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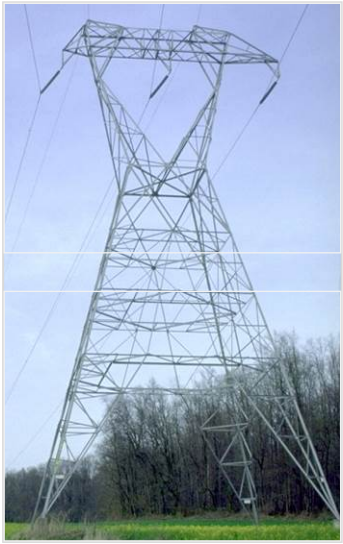

Environment and Social Impact Assessment Report (Scheme S, Volume 1)

Jharkhand Urja Sancharan Nigam Limited

Final Report

January 2018

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FINAL REPORT

Jharkhand Urja Sancharan Nigam Limited

Environment and Social Impact Assessment Report (Scheme S, Volume 1)

31 January 2018

Reference # 0402882

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Abbreviation

BMTPC - Building Material and Technology Promotion Council of India
CEA – Central Electricity Authority
CFC - Chlorofluorocarbon
CGWB – Central Groundwater Authority Board
CPCB – Central Pollution Control Board
dB – Decibel
DG –Diesel Generator
DVC - Damodar Valley Corporation
EA – Environmental Assessment
EMP – Environmental Management Plan
ERM – Environmental Resources Management
ESIA – Environmental and Social Impact Assessment
ESIA- Environmental and Social Impact Assessment
ESMF- Environmental and Social Management Framework
ESZ – Eco-Sensitive Zone
GCC- General Conditions of Contract
GM – Gair Mazrua
GOI – Government of India
GPS – Global Positioning System
GSS – Grid Sub Station
IESE - Initial Environmental and Social Examination
IMD – India Meteorological Department
IS – Indian Standard
IUCN – International Union for Conservation of Nature
IWPA – Indian Wildlife Protection Act
JPSIP- Jharkhand Power System Improvement Project
JUSNL - Jharkhand Urja Sancharan Nigam Limited
KL- Kilo Litre
KLD – Kilo Litre per Day
Km – Kilometer
KVA – Kilo-Volts-Ampere
MVA – Mega-Volts-Ampere
NBWL – National Board of Wildlife
NH- National Highway
PCB – Pollution Control Board
PCB – Polychlorinated Biphenyls
PfA – Power for All
PPP – Public Private Partnership
PUCC – Pollution under Control Certificate
SCC- Special Conditions of Contract
SF6 –Sulfur Hexafluoride
TCE – TATA Consulting Engineer
TL – Transmission Line
WPR- Work Participation Ratio

EXECUTIVE SUMMERY

The Jharkhand Urja Sancharan Nigam Limited (JUSNL) with financial assistance from the World Bank is implementing the transmission infrastructure development/upgradation under the Jharkhand Power System Improvement Project (JPSIP) and will include: (a) Creation of 25 new 132 kV substations, and (b) Development of associated 132 KV transmission lines of around 1800 kms. These 25 substations and associated transmission lines have been organised into 26 schemes. The proposed 132KV substation at Jharmundi Block is covered under **Scheme S of Phase 1**.

The proposed substation at Jharmundi would be located on Plot no. 325 of the Paharidih Village and Plot no. 200 of the Bunbhuni Villages, Jharmundi Block in Dumka District. Out of the entire plot of land which is approximately 7.65 acres , 4.44 acres from Plot no. 325 and 3.21 acres from Plot no.200 have been already allotted to JUSNL by the District Collector of Dumka for development of the substation. The site is connected to National Highway 114A by village road (connecting Dumka-Deoghar).

The project activities would involve the design, construction and operation of a 132/33 KV Sub-station. The key components of the project would include: 2 Nos 50 MVA oil cooled transformers, incoming and outgoing bays connecting to the transmission line, control room and residential quarters for JSUNL employees. Setting up of the sub-station would involve a permanent change in land use from presently non-forest land to infrastructure. Construction activities are expected to cause temporary disturbances because of plying of vehicles in approach roads, site preparation involving cutting and filling of earth and soil, operation of construction machinery and equipment, and the involvement of a labour force.

During operational phase, about 16-20 employees would be located at site. Resource use would comprise of about 9 KLD of water, to be sourced through a bore well at site. On a regular basis, small amounts of domestic waste and waste water would be generated from the site. From time to time, minor amounts of hazardous waste would also be generated and would be disposed off in conformance to regulatory requirements.

The baseline studies have profiled the environmental and social conditions of the Jharmundi site and the study area of 2 kms around it. The studies were designed to collect information from secondary sources and to obtain primary information through site visits and consultations with local communities and other related stakeholders. Overall, the baseline is reflective of the environmental and social landscape of the area and the Dumka District. Site specific environmental and social baseline is described in the Table below:

Environmental Setting	
Terrain & Slope	The site is located on a hillock with a level difference of about 20 m between the highest contour (at the centre of the site) and the lowest contour (on the northern boundaries).
Soil	The soil at site is lateritic in nature (mainly a wasteland) . Due to the nature of soil the area is prone to gully erosion.
HFL data	The highest and lowest contours of the site are 273 m and 253 m respectively.
Existing drainage pattern	There is no drainage channel within the site. Since the site is located on hillocks with its slope descending on all sides from the centre and it is lateritic in nature gullies have been observed inside the site.
Environmental pollution in the vicinity	The proposed substation is located in a rural setting. There are no sources of air pollution in the vicinity. During the site reconnaissance no industries were observed in the vicinity of the site.
Other environmental sensitivity	The village pond is located at 180m on the northern side of the site, used by the adjoining community for meeting their domestic needs (mainly for bathing purpose)
Social Setting	
Status of Land	The land belongs to the Land Revenue Department Government of Jharkhand, It would be transferred to JUSNL free of cost.
Habitations	There are only a few settlements in the vicinity. Settlement of Paharidih is the nearest settlement with respect to the site. Other settlements in the north are Tilwamarni, Bunbhuni in south, Tetariya and Amba in east, and Haripur in east.
Religious & Culture related sensitivity (including sacred groves)	At immediate northern side of the project site there is Shiv Mandir and adjoining to this temple there is vacant land which is used as fair ground by the local people during "Shivaratri". Since the land for the substation is a hillock it is not used during the fair. The fairground is limited to the land adjoining the Shiv Temple which is also a Gair Majua land(owned by the Revenue Department , Government of Jharkhand).There are no sacred groves either within the site or in its immediate vicinity.

In addition to the baseline surveys, a community consultation exercise was undertaken in the adjoining Bunbuni and Paharidih village. Residents of the village were consulted to validate secondary information on the socio economic status of the village, the perceptions of the local people with respect to the planned GSS project and to identify any existing dependency of the local community on the proposed site. The consultations revealed that there was no dependency on the plot of land which belonged revenue department, except for the Shiv Mandir located at northern side of the substation site is the major religious place in this area. Adjoining to this temple there is vacant land which is used as fair ground by the local people during "Shivaratri" for 3-4 days. People are concerned about the disturbance in the temple and mela ground during construction. Apart from that adjoining to the Shiv Mandir, there is a hand pump used by local people. As this hand pump is close to the

site, local people have concerns that it may be used by the workers engaged in the substation construction work.

The potential and associated impacts of the proposed project were identified and evaluated using standard procedures. Source references including past project experience, professional judgment and knowledge of both the project activities as well as environmental and social setting of the site and surroundings were used in the assessment.

The change in land use from vacant land to infrastructure type may be considered to be having insignificant impact because the small extent of such change within the study area, which has the presence of considerable percentage of agricultural and forest land uses, would be minimal. Further, the is not suitable for agricultural.

Excavations, cutting and filling of soil and rocky outcrops present on site may lead to erosion and runoffs which may adversely impact adjoining land parcels and / or waterbodies. In addition, local drainage in and around the site may get impacted due to the change of the site topography, if proper site design is not undertaken considering these factors.

With the construction phase lasting about 1 year, construction related activities are expected to cause local level impacts (Paharidih, Telwamarni, Bunbhuni, Tetariya, Amba and Haripur Villages) on environmental quality due to re-entrainment of dust in air from earth works and construction dumps, air and noise emissions from vehicles and construction equipment, discharge of domestic waste water from labour camps and generation of construction and domestic wastes. In the construction phase, there are expected to be health and safety related issues due to involvement of labour in project construction activities. Influx of people (migrant workers, subcontractors and suppliers) may lead pressure on existing social infrastructure and their interactions with nearby rural communities or potentially lead to cultural conflicts, and result in additional vulnerability to women and population belonging to scheduled castes or tribes. At the same time, positive socioeconomic impacts are also expected with scope for business opportunities for local subcontractors, skill acquisition for local workforce and employment opportunities arising from recruitment of local construction labour and staff, improvement of roads and access.

Adverse impacts caused by the project during the operational phase are expected to be minimal, with no plans for any point source emissions or discharges from the GSS to any environmental media. The operation of the facility is expected to result in generation of small amount of wastes, some of which (like oily rags, waste oil, etc.) may be hazardous in nature and are not expected to cause any significant adverse impacts if adequate safeguards and mitigation measures are adopted, as delineated in the ESMP.

In order to ensure that the mitigation measures developed for the significant impacts of the proposed project are implemented and maintained throughout

the project duration, an Environmental Management Plan (EMP) has been developed. The EMP outlines management strategies for managing all associated and potential impacts that could affect the environment and living conditions of people in the area. These mitigation measures and plans include:

- Arrange for appropriate compensation for loss of biodiversity (wasteland covering an area of 7.65 acres).
- Plan for the sub-station site layout and for cutting and filling of earth in a manner that local drainages are not disturbed and ensure that the adjoining pond on the northern side of the site to remain free of sewage and waste disposal and run-off. The hand pump adjoining the Shiv Mandir on the northern side of the site should not be tampered with during the construction and operational phases of the site;
- Adopt appropriate engineering and associated mitigation measures and plans to minimise adverse impacts to local communities during construction activities.
- Adopt appropriate EHS safeguards and good practices to be adopted by construction contractors to ensure that occupational health and safety risks of labours are maintained at acceptable levels. The labour force should also undergo compulsory training on work related health and safety measures.
- Ensure local suppliers and contractors implement local employment and procurement policies to the benefit neighboring communities of Paharidih, Tilwamarni, Bunbhuni, Tetariya, Amba and Haripur villages.

In order to ensure that the ESMP is implemented during construction phase, specific conditions of contract for Site Contractors to be engaged have been laid down which would be made part of the Bidding document. A ESMP monitoring plan would also be implemented to be enable JSUNL to ensure that the planned mitigation measures are being implemented and adverse impacts are kept to the minimum possible level.

For the implementation of the JPSIP Project JUSNL has developed a Project Implementation Unit (JPSIP PIU) headed by the Chief Engineer (Transmission O&M).The JPSIP PIU would also be responsible for driving the implementation of the E&S safeguards in JPSIP. At the field level, the Chief Engineer cum GM of theDumka Zone of JUSNL would be responsible for implementing the technical aspects of the JPSIP with respect to the Jarmundi GSS and would be responsible for overseeing the implementation of the ESMP and the E&S safeguards adopted by the contractor. In addition, it is recommended that the Contractor implementing the subprojects would induct Environment and Social personnel to supervise implementation of the E&S safeguards on the ground.

Through the process of consultation and disclosures, JPSIP would ensure that the project information is communicated to the stakeholders and the feedback from the community is integrated into the execution phases of the project. A Consultation Framework has been prepared to ensure involvement of

stakeholders' at each stage of project planning and implementation. In addition, a three-tier Grievance Mechanism has been proposed for handling any grievances of community related to the project i.e. Tier 1 -Circle level, Tier 2 -Zone level, Tier 3- Grievance Redresses Cell located centrally at the JPSIP PIU in Ranchi.

1 INTRODUCTION

1.1 BACKGROUND

The Government of Jharkhand with active support of the Government of India's has planned for implementing 24X7 Power for All (PfA) in Jharkhand. The program is aimed at achieving 24x7 reliable powers for all the households by FY 2019. The PfA roadmap includes interventions in generation, transmission, distribution, renewable energy and energy efficiency/ proposed to be implemented during FY16 to FY19. Government of Jharkhand through Jharkhand Urja Sancharan Nigam Limited (JUSNL) has planned to develop the transmission infrastructure in the State. This transmission infrastructure development is being funded from different sources e.g. domestic fund, Public Private Partnership (PPP) and multilateral funding. The Jharkhand Urja Sanchar Nigam Limited (the state run power transmission utility company) has approached the World Bank for assistance to fund a part of the transmission infrastructure under the Jharkhand Power System Improvement Project (JPSIP). The project would include creation of 25 new 132 kV substations and associated 132 KV transmission lines of around 2000 Kms.

JUSNL would like to develop the projects in a sustainable manner. Towards this objective, an Environmental and Social Management Framework (ESMF) has been developed to lay out a mechanism for integrating environmental and social concerns into the planning, designing and implementation phase of JPSIP. Based on the higher level guidance provided in the ESMF, each project component is undergoing a project specific Environmental and Social Impact Assessment (ESIA). Based on outcome of the assessment, a project specific Environmental and Social Management Plan (ESMP) is laid down for all the sub-projects.

1.2 PROJECT OVERVIEW

As part of the JPSIP, JUSNL has planned for development of 25 new substations and associated transmission lines. These substations and transmission lines have further been consolidated into schemes. For the purpose of implementation these schemes are divided into 3 Phases. The subprojects in each of the schemes are presented as ***Annexure 1***.

In Phase I there are 9 schemes. Three (3) nos of these schemes are located in Ranchi District while four (4) nos of scheme are located in Dumka and Pakur District, one (1) nos in East Singhbhum district and one (1) in Latehar district. Jarmundi GSS is part of Scheme S of Phase I, which falls within Dumka district.

This Environment and Social Impact Assessment Report deal only with the construction and operation of the new 132/33KV Substation at Jarmundi

block which is part of Scheme S of Phase I. The details of the other interlinked subprojects in the Scheme are presented in ***Table 1.1***.

Table 1.1 Details of the substation and interlinked project (Scheme S)

Sl. No	Details	Capacity (MVA)	Length (km)
1.	132/33 kV GSS (2 x 50 MVA)	100	
2.	LILO of 132 kV DC 3 Ph. Dumka-Deoghar Transmission line at GSS Jarmundi.		5.004*

Source: JUSNL; * Two transmission lines, each 132kV D/C line, will run parallel from LILO tower to proposed Jarmundi GSS (each of 2.502km) to constitute the LILO connection at Jarmundi on Deoghar-Dumka D/C line

The Environmental and Social Assessment of the transmission lines with the Jarmundi Substation are presented as **Scheme S Volume 2**:

- LILO of 132 kV DC 3 Ph. Dumka-Deoghar Transmission line at GSS Jarmundi.

1.3 STRUCTURE OF THE REPORT

The report has been organized considering the following:

- Chapter 1 above contains a brief background of JPSIP. It also presents a broad context to the ESIA Study;
- Chapter 2 presents the regulations and polices applicable and actions which are required by JUSNL;
- Chapter 3 presents the description of the proposed substation and interaction with the bio-physical and socio-economic environment;
- Chapter 4 provided methodology adopted the ESIA study;
- Chapter 5 outlines the environmental and social setting of the proposed substation which forms the basis for assessment of potential impacts;
- Chapter 6 presents the likely impacts from the proposed substation over the lifecycle of the project along with its severity levels;
- Chapter 7 elaborates on the stakeholder identification process adopted and a brief of the public consultations under taken to capture the local residents / stakeholders perceptions;
- Chapter 8 presents the mechanism of the implementation of the proposed mitigation measures complete with responsibility and resources requirements; and
- Chapter 9 presents the Conclusion and Recommendations;

1.4 PURPOSE AND SCOPE OF THIS ESIA

The ESIA process involves the identification of the potential environmental issues in the project and trying to address them through design interventions. The ESIA further carries out impact prediction and evaluation of residual environmental and social issues of a Project. It then goes on to outline the

proposed mitigation measures for residual impacts and enhancement measures for positive impacts which the Project will implement.
The objectives of this document are to:

- Identify all potentially significant adverse and positive environmental and social issues of the Project. Enumerate the design modification which has been influenced by the ESIA process and define the final alignment of the Grid Substations (GSS);
- Gather baseline data to inform the assessment of impacts on the environment as a result of the Project;
- Suggest appropriate mitigation measures to effectively manage potential adverse impacts; and
- Developing an Environmental Management Plan (EMP) to implement suggested mitigation measures to minimise adverse impacts through effective management systems including formulation of monitoring and reporting requirements.

1.5 *LIMITATION*

ERM would like to highlight the following limitations with regard to this ESIA document:

- Project planning for proposed transmission line has been undertaken by Tata Consulting Engineer (Hereinafter referred to as "Design Consultant") based on desktop studies and a Detailed Project Report has been developed based on the same. Detailed field survey of the project components is currently being undertaken by Design Consultant. The present draft of the ESIA therefore considers the project configuration as has been outlined in Design Consultant's Report and impacts for the same has been accordingly assessed.

1.6 *USES OF THIS REPORT*

The Client acknowledges that report provided by ERM in relation to the provision of Services is delivered to the Client solely for the Client's benefit. ERM, its officers, employees, contractors, and agents shall owe no duties, obligations or liabilities to any persons in connection with any use of or reliance on the Project information provided by JUSNL. We make no warranties, express or implied, including without limitation, warranties as to merchantability or fitness for a particular purpose.

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2 POLICY, LEGAL AND ADMINISTRATIVE FRAME WORK

The ESMF identifies all the national and state level legislation rules and guidelines which would be applicable to JPSIP. It has also identified all the World Bank Policies and guidelines which are applicable in JPSIP. This section highlights only the relevant environmental and social policies and regulations, World Bank guidelines which are applicable for this sub-project

2.1 APPLICABLE LAWS AND STANDARDS

The applicable acts, regulations, and relevant policies in the context of the project are presented in ***Table 2.1***

Table 2.1 Regulations Triggered for the Project

Sl. No.	Regulations	Applicability & Action Required	Responsibility
A.	**Electricity Related Regulation**		
1.	Electricity Act 2003 and Indian Telegraph Act 1885	Under the provisions of Section 68(1):- Prior approval of the Govt. of Jharkhand (GoJ) is a mandatory requirement to undertake any new transmission project 11 kV upward in the State which authorizes JUSNL to plan and coordinate activities to commission a new Transmission project. Under Section 164:- GoJ, may by order in writing, authorize JUSNL for the placing of electric line for the transmission of electricity confer upon licensee (i.e. JUSNL) in the business of supplying electricity under this act subject to such conditions and restrictions, if any, as GoJ may think fit to impose and to the provisions of the Indian Telegraph Act, 1885, any of the power which the Telegraph authority possesses. The Electricity Act and Telegraph Act provide guidance on the compensation payable for damages to crops/ trees and structures for setting up of transmission line. As per the provision of the above mentioned Acts, JPSIP would require to pay compensation for any damage or loss due to its projects.	JUSNL,JPSIP
2.	Technical Standards for Construction of Electrical Plants and Electric Lines Regulations, 2010; Measures relating to Safety and Electric Supply Regulations, 2010	Both the Regulations are framed by Central Electricity Authority (CEA) of India under Indian Electricity Act, 2003. These regulations provide technical standard for construction of electrical lines and safety requirements for construction/ installation/protection/operation/mainte nance of electric lines and apparatus. JPSIP	JPSIP, Contractor

Sl. No.	Regulations	Applicability & Action Required	Responsibility
		and its contractors would comply with the requirements of these regulations.	
B.	**Environment/Social Legislation**		
1.	Environment Protection Rules, 1986 and applicable standards	The standards for discharge/emission from different type of pollution source (e.g., DG sets) and industries have been laid down by CPCB under EP Rule, 1986. JPSIP would ensure that all these standards are complied during the planning, construction and operation of the project.	JPSIP, Contractor
2.	Ancient Monuments & Archaeological Sites and Remains Act, 1958; Indian Treasure Trove Act, 1878; Jharkhand Ancient Monuments and Archaeological Sites, Remains and Art Treasures Act, 2016.	Proposed substation site is not located near or inside archaeological site. Thus National and State level Acts on Ancient Monuments and Archaeological Sites will not be triggered for this project. However, treasure, archaeological artefacts can be found during excavation work; for which procedure laid down in Indian Treasure Trove Act, 1878 would be followed.	JPSIP, Contractor
3.	Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016	Generation of waste oil and used transformer oil at site would attract the provisions of Hazardous Waste and other waste Rules, 2016. The hazardous wastes have to be disposed through CPCB/SPCB approved recyclers only. JPSIP would obtain authorization for hazardous waste under this Rule. JPSIP would also maintain record of hazardous waste and submit the desired return (Form 4) in prescribed form to JSPCB.	JPSIP
4.	E-Waste (Management) Rules, 2016	JPSIP, being the bulk consumer of electrical and electronic equipment will ensure that e-waste generated is channelized through collection center or dealer of authorized producer or dismantler or recycler or through the designated take back service provider of the producer to authorized dismantler or recycler.	JPSIP
5.	Battery (Management & Handling) Rules 2001	It is the responsibility of the bulk consumer (1) (JPSIP) to ensure that the used batteries are deposited with the dealer, manufacturer, or registered recycler for handling and disposal. A half-yearly return (Form-1) is to be filed as per the rule to JSPCB.	JPSIP
6.	Ozone Depleting Substances (Regulation and Control) Rules, 2000	JPSIP shall follow the provisions of the notification and shall phase out all equipment, which uses these substances. In case of substation no equipment would be procured which contain CFC's.	JPSIP, Design Consultant

(1) 'Bulk Consumer' means a consumer such as the Departments of Central Government like Railways, Defense, Telecom, Posts and Telegraph, the Department of State Government, the Undertakings, Boards and other agencies or companies who purchase hundred or more than hundred batteries per annum.

Sl. No.	Regulations	Applicability & Action Required	Responsibility
7.	Central Ground Water Authority (CGWA) Public Notice dated 4th January 2017	Permission need to be obtained from State Level Ground Water Resources Development Authority and Central Ground Water Authority for installation of bore well and abstraction of ground water resource.	JPSIP
8.	Regulation of Polychlorinated Biphenyls Order, 2016	The use of polychlorinated biphenyls or any equipment containing PCB would be prohibited entirely from 31st December, 2025. The technical specification would clearly state that the transformer oil should be free of PCBs or else the DPR should provide a road map for ensuring the phasing out of all PCB's by 2025.	JPSIP and Design Consultant
C.	**Labour related Legislation**		
1.	The Child Labour (Prohibition and Regulation) Act, 1986	This Act prohibits engagement of children in certain employments and regulates the conditions of work of children in other certain employments. JPSIP and its contractors would comply with the requirements of these regulations.	JPSIP, Contractor
2.	Contract Labour (Regulation & Abolition) Act 1970	This Act regulates the employment of contract labours in certain establishments and prohibits for its abolition in certain circumstances. JPSIP and its contractors would comply with the requirements of these regulations.	
3.	Minimum Wage Act, 1948	Under this Act, Jharkhand State government has notified minimum wage rate f0or the workers. JPSIP's contractors would provide minimum wage to its workers as per the minimum wage rate provided in the said notification.	
4.	Bonded Labour System (Abolition) Act, 1976	This Act abolished bonded labour system to prevent the economic and physical exploitation of the weaker sections of the people. JPSIP and its contractors would comply with the requirements of these regulations.	
5.	Grievance Redressal Machinery under Industrial Disputes Amendment Act, 2010	This Act provides mechanism for setting up of grievance redressal committee in industrial establishment. JPSIP and its contractors would comply with the requirements of these regulations.	
6.	Employees' Provident Fund and Miscellaneous Provisions Act, 1952	This Act provides for the institution of provident funds, pension fund and deposit-linked insurance fund for employees in factories and other establishments. JPSIP and its contractors would comply with the requirements of these regulations.	
7.	The Payment of Wages Act, 1936, amended in 2005; Workmen's Compensation Act, 1923	This Act provides for timely disbursement of wages payable to employed persons covered by the Act. JPSIP and its contractors would comply with the	

Sl. No.	Regulations	Applicability & Action Required	Responsibility
		requirements of these regulations.	
8.	Maternity Benefit Act, 1961;	This Act regulate the employment of women in certain establishments for certain periods before and after child-birth and to provide for maternity benefit and certain other benefits. JPSIP and its contractors would comply with the requirements of these regulations.	
9.	Employees State Insurance Act, 1948	This Act provides certain benefits to employees in case of sickness, maternity and 'employment injury '. This Act is applicable to employees earning Rs 15,000 or less per month. JPSIP and its contractors would comply with the requirements of these regulations.	
10.	Inter-state Migrant Workmen Act, 1979	This Act regulates the employment of inter-State migrant workmen and provides for their conditions of service. JPSIP and its contractors would comply with the requirements of these regulations.	
11.	Intimation of Accidents (Forms and Time of Service of Notice) Rules, 2004	This Rule comes in force for occurrence of accident in connection with the generation, transmission, supply or use of electricity and electric line. JPSIP would incorporate requirements of these regulations in contract document of procurement.	

2.2 *WORLD BANK SAFEGUARD POLICY*

The implementation of the World Bank Operational Policies seek to avoid, minimize or mitigate the adverse environmental and social impacts, including protecting the rights of those likely to be affected or marginalized by the proposed project. Based on the information gathered during the study, following Policies are triggered and would require adequate measures to address the safeguard concerns.

