

Draft Terms of Reference (ToR)

For

Consultancy Services to Examine and Assess the Socio-economic & Environmental Impacts and Challenges for Implementation of 765kV Cross Border Line between Katihar and Bornagar Using Bangladesh Territory

A. INTRODUCTION

1. Project Background

India and Bangladesh share bonds of history, language, culture, and multitude of other commonalities. The excellent bilateral ties reflect an all-encompassing partnership based on sovereignty, equality, trust, and understanding that goes far beyond a strategic partnership. In order to coordinate the cooperative institutional relationship in power sector between the countries a “Joint Working Group (JWG)” and “Joint Steering Committee (JSC) have been established.”

The 20th meetings of the JWG and JSC were held on 28th and 29th May 2022 respectively in Dharmashala, India. The consultancy topic is related to pointing out the Socio-economic & Environmental Impacts and due diligence contexts of the implementation of “765kV Cross Border line between Katihar and Bornagar using Bangladesh Territory.” According to the minutes, in the 19th JSC meeting, it was agreed that while the Bangladesh side will carry out its due diligence on the issues pointed out by Bangladesh side, in parallel a committee of three officers from each side will be constituted to examine the legal and operational aspects of the proposed transmission system and make its recommendations at the earliest. Bangladesh side also stated that they would like to complete due diligence including environment and social impact assessment and analyzing the legal framework of Bangladesh for construction, operation, maintenance and ownership of the proposed transmission corridor. In the 19th meetings of the JWG and JSC held on 21 January 2021 in Dhaka, Bangladesh side expressed concern that this transmission system may be used to evacuate future hydro power from NER, India, and Bangladesh being lower riparian country, the issue also needs to be discussed in the Joint River Commission (JRC) of India and Bangladesh. Bangladesh side also raised the issue of security and O&M of the said corridor line. Bangladesh side proposed to sign a data sharing agreement between India and Bangladesh in order to get different kinds of data to conduct comprehensive feasibility study, hydrological and water modelling studies, environmental and social impact assessment which will be required to get the approval of construction for this transmission line

Indian side stated having recommendations from internally formed committee of JWG that POWERGRID, India would incorporate and register a Special Purpose Vehicle (SPV) in Bangladesh to construct, operate and maintain grid transmission line of 765kV. The same has also urged as SPV can obtain transmission license to undertake the implementation of grid transmission line. To the contrary, Bangladesh side stated that as per legal provision of Bangladesh only PGCB can be engaged for the implementation and O&M of the power transmission infrastructure at present. Both sides, agreed on the implementation of the project, but the consultancy service can play a pivotal role fixing the approach and methodology of electricity transmission planning, construction, and O&M for the transmission line passing through the Bangladeshi territory.

In such case it is required to prepare detailed environmental and social assessment with due diligence for the Project. To satisfy due diligence requirements, it is required to review the existing studies to develop the project viability in terms of technical, financial, economic, environmental, social, institutional and legal aspects, sector policies and safeguard contexts, in conjunction with the country partnership strategies, operational experiences and lessons learned from the evaluation of previous similar projects. On the other hand, for the proposed “765kV Cross Border line between Katihar and Bornagar using Bangladesh Territory” invokes details study for impact on hydrological distributaries shared with both of the parties as the possibilities of specific types of power (e.g., hydro power) transmission can bring forth vicarious impacts on hydrological network and direct impact on socio-economic & environmental aspects of the Bangladesh.

For the “Implementation of 765kV Cross Border line between Katihar and Bornagar using Bangladesh Territory”, it is paramount to identify appropriate transition passage with detailed alternative routes which must have lesser impacts on socio-economic and environmental components including the hydrological resources of Bangladesh. In keeping with the previous consideration of socioeconomic issues, examination of the compensation component and the authority of land acquisition in light of Bangladeshi laws and regulations should be prioritized.

2. Project Description and Rationale

Within the Project, it is proposed to conduct comprehensive detailed project studies and perform Environmental & Social Impact Assessment with due diligence and route survey.

As construction of 765kV transmission line and associated work falls within ultra-high voltage class which is completely new in Bangladesh, a comprehensive due diligence in light of Environmental and Socio-economic impacts and engineering study by a competent and experienced international Consultant is required.

3. Objectives of the Assignment and expected outcomes:

The objectives of the assignment are:

- (i) To examine the socio-economic and environmental aspects highlighting due diligence with associated reports,
- (ii) Identification of tentative routes and Right of Way (RoW),
- (iii) Prepare resettlement action plan (RAP) considering compensation aspects and other issues,
- (iv) Identification and recommendation for Project Affected Persons (PAP’s) asset losses (e.g., land, crops etc.),
- (v) To identify direct and indirect impacts on natural resources by producing and analyzing *Integrated Bio-diversity Assessment Tool (IBAT)* reports and associated other studies due to all relevant project implementation activities,
- (vi) To identify impacts on health & safety perspective and provide recommendations,
- (vii) To suggest and prepare socio-economic and environmental management plans and detailed analysis of associated impacts on water resources highlighting the project viability.

(viii) Analysis and suggest economic viability and options.

B. SCOPE OF WORK

Consultants will prepare a full-fledged detailed E&S Study Report comprising engineering layouts, cost estimates, necessary studies of Major Rivers along the route, direct & indirect impact on hydrological distributaries in case of transmission of hydro power, environment & social assessment, financial and economic analysis, risk assessment, risk mitigation plan. Based on the study further action will be taken. Consultant shall need to prepare basic cost estimate/ budget for ESMP (environment & social management plan) & RAP implementation and identification of suitable route by presenting alternative analysis for 765 kV transmission line. The scope of the consultancy services shall encompass following activities:

1. Technical due diligence of the proposed transmission line

Studies will include route surveys, soil survey, environment and social assessment reports, assessment of road, rail, and river crossings. The Consultant shall study initially on three routes and recommend one shortest feasible route through Bangladesh territory from those three routes along with necessary comparative analysis highlighting least minimum usage of land resources of Bangladesh. Survey data (easting, northing and elevation with drone survey data) to be supplied in Microsoft Excel file and the routes will be submitted in AutoCAD along with hardcopy. If any river crossings exist along the route, the consultant shall propose whether any morphological study is required or not.

2. Socio-economic analysis

Experts will assess the impacts of socio-economic aspect of the Project. They shall conduct proper analysis including assessment of all economic impacts with sensitivity analyses and evaluation highlighting the context of the project. Socio-economic analysis shall cover the life of the project and consider the impact on the national and international level issues of the titled project. Assessment of impacts on RoW in regard of 765 kV transmission line highlighting resettlement issue and loss of residential, commercial and agricultural land/ loss of crop/any type of production yields and impact on land ownership of project affected people's concern is needed to be analyzed. In such case Electricity Act & Rule and other relevant acts & rules of Bangladesh shall be considered.

Experts shall also explore economic impact on Bangladesh's economy due to the implementation of the proposed transmission line along with detail financial & economic analysis.

3. Environmental and Social Impact Assessment

3.1 In accordance with the applicable national requirements and international best practices (e.g., WB, IFC, ADB etc.) the Consultant shall:

- i. Prepare social & environmental assessment and associated framework;
- ii. Prepare Environmental and Social Impact Assessment (ESIA) report including the Environmental and Social Management Plans (ESMPs), Biodiversity Management Plan etc.;
- iii. Prepare Route Survey and associated reports;

- iv. Identification and analysis of direct & indirect impact on hydrological distributaries.
- v. Review and analysis of Bangladesh Delta Plan 2100 and include all of the associated aspect related to the study (e.g. impacts).
- vi. All the socio-economic and environmental components associated with such high voltage transmission line covering all aspects of impacts must be identified and highlighted by the consultant and associated details are needed to be attached with the deliverables.

3.2 In line with Environmental and Socio-economic due diligence concern, the Consultant shall:

- (i) Prepare Resettlement Action Plan (RAP) and Vulnerable and Ethnic Minority Development Plan;
- (ii) Review the government policies, strategies and recommendations for policy update in regard of resettlement and compensation if needed;
- (iii) Conduct socio-economic analysis and prepare associated action plans with considering stakeholder consultation.
- (iv) Conduct detail financial & economic viability analysis for implementing of the proposed transmission line.

