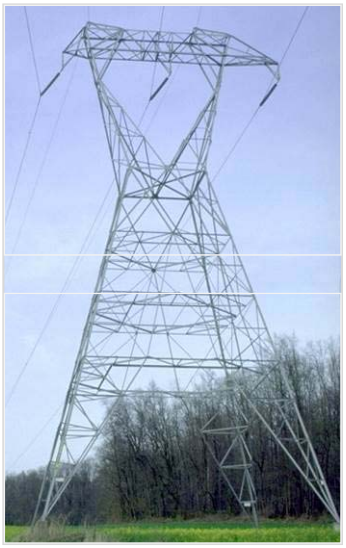

Environment and Social Impact Assessment Report (Additional Scheme 4 Volume 1)

Final Report

August 2018

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Jharkhand Urja Sancharan Nigam Limited

The Business of Sustainability

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FINAL REPORT

Jharkhand Urja Sancharan Nigam Limited

Environment and Social Impact Assessment Report (Additional Scheme 4 Volume 1)

14 August 2018

Reference # 0402882

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ABBREVIATIONS

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
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
TCE – TATA Consulting Engineer
TL – Transmission Line
WPR- Work Participation Ratio

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 Grid Substations (GSS), and (b) Development of associated 132 KV transmission lines of around 1800 kms. These 25 substations and associated transmission lines have been organized into 26 schemes. The proposed new 132 KV Grid substation at Narayanpur is covered under the Additional **Scheme 4 Phase III**.

The proposed Grid Substation (GSS) at Narayanpur would be constructed on 15 acre of revenue land (which is transferred to JUSNL vide letter dated 02.08.2017) located at Bhagabandh village, Jamtara District. Total of 15 acre of the land categorized as Puratan Patit land in the land allotment letter and is already identified and transferred to JUSNL. The site can be accessed through National Highway (NH) 2 and the State Highway (SH) 4, that connects Dhanbad (Jharkhand) and Asansol (West Bengal). From the SH, Major District Road connects metaled village road through Narodih and Bhagabandh village leads up to the site, which adjacent to the village road.

The project would involve design, construction and operation of a 132/33 KV GSS. The key components of the project would include: two (2) Nos 50 MVA oil cooled transformers, incoming and outgoing bays connecting to the grid, control room and residential quarters for JUSNL employees. Setting up of the substation would involve a permanent change in land use from presently scrub 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 8.4 KLD of water, to be sourced through bore well at site. On a regular basis, small amounts of domestic waste and wastewater would be generated from the site and would be managed through septic tank and soak pits. From time to time, minor amount of hazardous waste such as used oil, oil soaked cotton etc. 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 Narayanpur site and the study area of two (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 Jamtara District. Site-specific environmental and social baseline is described in the Table below:

Environmental Setting	
Terrain & Slope	The general slope of the site is towards the eastern direction. The highest contour is present along the western boundary of the site at 217 m. The terrain slightly slopes towards the eastern boundary of the site, where the elevation is 210 m, which is also the lowest contour point of the site.
Soil	Major soil types are alfisols amongst which red sandy soils are common and ultisols of which red and yellow soils are common.
Existing drainage pattern	There is drainage channel with a check dam, passing along the eastern boundary of the site. The site is sloping towards eastern direction; runoff gets collected in drainage channel.
Environmental pollution in the vicinity	The proposed substation is located in a rural setting. During the site reconnaissance, no industries or any other infrastructure having potential of polluting air and water was observed in the vicinity of the site.
Other environmental sensitivity	No Sensitive Ecological Habitat like National Park, Wild Life Sanctuary, Tiger Reserve or Elephant Reserve is located within the study area of the GSS.
Social Setting	
Status of Land	The land belongs to the Land Revenue Department Government of Jharkhand, and is categorized as Puratan Patit land. The land has been transferred to JUSNL free of cost by the Government of Jharkhand.
Habitations	Jamtara is the district headquarters, aerial distance of about 22 km from the site. There are about 20-25 houses of Bhagabandh village (Rangadih Tola) located adjacent to the south-west boundary of the site. One hamlet of the same village was located about 50 m north-west, across the project site approach road.
Religious & Culture related sensitivity (including sacred groves)	There are no religious & cultural sites inside the site. However, a Mosque is located at around 60 m in the north-west direction from the GSS boundary, in the Bhagabandh Village. There are no sacred groves inside the site or in the immediate 500 m of the site.

In addition to the baseline surveys, community consultation exercise were undertaken in the adjoining Bhagabandh 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. Previously, few house and one access route along south-west boundary of the site was within the proposed GSS plot. However, on the request of village people, the alignment of the south-west boundary was shifted and as per the current approved layout, no settlements or access road falls within the proposed GSS plot.

The consultations revealed that village people are using the plot as a common grazing ground and access route to their agriculture field. However, there are other grazing fields and access routes available in the Bhagabandh village and surrounding the area, so no major dependency on the GSS plot. The residents of the habitat (Bhagabandh hamlet), did not express any concern about the

project being set up. However, they have expectation of employment from this project.

Low-lying area at the eastern part of the project plot along the drainage channel was observed being used for agricultural purpose by the village people. Around 7-8 squatters were observed cultivating land (around 8 patches of land , each of size ~ 10m x 10m) on the day of site visit. The issue was discussed with concerned government authorities (Electrical Executive Engineer and Electrical Superintending Engineer, JUSNL, Circle office-Deogarh) during the site visit. Based on the discussion, it was understood that since, the occupied area is small, and no structure is planned in this particular area of the plot, it will be left out and will not be part of the proposed GSS.

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

The change in land use from scrub 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, barren land and open scrub land uses, would be minimal. 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 drainage channel along the east side of the project GSS boundary. 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 1-1.5 year, construction related activities are expected to cause local level impacts [small settlement (Rangadih *tola*) of Bhagabandh village immediately adjacent to the site's south-west and north-west boundary] 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 to 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 and Social Management Plan (ESMP) has been developed. The ESMP 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:

- 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 adjoining settlements are not damaged or disturbed;
- Adopt appropriate engineering and associated mitigation measures and plans such as noise and dust barriers to minimize 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; and
- Ensure local suppliers and contractors implement local employment and procurement policies to the benefit of neighboring communities in villages Bhagabandh and other nearby 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. An ESMP monitoring plan would also be implemented to be enabling JUSNL 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, World Bank Funded Projects). 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 the Dumka Zone, Deoghar Circle of JUSNL would be responsible for implementing the technical aspects of the JPSIP with respect to the Narayanpur 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.

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 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 1800 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 the 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 III, there are total of ten (10) schemes. The 132/33 KV GSS at Narayanpur, Jamtara District falls under Additional Scheme-4 of Phase III.

This Environment and Social Impact Assessment Report deals only with the construction and operation of the new 132/33KV Substation at Narayanpur, which is part of Additional Scheme-4 of Phase III. 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 (Additional Scheme 4)

Sl. No	Details	Capacity (MVA)	Length (km)
1.	132/33 Kv GIS GSS Narayanpur (2x50 MVA)	100	--
2.	LILO 1 of 132 kV D/C 3 Ph. Jamtara - Madhupur Transmission Line at Narayanpur GSS	-	12.599
3.	LILO 2 of 132 kV D/C 3 Ph. Jamtara - Madhupur Transmission Line at Narayanpur GSS	-	13.350

Source: DPR

The Environmental and Social Assessment of the transmission lines associated with the Narayanpur substation is covered as part of a separate ESIA Report.

1.3 PURPOSE AND SCOPE OF THIS ESIA

The ESIA process involves the identification of the potential environmental and social 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 and Social Management Plan (ESMP) to implement suggested mitigation measures to minimize adverse impacts through effective management systems including formulation of monitoring and reporting requirements.

1.4 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 for 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 Conclusions and Recommendations.

1.5 LIMITATION

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

Project planning for proposed GSS has been undertaken by Tata Consulting Engineer (TCE – the Design Consultant) based on desktop studies and a Detailed Project Report has been developed based on the same. The present draft of the ESIA therefore considers the project configuration that has been outlined in TCE's DPR 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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The ESMF identifies all the national and state level legislation, rules and guidelines, which would be applicable to the JPSIP projects. It has also identified all the World Bank Policies and guidelines, which are applicable to JPSIP. This section highlights the relevant environmental and social policies and regulations, World Bank guidelines applicable for this sub-project.

2.1 APPLICABLE LAWS AND STANDARDS

The applicable regulations in the context of the project are presented in below table.

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/maintenance 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. As per the DPR, insulating oils that will be used in the transformers will be PCB free.	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 for 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 requirements of these regulations.	
8.	Maternity Benefit Act, 1961;	This Act regulate the employment of women in certain establishments for	

Sl. No.	Regulations	Applicability & Action Required	Responsibility
		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.	
12.	The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996	This regulation provides conditions of service of building and other construction workers including their safety, health and welfare measures. JPSIP and its contractors would comply with the requirements of these regulations.	

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 and Social Consultant of JPSIP

Sl. No.	World Bank Policies/Guidelines	Applicability	Responsibility
		environmental assessment is being carried out for this project.	
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 Narayanpur substation has been carried out to have a better understanding of physical and cultural resources present at the site.	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.	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

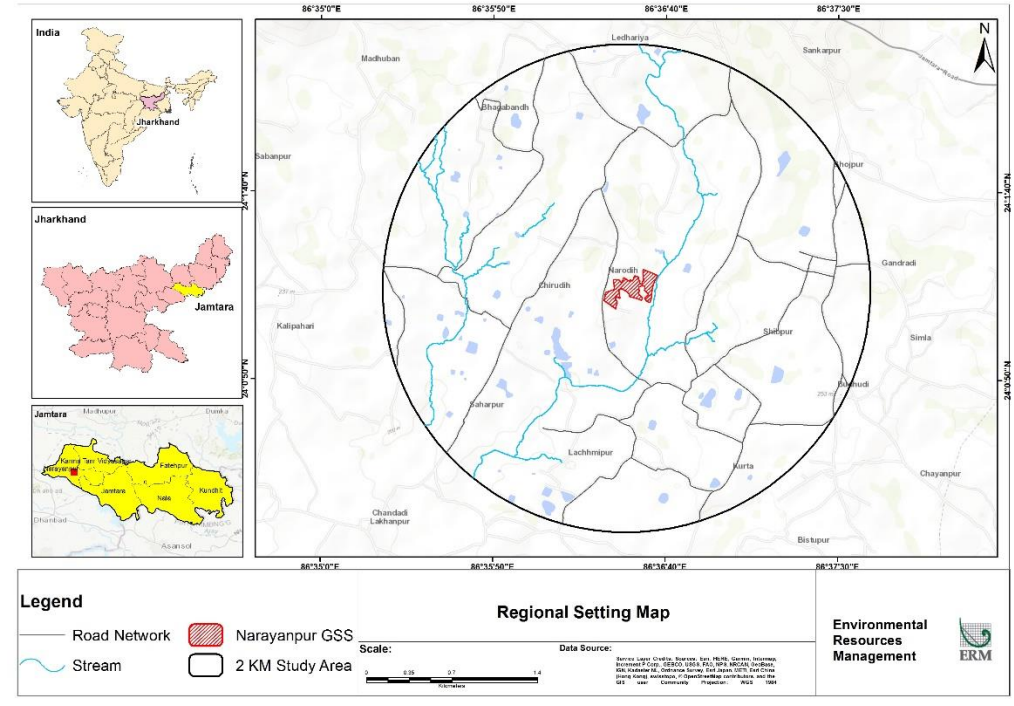
The proposed substation at Narayanpur is planned to be located at Bhagabandh village of Narayanpur block in Jamtara district of Jharkhand State.

3.2 PROJECT LOCATION

3.2.1 Location

The proposed Narayanpur grid substation would be located on 15 acres of Puratan Patit land (old fallow land). The land is on Plot No 1306/A in Bhagabandh village, Narayanpur block of Jamtara district.

Figure 3.1 Regional Setting of the project site



The entire land parcel has been identified and transferred to JUSNL from District Commissioner (DC) of Jamtara district on 02.08.17 for setting up the grid 132/33 KV grid substation. The salient features of the project site are presented in ***Table 3.1***.

Table 3.1 Salient Features of the Project Site

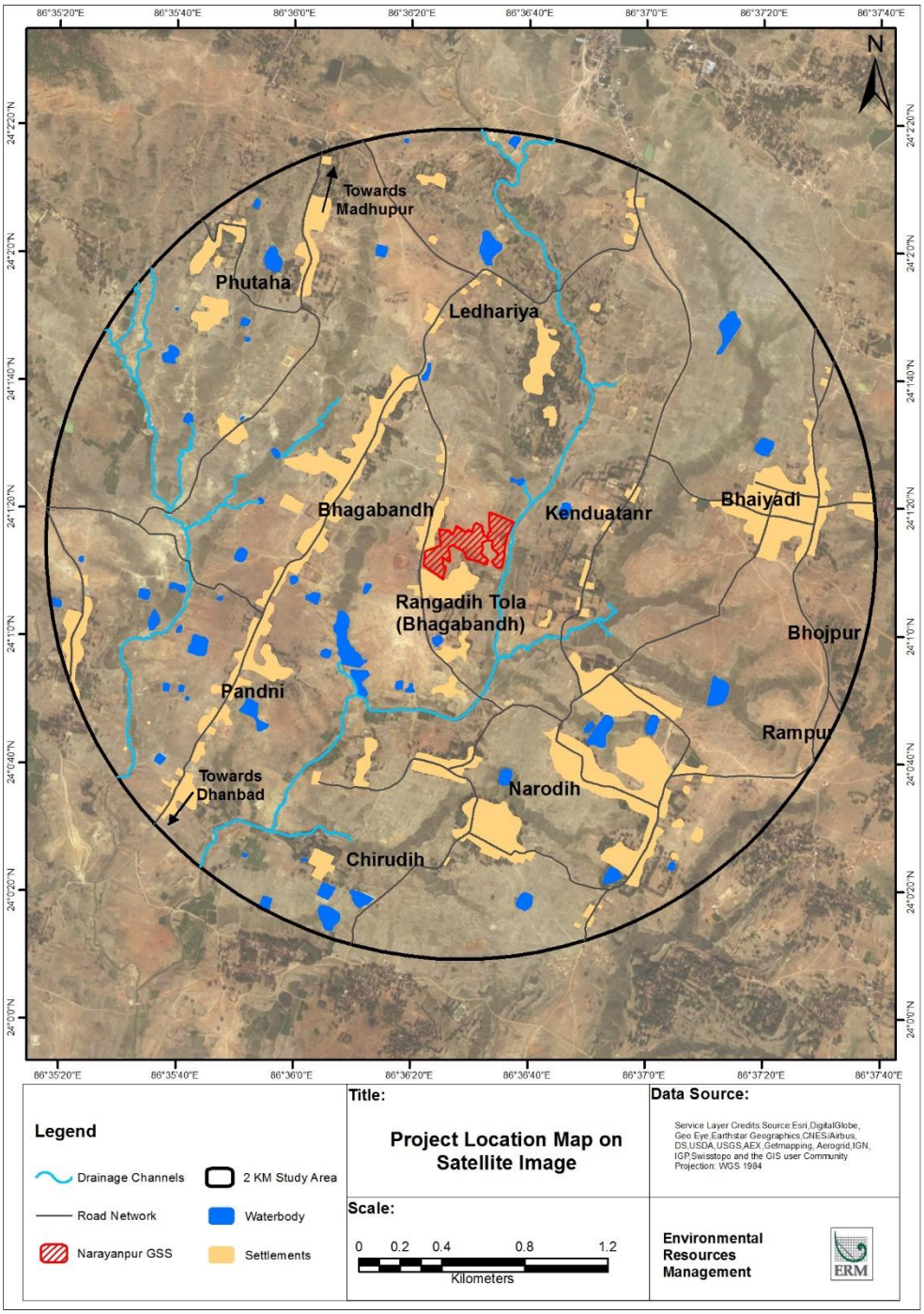
Sl. No	Item	Description
1.	Plot No (Khasra number)	1309
2.	Area	15 acre/6.07 Hectares
3.	Allotment Letter No	872, dated 02.08.17 of Revenue Branch, District Collector Office, Jamtara District
4.	Type of Land	Puratan Patit land
5.	Ownership	Government of Jharkhand
6.	Coordinates	24° 1'14.39"N, 86°36'29.97"E

3.2.2 Accessibility

The site can be accessed through National Highway (NH) 2 and the State Highway (SH) 4, that connects Dhanbad (Jharkhand) and Asansol (West Bengal). From the SH 4, metaled village road through Narodih and Bhagabandh village leads up to the site, which adjacent to the village road. This road runs along the western boundary of the site and goes upto Bhagabandh village. The village road will be upgraded (if required) by JUSNL for transportation of construction materials up to site.

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

Figure 3.2 Project Location Map



3.3 SITE SETTING

3.3.1 Project Site

As discussed above, the project site is located on 15 acres of Puratan Patit land (Revenue Land). The land has been identified and allotted by the District Collector's Office, Jamtara district to JUSNL on 02.08.2017. The site resembles an irregular shaped polygon having a horizontal length of almost 400 m and width varying from 90 m (center of the site) to 230 m (western portion of the

site) and 290 on the eastern side. Site has elevation difference of approximately 7 m with highest elevation of 217 m in the west and lowest elevation of 110 m in the east. Earlier few houses (3 nos) and a village road (of approximately 10 feet width) was the part of proposed GSS plot. However, on the request of the village people, the site boundary has been modified, keeping out these houses and the village road. As per the current approved layout, village road and the houses are excluded from the GSS plot.

Low-lying area at the eastern part of the project plot along the drainage channel was observed being used for agricultural purpose by the village people. Around 8 squatters were observed cultivating land (around 8 patches of land , each of size ~ 10m x 10m) on the day of site visit.

Figure 3.3 ***View of the Occupied Area by Squatters within the Project Site***

Boundary pillars are yet to be erected on site. As per the discussion with the relevant government officials, cost estimation for the erection of pillars at the site is pending approval and is anticipated to be commenced by the month of August 2018, post approval.

Proposed GSS plot is a scrubland with no mature trees within the site boundary. Few livestock were observed to be grazing within the site indicating that the land was being used as grazing land, although numerous other grazing areas are present within the study area.

There are no religious & cultural sites inside the site, except a Mosque around 60 m in the north-west, across the project site approach road in the Bhagabandh Village. There are no sacred groves in inside the site or in the immediate 500 m of the site.

3.3.2 Site Vicinity

The physical features, built structures (habitations, roads) and other environmental sensitivities around the site is presented below.

