BSES

Tender Notification for

TURNKEY PACKAGE FOR DESIGN, ENGINEERING, MANUFACTURING, SUPPLY, LAYING, JOINTING, TESTING AND COMMISSIONING OF 33KV, 3X400 MM^2 CABLE WITH REQUIRED ACCESSORIES AS PER THE SCOPE OF WORK, FOR BYPL, DELHI (INDIA)

NIT NO CMC/BY/18-19/RB/SV/104

Due Date for Submission: 16.04.2019, 14:30 HRS

BSES YAMUNA POWER LIMITED (BYPL)
SHAKTI KIRAN BUILDING, KARKARDOOMA,
DELHI-110032
CIN: U40109DL2001PLC111525
TEL: 011 3999 7111
WEBSITE: www.bsesdelhi.com
GSTIN: 07AABCC8569N1Z0

SECTION – I: REQUEST FOR QUOTATION

1.00 Event Information

1.01 BSES Yamuna Power Ltd (hereinafter referred to as **"BYPL"**) invites sealed tenders in 2 envelopes for TURNKEY PACKAGE FOR DESIGN, ENGINEERING, MANUFACTURING, SUPPLY, LAYING, JOINTING, TESTING AND COMMISSIONING OF 33KV, 3X400 MM2 CABLE WITH REQUIRED ACCESSORIES AS PER THE SCOPE OF WORK, FOR BYPL, DELHI (INDIA)The bidder must qualify the requirements as specified in clause 2.0 stated below. All envelopes shall be duly superscribed as — **"TURNKEY PACKAGE OF 33KV, 3X400 MM^2 CABLE WITH REQUIRED ACCESSORIES AS PER THE SCOPE OF WORK, FOR BYPL, DELHI (INDIA)" "NIT NO CMC/BY/18-19/RB/SV/104 DUE ON 16.04.2019, 14:30 HRS"**

Sl. No.	Description	Estimated Cost (₹)	Cost of EMD (₹)	Qty.
1	SURVEY, DESIGN, ENGINEERING, MANUFACTURE, SHOP TESTING, INSPECTION, PACKING, DISPATCH, LOADING, UNLOADING AND STORAGE AT SITE, TRANSIT/STORAGE AND CONSTRUCTION INSURANCE, ASSEMBLY, ERECTION, STRUCTURAL, COMPLETE PRE-COMMISSIONING CHECKS, TESTING & COMMISSIONING AT SITE, OBTAINING STATUTORY CLEARANCE & CERTIFICATION FROM STATE ELECTRICAL INSPECTOR, AND HANDING OVER TO THE OWNER AFTER SATISFACTORY COMMISSIONING OF 33KV CABLE WITH REQUIRED ACCESSORIES AS PER THE SCOPE OF WORK	3,00,00,000	6,00,000	AS PER BOQ (Bidder is requested to verify the same before bidding by visiting the site)

1.02 The schedule of specifications with detail terms & conditions can be obtained from address given below against submission of non-refundable demand draft of **Rs.1,180/-** drawn in favour of BSES Yamuna Power Ltd, payable at Delhi. The tender papers will be issued on all working days upto **15.04.2019, 17:00 P.M**. The tender documents & detail terms and conditions can also be downloaded from the website **"www.bsesdelhi.com --> BSES Yamuna Power Ltd --> Tenders--> Open Tenders"**.
In case tender papers are downloaded from the above website, then the bidder has to enclose a demand draft covering the cost of bid documents.

1.03 Offers will be received upto **16.04.2019, 14:30 PM.** at the address given below. Part A of the Bid shall be opened on **16.04.2019, 16:30 PM**. Part B of the Bid will be opened in case of Techno-Commercially qualified Bidders and the date of opening of same shall be intimated in due course. It is the sole responsibility of the bidder to ensure that the bid documents reach this office on or before the last date.

Head of Department

Contracts & Materials Deptt.
BSES Yamuna Power Ltd
3rd Floor, A Block
Shaktikiran Building, Karkardooma
Delhi 110032

1.03 Bid will be summarily rejected if:

(i) Earnest Money Deposit (EMD) of requisite value & validity.
(ii) Tender fee of requisite value.
(iii) The offer does not contain "FOR NEW DELHI" prices indicating break-up towards all taxes & duties.
(iv) Complete Technical details are not enclosed.
(v) Tender is received after due date and time**.**

2.00 **Qualification Criteria**

The prospective bidder must qualify all of the following requirements and shall be eligible to participate in the bidding who meets following requirements and management has a right to disqualify those bidders who do not meet these requirements.

