POWER GRID COMPANY OF BANGLADESH LIMITED

DESIGN, SUPPLY, INSTALLATION, TESTING & COMMISSIONING OF PATUAKHALI (PAYRA) - GOPALGANJ 400KV TRANSMISSION LINE ON TURNKEY BASIS

CLARIFICATION NO. 1

A pre bid meeting was held on October 10, 2016 as per provision of ITB 7.4, Volume 1 of 3 of the Bidding Document. Attendance Sheet of the meeting is enclosed (**Attachment-1**). A list of the firms, who have purchased the bidding document, is also enclosed (**Attachment-2**). Clarifications to the queries received from the prospective bidders regarding the bidding documents prior to and during the Pre-bid meeting and after the Pre-bid meeting has been prepared and given below:

Volume 1 of 3

Query 1: ITB Volume I Section II, Page II-4 BDS C. Preparation of Bids ITB 19.1

It is mentioned as below about the bidding currency;

"The currency(ies) of the bid shall be as follows:

(a) Plant and equipment to be supplied from abroad shall be quoted entirely in foreign currency: USD or/and EURO.
(b) Plant and equipment to be supplied from within the Employer's country shall be quoted in either foreign currency supplied from abroad shall be quoted entirely in foreign currency: USD or/and EURO and/or local currency BANGLADESH TAKA, depending upon the currency in which the costs are to be incurred.
(c) Design shall be quoted in either foreign and/or local currency as mentioned above, depending upon the currency in which the costs are to be incurred.
(d) Installation shall be quoted in local currency only.

Above (a) & (b) where is mentioned both of USD or/and EURO could be foreign currency on this tender. However, Volume III price schedule on the same have only single column for Unit Price of CIP. Therefore, please clarify.

1. Shall the bidder fill up the unit price for USD as well as EURO in single column (mixed currency to be shown in single column).
2. Or Shall the bidder add one more column for another currency if any.

Answer 1: Please refer to the end of Schedule. Bidders are allowed to create as many columns for unit price and total price as per the currencies as per the provision of Instruction to Bidders. Separate currency is required to be quoted in separate column.

Query 2: ITB Volume I Section II BDS ITB 18.4 Page II-4 & Section III: Evaluation and Qualification Criteria Page III-2, 1.2.6 Domestic Preference

It is mentioned two (CIF, CIP) incoterm condition for quoting for abroad is as below on ITB.

"The Incoterm for quoting plant to be supplied from abroad is: CIP Destinations are as follows: Patuakhali (Payra), Gopalganj"
&
A margin of preference will be granted to eligible domestically produced Plant & Equipment with the following provisions:

(a) The preference margin shall not be applied to the whole facilities but only to the eligible domestically produced Plant & Equipment within the Contract;

(b) Plant & Equipment offered from outside the Employer's country shall be quoted CIF (Section 4, Bidding Forms), and Plant and Equipment offered locally shall be quoted EXW (ex works, ex factory, ex warehouse, ex showroom, or off-the-shelf, as applicable) free of sales and similar taxes (Section 4, Bidding Forms).

Please clarify below.

1. Price schedule on ITB Volume III have column of only CIP condition. therefore, Shall the bidder quote the price as CIP for plant & equipment from abroad even if evaluation quoting condition is CIF.

Please confirm bidder's understanding is correct.

Answer 2: Both Volume 1 and Volume 3 refer to CIP condition only.

Query 3: ITB Volume I Page III-6 2.3 Financial Situation & Page IV-24, Kindly refer to below on ITB clauses.

2.3.1 Historical Financial Performance

Submission of audited balance sheets or, if not required by the law of the Bidder's country, other financial statements acceptable to the Employer, for the last three (3) ears, to demonstrate the current soundness of the Bidder's financial position and its prospective long-term profitability. As a minimum, Bidder's net worth calculated as the difference between total assets and total liabilities should be positive. &

☐ Attached are copies of financial statements (balance sheets including all related notes, and income statements) for the last three years, as indicated above, complying with the following conditions. All such documents reflect the financial situation of the Bidder or partner to a Joint Venture / Consortium, and not sister or parent companies.

Bidder's Clarification:

Please confirm whether the bidder shall submit separate financial statement (unconsolidated) or consolidated financial statement.

Answer 3: Bidders are required to submit their own financial statement, not the group (consolidated) statement.

Query 4: ITB Volume I, Page III-10, 2.5 Personnel, Kindly refer to below clauses on ITB.

"The Bidder must demonstrate that he has the personnel for the key positions that meets the following requirements:

Along with the above, the bidder will submit document/certificate from offered ACCC conductor manufacturer/ Composite Core manufacturer (CTC Global) certifying that the personnel which are expert in Installation/stringing of ACCC conductor must be deployed during installation/stringing of the transmission line as per required duration. The Bidder shall provide details of the proposed personnel and their experience records in the relevant information forms included in Volume 1 - Section 4 (Bidding Forms).

Expert from ACCC (CTC Global) conductor is hardly designated in bidding stage. Therefore, Please accept that the bidder could submit "the proposed expert personnel for ACCC (CTC Global)" in execution stage not on the bidding stage.

Answer 4: Please follow the bid requirement.

Query 5: ITB Volume, Page III-12, Section III: Evaluation and Qualification Criteria

Kindly refer to below clauses about stringing method and machinery on ITB in sequence.
The Bidder must demonstrate that he has the key equipment listed hereafter:

Along with the above, the bidder will submit document/certificate that they will arrange stringing machines capable of stringing quad bundle conductor (ACCC) per phase to be used under this Contract at the same time. The Bidder shall provide further details on the proposed items of equipment using the relevant form in. Volume 1 - Section 4 (Bidding Forms).

The Contractor must arrange additional (in quantity and capacity) and/or special equipment that is not mentioned in the above list but is technically required for the timely completion of the works without any extra cost to the Employer.

& Volume II mention,

i. Stringing of conductors and earthwires. The entire stringing of conductors and earth wire shall be carried out by tension stringing technique. The Bidder shall indicate in their offer, the sets of tension stringing equipment he is having in his possession and the sets of stringing equipment he would deploy exclusively for the Contract execution, which under no circumstance shall be less than the number and capacity requirement indicated in Qualifying Requirements for Bidder.

The Contractor is require to arrange and use stringing machine capable of stringing quad bundle conductor (ACCC) per phase to be used under this Contract at the same time. The Contractor has to assess the quantity and capacity of such machines required for timely completion of the Contract. Cost of arranging and using of such equipment as required to complete the Contract in time shall deem to be included in the Contract price.

1. Please confirm that the bidder shall include the price of above special stringing machine in bidding price.
2. Please clarify the employer will pay CD and VAT for above machine if the bidder purchase the same from abroad as those machine is not available in Employer's country.

Answer 5: All costs to fulfil the above requirements shall deem to be included in the quoted (Contract) Price.

Query 6: ITB Volume I, Page III-12

"It is mention that minimum criteria for ACCC conductor.

- Manufacturer's proposed factory must have manufacturing experience of ACCC conductor for at least three (03) years and supply record of at least 100KM ACCC conductors as on the date of bid submission;
- The said equipment shall be in satisfactory service for a minimum of one (01) year as on the date of bid submission deadline.
- Evidence from end users (at least one) of satisfactory service of equipment shall be end user's letterhead indicating address, telephone and fax number.
- Manufacturer's authorization letter;
- Implemented ISO 9001:2008 certificate;
- List of performed type tests and type test reports as per the requirements of Volume 1 Section 6;

Technical data sheets, drawings, catalogues and other technical documents;

Please clarify,

1. Shall manufacturing experiences for at least three (3) is applied for their own country or outside of manufacturer's country.
2. Shall Composite Core applied on behalf of steel-reinforced be manufactured from CTC Global only in there own country."

Answer 6:
(1) Supply record for manufacturer's own country and/or outside manufacturer's country, both may be considered acceptable.
(2) The query is not understood. However, Composite core must be sourced from CTC Global, USA factory.

Query 7: Section III: Evaluation and Qualification Criteria, ITB Volume I, Section 7: General Conditions of Contract & Section VIII-5, 10. Employer's Responsibilities

Kindly refer to two contrary clauses between GCC and SCC as below.

GCC 10.1 / 10.2 / 10.3 & SCC mentioned ;

Clause GC 10.2 shall be replaced by the following:

The Employer shall give administrative support to accord all rights of access for transmission line thereto on or before the date(s) specified in that appendix at the cost of the Contractor. Such cost is deemed to be included in the contract price. The Contractor shall be responsible for acquiring and providing legal and physical possession of the transmission line sites and access thereto, and for acquiring possession of and access to all other areas reasonably required for the proper execution of the contract, including all requisite rights of way as specified in the appendix (scope of works and supply by the employer) to the contract agreement.

Clause GC 10.3 shall be replaced by the following:

The Employer shall give administrative support to accord permits, approvals and/or licenses from local, state or national government authorities or public service undertakings in the country where the Site is located. The Contractor shall acquire and pay for all permits, approvals and/or licenses from local, state or national government authorities or public service undertakings in the country where the site is located which .....

As per standard practice and local practice followed by various project, the employer shall be responsible for acquiring and providing physical possession of the site and access, especially in such a severe condition of 24month completion period on this tender.

1. Therefore, kindly confirm that providing and access to all areas reasonably required for execution shall be responsible by the employer and the employer shall give full possession and right of way, access before commencement date to contractor without any cost implication.
2. If not, delay of project due to land possession or the right of way by land owner is not responsible for the contractor and will not be counted up on project time schedule so LD is not to be engaged. Please confirm the above."

Answer 7:
(1) The responsibility of right of way clearance, access, acquiring, providing physical possession etc. shall be as per the provision of the bidding document.
(2) Conditions for imposing of liquidated damage are clearly mentioned in the bidding document which will be followed in the execution stage.

Query 8: ITB Volume I, Section VIII: Special Conditions of Contract (SCC), Page VIII-7

"It is mentioned that the employer will pay VAT on EXW and VAT on EXW amounts is not included in the contract price and additionally VAT on EXW shall be paid by the Contractor and shall be reimbursed by the Employer to the Contractor on actual basis in accordance with the government rules upon submission of relevant documents in original.

The bidder understood above clause, but at the same time,

1. The bidder would like to ask whether the employer could pay directly that VAT on EXW but reimbursement.
2. Kindly confirm again above condition in SCC also to be applied for VAT for local subcontractor."

Answer 8:
(1) Provision of bid document shall be followed.
(2) VAT for local subcontractor shall be borne by the Contractor.

Query 9: ITB Volume I, Section 7 - General Conditions of Contract, Page 7-34, GCC 25.5.2

"Please clarify below:
The bidder understand that in case delayed pre-commissioning, guarantee test due to Employer, Contractor's right to be paid the interim with interim payment bond. Therefore,

1. the bidder would like to propose to delete the Contractor's obligation to submit interim payment bond. Because it occurs due to the Employer in case, and the Contractor already have complied with its obligations."

Answer 9: Provision of clauses in the bidding document shall be followed.

Query 10: Retention Bond

"The bidder understands there is no provision for retention bond.

Therefore, the bidder would like to propose to collect retention money with replacing retention bond. Kindly accept this request."

Answer 10: Provision of clauses in the bidding document shall be followed.

Query 11: ITB Volume I, Section 7 - General Conditions of Contract, Page 7-36

"The bidder would like to propose to add with regard to Max Cap of Defect Liability Period following clause 27.8

"Provided, however, the maximum period of Defects Liability Period shall not exceed [24] months from the date of Completion of Facilities."

Please accept our request.

Answer 11: Provision of clauses in the bidding document shall be followed.

Query 12: ITB Volume I, Section 7 - General Conditions of Contract, Page 7-39, 40

"The bidder would like to propose to delete clause below with regard to Limitation of Liability following clause 30.1 (a), (b) delete ""cost for repairing, replacing, or defective equipment"" in exception. Please accept our request.

Answer 12: Provision of clauses in the bidding document shall be followed.

Query 13: ITB Volume I, Section 7 - General Conditions of Contract, Page 7-44, 45

"With regard to both Unforeseeable Physical Obstructions/ Conditions GCC 35.1/2 and 40.1.(b) - Unforeseen physical conditions (except climatic conditions) or artificial obstructions.

The bidder understands all clauses, But would like to propose to delete "other than climatic conditions". Please accept our request.

Answer 13: Provision of clauses in the bidding document shall be followed.

Query 14: ITB Volume I, Section 7 - General Conditions of Contract, Page 7-44, 45

"The bidder understand that In case of the Warranty Period extension, the Contractor shall issue an additional security in an amount proportionate to the Contract Price of that part.

In this regard, the bidder would like to propose to replace the f SCC 13.3.3 as follows;

"Reduction in the security pro rata to the Contract Price of any part of the Facilities is not admissible since separate time for Completion of part of the Facilities is not applicable.

However, if the Defects Liability Period has been extended on any part of the Facilities pursuant to GC Sub-Clause 27.8 hereof, the Contractor shall extend the period of relevant security in an amount of 10% of the Contract Price of that part. The security shall be returned to the Contractor immediately after its expiration."

Answer 14: Provision of clauses in the bidding document shall be followed.

Query 15: ITB Volume I, Section VIII: Special Conditions of Contract (SCC), Page VIII-5

"It is mentioned Commencement date and Completion date counted from Effective date as below on ITB.

8.1 The Contractor shall commence work on the facilities within 30 (thirty) days from the effective date for determining time for completion as specified in the contract agreement.
8.2 The time for completion of the whole of the facilities shall be 720 (seven hundred twenty) days from the effective date as described in the contract agreement.

In this regard, the bidder would like to propose below, Kindly accept our request.

1. to propose that Time for Completion shall be counted from the date of receipt of AP by Contractor from Employer
2. or at least Time for completion date shall be counted from the commencement date not the signing date of contract."

Answer 15: Provision of clauses in the bidding document shall be followed.

Query 16: Vol.1, Section Ⅷ, SCC 1 and Vol.1, Section Ⅷ, SCC 8.2

"We understand the duration of 720 days in the clause of SCC 8.2 is from the effective date as described in the contract agreement to the issue date of the Completion Certificate/Taking-Over Certificate as per SCC 1. ""Completion"". Please confirm.

Answer 16: Please refer to Clause 8, Section VIII and Article 3, Section IX of Volume 1 of the bidding document.

Query 17: Vol.1, Section Ⅷ, SCC 26 and Vol.1, Section Ⅸ, Appendix 8, 4.1

"There are two clauses on the Liquidated damages. One is ""completion time guarantee"" in the clause of SCC 8.2, the other is ""functional guarantees"" in the clause of Appendix 8, 4.1.

We understand these two Liquidated Damages shall not be separately assessed against Contractor, because the conditions are the same content. It means if the contractor fails to attain completion of the facilities within the time for completion, the contractor shall pay to the employer liquidated damages based on either the ""completion time guarantee"" or the ""functional guarantees"". Is our understanding correct?"

Answer 17: Amount of liquidated damage for 'Completion time guarantee' and 'Functional guarantee' are separate and will be considered separately maximum 10% of the Contract Price for each.

Query 18: Vol.1, Section Ⅱ , ITB 19.1 (d) and Vol.3, Schedule B : Price schedules

"Installation shall be quoted in local currency only in the ""Vol.1, Section Ⅱ, ITB 19.1 (d)"".

The price of the installation and other services shall be quoted based on Foreign currency and Local Currency in the ""Vol.3, Schedule B: Price schedules"". Please clarify on what basis to fill the price schedule no. 4. Installation and other services"

Answer 18: Installation shall be quoted in local currency only as per ITB 19.1(d).

Query 19: Vol.1, Section Ⅲ, 1.2.6 & Vol.1, Section Ⅲ, 1.2.7

"1) In the comparison of bids, only the CIF price component of each bid for the plant & equipment offered from outside the Employer's country shall be increased by ten percent (10%) in the ""Vol.1, Section Ⅲ, 1.2.6 (d)"".
2) for evaluation purpose, include custom duties (CD) and VAT in the case of CIF Bids for imported Goods and include VAT for Goods manufactured locally in the ""Vol.1, Section Ⅲ, 1.2.7 (a)"".

Please clarify on how can add 1) and 2) conditions.

Example : In case of tower from outside the Employer's country,
① Evaluation Price: CIF x 110% x 144.95%
② Evaluation Price: CIF x (110% + 44.95%)

Please clarify on which calculation is correct"

Answer 19: Clause no. 1.2.7 will be applied first, and then clause no. 1.2.6 will be applied if necessary.

Query 20: Vol.1, Section Ⅱ, 11.2 (k) – 5 & Vol.1, Section Ⅲ, 2.7

"Technical Particulars and Guarantees" as per Schedule E in volume 3 of the bidding documents shall be submitted in the "Vol.1, Section Ⅱ, 11.2 (k) - 5"

"Technical data" sheets are required from manufacturers in the "Vol.1, Section Ⅲ, 2.7".

We understand "Technical Particulars and Guarantees" and "Technical data" are same documents.

Please clarify on whether both documents are same."

Answer 20: Your understanding is correct.

Query 21: Vol.1, Section Ⅵ, 4.3

Chattagong, Dhaka, Narayanganj, Benapole and Mongla are the ports of entry for material to Bangladesh by sea and road in the Vol.1, Section VI, 4.3. Please clarify on whether designated ports in the Vol.1, Section Ⅵ, 4.3 are only accepted.

Answer 21: Other ports may be acceptable if the relevant facilities are available.

Query 22: Vol.1, Section VIII, SCC 14.1

The Employer is responsible for deducting Income tax at source i.e. Tax Deducted at Source (TDS) at the rate applicable in accordance with the government rules of Bangladesh at the time of making any payment to the Contractor in the "Volume 1, Section VIII: Special Conditions of Contract, Clause No.14.1".

However, Income Tax levied on the Contractor in Bangladesh is normally paid by the Employer for the other projects. Please pay Income Tax for Contractor as per previous projects in Bangladesh. Please confirm.

Answer 22: Provision of clauses in the bidding document shall be followed.

Query 23: Vol.1, Section VIII, SCC 27.2 & Vol.1, Section VII, GCC 13.3.3

The defect Liability Period shall be twelve (12) months from the date of Completion/Taking over of facilities for all equipment/materials in the "Volume 1, Section VIII, Special Conditions of Contract, Clause No. 27.2"

The Security shall become null and void, or shall be reduced pro rata to the Contract Price of a part of the Facilities for which a separate Time for Completion is provided, five hundred and forty (540) days after Completion of the Facilities or three hundred and sixty five (365) days after Operational Acceptance of the Facilities, whichever occur first in the "Volume 1, Section VII, General Conditions of Contract, Clause No. 13.3.3" Please clarify on expire date of security.

Answer 23: Clause no. GCC 13.3.3 has been supplemented by clause no. SCC 13.3.3.

It is mentioned in SCC 13.3.3 that the performance security shall not be reduced on the date of the operational acceptance. Please refer to the Form of Performance Security, Section VI, Volume 1 of 3 for expiration of performance security.

Query 24: Vol.1, Section VIII, SCC 14.1

The Employer is responsible for deducting Income tax at source i.e. Tax Deducted at Source (TDS) at the rate applicable in accordance with the government rules of Bangladesh at the time of making any payment to the Contractor in the "Volume 1, Section VIII: Special Conditions of Contract, Clause No.14.1".

However, amount of Income Tax will be different to each bidder without specific guidelines from Employer. Please provide bidders with ratio of Income Tax and specific guidelines.

Answer 24: The bidders are requested to go through and follow Finance Act and Income Tax rules and regulations of Bangladesh.

Query 25: In case of Joint Venture Bid, we understand that it is not compulsory to purchase Bidding Documents from PGCB in the name of Joint Venture.
Joint Venture Bid will be accepted by PGCB, even if Bidding documents purchased by any of the One Partner in Joint Venture. Kindly, confirm.

Answer 25: Confirmed.

Query 26: BID SECURITY

If a bid is submitted by a joint venture, can the bidder submit two bid securities separately from each JV Partner with total value remain unchanged? Kindly, clarify.

If permitted, then can the foreign partner submit the Bid security in foreign currency and local partner in equivalent Bangladesh Taka with total value remain unchanged? Kindly, clarify.

Answer 26: Bidders must submit single bid security covering full amount.

Query 27: AVERAGE ANNUAL TURNOVER

As per Cl. No. 2.3.2 of Qualification Criteria and Requirements, Section-3 (Page III-6), one of the criteria for qualification is Average Annual Turnover. We understand that this criterion of turnover is for Construction / Turnkey Contract's Turnover only and it doesn't include turnover / income from of other various business activities. Please, Clarify / Confirm for better understanding and clarity.

Answer 27: Average annual turnover will be calculated as total certified payments received for Contracts in progress or completed within the last three years as mentioned in Clause 2.3.2, Section III, Volume 1 of 3 of the bidding document. Bidders are requested to go through Clause 7.5 Dorm FIN 2, Section IV, Volume 1 of 3 regarding the documents to be submitted in support of annual turnover.

Query 28: COMPLETION PERIOD

We would like to highlight the following scope of works / points involved in this project:

1)Design of all 400kV Towers & Foundations

2)Tower Testing of each designed Towers

3)Right of Way / Access Clearance Scope

4)Hardly 15-16 months working period at site due to flooding / limited approachability at low land areas during rainy seasons

Considering, all above major points, given 24 months completion period from Effective Date for this project is quite short. We request you to kindly arrange to increase the completion period by further 18-24 months.

Answer 28: This project is enlisted in the Fast Track Project of the Govt. of Bangladesh. The line will evacuate the power from Power Station at Payra. The power station construction work is in progress. Hence, the Contract completion time shall be 720days from signing of the Contract as mentioned in the bidding document.

Query 29: PAYMENT PROCEDURE

Please, refer Appendix – 1, Section IX, Volume – 1

We understand that foreign currency payment will be made through an irrevocable commercial letter of credit and local currency payment will be made through PGCB's Financial and Account Rules or any other Accounts rules in force and adopted by the Employer.

In this regards, we kindly request you to please provide the confirmed procedure for local currency payment i.e. through Letter of Credit or transfer in to contractor's bank account etc.

Also, request you to please confirm that the payment for the price quoted in foreign currency in Schedule No. – 4 for installation and other services shall also be paid through letter of credit. Kindly Confirm.

Answer 29: Local currency payment shall be made through bank Cheque.

Query 30: <u>PRICE ADJUSTMENT / ESCALATION (Appendix 2)</u>

a) Conductor (ACSR), Earhwire (ACSR) & OPGW:

1. Price Adjustment formula for ACCC Conductor not given in Appendix – 2.

Please, clarify, whether Price Adjustment applicable for ACCC Conductor or not? If applicable, please arrange to provide the applicable formula for the price adjustment of ACCC Conductor.

We understand that given price Adjustment formula also applicable for all kind of Earth Wires (ACSR / Galvanized Steel) & OPGW. Please, confirm.

b) Adjustment Date:

As per Appendix 2 – Price Adjustment / Escalation – "*The date of adjustment shall be the mid-point of the manufacturing period of components or plant. The mid-point shall be determined by considering the start date of manufacture to be 30 days prior to the opening of the L/C. The end date of manufacture is considered to be 30 days prior to the shipping date.*"

We request you to kindly arrange to clarify / confirm the followings:

1. Whether LC will be opened against each shipment on pro-rata basis OR one common LC for total value valid for whole contract period? Kindly, clarify.
2. Also, confirm the time period of LC opening to better understand the Price Adjustment realization.
3. Whether Separate LC will be opened for Tower & Conductor to determine the mid-point of the period of manufacture? Kindly, clarify.
4. *"the end date of manufacture as 30days before shipping date"* – To determine the mid-point, shipping date will be –

The date of last shipment of Contract
Or
The date of last shipment of individual equipment i.e. Tower / Conductor
Or
The date of individual Lot wise shipment

Kindly, clarify above to understand the actual PV realization.

5. LC will be opened only for Foreign Currency Portion which covers the plants & equipment

supplied from outside Bangladesh.

If, plants / equipment's quoted in Local Currency (for supply from within Bangladesh), how price adjustment will be effective? Considering, LC will not be opened for Local Currency payments.

6. As per point (g.) in the Appendix-2, –

"A price adjustment will be applied only in case the resulting price increase or decrease of any item is more than six (6) percent of the price quoted for this item. However, such payment implication shall not exceed a total ceiling of fifteen (15) percent of the relevant items."

From the above clause, we could not understand the exact methodology to work-out the Price Adjustment implication. We request you to kindly clarify / confirm, which methodology shall be applied from below options:

Option 1
For particular item, each shipment wise price adjustment amount will be worked-out and checked against quoted price of the same item to decide price adjustment applicability (based on 6% threshold limit) for particular shipment.

Option 2
For particular item, each shipment wise price adjustment will be added together to arrive at total price adjustment amount and same total price adjustment amount (combined for all shipment) will be checked against total quoted price for the same item to decide price adjustment applicability (based on 6% threshold limit) at the end of contract.

We request you to kindly arrange to clarify / confirm, whether our above understanding is in line with tender documents or not.

Answer 30: a)1. Price adjustment shall be allowed for ACCC conductor. Please refer to the **Addendum** for formula.

You understanding is not correct. Given price Adjustment formula is applicable for ACSR Conductor, ACSR earthwire & OPGW only.

b)1. One common LC will be opened for total value valid for whole contract period.
b)2. Approx. two to three months from Contract signing date.
b)3. No.
b)4. The date of individual Lot wise shipment.
b)5. If plants / equipments are quoted in Local Currency (for supply from within Bangladesh) then also the indices related to LC opening date shall be followed for Price Adjustment purpose.
b)6. Any payment, resulting from Price Adjustments, will be settled at the end of the Contract execution stage as specified in the bidding document. At the end of the Contract execution stage, total price implication of each item shall be calculated first. Then payment shall be made considering the limit mentioned in Clause (g), Appendix 2, Section IX, Volume 1 of 3 of the bidding document for each item. The percentage limitation shall be applied individually for each item. Please refer to Appendix 2, Section IX, Volume 1 of the bidding document for Items.