4. Summary of Legal Aspects

Conclusively, the consultant is to render (i) Route survey and associated report preparation, (ii) preparation of ESIA and (iii) RAP through examining and assessing socio-economic & environmental impacts with due diligence (associated components mentioned in previous section) while taking account of following legal aspects (but not limited to):

- Review Environment Conservation Rules, 1997 (Amendments in 2002, 2003, 2017), Bangladesh Water Act, 2013, Acquisition and Requisition of Immovable Property Act, 2017, International Policies and Plans (Bilateral Agreements), Trans-boundary pollutants issues and related conventions UNFCCC, Basel Convention and all the policies related to the assignment;
- Review the Electricity Act 2018 and Electricity Rule-2020 and subsequent amendments in 2022 of Bangladesh on the issue of electricity generation, transmission and distribution;
- Review the Central Electricity Regulatory Commission (Cross Border Trade of Electricity) Regulations, 2019 of CERC, India;
- Review of Government subsequent orders on the issue of electricity transmission planning, implementation and O&M in the territory of Bangladesh;
- Review the existing Land Act of Bangladesh on the issue of the legal entity for purchasing, acquiring, establishing right of way of the land of Bangladesh;
- Review of Presidential Order (PO) 59,1972, on the issue of electricity transmission planning, implementation and O&M;
- Review of the updated 'Grid Code' of Bangladesh and India in legal and operational context;
- Review policies regarding RoW & management, acquisition, compensation etc.

- Review of the legal framework of a Special Prepose Vehicle (SPV) in connection with purchasing or acquiring land in Bangladesh as per the JWG and JSC discussion related to the RAP;
- Review the regional/ international legal & regulatory framework for the cross-border power corridor;
- Review the regional/ international operational aspects for the cross-border power corridor;
- Comparison & Gap analysis from the legal, regulatory & operational points of view;
- Identifying potential barriers/ challenges for the implementation & operation of the interconnection;
- Consideration of legal provision for the implementation and O&M of the power transmission infrastructure;
- Recommendations regarding the interconnection;
- Recommendation on consent/clearance/ permission/no objection (NOC) may be required as per the government requirements for construction of special category transmission line;
- Consultation with appropriate authority / entities in connection to the consultancy outputs;
- Consultant will take initiatives and help the employer to identify all types of necessary clearance certificates related to the project and prepare associated documents accordingly. Such necessary clearance certificates that might need to be collected from the legal enforcement agencies are stated below (but not limited to):

<i>Sl no.</i>	<i>Ministry/Office/Commission</i>	<i>Division/Department/Section</i>
01	Ministry of Forestry, Environment and Climate Change	<ul style="list-style-type: none"> ✓ Department of Environment (DoE) ✓ Forest Department
02	Ministry of Foreign Affairs	-
03	Ministry of Defence	-
04	The Prime Minister's Office	Bangladesh Investment Development Authority (BIDA)
05	Ministry of Finance	-
06	Ministry of Fisheries and Livestock	-
07	Ministry of Power, Energy and Mineral Resources	<ul style="list-style-type: none"> ✓ Power Division ✓ Bangladesh Power Development Board (BPDB)
08	Bangladesh Energy Regulatory Commission (BERC)	-
09	Ministry of Water Resources	<ul style="list-style-type: none"> ✓ Water Resources Planning Organization (WARPO)

<i>Sl no.</i>	<i>Ministry/Office/Commission</i>	<i>Division/Department/Section</i>
		✓ Joint River Commission (JRC)
10	Ministry of Shipping	✓ Bangladesh Inland Water Transport Authority (BIWTA)
11	Ministry of Labor and Employment (MoLE)	-
12	Ministry of Law and Parliamentary Affairs	-
13	Ministry of Land	-
14	Ministry of Railways	-
15	Ministry of Home Affairs	
16	Ministry of Road Transport and Highways Division	-
17	Ministry of Civil Aviation and Tourism	✓ Civil Aviation Authority, Bangladesh (CAAB)
18	Local Government Division	✓ Union Parishad

C. ELIGIBILITY OF CONSULTING FIRM/ CONSULTANT

The international consulting firm/ individual international consultant shall be selected upon considering conflict of interest factor which involves relevant country(s). In this respect, the international consulting firm/ individual international consultant which should not be selected from relevant country(s) to avoid the conflict of interest between both of the parties.

D. DATA SHARING AGREEMENT

Based on the principle of reciprocal exchange, under the premise of not violating the law and not infringing the lawful rights and interests of others (all parties) -the consultant, employer and all other relevant associated parties shall share the relevant data/report/document needed/generated in its process within a general platform (confidential) agreed with all parties which shall include all of scope of works.

E. DURATION OF ASSIGNMENT

The duration of this assignment will be **12** months.

1. Deliverables

- **Inception report**

- This report includes, but not limited to, implementation arrangement of the consultancy services according to given terms of reference or corresponding adjustment, if requires, from the field data.

- Consultant will submit an Inception Report within 1 month from signing of the Contract
- **Interim Report:**
 - the report shall summarize the initial findings of the conception works,
 - Consultant will submit an Interim Report within 4 months from signing of the Contract
- **Draft Report**
 - This report includes, but not limited to, draft information collection by the consultant through all the documents, survey, assessments and/or stakeholder consultation, their interpretations, data analysis, subsequent iterations, draft outcomes upon reviewing background, objectives and the scope of the services;
 - Consultant will submit Draft Final within 9months from the date of Contract signing
 - Stakeholders Consultation Workshop on Draft Report would be conducted after 15 days of submission of Draft Report.
- **Final Report**
 - This report includes, but not limited to, final information collection by the consultant through all documents, survey, assessments and/or stakeholder consultation, their interpretations, data analysis, subsequent iterations, final outcomes upon reviewing background, objectives and the scope of the services;
 - Consultants shall submit Final Report after 12 months from the date of Contract signing;

2. Qualification and Experience Requirements:

<i>Sl no.</i>	<i>Key Experts</i>	<i>Qualification and Experience Requirements</i>
01	Team Leader/ Project Manager (International)	<p>Team Leader shall at least have a Master's Degree in Electrical/ Mechanical/ Civil with 20 years of professional experience in the related field. He/ She must have experience as Team Leader/Project Manager in a multidisciplinary Team conducting Feasibility Study, Topographic Survey, Route Survey, ESIA & RAP in 5 (Five) 400 kV or Higher Voltage Transmission Line Projects. Expert should provide testimonials from previous employers, if any. Experience related to power transmission system for regional project/interconnected grid study project (e.g., Continental Europe, Eastern Interconnection etc.) is desired. International Certification in Health & Safety is desirable.</p> <p>Team leader shall divide tasks specified in ToR and as per requirements of to the appropriate personnel/team members, coordinating the team of experts in order to delivering high quality of deliverables needed for the Project.</p> <p>Please follow the directives under “Section C: ELIGIBILITY OF CONSULTING FIRM/ CONSULTANT.”</p>
02	Environmental Expert (National)	<p>Graduate/ Master's Degree in Environment Science/ Environmental Engineering/ Environmental Management /Natural Resource Management/Biology/ Zoology/ Botany/Ecology with Total 10 years' experience. He/ She shall have a practical experience in conducting at least 5 nos. Projects in High Voltage Transmission Line Projects as Environmental Expert. The expert shall have experience in conducting Environmental and Social Impact Analysis (ESIA)/ Initial Environmental Examinations (IEE) in High Voltage Transmission Line Projects as per national laws and good international industry practices (GIIP) relating to ESIA and IEE. He/ She shall have in-depth knowledge and expertise on Environmental and Social Framework of global standards.</p> <p>The Expert shall review safeguard issues and prepare an Environment and Social Impact Assessment (ESIA) of the project with special consideration of transboundary impacts.</p>
03	Transmission Line Engineer (International)	<p>Graduate/ Master's Degree in Electrical/ Civil/ Mechanical Engineering with Total 10 years' Experience. Specific experience as a Transmission Line Design Engineer especially in High Voltage transmission system. He/ She have a practical experience in conducting of at least 3 nos High Voltage Transmission Line Projects as Transmission Line Engineer at 400 kV or above. Experience related to power transmission</p>

