



Environment and Social Impact Assessment Report (Scheme X Volume 2)

**Jharkhand Urja Sancharan
Nigam Limited**

Final Report

August 2018

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FINAL REPORT

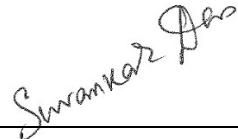
Jharkhand Urja Sancharan Nigam Limited

Environment and Social Impact Assessment Report (Scheme X Volume 2)

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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
ESIA-	Environmental and Social Impact Assessment
ESMF -	Environmental and Social Management Framework
ESZ -	Eco-Sensitive Zone
GCC-	General Conditions of Contract
GM -	Gair Mazrua
GOI -	Government of India
GPS -	Global Positioning System
GSS -	Grid Sub Station
IESE -	Initial Environmental and Social Examination
IMD -	India Meteorological Department
IS -	Indian Standard
IUCN -	International Union for Conservation of Nature
IWPA -	Indian Wildlife Protection Act
JPSIP-	Jharkhand Power System Improvement Project
JUSNL -	Jharkhand Urja Sancharan Nigam Limited
KL-	Kilo Litre
KLD -	Kilo Litre per Day
Km -	Kilometer
KVA -	Kilo-Volts-Ampere
MVA -	Mega-Volts-Ampere
NBWL -	National Board of Wildlife
NH-	National Highway
PCB -	Pollution Control Board
PCB -	Polychlorinated Biphenyls
PfA -	Power for All
PPP -	Public Private Partnership
PUCC -	Pollution Under Control Certificate
SCC-	Special Conditions of Contract
SF6 -	Sulfur Hexafluoride
TCE -	TATA Consulting Engineer
TL -	Transmission Line
WPR-	Work Participation Ratio

EXECUTIVE SUMMARY

The Jharkhand Urja Sancharan Nigam Limited (JUSNL) with financial assistance from the World Bank is implementing the transmission infrastructure development/upgradation under the Jharkhand Power System Improvement Project (JPSIP) and will include: (a) Creation of 25 new 132 kV substations, and (b) Development of associated 132 KV transmission lines of around 1800 km. These 25 substations and associated transmission lines have been organised into 26 schemes. This ESIA covers the transmission lines a) LILO 1 of 132 kV DC Bahragora-Dhalbhumgarh transmission line; b) LILO 2 of 132 kV DC Bahragora-Dhalbhumgarh transmission line, which is part of Scheme X and is to be covered under Phase I of the project. The ESIA has been undertaken based on the outcome of initial walk over survey which identified a preferred alignment based on analysis of three potential alternatives associated with the Bee-line between the two end-points. The level of detail captured in the ESIA is primarily based on the inputs of the walk-over survey; an attempt is being made to include some of the detail emerging from the detailed survey exercise, which is being conducted in parallel by the Design Consultant at this time. More detailed information about the accurate alignment of the transmission line, specific parcels of land which the RoW will intersect, and the exact footprint of the transmission towers would be available during the next phase of project planning, involving Check Surveys is not covered in this ESIA.

The two transmission lines, LILO 1 and LILO 2 of Bahragora-Dhalbhumgarh, are planned to extend for a distance of 20.936 km and 20.813 km respectively and would fall in the district of East Singhbhum. As per the plan, the RoW of the alignment would be 27 m and transmission towers are expected to be set up every 300 m (approx. 2-3 towers per km depending on terrain and other technical, environmental and social considerations), each occupying a land footprint of about 22 m square. Overall, they will run cross country and cover a physical, environmental and social landscape which is typical to the state of Jharkhand - a combination of plateau land exhibiting minor undulations and interspersed with flat terrain and hilly stretches. From the land use point of view, the line alignments would primarily cover agricultural, forest and barren/wasteland use types. The ends of the transmission lines would originate from respective substations of LILO 1 and LILO 2 of Bahragora - Dhalbhumgarh, which have access through road. At several other points along the route, crossings with roads (national or state highways) and railway lines are expected to occur. For access to other points of the proposed transmission line, access would have to be obtained through existing village roads and where required through open terrain.

The construction phase of the project would involve the following activities: (a) Site clearance - Ground vegetation and/or crops on field would be cleared and trees would be lopped or felled, to the extent required, for gaining access to the corridor and to allow for tower construction and wire stringing

activities; (b) For setting up towers within the 22 square m area, limited excavations would be undertaken for footings, concrete foundation developed, framework inserted, and the tower frame would be erected after hauling components to a nearby laydown area using existing roads and the transmission corridor RoW; (c) Mechanical stringing of conductors between towers would be done using a winching machine. The construction activities are anticipated to involve 15-20 people during construction of tower foundation and tower erection and 10-15 people would be involved in tower erection and stringing. Mostly the labour would be staying in fly camps while remaining workers would be staying in laydown areas (comprising of labour quarters and material storage areas). Typical vehicles on site at the construction site would include 2 trucks, 2-3 excavators and 6 light-duty vehicles (LDV), puller and tensioner.

After construction is over, there would be certain restrictions on future development and on the height of trees along the width of the corridor (per guidelines - IS 5613/MoEFCC, GoI Circular 7-25/2012-FC dated 5th May 2014) for the owners of the land parcels which get intersected. At the points where the transmission towers are to be set up, the right of the land for about 22 sq m of land would be obtained by JUSNL, though farmers can continue to pursue agricultural activities within the footprint, without causing any physical damage to the tower structure. Future access to the corridor can be sought by JUSNL for transmission line maintenance and subject to any damages to crops/property caused by such activity being compensated.

The baseline studies have profiled the environmental and social conditions along the two transmission line corridors (LILO 1 and LILO 2 of Bahragora - Dhalbhumgarh TL), covering, in general, a buffer distance of 500 m on either side of the RoW and up to 10 km where any significant environmental sensitivity is identified. 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 districts through which the alignment would pass. Corridor specific environmental and social baseline for each of the transmission lines described below:

LILO 1 Bahragora-Dhalbhumgarh transmission line

- LILO 1 Bahragora-Dhalbhumgarh transmission line passes through Chakuliya and Dhalbhumgarh Block, primarily through rural areas. Among 36 villages located within the study area of LILO 1 of Bahragora - Dhalbhumgarh TL, Bido (879) has the highest population lived in 217 household and the lowest populations were recorded in Barapahar (80).
- Four forest patches of approx. 2410 meters (as demarcated in SoI toposheets) is found near the above mentioned transmission line. The transmission line is located within the Singhbhum Elephant Reserve.
- The transmission line transverses through East Singhbhum district, which is Schedule V areas as specified in the Indian Constitution.

LILO 2 Bahragora - Dhalbhumgarh transmission line

- LILO 2 of Bahragora-Dhalbhumgarh transmission line passes through Chakuliya and Dhalbhumgarh Block, primarily through rural areas. Among 32 villages located within the study area of LILO 2 of Bahragora - Dhalbhumgarh TL, Bido (879) has the highest population lived in 217 household and the lowest populations were recorded in Kakur Rama (73).
- Five forest patches of approx. 2480 meters (as demarcated in SoI toposheets) is found near the above mentioned transmission line. The transmission line is located within the Singhbhum Elephant Reserve.
- The transmission line transverses through East Singhbhum district, which is Schedule V areas as specified in the Indian Constitution.

Community consultations were undertaken in villages (Kalimahulia, Bandangua, Bariyagajar, Kiyashol, Ghatdulmi, Palgam, Ulidih and Toranga) adjoining to the TL alignments to understand the perceptions of the local people with respect to the proposed project, problems faced by local people due to any existing transmission line (if any), livelihood pattern of the villagers etc. During consultations, following observations were recorded from community:

- Diminishing value of land falling within RoW;
- Timely payment of compensation for land, trees and damages to crops;
- Alignment of the transmission line to be designed away from habitation;
- Manual farming to be allowed at the tower base; and
- Employment of local people in project construction work.

During consultation with local community, it was also reported that community members would not have any problem with the labour camp. However, labour camp should be constructed away from village habitation area, if possible.

The potential and associated impacts of the proposed transmission line projects have been identified and evaluated using standard procedures. Source references including past project experience, professional judgment demarcated as a Schedule V area and knowledge of both the project activities as well as the environmental and social setting of the site and surroundings were used in the assessment.

The uptake of land for transmission line corridor, in sections which will pass through privately owned land, may lead to an adverse impact on the value of land parcels falling in the RoW in two ways: one, for parcels in which the towers are to be located, there is a physical obstruction to use of land falling under the tower footprint. The land owner is unable to use the land under the tower for alternative uses, other than agriculture, potentially leading to a reduction of land value, often for the entire parcel. Two, because of restrictions imposed with regard to undertaking any structural construction(s) above a stipulated safe height (depending on the height of the conductor), as per provisions of the Electricity Act 2003, for all land parcels falling within the RoW, the land value also diminishes. It must be noted however, that as per existing practice, only the rights to the use of land for the tower footprint is

obtained from the land owners (typically by invoking the provisions of the Indian Telegraph Act, 1885) on whose lands the towers are to be constructed – no land purchase or acquisition leading to a transfer of ownership is involved in the process. At present, there has been no empirically estimated value or evidence as to the % reduction in land value for parcels falling within the RoW of transmission line.

For stretches of the corridor which would pass through the agricultural land, there is expected to be a loss of crops and consequent economic losses to farmers if the construction phase is timed to a pre-harvest time. Other than that, because of the limited use of heavy vehicles and equipment during construction, it is unlikely that there would be any long-term impact related to compaction of soil or loss of fertility in topsoil. Efforts would be made during the detailed survey and in subsequent project planning phase to ensure that the transmission lines do not pass over any habitat or village dwellings.

For stretches of the corridor which will pass through forest land (4 forest patches covering approx. 2410 meters length for LILO 1 Bahragora-Dhalbhumgarh TL and 5 forest patches covering approx. 2480 meters length for LILO 2 of Bahragora-Dhalbhumgarh TL), the clearing of trees and vegetation along the corridor is anticipated to result in loss of biodiversity, though the adverse impact is expected to be limited to the corridor and with a scope for part of biodiversity to return back to normal conditions after the construction phase gets over with the exception for high trees (which would continue to be lopped during maintenance phase). Current experience with regard to existing transmission lines in Jharkhand confirms this assessment of impact to be minimal. With no Bird Areas of significance along the corridor and no local birds which having sufficiently wide wing spans that result in touching two conductors and resulting in electrocution, impacts to avian population is expected to be insignificant. Because of the narrow width of the corridor and taking into account the status of biodiversity of forests and wildlife in Jharkhand, no long-term habitat fragmentation impacts are expected to occur.

With the construction phase at a particular location along the transmission corridor expected to last about 3-4 weeks, construction related activities are expected to cause local level impacts 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 wastewater 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 the involvement of labour in construction activities. The influx of people (migrant workers, subcontractors and suppliers) may lead pressure on existing social infrastructure and their interactions with nearby rural communities or potentially lead to cultural conflicts, and result in additional vulnerability to women and population belonging to scheduled castes or tribes. At the same time, positive socioeconomic impacts are also expected with scope for business opportunities for local subcontractors, skill acquisition for the local workforce

and employment opportunities arising from recruitment of local construction labour and staff, improvement of roads and access.

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. It needs to be highlighted here that the overall approach for transmission line planning already takes into account the scope for minimising the stretch falling under forest land through the exploration of alternate alignments where forest land is encountered during the initial walkover surveys. 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 includes:

- Arrange for appropriate compensation for loss of biodiversity/forest land caused because of diversion of forest land (Protected forest land covering length 2410 meters for LILO 1 Bahragora-Dhalbhumgarh TL and 2480 meters for LILO 2 Bahragora-Dhalbhumgarh TL), as per regulatory provisions.
- Adopt engineering measures and associated mitigation measures and plans to minimise adverse impacts of the project on elephant habitats.
- Provide appropriate compensation (before beginning of project civil work) for the loss of value of land falling within the tower footprint or along the corridor RoW. In addition, for any temporary loss to crops, vegetation, trees, potentially caused by construction activities, arrange for compensation (before beginning of project civil work) to the affected landowners.
- Adopt appropriate engineering and associated mitigation measures and plans to minimise adverse impacts to local communities during construction activities.
- Adopt appropriate EHS safeguards and good practices to be adopted by construction contractors to ensure that occupational health and safety risks of labours are maintained at acceptable levels. The labour force should also undergo compulsory training on work-related health and safety measures.
- Where possible, ensure local suppliers and contractors implement local employment and procurement policies to the benefit neighbouring communities along the alignment.

As part of the ESMP, it is proposed to arrange for necessary approvals for clearing of forests, cutting of trees, and obtaining consent from land owners through whose land the RoW would be passing. 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 enable JUSNL in ensuring 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 Jamshedpur Zone of JUSNL would be responsible for implementing the technical aspects of the JPSIP with respect to the sub-project 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 considered for the execution phase of the project. A Consultation Framework has been prepared to ensure involvement of stakeholders' at each stage of project planning and implementation. In addition, a three-tier Grievance Mechanism has been proposed for handling any grievances of community related to the project i.e. Tier 1 -Circle level, Tier 2 -Zone level, Tier 3- Grievance Redresses Cell located centrally at the JPSIP PIU in Ranchi.

1.1

BACKGROUND

The Government of Jharkhand with active support of the Government of India's has planned for implementing 24X7 Power for All (PfA) in Jharkhand. The program is aimed at achieving 24x7 reliable powers for all the households by FY 2019. The PfA roadmap includes interventions in generation, transmission, distribution, renewable energy and energy efficiency/ proposed to be implemented during FY16 to FY19. Government of Jharkhand through Jharkhand Urja Sancharan Nigam Limited (JUSNL) has planned to develop the transmission infrastructure in the State. This transmission infrastructure development is being funded from different sources e.g. domestic fund, Public Private Partnership (PPP) and multilateral funding. The Jharkhand Urja Sanchar Nigam Limited (the state run power transmission utility company) has approached the World Bank for assistance to fund a part of the transmission infrastructure under the Jharkhand Power System Improvement Project (JPSIP). The project covers the entire state of Jharkhand except for the districts served by the Damodar Valley Corporation i.e. Dhanbad and Hazaribagh. These two districts are part of the Hazaribagh Zone of JUSNL and are not covered under the Jharkhand Power Sector Improvement Program. However, transmission infrastructure in these districts would be developed under the different programs of JUSNL. 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 I, there are 9 schemes. Three (3) nos of these schemes are located in Ranchi District while three (3) nos of scheme are located in Dumka District and three (3) nos in East Singhbhum district.

This Environment and Social Impact Assessment Report deal with the construction of:

- LILO 1 of 132 kV DC 3 Ph. Bahragora - Dhalbhumgarh transmission line at GSS Chakuliya and
- LILO 2 of 132 kV DC 3 Ph. Bahragora - Dhalbhumgarh transmission line at GSS Chakuliya.

These transmission lines are part of Scheme X of Phase I. The detail of the interlinked subprojects in the Scheme are presented in **Table 1.1**.

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

Sl. No	Details of Scheme X	Capacity (MVA)	Length (km)
1.	132/33 Kv GSS Chakuliya (2x50 MVA)	100	
2.	LILO 1 of 132 kV DC 3 Ph. Bahragora - Dhalbhumgarh transmission line at GSS Chakuliya	-	20.936
3.	LILO 2 of 132 kV DC 3 Ph. Bahragora - Dhalbhumgarh transmission line at GSS Chakuliya	-	20.813

Source: JUSNL

Environmental and Social Impact Assessment of the grid substation at Chakuliya is presented as separate volume: **Scheme X: Volume 1**.

1.3

PURPOSE AND SCOPE OF THIS ESIA

The ESIA process involves the identification of the potential environmental issues in the project and trying to address them through design interventions. The ESIA further carries out impact prediction and evaluation of residual environmental and social issues of a Project. It then goes on to outline the proposed mitigation measures for residual impacts and enhancement measures for positive impacts, which the Project will implement. The objectives of this document are to:

- Identify all potentially significant adverse and positive environmental and social issues of the Project. Enumerate the design modification which has been influenced by the ESIA process and define the final alignment of the transmission lines;
- Gather baseline data to inform the assessment of impacts on the environment as a result of the Project;
- Suggest appropriate mitigation measures to effectively manage potential adverse impacts; and
- Developing an Environmental Management Plan (EMP) to implement suggested mitigation measures to 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 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 transmission line 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 transmission line which forms the basis for assessment of potential impacts;
- Chapter 6 presents the alternative analysis carried out for the transmission line;
- Chapter 7 presents the likely impacts from the proposed transmission line over the lifecycle of the project along with its severity levels;
- Chapter 8 elaborates on the stakeholder identification process adopted and a brief of the public consultations undertaken to capture the local residents / stakeholders perceptions;
- Chapter 9 presents the mechanism of the implementation of the proposed mitigation measures complete with responsibility and resources requirements; and
- Chapter 10 presents the Conclusions and Recommendations.

1.5

LIMITATION

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

1.6

USES OF THIS REPORT

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

2.1

APPLICABLE LAWS AND STANDARDS

The applicable acts, regulations, and relevant policies in the context of the project are presented in below table.

Table 2.1 *Regulations Triggered for the Project*

Sl. No.	Regulation	Applicability & Action Required	Responsibility
A. Electricity Related Regulation			
1.	Electricity Act 2003, Indian Telegraph Act 1885 and Department of Power, Government of Jharkhand notification dated 15th December 2017	<p>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.</p> <p>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.</p> <p>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, before beginning of project construction work.</p> <p>Based on a Notification dated 15th of December, the Jharkhand Government has notified the following arrangement for compensation:</p> <ul style="list-style-type: none"> • Compensation at the rate of 85% of land value as determined by District Magistrate or any other authority based on Circle rate/ Guideline value/ 	JUSNL,JPSIP

Sl. No.	Regulation	Applicability & Action Required	Responsibility
1.	Stamp Act rates for tower base area (between four legs) impacted due to installation of tower/pylon structure; • Compensation towards diminution of land value in the width of RoW Corridor (27m for 132 KVA transmission line) due to laying of transmission line and imposing certain restriction would be decided by the States as per categorization/type of land, at 15% of land value, as determined based on prevailing Circle rate /Stamp Act rate.		
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 and its contractors would comply with the requirements of these regulations.	JPSIP, Contractor

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.	Forest Conservation Act, 1980	This Act mandates prior permission of the Forest Department for any activity which is to be undertaken on Forest Land. The provisions of conversion of forest land for non-forest purpose are specified under this Act. Some stretches of the transmission line have traversed through forest area. Thus clearance has to be obtained from relevant authorities under the Forest (Conservation) Act, 1980.	JPSIP, Contractor
3.	Jharkhand Timber and Other Forest Produce (Transit and Regulation) Rules, 2004 as amended	For felling of trees in the forest land identified within the ROW of the transmission line, permission need to be obtained from DFO or authorized ACF.	JPSIP, Contractor
4.	Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act 2006	The applicability of this Act has been linked with forest clearance process under Forest (Conservation) Act, 1980 w.e.f. August 2009 by MoEF. As part of the forest clearance process rights of the Scheduled Tribes and Other Traditional Forest Dwellers is required to be settled by District Collector.	JPSIP
5.	Ancient Monuments & Archaeological Sites and Remains Act, 1958; Indian Treasure Trove	Proposed transmission line did not traverse through archaeological site. Thus National and State level Acts on Ancient Monuments and Archaeological Sites will not be triggered	JPSIP, Contractor

Sl. No.	Regulation	Applicability & Action Required	Responsibility
	Act, 1878; Jharkhand Ancient Monuments and Archaeological Sites, Remains and Art Treasures Act, 2016	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.	
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 regulates the employment of women in certain establishments for certain periods before and after child-birth and to provide for maternity benefit and certain other benefits. JPSIP and its contractors would comply with the requirements of these regulations.	

Sl. No.	Regulation	Applicability & Action Required	Responsibility
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 assessment is being carried out for this project.	Environmental and Social Consultant of JPSIP

Sl. No.	World Bank Policies/Guidelines	Applicability	Responsibility
2.	BP 4.11 Physical Cultural Resources	<p>The Bank requires environmental assessment (EA) of projects under Bank financing to help ensure that they are environmentally sound and sustainable.</p> <p>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.</p> <p>As per requirement of the OP 4.01, environmental assessment is being carried out for this project.</p>	Environmental and Social Consultant of JPSIP
3.	OP 4.36 Forests	<p>This policy contributes to Bank's mission of poverty reduction and sustainable development through management, conservation and sustainable development of forest ecosystems and their associated resources. <i>As the project site is located on forest land, this Policy would be triggered.</i></p>	Environmental and Social Consultant of JPSIP
4.	OP 4.10 Indigenous Peoples	<p>This policy contributes to the Bank's mission of poverty reduction and sustainable development by ensuring that the development process fully respects the dignity, human rights, economies, and cultures of Indigenous Peoples. For projects which are likely to have impact on the tribal community a Tribal Development Plan would be developed and implemented.</p>	Environmental and Social Consultant of JPSIP/JPSIP
5.	IFC/WB General EHS Guidelines	Recommendations of these guidelines would be incorporated in ESMP and	Environmental and Social Consultant and Technical Consultant of JPSIP
6.	IFC/WB Guidelines for Power Transmission and Distribution	Bidding document for this project.	

3.1

PROJECT LOCATION

LILO 1 and LILO 2 of Bahragora - Dhalbhumgarh transmission line (TL) alignment will traverse through Dhalbhumgarh and Chakuliya block of East Singhbhum district. The administrative divisions through which both the alignments will pass are presented in *Table 3.1*, *Figure 3.1* and *Figure 3.2*.