2.02 **Technical Criteria:**

Sl No.	Criteria	Documents to be submitted by bidder
1	The bidder should have own manufacturing facility for 33KV or higher voltage grade Power Cable from last 3 years through Dry Cure CCV line.	Cable manufacturing CCV line details and factory incorporation certificate
2	The bidder should have supplied at least 100 km of 33KV or higher grade cable in last 3 years to Utilities/SEB/PSU	i. Summary list of executed Purchase orders ii. Purchase order copies iii. Material delivery clearance certificate copy
3	Bidder should have experience of turnkey execution including design, supply, installation, testing & commissioning project of 33KV or higher voltage grade cables in at least one utility/SEB/PSU having minimum 10 KM cable quantity in last 3 years.	i. Turnkey Purchase order/Work order copy ii. Work completion certificate copy
4	Performance certificate for minimum 1 year satisfactory performance from at least two utilities/SEB/PSUs of 33KV or higher voltage grade power cables, out of which one certificate should be of more than 10KM cable quantity.	Performance certificate
5	Bidder should have valid CPRI/ERDA Type test report of offered cable design as well as offered straight through joint and end termination joints	Relevant Type test report
6	The bidder must possess valid ISO 9001:2000 certification and valid BIS License or Equivalent International License.	Valid copy of BIS License or Equivalent International License.
7	The bidder should possess valid Electrical Contractor License issued by competent statutory agency to	Valid copy of Electrical Contractor License or

	undertake work in NCT Delhi. In case bidder is not having this license, Bidder to give the undertaking that it will be obtained by them before the start of the work at site or suitable sub-contractor having the valid license shall be engaged for works at site where copy of valid license shall be submitted to BYPL before the start of the work.	undertaking meeting the qualifying criteria

2.02 **Commercial Criteria:**

Sl No.	Criteria	Documents to be submitted by bidder
1	The bidder must have adequate Financial Stability and status to meet the financial obligation pursuant to the scope of work and shall have average annual turnover of minimum Rs 200 Crores during last three (3) Financial Years preceding the date of opening of bid	Duly certified CA certificate to be submitted
2	The bidder should possess valid Electrical Contractor License issued by competent statutory agency to undertake work in NCT Delhi. In case bidder is not having this license, Bidder to give the undertaking that it will be obtained by them before the start of the work at site or suitable sub-contractor having the valid license shall be engaged for works at site where copy of valid license shall be submitted to BYPL before the start of the work.	i. Electrical Contractor License Copy ii. Undertaking if not available
3	An undertaking (self certificate) that the bidder has not been blacklisted/debarred by any central/state government institution including electricity boards.	Undertaking
4	The bidder should have registered under GST ACT and shall submit PAN, EPF and GST Registration Number, in addition to other statuary compliances. The bidder must submit the copy of registrations and submit an undertaking that the bidder shall comply all the statutory compliances as per the applicable laws/rules etc before the start of the work.	Relevant Statutory Documents Copy

Notwithstanding anything stated above, BYPL reserves the right to assess bidder's capability to perform the contract, assess the capability and installed capacity of the Bidder for carrying out the supplies, should the circumstances warrant such assessment in the overall interest of the purchaser. In this regard the decision of the purchaser is final.

3.00 **Bidding and Award Process**

Bidders are requested to submit their offer strictly in line with this tender document. BYPL shall response to the clarifications raised by various bidders and the will be distributed to all participating bidders through website.

3.01 **BID SUBMISSION**

The bidders are required to submit the bids in 2(two) parts and submitted in **1 original + Duplicate** to the following address:

Head of Department
Contracts & Material Deptt.

BSES Yamuna Power Ltd
3rd Floor, A Block
Shaktikiran Building, Karkardooma
Delhi 110032

PART A :: TECHNICAL **BID** comprising of following

- EMD in prescribed format
- Non-refundable demand draft for Rs 1180/- in case the forms are downloaded from website
- Details of constitution of the company (Proprietary/Limited/etc along with the details)
- Memorandum of Association of the company
- Documentary evidence in support of qualifying criteria i.e, Copies of the following for last 3 years i) Balance sheet ii) Annual profit & loss statement iii) Annual turn over, iv) Capacity, v) CA certificate etc
- Copies of following i) Orders ii) Execution/Performance Certificates, & other documents to support the QC as per Clause 2.0
- Technical Literature/ GTP/Type test report etc
- Organization Chart/Qualified Manpower available
- Testing Facilities
- Original Tender documents duly stamped & signed on each page as token of acceptance
- Acceptance to Commercial Terms and Conditions viz. Delivery schedule/period, Payment terms, BG, Power-of-Attorney etc

PART B :: FINANCIAL **BID** comprising of

- Price strictly in the Format enclosed indicating Break up of basic price, taxes & duties, Freight etc

3.02 **TIME SCHEDULE**

The bidders should complete the following within the dates specified as under:

S.No.	Steps	Due date
1	Last Date of Sale of Bid Documents	15.04.2019, 17:00 PM
2	Last Date of Queries, if any	10.04.2019, 15:00 PM
3	Pre-Bid Meeting	10.04.2019, 15:00HRS
4	Last Date of Receipt of Bid Documents	16.04.2019, 16:00HRS
5	Date & Time of Opening of PART A - Technical and Commercial Bid	16.04.2019, 16:30HRS

NOTE: In case last date of submission of bids & date of opening of bids is declared as holiday in BYPL office, the last date of submission will be following working day at the same time.

This is a two part bid process. Bidders are to submit the bids in 2(Two) parts

Both these parts should be furnished in separate sealed covers super scribing NIT no. DUE DATE OF SUBMISSION, with particulars as **PART-A TECHNICAL BID &**

COMMERCIAL TERMS & CONDITIONS and **Part-B FINANCIAL BID** and these sealed envelopes should again be placed in another sealed cover which shall be submitted before the due date & time specified.