Query 31: EVALUATION OF PRICE

From clause no 1.2.7 (b) (ii) & (iii), Section – 3, Volume – 1, we understand that if proposed manufacturer from within employer's country not qualified / technically not responsive, in that

case alternative responsive foreign manufacturers will be Chosen for supply of materials and new CIP price will be derived after deducting 6% of the quoted Ex-work price.

a) In this case, bidder has initially quoted prices in local currency (BD Taka) in price schedule as a supply within Employer's country, whether new derived CIP price will be allowed to convert & pay in equivalent foreign currency (USD)? Kindly, Clarify.

If yes, then please also clarify the Source & Date of Exchange Rate to convert Quoted Ex-work (Local Currency) price into equivalent CIP Price (foreign currency).

Answer 31: The source and rate mentioned in ITB 37.1 shall be used for this purpose also.

Query 32: SUPPLY OF PLANT

Kindly refer to the clause 1.2.7 (b) (i), Volume-1 of 3, Section 3 "Evaluation and Qualification Criteria" where it is mentioned that *In case a Bidder proposes any equipment from more than one manufacturer, only one price shall be quoted for such equipment. If a Bidder quotes different prices for one and the same equipment proposed from different manufacturers, the bid shall be rejected.* We have the following specific queries in this regard:

a) Does the Bidder have the option of quoting partial quantities of a particular item in the price schedule from within the employer country as well as from outside the employer country? Kindly, Clarify.
b) Whether lattice towers are treated as single product item i.e. 'Tower' or different type of lattice towers (i.e 4DL, 4D1, 4D25, 4D45, ... etc.) are treated as different product altogether. Kindly, Clarify.
c) Whether a Bidder can quote few of the towers from within the employer's country in applicable price schedule as well as few towers from outside the employer's country in applicable price schedule? Please, Clarify.

Answer 32: (a) The Bidders are not allowed to quote partial quantities of a particular item in the price schedule from within the employer country as well as from outside the employer country.
(b) Lattice towers are treated as single product item.
(c) All of the quoted towers shall be supplied from the same manufacturer. Hence Bidders are allowed to quote the price of towers either in the price schedule from within the employer's country or from outside the employer's country, but Bidders are not allowed to quote the tower price in both the price schedule. The item price of Conductor, OPGW and Insulator shall also be quoted following the above mentioned criteria.

Query 33: MANUFACTURERS / SUBCONTRACTORS:

Consider a case, where bidder has quoted their price for supply of individual plant in the price schedule from within Employer's Country (i.e. EXW quote) by considering their supplier from Bangladesh i.e. M/s ABC, Dhaka. Also, proposed two suppliers (i.e. M/s. ABC, Dhaka – Within Bangladesh Supplier & M/s XYZ, India – Foreign Supplier) in the proposed supplier list against the same particular plant.

Both these suppliers (i.e. M/s ABC & M/s XYZ) are technically responsive & qualified by PGCB at evaluation & order stage. Accordingly, at execution stage, bidder has commenced the supply of plant from M/s ABC, Dhaka (Within Bangladesh Supplier), since quoted price in the price schedule is for plant supplied from within Employer's Country.

Now, at some point during the execution stage, for some reasons, M/s ABC, Dhaka is not performing / supplying the material to complete the contract within time period and bidder doesn't have any alternative option for supply from Bangladesh, but they can manage supply from foreign supplier (i.e. M/s XYZ, India).

In such case, we would like to clarify that,

1. If PGCB permits the supply from M/s. XYZ, India (qualified foreign supplier), then in such case will PGCB convert EXW quote of the price schedule into CIP price as per directives given in clause no. 1.2.7 (b) (iii), Section -3, Volume-1 ? Please, clarify.
2. Also, request to clarify that will PGCB pay all Custom Duty / Import Duty, VAT, AIT and other levies for this imported plant in the similar manner as done for other imported plants?

Kindly, request to please clarify all the above points.

Answer 33:
1. In such case, EXW price shall be converted into CIP price as per directives given in clause no. 1.2.7 (b) (iii), Section -3, Volume-1.
2. Contractor has to pay all Custom Duty / Import Duty, VAT, AIT and other levies for this imported plant.

Query 34: LIQUIDATED DAMAGES

Please, refer Clause No. 26.2, Special Condition of Contract, Section-VIII and Appendix-8, Section-IX in Volume 1.

As per the Appendix-8 for Functional Guarantees, liquidated damages will be applicable for failure in attaining guaranteed capacity.

However, liquidated damages for completion guarantees are also given in above referred clause no. 26.2.

We understand that, the liquidated damages given in Cl. No. 26.2 is including the liquidated damages given for functional guarantees and hence total liquidated damages will be 10% of total contract price (as per Cl. No. 26.2 of Section-8).

Please Confirm.

Answer 34: Please refer to the answer to similar query above on Volume 1.

Query 35: INTEREST ON DELAYED PAYMENT

In the event that the Employer fails to make any payment on its respective due date, the Employer shall pay to the Contractor interest on the amount of such delayed payment at the rate of 10-11% per annum for period of delay until payment has been made in full.

Kindly, consider our above request and issue necessary amendments in this regards. Also, clarify the Payment Terms and Procedure for Price Adjustment Bills to be followed.

Answer 35: Your above request regarding delayed payment could not be accepted.

Please refer to Appendix 1 and 2 to the Section IX: Contract Forms, Volume 1 of 3 of the bidding document.

Query 36: ROUTE CLEARANCE / ACCESSS

We understand that ROW clearances / Access are under the Contractors Scope.

We request you to kindly arrange to provide the guidelines shall be followed for compensation of Land, Trees, Crops, House etc. and all kind of damage compensation.

Answer 36: Your understanding is correct. Generally, civil works of transmission line is performed by local civil subcontractor. Hence, the local civil subcontractors assist the Contractor for such compensation. Hence, bidders are requested to contact with their probable local civil subcontractor/local agent in this regard. Bidders may also contact with relevant Agricultural Department to know the rate of compensation for crops.

Bidders are suggested to conduct site visit of the line route to get them acquainted about the right of way and compensation.

Query 37: FITTINGS FOR ACCC CONDUCTOR

List of preferred manufacturers given for Fittings for ACSR Conductor only.

We understand that Bidders required to submit all Qualification Documents of proposed manufacturers for *Fittings for ACCC Conductors* alongwith their Bid to meet / satisfy minimum criteria mentioned at Sr. No. 6 in Clause 2.7, Section-3, Volume 1.

Please, confirm, whether our above understanding is in line with tender documents or not.

Answer 37: The bidding document does not include any list for ACCC fittings manufacturer. Hence, bidders are requested to submit the qualification documents as per requirement of Clause 2.7.

Query 38: ISO CERTIFICATE

As per Cl. No. 2.7 of Section-3 of Vol. 1 (Page: III-12) for Evaluation and Qualification Criteria, the subcontractor is required to have valid ISO 9001:2008 certificate.

Since, all the subcontractor may not have exact ISO 9001:2008 certificate, we kindly request you to please amend this suitably as ISO equivalent or above standard certificate. Kindly confirm.

Answer 38: Bidders are requested to submit valid ISO 9001:2008 certificate for their proposed manufacturers.
It may be mentioned here that, the requirement of ISO certification is applicable for Manufacturers, not for civil subcontractor.

Query 39: BID SUBMITTALS

We understand that Bidders are required to submit all drawings and documents as mentioned in clause 1.3, Section-VI (Employer's Requirements), Volume 1 of 3 alongwith Manufacturer's Authorization even for all the preferable manufacturers as given in Clause 2.7, Section-III,

Evaluation & Qualification Criteria, Volume 1.

Kindly, confirm whether our above understanding is in line with tender requirements or not.

Answer 39: If the bidder proposes equipment from the manufacturers as mentioned in the list of Clause 2.7, Section III, Volume 1 of 3 of the bidding document., then only authorization letter from those manufacturers will require to be submitted, no need to provide any other documents.

Query 40: TAXES & DUTIES as per clause 14.1, Section – VIII, SCC:

"*The Employer is responsible for deducting Income tax at source i.e. Tax Deducted at Source (TDS) at the rate applicable in accordance with the government rules of Bangladesh at the time of making any payment to the Contractor.*

The Contractor shall consider TDS in its unit price and in total price"

1) From the above clause, we understand that PGCB will not pay any kind of TDS amount from their own fund, but there will be tax deduction by PGCB from the payment of Contractor's bill (irrespective of currency) as TDS (Tax Deduction at Source) as per Government Tax Rules of Bangladesh and issue the certificate of such payment to relevant Authority.

   We request you to kindly arrange to confirm whether our above understanding is in line with tender requirements or not.

   This will enable us to assess the exact tax implication and to avoid unnecessary loading in our quoted prices towards tax.

2) We request you to kindly arrange to clarify / confirm, how much income tax as TDS will be deducted by PGCB from Contractor's Bill.

3) We request you to kindly arrange to provide / confirm the rates and types of taxes applicable in connection with execution of this contract in Bangladesh as per Government Tax rules.

Answer 40:
1) Your understanding is correct.
2) Please refer to Answer 24 of Volume 1 in this regard.
3) Please refer to Clause 14, Section VII and VIII, Volume 1 of 3 of the bidding document in this regard.

Query 41: TAXES & DUTIES as per clause 14.1, Section – VIII, SCC

"VAT on EXW amounts is not included in the contract price. VAT on EXW shall be paid by the Contractor and shall be reimbursed by the Employer to the Contractor on actual basis in accordance with the government rules upon submission of relevant documents in original."

1) From the above clause, we understand that Employer will not deduct VAT on EXW as TDS (Tax Deducted at Source) from the payment of Contractor's Bill.

Kindly, clarify whether our above understanding is in line with bidding documents or not.

2) We understand that contractor paid VAT amount will be reimbursed to the contractor by PGCB within 45 days from the submission of relevant documents in Original to PGCB, in line with payment realization period.

Kindly, confirm whether our above understanding is in line with bidding documents or not.

Answer 41: 1) Your understanding is correct.
2) PGCB will try it's best to reimburse the VAT on EXW as early as possible after receiving the relevant documents.

Query 42: TAXES & DUTIES as per clause 14.2, Section – VIII, SCC:

"For Schedule No.-1: Supplied from Abroad

Custom Duties (CD), VAT & other charges related to port of entry incurred in the employer's country required for the project shall be borne by Employer upon submission by the Contractor of necessary documentation as detailed 14.2(e). Consequently, all bid prices shall be exclusive of customs and import duties and VAT."

1) From the above clause, we understand that employer (PGCB) will pay all kind of Customs, Import Duties, VAT and Advance Income Tax (AIT) including following duties levied for Imported Plant / equipment (consumable in the project),

   - Regulatory Duty
   - Pre-shipment and Inspection duty
   - Supplementary duty under VAT

Kindly, confirm whether our above understanding is in line with bidding documents or not.

2) For the execution of the project, if some services are imported from other countries, then whether same will be exempt from taxes applicable in Bangladesh (like – Income tax deduction, Withholding VAT, remittance tax etc.). Please, confirm.

3) We understand that Import license and permits for the Plant will be obtained by the Employer (PGCB) in his name. Kindly, confirm.

Answer 42: 1) VAT, Regulatory Duty and Supplementary Duty on VAT on imported plant applicable in Bangladesh, shall be paid by the Employer. Pre-shipment inspection (PSI) duty & charge (if applicable) shall be paid by the contractor.

VAT on EXW for the plant/materials supplied from within Bangladesh shall be reimbursed by the Employer at actual in accordance with the government rules.
2) Please refer to SCC 14.
3) Please refer to SCC 10.

Query 43: TAXES & DUTIES as per clause 14.2 (b), Section – VIII, SCC:

"For Other Schedule

Applicable VAT will be borne by the Employer and consequently, all bid prices shall be exclusive

of VAT.

The Employer shall not be responsible for the payment of customs duties and VAT for the items imported for civil works specified in Price Schedule No. 4."

1) From the above clause, we understand that Employer will not deduct VAT as TDS (Tax Deducted at Source) from the payment of Contractor's Bill against Schedule No. 3 & Schedule No. 4 and PGCB (Employer) will pay applicable VAT from their own fund & issue the certificate of such payment to Government.

We request you to kindly arrange to confirm whether our above understanding is in line with tender requirements or not. This will enable us to assess the exact tax implication and to avoid unnecessary loading in our quoted prices towards tax.

Answer 43: Your understanding is not correct. TDS shall be applied for all schedules. Bidders are requested to go through the SCC 14 carefully regarding duties, VAT, tax etc.

Query 44: <u>TYPE TEST REQUIREMENTS</u>

Insulator Units:

Please, refer the clause no. 6.3.1, Section VI, Volume-1 & other relevance clauses in Volume-2,

1. We understand that Type test report of all Insulator units require to be submitted with the bid proposal as stated in Volume 2, Clause 9.6.2 (i) of the bidding documents.

Failure to attach the above type test reports to the bid shall result in the rejection of the bid.

2. Please, also state the validity period of Test Report / Clarify the years within which Type Test should have been conducted.

3. We also understand that fresh Type Test shall not require during contract execution stage.

We request you to kindly arrange to confirm, whether our above understanding is in line with tender documents or not.

Answer 44: Insulator Units:

1. Your understanding is correct. However, if the bidder proposes the manufacturer within the list in Clause 2.7, Section III, Volume 1 of the bidding document then only authorization letter from the manufacturer is require to be submitted.
2. If the validity period is mentioned in the report then that period shall be followed otherwise the validity period shall be as per relevant standard.
3. Manufacturer will be considered qualified during evaluation if all the type test reports are found satisfactory as per Clause 9.6.2, Volume 2 of the biding document. Hence, fresh type test shall not require during contract execution stage.

Query 45: <u>TYPE TEST REQUIREMENTS</u>

Insulator String Sets:

Please, refer the clause no. 6.3.2, Section VI, Volume-1 & other relevance clauses in Volume-2,

1. We understand that Bidder needs to submit the type test report for all the offered or similar types of insulator string sets (except low duty set) as per the requirements stated in clause no. 6.3.2, Section VI, Volume 1 and clause no. 9.6.2 (ii), Volume 2. Please, clarify / confirm.

   All above Type Test report of insulator sets shall be comprising of cap and pin insulator units complete with all required fittings manufactured by the same manufacturer proposed in this package as stated in clause no. 9.6.2(ii), Volume-2. Please, clarify / confirm.

   We also understand that fresh Type Test shall not require during contract execution stage, if above requirements satisfied. Please, clarify / confirm.

2. If above Type Test requirements not satisfied by any Bidder, then Bid shall not be rejected but proposed manufacturer require to be replaced without change in quoted price. Please, clarify / confirm.

3. If the type tests for river crossing tension insulator set of offered combination of insulator & fittings manufacturer with proposed design are not available, fresh type test required as stated in clause no. 9.6.2 (ii), Volume 2. Please, clarify / confirm.

Please, also state the validity period of Test Report / Clarify the years within which Type Test should have been conducted.

Answer 45: Insulator String Sets:

1. & 2. Type test reports of insulator string sets are not require to be submitted with the bid. Please refer to the **Addendum** in this regard.

400kN tension sets are required to be type tested during the Contract execution. All costs related to the type tests is considered deem to be included in the Contract Price. Please refer to the **Addendum** in this regard.

3. If the type tests for 400kN tension insulator sets of offered combination of insulator & fittings manufacturer with proposed design are not available, fresh type test is require to be performed during execution stage. Please refer to the **Addendum** in this regard.

Query 46: <u>TYPE TEST REQUIREMENTS</u>

a) Type Test of OPGW:

Type Test requirements for OPGW not properly clarified / understandable based on Clause no. 6.2, Section VI, Volume-1 & other relevance clauses in Volume-2.

We request you to kindly arrange to clarify / confirm the followings:

1. Whether offered OPGW must be type tested at this pre-tender stage? OR Bidder allowed to conduct fresh type test after award of contract, if required / matching type test report not available at this stage.

2. Please, also state the validity period of Test Report / Clarify the years within which Type Test should have been conducted.

We also understand that fresh Type Test shall not require during contract execution stage, if matching test report available. Please, clarify / confirm.

Answer 46:
2. Type test reports of similar OPGW are require to be submitted with the bid proposal. Please refer to the **Addendum** in this regard. Please refer to Clause 14.7.1 regarding requirement of type test. In case the offered OPGW is not already type tested then the OPGW is require to be type tested during execution.
3. If the validity period is mentioned in the report then that period shall be followed otherwise the validity period shall be as per relevant standard.

Query 47: As per Volume-I, Section-IV Bidding Forms, Page No. IV-25, Clause 7.5, Annual Turnover of the Bidder or each member of a Joint Venture / Consortium in terms of the amounts billed to clients for each year for contracts in progress or completed, converted to US Dollars at the rate of exchange at the end of the period reported. However, in Form FIN-2, it is mentioned as EURO Equivalent. Please Clarify.

Answer 47: Euro or USD is acceptable.

Query 48: As per Volume-I, Section-IV Bidding Forms, Page No. IV-26, Clause 7.7, in Form FIN-4: Current Contract Commitments, Average monthly invoicing over last six months (Euro/month equivalent). Please confirm that Average monthly invoicing over last six months in USD/month equivalent is acceptable.

Answer 48: USD/month is also acceptable.

Query 49: Kindly refer to the Tender Volume-1 of 3, Section 3 "Evaluation & Qualification Criteria" clause no 1.2.2 "Time Schedule" where it is mentioned that the completion time period for this project is 720 Days from the Effective date of the contract which is "Contract Signing Date". We would like to submit that as per our experience in the country of executing various complexity projects of different voltage levels & Project size, we feel that the given time period is somehow appears to be very-very optimistic. You shall appreciate that from the current bidding cycle till date of contract signing and subsequent execution, there shall be minimum 2 (Two) rainy seasons which are about 8 months and hence effectively 16 months shall only be properly available to the bidders for executing 160kms 400kV Quad line involving 7 New towers (5 to be type Tested) as well as associated foundation designs along with about 500 Towers location having big pile foundation and that too in a low lying area of Gopalganj to Pyra. In view of the same we would like to request you to kindly reconsider the completion period and revise the same at least by 6-12 months so that the bidders can try their level best to finish the project within contractual deadlines else in current scenario it shall only be adding up to the project cost in terms of Liquidated damages for the time overrun which as per our experience is bound to happen in this project. Submitted for your kind consideration please.

Answer 49: This project is enlisted in the Fast Track Project of the Govt. of Bangladesh. The line will evacuate the power from Power Station at Payra. The power station construction work is in progress.

It may be added here that the bidder must work in rainy season to complete the project within the Completion time mentioned in the bidding document. Foundation works will require to be

performed under water condition in many locations. Costs of working in such condition shall deem to be included in the Contract Price.

Also, considering the urgency of the Project, it is kept mandatory for the Contractor to arrange stringing machine capable of stringing four conductors per phase at the same time.

Hence, the Contract completion time shall be 720days from signing of the Contract as mentioned in the bidding document.

Query 50: Kindly refer to the Tender Volume-1 of 3, Section 3 "Evaluation & Qualification Criteria" clause no 1.2.6 "Domestic Preference" item (e) where it is mentioned that the bidders may propose items from more than one manufacturer and they may be from within or outside the employer's country. We have the following specific queries in this regard

a. *Does the bidder has the option of quoting partial quantities of a particular item in the price schedule from within the employer country as well as from outside the employer country?*
b. *If the answer to above query is yes, then we understand that the bidder shall be able to get the margin of preference as applicable on the items quoted from within the employer's country. Please confirm.*
c. *Whether lattice towers are treated as single product item i.e. 'Tower" or different type of lattice towers (i.e 4DL, 4D1, 4D25, 4D45 etc for 400 kV & 1QL, 1Q15,1Q30, 1QT6 etc for 132 kV) are treated as different product altogether.*

In continuation of the point (C), We understand that irrespective of a voltage level, a particular product shall only be accepted from a single Vendor for the complete project. i.e the bidder cannot offer a product for 132 kV from one Vendor, and 400 kV from other vendor. Please confirm if the understanding is correct.

Answer 50: (a) & (b) The Bidders are not allowed to quote partial quantities of a particular item in the price schedule from within the employer country as well as from outside the employer country.
(c) Lattice towers are treated as single product item.

Query 51: Kindly refer to the Tender Volume-1 of 3, Section 3 "Evaluation & Qualification Criteria" clause no 1.2.7 (b) (ii) where it is mentioned that in absence of CIF prices quoted for the said items the EXW price quoted shall be reduced by 6% to make them CIF prices in case the local proposed manufacturer is found technically non responsive. In this regards we have the following clarification

a. We understand that in such case the items shall be considered to be offered from outside the employer's country and all domestic preference and TEC evaluation clause at 1.2.6 & 1.2.7 shall be applicable accordingly? Please confirm if the understanding is correct.
b. We understand that employer shall bear all custom duties and taxes as applicable on such derived CIF Price of the particular item? Please confirm.

Answer 51: (a) Please refer to the hardcopy of the bidding document where 'CIP' is mentioned. However, such items will considered to be offered from outside Employer's country and CIP prices of such items will be loaded to allow domestic preference to the domestically manufactured items.
(b) Your understanding is not correct. In such case, Contractor shall bear all custom duties and taxes as applicable on such derived CIP Price of the particular item.

Query 52: Kindly refer to the Tender Volume-1 of 3, Section 2 Bid Data Sheet clause ITB 19.1 (d) where it is mentioned that Installation shall only be quoted in Local Currency while the price schedule provided has the option of both USD & TAKA to be quoted in Civil & Erection. We have the following clarifications:

a. We understand that the bidders may quote civil & erection both in USD as well as TAKA. Please confirm if the understanding is correct.
b. If the answer to point a) is NO, then it is to submit that this project is the biggest project of transmission line in the country and have a very aggressive completion time of just 24 months. Also, it involves special product namely ACCC Conductor which requires careful handling and expert supervision while doing stringing. We would like to submit that this project shall require significant amount of resources from outside Bangladesh in terms of Experts of ACCC Conductor Stringing/Machinery associated with this stringing, expert expatriates for expediting the works for meeting the completion deadlines for which significant amount of foreign currency expenditure need to be incurred by the bidders. Hence, the option given in price schedule must be maintained and the restrictive clause of quoting installation only in TAKA must be amended. Please clarify the same.

Answer 52: (a) Your understanding is not correct. Please refer to ITB 19.1 in this regard.
(b) Bidders are requested to follow the bid document.

Query 53: Kindly refer to the Tender Volume-1 of 3, Section 3 "Evaluation & Qualification Criteria" clause no 1.2.7 (b) (iii) where it is mentioned that in absence of EXW prices quoted for the said items the CIF price quoted shall be reduced by insurance and freight cost to bring it to EXW level but no domestic preference shall be applicable to such item. We would like to understand that as the items were originally quoted from outside the Employers Country, in what way the clause 1.2.7 of TEC Evaluation Criteria shall be applicable to evaluate such bids on parity. Please clarify the same.

Answer 53: Your understanding is not correct. Please refer to the EQC 1.2.7(b)(iii), Section III, Volume 1 of the bidding document of this project.

Query 54: *Kindly refer to the Tender Volume-1 of 3, Section 6 "Employers Requirement" Clause 6 " Test Requirement where we seek the following clarification*

a. *Clause no 6.3 "Insulators" where it is mentioned that Type Tests reports for Insulator units shall be submitted along with the bid as per clause 9.6.2 (i) "Insulators". Also in clause 9.6.2 (i) it is mentioned that all the type tests must be as per IEC except Power Arc Test that should comply with the test procedure as detailed in this clause. We also understand that, the type test report to be submitted in the bid for the insulators must be only from*

i. KEMA Laboratories in the Netherlands
ii. Powertech High Power Laboratories in Canada
iii. IREQ Montreal in Canada
iv. CESI in Italy
v. Vattenfall in Sweden

Please confirm if the understanding is correct.

b. We understand that offered Insulators must be fully complying with the type test

requirement as specified in the bidding documents and no exemption for any vendor on any type test shall be acceptable during bidding stage especially for Power Arc Test that is must to be performed as per clause 9.6.2 of Volume 2 of the Bidding document. Please confirm.

c. We understand that if the bidder submits the Type Test Report for the offered Items in compliance to the bid requirement then the same product shall not be required to Type Test again. Please confirm if the understanding is correct.
d. In case the Bidder submits the TT Report of Similar or Higher Size Product then the Bidder shall need to do all the type tests as required in the bid without any additional cost to the employer. Please confirm if the understanding is correct.
e. As there is no Type Test Report Submission requirement specified in this section for Hardware Fittings, we understand that the bidder need not to submit any Type test Report for Hardware Fitting along with the bid. Please confirm if the understanding is correct. .
f. We understand that this line is to be constructed with ACCC Conductors which is first of its kind line in the country. As in this project ACCC hardware fittings manufacturer shall also be propose and hence we understand that all the type test as specified in the bid shall be conducted during execution on the combination of Insulators Hardware Fitting afresh despite submission of type test reports or proposing an approved supplier for Insulator. Please confirm if the understanding is correct.
g. As there is river crossing portion involved in this project and hence we understand that in case the river crossing Insulators sets are successfully type tested for the approved combination in the project, then the type tests of the lower rating insulator sets for Overland portion shall be waived off. Please confirm if the understanding is correct.

Answer 54: (a) & (b) Your understanding is correct. Also, please refer to Answer 44(i) of Volume 1.
(c) & (d) Your understanding is correct.
(e) Your understanding is correct. Also, please refer to the **Addendum** in this regard.
(f) Your understanding is correct.
(g) Please refer to the **Addendum** in this regard.

Query 55: *We would like to bring to your kind notice that the quantities of 400kN Insulators are very-very small compared to other 210/300KN Insulators. Also, the 400kN Insulators are used on a special case basis and not many of the insulators & insulator strings of 400kN rating shall be type tested in line with the requirement of the bidding document. We understand that submission of Type test reports upto 300KN Insulators shall be considered substantial and it shall not be mandatory to submit type test reports for 400 KN Insulators. Please confirm if the understanding is correct.*

Answer 55: Please follow the requirement of the bidding document.

