्र0 शासन,

नवीन एवं नवकरणीय ऊर्जा विभाग भोपाल.....आवेदक
बनाम

शासन म0प्र0.....अनावेदक



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(पारित दिनांक 17 जुलाई, 2015)

आवेदक कार्यपालन यंत्री जिला अश्रय ऊर्जा अधिकारी रीवा का पत्र क्रमांक ऊ.विनि.
/रीवा/2015/346 दिनांक 16.03.2015 द्वारा लेख किया है कि आल्ट्रा मेगा सोलर पावर
परियोजना गुड जिला रीवा हेतु ग्राम बदवार, इटार पहाड़, बरसैता देश, रामनगर पहाड़ एवं
बरसैता पहाड़ के कुल खसरा नम्बर 446 में कुल भूमि 1232.697 हेक्टेयर भूमि को नवीन एवं
नवकरणी ऊर्जा विभाग के नाम हस्तान्तरण करने की मांग की गई है।

2. आवेदक का उक्त पत्र तहसीलदार तहसील गुड जिला रीवा की ओर कार्यालयीन पत्र
क्रमांक 131/प्रवा.कले./2015 रीवा दिनांक 20 मार्च 2015 द्वारा भेजकर विधि अनुसार कार्यवाही
पूर्ण कर विस्तृत प्रतिवेदन हेतु लेख किया गया। तहसीलदार तहसील गुड जिला रीवा ने
न्यायालयीन प्रकरण क्रमांक 05/अ-19/2014-2015 प्रतिवेदन दिनांक 15.07.2015 अनुविभागीय
अधिकारी तहसील गुड की अनुशंसा सहित प्रस्तुत किया। तहसीलदार तहसील गुड ने प्रस्तुत
प्रतिवेदन दिनांक 15.07.2015 द्वारा प्रतिवेदित किया है कि प्रकरण में ग्राम रामनगर पहाड़ की भूमि
खसरा क्रमांक 13, 59, 61, 63, 68, 69, 76, 79, 82, 88, 93, 98, 99, 100, 112, 118, 119, 126,
129, 131, 167, 168, 171, 173, 174, 175, 177, 180, 191, 192, 195, 201, 206, 210, 214,
222, 226, 231, 232, 234, 238, 244, 247, 294, 297, 298, 301, 303, 308, 310, 322, 323,
324, 338, 357, 358, 366, 401, 487, 488, 491, 492, 501, 502, 518, 519, 524, 535, 536,
542, 547, 560, 562, 565, 567, 574, 526/583 क्रमशः रकवा 2.230, 6.067, 3.754, 4.100, 1.
798, 0.689, 6.195, 1.829, 2.602, 2.225, 1.596, 1.870, 1.526, 3.726, 5.702, 0.049, 0.845, 0.
519, 2.549, 2.691, 0.053, 2.055, 0.384, 0.020, 0.065, 0.073, 0.121, 0.295, 0.749, 2.699, 4.
630, 1.813, 3.358, 0.097, 5.152, 3.172, 5.192, 0.409, 0.057, 2.315, 2.281, 0.599, 7.549, 1.
141, 0.109, 0.174, 1.015, 0.081, 0.170, 0.837, 4.630, 3.237, 0.704, 3.170, 7.499, 0.162, 3.
004, 1.712, 4.131, 0.045, 0.020, 1.441, 0.364, 8.021, 0.170, 1.515, 1.028, 0.761, 10.854, 9.
195, 2.566, 1.279, 2.383, 1.315, 0.202, 1.235, 3.896 हेक्टेयर कुल किता 77 रकवा 180.430
हेक्टेयर का अंश रकवा 173.760 हेक्टेयर का आम इश्तहार प्रकाशन कराया गया। कोई आपत्ति
नहीं आयी। ग्राम पंचायत बरसैता से अनापत्ति प्रमाण पत्र प्राप्त किया गया। ग्राम पंचायत को भूमि
देने में कोई आपत्ति नहीं है। ग्राम का मूल खसरा लिया गया जो म0प्र0 शासन पटपर चट्टान
दर्ज अभिलेख है। पटवारी प्रतिवेदन के आधार पर भूमि वन विभाग की सीमा में नहीं है। प्रस्तावित
भूमि 173.760 हेक्टेयर के गाईड लाइन 2015.2016 के अनुसार 12,77,11,395.00 (बारह करोड़
सतहत्तर लाख ग्यारह हजार तीन सौ पंचानवे रुपये) मूल्य होता है। प्रश्नाधीन भूमि नवीन एवं
नवकरणी ऊर्जा विभाग को आवंटन करने की अनुशंसा की जाती है।

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प्रकरण क्रमांक 29/अ-19/मूल/2013

3. वन मण्डलाधिकारी वन मण्डल रीवा ने कार्यालयीन पत्र क्रमांक मा.चि./4925 दिनांक 15.07.2015 द्वारा प्रतिवेदित किया है कि ग्राम बदवार, बरसैता देश, बरसैता पहाड़, इट पहाड़ रामनगर पहाड़ की संलग्न इश्तहार प्रति में अंकित भूमि आल्ट्रा मेगा सोलर पावर परियोजना के आवंटन हेतु उप वनमण्डलाधिकारी रीवा के द्वारा खसरो का स्थल सत्यापन कर जांच कराई गई। उक्त क्षेत्र वन सीमा से बाहर होने के कारण ग्राम बदवार का राजस्व क्षेत्र 547.381 हेक्टेयर ग्राम बरसैता पहाड़ का राजस्व क्षेत्र 24.545 हेक्टेयर, ग्राम रामनगर पहाड़ का राजस्व क्षेत्र 173.760 हेक्टेयर ग्राम बरसैता देश का राजस्व क्षेत्र 367.630 हेक्टेयर तथा ग्राम इटार पहाड़ का राजस्व क्षेत्र 119.384 हेक्टेयर भूमि औद्योगिक प्रयोजन हेतु उद्योग सीपित होने पर वनमार्ग का उपयोग नहीं किया जावेगा, राजस्व क्षेत्र के चारो ओर लगे वनक्षेत्र में 10 मीटर चौड़ी पट्टी में प्लांटेशन कराया जाय, वनक्षेत्र के किनारे किसी प्रकार का श्रमिक कैम्प नहीं लगाया जायेगा। उक्त भूमि पूर्व में चारो तरफ की वनभूमि के साथ फील्ड फायरिंग रेंज हेतु प्रस्तावित व विचाराधीन रही है। वनक्षेत्र क बैकल्पिक वृक्षारोपण राशि 3,07,10,157.00 (तीन करोड़ सात लाख दस हजार एक सौ सन्तावन रुपये मात्र) भारत सरकार सेना द्वारा जमा कराया गया है। यदि उक्त राजस्व क्षेत्र उनके मांग अनुसार अनुपयुक्त/अनुपलब्ध है तो यह राजस्व भूमि अट्रामेगा सोलर पावर परियोजना को देने में वन विभाग को कोई आपत्ति नहीं है। तथा संयुक्त संचालक नगर तथा ग्राम निवेश रीवा के पत्र क्रमांक 364/नग्रानि/तक./2015 रीवा दिनांक 17.07.2015 द्वारा अनापत्ति प्रमाण पत्र पेश किया गया है।

4. सचिव म0प्र0 शासन राजस्व विभाग मंत्रालय बल्लभ भवन के पत्र क्रमांक एफ 6-7/2013/सात/2बी भोपाल दिनांक 13 फरवरी 2013 राजस्व पुस्तक परिपत्र खण्ड चार क्रमांक एक की वर्तमान कण्डिका 36 के स्थान पर नई कण्डिका 36 प्रतिस्थापित की गई है। "6(एक) ऐसे सभी मामलों में जिनमें राज्य शासन के किसी विभाग को भूमि आवश्यकता है ऐसे विभाग क विभागाध्यक्ष कलेक्टर को अपनी आवश्यकता प्रतिपादित करते हुए भूमि हस्तांतरण के लिए कलेक्टर को आवेदन करेगा और कलेक्टर स्थायी पट्टो के मामलों में अपनाई जाने वाली कार्य प्रणाली अपनाएगा अर्थात् स्थानीय निकायो मुख्य नगर निवेशक, अन्य शासकीय विभागो से परामर्श करेगा। विभाग की योजना के लिए भूमि का न्यूनतम आवश्यकता क्षेत्र का आंकलन किया जाएगा ऐसे आंकलन के समय इस बात का भी ध्यान रखा जाएगा कि यथासम्भव भूमि का उपयोग क्षितिजीय रूप में कम से कम और उर्ध्वाधर रूप में अधिक से अधिक किया जा सके इस प्रकार आंकलन करते हुए मामला उसी प्रकार तैयार किया जाएगा जिस प्रकार कि स्थायी पट्टो के मामले तैयार किए जाते हैं। इस प्रकार तैयार किए गए मामले में यदि ऐसी भूमि रक्षित भू-खण्ड का कोई भाग नहीं है तो कलेक्टर आवेदक विभाग/विभागाध्यक्ष को भूमि हस्तांतरण कर सकेगा परन्तु सम्भागीय मुख्यालयों में भूमि का ऐसा हस्तांतरण सम्भागायुक्त के अनुमोदन से तथा राजपधारी परियोजना क्षेत्र भोपाल तथा इन्दौर जबलपुर, ग्वालियर एवं उज्जैन के विकास योजना क्षेत्र मास्टर प्लान एरिया में राज्य शासन के अनुमोदन से किया जाएगा।

म0प्र0 शासन राजस्व विभाग मंत्रालय बल्लभ भवन भोपाल के कार्यालयीन पत्र क्रमांक एफ-16-14/ 2013/सात/2-ए भोपाल दिनांक 04.03.2014 द्वारा लेख किया गया है कि राज सरकार एतद द्वारा राजस्व पुस्तक परिपत्र खण्ड चार क्रमांक-1 के अन्तर्गत चहुमुखी विकास लिये निजी पूंजी निवेश के मामलों में सरकारी दखल रहित भूमि के आवंटन के लिए जारी

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प्रकरण क्रमांक २९/अ-१९/मूल/२०१३-२०१४

समसंख्या नीति दिनांक ३०.०५.२०१३ की कण्डिका ३(४) के स्थान पर उक्त नीति परिपत्र की संशोधित कण्डिका ३(४) में दर्शाया गया है कि "इस प्रकार मध्यप्रदेश राज्य औद्योगिक भूमि एवं औद्योगिक भवन प्रबंधन नियम २००८ के अन्तर्गत औद्योगिक विकास केन्द्रों के भीतर तथा बाहर वाणिज्य, उद्योग एवं रोजगार विभाग द्वारा और सूचना प्रौद्योगिकी पार्क (आई.टी. पार्क) में स्थित शासकीय भूमि को सूचना प्रौद्योगिकी विभाग के परिपत्र क्रमांक एफ ७-८/२०१२/५६ दिनांक २३ मार्च २०१३ के अन्तर्गत सूचना प्रौद्योगिकी विभाग द्वारा निवेशकों को भूमि आवंटन के मामले तथा नवकरणीय ऊर्जा विभाग की अनुमोदित नीतियों के अन्तर्गत विकास को परियोजना विकास हेतु पूर्ण पारदर्शिता अपनाते हुए नवीन एवं नवकरणीय ऊर्जा विभाग द्वारा उनके विभाग को आवंटित भूमि के उपयोग की अनुमति अनुबंध के आधार पर देने के मामले को छोड़कर राज्य की विभिन्न नीतियों के अन्तर्गत दी जाने वाली सुविधाओं के अनुक्रम में भूमि आवंटन के लिए इस परिपत्र के द्वारा प्रक्रिया विहित की जाती है।"

५. म०प्र० शासन राजस्व विभाग मंत्रालय बल्लभ भवन भोपाल के पत्र क्रमांक एफ-६-७/२०१३/सात/ २बी भोपाल दिनांक १३ फरवरी २०१३ एवं राजस्व विभाग के परिपत्र क्रमांक एफ १६-१४/२०१३/सात/२ए दिनांक ०४.०३.२०१४ के प्रावधानों के तहत अनुविभागीय अधिकारी एवं तहसीलदार तहसील गुड के प्रतिवेदनो एवं अनुशंसा के आधार पर कालम नम्बर दो में अंकित भूमियां ग्राम रामनगर पहाड़ की कुल किता ७७ रकबा १८०.४३० हेक्टेयर का अंश रकबा १७३.७६० हेक्टेयर भूमि म०प्र० शासन नवीन एवं नवकरणीय ऊर्जा विभाग को राज्य में सौर परियोजना स्थापित करने हेतु निम्न शर्तों के साथ हस्तांतरित की जाती है:-

१. उक्त शासकीय भूमि राजस्व अभिलेख (खसरे) में म०प्र० शासन ही अंकित रहेगी किन्तु खसरे के केफियत कालम में नवीन एवं नवकरणीय ऊर्जा विभाग को उक्त आदेश क्रमांक एवं दिनांक का उल्लेख करते हुए दर्ज की जाय।
२. नवीन एवं नवकरणीय ऊर्जा विभाग यह सुनिश्चित करेगा कि परियोजना के लिये आवश्यक न्यूनतम शासकीय भूमि के उपयोग की ही अनुमति शासन के नियमों एवं नीति के तहत दें।
३. उक्त भूमि का उपयोग प्रस्तावित परियोजना एवं उसके सीधे अनुशांगिक प्रयोजन के अतिरिक्त अन्य किसी प्रयोजन के लिये नहीं किया जावेगा।
४. उक्त भूमि का वर्णित प्रयोजनो के लिये उपयोग न होने अथवा अन्य प्रयोजन होने अथवा प्रयोजन बन्द हो जाने की स्थिति में भूमि स्वयमेव ही शासन (राजस्व विभाग) में निहित हो जावेगी।
५. ग्राम वासियों के निस्तार में कोई अवरोध उत्पन्न नहीं किया जाय।



(के०पी० राही)
कलेक्टर
जिला सीवा (म०प्र०)

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पृ०प्र०क० ३२/अ-१९/मूल/२०१४-२०१५

रीवा दिनांक २० जुलाई २०१५

प्रतिलिपि,

१. सचिव, म०प्र० शासन राजस्व विभाग मंत्रालय बल्लभ भवन भोपाल।
२. अपर मुख्य सचिव, म०प्र० शासन नवीन एवं नवकरणीय ऊर्जा विभाग भोपाल।
३. कमिश्नर, रीवा सम्भाग रीवा।
४. कार्यपालन यंत्री जिला अश्रय ऊर्जा अधिकारी, जिला रीवा।
५. अनुविभागीय अधिकारी तहसील गुढ जिला रीवा।
६. तहसीलदार तहसील गुढ जिला रीवा।

की ओर सूचनार्थ एवं आवश्यक कार्यवाही हेतु।

प्रभारी अधिकारी
न्यायालय कलेक्टर, जिला रीवा (म०प्र०)
जिला रीवा (म.प्र.)

न्यायालय कलेक्टर, जिला रीवा (म0प्र0)

प्रकरण क्रमांक 30/अ-19/मूल/2014-2015

म0प्र0 शासन,

नवीन एवं नवकरणीय ऊर्जा विभाग भोपाल.....आवेदक
बनाम

शासन म0प्र0.....अनावेदक



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(पारित दिनांक 17 जुलाई, 2015)

आवेदक कार्यपालन यंत्री जिला अश्रय ऊर्जा अधिकारी रीवा का पत्र क्रमांक ऊ.विनि. /रीवा/2015/346 दिनांक 16.03.2015 द्वारा लेख किया है कि आल्ट्रा मेगा सोलर पावर परियोजना गुड जिला रीवा हेतु ग्राम बदवार, इटार पहाड़, बरसैता देश एवं बरसैता पहाड़ के कुल खसरा नम्बर 446 में कुल भूमि 1232.697 हेक्टेयर भूमि को नवीन एवं नवकरणी ऊर्जा विभाग के नाम करने की मांग की गई है।

2. आवेदक का उक्त पत्र तहसीलदार तहसील गुड जिला रीवा की ओर कार्यालयीन पत्र क्रमांक 131/प्रवा.कले./2015 रीवा दिनांक 20 मार्च 2015 द्वारा भेजकर विधि अनुसार कार्यवाही पूर्ण कर विस्तृत प्रतिवेदन हेतु लेख किया गया। तहसीलदार तहसील गुड जिला रीवा ने न्यायालयीन प्रकरण क्रमांक 04/अ-19 /2014-2015 प्रतिवेदन दिनांक 15.07.2015 अनुविभागीय अधिकारी तहसील गुड की अनुशंसा सहित प्रस्तुत किया। तहसीलदार तहसील गुड ने प्रस्तुत प्रतिवेदन दिनांक 15.07.2015 द्वारा प्रतिवेदित किया है कि प्रकरण में ग्राम बरसैता पहाड़ की भूमि खसरा क्रमांक 11, 16, 59, 62, 63, 65, 67, 72, 74, 76, 81, 85, 90, 91, 93, 95 क्रमशः रकवा 0.328, 0.705, 0.311, 0.279, 0.162, 0.283, 0.871, 6.528, 2.197, 5.804, 1.627, 1.781, 0.150, 0.061, 2.467, 0.991 हेक्टेयर कुल कित्ता 16 रकवा 35.164 हेक्टेयर का अंश रकवा 24.545 हेक्टेयर का आम इश्तहार प्रकाशन कराया गया। कोई आपत्ति नहीं आयी। ग्राम पंचायत बरसैता से अनापत्ति प्रमाण पत्र प्राप्त किया गया। ग्राम पंचायत को भूमि देने में कोई आपत्ति नहीं है। ग्राम का मूल खसरा लिया गया जो म0प्र0 शासन पटपर चट्टान दर्ज अभिलेख है। पटवारी प्रतिवेदन के आधार पर भूमि वन विभाग की सीमा में नहीं है। प्रस्तावित भूमि 24.545 हेक्टेयर के गाईड लाइन 2015.2016 के अनुसार 1,75,74,220.00 (एक करोड़ पचहत्तर लाख चौहत्तर हजार दो सौ बीस रुपये) मूल्य होता है। प्रश्नाधीन भूमि नवीन एवं नवकरणी ऊर्जा विभाग को आवंटन करने की अनुशंसा की जाती है।

3. वन मण्डलाधिकारी वन मण्डल रीवा ने कार्यालयीन पत्र क्रमांक मा.चि./4925 रीवा दिनांक 15.07.2015 द्वारा प्रतिवेदित किया है कि ग्राम बदवार, बरसैता देश, बरसैता पहाड़, इटार पहाड़ रामनगर पहाड़ की संलग्न इश्तहार प्रति में अंकित भूमि आल्ट्रा मेगा सोलर पावर परियोजना के आवंटन हेतु उप वनमण्डलाधिकारी रीवा के द्वारा खसरो का स्थल सत्यापन कर जांच कराई गई। उक्त क्षेत्र वन सीमा से बाहर होने के कारण ग्राम बदवार का राजस्व क्षेत्र 547.381 हेक्टेयर ग्राम बरसैता पहाड़ का राजस्व क्षेत्र 24.545 हेक्टेयर, ग्राम रामनगर पहाड़ का राजस्व क्षेत्र 173.760 हेक्टेयर ग्राम बरसैता देश का राजस्व क्षेत्र 367.630 हेक्टेयर तथा ग्राम इटार पहाड़ का राजस्व क्षेत्र 119.384 हेक्टेयर भूमि औद्योगिक प्रयोजन हेतु उद्योग स्थापित होने पर

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प्रकरण क्रमांक 30 / अ-19 / मूल / 2014

वनमार्ग का उपयोग नहीं किया जावेगा, राजस्व क्षेत्र के चारों ओर लगे वनक्षेत्र में 10 मीटर चौड़ा पट्टी में प्लांटेशन कराया जाय, वनक्षेत्र के किनारे किसी प्रकार का श्रमिक कैम्प नहीं लगाया जायेगा।, उक्त भूमि पूर्व में चारों तरफ की वनभूमि के साथ फील्ड फायरिंग रेंज हेतु प्रस्तावित व विचाराधीन रही है। वनक्षेत्र के बैकल्पिक वृक्षारोपण राशि 3,07,10,157.00 (तीन करोड़ सात लाख दस हजार एक सौ सन्तावन रुपये मात्र) भारत सरकार सेना द्वारा जमा कराया गया है। यदि उक्त राजस्व क्षेत्र उनके मांग अनुसार अनुपयुक्त/अनुपलब्ध है तो यह राजस्व भूमि अट्रामेगा सोलर पावर परियोजना को देने में वन विभाग को कोई आपत्ति नहीं है। तथा संयुक्त संचालक नगर तथा ग्राम निवेश रीवा के पत्र क्रमांक 364/नगानि/तक./2015 रीवा दिनांक 17.07.2015 द्वारा अनापत्ति प्रमाण पत्र पेश किया गया है।

4. सचिव म0प्र0 शासन राजस्व विभाग मंत्रालय बल्लभ भवन के पत्र क्रमांक एफ 6-7/2013/सात/2बी भोपाल दिनांक 13 फरवरी 2013 राजस्व पुस्तक परिपत्र खण्ड चार क्रमांक एक की वर्तमान कण्डिका 36 के स्थान पर नई कण्डिका 36 प्रतिस्थापित की गई है। "6(एक) ऐसे सभी मामलों में जिनमें राज्य शासन के किसी विभाग को भूमि आवश्यकता है ऐसे विभाग का विभागाध्यक्ष कलेक्टर को अपनी आवश्यकता प्रतिपादित करते हुए भूमि हस्तांतरण के लिए कलेक्टर को आवेदन करेगा और कलेक्टर स्थायी पट्टों के मामलों में अपनाई जाने वाली कार्य प्रणाली अपनाएगा अर्थात् स्थानीय निकायो मुख्य नगर निवेशक, अन्य शासकीय विभागों से परामर्श करेगा। विभाग की योजना के लिए भूमि का न्यूनतम आवश्यकता क्षेत्र का आंकलन किया जाएगा। ऐसे आंकलन के समय इस बात का भी ध्यान रखा जाएगा कि यथासम्भव भूमि का उपयोग क्षितिजीय रूप में कम से कम और उर्ध्वाधर रूप में अधिक से अधिक किया जा सके इस प्रकार आंकलन करते हुए मामला उसी प्रकार तैयार किया जाएगा जिस प्रकार कि स्थायी पट्टों के मामले तैयार किए जाते हैं। इस प्रकार तैयार किए गए मामले में यदि ऐसी भूमि रक्षित भू-खण्ड का कोई भाग नहीं है तो कलेक्टर आवेदक विभाग/विभागाध्यक्ष को भूमि हस्तांतरण कर सकेगा। परन्तु सम्भागीय मुख्यालयों में भूमि का ऐसा हस्तांतरण सम्भागायुक्त के अनुमोदन से तथा राजपधारी परियोजना क्षेत्र भोपाल तथा इन्दौर जबलपुर, ग्वालियर एवं उज्जैन के विकास योजना क्षेत्र मास्टर प्लान एरिया में राज्य शासन के अनुमोदन से किया जाएगा।

म0प्र0 शासन राजस्व विभाग मंत्रालय बल्लभ भवन भोपाल के कार्यालयीन पत्र क्रमांक एफ-16-14/ 2013/सात/2-ए भोपाल दिनांक 04.03.2014 द्वारा लेख किया गया है कि राज्य सरकार एतद द्वारा राजस्व पुस्तक परिपत्र खण्ड चार क्रमांक-1 के अन्तर्गत चहुमुखी विकास के लिये निजी पूंजी निवेश के मामलों में सरकारी दखल रहित भूमि के आवंटन के लिए जारी समसंख्या नीति दिनांक 30.05.2013 की कण्डिका 3(4) के स्थान पर उक्त नीति परिपत्र की संशोधित कण्डिका 3(4) में दर्शाया गया है कि "इस प्रकार मध्यप्रदेश राज्य औद्योगिक भूमि एवं औद्योगिक भवन प्रबंधन नियम 2008 के अन्तर्गत औद्योगिक विकास केन्द्रों के भीतर तथा बाहर वाणिज्य, उद्योग एवं रोजगार विभाग द्वारा और सूचना प्रौद्योगिकी पार्क (आई.टी. पार्क) में स्थित शासकीय भूमि को सूचना प्रौद्योगिकी विभाग के परिपत्र क्रमांक एफ 7-8/2012/56 दिनांक 20 मार्च 2013 के अन्तर्गत सूचना प्रौद्योगिकी विभाग द्वारा निवेशकों को भूमि आवंटन के मामलों तथा नवकरणीय ऊर्जा विभाग की अनुमोदित नीतियों के अन्तर्गत विकास को परियोजना विकास हेतु पूर्ण पारदर्शिता अपनाते हुए नवीन एवं नवकरणीय ऊर्जा विभाग द्वारा उनके विभाग को आवंटित

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न्यायालय कलेक्टर, जिला रीवा (म0प्र0)

प्रकरण क्रमांक 31 / अ-19 / मूल / 2014-2015

म0प्र0 शासन,

नवीन एवं नवकरणीय ऊर्जा विभाग भोपाल.....आवेदक
बनाम

शासन म0प्र0.....अनावेदक



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(पारित दिनांक 17 जुलाई, 2015)

आवेदक कार्यपालन यंत्री जिला अश्रय ऊर्जा अधिकारी रीवा का पत्र क्रमांक ऊ.विनि. /रीवा/2015/346 दिनांक 16.03.2015 द्वारा लेख किया है कि आल्ट्रा मेगा सोलर पावर परियोजना गुड जिला रीवा हेतु ग्राम बदवार, इटार पहाड़, बरसैता देश एवं बरसैता पहाड़ के कुल खसरा नम्बर 446 में कुल भूमि 1232.697 हेक्टेयर भूमि को नवीन एवं नवकरणी ऊर्जा विभाग के नाम करने की मांग की गई है।

2. आवेदक का उक्त पत्र तहसीलदार तहसील गुड जिला रीवा की ओर कार्यालयीन पत्र क्रमांक 131/प्रवा.कले./2015 रीवा दिनांक 20 मार्च 2015 द्वारा भेजकर विधि अनुसार कार्यवाही पूर्ण कर विस्तृत प्रतिवेदन हेतु लेख किया गया। तहसीलदार तहसील गुड जिला रीवा ने न्यायालयीन प्रकरण क्रमांक 03/अ-19/2014-2015 प्रतिवेदन दिनांक 15.07.2015 अनुविभागीय अधिकारी तहसील गुड की अनुशंसा सहित प्रस्तुत किया। तहसीलदार तहसील गुड ने प्रस्तुत प्रतिवेदन दिनांक 15.07.2015 द्वारा प्रतिवेदित किया है कि ग्राम बरसैता देश तहसील गुड जिला रीवा की भूमि खसरा क्रमांक 1571/1/1571/2, 1572, 1576, 1577, 1583, 1594, 1595, 1598, 1599, 1602/2, 1603, 1617, 1631, 1632, 1637, 1686, 1687, 1688, 1689, 1691, 1692, 1699, 1704, 1705, 1707, 1708, 1709, 1712, 1715, 1716, 1717, 1721, 1722, 1727/1, 1734, 1737, 1738, 1742, 1743, 1744, 1748, 1749, 1760, 1764, 1766, 1767, 1769, 1771, 1774, 1776, 1777/2, 1779, 1782, 1863, 1864, 1865, 1897, 1898, 1900, 1901, 1903, 1906, 1920, 1932, 1937, 1941, 1945, 1948, 1953, 1961, 1971, 1972, 1973, 1976, 1981, 1990, 1993, 2001/2083, 2003, 2010, 2013, 2020, 2021, 2023, 2028, 2032, 2036, 2045, 2049, 2051, 2053, 2057, 2061, 2064, 2069, 2078, 2094, 2105, 2107, 2113, 2129, 2134, 2139, 2140, 2145, 2149, 2150, 2151, 2154, 2158, 2159, 2160, 2161, 2164, 2171, 2174, 2175, 2176 क्रमशः रकवा 11.012, 1.073, 0.013, 1.165, 2.039, 0.101, 6.584, 13.783, 0.097, 1.214, 0.162, 3.82, 16.167, 1.943, 4.738, 1.745, 1.275, 0.093, 0.227, 0.971, 5.381, 0.121, 1.518, 0.142, 0.008, 0.938, 4.703, 3.443, 0.073, 0.008, 6.147, 3.861, 0.049, 0.5, 3.089, 12.205, 14.042, 0.089, 0.04, 0.611, 13.394, 0.049, 0.15, 0.93, 0.105, 5.496, 0.809, 0.688, 4.217, 1.858, 0.053, 1.214, 3.46, 0.49, 0.567, 3.177, 0.024, 5.281, 0.247, 1.441, 0.539, 1.777, 11.582, 1.185, 8.478, 0.004, 0.129, 0.328, 6.929, 7.786, 4.249, 1.89, 6.823, 9.126, 1.708, 0.174, 4.391, 0.454, 2.31, 1.712, 6.487, 7.596, 0.405, 0.138, 0.065, 2.938, 0.089, 0.409, 0.053, 0.061, 0.178, 3.419, 0.019, 2.416, 5.208, 0.125, 0.624, 5.331, 8.073, 3.832, 14.115, 0.146, 19.002, 1.032, 0.214, 2.428, 10.522, 0.769, 8.838, 2.428, 6.584, 2.428, 0.737, 2.938, 4.156, 1.999, 0.202, 0.627 हेक्टेयर कुल कित्ता 118 रकवा 372.736 हेक्टेयर का अंश रकवा