<i>Sl no.</i>	<i>Key Experts</i>	<i>Qualification and Experience Requirements</i>
		<p>system for regional project/interconnected grid study project (e.g., Continental Europe, Eastern Interconnection etc.) is desired.</p> <p>The Consultant shall review the survey data carried out by the route survey experts and examine at least three possible routes of the transmission line.</p> <p>Please follow the directives under “Section C: ELIGIBILITY OF CONSULTING FIRM/ CONSULTANT.”</p>
04	Route Survey Expert (National)	<p>Graduate/ Master’s Degree in Civil Engineering/ Urban & Regional Planning with 10 years total Experience in conducting Route survey (including drone survey experience), land survey and GIS Mapping. He/ She shall have a practical experience in conducting route survey of at least 3 nos Projects (Minimum 100 km) in High Voltage transmission system i.e., 400 kV or above acquainted with technical terminology of survey.</p> <p>The Expert shall carry out the detailed survey of the possible route alignments following the modern international practices/standards of detail surveying of 765 kV High Voltage transmission line route.</p>
05	Water Resource Specialist (National)	<p>Graduate/ Master’s Degree in Water Resources Engineering from any recognized university with 5 years of experience in identifying the generic environmental and social impacts and risks typically encountered in hydropower projects. He/ She should have substantial knowledge and experience in river morphology studies. Experience related to power transmission system for regional project/interconnected grid study related project (e.g., Continental Europe, Eastern Interconnection etc.) is desired.</p> <p>The Specialist shall carry out studies whether the development of the Project affects the riverine ecosystem and cause significant adverse impacts on river resource users, primarily by altering river water, sediment, and biodiversity flows (daily and seasonal) and also recommend new or revised policies, procedures, or regulations to support water resource or conservation goals.</p>
06	Social Development Specialist (International)	<p>He/ She shall have a Master's Degree in Sociology/Anthropology or closely related discipline with more than ten (10) years of professional experience in the related field. The expert shall have experience in conducting environmental and social impact analysis (ESIA), social assessments or due</p>

<i>Sl no.</i>	<i>Key Experts</i>	<i>Qualification and Experience Requirements</i>
		<p>diligence of in High Voltage Transmission Line Projects as per relevant national laws.</p> <p>The consultant shall have proven experience in GBV/SEA, gender assessments, gender analysis, development of gender-sensitization programs and gender mainstreaming. Experience in GBV/SEA is mandatory. He/ She is encouraged to have experience in the integration of stakeholder engagement (public participation) during the ESIA process, with special consideration of local conditions and transboundary issues. Experience related to power transmission system for regional project/interconnected grid study project (e.g., Continental Europe, Eastern Interconnection etc.) is desired.</p> <p>The Specialist shall determine the social impacts and associated measures of the project including social resettlement.</p> <p>Please follow the directives under “Section C: ELIGIBILITY OF CONSULTING FIRM/ CONSULTANT.”</p>
07	Biodiversity Expert (National/International)	<p>He/ She shall have a Master's Degree in Biology/ Zoology or related studies with more than five (5) years of professional experience in the related field. The expert shall have experience in works related to biological studies of the Power Sector related projects (preferably in High Voltage Transmission Line Projects). Experience related to power transmission system for regional project/interconnected grid study project (e.g. Continental Europe, Eastern Interconnection etc.) is desired.</p> <p>The Expert shall define the environmental and social baseline of the potential impacts and risks associated with aquatic and terrestrial ecosystems, ecosystem services, and communities.</p> <p>Please follow the directives under “Section C: ELIGIBILITY OF CONSULTING FIRM/ CONSULTANT.”</p>
08	OHS Expert/ CHS Expert (National/International)	<p>He /She shall have a Master's Degree in Environmental/ Health & Safety related studies with more than five (5) years of professional experience in the related field. The experts shall have experience in works related to OHS/ CHS Management in infrastructure projects. Experience in High Voltage Transmission Line Projects is highly desirable. Experience related to power transmission system for regional project/interconnected grid study project (e.g. Continental Europe, Eastern Interconnection etc.) is desired.</p> <p>The Expert shall analyze and describe all occupational/ community health and safety concerns brought about by activities during all the phases of the project.</p>

<i>Sl no.</i>	<i>Key Experts</i>	<i>Qualification and Experience Requirements</i>
		Please follow the directives under “Section C: ELIGIBILITY OF CONSULTING FIRM/ CONSULTANT.”
09	Resettlement Expert (National)	<p>He/ She shall have a Master's Degree in related studies with more five (5) years of professional experience in the related field. The expert shall have experience in works related to the preparation of Resettlement Action Plan (RAP) and Vulnerable and Ethnic Minority Development Plan as per good international industry practice.</p> <p>The Specialist shall prepare Resettlement Action Plan and describe mitigation measures (if required).</p>
10	Legal Consultant (International/National)	<p>At least Master's Degree in Law or any relevant subject with 5 years of working experience in policy & planning electricity transmission in country or regional context.</p> <p>Please follow the directives under “Section C: ELIGIBILITY OF CONSULTING FIRM/ CONSULTANT.”</p>
11	Economic Analyst (National)	<p>At least Master's Degree in Economics/Energy Economics or any relevant subject with 5 years of working experience in economic policy, development & planning electricity transmission in country or regional context.</p>
12	Technical Consultant (international)	<p>Graduate/ Master’s Degree in Electrical/ Civil/ Mechanical Engineering with Total 5 years’ Experience. Specific experience on Transmission Line project planning & designing especially High Voltage transmission system. Experience related to power transmission system for regional project/interconnected grid study project (e.g., Continental Europe, Eastern Interconnection etc.) is desired.</p> <p>Please follow the directives under “Section C: ELIGIBILITY OF CONSULTING FIRM/ CONSULTANT.”</p>

3. Client’s Input and Counterpart Personnel

(a) Data, Personnel, facilities and local services to be provided by the Client:

The entities of power sector will ensure access to the available pertinent information to this assignment. Consultant will work in close association with Power Division/ Power Cell and other relevant entities. A coordination mechanism will be set up to review progress, provide guidance and advice. The designated personnel of the entities will interact with the consultants and provide data, arrange discussions and assistance as required.

(b) Logistics Support

Office accommodation, field visits, secretarial service, technical and support service from any resource person will have to be arranged by the consultant at his own costs.

4. Payment Schedule

Sl. no	Milestones (Submission and acceptance of reports under Scope of Services)	Payment (% of the contract price)	Cumulative (% of the Contract price)	Remarks
1.	Inception Report	10%	10%	All reports should be accepted by by the competent authorities.
2.	Interim Report	10%	20%	
3.	Draft Report (after Stakeholders Consultation Workshop on Draft Report)	30%	50%	
4.	Final Report	50%	100%	

**** Please follow the detailed guidelines & scope of works provided in the ToR (section A-E) and include all information accordingly by considering associated necessary issues mentioned in ToR.**

Route Survey for Transmission Line

1.1 FIXING OF ROUTE ALIGNMENT:

- 1.1.1 The alignment of the line route is carried out by survey using any methods or combination of methods like Drone, Electronic Total Station, DGPS and High precision Laser Distometer Etc. to achieve the required accuracy showing the correct shape of land, adjacent roads, boundaries, drains, overhead lines, railway track, highways, rivers/water bodies trees and all structures including foundations/power lines.
- 1.1.2 Equipment's required for the work such as total stations and all accessories to complete the work within the specified time are to be arranged by the consulting firm.
- 1.1.3 At least three route profile will be studied.
- 1.1.4 The following positions are fixed during this survey
 - 1.1.4.1 Fixing of angle tower positions / Bending position of Underground cable
 - 1.1.4.2 Finalizing of crossing points of major EHV lines (11 kV and above) & for underground cable details of the lines/ Crossing point for sewerage system, water or gas distribution system, telephone wire, fiber optics, any electrical underground cable
 - 1.1.4.3 Finalizing of crossing points of Railway Tracks & details of such points.
 - 1.1.4.4 Finalizing of crossing points of major rivers & details of such points.
- 1.1.5 Measurements of the angles of deviation at all angle / section points are made. Resurvey of parts of the line route is done wherever it is possible to reduce the number of angle points and/ or the magnitude of the angles of deviation.
- 1.1.6 For the purpose of guidance, the angles of deviation of the different types of towers are as below:

Tower type	Used as	Angle of deviation
VDL	Suspension tower	Up to 1 degree
VD1	Heavy Suspension tower	Up to 3 degrees
VD25	Medium angle tower	Up to 25 degrees
VD45	Heavy Angle Tower	Up to 45 degrees
VDT60	Large angle & dead end tower	Up to 60 degrees and Dead end
VDR	River-Crossing Suspension Tower	Up to 0 degrees
VDAX	River-Crossing Anchor Tower	Up to 35 degrees

Double Circuit Towers
Four Circuit Towers

Tower type	Used as	Angle of deviation
VQL	Suspension tower	Up to 1 degree
VQ1	Heavy Suspension tower	Up to 3 degrees
VQ15	Small angle tower	Up to 15 degrees
VQ30	Medium angle tower	Up to 30 degrees
VQT60	Large angle & dead-end tower	Up to 60 degrees and Dead end

Note: V shall be replaced by the left most digit of voltage level. For example, in 230kV lines, V shall be replaced by 2 and hence VDL shall be 2DL.