Query 56: Kindly refer to the Tender Volume-1 of 3 Section-8 Particular Conditions Clause 14 Taxes and Duties Sub Clause 14.1 (a) where it is state that "The Employer is responsible for deducting Income tax at source i.e. Tax Deducted at Source (TDS) at the rate applicable in accordance with the government rules of Bangladesh at the time of making any payment to the Contractor. **The Contractor shall consider TDS in its unit price and in total price.** Pursuant to this provision, the Employer shall deduct Tax at source (TDS) and deposit the same to the government's exchequer and provide the records of such deposit to the Contractor for facilitating its tax assessment or obligations in Bangladesh. We have the following clarification in this regard

a. As per our understanding the Ongoing TDS is **7.5%** for the current financial year and the

bidders need to build the same in there prices for supply, design & engineering, testing as well as Civil and Erection. PGCB shall deduct **7.5%** from the Invoice Raised and release 92.5% to the contractor. Please confirm if the understanding is correct.

Answer 56: Please refer to GCC 36: 'Change in Laws and Regulations' in this regard.

Query 57: Kindly refer to the Tender Volume-1 of 3 Section-8 Particular Conditions Clause 14 Taxes and Duties Sub Clause 14.1 (b) where it is mentioned that VAT on EXW shall be paid by the contractor which shall be reimbursed by the employer to the contractor on actual basis upon submission of the relevant documents in Original. We have the following clarification in this regard

a. We understand that PGCB shall not be deducting any amount from the Contractors Invoice irrespective of the currency against VAT on EXW. It is the contractor's responsibility to Pay first the applicable VAT on EXW to the Government and then submit the original document as evidence for claiming the reimbursement of such VAT paid for which PGCB shall do the reimbursement. Please confirm if the understanding is correct.

Answer 57: Your understanding is correct.

Query 58: Kindly refer to Tender Volume 1 of 3 Section 9 Contract Forms Appendix 2 Price Adjustment where in concluding conditions clause (e) it is stated that Price **Adjustment shall apply only if the resulting increase or decrease is more than SIX (6) PERCENT of the contract price for that item.** Since the project completion period is 24 Months and due to very volatile nature of Commodity Indices, it is proposed that the PV must be applicable without any limiting conditions as specified above. Please clarify the same.

Answer 58: Provision mentioned in the bidding document shall be followed in this regard.

Query 59: Kindly refer to the Tender Volume-1 of 3, Section IX "Contract Forms" Appendix-2 "Price Adjustment" where we have the following clarifications

a. We understand that P0 or P1 are the CIP TAX Inclusive Price quoted in the bid. Please confirm if the understanding is correct.
b. In Tower and Conductor for Materials and Labour, the indices has been asked from Country of Origin

i. We understand that country of origin shall be treated as country of Manufacture of the product from where it shall be dispatched for use in this project. Please confirm if the understanding is correct.
ii. We understand that there is no established indices for materials are existing in Bangladesh which are used by the local manufacturers for towers and hence we see that in case the indices proposed are not from country of origin, then it shall be deviation from the PV Formula which in turn shall make the bid non-responsive. Please confirm if the understanding is correct.
iii. In case the answer to point no. ii is "NO" then whether a manufacturer is allowed to propose internationally acceptable Indices like LME which is the most predominant indices in international competitive biddings. Please clarify the same.

Bidders may offer internationally acceptable material indices like LME etc that may not be

necessarily from the appropriate industry from the country of origin. Please confirm if the understanding is correct.

Answer 59: (a) Po and P1 are inclusive of tax. It may be mentioned here that the tax shall be deducted at source as mentioned in SCC 14, Section VIII, Volume 1 from the price adjustment invoices in case the price is increased.
(b) (i) Country of origin shall be the country in which the plant is manufactured.
(ii) & (iii) Bidders are allowed to propose as per LME for towers. Please refer to **Addendum.**

Query 60: We understand that all the insurances in the Employer's country including the marine insurance for the imported items to be supplied under this project **shall be made 100% from the Sadharan Bima Corporation**, Bangladesh. Please confirm if the understanding is correct.

Answer 60: All types of insurance in the Employer's country shall be made completely from the Sadharan Bima Corporation, Bangladesh.

Query 61: ITB4.1/Eligiblebidders/Page1-4

4.1 A Bidder may be a private entity or a government-owned entity - subject to ITB 4.5 - or any combination of such entities with the intent to enter into an agreement supported by a letter of intent or under an existing agreement in the form of a joint venture, consortium, or association (JV). In the case of a JV:

(a) all partners shall be jointly and severally liable, and
(b) the JV shall nominate a Representative who shall have the authority to conduct all business for and on behalf of any and all the partners of the JV during the bidding process and, in the event the JV is awarded the Contract, during contract execution.

We propose that the liability of all consortium members should be separate and limited to the extent of their portion of services/responsibility under the contract.

Answer 61: Your above request regarding delayed payment could not be accepted.

Query 62: ITB21.5/Bid Security/Page1-13

21.5 If a bid security is specified pursuant to ITB 21.1, ***the bid security of the unsuccessful Bidder shall be returned as promptly as possible*** upon the successful Bidder's furnishing of the performance security pursuant to ITB 45.

21.6 If a bid security is specified pursuant to ITB 21.1, ***the bid security of successful Bidders shall be returned as promptly as possible once the successful Bidder*** has signed the Contract and furnished the required performance security.

We request the authorities to specify a time limit within which the bid security will be returned. Therefore, we could request a suitable modification to ensure that a time line is specified.

Answer 62: The above clauses are self-explanatory. The Employer's will try it's best to complete the award process within the bid and bid security validity period.

Query 63: GCC9.3/Contractor'sResponsibility/Page7-10

9.3 The Contractor shall acquire and pay for all permits, approvals and/or licenses from all local, state or national government authorities or public service undertakings in the country where the Site is located which such authorities or undertakings require the Contractor to obtain in its name and which are necessary for the performance of the Contract, including, without limitation, visas for the Contractor's and Subcontractor's personnel and entry permits for all imported Contractor's Equipment. The Contractor shall acquire all other permits, approvals and/or licenses that are not the responsibility of the Employer under GCC Sub-Clause 10.3 hereof and that are necessary for the performance of the Contract.

Although we agree with this provision in principle, however, in order to acquire and pay for the requisite permits (except import permits), approvals and/or licenses from the local, state and national government, we may require assistance from the Employer. The Employer must, in this regard, extend its full cooperation with the Contractor.

In light of the aforementioned, we propose an appropriate modification to the provision.

Answer 63: The Employer will extend its full cooperation with the Contractor in this regard.

Query 64: 9.7 If the Contractor is a joint venture or consortium of two or more persons, all such persons shall be jointly and severally bound to the Employer for the fulfillment of the provisions of the Contract and shall designate one of such persons to act as a leader with authority to bind the joint venture or consortium. The composition or the constitution of the joint venture or consortium shall not be altered without the prior consent of the Employer.

We should propose that the liability of all members should be separate and limited to the extent of their portion of services/responsibilities under the contract.

Answer 64: All partners of Joint Venture or consortium shall be jointly and severely liable to the Employer for the fulfilment of the provisions of the Contract.

Query 65: GCC10.2/Employer'sResponsibility/Page7-11

10.2 The Employer shall be responsible for acquiring and providing legal and physical possession of the Site and access thereto, and for providing possession of and access to all other areas reasonably required for the proper execution of the Contract, including all requisite rights of way, as specified in the Appendix (Scope of Works and Supply by the Employer) to the Contract Agreement. The Employer shall give full possession of and accord all rights of access thereto on or before the date(s) specified in that Appendix.

We are of the firm view that this clause of the GCC must not be replaced with clause 10.2 of the SCC mentioned above. This clause must be maintained in the contract. In the event that this clause is removed, the contractor will be unable to attribute delay and/or liability upon the Employer vis-à-vis access/physical possession of the project site/ right of way etc.

We request to keep this provision intact.

Answer 65: Your above request regarding delayed payment could not be accepted.

Query 66: SCC10.5/Employer'sResponsibility/PageVIII-5

10.3 The Employer shall give administrative support to accord permits, approvals and/or

licenses from local, state or national government authorities or public service undertakings in the country where the Site is located. ***The Contractor shall acquire and pay for all permits, approvals and/or licenses from local, state or national government authorities or public service undertakings in the country*** where the site is located which

(a) such authorities or undertakings require to obtain in the Employer's name,
(b) are necessary for execution of the contract, including those required for the performance by both the Contractor and the Employer of their respective obligations under the contract, and
(c) are specified in the appendix (scope of works and supply by the employer) to the contract agreement.

The cost of acquiring such permits, approvals and/or licenses are deemed to be included in the contract price.

We request the authority to keep the original provision of clause 10.3 of the GCC intact wherein the responsibility to acquire and pay for the permits, approvals and/or licenses is the responsibility of the Employer unlike the present provision.

Answer 66: Your above request regarding delayed payment could not be accepted.

Query 67: GCC10.8/Employer'sResponsibility/Page7-12

10.8 In the event that the Employer shall be in breach of any of his obligations imposed by the Contract, then the additional cost reasonably incurred by the Contractor in consequence thereof shall be added to the Contract Price.

We request a minor variation in the said clause and request that the word 'reasonably incurred' be replaced with 'actually incurred'.

Answer 67: Your above request regarding delayed payment could not be accepted.

Query 68: GCC16.1/ConfidentialInformation/Page7-15

16.1 The Employer and the Contractor shall keep confidential and shall not, without the written consent of the other party hereto, divulge to any third party any documents, data or other information furnished directly or indirectly by the other party hereto in connection with the Contract, whether such information has been furnished prior to, during or following termination of the Contract. Notwithstanding the above, the Contractor may furnish to its Subcontractor(s) such documents, data and other information it receives from the Employer to the extent required for the Subcontractor(s) to perform its work under the Contract, in which event the Contractor shall obtain from such Subcontractor(s) an undertaking of confidentiality similar to that imposed on the Contractor under this GCC Clause 16.
We are a Private Limited Company and as such not bound by the provisions of Right to Information Act, 2005. As per this clause of confidentiality, we are only required to share information for the consumption of the Employer alone and not for any third party.

Answer 68: Please follow the provision of the bidding document in this regard.

Query 69: GCC16.3/ConfidentialInformation/Page7-15

16.3 The obligation of a party under GCC Sub-Clauses 16.1 and 16.2 above, however, shall not

apply to that information which

(a) now or hereafter enters the public domain through no fault of that party
(b) can be proven to have been possessed by that party at the time of disclosure and which was not previously obtained, directly or indirectly, from the other party hereto
(c) otherwise lawfully becomes available to that party from a third party that has no obligation of confidentiality.

The contractor must also be permitted to disclose confidential information in an eventuality that the Contractor is ordered by a court of competent jurisdiction to do so or wherever there is a statutory obligation to do so.

Answer 69: Please follow the provision of the bidding document in this regard.

Query 70: GCC/Clause22.2.11/Supplyofwater/Page7-23

22.2.11 The Contractor shall, having regard to local conditions, provide on the Site an adequate supply of drinking and other water for the use of the Contractor's Personnel.

We agree to this provision in principle, however in order to procure the utility services we may require assistance from the Employer and the Employer must in this regard extend its full cooperation.

In light of the above, we propose this provision be modified appropriately.

Answer 70: The Employer will extend its full cooperation with the Contractor in this regard.

Query 71: Since Power Arc Test is compulsory for insulators, it means no other vendor can be proposed not complying this test even if they are regular vendor of PGCB. Please Clarify.

Answer 71: Please refer to Answer 44:1 of Volume 1.

Query 72: GCC Clause 12.3

It says that PGCB will pay interest on delayed payment. Please clarify whether PGCB will pay interest and if so what will be the rate of interest? Please Clarify.

Answer 72: There is no provision of paying the interest as per Appendix 1, Section IX, Contract Form of the bidding document.

Query 73: Please Confirm that insurance if all type is mandatory from Sadharan Beema.

Answer 73: Sadharan Bima Corporation, Confirmed.

Query 74: Kindly refer to volume 1 of 3 Section 3 "EQC" where in clause 1.2.7 "**Calculation of the Lowest Evaluated Price"** where it mentioned that CIF/CIP prices of all the items except tower shall be loaded by 23.86%. As per our understanding this evaluation criteria shall be applicable and used during evaluation whether any eligible manufacturer for any of such items from Bangladesh has been proposed by any bidder or not. Please confirm if the understanding is correct.

Answer 74: Your understanding is not correct. Clause 1.2.7, Section III, Volume 1 will be applied in both cases.

Query 75: Cl. No. (d) of 1.2.6: Domestic Preference of Section III: Evaluation and Qualification Criteria and Cl. No. (a) of 1.2.7: Calculation of the Lowest Evaluated Price

In the comparison of bids, only the CIF price component.....outside employer's country shall be increased by ten percent (10%). ..... And for evaluation purpose, include customs duties (CD) and VAT in the case of CIF Bids for imported Goods and include VAT for Goods manufactured locally. The rate of CD & VAT is given table.

As per our understanding, if bidder chooses to purchase the Tower from outside the employer Country, the tower prices shall increase by (44.95%+10%) for evaluation purpose. Please confirm that our understanding is correct.

Answer 75: Please refer to Answer 19 of Volume 1.

Query 76: **Fittings for Conductor & Insulators (ACCC)**

Please, refer the Qualification Criteria mentioned at Sr. No. 6, Clause no. 2.7 (Manufacturers / Subcontractors), Section-III (Evaluation & Qualification Criteria), Volume 1 or 3.

- *Manufacturer's proposed factory must have at least last ten (10) years of manufacturing experience of transmission line fittings with 210kN or higher rating including at least three (3) years in manufacturing/supply transmission line fittings suitable for High Temperature Low Sag (HTLS) conductor like ACCC conductor;*

- *The similar type Hardware Fittings including 120kN & 210kN rating shall be in satisfactory service for a minimum of one (1) year with High Temperature Low Sag conductor like ACCC conductor as on the date of bid submission deadline. Evidence from end users of satisfactory service shall be on the end user's letterhead;*

In ref. to above clause, we request you to kindly arrange to clarify / confirm the followings:

1] We understand that it is not compulsory for the fitting manufacturers to have required experience (i.e. 3 years manufacturing and 1 year satisfactory service) for ACCC type HTLS conductors only. If manufacturer meet the required experience in combination of various types of HTLS conductors will also be qualified for this package. Please, confirm.

2] Since, Insulator String Fittings for ACCC conductor are identical to ACSR Conductor (except end suspension clamp / tension clamp), we request you to kindly arrange to clarify whether Fittings for Conductor & Insulators (ACCC) from two different manufacturers as per below will be acceptable to PGCB or not?

Manufacturer 1: Insulator String Fittings (except end clamps) from manufacturers meeting 10 years manufacturing experience and 1 year satisfactory service requirements for any other types of Conductors, and

Manufacturer 2: Insulator String End Clamps (matching with ACCC) & other ACCC conductor fittings from manufacturers meeting 3 years manufacturing experience and 1 year satisfactory service requirements for any types HTLS conductors.

We request you to kindly arrange to clarify / confirm all above points earliest possible for clarify

and better understanding of exact PGCB requirements.

Answer 76: 1) Confirmed.
2) Fittings for conductor and insulators are required to be offered from the same manufacturer.

Query 77: Cl 17.2 of ITB; Technical Proposal, Subcontractors

For major items of plant and services as listed by the Employer in Section 3 (Evaluation and Qualification Criteria), which the Bidder intends to purchase or subcontract, the Bidder shall give details of the name and nationality of the proposed Subcontractors, including manufacturers, for each of those items..... Adjustment of the rates and prices will be permitted.

Please confirm that bidder is free to choose any Subcontractor/manufacturer at the time of contract award from his proposed List of Subcontractors/manufacturers at the time bidding.

Answer 77: Bidder/Contractor is free to choose any Subcontractor/manufacturer provided that such Subcontractor/manufacturer has been found technically responsive during evaluation of bid.

Query 78: Clause No. 14.2 a of PC

For Schedule No.-1: Supplied from Abroad Custom Duties (CD), VAT & other charges related to port of entry incurred in the employer's country shall be borne by Employer and it will not be part of the Contract.

The Employer shall not be responsible for the payment of customs duties, VAT and taxes for the items imported for civil works or any

We understand that Custom Duties (CD), VAT & other charges shall be borne by PGCB as per actual basis.

Answer 78: Your understanding is correct.

Query 79: ITB 21.1 of BDS

Bids shall include a Bid Security issued by a bank using the form included in Volume 1 - Section 4 (Bidding Forms). The amount and currency of the bid security shall be: USD 2,500,000 (USD two million five hundred thousand) only, or an equivalent amount in freely convertible currency.

The Bidder shall submit the original of above bid security with the original technical bid; otherwise the bid shall be rejected.

We understand the beneficiary of the Bid Security will be "The Company Secretary
Power Grid Company of Bangladesh Ltd.(PGCB), 4th Floor, Institution of Engineers Building, 8/A, Ramna, Dhaka-1000, Bangladesh " Kindly confirm

Answer 79: The Beneficiary of Bid Security will be,
Power Grid Company of Bangladesh Limited.(PGCB),
Institution of Engineers Bangladesh (IEB) Building,
3rd & 4th Floor, 8/A, Ramna,
Dhaka-1000, Bangladesh

Volume 2 of 3

Query 1: Vol.2, Page7-2

It was mentioned that "The material factors are in accordance to Annex 7-3."

1) Bidder cannot find the material factors in Annex 7-3. Please confirm it."

Answer 1: The above sentence is not available in the hardcopy of the bidding document. However, materials factor will be adopted as per relevant standard.

All the bidders are requested to go through the hardcopy of the bidding documents. In case of any discrepancy between hardcopy and soft copy (in the website), the hardcopy shall prevail.

Query 2: Vol.2, Page 7-3

It was mentioned that "The geotechnical parameters for tendering purposes are provided in Annex 7-2. No extra payment will be made if the actual soil condition is found to be worse than the soil parameter given in Annex 7-2."

1) Bidder cannot find the soil parameter in Annex 7-2. Please confirm it.

Answer 2: Please follow the hard copy of bidding document where the reference is made as Annex 7-1.

Query 3: Vol.2, Page7-4

It was mentioned that "For design under compression loading, the area of the base is determined by the design ground bearing pressure under ultimate loads. In assessing the bearing pressure beneath the foundation, the additional weight of the foundation over that of the displaced soil shall be multiplied by the appropriate foundation dead weight-factor (Annex 7-1)."

1) Bidder cannot find the foundation dead weight-factor in Annex 7-1. Please confirm it.

Answer 3: Please refer to the 'Minimum Requirements of Piled Foundation' table of Annex 7-1.

Query 4: Vol.2, Page7-5

"It was mentioned that "Ultimate uplift resistance shall be obtained assuming the actual weight of piles, pile caps etc. plus the guaranteed ultimate uplift resistance of the piles. Allowance shall be made for buoyancy effects. The minimum component of the uplift resistance provided by the dead weight of the piles and pile caps should not be less than the value specified in Annex 7-2.

Ultimate compressive loads shall include the superimposed weight of soil; pile caps (and tie beams, etc.) multiplied by the dead load factor (as per Annex 7-1) and shall be obtained by the guaranteed ultimate resistance of the piles. "

1) Bidder cannot find the value and the dead load factor in Annex 7-1 and 7-2. Please

confirm it."

Answer 4: Please follow the hard copy of bidding document where the reference is made as Annex 7-1.

Query 5: Page 7-6, Vol. 2

It was mentioned that "To ensure the durability of the concrete, the requirements specified in Annex 7-4 shall be adhered to with regard to characteristic strength, minimum cement content and maximum free water/cement ratio ."

1) Bidder cannot find the requirements in Annex 7-4. Please confirm it.

Answer 5: Please follow the hard copy of bidding document where the reference is made as Annex 7-2.

Query 6: Page 7-6, Vol. 2

"It was mentioned that "All structural steelwork and reinforcing including links and stirrups below ground level shall be completely encased in concrete to ensure a minimum cover as specified in Annex 7-5."

1) Bidder cannot find the minimum cover in Annex 7-5. Please confirm it."

Answer 6: Please follow the hard copy of bidding document where the reference is made as Annex 7-3.

Query 7: Page 7-15, Vol. 2; Page 7-28, Vol. 2; Page 3-10, Vol. 2; Page 3-19, Vol. 2

It was mentioned that "Concrete slump requirement at the field for the Pile is 125mm-175mm and for the Pad & Pile cap is 30-75 mm respectively."

Grade of Concrete	Cement Type	Minimum Cement Content kg/m³	Maximum Free Water / Cement Ratio
C30	Ordinary Portland Cement (OPC)	370	0.5
C30	Pozzolanic Portland Cement (PPC)	370	0.5
C30	Sulphate Resistant Portland Cement (SRC)	As per BSEN 197-1 CEMII/B-V	

Notes:
1. Maximum nominal aggregate size 20 mm.
2. For installation of drilled shaft piled foundations using bentonite slurries minimum cement content shall be increased to 400 kg/m³.
3. Slump range for cap and chimney is 50 mm to 100 mm and for pile 150 mm to 200 mm.
* If required as per soil and ground water test report.

No.	Description of Activity	Items to be Checked	Tests / Checks to be done	Ref. Documents	Check/Testing		Counter Check / Test by Employer	Accepting Authority in Employer
					Agency	Extent		
		2. Stub setting	1) Centre Line 2) Diagonals 3) Level of stubs	-do-	-do-	-do-	-do-	-do-
		3. Reinforcement steel	Placement	Bar bending schedule	-do-	-do-	-do-	-do-
		b. During concreting						
		1. Workability	Slump test	Range 50 mm to 100 mm refer document at Annex 6-14	Contractor	100% at field	40% check at random	Site Engineer

Annex 3-10: Acceptance Criteria and Permissible Limits for Concrete Work

1)	Concrete	a) Workability		Slump shall be recorded by slump cone method and it shall between 50-100 mm for pile cap and chimney, 150mm to 200mm for concrete pile.				
		3. During con-creting						
		a. Workability	1. Slump test	150-200 mm as per Employer's Specif.	Contractor	For each pile	100% at field	Site ENGINEER

1) The value of concrete slump to be referred at Clause 7.4.9 is different with Annex 7-2, Annex 3-5 and Annex 3-10 as to be shown above. Which is correct? Please clarify.

Answer 7: Please follow the value mentioned in Annex 7-2. The values mentioned in Clause 7.4.9 is corrected through **Addendum**.

Query 8:
Page 3-8, Vol. 2
Page 3-8, Vol. 2
Page 3-8, Vol. 2
Page 3-9, Vol. 2
Page 3-10, Vol. 2
Page 3-10, Vol. 2

"As per Annex 6-10"
"As per Annex 6-11"
"As per Annex 6-12"
"As per Annex 6-13"
"Range 50mm to 100mm refer document at Annex 6-14"
"PWD SPEC as referred in document at Annex 6-14"

1) Bidder cannot find 'the items to be checked' from the Annexes to be mentioned above. Please confirm it.

Answer 8: Please refer to the **Addendum**.

Query 9:
Vol.2, Section IX, 9.6.
Vol.2, Section X, 10.6
Vol.2, Section XI, 11.6
Vol.2, Section XII, 12.6
Vol.2, Section XIII, 13.6
Vol.2, Section XIV, 14.7

Type Test shall be conducted by Contractor in the Volume 2, Technical Specification. Therefore, Contractor shall submit type test report in the Volume 1. Section III, 2.7. We understand the type test report is replaced to type test. Please clarify on the type test is waived.

Answer 9: The type test is not waived. If the bidder proposes the manufacturer within the list in Clause 2.7, Section III, Volume 1 of the bidding document then only authorization letter from the manufacturer is required to be submitted with the bid proposal.

Query 10: Vol.2, Section I, Annex 1-2

OPGW termination boxes shall be installed at the base of the substation gantry structures in "Vol.1, Section I, Annex 1-2".

We understand the termination boxes shall be installed from substation's contractor. Please confirm

Answer 10: Supply and installation of OPGW termination boxes is included in the scope of this Contract. Hence, OPGW termination boxes shall be supplied and installed by transmission line's contractor.

Query 11: Vol.2, Section IX, Annex 9-2

Glaze colour of Heavy Suspension Insulator is "Brown" in the "Vol.2, Section IX, Annex 9-2". We understand the Glaze colour of 210kN Insulator is "Grey" and other 210kN colours are also "Grey" in the technical specification.

Only Glaze colour of Heavy Suspension Insulator is different with other types. Please confirm.

Answer 11: Glaze color shall be finalized during execution stage.

Query 12: Vol.2, SectionXV, Annex 15-1, Vol.2, SectionVIII, Annex 8-4(2), Vol.3, 2. Price schedules

All river crossing towers and towers of which total height above GL exceeds 45m are to be painted in the "Vol.2, Section 15, Annex 15-1".

Towers of which tatal height above GL exceeds 45m are all in the "Vol.2, Section 8, Annex 8-4(2)".

Quantities of painting of tower having height more than 45m are only 25 in the "Vol.3, 2. Price schedules".

Please clarify on painting of tower having height more than 45m is correct.

Answer 12: Requirement of painting of tower having height more than 45m is correct. However, all the towers having height of 45m are not required to be painted. Final quantity and location of towers to be painted will be attained upon discussion with Civil Aviation Authority during execution stage.

Query 13: Vol.2, Section 15, Annex 15-1

All river crossing towers and towers of which total height above GL exceeds 45m are to be painted in the "Vol.2, Section 15, Annex 15-1".

Please clarify on contractor shall paint all body of tower. If not, Please provide bidder with detailed scope of paint works.

Answer 13: ICAO clauses shall be followed in this regard.

Query 14: Page 8-7, Vol.2

It was mentioned that "Transverse load due to wind (50% of ULS wind at angle 0°) on earthwire/OPGW, conductor, tower members, insulator and all other fittings and transverse component of maximum working tension of earthwire/OPGW & conductor due to maximum horizontal deviation angle of line. Load factor for horizontal tension of earthwire/OPGW & conductor shall be considered 1.25."

1) Regarding "50% of ULS wind.....", what is the meaning of "ULS wind"? Is it mean as "FL wind"?