Table 2.2 World Bank Policies Triggered for the Project

Sl. No.	World Bank Policies/Guidelines	Applicability	Responsibility
1.	OP 4.01 Environmental Assessment	The Bank requires environmental assessment (EA) of projects under Bank financing to help ensure that they are environmentally sound and sustainable. EA takes into account the natural environment (air, water, and land); human health and safety; social aspects (involuntary resettlement, indigenous peoples, and physical cultural resources); and transboundary and global environmental aspects. As per requirement of the OP 4.01, environmental assessment is being carried out for this project.	Environmental and Social Consultant of JPSIP

Sl. No.	World Bank Policies/Guidelines	Applicability	Responsibility
2.	BP 4.11 Physical Cultural Resources	This policy requires Bank financing projects to assess impacts on physical cultural resources at the earliest possible stage of the project planning cycle. Environmental assessment involves the preparation of a physical cultural resources management plan that includes (a) measures to avoid or mitigate any adverse impacts on physical cultural resources; (b) provisions for managing chance finds; (c) any necessary measures for strengthening institutional capacity for the management of physical cultural resources; and (d) a monitoring system to track the progress of these activities. Though presently there are no physical cultural resource found to be affected by the project, possibility of "chance finds" cannot be ruled out. If something is found at later stage of the project (construction phase), procedures laid down in "Indian Treasure Trove Act, 1878". The ESIA Study for the Jarmundi substation would be carried out to have a better understanding of physical and cultural resources present in the site (if any).	Environmental and Social Consultant of JPSIP
3.	OP 4.10 Indigenous Peoples	This policy contributes to the Bank's mission of poverty reduction and sustainable development by ensuring that the development process fully respects the dignity, human rights, economies, and cultures of Indigenous Peoples. For projects which are likely to have impact on the tribal community a Tribal Development Plan would be developed and implemented.	Environmental and Social Consultant of JPSIP/JPSIP
4.	IFC/WB General EHS Guidelines	Recommendations of these guidelines would be incorporated in ESMP and Bidding document for this project.	Environmental and Social Consultant and Design Consultant of JPSIP
5.	IFC/WB Guidelines for Power Transmission and Distribution		

3 PROJECT DESCRIPTION

3.1 REGIONAL SETTING

The proposed substation is located at Paharidih and Bunbhuni village of Jharmundi block in Dumka district. The Paharidih village is part of the Paharidih Gram Panchayat and Bunbhuni village is part of Tetariya Gram Panchayat.

3.2 PROJECT LOCATION

3.2.1 Location

The proposed substation is planned to be located on Plot No 325 of Paharidih village and Plot No 200 of Bunbhuni village of Dumka District.

Plot No 325 measuring approx. 4.44 acres of land and Plot No 200 measuring approx. 3.21acres has been already allotted to JUSNL by the District Collector of Dumka for development of the substation. The salient features of the project location is presented in ***Table 3.1***.

Table 3.1 Salient Features of the Project Location

Sl. No	Item	Description
1.	Plot No/s	325
		200
2.	Area	4.44 acre /1.796 Hectares
		3.21 acre / 1.299 Hectares
3.	Allotment Letter No	4611(11) dated 28/11/2016 of Revenue Branch, District Collector Office Dumka
4.	Type of Land	Pahari Bhumi.(Non-Forest land)
5.	Ownership	Government of Jharkhand
6.	Toposheet Number	72P/3
5.	Coordinate	24°25'29.58"N 86°55'32.50"E

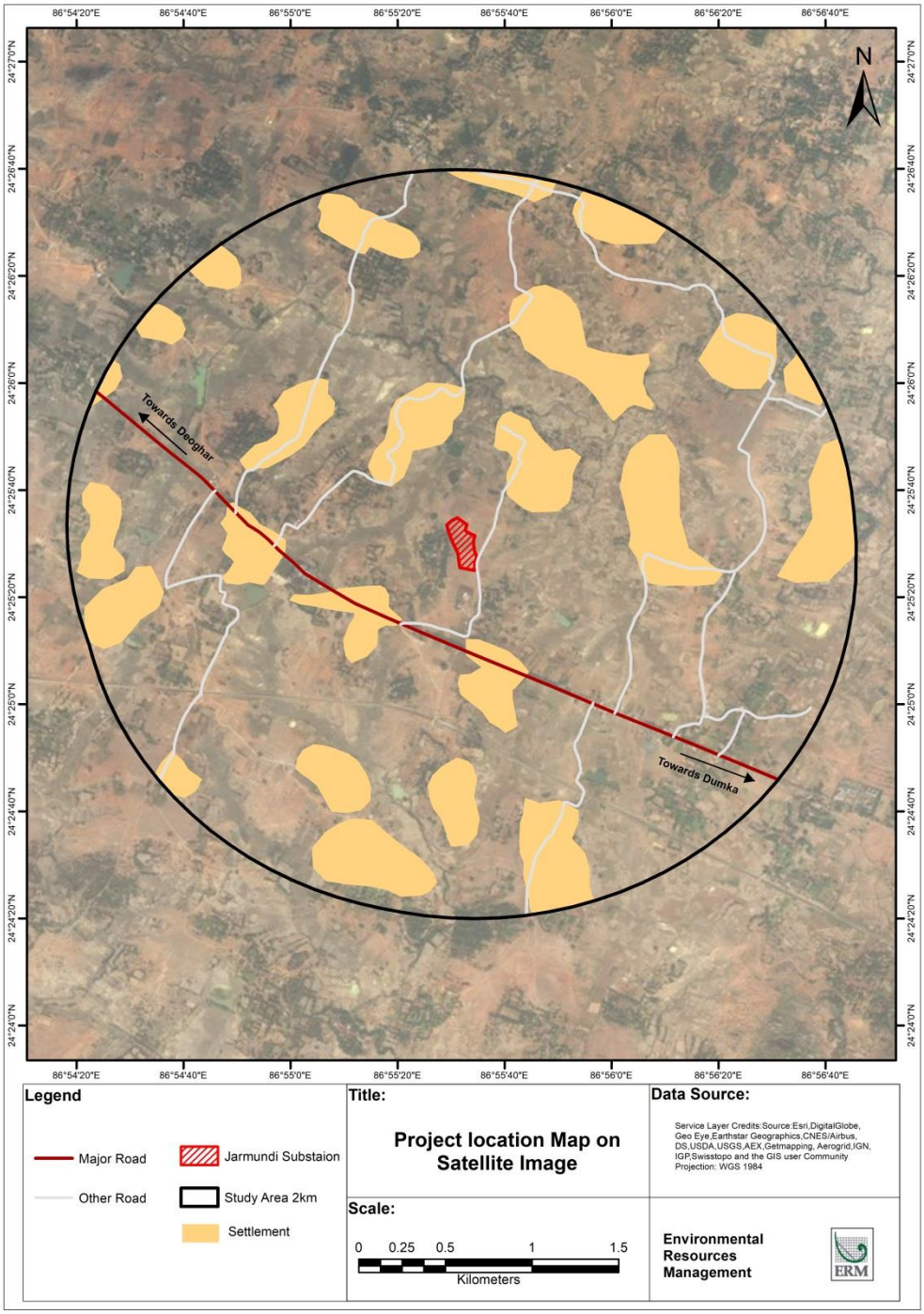
3.2.2 Accessibility

The site is connected with National Highway 114 A (connecting Dumka-Deoghar) by village road. This village road is of approx. 4m wide bituminous road. Since the site with the site is directly accessible from NH 114 A, there is no need for construction of access road. However, it is observed to be constricted at places and during the transportation of the equipment e.g. transformers, negotiating these places would be a challenge. Since the DPR for Scheme S has not considered any upgradation of the road the same is not considered in the ESIA. Photograph of the project site accessibility road is

presented in ***Figure 3.1***. The location, boundary and access to the site, as plotted on high resolution satellite imagery, is shown in ***Figure 3.2*** below.

Figure 3.1 Photograph of project site accessibility

Figure 3.2 Location, Site Boundary and Access shown on Satellite Imagery (along with adjacent settlements)



3.3 SITE SETTING

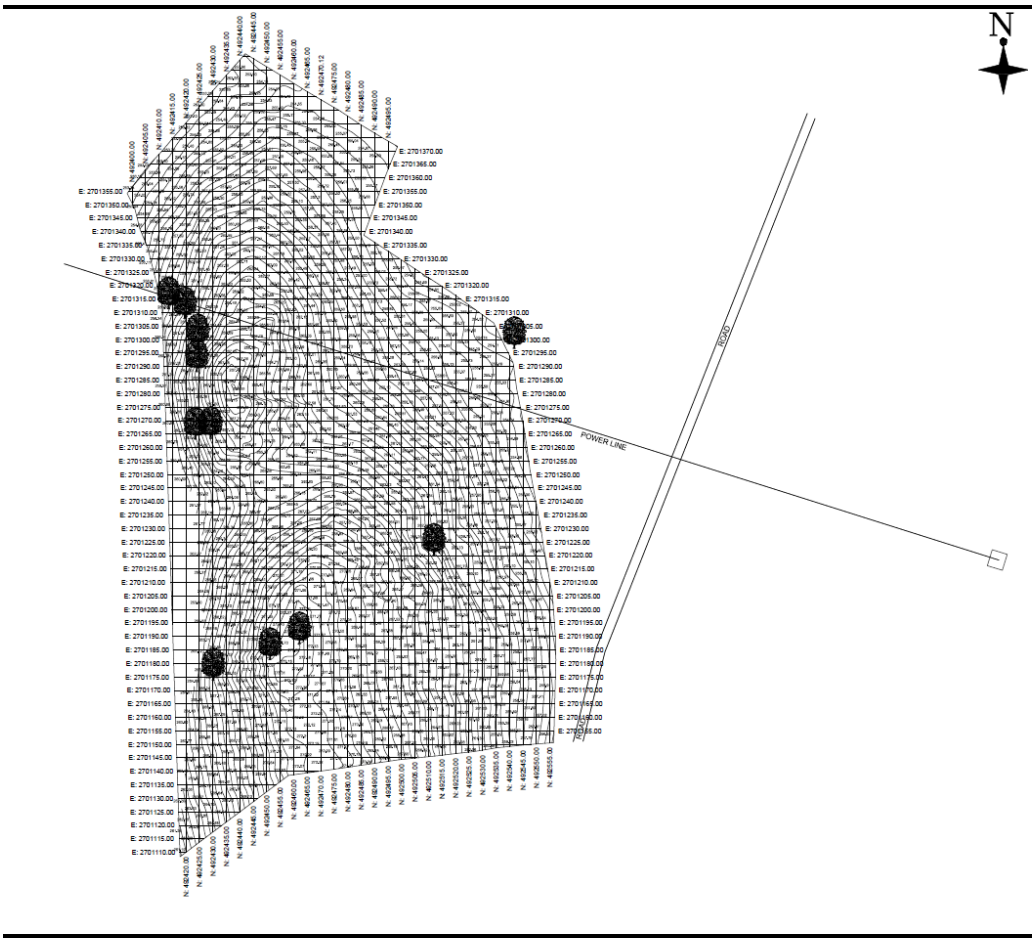
3.3.1 Project Site

This proposed site location is categorized as Pahari Bhumi category in the revenue record of Dumka district. As per the site observation this is non forest govt. land. There are approx. 10 nos of trees present at the western side of the project site. Shiv Mandir was observed just beside the north-eastern corner

boundary of the proposed site location. There are no defined drainage channels in the site surrounding, only few micro-drainage channels are present which carried water from the site surrounding to nearest drainage channel.

The substation site is located on the hillocks. The approach road to the site passes along the eastern boundary of the site. The topographical survey undertaken at site indicates that the highest contour (273 m) at the centre of the project site. From the centre the site slopes down at all sides. The lowest contour (253m) is located on the northern boundary of the site. The contour of the site is presented in ***Figure 3.3.***

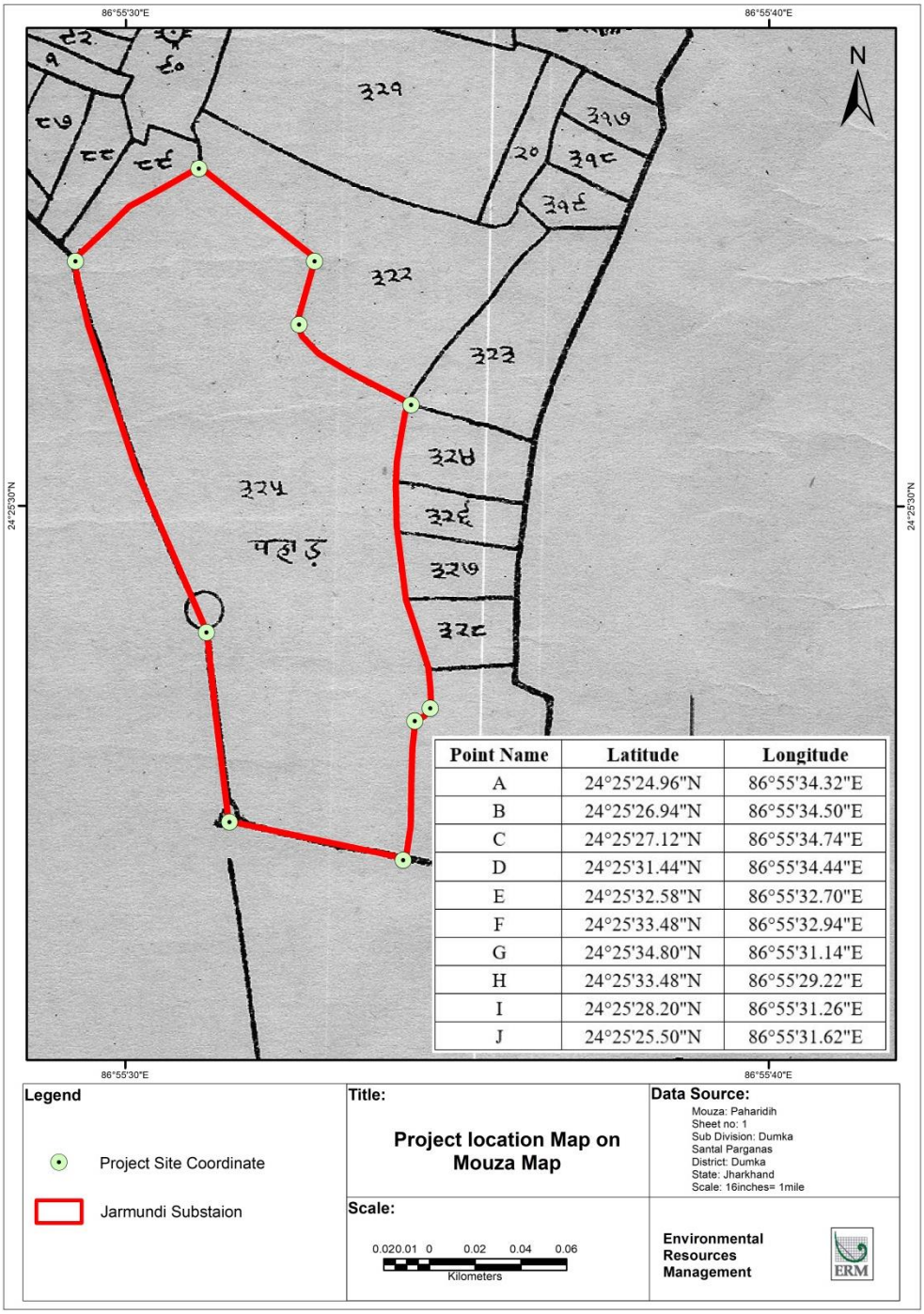
Figure 3.3 Contours of the Proposed Jarmundi Substation Site



Source: DPR

Superimposition of the boundary of the substation site on the Mouza sheet is presented in ***Figure 3.4***.

Figure 3.4 Site boundary superimposed on the Mouza map of Paharidih Village



Point Name	Latitude	Longitude
A	24°25'24.96"N	86°55'34.32"E
B	24°25'26.94"N	86°55'34.50"E
C	24°25'27.12"N	86°55'34.74"E
D	24°25'31.44"N	86°55'34.44"E
E	24°25'32.58"N	86°55'32.70"E
F	24°25'33.48"N	86°55'32.94"E
G	24°25'34.80"N	86°55'31.14"E
H	24°25'33.48"N	86°55'29.22"E
I	24°25'28.20"N	86°55'31.26"E
J	24°25'25.50"N	86°55'31.62"E

3.3.2 *Site Vicinity*

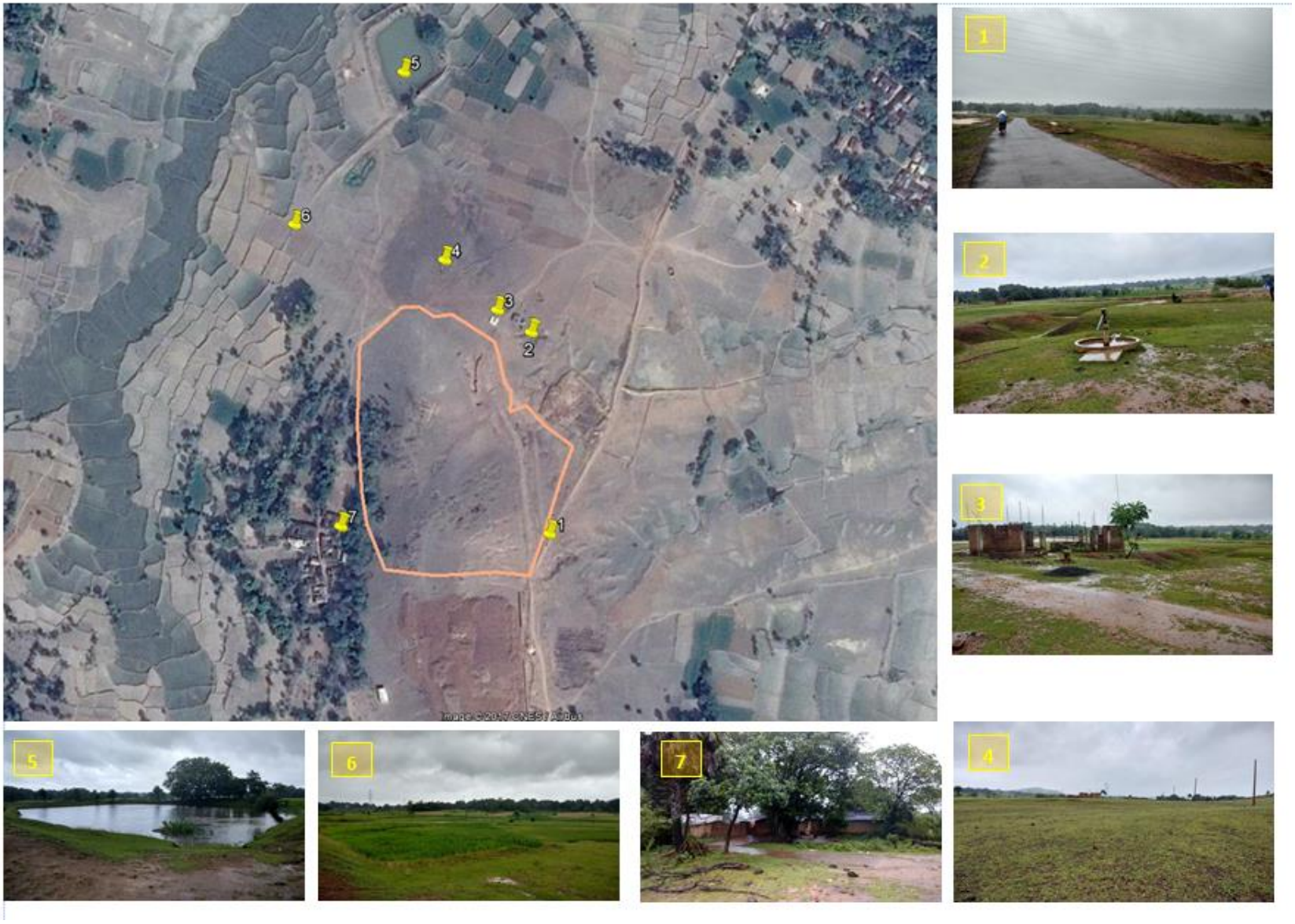
The physical features, built structures (habitations, roads) and other environmental sensitivities presented below

Direction	Features
North	There is a 132 kV transmission line is cutting across the proposed project site towards its northern most boundary. At immediate northern side of the project site there is Shiv Mandir and adjoining to this temple there is vacant land which is used as fair ground by the local people during "Shivaratri" (1) (an auspicious day) for 3-4 days. Since the land for the substation is a hillock at present it is not used during the fair. The fairground is limited to the land adjoining the Shiv Temple which is also a Gair Majua land (owned by the Revenure Department, Government of Jharkhand). Adjoining to the Shiv Mandir, there is a hand pump. A village pond is located 180m north of the site boundary. During the site visit it was observed that the pond is used by the local villagers for bathing. Settlements of Tilwamarni and Hathduba village are located at aerial distances of 500m and 1 km north from site boundary.
East	The approach road to the site marked the eastern boundary of the site. The road is approx. 4 m in width and connects small hamlets in the north (viz. Hathduba). The road is an all-weather bituminous road and observed in good condition during site visit. The initial 100m the road from the site passes through the Bunbuni settlement and the dwelling units are close to the carriageway. Agricultural fields are present at the east of the site. During site visit paddy cultivation was observed at these agricultural fields. Settlements of Tetariya and Amba village are located at aerial distances of 840m and 1.8 km east from site boundary.
South	Paharidih police station is located at immediate southern side of the project site. NH 114 A connecting Dumka and Deoghar district traverses at approx. 480m from site boundary. Settlements of Bunbuni village are located at aerial distances of 227m south from site boundary.
West	Settlements of Paharidih village are adjacent to the western boundary of the project site. Beyond this settlement agricultural fields are present at the west of the site boundary. Settlements of Pandedih and Haripur village are located at aerial distances of 430m and 730m east from site boundary.

Photograph of the features surrounding the substation site is presented in ***Figure 3.5***.

(1) Usually held in the month of February or March.

Figure 3.5 Photographs of Site Surroundings



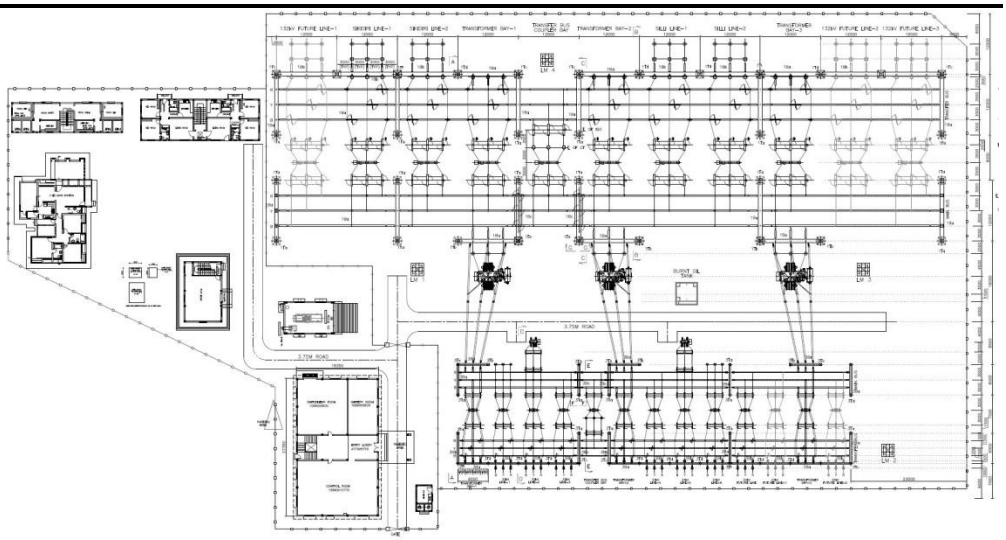
3.4 PROJECT COMPONENTS

The key project components which have been planned in the project are presented in the ***Table 3.2*** and the typical substation layout is presented in ***Figure 3.6.***

Table 3.2 Project Components in the 132/33 KV Substation at Jarmundi

Sl. No	Component	Description
1.	Transformer	2 nos 50 MVA Oil Cooled Transformer
2a.	Bays (incoming)	6 nos of 132 KV bays
2b.	Bays (outgoing)	6 Nos of 33 KV bays
3	Transformer Oil	Would be as per the Regulation of Polychlorinated Biphenyls Order, 2016
A. Associated Infrastructure		
4	Control Room	One number with control panel
5	Staff Quarter	8 nos of 2 bedroom Type II Accommodation 8 nos of 1 bedroom Type III Accommodation 1 four room Type I Accommodation
6	Pump House	1 nos of submersible pump

Figure 3.6 Typical Layout of a 132/33 KV Substation Planned in the JPSIP



3.5 PROJECT TIMELINE AND PROJECT COST

The estimated cost for construction of the 132/33 KV Jarmundi substation would be around INR 65.09 crores. This cost includes the cost of civil works, cost of procurement of electrical equipment and associated materials, installation and commissioning. It is estimated the construction would be completed within a period of 18 months. Site preparation, construction and civil works of the substation are expected to be completed in about 12 months.

3.6 RESOURCE

The resources required during the construction and operations phases of the project are presented in the ***Table 3.3*** below.

Table 3.3 Resource Requirement in Construction and Operation of 132/33 KV Grid Substation at Jarmundi

Sl. No	Description	Resource Requirement
1.	Land (Total)	7.65 acres
2a.	Manpower (Construction Phase)	The peak manpower requirement is expected to 50.
2b.	Manpower (Operation Phase)	The Peak manpower is expected to be 16-20
31.	Water (Construction Phase)	10-13 KLD (peak water)
3b.	Water (Operation Phase)	8.4 KLD (for domestic purpose)
4.	Construction Material	Steel, Cement, Aggregate and Sand

3.7 DISCHARGES AND WASTES

During the lifecycle of the substation i.e. construction and the operation the discharges and waste which would be generated is presented in ***Table 3.4***.