Part – A:: Technical Bid should not contain any cost information whatsoever and shall be submitted within the due date**.**

PART B:: This envelope will be opened internally after techno-commercial evaluation and only of the qualified bidders.

REVERSE AUCTION CLAUSE :: Purchaser reserves the right to use reverse auction as optional tool through SAP – SRM as an integral part of the entire tendering process. All the bidders who are techno-commercially qualified on the basis of tender requirements shall participate in reverse auction.

Notwithstanding anything stated above, the Purchaser reserves the right to assess bidder's capability to perform the contract, should the circumstances warrant such assessment in the overall interest of the purchaser. In this regard the decision of the purchaser is final.

BIDS RECEIVED AFTER DUE DATE AND TIME MAY BE LIABLE TO REJECTION

4.00 **Award Decision**

4.01 Purchaser intends to award the business on a lowest bid basis, so suppliers are encouraged to submit the bid competitively. The decision to place purchase order/LOI solely depends on purchaser on the cost competitiveness across multiple lots, quality, delivery and bidder's capacity, in addition to other factors that Purchaser may deem relevant.

4.02 The purchaser reserves all the rights to award the contract to bidder so as to meet the delivery requirement or nullify the award decision without any reason.

4.03 In the event of your bid being selected by purchaser (and / or its affiliates) and you subsequent DEFAULT on your bid; you will be required to pay purchaser (and / or its affiliates) an amount equal to the difference in your bid and the next lowest bid on the quantity declared in NIT/RFQ.

4.04 In case any bidder is found unsatisfactory during the Project execution, the award will be cancelled and BYPL reserves the right to award other bidders who are found fit.

4.05 Bidders are requested to quote their lowest No-Regret prices since BYPL would not prefer to negotiate the price further.

5.00 **Market Integrity**

We have a fair and competitive marketplace. The rules for bidders are outlined in the Terms & Conditions. Bidders must agree to these rules prior to participating. In addition to other remedies available, we reserves the right to exclude a bidder from participating in future markets due to the bidder's violation of any of the rules or obligations contained in the Terms & Condition. Bidders who violate the marketplace rules or engage in behavior that disrupts the fair execution of the marketplace restricts a bidder to length of time, depending upon the seriousness of the violation. Examples of violations include, but are not limited to:

- Failure to honor prices submitted to the marketplace.
- Breach of the terms of the published in Request For Quotation/NIT.

6.00 **Supplier Confidentiality**

All information contained in this RFQ is confidential and shall not be disclosed, published or advertised in any manner without written authorization from BYPL. This includes all bidding information submitted.

All RFQ documents remain the property of BYPL and all suppliers are required to return these documents to BYPL upon request.

Suppliers who do not honor these confidentiality provisions will be excluded from participating in future bidding events.

7.0 **Contact Information**

Technical clarification, if any, as regards this RFQ shall be sought in writing and sent by post/courier to following address. The same shall not be communicated through phone

	Technical	Commercial
Contact Person	Mr Ashwani Aggarwal Copy to : Mr. Rakesh Bansal	Mr Rakesh Bansal & Rajesh Srivastava
Address	BSES Yamuna Power Ltd , 3rd floor, B Block, Shaktikiran Building, Karkardooma, Delhi 110032	C&M Deptt. 3rd Floor , A-Block, BSES Yamuna Power Ltd Shaktikiran Building, Karkardooma, Delhi 110032
E-Mail ID	ashwani.aggarwal@relianceada.com	rakesh.bansal@relianceada.com rajesh.r.srivastava@relianceada.com

SECTION – II: INSTRUCTION TO BIDDERS

A. GENERAL

1.00 BSES Yamuna Power Ltd, hereinafter referred to as "The Purchaser" are desirous of implementing the various Systems Improvement/Repair & Maintenance works at their respective licensed area in Delhi. The Purchaser has now floated this tender for procurement of material notified earlier in this bid document.

2.00 SCOPE OF WORK

The scope of work covered under this package include Project Management, Design, Manufacture, Assembly, Testing at works conforming to the Technical Specifications/IS along with Packing, Insurance, Forwarding, Transportation and Unloading and proper stacking at Purchaser's stores/site.

Laying, testing & commissioning of 33KV cable with required accessories as per the scope of work, Electrical Inspector Clearance is to be done by Bidder.

Bidder shall also ensure that performance of complete cable link shall be as good as after commissioning of supplied cable.

Separate orders may be placed for supply & services which inter-alia includes the Scope of Work as mentioned/required for satisfactory operation of the Scheme shall be in Bidder's scope. Bidder(s) must provide goods and services that conform to these specifications for the entire term of the agreement.

3.0 DISCLAIMER

3.01 This Document includes statements, which reflect various assumptions, which may or may not be correct. Each Bidder/Bidding Consortium should conduct its own estimation and analysis and should check the accuracy, reliability and completeness of the information in this Document and obtain independent advice from appropriate sources in their own interest.

3.02 Neither Purchaser nor its employees will have any liability whatsoever to any Bidder or any other person under the law or contract, the principles of restitution or unjust enrichment or otherwise for any loss, expense or damage whatsoever which may arise from or be incurred or suffered in connection with anything contained in this Document, any matter deemed to form part of this Document, provision of Services and any other information supplied by or on behalf of Purchaser or its employees, or otherwise a rising in anyway from the selection process for the Supply.