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प्रकरण क्रमांक 31/अ-19/मूल/2014-2015

367.630 हेक्टेयर का आम इश्तहार प्रकाशन कराया गया। कोई आपत्ति नहीं आयी। ग्राम पंचायत बरसैता देश से अनापत्ति प्रमाण पत्र प्राप्त किया गया। ग्राम पंचायत को भूमि देने में कोई आपत्ति नहीं है। ग्राम का मूल खसरा लिया गया जो म0प्र0, शासन पटपर चटटान दर्ज अभिलेख है। पटवारी प्रतिवेदन के आधार पर भूमि वन विभाग की सीमा में नहीं है। प्रस्तावित भूमि 367.630 हेक्टेयर के गार्ड लाइन 2015.2016 के अनुसार 23,67,53,720.00 (तीस करोड़ सड़सठ लाख तिरपन हजार सात सौ बीस रुपये) मूल्य होता है। प्रश्नाधीन भूमि नवीन एवं नवकरणी ऊर्जा विभाग को आवंटन करने की अनुशंसा की जाती है।

3. वन मण्डलाधिकारी वन मण्डल रीवा ने कार्यालयीन पत्र क्रमांक मा.चि./4925 रीवा दिनांक 15.07.2015 द्वारा प्रतिवेदित किया है कि ग्राम बदवार, बरसैता देश, बरसैता पहाड़, इटार पहाड़, रामनगर पहाड़ की संलग्न इश्तहार प्रति में अंकित भूमि आल्ट्रा मेगा सोलर पावर परियोजना के आवंटन हेतु उप वनमण्डलाधिकारी रीवा के द्वारा खसरो का स्थल सत्यापन कर जांच कराई गई। उक्त क्षेत्र वन सीमा से बाहर होने के कारण ग्राम बदवार का राजस्व क्षेत्र 547.381 हेक्टेयर ग्राम बरसैता पहाड़ का राजस्व क्षेत्र 24.545 हेक्टेयर, ग्राम रामनगर पहाड़ का राजस्व क्षेत्र 173.760 हेक्टेयर ग्राम बरसैता देश का राजस्व क्षेत्र 367.630 हेक्टेयर तथा ग्राम इटार पहाड़ का राजस्व क्षेत्र 119.384 हेक्टेयर भूमि औद्योगिक प्रयोजन हेतु उद्योग सीपित होने पर वनमार्ग का उपयोग नहीं किया जावेगा, राजस्व क्षेत्र के चारो ओर लगे वनक्षेत्र में 10 मीटर चौड़ी पट्टी में प्लांटेशन कराया जाय, वनक्षेत्र के किनारे किसी प्रकार का श्रमिक कैम्प नहीं लगाया जायेगा।, उक्त भूमि पूर्व में चारो तरफ की वनभूमि के साथ फील्ड फायरिंग रेंज हेतु प्रस्तावित व विचाराधीन रही है। वनक्षेत्र क बैकल्पिक वृक्षारोपण राशि 3,07,10,157.00 (तीन करोड़ सात लाख दस हजार एक सौ सन्तावन रुपये मात्र) भारत सरकार सेना द्वारा जमा कराया गया है। यदि उक्त राजस्व क्षेत्र उनके मांग अनुसार अनुपयुक्त/अनुपलब्ध है तो यह राजस्व भूमि अट्रामेगा सोलर पावर परियोजना को देने में वन विभाग को कोई आपत्ति नहीं है। तथा संयुक्त संचालक नगर तथा ग्राम निवेश रीवा के पत्र क्रमांक 364/नग्रानि/तक./2015 रीवा दिनांक 17.07.2015 द्वारा अनापत्ति प्रमाण पत्र पेश किया गया है।

4. सचिव म0प्र0 शासन राजस्व विभाग मंत्रालय बल्लभ भवन के पत्र क्रमांक एफ 6-7/2013/सात/2बी भोपाल दिनांक 13 फरवरी 2013 राजस्व पुस्तक परिपत्र खण्ड चार क्रमांक एक की वर्तमान कण्डिका 36 के स्थान पर नई कण्डिका 36 प्रतिस्थापित की गई है। "6(एक) ऐसे सभी मामलो में जिनमें राज्य शासन के किसी विभाग को भूमि आवश्यकता है ऐसे विभाग का विभागाध्यक्ष कलेक्टर को अपनी आवश्यकता प्रतिपादित करते हुए भूमि हस्तांतरण के लिए कलेक्टर को आवेदन करेगा और कलेक्टर स्थायी पट्टो के मामलो में अपनाई जाने वाली कार्य प्रणाली अपनाएगा अर्थात् स्थानीय निकायो मुख्य नगर निवेशक, अन्य शासकीय विभागो से परामर्श करेगा। विभाग की योजना के लिए भूमि का न्यूनतम आवश्यकता क्षेत्र का आंकलन किया जाएगा। ऐसे आंकलन के समय इस बात का भी ध्यान रखा जाएगा कि यथासम्भव भूमि का उपयोग क्षितिजीय रूप में कम से कम और उर्ध्वाधर रूप में अधिक से अधिक किया जा सके इस प्रकार आंकलन करते हुए मामला उसी प्रकार तैयार किया जाएगा जिस प्रकार कि स्थायी पट्टो के मामले तैयार किए जाते हैं। इस प्रकार तैयार किए गए मामले में यदि ऐसी भूमि रक्षित भू-खण्ड का कोई भाग नहीं है तो कलेक्टर आवेदक विभाग/विभागाध्यक्ष को भूमि हस्तांतरण कर

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पृ०प्र०क० ३१/अ-१९/मूल/२०१४-२०१५

रीवा दिनांक २० जुलाई २०१५

प्रतिलिपि,

१. सचिव, म०प्र० शासन राजस्व विभाग मंत्रालय बल्लभ भवन भोपाल।
२. अपर मुख्य सचिव, म०प्र० शासन नवीन एवं नवकरणीय ऊर्जा विभाग भोपाल।
३. कमिश्नर, रीवा सभागा रीवा।
४. कार्यपालन यंत्री जिला अश्रय ऊर्जा अधिकारी, जिला रीवा।
५. अनुविभागीय अधिकारी तहसील गुढ जिला रीवा।
६. तहसीलदार तहसील गुढ जिला रीवा।

की ओर सूचनार्थ एवं आवश्यक कार्यवाही हेतु।

प्रमाणित अधिकारी
न्यायालय कलेक्टर जिला रीवा (म०प्र०)
जिला रीवा (म.प्र.)

न्यायालय कलेक्टर, जिला रीवा (म0प्र0)

प्रकरण क्रमांक 32/अ-19/मूल/2014-2015

म0प्र0 शासन,

नवीन एवं नवकरणीय ऊर्जा विभाग भोपाल.....आवेदक
बनाम

शासन म0प्र0.....अनावेदक



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(पारित दिनांक 17 जुलाई, 2015)

आवेदक कार्यपालन यंत्री जिला अश्रय ऊर्जा अधिकारी रीवा का पत्र क्रमांक ऊ.विनि./रीवा/2015/346 दिनांक 16.03.2015 द्वारा लेख किया है कि आल्ट्रा मेगा सोलर पावर परियोजना गुड जिला रीवा हेतु ग्राम बदवार, इटार पहाड़, बरसैता देश, रामनगर पहाड़ एवं बरसैता पहाड़ के कुल खसरा नम्बर 446 में कुल भूमि 1232.697 हेक्टेयर भूमि को नवीन एवं नवकरणी ऊर्जा विभाग के नाम करने हेतु मांग की गई है।

2. आवेदक का उक्त पत्र तहसीलदार तहसील गुड जिला रीवा की ओर कार्यालयीन पत्र क्रमांक 131 /प्रवा.कले./2015 रीवा दिनांक 20 मार्च 2015 द्वारा भेजकर विधि अनुसार कार्यवाही पूर्ण कर विस्तृत प्रतिवेदन हेतु लेख किया गया। तहसीलदार तहसील गुड जिला रीवा ने न्यायालयीन प्रकरण क्रमांक 06/अ-19/2014 -2015 प्रतिवेदन दिनांक 15.07.2015 अनुविभागीय अधिकारी तहसील गुड की अनुशंसा सहित प्रस्तुत किया। तहसीलदार तहसील गुड ने प्रस्तुत प्रतिवेदन दिनांक 15.07.2015 द्वारा प्रतिवेदित किया है कि प्रकरण में ग्राम इटार पहाड़ की भूमि खसरा क्रमांक 850, 852, 1393, 1397, 1398, 1402, 1403, 1406, 1408, 1416, 1417, 1422, 1427, 1429, 1431, 1433, 1435, 1436, 1438, 1439, 1440, 1445, 1449, 1452, 1457, 1458, 1459, 1461, 1464, 1502, 1505, 1513, 1515, 1526, 1528, 1530, 1539, 1543, 1546, 1547, 1548, 1550, 1551 क्रमशः रकवा 0.202, 0.101, 4.946, 6.071, 17.797, 5.755, 1.108, 0.987, 0.882, 3.415, 0.890, 1.638, 1.429, 12.606, 2.642, 6.432, 8.700, 2.727, 1.433, 4.634, 0.360, 1.080, 0.077, 1.903, 1.910, 3.423, 3.141, 2.306, 3.715, 0.955, 4.184, 0.971, 0.668, 2.663, 0.413, 1.238, 0.587, 1.643, 2.063, 0.081, 0.841, 0.065, 0.701 कुल किता 43 रकवा 121.302 हेक्टेयर का अंश रकवा 119.384 हेक्टेयर का आम इश्तहार प्रकाशन कराया गया। कोई आपत्ति नहीं आयी। ग्राम पंचायत इटार पहाड़ से अनापत्ति प्रमाण पत्र प्राप्त किया गया। ग्राम पंचायत को भूमि देने में कोई आपत्ति नहीं है। ग्राम का मूल खसरा लिया गया जो म0प्र0 शासन पटपर चटान दर्ज अभिलेख है। पटवारी प्रतिवेदन के आधार पर भूमि वन विभाग की सीमा में नहीं है। प्रस्तावित भूमि 119.384 हेक्टेयर के गाईड लाइन 2015.2016 के अनुसार 7,61,66,932.00 (सात करोड़ इकसठ लाख छह हज़ार नौ सौ बत्तीस रुपये) मूल्य होता है। प्रश्नाधीन भूमि नवीन एवं नवकरणी ऊर्जा विभाग को आवंटन करने की अनुशंसा की जाती है।

3. वन मण्डलाधिकारी वन मण्डल रीवा ने कार्यालयीन पत्र क्रमांक मा.चि./4925 रीवा दिनांक 15.07.2015 द्वारा प्रतिवेदित किया है कि ग्राम बदवार, बरसैता देश, बरसैता पहाड़, इटार पहाड़ रामनगर पहाड़ की संलग्न इश्तहार प्रति में अंकित भूमि आल्ट्रा मेगा सोलर पावर परियोजना के आवंटन हेतु उप वनमण्डलाधिकारी रीवा के द्वारा खसरो का स्थल सत्यापन कर

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प्रकरण क्रमांक 32/अ-19/मूल/2015

जांच कराई गई। उक्त क्षेत्र वन सीमा से बाहर होने के कारण ग्राम बदवार का राजस्व क्षेत्र 54.381 हेक्टेयर ग्राम बरसैता पहाड़ का राजस्व क्षेत्र 24.545 हेक्टेयर, ग्राम रामनगर पहाड़ का राजस्व क्षेत्र 173.760 हेक्टेयर ग्राम बरसैता देश का राजस्व क्षेत्र 367.630 हेक्टेयर तथा ग्राम इटा पहाड़ का राजस्व क्षेत्र 119.384 हेक्टेयर भूमि औद्योगिक प्रयोजन हेतु उद्योग सीमित होने पर वनमार्ग का उपयोग नहीं किया जावेगा, राजस्व क्षेत्र के चारों ओर लगे वनक्षेत्र में 10 मीटर चौड़ा पट्टी में प्लांटेशन कराया जाय, वनक्षेत्र के किनारे किसी प्रकार का श्रमिक कैम्प नहीं लगाया जायेगा।, उक्त भूमि पूर्व में चारों तरफ की वनभूमि के साथ फील्ड फायरिंग रेंज हेतु प्रस्तावित विचाराधीन रही है। वनक्षेत्र के बैकल्पिक वृक्षारोपण राशि 3,07,10,157.00 (तीन करोड़ सात लाख दस हजार एक सौ सन्तावन रुपये मात्र) भारत सरकार सेना द्वारा जमा कराया गया है। यदि उक्त राजस्व क्षेत्र उनके मांग अनुसार अनुपयुक्त/अनुपलब्ध है तो यह राजस्व भूमि अट्रामेग सोलर पावर परियोजना को देने में वन विभाग को कोई आपत्ति नहीं है, तथा संयुक्त संचालक नगर तथा ग्राम निवेश रीवा के पत्र क्रमांक 364/नगानि/तक./2015 रीवा दिनांक 17.07.2015 द्वारा अनापत्ति प्रमाण पत्र पेश किया गया है।

4. सचिव म0प्र0 शासन राजस्व विभाग मंत्रालय बल्लभ भवन के पत्र क्रमांक एफ-6-7/2013/सात/2बी भोपाल दिनांक 13 फरवरी 2013 राजस्व पुस्तक परिपत्र खण्ड चार क्रमांक एक की वर्तमान कण्डिका 36 के स्थान पर नई कण्डिका 36 प्रतिस्थापित की गई है "6(एक) ऐसे सभी मामलों में जिनमें राज्य शासन के किसी विभाग को भूमि आवश्यकता है ऐसे विभाग का विभागाध्यक्ष कलेक्टर को अपनी आवश्यकता प्रतिपादित करते हुए भूमि हस्तांतरण के लिए कलेक्टर को आवेदन करेगा और कलेक्टर स्थायी पट्टों के मामलों में अपनाई जाने वाले कार्य प्रणाली अपनाएगा अर्थात् स्थानीय निकायो मुख्य नगर निवेशक, अन्य शासकीय विभागों परामर्श करेगा। विभाग की योजना के लिए भूमि का न्यूनतम आवश्यकता क्षेत्र का आंकलन किया जाएगा। ऐसे आंकलन के समय इस बात का भी ध्यान रखा जाएगा कि यथासम्भव भूमि का उपयोग क्षितिजीय रूप में कम से कम और उर्ध्वाधर रूप में अधिक से अधिक किया जा सके इस प्रकार आंकलन करते हुए मामला उसी प्रकार तैयार किया जाएगा जिस प्रकार कि स्थायी पट्टों के मामले तैयार किए जाते हैं। इस प्रकार तैयार किए गए मामले में यदि ऐसी भूमि रक्षित भू-खण्ड का कोई भाग नहीं है तो कलेक्टर आवेदक विभाग/विभागाध्यक्ष को भूमि हस्तांतरण कर सकेगा। परन्तु सम्भागीय मुख्यालयों में भूमि का ऐसा हस्तांतरण सम्भागायुक्त के अनुमोदन से तथा राजपधारी परियोजना क्षेत्र भोपाल तथा इन्दौर जबलपुर, ग्वालियर एवं उज्जैन के विकास योजना क्षेत्र मास्टर प्लान एरिया में राज्य शासन के अनुमोदन से किया जाएगा।

म0प्र0 शासन राजस्व विभाग मंत्रालय बल्लभ भवन भोपाल के कार्यालयीन पत्र क्रमांक एफ-16-14/2013/सात/2-ए भोपाल दिनांक 04.03.2014 द्वारा लेख किया गया है कि राज सरकार एतद द्वारा राजस्व पुस्तक परिपत्र खण्ड चार क्रमांक-1 के अन्तर्गत बहुमुखी विकास लिये निजी पूंजी निवेश के मामलों में सरकारी दखल रहित भूमि के आवंटन के लिए जा समसंख्या नीति दिनांक 30.05.2013 की कण्डिका 3(4) के स्थान पर उक्त नीति परिपत्र के संशोधित कण्डिका 3(4) में दर्शाया गया है कि "इस प्रकार मध्यप्रदेश राज्य औद्योगिक भूमि एवं औद्योगिक भवन प्रबंधन नियम 2008 के अन्तर्गत औद्योगिक विकास केन्द्रों के भीतर तथा बाह्य वाणिज्य, उद्योग एवं रोजगार विभाग द्वारा और सूचना प्रौद्योगिकी पार्क (आई.टी. पार्क) में स्थित

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प्रकरण क्रमांक 32/अ-19/मूल/2014-2015



शासकीय भूमि को सूचना प्रौद्योगिकी विभाग के परिपत्र क्रमांक एफ 7-8/2012/56 दिनांक 23 मार्च 2013 के अन्तर्गत सूचना प्रौद्योगिकी विभाग द्वारा निवेशको को भूमि आवंटन के मामले तथा नवकरणीय ऊर्जा विभाग की अनुमोदित नीतियों के अन्तर्गत विकास को परियोजना विकास हेतु पूर्ण पारदर्शिता अपनाते हुए नवीन एवं नवकरणीय ऊर्जा विभाग द्वारा उनके विभाग को आवंटित भूमि के उपयोग की अनुमति अनुबंध के आधार पर देने के मामले को छोड़कर राज्य की विभिन्न नीतियों के अन्तर्गत दी जाने वाली सुविधाओं के अनुक्रम में भूमि आवंटन के लिए इस परिपत्र के द्वारा प्रक्रिया विहित की जाती है।"

5. म0प्र0 शासन राजस्व विभाग मंत्रालय बल्लभ भवन भोपाल के पत्र क्रमांक एफ-6-7/2013/सात/ 2बी भोपाल दिनांक 13 फरवरी 2013 एवं राजस्व विभाग के परिपत्र क्रमांक एफ 16-14/2013/सात/2ए दिनांक 04.03.2014 के प्रावधानों के तहत अनुविभागीय अधिकारी एवं तहसीलदार तहसील गुड के प्रतिवेदनो एवं अनुशंसा के आधार पर कालम नम्बर दो में अंकित भूमिया ग्राम इटार पहाड तहसील गुड जिला रीवा की कुल किता 43 रकवा 121.302 हेक्टेयर का अंश रकवा 119.384 हेक्टेयर भूमि म0प्र0 शासन नवीन एवं नवकरणीय ऊर्जा विभाग को राज्य में सौर परियोजना स्थापित करने हेतु निम्न शर्तों के साथ हस्तातरित की जाती है:-

1. उक्त शासकीय भूमि राजस्व अभिलेख (खसरे) में म0प्र0 शासन ही अंकित रहेगी किन्तु खसरे के कैफियत कालम में नवीन एवं नवकरणीय ऊर्जा विभाग को उक्त आदेश क्रमांक एवं दिनांक का उल्लेख करते हुए दर्ज की जाय।
2. नवीन एवं नवकरणीय ऊर्जा विभाग यह सुनिश्चित करेगा कि परियोजना के लिये आवश्यक न्यूनतम शासकीय भूमि के उपयोग की ही अनुमति शासन के नियमों एवं नीति के तहत दें।
3. उक्त भूमि का उपयोग प्रस्तावित परियोजना एवं उसके सीधे अनुशांगिक प्रयोजन के अतिरिक्त अन्य किसी प्रयोजन के लिये नहीं किया जावेगा।
4. उक्त भूमि का वर्णित प्रयोजनो के लिये उपयोग न होने अथवा अन्य प्रयोजन होने अथवा प्रयोजन बन्द हो जाने की स्थिति में भूमि स्वयमेव ही शासन (राजस्व विभाग) में निहित हो जावेगी।
5. ग्राम वासियों के निस्तार में कोई अवरोध उत्पन्न नहीं किया जाय।



(के0पी0 राही)

जिला सीकर (म0प्र0)

क.प.र.

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पृ0प्र0क0 32/अ-19/मूल/2014-2015

रीवा दिनांक 20 जुलाई 2015

प्रतिलिपि,

1. सचिव, म0प्र0 शासन राजस्व विभाग मंत्रालय बल्लभ भवन भोपाल।
2. अपर मुख्य सचिव, म0प्र0 शासन नवीन एवं नवकरणीय ऊर्जा विभाग भोपाल।
3. कमिश्नर, रीवा सम्भाग रीवा।
4. कार्यपालन यंत्री जिला अश्रय ऊर्जा अधिकारी, जिला रीवा।
5. अनुविभागीय अधिकारी तहसील गुढ जिला रीवा।
6. तहसीलदार तहसील गुढ जिला रीवा।

की ओर सूचनार्थ एवं आवश्यक कार्यवाही हेतु।

प्रभारी अधिकारी
न्यायालय, कामेश्वर, कलेक्टर, रीवा (म0प्र0)
जिला रीवा (म.प्र.)

ANNEXURE II

Environment Monitoring Location Maps

ESA Study for Rewa Solar Power Project,
Madhya Pradesh, India

Rewa Ultra Mega Solar Limited (RUMSL)