Table 3.1 *Administrative divisions of TL Alignments*

Sl. No	Line	District	Block	Approx. segment [Angle Point- from -to]
1.	LILO 1 of 132 kV DC 3 Ph. Bahragora - Dhalbhumgarh TL	East Singhbhum	Dhalbhumgarh	AP 1 - AP 6
2.	LILO 2 of 132 kV DC 3 Ph. Bahragora - Dhalbhumgarh TL	East Singhbhum	Dhalbhumgarh	AP 1 - AP 7
			Chakuliya	AP 7- AP 32
			Chakuliya	AP 8 - AP 32

Figure 3.1 Administrative Setting of LILO 1 of Bahragora -Dhalbhumgarh TL Alignment

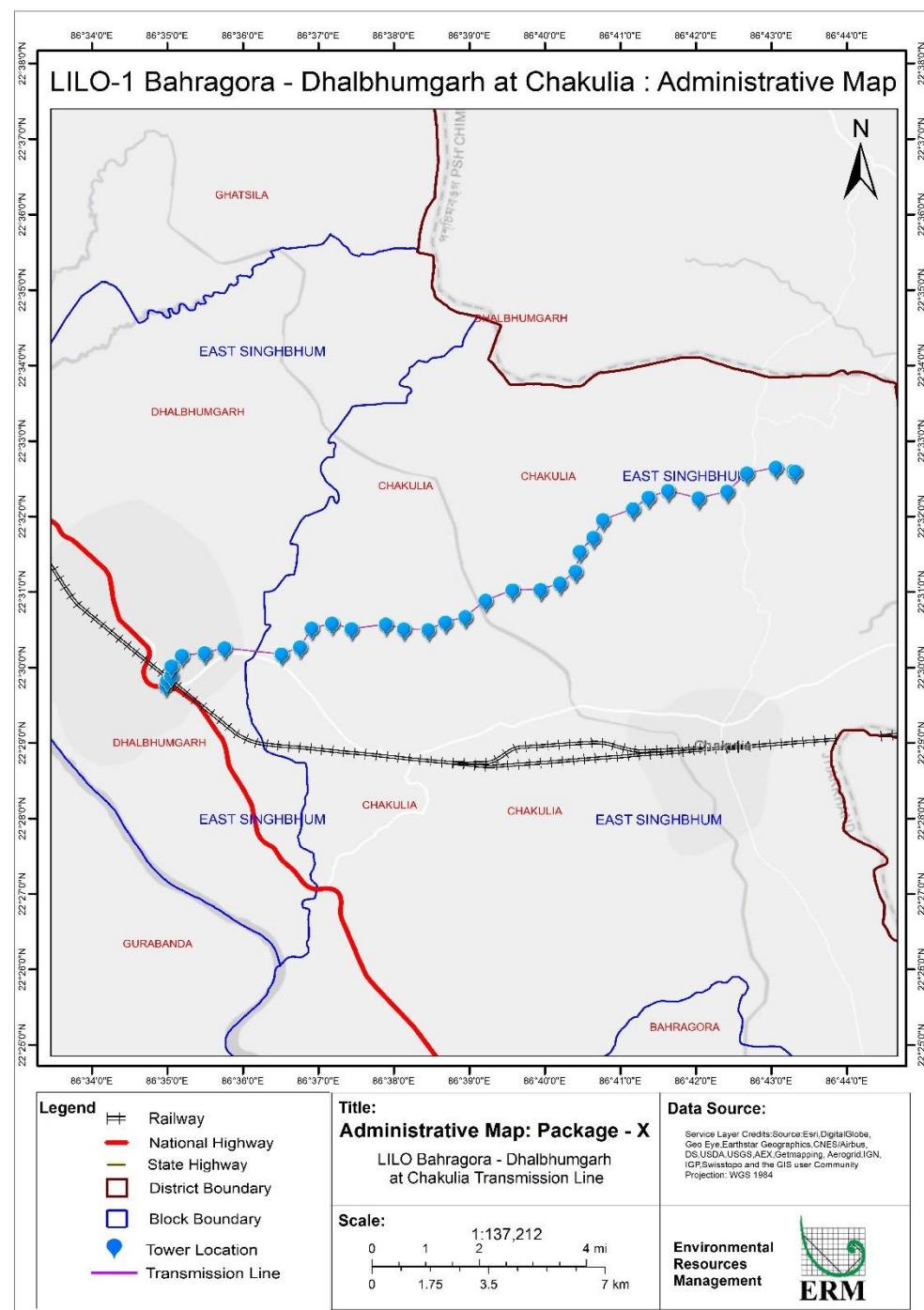
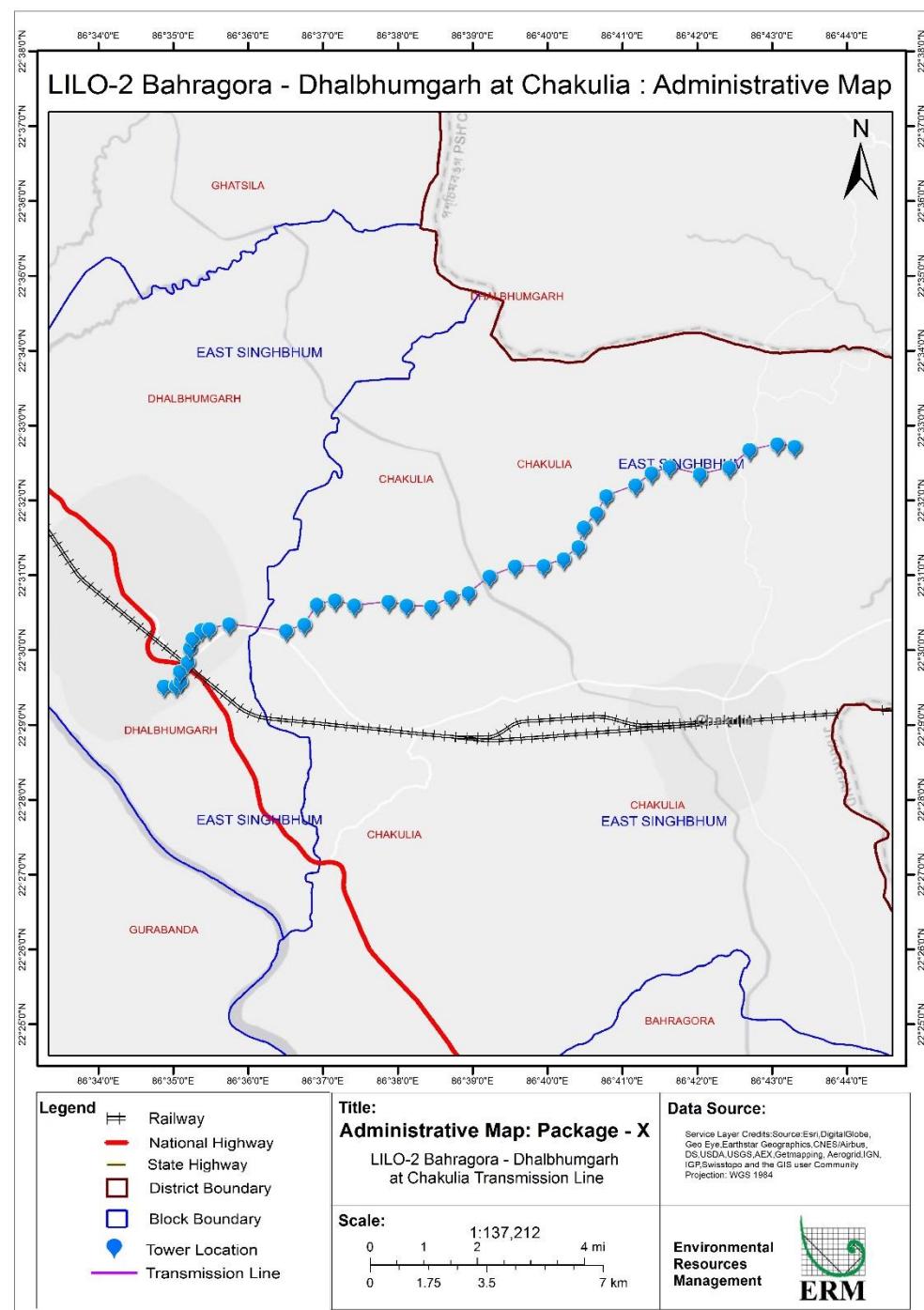


Figure 3.2 *Administrative Setting of LILO 2 of Bahragora -Dhalbhumgarh TL Alignment*



3.2

ACCESSIBILITY

The National Highway (NH) 18 (connecting Jamshedpur with Dhanbad) traverse close to both the TL alignments. Also, State Highway (SH) 9 traverses across both the TL alignments. Jamshedpur (Jharkhand) – Kharagpur (West Bengal) railway line traverse close to both the TL alignments. Locations where highway and railway line cuts the TL alignments are presented in *Table 3.2*. Accessibility map of the alignment is depicted in *Figure 3.3*.

Table 3.2 *Intersection of the Highways / Railway line with the TL Alignment*

Sl. No	Line	Highway/Railway	Approx. segment [Angle Point(AP) from -to]
1.	LILO 1 of Ramachandrapur - Jadugoda transmission line (TL) alignment at Sndernagar Substation	SH 9	AP 30 - AP 31
		Railway line	AP 1 - AP 2
2.	LILO 2 of Ramachandrapur - Jadugoda transmission line (TL) alignment at Sndernagar Substation	SH 9	AP 31 - AP 32
		NH 18	AP 1 - AP 2
		Railway line	AP 1 - AP 2

Source: ERM Survey

From above discussion it is apparent that there are NH and SH in the vicinity of the alignments. Also there are numerous village roads connecting villages in this area with NH 18 and SH 9. For the purpose of construction, these existing roads would be used for approaching the tower base locations. However in case at some of the tower location there are issues with regards to access the construction vehicle would ply over the agricultural field.

Figure 3.3 LILO 1 of Bahragora - Dhalbhumgarh TL Alignment on Satellite Imagery

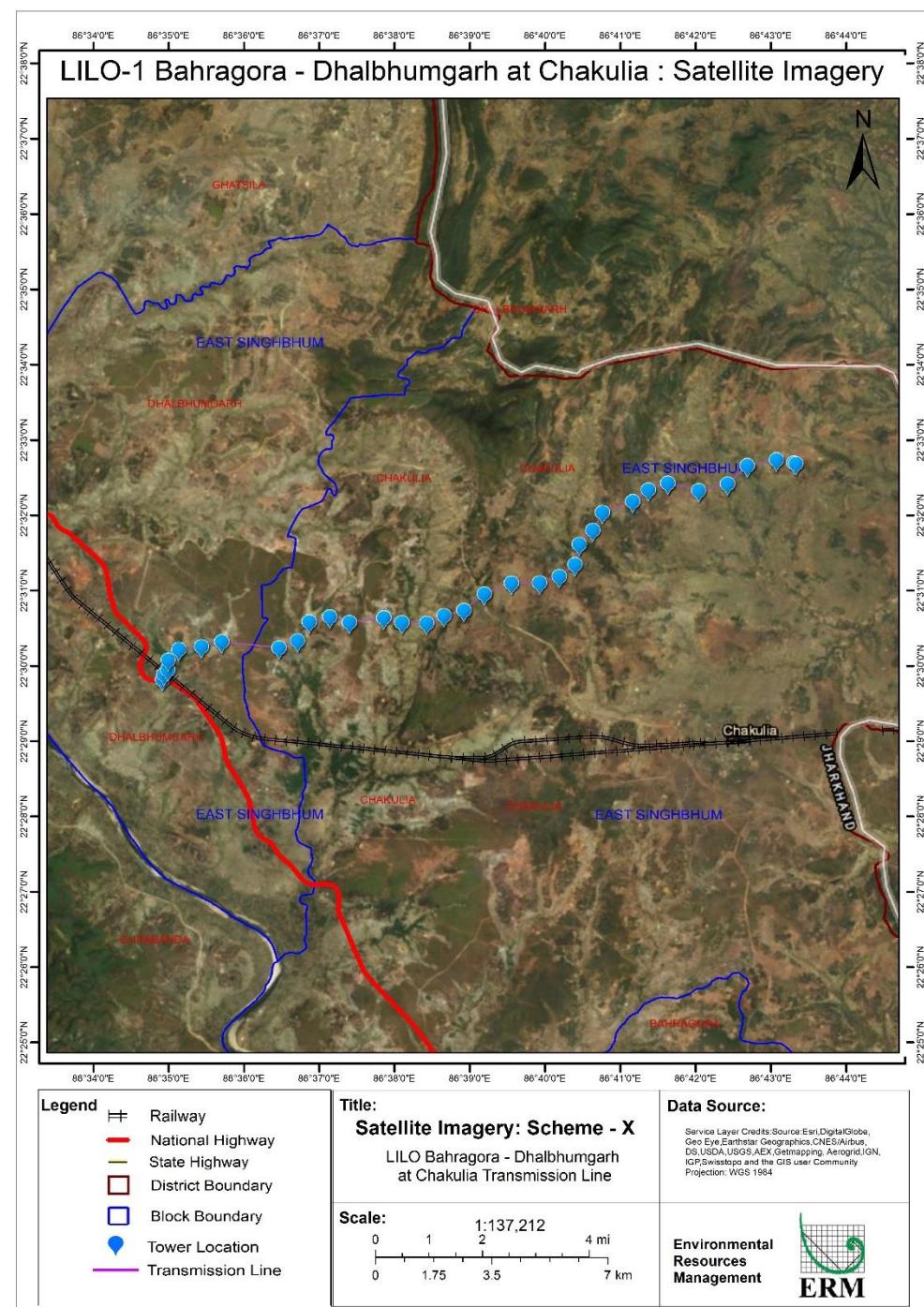
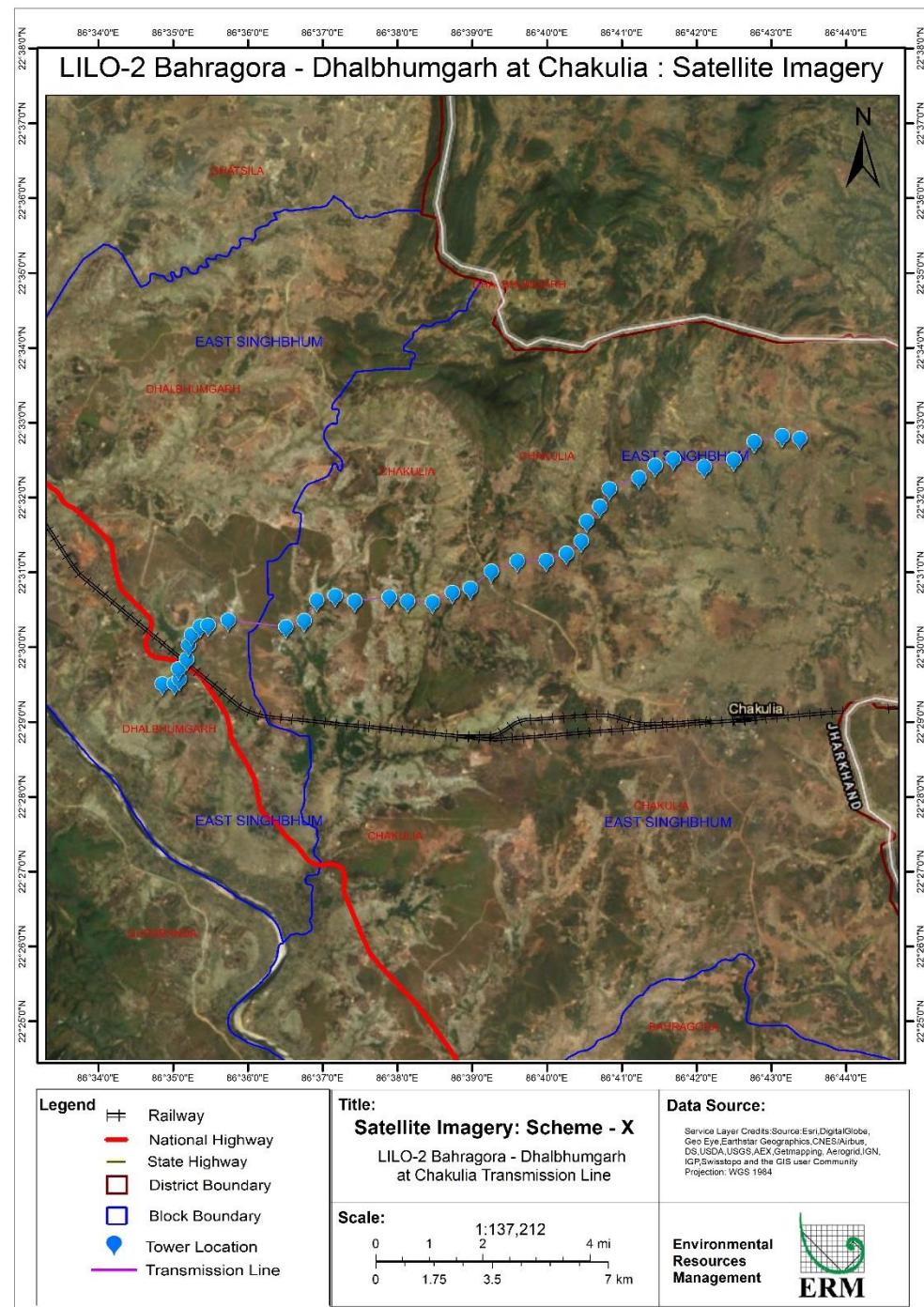


Figure 3.4 LILO 2 of Bahragora - Dhalbhumgarh TL Alignment on Satellite Imagery



Different phases of transmission line projects are described below.

3.3.1

Project Planning

During the stage the route planning for the transmission line takes place. At planning stage three alternative routes for each of the transmission line are identified avoiding sensitive areas such as the major settlements, forests etc. and based on other technical considerations. A preliminary level analysis is carried out to identify the best alternative. The typical activities which would be carried out during the project conceptualisation phases include:

- Walkover surveys of the alternative alignment;
- Techno-economic and Environmental and Social Analysis of the alternative alignment for deciding on the final ;
- Detailed survey of the final alignment; and
- Soil investigation of the tower locations at regular interval to ascertain the type of foundation.

3.3.2

Project Construction Activities

The construction of the transmission line route includes carrying out check surveys, site clearing, access road establishment, foundation construction, structure installation and finally energising. This phase is expected to take between 18 – 24 months to complete. The project construction activities would include a number of activities including:

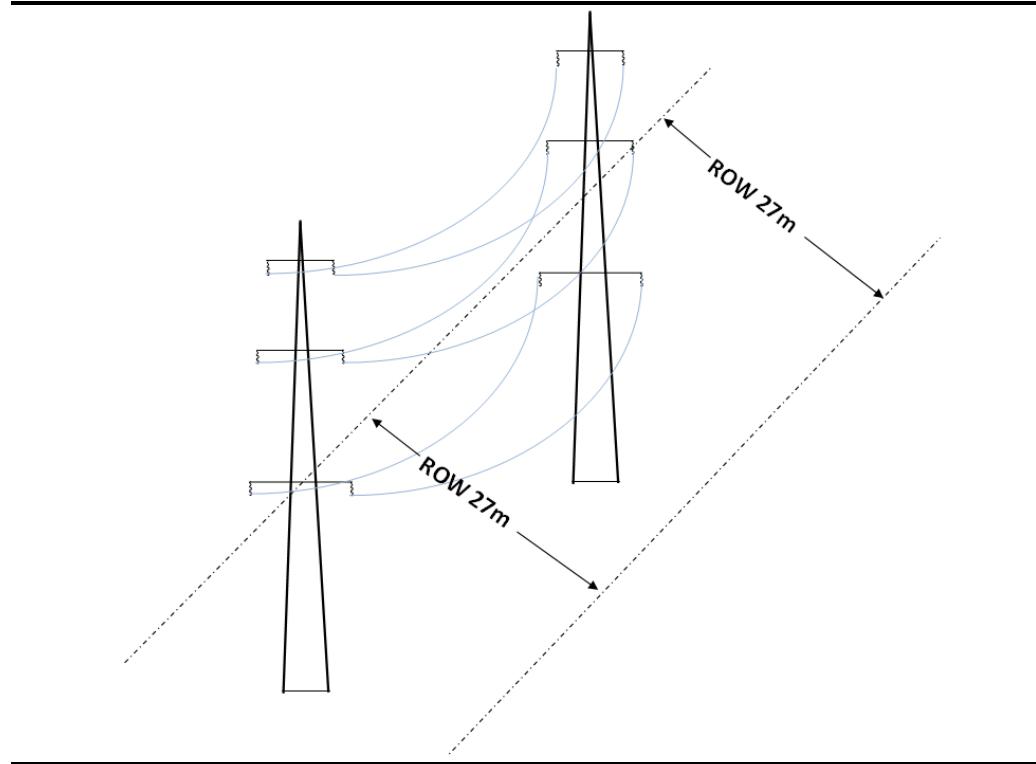
- Check Surveys;
- Site Clearing including vegetation removal and tree felling;
- Excavation for tower foundation, construction of the concrete bases for the transmission line pylons;
- Hauling in of the pylon components and other raw materials;
- Assembly and erection of the towers;
- Stringing of the transmission line; and
- Site rehabilitation.

Check Surveys

The check surveys are carried out by the contractor at the initiation for fixing the tower locations. At this point of time once the tower locations are known, the ownership of the land is identified by the Contractor with the help of the Revenue Department. Civil construction work would be initiated after the land owner has provided his/her consent and the compensations for damages have been paid.

All construction activities would be carried out within the Right of Way for the safe operation of the transmission line. The right of way for the 132 KV D/C transmission line is 27 m as per IS 5613.

Figure 3.5 Right of Way for 132 KV Transmission Line



Clearing of Sites

At the tower footing site all vegetation in the footprint of the tower base and the working area of approximately 2 m on each side of the base are cleared of vegetation.

Excavations

The total depth of foundation, below ground level shall generally be 3.0 to 3.5 m ⁽¹⁾. However, depth of tower foundations will vary depending on the soil condition and tower type. Excavations would be carried out for the foundations of the towers using an excavator. Each excavation would be inspected and tested to confirm its suitability. The foundations would be filled up with concrete. As per Annexure 2.0 of the DPR a typical suspension tower ⁽²⁾ would require 4.7m X 4.7 m area.

The framework, reinforcing bars, embedded of the tower and any earthing elements would be placed in the pits. A 50 mm thick pre-stressed concrete cement pad is laid at the base of the foundation. Concrete will be sourced from a 'ready-mix' truck which will access the site or concrete will be mixed on site using a portable concrete mixer.

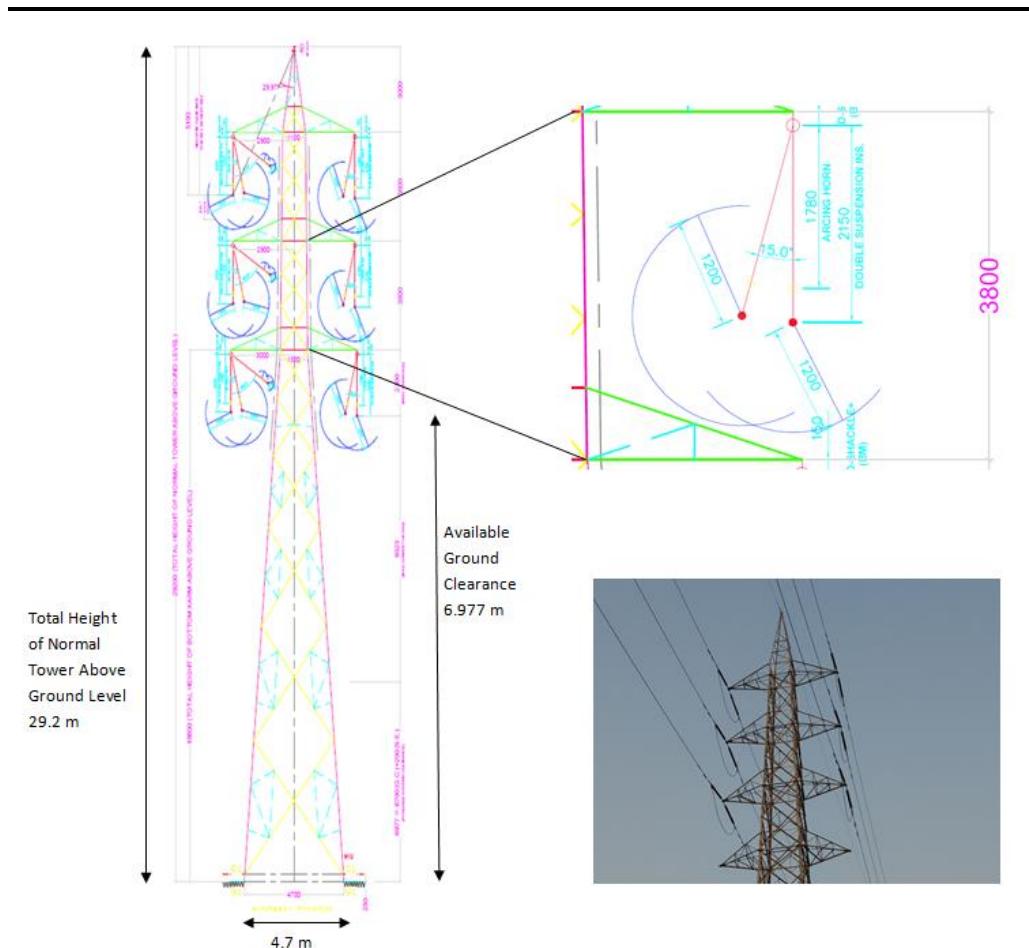
Approximately, 10-15 m³ of concrete is required per tower. The steel used for the tower foundation would conform to IS 456-2000. The casting of the

(1) Section 5.6.2.6 of Detail Project Report (DPR)

(2) Annexure 2.0 of DPR considers Type 2 tower in Wind zone 2.0 Category 2 with single ASCR conductor as a typical conductor.

foundation would take approximately 15- 30 days and would involve 15- 20 labours depending on the terrain and soil conditions. Approximately, 60 m³ of water is required daily for the purpose of construction and allied activities. Once the excavations have been filled, the concrete requires 28 days for curing. The excavated soil would be backfilled and compacted as per the good engineering practices.

Figure 3.6 Typical Electrical Clearance Diagram for Tower Type - DD2 (Suspension Tower)



Note- Information derived from Annexure 2.0 of Detail Project Report prepared by Design Consultant

Erection of Tower

The material for the construction of the tower would be delivered directly from the storage yard/lay down area directly to the tower construction site. The material would be brought to the site directly either by tractor trailer or manually depending on the accessibility. The tower construction would start after the setting of the concrete is complete. The setting time, as specified in the Indian Standards (usually 28 day) would be maintained before the construction of the tower can begin. About 50 litres of water would be required at each of the tower site for the purpose of curing. It is estimated that in Scheme X 164 towers would be constructed ass presented in *Table 3.3.*

Table 3.3 Estimated number of towers in Scheme X

Sl. No	Name of Alignment	No of Towers (nos)
1.	LILO 1 of Bahragora -Dhalbhumgarh TL	81
2.	LILO 2 of Bahragora -Dhalbhumgarh TL	83
Total Number of towers in Scheme X		164

The erection of the tower is done manually by assembling the prefabricated component of the lattice structure. The components are also hoisted manually by using a pulley system. Approximately 10-15 people are involved in the erection of the tower.