3.03 Though adequate care has been taken while issuing the Bid document, the Bidder should satisfy itself that Documents are complete in all respects. Intimation of any discrepancy shall be given to this office immediately.

3.04 This Document and the information contained herein are Strictly Confidential and are for the use of only the person(s) to whom it is issued. It may not be copied or distributed by the recipient to third parties (other than in confidence to the recipient's professional advisors).

4 COST OF BIDDING

The Bidder shall bear all cost associated with the preparation and submission of its Bid and Purchaser will in no case be responsible or liable for those costs.

B. BIDDING DOCUMENTS

5.01 The Scope of Work, Bidding Procedures and Contract Terms are described in the Bidding Documents. In addition to the covering letter accompanying Bidding Documents, the Bidding Documents include:

(a) Request for Quotation (RFQ) - Section - I
(b) Instructions to Bidders (ITB) - Section - II
(c) Terms & Conditions of SUPPLY (T&C) - Section -III
(d) Price Format - Supply - Section IV
(e) Summary T&C - Supply - Section V
(f) Bid Form - Section VI
(g) Acceptance Form RA - Section VII
(h) EMD BG Format - Section VIII
(i) Terms & Conditions of ETC (T&C) - Section –IX
(j) Price Format – ETC - Section –X
(k) GRAND SUMMARY OF THE QUOTED PRICE- Section –XIII
(l) Vendor Code of Conduct - Section –XIV
(m) Appendix
(n) SOW & Technical Specifications (TS) - Section –XIV

5.02 The Bidder is expected to examine the Bidding Documents, including all Instructions, Forms, Terms and Specifications. Failure to furnish all information required by the

Bidding Documents or submission of a Bid not substantially responsive to the Bidding Documents in every respect will may result in the rejection of the Bid.

6.0 AMENDMENT OF BIDDING DOCUMENTS

6.01 At any time prior to the deadline for submission of Bids, the Purchaser may for any reasons, whether at its own initiative or in response to a clarification requested by a prospective Bidder, modify the Bidding Documents by Amendment.

6.02 The Amendment shall be part of the Bidding Documents, pursuant to Clause 5.01, and it will be notified in web site **www.bsesdelhi.com** and the same will be binding on them.

6.03 In order to afford prospective Bidders reasonable time in which to take the Amendment into account in preparing their Bids, the Purchaser may, at its discretion, extend the deadline for the submission of Bids. The same shall be published as a corrigendum in website **www.bsesdelhi.com**

6.04 Purchaser shall reserve the rights to following:
a) extend due date of submission,
b) modify tender document in part/whole,
c) cancel the entire tender

6.05 **Bidders are requested to visit website regularly for any modification/clarification/corrigendum/addendum of the bid documents.**

C. PREPARATION OF BIDS

7.0 LANGUAGE OF BID

The Bid prepared by the Bidder, and all correspondence and documents relating to the Bid exchanged by the Bidder and the Purchaser, shall be written in the English Language. Any printed literature furnished by the Bidder may be written in another Language, provided that this literature is accompanied by an English translation, in which case, for purposes of interpretation of the Bid, the English translation shall govern.

8.0 DOCUMENTS COMPRISING THE BID

The Bid prepared and submitted by the Bidder shall comprise the following components:

(a) Bid Form, Price & other Schedules (STRICTLY AS PER FORMAT) and Technical Data Sheets completed in accordance with Technical Specification.

(b) All the Bids must be accompanied with the required EMD as mentioned in the Section-I against each tender.

(c) Tender documents duly stamped and signed on each page by authorized signatory.

8.0 BID FORM

8.1 The Bidder shall submit one ”Original”, “Copy- 1”, of the Bid Form, Supporting Documents & Technical Data Sheets duly filled in as per attached specification/BOM etc enclosed.

9.0 **EMD**

The bidder shall furnish, as part of its bid, an EMD amounting as specified in the RFQ. The EMD is required to protect the Purchaser against the risk of Bidder's conduct which would warrant forfeiture.

The EMD shall be denominated in any of the following form:

(a) Bank Guarantee drawn in favour of BSES Yamuna Power Ltd, payable at Delhi.

(b) EMD shall be valid for One Hundred Fifty (150) days after due date of submission drawn in favour of BSES Yamuna Power Ltd

The EMD may be forfeited in case of:

(a) the Bidder withdraws its bid during the period of specified bid validity

or

(b) the case of a successful Bidder, if the Bidder does not

(i) accept the Purchase Order, or

(ii) furnish the required contract performance BG.

10.0 **BID PRICES**

10.01 Bidders shall quote for the entire Scope of Supply/Work with a break-up of prices for individual items and Taxes & Duties. The total Bid Price shall also cover all the Supplier's obligations mentioned in or reasonably to be inferred from the Bidding Documents in respect of Design, Supply, Transportation to site, all in accordance with the requirement of Bidding Documents. The Bidder shall complete the appropriate Price Schedules included herein, stating the Unit Price for each item & total Price with taxes, duties & freight upto destination.

10.02 The prices offered shall be inclusive of all costs as well as Duties, Taxes and Levies paid or payable during execution of the supply work, breakup of price constituents, should be there.