Table 3.2 Site Vicinity

Direction	Features
North	The northern boundary of the site abuts a series of single cropped private agricultural land patches. Beyond the agricultural land patches there is cluster of household (part of Bhagabandh village) at approximately 650 m aerial distance from the north boundary of the proposed GSS plot.
East	Drainage Channel running north south is adjacent to the eastern boundary of the proposed GSS plot followed by series of private agriculture lands. Nearest settlement is approximately at the distance of 450 m from the eastern boundary of the plot.
South	One (1)seasonal water body adjacent to the south boundary followed by Bhagabandh village (Rangadih Tola) to the southwest boundary of the proposed GSS plot. Beyond Rangadih Tola, there are series of private agriculture lands.
West	Metalled village road through Narodih to Bhagabandh village connecting to the State Highway (SH) 4 leads up to the site, followed by Rangadih Tola (Bhagabandh Village) in the southwest. Further to the settlements, there are private agriculture lands and seasonal water bodies.

Photograph of the features surrounding the substation site is presented in ***Figure 3.4.***

Figure 3.4 Photographs of Site Surroundings

Captions: 1 – Bhagabandh Village; 2 – Approach road to the site; 3 – Bhagabandh Village; 4 – Land used for agriculture within east boundary of the proposed GSS plot; 5 –Drainage Channel along the eastern boundary of the site.

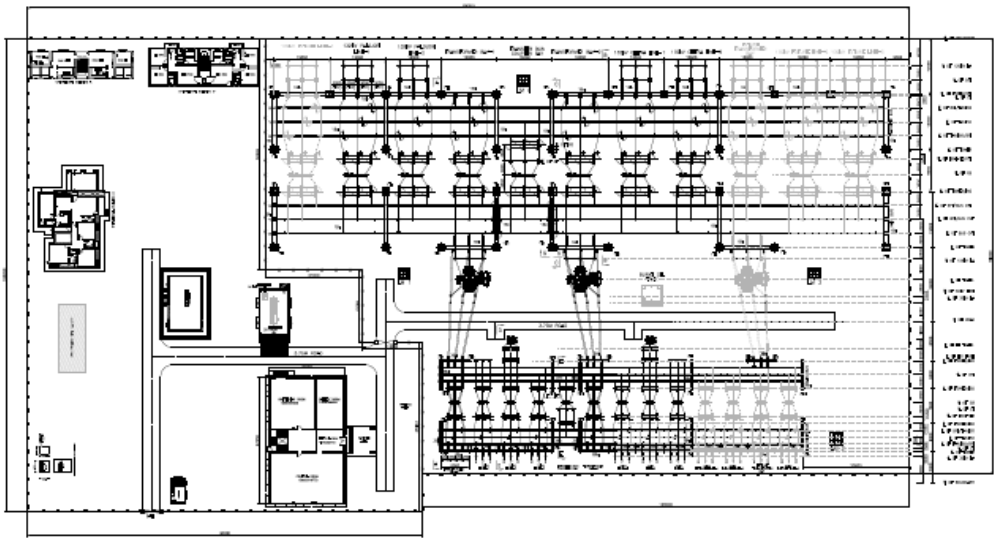
3.4 PROJECT COMPONENTS

For 132/33kV GSS at Narayanpur is planned as Air Insulated Switchyard (AIS). The key project components which have been planned in the project are presented in Table 3.3 and the typical substation layout is presented in ***Figure 3.5***.

Table 3.3 Project Components in the 132/33 KV Substation at Narayanpur

Sl. No	Component	Description
1.	Transformer	2 X 50 MVA Oil Cooled Transformer
2a.	Bays (132kV Switchyard) *The 132kV system is planned as Air Insulated Switchyard (AIS) with Main and Transfer Bus-Bar scheme configuration. The bays considered for 132kV Switchyard are listed in the succeeding column.*	2 Nos. bays for 2 x 50MVA, 132/33 kV Transformer 2 Nos. bay for 132 kV DC 3 Ph. Narainpur–Jamtara Transmission line 2 Nos. bays for 132 kV DC 3 Ph. Narainpur–Madhupur Transmission line 1 No. bay for Transfer bus-coupler
2b	Bays (33kV Switchyard) *The 33kV system is planned as Air insulated switchyard with Main and Transfer Bus-Bar scheme configuration. The bays considered for 33kV Switchyard are listed in the succeeding column.*	2 Nos. bays for 2 x 50MVA, 132/33 kV Transformer 1 No. bay for Transfer bus-coupler 6 No. bay for 33kV Line Bays 4 Nos. spare bays for future expansion (3 No for line and 1 No for future transformer)
3	Transformer Oil	Would be as per the Regulation of Polychlorinated Biphenyls Order, 2016
Associated Infrastructure		
4	Control Room	One number with control panel
5	Residential Quarters	Numbers and types of quarter yet to be decided
6	Pump House	-

Figure 3.5 Typical Layout of a 132/33 KV substation Planned in the Narayanpur



3.5 PROJECT TIMELINE AND PROJECT COST

As per the detailed project report (DOC NO: TCE.10718A-EL-4005-ES-40037), November 2017, the estimated cost for construction of the 132/33 KV Narayanpur substation and associated transmission lines would be around INR 53.67 crores and 32.9 crores respectively. This includes the cost of civil works as well as cost of procurement of electrical equipment and associated materials along with costs for installation and commissioning. Site preparation, construction and civil works of the substation are expected to be completed in about 12 months.

3.6 RESOURCE REQUIREMENTS

The resources required during the construction and operation phases of the project are presented in ***Table 3.4*** below.

Table 3.4 Resource Requirement for Construction and Operation of 132/33 KV Grid Substation at Narayanpur

Sl. No	Description	Resource Requirement	Source
1.	Land (Total)	15 acres	Government Land
2a.	Manpower (Construction Phase)	The peak manpower requirement is expected to be 50.	Through Contractors
2b.	Manpower (Operation Phase)	The peak manpower is expected to be 16-20	Operation and Maintenance/JUSNL
3a.	Water (Construction Phase)	10-13 KLD (peak water demand)	Groundwater Abstraction
3b.	Water (Operation Phase)	8.4 KLD (for domestic purpose)	Groundwater Abstraction
4.	Construction Material	Steel, Cement, Aggregate and Sand	Contractor

3.7 DISCHARGES AND WASTES

The solid and liquid waste expected to be generated during the lifecycle of the substation (i.e. construction and operation), is presented in ***Table 3.5***.

Table 3.5 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 generation would be around 22-25 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 8-10 kg/day.
3.	Used Transformer Oil	The used transformer oil would be generated at an interval of 15 years.
4.	e–Waste	The e-waste would be generated from the panels at the end of life.

Sl. No	Description	Quantity
5	Air Emission (construction)	Dust will be generated at places where earthwork, cutting and filling operations. 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.

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 the 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 and social effects/ impacts 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 making 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 office 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:

- The site had good road access;
- The site did not comprise of prime agricultural land and did not have any residential premises within it; and
- There were no settlements within the site.

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 Narayanpur 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 identify 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.

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 and social characteristics of the area due to the operation of the proposed project during its life cycle.

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 the same has been considered as study area for the ESIA. Site surveys were conducted in the study area to 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 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.

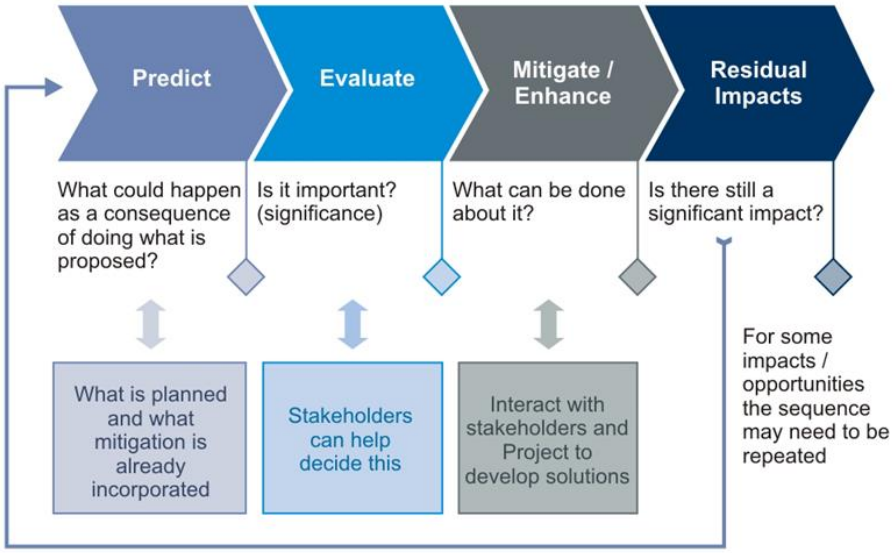
Prediction of impacts was undertaken as an objective exercise to determine what could potentially happen to the environmental and social receptors as a consequence of the project and its associated activities in due consideration of the baseline conditions at site, the stakeholder's opinion and expert 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 and social 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).

Once magnitude of impact and sensitivity/ vulnerability/ importance of resource/ receptor have been characterized, the significance was assigned for each impact using an impact score for each criteria, following a systematic rating method, leading to the qualification of significance of impact as Negligible, Minor, Moderate and Major. The overall impact assessment methodology is presented in ***Figure 4.1*** below:

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 study area (within 2 km radius of the proposed GSS) to provide a context within which the impacts of the proposed GSS Project at Narayanpur are to be assessed.

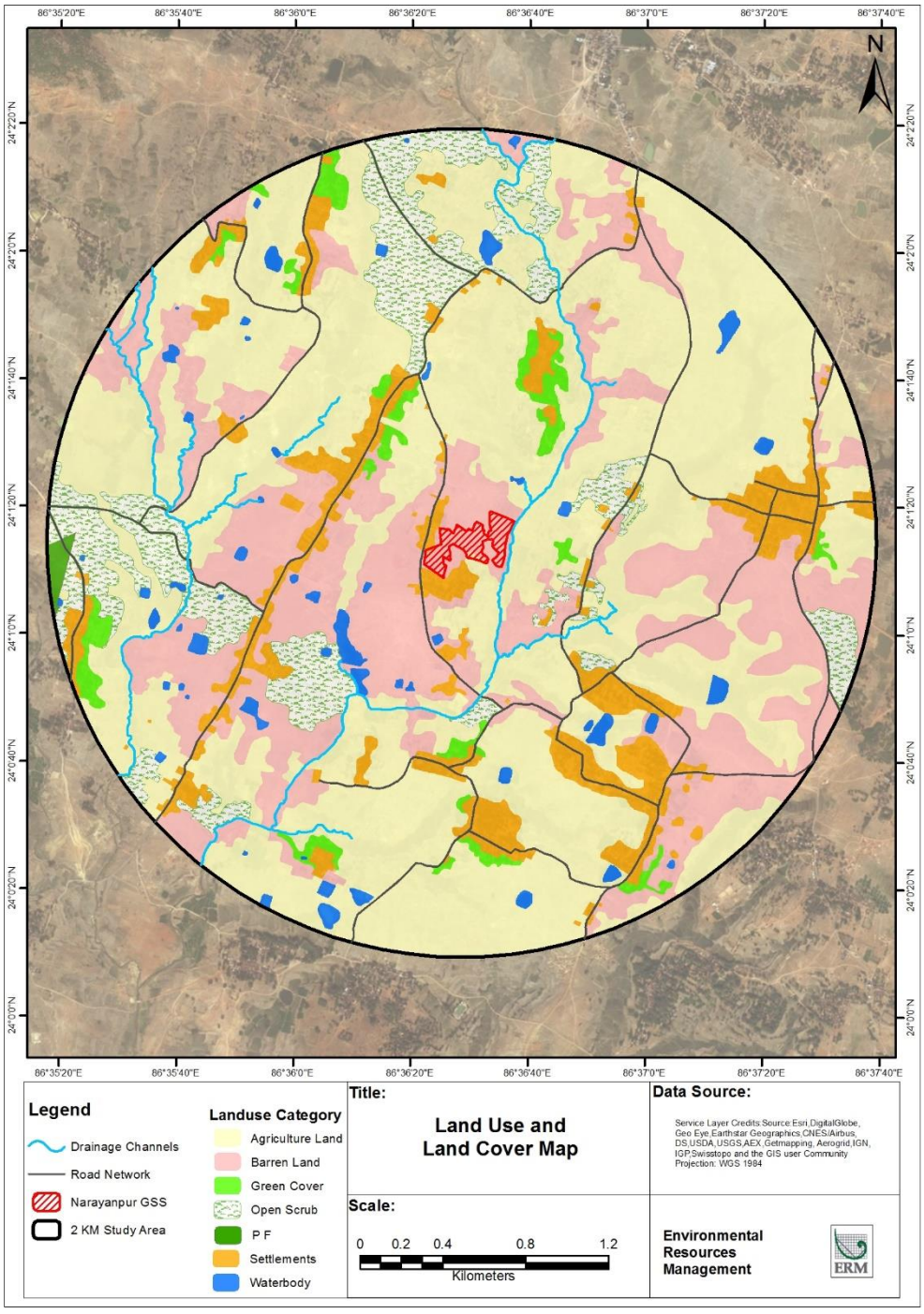
5.2 LAND USE/LAND COVER

Total land under the proposed GSS site is 15 acre, categorized as Puratan Patit land by the Revenue Department, Government of Jharkhand. Agricultural activities are not carried out within the proposed site. Currently, site is a vacant land parcel with scrub vegetation.
Agriculture is however, the most predominant land use in the study area followed by barren land. Existing land cover pattern in 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 Land	6.61	52.64
Barren Land	2.91	23.21
Drainage Channels	0.13	1.04
Green Cover	0.26	2.07
Open Scrub	1.13	8.99
Protected Forest	0.03	0.21
Road Network	0.27	2.17
Settlements	1.00	7.99
Waterbody	0.21	1.68
Total		**100**

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

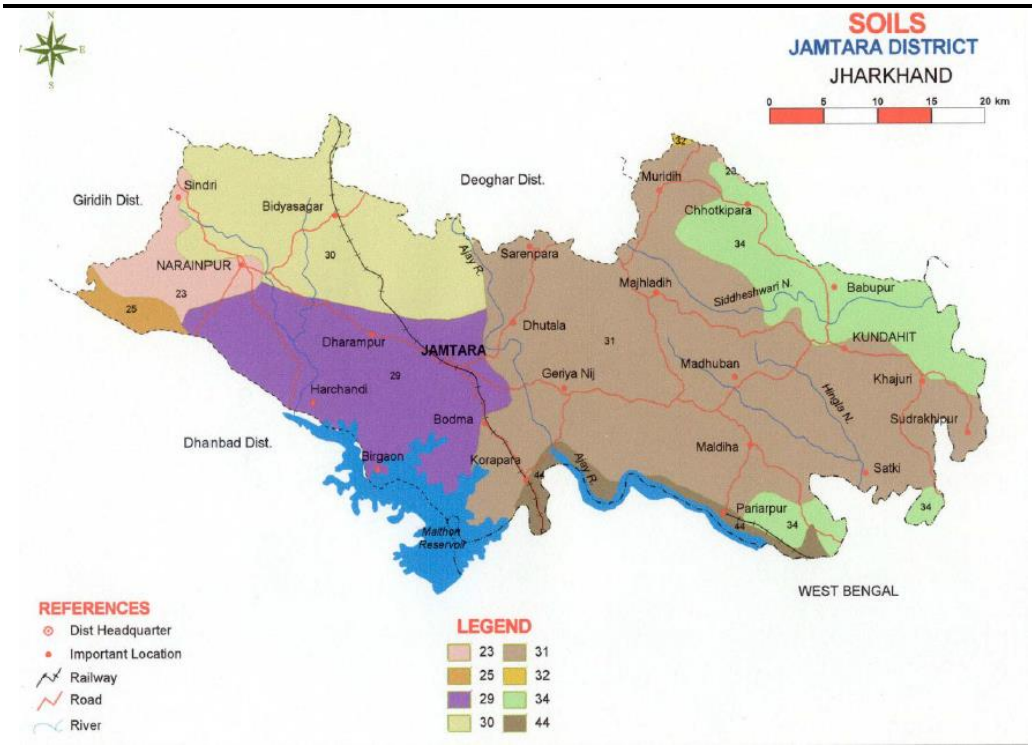


5.3 SOIL

As per the groundwater information booklet for Jamtara District, September 2013 issued by Central Groundwater Board, geomorphologically, the district can broadly be divided into three well defined physiographic units (a) Hilly area (b) Rolling Valleys and (c) Pedi plain flat country. Major soil types in the Jamtara District are alfisols amongst which Red sandy soils are common and ultisols of which red and yellow soils are common. At the proposed GSS site, soil was observed to be sandy loam in character, light red in colour and moderately permeable.

The soil pH of the district ranges from 4.3 to 7.4. The organic carbon content in the district ranges from 0.16 to 1.47 %.
They are mapped into three classes i.e., low (below 0.5 %), medium (0.5-0.75 %) and high (above 0.75 %). Nitrogen is an integral component of many compounds including chlorophyll and enzyme essential for plant growth. Available nitrogen content in the surface soils of the district ranges between 135 and 543 kg/ha. Phosphorus content in these soils ranges between 1.4 and 18.5 kg/ha. Potassium content in these soils ranges between 39 and 582 kg/ha. The available iron content in the surface soils is ranges between 5.9 and 82.0 mg kg^{-1}. Manganese content in surface soils ranges between 5.9 and 83.2 mg kg^{-1}. The soil map at district level is provided in ***Figure 5.2***.

Figure 5.2 Soil Map of East Jamtara District



Source: National Bureau of Soil Survey and Land Use Planning (ICAR) Regional Centre, Kolkata (*Legend 23 for Narayanpur GSS site*)

5.4 *CLIMATE AND METEOROLOGY*

The climate of Jamtara district can be divided into three distinct seasons in a year, viz. winter, summer and monsoon seasons. Winter commences from late November and continues until the end of February. January is the coldest month of the year. Winter is characterized by heavy dew, thick fog and associated cold wave when mercury drops down to as low as 30^{o} C to 40^{o} C. May is the hottest month of the year. The rainy season commences from the middle of June and continues till the end of September. The beginning of monsoon is marked by dust storms, thunder and lightning.

Owing to its position near West Bengal and hilly landscape of the region climatic condition is slightly different from the rest of the state. The district receives an annual rainfall of 1500 mm. and most of the rainfall occurs during the rainy season.

Relative humidity is the lowest during the summer months when it can be as low as 30% in the afternoon. Night time humidity is relatively high.
Light north westerly winds prevails during the winter and summer months. Towards the end of the summer season, wind begins to blow more and more from directions between north-east and south-east.. Dust storms occur occasionally in April and May.

5.5 *NATURAL HAZARDS*

District Disaster Management Plan (DMP) has not yet been prepared by Jamtara district administration. However, review of disaster related data at state level indicates that the district is vulnerable to drought, forest fire, earthquake (Zone –III) and heavy rains.