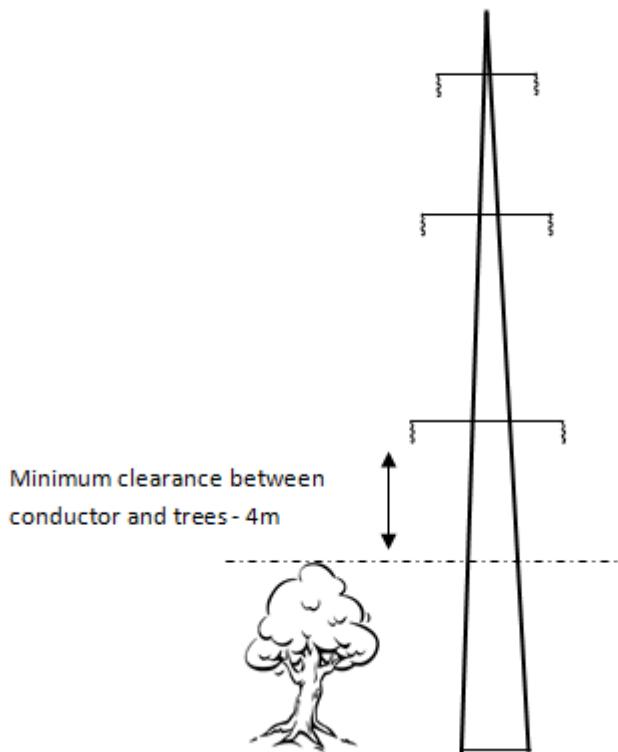
Stringing of Conductors

The stringing of the conductors can be done by either manual or tension method. Usually tension methods are used for stringing as this method keeps the conductor surface safe during stringing process. In this method, the conductor is kept under tension during the stringing process to keep the conductor clear of the ground. A pulling line is initially pulled into the travellers which are then used to pull the conductor from the reel stands using specially designed tensioners and pullers. There are basically two types of pulling machines used in the construction of transmission line being strung under tension. These are defined as bull wheel and drum/reel-type. Pullers would be equipped with load-indicating and load-limiting devices. Tensioners would be equipped with tension indicating devices. The capacities of the puller and tensioner would be based on the conductor, span length, terrain, and clearances required above obstructions. Sag tensions can never exceed during stringing. Required capacity for both puller and tensioner can be calculated as mentioned in IEEE 524⁽¹⁾. Positive braking systems will be required for pullers and tensioners to maintain conductor tension when pulling is stopped.

Tree felling/lopping: Within the width of Right of Way (RoW), trees will be felled or lopped to the extent required, for preventing electrical hazard. As per Government of India Circular 7-25/2012-FC dated 5th May 2014, minimum clearance between conductor and trees would be 4m for 132 KV transmission line. The maximum sag and swing of the conductors are to be kept in view while working out the minimum clearance mentioned of 4m. In the case of transmission line to be constructed in hilly areas, where adequate clearance is already available, trees will not be cut except those minimum required to be cut for stringing of conductors.

(1) Guide for the Installation of Overhead Transmission Line Conductors

Figure 3.7 Minimum clearance between conductor and trees



Note: Information derived from Government of India Circular 7-25/2012-FC dated 5th May 2014

3.4 RESOURCE REQUIREMENT

3.4.1 Land Requirement

Land will be required both for transmission line tower footing and 27 meter Right of Way for the 132 kV transmission line. As the detail survey of route alignment is not yet completed, exact land requirement is yet finalized. As stated earlier in Environmental and Social Management Framework for this project no land will be acquired for this project. However, there would be restriction on use of land falling within right of way and tower base. As per the regulation of Government of Jharkhand¹, due to restriction of land use, compensation at the rate of 85% of land value would be paid to land owners for tower base area. For RoW, compensation at the rate of 15% of land value would be paid to land owners towards diminution of land value in the width of RoW Corridor.

3.4.2 Manpower

The construction activity would be carried out by primarily three teams i) foundation ii) tower erection iii) stringing. The foundation construction team would have around 15-20 labours while the tower erection team which would follow would have 10-15 people. Finally the stringing team would also have around 20-30 people involved in the job.

1) Department of Power, Government of Jharkhand notification dated 15th December 2017

Since these teams would be travelling along the transmission line, they would preferably be staying on fly camps setup along the transmission line corridor. However for storage of the material, a laydown area would be constructed. The area would also be used for housing of labours.

3.4.3

Water uses

The water usage would include water for both construction and domestic activity. During tower foundation approximately 60 m³ of water (60 KL) will be required daily while in the tower erection phase approximately 50 L of water would be required daily. During stringing phase the water requirement would be primarily for domestic activity only and would be in the tune of 25 L per day.

3.4.4

Vehicle usage

Typical vehicles on site at TL alignment include 2 trucks, 2-3 excavators and 6 light duty vehicles (LDV), puller and tensioner.

3.4.5

Major material required During Construction

Equipment and material necessary for the construction of the transmission line is presented in *Table 3.4*.

Table 3.4

Equipment and Material required for Transmission Line

Sl. No	Activity	Equipment Required
1	Foundation of Towers	Stub of Towers Stub Setting Templates Stub Setting jacks From boxes for concreting Wooden planks for shuttering Concrete mixer machines , Vibrating Machines, Dewatering Pumps Back hoe Excavator Sand Cement Aggregate Metal Screens and other tools and tackles related for excavation , concreting and backfilling
2	Erection of Tower	Tower steel Members , nuts, bolts and rivets Derrick Poles for lifting of the tower members Poly propylene rope for Guying purpose Pulleys tools and tackles
3	Stringing of Conductor and earth wire	Conductors and earth wire drums Insulator discs hardware filings and accessories Tensioner and puller machine for stringing purpose Pilot wires for paying off earth wire Hydraulic compressor machine for making joints of conductors Pulley and sheaves , roller , clamps wires , ropes etc for stringing purpose

Source: JUSNL

3.5 WASTES

3.5.1 *Wastewater*

The wastewater generated at the construction phase would be primarily domestic wastewater from construction camp and laydown areas. These would be treated through septic tank and soak pit. In case of fly camp for the construction of the transmission bio-toilets would be provided.

3.5.2 *Solid Waste*

The solid waste generated from the construction activities would be primarily municipal solid waste.

3.6 PROJECT TIMELINE AND PROJECT COST

The estimated cost for the Scheme X is INR 93.12 crore while that of the transmission line is INR 40.51 crores. The time estimated for the construction period is envisaged to be 24 months.

A project level Environmental and Social Impact Assessment (ESIA) involves a systematic identification and evaluation of the potential impacts (effects) of the proposed transmission line project 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 & social effects of a project and ultimately identify actions which can ensure that the projects benefits outweigh the impact on the bio-physical and social environment. The activities which have been undertaken in each of these steps/stages are presented in the subsection below.

4.1

SCREENING & SCOPING

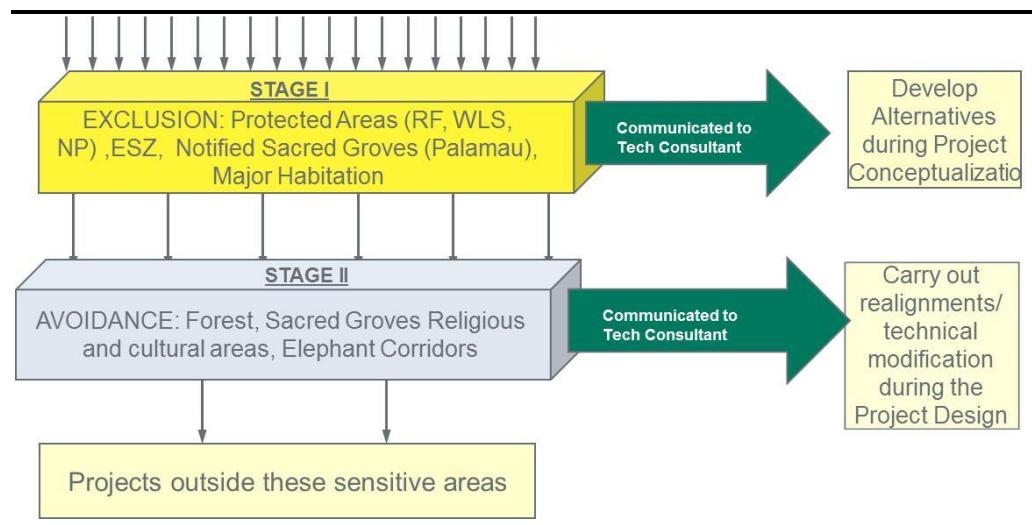
An initial reconnaissance was conducted along the TL alignments to understand prevailing environment and social setting in its immediate vicinity and use it as a basis for undertaking the screening and scoping exercise for the ESIA.

As defined in the ESMF, a two stage screening process has been followed for transmission line projects. The first level of screening was carried out with the analysis of the alternatives. While developing the alternatives JUSNL had taken into consideration the following criteria:

- Exclusion of protected areas such as Wildlife Sanctuary, National Park, Eco-Sensitive Zones etc.
- Forest land as identified on the Survey of India toposheet should be as less as possible;
- Avoidance of settlements as much as possible; and
- Technical constraints such as crossing e.g. rivers, railways, roads should be as low as possible.

The second stage of screening was carried out to identify and avoid forest land (wherever possible) on the best alternative. During this stage the best TL alignment was scanned for identifying any stretch of the alignment which has passed through any forest land. These were communicated to the Design Consultant for further consideration during the detailed survey stage. Moreover, during detail survey stage, it would be ensured by the Design Consultant that no houses are falling within the RoW of the transmission line.

Figure 4.1 Two Stage Screening Process



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 the transmission line. The results of the IESE has been recorded in an Environmental and Social Impact Identification Matrix presented in the IA Section (**Chapter 7**) and was used as a tool for scoping the ESIA to potential environmental and social issues of concern. The IESE also helped in determining the requirement for other specialized studies e.g. 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 & social characteristics of the area due to operation of the proposed project during its life cycle.

Considering the project activity described in **Chapter 3** it is anticipated that scale and magnitude of project related impacts are likely to be perceived in an area within 500 m both side of the alignment and has been considered to be the study area for the ESIA. Site surveys were conducted in the study area understand the environmental setting of the alignment 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 alignment 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.

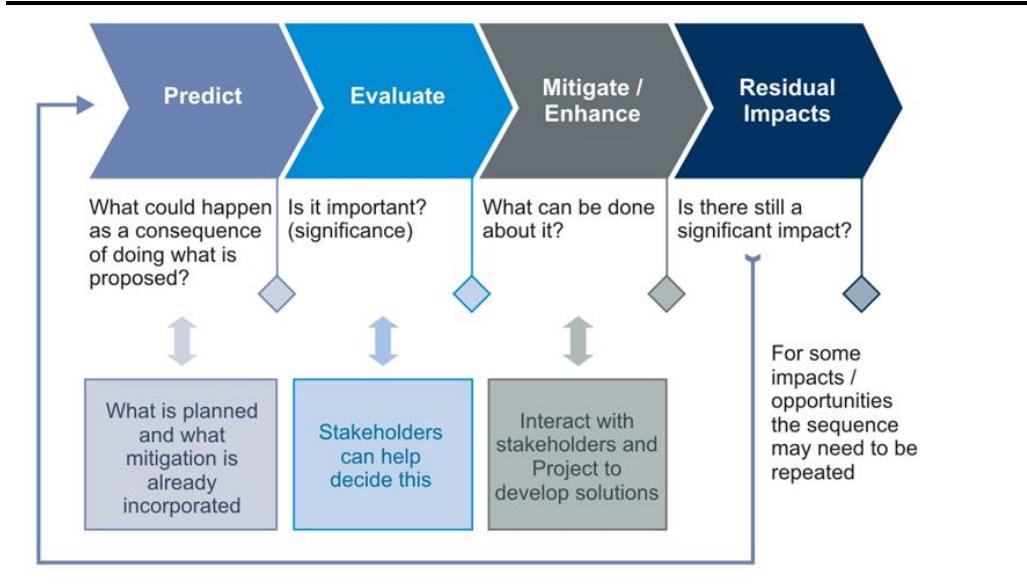
The key aim of the impact assessment process was to characterize and evaluate potential environmental and social impacts arising out of the project and prioritize them so that they can be effectively addressed through Environment & Social Management Plans (ESMPs). The potential impacts have been identified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

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

- *Scale*: Degree of damage that may be caused to the environmental & 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 below figure.

Figure 4.2 Impact Assessment Process



4.4 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN PREPARATION

The Environmental & Social Management Plan (ESMP) along with a Monitoring Plan has been prepared for construction and operation of the transmission lines. 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.

The environmental and social information along the alternative alignment were collated and based on these information, Analysis of Alternative for LILO 1 and LILO 2 of Bahragora - Dhalbhumgarh transmission line is carried out and is presented in *Table 5.1*. Alternative alignments of LILO 1 and LILO 2 of Bahragora - Dhalbhumgarh transmission line on Survey of India Toposheet/Satellite Imagery is presented in *Annexure 2*.

Table 5.1 *Environmental and Social details for Transmission Line*

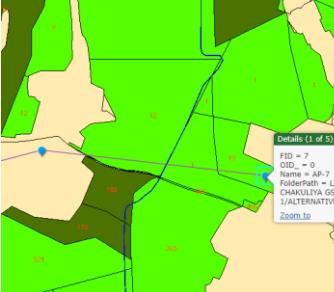
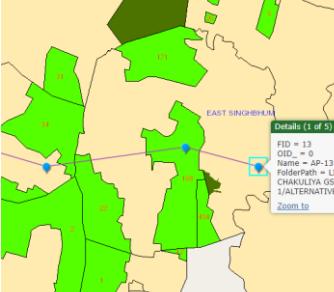
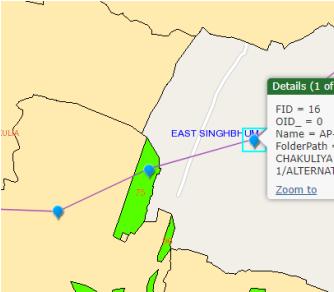
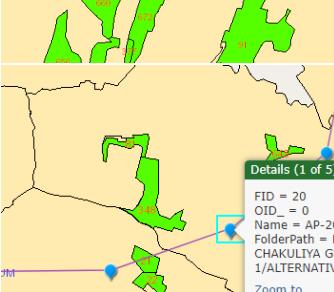
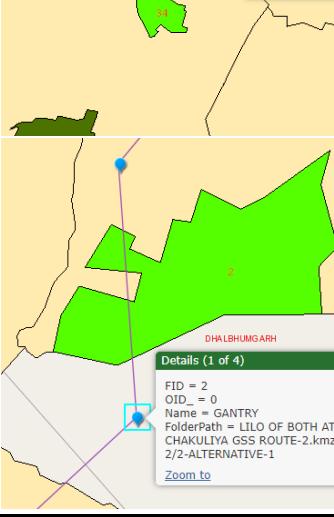
Sl. No	Description	LILO 1 of Bahragora -Dhalbhumgarh transmission line			LILO 1 of Bahragora -Dhalbhumgarh transmission line		
		Alternative-1	Alternative-2	Alternative-3	Alternative-1	Alternative-2	Alternative-3
1	Route particulars						
	Length (km)	20.936 km	21.733km	21.106 km	20.813 km	23.692km	21.171 km
	Terrain	Plain	Plain	Plain	Plain	Plain	Plain
2	Environmental Details						
	Settlement in Alignment (within 2km)	AP-6 Ulda 400m; AP-9	AP-5 Ulda 400m; AP-10	AP-6 Nutangarh 500m; AP-14	AP-7 Ulda 400m; AP-10	AP-5 Ulda 400m; AP-10	AP-7 Nutangarh 500m; AP-15
		Nuagaon 300m; AP-10	Satkatiya 300m; AP-13	Baramchali 200m; AP-26	Nuagaon 300m; AP-11	Satkatiya 300m; AP-13	Baramchali 200m; AP-27
		Baramchali 200m; AP-16	Kenddangri 300m; AP-25	Dhanghari 200m; AP-17	Baramchali 300m; AP-25	Kenddangri 300m; AP-25	Dhanghari 300m; AP-34
		Kalajhor 400m; AP-23	Dewtanala 300m; AP-30	Mayurnachni 400m	Kalajhor 400m; AP-24	Dewtanala 300m; AP-30	Mayurnachni 400m
		Boramchati 300m; AP-29	Banriyagajar 400m		Boramchati 300m; AP-30	Banriyagajar 400m	
		Baikunthpur 500m			Baikunthpur 500m		
	Houses within RoW	3	6	4	4	7	8
3	Forest Details						
	Forest Area in m	AP (6-7) - 1500m; AP (11-13) - 650m; AP (15-16) - 150m; AP (19-20) - 110m	AP (7-10) - 1200m; AP (15-16) - 550m; AP (20-21) - 180m; AP (28-29) - 140m	AP (6-8) - 1500m; AP (13-15) - 750m; AP (21-22) - 70m	AP (Gantry -1) - 170m; AP (7-8) - 1500m; AP (21-22) - 70m	AP (Gantry -1) - 170m; AP (7-10) - 1200m; AP (16-17) - 150m; AP (20-21) - 180m; AP (28-29) - 140m	AP (Gantry -1) - 170m; AP (7-9) - 1500m; AP (20-21) - 750m; AP (28-29) - 80m; AP (22-23) - 70m
	Type of forest	Protected Forest	Protected Forest/ Reserve	Protected Forest	Protected Forest	Protected Forest/ Reserve	Protected Forest
	Density of Forest	Primarily through non- forest areas, moderately dense forest where it intersects forest areas			Primarily through non- forest areas, moderately dense forest where it intersects forest areas		
	Historical and cultural monuments	None	None	None	None	None	None

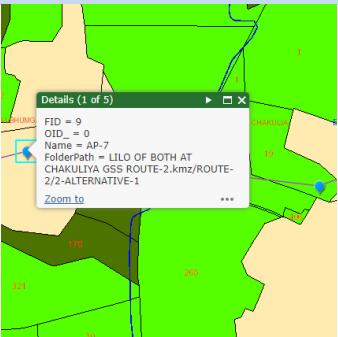
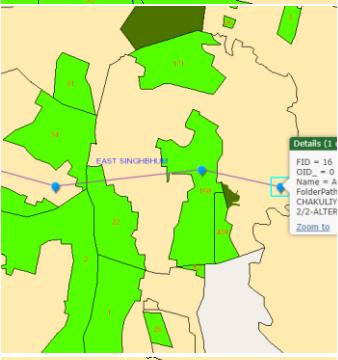
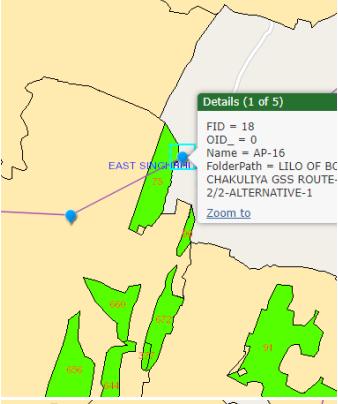
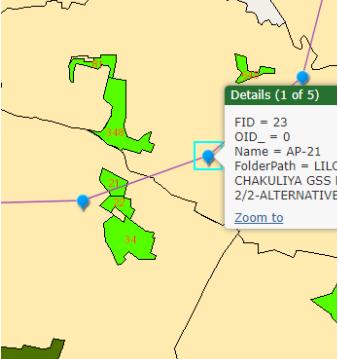
Sl. No	Description	LILO 1 of Bahragora -Dhalbhumgarh transmission line			LILO 1 of Bahragora -Dhalbhumgarh transmission line		
		Alternative-1	Alternative-2	Alternative-3	Alternative-1	Alternative-2	Alternative-3
4	Compensation Crop				Impact on crop if stringing is carried out during cropping season.	Impact on crop if stringing is carried out during cropping season.	
5	No of crossings						
	Road	1	1	1	2	4	2
	Railway	1	1	1	1	1	1
	Transmission Lines	0	0	0	0	0	0
	River Crossing	0	0	0	0	0	0

Based on this exercise, Alternative 1 for both the LILO 1 and LILO 2 of Bahragora - Dhalbhumgarh transmission line is found to be least disturbance in terms of social and environmental issues and also from the technical consideration (such as length, river/canal crossings, railway crossing, road crossing, EHV line crossing etc.) point of view. Technically, the Alignment 1 for both LILO 1 and LILO 2 been considered the best alignment and selected for detailed surveys.

The second stage of screening (refer *Table 5.2*) was carried out to identify and avoid forest land (wherever possible). During this stage the final alignment was scanned for identifying any stretch of the transmission line alignment which has passed through any forest land. These observations were communicated to the Design Consultant for further consideration during the detailed survey stage. Moreover, during detail survey stage, it would be ensured by the Design Consultant that there are no houses within the RoW of the transmission line.

Table 5.2 Second Level Screening carried out during the ESIA

Line	Area of Concern	Description	Response
LILO 1 of Bahragora - Dhalbhumgarh transmission line		The alignment between AP 6 and AP 8 would intersect Protected Forest.	The shifting would be carried out during the detailed surveys.
		The alignment between AP 11 and AP 13 would intersect Protected Forest. The area to the left is non-forest.	-
		The alignment between AP 14 and AP 16 would intersect Protected Forest. The area to the left is non-forest.	-
		The alignment between AP 19 and AP 20 would intersect Protected Forest. The area to the left is non-forest.	-
LILO 2 of Bahragora - Dhalbhumgarh transmission line		The alignment between GANTRY and AP 1 would intersect Protected Forest. The area to the left is non-forest.	-

Line	Area of Concern	Description	Response
		The alignment between AP 7 and AP 9 would intersect Protected Forest and Reserved Forest.	-
		The alignment between AP 12 and AP 14 would intersect Protected Forest. The area to the left is non-forest.	-
		The alignment between AP 15 and AP 16 would intersect Protected Forest. The area to the left is non-forest.	-
		The alignment between AP 20 and AP 21 would intersect Protected Forest. The area to the left is non-forest.	-

6.1**INTRODUCTION**

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

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

6.2**TERRAIN**

In East Singhbhum district, about 53% of the total area of the district is covered by residual mountains and hills consisting granite, gneiss, schist and basalt rocks. The district has large variation in slope. Dalma hill extends from north-west to south-east about 70 km. in length and 5km. in width.

A review of the relief ⁽¹⁾ of the areas along the two TL alignments indicates that majority of all the two TL alignments mainly passes through nearly level and very gently sloping area. Only a small stretch of both the alignment (AP 14 - AP 15 of LILO 1 of Bahragora - Dhalbhumgarh TL alignment and AP 15 - AP 16 of LILO 2 of Bahragora - Dhalbhumgarh TL alignment) passes through strongly sloping area.

6.3**LAND USE & LAND COVER**

The landuse land cover was assessed within a radius of 500 m from the proposed TL alignments. From the assessment, it was observed that both the TL alignments primarily passes through single cropped land (Kharif cropped). Approx. 2410m of LILO 1 of Ramachandrapur - Jadugoda TL and 2480m of LILO 2 of Ramachandrapur - Jadugoda TL traverses through forestland.

(1) Nearly Level: 0-1% (Class A), Very Gentle Sloping : 1-3% (Class B); Gentle Sloping 3-5% (Class C); Moderately Sloping : 5-10% (Class D); Strongly Sloping : 10-15% (Class E); Moderately Steep Sloping : 15-20% (Class F), Steep : 25-33% (Class G); Very Steep (Class H), Very Very Steep : Over 50% (Class I); Soil Survey Manual 1960. All India Soil and Land Survey Organisation

6.4

SOIL

The soils occurring in different landforms have been characterised during soil resource mapping of the state on 1:250,000 scale (Haldar et al. 1996) and three soil orders namely Entisols, Inceptisols and Alfisols were observed in East Singhbhum district.

As per CGWB handbook (2013), mainly five types of soils viz. red gravelly, red sandy, red loamy, red & yellow and lateritic soil are found in East Singhbhum district. Red gravelly soil is found in Chakulia block and parts of Bahragora blocks. Red sandy soil is observed in Mosabani, parts of Jamshedpur and Dumaria blocks. Red loamy soil is found in parts of Bahragora, Dhalbhumgarh and Jamshedpur sadar blocks. Red and Yellow soil is found in Patamda and Potka blocks. Lateritic soil is found in small patch of Bahragora block.

The majority of all the two TL alignments passes through fine and fine loamy soil.

6.5

CLIMATE AND METEOROLOGY

The climate of this region may be considered as extreme, being intensely hot in summer and moderately cold in winter. The climate of the area is also characterized by a hot dry summer and well-distributed rains in the monsoon season. The cold season commences from December and lasts till the end of February. The hot season follows thereafter and continues till about the third week of June. The southwest monsoon season is from the middle/end of June to the end of September. The Climate of the district is temperate. Annual rainfall is 1200 mm to 1400 mm. This area comes under the path of south-west monsoon so sometimes it receives heavy rain during July to September. During the summer seasons maximum temperature goes up 40 °C – 45 °C whereas in winter it has recorded a minimum of 8 °C.

6.6

AIR ENVIRONMENT

There is no major industrial area set up within 500 m of LILO 1 and LILO 2 of Bahragora - Dhalbhumgarh TL alignments. The source of generation of air pollutants is primarily from transportation corridors i.e., SH 9, NH 18 etc. and from burning of fossil fuels for domestic purpose. Therefore the ambient air quality is representative of a typical rural air-shed.

6.7

NOISE ENVIRONMENT

There are no industrial activities or major settlements along the TL alignments, the key source of noise is primarily from the plying of vehicles on SH, NH and other roads. Therefore the ambient noise quality along LILO 1

and LILO 2 of Bahragora - Dhalbhumgarh TL alignments is representative of residential areas.

6.8

DRAINAGE

As per the site reconnaissance and review of the Survey of India Topo sheet and satellite imagery it was observed that LILO 1 and LILO 2 of Bahragora - Dhalbhumgarh TL alignments are part of the Subarnarekha River Basin. Based on the review of the DPR and superimposing the route alignment on the topo sheet, it was observed that both the TL alignments do not cross any river. However, both the TL alignments crosses irrigation canals.

6.9

ECOLOGICAL ENVIRONMENT

The transmission line stretches are located in East Singhbhum district of Jharkhand. The proposed lines fall in 6B Deccan Peninsula - Chota-Nagpur Bio-geographic Province¹.