10.03 Prices quoted by the Bidder shall be **"Firm"** and not subject to any price adjustment during the performance of the Contract. **A Bid submitted with an adjustable price/ Price Variation Clause will be treated as non-responsive and rejected.**

10.04 The qty break-up shown else-where in Price Schedule is tentative. The bidder shall ascertain himself regarding material required for completeness of the entire work. Any item not indicated but is required to complete the job, shall be deemed to be included in the prices quoted.

11.0 **BID CURRENCIES**

11.01 Prices shall be quoted in Indian Rupees Only.

12.0 **PERIOD OF VALIDITY OF BIDS**

12.01 Bids shall remain valid for 150 days from the due date of submission of the Bid.

12.02 Notwithstanding Clause12.01 above, the Purchaser may solicit the Bidder's consent to an extension of the Period of Bid Validity. The request and the responses thereto shall be made in writing and sent by post/courier/e-mail.

13.0 **ALTERNATIVE BIDS**

13.01 Bidders shall submit Bids, which comply with the Bidding Documents. Alternative Bids will not be considered. The attention of Bidders is drawn to the provisions regarding the rejection of Bids in the terms and conditions, which are not substantially responsive to the requirements of the Bidding Documents.

14.0 **FORMAT AND SIGNING OF BID**

14.01 The original Bid Form and accompanying documents, clearly marked "Original Bid" plus copy1, must be received by the Purchaser at the date, time and place specified pursuant to Clauses 15.0 and 16.0. In the event of any discrepancy between the original and the copies, the original shall govern.

14.02 The original and copies of the Bid shall be typed or written in indelible ink and shall be signed by the Bidder or a person or persons duly authorized to sign on behalf of the Bidder. Such authorization shall be indicated by written Power-of-Attorney accompanying the Bid.

14.03 The Bid shall contain no interlineations, erasures or overwriting except as necessary to correct errors made by the Bidder, in which case such corrections shall be initialed by the person or persons signing the Bid.

15.0 **SEALING AND MARKING OF BIDS**

15.01 Bid submission: One original, & copy1 (hard copies) of all the Bid Documents shall be sealed and submitted to the Purchaser before the closing time for submission of the bid.

15.02 The Technical Documents and the EMD shall be enclosed in a sealed envelope and the said envelope shall be superscribed with —"Technical & EMD". The price bid shall be inside another sealed envelope with superscribed "Financial Bid". Both these envelopes shall be sealed inside another big envelope. All the envelopes should bear the Name and Address of the Bidder and marking for the Original, & copy1. The envelopes should be superscribed with —"Tender Notice No. & Due date of opening".

15.03 The Bidder has the option of sending the Bids in person. Bids submitted by Email/Telex/Telegram /Fax will be rejected. No request from any Bidder to the Purchaser to collect the proposals from Courier/Airlines/Cargo Agents etc shall be entertained by the Purchaser.

16.0 **DEADLINE FOR SUBMISSION OF BIDS**

16.01 The original Bid, together with the required copies, must be received by the Purchaser at the address specified earlier.

16.02 The Purchaser may, at its discretion, extend the deadline for the submission of Bids by amending the Bidding Documents, in which case all rights and obligations of the Purchaser and Bidders previously subject to the deadline will there after be subject to the deadline as extended.

17.0 **ONE BID PER BIDDER**

17.01 Each Bidder shall submit only one Bid by itself. No Joint venture is acceptable. A Bidder who submits or participates in more than one Bid will cause all those Bids to be rejected.

18.0 **LATE BIDS**

18.01 Any Bid received by the Purchaser after the deadline for submission of Bids prescribed by the Purchaser, pursuant to Clause 16.0, will be declared "Late" and may be rejected and returned unopened to the Bidder.

19.0 **MODIFICATIONS AND WITHDRAWAL OF BIDS**

19.01 The Bidder is not allowed to modify or withdraw its Bid after the Bid's submission.

E. EVALUATION OF BID

20.0 **PROCESS TO BE CONFIDENTIAL**

20.01 Information relating to the examination, clarification, evaluation and comparison of Bids and recommendations for the award of a contract shall not be disclosed to Bidders or any other persons not officially concerned with such process. Any effort by a Bidder to influence the Purchaser's processing of Bids or award decisions may result in the rejection of the Bidder's Bid.

21.0 **CLARIFICATION OF BIDS**

To assist in the examination, evaluation and comparison of Bids, the Purchaser may, at its discretion, ask the Bidder for a clarification of its Bid. All responses to requests for clarification shall be in writing and no change in the price or substance of the Bid shall be sought, offered or permitted.

22.0 **PRELIMINARY EXAMINATION OF BIDS / RESPONSIVENESS**

22.01 Purchaser will examine the Bids to determine whether they are complete, whether any computational errors have been made, whether required sureties have been furnished, whether the documents have been properly signed, and whether the Bids are generally in order. Purchaser may ask for submission of original documents in order to verify the documents submitted in support of qualification criteria.

22.02 Arithmetical errors will be rectified on the following basis. If there is a discrepancy between the unit price and the total price per item that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total price per item will be corrected. If there is a discrepancy between the Total Amount and the sum of the total price per item, the sum of the total price per item shall prevail and the Total Amount will be corrected.