For existing transmission lines, tower nomenclature shall be as mentioned in number plate/tower schedule.

- 1.1.7 The length of the line route is also measured. This is done with the use of survey chains or with the theodolite
- 1.1.8 When using survey chains for measuring the length of the line route, the chain should be kept horizontal in uneven or undulating land so that horizontal distances are measured and not the distances along the contours of the land.
- 1.1.9 A span is the part of the line between any two adjacent towers. A section is the portion of the line route with a single span or with a number of consecutive spans between two tension points with "VD25", "VDT60", "VDAX", "VQ15", "VQ30" or "VQT60" type towers, as applicable.
- 1.1.10 The number of consecutive spans between two angle / section points shall not exceed 15(fifteen) in plain terrain and 10 (ten) spans in hilly terrain.
- 1.1.11 The length of any section of the line, i.e., between two angle/section points, shall not exceed 5 km in plain terrain and 3 km in hilly terrain. In case longer sections are available, then cut points / section points shall be provided by using "VD25" type tower.
- 1.1.12 If the terrain & line route permit, attempts can be made so that the section lengths are, as far as possible, in multiples of the basic span of the towers for the relevant voltage class.
- 1.1.13 The consultant shall propose feasible basic spans and design span. However, typical basic spans of PGCB's approved towers for various voltage level are as below:

Voltage Level	Basic Span
765 kV	400 meters
400 kV	375 meters
230 kV	380 meters
132 kV	330 meters

In case of existing transmission lines, spans shall be measured from survey data.

- 1.1.14. In case of Underground Cable (if any), width of road under which the cable will pass, chainage, bridge lengths, bend radius of the Underground Cable, presence of any Gas line, sewerage line, pipeline etc. are required to be surveyed and shown in the route map drawing.
- 1.1.15. If any river crossings exist in the route, then the consultant shall propose whether any morphological study is required or not. The consultant shall also propose whether it is feasible to cross the river with overhead transmission line or with submarine cable.
- 1.1.16. Highest flood level data shall be collected along the route during fixing of route alignment.

1.2 CROSSING OF POWER LINES:

- 1.2.1 The crossing of existing power lines shall be at an angle as close to 90 degrees as possible. Higher voltage lines shall be over the lower voltage line during crossing.
- 1.2.2 The crossing of the new line over an existing power line is preferably done in the middle of the span between towers of existing power line where there is maximum sag of the conductor. When the line to be constructed is crossing another important EHV line for which shut down may be difficult, suspension towers in combination with angle / dead end towers, with extensions as required, may be used.
- 1.2.3 The crossing of the new line below an existing power line shall be done at locations where adequate ground clearance for the new line and the specified clearance from the existing power line are available. Such crossing shall preferably be in the mid span between towers /structures of the new power line, where there is maximum sag of the conductor, and near one of the towers of the crossing span of the existing line for taking advantage of the higher height of the conductors. These measures reduce the requirement of increasing the height of the existing line for obtaining the requisite clearance.

1.3 CROSSING OF THE TELECOMMUNICATION LINES:

- 1.3.1 The crossing of such lines should preferably be at 90 degrees, but an angle less than 60 degrees is not permissible

1.4 CROSSING OF RAILWAY TRACKS:

- 1.4.1 The angle of crossing should preferably be 90 degrees, but an angle of upto 60 degrees maybe permitted in special cases.
- 1.4.2 The crossing span shall be restricted to 300 meters or to 80% of the basic span of the towers of the relevant voltage class, whichever is less. Angle towers are to be provided on both sides.
- 1.4.3 The minimum distance of the towers of the crossing span from the center of the nearest railway track shall be equal to the height of the tower in meters above normal ground level plus 6 meters.
- 1.4.4 The crossing span over already electrified railway track shall be located at the middle of overhead equipment span supported by two adjacent traction masts/ structures. The distance between any of the crossing conductors of

the line and the nearest traction mast or structure under the most adverse conditions shall not be less than 6 meters.

- 1.4.5 As far as possible, higher levels of land on both sides of the railway track are preferred at crossings so that there is minimum requirement for increase in the height of the towers. One tower of the crossing span is located nearer to the Railway track for taking advantage of the higher height of the conductor on the tower.
- 1.4.6 The above paras give only the salient requirements prescribed in the Regulations for Power Line Crossings of Railway Tracks issued by the Railway Board. The latest issue of the above Regulations may be referred to for further details.

1.5 CROSSING OF ROADS:

- 1.5.1 Transmission line crossings across National Highways and major roads shall preferably be at right angles or as near to 90 degrees as possible.
- 1.5.2 For crossing of National Highways and major roads in case of lines up to 230 kV, it is advisable to provide at least one angle / section tower in the crossing span for the purpose of ease during stringing. For 400 kV lines, angle / section towers are to be provided on both sides in such cases. For 765 kV lines angle / section towers are to be provided on both sides in such cases
- 1.5.3 The towers supporting the crossing span shall be located outside the National Highway land.

1.6 RIGHT OF WAY:

- 1.6.1 The width of the right of way should be kept as per the provisions of the applicable part /section of the Power Grid Company of Bangladesh Ltd (PGCB) Practice for Design, Installation and Maintenance of Overhead Power Lines.
- 1.6.2 For lines up to 765 kV, recommends the following right of way widths taking into consideration the theoretical requirement of right of way and transport requirements of maintenance:

Transmission Voltage Recommended	Width of Right of Way
132 kV	28 meters
230 kV	40 meters
400 kV	46 meters
765 kV	80 meters

- 1.6.3 For 400 kV lines, the following right of way width, as per PGCB practice, shall be maintained taking into consideration the theoretical requirement of right of way and transport requirements of maintenance:

- | | | |
|-------|--|------------------------------------|
| 1.6.4 | Transmission Voltage Recommended
400 kV | Width of Right of Way
46 meters |
|-------|--|------------------------------------|

1.7 MAINTAINING STATUTORY CLEARANCES:

- 1.7.1 The minimum clearances defined below shall not be infringed at the specified maximum operating temperature of the phase conductor with the suspension insulators hanging vertically or deflected to any angle up to 70° from the vertical.

Description of Clearance - Minimum Clearance

Description	Unit	132kV	230kV	400kV	765 kV
Ground (see note d)	(m)	7.0	8.0	9.0	16
Roads	(m)	8.0	9.0	14.0	20
Buildings, structures, walls or other objects on which a person can stand or against which he can lean a ladder (see note b)	(m)	5.0	7.0	8.0	18
Trees (see note c)	(m)	3.5	5.5	6.5	12
Shrubs	(m)	3.0	5.5	6.5	12
Railways (measured from railway track)	(m)	15.6	18.26	18.5	20
River Crossing	(m)	23.0	25.0	26.0	28

Notes:

- a. Clearances are measured to the nearest projection of an object.
- b. These clearances also apply to earthed metal clad buildings.
- c. Clearances applicable to trees under the transmission line and to trees adjacent to the line. Clearances also applicable to trees falling, towards the line with conductors hanging in a vertical plane.
- d. The clearance shall be measured from the highest flood level or ground level whichever is higher.