Table 3.4 Emission and Discharges from 132/33 KV Grid Substation

Sl. No	Description	Quantity
1a.	Waste Water (Construction)	Peak generation of 2.5 KLD
1b.	Waste Water (Operation)	6.7 KLD
2a.	Solid Waste (Construction)	The Municipal solid waste would be around 7.5 -12 kg per day. In addition construction waste would be generated.
2b.	Solid Waste (Operation)	The municipal solid waste generated during the operational stage would be around 21 kg/day
3.	Used Transformer Oil	The waste transformer oil would be produced at an interval of 15 years.
4.	e–Waste	The e-waste generated from the panels at the end of the life

4 ESIA METHODOLOGY

A project level Environmental and Social Impact Assessment (ESIA) is method of systematic identification and evaluation of the potential impacts (effects) of a proposed substation relative to the physical, biological and socioeconomic components of the environment. The ESIA study can be considered as an important project management tool that can assist in collecting and analyzing information on the environmental effects of a project and ultimately identify actions which can ensure that the projects benefits outweigh the impact on the bio-physical and social environment. The activities which have been undertaken in each of these steps/stages are presented in the subsection below.

4.1 SCREENING & SCOPING

An initial reconnaissance visit was conducted to the site to understand the extent of the site and prevailing environment and social setting in its immediate vicinity and use it as a basis of screening and scoping exercise for the ESIA.

An effort was also made to understand the decision process that led to the selection of the site and how environmental and social issues were factored into the selection process. Discussions with the respective Zone and Division of JUSNL revealed that a number of available plots of land belonging to the government were proposed by the Land Revenue Department and the decision towards confirmation of the site was made based on the following technical, environmental and social considerations:

- A total of more than 8 acres of land was available;
- The plot had good road access;
- It did not comprise of prime agricultural land and did not have any residential premises within it;
- There were no major settlements in the immediate vicinity.

As per the ESMF, an initial environmental and social examination (IESE) was conducted to determine whether or not there would be key environmental and social impacts from the construction and operation of Jarmundi GSS at the allocated site. The results of the IESE has been recorded in an Environmental and Social Impact Identification Matrix presented in the IA Section (Chapter 6) and was used as a tool for scoping the ESIA to potential environmental and social issues of concern. The IESE also helped in determining the requirement for other specialized studies e.g. Resettlement Plan, Biodiversity Action Plan and Tribal People Plan.

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4.2 *BASELINE STUDIES*

Establishing baseline helps in understanding the prevailing environmental and socio economic status of the study area. It provides the background environmental and social conditions for prediction of the future environmental characteristics of the area based on the operation of the proposed project during its life cycle. It also helps in environmental and social management planning and strategy to minimise any potential impact due to the Project activities on surrounding environment.

Considering the project activities described in **Chapter 3** it is anticipated that scale and magnitude of project induced impacts are likely to be perceived within 2 km radius of the GSS site location and has been considered to the study area for the ESIA. Site surveys were conducted in the study area understand the environmental setting of the site and the study area, understanding of the drainage patterns, presence of physiographic features e.g. hillocks, rocky outcrops, location of the habitations with respect to the site, condition of the approach road to the site etc. Ecological surveys and community consultations were also conducted to collect the information related to the local community and biological environmental conditions of the study area. Secondary baseline data collection involved identifying and collecting available published material and documents on relevant environmental and social aspects (like soil quality, hydrogeology, hydrology, drainage pattern, ecology, meteorology and socio-economic conditions) from veritable sources including Govt. Departments, Research papers, etc.

4.3 IMPACT IDENTIFICATION AND ASSESSMENT

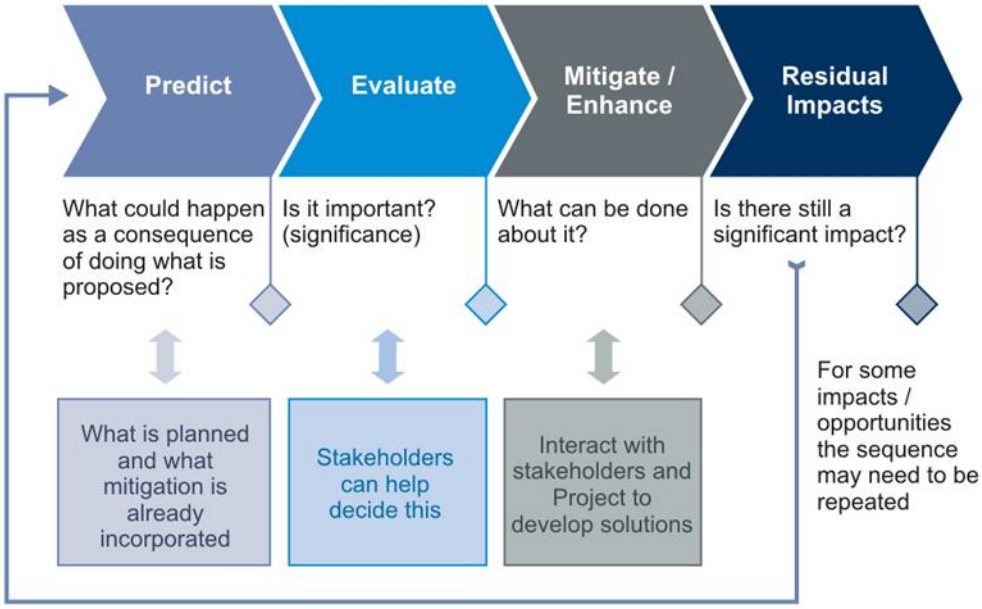
4.3.1 *Impact Assessment*

The key aim of the impact assessment process was to characterize and evaluate potential environmental and social impacts arising out of the project and prioritize them so that they can be effectively addressed through Environment & Social Management Plans (ESMPs). The potential impacts have been identified through a systematic process wherein the activities (both planned and unplanned) associated with the project, across the construction and operational phases have been considered with respect to their potential to interact with environmental and social resources or receptors. Thereafter, sequential impact assessment steps involving impact prediction, evaluation, mitigation and enhancement and evaluation of residual impacts have been followed in a phased manner.

Prediction of impacts was undertaken as an objective exercise to determine what could potentially happen to the environmental and social receptors as a consequence of the project and its associated activities and took into account baseline conditions at site, stakeholder's opinion and expert judgement. The evaluation of impacts was done using a semi-quantitative, based on the delineation of a set of criteria as follows:

- *Scale*: Degree of damage that may be caused to the environmental components concerned.
- *Extent*: The extent refers to spatial or geographical extent of impact due to proposed project and related activities.
- *Duration*: The temporal scale of the impact in terms of how long it is expected to last.
- *Magnitude:* Degree of change caused by a project activity is a function of Scale, Extent and Duration, as applicable.
- *Vulnerability of Receptor:* Represents the sensitivity of the receptor based on the relationship between the project and present baseline environment (the receptor).

Figure 4.1 Impact Assessment Process



4.4 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN PREPARATION

The Environmental & Social Management Plan along with a Monitoring Plan has been prepared as a site specific document for the construction and operation of the GSS. The ESMP would act as a guidance document for JPSIP to ensure that they can implement the project in an environmentally sound manner where project planners and design agencies, contractors, relevant government departments and stakeholders of concern understand the potential impacts arising out of the proposed project and take appropriate actions to properly manage them.

5 DESCRIPTION OF THE ENVIRONMENT

5.1 INTRODUCTION

This section establishes the baseline environmental and socio economic status of the project site and surrounding area to provide a context within which the impacts of the Project are to be assessed.

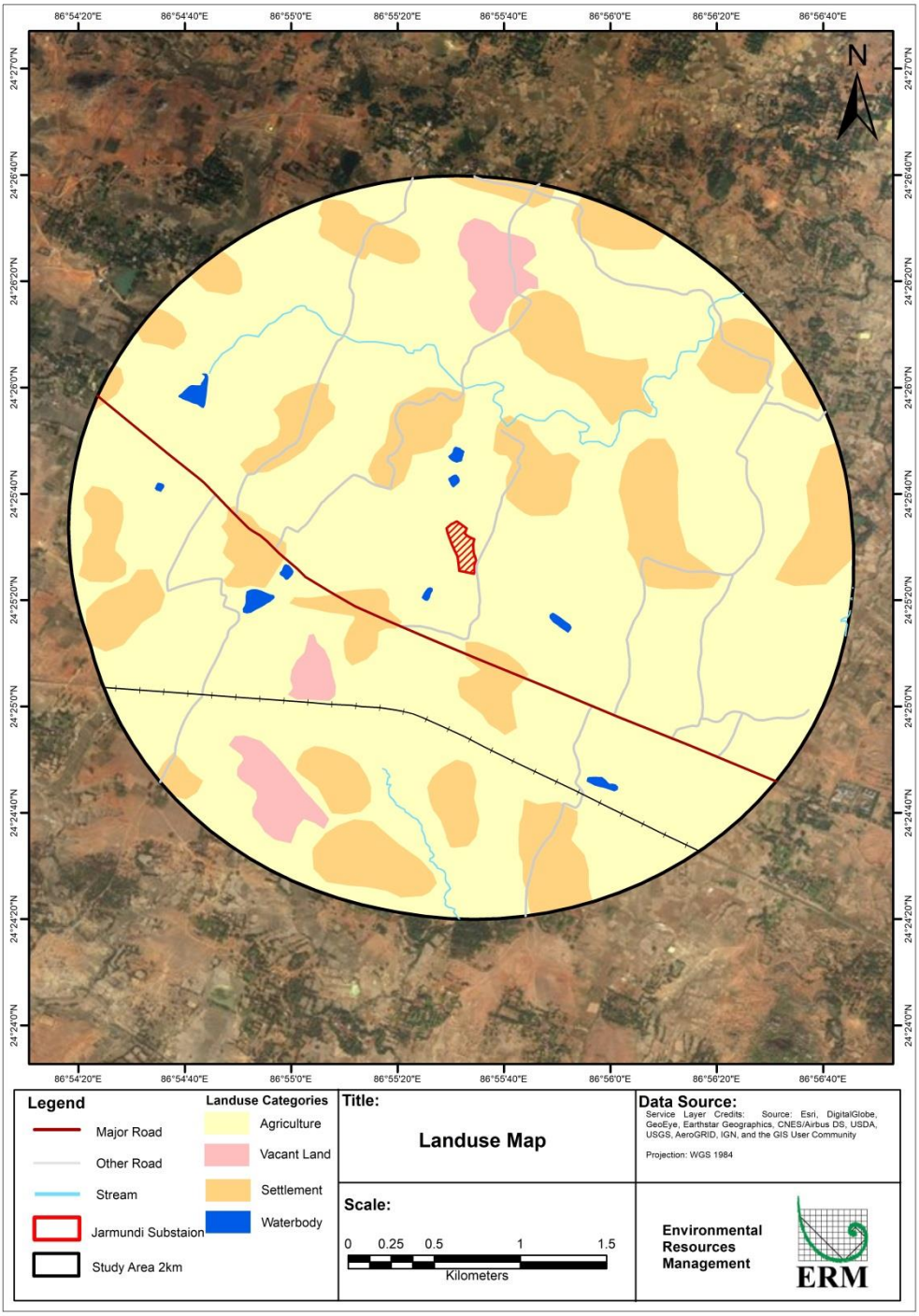
5.2 LAND USE/LAND COVER

Total land under the proposed GSS site is 7.65 acre govt. weast land and it is under Land Revenue Department of Dumka District. No agriculture land is involved within the proposed site. Agriculture land is the most predominant land use with in the study area followed by settlement. Existing land cover pattern in and around the study area is presented in ***Table 5.1*** and the land use map of the study area is shown in ***Figure 5.1.***

Table 5.1 Existing Land Use/ Cover Pattern of the Study Area

Name	Area in Sq. Km.	Percentage
Agriculture	9.255	73.66 %
Vacant	0.387	3.08 %
Water Bodies	0.060	0.47 %
Settlement	2.865	22.79 %
Total	12.567	100.000 %

Figure 5.1 Land Use/ Land Cover Map of the Study Area



5.3 SOIL

The proposed GSS is located on higher topography and the land are usually unfertile and not fit for agricultural purpose. The soil in this proposed site and adjoining area are lateritic(red in colour, highly permeable, coarse textured with low organic matter content) low fertility. Photographs of soil exposed at the project site are presented in ***Figure 5.2***.

Figure 5.2 Soil at Project Site

5.4 CLIMATE AND METEOROLOGY

The climate of Dumka district represents a transition between the dry and extreme climate of northern India and the warm and humid climate of West Bengal. Winter commences from mid-November and extends up to the middle of March, December and January being the coldest months. The winter is characterised by heavy dew, thick fog and associated with cold waves. The winter is followed by summer which lasts till mid – June and then monsoon sets in which generally lasts till the end of September. During winter the

mercury drops to 4°C and during summer it shoots up to 46°C. The relative humidity varies between 50 – 60%. Dumka district receives an annual rainfall of 1500 mm. and most of the rainfall occurs during the rainy season.

5.5 *NATURAL HAZARDS*

Natural hazard is rare phenomena in Dumka district. There is no reported occurrence of natural disaster in the recent history of Dumka district. Discussions with locals reveal that they have not experienced any flooding situation in the past. The risk of flooding in GSS site and surrounding is thus considered as very low Due to undulating terrain water quickly flows towards low lying areas so problem related to temporary water logging is also very rare.

5.6 *AIR & NOISE ENVIRONMENT*

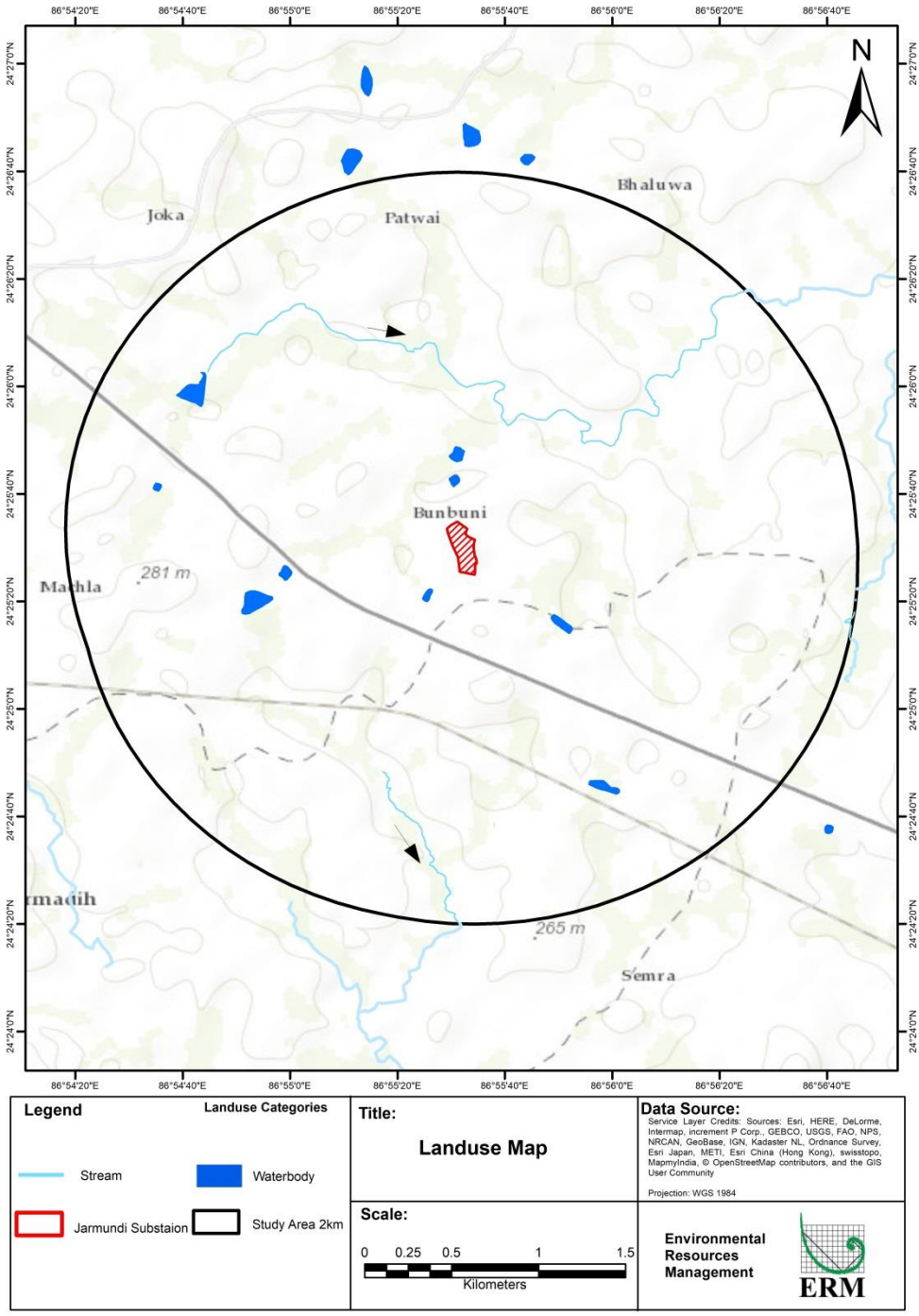
The study area can be characterized as a rural area comprising of habitations, farm lands and no industrial set up was found to be presented within 2 km of radius of the site. Existing sources of generation of particulate matter and gaseous air pollutants is primarily because of the transportation of vehicles through adjoining NH 114 A road and from burning of fossil fuels for domestic purpose. Considering all this context, the ambient air quality is expected to be well within the National Air Quality Standards for all parameters.

The ambient noise quality of the study area is also representative of ambient noise quality typically expected in rural residential areas. No industrial set up is observed in 500 meter of the proposed GSS site. The source of noise is transportation of vehicles through NH 144 A. However no significant noise levels were reported by the villagers during consultations

5.7 *DRAINAGE*

The study area has a dendritic drainage pattern that is representative of the drainage characteristics of the micro-watershed adjacent to site and is shown in ***Figure 5.3.*** As per the site assessment, there is no defined drainage channel present within the proposed GSS site and immediate vicinity. However, Few micro drainage channels are present near the project site, and carry the runoff water from site surrounding to nearest river i.e., Mayurakshi which is located at 16 km east. The topographic al surveys carried out by M/s Tata Consulting Engineers also confirm that the highest contour is located at the centre of the project site.

Figure 5.3 Drainage Map of the Study Area



5.8 GROUND WATER RESOURCES

As per the hydrogeological map of the District drawn up by the CGWB, the hydrogeology comprises of consolidated formation of the Archean age and characterized by Granites and Gneissic complex in which the ground water is restricted to a weathered residuum and interconnected fractured zone, having secondary porosity. As of 2013, the gross ground water draft for all uses in the Block was 1067.82 ha-m and the stage of ground water development was about 51.65 %.

From the aquifer characteristic and water resourcing angle, the depth to water table in the Jarmundi block varies between 5-10 mbgl both during pre and post monsoon season (as per CGWB Groundwater Information Booklet for Dumka District, 2013). The dug wells generally tap the initial shallow aquifer and many of such wells dry up during summer months. The hand pumps generally tap the first fracture zones in the lateritic terrain at depths of 20-60 m.bgl while the bore wells tap the deeper granite terrain zones.

Consultations with villagers in the study area revealed that ground water is predominantly used for drinking and domestic purposes and is sourced through dug wells or tube wells. From the ground water quality perspective, the water quality has been found to be potable in general and from the ground water quality perspective, ground water parameters are within permissible limit.

5.9 *SURFACE WATER*

A village pond is located 180m north of the site boundary. During the site visit it was observed that the pond is used by the local villagers for bathing. However, there is no such big surface water body is present with the 2 km periphery of the proposed site except some pond which is used by local community for their daily use.

5.10 *ECOLOGICAL ENVIRONMENT*

The proposed GSS site in Dumka district of Jharkhand State falls in 6B Deccan Peninsula – Chota-Nagpur Bio-geographic Province[1].

Terrestrial Ecosystem

In Dumka district, about 1609.89 sq. km of forest area is present, which is about 29.2% of the total geographic area of the district. As per site assessment proposed land for GSS site is located within the GM land area with approximately 10 trees with species *viz*. neem (*Azadirachta indica*), aam (*Mangifera indica*), date palm (*Phoenix dactylifera*) etc. There is also few herbs and shrubs within the GSS site,

Natural vegetation in the region can be broadly classified into 5B Northern Tropical Dry Deciduous Forests. The dominant species in the region is Sal (*Shorea robusta*).

5B Northern Tropical Dry Deciduous Forests – In this region dry deciduous forest are found in the drier parts, mostly in the upper ridges. Here also the dominant species is sal (*Shorea robusta*). Other species that are associated with

[1] http://iipsenvis.nic.in/Database/Envis_5275.aspx

sal are *Termnalia belerica, Terminalia chebula, Haldina cordifolia, Madhuca latifolia, Butea monosperma, Diospyros melanoxylon, Ailanthus excelsa, Cassia fistula* etc.

5.10.1 *Vegetation within the Study area*

There is no forest area within 2 km study area of the Jarmundi GSS.

Homestead plantation

During the primary survey trees like palas (*Butea monosperma*), mohua (*Madhuca latifolia*), neem (*Azadirachta indica*), peepal (*Ficus religiosa*), wad (*Ficus benghalensis*), aam (*Mangifera indica*), date palm (*Phoenix dactylifera*), sugar palm (*Borassus flabellifer*), semal (*Bombax ceiba*), kadam (*Haldina cordifolia*) etc. were found to occur frequently in proximity to the human settlements within the study area.

Roadside plantation

Along the roadside following trees were recorded *viz*. babool (*Acacia nilotica*), semal (*Bombax ceiba*), wad (*Ficus benghalensis*), shisham (*Dalbergia sisso*), radhachura (*Peltophorum pterocarpum*), munga (*Moringa* oleifera, ashoka (*Saraca asoka*), rain tree (*Samanea saman*), chhatim (*Alstonia scholaris*).
Riparian Vegetation

Riparian vegetation is observed on the sides of streams and waterbodies. Major vegetation observed are jamun (*Syzygium cumini*), semal (*Bombax ceiba*), wad (*Ficus benghalensis*), shisham (*Dalbergia sisso*) etc.

Invasive Alien species

Major invasive species recorded during the study are: *Lantana camara, Parthenium hysterophorus* etc.

5.10.2 Wildlife Habitat and Faunal Diversity

Wild Life Habitat

No Sensitive Ecological Habitat like National Park, Wild Life Sanctuary, Tiger Reserve or Elephant Reserve is located within the study area of the GSS.

Faunal Diversity

Herpetofauna

Two species of amphibians *viz*. Common Toad (*Duttaphrynus melanostictus*) and Indian Bullfrog (*Hoplobatrachus tigerinus*) etc. are observed from the study area. All the species are listed Least Concern as per IUCN Classification (IUCN Version 2017-3). Five species of reptiles were observed/reported from the study area. The list includes Indian Cobra (*Naja naja*), Common Krait (*Bungarus caeruleus*), Indian Rat Snake (*Ptyas mucosus*), Checkered Keelback

(*Xenochrophis piscator*) and Oriental Garden Lizard (*Calotes versicolor*). The list includes three Schedule II species as per the Indian Wildlife Protection Act, (1972) *viz*. Indian Cobra, Indian Rat Snake and Checkered Keelback.

Avifauna

A total of 32 species were recorded from the study area. The species list includes terrestrial and aquatic birds. Terrestrial and aquatic birds recorded are presented below

Terrestrial birds- Shikra (*Accipiter badius*), Common Myna (*Acridotheres tristis*), Paddyfield Pipit (*Anthus rufulus*), House Swift (*Apus nipalensis*), Common Pigeon (*Columba livia*), House Crow (*Corvus splendens*), Asian Palm Swift (*Cypsiurus balasiensis*), Black Drongo (*Dicrurus macrocercus*), Asian Koel (*Eudynamys scolopaceus)*, Coppersmith Barbet (*Psilopogon haemacephalus*), Little Green bee-eater (*Merops orientalis*), Black Kite (*Milvus migrans*), House sparrow (*Passer domesticus*), Baya weaver (*Ploceus philippinus*), Plain Prinia (*Prinia inornata*), Rose-ringed Parakeet (*Psittacula krameri*), Red-vented Bulbul (*Pycnonotus cafer*), Indian Robin (*Copsychus fulicatus*), Eurasian Collared Dove (*Streptopelia decaocto*), Jungle babbler (*Turdoides striata*) etc.

Aquatic birds- Common Kingfisher (*Alcedo atthis*), White-breasted Waterhen (*Amaurornis phoenicurus*), Grey Heron (*Ardea cinerea*), Indian Pond Heron (*Ardeola grayii*), Cattle Egret (*Bubulcus ibis*), Pied Kingfisher (*Ceryle rudis*), Little Egret (*Egretta garzetta*), White-throated Kingfisher (*Halcyon smyrnensis*), Intermediate Egret (*Ardea intermedia*), Little Cormorant (*Microcarbo niger*), Purple Swamphen (*Porphyrio porphyrio*), Red-wattled Lapwing (*Vanellus indicus*) etc.

Shikra (*Accipiter badius*) and Black Kite (*Milvus migrans*) are listed as Schedule I as per Wildlife Protection Act, 1972. All the species are listed as Least Concern as per IUCN Classification (IUCN version 2017-2).