Forest fires constitute a major threat in the district as the forests are mostly dry deciduous and are prone to fires in the summer season. Nearest protected forest is around 1.67 km in west direction from the site boundary. However, forest fire occurrences have not been reported in the recent past in the study area.

Jamtara is situated in Zone –III that is moderate intensity zone with maximum intensity of 3.0-3.9 Richter scale.

Discussions with locals reveal that risk of flooding in GSS site and surrounding areas is low and there has not been any flooding situation in the past.

5.6 *AIR AND NOISE QUALITY*

There is no industrial set up within 2 km of the proposed GSS site. The source of generation of particulate matter is during transportation of vehicles through Major District Road (MDR at the aerial distance of 2.3 km) which connect to

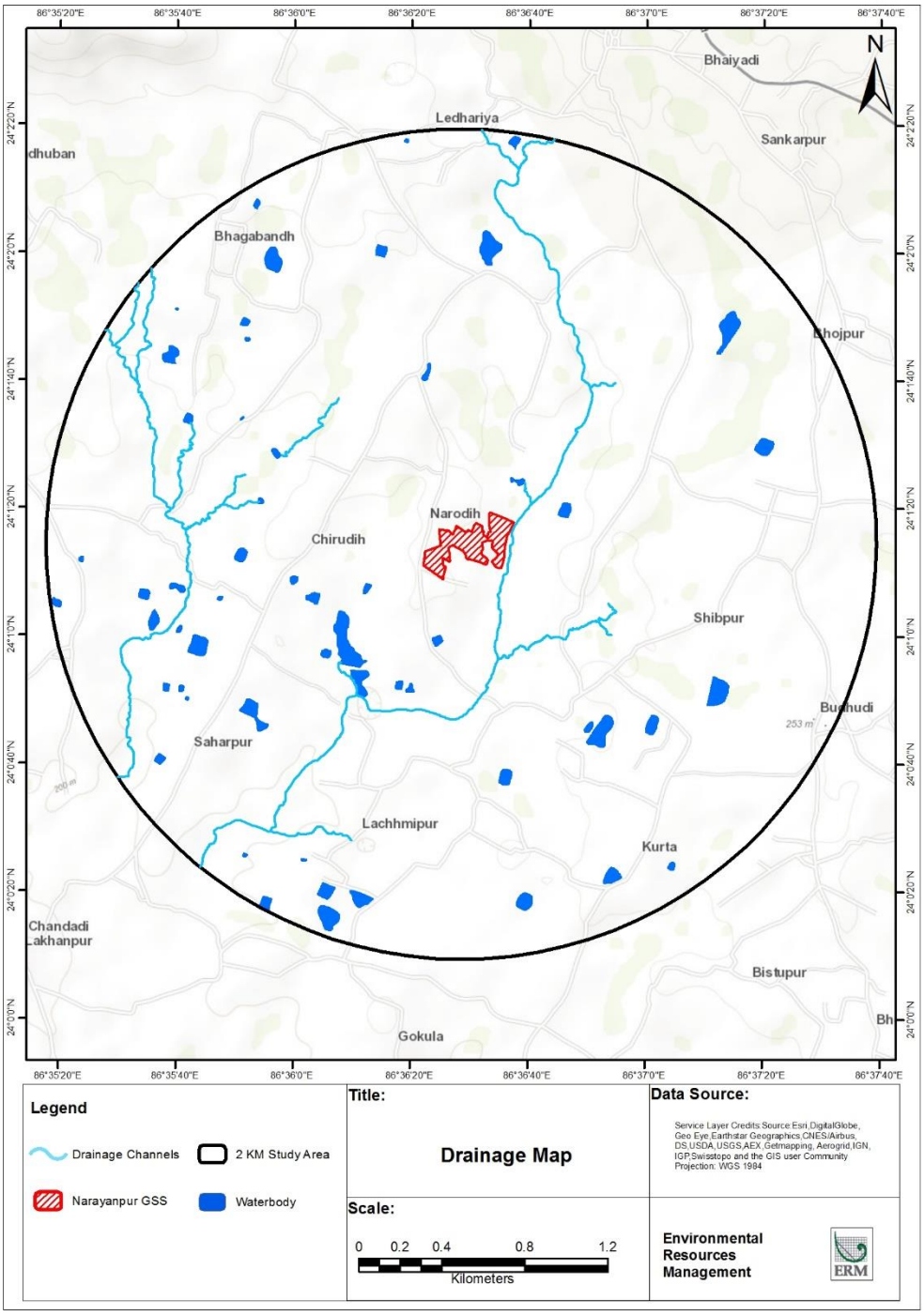
State Highway 4 (Dhanbad-Asansol road) and from burning of fossil fuels for domestic purpose. Considering this context, the ambient air quality is representative of rural set-up and expected to be well within the National Air Quality Standards for all parameters.

The ambient noise quality at site is also representative of ambient noise quality typically expected in rural residential areas. The primary source of noise is vehicles plying through the adjoining State Highway 4 (Dhanbad-Asansol). Limited vehicle movement was observed on the road during site visits and no significant noise levels were reported by villagers during consultations.

5.7 DRAINAGE

As per the site assessment, there is a drainage channel present adjacent to the eastern boundary of the proposed GSS site. The site is sloping from west to east. The site runoff gets collected in this drainage channel. Also, there are few seasonal waterbodies present in the vicinity of the GSS site. The drainage map of the study area is illustrated in ***Figure 5.3***.

Figure 5.3 Drainage Map of the Study Area



5.8 GROUND WATER RESOURCES

As per the groundwater information booklet for Jamtara District, September 2013 issued by Central Groundwater Board, the depth to water table in the Narayanpur block is 5 – 10 m bgl during pre-monsoon season and in the range of 2 – 5 m bgl during post-monsoon season. The ground water is being used for drinking as well as for domestic purposes and is sourced through dug well or tube well (hand pump). In discussion with locals, it was understood that water availability is an issue in the study area especially during dry seasons.

Ground water in the phreatic aquifers in Jamtara district has been found to be colourless, odourless and slightly alkaline in nature and is observed to be generally acceptable as per the CGWB Report, 2013. Most of the locals reported of good quality ground water available in the area.

5.9 SURFACE WATER RESOURCES

Except the drainage channel along the eastern boundary of the site, there is no other major surface water body present within the study area. There are seasonal waterbodies/ponds present in the site vicinity, however they are dry for most parts of the year except the monsoon season.

5.10 ECOLOGICAL ENVIRONMENT

The proposed GSS site in Jamtara district of Jharkhand State falls in 6B Deccan Peninsula – Chota-Nagpur plateau bio-geographic province.

Natural vegetation in the region can be broadly classified 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 sal are *Terminalia bellirica, Terminalia chebula, Haldina cordifolia, Madhuca latifolia, Butea monosperma, Diospyros melanoxylon, Ailanthus,Cassia fistula* etc.

None of the floral or faunal species expected to be present within the site is threatened as per IUCN Classification (Version 2017-3).

5.10.1 *Vegetation within the Study area*

There are no matured trees observed within site, howeverfew shrubs and herbs are present.

Vegetation within the study are is presented below.

Homestead plantation

During the primary survey trees like Aam (*Mangifera indica*), Jamun (*Syzygium cumini*), Date palm (*Phoenix dactylifera*), *Eucayptus* sp., Sugar palm (*Borassus flabellifer*), Neem (*Azadirachta indica*), Semal (*Bombax ceiba*), Peepal (*Ficus religiosa*), Kathal (*Artocarpus integrifolia*),Wad (*Ficus benghalensis*), Bans (*Bambusa arundinacea*), Ashoka (*Saraca asoka*), Chhatim (*Alstonia scholaris*), Siris (*Albizia lebbek*), Shisham (*Dalbergia sisso*), etc. were found to occur frequently in proximity to human settlement areas.

Roadside plantation

Along the roadside following trees were recorded *viz*. rain tree (*Samanea saman*), semal (*Bombax ceiba*), Ashoka (*Saraca asoka*), sagwan (*Tectona grandis*), wad (*Ficus benghalensis*), Shisham (*Dalbergia sisso*), Gulmohor (*Delonix regia*), Peepal (*Ficus religiosa*), neem (*Azadirachta indica*), date palm (*Phoenix dactylifera*) etc.

Riparian Vegetation

Riparian vegetation is observed on the sides of streams and waterbodies. Major vegetation observed are jamun (*Syzygium cumini*), sugar palm (*Borassus flabellifer*), semal (*Bombax ceiba*), gular (*Ficus hispida*), Siris (*Albizzia lebbek*), Gulmohor (*Delonix regia*), Sugar palm (*Borassus flabellifer*), wad (*Ficus benghalensis*), shisham (*Dalbergia sisso*), *Eucalyptus* sp. Etc.

Invasive Alien species

Major invasive species recorded during the study are: *Acacia auriculiformis*, *Eucalyptus* sp., *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.

Faunal Diversity

Herpetofauna

Two species of amphibians *viz*. Common Indian Toad (*Duttaphrynus melanostictus*) and Indian Bullfrog (*Hoplobatrachus tigerinus*) etc. 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*), Indian Rat Snake (*Ptyas mucosus*), Checkered Keelback (*Xenochrophis piscator*), Fan-Throated Lizard (*Sitana ponticeriana*), 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

27 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- Rose-ringed Parakeet (*Psittacula krameri*), House Crow (*Corvus splendens*), Common Myna (*Acridotheres tristis*), Common Pigeon (*Columba livia*), Spotted Dove (*Spilopelia chinensis*), Jungle Babbler (*Turdoides*

striata), House sparrow (*Passer domesticus*), Paddyfield Pipit (*Anthus rufulus*), Plain Prinia (*Prinia inornata*), Black Drongo (*Dicrurus macrocercus*), Asian Palm Swift (*Cypsiurus balasiensis*), Asian Koel (*Eudynamys scolopaceus*), Ashy drongo (*Dicrurus leucophaeus*), Long Tailed Shrike (*Lanius schach*), Indian Silverbill (*Euodice malabarica*), Coppersmith Barbet (*Psilopogon haemacephalus*), Little Green bee-eater (*Merops orientalis*), Black Kite (*Milvus migrans*), Baya Weaver (*Ploceus philippinus*), Red-vented Bulbul (*Pycnonotus cafer*), Indian Robin (*Copsychus fulicatus*) etc.

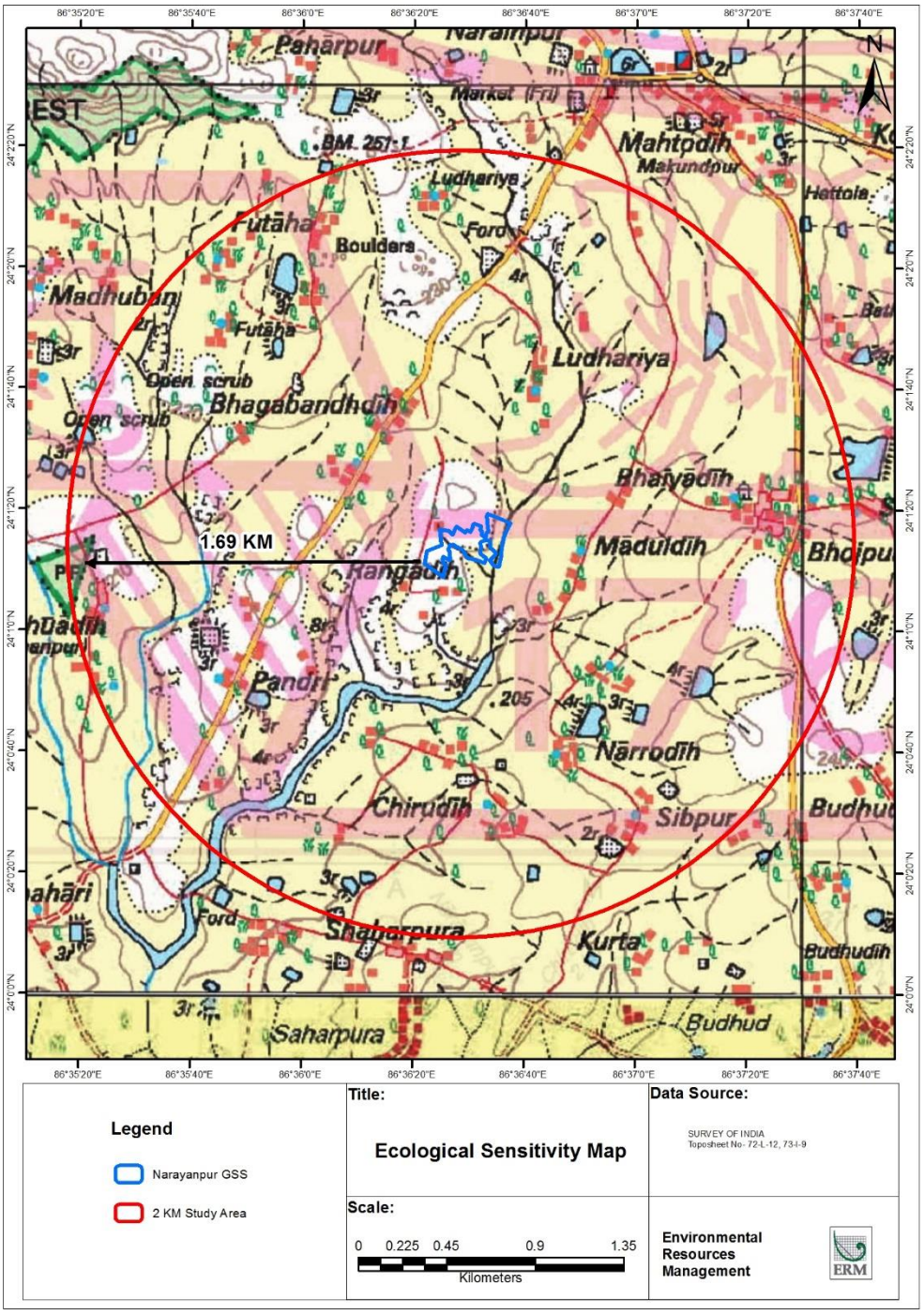
Aquatic birds- Indian Pond Heron (*Ardeola grayii*), Cattle Egret (*Bubulcus ibis*), Little Egret (*Egretta garzetta*), Little Cormorant (*Microcarbo niger*), White-throated Kingfisher (*Halcyon smyrnensis*), Red-wattled Lapwing (*Vanellus indicus*) etc.

Black Kite is listed as Schedule I as per Wildlife Protection Act, 1972. All the species are listed as Least Concern as per IUCN Classification (IUCN version 2017-3).

Mammals

Total six 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 Rat (*Rattus rattus*) etc. Large mammals were reported to be absent in the study area. The list includes four Schedule II species Golden Jackal, Northern Plains Langur, Common Grey Mongoose and Rhesus macaque. All the species are listed as Least Concern as per IUCN Classification (IUCN version 2017-3). Small mammalian species like mongoose, macaques, langurs may get electrocuted within the GSS area. Ecological sensitivity map is presented in the ***Figure 5.4.***

Figure 5.4 Ecological Sensitivity Map



5.11 SOCIO ECONOMIC ENVIRONMENT

5.11.1 Demographic Profile

Demographic Profile at State and District Level

The proposed Narayanpur substation is located in Jamtara district. The population of Jamtara district according to the 2011 Census is 791,042 and which was 653,081 as per the Census of 2001, registering a decadal growth of 21.42%. The analysis reveals that Jamtara district accounts for 2.40% of total population of Jharkhand State. The literacy rate in Jamtara district is 64.59% as against the state figure of 66.41%.

According to the 2011 Census, the district sex ratio is 954, which is slightly better than the state average of 949. The district Schedule Tribe (ST) population constitutes 30.4% as against the state figure of 26.21%. However, the Schedule Caste (SC) population of the district is 9.21% significantly lower than the state figure of 12.08%.

Total number of households in Narayanpur block, under which the proposed project site is located, is reported to be 28942, with average household size of 5.67. The total population of the Narayanpur block is 163,966 as per Census Report 2011. The literacy rate is 55.73% and the sex ratio is reported to be 954.

Demographic Profile of the Study area Villages

The GSS site is located in Bhagabandh village. Other than that 10 villages (of which one is uninhabited Rampur) are located with the 2 km study area. As per the 2011 Census records, the total population within the study area (comprising 9 villages) is 7954, residing in 1377 households. The entire population in the study area falls in the rural category. Demographic profile of the study area villages are presented in ***Table 5.2***.

Table 5.2 Demographic profiles of the villages located within study area

Village	Total Household	Total Population	Average Household Size	Male	Female	SC Population (%)	ST Population (%)	Literary Rate (%)	Male Literary rate (%)	Female Literary rate (%)
Bhagabandh	280	1735	6.20	50.95	49.05	0.00	1.79	52.63	61.19	43.68
Kenduatanr	20	90	4.50	58.89	41.11	0.00	0.00	57.14	62.22	50.00
Bhaiyadi	282	1546	5.48	51.55	48.45	14.42	0.00	52.64	68.89	35.03
Ledhariya	79	455	5.76	47.47	52.53	0.00	98.90	54.95	69.66	42.23
Phutaha	124	627	5.06	48.48	51.52	0.00	74.64	66.03	80.24	53.11
Bhojpur	11	51	4.64	50.98	49.02	0.00	0.00	88.89	92.00	85.00
Narodih	343	1978	5.77	51.42	48.58	0.00	0.00	68.50	81.48	55.03
Chirudih	148	918	6.20	49.02	50.98	0.00	37.58	21.26	32.97	9.19
Pandni	90	554	6.16	51.62	48.38	0.00	14.80	56.82	76.50	35.21

Source: Census 2011 Data

The highest population has been recorded in Narodih having a total population of 1978, followed by Bahagbandh (project village), 1735. The lowest population is of village Bhojpur having a total population of 51. Bhagbandh and Chirudih have the highest average HH size of 6.20, while Kenduatanar has the lowest average HH size of 4.50.

There is no SC population in any of the study area villages except, Bhaiyadi having a total SC presence of 14.42%; while ST population is highest in Ledhariya having 98.90% of its population belonging to tribal community followed by Phutaha having total 74.64% of its population belonging to ST community. Rest ST communities are in Chirudih (37.58%), Pandni (14.80%) and Bhagbandh (1.79%),

The literacy rate is highest in Bhojpur village (88.89%) having 92% male literates and 85% female literates population followed by Narodih having 68.50% literate population of which 81.48% are male literates and 55% are female literates.. Chirudih has the lowest literacy rate of 21.26%. Pandni has the highest literacy rate gap of 41.29% followed by Bhaiyadi having 33.86% literacy rate gap, Bhojpur has the lowest literacy rate gap of 7%.