Natural vegetation in the region can be broadly classified into **C3 Moist Mix Deciduous Forests and 5B Northern Tropical Dry Deciduous Forests**.

C3 Moist Mixed Deciduous Forests – This forest can be mainly found in some patches of narrow valley. Sal (*Shorea robusta*) is the dominant species. Other species that are associated with sal, in this type of forest are *Terminalia tomentosa*, *Diospyros melanoxylon*, *Buchanania latifolia*, *Bridelia retusa*, *Dillenia pentagyna*, *Anogeissus latifolia*, *Haldina cordifolia*, *Lannea grandis*, *Kydia calycina*, *Mallotus philippensis*, *Polyalthia suberosa*, *Micromelum pubescens*, *Boswellia serrata* etc.

5B Northern Tropical Dry Deciduous Forests – Dominant species is sal (*Shorea robusta*). Other species that are associated with sal are *Terminalia belerica*, *Terminalia chebula*, *Haldina cordifolia*, *Madhuca latifolia*, *Butea monosperma*, *Buchanania latifolia*, *Boswellia serrata*, *Diospyros melanoxylon*, *Ailanthus excelsa*, *Cassia fistula* etc.

6.9.1

Vegetation within the Study area

Forest Vegetation

LILO 1 and LILO 2 of Bahragora -Dhalbhumgarh TL alignments pass through few stretches of forest land. Sal is the most dominant tree of the forest areas of the study area. Other common tree species recorded within the study area are Palas (*Butea monosperma*), Mohua (*Madhuca latifolia*), Sagwan (*Tectona grandis*), Neem (*Azadirachta indica*), Semal (*Bombax ceiba*), Babool (*Acacia nilotica*), Raintree (*Samanea saman*), Amla (*Emblica officinalis*), Amaltas (*Cassia Fistula*),

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

Date palm (*Phoenix dactylifera*), Gulmohar (*Delonix regia*), Arjun (*Terminalia arjuna*), Asan (*Terminalia tomentosa*), Wad (*Ficus benghalensis*), Peepal (*Ficus religiosa*), Gular (*Ficus racemosa*), Kat-gular (*Ficus hispida*), Kusum (*Schleichera oleosa*), Aam (*Mangifera indica*), Sirish (*Albizia lebeck*), Kend (*Diaspyros melanoxylon*), Sugar Palm (*Borassus flabellifer*), Jarul (*Lagerstroemia speciosa*) etc.

Homestead plantation

During the primary survey trees like Aam (*Mangifera indica*), Wad (*Ficus benghalensis*), Peepal (*Ficus religiosa*), Sugar palm (*Borassus flabellifer*), Date palm (*Phoenix dactylifera*), Neem (*Azadirachta indica*), Munga (*Moringa oleifera*), Chhatim (*Alstonia scholaris*), Amaltas (*Cassia Fistula*), Karanj (*Pongamia pinnata*), Semal (*Bombax ceiba*), Arjun (*Terminalia arjuna*), Bakul (*Mimusops elengi*), Jarul (*Lagerstroemia speciosa*), Asan (*Terminalia tomentosa*), Jack fruit (*Artocarpus heterophyllus*), Bael (*Aegle marmelos*), Bhelwa (*Semelcarpus anacardium*), Imli (*Tamarindus indica*), Shisham (*Dalbergia sisso*), Kadam (*Haldina cordifolia*), etc. were found to occur in and around human settlements.

Roadside plantation

Trees like Wad (*Ficus benghalensis*), Rain tree (*Samanea saman*), Shisham (*Dalbergia sisso*), Semal (*Bombax ceiba*), Fountain tree (*Spathodea campanulata*), Imli (*Tamarindus indica*), Gulmohar (*Delonix regia*), Jarul (*Lagerstroemia speciosa*), Sugar palm (*Borassus flabellifer*), Babool (*Acacia nilotica*), Kusum (*Schleichera oleosa*), Chhatim (*Alstonia scholaris*), Amaltas (*Cassia Fistula*), Peepal (*Ficus religiosa*), Kend (*Diaspyros melanoxylon*), Neem (*Azadirachta indica*), *Eucalyptus* sp., Kadam (*Haldina cordifolia*), etc. were recorded on either sides of the roads within the study area.

Open Scrub

The species observed in open scrublands are Palas (*Butea monosperma*), Mohua (*Madhuca latifolia*), Karanj (*Pongamia pinnata*), Semal (*Bombax ceiba*), Kadam (*Haldina cordifolia*), Sugar palm (*Borassus flabellifer*), Neem (*Azadirachta indica*), Arjun (*Terminalia arjuna*), Babool (*Acacia nilotica*), *Eucalyptus* sp., Date palm (*Phoenix dactylifera*) etc.

Riparian Vegetation

Riparian vegetation is observed on the sides of streams and waterbodies within the study area. Major vegetation observed are Jamun (*Syzygium cumini*), Wad (*Ficus benghalensis*), Kat-gular (*Ficus hispida*), Semal (*Bombax ceiba*), Sugar palm (*Borassus flabellifer*), Peepal (*Ficus religiosa*), Chhatim (*Alstonia scholaris*) etc.

Trees within transmission line corridors

Tree species present with number of individuals within the transmission line corridors are listed in Appendix.

Invasive Alien species

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

6.9.2

Wildlife Habitat and Faunal Diversity

Wild Life Habitat

National Park, Wild Life Sanctuary, Tiger Reserve is not located within the study area of the transmission lines. All the transmission lines were located within the Singhbhum Elephant Reserve.

Faunal Diversity

Herpetofauna

Four species of amphibians viz. Common Indian Toad (*Duttaphrynus melanostictus*), Indian Bullfrog (*Hoplobatrachus tigerinus*), Cricket Frog (*Fejervarya limnocharis*) and Skittering Frog (*Euphlyctis cyanophlyctis*) etc. are observed from the study area. All the species are listed Least Concern as per IUCN Classification (IUCN Version 2017-3). 10 species of reptiles were observed/reported from the study area. The list includes Indian Rat Snake (*Ptyas mucosus*), Indian Cobra (*Naja naja*), Common Krait (*Bungarus caeruleus*), Banded Krait (*Bungarus fasciatus*), Checkered Keelback (*Xenochrophis piscator*), Russel's Viper (*Daboia russelii*), Common Wolf Snake (*Lycodon aulicus*), Fan-Throated Lizard (*Sitana ponticeriana*), Common Indian Monitor (*Varanus bengalensis*) and Oriental Garden Lizard (*Calotes versicolor*). The list includes one Schedule I species as per Indian Wildlife Protection Act (IWPA) viz. Indian Monitor, four Schedule II species viz. Russel's Viper, Indian Cobra, Indian Rat Snake and Checkered Keelback.

Avifauna

A total of 51 species of avifauna were recorded from the study area. The species list includes terrestrial and aquatic birds. Terrestrial and aquatic birds recorded are presented below.

Terrestrial birds- Black Headed Oriole (*Oriolus larvatus*), Asian Pied Starling (*Gracupica contra*), Shikra (*Accipiter badius*), Spotted Owlet (*Athene brama*), Plain Prinia (*Prinia inornata*), Ashy Prinia (*Prinia socialis*), Greater Coucal (*Centropus sinensis*) Asian Palm Swift (*Cypsiurus balasiensis*), Indian Tree Pie (*Dendrocitta vagabunda*), Common Iora (*Aegithina tiphia*), Indian roller (*Coracias benghalensis*), Long tailed Shrike (*Lanius schach*), Black Winged Kite (*Elanus caeruleus*), Red Whiskered Bulbul (*Pycnonotus jocosus*), Spotted Dove (*Spilopelia chinensis*), Eurasian Collared Dove (*Streptopelia decaocto*), Common Myna (*Acridotheres tristis*), Paddyfield Pipit (*Anthus rufulus*), House Swift (*Apus nipalensis*), Common Pigeon (*Columba livia*), House Crow (*Corvus splendens*), Black Drongo (*Dicrurus macrocercus*), Indian Peafowl (*Pavo cristatus*), Asian Koel (*Eudynamys scolopaceus*), Coppersmith Barbet (*Psilopogon haemacephalus*),

Little Green bee-eater (*Merops orientalis*), Black Kite (*Milvus migrans*), House sparrow (*Passer domesticus*), Baya weaver (*Ploceus philippinus*), Rose-ringed Parakeet (*Psittacula krameri*), Red-vented Bulbul (*Pycnonotus cafer*), Indian Robin (*Copsychus fulicatus*), Oriental magpie-robin (*Copsychus saularis*), Jungle babbler (*Turdoides striata*) etc.

Aquatic birds- White-breasted Waterhen (*Amaurornis phoenicurus*), Bronze Winged Jacana (*Metopidius indicus*), White Wagtail (*Motacilla alba*), Purple Heron (*Ardea purpurea*), Painted Stork (*Mycteria leucocephala*), Common Moorhen (*Gallinula chloropus*), Black Headed Ibis (*Threskiornis melanocephalus*), Cattle Egret (*Bubulcus ibis*), Intermediate Egret (*Ardea intermedia*), Grey Heron (*Ardea cinerea*), Indian Pond Heron (*Ardeola grayii*), Pied Kingfisher (*Ceryle rudis*), White-throated Kingfisher (*Halcyon smyrnensis*), Common Kingfisher (*Alcedo atthis*), Little Cormorant (*Microcarbo niger*), Purple Swamphen (*Porphyrio porphyrio*), Red-wattled Lapwing (*Vanellus indicus*) etc.

Indian Peafowl, Shikra, Black Kite and Black Winged Kite are listed as Schedule I as per Wildlife Protection Act, 1972. Painted Stork and Black Headed Ibis are listed as Near Threatened as per IUCN Classification (IUCN version 2017-3).

Mammals

Total 13 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*), Common Grey Mongoose (*Herpestes edwardsii*), Northern Plains Langur (*Semnopithecus entellus*), Rhesus macaque (*Macaca mulatta*), Wild Pig (*Sus scrofa*), Golden Jackal (*Canis aureus*), Indian Fox (*Vulpes bengalensis*), Indian Flying Fox (*Pteropus giganteus*), House Rat (*Rattus rattus*), Small Indian Civet (*Viverricula indica*), Common Palm Civet (*Paradoxurus hermaphroditus*), Lesser Bandicoot Rat (*Bandicota bengalensis*), Greater Bandicoot (*Bandicota indica*), Indian Elephant (*Elephas maximus*) etc.

The list includes one Schedule I species viz. Indian Elephant and seven Schedule II species Golden Jackal, Indian Fox, Small Indian Civet, Common Palm Civet, Common Grey Mongoose, Indian Northern Plains Langur and Rhesus macaque. Indian Elephant is listed as Endangered as per IUCN Classification (IUCN version 2017-3).

6.9.3

Critical Habitat Assessment

IFC Guidance Notes (GN57) for PS-6 defines that internationally and/or nationally recognized areas of high biodiversity value will likely qualify as Critical Habitat (CH), which includes Protected Areas, Important Bird Areas (IBA). The study area is not located in proximity to any protected areas and IBAs.

Critical Habitat Triggers

Critical habitat is defined under IFC PS6. Critical habitats are areas with: high biodiversity value, including;

- (i) habitat of significant importance to Critically Endangered and/or Endangered species;
- (ii) habitat of significant importance to endemic and/or restricted range species;
- (iii) habitat supporting globally significant concentrations of migratory species and/or congregatory species;
- (iv) highly threatened and/or unique ecosystems; and/or
- (v) areas associated with key evolutionary processes “

LILO 1 and LILO 2 of Bahragora -Dhalbhumgarh TL alignments is located in Singhbhum Elephant Reserve where movement of IUCN Endangered species, Indian Elephant is reported. Hence, assessment for Critical Habitat is undertaken as a screening process against the criteria defined within the IFC PS 6 Guidance Note. Criterion relevant for triggering the CHA as per IFC PS-6 is presented in *Annexure 10* and Candidate Critical Habitat Species Assessment is presented in *Annexure 11*.

6.10 SOCIO ECONOMIC ENVIRONMENT

This section deals with the baseline socio-economic environment of the associated proposed transmission lines (LILO 1 and LILO 2 of Bahragora - Dhalbhumgarh TL alignments) of proposed Chakulia Substation (Scheme-X). The following section discusses the methodology used for the socio-economic assessment. The subsequent sections discuss the baseline profile of the villages within the study area. The information provided has been primarily derived from the secondary sources (*Census of India*). In addition primary information was also collected during the discussions at the villages with the local community members. The village-wise secondary data (*obtained from Census, 2011*) has been taken into consideration for analyzing the socio-economic profile of the study area.

6.10.1 Study Area

The study area for this study is defined as area within 500 meter of each side of proposed transmission line. Total 38 villages (*Total 68 villages but among this 30 villages were common to both the transmission lines, as both the lines are parallel, and traverses across same geographic area*) are located within the 1 km (500 meter each side) buffer of two proposed transmission line. Line wise details of these villages are provided in *Table 6.1*.

Table 6.1 List of the Villages Located Within Study Area

Transmission Line	Number of Village	Block	District
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LILO 1 of Bahragora - Dhalbhumgarh TL alignment	27	Chakulia	East Singhbhum
	9	Dhalbhumgarh	
LILO 2 of Bahragora - Dhalbhumgarh TL alignment	24	Chakulia	
	8	Dhalbhumgarh	

Note- Kadambera village in Dhalbhumgarh block is uninhabited; hence not considered in the socio-economic section

6.10.2

General Socioeconomic Profile

The demographic profile in terms of total population, household size and sex-ratio of the above mentioned selected villages has been summarized in the sections below and presented in *Table 6.2*.

Population and Household Size

LILO 1 of Bahragora -Dhalbhumgarh TL Alignment: Among 36 villages located within the study area of LILO 1 of Bahragora -Dhalbhumgarh TL alignment, Bido (879) has the highest population lived in 217 household and the lowest populations were recorded in Barapahar (80) and total household no is 17. The household size of above mention 37 villages generally ranged within 3.72 to 5.43 with an average household size of 4.51.

LILO 2 of Bahragora -Dhalbhumgarh TL Alignment: Among 32 villages located within the study area of LILO 2 of Bahragora - Dhalbhumgarh TL alignment, Bido (879) has the highest population lived in 217 household and the lowest populations were recorded in Kakur Rama (73) and total household no is 19. The household size of above mention 34 villages generally ranged within 3.72 to 5.43 with an average household size of 4.46.

Table 6.2 Demographic profile of villages located within the study area

Village	No. of Household	Total Population	Household size	% Male Population	% Female Population	Sex Ratio	% SC Population	% ST Population	% Literate	% Male Literate	% Female Literate
LILO 1 of Bahragora - Dhalbhumgarh TL Alignment											
Bagdupa	46	210	4.57	51.90	48.10	927	0.00	82.86	61.08	75.27	46.74
Baikunthpur	65	304	4.68	50.99	49.01	961	0.00	78.29	55.30	70.07	39.37
Banriyagajar	135	687	5.09	49.49	50.51	1021	0.00	88.36	66.22	76.77	55.81
Banskatiya	98	441	4.50	48.75	51.25	1051	0.00	41.72	69.65	82.16	57.07
Baramchatti	26	124	4.77	48.39	51.61	1067	0.00	45.97	54.37	65.22	45.61
Bardangua	57	281	4.93	47.33	52.67	1113	0.00	89.68	60.68	74.77	47.97
Bardikanpur	136	599	4.40	48.41	51.59	1066	3.84	91.15	50.69	64.34	38.11
Bhandaro	161	680	4.22	48.68	51.32	1054	5.74	31.18	62.00	69.28	55.05
Bido	217	879	4.05	49.37	50.63	1025	29.58	13.77	77.48	87.26	68.13
Boramchati	97	429	4.42	49.65	50.35	1014	0.00	65.03	61.50	74.18	49.48
Burudi	36	161	4.47	54.66	45.34	830	0.00	63.35	66.19	78.38	52.31
Danrikia	71	298	4.20	50.00	50.00	1000	0.00	55.70	60.94	72.66	49.22
Darkhuli	30	147	4.90	47.62	52.38	1100	0.00	0.00	76.00	81.36	71.21
Dewtanala	72	391	5.43	48.59	51.41	1058	0.00	100.00	70.40	83.33	59.06
Dudhiyashol	108	491	4.55	52.95	47.05	888	2.65	65.78	55.25	70.13	38.65
Ghasidih	17	80	4.71	48.75	51.25	1051	0.00	100.00	44.07	53.13	33.33
Jorshol	139	683	4.91	50.81	49.19	968	0.00	94.00	56.93	68.28	45.12
Kala Pathar	178	704	3.96	49.57	50.43	1017	0.00	79.40	53.90	65.03	42.90
Kalajhor	103	532	5.17	50.38	49.62	985	0.00	90.23	52.97	65.94	39.82
Kanimahuli	52	229	4.40	52.40	47.60	908	0.00	75.55	56.76	71.28	41.76
Kiyashol	23	105	4.57	52.38	47.62	909	16.19	40.95	64.63	80.95	47.50
Kuchiya											
Kanali	103	440	4.27	52.27	47.73	913	0.00	56.14	62.03	77.39	44.57
Laubera	53	233	4.40	54.51	45.49	835	0.00	97.00	55.02	62.50	46.39
Lohamalia	191	868	4.54	48.73	51.27	1052	58.53	34.10	61.45	75.34	48.06
Machkandna	92	423	4.60	52.25	47.75	914	0.00	99.76	52.46	66.67	37.29
Malibani	48	239	4.98	50.63	49.37	975	0.00	99.58	65.38	80.95	49.51
Malkham	101	436	4.32	52.06	47.94	921	14.68	50.23	69.63	79.31	58.66
Murakati	107	469	4.38	46.70	53.30	1142	0.00	18.34	68.59	80.61	56.93
Nuagaon	25	114	4.56	55.26	44.74	810	0.00	0.00	69.31	81.82	54.35

Village	No. of Household	Total Population	Household size	% Male Population	% Female Population	Sex Ratio	% SC Population	% ST Population	% Literate	% Male Literate	% Female Literate
Nutangarh	196	840	4.29	47.74	52.26	1095	35.24	22.38	66.99	76.44	58.31
Panijiya	68	317	4.66	52.05	47.95	921	0.00	100.00	61.79	72.92	50.00
Raghunathpur	96	400	4.17	48.75	51.25	1051	0.00	84.25	59.94	76.51	44.75
Sarangashol	47	175	3.72	49.71	50.29	1011	0.00	0.00	51.70	54.79	48.65
Satkatiya	64	281	4.39	49.11	50.89	1036	0.00	18.86	71.20	81.89	60.16
Sindurgauri	62	258	4.16	53.10	46.90	883	0.00	59.30	60.19	66.96	52.53
Ulda	43	171	3.98	50.88	49.12	966	0.00	69.59	59.06	64.00	54.05
LILO 2 of Bahragora - Dhalbhumgarh TL Alignment											
Kakur Rama	19	73	3.84	54.79	45.21	825	0.00	0.00	80.88	89.74	68.97
Bido	217	879	4.05	49.37	50.63	1025	29.58	13.77	77.48	87.26	68.13
Darkhuli	30	147	4.90	47.62	52.38	1100	0.00	0.00	76.00	81.36	71.21
Satkatiya	64	281	4.39	49.11	50.89	1036	0.00	18.86	71.20	81.89	60.16
Dewtanala	72	391	5.43	48.59	51.41	1058	0.00	100.00	70.40	83.33	59.06
Malkham	101	436	4.32	52.06	47.94	921	14.68	50.23	69.63	79.31	58.66
Nuagaon	25	114	4.56	55.26	44.74	810	0.00	0.00	69.31	81.82	54.35
Nutangarh	196	840	4.29	47.74	52.26	1095	35.24	22.38	66.99	76.44	58.31
Banriyagajar	135	687	5.09	49.49	50.51	1021	0.00	88.36	66.22	76.77	55.81
Burudi	36	161	4.47	54.66	45.34	830	0.00	63.35	66.19	78.38	52.31
Malibani	48	239	4.98	50.63	49.37	975	0.00	99.58	65.38	80.95	49.51
Baranata	212	828	3.91	51.69	48.31	935	17.75	16.67	62.07	76.98	45.82
Kuchiya											
Kanali	103	440	4.27	52.27	47.73	913	0.00	56.14	62.03	77.39	44.57
Bhandaro	161	680	4.22	48.68	51.32	1054	5.74	31.18	62.00	69.28	55.05
Boramchati	97	429	4.42	49.65	50.35	1014	0.00	65.03	61.50	74.18	49.48
Lohamalia	191	868	4.54	48.73	51.27	1052	58.53	34.10	61.45	75.34	48.06
Bagdupa	46	210	4.57	51.90	48.10	927	0.00	82.86	61.08	75.27	46.74
Danrkia	71	298	4.20	50.00	50.00	1000	0.00	55.70	60.94	72.66	49.22
Bardangua	57	281	4.93	47.33	52.67	1113	0.00	89.68	60.68	74.77	47.97
Sindurgauri	62	258	4.16	53.10	46.90	883	0.00	59.30	60.19	66.96	52.53
Raghunathpur	96	400	4.17	48.75	51.25	1051	0.00	84.25	59.94	76.51	44.75
Ulda	43	171	3.98	50.88	49.12	966	0.00	69.59	59.06	64.00	54.05

Village	No. of Household	Total Population	Household size	% Male Population	% Female Population	Sex Ratio	% SC Population	%ST Population	% Literate	% Male Literate	%Female Literate
Jorshol	139	683	4.91	50.81	49.19	968	0.00	94.00	56.93	68.28	45.12
Kanimahuli	52	229	4.40	52.40	47.60	908	0.00	75.55	56.76	71.28	41.76
Dudhiyashol	108	491	4.55	52.95	47.05	888	2.65	65.78	55.25	70.13	38.65
Laubera	53	233	4.40	54.51	45.49	835	0.00	97.00	55.02	62.50	46.39
Baramchatti	26	124	4.77	48.39	51.61	1067	0.00	45.97	54.37	65.22	45.61
Kala Pathar	178	704	3.96	49.57	50.43	1017	0.00	79.40	53.90	65.03	42.90
Kalajhor	103	532	5.17	50.38	49.62	985	0.00	90.23	52.97	65.94	39.82
Machkandna	92	423	4.60	52.25	47.75	914	0.00	99.76	52.46	66.67	37.29
Sarangashol	47	175	3.72	49.71	50.29	1011	0.00	0.00	51.70	54.79	48.65
Ghasidih	17	80	4.71	48.75	51.25	1051	0.00	100.00	44.07	53.13	33.33

Source: PCA 2011

6.10.3

Sex Ratio

LIGO 1 of Bahragora - Dhalbhumgarh TL Alignment: Among above mentioned 36 study area villages, Murakati (1142) has the highest sex ratio and the lowest sex ratio was recorded in Nuagaon (810) and the average sex ratio is 1001 which is comparatively higher than the state averages of Jharkhand (948).

LIGO 2 of Bahragora - Dhalbhumgarh TL Alignment: Among above mentioned 32 study area villages, Bardangua (1113) has the highest sex ratio and the lowest sex ratio was recorded in Nuagaon (810) and the average sex ratio is 990 which is much higher than the state averages of Jharkhand (948).

6.10.4

Scheduled Caste (SC) & Scheduled Tribes (ST)

LIGO 1 of Bahragora - Dhalbhumgarh TL Alignment: Among above mentioned 36 study area villages, highest SC and ST population were recorded in Lohamalia (58.53%) and Dewtanala, Ghasidih, Panijiya (100%) respectively. Lowest SC and ST population were recorded in Dudhiyashol (2.65%) and Bido (13.77%) respectively. There are twenty eight villages, where SC populations are nil and three village (Darkhuli, Sarangshol and Nuagaon), where ST populations are nil. Average SC and ST population in the above mention 37 villages were recorded 4.62% and 61.18% respectively.

LIGO 2 of Bahragora - Dhalbhumgarh TL Alignment: Among above mentioned 32 study area villages, highest SC and ST population were recorded in Lohamalia (58.53%) and two villages Dewtanala, Ghasidih (100%) respectively. Lowest SC and ST population recorded in Dudhiyashol (2.65%) and Bido (13.77%) respectively. There are 25 villages where SC population is not found and only 4 villages (Darkhuli, Sarangshol, Kakur Rama and Nuagaon) where ST population is nil. Average SC and ST population in the above mention study area villages were recorded 5.13% and 57.77% respectively.

6.10.5

Education & Literacy

The study of the education and literacy profile in the region is relevant in order to have an understanding whether the proposed project can utilize skilled human resources available within the area.

According to 2011 census data, the average literacy rate in 71 study area villages was 62.17%. Average male and female literacy rate in the study area was recorded 73.82% and 50.49% respectively.

LIGO 1 of Bahragora - Dhalbhumgarh TL Alignment: Among above mentioned 36 study area villages, the average literacy rate was 61.44% and highest and lowest literacy rate was recorded in Bido (77.48%) and Ghasidih (44.07%). Average male and female literacy rate in the study area was recorded 73.00% and 49.68% respectively.