2) If the "ULS wind" means "FL wind", the "50% of FL wind" means 50% of wind velocity or wind pressure?

Please inform us the above questions.

Answer 14: 1) ULS wind means Failure Limit (FL) Wind. Please refer to **Addendum**.
2) 50% of wind velocity.

Query 15: Page8-7, Vol.2

For intact point, unbalanced tension is similar to normal condition.

For broken point, unbalanced longitudinal tension shall be considered as per criteria given below:

<table>
<tr><th>Tower Type</th><th>Conductor Tension</th><th colspan="2">Residual Static Load Factor</th><th>Load Factor</th><th>Broken Wire Assumption</th></tr>
<tr><td rowspan="4">Suspension/ Heavy suspension</td><td rowspan="5">Conductor tension at security condition</td><td>String Length</td><td>Factor</td><td rowspan="4">1.25</td><td rowspan="4">1 earthwire or 1 phase (all sub-phase) is broken</td></tr>
<tr><td>< 1m</td><td>1.0</td></tr>
<tr><td>1m< but < 2m</td><td>0.7</td></tr>
<tr><td>> 2m</td><td>0.6</td></tr>
<tr><td>Angle tower</td><td colspan="2">1.0</td><td>1.25</td><td>1 earthwire and 1 phase (all sub-phase) or 2 phase broken (all sub-phase) on the same side are broken</td></tr>
</table>

At the above Broken Wire Assumption, it is mentioned like "1 earthwire or 1 phase (all sub-phase) is broken".

1) Please clarify "How many sub-conductors in 1(one) phase will be broken?"
2) It is mentioned that "For intact point, unbalanced tension is similar to normal condition"

Then what is the direction of unbalanced tension of intact point?

Is it the same direction as unbalanced tension of broken phases or opposite direction of broken phases?

Answer 15:
1. All sub-conductors of a phase are broken.
2. The direction of unbalanced tension at intact points shall be similar to that of the broken phase.

Query 16: Page 10-17, Vol.2 and Page 10-16, Vol.2

In the table of "Insulator Sets -Types & Uses", the Overall set lengths of Suspension & Heavy

suspension is only 4700mm. It seems suitable if the conductor is 2 Bundle. But, the net insulator length is already 3910mm (=170mm x 23).

And when considering the other fittings and the yoke for 4-bundle conductor, It is considered that the overall length of suspension set shall be extended at least 450mm. Hence, the overall length should be Min. 5150mm.

Please clarify above question.

Answer 16: Bidders are free to propose increased length provided that the tower outline and clearances values are complied with the requirements of specification.

Query 17: Page 8-5 Vol.2

Loading Conditions	Wind	Coincident Temperature	Design Aspect
Normal Condition (DL)	50% of FL	50°C	Electrical Clearance of structure (PFC)
Normal Condition (DL)	15.6 m/s	50°C	Electrical Clearance of structure (LIC)

In above table, in order to calculate the "PFC", it is mentioned that 50% of FL for Wind.

Please clarify that the "50% of FL wind" means 50% of wind velocity or wind pressure?

Answer 17: Please Refer to Answer 14 of Volume 2.

Query 18: Page 8-40 Vol.2

3. Spatial Distances

			400kV	230kV – Not applicable	132kV
(a)	Minimum shielding angle of the earthwire (still air) from the vertical	(degrees)	0°	0°	30°
(b)	Maximum swing of the earthwire from vertical	(degrees)	85°	85°	85°
(c)	Minimum vertical spacing between adjacent phases	(m)	As per drawing	6.0	4.0
(d)	Minimum projected horizontally spacing between adjacent phases spaced vertically	(m)	-	-	-
(e)	Minimum vertical spacing between phase conductor and earthwire	(m)	As per drawing	5.1	3.2
(f)	Minimum horizontal spacing between adjacent phase conductors spaced horizontally.	(m)	-	-	-

In above table, it is mentioned that "Minimum vertical spacing between adjacent phases" shall follow "As per Drawing" for 400kV. But Bidder cannot find the values in the bid drawings.

Please supply the mentioned values.

Answer 18: Minimum vertical spacing between adjacent phases is to be calculated from the clearance diagram "As per drawing".

Minimum vertical spacing between phase conductor and earthwire shall be provided through **Addendum**.

Query 19: Page 8-29 Vol. 2

3. **Conductor System Loading**

3.1 400kV Overland Portion

Loading Condition	Maximum Allowable Tension[1]
Normal condition (Failure Limit)	55% of Ultimate tensile strength
Normal condition (Damage Limit)	50% of Ultimate tensile strength
Everyday condition	20% of Ultimate tensile strength

In above table, The conductor system loading of Normal condition (Failure limit) will be availed up to 55% of UTS. In this case, the 55% is based on "Creep condition" or "Initial condition"? Please clarify above question.

Answer 19: The 55% is based on "Creep condition".

Query 20: Page 8-8~8-9 Vol. 2

8.2.8 Allowable Ultimate Unit Stresses

The allowable ultimate unit stresses used in the determination of the nominal strength of support members shall be based on the following criteria:

a) For lattice steel tower shall be based on the recommendations contained in BS 8100-3 or ANSI / ASCE Std. 10-15. For ANSI/ASCE Std. 10-15 the appropriate reference stress levels shall be based on the values specified in BS 5950, and as summarized below:

Grade	Reference Stress Level (N/mm²)	Nominal Thickness
S235JRG2	235	≤ 16 mm
	225	> 16 ≤ 40mm
S275JR	275	≤ 16mm
	265	> 16 ≤ 40mm
S355JO	355	≤16mm
	345	> 16 ≤ 40mm

It is mentioned that the ultimate unit strength of support members shall be followed as per BS code.

But, if bidder/Contractor hope to use another country code like Japanese, Korean, or Chinese standard. Is it available to use another country code which is equivalent or higher than BS code? Please clarify above question.

Answer 20: British Standard (BSEN) is to be followed.

Query 21: Page 8-35 & 8-36 Vol. 2

1) It was mentioned that the Basic Span (Ruling span) of overland portion's towers is 375m. Bidder understood that this basic span will be used for checking the Min. standard height of tower. Please clarify it is correct?
2) When bidder want to check the height of River crossing tower. Bidder can use the same basic span for River crossing towers. Please clarify it is correct?

1.2 Anchor Supports					
(a)	Wind span	Anchor Towers	(m)	-	370
(b)	Maximum weight span	Anchor Towers	(m)	-	-850
(c)	Minimum weight span	Anchor Towers	(m)	-	250

3) It is mentioned that the maximum weight span of Anchor towers is minus (-) 850m. Please clarify it is correct?

Answer 21:
1) The basic span will be used for checking the min. standard height of overland towers.
2) Please refer to drawing no. PGCB/400kV/PG/P&P/Laukathi, page 22-42 for basic span of 4DR1 std and drawing no. PGCB/400kV/PG/P&P/Shondha, page 22-44 for basic span of 4DR2 std.
3) Correct.

Query 22: Page 11-19 & 11-20 Vol. 2

Sagging limits of earthwire:				
Sagging limits of earthwire as a percentage of conductor sag	%	n.a.	90	90
Conductor temperature	°C		5	5

When Bidder calculate the sagging limit of earthwire as per the criteria of specification, the maximum tension of ACSR Dorking conductor is about 70% of UTS. It does not satisfy the conductor system loading which is defined by 55% of UTS in Annex 8-1 Vol.2.

Bidder is thinking that the earthwire system loading or the sagging limit would be changed along with the phase conductor sag. And it will affect tower design.

Please confirm and supply the above changed values for bidder.

Answer 22: The sag of earthwire/OPGW at 5deg C is required to be maintained within 90% of conductor sag at the same temp. To maintain this sagging limit, bidders/Contractor may increase the peak height of tower or increase the percentage of UTS of OPGW/earthwire. However, tension of OPGW/earthwire shall not exceed 80% of UTS. Please refer to **Addendum** in this regard. Also, bidder/Contractor has to ensure through manufacturer during execution stage that there will be no fiber strain at that max. percentage UTS.

Query 23: ACCC Conductors

Format for Guaranteed Technical Particulars is not provided with the Technical Specification. We request you to kindly arrange to provide the required format for Guaranteed Technical Particulars.

Answer 23: Please refer to Item 5.3.1, page no. 9 and 5.3.2 page no. 10, Volume 3 of the bidding document.

Query 24: ACCC Conductors

As per Technical Specification, same design of ACCC Dhaka conductor in the name of ACCC Dhaka ULS is required with different UTS for Overland Portion and River crossing which only require change in the tensile strength of Composite core (High Strength and Extra High Strength).
We request you to kindly arrange to clarify, whether Bidder / Contractor required to conduct the specified type tests on both the conductors irrespective of same design, Aluminium area and core area? Or only one type test can suffice the requirement.

Answer 24: Type test will be required for overland portion ACCC only.

Query 25: ACCC Conductors

The Ambient Temperature mentioned in the Specification is 45 Deg C in Annexure 2-1, whereas in Annexure 11-1 it is given as 40 Deg C. Please Clarify, which temperature to be considered for Ampacity Calculations.

Answer 25: Temperature mentioned in Annex 11-1 to be considered for Ampacity Calculations.

Query 26: ACCC Conductors

Basic span given for 400 KV Line is 375 meter, but for River Crossing Span Length is not mentioned. We request you to kindly arrange to provide the Basic Span details for 400KV River Crossing Line.

Answer 26: Please refer to Answer no. 21 of Volume 2.

Query 27: ACCC Conductors

For Ampacity calculations, Emissivity Constant & Solar Absorption Co-efficient is not given. We request you to kindly arrange to provide the Emissivity Constant & Solar Absorption Co-efficient for Ampacity Calculation.

Answer 27: Please Refer to **Addendum**.

Query 28: ACCC Conductors

Type Tests given in the Specification is for both ACCC & Invar type Conductor, rest everywhere in the Bidding Documents ACCC is mentioned. We request you to kindly arrange to clarify the HTLS conductor technology requirements.

Answer 28: Only ACCC conductor is to be used in the 400kV line.

Query 29: Tower & Foundation Design:

As per Annex 6-1: Clearance of Obstacles, page 6-27 Volume 2 of 3. In table Description of Clearance - Minimum Clearance "Value of clearance from ground is 9 m for 400kV". Please confirm.

Answer 29: Confirmed.

Query 31: Tower & Foundation Design:

As per Annex 6-1: Clearance of obstacles, page 6-27 volume 2 of 3. Maximum temperature for conductor is 180°C for 400kV. Maximum temperature for Earth wire and OPGW is not specified in specification. Please provide the same.

Answer 31: Please Refer to **Addendum.**

Query 32: Tower & Foundation Design:

As per Annex 8-5: Span Criteria, page 8-35 volume 2 of 3. For Overland portion tower type-4DT6 (Terminal Tower) and for River crossing portion tower type-4DAX (Anchor Tower) Wind span, Max. weight span and Min. weight span in broken wire condition is not furnished. Please provide the same.

Answer 32: For 4DAX tower (when designed as angle tower), the value stated in Annex 8-5(2) Item 1.2 for the "minimum weight span" shall be the weight span value of broken wire condition (as vertical maximum). Minimum vertical weight span shall be 0.

Wind span shall be half of the intact wind span.
The span criteria given for tension tower shall be applicable to 4DT6 (angle) tower.
Terminal towers do not need broken wire condition to satisfy the design.

Query 33: Tower & Foundation Design:

As per Cl. 8.2.5.2 Security Loading c) Longitudinal loads, page 8-7, volume 2 of 3. Broken wire assumption for Suspension/ Heavy suspension tower is "1 earth wire or 1 phase (all sub-phase) is broken" and for Angle tower 1 earth wire and 1 phase (all sub-phase) or 2 phase broken (all sub-phase) on the same side are broken. 1 Phase (all sub-phase) means all four sub conductor is broken of Quad conductor. Please confirm our understanding is correct.

Answer 33: Please refer to Answer 15 of Volume 2.

Query 34: Tower & Foundation Design:

As per Annex 8-4: (2) Basic Dimension of Supports, page 8-33, Volume 2 of 3. Max. base width of standard height tower at k-point "x" and Max. width of bottom cross arm waist "y" is provided in table. This width is fixed or we can increase the width. Please confirm.

Answer 34: These are the maximum values.

Query 36: Tower & Foundation Design:

As per Cl. 8.2.4 Design criteria, page 8-5, volume 2 of 3. Below table "Wind speed (Failure Limit), weather load factor and exposure category shall be considered as mentioned in Annex 8-1". In Annex 8-1: 2. Design parameters, table indicated term "wind load factor". The term "Wind load factor" and "Weather load factor" both are same for this case. Please confirm.

Answer 36: The term "Wind load factor" and "Weather load factor" are same.

Query 37: Tower & Foundation Design:

As per Annex 8-9: Electrical Clearance, page 8-40 volume 2 of 3. Table 2 (a) Minimum clearance between a conductor and tower metal for suspension sets without any deflection is 3100mm. However, in bid drawings page 22-24 Volume 2 of 3, 3100mm clearance requirement is with and without deflection of suspension sets for 4DL (Suspension Tower). Please mentioned deflection angle for which we have to maintain clearance of 3100mm.

Answer 37: Please refer to the revised drawing enclosed with the **Addendum**.

Query 38: Tower & Foundation Design:

As per Annex 8-1: Design parameters and conductor system loading, page 8-29 volume 2 of 3. Table 3 conductor system loading, Maximum allowable tension is applicable for conductor, earth wire and OPGW. Please confirm.

Answer 38: Please refer to Answer 22 of Volume 2.

Query 39: Tower & Foundation Design:

As per Annex 8-10: Anti-Climbing Devices (ACD), Access Facilities, Danger & Identification Plates, page 8-42 Volume 2 of 3.

Table 2. Access Facilities, (e) Fall arrest system is required only for river crossing suspension towers only. Please confirm.

Answer 39: Fall arrest system is required for all types of towers.

Query 40: <u>LINE TERMINATION AT SUB-STATION</u>

As per Annex 1-2 (Terminal Point), Section-1, Volume 2 of 3:

OPGW and Earthwire shall be terminated at the Sub-station gantry for both 400KV and 132KV Transmission Line.

We understand that supply of Optical Fiber Patch Panel for connection of OPGW at Sub-station is not in the scope of this Contract. Kindly, Confirm.

Answer 40: Confirmed.

Query 41: <u>OPGW REQUIREMENTS</u>

a) Whether supply of Fibre Optic Cable (Approach Cable) is in the scope of Contractor?

   If yes, what will be the length required on either side of the line? Kindly, Confirm.

b) Tension set for OPGW are same for splicing and non-splicing locations?

   Unit "each" in the price schedule for OPGW tension set is for one side of tower or for both side of the Tower? Kindly, Clarify.

c) We request you to kindly arrange to clarify whether any special kind of connectors required to connect Overland portion OPGW (ACSR Dorking type) equivalent with River Crossing

portion OPGW (19x3.67 20 SA). Please, Confirm.

Answer 41:
a) Supply of Fibre Optic (Approach Cable) Cable is not included in the scope of transmission line Contractor.
b) Design of OPGW tension sets are in the scope of the Contractor. Unit "each" in the price schedule for OPGW tension set is applicable for one side of the Tower.
c) Requirement of special type connectors will depend on the design of OPGW joint box by the bidder (manufacturer). However, payment will be made as per price schedule. If special joint box is required, the price of such joint box shall deem to be included in the Contract price.

Query 42: REINFORCEMENT STEEL

Please, refer the clause no. 7.4.5 (e), 7.3.5 of Volume 2 of 3 (Technical Specification).

From above clauses, we could not define / understand the exact requirements of Epoxy Coated Reinforcement bars.

Kindly, confirm whether all required Reinforcement Steel Bars is Epoxy Coated?

If yes, kindly arrange to provide the detail Epoxy coating specifications to be followed with clearly mentioning the types of coating materials / methodology / Dry Film Thickness / standards etc. to enable us to assess the exact tender requirements.

Answer 42: Epoxy coating is not required. Please refer to the **Addendum**.

Query 43: PAINTING OF BOTTOM PARTS OF TOWERS

Please, refer the clause no. 21 of Volume 2 of 3 (Technical Specification).

a) We understand that all galvanized tower steel upto 3 meter or upto maximum anticipated flood level from ground level (whichever is maximum) shall be protected by Coal Tar Epoxy Coating Only and no other type of coating required.

   Kindly, confirm whether our above understanding is in line with tender requirements or not.

   Please, also provide the technical specification / standards to be followed and any Brand / make acceptable for Epoxy Tar.

b) Also, define / confirm the maximum anticipated flood level in proposed route (no. & types of tower), where required to consider Epoxy Tar Coating beyond 3 meter from ground level.

This will further enable us to assess the quantum of work & further infrastructure requirements.

c) We understand that Contractor also has a freedom to suitably apply 100% Coal Tar Epoxy Coating (all coats) on Site using Etch Primer (instead of blast cleaning & factory applications) to avoid the damage of coating during transportation.

Kindly, confirm whether our above understanding is in line with tender requirements or not.

Answer 43: a) Your understanding is correct. Standard specification shall be used. Cost of supply and

applying the coal tar epoxy shall deem to be included in the Contract price.

b) Please refer to the survey data table for highest flood level.

c) Your understanding is correct.

Query 44: REFLECTING PAINT FOR NAVIGATION

Please, refer the clause 15.2.10.5, Volume 2 of 3 and Item at Sr. No. A3.2, Price Schedule 1, Volume 3 of 3 regarding painting of towers in Submerge areas.

We understand that all tower steel members in Submerge area shall be painted with reflecting paint up to 3 meter above Epoxy Coat (not on Epoxy Coal Tar Coat). Please, Confirm.

We request you to kindly arrange to provide following details:

- Relevant Specifications / Standards
- Any Brand / make of Reflecting paint to be used?
- Dry Film Thickness per coat wise?
- How many coats shall be applied, one or two?

Any performance period to be considered for Reflecting Paint life?

Answer 44: All tower steel members in Submerge area shall be painted with reflecting paint up to 3 meter above Epoxy Coal Tar Coat. The coal tar epoxy shall be applied on bottom 3m or HFL whichever is higher, then reflecting paint shall be applied on next 3m.

- Please follow clause no. 15.5.10.1 for standard.
- Brand will be proposed by the contractor.
- Please follow clause no. 21.6 for dry film thickness
- Please follow clause no. 21

Performance period to be considered for Reflecting Paint is minimum five years.

Query 45: ACCESS FACILITIES FOR TOWER

Exact Quantity and requirements of Fall Arrest System not understandable from the details provided in Annex 8-10, Volume 2 or 3.We request you to kindly arrange to confirm / clarify the same.

Answer 45: Fall arrest system is required for all crossarms as per Annex 8-10. Please follow the clause no. 8.2.5.3(c), Volume 2 of the bidding document for fall arrest loading and clause no.8.2.16(c) for fall arrest system.

Query 46: DISCREPANCIES IN BID DRAWINGS

We require some clarifications regarding Bid Drawings provided in Volume - 2 of 3 at Section / Clause No.22 as per below:

a) Queries regarding Drawings for 132kV Transmission Lines (Sr. no. 22.2.1, Page No. 22-6)

1. As per Drawing No. PGCB/132kV/SS; 132 kV Single Suspension Set (70kN); Page No. -22-6; dimension of Arc Gap mentioned in drawing is 1140 mm with +20/-10 tolerance whereas as per table provided in Annexure 9-2: Electrical & Mechanical Characteristics; Sr. No.2 132 kV lines at Page No. -9-16-; dimension given for "Arc gap Nominal" is 1120 mm for Suspension/Jumper Suspension.

   We Kindly request you to please clarify which dimension for Arc gap of 132 kV Single Suspension Set (70kN) is to be considered.

2. As per Drawing No. PGCB/132kV/HS; 132 kV Heavy Suspension Set (120kN); Page No. -22-7-; dimension of Arc Gap mentioned in drawing is 1140 mm with +20/-10 tolerance whereas as per table provided in Annexure 9-2: Electrical & Mechanical Characteristics; Sr. No.2 132 kV lines at Page No. -9-16-; dimension given for "Arc gap Nominal" is 1120 mm for Heavy Suspension.

   We Kindly request you to please clarify which dimension for Arc gap of 132 kV Heavy Suspension Set (120kN) is to be considered.

3. As per Drawing No. PGCB/132kV/TS; 132 kV Tension Set (120kN); Page No. -22-8-; dimension of Arc Gap mentioned in drawing is 1140 mm with +20/-10 tolerance whereas as per table provided in Annexure 9-2: Electrical & Mechanical Characteristics; Sr. No.2 132 kV lines at Page No. -9-16-; dimension given for "Arc gap Nominal" is 1120 mm for Tension.

   Also, No. of Insulators mentioned in the string length is 10 as (10x146=1460); whereas as per table provided in Annexure 9-2: Electrical & Mechanical Characteristics; Sr. No.2 132 kV lines at Page No. -9-16- "Number of Insulator Units per String" given is 11 for 'Tension'.

   We Kindly request you to please clarify which dimension for Arc gap is to be considered and how many "Number of Insulator Units per String" are to be considered for 132 Tension Set (120kN).

4. As per Drawing No. PGCB/132kV/ULD; 132 kV Upright Low Duty Tension Set (70kN); page No. -22-9-; dimension of Arc Gap mentioned in drawing is 1140 mm with +20/-10 tolerance whereas as per table provided in Annexure 9-2: Electrical & Mechanical Characteristics; Sr. No.2 132 kV lines at Page No. -9-16-; dimension given for "Arc gap Nominal" is 1000 mm for Upright Low Duty.

   Also, No. of Insulators mentioned in the string length is 10 as (10x146=1460); whereas as per table provided in Annexure 9-2: Electrical & Mechanical Characteristics; Sr. No.2 132 kV lines at Page No. -9-16- "Number of Insulator Units per String" given is 11 for 'Upright Low Duty'.

   Overall length mentioned in the above referred drawing is 1820 mm whereas as per table provided in Annexure 10-1: Insulator Sets/Fittings-Types & uses; Sr. No.4 Insulator Fittings-Types & Uses-132 kV at Page No. -10-19-; dimension given for "Overall set length" for Low Duty is 2350 mm.

We Kindly request you to please clarify which dimension for Arc gap is to be considered, how many "Number of Insulator Units per String" are to be considered and exact Overall Length for 132 kV Upright Low Duty Tension Set (70 kN).

5. As per Drawing No. PGCB/132kV/ILD; 132 kV Inverted Low Duty Tension Set (70kN); Page No. -22-10-; dimension of Arc Gap mentioned in drawing is 1140 mm with +20/-10 tolerance whereas as per table provided in Annexure 9-2: Electrical & Mechanical Characteristics; Sr. No.2 132 kV lines at Page No. -9-16-; dimension given for "Arc gap Nominal" is 1000 mm for Inverted Low Duty.

   Also, No. of Insulators mentioned in the string length is 10 as (10x146=1460); whereas as per table provided in Annexure 9-2: Electrical & Mechanical Characteristics; Sr. No.2 132 kV lines at Page No. -9-16- "Number of Insulator Units per String" given is 11 for 'Inverted Low Duty'.

   Overall length mentioned in the above referred drawing is 2245-2475 mm whereas as per table provided in Annexure 10-1: Insulator Sets/Fittings-Types & uses; Sr. No.4 Insulator Fittings-Types & Uses-132 kV at Page No. -10-19-; dimension given for "Overall set length" for Low Duty is 2900 mm.

   We Kindly request you to please clarify which dimension for Arc gap is to be considered, how many "Number of Insulator Units per String" are to be considered and exact Overall Length for 132 kV Upright Low Duty tension Set (70 kN).

6. 70 kN Single Jumper Suspension String Drawing is missing in the given tender drawings. We kindly request you to please provide the same.

b) <u>Queries regarding Drawings for 400kV Transmission Lines</u>

210 kN Twin Jumper Suspension String Drawing is missing in the given tender drawings. We kindly request you to please provide the same.

Answer 46: a)1. & a)2. Please refer to the **Addendum**.
a)3. Nominal arc gap shall be 1120mm. Number of insulator for tension sets shall be 11. Please refer to the **Addendum**.
a)4. & a)5. Nominal arc gap shall be 1120mm. Number of insulator for tension sets shall be 11. Please follow Annex 10.1 for Overall set length. Please refer to the **Addendum**.
a)6. Bidders are requested to have the drawing from their manufacturer. However, generally, jumper suspension set drawing is similar to the suspension set drawing.

Query 47: <u>OPGW TOOLS / SPARES</u>

Please, refer the clause no. 14.8, 14.9 and Annex 14-3 in Volume 2 or 3.

We understand that Contractor not required to supply any tools & spare parts related to OPGW except OTDR. Please, confirm.

We also request you to kindly arrange to provide the Technical Specification for OTDR (OPGW Test Equipment).

Answer 47: Please follow the price schedule (Vol. 3 of 3, Schedule B) for mandatory spare parts and tools.

Query 48: Detailed Technical Specification for Earthwire and ACSR Grosbeak Conductors are missing in Volume 2 of 3. Please, arrange to provide.

Answer 48: Please follow the Section 11, Volume 2 of 3 of the bidding document for technical specification of Earthwire and ACSR Grosbeak Conductors.

Query 49: Please provide the details site map, which should show the coordinate of site, boundary of site topographic details, power transmission line corridor, direction of power outlet etc.

Answer 49: Please follow the coordinate data listed in clause 23.1, Volume 2 of 3 of the bidding document.

Query 50: Volume 2, Annex 9-2: Electrical & Mechanical Characteristics

The power arc test procedure defined for insulator Sets is 31.5 kA Current passing through the insulator Set for 0.5 Seconds (refer Appendix 9-2). However, as per Standard IEC it is 31.5 kA for 0.1 second and most of the insulator manufacturers have the type test report of Power Arc Test as per the standard IEC condition.

Answer 50: Please follow the requirement mentioned in the bidding document.

Query 51: Please provide the details site map of 132kV, which should show the route, LILO position, coordinate of site, boundary of site topographic details, power transmission line corridor etc.