January 2016

Figure 1: Ambient Air Quality Monitoring Locations

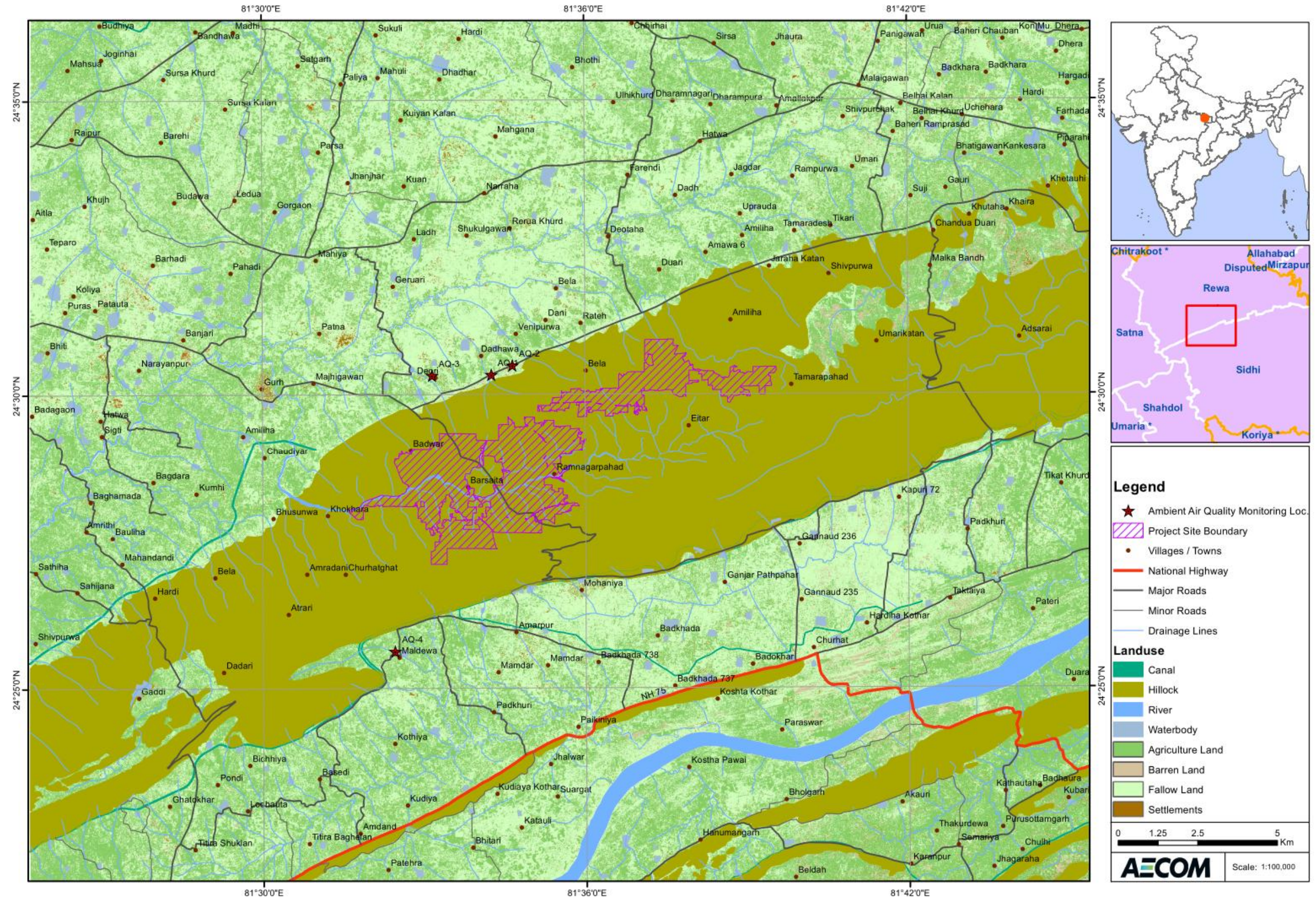


Figure 2: Water Quality Monitoring Locations

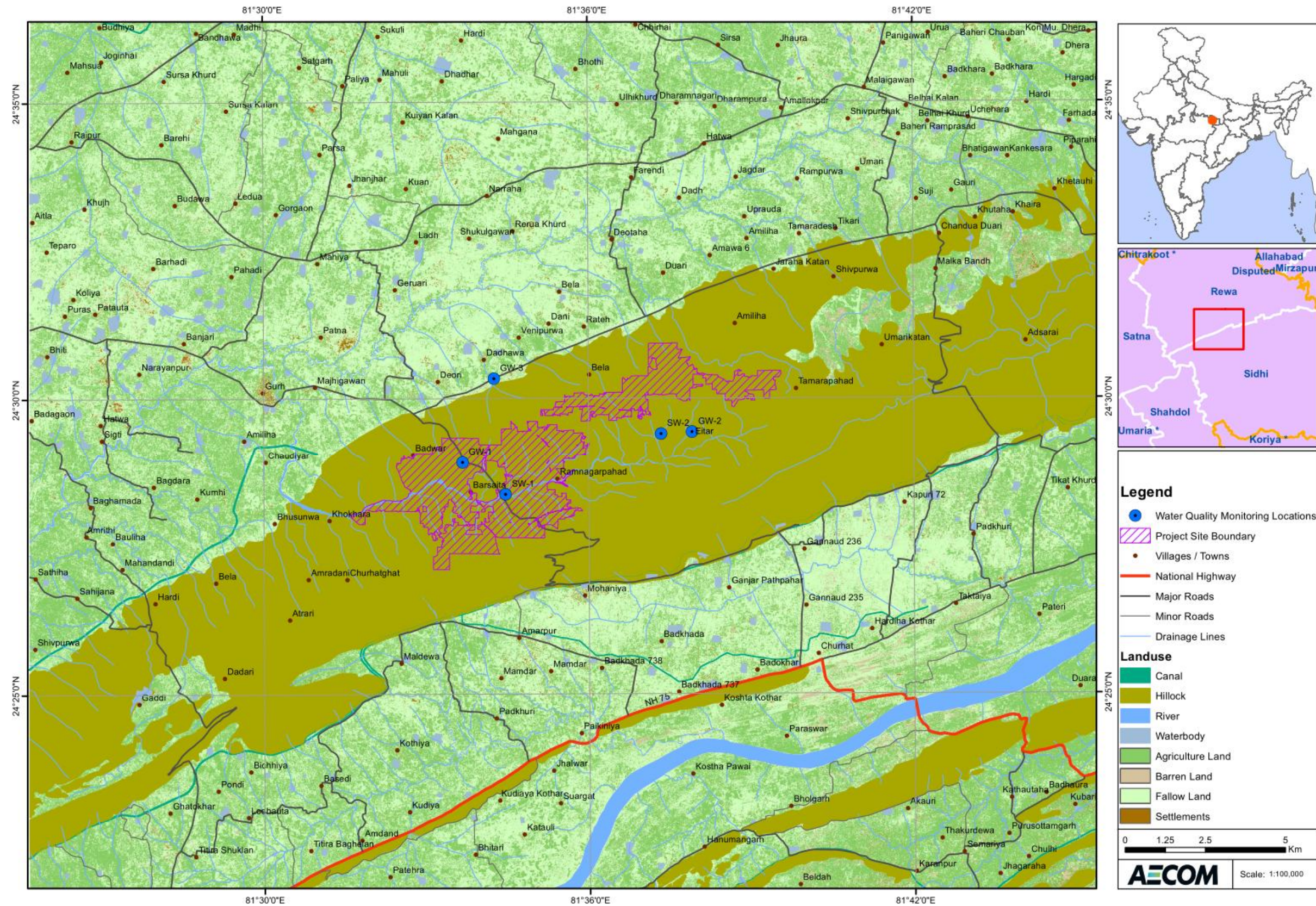


Figure 3: Soil Quality Monitoring Locations

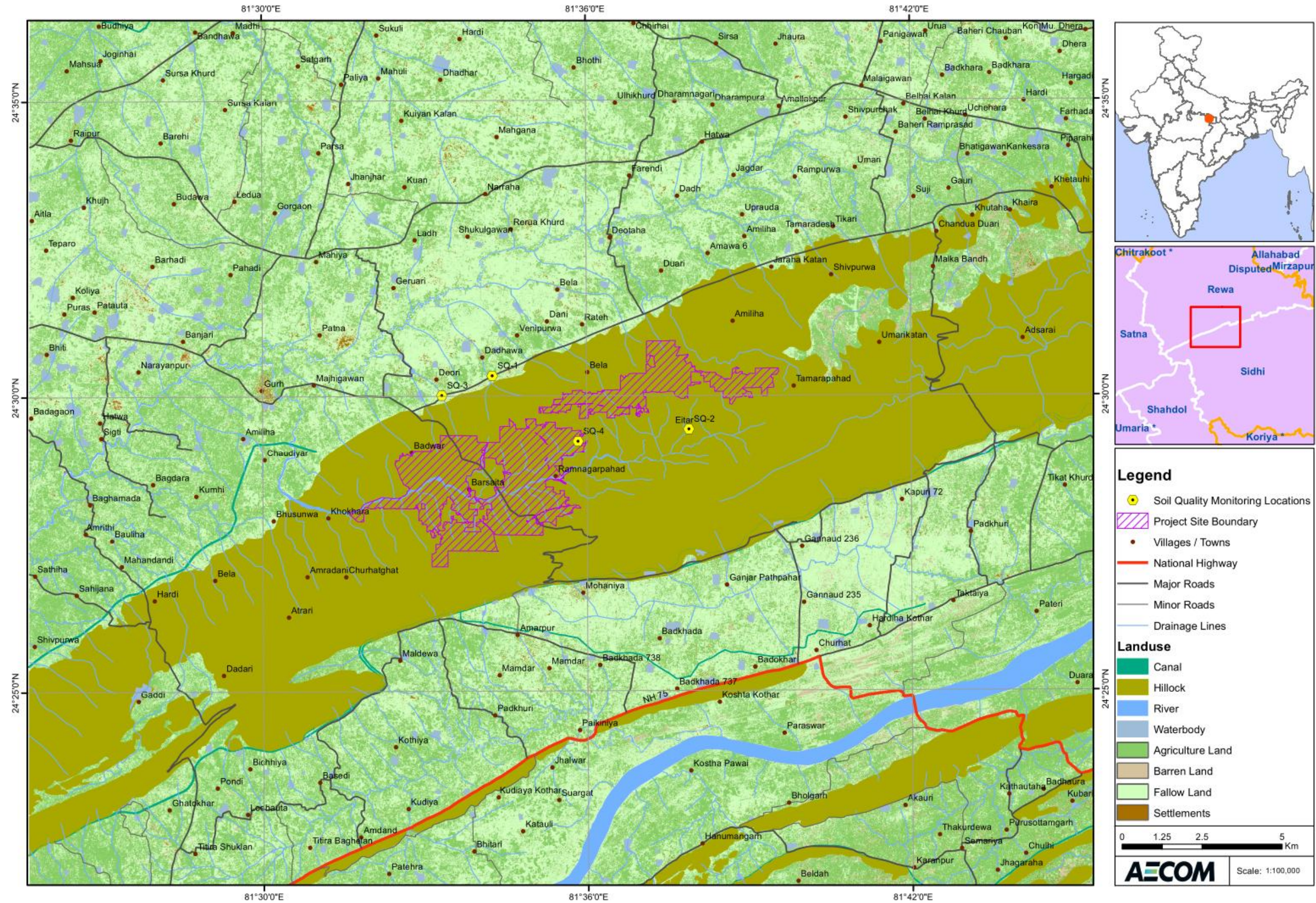


Figure 4: Noise Quality Monitoring Locations

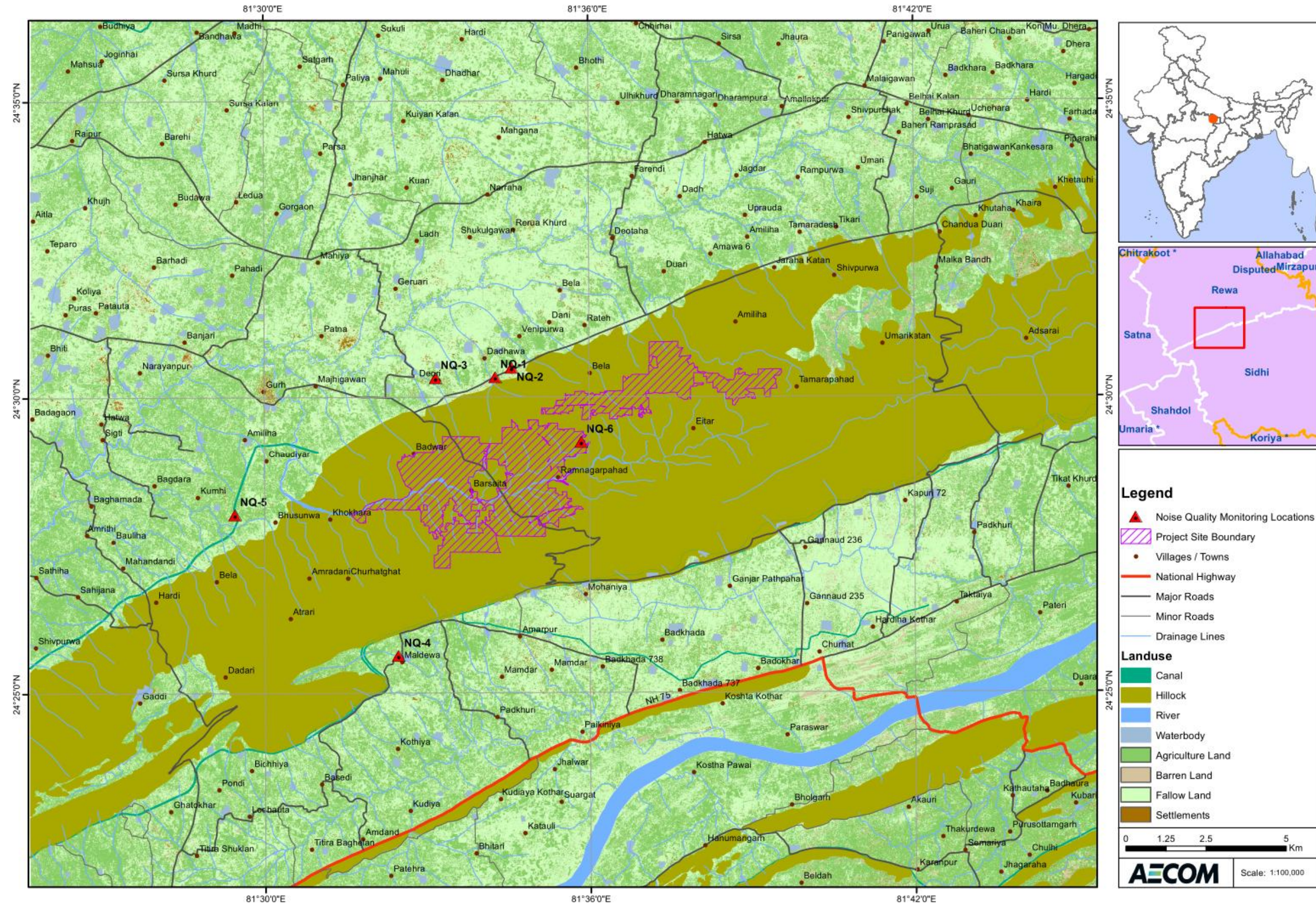
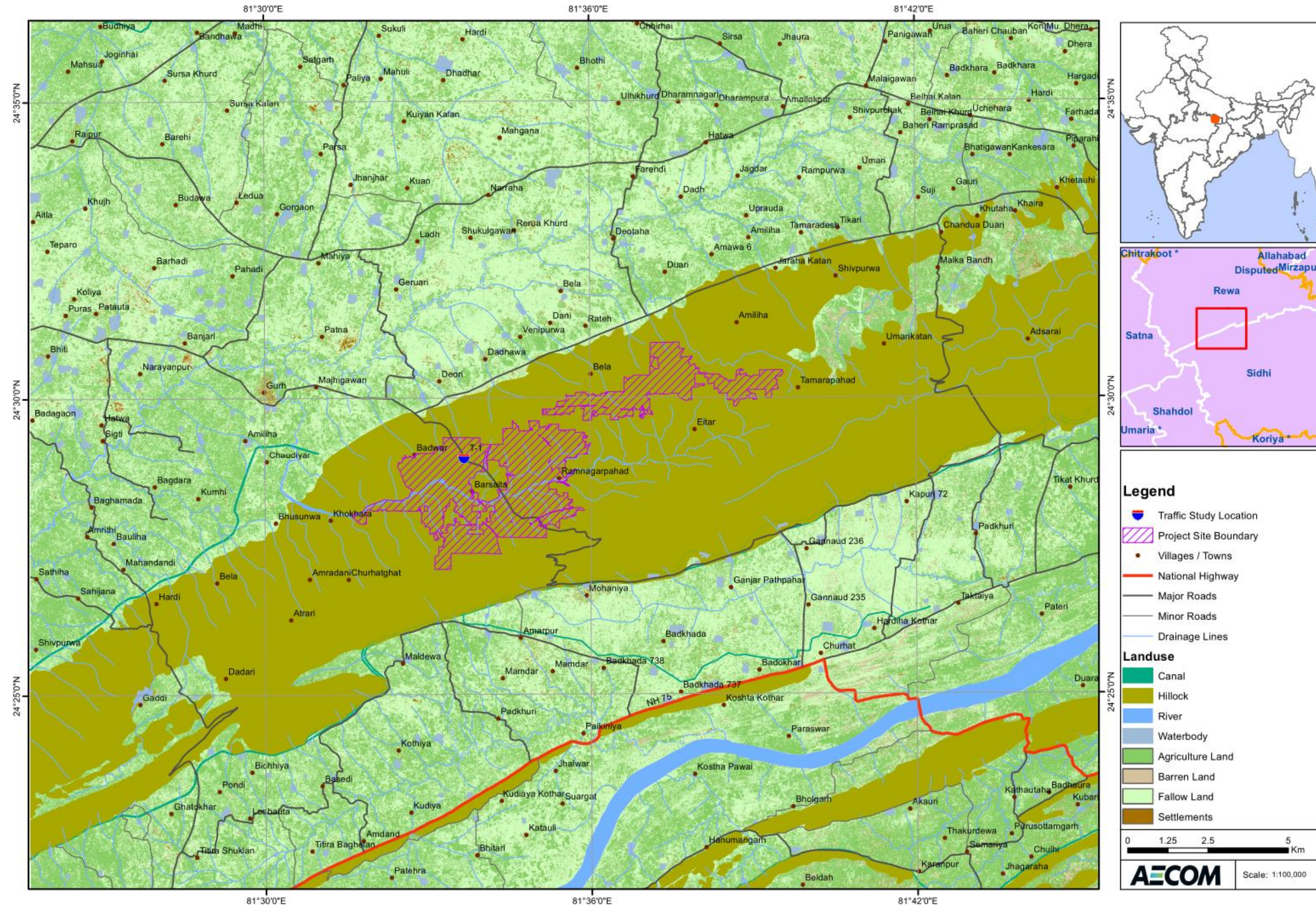


Figure 5: Road Traffic Monitoring Locations



ANNEXURE III

Formulae used for calculations of quadrat study for the Project

ESA Study for Rewa Solar Power Project,
Madhya Pradesh, India

Rewa Ultra Mega Solar Limited (RUMSL)

January 2016

The data recorded through the quadrat-studies was analysed to estimate the percentage frequency, abundance and density of each floristic species. Species richness was also calculated, separately for the woody and non-woody plants. The following formulae were used for calculating the percentage frequency, abundance and density, as applicable, of the species identified in the quadrats studied:

$$\% \text{ Frequency of species A} = \frac{\text{Number of quadrats of occurrence of species A}}{\text{Total number of quadrats studied}} \times 100$$

$$\text{Abundance of species A} = \frac{\text{Number of individuals of species A in total quadrats studied}}{\text{Number of quadrats of occurrence of species A}}$$

$$\text{Density of species A} = \frac{\text{Number of individuals of species A in total quadrats studied}}{\text{Total area studied}}$$

ANNEXURE IV

Questionnaire used for Census Survey

ESA Study for Rewa Solar Power Project,
Madhya Pradesh, India

Rewa Ultra Mega Solar Limited (RUMSL)

January 2016

Date:

Social Survey Questionnaire

A. Location Related Information

1. Name of the Village:	2. Panchayat:	3. Taluka:	4. District:
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B. Respondent and Family Details

1. Name of the Respondent:		2. Name of Household (HoH):	
3. Relationship with HOH:		4. Religion:	
5. Ethnic Group:		6. Whether BPL Card Holder:	
7. Respondent Type:	Land Owner:	Tenant:	Sharecropper:
8. Household Type:	Joint:	Nuclear:	Extended:
9. No. of Family Members:			
Adult Males:	Adult Females:	Males (Child):	Females (Child):
10. Female Head, if any:	Name:		Age of Head:

C. Literacy Level (No Education -1, Primary-2, Secondary -3, Higher Secondary-4, Graduate & above-5, Technical-6, Others-7)

S. No.	Name of Family Members	Age	Gender	Marital Status	Literacy Level
1.					
2.					
3.					
4.					
5.					
6.					

D. Land Ownership Details

Total Land Area Owned:	
Total Land Area for which consent has been provided (for the project)	
Total Land Area remaining after sale of land for the project:	

Date:

Social Survey Questionnaire

E. Basic Assets & Amenities (tick any or answer yes/no)

Livestock Ownership (mention total)	Total:	Cows:	Buffaloes:	Goats:	Poultry (Hens/Ducks):	Others:
Dwelling structure (wall):	Concrete:		Mud:		Others:	
Dwelling structure (roof):	Tin:		Thatched:		Others:	
Housing	Owned:			Rented:		
Sanitation Facility:			Electricity Connection:			
Source of Water Supply & quality:	Tap:		Tube Well:		Others:	
Television:			Mobile:			
Tractor:			Car:			
Two Wheeler:			Refrigerator:			
Others (specify):						

F. Occupation & Income Details

1. Employment Sector:	Agriculture	Industry	Manufacturing	Service
2. Occupation Type:	Agricultural Labours	Self employed in Farm	Self employed in non farm	Salaried
3. Average Income Level (monthly/yearly):	Below 5000 INR	5000-10000 INR	10000-20000 INR	20000 INR & above
4. Irrigation Facility:				
5. Details of Agricultural Crops Cultivated	Types of Crops:			
	Yield per acre:			
	Cost of cultivation per acre:			

Date:

Social Survey Questionnaire

	Details of agricultural labourers employed: • how many: • how often engaged: • names: • do they belong to same village:
6. Bank Account & name of bank:(Government - 1; Private-2)	

G. Perception about the Project

1. Awareness about the project?	
2. Status of the land prior to the purchase/ procurement?	
3. How was the land price determined?	
4. Was negotiation on prices undertaken? Is it above the market rate? How much?	
5. What will the compensation amount be used for?	
6. Besides compensation, any other benefit promised by the project proponent?	
7. Any cultural heritage/ archaeological site near the project area in your land parcel?	
8. Overall has land prices increased with the coming of the project in the area?	
9. Concerns about the project	
10. Expectations from the project	

H. Need Assessment (very important -5; somewhat important- 4; neutral- 3; not very important- 2; not at all important -1)

Educational Institutions		Health Centres	
Infrastructure (roads, electricity etc.)		Employment	
Water Supply		Transport Facilities	
Skill Development		Women Empowerment (vocational centres, jobs, healthcare, education etc.)	
Agricultural Improvement		Recreational/Community Hall etc.	
Others (specify) :		Remarks:	

ANNEXURE V

List of Landowners for Phase I

ESA Study for Rewa Solar Power Project,
Madhya Pradesh, India

Rewa Ultra Mega Solar Limited (RUMSL)

January 2016

रीवा अल्ट्रा मेगा सोलर पावर परियोजना हेतु आपसी सहमति नीति 2014 के
तहत क्रय की जाने वाली भूमि के धारक/धारकों की सूची
ग्राम - बदवार, रा.नि.म.- दुआरी, तहसील - गुढ़ जिला - रीवा (म.प्र.)

क्र.	खसरा नम्बर	रकबा	क्रय हेतु प्रस्तावित रकबा	भूमि स्वामी/शासकीय पट्टेदार का नाम एवं पता	विवरण
1	2	3	4	5	6
1	6404/1	0.053	0.053	हरछठिया पुत्री रामदुलारे सोनी पता सा देह भूमि स्वामी	Not Available
2	6690	0.109	0.109	रघुनाथ पि.समयलाल 1/2 भाग भूमि स्वामी गंगाप्रसाद, प्रयागदत्त पिता रामसलोना पता सा.देह 1/2 भाग भूमि स्वामी	
3	6571	0.085	0.085	रामप्रकाश पि.वाशुदेव पता सा.देह भूमि स्वामी	
4	6813	0.154	0.154	राजेन्द्रपि.मोतीलाल पता सा.देह भूमि स्वामी	
5	6242	0.024	0.218	परमसुख, रामसुन्दर मोतीलाल पिता जग्यभान अमलाबती पति शिवलाल, बीरेन्द्र, धीरेन्द्र, पिता शिवलाल रामभद्र शिवभद्र रामप्रताप श्रीनिवास शिवकुमार पिता चन्द्रभान धिरजुआ, पुत्री अयोध्या पटेल पता सा.देह भूमि स्वामी	
	6243	0.194			
6	6432/4	0.008	0.082	सत्यनारायण पि. केमला प्रसाद कुर्मी पता सा. देह भूमि स्वामी	
	6433/5	0.024			
	6454/6	0.033			
	6455/8	0.017			
7	6617	0.061	0.061	उमेश कुमार पि. वंशपती पटेल पता सा.देह भूमि स्वामी	
8	6569/1	0.053	0.053	विन्ध्येश्वरीप्रसाद पि.पीताम्बर पता सा.देह भूमि स्वामी	
9	6570	0.069	0.069	श्रीमतीगीता पटेल पति विनोद पटेल पता सा.देह भूमि स्वामी	
10	6691	0.073	0.356	गंगाप्रसाद, प्रयागदत्त पि.रामसलोना 1/2 हि. भान्जाप्रसाद, रामेश्वर राजेश्वरी, गम्भू रामसंगीत मनमोहन बृजकिशोर 1/2 भाग, राजकिशोर पि.जगदीश 1/4 हि. रघुनाथ पि.समयलाल 1/4 हि. पता सा.देह 1/2 भाग भूमि स्वामी Address not correct	Not in Work
	6692	0.283			
11	6473/3	0.154	0.292	गोमती पि. अयोध्या पटेल पता सा. देह भूमि स्वामी	
	6474	0.138			
12	6554/2	0.372	0.372	उग्रसेन पिता रामसुन्दर पता सा.देह भूमि स्वामी	
13	6554/3	0.372	0.372	रामधनी पिता ईश्वरदीन पता सा.देह भूमि स्वामी	
14	6225	0.045	0.276	बाबूलाल सुदामा ठाकुरदीन, श्यामलाल पिता लल्लूजी पता सा.देह भूमि स्वामी	
	6248	0.036			
	6250	0.065			
	6251	0.061			
	6254	0.069			
15	6406	0.040	0.040	अशोककुमार, अरुणकुमार पि.रामाश्रय जाति सोनी पता सा.देह भूमि स्वामी	

16	6185/3	0.045	0.045	रधिया पुत्री देवशरण नई पता सा.देह भूमि स्वामी	
17	6423/2	0.020	0.020	रामखिलावन पि.चिन्तामणि, पता सा.देह भूमि स्वामी	
18	6569/3	0.105	0.105	राजवहोर पि.सूर्यप्रसाद पता सा.देह भूमि स्वामी	
19	6185/2	0.045	0.045	खेलाडी पि.मंगल पता सा.देह भूमि स्वामी	
20	6616/2	0.146	0.146	रामसजीवन पिता राधे जाति कुर्मी पता सा.देह भूमि स्वामी	
21	6395/2	0.144	0.144	रामसुमिरन पि.सुदर्शन पटेल पता निवासी ग्राम देह भूमि स्वामी	
22	6432/1	0.008	0.056	जानकी प्रसाद पि. केमला प्रसाद कुर्मी पता सा. देह भूमि स्वामी	He lives in Bhop.
	6433/2	0.014			
	6454/3	0.018			
	6455/5	0.016			
23	6432/3	0.012	0.081	रामप्रकाश पि. केमला प्रसाद कुर्मी पता सा. देह भूमि स्वामी	
	6433/4	0.024			
	6454/5	0.028			
	6455/7	0.017			
24	6390	0.053	0.494	रामखेलावन पि.रामजियावन वसन्त पि.सुदामा पता सा.देह भूमि स्वामी	
	6391	0.441			
25	6948/1	0.101	0.101	शिवराज पि. रामसुमिरन पटेल पता सा. देह भूमि स्वामी	
26	6432/2	0.008	0.082	रामसलोने पि. केमला प्रसाद कुर्मी पता सा. देह भूमि स्वामी	
	6433/3	0.029			
	6454/4	0.028			
	6455/6	0.017			
27	6553/2	0.105	0.105	उग्रसेन रामवती पि. रामसुन्दर पता सा.देह भूमि स्वामी	
28	6689	0.478	0.559	भान्जाप्रसाद, रामेश्वर, राजेश्वर पि.गम्भू, रामसंगीता, मनमोहन, बृजकिशोर, राजकिशोर पि.जगदीश 1/2 भाग, गंगाप्रसाद, प्रयागदत्त पिता	He lives in Gurh or Birsota not Confir
	6693	0.081			
29	6642	0.178	0.482	रामसलोने जाति का पता सा.देह 1/2 भाग भूमि स्वामी धिरजुआ पत्नी गलईप्रसाद पता सा.देह भूमि स्वामी	Not Amild
	6650/2	0.304			
30	6246	0.069	0.069	मु. गुलाब वती पति नारायणप्रसाद ब्रा. पता सा.देह भूमि स्वामी	
31	6443	0.202	0.285	राजकुमार पि मंगल पटेल पता सा.देह भूमि स्वामी	
	6467/2	0.010			
	6468/5	0.073			
32	6587	0.053	0.575	गंगाप्रसाद, प्रयागदत्त पि.रामसलोना पता सा.गुढ़ भूमि स्वामी	He lives in Gurh or Birsota not Confir
	6588	0.162			
	6589	0.093			
	6590	0.069			
	6591	0.198			
33	6438/2	0.036	1.228	इन्द्रजीत पि. गंगा प्रसाद रजउआ वेवा गंगा प्रसाद पटेल पता सा. देह भूमि स्वामी	Address not Confir
	6454/2	0.020			
	6455/3	0.033			
	6440/2	0.105			
	6444/2	0.413			

	6445/2	0.208			
	6446/2	0.273			
	6447/2	0.130			
	6448/2	0.010			
34	6553/1	0.105	0.105	रामधनी पि.ईश्वरदीन पता सा.देह भूमि स्वामी	✓
35	6457/2	0.117	0.163	रामस्वयंम्बर पि.रामजियावन पता निवासी ग्राम देह भूमि स्वामी	✓
	6467/4	0.010			
	6468/7	0.036			
36	6616/3	0.146	0.146	कैलाशुआ पति रामसुमिरन, शंकरप्रसाद पि. रामसुमिरन जाति कुर्मी पता सा.देह भूमि स्वामी	✓
37	6229/1	0.050	0.271	सुमेश्वर पि.अर्जुन पता सा.देह भूमि स्वामी	✓
	6230/1	0.008			
	6234/1	0.099			
	6235/1	0.014			
	6501/1	0.047			
	6502/1	0.029			
	6503/1	0.024			
38	6184	0.016	0.044	ठाकुरदीन पि.रामहित जाति नाई पता सा.देह भूमि स्वामी	✓
	6185/1	0.028			
39	6569/2	0.101	0.101	महावीर पि.सूर्यप्रसाद पता सा.देह भूमि स्वामी	✓
40	6393/4	0.221	0.221	छोटेराल पि.सुदर्शन पटेल पता निवासी ग्राम देह भूमि स्वामी	
41	6394/2	0.180	0.180	तीरथ पि.सुदर्शन पटेल पता सा.देह भूमि स्वामी	
42	6183	0.049	0.049	कालू पि.चिड़डा जाति नाई पता सा.देह भूमि स्वामी	✓
43	6612/5	0.066	0.066	बुधसेन पि. लालामणि कुर्मी पता सा. देह भूमि स्वामी	
44	6421/2	0.016	0.214	रामभद्र पिता चिन्तामणि जाति कुर्मी पता सा.देह भूमि स्वामी	✓
	6422/2	0.073			
	6423/1	0.016			
	6424	0.089			
	6427	0.020			
45	6613/3	0.085	0.085	मुनिया पति विर्सजन समयलाल पि. विर्सजन पटेल पता सा.देह भूमि स्वामी	✓
46	6616/1	0.146	0.146	जगन्नाथ पिता राधे जाति कुर्मी पता सा.देह भूमि स्वामी	✓
47	6456/2	0.169	0.205	राम जी लालजी रामरहीश पि. रामगोपाल पटेल पता सा. देह भूमि स्वामी	
	6468/4	0.036			
48	6453/1	0.101	0.137	वसन्त पि.सुदामा पटेल पता निवासी ग्राम देह भूमि स्वामी	✓
	6468/1	0.036			
49	6612/1	0.009	0.009	राजकली पत्नी जगदीश, वशंराज पिता जगदीश 1/2 भैयालाल पि. रामसुन्दर 1/4 मुनिया पति विशर्जन समयलाल पि. विशर्जन 1/4 कुर्मी पता सा.देह भूमि स्वामी	✓
50	6271	0.081	0.252	वेवा सुखदेव पति रामखेलावनगंगाप्रसाद,राजेन्द्र पिता रामखेलावन पता सा.देह भूमि स्वामी	✓
	6272	0.094			
	6273	0.077			

51	6612/4	0.065	0.066	सुमित्रि पति इन्द्रपाल शेरवहादुर रामनरेश रामनिवास पि. इन्द्रपाल कुर्मी पता सा. देह भूमि स्वामी	
52	6456/1	0.167	0.203	रामसखी पि. धर्मदास पटेल पता सा. देह भूमि स्वामी	
	6468/3	0.036		डिप्टर हर्ष प्रसाद पि. रामसुन्दर पटेल	
53	6612/6	0.065	0.065	उग्रसेन पि. लालमणि कुर्मी पता सा. देह भूमि स्वामी	
54	6680/1	0.016	0.190	रामनिहोर पि. रामशरण पटेल पता सा. देह भूमि स्वामी	
	6681/1	0.174			
55	6452	0.154	0.301	शिवमूरत पि. जोखू पता सा. देह भूमि स्वामी	
	6453/2	0.101			
	6467/1	0.010			
	6468/2	0.036			
56	6602	0.129	0.999	ओमप्रकाश पिता सत्यनारायण दिनेशनारायण लक्ष्मीनारायण पिता रामेश्वर ब्रा. पता सा. देह भूमि स्वामी	
	6603	0.870			
57	6457/1	0.118	0.164	रामखेलावन पिता रामजियावन पटेल पता सा. देह भूमि स्वामी	
	6467/3	0.010			
	6468/6	0.036			
58	6630	0.445	0.911	श्यामकली पत्नी शिवमूरत सेंगीता पुत्री शिवमूरत पता सा. देह भूमि स्वामी	
	6631	0.466			
59	6556/2	0.073	0.073	रामसिया पि. गंगाराम पता सा. देह भूमि स्वामी	
60	6255	0.032	0.485	यदुनन्दन पि. घनानन्द ब्रा. पता सा. देह भूमि स्वामी	
	6257	0.032			
	6259	0.109			
	6264	0.247			
	6265	0.016			
	6266	0.049			
61	6399/1	0.263	0.263	रामसुन्दर पि. सुदर्शन पटेल पता सा. देह भूमि स्वामी	
62	6554/1	0.105	0.105	महावीर राजवहोर पि. सूर्यप्रसाद जाति कुर्मी पता सा. देह भूमि स्वामी	
63	6680/2	0.016	0.190	जयलाल पि. रामशरण पटेल पता सा. देह भूमि स्वामी	
	6681/2	0.174			
64	6393/3	0.220	0.483	अच्छेलाल पि. सुदर्शन पटेल पता निवासी ग्राम देह भूमि स्वामी	
	6399/2	0.263			
65	6472/2	0.010	0.125	राजेशकुमार पि. लखपति प्रसाद जाति कुर्मी पता सा. देह भूमि स्वामी	
	6473/2	0.115			
66	6595/2	0.073	0.279	राधावती पत्नी जगद्धारीदेवेन्द्र कुमार धीरेन्द्र कुमार पि. जगद्धारी पटेल पता सा. देह भूमि स्वामी	
	6673/2	0.085			
	6674/2	0.081			
	6686/2	0.040			
67	6274	0.040	0.076	रामखेलावन पि. सुखई जाति यादव पता सा. देह भूमि स्वामी	
	6276	0.036			
68	6472/1	0.010	0.124	देवनारायण पिता लक्षपति जाति कुर्मी पता सा. देह भूमि स्वामी	
	6473/1	0.114			
69	6421/1	0.024	0.072	म. गिल्ली पति राममिलन पटेल जाति कुर्मी पता सा. देह भूमि स्वामी	
	6422/1	0.048			
70	6673/3	0.105	0.210	राजेन्द्र प्रसाद पि. वलिराज पटेल पता सा. देह भूमि स्वामी	
	6674/3	0.089			