22.03 Prior to the detailed evaluation, Purchaser will determine the substantial responsiveness of each Bid to the Bidding Documents including production capability and acceptable quality of the Goods offered. A substantially responsive Bid is one, which conforms to all the terms and conditions of the Bidding Documents without material deviation.

22.04 Bid determined as not substantially responsive will be rejected by the Purchaser and/or the Purchaser and may not subsequently be made responsive by the Bidder by correction of the non -conformity.

23.0 **EVALUATION AND COMPARISON OF BIDS**

23.01 The evaluation of Bids shall be done based on the delivered cost competitiveness basis.

23.02 The evaluation of the Bids shall be a stage-wise procedure. The following stages are identified for evaluation purposes: In the first stage, the Bids would be subjected to a responsiveness check. The Technical & qualifying Proposals and the Conditional ties of the Bidders would be evaluated.

Subsequently, the Financial Proposals along with Supplementary Financial Proposals, if any, of Bidders with Techno-commercially Acceptable Bids shall be considered for final evaluation.

23.03 The Purchaser's evaluation of a Bid will take into account, in addition to the Bid price, the following factors, in the manner and to the extent indicated in this Clause:

(a) Delivery Schedule

(b) Conformance to Qualifying Criteria

(c) Deviations from Bidding Documents

Bidders shall base their Bid price on the terms and conditions specified in the Bidding Documents.

The cost of all quantifiable deviations and omissions from the specification, terms and conditions specified in Bidding Documents shall be evaluated. **The Purchaser will make its own assessment of the cost of any deviation for the purpose of ensuring fair comparison of Bids.**

23.04 Any adjustments in price, which result from the above procedures, shall be added for the purposes of comparative evaluation only to arrive at an "Evaluated Bid Price". Bid Prices quoted by Bidders shall remain unaltered.

F. AWARD OF CONTRACT

24.0 **CONTACTING THE PURCHASER**

24.01 If any Bidder wishes to contact the Purchaser on any matter related to the Bid, from the time of Bid opening to the time of contract award, the same shall be done in writing only.

24.02 Any effort by a Bidder to influence the Purchaser and/or in the Purchaser‘s decisions in respect of Bid evaluation, Bid comparison or Contract Award, will result in the rejection of the Bidder‘s Bid.

25.0 **THE PURCHASER’S RIGHT TO ACCEPT ANY BID AND TO REJECT ANY OR ALL BIDS**

25.01 The Purchaser reserves the right to accept or reject any Bid and to annul the Bidding process and reject all Bids at anytime prior to award of Contract, without thereby incurring any liability to the affected Bidder or Bidders or any obligation to inform the affected Bidder or Bidders of the grounds for the Purchaser‘s action.

26.0 **AWARD OF CONTRACT**

26.01 The Purchaser will award the Contract to the successful Bidder whose Bid has been Determined to be the lowest-evaluated responsive Bid, provided further that the Bidder has been determined to be qualified to satisfactorily perform the Contract. Purchaser reserves the right to award order to other bidders in the tender, provided it is required for timely execution of project & provided he agrees to come to the lowest rate.

Though the contract is for Turnkey in nature, the Purchaser intends to issue 2(two) separate Purchase/Works Orders viz.

a) Purchase Order for Supply Portion.
b) Work Order for Services - Laying, Testing & Commissioning, etc.

All individual contracts will contain cross fall breach clause (i.e., a breach of one will constitute breach of the others)

27.0 **THE PURCHASER'S RIGHT TO VARY QUANTITIES**

27.01 The Purchaser reserves the right to vary the quantity i.e. increase or decrease the numbers/quantities without any change in terms and conditions during the execution of the Order.

28.0 **LETTER OF INTENT/ NOTIFICATION OF AWARD**

28.01 The letter of intent/ Notification of Award shall be issued to the successful Bidder whose bids have been considered responsive, techno-commercially acceptable and evaluated to be the lowest (L1). The successful Bidder shall be required to furnish a letter of acceptance with in 7 days of issue of the letter of intent /Notification of Award by Purchaser. The date of LOI/NOA shall be treated as Start date of Project.

29.0 **CONTRACT PERFORMANCE BANK GAURANTEE**

29.01 Within 15 days of the receipt of Notification of Award/ Letter of Intent/PO from the Purchaser, the successful Bidder shall furnish Contract Performance Bank Guarantee towards faithful performance of Contract for an amount of 10% (Ten percent) of the Contract Price. The Performance Bond shall be valid upto completion period/handing over, whichever is earlier plus 3 months claim period. Upon submission of the performance security, the EMD shall be released. 02 (two) nos. separate CPBG's shall be submitted against Supply & Services Contract.

30.0 **CORRUPT OR FRADULENT PRACTICES**

30.01 The Purchaser requires that the Bidders observe the highest standard of ethics during the procurement and execution of the Project. In pursuance of this policy, the Purchaser:

(a) Defines, for the purposes of this provision , the terms set forth below as follows:

(i) "Corrupt practice" means behavior on the part of officials in the public or private sectors by which they improperly and unlawfully enrich themselves and/or those close to them ,or induce others to do so, by misusing the position in which they are placed, and it includes the offering, giving, receiving, or soliciting of anything of value to influence the action of any such official in the procurement process or in contract execution; and

(ii) "Fraudulent practice" means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of the Purchaser, and includes collusive practice among Bidders (prior to or after Bid

submission) designed to establish Bid prices at artificial non -competitive levels and to deprive the Purchaser of the benefits of free and open competition .