LILO 2 of Bahragora - Dhalbhumgarh TL Alignment: Among above mentioned 32 study area villages, the average literacy rate was 62.00% and highest and lowest literacy rate was recorded in Kakur Rama (80.88%) and Ghasidih (44.07%) respectively. Average male and female literacy rate in the study area was recorded 73.24% and 50.45% respectively.

6.10.6

Economic Activity & Livelihood Pattern

The relevance of economic activity and livelihood pattern is important in the context of the study since depending on the existing situation one can predict the impact of the project activity on the economy of the region. Summary of work force participation in different selected villages is mentioned in below table.

Table 6.3 *Livelihood profile of villages located within the study area*

Village	WPR	Main Worker (%)	Marginal Worker (%)	Cultivator (%)	Agricultural Labour (%)	HH Worker (%)	Other (%)
LILO 1 of Bahragora -Dhalbhumgarh TL Alignment							
Bagdupa	24.76	0.00	100.00	44.23	51.92	3.85	0.00
Baikunthpur	58.88	82.12	17.88	78.21	18.99	0.00	2.79
Banriyagajar	49.78	2.63	97.37	31.58	61.11	0.00	7.31
Banskatiya	41.50	66.67	33.33	16.39	32.79	0.00	50.82
Baramchatti	62.90	3.85	96.15	14.10	84.62	0.00	1.28
Bardangua	56.94	75.63	24.38	0.00	56.25	0.00	43.75
Bardikanpur	31.22	55.61	44.39	55.61	29.95	1.60	12.83
Bhandaro	49.12	37.72	62.28	20.06	76.35	0.60	2.99
Bido	40.27	26.84	73.16	2.54	64.12	2.26	31.07
Boramchati	52.91	5.29	94.71	75.33	18.94	0.00	5.73
Burudi	36.02	18.97	81.03	55.17	3.45	5.17	36.21
Danrkia	52.68	3.18	96.82	87.26	10.19	0.00	2.55
Darkhuli	61.90	14.29	85.71	78.02	21.98	0.00	0.00
Dewtanala	55.50	2.76	97.24	71.89	3.23	0.00	24.88
Dudhiyashol	56.82	3.23	96.77	20.79	75.63	1.43	2.15
Ghasidih	27.50	18.18	81.82	36.36	36.36	4.55	22.73
Jorshol	55.78	18.11	81.89	13.91	50.39	3.41	32.28
Kala Pathar	51.99	1.91	98.09	15.85	82.51	0.00	1.64
Kalajhor	54.32	0.35	99.65	9.34	90.31	0.00	0.35
Kanimahuli	37.12	23.53	76.47	43.53	23.53	3.53	29.41
Kiyashol	27.62	17.24	82.76	17.24	72.41	0.00	10.34
Kuchiya Kanali	54.55	5.83	94.17	27.50	67.92	0.00	4.58
Laubera	34.76	9.88	90.12	27.16	66.67	2.47	3.70
Lohamalia	44.24	7.03	92.97	16.67	36.72	0.00	46.61
Machkandna	64.07	29.52	70.48	95.94	0.74	0.00	3.32
Malibani	59.41	90.14	9.86	88.73	9.86	0.00	1.41
Malkham	50.00	19.27	80.73	8.26	48.17	5.50	38.07
Murakati	34.12	12.50	87.50	0.00	78.13	1.25	20.63
Nuagaon	48.25	5.45	94.55	21.82	72.73	0.00	5.45
Nutangarh	45.71	13.80	86.20	10.16	73.96	2.08	13.80
Panijiya	60.88	94.30	5.70	0.00	65.80	2.07	32.12
Raghunathpur	61.50	39.02	60.98	71.54	19.92	0.00	8.54
Sarangashol	30.29	28.30	71.70	5.66	64.15	0.00	30.19
Satkatiya	51.60	13.10	86.90	3.45	89.66	1.38	5.52
Sindurgauri	49.22	14.17	85.83	3.15	82.68	0.00	14.17
Ulda	35.67	4.92	95.08	1.64	85.25	0.00	13.11

Village	WPR	Main Worker (%)	Marginal Worker (%)	Cultivator (%)	Agricultural Labour (%)	HH Worker (%)	Other (%)
LILO 2 of Bahragora -Dhalbhumgarh TL Alignment							
Bagdupa	24.76	0.00	100.00	44.23	51.92	3.85	0.00
Banriyagajar	49.78	2.63	97.37	31.58	61.11	0.00	7.31
Baramchatti	62.90	3.85	96.15	14.10	84.62	0.00	1.28
Baranata	34.78	26.74	73.26	30.21	31.60	1.04	37.15
Bardangua	56.94	75.63	24.38	0.00	56.25	0.00	43.75
Bhandaro	49.12	37.72	62.28	20.06	76.35	0.60	2.99
Bido	40.27	26.84	73.16	2.54	64.12	2.26	31.07
Boramchati	52.91	5.29	94.71	75.33	18.94	0.00	5.73
Burudi	36.02	18.97	81.03	55.17	3.45	5.17	36.21
Danrkia	52.68	3.18	96.82	87.26	10.19	0.00	2.55
Darkhuli	61.90	14.29	85.71	78.02	21.98	0.00	0.00
Dewtanala	55.50	2.76	97.24	71.89	3.23	0.00	24.88
Dudhiyashol	56.82	3.23	96.77	20.79	75.63	1.43	2.15
Ghasidih	27.50	18.18	81.82	36.36	36.36	4.55	22.73
Jorshol	55.78	18.11	81.89	13.91	50.39	3.41	32.28
Kakur Rama	30.14	13.64	86.36	4.55	81.82	0.00	13.64
Kala Pathar	51.99	1.91	98.09	15.85	82.51	0.00	1.64
Kalajhor	54.32	0.35	99.65	9.34	90.31	0.00	0.35
Kanimahuli	37.12	23.53	76.47	43.53	23.53	3.53	29.41
Kuchiya Kanali	54.55	5.83	94.17	27.50	67.92	0.00	4.58
Laubera	34.76	9.88	90.12	27.16	66.67	2.47	3.70
Lohamalia	44.24	7.03	92.97	16.67	36.72	0.00	46.61
Machkandna	64.07	29.52	70.48	95.94	0.74	0.00	3.32
Malibani	59.41	90.14	9.86	88.73	9.86	0.00	1.41
Malkham	50.00	19.27	80.73	8.26	48.17	5.50	38.07
Nuagaon	48.25	5.45	94.55	21.82	72.73	0.00	5.45
Nutangarh	45.71	13.80	86.20	10.16	73.96	2.08	13.80
Raghunathpur	61.50	39.02	60.98	71.54	19.92	0.00	8.54
Sarangashol	30.29	28.30	71.70	5.66	64.15	0.00	30.19
Satkatiya	51.60	13.10	86.90	3.45	89.66	1.38	5.52
Sindurgauri	49.22	14.17	85.83	3.15	82.68	0.00	14.17
Ulda	35.67	4.92	95.08	1.64	85.25	0.00	13.11

Source: PCA 2011

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 48.47% which suggests the study area villages have relatively higher unemployment rate as most of people are involved in agriculture.

It can be seen from the following figures, the study area is characterised by dominance of marginal worker who are involved in a work for 3 months or less but less than six months of the reference period (i.e. in the last one year preceding the date of enumeration). It can be also observed that farm base and non-farm based

(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

livelihoods, both are the primary and secondary sources of livelihood. In farm based livelihood people mostly involved as both cultivator and agricultural labour while in case of nonfarm based livelihood community are involved as labour and other activities.

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

6.10.7 *Gender Profile*

Sex Ratio

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

Among 36 study area villages of LILO 1 of Bahragora -Dhalbhumgarh TL, Murakati (1142) has the highest sex ratio and the lowest sex ratio was recorded in Nuagaon (810) and the average sex ratio is 1001 which is comparatively higher than the state averages of Jharkhand (948).

Among 32 study area villages of LILO 2 of Bahragora -Dhalbhumgarh TL, Bardangua (1113) has the highest sex ratio and the lowest sex ratio was recorded in Nuagaon (810) and the average sex ratio is 990 which is much higher than the state averages of Jharkhand (948).

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.

Among 36 study area villages of LILO 1 of Bahragora -Dhalbhumgarh TL, average male and female literacy rate was the average literacy rate was 73.69 % and 50.38 % respectively. This figure indicates that female literacy is low when compared to the male literacy rate. Highest and lowest male literacy rate was recorded in Bido (87.26%) and Ghasidih (53.13%), whereas, highest and lowest female literacy rate was recorded in Darkhuli (71.21%) and Ghasidih (33.33%) respectively.

Among 32 study area villages of LILO 2 of Bahragora - Dhalbhumgarh TL, average male and female literacy rate was the average literacy rate was 73.96% and 50.60% respectively. This figure indicates that female literacy is low when compared to the male literacy rate. Highest and lowest male literacy rate was recorded in Kakur

Rama (89.74%) and Ghasidih (53.13%), whereas, highest and lowest female literacy rate was recorded in Darkhuli (71.21%) and Ghasidih (33.33%) respectively.

Female 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 villages of LILO 1 of Bahragora -Dhalbhumgarh TL, male work participation rate (55.36%) is higher than the female work participation rate (41.40%), as per 2011 Census. Main work force⁽¹⁾ for male and female workers was recorded to be 29.44% and 15.29% respectively. This figure indicates male workers constitute a dominant part of the main work force. However, in case of marginal work force⁽²⁾, the trend was reversed in terms of contribution from male workers (70.56%) and female workers (84.71%).

In the study area villages of LILO 2 of Bahragora -Dhalbhumgarh TL, male work participation rate (55.46%) is quite higher than the female work participation rate (41.60%), as per 2011 Census. Average main work force for male and female workers was recorded to be 23.97% and 9.18% respectively. This figure indicates male workers constitute a dominant part of the main work force. However, in case of marginal work force, the trend was reversed in terms of contribution from male workers (76.03%) and female workers (96.82%).

6.10.8

Basic Amenities and Infrastructure

Data on basic amenities and rural infrastructure for villages is drawn from the Village Directory 2011.

Drinking Water and Sanitation Facilities

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

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

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

(2) Workers who worked for less than six months (180 days)

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.

Medical Facilities

Medical facilities are one of the basic service indicators which need to be studied so as to know the quality of life in the area. In the most of the study area villages considered for the study, do not have health facility or Primary Health Centres. They have to depend on health facility in the nearby urban centre like Jamshedpur, Chakulia etc.

Educational Facilities

The study area possesses necessary educational infrastructure to cater to the educational needs of the both rural and urban population. Among the study area villages, one Govt. primary school is present in majority of the villages. Secondary school is available in Kala Pathar village. For higher education student have to go to nearest town.

Transport & Communication

Majority of the study area villages is not connected with major road and urban centre with all-weather road. Manually pulled rickshaw and tractors, are the main transport facility for the villages though a few of the villages also have bus facility from nearest urban centre. Lohamalia and Baranata villages are comparatively better connected to urban centres in this study area.

Power Supply

Electricity is available in all study area villages though the frequent power cut are also reported by the community during consultation.

Post and Telecommunication

In this era of telecommunication, access to mobile phone is within every bodies reach. Most of the villages from sample study area do not have the access to post-office and other private courier services. Post-office are present in Bardikanpur, Bhandaro, Kala Pathar (in Chakulia block); Nutangarh (in Dhalbhumgarh block).

This section identifies and assesses the potential impacts to the physical, biological and socioeconomic environment that can be expected from the proposed transmission line i.e. LILO 1 and LILO 2 of Bahragora - Dhalbhumgarh transmission line (TL) alignment at Chakuliya Substation. The impacts due to the project activities across different phases have been identified and assessed. 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*); and
- Baseline information (as outlined in *Section 6*).

7.1

POTENTIAL IMPACT

The identification of likely impacts during construction and operation phases has been carried out based on understanding of activities and their consequent impacts on various environmental and socio-economic resources or receptors. The impact identification matrix in *Table 7.1* captures the likely interactions between the activities on one axis and the resources / receptors on the other axis.

Table 7.1 Scoping Matrix for transmission line

Project Activity/ Hazards	Environmental Resources				Ecological Resource		Social-Economic Resources															
	Aesthetic & Visual Impact	Land Use	Soil Quality	Air Quality	Noise & Vibration	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	Common Property Resources	Land Use (Economic Displacement)	Infrastructure & Services	Cultural Resources	Community Health & Safety	Occupational health & safety
Pre-Construction Phase/Planning Phase																						
Land Procurement for Tower Footing		■															■					
Construction Phase																						
Clearance (Vegetation)	■	■																				
Construction of Site approach road		■																				
Excavation for tower foundation		■																				
Transportation of construction materials, equipment & machineries			■		■																	
Storage & handling of construction materials			■	■																		
Construction of the Tower Footing			■	■																		
Erection of Tower	■	■			■																	
Stringing of Transmission lines		■			■																	
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 transmission tower		■														■						

Project Activity/ Hazards	Environmental Resources				Ecological Resource	Social-Economic Resources															
	Aesthetic & Visual Impact	Land Use	Soil Quality	Air Quality	Noise & Vibration	Surface water resource	Ground water resource	Ground water quality	Traffic (Road)	Terrestrial Flora	Terrestrial Fauna	Aquatic Flora & Fauna	Protected/Migratory Species	Migratory Path/Corridor	Job & economic opportunity	Common Property Resources	Land Use (Economic Displacement)	Infrastructure & Services	Cultural Resources	Community Health & Safety	Occupational health & safety
Maintenance of transmission lines																					
Lopping of trees for maintaining safety distance																					


 = 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.

7.1.1

Impacts on Aesthetic and Visual Quality

Potential impacts to aesthetics and visual quality because of the setting up and operation of the transmission lines [LILO 1 and LILO 2 of Bahragora - Dhalbhumgarh TL alignments] may arise primarily due to disruption and degradation of views in the surrounding landscape. Visual impacts from transmission line 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 transmission line may result from cutting of trees and vegetation clearance from setting up of physical infrastructure (transmission towers). With the study area, not being recognized as a place of natural scenic beauty or a touristic destination, these factors are unlikely to lead to any significant adverse visual and aesthetic impacts in the area and it can be rated as **negligible**.

7.1.2

Air & Noise Quality

This project is not planned to house any point or area source of air emissions (particulate matter, pollutant gases etc.) and neither does the study area have any industrial air pollution sources – the NH 18/ SH 9 road passing adjacent to the transmission line alignments, through which regular vehicular movement occurs is the only line source of air pollution, caused by vehicular emissions and because of re-entrained dust from the road surface. Based on visual observations, the quality of the air shed can be categorized as good and no indicators or existing sources of air pollutants were noted in the study area that could potentially result in air quality parameters to exceed National Ambient Air Quality Standards (NAAQS).

During site preparation and construction, the project is likely to generate dust (as particulates) in spite of best efforts to control it and there will be times during the construction phase when elevated dust concentrations may occur. Higher amounts of dust will be generated at places where earthwork, cutting and filling operations take place or in material handling and storage areas. A large percentage of such dust emissions from construction sites have been found to comprise of particles which are coarse in size (>10 microns) and has a tendency to settle down within a few hundred metres of the source of emissions. The smaller fractions (PM10) can however be carried over longer distances in a dust cloud, in the case wind velocity is higher and depending on prevailing wind direction maybe deposited in the adjoining settlements 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, SO_x, NO_x 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. 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 is expected to be primarily generated during the site preparation and construction phases of the project. Such noise may be generated from blasting (if required), operation of construction equipment and machineries, DG sets and the transportation of equipment and materials. During stringing of transmission line, principal source of noise would be from operation of winching machine. The winching machine produces noise level near 80 dB (A).

The study area has no major noise sources, except for vehicular noise on the adjacent roads (NH 18/ SH 9). 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 of village settlements adjacent to the transmission line alignment. 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 15-20 days at specific tower location. 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**.

7.1.3 *Impact on Land use*

Approx. 164 nos of tower would be constructed in Scheme X (LILO 1 and LILO 2 of Bahragora - Dhalbhumgarh TL alignment). Total length of the transmission lines would be approx. 41 km. Land footprint of about 22 sq. m. would be required for each transmission tower, where right of way of the transmission lines would be of 27 m (for 132 KV transmission line).

The present land use of the area through which the transmission line (in Scheme X) passes is primarily agricultural land. As discussed in Section 6.3, mainly single cropped is practiced in this area. Though there would be restrictions on development work (e.g., construction of building) on the land parcels falling within the right of way, knowing the fact that there would not be any restrictions on these land parcels for use of agricultural purpose, and further both LILO 1 and LILO 2 of Bahragora - Dhalbhumgarh TL alignment passing through mainly rural areas where chance of development work being coming up is near future is very meagre, significance of the land use related impacts is considered to be minor. However, transmission line (in Scheme X) traverse through forest land of approx. 4.89 km. In these areas, JUSNL will divert the land use of the area falling within RoW of the TL alignment after obtaining necessary Forest Clearance (as per Forest Conservation Act, 1980) and this would result in a permanent change of land use. Due to permanent changes in land use, overall significance of the land use related impacts is rated as **moderate**.

7.1.4 *Impact on Soil*

Cutting of vegetation (at tower foundation area), stripping of topsoil and digging of foundation pits for the tower are the three main activities, which are likely to affect the soil structure and quality. At the tower site (approx. 164

nos), all vegetation within 2 m beyond the tower base in all direction will be cleared to ground level. At four legs of the tower, topsoil will be stripped and foundations will be dug up to a depth of 3 m depending upon the tower type and soil characteristics. General practice shows that upon construction of the transmission tower, land below the tower is used for cultivations. Therefore, if topsoil removed during tower base construction work is not properly reinstated, it may lead to loss of soil quality and thereby low agricultural productivity.

Considering good construction practices and planned embedded measures for mitigating these impacts, overall significance of the soil related impacts is considered as **minor**.

7.1.5 *Impact on Road & Traffic*

The traffic movement during construction phase (approx. 5-6 vehicle per day) will to some extent depend on which type and number of trips to and from the proposed site. The existing village roads would be used to the extent possible to approach the site. Since the vehicular traffic on the village roads are low there would be minimal increment in the existing traffic load. The overall significance of traffic related impacts is rated as **negligible to minor**.

7.1.6 *Impact on Biological Environment*

As discussed above some part of the transmission lines will traverse through forest land. JUSNL would have to obtain Forest Clearance as per the provisions of the FCA, 1980, before any project related activity can commence through forest land. Site preparation will involve removal of trees, shrubs and herbs present along the transmission line corridor which will cause change in the modified habitat within the corridor leading to a loss of floral biodiversity at local level.

Trees within the transmission line corridors would be removed before construction. Moreover, there would also be removal of herbs and shrubs from the transmission line corridors. None of the floral or faunal species expected to be present within the site is threatened as per IUCN Classification (Version 2017-3).

Faunal species that have the most probability of occurrence within the transmission line corridors include amphibians (Common toad), reptiles (lizards and snakes), birds (Common crow, Common sparrow, Common myna, Drongo, Indian Roller, Larks, Doves, Parakeets, Kites etc.) and mammals (mongoose, squirrels, rats, fox, jackal, langur, elephant etc.). LILO 1 and LILO 2 of Bahragora -Dhalbhumgarh TL alignments are located in Singhbhum Elephant Reserve where movement of IUCN Endangered (Version 2017-3) species Indian Elephant is reported. 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. Removal of vegetation at construction site (for tower footing) can adversely

affect residential burrowing faunal species *viz.* reptiles (lizards and snakes), ground roosting birds (sparrows, pigeon, doves etc.) and mammals (rats, mongoose etc.). Removal of trees, herbs and shrubs from the transmission line corridors may cause loss of nesting habitats for bird species. In most cases however it has been observed that faunal and bird species to migrate to other local habitats which are adjacent, if the land affected is not very large. The study area has reports of movement of Indian Elephant, which is an IUCN Endangered species. Therefore, the sensitivity of the site has been considered as high. 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 tower footing site because of deposition of dust, noise and light generated during construction activities may affect feeding, breeding and movement of animals. There is a chance of elephants and other mammalian species falling in the excavated areas for transmission towers and get injured. 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 or make nests within transmission line area and can get electrocuted. Collision with the transmission line canal also result in bird mortality. During daily movement between feeding and roosting sites bird mortality could happen due to collision with the transmission lines. The species recorded in study area are included within the IUCN Near Threatened or Least Concern category.

The terrain through which the transmission lines are passing is not hilly terrain. A matured Indian Elephant with its trunk extended can reach upto a height of 6 metres. However, in flat terrain the minimum height of the transmission line will be greater than 6 metres. Hence, chances of electrocution of elephants at flat terrain areas are low and the scale of the impact is considered as low. Duration will be long term- only and extent of impact will be local- immediate vicinity of the transmission line. However as elephant is an IUCN Endangered species and also the area has bird species protected under Schedule I of the IWPA and therefore the site has been deemed to have high sensitivity. The potential impact on flora and fauna during operation phase is assessed to be **moderate**.

Overall, the significance of impact on biological environment can be rated to be **moderate to high**.

Damage to Standing crops: Even though most of the construction activity has been planned during dry season there might be instances that during construction of the transmission tower foundation, erection of towers and subsequently stringing of transmission line involves movement of men, machinery and equipment across agricultural fields leading to the tower locations. This may cause potential damage to the standing crops in agriculture field not only at the tower base and RoW of the transmission line but also may cause damage to the crops in adjacent agricultural plots due to movement of the vehicle and equipment and construction workers. This damage to crops will result in temporary loss of income for the cultivators.

Restriction on Land use and diminution of land value: As reported in Section 6.3, majority of the alignment passes through single crop agricultural land. No land would be acquired for the construction of tower footing. However, there would be restriction on use of land falling within right of way and tower base. As per the regulation of Government of Jharkhand¹, due to restriction of land use, compensation at the rate of 85% of land value would be paid to land owners for tower base area, before beginning of civil work. For RoW, compensation at the rate of 15% of land value would be paid to land owners, before beginning of civil work, towards diminution of land value in the width of RoW Corridor. Further, even though there would be some loss of land and physical obstruction to use the land falling under the tower base, but the impacts would not be pronounced as non-mechanised agriculture is carried out in Jharkhand. The land owner would be able to use the land under the tower for agricultural purpose.

Influx of Labour: Labour would be required for erection of transmission line. Even though unskilled labour would be required for civil work and would be preferably sourced from local areas, skilled labour required for erection of transmission tower, stringing of transmission line etc, would be primarily migrant labour. 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.
- 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.
- 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

1) Department of Power, Government of Jharkhand notification dated 15th December 2017

The impacts described above are primarily within the RoW or would only extend to the settlements in the immediate vicinity of the transmission line, therefore localize in nature. Moreover, the damage to crop and conflicts of the migrant labour with the community would be temporary. The baseline information suggests that a considerable section of the population work as agricultural labourers (their involvement is assessed to be maximum for 6 months); this finding indicates that there is a pool of labour-resource who can be engaged in the project as unskilled workers. In addition, a planned labour camp for skilled workers within the TL construction site may further reduce the assessed potential impacts related to labour influx. Thus, socio-economic impact during the construction phase of the transmission line is evaluated to be **minor** significance.

7.1.8

Community Health & Safety

Excavation of Tower Footings: During the construction of the foundation for the tower footing the excavation can pose potential safety concerns for the inhabitants in the locality. This would be more relevant when the construction is carried out near a settlement or along a foot track or existing village road.

Interference with utilities and traffic: The stringing of the transmission line would cross existing roads (NH 18, SH 9) including village and districts road, state and national highways and railways. During the stringing operations when the transmission line crosses any road/ railways line, hindrance may be caused to the movement of traffic. In some instances temporary closure of the road/ railway line may be required to facilitate stringing activities. This disruption in movement would cause inconvenience to the local population as access would be interrupted temporarily.

Changes in Environmental Conditions: Changes in baseline environmental conditions can be experienced by the local community in terms of increased nuisance levels from emissions of dust, contamination of surface water or ground water and high noise levels during the construction phases. Even though there would be minimal increase in dust and noise during the construction period and this has the potential to lead to health impacts associated with eye irritation and general disturbance to daily activities.

Increased Prevalence of Disease: A maximum of 30 workers (at one point of time) will be employed for the construction phase during the peak construction and commissioning. This influx of workers to the community may cause impacts to public health, especially an increase in prevalence of diseases as well as pressures on existing health infrastructure. There is also the possibility of increase in sexually transmitted diseases such as HIV/ AIDS as a result of the expected influx of workers to the area. In addition, vector-borne diseases will be sensitivity for settlements closer to campsites for the construction phase labour, particularly due to lack of hygienic conditions.

Electro Magnetic Field (EMF): During operation phase, Electro Magnetic Field (EMF) created by the transmission line can cause inconvenience on the surrounding community. It has been reported during the consultation that the

people feel inconvenienced due to this charge especially when working on paddy fields underneath the conductors especially during the monsoon season. However, a review by the World Health Organization (WHO) held as part of the International EMF Project (1996), concluded that "From the current scientific literature there is no convincing evidence that exposure to radiation field shortens the life span of humans or induces or promotes cancer".