Answer 51: The 132kV lines have been passed near the proposed 400kV Gopalganj substation. In-out of these 132kV lines will be finalized during execution stage. Detailed information is not available in PGCB. Bidders are requested to conduct site visit to have idea about line in-out location and routes.

Query 52: Please confirm the requirement of flood control.

Answer 52: The query could not be understood. However, the Contractor is to continue the civil works in waterlogging condition. Please refer to Section 7, Volume 2 of 3 of the bidding document in this regard.

Query 53: Please provide the meteorological, hydrological and geological data.

Answer 53: Required data has already been included in the bidding document.

Query 54: At Article-8.2.4, Security condition will be checked for "50% of FL", which means at time of Tower design & wire load determination, wind speed will be 50% of Design wind speed and Load factor should be 1.25. - Is that concept correct or wrong?

Answer 54: Wind '50% of FL' means 50% wind speed as calculated based on wind speed and other factors mentioned in Annex 8.1, Volume 2 of 3 of the bidding document.

Query 55: At Article 8.2.5.1.1, Maximum Load factor on all wire will be 1.25. In that case should we consider load factor on Tower, as 1.25 or anything else?

Answer 55: 1.25

Query 56: At Article 8.2.5.1.2(b) High intensity local wind loadings, shall we consider no wind loadings on Conductor, Eathwire & OPGW?

Answer 56: Yes.

Query 57: From Article 8.2.5.2 (b), we understand that for Transverse load at Tower & all wires, at 50% Design wind speed with Maximum working tension of wires (Annex 8-1,3.1) load factor 1.25 should be considered? Please confirm if our understanding is correct or wrong.

Answer 57: Your understanding is correct. However, wind '50% of ULS wind at angle 0°' means '50% of FL wind at angle 0°' which means wind pressure calculated based on 50% wind speed and other factors mentioned in Annex 8.1, Volume 2 of 3 of the bidding document shall be considered.

Query 58: At Article 8.2.8 Allowable Ultimate Unit stresses, tower member limit stress shall be according to ASCE std. 10-15, but still at PLS Tower software, ASCE 10-97 code is followed, it is not updated as per ASCE 10-15 code. In that case, can we use ASCE 10-97 code for determination of allowable Ultimate Limit stress?

Answer 58: ASCE 10-97 code may be used for determination of allowable ultimate limit stress in case PLS Tower is not updated as per ACSE 10-15.

Query 59: At Annex 8-1: Design parameter & Conductor system loading "3.0 Conductor system loading" – conductor system loadings are specified, but what will be the Earthwire & OPGW system loading for Overland portion & River crossing portion?

Answer 59: Please refer to Answer 22 of Volume 2.

Query 60: At Section 22.0 Bid Drawings, at clearance diagram "swing angles' are not mentioned. But at previous tenders of PGCB swing angles were mentioned. So, is there any procedure to calculate swing angles of tower or PGCB will specify those angles?

Answer 60: It is the responsibility of bidders/Contractor to calculate the swing angle as per the criteria mentioned in the bidding document.

Query 61: For Transverse load on insulator, shall we consider shielding effect on insulator or not?

Answer 61: For Transverse load on insulator, shielding effect on insulator shall not be considered.

Query 62: As per Volume-II, Technical Specification, Annex 11-1, Page No. 11-16, Rated tensile strength of 19x3.67 Earthwire and 19x3.67 equiv. OPGW for 400kV River Crossing Portion is not given. Please provide the same for Earthwire and OPGW.

Answer 62: Bidders/Contractor is required to design the OPGW/earthwire satisfying the specification. Hence, the value of strength is not given for above items.

Query 63: In technical specification Volume-II, Section-8, Cl.8.2.4 – "Design Criteria" – It is mentioned that the tower design shall be as per ASCE74-2009.

Kindly clarify whether the tower design is strictly as per ASCE 74-2009 or Standards equivalent to ASCE74-2009 shall also be considered.

Answer 63: Tower loading shall be as per ASCE 74-2009 and tower structural design shall be as per ASCE 10-97/ASCE 10-15. Please Refer to **Addendum**.

Query 64: In Vol-II, Sec-8, Cl.8.2.4 – "Design Criteria", under the loading conditions the coincident temperature is given as 50 degree & 5 degree.

Kindly clarify the Minimum temperature & Everyday temperature (EDT), Maximum temperature of conductor & Earthwire/OPGW to be considered for the Sag tension calculations & in the design.

Answer 64: Min. temp. is 5degC. Please refer to the Annex 11-3: Conductor System Loading for everyday temp. and Annex 6-1 for max. operating temp.

Query 65: In Vol-II, Sec-8, Cl.8.2.5.1.1 (c), it was mentioned that the unbalanced tension to be considered as 3% & 10% of UTS of conductor or Earthwire/OPGW for Suspension tower & Tension tower respectively.

Kindly confirm in which UTS (Conductor or Earthwire) the corresponding percentage tension to be considered.

Answer 65: Unbalanced tension of conductor shall be considered for the crossarms connected with conductor and unbalanced tension of earthwire/OPGW shall be considered for the crossarms connected with earthwire/OPGW.

Query 66: In Vol-II, Sec-8, Cl.8.2.5.2 (c) – Security Loading- Longitudinal loads, the broken wire condition for terminal tower is not given. Whether it shall be considered as same as that of Angle tower? Kindly clarify.

Answer 66: Brokenwire condition loading is not required to apply for terminal tower load cases. However, since these towers are designed for angle as well terminal tower, hence the brokenwire loading is to be applied for angle load cases.

Query 67: In Vol-II, Sec-8, Cl.8.2.22, it was mentioned that at railway crossings & highway crossings cradle guards to be installed & shall be designed with wind pressure of 126 kg/sq.m. Kindly confirm the use of this cradle guard & show some drawings indicating at what places these will come in the tower.

Answer 67: Cradle guard is not required. Please refer to the **Addendum**.

Query 68: In Vol-II, Sec-8, Cl.8.3.1.3, it was mentioned that the grade of material used for tower sections confirms to grade S235JRG2 or S275JR for mild steel & S355JR for High tensile steel.

Kindly confirm whether the material grade shall be as per the indicated standard or equivalent grade of material shall be used.

Answer 68: It is confirmed that the material grade shall be as per the standard mentioned in the bidding document.

Query 69: In Vol-II, Sec-8, Cl.8.7.7.1 – Prototype load test, it was mentioned that, if a failure occurs in the final load case, the tower needs to be re-tested.

Kindly clarify whether the re-test shall be done for that particular load case or the tower is to be retested for all the test load cases.

Answer 69: In case the tower requires for re-design due to such failure then the tower is to be retested for all the test load cases.

Query 70: Kindly furnish the Modulus of elasticity, thermal co-efficient of linear expansion for conductor & earth wire to be used in 400kV transmission lines.

Answer 70: Please contact to your manufacturer.

Query 71: Kindly refer to Volume 2 of 3 Chapter 7 Clause 7.2.7.5 : River Crossing Foundations where it is mentioned that

a. If a tower is located on river bed or within 100 meter from river bank, the foundation of that tower shall be treated as foundation on water. Top of chimney of this type of tower shall be at least 450mm above highest flood level. Generally, the tower locations are selected in such a way that the towers could be installed on dry land. But, due to mighty river the banks are eroded. The Contractor has to assess the river erosion and has to perform the foundation works within the quoted price even if the tower location found under water during execution stage.

b. Foundation of this type of tower shall be of pile supported. Pile shall be designed considering an unsupported height equal to depth of river bed plus allowance for scour depth. Lacey's formula may be applicable for calculating scour depth.

We would like to submit that, based on our experience, the river banks get eroded and tower which were executed as on ground River Crossing towers are now appearing to be a mid-stream tower. In view of this we would like submit that PGCB must propose a minimum scour depth criteria that must be considered by all the bidders beyond 100-200 meter range in order to have river crossing tower foundations which shall be able to sustain the conditions even after erosion of the bank by 100 meter in worst case. For your consideration please.

Answer 71: Please refer to the hardcopy of the bidding document instead of soft copy in the website.

Query 72: Kindly refer tender volume 2 Section 8 "Tower" Clause 8.2.8 "Allowable Ultimate unit Stress", It is observed that recommendation of BS 8100-3 or ANSI/ASCE Std. 10-15 has been asked to be considered in the design. While going through the complete chapter only BSEN/ISO references are made for steel and other material applicable for towers. With this we understand that it is BSEN standard that shall prevail in case of any discrepancy etc. Please clarify.

Answer 72: ASCE shall be applied for structural design and BSEN shall be applied for structural properties.

Query 73: Kindly refer tender volume 2 Section 8 "Tower" Clause 8.7.7 "Type Test" where it is mentioned that towers as specified in Annexure 8-11 shall be type tested. We understand that all the type tested towers after replacing the damaged members after the type test shall need to be supplied to the employers in addition to the spare towers along with the fresh set of bolt & nuts for the particular tower. The cost of such supply must be included in the contract price itself. Please confirm if the understanding is correct.

Answer 73: Confirmed.

Query 74: Kindly refer tender Volume 2 Section 8 "Tower" Appendix 8.11 Tower Test Requirement where it is mentioned that Tower Type 4DE9, 4D1E15, 4D25E9, 4D45E9 & 4DT6E9 shall need to be type tested while in price schedule No. 1 for Section A "400kV Tower", there is mention of only 4 Type of towers, Please clarify the same.

Answer 74: Four types of tower shall be load tested. Please refer to the Annex 8.12 of hardcopy of the bidding document.

Query 75: Page8-16 & 8-38, Vol.2, 8.3.3 Bolts, Nuts, Clevis Pins and Washers

8.3.3 Bolts, Nuts, Clevis Pins and Washers

8.3.3.1. Unless specified to the contrary the following grades of steel shall be applicable:

a) Material quality of bolts of 12 mm diameter shall be Grade 4.6 according to ISO 898
b) Material quality of bolts and clevis pins of 16 mm diameter and over shall be Grade 5.6 according to ISO 898.
c) Material quality of non-structural step bolts shall be Grade 6.9 according to ISO 898.
d) Material quality of nuts shall be Grade 5 according to ISO 898 and appropriate to the material quality of bolts.

Annex 8-7: Minimum Thickness & Diameter of Material

The minimum thickness and diameter of material used in members and bolts shall be as detailed below:

(a)	For leg members and compression chords in gantries and cross arms.	(mm)	6
(b)	For other members (including earthwire peaks) carrying calculated stress.	(mm)	5
(c)	For secondary members without calculated stress.	(mm)	4
(d)	Gusset plates for lattice towers.	(mm)	6
(e)	Bolt diameter for members carrying calculated stress.	(mm)	16, 24 & 32
(f)	Minimum bolt diameter for secondary members without calculated stress	(mm)	16

It is mentioned that the connection bolts shall be followed according to ISO 898 standard. And the bolt Diameters shall be 16, 24 & 32 as above. But, there is no M32 bolt in ISO 898 standard. Please clarify that Bidder can consider M30 or M33 bolt instead of M32 as per ISO 898 standard?

Answer 75: Please refer to **Addendum**.

Query 76: Page8-44, Vol.2, Annex 8-12 : Tower Test Requirement; c) Longitudinal Loads

3. Visual Check, Galvanizing Test and Mechanical Test of Members/Nuts & Bolts / Plates

Before mass (batch) fabrication/manufacturing of tower materials the Contractor shall submit the proto assembly test report of towers for acceptance of the Employer. The Contractor shall proceed mass fabrication of towers after acceptance of the said test report by the Employer. After mass fabrication, tower members shall visually check for dimension and galvanizing thickness (which shall include weight basis test also). Mechanical tests shall also be done on the finished tower materials.

All costs related to such tests shall be deemed included in the Contract Price.

It is mentioned that "Mechanical tests shall also be done on the finished tower materials." Please give bidders the information how many samples would be taken.

Answer 76: Shall be finalized during execution stage. However, generally 10 to 15 samples are tested.

Query 77: Page 8-16, Vol. 2, 8.3 Materials; 8.3.1.4 Steel section profiles

> 8.3.1.4. Steel section profiles shall be in accordance with the requirements of BS 4: Part 1, BS EN 10210-2, BS EN 10056-1, BS EN 10024, BS EN 10034 and BS EN 10056-2 as appropriate.

It is mentioned that the steel section profiles shall be followed as per BS code. But, if bidder/Contractor hope to use another country code like Japanese, Korean, or Chinese standard. Is it available to use another country code for steel section? Please clarify above question

Answer 77: BSEN code is to be used.

Query 78: Page 11-5 & 11-16 Vol.2, 11.6.5 Inelastic Extension of Conductors, Annex 11-1: Conductor – Types & Uses

> **11.6.5 Inelastic Extensions of Conductors**
>
> The Contractor shall be responsible for evaluating the inelastic extension which is likely to occur in the conductor over the defined period of years. Reference shall be made to the recommendations contained in CIGRE Electra No. 75 for the evaluation. Compensation for the inelastic extensions so determined shall be made by the selection and use of an optimum pretension and time period and over tensioning the conductor at the time of erection. Over tensioning of the conductor shall be made by an allowance in the erection temperature i.e. sagging temperature equals conductor temperature mi-

It is mentioned that the inelastic extension of conductor shall be evaluated over the defined period of years. But bidder cannot find the defined creep period for 400kV conductors, earthwires & OPGW.

And ACCC conductors is new developed conductor so there is some difficulty to match referred CIGRE Electra No. 75 equations. ACCC conductors shall also be followed according to the CIGRE recommendation? Please give the information to bidders.

Answer 78: Inelastic extension in the conductor is another term for creep in the conductor. For ACCC, that utilizes fully annealed Aluminum wires, creep in the conductor is essentially never a governing factor for determining the final, high temperature sags. Only the Aluminum wires will undergo creep during the service life of the conductor. The composite core does not exhibit creep. Over the service life of the conductor, the fully annealed Aluminum wires relieve their tensile load. Once all the load is relieved, the remaining load on the conductor is all in the composite core. It is at this point, the conductor will exhibit its highest sags, and also will never exhibit creep again.

The publicly available ACCC wire files, all have a 10 year creep curve to determine the after creep sags. But, one will notice that the sag at the maximum operating temperature will also be the same for the after creep and after load conditions.

Considering the above, bidders are requested to download the 'ACCC Dhaka' and 'ACCC ULS Dhaka' wire files from PLS website.

Query 79: Page 11-16 Vol.2, Annex 11-1 : Conductor – Types & Uses
2. 400kV - Rivercrossing portion

2. 400kV – River Crossing Portion

Conductor	Phase	Earthwires	
Designation (Code Name)	ACCC ULS 724/71 Dhaka (ACSR Finch equiv. diameter)	19x3.67	19x3.67 equiv. OPGW
Type	ACCC	20SA	-
Reference standards	ASTM/IEC/BSEN	IEC 61232	IEC, ITU, IEEE
Aluminium/Aluminium alloy grade	1350 O	-	-
Steel grade	-	-	-
Galvanising Thickness	-	-	-
Aluminium class (AS wire)	-	-	-
Aluminium type (AS wire)	-	-	20SA
Conductor max. continuous operating temperature (°C)	180	-	-
Minimum mass of grease (kg/km)	-	12	-
Creep period of conductor to be considered (years)	-	-	-
No. and diameter of aluminium wire (No./mm)	Refer Note (ii)	12/3.2	-
No. and diameter of steel wire (No./mm)	-	7/3.2	Not applicable
Overall diameter of conductor (mm)	32.87	18.35	-
Overall sectional area of conductor (mm^2)	794.8		158
Rated tensile strength of conductor (kN)	224		-
Weight (kg/km)	2132		-

In above table, it is mentioned that the earthwire for 400kV rivercrossing portion shall follow as per "IEC 61232-Aluminum-Clad Steel wire" code but the sub-wires of earthwire are defined like ACSR. Manufacturers have some confusion about the earthwire. Please clarify that the earthwire is ACS or ACSR?

Answer 79: Earthwire is ACS. Please refer to **Addendum**.

Query 80: Common, Type Test

We would like to ask you to exempt the type test requirement for all items such as insulator, damper, conductor, OPGW etc mentioned on ITB in case that the proposed manufacturers have a type test certificate/report issued by independent test institutions during the bidding stage. Also, We would like to ask you to exempt the type test requirement of manufacturers given Volume 1, Section III, 2.7 Manufacturers/Subcontractors. (page Ⅲ-13~14)

Answer 80: Please follow the bidding document alongwith Clarification and Addendum.

Query 81: As per Annex 8-4, Min. height of standard height tower bottom conductor attachment point after creep or after load condition from k-point is mentioned. Are they fixed? Please clarify.

Answer 81: The minimum height is mentioned.

Query 82: If River-Crossing tower is within 100meter from river bank then foundation will be considered deep River Type. But the banks are breaking at site. Please confirm, shall we consider bank as per river authority?

Answer 82: Please follow the hardcopy of the bidding document in which it is mentioned that the foundation of river crossing towers and anchor towers are required to design considering certain unsupported length.

Query 83: Section 8, Cl 8.2.5.1.1(c) Page No. 8-6;Longitudinal loads

Confirm the Earthwire unbalanced tension, which percentage of UTS (Earthwire or OPGW) to be considered for design.

Answer 83: For suspension towers 3% and for angle towers 10% of conductor or earthwire/OPGW ultimate tensile strength shall be considered as unbalanced longitudinal load as per clause 8.2.5.1.1c, Section 8, Volume 2 of the bidding document.

Query 84: Section 8, Cl 8.2.5.2(c) Page No. 8-7; Longitudinal Loads/Broken wire assumption.

Provide the broken wire assumption for 4DT6 Angle/Terminal tower.

Answer 84: Broken wire assumption for angle tower is already provided in this clause. Broken wire assumption is not required for terminal condition. 4DT6 and 4DAX towers will be used as angle tower as well as terminal tower. Hence, for 4DT6 and 4DAX tower design, broken wire assumption for angle tower is required to be considered.

Query 85: Section 11, Annex 11-1, P.No. 11-15; Conductor- Types and Uses

Provide the modulus of Elasticity, Thermal coefficient of linear expansion for conductor, earthwire and OPGW.

Answer 85: Please Refer to Answer 70 of Volume 2.

Query 86: Section 8, Annex 8-13, P.No. 8-45; Foundation Forces

For 1DT6 & 1QT6 two foundation reactions (one for Angle & Terminal) are given. Clarify which one to be considered for foundation design of 1DT6 & 1QT6.

Answer 86: Foundation reaction for terminal tower is to be used when the tower is installed as terminal tower and foundation reaction for angle tower is to be considered when the tower is installed as angle tower. Generally, the start and end towers of four circuit line are installed as terminal tower and all the double circuit towers of LILO are installed as terminal tower.

Query 87: Section-, Cl.8.2.4 P.No. 8-5; Design Criteria/ Wind

Clarify the percentage of FL wind to be considered for normal condition (DL) & high intensity wind condition.

Answer 87: 100% of FL wind. Please refer to Annex 8-1: 2. for FL wind.

Query 88: Section-8, Cl.8.3.1.3 P.No. 8-16; Materials/Steel

Clarify whether the grade of Mild steel shall be S235JRG2 or S275JR & High Tensile Steel shall be of S355JR only or equivalent grade of material shall be used.

Answer 88: Mild steel shall be S235JR or S275JR. High tensile steel shall be S355J0 only.

Query 89: Section-8, Cl. 8.2.22 P.No. 8-15; Cradle Guard

Provide the sample drawing of cradle guard & at which place this needs to be fitted in the tower.

Answer 89: Please follow Answer 67 of Volume 2.

Query 90: Section 8, Cl. 8.2.4 P.No. 8-5; Design Criteria

Provide the load tress for 400kV towers as per ASCE 74-2009 else provide the loading cases/combinations to be considered for tower design.

Answer 90: The above service/works is included in the scope of the bidder/Contractor.

Query 91: Kindly refer to the Volume 2 of 3 Chapter 8, Clause 8.2.8, high tensile steel grade is 355JO whereas clause 8.3.1.3, high tensile steel grade is 355JR. kindly clarify which grade is to be used.

Answer 91: High tensile steel grade is S355J0. Please refer to the **Addendum**.

Query 92: 2. **Electrical Clearances - Live Metal & Earthed Steelwork**

Please also refer to the Bid Drawings, Section 22, Volume 2 of 3 of the bidding documents.

	Description	Unit	400kV
(a)	Minimum clearance between a conductor and tower metal for suspension sets without any deflection.	(mm)	3100
(b)	Minimum clearance between a conductor and tower metal for suspension sets deflected position under the weather case corresponding to Lightning Impulse Clearance (LIC).	(mm)	2800
(c)	Minimum clearance between a conductor and tower metal for suspension sets deflected position under the weather case corresponding to Power Frequency Clearance (PFC).	(mm)	1830
(d)	Minimum clearance between a conductor and tower metal for jumper suspension sets without any deflection.	(mm)	3100
(e)	Minimum clearance between a conductor and tower metal for suspension sets deflected position under the weather case corresponding to Lightning Impulse Clearance (LIC).	(mm)	2800
(f)	Minimum clearance between a conductor and tower metal for suspension sets deflected position under the weather case corresponding to Power Frequency Clearance (PFC).	(mm)	1830

We are not clear about what wind pressure is to be considered for Lightening impulse clearance (LIC) & Power frequency clearance (PFC) in Annexure 8-8, Table 2. Electric Clearance – live metal & earthed steel work. It is also requested to kindly furnish us the values of clearance requirement for swing of jumper loops for all tension tower.

Answer 92: Please refer to Clause 8.2.4, Volume 2 of the bidding document for corresponding wind speed.

Query 93: Kindly refer to As per Annexure 8-9: Anti-climbing devices (ACD), Access facilities, Danger & Identification Plates: Work Platforms are required for river crossing suspension towers & all tension towers. Kindly confirm if work platforms are required for tension towers in overland portion too.

Answer 93: It is confirmed that, work platforms are required for tension towers both in overland portion and river-crossing portion.

Query 94: Kindly refer vol-2 of 3 chapter 8, clause 8.2.5.2, Security loading, b) transverse loads: Transverse loads due to wind (50% of ULS wind at angle 0°) on earthwire/OPGW, conductor, tower members, insulator & all other fittings and transverse component of maximum working tension of earthwire/OPGW & conductor due to maximum horizontal deviation angle of line.

Kindly confirm if we can consider tension corresponding to 50% of ULS wind at angle 0° as per sag & tensions calculations.

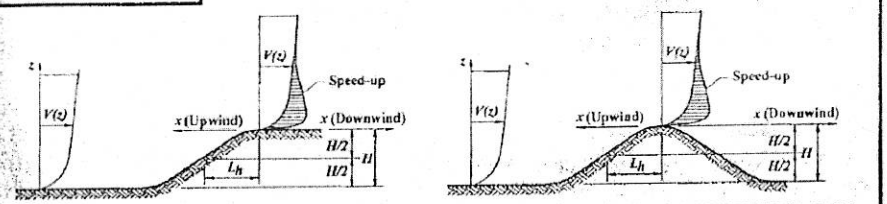
Answer 94: Calculated tension corresponding to 50% FL wind at angle 0° as per sag & tensions calculations to be considered.

Query 95: 1. As per ASCE 74-2009, wind force = $F = \mathbb{I}_w\ Q\ Kz\ Kzt\ (V50)^2\ G\ C_f\ A$

For calculation of Kzt, we require the values of K1, K2 & k3 as per formula given in ASCE 74-2009, clause 2.1.7.3 page 40
$Kzt = (1+K_1\ K_2\ K_3)^2$

Kindly suggest the value of K_1, K_2, K_3 to be considered from the below table from ASCE 74-2009

Topographic Factor, K_{zt}



ESCARPMENT 2-D RIDGE OR 3-D AXISYMMETRICAL HILL

Topographic Multipliers for Exposure C

H/L_h	K_1 Multiplier			x/L_h	K_2 Multiplier		z/L_h	K_3 Multiplier		
	2-D Ridge	2-D Escarp.	3-D Axisym. Hill		2-D Escarp.	All Other Cases		2-D Ridge	2-D Escarp.	3-D Axisym. Hill
0.20	0.29	0.17	0.21	0.00	1.00	1.00	0.00	1.00	1.00	1.00
0.25	0.36	0.21	0.26	0.50	0.88	0.67	0.10	0.74	0.78	0.67
0.30	0.43	0.26	0.32	1.00	0.75	0.33	0.20	0.55	0.61	0.45
0.35	0.51	0.30	0.37	1.50	0.63	0.00	0.30	0.41	0.47	0.30
0.40	0.58	0.34	0.42	2.00	0.50	0.00	0.40	0.30	0.37	0.20
0.45	0.65	0.38	0.47	2.50	0.38	0.00	0.50	0.22	0.29	0.14
0.50	0.72	0.43	0.53	3.00	0.25	0.00	0.60	0.17	0.22	0.09
				3.50	0.13	0.00	0.70	0.12	0.17	0.06
				4.00	0.00	0.00	0.80	0.09	0.14	0.04
							0.90	0.07	0.11	0.03
							1.00	0.05	0.08	0.02
							1.50	0.01	0.02	0.00
							2.00	0.00	0.00	0.00

Answer 95: Bidders/Contractors are requested to consider the values of K_1, K_2, K_3 as per standard practice.

Query 96:

Annex 6-1: Clearance of Obstacles

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.

Nominal system voltage	(kV)	132	230 – Not applicable	400
Maximum conductor temperature	(°C)	80	80	180

As per Annexure 6-1: Clearance of Obstacles, maximum conductor temperature for 400kV line is given as 180 deg. However, we understand that the maximum system temperature shall be considered from Annexure 2-1 Climatic Conditions where the same is specified as 45 Deg. Please confirm if the understanding is correct.

Answer 96: Your understanding is not correct. Maximum conductor temp. for 400kV line is 180deg C. For 132kV lines, maximum temp. shall be 80deg C.

Query 97: This line is double circuit. Kindly study the necessity of considering eccentric loads on the left or right side of tower. This may be studied for cost optimization. Load factor for this condition is not furnished. Our suggestion is that load factor may be reduced to 1.0 for cost optimization since single circuit loads may come for short duration only.