1.8 RIGHT OF WAY:

- 1.8.1 While carrying out preliminary survey in forest areas, permission of the local forest Authorities should be obtained for trimming / lopping of tree branches which obstruct the line of sight of the survey instrument. This is a mandatory requirement and any such above activity without permission can result in criminal proceedings.
- 1.8.2 While carrying out preliminary survey the proposal for crossing of forest area is to be submitted in the prescribed forms / formats to the Forest Department for obtaining the requisite clearance.

1.9 MEASUREMENT OF EARTH RESISTIVITY:

- 1.9.1 Measurements of earth resistivity shall be done along the route of the transmission line.

1.10 PLOTTING OF THE ROUTE ON THE MAP:

- 1.10.1 The line as surveyed shall be plotted on the G. T. sheet maps indicating all the angle points. The line as surveyed shall also be plotted AutoCAD indicating all the angle points, obstacles, power lines, houses, roads, rivers, canals, trees/garden/forest etc.

- 1.10.2 Total Station (TS) and GPS data shall be prepared at a grid of 5m x 5m (along the transmission line Survey width) with reference to nearby established BM (3-D pillar) Pillar of either Survey of Bangladesh (SoB) or Publics Works Division of Bangladesh. Both reference shall not be used for the same line.
- 1.10.3 The survey will cover X,Y, Z (RL) values of each and every Ground Control Point (GCP), structures and any other significant physical features exists above the surface, backlines of water bodies detail Route etc.
- 1.10.4 The data from Route survey shall be available in (x.y.z) format in 5m x 5m grids for use in a sophisticated digital terrain model (DTM) along the Survey width mentioned below:

Voltage Level	Survey Width
132kV	30m (15m from the centre line either side)
230kV	50m (25m from the centre line either side)
400 kV	60m (30 m from the centre line either side)
765 kV	92m (46 m from the centre line either side)

The data from route survey shall be presented in the PGCB's QF-DGN-13 format.

- 1.10.5 Prepare detail cartographical mapping (on GIS platform) of surveyed data, elevation models (DTM and DEM) with existing land uses, water bodies. The scale to be adopted for preparing the map shall be 1:1000 or as directed by the Engineer-in-Charge and the survey map is to be prepared in one or more number of sheets as require.
 - 1.10.6 For underground cable mark all obstacle with it route profile.
 - 1.10.7 Provide Elevation Profile and updated Flood level data along the Route.
 - 1.10.8 The scale to be adopted for preparing the map shall be 1:1000 or as directed by the Engineer-in-Charge and the survey map is to be prepared in one or more number of sheets as required.
 - 1.10.9 The data from Route Survey shall be encoded as per the feature codes mentioned in the PGCB's QF-DGN-14 format.
 - 1.10.10 Comparison of at least three surveyed route shall be presented in the format given in Annexure-1 of Attachment-4.
 - 1.10.11 The highest flood level shall be provided along with the survey data report. Benchmark reference of the Flood level data and benchmark reference of RL shall be equal.
- 1.11 APPROVAL OF THE LINE ROUTE:
- 1.11.1 In case there are major deviations in the route as surveyed and the deviations are likely to affect the induced voltages in the telecommunication / railway signal calculated earlier, this route of the line is sent to the Engineer-In-charge for review and intimating acceptability.
 - 1.11.2 In the above-mentioned circumstances, this route of the line as surveyed is resubmitted to the Engineer In charge for according approval.

Summary of Route Survey

Sl.	Description	Description
1.	Route particulars	
	i) GPS coordinates	
	ii) Length in km	
	iii) Angle Point	
	iv) Terrain (km)– (a) Plain (b) Hilly	
2.	Environmental impact	
	i) Towns in alignment	
	ii) Forest involvement	
	iii) Historical/Cultural monument	
	iv) Type of Flora & Fauna v) Endangered species, if any	
3.	Major Crossings:	
	i) River (Nos.) a. BIWTA Class I b. BIWTA Class II c. BIWTA Class III d. BIWTA Class IV	
	ii) Power line (Nos.) 132kV 230kV 400kV 765 kV	
	iii) Railway line (Nos.)	
	iv) National/State Highway/Road (Nos.)	
	v) Canal (Nos.)	
4.	Construction problems	
5.	O&M problems	

Power Line Crossing Details

Sl. No.	Existing Line Name	Voltage Rating	Crossing Point Distance from Starting Substation	Crossing Section AP-AP
1				
2				
3				

River Crossing Details

Sl. No.	River Name	River width	Crossing Point Distance from Starting Substation	Crossing Section AP-AP
1				
2				
3				

SURVEY DATA SUBMISSION FORMAT

Name of line:

Date of Survey:

Equipment Model:

Coordinate to be matched with Google Earth

Point No.	Easting	Northing	Elevation (PWD)	Height	Feature Code	Comments on Plan	Highest flood level
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							

19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							
31							
32							
33							
34							
35							

FEATURE CODE TABLE

Sl. No.	Feature Code	Feature Description
1	101	Line angle more than 25deg (Angle Points)
2	102	Line angle less than 3deg (Suspension and Heavy Suspension Tower points)
3	200	Null land/Paddy Field/Open Field/Ground
4	210	Graveyard, Crematorium
5	10	EP Line (below 11kV)
6	215	Playground/ School Field
7	220	Cantonment Area/Restricted Area
8	11	11kV Line
9	33	33kV Line
10	132	132kV T/L
11	230	230kV T/L
12	400	400kV T/L
13	765	765 kV T/L
14	450	<i>Telecommunication Line</i>
15	6	Building/Tin sheds/Homestead/Religious Buildings/ Historical Buildings/Educational Institutions
16	7	<i>Housing Plot/Residential Area</i>
17	8	<i>Factory/Industry</i>
18	20	Gas Pipe line
19	30	Sewerage Line, Drain
20	40	Garden
21	44	Trees/Bamboo bush
22	45	Reserve Forest/Sanctuary

Sl. No.	Feature Code	Feature Description
23	46	Forest
24	47	Elephant Corridor/Bird Migration Corridor
25	18	Railway Line
26	50	Highway
27	60	Paka Road/Concrete Road/Asphalt Road
28	65	Kacha/ HBB Road/Mud Road
29	90	Bridge
30	70	Ditch/Low Land
31	80	Pond/Hatchery
32	75	Khal/Canal
33	25	River (BIWTA Class-I)
34	26	River (BIWTA Class-II)
35	27	River (BIWTA Class-III)
36	28	River (BIWTA Class-IV)
37	99	Gantry
38	250	<i>Highest Flood Level</i>

Environmental and Social Impact Assessment (ESIA)

Table of Contents (not limited to)

** Please follow the detailed guidelines & scope of works provided in the ToR (section A-E) and include all information accordingly in the ESIA report.

Executive Summary

This section describes concisely the critical facts, significant findings, and recommended actions.

1. Introduction

This section describes the background, objective, scope of project, methodology of ESIA study, study area, study timeline, and structure of the report.

- 1.1 Project Background
- 1.2 Project Overview
- 1.3 ESIA Study
 - 1.3.1 Objective and Scope of ESIA Study
 - 1.3.2 Study Area
 - 1.3.3 Study Methodology
 - 1.3.4 ESIA Study Team and Timeline
 - 1.3.5 Structure of ESIA Report

2. Review of Policy and Regulatory Frameworks

This section discusses the Project's legal obligations under national law (including international agreements adopted by the member) applicable to the Project.