(71)	6687/2	0.016	0.348	जोखूलाल पि.वासुदेव पता सा.देह भूमि स्वामी ✓	
	6142	0.057			
	6143	0.251			
	6144	0.040			
(72)	6396	0.190	1.108	राजेश कुमार पिता रामसुन्दर, मनोज कुमार पिता राजेन्द्र प्रसाद ब्रा. पता सा.देह भूमि स्वामी <i>Not confirm</i>	<i>Not Available</i>
	6397	0.918			
73	6612/3	0.176	0.176	शिववहोर शेषमणि पि. हरदर्शन 1/3रामानुज रामानन्द पि. विद्या प्रसाद 1/3 रामावतार मुनेश महेश दिनेश रमेश पि. श्यामलाल 1/3 कुर्मी पता सा. देह भूमि स्वामी	<i>He lives Bareilly</i>
74	6341	0.405	1.214	रामदेव पि.भागवत कालीपत्नी भोला श्यामलाल रामनरेश रामनिवास पि. भोला 67पै.भाग,रामप्रसाद पिता गिरधारी36पै.भाग,पता सा.देह भूमि स्वामी ✓	
	6350	0.809			
(75)	6381	0.543	0.944	रघुनाथ प्रसाद वालमीक पि. शकर पटेल पता सा.देह भूमि स्वामी ✓	
	6382	0.053			
	6383	0.328			
	6384	0.020			
(76)	6385	0.628	1.007	शुदर्शन पि.वेलानी 1/2 भाग भूमि स्वामी नर्वदा, रामसजीवनवैजनाथ, पि.छोटे पता सा.देह 1/2 भाग भूमि स्वामी ✓	
	6387	0.040			
	6388	0.020			
	6402	0.109			
	6403	0.061			
	6407	0.109			
	6408	0.040			
77	6404/2	0.057	0.102	रामसजीवन रामस्वरूप रामरूप मुनिमहेश पि. बुद्धी सोनी पता सा.देह भूमि स्वामी	
	6405	0.045			
(78)	6438/3	0.118	0.183	मोतीलाल पि. रामफल कुर्मी पता सा. देह भूमि स्वामी ✓	
	6455/4	0.065			
79	6552/3	0.121	0.149	सत्यनारायण पि. रामाश्रय कुर्मी पता सा. देह भूमि स्वामी ✓	
	6566/3	0.028			
(80)	6393/1	0.880	1.527	रघुनाथ बालमीक पि. शँकर पटेल पता सा.देह भूमि स्वामी	
	6394/3	0.360			
	6395/3	0.287			
(81)	6425	0.032	0.396	जगन्नाथ,रामलखन पि.सरजू पता सा.देह भूमि स्वामी ✓	
	6426	0.121			
	6428	0.093			
	6812	0.024			
	6816	0.053			
	6817	0.073			
(82)	6613/2	0.085	0.085	भैयालाल पिता रामसुन्दर पता सा.देह भूमि स्वामी ✓	
83	6552/2	0.122	0.146	भीमसेन पि. रामाश्रय कुर्मी पता सा. देह भूमि स्वामी ✓	
	6566/1	0.024			
84	6393/2	0.440	0.764	राजकुमार अरुण कुमार अरविन्द कुमार संजय कुमार पि.वृजवासीलाल पटेल पता निवासी ग्राम देह भूमि स्वामी ✓	
	6394/1	0.180			
	6395/1	0.144			

85	6566/2	0.023	0.153	यजलाल पि. रामाश्रय कुर्मी पता सा. देह भूमि स्वामी	
	6568/2	0.125			
86	6433/1	0.377	0.591	रामाश्रय पि. गणेश पता सा. देह भूमि स्वामी	✓ अभि महेश
	6438/1	0.117			
	6455/1	0.065			
	6469	0.032			
87	6614	1.177	1.460	शत्रुधन पि. राजरूप पता सा. ररुआ भूमि स्वामी	✓
	6618	0.243			
	6620	0.040			
88	6805	0.255	0.283	रामसजीवन पिता वल्देव 1/2 भाग भूमि स्वामी महेशप्रसाद महेन्द्रप्रसाद पिता महादेव पता सा. देह 1/2 भाग भूमि स्वामी	✓
	6806	0.028			
89	6212	0.016	1.125	रामबती पत्नी राममिलन भगवानदीन लालमन मौकी विमला पिता राममिलन लुब्बा पि. जयराम ददन भूषनसुरेश रमेश पि. रामप्रसाद जाति वढ़ई पता सा. देह भूमि स्वामी	✓
	6213	0.012			
	6215	0.364			
	6216	0.045			
	6217	0.259			
	6220	0.028			
	6221	0.336			
	6222	0.053			
90	6566/4	0.029	0.155	रामजी पि. रामाश्रय कुर्मी पता सा. देह भूमि स्वामी	✓
	6567	0.057			
	6568/3	0.069			
91	6638	0.214	0.610	गिरजा संतोश कुमार राजडेश कुमार गोवर्धन पि. रामवहोर पता सा. देह भूमि स्वामी <i>with all family. He lives in Sidhu</i>	✓
	6639	0.121			
	6640	0.275			
92	6344	0.885	1.527	आलेश कुमार पि. कौशलप्रसाद कृष्णावती पति कौशल प्रसाद जाति ब्रा पता सा. देह भूमि स्वामी	✓
	6345	0.061			
	6346	0.073			
	6347	0.277			
	6349	0.146			
	6354	0.085			
93	6633/1	0.433	0.433	सूर्यदीन पिता गुल्ली पता सा. देह भूमि स्वामी	✓
94	6633/2	0.433	0.433	सूर्यभान पिता सुखदेव पता सा. देह भूमि स्वामी	✓
95	6409/1	0.069	0.815	दशोमति पति शंकर प्रसाद जाति कुर्मी पता सा. देह भूमि स्वामी <i>all family. lives in Bansi & address is confirm.</i>	✓
	6410/1	0.016			
	6411/1	0.016			
	6413/1	0.016			
	6414/1	0.020			
	6415/1	0.077			
	6416/1	0.016			
	6417/1	0.028			
	6418/1	0.008			
	6419/1	0.036			
	6436/1	0.213			

	6437/1	0.295			
96	6612/2	0.331	0.331	राजमणि कौशल प्रसाद पि. सुमेश्वर प्रसाद कुर्मी पता सा. देह भूमि स्वामी	✓
97	6440/1	0.105	1.228	गणेश प्रसाद पि. रामचन्द्र पटेल पता सा. देह भूमि स्वामी	
	6444/1	0.412			
	6445/1	0.208			
	6446/1	0.274			
	6447/1	0.129			
	6448/1	0.010			
	6454/1	0.057			
	6455/2	0.033			
98	6803	0.361	1.197	रामसजीवन पिता वल्लदेव पता सा. देह भूमि स्वामी	✓
	6804	0.549			
	6807	0.271			
	6808	0.016			
99	6476/2	0.026	0.855	रामफल पि. देवशरण पटेल पता सा. देह भूमि स्वामी	✓
	6481/2	0.128			
	6490	0.352			
	6491/2	0.016			
	6494/2	0.054			
	6495	0.279			
100	6641/2	0.106	0.106	रामसुन्दर पि. महावीर पटेल पता सा. देह भूमि स्वामी	✓
101	6948/2	0.101	0.101	रामसजीवन पि. भोला प्रसाद पता सा. देह भूमि स्वामी	✓
102	6238	0.049	0.280	जानकीप्रसाद, रणजीतप्रसाद पि. रामविशाल मु. मानवती वेवा रामलिशाल पता सा. देह भूमि स्वामी	
	6239	0.061			
	6240	0.170			
103	6643	0.024	0.658	दुआसकली पिता वसपती पटेल पता सा. देह भूमि स्वामी	✓
	6644	0.077			
	6646	0.016			
	6647	0.073			
	6648	0.012			
	6649	0.012			
	6650/1	0.307			
	6651	0.036			
	6652	0.065			
	6653	0.036			
104	6897	0.219	0.264	इन्दी वेवा गंगा 1/2 भाग भूमि स्वामी उमाशंकर, शिवशंकर, विश्वनाथ पिता द्वारिकाप्रसाद पता सा. देह 1/2 भाग भूमि स्वामी	✓
	6898	0.045			
105	6476/1	0.027	0.884	लल्लीदेवी पत्नी बृजभान रामनिरंजन भीमसेन सुरेश पि. वृजभान पता सा. देह भूमि स्वामी	✓
	6481/1	0.127			
	6485	0.376			
	6491/1	0.016			
	6494/1	0.055			
	6498	0.283			

Not Available.
He lives in Haridwar.

Same

106	6153	0.388	0.433	प्रमोद पि.रामचरण,लालमणि, रामखेलावन पि.राजाचन्द्रभान,बृजभान, द्वारिका,हीरा,धोखिया पि.सूर्यदीन वेवा कैलाश,विनोद,बुतुआपिता कैलाश पता सा.देह भूमि स्वामी	
	6154	0.045			
107	6556/3	0.202	0.202	सुखेन्द्र महेन्द्र रवीन्द्र भूपेन्द्र पिता यजसेन पटेल पता सा.देह भूमि स्वामी	
108	6463/2	0.142	0.158	सेवाभूमि कोटवार प. हल्का वदवार पता सा. देह भूमि स्वामी	
	6488	0.016			
109	6556/1	0.073	0.073	द्वारिकाप्रसाद पि.गंगा पता सा.देह भूमि स्वामी	
110	6809	2.025	2.025	नर्वदाप्रसाद पि.केमलाराम पता ला.देह भूमि स्वामी	
111	6595/1	0.300	1.580	रामनिहोर,जयलाल पि.रामशरणरामनिहार,जय- लाल,पि.रामशरण,गोकुल,पि.राममनोहर भूमि स्वामी विनोद,रावेन्द्र पि.श्यामसुन्दर पता सा.देह भूमि स्वामी	समिति ४९४ ९९९३५५९९९९ १९९९३
	6673/1	0.551			
	6674/1	0.518			
	6686/1	0.162			
	6687/1	0.049			
112	6409/2	0.073	0.799	भीमसेन,शम्भू,भैयालाल पिता रामकृपाल जाति कुर्मी पता सा.देह भूमि स्वामी	
	6410/2	0.016			
	6411/2	0.012			
	6413/2	0.020			
	6414/2	0.020			
	6415/2	0.073			
	6416/2	0.012			
	6417/2	0.024			
	6418/2	0.004			
	6419/2	0.040			
	6436/2	0.214			
	6437/2	0.291			
113	6932	0.020	0.488	रामविलोचन पि.सूर्यभान पता सा.देह भूमि स्वामी Not Available.	
	6933	0.053			
	6934	0.069			
	6935	0.028			
	6936	0.129			
	6938	0.020			
	6939	0.105			
	6940	0.040			
	6942	0.024			
114	6151	0.049	0.049	जगदीश प्रसाद पि. हरदर्शन प्रसाद ब्रा. पता सा. देह भूमि स्वामी	
115	6637/1	0.081	0.433	सुश्रीव गंगा जानकी पि. साधू वेवा साधू राजेश उमेश पि रामसिया सूर्यप्रताप रामानन्द पि. भोला कुर्मी पता सा. देह भूमि स्वामी	
	6641/1	0.352			
116	6613/1	0.172	0.172	राजकली पत्नी जगदीश वंशराज पिता जगदीश पटेल पता सा. देह भूमि स्वामी	
	6552/1	0.008			
				मु. दशोदिया पति मोतीलाल राजेन्द्र दयाशंकर विनोद निनीप पि मोतीलालमशग पहलाट मनामा	

	6568/1	0.073	0.081	यजनरायण, हरिहरपिता श्यामसुन्दर जाति कुर्मी पता सा. देह भूमि स्वामी <i>the lines for Satna.</i>	
118	7011	0.162	0.810	भगवानदीन पि. रामप्रताप पटेल पता सा. देह भूमि स्वामी ✓	
	7012	0.081			
	7014	0.567			
119	6662	0.214	0.214	विष्णुकान्त पि. अजय कुमार नावा. वली. सरपरस्त पि. अजय कुमार पि. जगदीश प्रसाद ब्रा. पता सा. देह भूमि स्वामी ✓	
120	6655	0.437	0.437	शुशीलकुमारपि. शेषमणि पता सा. देह भूमि स्वामी ✓	
121	6675	0.077	2.072	सत्यनारायण, अशोक, दिलीप पि. सूर्यप्रताप जाति पटेल पता सा. देह भूमि स्वामी	
	6676	0.890			
	6678	0.251			
	6679	0.186			
	6682	0.182			
	6683	0.032			
	6684	0.405			
122	6688	0.049	0.490	भागवत प्रसाद पि. शिवसहाय पता सा. देह भूमि स्वामी ✓	
	6606	0.069			
	6607	0.328			
123	6608	0.093	2.088	अवधेश राजेश पि. राजभान सा. पहरखा तह. मनगंमा शान्ती पत्नी रामश्राय पुत्री सूर्यप्रसाद पटेल सा. इटहा तह. मनगंमा रामकली पत्नी रमेश पुत्री सूर्यप्रसा उर्मिलापत्नी भगीरथी पुत्री सूर्यप्रसाद सा चन्दर महुली तह. मऊगंज 1/4 श्यामवती पति शिवमूरत 1/4 भाग भूमि स्वामी उग्रसेन, बुद्धसेन पि. राम-सखा, माधी, विन्दी पुत्री रामसखा, <u>वैवा रामसखा राजमणि राममिलन, महावीर महावीर वैजनाथ पि. रामऔतार 1/2 भूमि स्वामी</u> ✓	
	6478	0.393			
	6479	0.578			
	6480	0.049			
	6482	0.085			
	6483	0.045			
	6484	0.028			
124	6628	0.032	0.878	उमाशंकर, शिवशंकररमेश पि. द्वारिकाप्रसाद पता सा. वदवार भूमि स्वामी ✓	
	6629	0.878			
	6463/1	0.388			
	6464	0.016			
	6465	0.089			
	6466	0.190			
125	6896	0.053	1.303	राजरूप पि. वसुधा मु. सोनियावेवा रामलाल, आशादेवी, निर्मलादेवी, राजवहोर, राज-कुमार, पि. श्यामलाल 1/2 भाग भूमि स्वामी वंशगोपाल, रामकरण, मोलिया पि. राजधर पता सा. देह 1/2 भाग भूमि स्वामी ✓	
	6899	0.142			
	6486	0.028			
	6487	0.676			
126	6489	0.227	1.518	अजयकुमार पि. जगदीशप्रसाद जाति ब्रा. पता सा. देह भूमि स्वामी ✓	
	6496	0.372			
	6599	0.040			
	6663	0.040			
	6664	0.259			
	6665	0.024			
	6666	0.125			

	6667	0.555		स्वामी	
	6668	0.045			
	6669	0.243			
	6670	0.049			
	6671	0.138			
127	6604	0.801	0.801	ओम प्रकाश पि. सत्यनारायण, लक्ष्मीनारायण, दिनेशनारायण, पितारामेश्वर प्रसाद पता सा. देह भूमि स्वामी	
128	6241	0.162	0.162	रामभद्र, शिवभद्र, रामप्रताप, श्रीनिवास, शिवकुमार, पिता चन्द्रभान, जगन्नाथ पिता बोड़े, परमसुख, रामसुन्दर, शिवलाल, मोतीलाल पिता जगिभान पता सा. देह भूमि स्वामी	
129	6229/2	0.017	0.091	दिनेश पिता भगवत पता सा. देह भूमि स्वामी	
	6230/2	0.003			
	6234/2	0.033			
	6235/2	0.005			
	6501/2	0.015			
	6502/2	0.010			
	6503/2	0.008			
130	6229/3	0.018	0.092	उमेश पिता भगवत पता सा. देह भूमि स्वामी	
	6230/3	0.003			
	6234/3	0.033			
	6235/3	0.005			
	6501/3	0.015			
	6502/3	0.009			
	6503/3	0.009			
131	6229/4	0.017	0.089	राजेश पिता भगवत पता सा. देह भूमि स्वामी	129
	6230/4	0.002			
	6234/4	0.033			
	6235/4	0.004			
	6501/4	0.016			
	6502/4	0.009			
	6503/4	0.003			
132	6232	3.035	3.035		
133	6694	0.741	0.741		
134	6695	0.206	0.206		
योग	386 किता	58.700	58.700		

रीवा अल्ट्रा मेगा सोलर पावर परियोजना हेतु आपसी सहमति नीति 2014 के
तहत क्रय की जाने वाली भूमि के धारक/धारकों की सूची
ग्राम - रामनगर पहाड़, रा.नि.म.- दुआरी, तहसील - गुढ़ जिला - रीवा (म.प्र.)

क्रमांक	खसरा नम्बर	रकबा	क्रय हेतु प्रस्तावित रकबा	भूमि स्वामी/शासकीय पट्टेदार का नाम एवं पता	विवरण
1	2	3	4	5	6
1	227/1	0.039	0.039	हीरालाल पि. सुग्रीवराम ब्रा. पता सा. बरसैता भूमि स्वामी	Badula
2	75/2	0.018	0.118	दिगम्बर पिता सुरेन्द्र ब्रा. पता सा. बरसैता भूमिस्वामी	
	227/2	0.038			
	228/2	0.006			
	229/2	0.046			
	230/2	0.010			
3	497/8	0.038	0.050	पूनम पि. दिवाकर ब्रा. पता सा. डढवा भूमि स्वामी	
	499/8	0.012			
4	497/9	0.038	0.050	प्रियका पि. दिवाकर ब्रा. पता सा. डढवा भूमि स्वामी	
	499/9	0.012			
5	75/1	0.018	0.034	कौशल प्रसाद पिता सुग्रीवराम पता सा. बरसैता भूमि स्वामी	
	228/1	0.006			
	230/1	0.010			
6	229/1	0.047	0.047	जीवेश कुमार पिता जवाहर लाल ब्रा. सा. बरसैता भूमि स्वामी	
7	494/5	0.014	0.065	सुनीता पति दिवाकर ब्रा. पता सा. डढवा भूमि स्वामी	
	497/5	0.038			
	499/5	0.013			
8	494/4	0.014	0.066	दिवाकर पि. समालिया राम ब्रा. पता सा. डढवा भूमि स्वामी	
	497/4	0.039			
	499/4	0.013			
9	494/7	0.013	0.075	विश्वजीत पि. दिवाकर प्रसाद ब्रा. पता सा. डढवा भूमि स्वामी	
	495/3	0.002			
	496/3	0.003			
	497/7	0.038			
	498/3	0.002			
	499/7	0.013			
	500/5	0.004			
	494/6	0.013			

10	495/2	0.003	0.077	विनीत पि. दिवाकर प्रसाद ब्रा. पता सा. डढवा भूमि स्वामी	
	496/2	0.003			
	497/6	0.038			
	498/2	0.003			
	499/6	0.013			
	500/4	0.004	0.120	गायत्री पति सुखनिधान ब्रा. पता सा. देह भूमि स्वामी	
	494/8	0.019			
	497/10	0.076			
	499/10	0.025	0.243	भोला प्रसाद पि. महेशप्रसाद पता सा. बरसैठा भूमि स्वामी	a badre
12	248	0.243			
13	233	0.255	0.255	सरस्वती पुत्री सियाशरण पता सा. बरसैठा भूमि स्वामी	Gopal pur
14	494/2	0.018	0.135	दीपक पि. बाबूलाल ब्रा. पता सा. डढवा भूमि स्वामी	
	495/1	0.005			
	497/2	0.077			
	498/1	0.005			
	499/2	0.026			
	500/2	0.004			
15	102	0.283	0.283	भोलाप्रसादपि महेश प्रसाद पता सा. बरसैठा भूमि स्वामी	badre
16	113	0.020	0.324	सुदर्शन प्र. पिता चिडडा जाति ओहिर पता सा. देह भूमि स्वामी	
	114	0.195			
	115	0.020			
	116	0.089			
17	494/10	0.018	0.120	अनामिक पि. सुखनिधान ब्रा. पता सा. देह भूमि स्वामी	
	497/12	0.076			
	499/12	0.026			
18	494/3	0.018	0.121	ज्योति पति दीपक कुमार ब्रा. पता सा. डढवा भूमि स्वामी	
	497/3	0.076			
	499/3	0.025			
	500/3	0.002			
19	494/9	0.018	0.145	अनुराग पि. सुखनिधान ब्रा. पता सा. देह भूमि स्वामी	
	495/4	0.005			
	496/4	0.006			
	497/11	0.077			
	498/4	0.005			
	499/11	0.026			
	500/6	0.008			
20	249	0.032	0.400	छोटेलाल पि. रामधनी पता सा. बरसैठा भूमि स्वामी	
	250	0.368			

21	494/1	0.019	0.128	मालती पति बाबूलाल ब्रा. पता सा. डढवा भूमि स्वामी	
	496/1	0.006			
	497/1	0.076			
	499/1	0.025			
	500/1	0.002			
22	166/1	0.012	0.012	रामखेलावन पिता चिड़ड़ा यादव सा. देह भूमिस्वामी	
23	166/2	0.012	0.012	सुदर्शन पिता चिड़ड़ा यादव सा. देह भूमिस्वामी	
24	166/3	0.012	0.283	रामनिहोर पिता महादेव यादव सा. देह भूमिस्वामी	
	127/1	0.271			
25	166/4	0.013	0.285	यज्ञसेन पिता चुलबुल यादव सा. देह भूमिस्वामी	
	127/2	0.272			
26	208	0.032	0.546	रमेश प्रसाद पि. संकर्षण प्रसाद पटेल पत्नी सरपरस्त शान्तिबाई जाति कुर्मी पता सा. बरसैता भूमि स्वामी	
	209	0.514			
27	223	0.502	0.547	आनन्दवती पति सैकटमोचन ब्रा. पता सा. देह 1/2 भाग भूमि स्वामी सुदर्शन प्रसाद पि चिड़ड़ी जाति यादव पता सा. देह 1/2 भाग भूमि स्वामी	
	224	0.045			
28	489	0.028	0.101	रामनरेश पि रामनुज ब्रा. पता सा. डढवा भूमि स्वामी	
	493	0.073			
29	213	0.809	0.809	रमागोविन्द पि. जगन्नाथ ब्रा. पता सा. बरसैता भूमि स्वामी	
30	245	0.085	0.838	रामप्रसाद पि. सुदर्शन जाति कुर्मी पता सा. बरसैता भूमि स्वामी	
	246	0.753			
31	193	0.263	0.316	शिवबहोर शेषमणि पि. हरदर्शन 50 पै. भाग वेवा चन्द्रवती पति बद्री पता सा. बरसैता 50 पै. भाग भूमि स्वामी	
	194	0.053			
32	494/1/क	0.05	0.372	सुभाष भैयालाल दुधेश्वर पि. शेषमणि राजेश पि. शुभकरन ब्रा. पता सा. देह भूमि स्वामी	
	495/1/क	0.005			
	496/1/क	0.006			
	497/1/क	0.223			
	498/1/क	0.005			
	499/1/क	0.075			
	500/1/क	0.008			
33	107	0.381	1.072	सियासरण पि. जगदेव पता सा.	
	108	0.045			

	128	0.384	1.075	डढ़वा भूमि स्वामी	
	130	0.263			
34	94	0.117	0.938	आनन्द बती पति सँकटमोचन ब्रा. हि. 1/2 पता सा. बरसैता भूमि स्वामी दिनेश कुमार पि लक्ष्मीनारायण सँकटमोचन अरविन्द कुमार राजारामपि बाल्मीक 1/2 पता सा. बरसैता भूमि स्वामी	
	95	0.036			
	96	0.089			
	97	0.129			
	101	0.567			
35	545	0.295	0.594	कृष्णधर पि. रामदत्त 1/2 भाग भूमि स्वामी चूड़ामणि पि. कामता प्रसाद जाति ब्रा. पता सा. डढ़वा 1/2 भाग	
	546	0.028			
	548	0.271			
36	215	0.065	1.207	श्री मती श्यामवती पति रामकृपाल पता सा. डढ़वा भूमि स्वामी पता सा. बरसैता	
	216	0.057			
	217	0.304			
	218	0.02			
	219	0.498			
	220	0.04			
	221	0.223			
37	207	0.607	1.214	गणेशिया पति छोटेलाल भूमि स्वामी	(Buddhika desh)
	239	0.607			
38	225	1.364	1.554	शारदा प्रसाद पिता देवीदीन ब्रा. पता सा. देह भूमि स्वामी	
	235	0.065			
	236	0.105			
	237	0.020			
39	240	0.405	0.867	राजमणि पि. गजाधर पटेल जाति पटेल पता सा. बरसैता भूमि स्वामी	
	241	0.325			
	242	0.04			
	243	0.097			
40	67	0.04	1.488	लक्ष्मीनारायण, सँकट मोचन, अरविन्द कुमार, राजाराम पिता बाल्मीक पता सा. बरसैता भूमि स्वामी	
	70	0.024			
	72	0.008			
	73	0.259			
	74	0.02			
	78	0.162			
	84	0.036			
	85	0.283			
	86	0.134			
	87	0.117			
	89	0.049			
	90	0.049			
	91	0.024			

	92	0.283			
41	561	0.332	0.332	रामाशेरोमाणे पि. शिवप्रसाद जाति ब्रा. पता सा. बांधी भूमि स्वामी	
42	77	0.394	1.094	अनन्दवती पति सँकट मोचन ब्रा. पता सा. देह भूमि स्वामी	
	80	0.15			
	81	0.372			
	83	0.178			
43	103	2.603	6.386	जगद्देव पि. दुलारे जाति अहिर पता सा. डंढवा भूमि स्वामी	
	104	0.539			
	105	1.088			
	106	1.639			
	109	0.109			
	110	0.384			
	111	0.024			
44	117	0.130	0.130	ऊषा पति राजेन्द्र प्रसादशुक्ला जाति शुक्ला पता सा. मनिकवार भूमि स्वामी	Rama Gopalpur
	152 किता	23.893	23.893	44 खाता	

रीवा अल्ट्रा मेगा सोलर पावर परियोजना हेतु आपसी सहमति नीति 2014 के
तहत क्रय की जाने वाली भूमि के धारक/धारकों की सूची
ग्राम - इटार पहाड़, रा.नि.म.- दुआरी, तहसील - गुढ़ जिला - रीवा (म.प्र.)

क्रमांक	खसरा नम्बर	रकबा	क्रय हेतु प्रस्तावित रकबा	भूमि स्वामी/शासकीय पट्टेदार का नाम एवं पता	विवरण
1	2	3	4	5	6
1	1407/3	0.043	0.043	वन्दना पि. दिनकर प्रसाद ब्रा.पता सा. देह भूमि स्वामी	
2	1407/2	0.250	0.250	विवेक कुमार पि. दिनकर प्रसाद ब्रा. पता सा. देह भूमि स्वामी	
3	1405	0.312	0.562	राकेश कुमार पि. दिनकरप्रसाद ब्रा.पता सा.डढवा भूमि स्वामी	
	1407/1	0.250			
4	1418	0.295	0.643	दयाशंकर पि.रामभरोसा पता सा.वाधी भूमि स्वामी	
	1419	0.024			
	1420	0.324			
5	1399	0.316	0.781	सुग्रीम पि.रमोले,रामफलपि.पियारे, शियाशरण,अवन्ती पि.राजधर जाति नाई पता सा.जल्दर भूमि स्वामी	
	1400	0.024			
	1401	0.162			
	1404	0.279			
6	1426	0.044	0.044	शैलेन्द्रकुमार,वालेन्द्रकुमार पि.शेषमणिम जाति ब्रा. पता सा.वांधी भूमि स्वामी पता सा.लरसैता	
7	1430	0.186	0.356	गुरुप्रसाद,हरप्रसाद,सनत- कुमार,रामरतन पि.रामलला जाति ब्रा. पता सा.वाधी भूमि स्वामी	
	1434	0.170			
8	1441	0.170	0.914	राममणि,छोटेराम,लखनराम लछमण पि.सुमेश्वरराम वेवासुमेश्वरराम भूमि स्वामी	
	1442	0.324			
	1443	0.036			
	1444	0.384			
योग	18 किता	3.593	3.593	08 खाता	

रीवा अल्ट्रा मेगा सोलर पावर परियोजना हेतु आपसी सहमति नीति 2014 के

तहत क्रय की जाने वाली भूमि के धारक/धारकों की सूची

ग्राम - बरसैता पहाड़, रा.नि.म.- दुआरी, तहसील - गुढ़ जिला - रीवा (म.प्र.)