Demographic Profile of Surveyed Population of Bhagabandh Village

A general socio economic survey was conducted in the village of Bhagabandh as a part of the ESIA study to validate the present socio-economic scenario of Bhagabandh village. The questionnaire template used for administering the survey is presented in **Annexure 9.**

A total of 20 HHs have been covered during the course of site visit. The total surveyed population is 101 individuals, residing in 20 households. The average household size is 5.05, which is almost similar to the household size in the study area (5.53), as recorded in the Census data. Among the 101-surveyed population, total male and female population is 52 and 49 respectively and the sex ratio for the surveyed population is 942.

Table 5.3 Demographic profile of the Surveyed Population

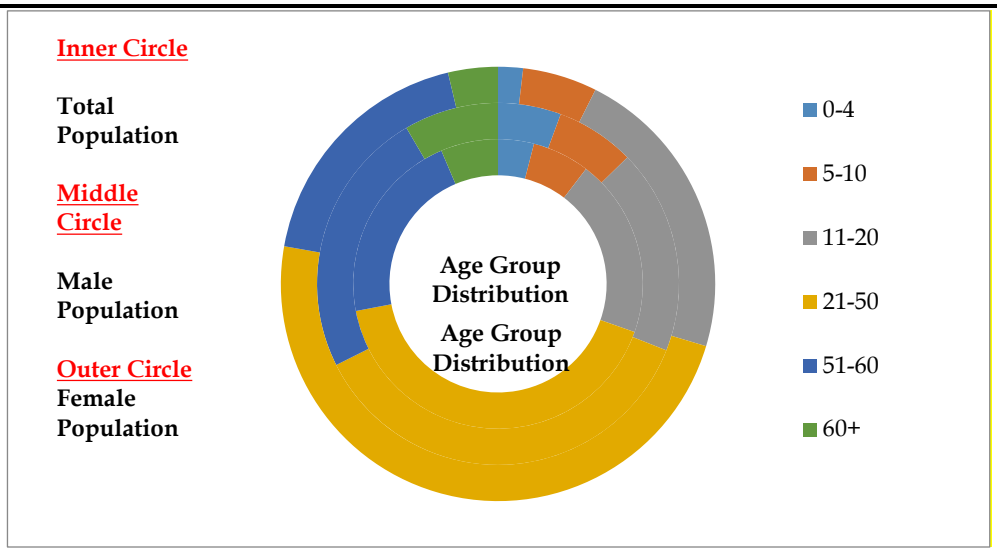
Village	Total Household	Total Population	Average Household Size	Male	Female	SC Population	ST Population	Literary Rate (%)	Male Literary rate (%)	Female Literary rate (%)
Bhagabandh	20	101	5.05	52	49	80	2	62.77	67.31	57.14

Source: ERM Socio Economic Survey

Age group distribution of the surveyed population shows 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 5.5 represents the age group distribution of the surveyed population.

Figure 5.5 *Age Group Distribution of the Surveyed Population*



Source: ERM Socio Economic Survey

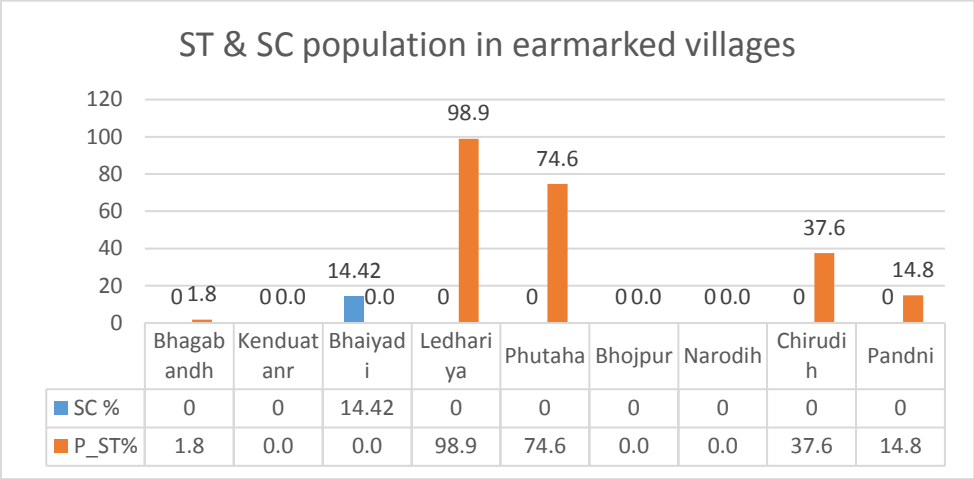
5.11.2 *SC/ST Population*

The total scheduled caste (SC) and scheduled tribe (ST) population in study area is 223 and 1376 respectively, which is 2.80% and 17.30% of the total population of the study area. The scheduled tribe population in study area (17.30%) is lower than the district figure of 30.40% as per Census 2011. Highest and lowest scheduled tribe population was observed in Ledhariya (98.90%) and Baghabandh (1.79%) village respectively.

Scheduled caste population was observed only in Bhaiyadi (14.42%), while there is none in surveyed village (Bhagaband) and seven (7) study area villages (falling under 2 Kms. of radius).

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 project activities to be conducted in Bhagabandh (which is the exactly the village where the project is located) which has no SC population, while ST population is just 1.79%.

Figure 5.6 ***Proportion of SC/ST Population in the Study Area***

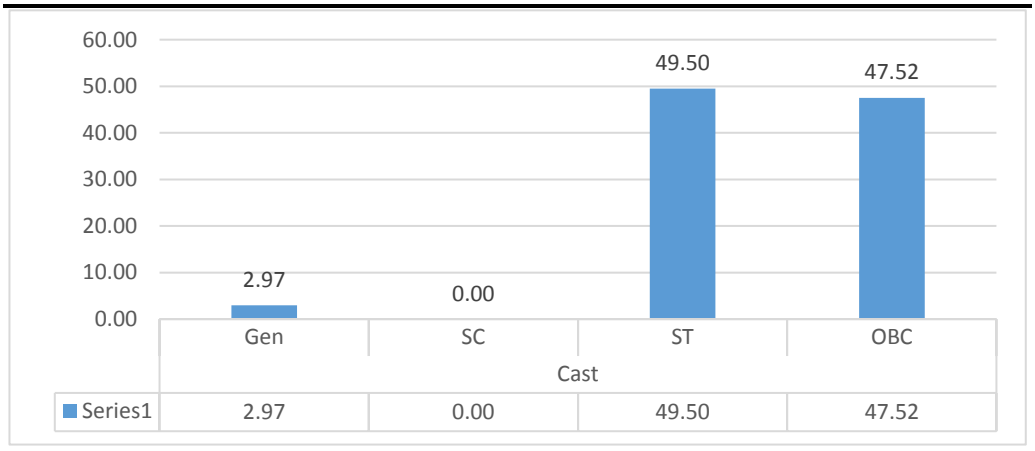


Source: Census 2011 Data

SC & ST Population of Surveyed Village (Bhagabandh)

As per the surveyed population, the ST community is the predominant population in Bhagabandh village and constitutes 49.5% of the total population, followed by Other Backward Cast (47.52%) and General (2.97%) of the surveyed population.

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

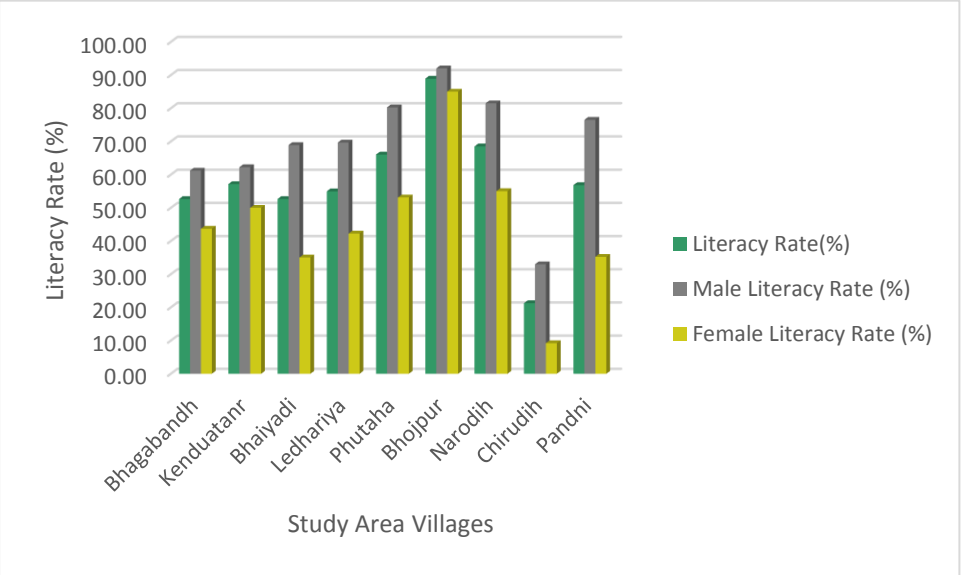


5.11.3 ***Education profile***

Literacy Profile

Literacy status of the study area villages is presented in ***Figure 5.8***7 and it suggests that the average literacy rate in study area villages (57.65%) is lower than that observed at the District level (75.49%). Highest and lowest literacy rates were observed in Bhojpur (88.89%) and Chirudih (21.26%) villages respectively. The average female literacy rate (45.39%) was also found to be low in study area villages. A general trend of education level attainment in study area as observed during consultation is that mostly teenagers drop out after secondary school and key reasons for this high dropout rate is the weak economic conditions of the families as well as lack of quality education facilities.

Figure 5.8 ***Literacy profile of the study area villages***

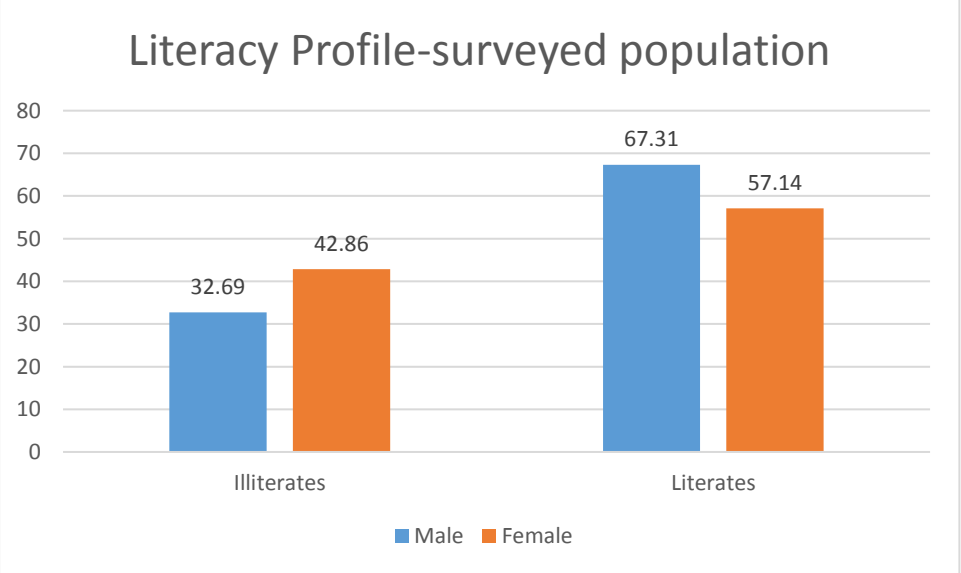


Source: Census 2011 Data

Educational profile of Surveyed Population of Bhagabandh Village

Out of the total population of 101, covered under 20 households during survey, 94 are above 6 years of age, of which 67.31% are male literates and 57.14% are female literates. A graphical representation of the same is presented in ***Figure 5.9 .***

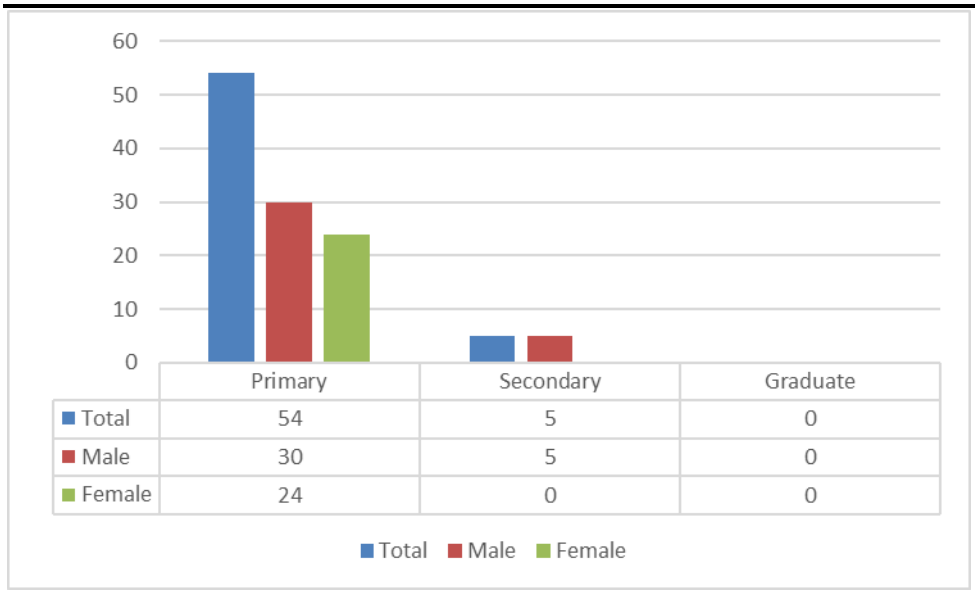
Figure 5.9 ***Literacy profile of the Surveyed Village***



Source: Census 2011 Data

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

Figure 5.10 Educational Status of the Surveyed Population of Bhagabandh Village



Source: ERM Socio Economic Survey

Educational Infrastructure

The assessment of education facilities and education promotion programs provided by the government in the study area indicates that available education infrastructures in terms of number of schools are adequate. Number of schools and colleges existing in study area villages is presented in ***Table 5.4.*** The information is compiled from Village Directory, 2011. This indicates that all the nearby villages have primary schools except Bhojpur, while there are infrastructure for Middle school at village level in Bhagbandh, Bhaiyadi and Narodih village, rest there are none in any of the study area villages.

Similarly there are no pre-primary schools, secondary schools, senior secondary schools or degree colleges in any of the named villages. Given below is a tabular representation for the same.

Table 5.4 Schools facilities in study area

Study Area Villages	Pre-primary school	Primary school	Middle school	Secondary school	Senior secondary school	Degree college
Bhagabandh	N	Y (1)	Y (1)	N	N	N
Kenduatanr	N	Y (1)	N	N	N	N
Bhaiyadi	N	Y (1)	Y (1)	N	N	N
Ledhariya	N	Y (1)	N	N	N	N
Phutaha	N	Y (1)	N	N	N	N
Bhojpur	N	N	N	N	N	N
Narodih	N	Y (1)	Y (1)	N	N	N
Chirudih	N	Y (1)	N	N	N	N
Pandni	N	Y (1)	N	N	N	N

Source: Village Directory, Census 2011; (Y – Yes; N – No)

Educational Infrastructure of Surveyed Village

All respondents informed that a Primary and middle school is present within 1 to 1.5 km of the Bhagbandh village. In case of higher educational infrastructures, Higher Secondary school and college is present in Jamtara and Narayanpur.

5.11.4 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 41.29% of total population of Jamtara District is total main workers, 25.81% are marginal workers and 58.71% are non -workers, who depend for their livelihood on the toils of the main workforce. The non-workers comprise of old, diseased, disabled and also children of non-working age group beside housewives.

In case of Narayanpur block, 39.26% of the total population comprises the total worker population. Of the total working population, 10.43% are main workers whereas 28.84% comprises the marginal worker population. The employment pattern in this area suggests that 83.17% of local people are employed in agriculture as cultivators and agricultural labourers whereas 13.08% workers are engaged in other sectors.

Occupational Pattern of the Study area Villages

Agriculture is the mainstay of the local economy of the study area. Majority of local people are primarily dependent on agricultural activities for earning their livelihood. Occupational pattern of the study area shows agricultural labourer as the main occupation followed by cultivators and Household industries. Other workers, constituting people in service sector such as carpentry, fabrication etc. Classification of working population of the study area as per Census 2011 data is presented in the ***Table 5.5***.

Table 5.5 Occupational pattern of villages in the study area

Name of the village	WPR	Main Workers	Marginal Workers	Cultivator	Agricultural Labour	Household Industry	Other Workers
Bhagabandh	29.16	9.29	90.71	13.24	38.14	6.92	48.22
Kenduatanr	36.67	72.73	27.27	18.18	33.33	48.48	48.48
Bhaiyadi	31.76	20.77	79.23	11.41	28.31	18.53	49.69
Ledhariya	50.33	94.32	5.68	27.95	26.20	44.54	0.44
Phutaha	40.67	95.29	4.71	61.18	22.75	14.51	13.73
Bhojpur	35.29	33.33	66.67	16.67	50.00	33.33	33.33
Narodih	45.30	1.67	98.33	28.91	62.72	0.33	7.03
Chirudih	50.54	2.16	97.84	78.88	14.22	0.00	2.80
Pandni	23.29	6.20	93.80	44.19	8.53	4.65	45.74

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

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

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 29.55% which suggests the study area villages have relatively higher unemployment rate as most of people are involved in agriculture.

Economic Status of the Surveyed Population

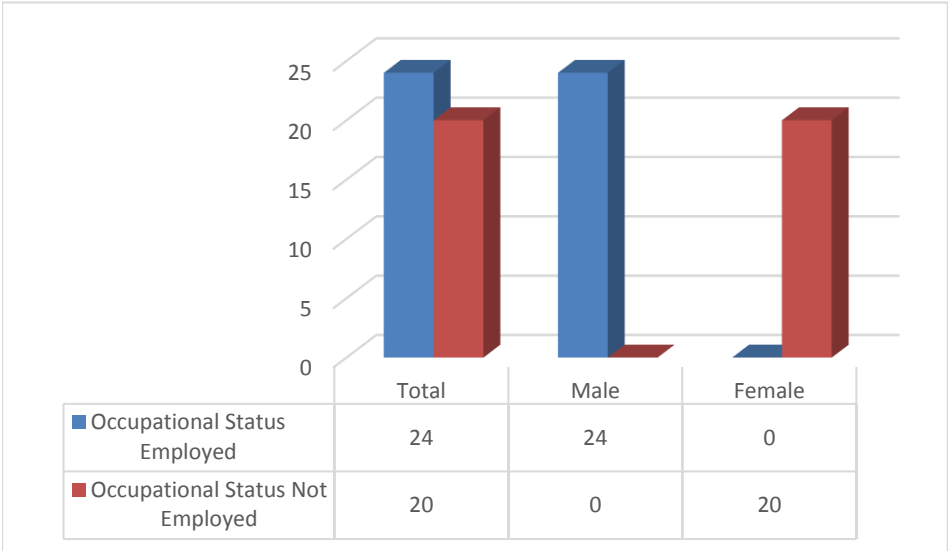
The survey conducted by the ERM team revealed that nearly 90% of the households are below poverty line while the rest 10% constitute to form the APL category.