- 2.1 Summary of Legislation/Policies and Their Applicability for Proposed Project
- 2.2 National Legislative Framework
 - 2.2.1 Environment Related
 - 2.2.1.1 Environment Conservation Act, 1995 (Amendment 2010)
 - 2.2.1.2 Environment Conservation Rules, 1997 (Amendments in 2002, 2003, 2017)
 - 2.2.1.3 Environment Court Act, 2010
 - 2.2.1.4 Bangladesh Water Act, 2013
 - 2.2.1.5 Wildlife (Conservation and Security) Act, 2012
 - 2.2.1.6 The Protection and Conservation of Fish Act, 1950 and Rules, 1985
 - 2.2.1.7 Noise Pollution (Control) Rules, 2006
 - 2.2.1.8 Disaster Management Act, 2012
 - 2.2.1.9 Municipal Ordinance, 1979 and Act, 1982
 - 2.2.1.10 Factory Rules, 1979
 - 2.2.1.11 East Bengal Protection and Conservation of Fish Act, 1985
 - 2.2.1.12 The Protection and Conservation of Fish Rules, 1985
 - 2.2.1.13 Building Construction (Amendment) Act and Building Construction Rules, 1996
 - 2.2.2 Social Related
 - 2.2.2.1 Acquisition and Requisition of Immovable Property Act, 2017
 - 2.2.2.2 East Bengal State Acquisition and Tenancy Act, 1950
 - 2.2.2.3 Bangladesh Labor Act, 2006 (Amendment Act #30, 2013) and Rules, 2015
 - 2.2.2.4 National Women Development Policy, 2011

- 2.2.3 Energy Related
 - 2.2.3.1 Bangladesh Energy Regulatory Commission (Electricity Grid Code) Regulations, 2019
 - 2.2.3.2 Categorization of Projects or Industrial Units
 - 2.2.3.3 The Electricity Act, 2018
- 2.3 Relevant National Policies and Plans
 - 2.3.1 Environmental Policy, 1992
 - 2.3.2 National Energy Policy, 2005
 - 2.3.3 National Conservation Strategy, 1992
 - 2.3.4 The National Forest Policy, 1994
 - 2.3.5 National Environmental Management Action Plan 1995
 - 2.3.6 The Power Policy, 1996
 - 2.3.7 The Energy Policy, 1996; updated 2004
- 2.4 International Policies and Plans (Treaties or agreement on transboundary natural resource sharing between Bangladesh and India; Bilateral Agreements; Current status of water resources & distribution & associated reports/data from Joint River commission and other relevant authorities; Guidelines on Cross Border Trade of Electricity, India; Central Electricity Regulatory Commission (Cross Border Trade of Electricity) Regulations, 2019 of CERC, India.)
- 2.5 Administrative Procedures for Obtaining Location/Environmental Clearance
- 2.6 Comparison with Good International Industry Practice (GIIP) EHS Standards and Justifications of their requirements
 - 2.6.1 Air Quality
 - 2.6.2 Water Quality
 - 2.6.3 Noise Quality
 - 2.6.4 Soil Quality
- 2.7 International Requirements (Please add international agreements, e.g., CBD, Trans-boundary pollutants issues and related conventions UNFCCC, Basel Convention; UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes (UNECE Water Convention 2007); Convention on the Law of the Non-Navigational Uses of International Watercourses (2007). etc. adopted by GoB applicable to the Project)
- 2.8 Comparison of Environmental Safeguard Principles between International agencies and Bangladesh

3. Project Description

This section describes the proposed project; its major components; and its geographic, ecological, social, and temporal context, including any associated facility required by and for the project (for example, access roads, power plants, water supply, quarries and borrow pits, and spoil disposal). It normally includes drawings and maps showing the project's layout and components, the project site, and the project's area of influence.

- 3.1 Background
- 3.2 Major Components of the Project
- 3.3 Project Location
- 3.4 Salient Features of Transmission Lines
 - 3.4.1 List of TLs
- 3.5 Construction
 - 3.5.1 Construction Activities Related Works for Transmission Lines
 - 3.5.2 Construction Equipment and Materials
 - 3.5.3 Construction Waste and Hazardous Materials Disposal

- 3.5.4 Construction Manpower and Work Schedule
- 3.6 Source of Power and Its Impact Analysis
- 3.7 Temporary Facilities and Associated Facilities
- 3.8 Development needs and aspirations of the community along the RoW
- 3.9 O&M Activities for Transmission Lines

4. Environmental Baseline

This section describes relevant physical, and biological conditions within the study area. It also looks at current and proposed development activities within the project's area of influence, including those not directly connected to the project. It indicates the accuracy, reliability, and sources of the Primary and Secondary data.

4.1 Physical Environmental base line data (primary climate data, secondary isokeraunic data, secondary seismic zone coefficient data, combined natural hazard map, flood inundation data and map, primary wind rose map & risk level coefficient factor for the structures of the project etc.)

- 4.1.1 Meteorology
- 4.1.2 Geology
- 4.1.3 Topography
- 4.1.4 River Hydrology (*including river capacity reduction*)
- 4.1.5 Environmental Quality air, water (resource and quality), acoustic, soil
- 4.1.6 Natural Disaster
 - 4.1.6.1 Seismicity
 - 4.1.6.2 Storms
 - 4.1.6.3 Cyclones
 - 4.1.6.4 Landslide
 - 4.1.6.5 Floods
 - 4.1.6.6 Droughts

4.2 Ecological Resources

- 4.2.1 Bio-ecological Zone
- 4.2.2 Flora
- 4.2.3 Fauna
- 4.2.4 Ecologically Sensitive Areas (NP, Protected Areas, IBAs etc.)

4.2.4.1 Sensitive locations and project boundaries (Protected areas showing project location, Important Birds and Biodiversity areas, International Migratory Bird flyways and breeding places, Compliance with the Asia-Pacific Migratory Water Bird Conservation Strategy 2001-2005, Vulnerability to Birds, Flying mammals and species to colloid with Transmission lines during Operation in a matrix format with high, medium, low category)

4.2.5 Detail Integrated Bio-Diversity Assessment Tool (IBAT) Analysis

4.2.6 Detail Hydrological Study (If there is any river crossing tower, vertical & horizontal navigation clearance, navigation draft, hydrological data, river bed sedimentation and soil data, sediment transport data, river bank erosion data etc.)

4.2.7 Cropping Patterns and Intensity

4.2.8 Cumulative Cross Border Impacts

4.3 Review and analysis of Bangladesh Delta Plan 2100 and include all of the necessary associated aspect related to the study (e.g. impacts).

5. Social Baseline

This section describes socioeconomic conditions within the study area. It also looks at current and proposed development activities within the project's area of influence, including those not directly connected to the project. It indicates the accuracy, reliability, and sources of the data.

- 5.1 Socio-Economic Resources
 - 5.1.1 Administrative Bounding of Study Area
 - 5.1.2 Demography
 - 5.1.3 Household Size
 - 5.1.4 Age Structure
 - 5.1.5 Dependency Ratio
 - 5.1.6 Ethnic Minority
 - 5.1.7 Literacy Rate
 - 5.1.8 Access to Health Facilities
 - 5.1.9 Employment Opportunities and Unemployment
 - 5.1.10 Availability of Labor and Wage Rate
 - 5.1.11 Migration
 - 5.1.12 Housing Conditions
 - 5.1.13 Drinking Water Facilities
 - 5.1.14 Sanitation Facilities
 - 5.1.15 Access to Electricity
 - 5.1.16 Land Ownership and Price (For tower footing area)
 - 5.1.17 Income and Expenditure
 - 5.1.18 Self-Assessed Poverty and Indebtedness
 - 5.1.19 Government Assistance
 - 5.1.20 Role of Women and Gender Issues
- 5.2 Project Related Information
 - 5.2.1 Public Utilities
 - 5.2.2 Cultural Resources
 - 5.2.3 Land required for project Intervention
- 5.3 Baseline Conditions of Project Affected People

6. Analysis of Alternatives

This chapter shall analyze alternatives while including details of impact on biodiversity within the proposed routes, location details, disturbance of wild life, generic environmental and social risks typically encountered in hydropower transmission as secondary impacts/cross boundary high voltage transmission line projects, introduction of invasive species, risks of bat, tree trimming, habitat damage for site access, inventory of impact on biodiversity etc. on the proposed routes and associated economic analysis in respect of project viability.

- 6.1 Environmental and Social Criteria for Route Selection
- 6.2 Comparison between Selected Routes
- 6.3 Review and analysis of Bangladesh Delta Plan 2100 and include all of the necessary associated aspect related to the study (e.g. impacts).

7. Environmental Impact Assessment

This section predicts and assesses the project's likely positive and negative direct and indirect impacts to physical and biological (including occupational health and safety, community

health and safety in the project's area of influence) in quantitative terms to the extent possible. Apply a mitigation hierarchy in the environmental assessment, by: (i) anticipating and avoiding risks and impacts; (ii) where avoidance is not possible, minimizing or reducing risks and impacts to acceptable levels; (iii) once risks and impacts have been minimized or reduced, mitigating; and (iv) where residual risks or impacts remain, compensating for or offsetting them, where technically and financially feasible.