क्रमांक	खसरा नम्बर	रकबा	क्रय हेतु प्रस्तावित रकबा	भूमि स्वामी/शासकीय पट्टेदार का नाम एवं पता
1	2	3	4	5
1	55	0.024	0.024	रामफल,राममिलनपि.हनुमान व रामसजीवन पि.जगन्नाथ जाति कुर्मी. पता सा.बरसैता भूमि स्वामी
2	66	0.214	0.214	राममिलन पि.हनुमान जाति कुर्मी. पता सा.बरसैता भूमि स्वामी
3	68	0.093	0.291	रामफल पि.हनुमान पता सा.बरसैता भूमि स्वामी
	69	0.020		
	70	0.069		
	71	0.109		
4	75	0.113	0.344	बद्री,बिशाल,सीताराम पि.श्रीमन जाति ब्रा. पता सा.डढ़वा भूमि स्वामी
	77	0.089		
	78	0.142		
5	73	0.206	0.206	उमेश कुमार पि.किशोरीशरण जाति ब्रा. पता सा.बरसैता भूमि स्वामी
6	60	0.121	0.339	अंशमणि सुमन्त आन्नद पिता हनुमान प्रसाद सोमबती पति हनुमान प्रसाद वेवाढवारिकाप्रसाद जाति ब्रा. पता सा.बरसैता भूमि स्वामी
	61	0.04		
	64	0.077		
7	80	0.364	0.74	राघो प्रसाद पि.राजमणि जाति ब्रा. पता सा.बरसैता भूमि स्वामी
	82	0.34		
	83	0.02		
	84	0.016		
8	14	0.105	0.166	शिववहोरशेषमणि पि.हरदर्शन जाति कुर्मी. पता सा.बरसैता भूमि स्वामी
9	86	0.134	0.947	राजमणिपि.रामउदार 1/2 भाग भूमि स्वामी राघो प्रसाद पि. राजमणि जाति ब्रा. पता सा.बरसैता 1/2 भाग भूमि स्वामी
	87	0.02		
	88	0.7		
	89	0.053		
	92	0.04		
10	13	0.170	0.17	अच्छेलाल पि. बद्री जाति कुर्मी. पता सा. बरसैता भूमि स्वामी
योग	24 किता	3.441	3.441	10 खाता

रीवा अल्ट्रा मेगा सोलर पावर परियोजना हेतु आपसी सहमति नीति 2014 के
तहत क्रय की जाने वाली भूमि के धारक/धारकों की सूची
ग्राम - बरसैता देश, रा.नि.म.- दुआरी, तहसील - गुढ़ जिला - रीवा (म.प्र.)
जिनकी सहमति प्राप्त हो चुकी है।

क्रमांक	खसरा नम्बर	रकबा	क्रय हेतु प्रस्तावित रकबा	भूमि स्वामी/शासकीय पट्टेदार का नाम एवं पता	विवरण
1	2	3	4	5	6
1	2137	0.008	0.008	यज्ञनारायण पता सा. वदवार भूमि स्वामी	
2	1601	0.024	0.024	मु. समुद्री देवी पता सा. देह 0.06 पै. भाग भूमि स्वामी	
3	1706	0.024	0.024	सरस्वती पिता सियाशरण पता सा. देह भूमि स्वामी	
4	1630/2	0.088	0.088	नागेन्द्र पिता गोवर्धन प्रसाद ब्रा. पता सा. देह भूमि स्वामी	
5	1979/2	0.101	0.101	संजय उमेश रामभुवन तेजभान पिता रामाश्रय व वेवा रामाश्रय पता सा. देह भूमि स्वामी	
6	1735/2	0.101	0.202	ज्ञानेन्द्रभूषण जनार्दन शशिभूषण पिता जगदीश प्रसाद पता सा. देह भूमि स्वामी	
	1713	0.028			
	1714/1	0.073			
7	2138/2	0.202	0.202	रामगरीब पि. गरूल जाति कुर्मी पता सा. देह भूमि स्वामी	
8	2138/1	0.203	0.203	तीरथ पि. गरूल जाति कुर्मी पता सा. देह भूमि स्वामी	
9	1951	0.170	0.219	योगेश कुमारS/O रघुनाथ प्रसाद पटेल पता सा. देह भूमि स्वामी	
	1952	0.049			
10	1731	0.227	0.227	भैयालाल पि. ईश्वरदीन पता सा. देह भूमि स्वामी	
11	1991	0.016	0.202	रामप्रगास पि. वासदेव पता सा. बदवार भूमि स्वामी	
	1992	0.186			
12	2144	0.454	0.454	चन्द्रवती पति विसर्जन 1/2 भाग भूमि स्वामी रामाश्रय, रामगोपालअम्बिका प्रसाद पि. रामकृपाल तरुण कुमारअभिलाख, लालभाई पि. नर्वदा भूमि स्वामी मुन्नी पुत्री नर्वदा ववेवा नर्वदा सूर्यभानछोटे लाल, पि. रामधनी पता सा. देह 1/2 बराबर भाग भूमि स्वामी	
13	1587/1	0.023	0.023	नरेश शरण पि. गंंगाराम जाति ब्रा. पता सा. देह भूमि स्वामी	
14	1962/2	0.020	0.390	जयपाल सिंह पि. लखपती सिंह पता सा. देह भूमि स्वामी	
	1963/2	0.243			
	2018/2	0.117			
	2019/1	0.010			
15	1962/1	0.020	0.391	धर्मपाल सिंह पि. लखपती सिंह पता सा. देह भूमि स्वामी	
	1963/1	0.243			
	2018/2	0.118			
	2019/1	0.010			

16	1727/2	0.500	0.500	रामशरण पि. पंची जाति कोल पता सा.देह भूमि स्वामी	
17	1727/3	0.500	0.500	रामाश्रय पि.शिववालक जाति कोल पता सा.देह भूमि स्वामी	
18	1727/4	0.500	0.500	रामलाल कल्लू जगदीश पिता औसेरी जाति कोल पता सा.देह भूमि स्वामी	
19	1727/5	0.500	0.500	छोटेलाल पि.चैतू जाति कोल पता सा.देह भूमि स्वामी	
20	1727/6	0.500	0.500	रामसजीवन पि. सरजू जाति कोल पता सा.देह भूमि स्वामी	
21	1727/7	0.500	0.500	रामसुमिरन रामबक्स पिता गंगा जाति कोल पता सा.देह भूमि स्वामी शासकीय पट्टेदार	
22	1714/2	0.186	0.186	लालजी पि. अंगद पता सा. देह भूमि स्वामी	
23	2059	0.093	0.299	रामसुमिरन पि.वट्टी पता निवासी ग्राम देह भूमि स्वामी	
	2060	0.206			
24	2147/2	0.405	0.405	शिवराज पि. रामगोपल कुर्मी पता सा. देह भूमि स्वामी	
25	1977	0.061	0.523	रामगोपाल पि. रामकृपाल पता सा. देह भूमि स्वामी	
	1978/1	0.243			
	1979/3	0.174			
	2050/1	0.045			
26	1735/1	0.526	0.566	शंकरप्रसाद पिता गंगा प्रसाद जाति ब्रा. पता सा. देह भूमि स्वामी	
	1736	0.040			
27	2081	0.125	0.372	जोखूलाल,शालिकराम श्रीनिवास पि. रामधारी 0.94 पै भाग भूमि स्वामी शिवदर्शन पि. गजाधर पता सा. देह 0.06 पै भाग भूमि स्वामी	
	2082	0.012			
	2084	0.045			
	2086	0.081			
	2087	0.036			
	2088	0.073			
28	1710	0.028	0.380	प्रभावती पति मोतीलाल पता सा. देह भूमि स्वामी	
	1711	0.352			
29	2011	0.247	0.570	गनेशिया पति छोटेलाल पटेल पता सा. देह भूमि स्वामी	
	2012	0.045			
	2035/2	0.040			
	2037/2	0.238			
30	1752	0.113	0.181	श्री मती चौरासिया देवी मोहनलाल जाति काछी पता सा. देह भूमि स्वामी	
	1753	0.028			
	1754	0.040			
31	1761/1	0.372	0.372		
32	1590/2	0.180	1.397	गोवर्धन पि. अर्जुनराम ब्रा. पता सा. देह भूमि स्वामी	
	1591/2	0.008			
	1592/2	0.022			
	1593/2	0.004			
	1628/2	0.674			
	1768/2	0.270			
	1619/2	0.235			

	1629/2	0.004			
33	2009	0.809	1.096	छोटेलाल पि. रामधनी पता सा. देह भूमि स्वामी	
	2035/1	0.045			
	2037/1	0.242			
34	1997	0.093	7.263	चक्रधीन पि. राजमणि पता सा. देह भूमि स्वामी	
	1998	0.324			
	2038	0.061			
	2039/1	0.250			
	2075/1	0.020			
	2076/1	0.129			
	2083/1	0.040			
	2089/1	0.012			
	2091	0.024			
	2093	0.101			
	1995	0.405			
	1996	0.081			
	1999	0.162			
	2002	0.162			
	2022	1.011			
	2048	0.142			
	2052	0.073			
	2058	0.405			
	2146	1.416			
	2034	0.138			
	2162	2.214			
35	1590/3	0.184	0.996	गिरधारी पि. अर्जुन राम ब्रा. पता सा. देह भूमि स्वामी	
	1591/3	0.004			
	1592/3	0.022			
	1618/3	0.464			
	1619/3	0.234			
	1630/3	0.088			
36	1590/1	0.180	0.765	वंशवर्धन पि. अर्जुन राम ब्रा. पता सा. देह भूमि स्वामी	
	1591/1	0.008			
	1592/1	0.021			
	1593/1	0.004			
	1618/1	0.460			
	1629/1	0.004			
	1630/1	0.088			
37	1938/2	0.405	0.405	शिवबहोर, शेषमणिपि. हरदर्शन जाति कुर्मी पता सा. देह भूमि स्वामी	
38	1978/2	0.162	0.814	तरूण कुमार, अभिलाख, पि. नर्वदा व मुन्नी पुत्री नर्वदावेवा नर्वदा पता सा. देह भूमि स्वामी	
	1979/1	0.162			
	1980	0.040			
	2050/2	0.045			
	2147/1	0.405			
39	1750	0.174	0.202	सियाशरण पि. जगदेव जाति काछी पता सा. देह भूमि स्वामी	
	1751	0.028			
40	2024	0.486	1.227	रघुनाथ प्रसाद पि. रामेश्वर प्रसाद पता सा. देह	
	2025	0.628			

70	2026	0.028	1.221	भूमि स्वामी	
	2027	0.085			
41	1950	0.182	0.573	रामगरीब पि. गरूल रामसुमिरन पि. बट्टी पता सा. देह भूमि स्वामी	
	2000	0.012			
	2001	0.129			
	2039/2	0.250			
42	1586/3	0.356	0.356	अगमानन्दपि. गंगा प्रसाद ब्रा. पता सा. देह भूमि स्वामी	
43	2075/2	0.020	0.423	रमेश प्रसाद पि.संकर्षणप्रसाद पटेल पत्नी सरपरस्त शांती बाई तीरथ पि. गरूल पता सा. देह भूमि स्वामी	
	2076/2	0.133			
	2077/2	0.012			
	2083/2	0.040			
	2089/2	0.016			
	2090	0.129			
	2092	0.073			
44	2068	0.518	0.975	अम्बिका पि. रामकृपाल पता सा. देह भूमि स्वामी	
	2072	0.308			
	2073	0.028			
	2074	0.121			
45	1698	0.024	0.024	जीवेश कुमार पि. जवाहरलाल जाति ब्रा. पता सा. देह भूमि स्वामी	
46	1584	0.223	0.625	राजेश कुमार पि. गंगाराम ब्रा. पता सा. देह भूमि स्वामी	
	1585	0.024			
	1586/2	0.356			
	1587/2	0.022			
47	1586/1	0.356	0.356	अजय कुमार पि. नरेशसरण ब्रा. पता सा. देह भूमि स्वामी	
48	1964	0.008	0.781	वेवा चन्द्रकान्ता सिंहपति प्रभुनाथ सिंह पता सा. देह भूमि स्वामी	
	1965	0.206			
	2018/4	0.542			
	2019/2	0.025			
49	2130	0.809	0.809	अरुण कुमार पि. छोटेलाल पता सा. देह भूमि स्वामी	
50	2155/1	0.599	0.599	ददी पि. धनपति जाति गड़रिया पता सा. वदवार भूमि स्वामी	
51	1761/2	0.559	0.604	अमरनाथ पि. रामसुशील ब्रा. पता सा. देह भूमि स्वामी	
	1762	0.045			
52	1573	0.069	0.766	श्रीशरण पिता रामखेलावन जाति ब्रा. पता सा. देह भूमि स्वामी	
	1578	0.182			
	1582	0.178			
	1588/2	0.289			
	1589	0.036			
	2077/1	0.012			
53	1938/1	0.081	0.436	अच्छेलाल पि. बट्टी अनुप्रिया देवी पि .बट्टी कुर्मी बराबर भाग पता सा. देह भूमि स्वामी	
	1939/1	0.040			
	1944	0.020			
	1974	0.036			
	1975	0.259			
54	2132	0.725	1.610	रामखेलावन रामबक्स समयलाल पि गंगा	

54	2133	0.894	1.017	पता सा. देह भूमि स्वामी	
55	2079/1	0.018	0.031	मु. कैलाशबती पत्नी कोमलचन्द पटेल पता सा. देह भूमिस्वामी	
	2080/1	0.008			
	2098/1	0.005			
56	1702	0.081	0.097	श्रीमती प्रेमवती पत्नी छोटेलाल जाति ब्रा. पता सा. देह भूमि स्वामी	
	1703	0.016			
57	2016	0.202	0.781	अमरपाल सिंहपि तेजभान सिंह पता सा. देह भूमि स्वामी	
	2017	0.016			
	2018/3	0.563			
58	1575	0.146	0.671	बालेन्द्रशरण पिता राजीवलोचन जाति ब्रा. पता सा. देह भूमि स्वामी	
	1576	0.020			
	1581	0.032			
	1633	0.275			
	1634	0.028			
	1635	0.028			
59	1636	0.142			
	1579	0.040	0.040	राजीवलोचन पिता रामखेलावन जाति ब्रा. पता सा. देह भूमिस्वामी	
60	1690	0.113	0.330	दिनेश कुमारपि. लक्ष्मी नारायण ब्रा. पता सा. देह भूमि स्वामी	
	1693	0.024			
	1694	0.040			
	1695	0.004			
	1696	0.129			
	1697	0.020			
61	1954	0.121	0.282	मानवती पति अतिवलप्रेमवती पति रामसजीवन पता सा. देह भूमि स्वामी	
	1955	0.016			
	1956	0.117			
	1957	0.028			
62	1596	0.036	0.603	जगदीश प्रसादपि. हरदर्शन प्रसाद पता सा. वदवार भूमि स्वामी	
	1597	0.567			
63	1628/3	0.675	0.945	अतुल पिता गिरधारी ब्रा. पता सा. देह भूमि स्वामी	
	1768/3	0.270			
64	1966	0.081	0.780	अरुणेन्द्र सिंह भूपेन्द्र सिंह शिवेन्द्र सिंह पिता रामपाल सिंह रामकुमारी सिंह पत्नी रामपाल सिंह मु. प्रेमावाई वेवा वंशपतीसिंह पता सा. देह भूमि स्वामी	
	1967	0.016			
	1968	0.113			
	1969	0.028			
	1970	0.198			
	2018/1	0.344			
65	1947	0.692	1.354	राजकुमार अवधेश पिता रामप्रसाद पटेल गीता पति रामप्रसाद पटेल पता सा. देह भूमिस्वामी	
	1949	0.020			
	2054	0.036			
	2055	0.275			
	2062	0.012			
	2063	0.117			
	2070	0.024			
	2071	0.178			
66	1580	0.470	0.759	हनुमान शरण पि. रामखेलावन. जाति ब्रा. पता सा. देह भूमि स्वामी	
	1588/1	0.289			
	2004	0.061		निजली पिता रामराज कैलाशबती पत्नी कोमल	

67	2005	0.142	2.102	1584/1 पता जनुगा, कलारापता पता पगनल, हर्षलाल पिता कोमल अनिल पुष्पेन्द्र पिता जवाहर, सुमन पति जवाहर, समयलाल मनीष पिता रामचन्द्र, छोटी पति रामचन्द्र पटेल, राममिलन पिता हनुमान 067 पै.भाग चन्द्रवती पति विसर्जन 033 पै. भाग सा. देह भूमिस्वामी	
	2014	0.607			
	2031	0.611			
	2066	0.077			
	2067	0.543			
	2085	0.061			
68	1628/1	0.674	0.909	संजीव कुमार पिता बँशवर्धन ब्रा. पता सा. देह भूमि स्वामी	
69	1619/1	0.235	0.592	अंजीव कुमार पिता बँशवर्धन ब्रा. पता सा. देह भूमि स्वामी	
	1630/1	0.088			
	1768/1	0.269			
70	1590/4	0.552	1.501	शंभूदयाल पि. राममेश्वर प्रसाद ब्रा. जाति ब्रा. पता सा. देह भूमि स्वामी	
	1591/4	0.020			
	1592/4	0.101			
	1593/3	0.008			
	1619/4	0.704			
	1629/3	0.008			
	1630/4	0.108			
71	2153/1	0.252	0.252	शंकर पिता रामफल गडरिया पता सा. बदवार देह भूमि स्वामी	
72	1958	3.812	4.007	रामानुज पि. बसंतराम पता सा. देह भूमि स्वामी	
	1959	0.179			
	1960	0.016			
13-Mar	2006	0.202	1.317	राममिलन पि. हनुमान पता सा. देह भूमि स्वामी	
	2007	0.340			
	2008	0.045			
	2096	0.053			
	2100	0.069			
	2103	0.150			
	2104	0.458			
74	1602/1	0.016	0.016	राममित्र पि. रामसजीवन ब्रा. पता सा. बदवार भूमि स्वामी	
75	1685	0.045	0.815	बेबा सोमवती पति हनुमान अंशमणि सुमन्त प्रसाद अंनन्द कुमार पि हनुमान 1/2 भाग पता निवासी ग्राम भूमि स्वामी	
	1718	0.065			
	1719	0.008			
	1720	0.146			
	1724	0.138			
	1725	0.02			
	1726	0.065			
	1730	0.304			
	1732	0.024			
76	1983	0.101	2.547	सुनील कुमार पि. सोमेश्वरप्रसाद पटेल पता सा. देह भूमि स्वामी	
	1994/2	0.203			
	2030	0.121			
	2041/2	0.235			
	2042/2	0.336			
	2047/2	0.522			
	2065	0.202			
	2136/2	0.422			

	2152	0.405			
77	1984	0.202	2.570	अशोक कुमार पि. सोमेश्वर प्रसाद पटेल पता सा. देह भूमि स्वामी	
	1987	0.061			
	1988	0.053			
	1989	0.182			
	2043	0.279			
	2044	0.433			
	2131	0.809			
	2135	0.551			
78	1982	0.202	2.571	प्रसन्न कुमार पि. सोमेश्वर प्रसाद पटेल पता सा. देह भूमि स्वामी	
	1985	0.016			
	1986	0.069			
	1994/1	0.202			
	2015	0.081			
	2029	0.243			
	2040	0.040			
	2041/1	0.235			
	2042/1	0.336			
	2047/1	0.522			
	2056	0.202			
	2136/1	0.423			
79	1739	0.057	5.831	कामता प्रसाद पिता रामसजीवन जाति पटेल पता सा. देह भूमि स्वामी	
	1740	1.104			
	1741	0.223			
	1745	0.393			
	1746	0.040			
	1747	0.878			
	1755	0.020			
	1756	0.170			
	1757	0.036			
	1758	0.745			
	1759	0.049			
	2163	2.116			
80	1940	0.458	0.774	शिव बहोर, शेषमणि, गणेश पि. हर्दशन कुर्मी पता सा. देह	
	1942	0.223			
	1943	0.028			
	1946	0.065			
81	1618/4/2	1.010	1.010	अपरेश, सर्वेश कुमार, देवेश कुमार, अमरेश कुमार, रतनेश कुमार पि. उमेश कुमार उपाध्यय नि. गुढ	
82	2153/2	0.126	0.126	रामफल पिता जमुना गड़रिया पता बदवार	
83	2153/3	0.126	0.126	समयलाल पिता जमुना गड़रिया पता बदवार	
84	2153/4	0.188	0.188	जोखू पिता रामकृपाल पता बदवार	
85	2153/5	0.188	0.188	बुद्धसेन पिता रामकृपाल पता बदवार	
86	2153/6	0.085	0.085	लालमणि पिता मैकू गड़रिया पता बदवार	
87	2153/7	0.085	0.085	जानकी पिता मैकू गड़रिया पता बदवार	

88	2153/8	0.085	0.085	सुदामा पिता मैकू गड़रिया पता बदवार	
89	2153/9	0.044	0.044	वृहस्पति पिता रामप्रगास गड़रिया पता बदवार	
90	2153/10	0.052	0.052	रामकरन पिता रामप्रगास गड़रिया पता बदवार	
91	2153/11	0.052	0.052	रामजन पिता रामप्रगास गड़रिया पता बदवार	
92	2153/12	0.564	0.564	सूर्यभान पिता गंगा गड़रिया पता बदवार	
93	2153/13	0.140	0.140	मणिराज, शिवनारायण पिता राजरूप गड़रिया पता बदवार	
94	2153/14	0.140	0.140	भैयालाल, गम्भू, शम्भू पिता रामदास पता बदवार	
95	2153/15	0.140	0.140	राजमणि पिता सीताराम गड़रिया पता बदवार	
96	2153/16	0.562	0.562	रामायण पिता रामप्रताप पता बदवार	
97	2153/17	0.070	0.070	कनछेदी पिता छोटकू गड़रिया पता बदवार	
98	2153/18	0.070	0.070	रामदुलारे पिता छोटकू गड़रिया पता बदवार	
99	2153/19	0.074	0.074	रघुनाथ पिता छोटकू गड़रिया पता बदवार	
100	2153/20	0.074	0.074	शारदा पिता छोटकू गड़रिया पता बदवार	
101	2153/21	0.028	0.282	ददूली पिता काशी गड़रिया पता बदवार	
102	1700/2	0.020	0.028	कौशल प्रसाद पिता सुग्रीवराम शुक्ला सा. देह भूमि स्वामी	
	1701	0.008			
103	1700/1	0.029	0.029	दिलीप कुमार पिता हीरालाल शुक्ला सा. देह भूमि स्वामी	
104	2155/2	0.599	0.599	ठाकुरदीन पिता धनपती गड़रिया पता सा. बदवार भूमिस्वामी	
105	2155/3	0.120	0.120	सुखलाल पिता जगन्नाथ गड़रिया पता सा. बदवार भूमिस्वामी	
106	2155/4	0.120	0.120	जवाहिर पिता जगन्नाथ गड़रिया पता सा. बदवार भूमिस्वामी	
107	2155/5	0.120	0.120	जगजाहिर पिता जगन्नाथ गड़रिया पता सा. बदवार भूमिस्वामी	
108	2155/6	0.120	0.120	जगदीश पिता जगन्नाथ गड़रिया पता सा. बदवार भूमिस्वामी	
109	2155/7	0.119	0.119	सत्यभान पिता जगन्नाथ गड़रिया पता सा. बदवार भूमिस्वामी	
110	2079/2	0.018	0.030	बिहारी लाल पिता जमुना पटेल पता सा. देह भूमिस्वामी	
	2080/2	0.007			
	2098/2	0.005			
111	2079/3	0.019	0.030	मु. बुटानदेवी पत्नी जवाहर पटेल पता सा. देह भूमिस्वामी	
	2080/3	0.007			
	2098/3	0.004			
112	2079/4	0.027	0.046	समयलाल पिता रामचन्द्र पटेल पता सा. देह भूमिस्वामी	
	2080/4	0.012			
	2098/4	0.007			
113	2079/5	0.027	0.045	मुनीश पिता रामचन्द्र पटेल पता सा. देह भूमिस्वामी	
	2080/5	0.011			
	2098/5	0.007			

109✓	2155/3	0.120	0.120	सुखलाल पिता जगन्नाथ गडरिया पता सा. बदवार भूमिस्वामी
110✓	2155/4	0.120	0.120	जवाहिर पिता जगन्नाथ गडरिया पता सा. बदवार भूमिस्वामी
111✓	2155/5	0.120	0.120	जगजाहिर पिता जगन्नाथ गडरिया पता सा. बदवार भूमिस्वामी
112✓	2155/6	0.120	0.120	जगदीश पिता जगन्नाथ गडरिया पता सा. बदवार भूमिस्वामी
113✓	2155/7	0.119	0.119	सत्यभान पिता जगन्नाथ गडरिया पता सा. बदवार भूमिस्वामी
114✓	2079/2	0.018	0.030	बिहारी लाल पिता जमुना पटेल पता सा. देह भूमिस्वामी
	2080/2	0.007		
	2098/2	0.005		
115✓	2079/3	0.019	0.030	मु. बुटानदेवी पत्नी जवाहर पटेल पता सा. देह भूमिस्वामी
	2080/3	0.007		
	2098/3	0.004		
116✓	2079/4	0.027	0.046	समयलाल पिता रामचन्द्र पटेल पता सा. देह भूमिस्वामी
	2080/4	0.012		
	2098/4	0.007		
117✓	2079/5	0.027	0.045	मुनीश पिता रामचन्द्र पटेल पता सा. देह भूमिस्वामी
	2080/5	0.011		
	2098/5	0.007		
118	1618/4/1	0.410	0.410	रविशंकर पिता विष्णुप्रसाद, तनुज पिता श्रीप्रकाश सा. दुआरी भूमिस्वामी
योग	341 किता	74.604	74.604	118 खाता

ANNEXURE VI

List of Landowners for Phase II

ESA Study for Rewa Solar Power Project,
Madhya Pradesh, India

Rewa Ultra Mega Solar Limited (RUMSL)

January 2016

Ownership Details of Private Khasras Proposed for Procurement for UMPP Solar Power Project

Village Badwaar District Rewa

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108	0.016	6334/2	0.016	0.016	महावीर पि.वद्री भागवत भोला पि.राजा,रामप्रसाद.पिता गिरधारी पता सा.देह भूमि स्वामी
167	0.02	6976	0.020	0.020	वल्देवराम,पि.शिवगुलाम37पै.भाग चिन्तामणि,श्रीमणि पि.सहदेव13पैसा,राजीवलोचन पिता सूर्यभान50पैसा भाग पता सा.देह भूमि स्वामी
279	0.032	6147/2	0.032	0.032	
627	0.1	6972/3 6973/3	0.024 0.076	0.100	रविशंकर पि. विष्णुप्रसाद ब्रा. पता सा. चिरहुला रीवा भूमि स्वामी
628	0.1	6973/2	0.1	0.1	सत्यप्रकाश पि. एस.एल दुवे पता सा. अन्तपुर रीवा भूमि स्वामी
880	0.2	6971/2	0.2	0.2	विष्णुप्रकाश पि. विश्वेश्वर प्रसाद ब्रा. पता सा.गुढ भूमि स्वामी
882	0.2	6971/3	0.2	0.2	लक्ष्मीप्रकाश पि. विश्वेश्वर प्रसाद ब्रा. पता सा. गुढ भूमि स्वामी
883	0.2	6971/4	0.2	0.2	संदीप प्रकाश पि. आँमप्रकाश ब्रा. पता सा. गुढ भूमि स्वामी
884	0.2	6973/1	0.2	0.2	रत्नेश कुमार पि. उमेश कुमार ब्रा. पता सा. गुढ भूमि स्वामी
948	0.238	6981	0.081	0.081	सुखवन्त किशोर पि.महेशप्रसाद पता सा.देह भूमि स्वामी
975	0.255	6557/2	0.255	0.255	विन्धेश्वरीप्रसाद पिता पीताम्बर पता सा.देह भूमि स्वामी
976	0.255	6557/3	0.255	0.255	रामावतार पिता वासुदेव पता सा.देह भूमि स्वामी
985	0.259	6557/1	0.259	0.259	रामप्रकाश पिता वासुदेव पता सा.देह भूमि स्वामी
998	0.271	6980 6983	0.162 0.097	0.259	वल्देव पि. शिवगुलाम,चिन्तामणि, श्रीमणि पि.सहदेव34पैसा भाग, जमुना पि.वालगोविन्द33पैसा भाग, राजीवलोचन पिता सूर्यभान33पैसा भाग पता सा.देह भूमि स्वामी
1052	0.321	6332/2 6331/1	0.188 0.061	0.249	श्रीमती कुसुम पति संकटमोचन ब्रा. पता सा.देह भूमि स्वामी