(b) Will reject a proposal for award if it determines that the Bidder recommended for award has engaged in corrupt or fraudulent practices in competing for the contract in question ;

(c) Will declare a firm ineligible, either indefinitely or for a stated period of time, to be awarded a contract if it at any time determines that the firm has engaged in corrupt or fraudulent practices in competing for, or in executing, a contract.

30.02 Furthermore, Bidders shall be aware of the provision stated in the Terms and Conditions of Contract.

31.0 **COMPLETION PERIOD (PROJECT)**

31.01 150 days from the date of issuance of LOI/PO's. After award of work, successful bidder shall complete the detailed survey to finalize & submit the base line Project schedule within 15 days from the date of issue of LOI/PO whichever is earlier.

SPECIAL TERMS AND CONDITIONS OF CONTRACT

1.01 Bidders are requested to visit the site to understand the scope of work, site conditions and requirements prior to Bidding. Hence, no price/time escalation shall be admissible on these accounts.

1.02 Statutory variation will be allowed for direct supplies only wherever breakup of Taxes & Duties are available in Price Bid.

1.03 Bidder has to submit the item wise price bifurcation in bid. Unprice copy must be attached with the Part A. Reverse Auction will be carried out on Lump sum Basis/Total Landed Cost i.e. Supply + Services.

1.04 Successful bidder has to compliance the statutory compliance.

1.05 Wherever BYPL specifications are not available relevant IS/IEC to be followed. All Drawings mentioned in the Tender Specification and other required for the completeness of the tender shall be submitted. Drawing submission process shall not be deemed complete of all the requirements are not complied during the submission of the same.

1.06 In case of any major deviation, deletion or addition which bidder may feel is relevant to this project & for its safe operation and completion of works; Bidder may clearly highlight and communicate the same to the purchaser with his bid.

1.07 Necessary Statutory Clearances & any other authority for energizing the substation shall be in the scope of this tender. However, any statutory fees shall be borne by BYPL on production of documentary evidence.

1.08 Problem Troubleshooting & Restoration In Warranty Period For A Particular Equipment:
a) Service Engineer Availability to Attend, Identify & Restore Defects (Minor) Of Equipments under Guarantee Period within 48 Working Hours (Exclusion of Material Support Cases)
b) Spare Material Delivery For Restoration Of Equipment (Major Defect) Under Guarantee Period Within Two Weeks. Seller must keep Requisite Inventory of Critical Spares &

Other Equipment's Covered in Guarantee Period to Restore Equipment within Two Weeks.
c) In Case Of Complete Replacement of Equipment, Complete Equipment to Be Replaced Within a Period Of 4 Weeks.

1.09 PROJECT INFORMATION & COMPLETION
The contractor shall be fully responsible to complete the project in time. It is desired that the total project should complete in 150 days from the date of LOI or purchase order whichever is earlier. The detail completion schedule shall be prepared by vendor and shall be submitted at the time of detailed engineering for approval. Vendor has to submit the progress report fortnightly in the format attached with this tender/as asked by the Purchaser.

1.10 PROJECT IMPLEMETATION & EXECUTION CONTROL
The bidders are requested to submit the following along with the bid, about the project implementation & execution methodology.
a) Write up/overview of project Plan
b) Implementation Methodology
c) Project Organization Chart for Representatives, Project Office & site office teams along with the functions.
d) Bar Chart & Network Diagram (with critical path) for various activities to achieve scheduled completion.
The successful Bidder shall be required to prepare detailed Network(s) and project implementation plans & programmes and finalize the same with the Employer as per requirement specified in Technical Specifications, which shall form a part of the Contract.

1.11 Bidders are required to quote the price for the commercial, contractual and technical obligations outlined, in the bidding documents. If a Bidder wishes to make a deviation, such deviation shall be listed in annexure of its bid.

SECTION III

GENERAL TERMS AND CONDITIONS – SUPPLY

1.0 General Instructions

1.01 All the Bids shall be prepared and submitted in accordance with these instructions.

1.02 Bidder shall bear all costs associated with the preparation and delivery of its Bid, and the Purchaser will in no case shall be responsible or liable for these costs.

1.03 The Bid should be submitted by the Bidder in whose name the bid document has been issued and under no circumstances it shall be transferred /sold to the other party.

1.04 The Purchaser reserves the right to request for any additional information and also reserves the right to reject the proposal of any Bidder, if in the opinion of the Purchaser, the data in support of RFQ requirement is incomplete.

1.05 The Bidder is expected to examine all instructions, forms, terms & conditions and specifications in the Bid Documents. Failure to furnish all information required in the Bid Documents or submission of a Bid not substantially responsive to the Bid Documents in

every respect may result in rejection of the Bid. However, the Purchaser's decision in regard to the responsiveness and rejection of bids shall be final and binding without any obligation, financial or otherwise, on the Purchaser.