- 7.1 Summary of Potential Impacts
- 7.2 Environmental Impacts from Project Siting
 - 7.2.1 Important Environmental Components
 - 7.2.2 Improvement of Electricity Grid in surrounding Area
 - 7.2.3 Impact Matrix
- 7.3 Impacts during Construction Phase
 - 7.3.1 Soil Contamination and Erosion
 - 7.3.2 Water Contamination
 - 7.3.3 Damage to water bodies (e.g., Khals) and Tube-wells
 - 7.3.4 Dust and Air Pollution
 - 7.3.5 Noise and Vibration
 - 7.3.6 Solid Waste Management
 - 7.3.7 Impacts on Wildlife
 - 7.3.8 Impacts on Crop Area and Production
 - 7.3.9 Community Health and Safety (including overview of SEA/SH situation)
 - 7.3.10 Occupational Health and Safety (including dam safety and safe use of pesticides)
 - 7.3.11 Traffic Congestion
 - 7.3.12 Additional Load on Local Resources
 - 7.3.13 Site Clearance and Restoration
 - 7.3.14 Climate Change
 - 7.3.15 Transboundary/Global Risks
 - 7.3.16 Hydrological Distributaries (covering within Bangladesh and international/trans boundary perspective and water sharing issues considering future direct/indirect impacts due to hydro power transmission)
- 7.4 Impacts during O&M Phase
 - 7.4.1 Public Health Impacts from Electro Magnetic Fields (Detail EMF simulation for 765 kV TL, Possible impacts according to ICNIRP etc.)
 - 7.4.2 Audible Noise and Radio Interference
 - 7.4.3 Diminution of Land Value in Right of Way Corridor and administrative issue management of RoW corridor
 - 7.4.4 Tree Cutting during Maintenance Activities
 - 7.4.5 Tree Plantation Plan
 - 7.4.6 Risk of Bird Collision and Electrocution
 - 7.4.7 Occupational Health and Safety during Operation and Maintenance

8. Social Impact Assessment

This section predicts and assesses the project's likely positive and negative direct and indirect impacts to socioeconomic (vulnerable groups and gender issues, and impacts on livelihoods through environmental media, and physical cultural resources in the project's area of influence) in quantitative terms to the extent possible. Apply a mitigation hierarchy in the social assessment, by: (i) anticipating and avoiding risks and impacts; (ii) where avoidance is not possible, minimizing or reducing risks and impacts to acceptable levels; (iii) once risks and

impacts have been minimized or reduced, mitigating; and (iv) where residual risks or impacts remain, compensating for or offsetting them, where technically and financially feasible.

- 8.1 Project Impacts
 - 8.1.1 Employment Opportunities
 - 8.1.2 Access Restrictions
 - 8.1.2.1 Impacts from Access Roads and Damages to Local Infrastructure
 - 8.1.2.2 Blockage of Access Routes
 - 8.1.3 Impact on Livelihood
 - 8.1.4 Impacts on Land Use
 - 8.1.4.1 Agricultural Land
 - 8.1.4.2 Commercial Land
 - 8.1.4.3 Residential Land
 - 8.1.5 Affected Residential Structures in the RoW
 - 8.1.6 Affected Commercial Structures in the RoW
 - 8.1.7 Temporary Loss of Crops in the RoW
 - 8.1.8 Loss of Trees in the RoW
 - 8.1.9 Other Impacts in RoW
 - 8.1.10 Damage to Cultural Resources
 - 8.1.11 Vulnerable Households
 - 8.1.12 Gender Issues
 - 8.1.13 Potential Gender Based Violence Issues
 - 8.1.14 Social Conflict and Influx of Workers
 - 8.1.15 Security Risks
- 8.2 Alternative Traffic Plan

9. Information Disclosure, Stakeholder Consultations and Participations

This section: (i) describes the process undertaken during project design and preparation for engaging stakeholders, including information disclosure and consultation with affected people and other stakeholders; (ii) summarizes comments and concerns received from affected people and other stakeholders and how these comments have been addressed in project design and mitigation measures, with special attention paid to the needs and concerns of vulnerable groups, including women, the poor, and Ethnic Minority; and (iii) describes the planned information disclosure measures (including the type of information to be disseminated and the method of dissemination) and the process for carrying out consultation with affected people and facilitating their participation during project implementation.

- 9.1 Objectives of Stakeholder Consultations
- 9.2 Identification of Stakeholders
 - 9.2.1 Primary Stakeholders
 - 9.2.2 Secondary Stakeholders
- 9.3 Consultation Process
- 9.4 Issues Identified through Consultations
 - 9.4.1 Environment
 - 9.4.2 Social
- 9.5 Future Consultation Plan for Employer and Contractor
- 9.6 Information Disclosure

10. Grievance Redress Mechanism

This section describes the grievance redress framework (both informal and formal channels), setting out the time frame and mechanisms for resolving complaints about environmental and social performance.

- 10.1 Objectives of Grievance Redress Mechanism
- 10.2 Grievance Redress Mechanism
- 10.3 Composition of GRC
- 10.4 Processes for Filing GRC Cases and Role of GRC

11. Environmental and Social Management Plan

This section deals with the set of mitigation and management measures to be taken during project implementation to avoid, reduce, mitigate, or compensate for adverse environmental and social impacts (in that order of priority). It may include multiple management plans and actions. It includes the following key components (with the level of detail commensurate with the project's impacts and risks including those for transboundary hydrological distributaries): (a) mitigation measures; (b) environmental and social monitoring and reporting requirements; (c) related institutional or organizational arrangements; (d) provisions for disclosure and consultation; (e) capacity development and training measures; (f) implementation schedule; (g) cost estimates; and (h) performance indicators. Key considerations for ESMP preparation include mitigation of potentially adverse impacts to acceptable levels, and the polluter pays principle.

- 11.1 Objectives of ESMP
- 11.2 Inclusion of Relevant Components of ESMP in Contract Documents
 - 11.2.1 BoQs in Bid Documents
 - 11.2.2 Payment Milestones
- 11.3 Environmental and Social Management Plan
(Covering from pre-construction to O&M phase and also cover all the social impact management aspect for section 8.1 of Chapter-8)
- 11.4 Institutional Arrangements
 - 11.4.1 Monitoring Program
 - 11.4.2 Independent Auditing Arrangements
 - 11.4.3 Compliance Monitoring
 - 11.4.4 Effects Monitoring
 - 11.4.5 Performance Indicators
 - 11.4.6 Capacity Building
 - 11.4.7 Documentation and Reporting
 - 11.4.8 Budget for ESMP Implementation

12. Economic Analysis

- 12.1 Identify the direct, indirect and associated cost and benefit components;
- 12.2 Mention the Assumption;
- 12.3 Compute the following indicators and interpret the results:
 - 12.3.1 Economic Net Present Value (EMV)
 - 12.3.2 Economic Benefit Cost Ratio (EBCR)
 - 12.3.3 Economic Internal Rate of Return (EIRR)

13. Conclusion

This section provides the conclusions drawn from the assessment and provides recommendations.

List of Annexures of ESIA (not limited to)

Annex A: Tree Plantation Plan

The tree plantation plan should address the fact that endemic/native species of fruit-bearing/medicinal/forestry trees must be planted instead of invasive/exotic species. The plan shall include the following sections but not limited to:

- Identification of indigenous/native/endemic species and invasive/exotic species of trees;
- Number and species of trees required to be cut for the construction of the transmission lines;
- Suggested location, number and species of trees required to be planted as per mitigation measures [it should be noted that 1:3 tree plantation ratio should be followed (i.e., three trees should be planted if one tree is cut down), whereas fruit-bearing/medicinal/forestry trees should be planted instead of exotic species];
- Review the institutional arrangements for plantation;
- Tree plantation management plan;
- Budget allocation for the tree plantation plan including future management guidelines.

Annex B: Stakeholder Engagement Plan (SEP):

The consultant shall conduct a Stakeholder Engagement during ESIA reporting. The feedbacks received shall be analyzed, and the consultations shall determine how it can be addressed in the updated ESIA and project designs. The SEP Development should ensure that the entire project affected parties and other interested parties (including NGOs, Civil Society Organizations- CSOs and woman representatives) identified and included in any ongoing engagement plans. A robust stakeholder mapping shall be provided. The overall engagement process will be gender- inclusive. The consultant will specifically identify those project-affected parties (individual or groups) who, because of their circumstances, may be disadvantaged, marginalized or vulnerable. Specific measures to maximize participation of vulnerable persons/groups to the consultation activities will be presented.