1128	0.38	6547	0.38	0.38	रामसिया पिता गंगा भूमि स्वामी
1144	0.4	6972/2	0.4	0.4	विद्याप्रसाद पि. शेषमणि ब्रा. पता सा. जमोडीकला सीधी भूमि स्वामी
1171	0.423	6971/1	0.225	0.275	शिवशंकर पि. रामप्रताप ब्रा. पता सा. शास्त्री नगर सीधी भूमि स्वामी
		6972/1	0.050		
1206	0.474	6950/3	0.298	0.298	रविराज पि. रामसुमिरन पटेल पता सा. देह भूमि स्वामी
1207	0.474	6950/4	0.306	0.306	धुवराज पि. रामसुमिरन पटेल पता सा. देह भूमि स्वामी
1223	0.497	6950/1	0.21	0.21	शिवराज पि. रामसुमिरन पटेल पता सा. देह भूमि स्वामी
1341	0.691	6819/2	0.04	0.04	रामभद्र पिता चिन्तामणि जाति कुर्मी पता सा. देह भूमि स्वामी
1444	0.936	6549	0.652	0.652	महावीर राजवहोर पि. सूर्यप्रसाद जाति कुर्मी पता सा. देह भूमि स्वामी
1461	0.996	6308	0.129	0.129	अखिलेश कुमार पि. विश्ववन्धन प्रसाद ब्रा. पता सा. देह भूमि स्वामी
1470	1.034	6997/3	0.111	0.45	भैयालाल पि. रामाश्रय पटेल पता सा. देह भूमि स्वामी
		6999/2	0.339		
1471	1.034	6944/2	0.004	0.902	अनिरुध पि. जमुना प्रसाद पटेल पता सा. देह भूमि स्वामी
		6945/2	0.291		
		6949/2	0.607		
1472	1.035	6944/1	0.004	0.902	जग्यभान पि. जमुना पटेल पता सा. देह भूमि स्वामी
		6945/1	0.291		
		6949/1	0.607		
1475	1.048	6819/1	0.037	0.037	म. गिल्ली पति राममिलन पटेल जाति कुर्मी पता सा. देह भूमि स्वामी
1478	1.052	6583/2	0.045	0.065	राजेन्द्र प्रसाद पि. वलिराज पटेल पता सा. देह भूमि स्वामी
		6584/2	0.02		
1479	1.053	6999/3	0.47	0.47	सूर्यवती पति गोकुल प्रसाद सन्तोष सुरेश पि. गोकुल प्रसाद पता सा. देह भूमि स्वामी
1486	1.068	6997/2	0.471	0.471	लालमणि पि. रामाश्रय पटेल पता सा. देह भूमि स्वामी
1554	1.432	6995	0.15	1.432	मु. फुलवसुआ वेवा रामसुमिरन पता सा. देह भूमि स्वामी
		6996	0.02		
		6997/1	0.871		
		6998	0.02		
		6999/1	0.371		
1567	1.51	6546/4	0.411	0.553	सत्यनारायण पि. रामाश्रय कुर्मी पता सा. देह भूमि स्वामी
		6563/3	0.142		
1570	1.529	6146/2	0.53	0.53	चन्दवती पति नन्दकिशोर पटेल पता सा. देह भूमि स्वामी

1595	1.698	6546/2	0.411	0.553	भीमसेन पि. रामाश्रय कुर्मी पता सा. देह भूमि स्वामी
		6563/1	0.142		
1602	1.747	6546/3	0.411	0.553	यजलाल पि. रामाश्रय कुर्मी पता सा. देह भूमि स्वामी
		6563/2	0.142		
1610	1.797	6546/5	0.41	0.547	रामजी पि. रामाश्रय कुर्मी पता सा. देह भूमि स्वामी
		6563/4	0.137		
1626	1.893	6187	0.032	0.654	मु.वतसिया पति गंगा,श्यामलाल,रामलालपिता गंगा जाति नाई 1/2 भाग भूमि स्वामी रामकरण त्रीवेणी रामसजीवनरामचरण पि.रामदुलारे मंती पति रामदुलारे जाति नाई पता सा.देह 1/2 भाग भूमि स्वामी
		6188	0.032		
		6189	0.036		
		6190	0.02		
		6191	0.016		
		6192	0.073		
		6193	0.012		
		6195	0.02		
		6197	0.012		
		6198	0.045		
		6200	0.053		
		6201	0.012		
		6202	0.016		
		6203	0.036		
		6205	0.012		
		6207	0.073		
		6208	0.154		
1654	2.162	6977	0.032	0.032	रामनिवाश पि.वासदेव पता सा.देह भूमि स्वामी
1663	2.336	6546/1	2.336	2.336	मोतीलाल मथुरा प्रहलाद सुदामा यजनारायण हरिहर प्रसाद पि. श्यामसुन्दर कुर्मी पता सा.देह भूमि स्वामी
1664	2.384	6950/2	0.805	0.805	रामसजीवन पि. भोला प्रसाद पता सा. देह भूमि स्वामी
1690	2.947	6548	1.449	1.449	सुखेन्द्र महेन्द्र रवीन्द्र भूपेन्द्र पिता यजसेन पटेल पता सा.देह भूमि स्वामी
1695	3.038	6550	0.316	0.603	द्वारिकाप्रसाद पि.गंगा पता सा.देह भूमि स्वामी
		6559	0.287		
1701	3.219	6583/1	0.165	0.250	रामनिहोर,जयलाल पि.रामशरणरामनिहार,जय-लाल,पि.रामशरण,गोकुल,पि.राममनोहर भूमि स्वामी विनोद,रावेन्द्र पि.श्यामसुन्दर पता सा.देह भूमि स्वामी
		6584/1	0.085		
1707	3.496	6331/2	0.060	0.872	मु.राधा वाई पति वृजवासीलाल कृष्णमित्र राममित्र वेदमित्र हरिमित्र पि.वृजवासी पता सा.देह भूमि स्वामी
		6332/3	0.188		
		6993	0.624		
1710	3.824	6332/1	0.364	0.364	महेन्द्र,पुष्पेन्द्र,प्रमोद,रावेन्द्र पिता भास्कर प्रसाद पता सा.देह भूमि स्वामी

1711	3.864	6328	0.543	0.816	रामविलोचन पि.सुर्यभान पता सा.देह भूमि स्वामी
		6333	0.273		
1712	3.991	6150	0.684	0.684	जगदीश प्रसाद पि. हरदर्शन प्रसाद ब्रा. पता सा. देह भूमि स्वामी
1719	4.573	6562	0.413	0.413	मु. दशोदिया पति मोतीलाल राजेन्द्र दयाशंकर विनोद दिलीप पि. मोतीलालमथुरा,प्रहलाद,सुदामा यजनरायण,हरिहरपिता श्यामसुन्दर जाति कुर्मी पता सा. देह भूमि स्वामी
1730	6.624	6146/1	0.530	0.562	प्रयागवती पति रामप्रसाद शुदर्शन प्रसाद केशवशंकर पि.रामप्रसाद 1/2द्वारिकाप्रसाद, पि.रामदुलारे 1/2 पता सा.देह भूमि स्वामी
		6147/1	0.032		
1733	7.888	6994	0.587	0.587	लाल कृष्णमित्र राममित्र वेदमित्र हरिमित्र पिता बृजवासीलाल चन्द्रिकाप्रसाद पिता जमुनाराम पता सा.देह भूमि स्वामी
1738	9.361	6334/1	0.016	5.136	जगजीवनलाल,चन्द्रमणिहारेन्द्र पि.महावीर दुअसियापत्नी महावीर 1/2 भाग भूमि स्वामी रामदेवपि.भगवत मु. काली पत्नी भोला श्यामलाल रामनरोश रामनिवास पि. भोला रामप्रसादपिता.गिरधारी पता सा.देह 1/2 भाग भूमि स्वामी
		6335	2.821		
		6338	0.773		
		6339	1.526		
1740	11.386	6148	2.25	2.25	राममूर्ति पि.रामसजीवन ब्रा. पता सा. देह भूमि स्वामी
1741	12.853	6543	0.287	1.189	ओम प्रकाश पि.सत्यनरायण,लक्ष्मीनरायण,दिनेशनरायण, पितारामेश्वर प्रसाद पता सा.देह भूमि स्वामी
		6544	0.016		
		6545	0.518		
		6574	0.065		
		6576	0.174		
		6577	0.012		
		6579	0.117		
A		6199	0.032	0.032	
			31.064	31.064	

Ownership Details of Private Khasras Proposed for Procurement for UMPP Solar Power Project

Village Barseta District Rewa
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327	0.202	2127	0.202	0.202	चक्रपाणि प्रसाद पि. रामानुज पता सा. देह भूमि स्वामी
328	0.202	02-05-2106	0.202	0.202	अनुपम पि. राजेश पाण्डेय पता सा. देह भूमि स्वामी
329	0.202	03-05-2106	0.202	0.202	पुष्पलता पुत्री राजेश ब्रा. पता सा. देह भूमि स्वामी
420	0.384	1902/1	0.384	0.384	शकुन्तला देवी पति उमाकान्त जाति ब्रा. पता सा. देह भूमि स्वामी
421	0.385	1902/2	0.344	0.385	सूर्यभान पि. रामकृपाल जाति ब्रा. पता सा. देह भूमि स्वामी
		1904/1	0.041		
427	0.392	1902/3	0.356	0.392	उमाशंकर,हरीशंकर पि. रामगोपाल जाति ब्रा. पता सा. देह भूमि स्वामी
		1904/2	0.036		
431	0.405	1896	0.405	0.405	
457	0.472	03-01-2121	0.472	0.472	आनन्द सागर पि. नागेश्वर प्रसाद जाति ब्रा. पता सा.देह भूमि स्वामी
540	0.8	02-01-2121	0.44	0.44	आशुतोषकुमार पि.आनन्द सागर जाति ब्रा. पता सा. देह भूमि स्वामी
559	0.921	2117/2	0.178	0.59	रामजी पि. नागेश्वर प्रसाद जाति ब्रा. पता सा. देह भूमि स्वामी
		2118/1	0.412		
560	0.923	2122/1	0.607	0.923	छोटेला ल पि. रघुवंश प्रसाद पता सा. देह भूमि स्वामी
		2124	0.316		
570	0.971	2109/2	0.971	0.971	छोटेला ल पि. रघुवंश प्रसाद पता सा. देह भूमि स्वामी
572	0.986	1620/2	0.013	0.073	गोवर्धन पि. गिरधारी ब्रा. पता सा. देह भूमि स्वामी
		1621/2	0.004		
		1622/2	0.016		
		1626/2	0.04		
577	1.041	01-01-2121	0.605	0.605	रवि सागर पि.आनन्द सागर ब्रा. पता सा. देह भूमि स्वामी

580	1.073	1620/3	0.012	0.077	गिरधारी पि. अर्जुन राम ब्रा. पता सा. देह भूमि स्वामी
		1621/3	0.004		
		1622/3	0.013		
		1626/3	0.04		
		1627/1	0.008		
581	1.076	1620/1	0.012	0.076	वंशवर्धन पि. अर्जुन राम ब्रा. पता सा. देह भूमि स्वामी
		1621/1	0.004		
		1622/1	0.016		
		1625/1	0.004		
		1626/1	0.04		
595	1.2	1905/2	0.600	0.600	शैलेन्द्र कुमार पि. विन्धेश्वरी प्रसाद ब्रा. पता सा. वदवार भूमि स्वामी
607	1.414	2106/6	0.507	0.507	अगमानन्दपि. गंगा प्रसाद ब्रा. पता सा. देह भूमि स्वामी
609	1.416	2122/2	1.416	1.416	शम्भू मणि प्रसाद पि. रघुवंश प्रसाद पता सा. देह भूमि स्वामी
610	1.416	2109/1	1.416	1.416	रामनरेश पि. रघुवंश प्रसाद पता सा. देह भूमि स्वामी
615	1.457	2108	0.243	1.417	बालमीक प्रसाद पि. रघुवंश प्रसाद ब्रा. पता सा. देह भूमि स्वामी
		2109/3	0.162		
		2111	0.943		
		2112	0.069		
620	1.554	1931	0.028	0.319	जीवेश कुमार पि. जवाहरलाल जाति ब्रा. पता सा. देह भूमि स्वामी
		1935	0.291		
621	1.572	2106/3	0.053	0.053	असरण शरण पिता रामखेलावन जाति ब्रा. पता सा. देह भूमि स्वामी
622	1.577	01-05-2106	0.103	0.103	राजेश कुमार पि. गंगाराम ब्रा. पता सा. देह भूमि स्वामी
623	1.589	2106/1/क	0.507	0.507	अजय कुमार पि. नरेशरण ब्रा. पता सा. देह भूमि स्वामी
625	1.618	2127/1	1.618	1.618	इन्द्रजीत पि. शिवऔतार पता सा. देह भूमि स्वामी
629	1.707	2123	0.898	0.898	अरुण कुमार पि. छोटेलाल पता सा. देह भूमि स्वामी
631	1.772	1905/1	0.614	0.614	जमुना रामपि. वालगोविन्द पता सा. वदवार भूमि स्वामी

632	1.777	1907	0.583	0.583	शिवगुलाम पि. छकौड़ीराम,चन्द्रिकाप्रसाद,पि. जमुनाराम राजीव लोचनपि. सूर्यभान पता सा. वदवार भूमि स्वामी
640	1.854	1927	0.947	1.704	जोखूलाल,शालिकरामश्रीनिवास पि. रामधारी 1/3 भाग विन्धेश्वरी पि. पीताम्बर 1/3 भाग प्रेमवती पति रामसजीवन मानवती पति अतिवल जाति कुर्मी पता सा. वरसैता 1/3 बराबर भाग भूमि स्वामी
		1928	0.757		
641	1.865	2119/1	0.154	1.772	श्यामचरण पि. नागेश्वर प्रसाद पता सा. देह भूमि स्वामी
		2127/2	1.618		
643	1.89	2106/4	0.376	0.376	श्रीशरण पिता रामखेलावन जाति ब्रा. पता सा. देह भूमि स्वामी
647	1.993	2095	0.405	1.109	रामफल पि. हनुमान प्रसाद पता सा. देह भूमि स्वामी
		2097	0.299		
		2102	0.405		
650	2.059	1929	0.073	0.707	श्रीमती प्रेमवती पत्नी छोटेलाल जाति ब्रा. पता सा. देह भूमि स्वामी
		1930	0.291		
		2110	0.113		
		2114	0.028		
		2115	0.174		
		2116	0.028		
655	2.219	2106/2	0.142	0.142	राजीव लोचन पिता रामखेलावन जाति ब्रा. पता सा. देह भूमि स्वामी
667	2.483	2106/1/ख	0.496	0.496	हनुमान शरण पि. रामखेलावन. जाति ब्रा. पता सा. देह भूमि स्वामी
671	2.83	1638	0.283	0.891	रामनिवास रामनरेश पि. राममिलन काछी बराबर भाग पता सा. देह भूमि स्वामी
		1639	0.045		
		1640	0.563		
674	3.221	1620/4	0.036	0.288	शंभूदयाल पि. राममेश्वर प्रसाद ब्रा. जाति ब्रा. पता सा. देह भूमि स्वामी
		1621/4	0.008		
		1622/4	0.044		
		1623	0.012		
		1624	0.057		
		1625/2	0.008		

		1626/4	0.119		
		1627/2	0.004		
675	3.238	2117/1	0.178	2.262	दिगाम्बर उमा निवास महेश कुमार पिता सुरेन्द्र कुमार ब्रा. पता सा. देह भूमि स्वामी
		2118/2	0.413		
		2119/2	0.134		
		2120	0.02		
		2121/2	1.517		
683	4.064	2099	0.235	0.369	राममिलन पि. हनुमान पता सा. देह भूमि स्वामी
		2101	0.134		
685	4.327	1723	0.158	0.263	बेबा सोमवती पति हनुमान अंशमणि सुमन्त प्रसाद अंनन्द कुमार पि हनुमान 1/2 भाग पता निवासी ग्राम भूमि स्वामी
		1733	0.105		
686	4.555	2126/2	0.712	0.712	सुनील कुमार पि. सोमेश्वरप्रसाद पटेल पता सा. देह भूमि स्वामी
687	4.711	2126/1	0.712	0.712	अशोक कुमार पि. सोमेश्वर प्रसाद पटेल पता सा. देह भूमि स्वामी
688	4.75	1899	1.011	4.750	कौशल प्रसाद पि. सुग्रीवराम पता सा. देह भूमि स्वामी
		1933	0.405		
		1934	0.372		
		1936	0.405		
		2128	2.557		
689	4.777	2125	0.713	0.713	प्रसन्न कुमार पि. सोमेश्वर प्रसाद पटेल पता सा. देह भूमि स्वामी
694	6.212	2173	4.047	4.047	रामानुज पि. केदारराम जाति ब्रा. पता सा. देह भूमि स्वामी
		Total	37.763	37.763	

Ownership Details of Private Khasras Proposed for Procurement for UMPP Solar Power Project

Village

Barseta
Pahad

District

Rewa

[kkrs dk dzekad	[kkrsnkj dk dqy {ks=Qy	ifj;kstuk esa lfEefyr [kljksa dk dzekad	ifj;kstuk esa lfEefyr [kljksa dk {ks=Qy	[kkrsnkj dk ifj;kstuk esa lfEefyr {ks=Qy	HkwfeLokeh ;k 'kkldh; iVsnkj dk uke
1	0.19	52	0.142	0.308	रामफल,राममिलनपि.हनुमान व रामसजीवन पि.जगन्नाथ जाति कुर्मी. पता सा.बरसैता भूमि स्वामी
		53	0.024		
		54	0.142		
8	0.695	57	0.214	0.356	हनुमान प्रसाद पि.गणेश प्रसाद वेवाद्वारिकाप्रसाद जाति ब्रा. पता सा.बरसैता भूमि स्वामी
		58	0.142		
10	0.809	22/2	0.809	0.809	अरुणकुमार पि.छोटेराल जाति ब्रा. पता सा.बरसैता भूमि स्वामी
11	0.83	10/2	0.664	0.664	शिववहोरशेषमणि पि.हरदर्शन जाति कुर्मी. पता सा.बरसैता भूमि स्वामी
14	1.214	7	1.214	1.214	जीवेश कुमार पि. जवाहरलाल जाति ब्रा. पता सा.बरसैता भूमि स्वामी
17	1.89	10/1	1.364	1.72	अच्छेलाल पि.बद्री जाति कुर्मी. पता सा.बरसैता भूमि स्वामी
		17	0.036		
		18	0.304		
		19	0.016		
18	1.939	22/1	1.263	1.263	अनिल कुमार पि.छोटेराल जाति ब्रा. पता सा.बरसैता भूमि स्वामी
19	4.849	1	1.259	4.849	हीरालाल,कौशल पि. सुग्रीवराम जीवेश कुमार पि. जवाहर लाल जाति ब्रा. पता सा.बरसैता भूमि स्वामी
		2	0.049		
		3	0.219		
		4	0.097		
		5	0.901		
		6	2.198		
		12	0.126		
			11.183	11.183	

Ownership Details of Private Khasras Proposed for Procurement for UMPP Solar Power Project

Village Itaar Pahar District Rewa

[kkrs dk dzekad	[kkrsnkj dk dqy {ks=Qy	ifj;kstuk esa lfEefyr [kljksa dk dzekad	ifj;kstuk esa lfEefyr [kljksa dk {ks=Qy	[kkrsnkj dk ifj;kstuk esa lfEefyr {ks=Qy	HkwfeLokesh ;k 'kkldh; iVsnkj dk uke
110	0.728	1517	0.057	0.728	रामसजीवन पि.समल जाति कचेर पता सा.देह भूमि स्वामी
		1540	0.202		
		1541	0.024		
		1542	0.194		
		1544	0.045		
		1545	0.117		
		1549	0.089		
120	0.814	1423	0.219	0.770	'kSysUnz dqekj ckysUnz dqekj firk 'ks"kef.k tkfr czk- irk lk- cka/kh Hkwfe Lokesh
		1424	0.008		
		1425	0.543		
131	1.008	1503	0.369	1.008	रामशिरोमणि fi- f'koizlkn tkfr czk- irk lk- cka/kh Hkwfe Lokesh
		1506	0.279		
		1507	0.024		
		1508	0.291		
		1509	0.045		
309	2.897	1529	0.077	2.456	मंगलदीन,गुरुप्रसाद,अवधलाल पि.गंगा प्रसाद पता सा.डढवा भूमि स्वामी
		1531	0.093		
		1533	0.053		
		1534	1.141		
		1535	0.194		
		1536	0.571		
		1537	0.194		
		1538	0.097		
		1552	0.036		
321	3.169	1510	0.166	0.961	हर्षलाल पिता रामशिरोमणि ब्रा. पता सा. देह भूमि स्वामी
		1514	0.032		
		1518	0.016		
		1519	0.178		

		1523/2	0.569		
361	4.448	1520	0.154	4.448	इन्द्रेश पि. रामशिरोमणि ब्रा. पता सा. बाधी भूमि स्वामी
		1521	0.19		
		1522	4.104		
375	5.043	1511	0.028	1.587	बृजमोहन,राधामोहन,हर्षलालमु.वेवा संस्कृतप्रसाद व अमितकुमार,अनीता,नीतू,विनीता पि.संस्कृतप्रसाद भूमि स्वामी इन्द्रदेशकुमार, पि.रामशिरोमणिप्रसाद जाति ब्रा. पता सा.वाधी भूमि स्वामी
		1512	0.392		
		1516	0.061		
		1523/1	0.569		
		1524	0.328		
		1525	0.185		
		1527	0.024		
			11.958	11.958	

Ownership Details of Private Khasras Proposed for Procurement for UMPP Solar Power Project

Village Ramnagar Pahar

District

Rewa

[kkrs dk dzekad	[kkrsnkj dk dqy {ks=Qy	ifj;kstuk esa lfEefyr [kljksa dk dzekad	ifj;kstuk esa lfEefyr [kljksa dk {ks=Qy	[kkrsnkj dk ifj;kstuk esa lfEefyr {ks=Qy	HkwfeLokeh ;k 'kkldh; iVsnkj dk uke
4	0.118	363/10	0.118	0.118	
7	0.146	363/8	0.058	0.058	पूनम पि. दिवाकर ब्रा.पता सा.डढवा भूमि स्वामी
8	0.146	363/9	0.058	0.058	प्रियंका पि. दिवाकर ब्रा. पता सा.डढवा भूमि स्वामी
11	0.188	363/5	0.059	0.059	सुनीता पति दिवाकर ब्रा. पता सा.डढवा भूमि स्वामी
12	0.191	363/4	0.059	0.059	दिवाकर पि. समालिया राम ब्रा. पता सा. डढवा भूमि स्वामी
13	0.202	363/7	0.058	0.058	विश्वजीत पि. दिवाकर प्रसाद ब्रा. पता सा. डढवा भूमि स्वामी
18	0.205	363/6	0.059	0.059	विनीत पि. दिवाकर प्रसाद ब्रा. पता सा. डढवा भूमि स्वामी
24	0.281	363/2	0.016	0.016	दीपक पि. बाबूलाल ब्रा. पता सा. डढवा भूमि स्वामी
30	0.339	363/12	0.116	0.116	अनामिक पि. सुखनिधान ब्रा. पता सा. देह भूमि स्वामी
32	0.349	363/3	0.116	0.116	ज्योति पति दीपक कुमार ब्रा. पता सा. डढवा भूमि स्वामी
33	0.365	363/11	0.116	0.116	अनुराग पि. सुखनिधान ब्रा. पता सा.देह भूमि स्वामी
41	0.423	363/1	0.118	0.118	मालती पति बाबूलाल ब्रा. पता सा. डढवा भूमि स्वामी

44	0.523	172	0.016	0.016	रामखेलावन पि. चिडडा 1/2 भाग भूमि स्वामी मु. मोलिया पति महादेवगुनगुन पि. सहादेव पता सा. देह 1/2 भाग भूमि स्वामी राममणि कमलेश्वर रामसरणपि.
		305	0.040		हरशरणराम 0.017 भाग भूमि स्वामी वेवा जानकी बृजेन्द्र प्र.राजेन्द्र प्र. सुरेश प्र. राजेश प्रसाद पि. जानकीप्रसाद व बेबी भूमि स्वामी पुत्री जानकी प्रसादहनुमान प्र. लालजी अनन्त प्रसाद पि. रामधनी दामोदरप्र. रामावतार पि. हीरा जाति ब भूमि स्वामी कृष्णधर इन्द्रमणिपि. नन्दू रामलोचन पि. गणेश पता सा. लोंधी 0.083 पै. भाग भूमि स्वामी
52	0.663	306	0.016	0.412	
		307	0.178		
		309	0.178		
62	0.871	211	0.045	0.774	रामानंदपि.अर्जुनराम पता सा.बरसैता भूमि स्वामी
		212	0.729		
67	1.027	363/1/क	0.349	0.349	सुभाष भैयालाल दुधेश्वर पि. शेषमणिराजेश पि. शुभकरन ब्रा. पता सा. देह भूमि स्वामी
74	1.137	543	0.543	0.543	कृष्णधर पि. रामदत्त 1/2 भाग भूमि स्वामी चूडमणि पि. कामता प्रसाद जाति ब्रा. पता सा. डढ़वा 1/2 भाग
75	1.173	520	0.275	1.173	गोटईराम पि. छकौड़ीराम पता सा. बांधी
		521	0.020		
		522	0.174		
		523	0.704		
91	1.698	71	0.040	0.040	लक्ष्मीनारायण,सँकट मोचन,अरविन्द कुमार,राजाराम दपिता बाल्मीक पता सा. बरसैता भूमि स्वामी
92	1.702	299	0.069	1.228	राममिलन पि. बल्देव प्रसाद जाति ब्रा. पता सा. डहवा
		302	0.665		
		304	0.409		
		311	0.085		
93	1.777	563	0.016	1.445	रामशिरोमणि पि. शिवप्रसाद जाति ब्रा. पता सा. बांधी भूमि स्वामी
		564	0.113		
		566	0.097		
		568	0.016		

		569	0.097		
		570	0.004		
		571	0.181		
		572	0.125		
		573	0.036		
		575	0.032		
		576	0.332		
		577	0.020		
		578	0.376		
107	3.992	64	0.368	0.368	अनन्दवती पति सँकट मोचन ब्रा. पता सा.देह भूमि स्वामी
109	4.44	526	4.440	4.440	रामकृपाल रामदयाल,हरिदयालसन्तोष पि. बृजभूषण जाति ब्रा. पता सा. दुआरी भूमि स्वामी
110	4.569	528	0.174	4.569	वृन्दावन पि. बृजभूषण जाति ब्रा. पता सा. दुआरी भूमि स्वामी
		529	0.709		
		530	0.376		
		532	2.169		
		533	0.461		
		534	0.680		
113	5.746	327	5.746	5.746	राधेश्याम पि. श्रीधर पता सा. मनिकवार भूमि स्वामी
115	5.989	328	0.283	5.357	रविशंकर पि. सूर्यदेव जाति ब्रा. पता सा. मनिकवार भूमि स्वामी
		329	5.074		
126	8.616	544/2	0.874	0.874	राघव सिंह तिवारी पिता राजकुमार सिंह तिवारी ना.वली पि. राजकुमार सिंह देव सिंह पि. राजर्षि सिंहना. वली पि. राजर्षि सिंह तिवारी पता सा. मनिकवार भूमि स्वामी
128	9.105	531	4.678	4.678	प्रधुम्न प्रसादपि. राजकेशर प्रसाद जाति ब्रा. पता सा. मनिकवार भूमि स्वामी
131	12.659	544/1	2.622	2.622	माण्डवी पत्नी गिरीश कुमार ब्रा. पता सा. देह भूमि स्वामी
137	15.5	295	0.134	0.134	परमेश्वर बृजेश प्रसादपि. श्याम किशोर जाति ब्रा. पता सा. मनिकवार भूमि स्वामी

138	15.694	525	2.622	2.893	ऊषा पति राजेन्द्र प्रसादशुक्ला जाति शुक्ला पता सा. मनिकवार भूमि स्वामी
		527	0.271		
139	17.603	541	0.914	0.914	कुशुम सिंह वेवा पत्नी राजनारायण सिंह तिवारी व ध्रुव सिंह तिवारी नीरज सिंह तिवारी पि. राजनारायण सिंह तिवारी पता सा. देह भूमि स्वामी
141	18.502	540	6.750	6.750	लक्षमण प्रसाद पि. औहानराम जाति ब्रा. पता सा. मनिकवार भूमि स्वामी
48	0.615	490	0.514	0.514	jkeujs'k jkekuqt czk- lk- <Mok
			46.790	46.790	

ANNEXURE VII

List of Landowners who have given their Consent for Land Sale

ESA Study for Rewa Solar Power Project,
Madhya Pradesh, India

Rewa Ultra Mega Solar Limited (RUMSL)

January 2016

रीवा अल्ट्रा मेगा सोलर पावर परियोजना हेतु आपसी सहमति नीति 2014 के

तहत क्रय की जाने वाली भूमि के धारक/धारकों की सूची

जिनकी सहमति प्राप्त हो चुकी है।

ग्राम - बदवार, रा.नि.म.- दुआरी, तहसील - गुढ़ जिला - रीवा (म.प्र.)