Answer 97: Please follow the requirement mentioned in the bidding document. Single circuit strung condition is a normal condition. Hence, load factors related to normal condition shall be followed.

Query 98: Kindly specify the diameter of safety ring for ladder for river crossing tower.

Answer 98: Please follow the standard for ladder mentioned in Bidding Document.

Query 99: Sub- Clause C of clause no.2 of Annexure 1-1 Scope and Extend of Definite Works- of - Volume-2

Design, fabrication and supply of all types of transmission line towers including stubs, fasteners, anti-theft fasteners, step bolts, hangers, D- shackles etc. The contract comprises design of new towers for completely new 400 KV double circuit lines. For 132 KV in-out lines, PGCB's existing design Shall be used.....approval of the Employer.

Bidders are requested to inspect available drawings in the Design Dept. of PGCB to satisfy them regarding the extend of available drawings. Bidders are required to propose the tower materials from the manufacturer who will use the same material standard as mentioned in the tower drawings.

Request PGCB to provide unit weight & Volume (quantities for all Types of towers their body/leg extension including fasteners and all types foundation quintiles to quote our rates in the bid.

Answer 99: Please refer to the soft copies of 132kV tower structural drawings mentioned in Section 22, Volume 2 which has been provided with the bidding document. Bidders are responsible to calculate the weight of towers as per provided drawings.

Query 100: Annexure 8-4 (1) Support Extension of-Volume-2

Type of Extension is Body / Leg Extension are indicated for each type of towers.

Requested PGCB to confirm that towers are to be designed with un-equal Leg Extensions. If so the max. differential height of legs may be defined.

Answer 100: Towers are to be designed with equal Leg Extensions

Query 101: Annexure 8-3 Designation & Uses of Tower- Volume-2

Two types of River crossing towers 4DR1 & 4DR2 required and Max. Hamper width also defined

1. Requested PGCB to design a common River Crossing tower.
2. River crossing Tower with defined width in tender document shall be less & will not allow optimizing the tower design so this can be optimally decided by the bidder.

Answer 101:
1. During Execution, the bidder may propose a common river-crossing tower fulfilling the span criteria and Annex 8-4(2)
2. Please design the tower with defined width.

Query 102: 4. Design; 4.1 Philosophy of design

4.1.1. The philosophy of design in this specification is based upon deterministic principles, whereby the applied loading multiplied by the appropriate safety factor must be less than the ultimate strength of the component.

Please confirm if the component safety factor should be considered in tower design. If so, please provide the corresponding values.

Answer 102: Applicable load factor and strength factor have already been provided in technical specification.

Query 103: 7.2.1 General

7.2.1.1. During design of towers, the tower reactions on the foundation shall be calculated considering appropriate maximum simultaneous loading on the towers. During foundation design the obtained reactions shall be multiplied by the foundation overload factors indicated in Annex in Tower Section, and the resultant reactions shall be used for foundation design.

Please provide the overload factor to be multiplied in towers reaction for the 400 kV line.

Answer 103: Please refer to the Annex 7-5, Section 7, Volume 2, hardcopy of the bidding document.

Query 104: Annex 8-1; 2. Design parameters; Wind design parameter
Please confirm the return period to be considered in design wind pressure

Answer 104: Load return period shall be 100 years as per Table 1-1, ASCE 74-2009 (Third Edition). Please refer to Annex 8-1, Table 2 in this regard.

Query 105: Annex 11-3 portion conductor system loading
Sagging limit of earthwire : Conductor temperature

Earthwire temperature to calculate the sagging limits is 5°C. Request to provide the temperature for conductor ACCC.

Answer 105: Earthwire sag shall not exceed 90% of conductor sag at 5°C. Please refer to **Addendum**.

Query 106: Section 7.2.1.3; Material factors.

Section 7.2.1.3 refers to ANNEX 7-3, Material factors to take into consideration; however ANNEX 7-3 refers to Concrete cover. Kindly clarify the material factor to take into consideration if there are any.

Answer 106: Material factor shall be taken as per relevant standard.

Query 107: Section 7.2.7.1.3; Foundation dead weight-factor.
Section 7.2.7.1.3 refers to ANNEX 7-1 for a foundation dead weight/load- factor to design under compression loading, this Annex does not provide any information about that. Please confirm.

Answer 107: Please refer to 'Annex 7-1: Geotechnical Parameters (for Tender Purposes only)' Table for 'Minimum Requirement for Piled Foundations'

Query 108: ANNEX 7-4; Minimum strength characteristic of concrete and steel refers to ANNEX 7- 4.

ANNEX 7-4 does not provide any information about that. These are my considerations:
• Minimum strength for concrete→ fck = 300 kg/cm².
• Minimum strength for steel reinforcement → fyk = 460 Mpa (N/mm²)
Kindly confirm.

Answer 108: Minimum Strength of Concrete should be as per C30 grade as mentioned in Annex 7-2 and minimum strength for steel reinforcement 410 N/mm².

Query 109: ANNEX 7-1
Minimum requirement for piled foundations, the safety factor for piles or drilled shafts is 2.

We understand this is the safety factor to be considered for foundation design. That means we have to multiply reactions obtained from the maximum simultaneous loading on the towers by this SF= 2 for all soils types. In case we have to design pad and chimney foundation, what is the safety factor to take into consideration? Please confirm.

Answer 109: Safety factor mentioned in Annex 7-1 (Table: Minimum Requirement for Piled Foundations) to be considered for foundation design. Please refer to the hardcopy of bidding document. Pad and Chimney type foundation is not applicable for this project.

Query 110: Section 7.1.3, Types and uses
Foundation shall be open cast and/or cast in situ piles. Total depth of foundations shall be 3m or 3.5m generally.

How can a deep foundation have a maximum length limited to 3.5m? Please kindly clarify this point, according to the reactions we will have and soil characteristics it is clear the length of the pile is going to be longer.

For foundation design we are going to take into account only the following foundation types:

• For soil type 2, 3 and 4 concrete cast in situ piles (variables in number, diameter and length and connected with a cap for each tower leg)

In case we have to design foundation for soil category 1, pad and chimney foundation will be chosen, pending of the information about safety factor it is going to be used for this design. Please confirm

Answer 110: Shallow foundation is not applicable for this project. Hence, 7.1.3.1 is not applicable.

Query 111: ANNEX 7-1 ;Geotechnical Parameters (for Tender Purposes only)

Regarding ANNEX 7-1, we have documentation about the soil category and the parameters to be used in case of pile foundation for soil category 2, 3 and 4, but we don't have information relating soils categories and allowable foundations types. You can see our conclusion in the table below, is it our understanding correct? Please confirm:

SOIL CATEGORY	FOUNDATION TYPE
1	Pad & Chimney
2	Piles
3	Piles
4	Piles

Answer 111: Soil Category-1 is not applicable for this project.

Query 112: After carefully studying the tender documentation, we do not find the foundation drawing for civil works or civil works volume (as per attached file), and tower erection drawing or tower height (as per attached file).

You are kindly requested to clarify us the above points at your earliest convenience.

Answer 112: Design of tower and foundation for 400kV portion is the scope of Contractor. Hence, bidders are required to design their towers and foundation to get the above information.

The soft copy of tower structural drawing and foundation reactions of 132kV portion is provided by the Employer with bidding document. Bidders are required to calculate the weight as per the provided drawings and to design the foundation on the basis of reactions provided with the bidding document.

Volume 3 of 3

Query 1: Vol.3, Schedule B : Price schedules

Price summary is not included in the "Vol.3, 2. Price schedules". Please update.

Answer 1: Summary is included through **Addendum**.

Query 2: Vol.3, Schedule B : Price schedules, Section A, Schedule No.1

Tower test for Tower Type 2D25 E9.0 is included in the "Vol.3, 2. Price schedules, Section A, Schedule No.1". We understand the Tower Type 2D25 E9.0 shall be changed to Tower Type 4D25 E9.0. Please confirm.

Answer 2: Confirmed. Please refer to the **Addendum**.

Query 3: Vol.3, Schedule E : Particulars and Guarantees

We understand the Employer's requirement conditions shall be given by Employer in the Vol.3, Schedule E: Technical Particulars and Guarantees. But All cells in the "Vol.3, Schedule E: Technical Particulars and Guarantees" are blank. We understand the Bid requirement of Particulars and Guarantees shall be given by Employer. Please provide.

Answer 3: Bid requirement of Technical Particulars and Guarantees are given in Volume 2 of 3. Please fill accordingly.

Query 4: PRICE SCHEDULE CLARITY (Volume - 3)

a) The Item No. S.A1.1.6 (Additional Galvanised Tower Steel) of Schedule 1 & Schedule 2 indicates the common quantity of High Tensile Steel and Mild Steel.

   We kindly request you to kindly arrange to provide the quantity break-up for High Tensile Steel and Mild Steel to correctly estimate the cost.

b) Please, refer the items under Sr. No. A1.10 – Tower Test in Schedule-1 of Section-A: 400KV Line.

   At sr. no. A1.10.1 © Tower Type *2D25 E9.0* mentioned in place of *4D25 E9.0*

   Please, issue necessary clarifications / amendment in this regards.

c) Please, refer the items No. A1 – Towers in Schedule-1 of Section-B: 132KV Line.

   Supply of 400KV double circuit towers mentioned in Description of Works in place of *132KV*

   Please, issue necessary clarifications / amendment in this regards.

d) Please, refer the item at Sr. No. A3 & A4.1.1 (Geotechnical Investigation / Foundation) in Price Schedule No. – 4 (Installation and other Services).

Geotechnical Investigation, Level – 2 repetitive in item at Sr. No. A3 & A4.1.1

If Level-2 Geotechnical Investigation required at all Foundation Locations, then please erase the requirements at Sr. No. A4.1.1 to avoid the duplication of cost considerations.

Answer 4:
a) Quantity breakup will be finalized during execution stage.
b) Please refer to Answer 2 of Volume 3.
c) Please refer to the hardcopy of the bidding document.
d) Please refer to **Addendum**.

Query 5: Also, we understand that the line Item No. A.1.11 in Price Schedule No. 4 for Section A 400 kV & Section-B 132 kV is applicable for the proto type load tests and not only to proto assembly tests. Please confirm.

Answer 5: Item No. A.1.11 in Price Schedule No. 4 for Section A: 400kV and Section B: 132kV is applicable for the proto assembly tests only. Provision of quoting proto load test of 400kV towers is kept in item A1.10.1 of Schedule 1 & 2 of Section A: 400kV Line.

Query 6: Kindly refer to the price schedule No. 1 for 400kV where in Item No. A 2.2 "River Crossing Portion" where 300kN triple suspension insulator sets and 400kN Triple Tension Fitting are asked for while in Volume 2 of 3 Chapter 10 Annex 10-2 for Suspension Set 2x210KN Fittings and for tension 2x400kN fitting are specified. Please clarify the same.

Answer 6: Triple string set will be used for river crossing suspension and tension sets. Please follow the hardcopy of the bidding document.

Query 7: PGTL Volume 3 of 3; Bid Prices and Schedules

In schedules of rates and prices only appears quotations for soil category 2, 3 and 4. Do we have to consider only these 3 types of soil according to the BoQ criteria and doesn't take into account soil category 1? Kindly confirm.

Answer 7: Soil Category-1 is not applicable for this project.

Enclosure: As stated.

The above mentioned clarifications will form part of the bidding documents.

List of 400kV PGTL Project Bid Document Purchaser Firms:

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1	GS Engineering & Construction Head Office: Gran Seoul, 33, Joung-ro, J.ongo-gu, Seoul, 110-130, Korea. Tel: 82-2-21545201 Fax: 82-2-2154-0901 Site Office: House# 12(5th Floor), Road#4, Sector#1, Uttara, Dhaka, Bangladesh.	amamul.ccce@yahoo.com	Md. Amamul Haque Mobile: 01717-222269
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POWER GRID COMPANY OF BANGLADESH LIMITED (PGCB)

DESIGN, SUPPLY, INSTALLATION, TESTING & COMMISSIONING OF PATUAKHALI (PAYRA) - GOPALGANJ 400KV TRANSMISSION LINE ON TURNKEY BASIS

IFB No.: 01/PGCB/Sec(TLD&QC)/4867 dated: September 01, 2016

Contract No: PGCB/400kV/PAT-GOP/TL

ADDENDUM NO. 1

Following revisions/changes are made in the Bidding Document which will form part of the Bidding Document:

Volume 1 of 3

1. Section VI:

   (i) Clause 6.3.2 in page VI-2 is deleted.

   (ii) Page IV-2, Clause 1.3, sub-clause 6.2:
   The text "Type test report of OPGW" is replaced by "Type test report of similar OPGW".

2. Section IX: Contract Forms, Appendix-2, Price Adjustment/Escalation

   Page nos. IX-9 to IX-11 are replaced by enclosed revised Page nos. IX-9(rev.1) to IX-11(rev.1) **[Enclosure-1]**

Volume 2 of 3

1. Section 3 – Quality Assurance

   (i) Annex 3-5, Column: Ref. Documents
   - (a) The text "As per Annex 6-10" is replace by "As per Annex 3-6" in page no. 3-8
   - (b) The text "As per Annex 6-11" is replace by "As per Annex 3-7" in page no. 3-8
   - (c) The text "As per Annex 6-12" is replace by "As per Annex 3-8" in page no. 3-8
   - (d) The text "As per Annex 6-13" is replace by "As per Annex 3-9" in page no. 3-9
   - (e) The text "Range 50mm to 100mm refer document at Annex 6-14" is replace by "Range 50mm to 100mm refer document at Annex 3-10" in page no. 3-10
   - (f) The text "PWD SPEC as referred in document at Annex 6-14" is replace by "PWD SPEC as referred in document at Annex 3-10" in page no. 3-10

2. Section 6 – Survey, Profile, Geotechnical Investigations and Field Quality Plan, Annex 6-1:
   Page 6-27 is replaced by enclosed revised page no -6-27-(rev.1). **[Enclosure 2]**

3. Section 7 – Foundation

(i) Clause no, 7.4.9, page no. : 7-15

The text "Concrete slump requirement at the field for the Pile is 125mm-175mm and for the Pad & Pile cap is 30-75 mm respectively." is replaced by "Concrete slump requirement at the field for the Pile is 150m-200mm and for the Pad & Pile cap is 50-100 mm respectively."

(ii) Clause no, 7.4.9, page no. : 7-15

Following text is added at the end of sub-clause 7.4.5(e)-
"The Contractors are encouraged to use epoxy coated bar."

4. Section 8 – Tower

(i) Clause 8.2.22
All text of this clause is deleted.

(ii) Clause No.8.2.4 – "Design Criteria"

The text "Unless otherwise mentioned in the bidding documents, towers shall be designed in accordance with ASCE 74-2009" is replaced by "Unless otherwise mentioned in the bidding documents, tower loading shall be in accordance with ASCE 74-2009 and tower structure shall be designed in accordance with ASCE 10-97/ASCE 10-15".

(iii) Clause No.8.3.1.3, Page 8-16

The text "S355JR" is replaced by "S355J0" in Item no. (b).

(iv) Annex 8-1, Table 3.1 400kV Overland Portion and Table 3.2 400kV River Crossing Portion

The tables are replaced by following Tables

3.1 400kV Overland Portion (rev.1)

Loading Condition	Maximum Allowable Tension[1]
Normal condition (Failure Limit)	55% of Ultimate tensile strength (Conductor)
	80% of Ultimate tensile strength (Earthwire & OPGW)
Normal condition (Damage Limit)	50% of Ultimate tensile strength
Everyday condition	20% of Ultimate tensile strength
[1]The bidder/Contractor shall determine the appropriate conductor tension under different loading condition to maintain the minimum height of phase conductors after creep or after load at the support on standard height, from ground level for the corresponding span criteria. Min. height of bottom conductor attachment level is mentioned in Annex under this Section.	

3.2 400kV River Crossing Portion (rev.1)

Loading Condition	Maximum Allowable Tension[1]
Normal condition (Failure Limit)	80% of Ultimate tensile strength (Conductor)
	80% of Ultimate tensile strength (Earthwire & OPGW)
Normal condition (Damage Limit)	55% of Ultimate tensile strength
Everyday condition	20% of Ultimate tensile strength
[1]The bidder/Contractor shall determine the appropriate conductor tension under different loading condition to maintain the minimum height of phase conductors after creep or after load at the support on standard height, from ground level for the corresponding span criteria. Min. height of bottom conductor attachment level is mentioned in Annex under this Section.	

(v) Annex 8-7: Minimum Thickness & Diameter of Material:

In '(e) Bolt diameter for members carrying calculated stress (mm)', the text "32" is replaced by "30"

(vi) Annex 8-9: Electrical Clearance, page 8-40; table 3, Spatial distances - (e) Minimum vertical spacing between phase conductor and earth wire for 400 kV:

The text "As per Drawing" mentioned in is replaced by "8.0m"

5. Section 9 – Insulators

(i) Clause no. 9.6.2 (ii), Page No. 9-7:

The text "in an independent reputed laboratory outside manufacturer's country" is replaced by "in laboratories mentioned in Clause 9.6.2 (i)".

6. Section 11 – Conductor

(ii) Clause no. 11.7.5 Type Test (a) ACCC Conductor, (1) Complete Conductor Sl. No.(iv)

The text "Stress – Strain Test on stranded conductor and core at elevated temperature" is replaced by "Not used".

(iii) Annex 11-1 : Conductor – Types & Uses; 400kV – River crossing portion

a) The Text "12/3.2" and "7/3.2" for 19x3.67 Earthwire are deleted.
b) Following text is added for 400kV Overland portion and 400kV River crossing portion under "Note" after note no (iii)
"(iv) Absorptivity 0.9 and Emissivity 0.7"

(iv) Annex 11-3: Conductor System Loading

a. In the Title of Annex 11-3, the word "Portion" is deleted.

b. Annex 11-3:

Page nos. -11-18- to -11-21- are replaced by enclosed revised page nos. -11-18-(rev.1) to -11-21-(rev.1). **[Enclosure-3]**

(v) The following text is added in Annex 11-6 after "ICAO - Aerodrome Annex 14 Volume 1 "Aerodrome Design and Operation"":
"ASTM B987: Standard Specification for Carbon Fiber Composite Core (CFCC/TS) for use in Overhead Electrical Conductors"

7. Section 15: Aircraft Navigation (Obstruction Aids)

(i) Clause 15.2.2.2:
The text of this clause is replaced by "The obstruction lights shall be in compliance with Annex 15-1"

(ii) Clause 15.2.2.3:

The text "medium intensity and" is deleted

(iii) Annex 15-1:

The text "Medium intensity, type C" is replaced by "High Intensity, type B" according to the clause no.6.2.5.8 of 'ICAO – Annex 14, Volume I (Aerodrome Design and Operations)', Sixth Edition (July 2013)

8. Section 22: Bid Drawings

(i) Page -22-6- to page -22-12- and page -22-24- are replaced by enclosed revised page nos. -22-6-(rev.1) to page -22-12-(rev. 1) and page -22-24-(rev. 1) respectively. **[Enclosure 4]**.

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1. Schedule B: Price Schedule:

(i) The word 'CIP' is deleted from all pages of Schedule 4 of Section A and Schedule 4 of Section-B

(ii) The word "CIP" is replaced by "EXW" from all pages of Schedule 2 of Section A and Schedule 2 of Section-B

(iii) Section A, Schedule 1, Item no. A1.10.1(c) and Section A, Schedule 2, Item no. A1.10.1(c)

The text "Tower Type 2D25 E9.0" is replaced by "Tower Type 4D25 E9.0"

(iv) Section B, Schedule 1, Item no. A1 and Section B, Schedule 2, Item no. A1

Description of works is replaced by "Towers complete with all stubs, nuts, bolts, locking nuts, washers, phase conductor and earthwire swivels/shackles, step bolts, tower notice and identification plates, ACDs, protective coating, earthing etc."

(v) Section B, Schedule 1, Item no. S.A1.1 and Section B, Schedule 2, Item no. S.A1.1:

Description of works is replaced by "Towers complete with all stubs, nuts, bolts, phase conductor and earthwire swivels /shackles, step bolts, access, ladders, tower notice and identification plates, ACDs etc."

(vi) Section B, Schedule 4, item no. A1:

Description of works is replaced by "Erection of towers complete with all stubs, nuts, bolts, locking nuts, washers, phase conductor and earthwire swivels/shackles, step bolts, tower notice and identification plates, ACDs, protective coating, earthing etc."

(vii) 'Price Summary' is added at the end of 'Price Schedule'. **[Enclosure-5].**

(viii) The quantity in Item No. 4.1.1 is deleted in Schedule 4 of both Section A and Section B

(ix) Page no. SA 4-5 is revised and replaced by page no. SA 4-5(rev.1). **[Enclosure-6].**

(x) The text "Employers" is replaced by "Employer's Country" in all title of Schedule 2 for 400kV and 132kV price schedule.

(xi) Page nos. SA 1-4 and SA 2-4 is revised and replaced by page no SA 1-4(rev.1) and SA 2-4(rev.1). **[Enclosure-7].**

Enclosure-1

Appendix 2 - Price Adjustment/Escalation

Prices payable to the Contractor in accordance with the contract shall be subject to adjustment during the performance of the contract to reflect changes in the cost of material components.

This will be done in accordance with the following formula:

Towers (including Bolts and Nuts)

The formula for calculating the price adjustment to be applied to the contract price component of fabricated towers (including bolts & nuts) is as follows:-

$$P_1 = P_0 x(a + b\frac{L_1}{L_0} + c\frac{M_1}{M_0} + d\frac{N_1}{N_0}) - P_0$$

Where,

P_1 =	Price adjustment amount of fabricated towers & tower parts and poles including bolts and nuts (if the figure is negative, this amount has to be recovered by the Employer from the Contractor)
P_0 =	Ex-works/CIP price component (base price) of fabricated towers, tower parts and poles & hardware fittings (including bolts & nuts), less advance
a =	percentage of fixed elements in the contract price (a = 10%)
b =	percentage of labour components in the contract price (b = 12%)
c =	percentage of material (steel) components in the contract price (c = 61%)
d =	percentage of materials (zinc) components in the contract price (d = 17%)
L_0, L_1 =	labour indices applicable to the appropriate industry in the country of origin at the base date and at the date for adjustment, respectively
M0, M1 =	LME mid day cash settlement prices of Steel ingots in USD/metric ton at the base date and at the date for adjustment, respectively.
N0, N1 =	LME mid day cash settlement prices of zinc ingots in USD/metric ton at the base date and at the date for adjustment, respectively

Conductors (ACSR), Earthwire (ACSR) & OPGW

The formula for calculating the price adjustment of the contract price component of the conductor (ACSR) & OPGW is as follows:

$$P_1 = P_0 x(a + b\frac{L_1}{L_0} + c\frac{M_1}{M_0} + d\frac{N_1}{N_0}) - P_0$$

Where,

P_1 =	Price adjustment for conductors,
P_0 =	Contract price (base price)
a =	percentage of fixed elements in the contract price (a = 10%)
b =	percentage of labour components in the contract price (b = 6%)

c = percentage of material (aluminium) components in the contract price (c = 70%)
d = percentage of materials (steel) components in the contract price (d = 14%)
L_0, L_1 = labour indices applicable to the appropriate industry in the country of origin at the base date and at the date for adjustment, respectively
M_0, M_1 = material (aluminium) indices applicable to the appropriate industry in the country of origin at the base date and at the date for adjustment, respectively
N_0, N_1 = material (steel) indices applicable to the appropriate industry in the country of origin at the base date and at the date for adjustment, respectively

Conductors (ACCC)

The formula for calculating the price adjustment of the contract price component of the conductor (ACSR) & OPGW is as follows:

$$P_1 = P_0 x \left(a + b\frac{L_1}{L_0} + c\frac{M_1}{M_0}\right) - P_0$$

Where,
P_1 = Price adjustment for conductors,
P_o = Contract price (base price)
a = percentage of fixed elements in the contract price (a = 10%)
b = percentage of labour components in the contract price (b = 10%)
c = percentage of material (aluminium) components in the contract price (c = 80%)
L_0, L_1 = labour indices applicable to the appropriate industry in the country of origin at the base date and at the date for adjustment, respectively
M_0, M_1 = material (aluminium) indices applicable to the appropriate industry in the country of origin at the base date and at the date for adjustment, respectively

Conditions Applicable to Price Adjustment

Steel Towers (including Bolts and Nuts)

Item	Country of Origin; Currency of index	Source of Indices Used Title / Definition	Base Date Indices Value Date
L (Labour)			
M (Steel)			
N (Zinc)			

Conductors (ACSR). Earthwire (ACSR) & OPGW

Item	Country of Origin; Currency of index	Source of Indices Used Title / Definition	Base Date Indices Value Date
L (Labour)			
M (Aluminium)			
N (Steel)			

The following conditions shall apply:

a. The base date shall be the date twenty eight (28) days prior to the bid submission deadline.

b. The date of adjustment shall be the mid-point of the manufacturing period of components or plant. The mid-point shall be determined by considering the start date of manufacture to be 30 days prior to the opening of the L/C. The end date of manufacture is considered to be 30 days prior to the shipping date.

c. No price increase will be allowed beyond the original delivery date unless covered by a time extension granted by the Employer under the terms of the contract. No price increase will be allowed for periods of delay for which the Contractor is responsible. The Employer will, however, be entitled to any price decrease occurring during such periods of delay.

d. If the currency in which the contract price P_o is expressed is different from the currency of the country of origin of the labour and/or material indices, a correction factor will be applied to avoid incorrect adjustments of the contract price. The correction factor shall correspond to the ratio of exchange rates between the two currencies at the base date and at the date for adjustment as defined above.

e. No price adjustment shall be payable on the advance payment portion of the contract.

f. If no data is entered for one item in the above table, the price adjustment does not apply to this item.

g. A price adjustment will be applied only in case the resulting price increase or decrease of any item is more than six (6) percent of the price quoted for this item. However, such payment implication shall not exceed a total ceiling of fifteen (15) percent of the relevant items.