Considering good construction practices and planned embedded measures for mitigating these impacts, the overall significance of community health and safety impacts can be rated to be **minor**.

7.1.9

Occupational, Health & Safety

The occupational risk related to the construction of transmission line is primarily due to fall from heights which might cause serious injuries.

Transmission towers would be of different heights and minimum height of the tower would be approx. 25 m in case of 132 kV transmission line. A review of the incident database (OSHA's Integrated Management Information System (IMIS) database) ⁽¹⁾ indicate most of the incidents are due to fall from height while some incidents reported also include being struck by loads or falling objects during the erection of tower. Similarly there are risks of fall in the excavation created for tower footing.

Electrocution during the testing and charging: It has also been reported [OSHA's Integrated Management Information System (IMIS) database] that there has been fatalities due to electrocution. This occurs primarily during the testing and charging of the transmission line if proper safety procedures are not followed.

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

(1) <https://www.osha.gov/laws-regulations/federalregister/2015-04-15-0>

8.1

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.

8.2

IDENTIFICATION OF STAKEHOLDERS

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

Table 8.1 *List of key stakeholders*

Stakeholder Category/ Group	Key Stakeholders
Primary Stakeholders	
Local Community	<ul style="list-style-type: none"> • Local Community
Other Primary Stakeholders	<ul style="list-style-type: none"> • Jharkhand Urja Sancharan Nigam Limited • World Bank
Secondary Stakeholder	
Institutional Stakeholders	<ul style="list-style-type: none"> • District Administration • Forest Department • Tribal Development Department
Other Secondary Stakeholder	<ul style="list-style-type: none"> • Contractors

Consultations with Local Communities

Community consultation is central to every impact assessment study because it helps 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 transmission line to understand their concerns and also assess the extent of impact on the common. The location where the consultations were held in Scheme X along with the target group and the dates of consultation are presented in *Table 8.2*.

Table 8.2 *Details of Consultation*

Sl. No	Location	Date	Target group
1.	Kalimahulia	18/03/2018	General Population
2.	Bandangua	17/03/2018	General Population
3.	Bariyagajar	18/03/2018	General Population
4.	Kiyashol	18/03/2018	General Population
5.	Ghatdulmi	17/03/2018	General Population
6.	Palgam	16/03/2018	General Population
7.	Ulidih	16/03/2018	General Population
8.	Toranga	16/03/2018	General Population

The brief outcome of the consultations with the key stakeholder groups are listed below. The minutes of all consultations are recorded under *Annexure 3* of this document.

8.3

SUMMARY OF STAKEHOLDER CONSULTATIONS

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

Table 8.3 Summary of Stakeholder Consultation

Sl. No.	Stakeholder Category	Key Points Discussed	Findings of the Consultation
Local Community			
1.1	Village - Kalimahulia, No of Participants - 10 persons; Date- 18/03/2018	<ul style="list-style-type: none"> • Current engagement scenario -livelihood options; • Basic amenities in the village - electricity, drinking water, etc.; • Health scenario in the village and distances of Hospitals/ Clinics; • Perception of local community towards the project; • Issues faced by the local community from existing transmission line 	<ul style="list-style-type: none"> • Majority of the population in this village belongs to Santhal community. Apart from that, Mahto community also reported from the village. The ratio of Santhal and Mahto is approximately 85:15. • During consultation with villagers, following issues related to the transmission line project are raised: <ul style="list-style-type: none"> ○ Compensation should be provided for land as well as for trees felling. Compensation money should be provided before beginning of construction work. ○ It was advised to regularly undertake lopping of tree branches, below the transmission line. ○ It was advised to design transmission line away from habitation area.
1.2	Village - Bandangua, No of Participants- 9 persons; Date- 17/03/2018		<ul style="list-style-type: none"> • Total 60 households are present in this village. Majority of them are from Santhal community. • Wells and hand pumps are sourced for domestic water requirement. Reportedly, majority of the wells available in this village dried up in summer season. • Villagers expressed their need for drinking water source because in summer season there is scarcity of water. Also, irrigation facility needed for the agriculture. Regular electricity is also a need of the village because current condition of electricity availability is not good. • Villagers have expressed that they would not have any issue if labour camp is planned to be constructed for the project in the vicinity of the village. • It was advised to provide compensation to the land owner, before starting of the work. • Local people in this area are interested to be engaged as workers in the project. • People in this area have expressed concerns about diminishing value of land falling within RoW.
1.3	Village - Bariyagajar No of Participants		<ul style="list-style-type: none"> • Majority population of this village belongs to Santhal community. • Villagers have raised following issues related to the transmission line project: <ul style="list-style-type: none"> ○ Villagers have wanted the

Sl. No. Stakeholder Category	Key Points Discussed	Findings of the Consultation
<p>1.4 Village - Kiyashol</p> <p>No of Participants - 9 persons;</p> <p>Date- 18/03/2018</p>		<p>compensation money to be paid to affected families before starting of the work. They have also opined that, they would be allowed, to cultivate at tower base, then, there would not be any problem.</p> <ul style="list-style-type: none"> ○ Local people in this area are interested to be engaged as workers in the project, as during non-monsoon season, as they don't have any agricultural work.
<p>1.5 Village - Ghatdulmi</p> <p>No of Participants - 8 persons;</p> <p>Date- 17/03/2018</p>		<ul style="list-style-type: none"> ● Total 40 household were present in the village. Maximum population belongs to Santhal community. Apart from that, Mahato, and Nayak community are also reported from the village. ● Primary occupation of the villagers is Agriculture. Some farmers also grow vegetables in their fields near the water sources. ● Community in this area has expressed their willingness to the transmission line project, if compensations (for land, crop damage etc.) are paid on time. Villagers have also suggested to undertake transmission line stringing work in non-agricultural season (January - June), to avoid damages to the crops.
<p>1.6 Village - Palgam</p> <p>No of Participants - 11 persons;</p> <p>Date-</p>		<ul style="list-style-type: none"> ● Majority of the population in this village belongs to Manjhi and Munda tribal families are present in the village. ● Villager have expressed that they would have no issue related to the establishment of labour camp in village. However, labour camp should be constructed away from village houses, if possible. ● Villagers have raised following issues related to the transmission line project: <ul style="list-style-type: none"> ○ For transmission tower, adequate height should be maintained from the ground level. ○ They wanted to be educated on the risks and assured that the risks they will be exposed to, will be timely solved. ○ During the construction work, compensation to be provided, in case there any damages to crop. ● Majhi and Munda tribal community were present in the village. ● Villagers have raised below mentioned concerns regarding the transmission line project e.g. <ul style="list-style-type: none"> ○ Land owner would find difficulty to practice agriculture at tower base.

Sl. No.	Stakeholder Category	Key Points Discussed	Findings of the Consultation
		16/03/2018	<ul style="list-style-type: none"> ○ Repair work on transmission line will damage the crop. ○ No compensation was given to land owner in 1950s when a transmission line was passed from that person's land. ○ If villagers pass below the transmission line having a umbrella in hand then they feel current.
1.7	Village - Ulidih		<ul style="list-style-type: none"> ● Population of this village comprises of mainly Munda, Oraon and Mahli tribal communities. ● During consultation process, people has expressed their need for adequate drinking water sources. ● Villagers have reported that due to proximity of this village to the elephant corridor, elephant movement is high in this area, and further, they suffer crop damages from elephant movements. ● Villagers have welcomed this project. Their concern was only that transmission should not pass over the habitation of the village.
1.8	Village - Toranga	<p>No of Participants - 12 persons;</p> <p>Date- 16/03/2018</p>	<ul style="list-style-type: none"> ● Population of this village comprises of Soren and Munda tribe. ● Villagers have expressed their need to repair defunct hand pumps in the village. Also, electricity should cover all the houses in the village. ● Villagers are aware of transmission line and its associated impacts. During consultation, they have raised following concerns: <ul style="list-style-type: none"> ○ Houses can not be built below the transmission line, thus, transmission line should avoid habitation area. ○ Compensation should be provided on time. ○ Manual farming should be allowed under the TL.

The ESIA for the transmission lines associated to Chakuliya 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 activity specific mitigation measures in the form of an *Impact Mitigation Matrix (IMM)* as detailed in *Table 9.1*, 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 transmission line projects are managed in accordance to national and international best practices and benchmarks.

9.1

MITIGATION MEASURES

The Impact Mitigation Matrix (IMM) is detailed in *Table 9.1*. 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 Conditions of Contract. The General Conditions of Contract are presented in *Annexure 4*.

Table 9.1 *Impact Mitigation Matrix*

Sl. No.	Project Phase /Activity	Potential Impacts	Proposed Mitigation Measures	Responsibility
Planning/Prec onstruction				
1.1	Location of transmission line/tower	Diminution of land value in the width of RoW, restriction on use of land	<ul style="list-style-type: none"> Compensation to be paid before beginning of civil work, at the rate of 85% of land value, as determined by District Magistrate or any other authority based on Circle rate/ Guideline value/ Stamp Act rates for tower base area (between four legs); Compensation to be paid before beginning of civil work, at the rate of 	JUSNL Subdivision/Division/Circle

Sl. No.	Project Phase /Activity	Potential Impacts	Proposed Mitigation Measures	Responsibility
		15% of land value, as determined based on prevailing Circle rate /Stamp Act rate towards diminution of land value in the width of RoW (27m) corridor.		
1.2		Exposure to safety related risks	Transmission line will be designed as per IS 5613 (Part 2) to provide setback from dwelling area.	Design Consultant
1.3		Exposure to electromagnetic interference	Transmission line would be designed considering international guidelines such as Commission on Non-Ionizing Radiation Protection (ICNIRP), US National Council on Radiation, State Transmission Lines Standards and Guidelines in the USA etc.	Design Consultant
1.4		Damage to private property	Avoid settlement / hamlets within RoW	Design Consultant
1.5		Impact on Cultural Heritage	<ul style="list-style-type: none"> Careful selection of route alignment to avoid socially, culturally and archaeological sensitive areas (i. g. sacred groves, graveyard, religious worship place, monuments etc.); and Maintain minimum distance of 100 m from archaeological monuments 	Design Consultant
1.6		Tree felling (Permission under the tree felling act)	Permission for felling of trees to be obtained before tree felling	JUSNL Circle/Divisional Office/External Consultant
2.1	Transmission line through forest/ protected area / precious ecological area	Loss of precious ecological values/ damage to precious species	Careful selection of route alignment to avoid natural habitats (i. g. National Parks, Wildlife Sanctuary, Biosphere Reserves/ Biodiversity Hotspots)	Design Consultant
2.2		Deforestation and loss of biodiversity edge effect	<ul style="list-style-type: none"> Avoid transmission line/ tower in protected and reserve forest, Jungle Jhari by careful selection of alignment If avoidance is not possible, minimise the land to be taken from forest, jungle jhari Obtain Stage I and Stage 	Design Consultant

Sl. No.	Project Phase /Activity	Potential Impacts	Proposed Mitigation Measures	Responsibility
3.1.1	Line through identified migratory bird path and bird habitats and near waterbodies	Risk to the bird population primarily due to collision	II Clearance from the forest department. Careful selection of route to avoid such areas with known avian populations e.g. nesting grounds, foraging grounds, migration corridors etc.	Design Consultant
3.1.2			Provide bird guards and markers [as per the specification provided in IS-5613 (Part-II)] in transmission lines when passing through/near nesting grounds, foraging grounds, migration corridors etc.	Design Consultant
4	Line through designated elephant corridor or local wildlife corridors	Damage to the wildlife	The height above the ground at the lowest point of the lowest conductor or grounding wires (i.e., at maximum sag point) of power lines shall be: <ul style="list-style-type: none"> • a minimum of 20 feet (6.6 meters) above ground on level terrain (slope <20 degrees) • a minimum of 30 feet (9.1 metres) above ground on steeper terrain (slope > 20 degrees) ⁽¹⁾ 	Design Consultant
Construction				
5.1	Site preparation and construction work	Loss of topsoil	<ul style="list-style-type: none"> • Top soil from the entire tower footing area (approx. 22 sq. m.) will be stripped (10 to 15 cm) 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; • After construction work is over, top soil will be reinstated at the construction site. 	Contractor

(1)<http://www.moef.nic.in/sites/default/files/FIRSTDraft%20guidelines%20roads%20and%20powerlines.pdf>
[<http://www.moef.nic.in/sites/default/files/FIRSTDraft%20guidelines%20roads%20and%20powerlines.pdf>](http://www.moef.nic.in/sites/default/files/FIRSTDraft%20guidelines%20roads%20and%20powerlines.pdf)

Sl. No.	Project Phase /Activity	Potential Impacts	Proposed Mitigation Measures	Responsibility
5.2.1		Noise and vibrations	All equipment/machineries to be regularly maintained to ensure efficient operation	Contractor
5.2.2			DG sets with acoustic enclosure should be used	Contractor
5.2.3			Construction work during night time (10 pm to 6 am) to be prohibited. In case of emergency work at night approval of JUSNL Division/ Circle is mandatory	Contractor
5.3.1		Air Pollution	Water sprinkling to be carried out twice a day during dry season on exposed surface area.	Contractor
5.3.2			Vehicles transporting loose construction/excavated materials shall be covered with tarpaulin sheets.	Contractor
5.3.2			Loose construction material/excavated material shall be stored against any structure or would be kept covered with tarpaulin sheet at the construction site.	Contractor
5.3.3			All vehicles utilized in transportation of raw materials and personnel, will have valid Pollution under Control Certificate (PUCC)	Contractor
5.3.4			Regular maintenance of machines, equipment and vehicles that will be used for construction activities of substation/tower construction	Contractor
5.4		Water/Soil Pollution	Soak pits/modular bio-toilets would be provided at all construction camp, laydown area and labour camp	Contractor
6.1.1	Line through farm land	Disturbance to farming activity	<ul style="list-style-type: none"> • Use existing access roads wherever possible • Repair /reinstate damaged bunds on agricultural field etc. after completion of construction work. 	Contractor
6.1.2			Construction activities and stringing of line to be avoided during cropping season.	Contractor
6.1.3			<ul style="list-style-type: none"> • Compensation (to be paid before beginning of civil work) for fruit bearing trees at 	Contractor

Sl. No.	Project Phase /Activity	Potential Impacts	Proposed Mitigation Measures	Responsibility
7	Occupational health and safety	Injury and sickness of workers	<p>prevailing market rates, to be calculated as annual net product value multiplied by the number of productive years remaining;</p> <ul style="list-style-type: none"> • Compensation (to be paid before beginning of civil work) for timber trees to be calculated based on girth and type of trees; • Compensation (to be paid before beginning of civil work) for one-year net harvest for seasonal crops at prevailing market rates; 	Contractor
8.1	Blasting (if blasting is required)	Noise and Vibration	<ul style="list-style-type: none"> • Provide safety equipment's (PPEs) for construction workers; • Prevent entry of unauthorized person at construction site; • Provide training on health and safety to all the workers. • Adopt appropriate engineering safeguards to meet the regulatory standard [DGMS Prescribed • Permissible Limit of Ground Vibration (<i>Annexure 5</i>) for blasting operation. 	Contractor
8.2		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
8.3		Injury of workers	<ul style="list-style-type: none"> • 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 	Contractor

Sl. No.	Project Phase /Activity	Potential Impacts	Proposed Mitigation Measures	Responsibility
blasting activity.				
9.1	Community Health and Safety	Injury and sickness of local people	<ul style="list-style-type: none"> • Coordination with local communities for construction schedules etc; • Barricading construction area; • Placing reflective tapes on the boundary of construction area; • 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
9.2		Gender issue of local community	<ul style="list-style-type: none"> • Labour Camp should be located away from the village and it should be access control for the local people; • Awareness should be created among the migratory labour that they should not be entered in the village without prior information to the villagers; • Local resource like hand pump, bathing ghat should not be used by the labours. 	Contractor

Sl. No.	Project Phase /Activity	Potential Impacts	Proposed Mitigation Measures	Responsibility
10.1	Health, Hygiene, Safety and Security of Workers in Labour Camp	Labour camp related EHS and Hygiene Issues	<p>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:</p> <ol style="list-style-type: none"> 1. Worker's accommodation; 2. Provision of safe drinking water; 3. Appropriate arrangement for cooking; 4. Management of waste water and solid waste from the camp site; 5. Availability of medical facility (first aid); 6. Security arrangement of the camp site; 7. Arrangement to register and redress grievance of workers. 	Contractor
10.2		Conflict with local community due to sharing of local resources	Refer <i>Annexure 6</i> for detail guideline.	Contractor
11	Line through areas having vegetation (trimming /cutting of trees/ vegetation clearance)	Loss of vegetation	<ul style="list-style-type: none"> • Avoid felling of trees during stringing unless it becomes absolutely necessary. • After completion of stringing, natural regeneration or dwarf tree/medicinal tree plantation would be allowed to heights as per the standards mentioned in IS: 5613 and Government of India Circular 7-25/2012-FC dated 5th May 2014. 	Contractor
12	Line through forest land/near forest areas/ near the elephant corridors/national park	Injury to wildlife	<ul style="list-style-type: none"> • Install the protective fencing around excavated area (for tower foundation); • Install reflector or beacons in case elephant movement is reported 	Contractor
Operation and Maintenance				

Sl. No.	Project Phase /Activity	Potential Impacts	Proposed Mitigation Measures	Responsibility
13	Operation of transmission line	Collision of avifauna	<ul style="list-style-type: none"> Regular checking of the vacuums or holes in the towers to avoid bird nesting; Use of power line markers, which reduces of bird collision by increasing the visibility of transmission line to birds. 	JUSNL Subdivision Office
		Electrocution of elephants	Regular supervision of the sagging of the transmission lines.	JUSNL Division/Circle Office
14	Uncontrolled growth of vegetation	Loss of vegetation	<ul style="list-style-type: none"> Periodic pruning of vegetation to maintain minimum clearance of 4m between conductor and trees would (As per Government of India Circular 7-25/2012-FC dated 5th May 2014). 	JUSNL Subdivision Office
15.1.1	Occupational health and safety of staff	Injury/ mortality to staff during O&M work	<ul style="list-style-type: none"> During the testing and charging of electrical line, 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
				JUSNL Subdivision Office
15.1.2			Induction training to all the new employee and six monthly refresher training for substation O&M staff would be organised.	JUSNL Subdivision Office
15.2		Injury/ mortality from emergency situation	Preparation of fire emergency action plan and training given to staff on implementing emergency action plan	JUSNL Subdivision Office
16	Community health and safety	Injury/ mortality to public	<ul style="list-style-type: none"> Barriers to prevent climbing on transmission towers Warning signs at transmission towers 	JUSNL Subdivision Office

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.

9.2.1 *Labour Management Plan*

It is envisaged that during construction phase of LILO 1 and LILO 2 of Bahragora - Dhalbhumgarh TL, 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. 30 persons involving unskilled, semi-skilled and skilled labourers. Unskilled labourers is likely to be recruited from local villages, while semi-skilled and skilled labourers 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 near construction site, 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 6*) 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; and
- Inspection & Reporting

9.2.2

Gender Action Plan

As discussed in **Section 6.10** 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 are proposed to monitor implementation of the 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 JUSNL to register sexual harassment case.

9.2.3

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) which is 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 7*.

This plan aims at allowing the engagement of citizens in a systematic manner, which will allow 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 9.2 *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 <i>Online, through Project website</i>	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	Contractor along with the JUSNL Circle/Divisional Office	Community People especially the land owners within and adjacent to the transmission line corridor, Village Panchayat
		<i>Printed out documents</i>		
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	Contractor along with the JUSNL Circle/Divisional Office	People especially the land owners within and adjacent to the transmission line corridor, people residing near transmission line corridor, Village Panchayat
		<i>Printed posters</i>		
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	Contractor along with the JUSNL Circle/Divisional Office	Local community
		<i>Printed out documents</i>		
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	JUSNL Circle/Divisional Office	People especially the land owners within and adjacent to the transmission line corridor, people residing near transmission line corridor, Village Panchayat
		<i>Public Announcement & leaflets</i>		

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 9.5.3*. 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 9.3*.

Table 9.3 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 property and agree to mitigations.	Contractor along with the JUSNL Circle/Divisional Office	Community, , especially the land owners 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 9.1**.

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 Jamshedpur Circle and all the Executive Engineers and Assistant Engineers in the Golmuri 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 Jamshedpur Zone would be the member of Tier 2 level. The Chief Engineer would hear the aggrieved and also review the proceedings of the Jamshedpur 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 Jamshedpur 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 9*) 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

Project Implementation Unit (PIU) (Tire 3)	Name: Sri C S Jha Chief Engineer (Transmission, World Bank Funded Projects) Number: 9431780254
Jamshedpur Zone (Tire 2)	Name: Sri Arun Kr. Prashad (GM-cum-CE) Number: 9431707313

Jamshedpur Circle (Tire 1)	Name: Sri Arun Kumar (Electrical Superintending Engineer) Number: 7070816390
Golmuri Division	Name: Sri Ashwini Kr. Kachhap (Electrical Executive Engineer) Number: 9471707319

9.3

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 9.4*. The monitoring of the ESMP provisions would be carried out by the respective agencies at a frequency mentioned in the monitoring 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 8*.

Table 9.4 *Monitoring Plan*

Sl. No.	Project Phase /Activity	Potential Impacts	Parameter to be monitored/indicator	Monitoring frequency	Responsibility
Planning/Prec onstruction					
1.1	Location of transmission line/tower	Diminution of land value in the width of RoW , restriction on use of land	Compensation received by land owner, grievance recorded from land owner	Once before construction work	JPSIP PIU
1.2		Exposure to safety related risks	Setback distances to nearest dwelling units	Once during the detailed design	JUSNL Subdivision/Division/Circle/ JPSIP PIU
1.3		Exposure to electromagnetic interference	Electromagnetic field strength for proposed line design	Once during the detailed design	JUSNL Subdivision/Division/Circle/ JPSIP PIU
1.4		Damage to private property	Distance from nearest dwellings units	Once during the detailed design	JUSNL Subdivision/Division/Circle/ JPSIP PIU
1.5		Impact on Cultural Heritage	Distance from socially, culturally and archaeological sensitive areas	Once during the detailed design	JUSNL Subdivision/Division/Circle/ JPSIP PIU

Sl. No.	Project Phase /Activity	Potential Impacts	Parameter to be monitored/indicator	Monitoring frequency	Responsibility
1.6		Tree felling (Permission under the tree felling act)	Number of trees felled against the permissible number of trees which can be felled	Once- Before commencement of construction activity	JUSNL Subdivision/Division/Circle/ JPSIP PIU
2.1	Transmission line through forest/ protected area / precious ecological area	Loss of precious ecological values/ damage to precious species	Distance to natural habitats	Once during the detailed design	JUSNL Subdivision/Division/Circle/ JPSIP PIU
2.2		Deforestation and loss of biodiversity edge effect	Distance to nearest protected and reserve forest and Jungle Jhari; Stage-I and Stage-II clearance	Once during the detailed design	JUSNL Subdivision/Division/Circle/ JPSIP PIU
3.1.1	Line through identified migratory bird path and bird habitats and near waterbodies	Risk to the bird population primarily due to collision	Proximity of transmission line to nesting grounds, foraging grounds, migration corridors etc.	Once during the detailed design	JUSNL Subdivision/Division/Circle/ JPSIP PIU
3.1.2			Provision of bird guards and markers in transmission line	Once during the detailed design	JUSNL Subdivision/Division/Circle/ JPSIP PIU
4	Line through designated elephant corridor or local wildlife corridors Construction	Damage to the wildlife	Minimum/maximum ground clearance inside Elephant Corridor	Once during the detailed design	JUSNL Subdivision/Division/Circle/ JPSIP PIU
5.1	Site preparation and construction work	Loss of topsoil	Practice adopted to store and reuse topsoil which is removed from the construction site	Every week during tower construction work	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
5.2.1		Noise and vibrations	Maintenance log book of vehicle/machinery, Number of equipment /vehicle undergoing regular maintenance	Every week during tower construction/ line stringing work	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
5.2.2			Presence of acoustic enclosure in DG set	Every week during tower construction/ line stringing work	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU

Sl. No.	Project Phase /Activity	Potential Impacts	Parameter to be monitored/indicator	Monitoring frequency	Responsibility
5.2.3			How many night time approval was taken	Every week during tower construction/ line stringing work	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
5.3.1		Air Pollution	Water sprinkling at dust generating area	Every week during tower construction work	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
5.3.2			Tarpaulin cover on vehicle carrying loose construction/excavated materials	Every week during tower construction work	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
5.3.3			Tarpaulin cover on loose construction/excavated materials	Every week during tower construction work	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
5.3.4			Number of vehicle not having valid PUCC certificate	Every month during tower construction work	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
5.3.5			Maintenance log book of vehicle/machinery, Number of equipment /vehicle undergoing regular maintenance.	Every month during tower construction work	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
5.4		Water/Soil Pollution	Availability of Septic tanks and soak pits/modular bio-toilets	Every month during tower construction/ line stringing work	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
6.1.1	Line through farm land	Disturbance to farming activity	No of new access roads constructed, number of grievance recorded from local community	Every month during line stringing work	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
6.1.2			Construction work schedule	Every month during line stringing work	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
6.1.3			Disbursement of Compensation before beginning of civil work	Every month during line stringing work	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
7	Occupational health and safety	Injury and sickness of workers	Awareness of workers, use of PPE by workers	Every 15 days during tower construction/ line stringing work	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU

Sl. No.	Project Phase /Activity	Potential Impacts	Parameter to be monitored/indicator	Monitoring frequency	Responsibility
8.1	Blasting (if blasting is required)	Noise and Vibration	Measures adopted to control noise and vibration at blasting site	Weekly during blasting work	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
8.2		Damage to Structure	Record of any damaged and repaired structure	Weekly during blasting work	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
8.3		Injury of workers	Measures adopted to control fly rock, safety measures adopted for transport and storage of explosives, use of protective equipment, measures adopted for access restriction at blasting site	Weekly during blasting work	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
9.1	Community Health and Safety	Injury and sickness of local people	Number of accidents of local people (if any) at construction site; number of grievance recorded; Review of document related to regular health check-up of the work force; Review of document related to awareness camp organised periodically	Every month during tower construction/ line stringing work	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
9.2		Gender issue of local community	Physical observation of the labour camp; grievance received from local community.	Every month during tower construction/ line stringing work	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
10.1	Health, Hygiene, Safety and Security of Workers in Labour Camp	Labour camp related EHS and Hygiene Issues	Condition of labour camp, awareness of workers, complainant register	Every 15 days during operation of labour camp	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
10.2		Conflict with local community due to sharing of local resources	No of registered grievances and redressal status	during operation of labour camp	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU

Sl. No.	Project Phase /Activity	Potential Impacts	Parameter to be monitored/indicator	Monitoring frequency	Responsibility
11	Line through areas having vegetation (trimming /cutting of trees/ vegetation clearance)	Loss of vegetation	Tree felling in the RoW corridor, minimum clearance b between conductor and trees	Every month during line stringing work	JUSNL Subdivision/ Division/Circle/ Head Office
12	Line through forest land/near forest areas	Injury to small animal	Availability of fencing, reflector or beacons	Every month during tower construction work	JUSNL Subdivision/ Division/Circle/ Head Office
Operation and Maintenance					
13	Operation of transmission line	Collision of avifauna	Bird nests in towers, number of power line markers between towers	Monthly throughout the operation phase of the project	JUSNL Division/Circle/ Head Office
14		Electrocution of elephants	Vertical clearance between transmission line and ground level	Monthly the operation phase of the project	JUSNL Division/Circle/ Head Office
15	Uncontrolled growth of vegetation	Loss of vegetation	Minimum clearance b between conductor and trees	Monthly the operation phase of the project	JUSNL Division/Circle/ Head Office
16.1.1	Occupational health and safety of staff	Injury/ mortality to staff during O&M work	Accident-Incident register	Monthly the operation phase of the project	JUSNL Division/Circle/ Head Office
16.1.2			Document pertaining to training/awareness programs and mock drills/awareness level of staff engaged in O&M work of substation	Monthly the operation phase of the project	JUSNL Division/Circle/ JPSIP PIU
16.2		Injury/ mortality from emergency situation	Accident-Incident list	Monthly the operation phase of the project	JUSNL Division/Circle Office/ JUSNL PIU
17	Community health and safety	Injury/ mortality to public	Accident-Incident list	Monthly the operation phase of the project	JUSNL Division/Circle/ Head Office

9.4

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 Jamshedpur 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 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 9.5 Responsibility Matrix

Sl. No.	Designated Official	Role
1.	Electrical Superintending Engineer (ESE) of Jamshedpur Transmission Circle	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Monitoring implementation of ESMP. Obtaining approvals for release of payments for forest, land, compensation etc. to ESE's Office
3.	Project Monitoring Consultant (PMC)	<ul style="list-style-type: none"> 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 construction of the LILO 1 and LILO 2 of Bahragora - Dhalbhumgarh transmission line (TL) alignment at Chakuliya Substation may lead to potential impacts on:

- Diminution of land value along the transmission line corridor and damage to standing crops, both of which will be mitigated by way of payment of compensation (before beginning of civil work) to affected land owners;
- Impacts on biodiversity and potential fragmentation of habitats in forested stretches primarily due to felling of trees, clearance of vegetation and diversion of forest areas along the alignment;
- Impacts on elephant habitats and elephant corridor, which would be intersected by the TL alignment;
- Deterioration of local level air quality due to vehicular movements, construction activities involving setting up of foundation structures, tower erection and stringing of conductors;
- Community health and safety aspects arising out of excavation of towers foundation near pathways and because of labour influx issues; and
- Occupational health safety (risks of construction workers falling from height and electrocution) during the construction phase.

However, most of these impacts are temporary and can be mitigated with appropriate mitigation measures. During the operation stage, there is expected to be no impacts on the physical environment. The adverse impacts on ecology would also be reduced to a significant extent with time as natural vegetation would be allowed to regenerate to a safe height beneath the conductors. The implementation of the mitigation measures suggested can help in managing the adverse impacts on air quality, ground water etc. whereas the economic opportunities in terms of local employment are assessed to be positive. It is also anticipated that the development of 132/33 KV transmission line and the associated 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.

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 at 132/33 KV GS/S at Goelkera including with 2 nos. of 132 kV bay		14 km

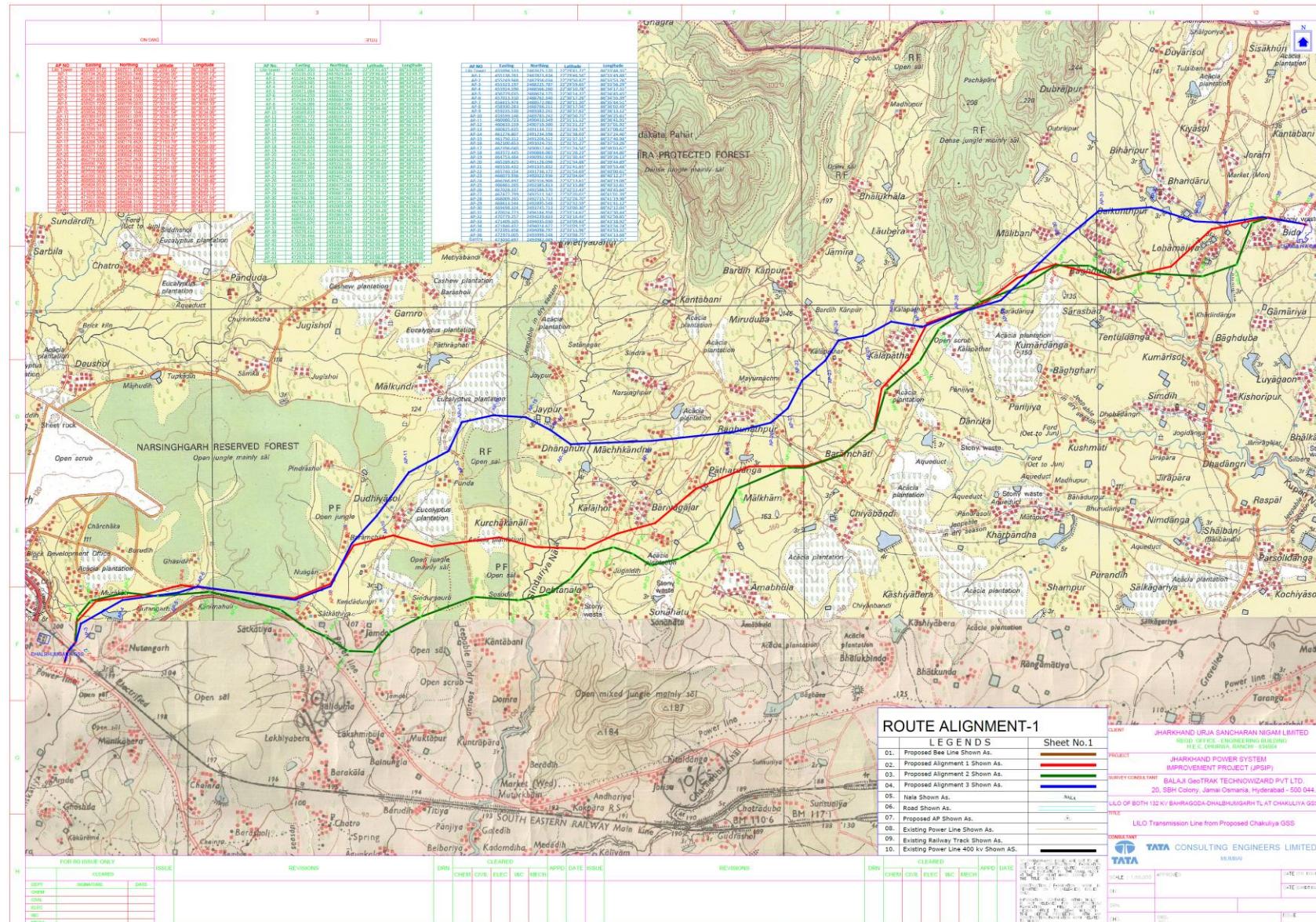
PHASE-III

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 - Rajkharawan 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

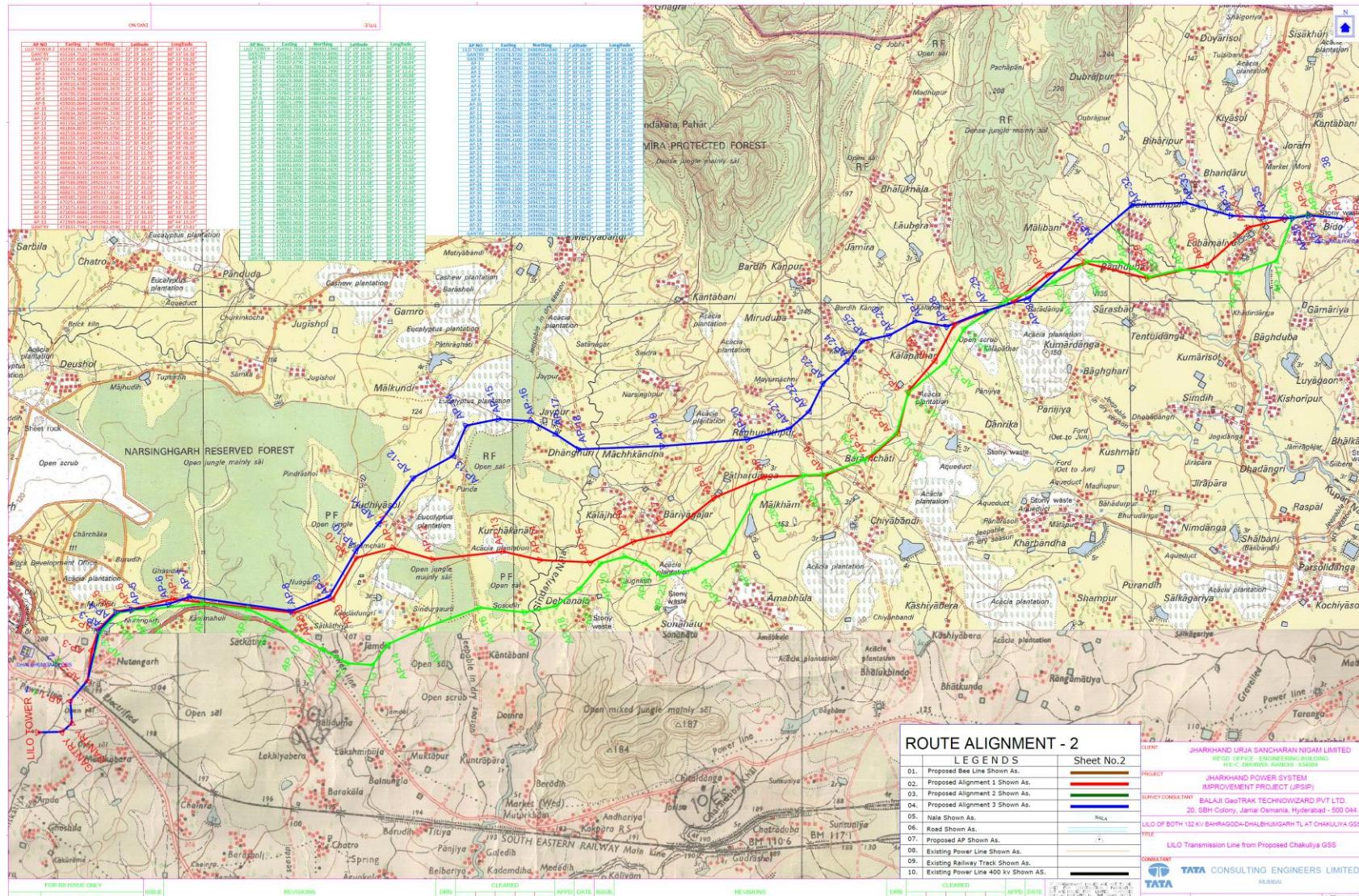
Annexure 2

Alternative Alignments

LILO 1 of Bahragora -Dhalbhumgarh transmission line (TL) alignment: Alternative Alignment



LILO 2 of Bahragora -Dhalbhumgarh transmission line (TL) alignment: Alternative Alignment



Annexure 3

Minutes of Meeting of Consultation

A	Project Title:	Jharkhand Power System Improvement Project (JPSIP)			
B	Stakeholder Title:	(Gram Panchayat Mukhiya/ Pradhan/ Community Members (TP)			
Note: This document provides a working summary of the main facts captured during the consultation/key informant interview held and should not be treated as formal minutes. It is therefore deliberately not exhaustive or chronological. Its purpose is to record significant information/feedback and not intended for official review or approval.					
C	Basic details:				
	Location:	Village: Kalimahulia	Gram Panchayat: Nutangarh		
D	Date	18/03/2018	Block: Dhalbhumgarh		
	Attended By				
D	Sr.	Name	Designation		
	1.	Govind Marandi	Gram Panchayat Mukhiya		
	2.	Kunu Murmu	Gram Pradhan		
	3.	Aryan Tudu	Village Resident		
	4.	Sukumar Hemrom	Village Resident		
	5.	Mangal Marandi	Village Resident		
	6.	Vijay Marandi	Village Resident		
	7.	Kunal Hemrom	Village Resident		
	8.	Bulai Hemrom	Village Resident		
	9.	Samba Hemrom	Village Resident		
	10.	Ramesh Hemrom	Village Resident		
E	Purpose of Consultation				
	Collection of information regarding baseline socio-economic condition				
F	Key Points Discussed:				
	<ul style="list-style-type: none"> Majority of the population in this village belongs to Santhal community. Apart from that Mahto community also reported from the village. The ratio of Santhal and Mahto is approx. 85:15. 				
	<ul style="list-style-type: none"> Agriculture is the prime occupation of the villagers. They mainly grow paddy in their fields as Kharif crop. They do agriculture in monsoon season only. During Non-Monsoon season they work as daily wage labourers in village or nearby areas. 				
	<ul style="list-style-type: none"> Wells and handpumps available in the village. 5 handpumps and 2 wells present in the village. Only 2 handpumps out of 5 are working. In summer season water delivery was less from the handpumps. 2 wells available in the village have less depth so they get dry in summer season. 				
	<ul style="list-style-type: none"> Toilets were reported in the village. Nearly 65% household in the village has toilet. These toilets were made under Swachha Bharat Mission. Due to unavailability of water in the house premises and bad construction of toilet, the toilet use is not in practice. Many villagers having toilets in their house practice open defecation. 				
	<ul style="list-style-type: none"> Primary Health Centre is present in the village, but doctor and nurse availability is not regular. For further health facility they have to travel to Dhalbhumgarh. 				
	<ul style="list-style-type: none"> Five Mahila Samiti reported from the village. 				
	<ul style="list-style-type: none"> Following welfare schemes were reported from the villagers. 				
	<p>PDS Scheme – In this scheme villagers get rice and Kerosine in subsidised rate from the government. Red card holders get 5 Kg rice/ Month/ person at Rs 1/Kg. Yellow card holder also reported from the village, they got 35 kg of rice per month per family.</p>				
	<p>Pradhanmantri Awas Yojna – Earlier known as Indira Awas Yojna, this scheme is also running in the village. Approx. 14 houses were made under this scheme in village.</p>				
	<ul style="list-style-type: none"> Toilets under Swachha Bharat Mission – 65% household got toilet under this scheme. 				
	<ul style="list-style-type: none"> Scholarship Scheme – Children from the village studying in different classes get regular scholarship. The payment mode is now online and students get their scholarship directly in their account. 				
	<ul style="list-style-type: none"> Cycle Scheme – Schoolchildren studying in class 8 and above get one-time contingency 				

money to purchase a cycle, which will help them to go school.

- Pension Scheme – only 5 person getting old age pension reported from the village. Many widows applied for widow pension 1 year ago but not yet started.
- Makarsankranti, Baha Parab, Sohrai are the main festival in this village. Jahirthan is the primary religious and cultural area of the village situated inside the village. Villagers perform their religious rituals in this place. Akhra is also a common place where they do community meetings or gatherings in the village. These places are considered to be sacred and no physical or any other type of disturbance allowed to it.
- Their religious head is called Nyki, who assist them in performing the rituals.
- Anganbadi present in the village. Middle school up to class 8 present in the village, for high school students have to go Dhalbhumgarh (5 Km away).
- Grievance redressal generally done inside the community, inside the village. Any type of grievance was first reported to the Panch (They are few selected peoples from the community). Panch listen both the parties and asks villagers for suggestions. And after listing both the parties and considering the suggestions of villagers, they settle the matter. More serious matters were reported to the Nearest Police Station.
- Villagers need irrigation facility, drinking water facility, availability of doctors and nurses in health centre, Toilets should be reconstructed to make them usable.
- Villagers have raised following issues related to the transmission line project:
 - Compensation should be provided for land as well as for trees felling. Compensation money should be provided before starting of construction work.
 - It was advised to regularly undertake lopping of tree branches, below the transmission line.
 - It was advised to design transmission line away from habitation area.

Photo



A	Project Title:	Jharkhand Power System Improvement Project (JPSIP)	
B	Stakeholder Title:	(Gram Panchayat Mukhiya/ Pradhan/ Community Members (TP)	
<i>Note: This document provides a working summary of the main facts captured during the consultation/key informant interview held and should not be treated as formal minutes. It is therefore deliberately not exhaustive or chronological. Its purpose is to record significant information/feedback and not intended for official review or approval.</i>			
C	Basic details:		
	Location:	Village: Bandangua	Gram Panchayat: Simdi
	Date	17/03/2018	Block: Chakulia
D	Attended By		
	Sr.	Name	Designation
	1.	Smt. Kunti Marandi	Gram Panchayat Mukhiya (Bansia)
	2.	Sidow Hansda	Gram Pradhan
	3.	Bahuram Soren	Village Resident
	4.	Dhunus Hansda	Village Resident
	5.	Sindhu Hansda	Village Resident
	6.	Jiten Hansda	Village Resident
	7.	Badu Marandi	Village Resident
	8.	Raghunath Hansda	Village Resident
	9.	Sukhlal Kisko	Village Resident
E	Purpose of Consultation		
	Collection of information regarding baseline socio-economic condition		
F	Key Points Discussed:		
	<ul style="list-style-type: none"> Total 60 households are present in the village. Only Santhal community reported from the village. Agriculture is the prime occupation of the villagers. They generally grow paddy in their fields. They do agriculture in monsoon season only. During Non-Monsoon season they work as daily wage labourers in village or nearby areas. Wells and hand pumps are sourced for domestic water requirement. 2 handpump available in village. 2 well available in the village. All water sources get dried in summer season. In summer season water available in only One hand pump. Toilets were reported to be constructed in the village. Nearly 80% families have toilets in their houses. These toilets were made under Swachha Bharat Mission. No primary health clinic available in the village. Approach road condition is also very bad. In case of any medical emergency villagers have to bring the patient on foot or any two-wheeler available in the village. Nearest hospital is available at Chakulia (approx. 8 km distance). A primary school is present in the village. Nearest high school is at Badikanour (approx. 4 km distance). Nearest college is located at Chakulia at 8 KM distance. Following welfare schemes were reported from the villagers. <p>PDS Scheme - In this scheme villagers get rice and Kerosine in subsidised rate from the government. Red card holders get 5 Kg rice/ Month/ person at Rs 1/Kg. 40 red card holders reported from the village.</p> <p>Pradhanmantri Awas Yojna - Earlier known as Indira Awas Yojna, this scheme is also running in the village. Approx. 6 houses were made under this scheme in village.</p> <p>Toilets under Swachha Bharat Mission - Each household get toilet under this scheme.</p> <p>Scholarship Scheme - Scholarship is being provided to School children.</p> <p>Cycle Scheme - Schoolchildren studying in class 8 and above get one-time contingency money to purchase a cycle, which will help them to go school.</p> <p>Pension Scheme - Widow and old age pension reported from the village.</p>		

- Jahirthan is the primary religious and cultural area of the village.
- Grievance redressal generally done inside the community, inside the village. Any type of grievance was first reported to the Panch (They are few selected peoples from the community). Panch listen both the parties and asks villagers for suggestions. And after listing both the parties and considering the suggestions of villagers, they settle the matter. More serious matters were reported to the Nearest Police Station.
- Villagers expressed their need for drinking water source because in summer season there is scarcity of water. Also, irrigation facility needed for the agriculture. Regular electricity is also a need of the village because current condition of water availability is not good. Approach road to the village should be reconstructed.
- Villagers have raised following issues related to the transmission line project:
 - Compensation should be provided to the land owner before starting of the work.
 - Local people in this area interested to be engaged as workers in the project.
 - People have expressed concerns about diminishing value of land falling within RoW.

Photo



A	Project Title:	Jharkhand Power System Improvement Project (JPSIP)	
B	Stakeholder Title:	(Gram Panchayat Mukhiya/ Pradhan/ Community Members (TP)	
<p><i>Note: This document provides a working summary of the main facts captured during the consultation/key informant interview held and should not be treated as formal minutes. It is therefore deliberately not exhaustive or chronological. Its purpose is to record significant information/feedback and not intended for official review or approval.</i></p>			
C	<i>Basic details:</i>		
	Location:	Village: Bariyagajar	Gram Panchayat: Sonahatu
	Date	18/03/2018	Block: Chakulia
D	<i>Attended By</i>		
	Sr.	Name	Designation
	1.	Shyampad Mardi	Gram Panchayat Mukhiya
	2.	Dugu Hansda	Village Resident
	3.	Baso Hemrom	Village Resident
	4.	Mohan Soren	Village Resident
	5.	Gnadhar Hansda	Village Resident
	6.	Gurcharan Mardi	Village Resident
	7.	Mangal Hansda	Village Resident
	8.	Khudiram Hemrom	Village Resident
9.	Sirmat Eoren	Village Resident	
E	<i>Purpose of Consultation</i>		
	Collection of information regarding baseline socio-economic condition		
F	<i>Key Points Discussed:</i>		
	<ul style="list-style-type: none"> Majority population of this village belongs to Santhal community. 		
	<ul style="list-style-type: none"> Agriculture is the prime occupation of the villagers. Mainly paddy is grown in their fields, in monsoon season only. During Non-Monsoon season they work as daily wage labourers in village or nearby areas. 		
	<ul style="list-style-type: none"> Wells and handpumps available in the village. For drinking water villagers prefer water from the wells. Wells are also reported to be dry in summer season. Most of the handpumps available in the village are reported to be in bad condition. 		
	<ul style="list-style-type: none"> Nearly all household in the village has toilet. These toilets are constructed under Swachha Bharat Mission. 		
	<ul style="list-style-type: none"> Following welfare schemes are reported from the villagers. 		
	PDS Scheme - In this scheme villagers get rice and Kerosine in subsidised rate from the government. Red card holders get 5 Kg rice/ Month/ person at Rs 1/Kg.		
	Pradhanmantri Awas Yojna - Earlier known as Indira Awas Yojna, this scheme is also functional in the village. Approx. 10 houses were made under this scheme in village.		
	Toilets under Swachha Bharat Mission - Each household gets toilet under this scheme.		
	Scholarship Scheme - Children from the village studying in different classes get regular scholarship. The payment mode is now online and students get their scholarship directly in their account.		
	Cycle Scheme - Schoolchildren studying in class 8 and above get one-time contingency money to purchase a cycle, which will help them to go school.		
	Pension Scheme - Widow and old age pension reported from the village.		
	<ul style="list-style-type: none"> There are 3 women's <i>Samiti</i> / SHG (Self Help Group) in this village. Each group comprises of 12-14 members. Members of the SHG collect money from members and provide financial support to needy members. 		
	<ul style="list-style-type: none"> Jahirthan is the primary religious and cultural area in this village. Villagers perform their religious rituals in this place. Akhra is also a common place where they do community meetings or gatherings. These places are considered sacred and no physical or any other type of disturbance are allowed in it. 		