Mammals

Total 6 species of mammals are reported/recorded from the study area. The mammals observed/reported in the study area are Five-striped Palm Squirrel (*Funambulus pennantii*), Golden Jackal (*Canis aureus*), Common Grey Mongoose (*Herpestes edwardsii*), Northern Plains Langur (*Semnopithecus entellus*), Rhesus macaque (*Macaca mulatta*), House Mouse (*Mus musculus*) etc. Large mammals were reported to be absent in the study area. The list includes four Schedule II species Golden Jackal, Common Grey Mongoose, Indian Northern Plains Langur and Rhesus macaque. All the species are listed as Least Concern as per IUCN Classification (IUCN version 2017-3).

5.11 SOCIO ECONOMIC ENVIRONMENT

Proposed Jarmundi substation is located in dumka district. The population of Dumka district according to the 2011 census is 1,321,442 as compared to

1,106,521 during 2001, registering a decadal growth rate of compared to 1,106,521 as per the census of 2001, registering a decadal growth rate of 19.42 %. Analysis reveals that Dumka district accounts for 4.00 % of the total population of Jharkhand State.

According to the 2011 census, the sex ratio of Dumka district at 976.68 is significantly higher than the state average of 940. STs constitute 43.21 % of the total population of Dumka as against the state figure of 26.2%.However, the opposite trend is observed in case of the SCs, i.e. SCs account for only 6.2 % of the total population of Dumka district against the state figures of 12.08%.

Total household in Jarmundi block, where the proposed Jarmundi project site is located, is reported to be 37,342 with average household size of 4.96 individuals. The total population of the Jarmundi block is 1, 85,286 as per Census Report 2011. The literacy rate is 48.67.53% and the sex ratio is reported to be 966.

5.11.1 *Demographic Profile of the Study area Villages*

Proposed GSS land is situated in Pahardih and Bunbhuni mouzas of Jarmundi block. Nineteen villages are located within the 2 km study area i.e. Gulkarhia, Duldih, Sabaijor, Karhiya Bahiyar, Parwaldih, Bahinga, Kusmaha, Haripur, Hariharpur, Paharidih, Tetaria, Taljhari, Tilwamarni, Hathduba, Nawadih, Sibganjgola, Patwai, Ladar and Bhaluwa. As per the 2011 Census records, the study area has a total of 1840 households and a population of 5844. The entire population in the study area falls in the rural category. Key demographic data of the villages within the study area represents the fact that most villages are sparsely populated with population density being significantly lower than that of the district level. Demographic profile of the study area villages are presented in ***Table 5.2***.

Table 5.2 Demographic profile of villages located within the study area

Name of the village	No. of households	Total population	Average household size	Male %	Female %	SC population %	ST population %	Literacy rate %	Male literacy rate %	Female literacy rate %
Patwai	65	329	5.06	49.85	50.15	3.65	0.00	67.17	82.32	52.12
Sibganjgola	26	163	6.27	52.76	47.24	0.00	6.13	57.67	66.28	48.05
Hariharpur	38	191	5.03	54.97	45.03	0.00	0.00	72.77	82.86	60.47
Gilkarhia	33	188	5.70	55.32	44.68	0.00	0.00	56.91	65.38	46.43
Karhia Bahiyar	2	8	4.00	37.50	62.50	0.00	0.00	12.50	33.33	0.00
Kusmaha	60	360	6.00	48.61	51.39	0.00	0.00	54.17	70.29	38.92
Taljhari	61	342	5.61	54.97	45.03	58.77	0.00	62.87	75.53	47.40
Tilwamarni	57	313	5.49	53.67	46.33	0.00	0.00	55.27	66.67	42.07
Bunbuni	45	254	5.64	53.54	46.46	0.39	35.03	70.19	77.68	61.46
Ladar	23	126	5.48	49.21	50.79	0.00	0.00	55.56	62.90	48.44
Bhaluwa	81	436	5.38	54.59	45.41	0.00	7.80	30.28	36.55	22.73
Nawadih	30	153	5.10	46.41	53.59	0.00	84.97	21.57	23.94	19.51
Hathduba	71	357	5.03	45.94	54.06	0.00	42.30	43.42	55.49	33.16
Paharidih	28	153	5.46	50.33	49.67	0.00	67.32	41.18	53.25	28.95

Name of the village	No. of households	Total population	Average household size	Male %	Female %	SC population %	ST population %	Literacy rate %	Male literacy rate %	Female literacy rate %
Tetaria	135	841.	6.23	53.27	46.73	0.00	25.45	36.50	46.65	24.94
Haripur	253	1045	4.13	49.47	50.05	04.78	20.09	59.56	64.35	54.88
Bahinga	53	321	6.05	56.07	43.92	0	15.52	70.28	89.31	46.46
Parwaldih	23	104	4.52	52.89	47.11	100	0	52.49	61.36	43.40
Duldih	23	142	6.17	54.22	45.74	0	0	62.39	71.21	50.98

Source: Census 2011 Data

Demographic Profile of Surveyed Population of Paharidih and Bunbuni Village

A general socio economic survey of over 20% of households i.e. 40 households (20 Household from Paharidih village and 20 household from Bunbuni village was conducted during the month of January, 2018 as a part of the ESIA study to validate the present socio-economic scenario of above mention two villages. The questionnaire template used for administering the survey is presented in Annexure 8. Community consultations were also conducted to supplement the survey findings.

Total no of surveyed population is 93 in Bunbuni village residing in 20 household and 92 in Pharidih villages residing in 20 household. Average household size is 4.6 in both the villages which is lower than the household size recorded in the Census data. Among the surveyed population, total male and female population is 55.43 percent and 44.57percent in Paharidih village and 55.91 percent and 44.09 percent in Bunbuni village respectively and the sex ratio in Bunbuni and Paharidih is 804 and 788 respectively.

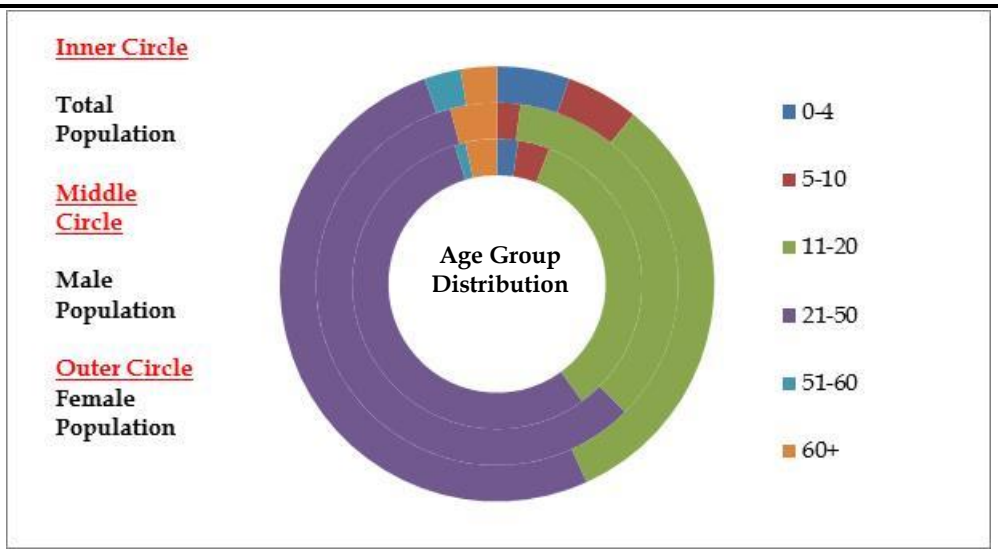
Table 5.3 Demographic profiles of the Surveyed Population

Village	Total Household	Total Population	Average Household Size	Male	Female	SC Population	ST Population	Literary Rate (%)	Male Literary rate (%)	Female Literary rate (%)
Bunbuni	20	93	4.65	55.91	44.09	0	61.29	63.74	67.31	58.97
Paharidih	20	92	4.60	55.43	44.57	0	36.96	53.49	54.17	52.63

Source: ERM Socio Economic Survey

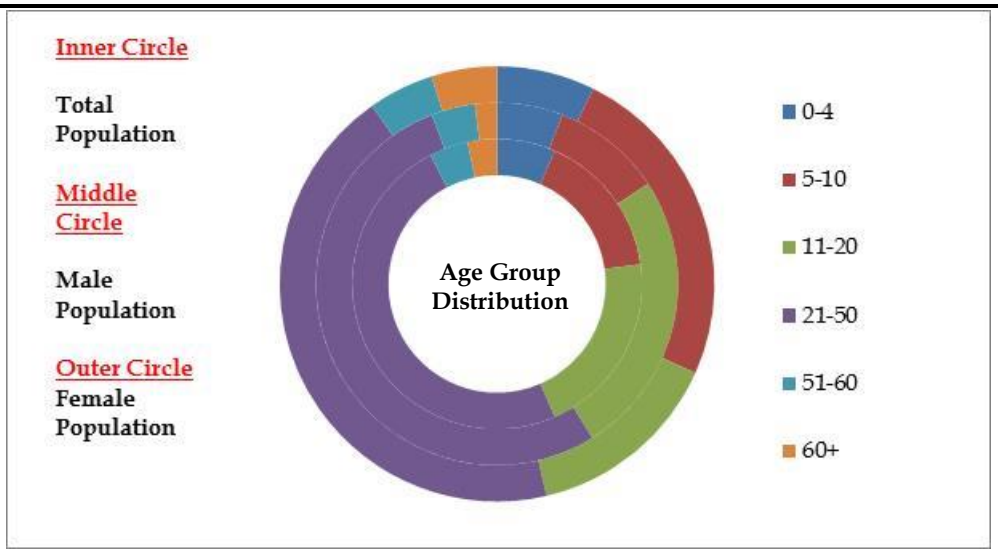
Age group distribution of the surveyed population of both the villages show that maximum number of population belongs to the working age group of 21 to 50 followed by the young age group (11 to 20) which potentially will become the working age group in the future. ***Figure 5.4*** represents the age group distribution of the surveyed population.

Figure 5.4 Age Group Distribution of the Surveyed Population in Bunbuni Village



Source: ERM Socio Economic Survey

Figure 5.5 Age Group Distribution of the Surveyed Population in Paharidih Village



Source: ERM Socio Economic Survey

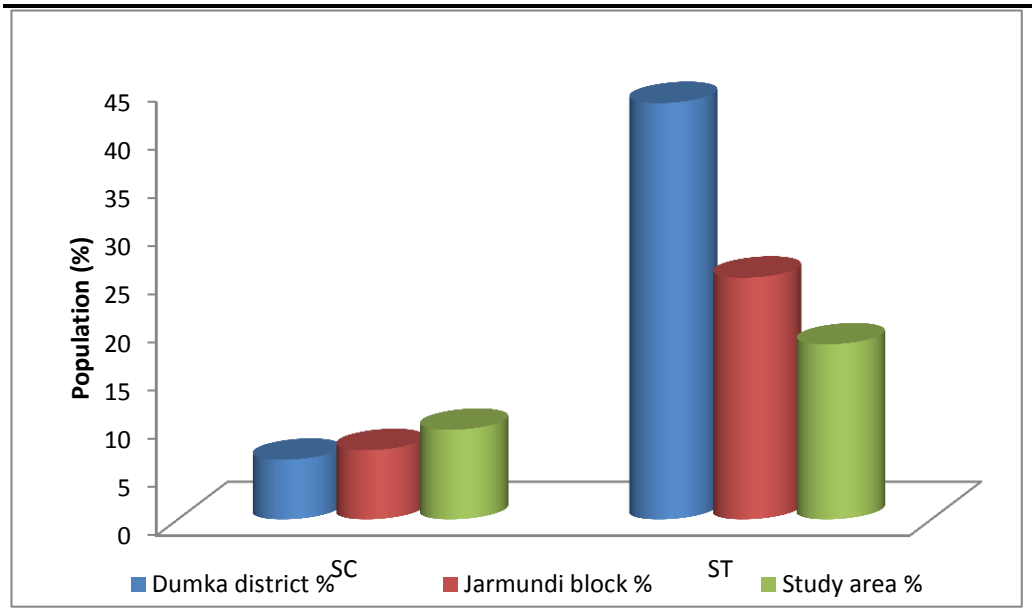
5.11.2 SC/ST Population

The scheduled tribe population in the study area is 18.19 %, which is lower than the district figure of 43.21 % as per Census 2011 data. Proportion of SC and ST Population in the study area is captured in ***Figure 5.6***. Analysis of the Caste and community profile further reflects that percentage of ST population is significant in the study area. Nawadih village is having 84.97 % ST population. Other than that, Paharidih (67.42 %) and Hathduba (42.30 %) also have significant presence of STs.

At 9.31 %, the proportion of SCs is almost negligible in the study area except for Parwaldih where the entire population is SC. However, village Taljhari accounts for a majority SC population (58.77 %). In fact only villages Patwai (3.65 %) and Taljhari record the presence of SC communities in the study area.

Remaining population are further classified into three major groups; General cast and OBC (Other Backward Caste) that is not accounted for in the Census survey of India. Considering the activities to be undertaken as part of the project schedule, no specific impacts are envisaged on the SC and ST Population of the area.

Figure 5.6 Proportion of SC/ST Population in the Study Area vis-à-vis Block/District



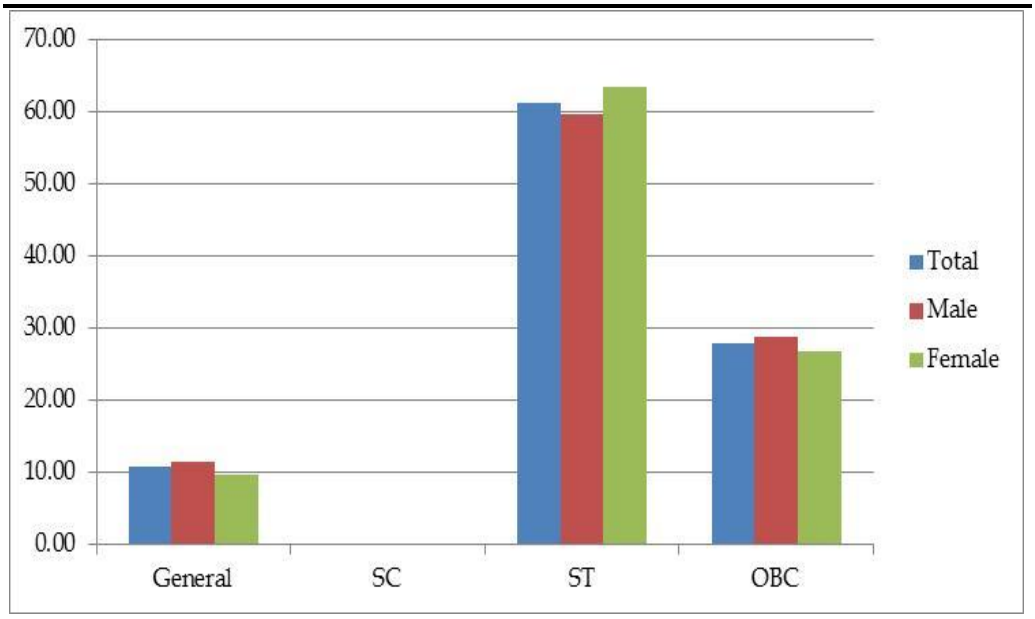
Source: Census 2011 Data

SC & ST Population of Surveyed Villages

Bunbuni Village

Among the 93 surveyed populations, ST population is 57 which is 61.29 percent of the total surveyed population they resides in 11 household which is 55 percent of total surveyed households. Other caste like general and OBC population is 10.75 percent and 27.96 percent respectively however SC is not present in the Bunbuni village. It can be observed that ST is the predominant caste in Bunbuni Village. Male and female ST population surveyed is 59.62 percent and 63.41 percent respectively. ***Figure 5.7*** depicted the cast wise distribution of the surveyed population.

Figure 5.7 ***Caste Distribution of the Surveyed Population of Bunbuni Village***

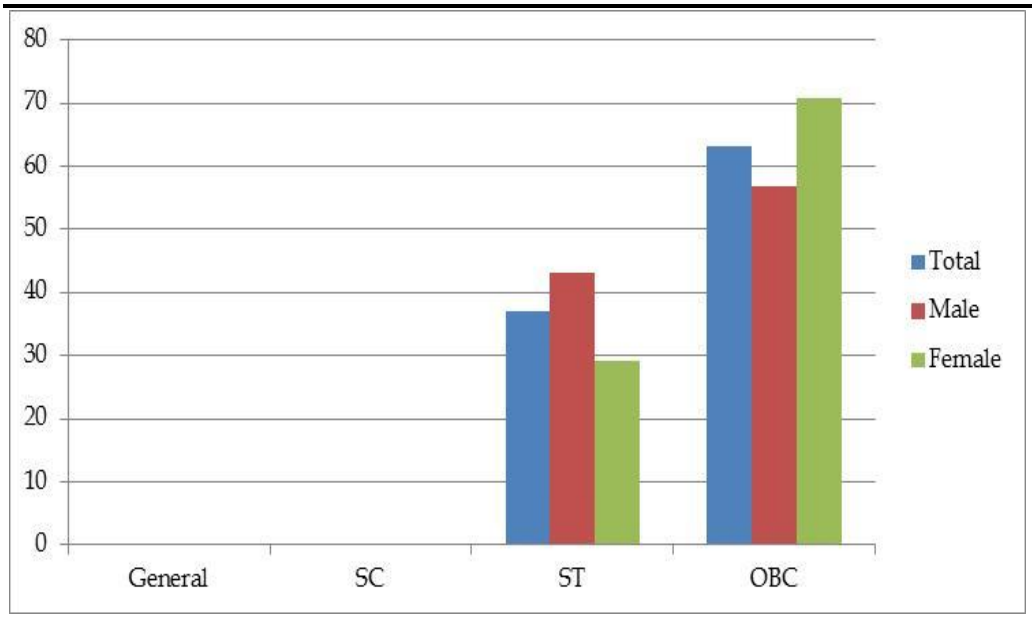


Source: ERM Socio Economic Survey

Paharidih Village

Among the 92 surveyed populations, ST population is 34 which is 36.96 percent of the total surveyed population they resides in 7 household which is 35 percent of total surveyed households. Other caste like OBC population is 63.04 percent however SC and general cast is not present in the Paharidih village. It can be observed that OBC is the predominant caste in Paharidih Village. Male and female ST population surveyed is 41.14 percent and 29.27 percent respectively. ***Figure 5.8*** depicted the cast wise distribution of the surveyed population.

Figure 5.8 ***Caste Distribution of the Surveyed Population of Paharidih Village***



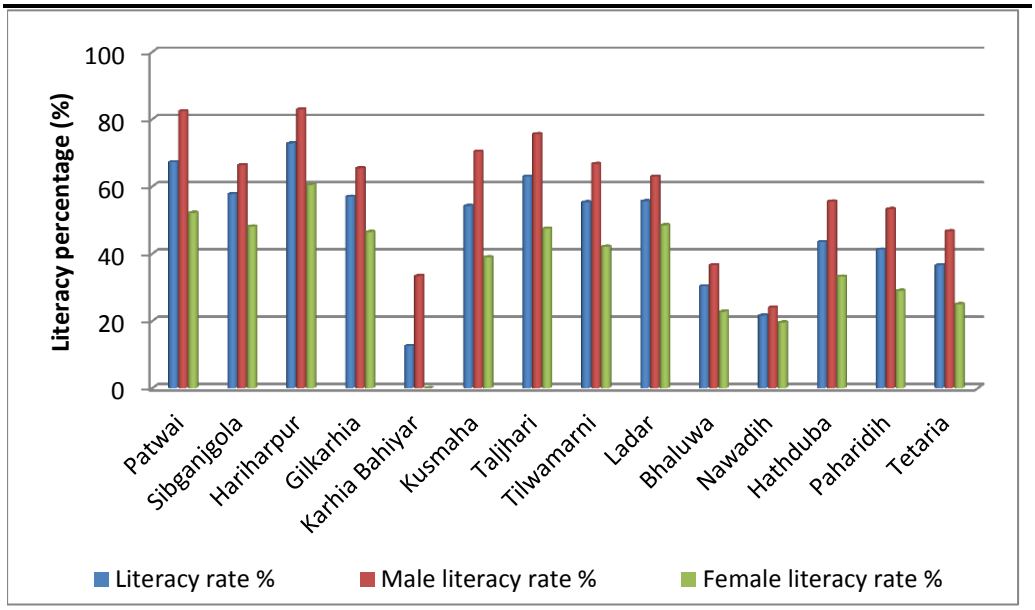
Source: ERM Socio Economic Survey

5.11.3 *Education profile*

Literacy Profile

The literacy scenario of the study area villages is presented in ***Figure 5.9***. The average literacy rate in study area villages (48.48 %) is lower than that observed at the State level (66.41 %). Female literacy rate (37.18 %) is also lower in all the study area villages. The general trend of educational attainment in the study area as observed during consultations indicates that drop out; especially at the primary school level is high. It was also reported by local communities that school dropout is directly proportional to the economic condition of the family of the students.

Figure 5.9 ***Literacy profile of the study area villages***



Source: Census 2011 Data

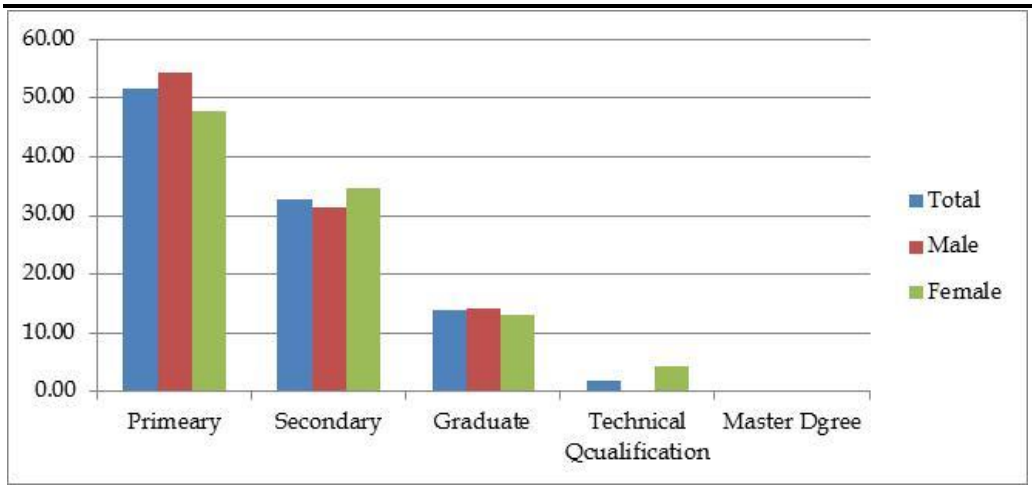
Educational profile of Surveyed Population

Bunbuni Village

Out of total 93 surveyed population 63.74 percent are literate and 36.26 percent are illiterate. Male and female literacy rate is 63.31 percent and 58.97 percent respectively and illiteracy rate is higher amongst the female population in comparison of male population.

Educational status of surveyed population shows that maximum category of population are either educated up the primary level or continuing their education in primary level. Educational status of the surveyed population presented in ***Figure 5.10.***

Figure 5.10 ***Educational Status of the Surveyed Population of Bunbuni Village***



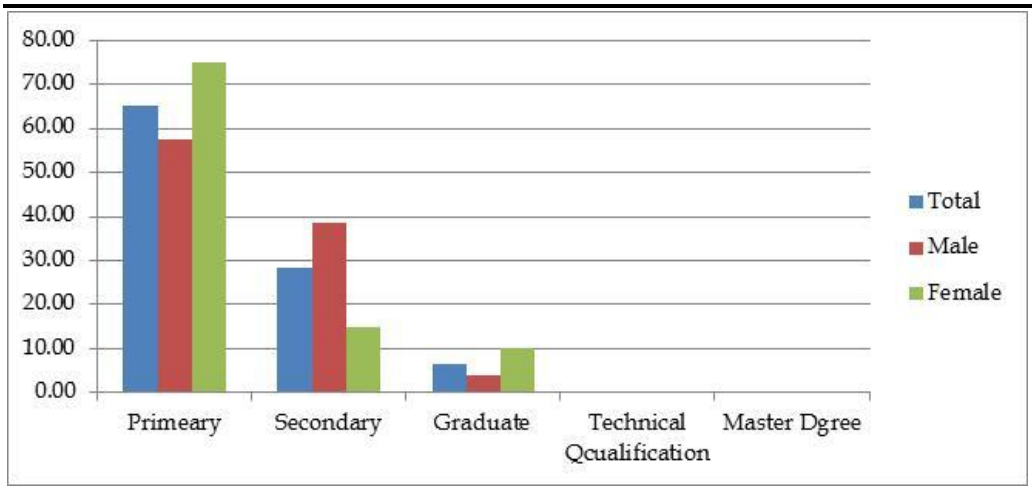
Source: ERM Socio Economic Survey

Paharidih Village

Out of total 92 surveyed population 53.49 percent are literate and 46.51 percent are illiterate. Male and female literacy rate is 54.17 percent and 52.63 percent respectively and illiteracy rate is higher amongst the female population in comparison of male population.

Educational status of surveyed population shows that maximum category of population are either educated up the primary level or continuing their education in primary level. Educational status of the surveyed population presented in ***Figure 5.11.***

Figure 5.11 ***Educational Status of the Surveyed Population of Paharidih Village***



Source: ERM Socio Economic Survey

Educational Infrastructure

Number of schools and colleges existing in study area villages is shown in ***Table 5.4***. The information is compiled from village directory, 2011. The table reflects that all villages in the study area except for four – Sibganjgola, Karhia

Bahiyar, Kusmaha and Ladar are having a primary Middle school within its peripheral boundary. However, the presence of Middle schools and Secondary schools is limited to 3 villages and 1 village respectively. There are no Senior secondary schools or Degree colleges in the study area. A Government Tool room and Training Centre, Dumka is also located within the study. Even though there is absence of degree colleges and senior secondary school the study the presence of this technical traning institute would increase the availability of skilled workforece in the area.