Any payments resulting from price adjustments will be settled at the end of contract.

Enclosure-2

Annex 6-1: Clearance of Obstacles

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.

Nominal system voltage	(kV)	132	230 – Not applicable	400
Maximum conductor temperature	(°C)	80	80	180
Maximum Earthwire/OPGW temperature	**(°C)**	**50**	**50**	**50**

Description of Clearance - Minimum Clearance

Description	**Unit**	**132kV**	**230kV – Not applicable**	**400kV**
Ground (see note d)	(m)	7.0	8.0	9.0
Roads	(m)	8.0	9.0	14.0
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
Trees (see note c)	(m)	3.5	5.5	6.5
Shrubs	(m)	3.0	5.5	6.5
Railways (measured from railway track)	(m)	9.0	10.0	**18.0**
River Crossing	(m)	23.0	25.0	26.0

Notes:

a. Clearances are measured to the nearest projection of an object.

b. These clearances also apply to earthed metalclad 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.

Enclosure-3

Conductor	Phase	Earthwires	
Direction of external lay	Right hand	Right hand	Right hand

4. 132kV

Conductor	Phase	Earthwires
Designation (Code Name)	Grosbeak	OPGW 7x3.25 GS equiv.
Type	ACSR	"A"
Reference standards	ASTM B232	IEC 61089
Aluminium Alloy Grade Steel Grade	- -	as appropriate
Galvanising Thickness	-	-
Aluminium class (AS wire)	Ref IEC 61232	-
Aluminium type (AS wire)	-	20 % IACS
Conductor operating temperature range (°C)	5-80	-
Minimum mass of grease (kg/km)	-	-
Creep period of conductor to be considered (years)	20	-
Number and diameter of wire (no./mm)	A1. 26/3.973 St. 7/3.089	-
Overall diameter (mm)	25.16	-
Nominal breaking load (kN)	112	-
Weight (kg/km)	-	-
Direction of external lay	Right hand	Right hand

Annex 11-2: Subconductor Configuration

Configuration	Spacing (mm x mm)	Orientation	Notes
Twin	450	Horizontal	230 kV – Not applicable
Quad	450 x 450	Square	400 kV

Annex 11-3: Conductor System Loading

1. Conductor System Loading - 400kV Overland Portion

Conductor	Unit	Phase	Earthwire	
Code Name		ACCC Dhaka (ACSR Finch equal diameter)	ACSR Dorking	OPGW
Maximum Working Tension Conditions (MWT)				
Maximum allowable tension	kN	as per Section 8. Tower		
Wind pressure	N/m²	as per Section 8. Tower		
Temperature	°C	5	5	5
Every-day conditions (still air):				
Maximum tension	kN	as per Section 8. Tower		
Temperature	°C	as per Section 2. Technical Particulars		
Erection Conditions (still air)				
Max. tangential tension	kN	n.a.	n.a.	n.a.
Temperature	°C			
Sagging limits of earthwire:				
Sagging limits of earthwire as a percentage of conductor sag	%	n.a	90	90
Conductor temperature	°C	**5**	5	5

Notes:

1. B.L. is minimum breaking strength of OPGW.
2. OPGW to be sag matched to earthwire.

2. Conductor System Loading - 400kV River Crossing Portion

Conductor	Unit	Phase	Earthwire	
Code Name		ACCC Dhaka-ULS (ACSR Finch equal diameter)	19x3.67	19x3.67 equiv. OPGW
Maximum Working Tension Conditions (MWT)				
Maximum allowable tension	kN	as per Section 8. Tower		
Wind pressure	N/m²	as per Section 8. Tower		
Temperature	°C	5	5	5
Every-day conditions (still air):				
Maximum tension	kN	as per Section 8. Tower		
Temperature	°C	as per Section 2. Technical Particulars		
Erection Conditions (still air)				
Max. tangential tension	kN	n.a.	n.a.	n.a.
Temperature	°C			
Sagging limits of earthwire:				
Sagging limits of earthwire as a percentage of conductor sag	%	n.a	90	90
Conductor temperature	°C	**5**	5	5

Notes:

1. B.L. is minimum breaking strength of OPGW.
2. OPGW to be sag matched to earthwire.

3. Conductor System Loading – 230kV - Not applicable

Conductor	Unit	Phase	Earthwire	
Code Name		ACSR Mallard	OPGW 7x4.0 S Equiv.	GS 7 x 4.0
Maximum Working Tension Conditions (MWT)				
Maximum allowable tension	kN	as per Section 8. Tower		
Wind pressure	N/m²	as per Section 8. Tower		
Temperature	°C	5	5	5
Every-day conditions (still air):				
Maximum tension	kN	as per Section 8. Tower		
Temperature	°C	as per Section 2. Technical Particulars		
Erection Conditions (still air)				
Max. tangential tension	kN	n.a.	n.a.	n.a.
Temperature	°C			
Sagging limits of earthwire:				
Sagging limits of earthwire as a percentage of conductor sag	%	n.a.	90	90
Conductor temperature	°C	**5**	5	5

Notes:
1. B.L. is minimum breaking strength of OPGW.
2. OPGW to be sag matched to earthwire.

4. Conductor System Loading - 132kV

Conductor	Unit	Phase	Earthwire OPGW
Code Name		ACSR Grosbeak	GS 7x32.5 equiv.
Maximum Working Tension Conditions (MWT)			
Maximum allowable tension	kN	to be provided during execution upon written request from the Contractor	
Wind pressure	N/m²	to be provided during execution upon written request from the Contractor	
Temperature	°C	5	5
Every-day conditions (still air):			
Maximum tension	kN	to be provided during execution upon written request from the Contractor	
Temperature	°C	to be provided during execution upon written request from the Contractor	
Erection Conditions (still air)			
Max. tangential tension	kN	n.a.	n.a.
Temperature	°C		
Sagging limits of earthwire:			
Sagging limits of earthwire as a percentage of conductor sag	%	n.a.	90
Conductor temperature	°C	**5**	5

Notes:
1. B.L. is minimum breaking strength of OPGW.
2. OPGW to be sag matched to earthwire.

Annex 11-4: Test Procedures of Conductor

1. Tests on ACCC Conductor

1.1 UTS Test on Stranded Conductor

Circles perpendicular to the axis of the conductor shall be marked at two places on a sample of conductor of minimum 5 m length between fixing arrangement suitably fixed by appropriate fittings on a tensile testing machine. The load shall be increased at a steady rate up to 50% of minimum specified UTS and held for one minute. The circles drawn shall not be distorted due to relative movement of strands. Thereafter the load shall be increased at steady rate to minimum UTS and held for one minute. The Conductor sample shall not fail during this period. The applied load shall then be increased until the failing load is reached and the value recorded.

If the conductor is terminated with compression (dead end) clamps, after the 50% hold, the load on the conductor shall be steadily increased until failure occurs and the failure load recorded. The failure load shall be ≥95% of the rated tensile strength of the conductor. (as per IEC 61284 Section 11.5.1 b))

1.2 Corona Extinction Voltage Test (Not applicable)

The sample of the conductor of 5 m length shall be strung at a height not exceeding 7.01 m above ground. The sample assembly when subjected to power frequency voltage shall have a corona extinction voltage of not less than 154kV (rms) line to ground under dry condition. There shall be no evidence of corona on any part of the samples. The test should be conducted without corona control rings. However, small corona control rings may be used to prevent corona in the end fittings. The voltage should be corrected for standard atmospheric conditions.

1.3 Radio Interference Voltage Test (Not applicable)

Under the conditions as specified under (1.2) above, the conductor samples shall have radio interference voltage level below 1000 microvolts at one MHz when subjected to 50 Hz AC voltage of 154 kV line to ground under dry conditions. This test may be carried out with corona control rings and arcing horns.

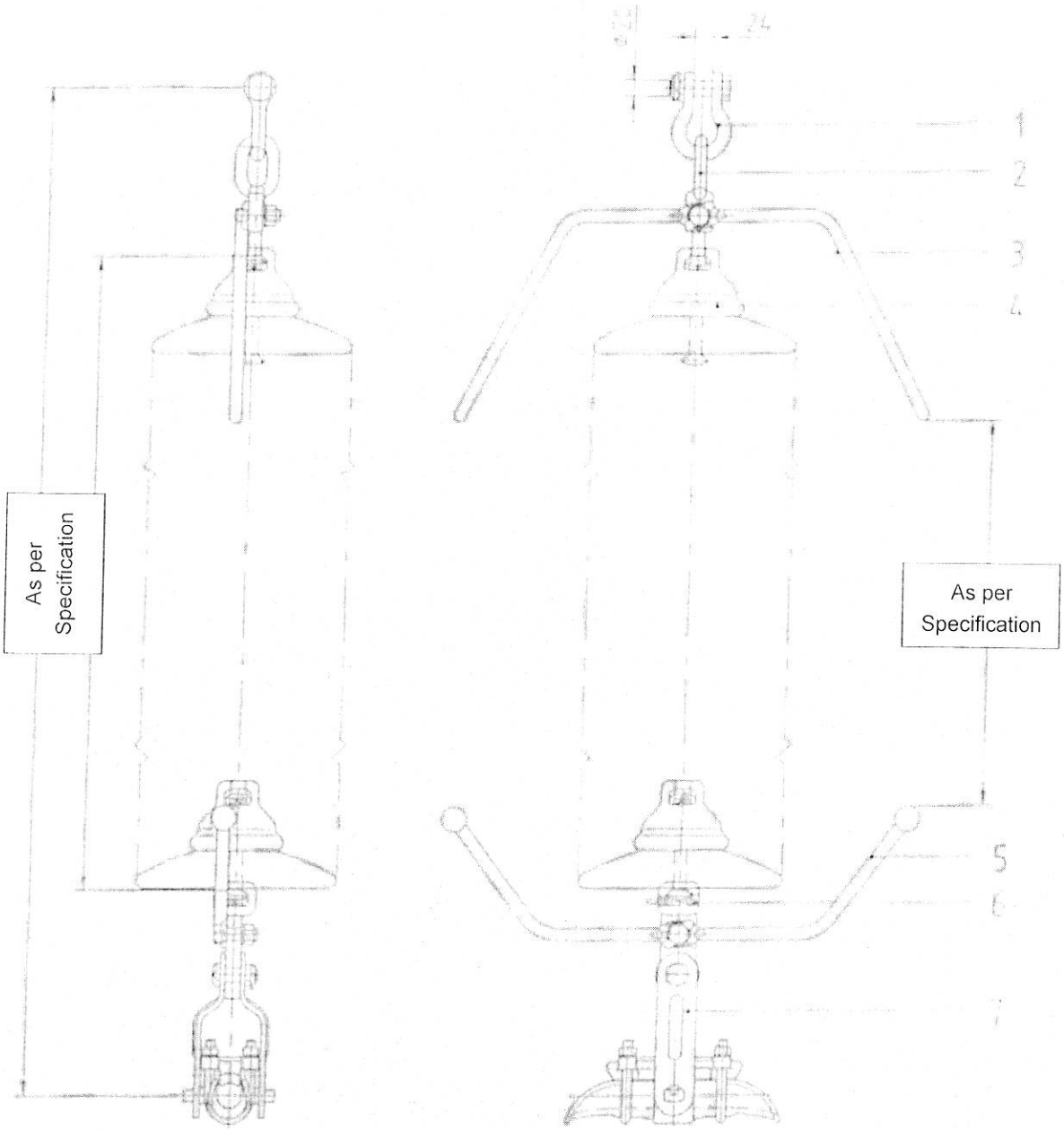
1.4 D.C. Resistance Test on Stranded Conductor

On a conductor sample of minimum 5m length two contact-clamps shall be fixed with a predetermined bolt torque. The resistance shall be measured by a Kelvin double bridge by placing the clamps initially zero metre and subsequently one metre apart. The test shall be repeated at least five times and the average value recorded. The value obtained shall be corrected to the value at 20°C as per relevant IEC/BS/equivalent standard. The resistance corrected at 20°C shall conform to the requirements indicated in the STP.

1.5 High Temperature endurance & creep test

Two conductor samples of length equal to at least 100 X d + 2 X a (where, d is the conductor diameter and a

Enclosure-4



ITEM	DESCRIPTION
1	SHACKLE
2	BALL EYE-TWISTED
3	UPPER ARC HORN
4	INSULATOR
5	LOWER ARC HORN
6	SOCKET TOUNG-STRAIGHT
7	SUSPENSION CLAMP

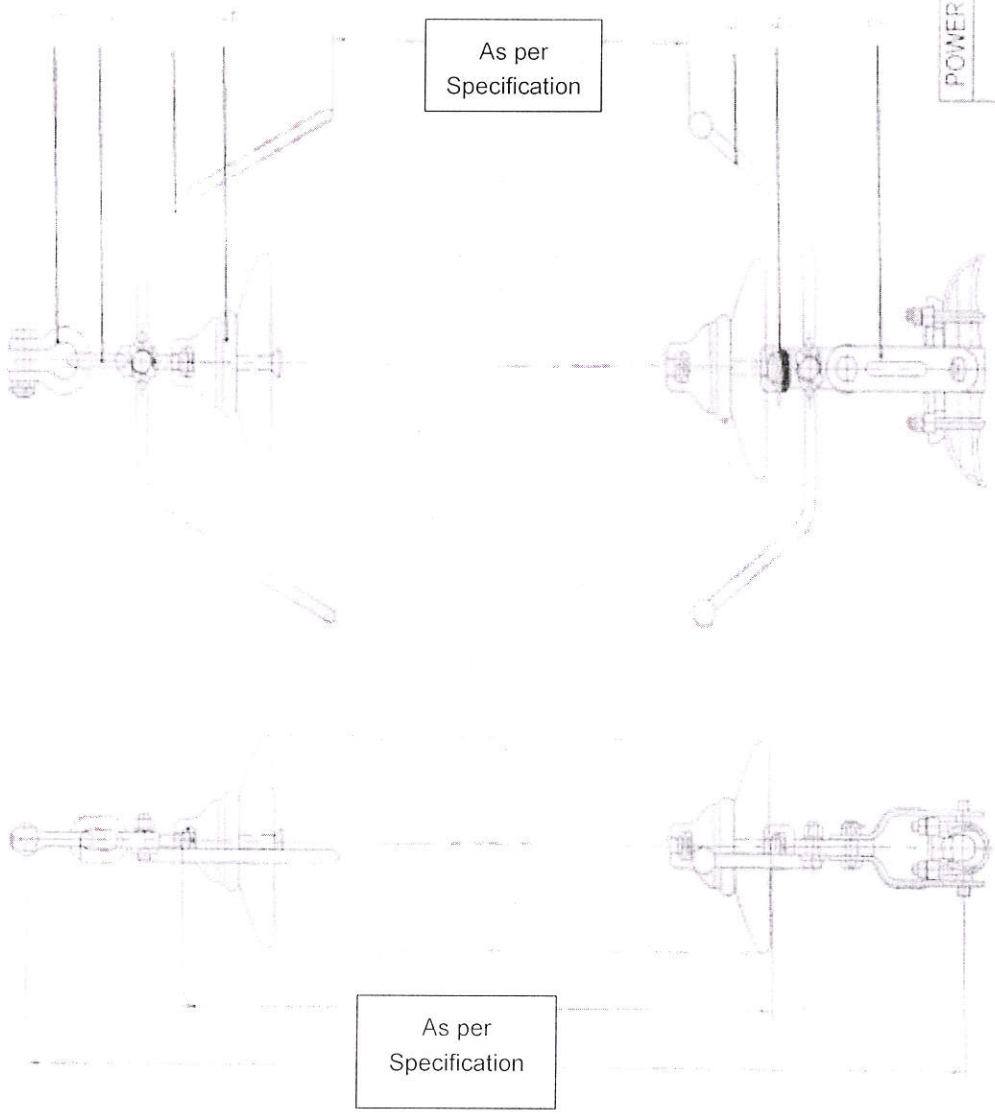
POWER GRID COMPANY OF BANGLADESH LIMITED

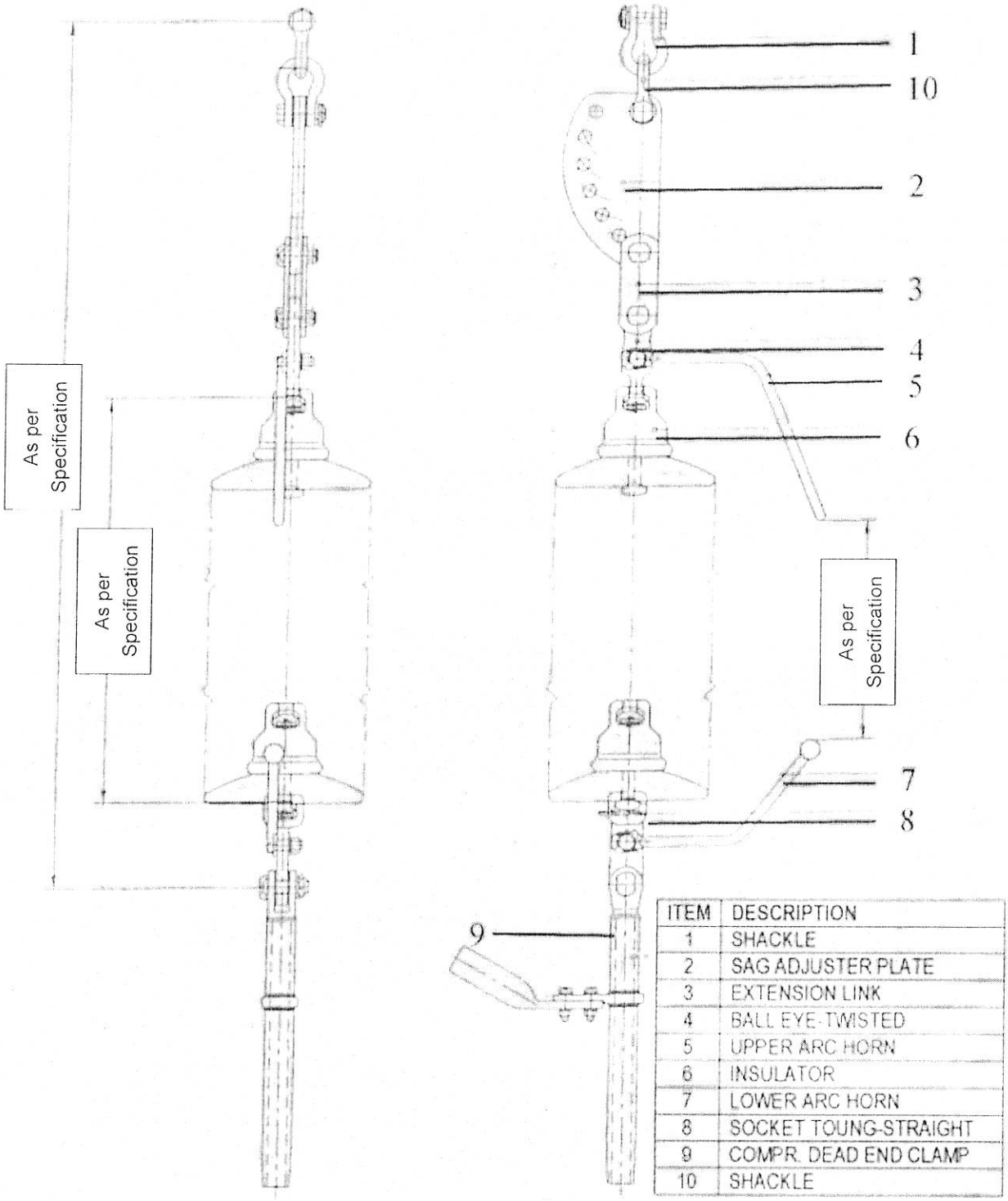
132kV SINGLE SUSPENSION SET (70kN)

DRG. NO. : PGCB/132kV/SS

ITEM	DESCRIPTION
1	SHACKLE
2	BALL EYE-TWISTED
3	UPPER ARC HORN
4	INSULATOR
5	LOWER ARC HORN
6	SOCKET TOUNG STRAIGHT
7	SUSPENSION CLAMP

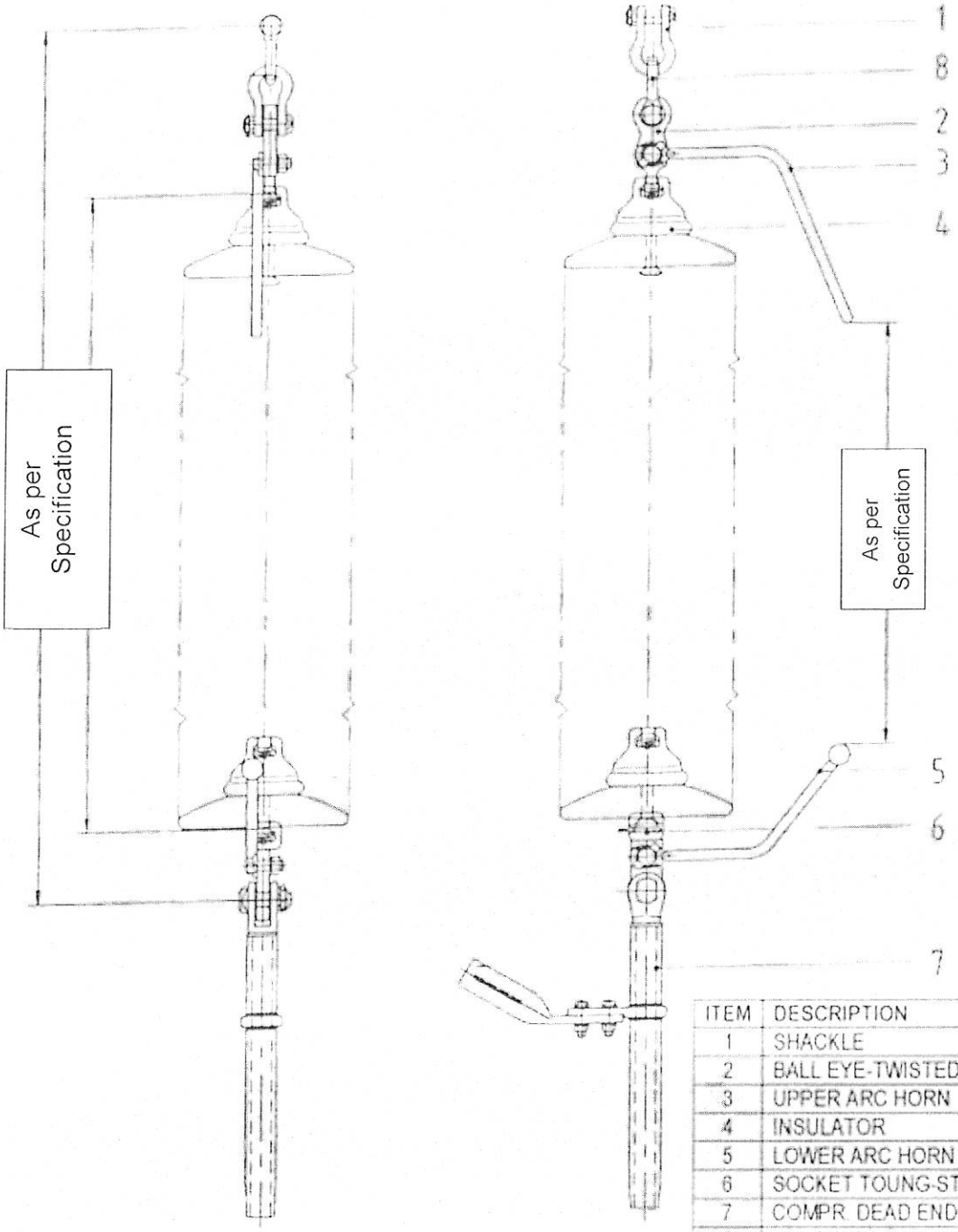
POWER GRID COMPANY OF BANGLADESH LIMITED
132KV HEAVY SUSPENSION SET (120KN)
DRG. NO. : PGCB/132kV/HS





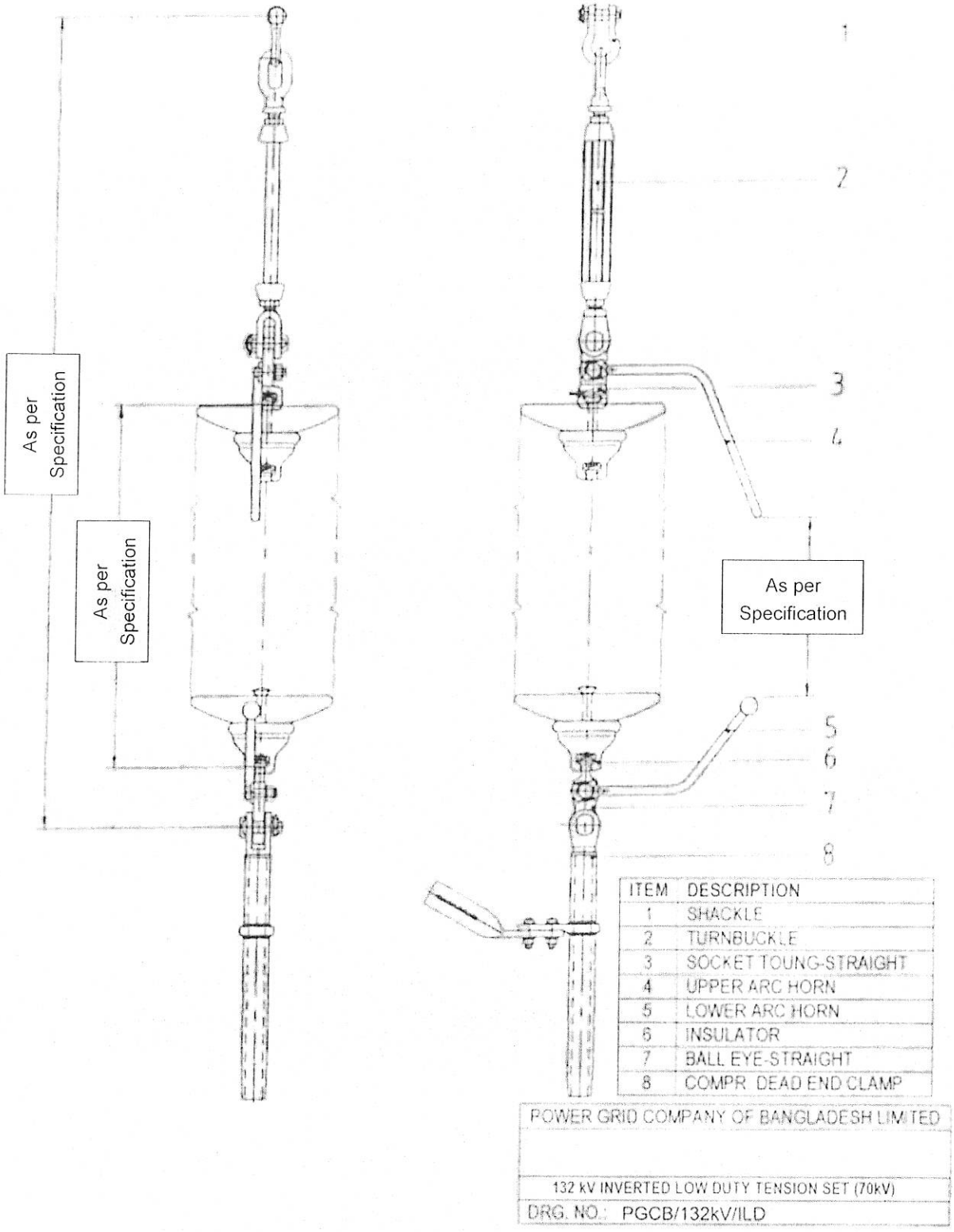
ITEM	DESCRIPTION
1	SHACKLE
2	SAG ADJUSTER PLATE
3	EXTENSION LINK
4	BALL EYE-TWISTED
5	UPPER ARC HORN
6	INSULATOR
7	LOWER ARC HORN
8	SOCKET TOUNG-STRAIGHT
9	COMPR. DEAD END CLAMP
10	SHACKLE