- Their religious head is called Nyki, who assist them in performing the rituals
- Grievance redressal generally done inside the community, inside the village. Any type of grievance was first reported to the Panch (They are few selected peoples from the community). Panch listen both the parties and asks villagers for suggestions. And after listing both the parties and considering the suggestions of villagers, they settle the matter. More serious matters were reported to the Nearest Police Station.
- Villagers have raised following issues related to the transmission line project:
 - Villagers have wanted the compensation money to be paid to affected families before starting of the work. They have also opined that, they are allowed, to cultivate at tower base, then, there would not be any problem.
 - Local people in this area are interested to be engaged as workers in the project, as during non-monsoon season, as they don't have any agricultural work.

Photo



A	Project Title:	Jharkhand Power System Improvement Project (JPSIP)			
B	Stakeholder Title:	(Gram Panchayat Mukhiya/ Pradhan/ Community Members (TP)			
<i>Note: This document provides a working summary of the main facts captured during the consultation/key informant interview held and should not be treated as formal minutes. It is therefore deliberately not exhaustive or chronological. Its purpose is to record significant information/feedback and not intended for official review or approval.</i>					
C	<i>Basic details:</i>				
	Location:	Village: Kiyashol	Gram Panchayat: Chalunia		
	Date	18/03/2018	Block: Chakulia		
D	<i>Attended By</i>				
	Sr.	Name	Designation		
	1.	Punam Mandi	Gram Panchayat Mukhiya		
	2.	Shyam Charan Basky	Gram Pradhan		
	3.	Sukilal Tudu	Village Resident		
	4.	Dulal Nayak	Village Resident		
	5.	Nepal Nayak	Village Resident		
	6.	Manojit Mahato	Village Resident		
	7.	Bailul Tudu	Village Resident		
	8.	Subhash Mahato	Village Resident		
	9.	Samu Basky	Village Resident		
E	<i>Purpose of Consultation</i>				
	Collection of information regarding baseline socio-economic condition				
F	<i>Key Points Discussed:</i>				
	<ul style="list-style-type: none"> Total 40 household were present in the village. Maximum population belongs to Santhal community. Apart from that, Mahato, and Nayak community are also reported from the village. Primary occupation of the villagers is Agriculture. Some farmers also grow vegetables in their fields near the water sources. Wells and handpumps available in the village. 4 handpumps reported from the village. But 2 handpumps are in bad condition and needs repair. High Iron contaminated water reported from the handpump. So, for drinking water villagers prefer water from the wells. Wells are also reported to be dry in summer seasons. Toilets were reported in the village. Nearly all household in the village has toilet except some odd ones. These toilets were made under Swachha Bharat Mission. Many villagers having toilets. Following welfare schemes were reported from the villagers. PDS Scheme - In this scheme villagers get rice and Kerosine in subsidised rate from the government. Red card holders get 5 Kg rice/ Month/ person at Rs 1/Kg. Pradhanmantri Awas Yojna - Earlier known as Indira Awas Yojna, this scheme is also running in the village. Approx. 40 houses were made under this scheme in village. Toilets under Swachha Bharat Mission - Each household get toilet under this scheme. Scholarship Scheme - Children from the village studying in different classes get regular scholarship. The payment mode is now online and students get their scholarship directly in their account. Cycle Scheme - Schoolchildren studying in class 8 and above get one-time contingency money to purchase a cycle, which will help them to go school. Pension Scheme - Widow and old age pension reported from the village. 				
	<ul style="list-style-type: none"> Jahirthan is the primary religious and cultural area of the village. Villagers perform their religious rituals in this place. Akhra is also a common place where they do community meetings or gatherings in the village. These places are considered to be sacred and no physical or any other type of disturbance allowed to it. Sarhul, Baha etc. are the main festivals of Santhal 				

community.

- Grievance redressal generally done inside the community, inside the village. Any type of grievance was first reported to the Panch (They are few selected peoples from the community). Panch listen both the parties and asks villagers for suggestions. And after listing both the parties and considering the suggestions of villagers, they settle the matter. More serious matters were reported to the Nearest Police Station.
- Villagers need more drinking water source, repairing of approach road, irrigation facility, health centre, etc.
- Community in this area has expressed their willingness to the transmission line project, if compensations (for land, crop damage etc.) are paid on time. Villagers have also suggested to undertake transmission line stringing work in nonagricultural season (January - June), to avoid damages to the crops.

Photo



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C	Basic details:				
	Location:	Village: Ghatdulmi	Gram Panchayat: Dhunaburu		
D	Date	17/03/2018	Block: Chandil		
D	Attended By				
	Sr.	Name	Designation		
	1.	Kalipodo Singh Munda	Village Resident		
	2.	Umapodo Singh Munda	Village Resident		
	3.	Budheshwar Manjhi	Village Resident		
	4.	Dalgobind Singh Munda	Village Resident		
	5.	Bheto Singh Sardar	Village Resident		
	6.	Rohina Majhi	Village Resident		
	7.	Kulmi Devi	Village Resident		
	8.	Jaru Manjhi	Village Resident		
	9.	Ravi Manjhi	Village Resident		
E	Purpose of Consultation				
	Collection of information regarding baseline socio-economic condition				
F	Key Points Discussed:				
	<ul style="list-style-type: none"> Majority of the population in this village belongs to Manjhi; and Munda tribal families are present in the village. 				
	<ul style="list-style-type: none"> People living in this village are entirely dependent on agriculture. They engage in paddy cultivation. Due to unavailability of water in summer seasons, they do not practice Rabi cropping. 				
	<ul style="list-style-type: none"> Hand pumps and wells are present in the village. Villagers use handpumps more than wells. 				
	<ul style="list-style-type: none"> Majhi Than or Jahar Than is the main cultural area of the community. No disturbance allowed in these areas. 				
	<ul style="list-style-type: none"> Grievances of the local people are settled within the community. To address community grievance, a committee comprising three local peoples are formed. This committee listen opinions of both the parties and consult with other villagers and finally settles the grievance. 				
	<ul style="list-style-type: none"> Local community have expressed their need for proper irrigation facilities. If a pipeline will be laid to bring water from the nearest river then it will be beneficial for the community as well as for village also. There is no pond in the village, thus cattle do not have proper drinking water. 				
	<ul style="list-style-type: none"> Villagers have expressed that they would have no issue related to the establishment of labour camp in village. However, labour should be constructed away from village houses, if possible. 				
	<ul style="list-style-type: none"> Villagers have raised following issues related to the transmission line project: <ul style="list-style-type: none"> For transmission tower, adequate height should be maintained from the ground level. They wanted to be educated on the risks and assured that the risks they will be exposed to, will be timely solved. During the construction work, compensation to be provided, in case there any damages to crop. 				

Photo



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C	Basic details:				
	Location:	Village: Palgam	Gram Panchayat: Dhunaburu		
	Date	16/03/2018	Block: Chandil		
D	Attended By				
Sr.	Name	Designation			
1.	Budheshwar Singh Munda	Gram Panchayat Mukhiya			
2.	Parikshit Mahato	Gram Pradhan			
3.	Jaidev Das	Village Resident			
4.	Sufal Machua	Village Resident			
5.	Susen Machua	Village Resident			
6.	Bhola nath Mahato	Village Resident			
7.	Rabindra Nath Das	Village Resident			
8.	Ajit Manjhi	Village Resident			
9.	Jagdish Munda	Village Resident			
10.	Salonti Majhi	Village Resident			
11.	Himanshu Mahato	Village resident			
E	Purpose of Consultation				
	Collection of information regarding baseline socio-economic condition				
F	Key Points Discussed:				
	<ul style="list-style-type: none"> Majhi and Munda tribal community were present in the village. Agriculture is mainly practised for livelihood. Some villagers work in nearby factory as labours and other posts as Fitter etc. Total 8 handpumps are available in village out of only 4 are in working condition. Wells are also present in the village, but due to salty water people don't use water from that source. SBM Toilets were made for all the households but villagers don't use them due to lack of water and proper design. Rice was given to tribal community peoples holding Red cards. No Pradhanmantri Awas Yojna was reported in the village. Majhi Than or Jahar Than is the main cultural area of the community. No disturbance allowed in these areas. Grievances were settled within the community and three peoples were selected from the community, who listen opinions of both the parties and consult with other villagers and finally settles the matter. Approach road to village is not in good condition it should be repaired. Electricity supply hours should be improved. Irrigation facility needed. Villagers have many concerns regarding the Transmission line e.g. <ul style="list-style-type: none"> Land owner would find difficulty to practice agriculture at tower base. Repair work on transmission line will damage the crop. No compensation was given to land owner in 1950s when a transmission line was passed from that person's land. If villagers pass below the transmission line having a umbrella in hand then they feel current. 				

Photo



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C	<i>Basic details:</i>				
	Location:	Village: Ulidih	Gram Panchayat: Ulidih		
D	Date	16/03/2018	Block: Tamar		
	<i>Attended By</i>				
Sr.	Name	Designation			
1.	Kiran Devi	Gram Panchayat Mukhiya (Deputy)			
2.	Sukhdeo Singh Munda	Gram Pradhan			
3.	Kanu Munda	Village resident			
4.	Sharma Munda	Village resident			
5.	Bhato Oraon	Village resident			
6.	Shyam chand Munda	Village resident			
7.	Lalmani Devi	Village resident			
8.	Sudarshan Swansi	Village resident			
9.	Ratan Swansi	Village resident			
10.	Sohan Munda	Village resident			
11.	Basudev Munda	Village resident			
12.	Lalbahadur Munda	Village resident			
E	<i>Purpose of Consultation</i>				
	To understand the key issues related to livelihood, welfare, opinion on the project and the felt needs				
F	<i>Key Points Discussed:</i>				
	<ul style="list-style-type: none"> Population of this village comprises of mainly Munda, Oraon and Mahli tribal communities. Agriculture is the main livelihood of the villagers living in this village. Villagers also work as daily wage labours in off season when there is no agriculture work. Hand pumps and Government constructed bore well available in the village to meet water requirement. Tribals are benefited by the PDS scheme. In PDS scheme, the person bears the Red cards is eligible to get 5 Kg rice/ month at Rs 1 per Kg. Toilets under Swachh Bharat mission are constructed at 25 houses. No Pradhanmantri Awas Yojna beneficiary was reported from the village. Jatra Tand and Akhra are the main religious place of the community. They do not want any construction work or any disturbance in those places. Community level grievances are settled through grievance redressal committee, which is known as "Panch system". During consultation process, people has expressed their need for adequate drinking water sources. Villagers have reported that due to proximity of this village to the elephant corridor, elephant movement is high in this area, and further, they suffer crop damages from elephant movements. Villagers don't have any adverse comment on transmission line. Their concern was only that transmission should not pass over the habitation of the village. 				

Photo



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C	Basic details:				
	Location:	Village: Toranga	Gram Panchayat: Ulidih		
D	Date:	16/03/2018	Block: Tamar		
	Attended By				
Sr.	Name	Designation			
1.	Lakhimani Devi	Gram Panchayat Mukhiya			
2.	Ravi singh Munda	Village Resident			
3.	Yogendra Singh Munda	Village Resident			
4.	Munna Munda	Village Resident			
5.	Nilmadhav Singh Munda	Village Resident			
6.	Mangal Singh Munda	Village Resident			
7.	Gorang Munda	Village Resident			
8.	Jitendra Singh Munda	Village Resident			
9.	Benimadhav Singh Munda	Village Resident			
E	Purpose of Consultation				
	To understand the key issues related to livelihood, welfare, opinion on the project and the felt needs				
F	Key Points Discussed:				
	<ul style="list-style-type: none"> Population of this village comprises of Soren and Munda tribe. Agriculture is the primary occupation of the village. In monsoon season they grow paddy. Some farmers also grow vegetables. In Non-Monsoon season they work in nearby places as daily wage labourers. In government welfare scheme PDS scheme, Pradhanmantri Awas Yojna and scholarship available in the village. Akhra and Jatra Tand are the two main cultural areas in the village. For grievance redressal a team of five man called "panch" was selected from the village and they discuss the matter by listening both the parties, and then give the solution. Sometimes these local hearings were merged with Gram Sabha of the panchayat and Mukhiya as the head person try to settle the matter from public opinion. Hand pumps should be repaired. All tolas of the village are not covered by electricity, so electricity should cover all the houses in the village. Villagers are aware of transmission line and its associated impacts. During consultation, they have raised following concerns: <ol style="list-style-type: none"> Houses can not be built below the transmission line, thus, transmission line should avoid habitation area. Compensation should be provided on time. Manual farming should be allowed at tower base. 				

Photo



Annexure 4

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 and the Environmental and Social Management Plans attached to the report
- 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 filling 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. In case this is not feasible the contractor shall remove the excess excavated material from the area of the construction of tower footing before the completion of the tower erection. All other provisions specified in the EMP shall be implemented.
- vi. The Contractor should contain requisite quantity and type of spill kits to control the spills of fuel and other oils e.g. transformer oil to prevent the pollutant from spreading either outside the area of the spill or into the ground.

GCC 1.2

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

In case of filling/ 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 from the Oil storage areas shall be passed through a Oil Water Separator (OWS) before it being discharged outside.

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

GCC 1.3

- (i) All water and liquid waste products arising on the sites shall be collected and disposed off at location onsite or offsite and in a manner that shall not cause nuisance or pollution.
- (ii) The Contractor shall not discharge or deposit any matter arising from the execution of the works into any place except at the designated places without the permission of the Environmental and Social Officer and the regulatory authorities concerned.

GCC 1.4

- (i) The Contractor shall carry out dust suppression by sprinkling of water or methods of working to minimise dust, gaseous or other air born emissions and carry out the works in such a manner as to minimise adverse impacts on air quality. Sprinkling of water shall be carried out twice a day on exposed surface area during dry season.
- (ii) Stockpiles of materials should be sited in sheltered areas or within hoarding, away from sensitive areas. Stockpiles of friable materials shall be covered with clean tarpaulins with application of sprayed water during dry and windy weather. Stockpiles of debris shall be dampened prior to their movement, except where this is contrary to the specifications.
- (iii) Any vehicle with an open load carrying area used for transport of potentially dust producing materials shall have properly fitting side and tailboards. Materials having potential to produce dust shall not be loaded to a level higher than the side and tail boards and shall be covered with clean tarpaulin in good condition. The tarpaulin should be properly secured and extended to at least 300 mm over the edges of the sideboard and tailboard.
- (iv) During high wind, no dust generating operations shall be permitted within 200m of residential areas having regard to the prevailing direction of the wind.
- (v) Construction vehicles and machinery shall be kept in good working order and engines turned off when not in use. Appropriate measures shall be taken to limit exhaust emissions from construction vehicles, machinery and plant and the contractor shall include details of such proposed measures in the mitigation and monitoring plan to be submitted to the Employer or his representative.
- (vi) All vehicle employed in the project shall have valid Pollution under Control (PUC) Certificate. The Contractor should maintain PUC Certificate log book on a regular basis and shall provide it to the Employer or his representation for inspection when asked for.

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

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

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

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

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

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

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

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

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

1.2 COMPLIANCE WITH LABOUR REGULATIONS

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

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

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

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

- a) Workmen Compensation Act 1923
- b) Payment of Gratuity Act 1972
- c) Employee P.F. and Miscellaneous Revision 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 Act 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

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 **Annexure 11** Management of Labour Influx of the Environmental and Social Management Framework)

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'ble 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 adhere provisions of the following acts;

- a) The Water (Prevention and Control of Pollution) Act, 1974
- b) The Air (Prevention and Control of Pollution) Act, 1981
- c) The Environment (Protection) Act 1986
- d) The Public Liability Insurance Act, 1991
- e) Wild Life Protection Act, 1972, as amended
- f) Forest Conservation Act, 1980 & Forest Conservation Rules, 2003 (as amended) & corresponding orders and judgements
- g) Jharkhand Biological Diversity Rules 2007
- h) Ancient Monuments & Archaeological Sites and Remains Act, 1958
- i) Indian Treasure Trove Act, 1878
- j) Jharkhand Ancient Monuments and Archaeological Sites, Remains and Art Treasures Act, 2016
- k) Jharkhand Timber and Other Forest Produce (Transit and Regulation) Rules, 2004
- l) Ozone Depleting Substances (Regulation and Control) Rules, 2000
- m) The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013 (LARR 2013)
- n) Chota- Nagpur Tenancy Act, 1908
- o) Santal Pargana Tenancy Act, 1949
- p) Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016
- q) E-Waste (Management) Rules, 2016
- r) Battery (Management & Handling) Rules 2001
- s) Ozone Depleting Substances (Regulation and Control) Rules, 2000
- t) Central Ground Water Authority (CGWA) Public Notice dated 4th January 2017
- u) 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 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

GCC4.1 The Contractor shall observe all applicable regulations regarding safety on the Site.
Unless otherwise agreed, the Contractor shall, from the commencement of work on Site until handing over, provide:
a) fencing, lighting, guarding, putting up reflective strips and watching of the Works wherever required, and
b) temporary roadways, footways, guards and fences which may be necessary for the accommodation and protection of Employer / his representatives and occupiers of adjacent property, the public and others.

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

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

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

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

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

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

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

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

- Satisfy the JUSNL Division /JUSNL PIU that the appliance is in good working condition;
- Inform the JUSNL Division /JUSNL PIU of the maximum current rating, voltage and phases of the appliances;
- 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:

- The appliance is in good condition and is fitted with suitable plug;
- 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 be 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.

1.4 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 tools 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 5

DGMS Prescribed Permissible Limit of Ground Vibration

DGMS Prescribed Permissible Limit of Ground Vibration

Type of structures	Dominant excitation frequency, Hz		
	< 8Hz	8-25Hz	>25Hz
(A) Buildings/structures not belong to the owner			
1. Domestic houses/structures (Kuchcha, bricks & Cement)	5	10	15
2. Industrial building	10	20	25
	2	5	10
3. Objects of historical importance & sensitive Structures			
(B) Buildings belonging to the owner with limited span of life			
1. Domestic houses/structures	10	15	20
2. Industrial buildings	15	25	50

Annexure 6

Labour Management Plan

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. 30 persons involving unskilled, semi-skilled and skilled labourers. Unskilled labourers is likely to be recruited from local villages, while semi-skilled and skilled labourers 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 near project site, 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 plan.

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 be 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 7

Health & Safety Management Plan (HSMP) Template

CONTRACTOR HEALTH AND SAFETY MANAGEMENT PLAN - TEMPLATE

10.1 PROJECT INFORMATION

10.1.1 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>**.

10.1.2 Contractor Details

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

10.1.3 Details of Contractor H&S Personnel

Name	Position	Responsibilities

10.1.4 Scope of Project Work

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

10.2 GENERAL H&S INFORMATION

10.2.1 List of Regulations

Relevant legislation	Tick if applicable
<i>Contractor Labour (Regulation & Abolition) Act, 1970</i>	<input checked="" type="checkbox"/>
<i>Contractor Labour (Regulation & Abolition) Central Rules, 1971</i>	<input checked="" type="checkbox"/>
<INSERT ANY OTHER RELEVANT LEGISLATION>	<input type="checkbox"/>

10.2.2 H&S Codes of Practice

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

Work health and safety consultation, cooperation and coordination	<input type="checkbox"/>
Working in the vicinity of overhead and underground electrical lines	<input type="checkbox"/>
<INSERT ANY OTHER RELEVANT CODES OF PRACTICE>	

10.2.3 Contractor H&S Policy

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

10.3 RISK MANAGEMENT

10.3.1 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

10.3.2 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.

10.3.3

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.

10.4

EMERGENCY PREPAREDNESS & RESPONSE

10.4.1

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>.**

10.4.2

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>.

10.4.3

Emergency Contact

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

10.5

INCIDENT REPORTING & INVESTIGATION

10.5.1

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>.

10.5.2

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.

10.6 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.

10.7 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 8

Format for Reporting of ESMP Implementation

JHARKHAND POWER SYSTEMS IMPROVEMENT PROJECT

ENVIRONMENTAL MANAGEMENT PLAN MONTHLY IMPLEMENTATION STATUS REPORT

Name of the Transmission Line _____ Period/Month _____

EMP Refer ence	Activities	Observation/ Status till end of last Observation/ Period	Status till end of this Period
1c	Has the final route selection avoided the displacements/ damage to property		
2bi	Has the final route been able to avoid transmission line/ tower in Forest, Jungle Jharis by careful selection of alignment		
2bii	Has the final route minimizes the need of deforestation by reducing the RoW requirement wherever possible as per the MoEF Circular No F. No.7-/25.- 2012 -FC		
3ai	Has the route included bird guards and markers in transmission lines as per the specification provided in IS-5613, near the migratory bird path and bird habitats e.g. nesting grounds, foraging grounds, migration corridors etc		
6aii	Has the pre-construction equipment checks been carried out (use additional sheets to provide the monitored Leq values)		
6aiii	Is regular equipment maintenance being carried out? (Use additional sheets to provide maintenance log)		
6aiv	Has monthly noise monitoring been carried out for DG sets		
6av	Has any permission been provided by Chief Engineer for night time work?		
6bi	Has quarterly air quality monitoring been carried out during the earthwork?		
6biii	Is PUCC certificate log book being maintained on regular basis?		
6biv	Instrument, machine, vehicle maintenance log book should be maintained on regular basis		
7ci	Has the Cut and fill slopes been protected with using standard engineering practices?		
7dii	Has peripheral site drainage channel and provision of oil-water separator been made for the site?		
7di	Has septic tanks and soak pits/modular bio-toilets would be provided at construction camp?		

EMP Refer ence	Activities	Observation/ Status till end of last Observation/ Period	Status till end of this Period
9 aiv	Has the safety practices been undertaken during the construction? Please explain in details whether barricading, reflective tapes has been undertaken?		
7g	What steps has been taken for coordination with local communities?		
7h	What initiatives have been taken to prevent obstruction to traffic?		
10	Please indicate the actions which have been taken to prevent conflicts with local workers?		
12ai	Have the workers been provided with relevant PPE?		
12aii	How many observation on non - compliance in using personal protective equipment?		
12bi	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 9

Format for Registering
Grievance from
Community/Project Affected
Persons

JHARKHAND POWER SYSTEMS IMPROVEMENT PROJECT

GRIEVANCE REDRESSAL MECHANISM

Format for Grievance Recording

Name of the Village: _____

Name of Block: _____

Name of the Transmission Line _____

Period/Month _____

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

Thank you.

Managing Director

Jharkhand Urja Sancharan Nigam Limited

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

For Official Use Only

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

Annexure 10

**Critical Habitat Criteria (IFC
PS6 Guidance Note 2012)**

Critical Habitat Criteria (IFC PS6 Guidance Note 2012)

Criteria	Tier 1	Tier 2
Criterion 1: Critically Endangered (CR) / Endangered (EN) species:	<p>a)Habitat required to sustain \geq 10 % of the global population of a CR or EN species /sub /species and where there known regular occurrences of the species and where habitat could be considered a discrete management unit for the species.</p> <p>b) Habitat with known, regular occurrences of CR or EN species where that habitat is one of 10 or fewer discrete management sites globally for that species.</p>	<p>c) Habitat that supports the regular occurrence of a single individual of a CR species and/or habitat containing regionally- important concentrations of Red-listed EN species where that habitat could be considered as a discrete management unit for the species/subspecies.</p> <p>d) Habitat of significant importance to CR/EN species that are wide-ranging and/or whose population distribution is not well understood and where the loss of such a habitat could potentially impact the long-term survivability of the species.</p> <p>e) As appropriate, habitat containing nationally/regionally important concentrations of an EN, CR or equivalent national/regional listing.</p>

Annexure 11

Candidate Critical Habitat Species (Criteria 1-3) and Assessment

Candidate Critical Habitat Species (Criteria 1) and Assessment

Common Name	IUCN Listing	Criterion 1	Criterion 2	Species Information	CH Rationale
				Criterion 3	
Indian Elephant	EN	X		The transmission lines are located within Singhbhum Elephant Reserve where movement of Asian Elephant is reported	<p>The elephant corridor area other areas from the Singhbhum Elephant Reserve within which the transmission lines are passing could be included as habitat containing regionally- important concentrations of elephants and thereby may trigger Criterion 1, Tier 2c and 2e for Critical Habitats.</p> <p>However, further studies in this regard will be carried out after detailed line surveys to assess the potential of the area as Critical Habitat.</p>

IUCN Categorization- EN=Endangered; NT

Annexure 12

Assessment of Impact Significance

Impacts on Aesthetics & Visual Quality

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

Impacts on Air Quality

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

Impacts on Noise Quality

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

Impact on Land use

Impact	Impact on land use			
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
Resource/ Receptor Sensitivity	Low	Medium	High
Impact Significance	Negligible	Minor	Moderate
	Significance of impact is considered Moderate		

Impact on Soil

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

Impacts on Road & Traffic

Impact	Impacts on Road & Traffic		
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
Resource/ Receptor Sensitivity	Low	Medium	High
Impact Significance	Negligible	Minor	Moderate
	Significance of impact is considered Negligible to 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
Resource/ Receptor Sensitivity	Low	Medium	High
Impact Significance	Negligible	Minor	Moderate
	Significance of impact is considered Moderate to Major		

Impact on Socio-economic Conditions

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

Impact on Community Health and Safety

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

Impact on Occupational Health and Safety

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



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