Table 5.4 Educational infrastructure in the villages located within the study area

Name of the village	Pre-primary school	Primary school	Middle school	Secondary school	Senior secondary school	Degree college
Patwai	N	Y	N	N	N	N
Sibganjgola	N	N	N	N	N	N
Hariharpur	N	Y	Y	Y	N	N
Gilkarhia	N	Y	N	N	N	N
Karhia Bahiyar	N	N	N	N	N	N
Kusmaha	N	N	N	N	N	N
Taljhari	N	Y	Y	N	N	N
Tilwamarni	N	Y	N	N	N	N
Ladar	N	N	N	N	N	N
Bhaluwa	N	Y	N	N	N	N
Nawadih	N	Y	N	N	N	N
Hathduba	N	Y	N	N	N	N
Paharidih	N	Y	Y	N	N	N
Tetaria	N	Y	Y	N	N	N
Haripur	N	Y	N	N	N	N
Bahinga	N	Y	Y	N	N	N
Parwaldih	N	Y	Y	N	N	N
Duldih	N	Y	Y	N	N	N

Source: Village Directory, Census 2011

All respondents from both the village informed that primary and secondary school is present within 1 to 1.5 km of the village but collage is not present.

Occupational Pattern

The most important factor, which governs the occupational pattern of an economy, is the availability of the total work force in an economy. The analysis of workers' profile reflects that 38.01 % of total working population of Dumka district is total main workers and 61.99 % are marginal. The non-workers comprise of old, diseased, disabled and most of them are children of non-working age group beside housewives.

In case of Jarmundi, main workers and marginal workers account for 44.58 % and 55.42 % of the total working population of the block. The employment pattern in this area suggests that 29.84 % of the total main workers are engaged as agricultural labourers. Similarly, main workers engaged as

cultivators, in the Household industry and in other activities account for 43.94 %, 3.45 % and 22.77 % respectively.

Occupational Pattern of the Study area Villages

Agriculture is the mainstay of the local economy of the study area. Agriculture laborers constitute significant portion among the different occupation followed by the people in study area. Classification of working population of the study area as well as of the study area as per census 2011 data is presented in the ***Table 5.5***.

Table 5.5 Occupational pattern in the study villages

Name of the village	Total population	Main workers	Marginal workers	Cultivators	Agricultural labourers	Household industry	Other workers
Patwai	329.	6.97	93.03	5.88	0.00	0.00	94.12
Sibganjgola	163	93.98	6.02	12.82	70.51	0.00	16.67
Hariharpur	191	96.00	4.00	25.00	45.83	0.00	29.17
Gilkarhia	188	47.86	52.14	30.36	58.93	0.00	10.71
Karhia Bahiyar	8	40.00	60.00	100.00	0.00	0.00	0.00
Kusmaha	360	78.64	21.36	59.26	17.28	3.70	19.75
Bunbuni	45	94.44	5.56	19.44	0.00	44.44	71.65
Taljhari	342	100.00	0.00	32.82	60.31	0.00	6.87
Tilwamarni	313	100.00	0.00	93.14	1.96	0.00	4.90
Ladar	126	78.57	21.43	18.18	6.06	0.00	75.76
Bhaluwa	436	99.22	0.78	32.81	46.09	0.00	21.09
Nawadih	153	100.00	0.00	17.02	78.72	0.00	4.26
Hathduba	357	37.90	62.10	95.74	2.13	0.00	2.13
Paharidih	153	97.73	2.27	4.65	94.19	0.00	1.16
Tetaria	841	81.92	18.08	34.11	63.55	1.67	0.67

Source: Census 2011 Data; *Note:* WPR – Work Participation Ratio

Work Participation ratio (WPR) (1) , defined as percentage of total workers including main and marginal workers out of the total population of the study area, is 50.89% which suggests the study area villages have relatively higher unemployment rate as most of people are involved in agriculture.

Other noticeable aspects as evident in the above table is that proportion of Agriculture Labour (AL) is relatively high in all the study area villages which indicates number of farmers having sufficient land holding for their livelihood is on lower side in study area and community consultation also reveals that most of the people of local community has marginal to small landholding which is not sufficient for earning their livelihood.

Economic Status of the Surveyed Population

(1) Work Participation ratio (WPR) is defined as percentage of total workers including main and marginal workers out of the total population of the study area

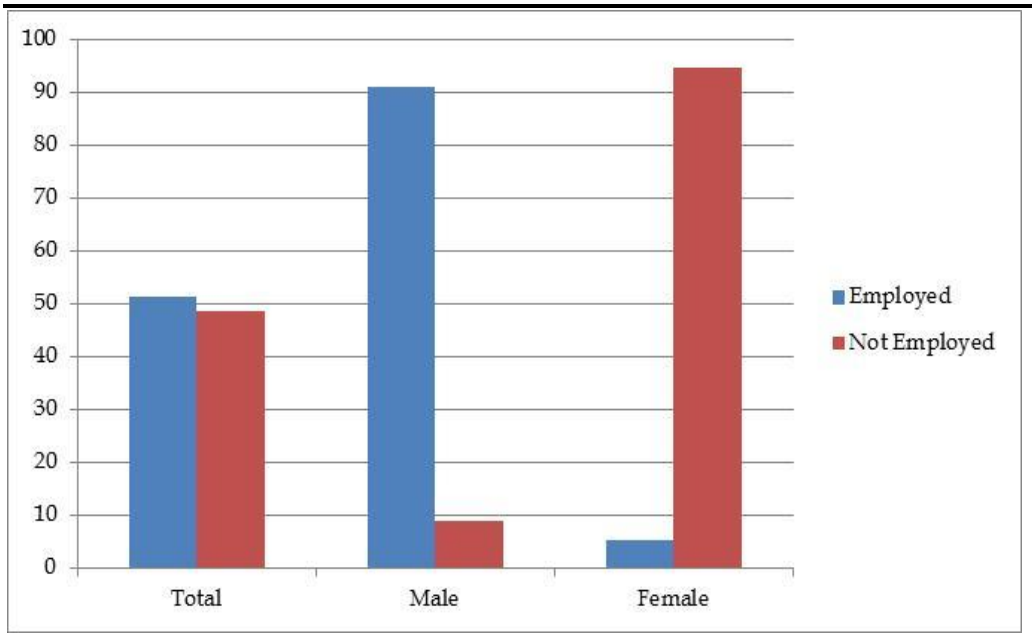
The survey conducted by the ERM team revealed that maximum (60 percent in Bunbuni village and 95 percent Paharidih Village) household is under below poverty level and only 40 percent and 5 percent household in Bunbuni and Paharidih village respectively is above poverty level. In comparison in these two villages shows that economic condition of the villagers is more poor in Paharidih village than Bunbuni village.

Employment Status of the Surveyed Population

Bunbuni Village

It can be seen from the primary survey data that 51.22 percent of the surveyed population above the age of 20 are employed while 48.78 percent population are not employed. The male and female employment rates among surveyed households were found to be 90.91% and 9.09% respectively. It can also observe from figure below that unemployment rate is higher in female population than the male population. This is because most of the women in the village were mainly involved in household work. Employment status of surveyed population is presented in *Figure 4.9.*

Figure 5.12 Employment Status of the Surveyed Population in Bunbuni Village

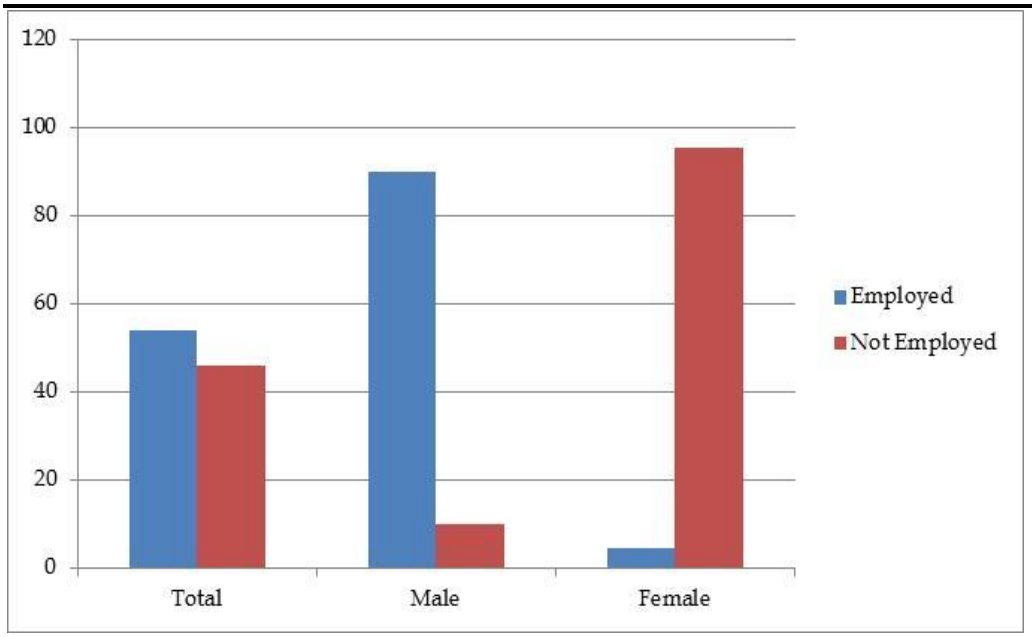


Source: ERM Socio Economic Survey

Paharidih Village

It can be seen from the primary survey data that 53.85 percent of the surveyed population above the age of 20 are employed while 46.15 percent population are not employed. The male and female employment rates among surveyed households were found to be 90% and 10% respectively. It can also observe from figure below that unemployment rate is higher in female population than the male population. This is because most of the women in the village were mainly involved in household work . Employment status of surveyed population is presented in *Figure 4.9.*

Figure 5.13 Employment Status of the Surveyed Population in Paharidih Village



Source: ERM Socio Economic Survey

Occupational Pattern of the Surveyed Population

Bunbuni Village

Among the surveyed population maximum (90.48%) number of people is involved in agricultural activity in their own land. Employment status of female population is very poor. Only one female member of the surveyd population is working as agri. Labour. Other than that male population is also involved in private service.

Paharidih Village

In case of Paharidih village entire surveyed population is involved in agricultural activity in their own land.

5.11.4 *Skill of the Surveyed Population*

Survey data show that the residents of this village are not having significant indigenous skills.

5.11.5 *Drinking Water & Sanitation Facilities*

The social organization and settlement pattern in the study area is predominantly arranged around the available agricultural land and water resources in the area. Land based livelihood being the key feature of the community, proximity and availability of water is often linked to the economic status of the family/ household. Also typically in a village, water for drinking and other purposes defines the household hygiene/ sanitation and ultimately the standard of living of the community. For drinking purpose, availability of water is mostly in the form of:

- Ground water sourced through hand pump and well serve mostly to the needs of household drinking water consumption however no filtration facility is available for drinking water;
- Supply of water is not available in study area villages;

Community consultations indicate that only a handful of households in the villages located within the study zone have access to individual sanitation facility (household toilets) and majority of the community reportedly rely on open defecation.

Primary surveys revealed that maximum (55 percent) number of family are dependent on hand pump in spite of dug well for fulfilling their drinking water and domestic use water requirement in Paharidih village however maximum (80 percent) household in Bunbuni village is dependent on dug well. But all the sources both hand pump and dug well in both the villages are shared resources among the families.

5.11.6 Irrigation

Community consultation reveals that irrigation facilities in study area seem to be extremely poor as farmers reported to be entirely dependent upon rain water for irrigating their field. Though use of water drawn from wells was reported, the same was confirmed to be rare.

5.12 HEALTH INFRASTRUCTURE

Health care infrastructure of the study villages is captured in ***Table 5.6***.

Table 5.6 Health care facilities in study area

Name of the village	Community Health Centre	Primary Health Centre	Sub Centre
Patwai	N	Y	Y
Sibganjgola	N	N	N
Hariharpur	N	N	Y
Gilkarhia	N	N	N
Karhia Bahiyar	N	N	N
Kusmaha	N	N	Y
Taljhari	N	N	Y
Tilwamarni	N	N	Y
Ladar	N	N	N
Bhaluwa	N	N	Y
Nawadih	N	N	N
Hathduba	N	N	Y
Paharidih	N	N	N
Tetaria	N	N	Y
Haripur	N	N	N
Bahinga	N	N	N
Parwaldih	N	N	N
Duldih	N	N	N

Source: Village Directory, Census 2011

There are no Community Health Centres in the study area. There is only one Primary Health Centre in the study area i.e. in village Patwai. Similarly, there are 8 sub-centres in the study area, one each in villages Patwai, Hariharpur, Kusmaha, Taljhari, Tilwamarni, Bhaluwa, Hathduba and Tetaria.

Primary survey reveals that entire population is dependent on govt. health facility in Basukinath in Dumka Deoghar road.

5.13 OTHERS PHYSICAL INFRASTRUCTURE

Road & Transportation

None of the villages in the study area are connected by National Highways (NH). However, 4 villages – Hariharpur, Taljhari, Tilwamarni and Nawadih are connected by State Highways (SH) and Major district roads.

Electricity

All the villages in the study area except for four – Patwai, Gilkarhia, Karhia Bahiyar and Ladar have access to household electricity supply.

Postal Service and Bank

As per 2011 census data, there are two post offices in the study area , one each in village Hariharpur and Taljhari. There are no ATMs or cooperative banks in the study area. However, branches of commercial banks have been set up in three villages – Hariharpur, Gilkarhia and Taljhari.

6 IMPACT ASSESSMENT AND MITIGATION MEASURES

This section identifies and assesses the potential impacts to the physical, biological and socioeconomic environment that can be expected from the proposed substation project at Jarmundi. The impacts due to the Project activities across different phases have been identified and assessed. Impacts are identified and predicted based on the analysis of the information collected from the following:

- Project information (as outlined in ***Section 3***);
- Baseline information (as outlined in ***Section 4***).

6.1 POTENTIAL IMPACT

The identification of likely impacts during construction and operation phases has been carried out based on understanding of activities and their consequent impacts on various environmental and socio-economic resources or receptors. The impact identification matrix in *Error! Reference source not found.* captures the likely interactions between the activities on one axis and the resources / receptors on the other axis.

Table 6.1 Environmental and Social Impact Identification Matrix

Project Activity/ Hazards	Environmental Resources											Ecological Resource					Social-Economic Resources							
	Aesthetic & Visual Impact	Land Use	Soil Quality	Air Quality	Noise & Vibration	Topography & Drainage	Surface water resource	Surface water quality	Ground water resource	Ground water quality	Traffic (Road)	Terrestrial Flora	Terrestrial Fauna	Aquatic Flora & Fauna	Protected /Migratory Species	Migratory Path/Corridor	Job & economic opportunity	Economy & Livelihoods	Common Property Resources	Land Use (Economic Displacement)	Infrastructure & Services	Cultural Resources	Community Health & Safety	Occupational health & safety
Construction Phase																								
Land Procurement																								
Clearance (Vegetation & other structure)																								
Site Development (cutting & filling)																								
Construction of Site approach road																								
Transportation of construction materials, equipment & machineries																								
Storage & handling of construction materials																								
Construction of switch yard and Other building																								
Storage, handling and disposal of construction waste																								
Generation of sewage and discharge																								
Sourcing of construction water & domestic water																								
Surface Runoff from construction site																								
Operation Phase																								
Physical presence of sub-station																								
Maintenance of Substation & generation of transformer oil and e-waste																								
Sourcing of water for earthling pit & residential units																								
Storm water runoff																								
Generation of MSW & Disposal																								

Project Activity/ Hazards	Environmental Resources											Ecological Resource					Social-Economic Resources						
	Aesthetic & Visual Impact	Land Use	Soil Quality	Air Quality	Noise & Vibration	Topography & Drainage	Surface water resource	Surface water quality	Ground water resource	Ground water quality	Traffic (Road)	Terrestrial Flora	Terrestrial Fauna	Aquatic Flora & Fauna	Protected /Migratory Species	Migratory Path/Corridor	Job & economic opportunity	Economy & Livelihoods	Common Property Resources	Land Use (Economic Displacement)	Infrastructure & Services	Cultural Resources	Community Health & Safety	Occupational health & safety
Generation of sewage & discharge																								

= Represents "no" interactions is reasonably expected

= Represents interactions reasonably possible but none of the outcomes will lead to significant impact

= Represents interactions reasonably possible where any of the outcomes may lead to potential significant impact

The details of the activities and their impacts have been discussed in detail in the following sections.

6.1.1 *Impact Aesthetic and Visual Quality*

Potential impacts to aesthetics and visual quality because of the setting up and operation of the Jarmundi GSS may arise because of two key factors – disruption and degradation of views in the surrounding landscape; and, use of nighttime lighting for construction and security purposes. Visual impacts of GSS projects along with associated transmission lines (in and outgoing) are highly variable and depends on several factors like location of the project, lines of sight, scenic vistas and most importantly the perception of the people. Degradation of views from setting up of the GSS in the identified plot of land may result from cutting of trees and vegetation clearance, handling of construction and domestic wastes, and setting up of physical infrastructure (including some transmission towers which are to be constructed on the boundary of the site) associated with the GSS. After the GSS is commissioned, night-time security lighting would be operational and would lead to addition of strong artificial lights in what is at present is a predominantly rural area with no street or external lighting. With the study area, not being recognized as a place of natural scenic beauty or a touristic destination, these factors are unlikely to lead to any significant adverse visual and aesthetic impacts in the area and it can be rated as **negligible**.

6.1.2 *Air & Noise Quality*

The GSS is not planned to house any point or area source of air emissions (particulate matter, pollutant gases, etc.) and neither does the study area have any industrial air pollution sources – NH 114 A Road passing along the northern side, through which regular vehicular movement occurs is the only line source of air pollution, caused by vehicular emissions and because of re-entrained dust from the road surface. Based on visual observations, the quality of the air shed can be categorized as good and no indicators or existing sources of air pollutants were noted in the study area that could potentially result in air quality parameters to exceed National Ambient Air Quality Standards (NAAQS).

During site preparation and construction, the project is likely to generate dust (as particulates) in spite of best efforts to control it and there will be times during the construction phase when elevated dust concentrations may occur. Higher amounts of dust will be generated at places where earthwork, cutting and filling operations take place or in material handling and storage areas. A large percentage of such dust emissions from construction sites have been found to comprise of particles which are coarse in size (>10 microns) and has a tendency to settle down within a few hundred metres of the source of emissions. The smaller fractions (PM10) can however be carried over longer distances in a dust cloud, in the case wind velocity is higher and depending on prevailing wind direction maybe deposited in the adjoining Pharidih village with a potential to cause soiling of residential premises, deposition on agricultural crops, etc.. However, this will be a short-term impact lasting for a

few months. Particulates, CO, SOx, NOx and unburnt hydrocarbons (VOCs) will be emitted by vehicles, batching plants (if used), heavy equipment and DG sets associated with site clearing and construction activities.

The operational GSS site at Jarmundi will not have any specific source contributing to air emissions. However, the site will house transformers, switches and associated cables which may contain insulating gases such as Fluorocarbons and Sulfur hexafluoride (SF_6). If accidentally released during maintenance work or equipment overhauling, they may release these gases which are categorized as greenhouse gases and having significantly higher global warming potential (GWP) than CO_2. The frequency of such non-routine incidents is predicted to be very few in the entire lifecycle of the operation of the GSS. Overall, the impact on air quality during the construction and operational phase of the project can be rated as **negligible to minor**.

Noise and vibration at the Jarmundi GSS site is expected to be primarily generated during the site preparation and construction phases of the project. Such noise may be generated from blasting (if required), operation of heavy construction equipment and machineries, DG sets and the transportation of equipment and materials. During operational phase, the transformers and switches to be installed within the GSS would also emit typical humming noise caused because of magnetostriction (involving the expansion and contraction of the iron core due to the magnetic effect of alternation current flowing through the transformer coils). Though the emitted noise may vary in characteristics depending on the rating of the transformer, typically the intensity and amplitude transformer emitted noise is about 120 Hz and 55 dB (A). As the transformers and other sound emitting equipment would be located well within the boundary of the site, any incremental contribution to the ambient noise quality at the boundary of the site would be negligible.

The study area has no major noise sources, except for vehicular noise on the adjacent NH 114 A. The noise generated from the construction phase activities is likely to be attenuated to acceptable levels as per the ambient noise standards within 200 m of the site. Such noise may however, cause discomfort the construction workers at site and nearby receptors at Paharidih village adjacent to the site boundary. The construction activities, especially those with a potential to generate high noise levels would be temporary in nature and are not expected to last more than 6 months. The spatial scale of impact will be limited to a few hundred meters. The overall significance of the noise related impacts is rated as **minor**.

6.1.3 *Impact on Land Use, Soil & Drainage*

The proposed substation will be constructed over 7.65 acres of land. The land use study reveals that the proposed land is a pahari land (hilly land) under land revenue department and during site visit it was observed that the land was barren land without any vagitation. The land use study reveals that the proposed land is a GM land. JUSNL will divert the land use of the tract of land to industrial use and this would result in a permanent change of land use. Because of the nature of the project and low level of anthropogenic

activity to be associated with the site during operational phase, it is unlikely that the GSS project would induce any significant change of land use in other land parcels in the immediate vicinity

As the site is located on a hillock, the preparation of land for the construction activities at site would involve soil stripping and considerable cutting, filling and levelling activities in order to make the site topography suitable for setting up of the GSS. As the site as lateritic soil which is loose in nature, changing of topography of the site can create potential for local slope failures. The removal of vegetation cover and top soil can increase the potential for soil erosion during a short period of time till the site is levelled and then stabilized with fill materials like gravel, sand and fly ash.

There is also a potential for local level changes in drainage pattern of the area, though the drainage to the second order drainage to the north of the site is unlikely to be affected because the prevailing steady slope leading to the catchment of the drainages. If proper soil erosion and slope stability control measures are implemented, these impacts will be in the short term and unlikely to be severe in terms of scale and magnitude.

Disposal of solid waste and spills of lubricants, fuels and chemicals during land clearing, terrain sloping, levelling and construction activities creates the potential for soil and water contamination. The specific type of solid wastes likely to generated during the construction of the Jarmundi GSS sites would include remains of cut trees and vegetation, defective or compromised building materials, waste concrete, wastes from on-site machineries and repair of machineries and equipment, packaging pallets and crates and wastes associated with onsite activities of workers (in relation to the number of workers present) like domestic solid wastes.

6.1.4 *Impact on Water Resources*

Water resourcing requirements for a GSS project are minimal, as there is no process or activities that require a steady supply of water. In the operational phase, water would need to be sourced on the long term to meet the domestic needs of about 16 – 20 people and the daily requirement would be about 8.4 KLD. The water requirement during the construction phase is expected to be more intense – an estimated amount of 10-12 KLD (including provision for domestic water supply to labourers of approx. 2 KLD) and about 3-4 KLD during the rest of the construction period. It is estimated that the civil works would be completed within 1 year and the construction phase would last 2 years.

With no nearby source or provision to provide piped or treated water from a surface water being present, the project would depend on extraction of ground water resources, using a bore well, to be dug at site. The bore well would be planned to extract water from the deeper aquifers.. As per CGWB report (2013), the level of ground water development in the Jarmundi Block is 51.65 percent (expected yield of 10 – 30 m^3/hr.) should be sufficient to meet the water requirement of the Jarmundi GSS during the short to medium term.

The neighboring settlements source water using dug wells and tube wells and both of them utilize the shallow, near shallow aquifers; so, there is expected to be no conflicting demands on ground water resources. Considering the amount of water planned to be sourced, the limited spatial extent which would be impacted and the sensitivity of the resource, the significance of the project's impact on water resources can be considered to be **minimal**.

6.1.5 Potential Impact on Biological Environment

As discussed earlier, there are approximately 10 matured trees with species *viz*. neem, aam, date palm and few shrubs and herbs within the site. Site preparation will involve removal of the trees, shrubs and herbs present at site which will cause change in the modified habitat within the site leading to a loss of floral biodiversity at local level.

Faunal species that have high probability of occurrence within the site include amphibians (Common toad), reptiles (lizards and snakes), birds (House crow, Common sparrow, Common myna, Drongo, doves, parakeets, kites etc.) and mammals (Indian Grey mongoose, squirrels, mouse etc.). Removal of vegetation from the site can adverse on residential burrowing faunal species *viz*. reptiles (lizards and snakes), ground roosting birds (sparrows, pigeon, doves etc.) and mammals (mongoose, mouse etc.). In most cases however it has been observed that faunal species to migrate to other local habitats which are adjacent, if the land affected is not very large.

The floral species that would be affected because of site clearance and preparation are few trees, shrubs and herbs. The loss of trees, shrubs and herbs from the site will not create any habitat degradation or fragmentation in the area. None of the floral or faunal species expected to be present within the site is threatened as per IUCN Classification (Version 2017-3). Vegetation clearance may affect the faunal species mentioned above, however, there are similar habitats in the vicinity and the species can easily relocate to those areas. The scale of impact will be medium as it causes irreversible damage to a modified habitat. Duration of the impact will be long term as vegetation clearance would create a permanent impact within the site area. Extent of the impact would be only within the project site and immediate vicinity.