क्र.	खसरा नम्बर	रकबा	क्रय हेतु प्रस्तावित रकबा	भूमि स्वामी/शासकीय पट्टेदार का नाम एवं पता	विवरण
1	2	3	4	5	6
1	6404/1	0.053	0.053	हरछठिया पुत्री रामदुलारे सोनी पता सा देह भूमि स्वामी	
2	6242	0.024	0.218	परमसुख, रामसुन्दर मोतीलाल पिता जग्यभान अमलाबती पति शिवलाल, बीरेन्द्र, धीरेन्द्र, पिता शिवलाल रामभद्र शिवभद्र रामप्रताप श्रीनिवास शिवकुमार पिता चन्द्रभान धिरजुआ, पुत्री अयोध्या पटेल पता सा.देह भूमि स्वामी	
	6243	0.194			
3	6432/4	0.008	0.082	सत्यनारायण पि. केमला प्रसाद कुर्मी पता सा. देह भूमि स्वामी	
	6433/5	0.024			
	6454/6	0.033			
	6455/8	0.017			
4	6473/3	0.154	0.292	गोमती पि. अयोध्या पटेल पता सा. देह भूमि स्वामी	
	6474	0.138			
5	6554/2	0.372	0.372	उग्रसेन पिता रामसुन्दर पता सा.देह भूमि स्वामी	
6	6554/3	0.372	0.372	रामधनी पिता ईश्वरदीन पता सा.देह भूमि स्वामी	
7	6225	0.045	0.276	वावूलाल सुदामा ठाकुरदीन,श्यामलाल पिता लल्लूजी पता सा.देह भूमि स्वामी	
	6248	0.036			
	6250	0.065			
	6251	0.061			
	6254	0.069			
8	6406	0.040	0.040	अशोककुमार,अरुणकुमार पि.रामाश्रय जाति सोनी पता सा.देह भूमि स्वामी	
9	6185/3	0.045	0.045	रधिया पुत्री देवशरण नाई पता सा.देह भूमि स्वामी	
10	6569/3	0.105	0.105	राजवहोर पि.सूर्यप्रसाद पता सा.देह भूमि स्वामी	
11	6185/2	0.045	0.045	खेलाडी पि.मंगल पता सा.देह भूमि स्वामी	
12	6616/2	0.146	0.146	रामसजीवन पिता राधे जाति कुर्मी पता सा.देह भूमि स्वामी	
13	6395/2	0.144	0.144	रामसुमिरन पि.सुदर्शन पटेल पता निवासी ग्राम देह भूमि स्वामी	
14	6432/1	0.008	0.056	जानकी प्रसाद पि. केमला प्रसाद कुर्मी पता सा. देह भूमि स्वामी	
	6433/2	0.014			
	6454/3	0.018			
	6455/5	0.016			
15	6432/3	0.012	0.081	रामप्रकाश पि. केमला प्रसाद कुर्मी पता सा. देह भूमि स्वामी	
	6433/4	0.024			
	6454/5	0.028			
	6455/7	0.017			
16	6390	0.053	0.494	रामखेलावन पि.रामजियावन वसन्त पि.सुदामा पता सा.देह भूमि स्वामी	
	6391	0.441			

17	6948/1	0.101	0.101	शिवराज पि. रामसुमिरन पटेल पता सा. देह भूमि स्वामी	
18	6432/2	0.008	0.082	रामसलोने पि. केमला प्रसाद कुर्मी पता सा. देह भूमि स्वामी	
	6433/3	0.029			
	6454/4	0.028			
	6455/6	0.017			
19	6553/2	0.105	0.105	उग्रसेन रामवती पि. रामसुन्दर पता सा.देह भूमि स्वामी	
20	6689	0.478	0.559	भान्जाप्रसाद, रामेश्वर, राजेश्वर पि. गम्भू, रामसंगीता, मनमोहन, बृजकिशोर, राजकिशोर पि. जगदीश 1/2 भाग , गंगाप्रसाद, प्रयागदत्त पिता रामसलोने जाति का पता सा. देह 1/2 भाग भूमि स्वामी	
	6693	0.081			
21	6642	0.178	0.482	धिरजुआ पत्नी गलईप्रसाद पता सा. देह भूमि स्वामी	
	6650/2	0.304			
22	6246	0.069	0.069	मु. गुलाब वती पति नारायणप्रसाद ब्रा. पता सा. देह भूमि स्वामी	
23	6443	0.202	0.285	राजकुमार पि मंगल पटेल पता सा. देह भूमि स्वामी	
	6467/2	0.010			
	6468/5	0.073			
24	6438/2	0.036	1.228	इन्द्रजीत पि. गंगा प्रसाद रजउआ वेवा गंगा प्रसाद पटेल पता सा. देह भूमि स्वामी	
	6454/2	0.020			
	6455/3	0.033			
	6440/2	0.105			
	6444/2	0.413			
	6445/2	0.208			
	6446/2	0.273			
	6447/2	0.130			
25	6448/2	0.010			
	6457/2	0.117	0.163	रामस्वयंम्बर पि. रामजियावन पता निवासी ग्राम देह भूमि स्वामी	
	6467/4	0.010			
	6468/7	0.036			
26	6616/3	0.146	0.146	कैलाशुआ पति रामसुमिरन, शंकरप्रसाद पि. रामसुमिरन जाति कुर्मी पता सा. देह भूमि स्वामी	
27	6229/1	0.050	0.271	सुमेश्वर पि. अर्जुन पता सा. देह भूमि स्वामी	
	6230/1	0.008			
	6234/1	0.099			
	6235/1	0.014			
	6501/1	0.047			
	6502/1	0.029			
	6503/1	0.024			
28	6184	0.016	0.044	ठाकुरदीन पि. रामहित्त जाति नाई पता सा. देह भूमि स्वामी	
	6185/1	0.028			
29	6569/2	0.101	0.101	महावीर पि. सूर्यप्रसाद पता सा. देह भूमि स्वामी	
30	6393/4	0.221	0.221	छोटेला पि. सुदर्शन पटेल पता निवासी ग्राम देह भूमि स्वामी	
31	6394/2	0.180	0.180	तीरथ पि. सुदर्शन पटेल पता सा. देह भूमि स्वामी	
32	6183	0.049	0.049	कालू पि. चिड्डा जाति नाई पता सा. देह भूमि स्वामी	

33	6612/5	0.066	0.066	बुधसेन पि. लालामणि कुर्मी पता सा. देह भूमि स्वामी	
34	6421/2	0.016	0.214	रामभद्र पिता चिन्तामणि जाति कुर्मी पता सा.देह भूमि स्वामी	
	6422/2	0.073			
	6423/1	0.016			
	6424	0.089			
	6427	0.020			
35	6613/3	0.085	0.085	मुनिया पति विर्सजन समयलाल पि. विर्सजन पटेल पता सा.देह भूमि स्वामी	
36	6616/1	0.146	0.146	जगन्नाथ पिता राधे जाति कुर्मी पता सा.देह भूमि स्वामी	
37	6456/2	0.169	0.205	राम जी लालजी रामरहीश पि. रामगोपाल पटेल पता सा. देह भूमि स्वामी	
	6468/4	0.036			
38	6453/1	0.101	0.137	वसन्त पि.सुदामा पटेल पता निवासी ग्राम देह भूमि स्वामी	
	6468/1	0.036			
39	6612/1	0.009	0.009	राजकली पत्नी जगदीश, वशंराज पिता जगदीश 1/2 भैयालाल पि. रामसुन्दर 1/4 मुनिया पति विशर्जन समयलाल पि. विशर्जन 1/4 कुर्मी पता सा.देह भूमि स्वामी	
40	6612/4	0.066	0.066	सुमित्री पति इन्द्रपाल शेरवहादुर रामनरेश रामनिवास पि. इन्द्रपाल कुर्मी पता सा. देह भूमि स्वामी	
41	6456/1	0.167	0.203	रामसखा पि. धर्मदास पटेल पता सा. देह भूमि स्वामी	
	6468/3	0.036			
42	6612/6	0.065	0.065	उग्रसेन पि. लालमणि कुर्मी पता सा. देह भूमि स्वामी	
43	6680/1	0.016	0.190	रामनिहोर पि. रामशरण पटेल पता सा. देह भूमि स्वामी	
	6681/1	0.174			
44	6452	0.154	0.301	शिवमूरत पि. जोखू पता सा.देह भूमि स्वामी	
	6453/2	0.101			
	6467/1	0.010			
	6468/2	0.036			
45	6602	0.129	0.999	ओमप्रकाश पिता सत्यनारायण दिनेशनारायण लक्ष्मीनारायण पिता रामेश्वर ब्रा. पता सा. देह भूमि स्वामी	
	6603	0.870			
46	6457/1	0.118	0.164	रामखेलावन पिता रामजियावन पटेल पता सा. देह भूमि स्वामी	
	6467/3	0.010			
	6468/6	0.036			
47	6630	0.445	0.911	श्यामकली पत्नी शिवमूरत संगीता पुत्री शिवमूरत पता सा.देह भूमि स्वामी	
	6631	0.466			
48	6255	0.032	0.485	यदुनन्दन पि. घनानन्द ब्रा. पता सा. देह भूमि स्वामी	
	6257	0.032			
	6259	0.109			
	6264	0.247			
	6265	0.016			
	6266	0.049			
49	6399/1	0.263	0.263	रामसुन्दर पि. सुदर्श न पटेल पता सा.देह भूमि स्वामी	
50	6554/1	0.105	0.105	महावीर राजवहोर पि. सूर्यप्रसाद जाति कुर्मी पता सा.देह भूमि स्वामी	
51	6680/2	0.016	0.190	जयलाल पि. रामशरण पटेल पता सा. देह भूमि स्वामी	

51	6681/2	0.174	0.174	अच्छेलाल पि.सुदर्शन पटेल पता निवासी ग्राम देह भूमि स्वामी	
52	6393/3	0.220	0.483	अच्छेलाल पि.सुदर्शन पटेल पता निवासी ग्राम देह भूमि स्वामी	
	6399/2	0.263			
53	6595/2	0.073	0.279	राधावती पत्नी जगद्धारीदेवेन्द्र कुमार धीरेन्द्र कुमार पि. जगद्धारी पटेल पता सा. देह भूमि स्वामी	
	6673/2	0.085			
	6674/2	0.081			
	6686/2	0.040			
54	6274	0.040	0.076	रामखेलावन पि.सुखई जाति यादव पता सा.देह भूमि स्वामी	
	6276	0.036			
55	6673/3	0.105	0.210	राजेन्द्र प्रसाद पि. वलिराज पटेल पता सा. देह भूमि स्वामी	
	6674/3	0.089			
	6687/2	0.016			
56	6142	0.057	0.348	जोखूलाल पि.वासुदेव पता सा.देह भूमि स्वामी	
	6143	0.251			
	6144	0.040			
57	6396	0.190	1.108	राजेश कुमार पिता रामसुन्दर , मनोज कुमार पिता राजेन्द्र प्रसाद ब्रा. पता सा.देह भूमि स्वामी	
	6397	0.918			
58	6612/3	0.176	0.176	शिववहोर शेषमणि पि. हरदर्शन 1/3रामानुज रामानन्द पि. विद्या प्रसाद 1/3 रामावतार मुनेश महेश दिनेश रमेश पि. श्यामलाल 1/3 कुर्मी पता सा. देह भूमि स्वामी	
59	6341	0.405	1.214	रामदेव पि.भागवत कालीपत्नी भोला श्यामलाल रामनरेश रामनिवास पि. भोला 67पै.भाग,रामप्रसाद पिता गिरधारी36पै.भाग,पता सा.देह भूमि स्वामी	
	6350	0.809			
60	6381	0.543	0.944	रघुनाथ प्रसाद बालमीक पि. शंकर पटेल पता सा.देह भूमि स्वामी	
	6382	0.053			
	6383	0.328			
	6384	0.020			
61	6385	0.628	1.007	शुदर्शन पि.वेलानी 1/2 भाग भूमि स्वामी नर्वदा, रामसजीवनवैजनाथ, पि.छोटे पता सा.देह 1/2 भाग भूमि स्वामी	
	6387	0.040			
	6388	0.020			
	6402	0.109			
	6403	0.061			
	6407	0.109			
	6408	0.040			
62	6438/3	0.118	0.183	मोतीलाल पि. रामफल कुर्मी पता सा. देह भूमि स्वामी	
	6455/4	0.065			
63	6393/1	0.880	1.527	रघुनाथ बालमीक पि. शंकर पटेल पता सा.देह भूमि स्वामी	
	6394/3	0.360			
	6395/3	0.287			
64	6425	0.032	0.396	जगन्नाथ,रामलखन पि.सरजू पता सा.देह भूमि स्वामी	
	6426	0.121			
	6428	0.093			
	6812	0.024			
	6816	0.053			

	6817	0.073			
65	6613/2	0.085	0.085	भैयालाल पिता रामसुन्दर पता सा.देह भूमि स्वामी	
66	6566/2	0.028	0.153	यजलाल पि. रामाश्रय कुर्मी पता सा. देह भूमि स्वामी	
	6568/2	0.125			
67	6433/1	0.377	0.591	रामाश्रय पि.गणेश पता सा. देह भूमि स्वामी	
	6438/1	0.117			
	6455/1	0.065			
	6469	0.032			
68	6614	1.177	1.460	शत्रुधन पि.राजरूप पता सा.ररुआ भूमि स्वामी	
	6618	0.243			
	6620	0.040			
69	6212	0.016	1.125	रामबती पत्नी राममिलन भगवानदीन लालमन मौकी विमला पिता राममिलन लुब्बा पि. जयराम ददन भूषनसुरेश रमेश पि० रामप्रसाद जाति वढ़ई पता सा.देह भूमि स्वामी	
	6213	0.012			
	6215	0.364			
	6216	0.045			
	6217	0.259			
	6220	0.028			
	6221	0.336			
	6222	0.053			
70	6223	0.012			
	6638	0.214	0.610	गिरजा संतोश कुमार राजडेश कुमार गोवर्धन पि.रामवहोर पता सा.देह भूमि स्वामी	
	6639	0.121			
	6640	0.275			
71	6344	0.885	1.527	आलेश कुमार पि.कौशलप्रसाद कृष्णावती पति कौशल प्रसाद जाति ब्रा पता सा.देह भूमि स्वामी	
	6345	0.061			
	6346	0.073			
	6347	0.277			
	6349	0.146			
	6354	0.085			
72	6633/1	0.433	0.433	सूर्यदीन पिता गुल्ली पता सा.देह भूमि स्वामी	
73	6633/2	0.433	0.433	सूर्यभान पिता सुखदेव पता सा.देह भूमि स्वामी	
74	6612/2	0.331	0.331	राजमणि कौशल प्रसाद पि. सुमेश्वर प्रसाद कुर्मी पता सा. देह भूमि स्वामी	
75	6440/1	0.105	1.228	गणेश प्रसाद पि. रामचन्द्र पटेल पता सा. देह भूमि स्वामी	
	6444/1	0.412			
	6445/1	0.208			
	6446/1	0.274			
	6447/1	0.129			
	6448/1	0.010			
	6454/1	0.057			
	6455/2	0.033			
76	6803	0.361	1.197	रामसजीवन पिता वल्देव पता सा.देह भूमि स्वामी	
	6804	0.549			
	6807	0.271			
	6808	0.016			
	6476/2	0.026			

77	6481/2	0.128	0.855	रामफल पि. देवशरण पटेल पता सा. देह भूमि स्वामी	
	6490	0.352			
	6491/2	0.016			
	6494/2	0.054			
	6495	0.279			
78	6641/2	0.106	0.106	रामसुन्दर पि. महावीर पटेल पता सा.देह भूमि स्वामी	
79	6643	0.024	0.658	दुआसकली पिता वसपती पटेल पता सा.देह भूमि स्वामी	
	6644	0.077			
	6646	0.016			
	6647	0.073			
	6648	0.012			
	6649	0.012			
	6650/1	0.307			
	6651	0.036			
	6652	0.065			
	6653	0.036			
80	6556/3	0.202	0.202	सुखेन्द्र महेन्द्र रवीन्द्र भूपेन्द्र पिता यज्ञसेन पटेल पता सा.देह भूमि स्वामी	
81	6463/2	0.142	0.158	सेवाभूमि कोटवार प. हल्का वदवार पता सा. देह भूमि स्वामी	
	6488	0.016			
82	6556/1	0.073	0.073	द्वारिकाप्रसाद पि.गंगा पता सा.देह भूमि स्वामी	
83	6809	2.025	2.025	नर्वदाप्रसाद पि.केमलाराम पता ला.देह भूमि स्वामी	
84	6595/1	0.300	1.580	रामनिहोर, जयलाल पि.रामशरणरामनिहार, जय-लाल, पि.रामशरण, गोकुल, पि.राममनोहर भूमि स्वामी विनोद, रावेन्द्र पि.श्यामसुन्दर पता सा.देह भूमि स्वामी	
	6673/1	0.551			
	6674/1	0.518			
	6686/1	0.162			
	6687/1	0.049			
85	6932	0.020	0.488	रामविलोचन पि.सुर्यभान पता सा.देह भूमि स्वामी	
	6933	0.053			
	6934	0.069			
	6935	0.028			
	6936	0.129			
	6938	0.020			
	6939	0.105			
	6940	0.040			
	6942	0.024			
86	6151	0.049	0.049	जगदीश प्रसाद पि. हरदर्शन प्रसाद ब्रा. पता सा. देह भूमि स्वामी	
87	6637/1	0.081	0.433	सुशीव गंगा जानकी पि. साधू वेवा साधू राजेश उमेश पि रामसिया सूर्यप्रताप रामानन्द पि. भोला कुर्मी पता सा. देह भूमि स्वामी	
	6641/1	0.352			
88	6613/1	0.172	0.172	राजकली पत्नी जगदीश वंशराज पिता जगदीश पटेल पता सा. देह भूमि स्वामी	
89	7011	0.162	0.810	भगवानदीन पि. रामप्रताप पटेल पता सा. देह भूमि स्वामी	
	7012	0.081			

	7014	0.567			
90	6662	0.214	0.214	विष्णुकान्त पि. अजय कुमार नावा. वली. सरपरस्त पि. अजय कुमार पि. जगदीस प्रसाद ब्रा. पता सा.देह भूमि स्वामी	
91	6655	0.437	0.437	शुशीलकुमारपि.शेषमणि पता सा.देह भूमि स्वामी	
92	6675	0.077	2.072	सत्यनारायण,अशोक,दिलीप पि.सूर्यप्रताप जाति पटेल पता सा.देह भूमि स्वामी	
	6676	0.890			
	6678	0.251			
	6679	0.186			
	6682	0.182			
	6683	0.032			
	6684	0.405			
	6688	0.049			
93	6606	0.069	0.490	भागवत प्रसाद पि.शिवसहाय पता सा.देह भूमि स्वामी	
	6607	0.328			
	6608	0.093			
94	6478	0.393	2.088	अवधेश राजेश पि. राजभान सा. पहरखा तह.मनगंमा शान्ती पत्नी रामश्राय पुत्री सूर्यप्रसाद पटेल सा इटहा तह.मनगंमा रामकली पत्नी रमेश पुत्री सूर्यप्रसा उर्मिलापत्नी भगीरथी पुत्री सूर्यप्रसाद सा चन्दर महुली तह. मऊगँज 1/4श्यामवती पति शिवमूरत 1/4 भाग भूमि स्वामी उग्रसेन,बुद्धसेन पि.राम-सखा,माधी,विन्दी पुत्री रामसखा,वेवा रामसखा,राजमणिराममिलन,महावीरमहावीर वैजनाथ पि.रामऔतार 1/2 भूमि स्वामी	
	6479	0.578			
	6480	0.049			
	6482	0.085			
	6483	0.045			
	6484	0.028			
	6628	0.032			
	6629	0.878			
95	6486	0.028	1.303	राजरूप पि.वसुधा मु.सोनियावेवा रामलाल,आशादेवी, निर्मलादेवी,राजवहोर,राज-कुमार,पि.श्यामलाल 1/2 भाग भूमि स्वामी वंशगोपाल,रामकरण,मोलिया पि.राजधर पता सा.देह 1/2 भाग भूमि स्वामी	
	6487	0.676			
	6489	0.227			
	6496	0.372			
96	6599	0.040	1.518	अजयकुमार पि.जगदीशप्रसाद जाति ब्रा. पता सा.देह भूमि स्वामी	
	6663	0.040			
	6664	0.259			
	6665	0.024			
	6666	0.125			
	6667	0.555			
	6668	0.045			
	6669	0.243			
	6670	0.049			
	6671	0.138			
97	6604	0.801	0.801	ओम प्रकाश पि.सत्यनारायण,लक्ष्मीनारायण,दिनेशनारायण, पितारामेश्वर प्रसाद पता सा.देह भूमि स्वामी	

98	6241	0.162	0.162	रामभद्र, शिवभद्र, रामप्रताप, श्रीनिवास, शिवकुमार, पिता चन्द्रभान, जगन्नाथ पिता बोडे, परमसुख, रामसुन्दर, शिवलाल, मोतीलाल पिता जगिभान पता सा. देह भूमि स्वामी	
99	6229/2	0.017	0.091	दिनेश पिता भगवत पता सा.देह भूमि स्वामी	
	6230/2	0.003			
	6234/2	0.033			
	6235/2	0.005			
	6501/2	0.015			
	6502/2	0.010			
	6503/2	0.008			
100	6229/3	0.018	0.092	उमेश पिता भगवत पता सा. देह भूमि स्वामी	
	6230/3	0.003			
	6234/3	0.033			
	6235/3	0.005			
	6501/3	0.015			
	6502/3	0.009			
	6503/3	0.009			
101	6229/4	0.017	0.089	राजेश पिता भगवत पता सा. देह भूमि स्वामी	
	6230/4	0.002			
	6234/4	0.033			
	6235/4	0.004			
	6501/4	0.016			
	6502/4	0.009			
	6503/4	0.008			
योग	297 कित्ता	45.801	45.801	101 खाता	

रीवा अल्ट्रा मेगा सोलर पावर परियोजना हेतु आपसी सहमति नीति 2014 के

तहत क्रय की जाने वाली भूमि के धारक/धारकों की सूची

जिनकी सहमति प्राप्त हो चुकी है।

ग्राम - बरसैता पहाड़, रा.नि.म.- दुआरी, तहसील - गुढ़ जिला - रीवा (म.प्र.)

क्रमांक	खसरा नम्बर	रकबा	क्रय हेतु प्रस्तावित रकबा	भूमि स्वामी/शासकीय पट्टेदार का नाम एवं पता
1	2	3	4	5
1	55	0.024	0.024	बिहारी पिता जमुना, कैलाशवती पत्नी कोमल, हर्षलाल पिता कोमल अनिल पुष्पेन्द्र पिता जवाहर, सुमन पति जवाहर, समयलाल मनीष पिता रामचन्द्र, छोटी पति रामचन्द्र पटेल, राममिलन पि. हनुमान व रामसजीवन पि. जगन्नाथ जाति कुर्मी. पता सा.बरसैता भूमि स्वामी
2	66	0.214	0.214	राममिलन पि. हनुमान जाति कुर्मी. पता सा.बरसैता भूमि स्वामी
3	68	0.093	0.291	बिहारी पिता जमुना, कैलाशवती पत्नी कोमल, हर्षलाल पिता कोमल अनिल पुष्पेन्द्र पिता जवाहर, सुमन पति जवाहर, समयलाल मनीष पिता रामचन्द्र, छोटी पति रामचन्द्र पटेल पता सा.बरसैता भूमि स्वामी
	69	0.020		
	70	0.069		
	71	0.109		
4	75	0.113	0.344	बट्टी, बिशाल, सीताराम पि. श्रीमन जाति ब्रा. पता सा.डढ़वा भूमि स्वामी
	77	0.089		
	78	0.142		
5	73	0.206	0.206	उमेश कुमार पि. किशोरीशरण जाति ब्रा. पता सा.बरसैता भूमि स्वामी
6	60	0.121	0.339	अंशमणि सुमन्त आनन्द पिता हनुमान प्रसाद सोमवती पति हनुमान प्रसाद वेवाढवारिकाप्रसाद जाति ब्रा. पता सा.बरसैता भूमि स्वामी
	61	0.04		
	64	0.077		
7	80	0.364	0.74	राघो प्रसाद पि. राजमणि जाति ब्रा. पता सा.बरसैता भूमि स्वामी
	82	0.34		
	83	0.02		
	84	0.016		
8	14	0.105	0.166	शिववहोरशेषमणि पि. हरदर्शन जाति कुर्मी. पता सा.बरसैता भूमि स्वामी
9	86	0.134	0.947	राजमणि पि. रामउदार 1/2 भाग भूमि स्वामी राघो प्रसाद पि. राजमणि जाति ब्रा. पता सा.बरसैता 1/2 भाग भूमि स्वामी
	87	0.02		
	88	0.7		

	89	0.053		
	92	0.04		
10	13	0.170	0.170	અચ્છેલાલ પિ. બદ્રી જાતિ કુર્મી. પતા સા. બરસૈતા ભૂમિ સ્વામી
યોગ	24 કિતા	3.441	3.441	10 ખાતા

रीवा अल्ट्रा मेगा सोलर पावर परियोजना हेतु आपसी सहमति नीति 2014 के

तहत क्रय की जाने वाली भूमि के धारक/धारकों की सूची

जिनकी सहमति प्राप्त हो चुकी है।

ग्राम – रामनगर पहाड़, रा.नि.म.- दुआरी, तहसील – गुढ़ जिला – रीवा (म.प्र.)