Employment Status of the Surveyed Population

From the primary survey conducted by ERM team in of Bhagabandh village, it has been concluded that there 65 out of 101 who are in the working age group; rest of the people belong to age group either below 20 years or above 60 years.

Out of total surveyed people, 23.76% are employed. Out of total employed population, 100% are males, while there are no females who are reported to be employed in the main working force. Most of the women in village is involved in household work or work, which is substantially not adding any monetary gain at household level.

Figure 5.11 Employment Status of the Surveyed Population



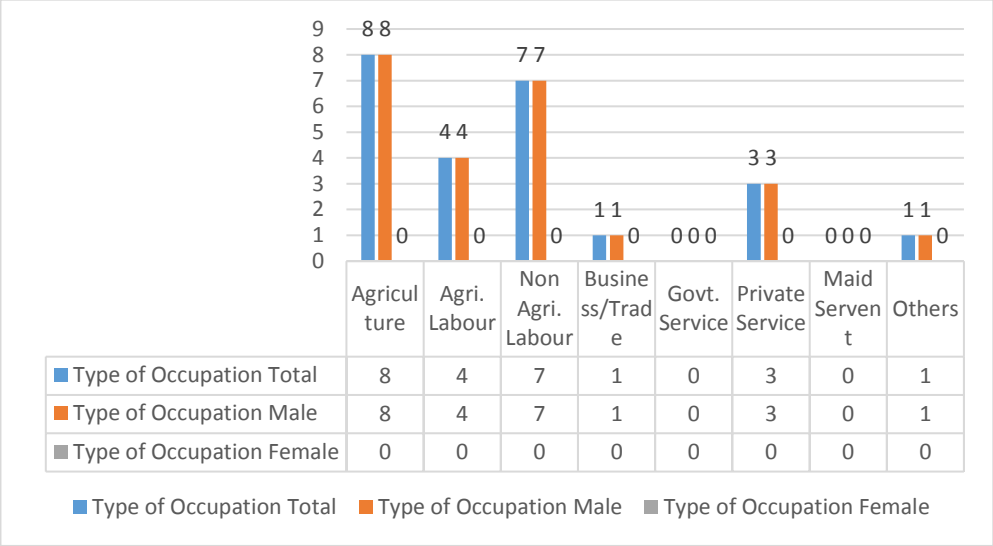
Source: ERM Socio Economic Survey

(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

Occupational Pattern of the Surveyed Population

From the figure below (***Figure 5.12***), it could be inferred that most of the people are engaged in agricultural work. Based on the figure below, it could also be apprehended that there are none in Government services, while only 1 person has been recorded to be involved in business or trade activities, while rest 7 persons are involved as non-agricultural laborers and 4 persons are involved as agricultural laborers.

Figure 5.12 Occupational Pattern of the Surveyed Population



Source: ERM Socio Economic Survey

Skill of the Surveyed Population

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

5.11.5 Gender profile

Sex Ratio

Sex ratio is one of the most important indicators defining gender equality. This indicates improvement of one of the Human Development indicators that can enhance gender equality influencing progress in productivity, improve development outcomes and make institutions more representative.

The average sex ratio in the study area villages as per the Census 2011 is 972, is higher than the State average (948). Within the study area villages, Ledhariya (1106) records the highest sex ratio while Kenduatanr (698) recorded the lowest sex ratio.

Education

Improving female educational levels has been demonstrated to have clear impacts on the health and economic future of young women, which in turn improves the prospects of their family and entire community.

Average literacy rate in study area villages (54.91%) is lower than that observed at State level (66.41%). According to 2011 census data, the average male and female literacy rate in the study area was recorded as 67.96% and 41.42% respectively, indicating that the female literacy rate is low when compared to the male literacy in this area. Among the study area villages, the highest and lowest female literacy rate was recorded at Bhojpur (85.00%) and Chirudih (9.19%) whereas highest and lowest male literacy rate was recorded at Bhojpur (92.00%) and Chirudih (32.97%). Interestingly, analysis of the census data shows that both male and female literacy rates are lowest in Chirudih village, indicating backwardness, and exclusion from formal education system due to unavailability of proper education infrastructure.

Workforce Participation

Female labour force participation is a driver of growth and therefore participation rates indicate the potential for a state to grow more rapidly. The participation of women in the labour is driven by a wide variety of economic and social factors including economic growth, increasing educational attainment, social norms, etc.

In the study area, male work participation rate (47.31%) is higher than the female work participation rate (28.39%), as per 2011 Census. Male and female workers involved in main work force (1) were recorded to be 22.27% and 22.10% respectively. This figure indicates male workers constitute a dominant part of the main work force. However, in case of the marginal work force, the trend was reversed in terms of contribution from male workers (77.73%) and female workers (77.90%). It's observed that female marginal workers outnumber the male marginal workers, indicating that more number of females are possibly involved in cultivation, as agricultural labourers, and also as workers in household industries. The low literacy rate amongst the female population can also be attributed as one of prime reason for their increased involvement as marginal workers.

5.11.6 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

(1) Workers who worked for more than 6 months (180 days) in the reference period are termed as Main Workers.

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 dug wells that serve mostly to the needs of household drinking water consumption however no filtration facility is available for drinking water;
- Piped water supply is not available in study area villages.

As per community consultation very few household in the village have access to individual sanitation facility and majority of the community reportedly resort to open defecation.

Hand pumps and wells are the main source of water for drinking in surveyed villages. Apart from this 4 villages have access to river water, while tanks/ponds or lakes are present in every village. Tap water or community pipe water source is present in just two vilalges Phutaha and Pandni.

Figure 5.13 Infrastructure at the project site vicinity

Hand pump used as a source of water for domestic and drinking purpose

Village road connecting State Highway (SH) 4

Village road (Bhagabandh)

Mosque in Bhagabandh village

5.11.7 Irrigation

Community consultation reveals that irrigation facilities in study area seem to be extremely poor as farmers were reported to be entirely dependent upon rainwater for irrigating their field.

5.11.8 Health Infrastructure

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

Table 5.6 Health care facilities in study area

Study villages	Hospitals	PHC	Sub-Centre
Bhagabandh	0	0	Y (1)
Kenduatanr	0	0	Y (1)
Bhaiyadi	0	0	Y (1)
Ledhariya	0	0	Y (1)
Phutaha	0	0	0
Bhojpur	0	0	Y (1)
Narodih	0	0	Y (1)
Chirudih	0	Y (1)	Y (1)
Pandni	0	0	0

Source: Village Directory, Census 2011; Y- Yes, N- No

As per the census data, health care infrastructure of the study region is indicated in the table above. Bhagabandh, Kenduatanr, Bhaiyadi, Ledhariya, Bhojpur, Narodih, Chirudih village has one health sub-centre each ; one primary health centre (PHC) at Chirudih while the nearest hospital is in Jamtara, about 20 km from GSS site. However, primary consultation reveals that the health-sub center in the Bhagabandh village does not have permanent doctor and for any medical help, village people are dependent on Sadar Hospital at Narayanpur block.

5.11.9 Other physical infrastructure

Road & Transportation

All the study area villages are connected through Major District Road (MDR) which is further connected with State highway 4 (Dhanbad-Asansol Road) For the local transportation, use of auto rickshaw is quite common in the study area.

Electricity

As per the census data (2011), all study area villages except Bhaiyadi, Narodih, and Chirudih do not have access to electricsupply and most of the households were reported to not be connected with the existing electricsupply network. During the consultation in Bhagabandh Village, it was reported that the village is recently connected to electricity supply however, electricity supply is not adequate and present only for 10-12 days a month.

Postal Service, Bank, Telecommunication

As per 2011 Census data, no village in the study area has a post office within its peripheral boundary. No banks are located in the any of the study area villages. Nearest bank, facility is available in Narayanpur.

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 Narayanpur. 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 IMPACTS

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 ***Table 6.1*** captures the likely interactions between the activities on one axis and the resources / receptors on the other axis.

Table 6.1 Environmental and Social 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	▒															▒								

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
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																								
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 Impacts on Aesthetic and Visual Quality

Potential impacts to aesthetics and visual quality because of the setting up and operation of the Narayanpur GSS may arise because of two key factors – disruption and degradation of views in the surrounding landscape; and, use of night time 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 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 a predominantly rural area with no street or external lighting.

The receptor sensitivity to change in aesthetics and visual impacts is considered to be medium due to presence of Bhagabandh hamlet adjacent to the southwest boundary of site. 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 minor.

6.1.2 Ambient Air and Noise Quality

The GSS operations will not include 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. The primary source of air pollution is vehicular emission from movement of traffic on SH-4 and 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 (PM_{10}) 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 *tola's* of Bhagabandh 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.

Since the proposed GSS at Narayanpur will be Air Insulated Substation (AIS), it will not have any specific source contributing to air emissions. 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 Narayanpur GSS site is expected to be primarily generated during the site preparation and construction phases of the project. Such noise may be generated from operation of heavy construction equipment and machineries, DG sets and the transportation of equipment and materials. During operation 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 noise on the adjacent settlement areas and vehicle movement on SH 4 and village roads. 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 to the construction workers at site and nearby receptors at the small settlement (*tola*) of Bhagabandh village immediately adjacent to the site's southwest 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 Impacts on Land Use, Soil and Drainage

The proposed substation will be constructed on 15 acres of revenue land. The land use study reveals that the proposed land is a Puratan Patit land (comprises old fallow land). Proposed GSS plot is a scrubland with no mature trees within the site boundary. JUSNL has been allocated the land by Government of Jharkhand for setting up the GSS. 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. However, considering 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 uneven topography, the preparation of land for the construction activities at site would involve vegetation clearance, limited soil stripping and cutting, filling and levelling activities in order to make the site topography suitable for setting up of the GSS. Further, as the proposed substation has alfisols and ultisols which is loose in nature and prone to erosion So changing of topography of the site can create potential for local slope failures. The removal of vegetation cover and top soil can also increase the potential for soil erosion during a short period, till the site is levelled and then stabilized with fill materials like gravel, sand and fly ash. Surface runoff from the construction site may contain eroded earth, sand, aggregate, spilled oil, lubricant, paint residues etc. which have the potential to reach drainage channel adjacent to the eastern boundary of the site and surrounding agricultural lands and thereby affecting the water quality of the drainage and soil quality there. There is also a potential for local level changes in drainage pattern of the area, though it is unlikely to be significantly affected.

Disposal of solid waste and spills of lubricants, fuels and chemicals during land clearing, 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 GSS sites would include remains of cut 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. Unplanned disposal of construction waste and MSW from construction site into adjacent agricultural lands may also affect the soil quality. The overall impact significance has been assessed to be **minor**.

6.1.4 Impacts on Water Resources and Quality

Water resourcing requirements for a GSS project are minimal, as there is no process or activities that require a steady supply of water. The water requirement during the construction phase is expected to be intense – an estimated amount of 10 - 12 KLD (including provision for approx. 2 KLD domestic water supply to labour) and about 3-4 KLD during the rest of the construction period. It is estimated that the civil works would be completed in about 1 year and the construction phase would last 2 years. 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.

With no nearby source or provision for piped or treated water from a surface water body, 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 which are at the level of 60 to 100 m. As per CGWB report (2013), the entire Narayanpur block falls in 'safe zone'

category of ground water utilization. The neighboring settlements source water using dug wells and tube wells and both of them utilize the shallow or near shallow aquifers; so, there is expected to be additional stress on ground water resources if used for due to proposed project. 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 **moderate**.

6.1.5 Impact on Biological Environment

As discussed earlier, there are no matured trees within the proposed GSS site. Site preparation will involve removal of the shrubs and herbs present at site from the 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, kite etc.) and mammals (Indian Grey mongoose, squirrels etc.). Removal of vegetation from the site can have adverse impact on residential burrowing faunal species viz. reptiles (lizards and snakes), ground roosting birds (sparrows, pigeon, doves etc.) and mammals (mongoose, rat etc.). In most cases, however it has been observed that faunal species 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 few scattered 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 2018-1). 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. Small mammalian species like mongoose, macaques, langurs may get electrocuted within the GSS area. However, the chances of birds and mammalian species being 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 Impacts on Socio-economic environment

Proposed Naraynpur substation will be constructed on 15 acres of GM land (government land) and would therefore not involve any land acquisition (through any involuntary mechanism / application of powers of eminent domain) or negotiations for purchase of land for setting up the project.

Low-lying area at the eastern part of the project plot along the drainage channel was observed being used for agricultural purpose by the village people. Around 8 squatters were observed cultivating land (around 8 patches of land , each of size ~ 10m x 10m) on the day of site visit. The issue was discussed with concerned government authorities (*Electrical Executive Engineer and Electrical Superintending Engineer, JUSNL, Circle office- Deogarh*) during the site visit. Based on the discussion, it was understood that since, the occupied area is small, and no structure is planned in this particular area of the plot, it will be left out and will not be part of the proposed GSS . Since, the occupied area, which is used for farming by villagers, will be excluded from the GSS plan; it will not impact the livelihood of the encroachers. Both the beneficial and adverse socio-economic impacts can be rated as **moderate** in terms of significance.

Proposed GSS plot is also used as a grazing ground and pedestrian access route to surrounding agriculture field. However, there are other grazing fields and access routes available in the village and surrounding area, so no major dependency on the GSS plot is envisaged. Apart from this, there are no shared community resources in the immediate vicinity of the site, which might get affected due to the project development.

Earlier few house and one village road along the southwest boundary of the proposed GSS, was the part of proposed GSS plot. However, on the request of the village people, the site boundary has been shifted and now there is no settlement or common village access road within the revised site plan and hence, eliminated or minimized the potential impact.

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 peak 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 of a small number (about 8 – 10) of technical skilled workmen (mostly engineers).

6.1.7 Influx of Labour

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 authorized manpower agencies. Even though unskilled labour force can be sourced locally, the skilled labour required for the project would be primarily migrant labour.

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 some 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 may put some pressure on the local resources such as roads, fuel wood, water etc. Some of the significant issues related with migrant labour would include:

- Conflict amongst workers, and between workers and local community, based on cultural, religious or behavioural practices;
- Discontent amongst local community on engagement of outsiders;
- Outbreaks of certain infectious diseases;
- Security issues to local women from migrant workforce;
- Use of community facilities such as health centres, temples, transport facility etc. by migrant labour may lead to discontent with local community; and
- In case contractors bring in unskilled migrant labour, there stands the risk of exploitation of a labourer. This can happen in the form of hiring underage labourers, low and unequal wage payments, forced labour and discrimination on basis of the basis of caste, religion or ethnicity.

The impacts described above may primarily extend to the settlements in the immediate vicinity, and therefore is localized in nature. From the context of project site setting, it would be noted that, other than ~2% of ST community in Bhagabandh village, no other vulnerable community such as women headed family etc. was recorded from community consultation and from socioeconomic survey.

The socioeconomic survey in Bagabandh village, indicates Work Participation ratio (WPR) defined as percentage of total workers including main and marginal workers out of the total population of the study area, to be 29.16%. The finding indicates that there is a pool of labour-resource who can be engaged in the project as unskilled labour. The project would source unskilled workers from surrounding villages. Also a planned labour camp for skilled

workers within the GSS site may further reduce the assessed potential impacts related to labour influx. Therefore, impact from labour influx is evaluated to be of **minor** significance.

6.1.8 Impacts 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 community and households located immediately adjacent to site. The main habitation (*tola*) of Bhagabandh village is located immediately adjacent to the site, however no significant health related impacts are expected as interaction with community will be kept to minimum. 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 operational 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 as **minor**.

6.1.9 Occupational, Health and Safety

During the peak 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 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 occupational hazards would vary with the nature of work undertaken by the workmen, as they may be 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 workers 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 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 ***Table 7.1*** 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, Jamtara ▪ District Rural Development Agency (DRDA) ▪ Tribal Development Department ▪ Circle cum Block Development Office, Zone- Dumka, Circle- Deoghar, Division- Deoghar 2
Other Secondary Stakeholder	▪ Contractors

Consultations at Circle Office (CO), Deoghar

In order to consult district administration, ERM team visited Deoghar Circle office on 28.07.18 to meet Electrical Executive Engineer and Electrical Superintending Engineer, JUSNL to brief the CO on the site visit/consultation and also to discuss the issues pertaining to the squatters at the proposed GSS site.

Consultations with Local Communities

Community consultation was conducted in close vicinity of the project boundary to 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 Key Stakeholders

Consultation at Rangadih tola (Bhagabandh village) adjacent to the GSS site

Consultation at mosque in Bhagabandh village

Consultation at with a squatter (Mr. Nuruddin)

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.

Consultations were undertaken in the adjoining Bhagabandh Village (Rangadih Tola). 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 village people are using the plot as a common grazing ground and access route to their agriculture field. However, there are other grazing fields and access routes available around the area, so no major dependency on the GSS plot was envisaged.

The residents of the habitat (Bhagabandh Village, Rangadih Tola) located immediately adjacent to the southwest and northwest boundary of the site, did not express any concern about the project being set up. However, they have expectation of employment and free electricity from this project.

The key points discussed with each of these stakeholders are provided in summarised below.