Construction activities will include excavation, movement of machineries, increased anthropogenic movement (men and transport) and may lead to minor disturbances to floral and faunal habitats in the vicinity of the site because of deposition of dust, noise and light generated during construction activities may affect feeding, breeding and movement of animals. However, these disturbances will be for a temporary period and expected to be of low magnitude and local in scale.

During the operation phase, several species of birds identified during the ecological study which can perch (viz. doves, pigeon, mynas, kites etc.) or make nests within the GSS area (viz. sparrows, pigeons, doves etc.) with a possibility for electrocution. The same could occur to small mammalian species like mongoose, macaques, langurs may get electrocuted within the

GSS area. However, the chances of birds and mammalian species getting electrocuted within the GSS site are rare; moreover the species having the potential to get electrocuted are common in the area and of low sensitivity. Overall the significance of impact on biological environment can be rated to be between **minor** to **moderate**.

6.1.6 Impact on Socio-economic Condition

Proposed Jarmundi GSS will be constructed on 7.65 acres of land which belongs to the government and therefore would not require any land acquisition (through any involuntary mechanism / application of powers of eminent domain) or negotiations for purchase of land for setting up the project. In addition, no encroachments or encumbrances within the land parcel either in form of agricultural or residential uses was noted within the demarcated site and as a result no displacement or adverse impact on livelihoods (of people) are expected because of the uptake of land to build the GSS. In terms of cultural and religious property, there is a temple and mela ground is located just outside the northern boundary of proposed site-any disturbance may lead to local community agitation. Other than this, no dependency of the local people on the proposed land was recorded during consultations with the community.

However, several nominally positive socio-economic impacts can result from the project. There is scope for generation of indirect employment opportunities generated during the site preparation and construction phases of the project. It is anticipated that about 50 workers would be employed during the construction phase and it is expected that part of these workers, especially need for unskilled workers, would be met from local villages. There would also be a scope for some small contracts to be provided to local contractors for supply of construction materials, vehicles, tractors, etc. In addition, the presence of workers, contractors, engineers during the construction period is expected to stimulate a demand for economic activities (shops, restaurants, etc.) and increased purchase from local businesses. It should be noted that these opportunities would be in the short-term, as the operational phase of the project would involve the deployment a small number (about 8 – 10) of technical skilled workmen (mostly engineers). Both the beneficial and adverse socio-economic impacts can be rated to be **minor** in terms of significance.

6.1.7 Impact on Community Health and Safety

Experience shows that because of its nature and scale, project like GSS's can be expected to have a limited interface with the local community and as a result will have minimal impact on the safety and health of local communities. During the construction stage of the project, there will be an influx of workmen and labours, with some of them being from different socio-cultural settings as compared to the villages around site. In the case that hygienic conditions are not maintained at the construction site, there may be a vector borne and other ailments in the immediate vicinity. Unless proper sensitisation of neighbouring communities is undertaken and appropriate

safeguards are adopted, there is a possibility for increase in sexually transmitted diseases, though the possibility appears quite remote.

The site clearing activities and construction activities (involving fill materials, brick and concreting work) would result in emissions of dust and noise, discharge of sanitary waste water and potential littering from labour quarters during a short phase of around 6 months and has a potential to contribute to additional nuisance levels for the local community. However, there is no people living close to the site and the habitation (*tola's*) of Paharidi village being located at a distance of 300 m, no significant health related impacts are expected to the communities in the area. The increase in vehicular movements as a result of plying of construction vehicles on the adjoining highway and the site access road would add to the risk of accidents in which local villagers may be involved. In addition, the GSS project would have incoming and outgoing transmission lines (132KV), house transformers and associated equipment which has the potential to create electro-magnetic fields (EMF). Although there is a public concern over the potential health effects associated with the exposure to EMF, empirical data is insufficient to demonstrate adverse health impacts from typical EMF levels originating from high voltage power lines and substation equipment. Considering good construction practices and planned embedded measures for mitigating these impacts, the overall significance of community health and safety impacts can be rated to be **minor**.

6.1.8 Occupational, Health and Safety

During the construction phase of the project, about 50 workers would be involved in construction related activities, some of which are inherently unsafe, unless adequate precautions and safeguards are adopted by the workers and construction site contractors. Safety issues related to construction of the GSS at Jarmundi may involve physical hazards like working at height, exposure to heat, particulate matter, noise and vibration, collision with vehicles/moving equipment; exposure to electrical hazards; exposure to chemicals hazards (both inhalation and physical contact) like organic solvent vapours, reactive and toxic chemicals (acids's, bases, insecticides, etc.). Such occupation hazards would vary with the nature of work undertaken by the workmen, as they may employed by different contractors responsible for doing a particular component of the work.

The construction work would involve several contractors who in turn would engage different labourers having varied skillsets. The duration and extent for most workmen is expected to extend for a few months and the occurrence of any accidents and consequent injuries/fatalities will lead to adverse impacts that could range from loss of productive time to loss of livelihoods (of workmen). If local workers are hired, they may not have appropriate training for adopting a safety culture expected at an industrial construction site – so receptor sensitivity may be anticipated to be high. There is also a possibility of legal non-compliance which may lead to temporary stoppage of work affecting construction schedules. Hence the receptor sensitivity is high. Overall, the impact significance for occupational health and safety can be considered to be ***moderate***.

7 STAKEHOLDER ENGAGEMENT

7.1 INTRODUCTION

A stakeholder is defined as "an individual, group, or organization, who may affect, be affected by, or perceive itself to be affected by a decision, activity, or outcome of a project". "Stakeholder Analysis" is the process of sorting identified stakeholder groups according to their impact on the project and the impact the project will have on them. This information is then used to assess the manner in which the interests of the stakeholders or projects impact on them should be addressed in the project development plan or its operation.

The importance of stakeholder analysis lies in the assessment and understanding of the socio-political environment surrounding the project. It allows for:

- Identification of the interests, concerns and societal risks surrounding the stakeholders, as well as conflicts of interests (if any);
- Identification of relations between stakeholders that may enable "coalitions" of project sponsorship, ownership and co-operation as well as the mechanisms which may influence other stakeholders;
- Key groups/ individuals to be identified who need to be informed about the project during the execution phase;
- Identifying stakeholders (those who might have an adverse impact on the project) and taking appropriate measures to mitigate their influence; and;
- Development of a framework for participatory planning and implementation of various project activities including interventions for community development.

The identification of stakeholders and their inclusion in the decision-making process is thus essential in the process of prioritizing, analyzing and addressing issues; and in creating management systems and strategies to address the concerns/ expectations of various stakeholders.

The following sub-sections provide a profile of the various stakeholders in the project as well as their concerns and relative influence with regards to the project.

7.2 IDENTIFICATION OF STAKEHOLDERS

The stakeholders who would directly impact or are directly impacted by the project are known as Primary Stakeholders, those who have an indirect impact or are indirectly impacted are known as Secondary Stakeholders. Keeping in mind the nature of the project and its setting, the stakeholders have been identified and listed in the table below;

Table 7.1 List of key stakeholders

Stakeholder Category/ Group	Key Stakeholders
Primary Stakeholders	
Local Community	• Local Community
Other Primary Stakeholders	• Jharkhand Urja Sancharan Nigam Limited • World Bank
Secondary Stakeholder	
Institutional Stakeholders	• District Administration • Forest Department • Tribal Development Department
Other Secondary Stakeholder	• Contractors

Consultations with Local Communities a

Community consultation was conducted in close vicinity of the project boundaryto gather the opinion of the public on the proposed project and assess its potential effect on the public especially vulnerable groups. Consultations were carried out with community people residing in the adjacent to the proposed Substation site to assess the extent of impact on the common people.

Figure 7.1 Consultations with Local Communities

Consultation at Bunbuni village

Consultation at fair ground, Paharidih village

Consultation at Tilwamarni village

Consultation at Bunbuni Village

The brief outcome of the consultations with the key stakeholder groups are listed below.

7.3 *SUMMARY OF STAKEHOLDER CONSULTATIONS*

ERM undertook consultations/ meetings with identified stakeholders during the course of the site visit. The intensive deliberations provided a platform for two-way communication between the team of consultants and the stakeholder groups. This in turn helped in developing an understanding of the perceptions of stakeholders with regards to the project and also allowed for a means of recording their feedback. The key points discussed with each of these stakeholders are provided in the table below:

Table 7.2 Stakeholders and Key Points Discussed

S. No.	Stakeholder Category	Key Points Discussed	Finding of the Consultation
Local Community			
1.1	Local Community (Location- Paharidih Date- 5/10/2017 Number of Participant-5, Location- Bunbuni Date- 5/10/2017 Number of Participant-6 Location- Bunbuni Date- 09/01/2018 Number of Participant-5)	• Current engagement scenario –livelihood options; • Basic amenities in the village – electricity, drinking water, etc.; • Health scenario in the village and distances of Hospitals/ Clinics; • Perception of local community towards the project;	• Majority of the people in nearby villages like Tilwamarni, Paharidih and Bunbuni are involved in agriculture. • Agricultural land is single cropped. Agricultural activities are practiced during rainy season. No irrigation facility is available in this area. • Paddy is the main agricultural produce of the area. Vegetable are also produced. • People are also involved as day agricultural labour. During nonagricultural season, people travel to Dumka city for work. During consultation with them, they have raised their desire to involve as labour for the construction work. • Electricity supply is present in all the villages consulted. It was reported that power cut is very frequent. • Source of drinking waste is mainly from ground water. Primarily tube wells are used for abstracting ground water. Ground water is available throughout the year. • Toilets area present only in few household. Community mainly practice open defecation • Health facility is the main problem area for the local community. There is only one Primary Health Centre at village Patwai. However, facilities like doctor, nurse and medicines are not available all the time. • Shiv Mandir located at northern side of the substation site is the major religious place in this area. Adjoining to this temple there is vacant land which is used as fair ground by the local people during "Shivaratri" for 3-4 days. People are concerned about the disturbance in the temple and mela ground during construction. • Adjoining to the Shiv Mandir, there is a hand pump used by local people. As this hand pump is close to the site, local people have concerns that it may be used by the workers engaged in the substation construction work.

8 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

8.1 MITIGATION MEASURES & MANAGEMENT PLAN

This document provides the Environmental Management Plan (EMP) for the planning, construction and operation of the Project life cycle which is described in ***Table 8.1***. This ESMP provides an action plan against each of the mitigations measures identified for an impact identified in the earlier section. It also defines the actions to be taken to check and monitor compliance and effectiveness of the mitigation measures to which JUSNL is committed. In addition, this EMP is used to ensure compliance with statutory requirements and World Bank safeguards policies

The environmental mitigation measures and plans are presented in form of a matrix according to the sequential flow of activities in the project life cycle. The matrix focuses on strategies to be adopted for safe guard of the environment from possible impacts resulting out of the project activities. These measures would be further updated by Contractor during the implementation of the EMP. The ESMP is provided in Table 8.2. To ensure that the conditions specified in the ESMP are adequately implemented by the Contractor General and Special Conditions of Contract has been developed. The General and Special Conditions of Contract are presented in ***Annexure 2*** and ***Annexure 3*** respectively

Table 8.1 Environment and Social Management Plan

Sl No	Project Phase/Activity	Potential Impacts	Proposed Mitigation Measures	Responsibility
Planning/Preconstruction				
1	Substation location and design	Conflict with community	Careful design of site to avoid damages to the Sib Temple located just outside the northern boundary of proposed site	Design Consultant/ Contractor
2	Design of residential quarter and office at substation	Water/soil pollution	Septic Tank with soak pit to be designed as per IS: 2470 (Part-1) - 1985 (Code of Practice for Installation of Septic Tank).	Design Consultant/ Contractor
Construction				
3	Site preparation and construction work	Loss of topsoil	• Top soil from the construction site will be stripped before commencement of construction work; • Top soil will be stored in a dedicated top soil storage site, having adequate mitigation measures for preventing erosion due to runoff; • Activities will be scheduled (as far as possible) to avoid extreme weather events, such as heavy rainfall; • Top soil will be used for landscaping within the GSS site.	Contractor
3.1		Noise and vibrations	All equipment/machineries to be regularly maintained to ensure efficient operation	Contractor
3.2			DG sets with acoustic enclosure should be used	Contractor
3.3			Construction work during night time (10 pm to 6 am) to be prohibited. In case of emergency work at night approval of JUSNL Division/ Circle is mandatory	Contractor
3.4		Air Pollution	Water sprinkling to be carried out twice a day during dry season on exposed surface area.	Contractor
3.5			Vehicles transporting loose construction/excavated materials shall be covered with tarpaulin sheets.	Contractor

Sl No	Project Phase/Activity	Potential Impacts	Proposed Mitigation Measures	Responsibility
3.6			Loose construction material/ excavated material shall be stored against any structure or would be kept covered with tarpaulin sheet at the construction site.	Contractor
3.7			All vehicles utilized in transportation of raw materials and personnel, will have valid Pollution under Control Certificate (PUCC)	Contractor
3.8			Regular maintenance of machines, equipment and vehicles that will be used for construction activities of substation/tower construction	Contractor
3.9		Water/Soil Pollution	Septic tanks and soak pits/modular bio-toilets would be provided at all construction site and labour camp	Contractor
3.10			• A peripheral site drainage channel would be constructed at the beginning of the construction work. The peripheral site drainage channel would be provided with a sedimentation tank to prevent sediments to be carried away by the runoff. • Storm water drainage should not be discharged to into any agricultural field.	Contractor
3.11		Depletion of water resource	Consumption of water would be reduced to the extent possible through the application of water conservation measures and through reuse/recycling of water, wherever possible.	Contractor
3.12		Alteration /diversion of natural drainage channel	Existing micro drainage channel passing through the GSS site would be redirected along the boundary of the GSS site to prevent any waterlogging within premises.	Contractor
4	Community Health and Safety	Injury and sickness of local people	Coordination with local communities for construction schedules; Access restriction for local people at the construction site.	Contractor

Sl No	Project Phase/Activity	Potential Impacts	Proposed Mitigation Measures	Responsibility
			Undertaking regular health check-ups of the work-force and reporting any major illnesses at the earliest to Block health officer for disease control and surveillance. Creating mass and labour awareness on HIV and STDs;	
4.1		Local Woman Community	• Labour Camp should be located away from the village and it should be access control for the local people. • Awareness should be created among the migratory labour that they should not be entered in the village without prior information to the villagers. • Local resource like handpump, bathing ghat should not be used by the labours.	Contractor
5	Occupational health and safety	Injury and sickness of workers	• Provide safety equipment's (PPEs) for construction workers; • Prevent entry of unauthorised person at construction site; • Provide training on health and safety to all the workers.	Contractor
6	Blasting (in case of hard rock formation)	Noise and Vibration	Adopt appropriate engineering safeguards to meet the regulatory standard [DGMS Prescribed Permissible Limit of Ground Vibration (refer Annex 6)] for blasting operation.	Contractor
6.1		Damage to Structure	In case there are any damages to the structures due to blasting, the same will be assessed and would be repaired	Contractor
6.2		Occupational health and safety	• Implement mitigation measures to control fly rock; • Secure and limit access to blasting areas to qualified personnel involved in, and necessary for, blasting operations;	Contractor

Sl No	Project Phase/Activity	Potential Impacts	Proposed Mitigation Measures	Responsibility
			• Arrange for adequate safety measures (as per Explosives Rules, 2008) for transport and storage of explosives; • Provide protective equipment to all the personnel engaged in blasting activity.	
7	Health, Hygiene, Safety and Security of Workers in Labour Camp	Labour camp related EHS and Hygiene Issues	Facilities would be provided at the labour camp as per provisions of IFC Guidance Note on Worker's Accommodation 2009. Some of the relevant provisions to be complied are as follows: 1. Worker's accommodation; 2. Provision of safe drinking water; 3. Appropriate arrangement for cooking; 4. Management of waste water and solid waste from the camp site; 5. Availability of medical facility (first aid) 6. Security arrangement of the camp site. 7. Arrangement to register and redress grievance of workers. Refer **Annexure 7** for detail guideline.	Contractor
7.1		Conflict with local population due to disturbance on religious/cultural site	• Boundary wall or fencing should be constructed before commencement of construction work • Labour camp should be located away from the satvari • Any kind of waste should not be dumped on side of the temple and mela ground • Awareness camp for labour regarding the sensitivity of the siv Temple should be organised on regular interval	Contractor
Operation and Maintenance				
8	Drainage of storm water	Water/Soil Pollution	• All internal drainage channels from the substation site would be connected to a peripheral site drainage channel. • The peripheral site drainage channel would be provided with a sedimentation tank and oil-water separator to prevent sediments and oil & grease to be carried away by the runoff. • Storm water drainage should not be	Contractor

Sl No	Project Phase/Activity	Potential Impacts	Proposed Mitigation Measures	Responsibility
			discharged to into any agricultural field.	
9	Handling and disposal of waste	Water/Soil Pollution	The municipal solid waste would be composted in composting pits	JUSNL Subdivision Office
			• Authorization for hazardous waste generation (used transformer oil) should be obtained from the Jharkhand State Pollution Control Board (1); • Hazardous waste need to be disposed through CPCB/PCB authorised recyclers; • Annual return [Form 4 Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016] to be submitted to JSPCB.	JUSNL Subdivision Office
10	Storage and handling of SF6	Emission of most potent GHG causing climate change	Procedure would be put in place for storage, handling and refilling of SF6 gas cylinders. Every refill would be documented and any unusual variation in gas volume would be reported to JPSIP for review and rectification. Each and every leakage will be promptly detected, addressed and documented and reported to the JUSNL Management.	JUSNL Subdivision Office
11	Occupational health and safety of staff	Injury/ mortality to staff during O&M work	During the testing and charging of electrical lines and substation, electricity insulating protective equipment like footwear (ISO 20345: 2004 Part-2), rubber gloves (IS 4770: 1991) would be provided to workers. In addition, provisions of the "Central Electricity Authority (Measures Relating to Safety and Electric Supply) Regulations 2010" would be adhered to.	JUSNL Subdivision Office
11.1			Induction training to all the new employee and six monthly refresher training for substation O&M staff would be organised.	JUSNL Subdivision Office

(1) As per recommendation made by the Jharkhand Pollution Control Board

Sl No	Project Phase/Activity	Potential Impacts	Proposed Mitigation Measures	Responsibility
11.2		Injury/ mortality from emergency situation	Preparation of fire emergency action plan and training given to staff on implementing emergency action plan	JUSNL Subdivision Office
12	Community health and safety	Injury/ mortality to public	Integrity of compound wall would be maintained all time	JUSNL Subdivision Office

8.2 ENVIRONMENTAL MONITORING & REPORTING

The monitoring indicators, frequency for measurement and the responsibility for monitoring for each of the mitigations proposed in the management plan are described alongside the mitigation measures proposed in ***Table 8.2***. The monitoring of the EMP provisions would be carried out by the respective agencies at a frequency mentioned in the Environmental Management Plan.

For ensuring effective implementation and evaluation of the performance of the environmental mitigation measure a reporting mechanism has been drawn up and presented in ***Section 5.3*** of the Environmental and Social Management Framework. The reporting of the implementation of the ESMP for this project is presented ***Annexure 4.***

Table 8.2 Environment and Social Monitoring Plan

Sl No	Project Phase /Activity	Potential Impacts	Parameter to be monitored/indicator	Monitoring frequency	Responsibility
Planning/Preconstruction					
1	Substation location and design	Conflict with community	Design consideration to avoid interference with Siv Temple located just outside the northern boundary of proposed site	Once- during the detailed design	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
2	Design of residential quarter and office at substation	Water/soil pollution	Provisioning of septic tank with soak pit in substation design	Once- during the detailed design	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
Construction					
3	Site preparation and construction work	Loss of topsoil	Practice adopted to store and reuse topsoil which is removed from the construction site	Every week	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
3.1		Noise and vibrations	Maintenance log book of vehicle/machinery , Number of equipment /vehicle undergoing regular maintenance	Every week	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
3.2			Presence of acoustic enclosure in DG set	Every week	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
3.3			How many night time approval was taken	Every week	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
3.4		Air Pollution	Water sprinkling at dust generating area	Every week	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
3.5			Tarpaulin cover on vehicle carrying loose construction/excavated materials	Every week	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
3.6			Tarpaulin cover on loose construction/ excavated materials	Every week	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
3.7			Number of vehicle not having valid PUCC certificate	Every Month	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
3.8			Maintenance log book of vehicle/machinery, Number of equipment /vehicle undergoing regular maintenance.	Every Month	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
3.9		Water/Soil Pollution	Availability of Septic tanks and	Every Month	JUSNL Subdivision/Division/Circle

Sl No	Project Phase /Activity	Potential Impacts	Parameter to be monitored/indicator	Monitoring frequency	Responsibility
			soak pits/modular bio-toilets		Office/ JPSIP PIU
3.10			Availability of peripheral site drainage channel, sedimentation tank	Every Month	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
3.11		Depletion of water resource	Water conservation measures adopted at construction and labour camp	Every Month	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
3.12		Alteration /diversion of natural drainage channel	Diversion of natural drainage channel passing through the GSS Site	Every Month	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
4	Community Health and Safety	Injury and sickness of local people	Number of accidents of local people (if any) at construction site, number of grievance recorded Review of document related to regular health check-up of the work force Review of document related to awareness camp organised periodically	Every Month	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
4.1		Local Woman Community	Physical observation of the labour camp before commencement of construction and during construction period.	Every Month	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
5	Occupational health and safety	Injury and sickness of workers	Awareness of workers, use of PPE by workers	Every 15 days	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
6	Blasting (in case of hard rock formation)	Noise and Vibration	Measures adopted to control noise and vibration at blasting site	Every 15 days	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
6.1		Damage to Structure	Record of any damaged and repaired structure	Every one month	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
6.2		Occupational health and safety	Measures adopted to control fly rock, safety measures adopted for transport and storage of explosives, use of protective equipment, measures adopted for access restriction at blasting site	Weekly during blasting work	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU

Sl No	Project Phase /Activity	Potential Impacts	Parameter to be monitored/indicator	Monitoring frequency	Responsibility
7	Health, Hygiene, Safety and Security of Workers in Labour Camp	Labour camp related EHS and Hygiene Issues	Condition of labour camp, awareness of workers, complainant register	Every 15 days	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
7.1		Conflict with local population due to disturbance on religious/cultural site	Any registered community grievance regarding the disturbance of siv temple	Every Month	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
Operation and Maintenance					
8	Drainage of storm water	Water/Soil Pollution	Availability of internal and peripheral site drainage channel, sedimentation tank and oil-water separator at outfall of peripheral site drainage channel	Every Month	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
9	Handling and disposal of waste	Water/Soil Pollution	Municipal disposal arrangement for GSS, Availability of composting pit		JUSNL Division/Circle/ JPSIP PIU
			Availability of authorization letter, Annual return (Form 4)	Annually	JUSNL Division/Circle/ JPSIP PIU
10	Storage and handling of SF6	Emission of most potent GHG causing climate change	Leakage and gas density/level	Monthly	JUSNL Division/Circle/ JPSIP PIU
11	Occupational health and safety of staff	Injury/ mortality to staff during O&M work	Accident-Incident register	Monthly	JUSNL Division/Circle/ Head Office
11.1			Document pertaining to training/awareness programs and mock drills/awareness level of staff engaged in O&M work of substation	Monthly	JUSNL Division/Circle/ JPSIP PIU
11.2		Injury/ mortality from emergency situation	Accident-Incident list	Monthly	JUSNL Division/Circle Office/ JUSNL PIU
12	Community health and safety	Injury/ mortality to public	Accident-Incident list	Monthly	JUSNL Division/Circle/ Head Office

8.3 INSTITUTIONAL SETTING AND IMPLEMENTATION ARRANGEMENTS

For the implementation of the Jharkhand Power System Improvement Project JUSNL has developed a Project Implementation Unit (JPSIP PIU). The JPSIP PIU is located at the JUSNL headquarters in Ranchi and is headed by the Chief Engineer (Transmission O&M) i.e. the Project Director (PD). Presently it includes four other members. The JPSIP PIU would also be responsible for driving the implementation of the E&S safeguards in JPSIP.

At the field level the Divisional/ Circle offices of JUSNL, who would be responsible for implementing the technical aspects of the JPSIP; he would also be responsible for the implementation of the E&S safeguards. The Junior Engineer of the respective division of JUSNL responsible for overseeing the project would also be responsible for overseeing that the provisions of the ESMP is being implemented by the Contractor. The Chief Engineer cum GM of the Dumka Zone however has the ultimate responsibility of ensuring that the project is implemented successfully and also ensuring the project's desired environmental and social outcomes are attained. In addition the Environmental Officer and the Social Officer at the Project Implementation Unit of JPSIP would also undertake periodic site visits to oversee the operations and suggest corrective actions in case it is warranted.

In addition, the Contractor implementing the subprojects would also have an Environment and Social personnel to actually carry out the E&S safeguards on the ground.

8.4 COMMUNICATION PLAN

Through the process of consultation and disclosures, JPSIP would ensure that the project information are communicated to the stakeholder and the feedback from the community is integrated into the execution of the project.

A Consultation Framework has been prepared to ensure involvement of stakeholders' at each stage of project planning and implementation. To ensure community participation at different stages of the project the Consultation framework for JPSIP has been proposed in *Table 8.2*.