POWER GRID COMPANY OF BANGLADESH LIMITED
132kV TENSION SET (120kN)
DRG. NO.: PGCB/132kV/TS



ITEM	DESCRIPTION
1	SHACKLE
2	BALL EYE-TWISTED
3	UPPER ARC HORN
4	INSULATOR
5	LOWER ARC HORN
6	SOCKET TOUNG-STRAIGHT
7	COMPR. DEAD END CLAMP
8	SHACKLE

POWER GRID COMPANY OF BANGLADESH LIMITED
132 kV UPRIGHT LOW DUTY TENSION SET (70kV)
DRG. NO.: PGCB/132kV/ULD

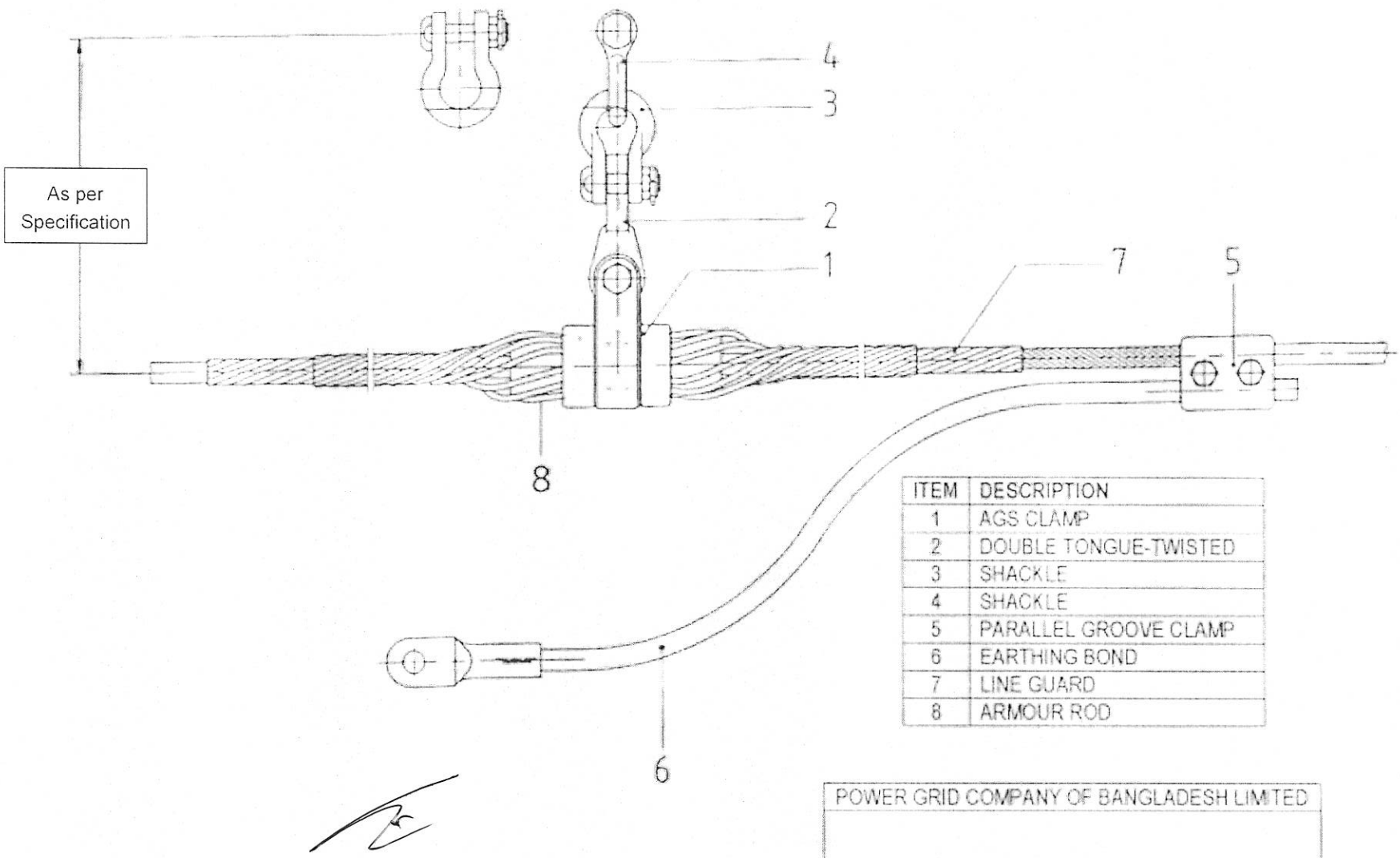


ITEM	DESCRIPTION
1	SHACKLE
2	TURNBUCKLE
3	SOCKET TOUNG-STRAIGHT
4	UPPER ARC HORN
5	LOWER ARC HORN
6	INSULATOR
7	BALL EYE-STRAIGHT
8	COMPR DEAD END CLAMP

POWER GRID COMPANY OF BANGLADESH LIMITED

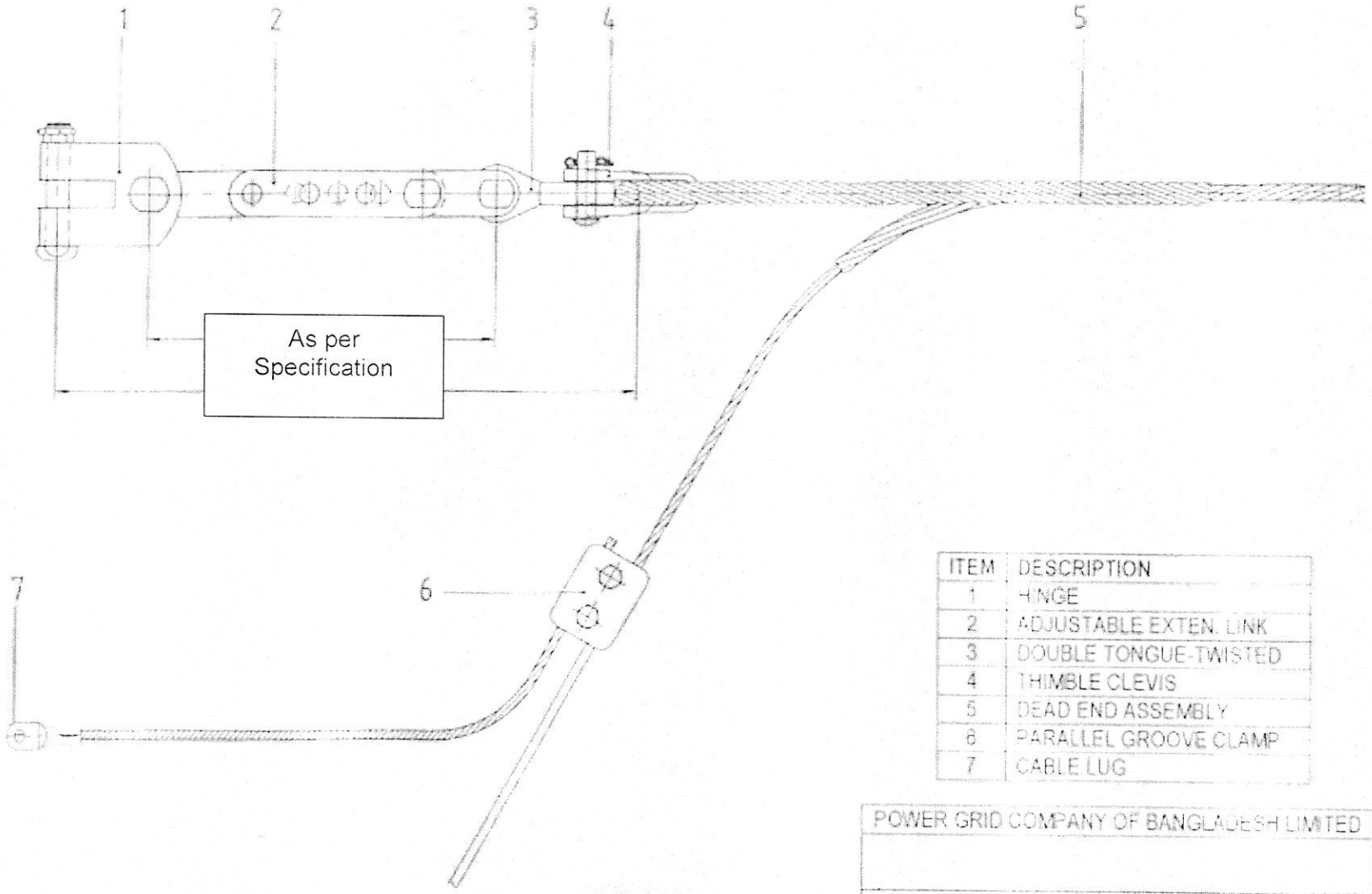
132 kV INVERTED LOW DUTY TENSION SET (70kV)

DRG. NO.: PGCB/132kV/ILD



ITEM	DESCRIPTION
1	AGS CLAMP
2	DOUBLE TONGUE-TWISTED
3	SHACKLE
4	SHACKLE
5	PARALLEL GROOVE CLAMP
6	EARTHING BOND
7	LINE GUARD
8	ARMOUR ROD

POWER GRID COMPANY OF BANGLADESH LIMITED
OPGW SUSPENSION SET
DRG. NO.: PGCB/132kV/OPGW/SS

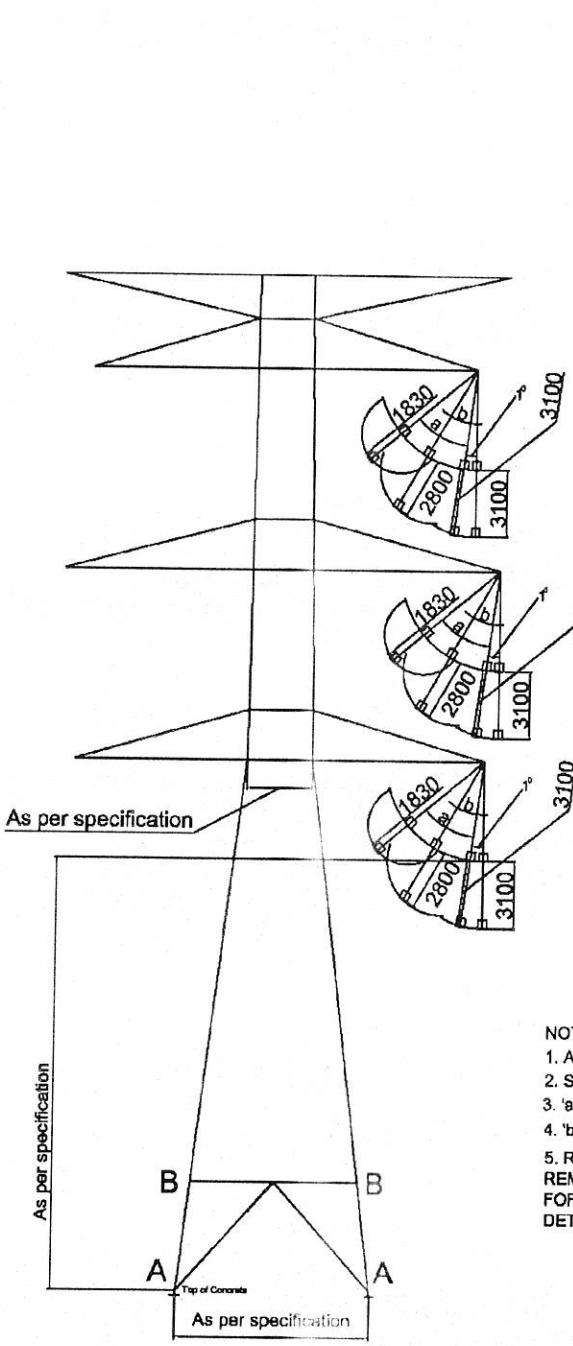


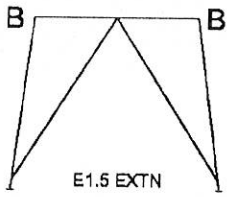
ITEM	DESCRIPTION
1	HINGE
2	ADJUSTABLE EXTEN. LINK
3	DOUBLE TONGUE-TWISTED
4	THIMBLE CLEVIS
5	DEAD END ASSEMBLY
6	PARALLEL GROOVE CLAMP
7	CABLE LUG

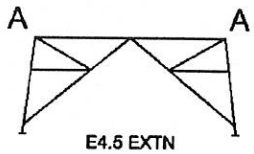
POWER GRID COMPANY OF BANGLADESH LIMITED

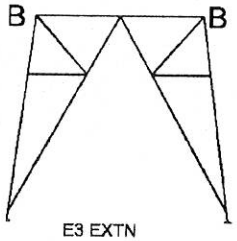
OPGW TENSION SET

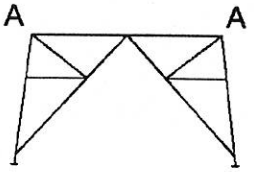
DRG. NO.: PGCB/132kV/OPGW/TS

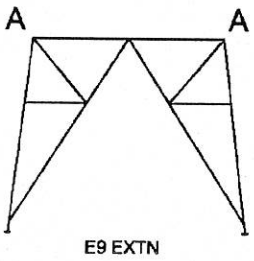












NOTE

1. ALL DIMENSIONS ARE MILLIMETER.
2. SWING ANGLES ARE REQUIRE TO BE CALCULATED BY THE CONTRACTOR.
3. 'a' IS THE SWING ANGLE AT LIGHTNING IMPULSE CLEARANCE CONDITION.
4. 'b' IS THE SWING ANGLE AT POWER FREQUENCY CLEARANCE CONDITION.
5. REFERENCE TO BE MADE TO THE TECHNICAL SPECIFICATION FOR REMAINING DETAILS. THE DIAGRAM DESCRIBED IN THIS DRAWING IS ONLY FOR BIDDING PURPOSE. THERFORE CONTRACTOR SHALL PREPARE DETAILED DRAWINGS WITH REFLECTION TO THE SITE CONDTION.

POWER GRID COMPANY OF BANGLADESH LTD.
400kV DOUBLE CIRCUIT TOWER
400kV 4DL TYPE TOWER
DRAWING NO. PGCB/400KV/QF/4DL

Enclosure-5

Schedules of Rates and Prices
POWER GRID COMPANY OF BANGLADESH LIMITED

BIDDING DOCUMENT
FOR
DESIGN, SUPPLY, ERECTION, TESTING & COMMISSIONING OF 400kV DOUBLE CIRCUIT PATUAKHALI (PAYRA) - GOPALGANJ TRANSMISSION LINE ON TURNKEY BASIS

Schedule No. 5 Grand Summary

Item	Description	Total Price[1]	
		Foreign	Local
1	Total Schedule No. 1. Plant and Mandatory Spare Parts Supplied from Aboard		
	(A) Section A: 400kV Lines		
	(B) Section B: 132kV Lines		
2	Total Schedule No. 2. Plant and Mandatory Spare Parts Supplied from within Employers Country		
	(A) Section A: 400kV Lines		
	(B) Section B: 132kV Lines		
3	Total Schedule No. 3. Design Services		
	(A) Section A: 400kV Lines		
	(B) Section B: 132kV Lines		
4	Total Schedule No. 4: Installation and other Services		
	(A) Section A: 400kV Lines		
	(B) Section B: 132kV Lines		
	TOTAL (to Bid Form)		

VAT on EXW amounts is not included in the contract price. VAT on EXW shall be paid by the Contractor and shall be reimbursed by the Employer to the Contractor on actual basis in accordance with the government rules upon submission of relevant documents in original.

Name of Bidder _____

Signature of Bidder _____

[1] Specify currency in accordance with specifications in Bid Data Sheet under ITB 19.1 in Single-stage Bid. Create and use as many columns for Unit Price and Total Price as there are currencies.

Enclosure-6

Schedule No. 4: Installation and other Services

Item no.	Description of Works	Code[1]	Unit	Qty	Price in	
					Unit Price2	Total Price
				1	*2*	*4=1x2*
A3.2	**Tower Type 4D1**					
A3.2.1	Deep Foundation for Soil Category-2		Per tower	1		
A3.2.2	Deep Foundation for Soil Category-3		Per tower	5		
A3.2.3	Deep Foundation for Soil Category-4		Per tower	**5**		
A3.2.4	Deep Foundation (1 meter raised chimney) for soil category-2		Per tower	1		
A3.2.5	Deep Foundation (2 meter raised chimney) for soil category-2		Per tower	1		
A3.2.6	Deep Foundation (1 meter raised chimney) for soil category-3		Per tower	1		
A3.2.7	Deep Foundation (2 meter raised chimney) for soil category-3		Per tower	3		
A3.2.8	Deep Foundation (1 meter raised chimney) for soil category-4		Per tower	1		
A3.2.9	Deep Foundation (2 meter raised chimney) for soil category-4		Per tower	**4**		
A3.2.10	**River Crossing Foundation for 4D1 tower at Payra S/S end**		Per tower	**2**		
A3.3	**Tower type 4D25 (4DXP)**					
A3.3.1	Deep Foundation for Soil Category-2		Per tower	2		
A3.3.2	Deep Foundation for Soil Category-3		Per tower	6		
A3.3.3	Deep Foundation for Soil Category-4		Per tower	8		
A3.3.4	Deep Foundation (1 meter raised chimney) for soil category-2		Per tower	1		
A3.3.5	Deep Foundation (2 meter raised chimney) for soil category-2		Per tower	1		
A3.3.6	Deep Foundation (1 meter raised chimney) for soil category-3		Per tower	1		
A3.3.7	Deep Foundation (2 meter raised chimney) for soil category-3		Per tower	4		
A3.3.8	Deep Foundation (1 meter raised chimney) for soil category-4		Per tower	2		
A3.3.9	Deep Foundation (2 meter raised chimney) for soil category-4		Per tower	5		

Enclosure-7

POWER GRID COMPANY OF BANGLADESH LIMITED

BIDDING DOCUMENT
FOR
DESIGN, SUPPLY, ERECTION, TESTING & COMMISSIONING OF 400kV DOUBLE CIRCUIT PATUAKHALI (PAYRA) - GOPALGANJ TRANSMISSION LINE ON TURNKEY BASIS

SECTION A: 400kV Line

Schedule No. 1. Plant and Mandatory Spare Parts Supplied from Aboard

Item no.	Description of Works	Code[1]	Unit	Qty	Unit Price2 CIP	Total Price CIP
				1	2	3=1x2
A2.1.16	Counterweights for 210kN suspension insulator sets complete with yoke plate attachment bolts to be used for 4D1 towers					
(a)	- 40kg set		each	8		
(b)	- 80kg set		each	6		
(c)	- 120kg set		each	10		
A2.2	**400kV River Crossing Portion**					
A2.2.1	a) 300kN tripple suspension Insulators set for Quadruple "ACCC ULS 724/71 DHAKA" Conductor (Suspension) - disc only		set	36		
	b) 300kN tripple suspension Insulators Fittings set for Quadruple "ACCC ULS 724/71 DHAKA" Conductor (Suspension) - hardware fittings only		set	36		
A2.2.1a	a) 300kN tripple suspension Insulators set for Quadruple "ACCC ULS 724/71 DHAKA" Conductor (Suspension) - disc only		set	12		
	b) 300kN tripple suspension Insulators Fittings set **with double AGS Clamp** for Quadruple "ACCC ULS 724/71 DHAKA" Conductor (Suspension) - hardware fittings only		set	12		
A2.2.2	a) 400kN tripple tension Insulators Set for Quadruple "ACCC ULS 724/71 DHAKA" Conductor - disc only		set	48		
	b) 400kN tripple tension Insulators Fittings Set for Quadruple "ACCC ULS 724/71 DHAKA" Conductor - hardware fittings only		set	48		
A2.2.3	Spacer damper for Quadruple "ACCC ULS 724/71 DHAKA" Conductor		span-phase	72		
	**Span-phase=No. of span x 6. Total quantities of spacer or spacer dampers shall be 'Span-phasexN', where N= Number of spacer dampers for each phase in each span which shall be determined by contractor based on the design of spacer or spacer dampers. The price quoted shall remain unchanged, even if the value of N increases during final design of the spacer or dampers and it's approval thereof.					
A2.2.4	Vibration Damper for Quadruple "ACCC ULS 724/71 DHAKA" Conductor		span	12		
A2.2.5	Jumper Spacer for Quadruple "ACCC ULS 724/71 DHAKA" Conductor		each	144		
A2.2.6	Vibration damper for 19x3.67 20SA earthwire		span	12		
A2.2.7	Suspension set for 19x3.67 20SA earthwire		each	8		
A2.2.8	Tension set for 19x3.67 20SA earthwire		each	8		
A2.2.9	Vibration Damper for 19x3.67 20SA Earthwire equivalent OPGW		span	12		
A2.2.10	19x3.67 20SA Earthwire equivalent OPGW suspension set, complete assembly		each	8		
A2.2.11	19x3.67 20SA Earthwire equivalent OPGW tension set, complete assembly		each	8		
A3	**Supply of Tower Paint, Warning spheres**					
A3.1	Painting of tower having height more than 45meter in accordance with the requirements of the Technical Specification		per tower	25		
A3.2	Painting of tower (Reflecting Paint) upto 3 meter in submerge area in accordance with the requirements of the Technical Specification		per tower	20		
A3.3	Aircraft warning spheres for ACSR "Dorking" earthwire-Overland		each	160		

Schedule No. 2. Plant and Mandatory Spare Parts Supplied from within Employer's Country

Item no.	Description of Works	Code[1]	Unit	Qty	Unit Price2 CIP	Total Price CIP
				1	*2*	*3=1x2*
A2.1.8	Vibration Damper for Quadruple "ACCC 724/71 DHAKA" Conductor		span	423		
A2.1.9	Jumper Spacer for Quadruple "ACCC 724/71 DHAKA" Conductor		each	1182		
A2.1.10	Vibration damper for ACSR "Dorking"earthwire		span	423		
A2.1.11	Suspension set for ACSR "Dorking"earthwire		each	331		
A2.1.12	Tension set for ACSR "Dorking" earthwire		each	138		
A2.1.13	Vibration Damper for ACSR Dorking earthwire equivalent OPGW		span	423		
A2.1.14	Suspension set for ACSR Dorking earthwire equivalent OPGW, complete assembly		each	331		
A2.1.15	Tension set for ACSR Dorking earthwire equivalent OPGW, complete assembly		each	138		
A2.1.16	Counterweights for 210kN suspension insulator sets complete with yoke plate attachment bolts to be used for 4D1 towers:					
(a)	- 40kg set		each	8		
(b)	- 80kg set		each	6		
(c)	- 120kg set		each	10		
A2.2	**400kV River Crossing Portion**					
A2.2.1	a: 300kN tripple suspension Insulators set for Quadruple "ACCC ULS 724/71 DHAKA" Conductor (Suspension) - disc only		set	**36**		
	b) 300kN tripple suspension Insulators Fittings set for Quadruple "ACCC ULS 724/71 DHAKA" Conductor (Suspension) - hardware fittings only		set	**36**		
A2.2.1a	a) 300kN tripple suspension Insulators set for Quadruple "ACCC ULS 724/71 DHAKA" Conductor (Suspension) - disc only		set	**12**		
	b)300kN tripple suspension Insulators Fittings set **with double AGS Clamp** for Quadruple "ACCC ULS 724/71 DHAKA" Conductor (Suspension) - hardware fittings only		set	12		
A2.2.2	a) 400kN tripple tension Insulators Set for Quadruple "ACCC ULS 724/71 DHAKA" Conductor - disc only		set	48		
	b) 400kN tripple tension Insulators Fittings Set for Quadruple "ACCC ULS 724/71 DHAKA" Conductor - hardware fittings only		set	48		
A2.2.3	Spacer damper for Quadruple "ACCC ULS 724/71 DHAKA" Conductor		span-phase	72		
	**Span-phase=No. of span x 6. Total quantities of spacer or spacer dampers shall be 'Span-phasexN', where N= Number of spacer dampers for each phase in each span which shall be determined by contractor based on the design of spacer or spacer dampers. The price quoted shall remain unchanged, even if the value of N increases during final design of the spacer or dampers and it's approval thereof.					