Table 7.2 Summary of Stakeholder Consultation

S. No.	Stakeholder Category	Key Points Discussed	Findings of the Consultation
Local Community			
1.1	▪ Bhagabandh village (Date – 27 July 2018 at Rangadih Tola; Number of participants- 9); ▪ Bhagabandh village (Date – 27 July 2018 at Mosque; Number of participants- 15); ▪ Bhagabandh village [Date – 27 July 2018; Number of participant- 1 (squatter)]	▪ Current engagement scenario – livelihood options, employment; ▪ Basic amenities in the village – electricity, drinking water, etc.; ▪ Squatter along the eastern boundary of the proposed GSS plot ▪ Health scenario in the village and distances of Hospitals/ Clinics; and ▪ Perception of local community towards the project.	▪ Proposed GSS site is located in the Rangadih tola, Bhagabandh village of Narayanpur Block. ▪ The primary communities residing are Muslim. ▪ The primary occupation of the people in the villages is agriculture, wherein very few households own land and are cultivators, while most of the people are engaged as agricultural labour in other's fields. ▪ Few people from this area also go to the nearing state of West Bengal and other states such as Bihar, Maharashtra to earn for their livelihood. ▪ Pre-Primary and Primary school is present in the Bhagabandh village and high school is present in Narayanpur. ▪ Health care facility is poor in this area. Nearest Primary Health Centre is in Chirudih village. Reportedly, people of this area travel to Narayanpur and Jamtara for medical needs. ▪ Borewell going up to a depth of 200-250 feet is used for drinking water. The water quality was reported to be good however, community are facing problem related to drinking water during dry season ▪ The agricultural lands in the villages are mono cropped and farming is totally dependent on rain due to lack of irrigation facilities. ▪ Paddy is the main agricultural produce of the area. Other than that vegetables are also produced. ▪ Majority of the households does not have toilets and due to lack of toilet facilities practice open defecation. ▪ Women are mostly engaged in house work and as agricultural labour. Literacy amongst girls in current generation has improved as compared to previous generation. ▪ In discussion with the one of the squatter, it was understood that they are cultivating this land from last 30-35 years and is the major source of their livelihood. ▪ Local people were aware about the upcoming GSS project. However, they expect employment. opportunities and

S. No.	Stakeholder Category	Key Points Discussed	Findings of the Consultation
			free electricity in case any project comes up in the area. ▪ During consultation process, local people was informed about the project site camp to be set up in this area. At the time of discussion, villagers opined they should not have any problem in this regard. However, they pointed out that outsiders should not cause any security related issue to women's living in the vicinity of the project site. This point was raised considering the fact that, during day time male members of family leave their houses for work, any only return in the evening. During this time, only female and children stays in the houses. In this discussion process, communities are told that, labour management plan would be prepared for the project considering security of the villagers, and security would be arranged at the labour camp. In addition, grievance from local community will be recorded and addressed for this project.
Institutional Stakeholders			
2.1	JUSNL Circle Office, Dumka Zone, Deoghar.	▪ Opinion on the project benefits and impacts; ▪ About the Squatters at the eastern part of the proposed GSS plot	▪ Consultation was held with Electrical Executive Engineer and Electrical Superintending Engineer, JUSNL, Circle office- Deogarh. They were briefed on the background of the project and the objective and scope of the ESIA Study, and his opinion on the project benefits and impacts was sought. ▪ Both the Government officers supported the project and was certain that it will contribute to development of the study area considering that power availability and employment opportunities are major areas of concern in the study area. ▪ Issues pertaining to squatters at the eastern part of the proposed GSS plot was also discussed. After discussion, it was confirmed that the encroached area used for agriculture purpose will be left out and will not be part of the proposed GSS.

The ESIA for the Narayanpur GSS site has been undertaken to assess and report the environmental and social impacts of this component of the JPSIP project. In course of the project's planning and the ESIA, project design decision have been made taking into account the need to avoid, minimize and reduce adverse impacts. Further, this Environmental and Social Management Plan (ESMP) provides project and site specific mitigation measures to minimize damage to the local environment and disruption to local communities.

The ESMP comprises of site and activity specific mitigation measures in the form of an ***Impact Mitigation Matrix (IMM)*** as detailed in ***Table 8.1***, structured according to the sequential flow of activities in the project life cycle and accounting for a choice of design criteria, construction methods, practices and logistics, pollution prevention and reduction measures, labour and community related safeguards. In addition, the IMM is supported by several complementary ***Environment & Social Action Plans*** (ESAP), which provide customized best practice recommendations to ensure that the impacts of the GSS projects are managed in accordance to national and international best practices and benchmarks.

8.1 MITIGATION MEASURES

The Impact Mitigation Matrix (IMM) is detailed in ***Table 8.1.*** In order to ensure that the ESMP is being adhered to by Contractors, who will be responsible for implementing the project, provisions with respect to specific mitigation measures have been incorporated as a part of General and Special Conditions of Contract. The General and Special Conditions of Contract are presented in ***Annexure 2*** and ***Annexure 3*** respectively.

Table 8.1 Impact Mitigation Matrix

Sl. No.	Project Phase /Activity	Potential Impacts	Proposed Mitigation Measures	Responsibility
Planning/Preconstruction				
1	Land procurement	Economic or physical displacement	Design consideration to ensure that the area of the land used for agriculture by the squatter within the eastern boundary of the site to be excluded from the GSS layout. In case this is not feasible, than squatter to be identified and fair compensation to be given as per the Resettlement Framework (RF) developed for the Project.	JUSNL/Design Consultant
2	Substation location and design	Conflict with community due to disturbance to adjoining residential structures in the southwest and northwest of the proposed GSS plot.	Careful design of site to avoid damages to adjacent residential structures	Design Consultant/ Contractor
3	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				
4.a.i	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
4.b.i		Noise and vibrations	All equipment/machineries to be regularly maintained to ensure efficient operation	Contractor
4.b.ii			DG sets with acoustic enclosure should be used	Contractor

Sl. No.	Project Phase /Activity	Potential Impacts	Proposed Mitigation Measures	Responsibility
4.b.iii			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. Informing and taking consent from the village panchayat.	Contractor
4.c.i		Air Pollution	Since, proposed GSS is in close vicinity of the Rangadih Tola Hamlet, contractor to ensure that water sprinkling to be carried out twice a day during dry season on exposed surface area.	Contractor
4.c.ii			Vehicles transporting loose construction/ excavated materials shall be covered with tarpaulin sheets.	Contractor
4.c.iii			Loose construction material/ excavated material shall be stored against any structure or would be kept covered with tarpaulin sheet at the construction site. Site specific…..	Contractor
4.c.iv			All vehicles utilized in transportation of raw materials and personnel, will have valid Pollution under Control Certificate (PUCC)	Contractor
4.c.v			Regular maintenance of machines, equipment and vehicles that will be used for construction activities of substation/tower construction	Contractor
4.d.i		Water/Soil Pollution	Septic tanks and soak pits/modular bio-toilets would be provided at all construction site and labour camp	Contractor
4.e.i		Erosion and sediment	The general slope of the site is towards the eastern direction. The highest contour is present along the western boundary of the site at 217 m. The terrain slightly slopes towards the eastern boundary of the site, where the elevation is 210 m, which is also the lowest contour point of the site. Cut and fill slopes would be protected using standard engineering practices including bio-engineering	Contractor

Sl. No.	Project Phase /Activity	Potential Impacts	Proposed Mitigation Measures	Responsibility
			techniques (**Annexure 5** of the ESMF) wherever feasible.	
4.e.ii			• 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 located adjacent to the site. • Surface runoff/storm water drainage can be discharged into natural drainage channel adjoining the eastern boundary of the site, after passing it through sedimentation tank.	Contractor
4.f.i		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
5.a.i	Community Health and Safety	Injury and sickness of local people	• Coordination with local communities for construction schedules; prior information about incoming vehicles carrying construction materials, deployment of traffic marshals; access restriction for local people at the construction site. • 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;	Contractor
5.b.i		Local Woman Community	• Labour Camp should be located away from the village and it should be access controlled for the local people. • Awareness should be created among the migratory labour that they should not be	Contractor

Sl. No.	Project Phase /Activity	Potential Impacts	Proposed Mitigation Measures	Responsibility
			entered in the village without prior information to the villagers. • Local resource like hand pump, bathing ghat should not be used by the labours.	
6	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
7.a.i	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 Annexure 6)] for blasting operation.	Contractor
7.b.i		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
7.c.i		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; • 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.	Contractor
8.a.i	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;	Contractor

Sl. No.	Project Phase /Activity	Potential Impacts	Proposed Mitigation Measures	Responsibility
			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.	
8.b.i		Conflict with local community due to sharing of local resources (e.g. use of hand pump in adjacent Bhagabandh village by workers engaged at site)	• Workers to be provided with adequate facilities including water for drinking and domestic use to avoid conflict with community resources. • Behavioural training to be provided to workers on how to prevent conflicts with community	Contractor
Operation and Maintenance				
9	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 discharged to into any agricultural field.	Contractor
10.a.i	Handling and disposal of waste	Water/Soil Pollution	The municipal solid waste would be composted in composting pits	JUSNL Subdivision Office
10.a.ii			• 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/JSPCB authorised recyclers; • Annual return [Form 4 Hazardous and Other Wastes (Management and Transboundary	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
			Movement) Rules, 2016] to be submitted to JSPCB.	
11.a.i	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.a.ii			Induction training to all the new employee and six monthly refresher training for substation O&M staff would be organised.	JUSNL Subdivision Office
11.b.i		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 *ENVIRONMENT AND SOCIAL ACTION PLAN*

The supporting ESAP's are as follows:

- Labour Management Plan;
- Occupational Health and Safety Management Plan;
- Gender Action Plan; and
- Citizen Engagement Action Plan.

In addition, Contractors/JUSNL would be expected to work upon customised and site specific Action Plans (e.g., waste management plan, pollution prevention and management plan, top soil management plan etc.), as a part of this ESMP, to demonstrate that the requirements specified therein would be followed during the construction and operational phases of the JSPIP project.

8.2.1 *Labour Management Plan*

It is envisaged that during construction phase of Narayanpur GSS, labourers for various jobs such as civil, mechanical and electrical works will be hired through authorised manpower agencies. It is anticipated that the peak labour requirement during construction phase of the project will be approx. 50 persons involving unskilled, semi-skilled and skilled labourers. Unskilled labourers is likely to be recruited from local villages, while semi-skilled and skilled labourers (approx. 10 to 15) may come from outside area. For labourer, who will spend the night onsite, accommodation will be provided.

The influx of construction labourer will have both negative and positive impacts on the nearby community and local environment. The labourer will be accommodated in temporary campsite within the project boundary, which can have significant interface with the nearby communities. This might also put pressure on the local resources such as roads, fuel wood, water etc.

Labour Management Plan has been prepared to minimize potential health, safety and social impacts associated with influx of project workers on the host population and ensure provision of safe and healthy working conditions, for such workers in consistent with IFC PS 2 and 4 requirements and national labour laws. This labour management plan (refer ***Annexure 7***) has covered following aspects:

- HR Policy and Employment Contract
- Working Hours
- Non-Discrimination and Equal Opportunity
- Child Labour
- Worker Health & Hygiene
- Wage Payment & Benefits
- Worker Accommodation
- Emergency Preparedness & Response
- Worker Grievance Management
- Inspection & Reporting

8.2.2 Occupational Health and Safety Management Action Plan

There may be potential safety hazards for workers or labourers involved during the construction phase of the project. IFC PS2 requires providing the workers with a safe and healthy work environment, taking into account inherent risks and hazards specific to the work.

In view of the above, the construction Contractor shall develop a site specific Health & Safety Management Plan (HSMP) in consistent with all applicable health and safety regulations. The same shall be submitted to JUSNL for approval with progress on the implementation of the plan to be shared with JUSNL on a monthly basis. Template for HSMP, which would be prepared by the contractor is provided in ***Annexure 8.***

8.2.3 Gender Action Plan

As discussed in Section 5.11 of this report, there is imbalance in socio-economic profile of men and women in the study area related to sex ratio, literacy rate and workforce participation.

Following measures are suggested during project implementation to improve gender equality:

- Prioritize temporary employment of women in the project construction work, in keeping with the required skill set;
- Ensure equal pay for equal work for women and men workers;
- Provide basic amenities (such as separate toilets for male and female workers, clean water, drinking water facilities, resting place etc.) for male and female workforce at construction site and labour camp;
- Implement provisions of the Sexual Harassment of Women at Workplace Act, 2013;
- Address gender based violence risk through (i) community engagement throughout project lifecycle, (ii) labour management plan, and (iii) grievance redressal mechanism.

Gender Monitoring Indicators:

Following indicators would be used to adequately monitor gender action plan:

- Number of women employed as a percentage of total persons employed in construction activities;
- Number of women workers earning same wage as men workers, as a percentage of total women workers employed in construction activities;
- Availability of basic amenities and separate toilet at campsite; and
- Constitution of "Internal Compliant Committee" in JUNSL to register sexual harassment case.

8.2.4 Citizen Engagement Action Plan

This plan aims at allowing the engagement of citizens in a systematic manner, which will allow the various stakeholder groups and citizens, to express their individual views, opinions and concerns, while allowing for the project to appropriately respond to them. The plan is aimed at enabling active meaningful engagement with the stakeholder groups, one of the most important mechanisms of which is grievance redressal.

Information Disclosure

Information disclosure is a critical component of the engagement activities to be undertaken for the project. The information disclosure will be undertaken primarily through two means; ***preparation and dissemination of briefing material*** and ***organization of community consultations or group meetings***. Key goal of the disclosure process will be to make information accessible and available to all in a simple and easy to understand manner. The briefing material shall be prepared in local language, i.e. Hindi. Following communication tools shall be designed for effective dissemination of relevant information:

- **Executive Summary of ESIA and ESMP Reports:** This will be kept at the offices of local gram panchayats and also at the project office.
- **Non-technical Summary/Brochures in Hindi:** Sufficient number of the brochures will be circulated during subsequent public meetings/individual consultations during project implementation.
- **Posters on Grievance Mechanism along with contact details:** To be made available at the Gram Panchayat office and other government offices where local people gather frequently.

All documents shall be made available to the public in accordance with relevant provisions of the RTI Act, except when otherwise warranted by legal requirements. Information shall be provided in a timely and regular manner to all stakeholders, affected parties and the general public. The following table provides an understanding of the specific information to be disclosed.

Table 8.2 Information Disclosure Plan

Project Phase/Activity	Disclosed document	Place & Mode for disclosure	Responsible Agency	Target Stakeholder
Planning/ Preparation of DPR, ESIA & EMP	Environmental and Social Impact Assessment Report; Environmental and Social Management Plan	1. JUSNL website 2. World Bank's Infoshop Online, through Project website.	JUSNL Project Office	All citizens

Project Phase/Activity	Disclosed document	Place & Mode for disclosure	Responsible Agency	Target Stakeholder
Construction / Commencement of Construction	Executive Summary of ESIA and ESMP Reports	1. Local Gram Panchayat office 2. Site Office of the EPC Contractor Printed out Documents	Contractor along with the JUSNL Circle/Divisional Office	Community People especially the land owners adjacent to the site, Village Panchayat
Construction / Ongoing construction work	Posters on Grievance Mechanism along with contact details	1. Gram Panchayat office and other government offices where local people gather frequently. 2. Construction site and labour campsite Printed Posters	Contractor along with the JUSNL Circle/Divisional Office	People especially the land owners adjacent to the site, people residing near site, Village Panchayat
Construction / Ongoing construction work	Non-technical Summary of Project/ Brochures in Hindi	1. Site Office of the EPC Contractor 2. Places of public meetings/individual consultations Printed out Documents	Contractor along with the JUSNL Circle/Divisional Office	Local community
Operation / Commencement of operation	Information about date of start of operation and charging of substation and associated transmission line	1. Gram Panchayat office and other government offices where local people gather frequently. 2. Site Office of the EPC Contractor 3. Places of public meetings/individual consultations Public Announcement & leaflets	JUSNL Circle/Divisional Office	People especially the land owners adjacent to the site, people residing near site, Village Panchayat

As part of the information disclosure process, the stakeholders shall be provided with an opportunity to provide feedback and inputs related to the project using the grievance mechanism as defined in ***Section 8.6.3***. The feedback should be recorded and documented. This information disclosure process will thus facilitate the transparency, accountability, and legitimacy as well as operations overseen by it.

Consultation Mechanism

A consultation mechanism has been prepared to ensure involvement of stakeholders' at each stage of project planning and implementation. The mechanism for JPSIP GSS projects is proposed in ***Table 8.3***.

Table 8.3 Summary of Consultation Mechanism

Project Phase	Activity	Details	Responsible Agency	Target Stakeholders
Planning	Securing of Land for substation Site	Consult to identify sensitivities around the site and common	Contractor along with the JUSNL	Community, , especially the land owners

Project Phase	Activity	Details	Responsible Agency	Target Stakeholders
		property and agree to mitigations.	Circle/Divisional Office	adjacent to the site, people residing near site, Revenue Officer, Village Panchayat, Civil Society
Construction	Commencement of Construction	Consult on proposed activity and period of activity- e.g., location of project site, construction and labour camp and associated impacts, ESMP implementation, benefit from the project, procedure for grievance redressal	Contractor along with the site-in-charge (JUSNL)	Do
	Ongoing construction work	Communicate about the progress of construction activity, impact and benefit from the project, record community grievance and redress the same	Contractor along with the site-in-charge (JUSNL)	Do
Operation	Commencement of operation	Communicate about the date of start of operation and charging of substation and associated transmission line	JUSNL Circle/Divisional Office	Do

Grievance Mechanism

A three tier Grievance Mechanism would be used for handling any grievances of the local 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 for Narayanpur GSS

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 Deoghar Circle and all the Executive Engineers and Assistant Engineers in the Deoghat-2 Division within 21 days of the filing of Compliant. In case the aggrieved is not satisfied with the solution provided at Tier 1, he may escalate it to Tier 2: Zone Level.

Tier 2: Zone Level: The Chief Engineer cum GM of Dumka Zone would be the members of Tier 2 level. The Chief Engineer cum GM would hear the aggrieved and also review the proceedings of the Dumka Zone 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, World Bank Funded Projects), 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 through the GRC mechanism or if the complainant is not satisfied with the resolution 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 will 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.