Table 8.3 Summary of Consultation Framework

Project Phase	Activity	Details	Responsible Agency	Target Stakeholders
	Securing of Land for substation Site	Identification of sensitivities around the site and common property which might get affected	Contractor along with the JUSNL Circle/Divisional	Community People especially the Land Owners adjacent to the site, Revenue officer , Village Panchayat
Construction	Commencement of Construction	Communicate about the activity and period of	Contractor along with the JUSNL Circle/Divisional	Community People especially the land owners

Project Phase	Activity	Details	Responsible Agency	Target Stakeholders
		activity.		adjacent to the site, Village Panchayat
Operation	Commencement of operation	Communicate about the date of start of operation and charging of transmission line	JUSNL Circle/Divisional	Community People especially the located adjacent to the site and transmission line, Village Panchayat

8.5 GRIEVANCE MECHANISM

A three tier Grievance Mechanism would be used for handling any grievances of community related to the project. The Three Tier grievances redressal process is presented in *Box 8.1*

Box 8.1 Three tier Grievance Redress Mechanism of JPSIP

Tier1: Circle Level: The aggrieved stakeholder can file a complaint with the respective Junior Engineer in charge of the site or at the Divisional/Sub-Divisional Offices of JUSNL. The complaints would be attended to by the Electrical Superintending Engineer of the Dumka Division and all the Executive Engineers and Assistant Engineers in the Dumka circle within 21 days of the filing of Compliant. In case the aggrieved is not satisfied with the solution provided Tier 1 he may escalate it to Tier 2: Zone Level.

Tier 2: Zone Level: The Chief Engineer cum GM of Dumka Zone and all the Superintending Engineers of the Dumka Zone would be the members of Tier 2 level. They would hear the aggrieved and also review the proceedings of the Dumka Division and provide relief to the aggrieved. The entire process would be completed within 45 days of the compliant being referred to Tier II. Unsatisfied with the solution the Complainant can approach the Tier III: GRC Level.

Tier 3: Grievance Redresses Cell (GRC): The GRC for JPSIP would be housed at the JPSIP-PIU. The cell would be headed by the Managing Director, JUSNL or his representative not below the rank of Director (Projects). It would have the Director Projects, JUSNL Chief Engineer (Transmission (O&M), Superintendent Engineer, JPSIP-PIU, Executive Engineer (JPSIP-PIU) as members. The Chief Engineer of Dumka Zone would be an invited member. Hearing the compliant the GRC would provide its decision. The process at the GRC would be completed with 60 days of the complaint being registered in Tier 3.

Court of Law: If the grievance/ complaint is not resolved at GRC Level or the complainant is not satisfied with the solution provided by GRC, the person may approach the Court of Law.

Mechanism for Registering and Communicating grievances:

The Junior Engineer responsible for overseeing the activities of the project would be the first point of contact for registering the grievance. He shall be responsible for registering all grievances in the Grievance Form. The Grievance Form (***Annexure 5***) would be placed at the Office of the Junior Engineer of the respective sub-division and would also be available with the Supervisor of the Contractor. The contact number of the Junior Engineer shall also be displayed prominently at the site of the construction activity. The

aggrieved person can either fill the Grievance Redress form and submit it at the nearest sub-division office of JUSNL or call up the Junior Engineer and register the grievance. The Junior Engineer in the latter case complete the grievances Redress Form and pass it to the Tier 1 for redressal. The outcome of the grievances redressal process shall be sent to the person registering the grievance by Registered Post

9 CONCLUSION AND RECOMMENDATION

It is understood from the ESIA study that the Project activities related to the development of the substation may create some impacts on air quality, community health and safety during the construction phase. However all these impacts are temporary and can be mitigated with proper mitigation measures. However the development of the 132/33 KV substation would improve the availability of quality power in the region.

The Environmental and Social Management Plan (ESMP) describes mitigation measures for impacts specific to the Project activities and also discusses implementation mechanisms. The implementation of the mitigation measures suggested can help in managing the negative impacts on air quality, ground water etc. whereas the economic opportunities in terms of local employment are assessed as positive.

To conclude, implementation of ESMP will help the Project to comply with national/state regulatory framework as well as to meet World Bank's requirement of the environmental and social performance.

Annexure 1

List of Sub Projects in JPSIP

PHASE-I

Scheme – D			
1	132/33 Kv GSS Irba (2x50 MVA)	100	Zone-I Transferred
2	132 kV D/C Irba-Ramgarh Trans. line		50
3	132 kV D/C Irba-Kanke Trans. line		13
4	132 kV D/C Irba-Ratu Trans. line		25
Scheme – E			
1	132/33 kV GSS at Shikaripara (2x50 MVA)	100	Zone-II Transferred
2	132 kV D/C 3 Ph. Dumka - Shikaripara Trans. line		40
Scheme – H			
1	132/33 kV GSS at Silli (2x50 MVA)	100	Zone-I Transferred
2	132 kV D/C 3 Ph. Silli - Chouka Trans line		46
3	132 kV D/C 3 Ph. Silli - Sikidiri Trans line		32
Scheme – O			
1	132/33 kV GSS at Mahuadanr (2x50 MVA)	100	Zone-IV Transferred
2	132 kV D/C 3 Ph. Latehar– Mahuadanr Trans line		45
Scheme – P			
1	132/33 kV GSS at Angada (2x50 MVA)	100	Zone-I Transferred
2	132 kV D/C 3 Ph. Silli–Angada Transmission line		43
3	132 kV D/C 3 Ph. Angada–Sikidiri Trans. line		50
Scheme – S			
1	132/33 kV GSS at Jarmundi (2x50 MVA)	100	Zone-II Transferred
2	LILO of 132 kV D/C 3 Ph. Dumka–Deoghar Transmission line at GSS Jarmundi		6
Scheme – X			
1	132/33 kV GSS at Chakuliya (2x50 MVA)	100	Zone-III
			Transferred
2	132 kV D/C 3 Ph. Chandil–Chakuliya Trans. line		65
3	132 kV D/C 3 Ph. Bahragora–Chakuliya Trans. line		60
4	132 kV D/C 3 Ph. Dhalbhumgarh–Chakuliya Trans. Line		25
Scheme – Q			
1	132/33 kV GSS at Hansdiha (2x50 MVA)	100	Zone-II
			Transferred
2	LILO of 132 kV Lalmatia-Dumka Trans Line at GSS Hansdiha		35
3	132 kV D/C Hansdiha-Jasidih Trans Line		52
Scheme – T			
1	132/33 kV GSS at Amarapara (2x50 MVA)	100	Zone-II
			Transferred
2	132 kV D/C 3 Ph. Amarapara–Godda Transmission line		80

3	132 kV D/C 3 Ph. Amarapara - Pakur Trans. line		45
4	132 kV D/C 3 Ph. Amarapara–Dumka Transmission line		50

PHASE-II (7)

Scheme-A			
1	132/33 kV GSS at Chainpur (2x50 MVA)	100	Zone-I Identified
2	132 kV D/C 3 Ph. Chainpur-Mahuandanr Tran. line		42
3	132 kV D/C Chainpur-Gumla Trans. Line		50
Scheme - G			
1	132/33 KV GSS Sundarnagar (2x50 MVA)	100	Zone-III Transferred
2	132 kV D/C 3 Ph. Sundarnagar - Jadugoda		30
Scheme - K			
1	132/33 kV GSS at Ramkanda (2 x 50 MVA)	100	Zone- IV Not Identified
2	132 kV D/C 3 Ph. Ramkanda - Garhwa Trans line		60
Scheme - N			
1	132/33 kV GSS at Chhatarpur (2x50 MVA)	100	Zone-IV Identified
2	132 kV D/C 3 Ph. Chhatarpur–Daltonganj Transmission line		50
3	132 kV D/C 3 Ph. Chhatarpur-Japla Trans.line		40
Scheme - W			
1	132/33 kV GSS at Kolebira (2x50 MVA)	100	Zone-I Identified
2	132 kV D/C 3 Ph. Kolebira–Kamdara Transmission line		40
3	132 kV D/C 3 Ph. Kolebira–Simdega Trans. line		70
Scheme – AA			
1	132/33 kV GSS at Chouka(2x50 MVA)	100	Zone-III Identified
2	132 kV D/C 3 Ph. Chouka - Tamar Trans. line		40
Scheme – R			
1	132 kV D/C Chaibasa-Chakradharpur Trans. Line		22
2	132 kv D/C Nowamundi- Chaibasa Trans. Line		80
3	LILO of one ckt of 132 kV D/C 3 ph Nowamundi-Chaibasa Trans Line at 132/33 kV GSS Kendposi including 2 nos 132 kV bays		14
4	LILO of one ckt of 132 kV D/C 3 ph Chaibasa-Manoharpur Trans Line at 132/33 kV GSS Goelkera including 2 nos 132 kV bays		14
5	132 KV D/C Jadugoda old - Jadugoda New T/L		15

PHASE-III (10)

Scheme – F			
1	132/33 kV GSS at Meral (2 x 50 MVA)	100	Zone-IV Not Identified
2	132 kV D/C Meral - Garhwa Trans. line		20

Scheme – I			
1	132/33 kV GSS at Panki (2x50 MVA)	100	Zone-IV Not Identified
2	132 kV D/C Panki - Chhatarpur trans. line		50
Scheme – J			
1	132/33 kV GSS at Nagar Untari (2 x 50 MVA)	100	Zone-IV Identified
2	132 kV D/C 3 Ph. Nagar Untari-Garhwa Trans. line		40
Scheme – V			
1	132/33 kV GSS at Kandra (2x50 MVA)	100	Zone-III Not Identified
2	LILO of 132 kV Chaibasa-Rajkharsawan at Kandra		10
Scheme – Y			
1	132/33 kV GSS at Kurdeg (2x50 MVA)	100	Zone-I Identified
2	132 kV D/C 3 Ph. Kurdeg–220/132 kV Simdega GSS Transmission line		45
Scheme – Z			
1	132 kV GSS at Chandwa (2x50 MVA)	100	Zone-IV Identified
2	132 kV D/C Chandwa – Latehar Trans. Line		30
Additional Scheme-1			
1	132/33kV GSS at Sarath (2 x 50 MVA)	100	Zone-II Identified
2	132k DC Sarath-Palojori TL		24
3	132k DC Sarath-Madhupur TL		30
4	132k DC Sarath-Chitra TL		20
Additional Scheme-2			
1	132/33kV GSS at Surda (2 x 50 MVA)	100	Zone-III
2	132k DC Surda-Jadugoda TL		19
3	132k DC Surda-Musabani (DVC) TL		5
Additional Scheme-3			
1	132/33kV GSS at Naudiha (Palamu) (2 50 MVA)	100	Zone-IV
2	132k DC Naudiha-Panki TL		74
3	132k DC Naudiha-Chhatarpur TL		19
Additional Scheme-4			
1	132/33kV GSS at Narayanpur (Devipur) (2 x 50 MVA)	100	Zone-II
2	LILO of 132kV DC Jamtara-Madhupur TL at Narayanpur (Devipur)		12

Annexure 2

General Conditions of Contract

1.1 GENERAL EHS CONDITIONS

GCC 1.1 i. The contractor shall take all necessary measures and precautions, otherwise ensure that the execution of the works and all associated operations on-site or of-site are carried out in conformity with statutory and regulatory environmental health safety requirements including those prescribed elsewhere in the Environmental and Social Management Framework.

ii. The Contractor shall ensure that the construction site will be secured by means of fencing to prevent unauthorized entry into the site. The Contractor shall also ensure that the access to the construction site is restricted to public at all times.

iii. The Contractor shall take all the measures and precautions to avoid any nuisance or disturbance arising from execution of the work. This shall, wherever possible, be achieved by suppression of the nuisance at source rather than abatement of the nuisance once generated. The provisions of the Environmental, Social Health Safety Management Plan would be implemented for the suppression of nuisance, but it shall not be limited to these provisions of the ESMP. The provisions of this sub-clause shall however, be disregarded in respect of emergency work required for saving life or the safety of the works.

iv. In event of any spoil or debris or silt from the sites being deposited on adjacent land, the Contractor shall immediately remove such spoils, debris or silt and restore the affected area to its original state to the satisfaction of the JUSNL. No debris should be dumped on the community land like Gochars, thans etc. In case the extra excavated earth is placed for levelling the playground the same should be done with the written consent of the community. Such materials should be spread in such a manner as to limit subsequent erosion and shall be re-vegetated as existing ground cover dictates. JUSNL should be absolved of any liabilities arising such works which are undertaken

v. Surplus excavated material from the tower footing shall be carried out to the substation for the purpose of filing in case the tower is located within 15 kms of the substation area. The cost of hauling the material shall be considered within the cost for the earthwork for the substation. Additional borrow pits shall only be allowed by the Junior Engineer, only after the excavated material has been exhausted.

vi. The Contractor should contain requisite quantity and type of spill kits to control the spills of fuel and other oils e.g. transformer oil to prevent the pollutant from spreading either outside the area of the spill or into the ground.

GCC 1.2 a) All fuel and chemical storage shall be sited on an impervious base within an embanked area and secured by fencing. The storage area shall be located away from any watercourse or wetland. The base and walls of the embankment shall be impermeable and of sufficient capacity to contain 110% of the volume of tanks/ containers taken together.

In case of filling/ refueling of fuel or oil, filling and refueling shall be strictly controlled and subjected to formal procedures. The contents of any tank or drum shall be clearly marked. Measures shall be taken to ensure that no contamination happens or discharges enter any drain or

watercourses. All discharge from the Oil storage areas shall be passed through a Oil Water Separator (OWS) before it being discharged outside.

b) All internal drainage channels from the site would be connected to a peripheral site drainage channel. The peripheral site drainage channel would be provided with a sedimentation tank and oil-water separator to prevent sediments and oil & grease to be carried away by the runoff.

GCC 1.3 (i) All water and liquid waste products arising on the sites shall be collected and disposed off at location onsite or offsite and in a manner that shall not cause nuisance or pollution.

(ii) The Contractor shall not discharge or deposit any matter arising from the execution of the works into any place except at the designated places without the permission of the Environmental and Social Officer and the regulatory authorities concerned.

GCC 1.4 (i) The Contractor shall carry out dust suppression by sprinkling of water or methods of working to minimise dust, gaseous or other air born emissions and carry out the works in such a manner as to minimise adverse impacts on air quality. Sprinkling of water shall be carried out twice a day on exposed surface area during dry season.

(ii) Stockpiles of materials should be sited in sheltered areas or within hoarding, away from sensitive areas. Stockpiles of friable materials shall be covered with clean tarpaulins with application of sprayed water during dry and windy weather. Stockpiles of debris shall be dampened prior to their movement, except where this is contrary to the specifications.

(iii) Any vehicle with an open load carrying area used for transport of potentially dust producing materials shall have properly fitting side and tailboards. Materials having potential to produce dust shall not be loaded to a level higher than the side and tail boards and shall be covered with clean tarpaulin in good condition. The tarpaulin should be properly secured and extended to at least 300 mm over the edges of the sideboard and tailboard.

(iv) During high wind, no dust generating operations shall be permitted within 200m of residential areas having regard to the prevailing direction of the wind.

(v) Construction vehicles and machinery shall be kept in good working order and engines turned off when not in use. Appropriate measures shall be taken to limit exhaust emissions from construction vehicles, machinery and plant and the contractor shall include details of such proposed measures in the mitigation and monitoring plan to be submitted to the Employer or his representative.

(vi) All vehicle employed in the project shall have valid Pollution under Control (PUC) Certificate. The Contractor should maintain PUC Certificate log book on a regular basis and shall provide it to the Employer or his representation for inspection when asked for.

GCC 1.5 (i) The Contractor shall consider noise as an environmental concern in his planning and during execution of the works.

(ii) The Contractor shall use plant and equipment conforming to National and International standards and directives on noise, vibrations and emissions.

(iii) The Contractor shall take all necessary measures to ensure that operation of all mechanical equipment and construction processes on and off the site shall not cause any unnecessary or excessive noise, taking into account all applicable environmental requirements. The Contractor shall use all necessary measures and shall maintain all plant and silencing equipment in good condition so as to minimise the noise emissions during construction works.

(iv) The operations of the Contractor which is likely to generate noise shall be restricted during the night time (22.00 hrs to 6.00 hrs) especially if it is near residential areas.

GCC 1.6 (i) The Contractor shall take all necessary measures to protect any archaeological finds or antiquities as required.

(ii) Where antiquities are shown on the drawing or otherwise identified during the course of the works, these shall be protected by means of suitable fencing and barriers to the satisfaction of the EHS Engineer of JUSNL. The Contractor shall abide by the provisions of the Indian Treasure Trove Act, 1878, Jharkhand Ancient Monuments and Archaeological Sites, Remains and Art Treasures Act, 2016.

GCC 1.7 On completion of the works, the Contractor shall reinstate all areas with natural vegetation to the satisfaction of the Environmental Officer of JPSIP PIU. Where directed by the Environment Officer the Contractor shall improve and reinstate the land on which informal roadside service area have been established by removing all debris and contaminated soils, re-grading to natural ground levels and re-establishing the natural vegetation where appropriate. All debris and contaminated materials shall be disposed off site as approved by the Environment Officer at the PIU.

GCC 1.8 The Contractor shall ensure that the labour accommodation within the site /fly camp/ laydown area is provided with toilets/modular bio-toilets, septic tank and soak pits. The municipal solid waste generated shall be composted in pits located within the site.

GCC 1.9 The Contractor shall adopt all possible means to ensure that groundwater usage is minimised during the construction activities. The bore well/s used for extraction of water for construction purpose shall be provided with water metres to monitor the ground water abstraction. The Contractor should maintain a daily water abstraction log book of water extracted from the bore well. Daily water abstraction log book should be produced to the employer or his representative on demand.

1.2 COMPLIANCE WITH LABOUR REGULATIONS

GCC 2.1 During continuance of the contract, the Contractor and his sub-contractors shall abide at all times by all applicable existing labour enactments and rules made thereunder, regulations notifications and byelaws of the State or Central Government or local authority and any other labour law (including rules), regulations byelaws that may be passed or notification that may be issued under any labour law in future either by the State or the Central Government or the local authority. The employees of the Contractor and the Sub-contractor in no case shall be treated as the employees of the Employer at any point of time.

GCC 2.2 The Contractor shall keep JUSNL indemnified in case any action is taken against the Employer by the competent authority on account of contravention of any of the provisions of any Act or rules made thereunder, regulations or notifications including amendments.

GCC 2.3 If the Employer is caused to pay under any law as principal employer such amounts as may be necessary to cause or observe, or for non-observance of the provisions stipulated in the notifications / byelaws/Acts / Rules/regulations including amendments, if any, on the part of the Contractor, the Employer shall have the right to deduct any money due to the Contractor under this contract or any other contract with the employer including his amount of performance security for adjusting the aforesaid payment. The Employer shall also have right to recover from the Contractor any sum required or estimated to be required for making good the loss or damage suffered by the Employer.

GCC 2.4 The contractor shall abide by the provision of the following acts:

a) Workmen Compensation Act 1923
b) Payment of Gratuity Act 1972
c) Employee P.F. and Miscellaneous Prevision Act 1952
d) Maternity Benefit Act 1951:
e) Contract Labour (Regulation & Abolition) Act 1070
f) Minimum Wages Act 1948
g) Payment of Wages Act 1936
h) Equal Remuneration Art 1970
i) Payment of Bonus Act 1965
j) Industrial Dispute Act 1947
k) Industrial Employment (Standing Orders) Act 1946
l) Trade Unions Act 1926
m) Child Labour (Prohibition & Regulation) Act 1986
n) Inter-State Migrant workmen's (Regulation of Employment & Conditions of Service Act 1979
o) The Building and Other Construction workers (Regulation of Employment and Conditions of Service) Act 1996 and the Cess Act of 1996
p) Factories Act 1948

GCC 2.5. During continuance of the contract, the Contractor and his sub-contractors shall abide at all times by all applicable existing World Bank Group labour requirements (refer **Annex11** Management of Labour Influx of the Environmental and Social Management Framework)

1.3 COMPLIANCE TO ENVIRONMENTAL & SOCIAL REGULATIONS

GCC 3.1 If the employer is caused to pay under any law as proponent such amounts as may be necessary to cause or observe, or for non-compliance of the provisions or negligence of the Contractor for any provision stipulated in the notifications / byelaws/Acts / Rules/regulations including amendments and Orders of the Hon'ble National Green Tribunal/ Hon'rble Court of Law, if any, on the part of the Contractor, the Employer shall have the right to deduct any money due to the Contractor under this contract or any other contract with the employer including his amount of performance security for adjusting the aforesaid payment.

The Contractor shall ensure to adhered provisions of the following acts;

a) The Water (Prevention and Control of Pollution) Act, 1974
b) The Air (Prevention and Control of Pollution) Act, 1981
c) The Environment (Protection) Act 1986
d) The Public Liability Insurance Act, 1991
e) Wild Life Protection Act, 1972, as amended
f) Forest Conservation Act, 1980 & Forest Conservation Rules, 2003 (as amended) & corresponding orders and judgements
g) Jharkhand Biological Diversity Rules 2007
h) Ancient Monuments & Archaeological Sites and Remains Act, 1958
i) Indian Treasure Trove Act, 1878
j) Jharkhand Ancient Monuments and Archaeological Sites, Remains and Art Treasures Act, 2016
k) Jharkhand Timber and Other Forest Produce (Transit and Regulation) Rules, 2004
l) Ozone Depleting Substances (Regulation and Control) Rules, 2000
m) Chota- Nagpur Tenancy Act, 1908
n) Santal Pargana Tenancy Act, 1949
o) Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016
p) E-Waste (Management) Rules, 2016
q) Battery (Management & Handling) Rules 2001
r) Ozone Depleting Substances (Regulation and Control) Rules, 2000
s) Central Ground Water Authority (CGWA) Public Notice dated 4th January 2017
t) Regulation of Polychlorinated Biphenyls Order, 2016

GCC 3.2 (i) If the Employer is caused to pay under any law as principal employer such amounts as may be necessary to cause or observe, or for non-observance of the provisions stipulated in the notifications / byelaws/Acts / Rules/regulations including amendments, if any, on the part of the Contractor, the Employer shall have the right to deduct any money due to the Contractor under this contract or any other contract with the employer including his amount of performance security for adjusting the aforesaid payment. The Employer shall also have right to recover from the Contractor any sum required or estimated to be required for making good the loss or damage suffered by the Employer.

(ii)The Contractor shall (a) abide by the Environmental Management Plan (b) carry out all the monitoring and mitigation measures set forth in the environmental management plan and (c) allocate the budget required to ensure that such measures are carried out. The Contractor shall submit to the Employer Monthly Reports on the carrying out of such measures.

(iii) The Contractor shall adequately record the conditions of roads, agricultural land and other infrastructure prior to transport of material and construction commencement before start of the construction activity. In case of deterioration during the construction activity the Contractor shall fully reinstate pathways, other local infrastructure and agricultural land to at-least their pre-project condition upon construction completion. In case of any grievance of the community regarding damage to any common property e.g. roads/ walkways/ pathways, bridges, wells or any place of worship due to any construction activity; it shall be the responsibility of the Contractor to reinstate the same to its original condition (before the start of construction) unless other he can prove that the same was not constructed due to his activities.

(iv) The Contractor shall undertake detailed survey of the affected persons during transmission line alignment finalization under the Project, where applicable. The Contractor shall provide the information to the employer for records and use wherever required. Any compensation due to the damage of property shall be commensurate to the provisions in the entitlement matrix.

(v) The Contractor shall include a Social Officer in his team. The Social Officer shall explain to the land owners the process of the procurement of land through a negotiated settlement process.
(vi) The Contractor shall conduct health and safety programme for workers employed under the Contract and shall include information on the risk of sexually transmitted diseases, including HIV/AIDS in such programs.

GCC 3.3 The procurement or deployment of any machinery by the Contractor for the project should be in accordance to the environmental rules and regulations in place at the time of implementation. All DG sets should conform to the CPCB standards for noise and emission mentioned under the under the Environment (Protection) Act, 1986.

GCC 3.4 The Contractor shall procure transformer oil in conformance to the Regulation of Polychlorinated Biphenyls Order, 2016.

GCC 3.5 The Contractor shall procure CFC free equipment in conformance to the Government of India Guidelines

1.4 SAFETY PRECAUTIONS

GCC4.1 The Contractor shall observe all applicable regulations regarding safety on the Site.

Unless otherwise agreed, the Contractor shall, from the commencement of work on Site until handing over, provide:

a) fencing, lighting, guarding, putting up reflective strips and watching of the Works wherever required, and

b) temporary roadways, footways, guards and fences which may be necessary for the accommodation and protection of Employer / his representatives and occupiers of adjacent property, the public and others.

GCC 4.2 The Contractor shall ensure proper safety of all the workmen, materials, plant and equipment belonging to him or to the employer or to others, working at the Site. The Contractor shall also be responsible for provision of all safety notices and safety equipment required both by the relevant legislations or as may be directed by the Engineer of JUSNL or as he may deem necessary.

GCC 4.3 The Contractor will notify well in advance to the JUSNL Division / JPSIP PIU of his intention to bring to the site any container filled with liquid or gaseous fuel or explosive or petroleum substance or such chemicals which may involve hazards. The JUSNL Division /JPSIP PIU shall have the right to prescribe the conditions, under which such container is to be stored, handled and used during the performance of the works and the Contractor shall strictly adhere to and comply with such instructions. The JUSNL Division / JPSIP PIU shall have the right at his sole discretion to inspect any such container or such construction plant/equipment for which material in the container is required to be used and if in his opinion, its use is not safe, he may forbid its use. No claim due to such prohibition shall be entertained by JUSNL. JUSNL shall not entertain any claim of the Contractor towards additional safety provisions/conditions to be provided for/constructed as per the JUSNL Division /JUSNL PIU Instructions. Further, any such decision of the JUSNL Division /JUSNL PIU shall not, in any way, absolve the Contractor of his responsibilities and in case use of such a container or entry thereof into the Site area is forbidden by the JUSNL Division /JUSNL PIU, the Contractor shall use alternative methods with the approval of the JUSNL Division /JUSNL PIU without any cost implication to the Employer or extension of work schedule.