क्रमांक	खसरा नम्बर	रकबा	क्रय हेतु प्रस्तावित रकबा	भूमि स्वामी/शासकीय पट्टेदार का नाम एवं पता	विवरण
1	2	3	4	5	6
1	227/1	0.039	0.039	हीरालाल पि. सुग्रीवराम ब्रा. पता सा. बरसैता भूमि स्वामी	
2	75/2	0.018	0.118	दिगम्बर पिता सुरेन्द्र ब्रा. पता सा. बरसैता भूमिस्वामी	
	227/2	0.038			
	228/2	0.006			
	229/2	0.046			
	230/2	0.010			
3	497/8	0.038	0.050	पूनम पि. दिवाकर ब्रा. पता सा. डढवा भूमि स्वामी	
	499/8	0.012			
4	497/9	0.038	0.050	प्रियंका पि. दिवाकर ब्रा. पता सा. डढवा भूमि स्वामी	
	499/9	0.012			
5	75/1	0.018	0.034	कौशल प्रसाद पिता सुग्रीवराम पता सा. बरसैता भूमि स्वामी	
	228/1	0.006			
	230/1	0.010			
6	229/1	0.047	0.047	जीवेश कुमार पिता जवाहर लाल ब्रा. सा. बरसैता भूमि स्वामी	
7	494/5	0.014	0.065	सुनीता पति दिवाकर ब्रा. पता सा. डढवा भूमि स्वामी	
	497/5	0.038			
	499/5	0.013			
8	494/4	0.014	0.066	दिवाकर पि. समालिया राम ब्रा. पता सा. डढवा भूमि स्वामी	
	497/4	0.039			
	499/4	0.013			
9	494/7	0.013	0.075	विश्वजीत पि. दिवाकर प्रसाद ब्रा. पता सा. डढवा भूमि स्वामी	
	495/3	0.002			
	496/3	0.003			
	497/7	0.038			
	498/3	0.002			
	499/7	0.013			
	500/5	0.004			
10	494/6	0.013	0.077	विनीत पि. दिवाकर प्रसाद ब्रा. पता सा. डढवा भूमि स्वामी	
	495/2	0.003			
	496/2	0.003			
	497/6	0.038			

	498/2	0.003			
	499/6	0.013			
	500/4	0.004			
11	494/8	0.019	0.120	गायत्री पति सुखनिधान ब्रा. पता सा. देह भूमि स्वामी	
	497/10	0.076			
	499/10	0.025			
12	248	0.243	0.243	भोला प्रसाद पि. महेशप्रसाद पता सा. बरसैठा भूमि स्वामी	
13	233	0.255	0.255	सरस्वती पुत्री सियाशरण पता सा. बरसैठा भूमि स्वामी	
14	494/2	0.018	0.135	दीपक पि. बाबूलाल ब्रा. पता सा. डढवा भूमि स्वामी	
	495/1	0.005			
	497/2	0.077			
	498/1	0.005			
	499/2	0.026			
	500/2	0.004			
15	102	0.283	0.283	भोलाप्रसादपि. महेश प्रसाद पता सा. बरसैठा भूमि स्वामी	
16	113	0.020	0.324	सुदर्शन प्र. पिता चिड्डा जाति अहिर पता सा. देह भूमि स्वामी	
	114	0.195			
	115	0.020			
	116	0.089			
17	494/10	0.018	0.120	अनामिक पि. सुखनिधान ब्रा. पता सा. देह भूमि स्वामी	
	497/12	0.076			
	499/12	0.026			
18	494/3	0.018	0.121	ज्योति पति दीपक कुमार ब्रा. पता सा. डढवा भूमि स्वामी	
	497/3	0.076			
	499/3	0.025			
	500/3	0.002			
19	494/9	0.018	0.145	अनुराग पि. सुखनिधान ब्रा. पता सा. देह भूमि स्वामी	
	495/4	0.005			
	496/4	0.006			
	497/11	0.077			
	498/4	0.005			
	499/11	0.026			
	500/6	0.008			
20	249	0.032	0.400	छोटेलाल पि. रामधनी पता सा. बरसैठा भूमि स्वामी	
	250	0.368			
21	494/1	0.019	0.128	मालती पति बाबूलाल ब्रा. पता सा. डढवा भूमि स्वामी	
	496/1	0.006			
	497/1	0.076			
	499/1	0.025			

	500/1	0.002			
22	166/1	0.012	0.012	रामखेलावन पिता चिड़डा यादव सा. देह भूमिस्वामी	
23	166/2	0.012	0.012	सुदर्शन पिता चिड़डा यादव सा. देह भूमिस्वामी	
24	166/3	0.012	0.283	रामनिहोर पिता महादेव यादव सा. देह भूमिस्वामी	
	127/1	0.271			
25	166/4	0.013	0.285	यज्ञसेन पिता चुलबुल यादव सा. देह भूमिस्वामी	
	127/2	0.272			
26	208	0.032	0.546	रमेश प्रसाद पि. संकर्षण प्रसाद पटेल पत्नी सरपरस्त शान्तिबाई जाति कुर्मी पता सा. बरसैता भूमि स्वामी	
	209	0.514			
27	223	0.502	0.547	आनन्दवती पति संकटमोचन ब्रा. पता सा. देह 1/2 भाग भूमि स्वामी सुदर्शन प्रसाद पि चिड़डी जाति यादव पता सा. देह 1/2 भाग भूमि स्वामी	
	224	0.045			
28	489	0.028	0.101	रामनरेश पि रामनूज ब्रा. पता सा. डढवा भूमि स्वामी	
	493	0.073			
29	213	0.809	0.809	रमागोविन्द पि. जगन्नाथ ब्रा. पता सा. बरसैता भूमि स्वामी	
30	245	0.085	0.838	रामप्रसाद पि. सुदर्शन जाति कुर्मी पता सा. बरसैता भूमि स्वामी	
	246	0.753			
31	193	0.263	0.316	शिवबहोर शेषमणि पि. हरदर्शन 50 पै. भाग वेवा चन्द्रवती पति बट्टी पता सा. बरसैता 50 पै. भाग भूमि स्वामी	
	194	0.053			
32	494/1/क	0.05	0.372	सुभाष भैयालाल दुधेश्वर पि. शेषमणि राजेश पि. शंभकरन ब्रा. पता सा. देह भूमि स्वामी	
	495/1/क	0.005			
	496/1/क	0.006			
	497/1/क	0.223			
	498/1/क	0.005			
	499/1/क	0.075			
	500/1/क	0.008			
33	107	0.381	1.073	सियासरण पि. जगदेव पता सा. डढवा भूमि स्वामी	
	108	0.045			
	128	0.384			
	130	0.263			
34	94	0.117	0.938	आनन्द बती पति संकटमोचन ब्रा. हि. 1/2 पता सा. बरसैता भूमि स्वामी दिनेश कुमार पि लक्ष्मीनारायण संकटमोचन अरविन्द कुमार	
	95	0.036			
	96	0.089			

	97	0.129		राजारामपि बाल्मीक 1/2 पता सा. बरसैता भूमि स्वामी	
	101	0.567			
35	545	0.295	0.594	कृष्णधर पि. रामदत्त 1/2 भाग भूमि स्वामी चूड़ामणि पि. कामता प्रसाद जाति ब्रा. पता सा. डढ़वा 1/2 भाग	
	546	0.028			
	548	0.271			
36	215	0.065	1.207	श्री मती श्यामवती पति रामकृपाल पता सा. डहवा भूमि स्वामी पता सा. बरसैता	
	216	0.057			
	217	0.304			
	218	0.02			
	219	0.498			
	220	0.04			
	221	0.223			
37	207	0.607	1.214	गणेशिया पति छोटेलाल भूमि स्वामी	
	239	0.607			
38	225	1.364	1.554	शारदा प्रसाद पिता देवीदीन ब्रा. पता सा. देह भूमि स्वामी	
	235	0.065			
	236	0.105			
	237	0.020			
39	240	0.405	0.867	राजमणि पि. गजाधर पटेल जाति पटेल पता सा. बरसैता भूमि स्वामी	
	241	0.325			
	242	0.04			
	243	0.097			
40	67	0.04	1.488	लक्ष्मीनारायण, सँकट मोचन, अरविन्द कुमार, राजाराम पिता बाल्मीक पता सा. बरसैता भूमि स्वामी	
	70	0.024			
	72	0.008			
	73	0.259			
	74	0.02			
	78	0.162			
	84	0.036			
	85	0.283			
	86	0.134			
	87	0.117			
	89	0.049			
	90	0.049			
	91	0.024			
	92	0.283			
41	561	0.332	0.332	रामाशेरोमणि पि. शिवप्रसाद जाति ब्रा. पता सा. बांधी भूमि स्वामी	
42	77	0.394	1.094	अनन्दवती पति सँकट मोचन ब्रा. पता सा. देह भूमि स्वामी	
	80	0.15			
	81	0.372			

	83	0.178			
43	103	2.603	6.386	जगद्धेव पि. दुलारे जाति अहिर पता सा. डडवा भूमि स्वामी	
	104	0.539			
	105	1.088			
	106	1.639			
	109	0.109			
	110	0.384			
	111	0.024			
	151 किता	23.763	23.763	43 खाता	

ANNEXURE VIII

Signatures of People Interviewed

ESA Study for Rewa Solar Power Project,
Madhya Pradesh, India

Rewa Ultra Mega Solar Limited (RUMSL)

January 2016

Participant List

AECOM

Built to deliver a better world

S.No.	Name	Address	Signature
1	Narmada P.d.	Badwaar Village	नर्मदा पटेल
2	Mahavir Prasad	Badwaar village.	महवीर प्रसाद
3	Shivshanker. G.	"	शिवशंकर गुप्ता
4	Jalpat Patel	"	जलपट पटेल
5	Vijay kr Tiwar.	"	Vijay Tiwar
6	Yadunandan	"	Yadunandan
7	Ram Prasad Patel	"	राम प्रसाद पटेल
8	Ram Lattan Patel	"	राम लाल पटेल
9	Sushil kr Pandey	"	सुशील कृष्ण पण्डे
10	Ram Dev.	"	राम देव
11	Ramji	"	रामजी
12	Kali Patni Bhola.	"	काली पति भोला
13	Harri Patel	"	हरि पटेल
14	Bhupendra Singh	Badwaar	भूपेन्द्र सिंह
15	Satyanarayan	Badwaar	सत्यनारायण
16	Raghunath.	Badwaar.	राघुनाथ
17	Babur	"	बाबुर
18	Sudama.	"	सुदामा
19	Dev Narayan.	"	देव नारायण
20	Valmiki (Prasad Patel)	"	वैष्णवी (प्रसाद पटेल)
21	Jokhat.	"	जोखट
22	Rajesh Kumar	Badwaar	राजेश कुमार
23	Unesh Kumar	"	अनेश कुमार
24	Bhagwat Prasad	"	भगवत प्रसाद

S.No.	Name	Address	Signature
25	Bhagwandin Patil	Badwar	ममलान दीनपतेल
26	Mathuram Patil	"	ममलान दीनपतेल
27	Jokhulal Patil	"	गोखलाल पतेल
28	Umesh	"	उमेश पतेल
29	Bhagwanlal Patil	"	ममलान दीनपतेल
30	Sher Bahadur Patil	Badwar	शेर बहादुर पतेल
31	Thakurdin	Badwar	ठाकुर दीनपतेल
32	Rajman Patil	"	राजमान पतेल
33	Jagnath Patil	"	जगन्नाथ पतेल
34	Yagyulal Patil	"	याज्ञिकल पतेल
35	Ramdhani Patil	"	रामधनी पतेल
36	Sanjay Kumar Sen	"	संजय कुमार सेन

Participant List

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S.No.	Name	Address	Signature
①	Vangh Gopay	Badwaran	
②	Mopila	"	- - - -
③	Munira V Shergar	"	
④	Gulabrat	"	રડા મીઠાવ ની
⑤	Rajendr Pd	"	
⑥	Arav Kr	"	
⑦	Anvita M	"	અમીતલાલ પટેલ
⑧	Ram Khilwan	"	sign on previous page
⑨	Ramasherya	"	રામશ્યાય પટેલ
10	Ram Khilwan	"	રામશ્યાય પટેલ
⑪	Indrajeet Sharmak	"	
⑫	Indrajeet	"	દ્રુપદીશ પટેલ
⑬	Ramsayraan	"	રામસાઈવીન પટેલ
⑭	Rajendra Prasad	"	રાજેન્દ્ર પ્રસાદ પટેલ
⑮	Mahavir	"	મહાવિર પટેલ
⑯	Shayantani	"	- કુચામલાલ પટેલ
⑰	Shivraj Patel	"	
⑱	Kailashva pate	"	
⑲	Jagande putu	"	- R
20	Ram Selone Patel	"	રામસેલોને
21	Satish Patel	"	- સતીશ પટેલ
22	Satyadev pater	"	- સાત્યદેવ
23	Sangueta Sin	"	
24	Ramdhani	"	-

S.No.	Name	Address	Signature
25	Dwarika Pat.	Badwar.	21/12/21 4:43 PM
26	Rajkumar.	"	21/12/21
27	Bhimsen Patel.	"	m/n/21
28	Alphavert	"	"
29	Jagdish Pat.	"	21/12/21
30	Hakish Mishra.	"	21/12/21
31	Gomti	"	"
32	Chinnarayana.	"	21/12/21

S.No.	Name	Address	Signature
①	Ram Kheluan	Badwar	पि मे देवली वन
	Surya	Badwar	
②	Suryadin	"	
③	Hindal .	"	
④	Rajkumar .	"	
⑤	Bhimsen Patel .	"	
⑥	Ramsinghvan	"	रामसिंह वन
⑦	Dinshen	"	दिनेश
⑧	Ganga Pd.	"	गंगा
⑨	Shita patel .	"	शीतला पटेल
⑩	Rajkumar	"	राजकुमार पटेल
⑪	Bhindekar . (Shita)	"	शीतला
⑫	Sudarsan	"	सुदर्शन
⑬	Rampatel .	"	
⑭	Ganji Pd.	"	गणपति
⑮	Adarsh Rajmani Patel .	"	राजमणि पटेल
⑯	Umashankar .	"	
⑰	Ram swamber	"	रामस्वाम्य पटेल
⑱	Shivbhadra	"	शिवभद्र पटेल
⑲	Ram singh	"	रामसिंह पटेल
⑳	Ganji Pd .	"	गणपति पटेल
㉑	Rajesh .	"	
㉒	Shanti	"	
㉓	Santa Tirath .	"	तीर्थ पटेल

[illegible]

Participant List

[illegible]

2020-2021

Participant List

AECOM

Built to deliver a better world

S.No.	Name	Address	Signature
1	Ram Ananddevi devi	Ramnagar Barsite dem	राम अ. नंद देवी
2	Laxmi Narayan Duby	Ramnagar, Barsite	L.H. Duby
3	Ram shirromani	Ramnagar, Bandi	
4	Shantidevi	Ramnagar	
5	Sunita Ramnagar Dube.	Dadwa, Ramnagar.	सुनीता
6	Ram Gaurabi Dabee	"	गौरी डूबे
7	Ram Siga Sharan Yadav	"	वि. 11/2/12 रा. यादव
8	Chudamall Duvedi	"	चुडामल दुवेदी
9	Indranjani Divaeli	"	इंदर अमवेली
10	Ram Naresh Divaeli	"	
11	Shiv Bhas Yadav	"	शिव बहास यादव
12	Dudheshwar Duwadi	"	
13	Sulharshan Yadav	"	सुहरीश यादव
14	Ram Nihar Yadav	"	राम निलहन
15	Yag sen Yadav	"	राम निहार यादव
16	Shridevi Pande	"	यशसेन यादव
17	Hari Lal. Sagar Ram	"	श्रीदेवी
18	Shanti Patel	"	हरि लाल सगर राम
19	Ramagouind Pande	"	
20	Bhole Prasad Pande	"	रामगोविंद पण्डे
			मोला प्रसाद पण्डे

Etar Pahad

Participant List

[illegible]

Participant List

S.No.	Name	Address	Signature
1.	Amarnath Mishra	Barshetha desh	Amay
2.	Suninal Kumar	"	Sunam
3.	Ashok Kumar	"	Ashok
4.	Prasan Kumar	"	Prasan
5.	Kallu	Barshetha desh	Kallu
6.	Anshumani (Sommari)	Barshetha desh	Anshumani
7.	Jivesh Kumar	Barshetha desh	Jivesh Kumar
8.	Kaushal Prasad	"	Kaushal Prasad
9.	Dilcep Kumar	"	Dilcep Kumar
10.	Shankar Prasad Pandey	"	Shankar
11.	Aagmanand Pandey	"	Amish Pandey
12.	Prabhavati	"	Prabhavati
13.	Chandrakanta	"	Chandrakanta
14.	Sanjay singh v/o Dheem	"	Sanjay
15.	Bhulanandini	"	Bhulanandini
16.	Brendra Patel	"	Brendra Patel
17.	Shatrungay Pandey	"	Shatrungay

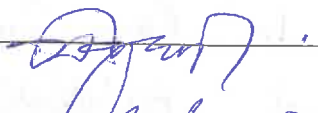
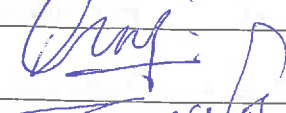
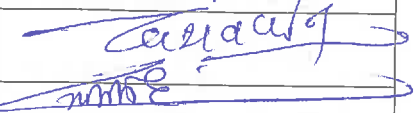
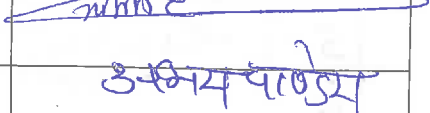
Participant List

S.No.	Name	Address	Signature
1.	Dadigal Pad	Bashitadesh	काशीपति (on behalf)
2.	Sukhlal	Bashitadesh	काशीपति
3.	Jana lal	Bashitadesh.	काशीपति
4.	Jagdish	Bashitadesh	काशीपति
5.	Jagjahir.	Bashitadesh.	काशीपति
6.	Satyaharan	Bashitadesh	
7.	Shradha Lal	Bashitadesh	
8.	Thakurdeen Lal	Bashitadesh	
9.	Shiv narayan Pal.	Bashitadesh.	शिवनारायण पाल
10.	Ramlal.	//	
	//	// →	
11.	Samaylal	//	
12.	Raghunath	//	
13.	Ranija	Bashitadesh.	
14.	Manbatti	//	
15.	Ramelulrah.	//	
16.	Ramkaran.	//	
17.	Ranjan.	//	

S.No.	Name	Address Village	Signature
1.	Ram Sumirat Patel	Balasta	Ram Sumirat Patel
2.	Hiralal Kander	Dharmawa	Hiralal Kander
3.	Ramet Masad. Mishra. Dharmawa.	Dharmawa	Ramet Masad. Mishra
4.	Biswanjan Pat. Patil	Banswara	Biswanjan Pat. Patil
5.	Guru Bhanu Chandra Bhandari	Banswara	Guru Bhanu Chandra Bhandari
6.	गुरु भानु चन्द्र बन्धारी	बान्सवा	गुरु भानु चन्द्र बन्धारी
7.	आगम नन्द पण्डेय (Agam Nand Pandey)	वरसेता	आगम नन्द पण्डेय
8.	वामानन्द पण्डेय	वरसेता	वामानन्द पण्डेय
9.	शम्भु प्रसाद पण्डेय	वरसेता	शम्भु प्रसाद पण्डेय
10.	श्री राज पाण्डेय	वरसेता	श्री राज पाण्डेय
11.	सर्वेश कुमार मिश्र	वरसेता	सर्वेश कुमार मिश्र
12.	उमेश कुमार त्रिपाठी	वरसेता	उमेश कुमार त्रिपाठी
13.	शिवकली कोठारी जनपद सदस्य	वरसेता (जनपद सदस्य)	शिवकली कोठारी
14.	श्री रामा शिरोमणी दिवेदी	वरसेता	श्री रामा शिरोमणी दिवेदी
15.	कृष्ण शंकर मिश्र	वरसेता	कृष्ण शंकर मिश्र
16.	सुरेश पाठक	वरसेता	सुरेश पाठक
17.	संमिता	+ Zilla Panchayat member. वरसेता (सरपंच)	संमिता
18.	श्याम कली यादव	वरसेता	श्याम कली यादव
19.	सुरेश पाठक दिवेदी	वरसेता	सुरेश पाठक दिवेदी
20.	श्री मणी मिश्रा	वरसेता	श्री मणी मिश्रा
21.	शिवेन्द्र सिंह	वरसेता	शिवेन्द्र सिंह
22.	राम मिलन पटेल	वरसेता	राम मिलन पटेल
23.	रावेन्द्र पटेल	वरसेता	रावेन्द्र पटेल

Date: 20/11/2015

Banseta Gram Panchayat Venue

S.No.	Name	Address	Signature
24	विराट लाल पांडेय	बरसैता	
25	शानेश सुषण पांडेय	बरसैता	
26	वंशावर्धन प्रसाद पांडेय	बरसैता	
27	अमरपाल सिंह	बरसैता	
28	अमर कुमार पांडेय पुत्र राजेश कुमार पांडेय	बरसैता	अमर पांडेय
29	नारायण विरवर्धन पुत्र राम बन्धु विश्वकर्मा	बझावर	विरवर्धन विश्वकर्मा
30	जयपाल सिंह	बरसैता	जयपाल सिंह
31	शारदा प्रसाद पांडेय	बरसैता	शारदा प्रसाद पांडेय
32	गोवर्धन प्रसाद पांडेय	बरसैता	गोवर्धन प्रसाद
33	अवनीश कुमार मिश्रा पुत्र अशोक कुमार मिश्रा शशी प्रसाद मिश्रा	बरसैता	अवनीश
34	शकुन्तला पांडेय	बरसैता	शकुन्तला पांडेय
35	धनवन्ता कौल पत्नी रामाश्रम कौल	बरसैता	(बैरवा)
36	तरुण कुमार पटेल	बरसैता	तरुण कुमार पटेल
37	राजीव लोचन पांडेय	बरसैता	राजीव लोचन पांडेय
38	समयलाल पटेल	बरसैता	समयलाल पटेल
39	धीरेन्द्र तिवारी	बरसैता	रामानुज तिवारी
40	राज कुमार पटेल	बरसैता	राज कुमार पटेल
41	रामश्रील पटेल % रामगरीन पटेल	बरसैता	रामश्रील पटेल
42	सुमन देवी कौल % रामसजीव कौल	बरसैता	सुमन देवी कौल
43	रामसदन % पेची	बरसैता	—
44	अजय कुमार % नरेश शरण पांडेय	बरसैता	अजय कुमार पांडेय
45	छोटे लाल % चैत कौल	बरसैता	—

Date: 20/11/2015

ANNEXURE IX

Environment Code of Practice and Social Exclusion List

ESA Study for Rewa Solar Power Project,
Madhya Pradesh, India

Rewa Ultra Mega Solar Limited (RUMSL)

April 2016

1. Environment Code of Practice and Social Exclusion List

1.1 Environmental Codes for Activities to be undertaken during Site Preparation

Personnel who will be undertaking site clearing and preparation activities before installation of solar panels should collect the following information before commencement of construction activities:

- The construction schedule ;
- changes to the topography of the site during each stage of the project ;
- A map of existing vegetation identifying areas to be retained;
- Details of areas of cleared land at each stage of the development, and period of time that each section will be exposed;
- changes to drainage and identification of sources of clean and contaminated storm water;

Minimizing Erosion and Sediment Control

- Schedule measures to avoid and reduce erosion by phasing the work program to minimise land disturbance in the planning and design stage;
- Keep the areas of land cleared to a minimum, and the period of time areas remain cleared to a minimum;
- Base control measures to manage erosion on the vulnerability of cleared land to soil loss, paying particular attention to protecting slopes;
- Keep vehicles to well-defined haul roads. · Rehabilitate cleared areas promptly.
- Install erosion and sediment control measures, if possible before construction commences;
- Identify drainage lines and install control measures to handle predicted storm water and sediment loads generated in the mini catchment;
- Establish an adequate inspection, maintenance and cleaning program for sediment run-off control structures.
- Take dust suppression measures, such as promptly watering exposed areas when visible dust is observed;
- Install wind fences wherever appropriate;
- Locate stockpiles away from drainage lines to where they are protected from wind;
- Minimise the number and size of stockpiles;
- Keep topsoil separate from under burden when stockpiling soil;
- Construct the stockpile with no slope greater than 2:1 (horizontal to vertical). A less steep slope may be required where the erosion risk is high.

Noise and Vibration

- Fit and maintain appropriate mufflers on earth-moving and other vehicles on the site.;
- Enclose noisy equipment;
- Provide noise attenuation screens, where appropriate;
- Where an activity is likely to cause a noise nuisance to nearby residents, restrict operating hours to between 7 am and 6 pm weekdays and 7 am to 1 pm Saturday, except where, for practical reasons, the activity is unavoidable;

- Noise should not be above background levels inside any adjacent residence between 10 pm and 7 am;
- Advise local residents when unavoidable out-of-hours work will occur;
- Schedule deliveries to the site so that disruption to local amenity and traffic are minimised;
- Minimise vibrations.

Air Quality

- Ensure that all vehicles and machinery are fitted with appropriate emission control equipment, maintained frequently and serviced to the manufacturers' specifications;
- Smoke from internal combustion engines should not be visible.

Inspections

Inspection should be undertaken on weekly basis to ensure effective implementation of the codes prescribed above.

Activity	Issue	Frequency	Remedial Action
Drainage	New drainage lines not controlled	At least once every two days in areas where earth-moving is occurring Weekly in other areas of the project site	Install appropriate sediment controls on new drainage lines
Sediment controls, silt fences and traps	Not controlled effectively	Once in two days	Remove sediment from trap Replace barrier or filter material Improve maintenance
Roads	Dust Soil on paved roads	Daily	Avoid dust emission Sprinkling of water to be undertaken
Stockpiles and bare slopes	Erosion	Weekly	Minimise exposure to run-off and action of wind Ensure stabilisation measures are effective
Un-vegetated areas	Dust	Daily during dry weather	Increase use of water spray on un-vegetated areas
Vehicles and machinery	Noise pollution Exhaust gases	Initially when vehicle or machinery is introduced to the site and thereafter monthly	Ensure that mufflers and noise shielding are effective Ensure that emission controls are effective and motors well maintained.
Chemical storage areas	Spills	Weekly	Clean-up contaminated area and provision of secondary containment

1.2 Environmental Codes to be adopted during installation of Solar Panels

Evaluation of hazards and potential injuries

It's mandatory to evaluate each specific situation to develop a list of the hazards and the potential injuries that could occur. Installation of solar panels comprises of:

- Using power tools;
- Movement of solar panels;
- Installation of mounting structure for fixing of panels;
- Excavation for mounting structure

Using power tools:

- Working conditions include: using many different power tools and power cords on the jobsite.
- Hazards include: worn or frayed power cords and power lines (electric shock hazards), objects thrown from equipment such as saw blades (eye injury, laceration, puncture wound, and bleeding hazards), sharp tools (laceration, puncture wound, and bleeding hazards).
- Action: Instruct workers on usage of power tools, use of safety boots every time, daily tool box training.

Movement of solar panels:

- Working conditions include: movement of panels in hot summer conditions, lifting and moving of panels
- Hazards include: dehydration, potential of passing out, heat exhaustion, heatstroke, lifting hazards from carrying panels, fall hazards from accidents on ladders, electrical hazards from contact with electrical power lines.
- Action: Develop hydration and safe practices while working in hot weather conditions, mark the area for movement of solar panels, identified workers who will be responsible for carrying of solar panels, identification of fire fighters to be undertaken.

Installation of mounting structure for fixing of panels:

- Working conditions include: lifting, moving and installing
- Hazards include: lifting of heavy mounting structures, fire hazards and electrocution
- Actions: wear appropriate PPEs (hard hats, safety boots, gloves), training on fixing of solar panels to be provided.

Excavation for mounting structure:

- Working conditions include: drilling to be undertaken through drilling machines, marking of pointers, moving of earth moving structures.
- Hazards include: electrocution while using drilling machine, injury from rotating parts
- Actions: Maintain a distance while working with drilling machine, check all electrical wiring before start of work, and wear appropriate PPEs while excavation.

Serious injuries, including death, result from jobsite accidents. Just a few of the potential injuries from jobsite hazards include:

- Death
- Severe/traumatic/massive head/brain/skull injuries
- Broken/fractured/shattered bones
- Spinal injuries
- Punctured lungs
- Electrocutation
- Burns
- Heatstroke
- Severe cuts or lacerations
- Serious back or neck injuries
- Puncture injuries from falling onto items
- Eye injuries
- Strains and sprains

The following measures to be implemented during installation of solar panels at the project site:

- PPE policies and procedures should be reviewed if an employee appears to need retraining or when introducing new PPE into the workplace. PPE can include the following:
 - o Eye and face protection (e.g., safety goggles, glasses, face shield, visor).
 - o Head protection (e.g., hard hats, helmets, hats). Hard hats are required if there is a risk of objects falling onto a person or a risk of hitting your head on an object.
 - o Hearing protection (e.g., ear plugs, canal caps, ear muffs).
 - o Protective clothing.
- Module Developers must designate one or more competent persons to oversee the proper use and maintenance of tools used on the job. In general, equipment, including electrical cords, must be inspected prior to use to ensure it is in safe condition;
- Working in hot conditions can contribute to dehydration, the excessive loss of water from your body. Available potable water must be on the jobsite.
- Check for provision of insulation to all the electrical wires before start of any job;
- Check working conditions of fire extinguishers and identify fire fighters for the site;
- Keep first aid box handy and provide identified workers with appropriate training on first aid.

1.3 Code of Conduct for Labours working at construction site

This “Code of Conduct” has been designed to ensure that a consistent approach to construction labour behaviour is achieved in order to provide a respectful and safe environment for all project staff and surrounding community. This “Code of Conduct” requires all construction labour while on the construction premises to behave in a manner that is lawful and respectful of others.

Behavioural Standards

The construction labour shall demonstrate acceptable behavioural standards. Unacceptable behaviour will result in disciplinary action against the guilty. Repeated instance of unacceptable behaviour will result in immediate termination of employment and removal from the site.

Appropriate Use of Language

When working on site, the construction labour should act in a socially responsible manner. They shall be respectful and sensitive to all co-workers and management staff. The use of profane, harassing or threatening behaviour (including language and gestures) is unacceptable, regardless of the actions of others. In the event of an altercation, the labour shall report the matter to the contractor or Module Developer representative immediately.

Use of PPEs

All labour is required to wear appropriate work wear, hard hats and safety footwear while on the construction site. Non usage of PPEs by any labour will result in disciplinary action.

Smoking and Alcohol Consumption

Smoking is not permitted in any enclosed area on project site, including labour camps, kitchen premises, and toilets. Alcohol is prohibited on all project sites, including construction areas, labour camps, kitchen premises and toilets, except for designated areas.

1.4 Social Exclusion List

The Social Exclusion List lays the guidelines which should be incorporated in the project planning and execution of the project.

- In the Contract Bid Agreement, a clause should be mentioned that the prospective bidders should strictly adhere to the prohibition of engagement of forced labour and exploitative forms of child labour in all activities related to the project, further extending this clause to the Contractors and Sub Contractors. The regulatory citation of The Child Labour (Prohibition and Regulation) Act, 1986 and The Bonded Labour System (Abolition) Act, 1976 should be strictly abided by all bidders/project developers.
- The Contract Bid Agreement should have clause requiring the developers to be responsible in adhering to the elements of non-discrimination and equal opportunity in all works related to the project. The regulatory citation of The Minimum Wages Act, 1948 and rules made thereunder; The Contract Labour (Regulation and Abolition) Act, 1970; The Inter State Migrant Workmen (Regulation of Employment and Conditions of Service) Act, 1979 and rules made thereunder; The Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 and rules made thereunder; The Workmen's Compensation Act, 1923; The Equal Remuneration Rules, 1976 and The Maternity Act, 1961 should be strictly abided by all bidders/project developers.
- Additionally, RUMSL should develop a procedure on management of chance find, which further should be formally communicated to the Developers for effective implementation.

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