Nodal officer for Grievance Redressal for Narayanpur GSS

Project Implementation Unit (PIU) (Tire 3)	Name: Sri C S Jha Chief Engineer (Transmission, World Bank Funded Projects) Number: 9431780254

Dumka Zone (Tire 2)	Name: Sri S K Pandey (GM-cum-CE) Number: 99397 75741
Deoghar Circle (Tire 1)	Name: Sri S K Baranwal (Electrical Superintending Engineer) Number: 94311 32746
Deoghar - 2 Division	Name: Sri Pradeep Sharma (Electrical Executive Engineer) Number: 96311 68720

8.3 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 in ***Table 8.4***. 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 8.4 Monitoring Plan

Sl. No.	Project Phase /Activity	Potential Impacts	Parameter to be monitored/indicator	Location	Monitoring frequency	Responsibility
Planning/Preconstruction						
1	Land procurement	Economic or physical displacement	Design consideration to avoid the land used for agriculture by the squatters.	-	Once- during the detailed design	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
2	Substation location and design	Conflict with community	Design consideration to avoid interference with private residential structure immediately adjacent to project site	-	Once- during the detailed design	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
3	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						
4.a.i	Site preparation and construction work	Loss of topsoil	Practice adopted to store and reuse topsoil which is removed from the construction site	GSS construction site	Every week	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
4.b.i		Noise and vibrations	Maintenance log book of vehicle/machinery, Number of equipment /vehicle undergoing regular maintenance	GSS construction site	Every week	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
4.b.ii			Presence of acoustic enclosure in DG set	GSS construction site	Every week	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
4.b.iii			How many night time approval was taken	GSS construction site	Every week	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
4.c.i		Air Pollution	Water sprinkling at dust generating area	GSS construction site	Every week	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU

Sl. No.	Project Phase /Activity	Potential Impacts	Parameter to be monitored/indicator	Location	Monitoring frequency	Responsibility
4.c.ii			Tarpaulin cover on vehicle carrying loose construction/excavated materials	GSS construction site	Every week	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
4.c.iii			Tarpaulin cover on loose construction/ excavated materials	GSS construction site	Every week	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
4.c.iv			Number of vehicle not having valid PUCC certificate	GSS construction site	Every Month	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
4.c.v			Maintenance log book of vehicle/machinery, Number of equipment /vehicle undergoing regular maintenance.	GSS construction site	Every Month	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
4.d.i		Water/Soil Pollution	Availability of Septic tanks and soak pits/modular bio-toilets	Construction camp, lay down area	Every Month	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
4.e.i		Erosion and sediment	Measures adopted to prevent erosion	GSS construction site	Every Month	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
4.e.ii			Availability of peripheral site drainage channel, sedimentation tank	GSS construction site	Every Month	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
4.f.i		Depletion of water resource	Water conservation measures adopted at construction and labour camp	Construction site and labour camp	Every Month	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
4.g.i		Alteration /diversion of natural drainage channel	Diversion of natural drainage channel passing through the GSS Site	GSS Site	Every Month	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU

Sl. No.	Project Phase /Activity	Potential Impacts	Parameter to be monitored/indicator	Location	Monitoring frequency	Responsibility
5.a.i	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	GSS construction site	Every Month	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
5.b.i		Local Woman Community	Physical observation of the labour camp before commencement of construction and during construction period.	GSS construction site	Every Month	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
6	Occupational health and safety	Injury and sickness of workers	Awareness of workers, use of PPE by workers	GSS construction site	Every 15 days	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
7.a.i	Blasting (in case of hard rock formation)	Noise and Vibration	Measures adopted to control noise and vibration at blasting site	GSS construction site	Every 15 days	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
7.b.i		Damage to Structure	Record of any damaged and repaired structure	Settlement area, structure near GSS construction site	Every one month	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU

Sl. No.	Project Phase /Activity	Potential Impacts	Parameter to be monitored/indicator	Location	Monitoring frequency	Responsibility
7.c.i		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	GSS construction site	Weekly during blasting work	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
8.a.i	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	Labour camp/GSS construction site	Every 15 days	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
8.b.i		Conflict with local community due to sharing of local resources (e.g. use of hand pump in adjacent Bhagabandh village by workers engaged at site)	Avoidance/reduction of conflict through enhancement/ augmentation of resource requirements	GSS construction site	Every Month	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
Operation and Maintenance						
9	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	GSS construction site	Every Month	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
10.a.i	Handling and disposal of waste	Water/Soil Pollution	Municipal disposal arrangement for GSS, Availability of composting pit	GSS		JUSNL Division/Circle/ JPSIP PIU
10.a.ii			Availability of authorization letter, Annual return (Form 4)	GSS	Annually	JUSNL Division/Circle/ JPSIP PIU

Sl. No.	Project Phase /Activity	Potential Impacts	Parameter to be monitored/indicator	Location	Monitoring frequency	Responsibility
11.a.i	Occupational health and safety of staff	Injury/ mortality to staff during O&M work	Accident-Incident register	GSS	Monthly	JUSNL Division/Circle/ Head Office
11.a.ii			Document pertaining to training/awareness programs and mock drills/awareness level of staff engaged in O&M work of substation	GSS	Monthly	JUSNL Division/Circle/ JPSIP PIU
11.b.i		Injury/ mortality from emergency situation	Accident-Incident list	GSS	Monthly	JUSNL Division/Circle Office/ JUSNL PIU
12	Community health and safety	Injury/ mortality to public	Accident-Incident list	GSS	Monthly	JUSNL Division/Circle/ Head Office

8.4 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, World Bank Funded Projects). 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.

The roles and responsibilities of various officials of JUNSL for carrying out activities related implementation of ESMP, Forest Clearance, Land/ Rehabilitation & Resettlement (R&R) and obtaining ROW are detailed in below table.

Table 8.5 Responsibility Matrix

Sl. No.	Designated Official	Role
1.	Electrical Superintending Engineer (ESE) of Deoghar Transmission Circle	• Overall responsibility for implementation of ESIA and ESMP. • ESE shall be responsible for obtaining Forest Clearance, undertaking Land/ R&R and ROW clearance and shall carry out activities such as submitting proposals, coordinating with concerned authorities, responding to clarifications, making payments etc. • ESE shall be supported by EEE, AEE and JEE. In addition, there shall be a Nodal Officer (EEE rank) in each Circle for environmental and social activities.
2.	Chief Engineer (Transmission WB Projects) in HQ	• Monitoring implementation of ESMP. • Obtaining approvals for release of payments for forest, land, compensation etc. to ESE's Office
3.	Project Monitoring Consultant (PMC)	• Support monitoring of implementation of ESMP. • Coordinate with concerned ESE's Office to obtain progress and status reports.

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. Limited disturbance is envisaged on the neighboring community in Bhagabandh village, but it is understood to be short term and only during the construction phase. However all these impacts are temporary and can be mitigated with proper mitigation measures. Moreover, 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.

Key mitigation measures proposed for addressing impacts include:

- design consideration to ensure that the area of the land used for agriculture by the squatter within the eastern boundary of the site to be excluded from the GSS layout. In case this is not feasible, than squatter to be identified and fair compensation to be given as per the Resettlement Framework (RF) developed for the Project.
- design considerations to avoid interference with private residential structure immediately adjacent to project site,
- noise reduction measures to minimize disturbance to adjacent residential structures,
- dust emissions control measures during construction phase such as water sprinkling,
- covered transportation and storage of construction materials,
- provision of peripheral site drainage channels to prevent erosion,
- coordination with local communities for construction schedules;
- prior information about incoming vehicles carrying construction materials,
- deployment of traffic marshals and access restriction for local people at the construction site.
- development of grievance redressal mechanism to receive and address any issues or concerns that might be reported by the neighboring community.

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

Sl. No	Name of GSS / Transmission Line	Capacity	Length of TL
Scheme – D			
1	132/33 Kv GSS Irba (2x50 MVA)	100 MVA	
2	132 KV D/C 3 ph Irba- Kanke Transmission Line		23.598 km
3	132 kV D/C 3 Ph. Irba - Ratu Transmission line		42.678 km
Scheme – E			
1	132/33 kV GSS at Shikaripara (2x50 MVA)	100	
2	132 kV D/C 3 Ph. Dumka - Shikaripara Transmission line		51.30 km
Scheme – H			
1	132/33 kV GSS at Silli (2x50 MVA)	100	
2	132 kV D/C 3 Ph. Silli - Chouka Transmission line		52.185 km
Scheme – O			
1	132/33 kV GSS at Mahuadanr (2x50 MVA)	100	
2	132 kV D/C 3 Ph. Latehar– Mahuadanr Transmission line		86.72 km
Scheme – P			
1	132/33 kV GSS at Angada (2x50 MVA)	100	
2	132 kV D/C 3 Ph. Silli – Angada Transmission line		39.048 km
3	132 kV D/C 3 Ph. Angada – Irba Transmission line		34.529 km
Scheme – S			
1	132/33 kV GSS at Jarmundi (2x50 MVA)	100	
2	LILO of 132 kV D/C 3 Ph. Dumka–Deoghar Transmission line at GSS Jarmundi		3.69 km
Scheme – X			
1	132/33 kV GSS at Chakuliya (2x50 MVA)	100	
2	LILO of both 132kV Bahragora - Dhalbhumgarh Transmission line at GSS Chakuliya		21.64 km
Scheme – Q			
1	132/33 kV GSS at Hansdiha (2x50 MVA)	100	
2	LILO of 132 kV Lalmatia - Dumka Transmission line at GSS Hansdiha		3.36 km
3	132 kV D/C Hansdiha - Jasidih Transmission line		43 km
Scheme – T			
1	132/33 kV GSS at Amarapara (2x50 MVA)	100	
2	132 kV D/C 3 Ph. Amarapara – Godda Transmission line		67.45 km
3	132 kV D/C 3 Ph. Amarapara - Pakur Trans. line		24.75 km

PHASE-II

Sl. No	Name of GSS / Transmission Line	Capacity	Length of TL
Scheme-A			
1	132/33 kV GSS at Chainpur (2x50 MVA)	100	
2	132 kV D/C 3 Ph. Chainpur - Mahuandanr Tran. line		53.63 km
3	LILO of 132 kV Gumla - Simdega Transmission line at GSS Chainpur		10 km
Scheme - G			
1	132/33 KV GSS Sundarnagar (2x50 MVA)	100	
2	LILO of 132 kV Ramchandrapur - Jadugoda Old Transmission line at GSS Sundarnagar		17.50 km
Scheme - K			
1	132/33 kV GSS at Ramkanda (2 x 50 MVA)	100	
2	32 kV D/C 3 Ph. Ramkanda - Garhwa (220KV GSS) Transmission line		60 km
Scheme - N			
1	132/33 kV GSS at Chhatarpur (2x50 MVA)	100	
2	132 kV D/C 3 Ph. Chhatarpur - Daltonganj (220 kV GSS) Transmission line		41.53 km
3	132 kV D/C 3 Ph. Chhatarpur - Japla Transmission line		29.09 km
Scheme - W			
1	132/33 kV GSS at Kolebira (2x50 MVA)	100	
2	132 kV D/C 3 Ph. Kolebira–Kamdara Transmission line		38.63 km
3	132 kV D/C 3 Ph. Kolebira – Simdega Transmission line		16.44 km
Scheme – AA			
1	132/33 kV GSS at Chouka(2x50 MVA)	100	
2	132 kV D/C 3 Ph. Chouka - Tamar Transmission line		27.60 km
Scheme – R			
1	LILO of one Ckt of 132 KV D/C 3 ph Chaibasa-Manoharpur Transmission Line at132/33 KV GS/S at Goelkera including with 2 nos. of 132 kV bay		14 km

PHASE-III

Sl. No	Name of GSS / Transmission Line	Capacity	Length of TL
Scheme – F			
1	132/33 kV GSS at Meral (2 x 50 MVA)	100	
Scheme – I			
1	132/33 kV GSS at Panki (2x50 MVA)	100	
2	132 kV D/C 3 Ph. Chhatarpur - Panki Transmission line		50 km
Scheme – J			
1	132/33 kV GSS at Nagar Untari (2 x 50 MVA)	100	
2	132 kV D/C 3 Ph. Nagar Untari - Garhwa Trans. line		15.85 km
Scheme – V			
1	132/33 kV GSS at Kandra (2x50 MVA)	100	
2	LILO of 132 kV D/C 3 Ph. Chandil – Rajkharsawan Transmission line at Kandra		10 km
Scheme – Y			
1	132/33 kV GSS at Kurdeg (2x50 MVA)	100	
2	132 kV D/C 3 Ph. Kurdeg – 220/132 kV Simdega GSS Transmission line		45 km
Scheme – Z			
1	132 kV GSS at Chandwa (2x50 MVA)	100	
2	132 kV D/C Chandwa – Latehar Transmission Line		30 km
Additional Scheme-1			
1	132/33kV GSS at Sarath (2 x 50 MVA)	100	
2	132k DC Sarath - Palojori TL		20.10 km
4	132k DC Sarath - Chitra TL		15.14 km
Additional Scheme-2			
1	132/33kV GSS at Surda (2 x 50 MVA)	100	
2	132 kV D/C Surda - Jadugoda Transmission line		20.81 km
3	132 kV D/C Surda – Musabani (DVC) Transmission line		4.6 km
4	132 kV D/C Surda - Bharagora Transmission line		43.04 km
Additional Scheme-3			
1	132/33kV GSS at Naudiha (Palamu) (2 50 MVA)	100	
3	132k DC Naudiha - Chhatarpur TL		18.49 km
Additional Scheme-4			
1	132/33kV GSS at Narayanpur (Devipur) (2 x 50 MVA)	100	
2	LILO of 132kV DC Jamtara - Madhupur TL at Narayanpur (Devipur)		27 km

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 form 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/ refuelling of fuel or oil, filling and refuelling 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 form 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) Jharkhand Biological Diversity Rules 2007
g) Ancient Monuments & Archaeological Sites and Remains Act, 1958
h) Indian Treasure Trove Act, 1878
i) Jharkhand Ancient Monuments and Archaeological Sites, Remains and Art Treasures Act, 2016
j) Jharkhand Timber and Other Forest Produce (Transit and Regulation) Rules, 2004
k) Ozone Depleting Substances (Regulation and Control) Rules, 2000
l) Chota- Nagpur Tenancy Act, 1908
m) Santal Pargana Tenancy Act, 1949
n) Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016
o) E-Waste (Management) Rules, 2016
p) Battery (Management & Handling) Rules 2001
q) Ozone Depleting Substances (Regulation and Control) Rules, 2000
r) Central Ground Water Authority (CGWA) Public Notice dated 4th January 2017
s) 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 authorized 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.

1.5 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 Narayanpur Substation

SCC 1.1	The Contractor shall ensure that adequate erosion and sediment control measures are undertaken during the construction of the substation. In addition to the standard engineering techniques bio-engineering techniques as stated in the Annexure 10 of the ESMF would be adopted for slope stabilization.
SCC 1.2	The Contractor shall ensure that the cut and fill slopes would be protected using standard engineering practices including bio-engineering techniques as stated in the Annexure 10 of the ESMF as appropriate.
SCC 1.3	Contractor should ensure that nighttime movement of vehicles carrying construction equipment and materials to be restricted and speed of the vehicles not to exceed 20 km/hr in the Bhagabandh village road.
SCC 1.4	The contractor shall install signboards at the Bhagabandh village road for speed limits.
SCC 1.5	Contractor should place traffic wardens at the approach road to the site to supervise vehicle movement;
SCC 1.6	JUSN to ensure that design consideration to ensure that the area of the land used for agriculture by the squatter within the eastern boundary of the site to be excluded from the GSS layout. In case this is not feasible, than squatter to be identified and fair compensation to be given as per the Resettlement Framework (RF) developed for the Project.

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
4.	Site Preparation		
4ai	Has the pre-construction equipment checks been carried out (use additional sheets to provide the monitored Leq values)		
4bi	Is regular equipment maintenance being carried out? (Use additional sheets to provide maintenance log)		
4bii	Has monthly noise monitoring been carried out for DG sets		
4biii	Has any permission been provided by Chief Engineer for night time work?		
4ci	Has quarterly air quality monitoring been carried out during the earthwork?		
4civ	Is PUCC certificate log book being maintained on regular basis?		
4civ	Instrument , machine, vehicle maintenance log book should be maintained on regular basis		
4ei	Has the Cut and fill slopes been protected with using standard engineering practices?		
9	Has peripheral site drainage channel and provision of oil-water separator been made for the site?		
4di	Has septic tanks and soak pits/modular bio-toilets would be provided at construction camp?		
4fi	Are best practices been adopted for ground water usage?		
6	Has the safety practices been undertaken during the construction? Please explain in details whether barricading, reflective tapes has been undertaken?		
8bi	What steps has been taken for coordination with local communities?		
5ai	What initiatives have been taken to prevent obstruction to traffic?		
2	Please indicate the actions which have been taken to prevent conflicts with local workers?		
6	Have the workers been provided with relevant PPE?		

EMP Reference	Activities	Observation/ Status till end of last Observation/ Period	Status till end of this Period
13aii	How many observation on non – compliance in using personal protective equipment?		
11ai	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.		

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 Grid Substation:_____ 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 Prescribed Permissible Limit for 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

Labour Management Plan

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. It is anticipated that the peak labour requirement during construction phase of the project will be approx. 50 persons involving unskilled, semi-skilled and skilled labourers. Unskilled labourers is likely to be recruited from local villages, while semi-skilled and skilled labourers (approx. 10 to 15) may come from outside area. For labourer, who will spend the night onsite, accommodation will be provided.

The influx of construction labourer will have both negative and positive impacts on the nearby community and local environment. The labourer will be accommodated in temporary campsite within the project boundary, which can have significant interface with the nearby communities. This might also put pressure on the local resources such as roads, fuel wood, water etc.

Purpose

The purpose of this plan is to minimize potential health, safety and social impacts associated with influx of project workers on the host population and ensure provision of safe and healthy working conditions, for such workers in consistent with IFC PS 2 and 4 requirements and national labour laws.

Scope

The scope of this management plan encompass key labour related aspects with respect to the proposed project construction phase, such as payment of minimum wage, worker's welfare and amenities, hours of work, grievance redressal, non-discrimination and equal opportunities etc.

Regulatory References

All Contractors and its Subcontractors engaged during project construction are subject to the conditions and obligation set out in the national legislative framework, and relevant IFC PS requirements as outlined in the Box below.

International Finance Cooperation (IFC) Performance Standard

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 Performance Standard 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.

National Labour Laws

- Contract Labour (Regulation & Abolition) Act 1970
- Inter-state Migrant Workmen Act, 1979
- Minimum Wage Act, 1948
- Bonded Labour System (Abolition) Act, 1976
- Grievance Redressal Machinery under Industrial Disputes Amendment Act, 2010
- The Child Labour (Prohibition and Regulation) Act, 1986; The Child Labour (Prohibition and Regulation) Amendment Act, 2016
- Employees' Provident Fund and Miscellaneous Provisions Act, 1952
- The Payment of Wages Act, 1936, amended in 2005; Workmen's Compensation Act, 1923; The Equal Remuneration Act 1976; The Equal Remuneration Rules 1976; The Minimum Wages (Jharkhand Amendment) Rules 2015
- Maternity Benefit Act, 1961
- The Contract Labour Regulation and Abolition Act 1970 ; The Contact Labour (Prohibition and Regulation) (Jharkhand Amendment) Rules 2015
- The Inter State Migrant Workmen (Regulation of Employment and Conditions of Service)Act 1979; The Jharkhand Inter State Migrant Workmen(Regulation of Employment and Conditions of Service)(Jharkhand Amendment) Rules 2015
- The Building and other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996; The Jharkhand Building and Other Construction (RECS)(Jharkhand Amendment) Rules 2015
- Employees State Insurance Act, 1948
- Intimation of Accidents (Forms and Time of Service of Notice) Rules, 2004

Roles and Responsibilities

Contractor will be responsible to implement this labour management plan. Junior Engineer (JUSNL) who will be in charge of the site or at the Divisional/Sub-Divisional Offices of JUSNL will be responsible to monitor contractor's performance on implementation of this labour management plant.

Contract Agreement

Each contractor to be mobilised for the project will have a legally binding, written contract with JUSNL that defines the following items. The scope of the contracted work, will be described in terms of:

- the responsibilities and authority limits of each party to the contract;
- a clear definition of the deliverables and minimum content to be provided by the contractor;
- a clear definition of the services to be provided by the contractor;
- any and all constraints imposed on the contractor by JUSNL such as schedule constraints, budget constraints, specific tools to be used, and
- a clear statement of requirements for quality of deliverables and services including the requirement to allow independent quality inspections of materials and processes.

Appropriate terms and conditions which will be imposed on both JUSNL and the contractor will be identified.