GCC 4.4 All equipment used in construction and erection by Contractor shall meet Indian/International Standards and where such standards do not exist, the Contractor shall ensure these to be absolutely safe. All equipment shall be strictly operated and maintained by the Contractor in accordance with manufacturer's Operation Manual.

GCC 4.5 Periodical examinations and all tests for all lifting/hoisting equipment & tackles shall be carried-out. In accordance with the relevant provisions of Factories Act 1948, Indian Electricity Act 1910 and associated Laws/Rules in force from time to time. A register of such examinations and tests shall be properly maintained by the Contractor and will be promptly produced as and when desired by the JUSNL Division /JUSNL PIU or by the person authorised by him.

GCC 4.6 The Contractor shall provide suitable personal safety equipment of prescribed standard to all employees and workmen according to the Job Safety Analysis carried out by the Contractor, or as may be directed by the Employer. The Employer or his representative will also have right to examine these safety equipment to determine their suitability, reliability, acceptability and adaptability. The Contractor shall arrange biannual safety training for all workers.

GCC 4.7 The Contractor shall provide safe working conditions to all workmen and employees at the Site including safe means of access, railings, stairs, ladders, scaffoldings etc. The scaffoldings shall be erected under the control and supervision of an experienced and competent person. For erection, good and standard quality of material only shall be used by the Contractor.

GCC 4.8 The Contractor shall not interfere or disturb electric fuses, wiring and other electrical equipment belonging to the Owner or other Contractors under any circumstances, whatsoever, unless expressly permitted in writing by the Employer to handle such fuses, wiring or electrical equipment.

GCC 4.9 Before the Contractor connects any electrical appliances to any plug or socket belonging to the other Contractor or the Employer , he shall:

a) Satisfy the JUSNL Division /JUSNL PIU that the appliance is in good working condition;
b) Inform the JUSNL Division /JUSNL PIU of the maximum current rating, voltage and phases of the appliances;
c) Obtain permission of the JUSNL Division /JUSNL PIU detailing the sockets to which the appliances may be connected.

GCC 4.10 The JUSNL Division /JUSNL PIU will not grant permission to connect until he is satisfied that:

a) The appliance is in good condition and is fitted with suitable plug;
b) The appliance is fitted with a suitable cable having two earth conductors, one of which shall be an earthed metal sheath surrounding the cores.

GCC 4.11 No electric cable in use by the Contractor/Owner will be disturbed without prior permission. No weight of any description will be imposed on any cable and no ladder or similar equipment will rest against or attached to it.

GCC 4.12 No repair work shall be carried out on any live equipment. The equipment must be declared safe by the JUSNL Division /JUSNL PIU and a permit to work shall be issued by the JUSNL Division /JUSNL PIU before any repair work is carried out by the contractor. While working on electric lines/equipment, whether live or dead, suitable type and sufficient quantity of tools will have to he provided by the Contractor to electricians/workmen/officers.

GCC 4.13 The Contractors shall employ necessary number of qualified, full time electricians/electrical supervisors to maintain his temporary electrical installation.

GCC 4.14 The Contractor employing more than 100 workmen whether temporary, casual, probationer, regular or permanent or on contract, either directly or through the Contractor shall employ at least one full time officer exclusively as EHS Officer (who shall have a Bachelors degree in Environmental Management/ Environmental Engineering /Environmental Science with additional qualification in safety) to supervise safety aspects of the equipment and workmen, who will coordinate with the Environmental Officer and Social Officer . In case of work being carried out through Sub-Contractors, the Sub-Contractor's workmen/employees will also be considered as the Contractor's employees/workmen for the above purpose.

Contractor shall employ a social team as it may deem fit. The Social Team would be led by the Social Officer (who shall have degree Sociology/Anthropology/Economics or any other Social Science with experience in handling resettlement of multilateral funded projects) and would assist the Contractor to carry out negotiation with the land owners.

The name and address of such EHS Officer and Social Officer of the Contractor will be promptly informed in writing to JUSNL with a copy to JUSNL Division /JUSNL PIU before he starts work or immediately after any change of the incumbent is made during currency of the Contract.

GCC 4.15 In case any accident occurs during the construction/ erection or other associated activities undertaken by the Contractor thereby causing any minor or major or fatal injury to his employees due to any reason, whatsoever. It shall be the responsibility of the Contractor to promptly inform the same to the JUSNL Division /JUSNL PIU in prescribed form and also to all the authorities envisaged under the applicable laws.

GCC 4.16 The JUSNL Division /JUSNL PIU shall have the right at his sole discretion to stop the work, if in his opinion the work is being carried out in such a way that it may cause accidents and endanger the safety of the persons and/or property, and/or equipment. In such cases, the Contractor shall be informed in writing about the nature of hazards and possible injury/accident and he shall comply to remove shortcomings promptly. The Contractor after stopping the specific work can, if felt necessary, appeal against the order of stoppage of work to the JUSNL Division /JUSNL PIU within 3 days of such stoppage of work and decision of the JUSNL Division /JUSNL PIU in this respect shall be conclusive and binding on the Contractor.

15 EHS RULES

GCC 5.1 Each employee of the Contractor shall be provided with initial indoctrination regarding Environment Health and Safety by the Contractor, so as to enable him to conduct his work in a safe and sustainable manner.

GCC. 5.2 No employee shall be given a new assignment of work unfamiliar to him without proper introduction as to the hazards incident thereto, both to himself and his fellow employees.

GCC 5.3 Under no circumstances shall an employee hurry or take unnecessary chance when working under hazardous conditions.

GCC 5.4 Employees must not leave naked fires unattended. Smoking shall not be permitted around fire prone areas and adequate firefighting equipment shall be provided at crucial location.

Employee should also not leave any equipment/machinery /activity unattended if it has the potential to cause harm to the environment

GCC 5.5 Employees under the influence of any intoxicating beverage, even to the slightest degree shall not be permitted to remain at work.

GCC 5.6 The contractor shall make suitable arrangement at every work site for rendering prompt and sufficient first aid to the injured.

GCC 5.7 The staircases and passageways shall be adequately lighted.

GCC 5.8 The employees when working around moving machinery must not be permitted to wear loose garments. Safety shoes, safety helmets (IS 2925: 1984) are recommended when working in the construction site or any activity related to the project where materials or tolls are likely to fall. When working at height the Contractor shall ensure that all employees use full body harness (as per IS 3521: 1999). Only experienced workers shall be permitted to go behind guard rails or to clean around energized or moving equipment. The employer shall at periodic intervals or as he may deem fit inspect these equipment and ask the Contractor for replacement of the personal safety equipment.

GCC 5.9 The employees must use the standard protection equipment intended for each job. Each piece of equipment shall be inspected before and after it is used. During the testing and charging of electrical lines and substation, the Contractor shall provide electricity insulating protective equipment like footwear (ISO 20345: 2004 Part-2), rubber gloves (IS 4770: 1991) to workers. In addition, provisions of the "Central Electricity Authority (Measures Relating to Safety and Electric Supply) Regulations 2010" would be adhered to.

GCC 5.10 Requirements of ventilation in underwater working to licensed and experienced divers, use of gum boots for working in slushy or in inundated conditions are essential requirements to be fulfilled.

GCC 5.11 In case of rock excavation, blasting shall invariably be done through licensed blasters and other precautions during blasting and storage/transport of charge material shall be observed strictly.

Annexure 3

Special Conditions of Contract for Jarmundi Substation

SCC 1.1	The Contractor shall ensure that the community property located in the vicinity of the site is not affected in the vicinity in any form.
SCC 1.2	The Contractor shall ensure that the hand pump adjoining to the Shiv Mandir towards norther side of the project site is not used for the project purpose.
SCC 1.3	The Contractor shall ensure that adequate measures are taken that may construction material, debris, waste material is dumped on the said property. The contractor shall ensure that no water or wastewater from the site flows into the said property. The labour quarters or the septic tank, soak pit, waste disposal area should not be located in the area. No constriction activity should be carried out on the said property.
SCC1.4	The Contractor shall ensure that the people working on site are made aware of the sensitivities associated with the site and that they should not in any for interfere with the said property.
SCC 1.5	In case of Blasting the Contractor should ensure that the PPV at the Pahardih settlement does not exceed the values specified in the DGMS Circular 7 of 1997 dated 29.08.1997.
SCC 1.6	The Contractor should carry out blastic studies and identify an exclusion zone for blasting. He should ensure that there is no movement in the blasting zone 20 minutes prior and post the blasting operations.
SCC 1.7	The Contractor should carry out a survey of all the houses in the Pahardi settlement prior to the blasting schedule. Any claim of damage to the houses during the blasting operation if assessed by JUSNL Circle /Division Office to be caused by the blasting the same should be repaired by the Contractor at no additional cost.

Annexure 4

Format for Reporting of ESMP Implementation

JHARKHAND POWER SYSTEMS IMPROVEMENT PROJECT

ENVIRONMENTAL MANAGEMENT PLAN
MONTHLY IMPLEMENTATION STATUS REPORT

Name of the Substation_____ Period/Month _____

EMP Reference	Activities	Observation/ Status till end of last Observation/ Period	Status till end of this Period
8.	Site Preparation		
8ai	Has the pre-construction equipment checks been carried out (use additional sheets to provide the monitored Leq values)		
8aii	Is regular equipment maintenance being carried out? (Use additional sheets to provide maintenance log)		
8aiv	Has monthly noise monitoring been carried out for DG sets		
8av	Has any permission been provided by Chief Engineer for night time work?		
8bi	Has quarterly air quality monitoring been carried out during the earthwork?		
8biii	Is PUCC certificate log book being maintained on regular basis?		
8biv	Instrument, machine, vehicle maintenance log book should be maintained on regular basis		
10ci	Has the Cut and fill slopes been protected with using standard engineering practices?		
10.ci	Has peripheral site drainage channel and provision of oil-water separator been made for the site?		
10di	Has septic tanks and soak pits/modular bio-toilets would be provided at construction camp?		
10ei	Are best practices been adopted for ground water usage?		
10g	Has the safety practices been undertaken during the construction? Please explain in details whether barricading, reflective tapes has been undertaken?		
10g	What steps has been taken for coordination with local communities?		
10h	What initiatives have been taken to prevent obstruction to traffic?		
12	Please indicate the actions which have been taken to prevent conflicts with local workers?		
13ai	Have the workers been provided with relevant PPE?		
13aii	How many observation on non – compliance in using personal protective equipment?		

EMP Reference	Activities	Observation/ Status till end of last Observation/ Period	Status till end of this Period
13bi	Has the Contractor carried out Health Safety training for workers? (Please provide details of training carried out). This should include the details of carrying out the induction training, refresher training etc. **Special Condition**		
	Has the precautionary measures which were suggested for the cultural property implemented		

Annexure 5

Format for Registering Grievance from Community/ Project Affected Persons

JHARKHAND POWER SYSTEMS IMPROVEMENT PROJECT

GRIEVANCE REDRESSAL MECHANISM
Format for Grievance Recording

Name of the Village: _____ Name of Block: _____

Name of the Transmission Line:_____ Period/Month: _____

*The project welcomes complaints, suggestions, queries and comments regarding project implementation. We encourage persons with grievance to provide their name and contact information to enable us to get in touch with you for clarification and feedback. Mentioning the name and Contact details are essential as this would help us in getting in touch with you. Should you choose to include your personal details but want that information to remain confidential, please inform us by writing/typing *(CONFIDENTIAL)* above your name.*
Thank you.
Managing Director
Jharkhand Urja Sancharan Nigam Limited

Date	Sub Division of Registration (to be filled by JE)
Contact Information/Personal Details	
Name	
Address	
Phone Number	
Complaint/Suggestion/Comment/Question: *Please provide the details (who, what, where and how) of your grievance below*:	
If included as attachment/note/letter, please tick here:	

For Official Use Only

Registered by *(Name of the Junior Engineer Registering Grievance)*
Mode of Communication: 1. Letter 2. Verbal/Telephonic
Reviewed by (Name /Position of Official reviewing Grievance)
Action Taken
Whether Action Taken has been communicated to the Complainant: Yes/No

Annexure 6

DGMS Prescribe Permissible Limit of Ground Vibration

DGMS Prescribed Permissible Limit of Ground Vibration

Type of Structure	**Dominant Excitation Frequency, HZ**		
	<8 HZ	8-25 HZ	>25 HZ
(A) Building/ Structure not belong to the owner			
1. Domestic house/structures (Kutchcha, Brickes & Cement)	5	10	15
2. Industrial Building	10	20	25
3. Objects of historical & Sensitive Structures	2	5	10
(B) Buildings belongs to the owner with limited span of life			
1. Domestic houses/structures	10	15	20
2. Industrial buildings	15	25	50

Annexure 7

Management Plan for Labour Influx

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 10 to 15 workers for construction of substation. Since these 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. This could result in stress on local resources, disruption in community relations, and movement of labours.

Objective:

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 2and 4 and national labour laws;

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 contractor 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.

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 contractor during construction phase of the project . Contractor 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.

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 contractor 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. 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.

Hiring and Recruitment Procedures:

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:

- Project should include a code of conduct relating to the accommodation to be signed with the contract document of contractor.
- 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 or those who have their land parcels under ROW;
- No discrimination shall be done by the 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;
- Project 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 Project shall ensure that the contractor develops and implement a procedure to review the performance of their sub-contractors, if any.
- The procedure developed should include regular inspection of the camp sites, maintaining information pertaining to labours sourced by sub-contractors;

Workers' Accommodation:

The Project will supervise and monitor the activities performed by their contractor and accommodation facilities provided in the 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 kitchen facility for the construction workers and the food will be of appropriate nutritional value and will consider 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.

Security:

The contractor 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.

Provision of 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 Project 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.

Cooking Arrangement:

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 hygiene practices, including protection against contamination between and during food preparation;
- Adequate personal hygiene including designated areas for cleaning hands and cleaning of utensils; 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 area to be 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 cooking fuel to the labourers shall be done by the contractor. In case, fuel requirement for cooking purposes are only to be met by fuel wood then that must be purchased from authorized vendors.

Waste Water Generation:

There will of generation of wastewater from the campsite. About 80% of water used shall be generated as sewage/wastewater. Contractor shall ensure that the campsite are equipped with septic tank and soak pit for disposal of sewage or with mobile bio-toilets. 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.

Solid Waste Management:

The solid waste generated from campsite will mostly comprise of compostable wastes like vegetable residues (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
- It is the responsibility of contractor to ensure safe disposal of all wastes generated out of labour camps.

Medical Facility:

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 aid; where possible, nurses should be available for female workers;
- First aid kits are adequately stocked.
- Information and awareness of communicable diseases, AIDS etc. shall be provided to workers.
- Basic collective social/rest spaces are provided to workers.;

Inspection of camp sites:

- Campsite shall be inspected at frequent intervals to ensure that the facilities are well organized and maintained to acceptable and appropriate standards by the contractor. 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, contractor shall provide adequate number of labour camps which should be appropriate for its location and be clean, safe and, at a minimum, meet the basic needs of workers.

- Contractor should assess the location of labour camp, that it should not be constructed in immediate vicinity of any drainage channel;

- All tanks used for the storage of drinking and cooking water to be covered as to prevent water stored therein from becoming polluted or contaminated and all the migrant workers will be instructed accordingly;
- Contractor 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 sceptic tanks and soak pits and avoid presence of stagnant water is a factor of proliferation of potential disease vectors such as mosquitoes;
- Contractor should ensure that the disruption of local communities is minimum and if required limit the worker's movements in the nearby areas;
- Security staff should have a clear mandate and instructions about their duties and responsibilities such as not to harass, intimidate, discipline or discriminate against workers;
- Contractor should ensure that workers and members of the surrounding communities have specific means to raise concerns about security arrangement and staff;

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. Project can extend the grievance mechanism developed for the project to the contractor 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.

Annexure 8

Socio-Economic Survey Format

Socio Economic Survey Form for Proposed Grid Sub Station Site of JPSIP

Form No		Village Name	
Domicile No		Name of the Surveyor	
Name of the Informant		Signature	
Relationship with HOH		Date	

A1. What Caste Do You Belong				**A2.** What is Your Religious Group				**A3**.Do You Have BPL Ration Card	
General	SC	ST	OBC	Hindu	Muslim	Christian	Sikhs	Yes	No
①	②	③	④	①	②	③	④	①	②

Member Number	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	
B1.1 Name	HOH												Write down the names of all person who live and eat together in this household (sharing same kitchen) starting with head
B1.2 Relationship													
B1.3 Sex	**Is the NAME male or female?**												
	M	M	M	M	M	M	M	M	M	M	M	M	
	F	F	F	F	F	F	F	F	F	F	F	F	
B1.4 Age	**How old was NAME on the last birthday?**												
B1.5 Education	**The class till which the person has been educated.**												
	①	①	①	①	①	①	①	①	①	①	①	①	Illiterate
	②	②	②	②	②	②	②	②	②	②	②	②	Primary (class 3)
	③	③	③	③	③	③	③	③	③	③	③	③	Secondary (Class 10)
	④	④	④	④	④	④	④	④	④	④	④	④	Higher (graduate)
	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	Technical
	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	Vocational
B1.6	**Is the NAME working?**												
	①	①	①	①	①	①	①	①	①	①	①	①	Yes
	②	②	②	②	②	②	②	②	②	②	②	②	No
B1.7 Occupation	A. **The main activity at the place of job?**												This may have multiple entries
	①	①	①	①	①	①	①	①	①	①	①	①	Agriculture
	②	②	②	②	②	②	②	②	②	②	②	②	Agri Labour
	③	③	③	③	③	③	③	③	③	③	③	③	Non Agri Labour
	④	④	④	④	④	④	④	④	④	④	④	④	Business/Trade
	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	Govt. Service
	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	Private Service

	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦	Maid Servant
	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	Others
B1.8	**What was the main reason for the NAME not working?**												To be filled for persons who are not working.
	①	①	①	①	①	①	①	①	①	①	①	①	No work available
	②	②	②	②	②	②	②	②	②	②	②	②	Seasonal inactivity
	③	③	③	③	③	③	③	③	③	③	③	③	Household family duties
	④	④	④	④	④	④	④	④	④	④	④	④	Old/young
	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	Handicapped
	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	Others
B1.9 Income	**How much does the NAME earn in a month?**												
	①	①	①	①	①	①	①	①	①	①	①	①	Rs. 0-Rs. 2000
	②	②	②	②	②	②	②	②	②	②	②	②	Rs. 2000-Rs. 5000
	③	③	③	③	③	③	③	③	③	③	③	③	Rs. 5000 and 10,000
	④	④	④	④	④	④	④	④	④	④	④	④	10,0000+
C1.1 Skills	**What is the skill possessed by the person?**												
													e.g.: traditional artisans, carpentry, mason, weaving, garage mechanic, nursery, others (please mention)
D1.1 Which of the following are availed by the family	**General Scheme** 1. Old age Pension Scheme 2. Widow Pensison Scheme 3. Pradhanmantri Awas Yojana 4. Chief Minister Health insurance scheme 5. Udyami Sakhi Mandal Yojana (To empower rural women) 6. ARYA scheme (To attract rural youth in agriculture in Jharkhand) 7. Vimrao Ambedkar Awas Yojana for widow in Jharkhand **Scheme for Tribal people** 1. PTG Dakiya Yojana (Free rice scheme for primitive tribal group) 2. Eklavya Model Residential Schools for Tribal Student 3. Development and Marketing of Tribal Products 4. Scheme for Minimum Support Price for Minor Forest Produce 5. Educational Fellowship and Scholarship for Higher Education of ST Students. 2017-2018" 6. National Overseas Scholarship for ST candidates 7. Pre and Post Matric Scholarship 8. Establishment of Ashram Schools in Tribal Sub-Plan Areas 9. Centrally Sponsored Scheme of Hostels for ST boys and ST Girls **Others (Please Specify)** …… ……												
E1.1	A. What is the drinking water source for the family?												

Amenities	Piped Water ☐	Tube Well ☐	Well ☐	Pond ☐	Any other, specify……
	B. What is the source of water for domestic use?				
	Piped Water ☐	Tube Well ☐	Well ☐	Pond ☐	Any other, specify……
	C. Is the water source used by you or other families also		Only by the HH ☐		Shared by other families ☐
	D. Availability of Household Electricity			Yes ☐	No ☐
	E. Are there Primary Schools nearby (within 1 – 1.5 km)			Yes ☐	No ☐
	F. Are there Secondary Schools nearby				
	G. Are there Colleges nearby				
	H. Are there Hospitals nearby		Private Hospital ☐	Govt. Hospital ☐	None ☐

Annexure 9

Assessment of Impact Significance

Impacts on Aesthetics & Visual Quality

Impact	Aesthetic and visual impact			
Impact Nature	Negative	Positive	Neutral	
Impact Type	Direct	Indirect	Induced	
Impact Duration	Short Term	Medium Term	Long Term	
Impact Extent	Local	Regional	National	
Impact Scale	Low	Medium	High	
Impact Magnitude	Positive	Small	Medium	Large
Resource/ Receptor Sensitivity	Low	Medium	High	
Impact Significance	Negligible	Minor	Moderate	Major
	Significance of impact is considered **Negligible**			

Impacts on Air Quality

Impact	Air quality impact			
Impact Nature	Negative	Positive	Neutral	
Impact Type	Direct	Indirect	Induced	
Impact Duration	Short Term	Medium Term	Long Term	
Impact Extent	Local	Regional	National	
Impact Scale	Low	Medium	High	
Impact Magnitude	Positive	Small	Medium	Large
Resource/ Receptor Sensitivity	Low	Medium	High	
Impact Significance	Negligible	Minor	Moderate	Major
	Significance of impact is considered **Negligible to Minor**			

Impacts on Noise Quality

Impact	Noise quality impact			
Impact Nature	Negative	Positive	Neutral	
Impact Type	Direct	Indirect	Induced	
Impact Duration	Short Term	Medium Term	Long Term	
Impact Extent	Local	Regional	National	
Impact Scale	Low	Medium	High	
Impact Magnitude	Positive	Small	Medium	Large
Resource/ Receptor Sensitivity	Low	Medium	High	
Impact Significance	Negligible	Minor	Moderate	Major
	Significance of impact is considered **Minor**			

Impact on Land use, Soil & Drainage

Impact	Impact on Land use, Soil & Drainage		
Impact Nature	Negative	Positive	Neutral
Impact Type	Direct	Indirect	Induced
Impact Duration	Short Term	Medium Term	Long Term
Impact Extent	Local	Regional	National

Impact Scale	Low	Medium	High	
Impact Magnitude	Positive	Small	Medium	Large
Resource/ Receptor Sensitivity	Low	Medium	High	
Impact Significance	Negligible	Minor	Moderate	Major
	Significance of impact is considered **Minor**			

Impact on Water Resources

Impact	Impact on water resource			
Impact Nature	Negative	Positive	Neutral	
Impact Type	Direct	Indirect	Induced	
Impact Duration	Short Term	Medium Term	Long Term	
Impact Extent	Local	Regional	National	
Impact Scale	Low	Medium	High	
Impact Magnitude	Positive	Small	Medium	Large
Resource/ Receptor Sensitivity	Low	Medium	High	
Impact Significance	Negligible	Minor	Moderate	Major
	Significance of impact is considered **Negligible**			

Impact on Biological Environment

Impact	Impact to Biological Environment			
Impact Nature	Negative	Positive	Neutral	
Impact Type	Direct	Indirect	Induced	
Impact Duration	Short Term	Medium Term	Long Term	
Impact Extent	Local	Regional	National	
Impact Scale	Low	Medium	High	
Impact Magnitude	Positive	Small	Medium	Large
Resource/ Receptor Sensitivity	Low	Medium	High	
Impact Significance	Negligible	Minor	Moderate	Major
	Significance of impact is considered **Minor to Moderate**			

Impact on Socio-economic Conditions

Impact	Impact on Socio-economic Conditions			
Impact Nature	Negative	Positive	Neutral	
Impact Type	Direct	Indirect	Induced	
Impact Duration	Short Term	Medium Term	Long Term	
Impact Extent	Local	Regional	National	
Impact Scale	Low	Medium	High	
Impact Magnitude	Positive	Small	Medium	Large
Resource/ Receptor Sensitivity	Low	Medium	High	
Impact Significance	Negligible	Minor	Moderate	Major

	Significance of impact is considered **Minor**

Impact on Community Health and Safety

Impact	Community Health and Safety			
Impact Nature	Negative	Positive	Neutral	
Impact Type	Direct	Indirect	Induced	
Impact Duration	Short Term	Medium Term	Long Term	
Impact Extent	Local	Regional	National	
Impact Scale	Low	Medium	High	
Impact Magnitude	Positive	Small	Medium	Large
Resource/ Receptor Sensitivity	Low	Medium	High	
Impact Significance	Negligible	Minor	Moderate	Major
	Significance of impact is considered **Minor**			

Impact on Occupational Health and Safety

Impact	Occupational Health and Safety			
Impact Nature	Negative	Positive	Neutral	
Impact Type	Direct	Indirect	Induced	
Impact Duration	Short Term	Medium Term	Long Term	
Impact Extent	Local	Regional	National	
Impact Scale	Low	Medium	High	
Impact Magnitude	Positive	Small	Medium	Large
Resource/ Receptor Sensitivity	Low	Medium	High	
Impact Significance	Negligible	Minor	Moderate	Major
	Significance of impact is considered **Moderate**			