Stakeholder engagement should not be treated as a project information dissemination session but should be used to take into account the main interest and influence of the stakeholders and improve the plan and design of the project shall continue throughout the project life. The updated ESIA should reflect the comments and responses to various consultations. The data collected will be disaggregated by gender in order to provide an understanding of specific women concerns. Project information shall be disclosed as early as possible and, in a way, and timeframe that allows the stakeholders to understand the risk and impacts of the project, and potential opportunities have meaningful consultations with the stakeholders on project design. Information will be disclosed in relevant local languages and in a manner that is accessible and culturally appropriate. A grievance mechanism will be included in the SEP.

SEP will be disclosed as early as possible to seek the views of the stakeholders on the SEP and update the document accordingly.

Annex C: Preparation of Ethnic Minority Development Framework (EMDF) and Plans (EMDP)

The project area is inhabited by ethnic minorities who are expected to be impacted by the project. Ethnic Minority Development Framework and Plan shall be prepared to minimize negative impacts and enhance positive impacts to vulnerable and ethnic minority in the project areas.

The Framework should include, but is not limited to the following:

- Review of legal and institutional framework regarding ethnic minority including relevant laws and policies of the GoB and any ratified international conventions.
- An over view of any legacy issues (if applicable)
- Social baseline (ethnic minority present in the project area, community, dynamics between the various groups, social conflicts (if any) land uses, livelihoods, cultural and religious practices etc.).
- Mapping of organizations representing ethnic minority.
- Assessment of the nature and degree of expected degree of expected direct and indirect economic, social, cultural (including cultural heritage), and environmental impacts on ethnic minority.
- Assessment of the vulnerability of and risk to, the affected ethnic minority in the area given their distinct circumstances close ties to land and natural resources, as well as their lack of access to opportunities relative to other social groups in the communities, regions or national societies in which they live.
- Methodologies for more targeted community specific assessments that may be required in order to prepare site specific EMDP's.
- In line with the mitigation hierarchy, explore alternatives to avoid and minimize adverse impacts as well as opportunities for culturally appropriate and sustainable development. Propose compensation for those adverse impacts in a culturally appropriate manner proportionate to the nature and scale of such impacts and the form and degree of vulnerability of the local community.
- Assess whether Free, Prior and Informed Consent (FPIC) is required, based on the following criteria- where the project will:
 - Have adverse impacts on land and natural resources subject to traditional ownership or under customary use of occupation;
 - Cause relocation of ethnic minority from land natural resources subject to traditional ownership or under customary use or occupation; or
 - Have significant impacts on ethnic minority's cultural heritage that is material to the identify and/or cultural, ceremonial, or spiritual aspects of the of ethnic minority communities' lives.

In case that FPIC is required, design a process that could support the communities and the government counterparts to develop an FPIC agreement.

A grievance mechanism that is culturally adapted to the IPs with specific channels to handle GBV related complaints.

At the same time specific EMDP s shall be prepared for locations where alignments are already known at the same time specific EMDP s shall be prepared for location where alignments are already known at the time of the ESIA preparation. The plan should be in line with the EMDF and mitigation/ benefit sharing measures based on the social assessment survey and the more targeted community assessment. If community specific FPIC processes are required, then the EMDP should include a community specific process in line with the process outlined in the EMDP.

Annex D: Gender Action Plan (GAP)

The GAP shall include the following section:

- An over view of the Gender situation and risks faced by women including GBV risks in investment projects involving major civil works of transmission line in PGCB;

- Key regulatory framework on gender, rights of women, gender-based violence, sexual exploitation and abuse, sexual harassment;
- Review of formal and informal institutional structures and process that affect gender outcomes in the project and under the project setup (including but not limited to gender norms, role of women in households and communities, rights to land, women in the workplace etc.);
- Review of setup, capacity and constraints within relevant institutions to address gender concerns and considerations;
- The results of the SEA/SH risk assessment tool;
- GBV/SEA/SH prevention and mitigation measures to address potential risks (including staff resources roles and responsibilities, indicators, timeline, estimated budget);
- Mapping of SEA/SH/ GBV service providers;
- Measures to ensure access to women to employment opportunities and other project benefits;
- Grievance mechanism (including grievances reporting protocol, roles and responsibilities, service providers of GBV etc.);
- Monitoring and supervision (frequency, indicators, roles and responsibilities);
- Estimated budget for the implementation of the GAP;
- The development of the Gender Action Plan should be informed by the relevant Good Practice Note on Gender and GBV.

Annex E: Labor Management Procedures

Labor management procedures should include the following topics:

- Terms and conditions of employment, such as rights to regular payment, hours of work, overtime, adequate rest, benefits such as annual, sick, maternity and family leave, and timely notice of termination.
- Non-discrimination and equal opportunity provisions for all aspects of employment, and including measures to prevent and address harassment, intimidation and/or exploitation.
- The right to organize for collective bargaining in accordance with national law. Where workers' organizations are restricted by law, the project will not restrict workers from developing alternative mechanisms to express grievances and protect their rights.
- Prohibitions against child labor and forced labor.
- Access to a grievance mechanism provisions specifically for direct and contracted workers.

Annex F: Occupational Health and Safety Plan

In addition to the labor management procedures, the Contractor should prepare and implement this plan addressing the following issues:

- Hazards in the workplace
- Organization and staffing
- Protective measures for hazardous conditions or substances (such as protective gear, fire control)
- Worker training
- Accident or incident reporting procedures
- Health screening and monitoring where appropriate
- Emergency response procedures
- Remedies for adverse environmental and social impacts

Implementation of this plan will be required under the contract.

Annex G: Community Health and Safety Plan

Identify and assess a wide range of potential risks and impacts on health and safety of affected communities including the vulnerable, as part of the ESIA. For projects having the potential to cause emergency events, and/or when traffic and road safety issues are likely to be significant, Government will conduct respectively,

- A Risk/Hazard Assessment and/or
- A Road Safety Assessment as part of the ESIA.

Examples of Risk:

- Dangers of electrical shock from wiring;
- Un-authorized access to quarries, excavation works, open water, or irrigation canals that can result in injury or death

The framework should include but not limited to:

- Avoidance or minimizing community exposure to project related traffic and road safety risks, diseases and hazardous materials. For examples: including safe road crossings into the project design, groundwater for potential pollution seepage, including measures to counter service provider risks (e.g., marking utility rights of way to prevent accidents from digging in the wrong place).
- Identifying and assessing the risks and impacts in regulating and provisioning ecosystem services including those that may be exacerbated by climate change as part of the environmental and social assessment. For example: regulating services include flood management and soil stability and provisioning services are fresh water, food and fuelwood.
- Anticipation or avoidance of adverse impacts on the health and safety of project-affected communities during project life-cycle from routine and non-routine circumstances.
- Promoting quality, safety, and climate change considerations in infrastructure design and construction.
- Identifying and assessing risks and impacts posed by security provided by Government's direct or contracted workers on the Project's personnel, facilities, assets, operation and the local community.

Annex H: Biodiversity Management Plan

The plan should be prepared if the project has significant risk of adverse impacts on biodiversity. It should be definitely required if the project may affect "Critical Habitat." It is needed where mitigating risks and impacts to biodiversity requires taking multiple actions over time, with defined responsibilities and budget, rather than a single one-time action. Biodiversity Management Plan will typically include:

- Creation, expansion or improved management of Protected Areas
- Site-specific habitat restoration
- Species-specific protection or management interventions
- Benefit-sharing and/or alternative livelihood measures for resource-dependent communities
- Monitoring the implementation and outcomes of the Biodiversity Management Plan

Resettlement Action Plan (RAP)

Table of Contents (not limited to)

*** Please follow the detailed guidelines & scope of works provided in the ToR (section A-E) and include all information accordingly in the RAP report.*

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- 3.8 Household Income and Expenditure
- 3.9 Government Assistance and Foreign Remittance for Households
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- Annex 3: Details of surveyed lands/ RoW corridor
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