In order to ensure that EHSS aspects related to construction workforce are managed in consistent with the applicable regulatory requirements and international best practices, the same shall be incorporated in the contractor bid/agreement document to demonstrate necessary compliance.

HR Policy and Employment Contract

As part of the mobilisation process, the Contractor shall be responsible for submission to JUSNL, for approval, a site specific HR Policy and Procedure that covers worker recruitment and selection processes including selection criteria of each position; method of recruitment; transparency clauses; prohibition of child labour; acknowledgement of cultural differences; non-discrimination and equal opportunity; worker wages and benefits; worker health and hygiene; grievance redressal etc.

The HR Policy shall be appropriate to the size of the project and workforce strength and prepared in consistent with the IFC PS 2 requirements.

In addition to the development of HR Policy, the contractor is required to have written contract documenting and communicating to all workers their general and special conditions of work; standard working hours; entitlement to wages and benefits and conditions concerning the termination of the contract.

Wherever possible, priority will be given for recruitment of local people. Appropriate and requisite on job and EHS training shall be provided to workers. Further, the contractor as part of the engagement should provide a signed code of conduct governing worker's behaviour.

Working Hours

Regarding working hours and conditions, the Contractor shall comply with the national laws and regulations as referred in Box 1.1 and 1.2. According to applicable labour laws viz. *BOCW Act, 1996*, the duration for onsite construction work shall not exceed more than nine hours a day or forty-eight hours a week.

In consistent with the aforesaid regulation each such worker shall be allowed a day of rest every week which shall ordinarily be Sunday, but the Contractor may fix any other day of the week as the rest day.

A notice showing the construction worker wage rate, hours of work, payment date, wage period and contact details of the Inspector having jurisdiction over such area shall be displayed at a conspicuous place. The notice shall be in English, Hindi and in the local language understood by the majority of such building workers.

Non-Discrimination and Equal Opportunity

JUSNL will strictly prohibit discrimination exercised by the Contractor against any employee or applicant for employment because of the individual's race, color, religion, gender, sexual orientation, gender identity or expression, national origin, age, disability, or any other characteristic protected by law.

Child Labour

In accordance to the national labour law provision viz. *The Child Labour (Prohibition and Regulation) Act, 1986 (as amended 2016)*, the engagement of child labour below the age of fourteen is prohibited in any occupation and/or processes. In this regard, efforts shall be made by the contractor to obtain and verify age proof documents for all workers to be engaged for the project.

Adequate care must be taken by the Contractor to prevent adolescent workers who have not received relevant occupational training to be engaged in any hazardous and dangerous activities like height work, confined space entry etc.

An abstract of the relevant section of the Child Labour Act in both English and local language to be displayed by the Contractor at a conspicuous and accessible location within the workplace.

Worker Health & Hygiene

For any construction work involving hazardous processes the Contractor is required to set up an Occupational Health Centre (OHC) The OHC to be kept in charge of a construction medical officer possessing requisite qualification.

Sufficient number of first aid boxes or cupboards to be provided and maintained at the construction site. The first aid box or cupboard to be distinctly marked "First Aid" and shall be equipped with contents as prescribed in the *BOCW Rules, 1998* . All such boxes to be kept in charge of a trained first aider who is readily available during the working hours.
The Contractor shall conduct both pre-employment and six monthly medical examination for all worker deployed onsite particularly those engaged in hazardous process and/or dangerous operations viz. operation of crane, winch or other lifting appliance etc. Such examination to be undertaken by approved medical officer or hospitals and medical records maintained for verification by JUSNL.

Furthermore, the Contractor shall make arrangement to facilitate emergency transportation of workers suffering from serious injuries.

With respect to the provision of sanitation facilities and drinking water, please refer to the below section *"Worker Accommodation"*.

Wage Payment & Benefits

With respect to payment of wages, JUSNL shall ensure that Contractor conforms to the requirements of the Minimum Wages (Jharkhand Amendment) Rules 2015 with equal wages being paid to both male and female workers for work of similar nature. Where any worker operating for the project is required to work over time he shall be entitled, in respect of such overtime work, to wages at twice the ordinary rate of wages

The wage rates, holiday hours of work and other conditions of service of an inter-State migrant workman shall the same as those applicable to other workmen in that establishment. The contractor employing interstate migrant workmen shall provide and maintain suitable residential accommodation for such workers during the period of their employment; provide the prescribed medical facilities to them, free of charge; provide such protective clothing as may be prescribed.

Worker Accommodation

In every place wherein contract worker is required to halt at night in connection regarding work at the establishment, rest rooms or alternate accommodation to be provided by the contractor. Such accommodation shall conform to the following requirements:

Selection of Worker Accommodation Site
Adequate care to be taken for selection of the worker accommodation site viz. avoidance of flood prone zone; proximity to water bodies.

Ventilation & Lighting

All worker accommodation to be sufficiently lighted and ventilated and maintained in a clean and comfortable condition.

Drinking Water

The worker residing at the accommodation to have access to adequate and convenient supply of free drinking water. Drinking water receptacles shall be provided at every worker accommodation and shall be maintained in a clean and hygienic condition at all times in accordance to the applicable labour laws.

The drinking water supplied shall conform to the *IS 10500:2012* standards; in case of non-compliance with the aforesaid drinking water specifications, additional treatment shall be provided or alternative sources of water supply be arranged such as packaged drinking water conforming to IS 10500 requirements. The direct usage of water from bore well should be prohibited unless permission from the same has obtained from competent ground water authorities.

Cooking Arrangements

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 workers 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.

Requirement of provision of cooking facilities (kitchen) at campsite are listed below:

- Places for food preparation are designed to permit good hygiene practices;
- 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.

Security Arrangements

The contractor shall constitute a Camp Security Team headed by a Security Manager who will be responsible for checking the security arrangements round the clock. The residing workforce shall be made aware of security related Do's & Don'ts by the Security Team. The usage of any arms by the campsite security team shall be prohibited and all such personnel shall be imparted necessary training on dealing with conflict with local communities.

Drainage Arrangements

The presence of stagnant water at the campsite may lead to spread of vector borne diseases. Hence adequate care should be taken during selection of the

camp site. The selected site should not be prone to flooding and located at least 200 feet from surface water collections unless they can be subjected to vector control measures.

All worker accommodation sites should be graded, ditched, rendered free from depressions and adequately drained to avoid accumulation of water.

Sanitation Arrangements

Adequate number of sanitation facilities shall be provided at the worker accommodation - a minimum of 1 unit to 15 males and 1 unit for 10 females shall be provided. These facilities should be conveniently located and easily accessible.

All such facilities to be have wholesome supply of water, cleaned frequently (at least daily) and maintained in a clean and hygienic conditions. Each sanitation facility shall be lighted naturally or artificially with adequate lighting at all hours of the day and night.

Waste Water Management

Wastewater in the form of sewage shall be generated from the worker accommodation. The Contractor shall ensure that the accommodation sites are equipped with a combination of septic tank and soak pit system for disposal of sewage or there shall be provision of mobile bio-toilets depending upon the strength of the residing workforce.

It is also recommended that the storm water and sewage system should be maintained separately.

Solid Waste Management

The solid waste shall 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 the Contractor 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/colour coding in terms of recyclable or non-recyclable waste shall be provided in the houses, kitchen premises and canteen in sufficient numbers for collection of garbage;
- Pest control shall be undertaken regularly at the accommodation site;
- Food waste and other refuse are to be adequately deposited in sealable containers and removed from the kitchen frequently to avoid accumulation; and
- Wherever possible, the contractor shall engage with local waste disposal agencies approved by the municipal/rural authorities to ensure disposal of biodegradable and recyclable waste.

Health Care Arrangements

Effective health management is necessary for preventing spread of communicable diseases among the workers and within the neighbouring communities. The following health care arrangements shall be provided by the Contractor at the worker accommodation:

- Adequate first aid kits shall be provided at the accommodation in accessible locations. First aid kit shall contain all type of medicines and dressing material;
- The Contractor shall identify nearby hospital and make an agreement with the hospital to seek health care support including ambulance service for its workers, in case of an emergency.
- Contact details of nearby health care facility (hospital) shall be displayed at the camp;
- Contractor shall identify and train adequate number of workers to provide first aid during medical emergencies;
- Regular health check-ups shall be carried out for the construction workers as discussed in Section 1.1.10; and
- Conducting of awareness training on communicable diseases, AIDS etc. for the resident workers.

Emergency Preparedness & Response

The Contractor at the project construction site to ensure the provision of essential life-saving aids and appliances required to handle emergencies like - head and or spinal injuries; bleeding; fractures; burns dehydration; paralysis; drowning; sunstroke; frost bite; electrical shock and poisonous bites.

Furthermore in construction site where 500 or more workers are deployed, an emergency action plan shall be developed to handle the following emergencies - fire and explosion; lifting appliance collapse; gas leakage; chemical spillage; and natural hazards.
The Contractor shall perform quarterly mock drills at both the site and worker accommodation to evaluate overall preparedness and response in dealing with emergencies.

Worker Grievance Management

A Grievance Redressal Mechanism (GRM) shall be developed for the construction workers which shall include constituting a Review Committee comprising of representatives from both Contractor and JUSNL. This GRM shall have the following elements:

- Proper system for lodging grievances;
- Provision for raising anonymous complaints through complain box;
- 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.

The contractor shall regularly share all the grievance received from workers and local community along with details of how the grievances are redressed, with Junior Engineer (JUSNL) who will be in charge of the site or at the Divisional/Sub-Divisional Offices of JUSNL. Workers of a particular site can also register their grievance with Junior Engineer (JUSNL) who will be in charge of the site or at the Divisional/Sub-Divisional Offices of JUSNL. In case, grievance is registered by in-charge of the site or at the Divisional/Sub-Divisional Offices of JUSNL, process laid down in the project level Grievance Redressal Mechanism (refer Section 8.6.3 of this ESIA report) would be followed.

Inspection & Reporting

The Contractor shall perform monthly inspection of the worksite and accommodation area to assess the status of implementation of the Plan and submit monthly progress report to JUSNL.

- Contractor shall organise monthly progress review meeting with JUSNL to prepare a corrective action plan to deal with health, safety and social issues related to project construction work. All such meeting minutes to be documented and shared with both parties for necessary action.

Annexure 8

Health & Safety Management Plan (HSMP) Template

CONTRACTOR HEALTH AND SAFETY MANAGEMENT PLAN – TEMPLATE

9.1 PROJECT INFORMATION

9.1.1 Management Review

This Management Plan has been developed to outline the Contractor's approach to managing work health and safety at the <INSERT NAME OF PROJECT> at <INSERT ADDRESS>. The Contractor shall

- make this plan available to all workers and contractors on this project and ensure they have the opportunity to read, understand, clarify and ask questions
- keep a copy of the Management Plan readily available for the duration of the project
- review the plan regularly throughout this project and make any revisions known to those working on the project
- <INSERT ANY OTHER REQUIREMENTS>.

9.1.2 Contractor Details

Business name:	
Address:	
Contact person:	
Work phone:	
Mobile phone:	
Fax:	
Email:	
ABN:	
Contract licence number:	
Principal contractor signature:	

9.1.3 Details of Contractor H&S Personnel

Name	Position	Responsibilities

9.1.4 *Scope of Project Work*

Description of project:	
Location of project:	
Start and finish dates:	

9.2 *GENERAL H&S INFORMATION*

9.2.1 *List of Regulations*

Relevant legislation	Tick if applicable
Contractor Labour (Regulation & Abolition) Act, 1970	☑
Contractor Labour (Regulation & Abolition) Central Rules, 1971	☑
<INSERT ANY OTHER RELEVANT LEGISLATION>	☐

9.2.2 *H&S Codes of Practice*

Relevant Codes of Practice	Tick if applicable
Confined spaces	☐
Construction work	☐
Cranes	☐
Demolition work	☐
Excavation work	☐
First aid in the workplace	☐
Hazardous manual tasks	☐
How to manage work health and safety risks	☐
Labelling of workplace hazardous chemicals	☐
Managing electrical risks at the workplace	☐
Managing noise and preventing hearing loss at work	☐
Managing risks of plant in the workplace	☐
Managing the risks of falls in the workplace	☐
Managing the work environment and facilities	☐
Preventing falls in construction	☐
Safe design structures	☐
Scaffolding	☐
Traffic management in workplaces	☐

Welding processes	☐
Work health and safety consultation, cooperation and coordination	☐
Working in the vicinity of overhead and underground electrical lines	☐
<INSERT ANY OTHER RELEVANT CODES OF PRACTICE>	

9.2.3 Contractor H&S Policy

Share a copy of the Principal Contractor H&S Policy.

9.3 RISK MANAGEMENT

9.3.1 Identifying hazards and managing risks

The Contractor shall systematically identify hazards and assess risks before the project starts by using the hierarchy of control (see 1.3.2) in conjunction with:

- developing Safe Work Method Statements (SWMS) to control risks associated with high risk construction work
- using a risk management form to control general construction risks where necessary
- <INSERT ANY OTHER STEPS IF NECESSARY>

The Contractor shall identify risks:

- when introducing a new task; and
- when new information is received about tasks, procedures, equipment or chemicals.

All hazards that are identified throughout the project must be reported immediately to the principal employer. We will inform our workers of our risk management procedures and ensure they are trained in risk management

9.3.2 Hierarchy of Control

The contractor shall control all risks identified by applying the Hierarchy of Controls as follows:

- Eliminate
- Substitute
- Isolate
- Engineering controls
- Administrative controls
- Personal Protective Equipment.

Where possible, we will implement risk controls that are high in the order and will implement multiple controls where necessary.

9.3.3 Critical Construction Work

We have identified the following critical construction work for this project. A Safe Work Method Statement (SWMS) shall be developed for each of the high risk construction work activities. We will also develop SWMSs for any additional high risk work that is introduced or identified during the project.

Critical construction work activity	**Safe Work Method Statement developed and attached (Yes/No)**

All critical construction work shall be governed by a "*Permit to Work*" system which shall be implemented by the Contractor.

The SWMS shall be reviewed by the Contractor when:

- there is a need to change the method of carrying out of the high risk construction work; and
- a risk has been identified that is not included and managed within a SWMS.

9.4 EMERGENCY PREPAREDNESS & RESPONSE

9.4.1 Emergency Preparedness

The Contractor shall be make arrangements for emergency preparedness to:

- show all workers and subcontractors the emergency point as part of their induction (this shall be covered in the induction checklist)
- display emergency procedures in the site office or other visible location
- provide and inspect fire extinguishers at the beginning of the project and six-monthly after that
- <INSERT ANYTHING ELSE RELEVANT TO YOUR PLAN>.

9.4.2 Emergency Procedure

In the event of a fire or similar emergency evacuation, the Contractor shall adopt following measures:

- constitute an Emergency Response Team and develop a response plan encompassing all potential emergency situations:
- stop work immediately and vacate the workplace;
- assist anyone in the workplace who may not be familiar with the evacuation procedures;
- call emergency services on the desired number. Other emergency numbers are on display in the site office (if applicable);
- notify the principal employer;

- assemble in the nominated assembly points until you receive further instructions from the principal employer or emergency services personnel
- <INSERT ANYTHING ELSE RELEVANT TO YOUR PLAN>.

9.4.3 Emergency Contact

The contact details of the Emergency Response Team (ERT) and other emergency responder to be provided here.

9.5 INCIDENT REPORTING & INVESTIGATION

9.5.1 Notification of Incidents

Whenever an incident occurs at the workplace the Contractor shall:

- immediately notify the principal employer and any other authorities in conformance with the applicable regulatory requirements; and
- not interfere with the scene of the incident.

The Contractor shall report the following incidents:

- the death of a person;
- an incident requiring hospitalisation;
- a serious injury or illness of a person as defined in the relevant regulations.

In the event of such an occurrence:

- notify the principal employer who must notify the relevant authorities by the quickest means possible.
- complete and share an **Incident Notification Form** with the principal employer as soon as possible following the incident (must be within 48 hours)
- do not disturb the site until given clearance by the principal employer who will take advice from the local authorities
- the principal contractor shall only give permission to disturb the site when it is agreed that a formal investigation is not required
- if a formal investigation is required, the Contractor will secure the site
- <INSERT ANY OTHER REQUIREMENTS>.

9.5.2 Investigation of Incidents

For any reportable incident, the Contractor shall examine all incident/accident reports and identify trends. This shall be carried out in accordance to an *Incident Investigation Procedure* which shall be developed and comprise of the following key elements:

- Establishing what happened, when, where and why through collection of evidence;
- Investigation of accidents with a high priority - before people's memories fade and while evidence is still available;

- Looking at root or underlying issues not just immediate causes: viz premises, plant and substances, procedures, or people. Underlying causes includes - management arrangements and organisational factors such as design, selection of materials, maintenance, management of change, adequacy of risk controls, communication, competence etc.

All incident investigation findings to be conducted by trained personnel and maintained in the form of a formal investigation report. In case of complex investigations involving major accident hazards, the Contractor shall engage specialist to support the process.

9.6 SITE SAFETY PROCEDURE

The Contractor shall develop *Site Specific Safety Procedure* which shall provide details related to the following:

- Site Safety Rules;
- Site Amenities viz. provision and maintenance of sanitation facilities;
- Site Security Arrangements;
- Provision and display of safety signages at the conspicuous places;
- Provision and maintenance of Personal Protective Equipment's (PPEs);
- Management measures for specific construction hazards viz. fall from heights; excavation work; work near overhead or underground electrical lines; electrical work; scaffolding work; and
- Plan for managing the hazards associated with onsite traffic movement, as applicable.

9.7 H&S PERFORMANCE MONITORING AND REPORTING

The H&S Plan will be reviewed on periodic basis by the Project in Charge and Senior Manager Safety and Compliance the Contractor and shall be shared with the principal employer. The performance of the Contractor will be monitored against the following Key Performance Indicators (KPIs):

- Lost time (in hours) due to accidents (including fatalities);
- Lost Time Injury (LTI) – Frequency Rate
- Number of fatalities;
- Number of reportable accidents; and
- Total of hours of Health and Safety training in the month; and
- Number of grievances raised with respect to Health and Safety.

The aforesaid indicators will be tracked and recorded on a monthly basis by the Contractor H&S Manager and compared with the industry best practices. To this regard, the Contractor shall conduct weekly site safety inspection using a standard inspection checklist and corrective action plan developed and shared with the principal employer.

Annexure 9

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 Amenities	A. What is the drinking water source for the family?					
	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 10

Assessment of Impact Significance

Impacts on Aesthetics & Visual Quality

Impact	Aesthetic and visual impacts			
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**			

Impacts on Ambient 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 Ambient 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 and quality

Impact	Impact on water resources and quality			
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 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	International		
Impact Scale	Low	Medium	High		
Impact Magnitude	Positive	Negligible	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**			



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