2.0 Definition of Terms

2.01 "Purchaser" shall mean BSES Yamuna Power Limited, on whose behalf this bid enquiry is issued by its authorized representative / officers.

2.02 "Bidder" shall mean the firm who quotes against this bid enquiry issued by the Purchaser. "Supplier" or "Supplier" shall mean the successful Bidder and/or Bidders whose bid has been accepted by the Purchaser and on whom the "Letter of Acceptance" is placed by the Purchaser and shall include his heirs, legal representatives, successors and permitted assigns wherever the context so admits.

2.03 "Supply" shall mean the Scope of Contract as described.

2.04 "Specification" shall mean collectively all the terms and stipulations contained in those portions of this bid document known as RFQ, Commercial Terms & Condition, Instructions to Bidders, Technical Specifications and the Amendments, Revisions, Deletions or Additions, as may be made by the Purchaser from time to time.

2.05 "Letter of Acceptance" shall mean the official notice issued by the Purchaser notifying the Supplier that his proposal has been accepted and it shall include amendments thereto, if any, issued by the Purchaser. The "Letter of Acceptance" issued by the Purchaser shall be binding on the "Supplier" The date of Letter of Acceptance shall be taken as the effective date of the commencement of contract.

2.06 "Month" shall mean the calendar month and "Day" shall mean the calendar day.

2.07 "Codes and Standards" shall mean all the applicable codes and standards as indicated in the Specification.

2.08 "Offer Sheet" shall mean Bidder's firm offer submitted to BYPL in accordance with the specification.

2.09 "Contract" shall mean the "Letter of Acceptance/Purchase Order" issued by the Purchaser.

2.10 "Contract Price" shall mean the price referred to in the "Letter of Acceptance/Purchase Order".

2.11 "Contract Period" shall mean the period during which the "Contract" shall be executed as agreed between the Supplier and the Purchaser in the Contract inclusive of extended contract period for reason beyond the control of the Supplier and/or Purchaser due to force majeure.

2.12 "Acceptance" shall mean and deemed to include one or more of the following as will be stipulated in the specification:

a) The written acceptance of material by the inspector at suppliers works to ship the materials.

b) Acceptance of material at Purchaser site stores after its receipt and due inspection/ testing and release of material acceptance voucher.

c) Where the scope of the contract includes supply, acceptance shall mean issue of necessary equipment / material takeover receipt after installation & commissioning and final acceptance.

3.0 Contract Documents & Priority

3.01 Contract Documents: The terms and conditions of the contract shall consist solely of these RFQ conditions and the offer sheet.

4.0 Scope of Supply -General

4.01 The "Scope of Supply" shall be on the basis of Bidder's responsibility, completely covering the obligations, responsibility and supplies provided in this Bid enquiry whether implicit or explicit.

4.02 Bidder shall have to quote for the Bill of quantities as listed elsewhere.

4.03 All relevant drawings, data and instruction manuals.

5.0 Quality Assurance and Inspection

5.01 Immediately on award of contract, the bidder shall prepare detailed quality assurance plan/test procedure identifying the various stages of manufacture, quality checks performed at each stage, raw material inspection and the Customer hold points. The document shall also furnish details of method of checking, inspection and acceptance standards / values and get the approval of Purchaser before proceeding with manufacturing. However, Purchaser shall have right to review the inspection reports, quality checks and results of suppliers in house inspection department which are not Customer hold points and the supplier shall comply with the remarks made by purchaser or his representative on such reviews with regards to further testing, rectification or rejection, etc.

5.02 Witness and Hold points are critical steps in manufacturing, inspection and testing where the supplier is obliged to notify the Purchaser in advance so that it may be witnessed by the Purchaser. Final inspection is a mandatory hold point. The supplier to proceed with the work past a hold point only after clearance by purchaser or a witness waiver letter from BYPL.

5.03 The performance of waiver of QA activity by Purchaser at any stage of manufacturing does not relieve the supplier of any obligation to perform in accordance with and meet all the requirements of the procurement documents and also all the codes & reference documents mentioned in the procurement document nor shall it preclude subsequent rejection by the purchaser.

5.04 On completion of manufacturing the items can only be dispatched after receipt of dispatch instructions issued by the Purchaser.

5.05 All in-house testing and inspection shall be done with out any extra cost. The in-house inspection shall be carried out in presence of BSES/BSES authorized third party inspection agency. Cost of Futile/abortive visit(s) shall be debited from the invoices

5.06 Purchaser reserves the right to send any material being supplied to any recognized laboratory for testing, wherever necessary and the cost of testing shall be borne by the Bidder. In case the material is found not in order with the technical requirement / specification, the charges along with any other penalty which may be levied is to be borne by the bidder. To avoid any complaint the supplier is advised to send his representative to the stores to see that the material sent for testing is being sealed in the presence of bidder's representative.

6.0 Packing, Packing List & Marking

6.01 Packing: Supplier shall pack or shall cause to be packed all Commodities in crates/boxes/drums/containers/cartons and otherwise in such a manner as shall be reasonably suitable for shipment by road or rail to BYPL, Delhi/New Delhi stores/site without undue risk of damage in transit.

6.02 Packing List: The contents of each package shall be itemized on a detailed list showing the exact weight, extreme outside dimensions (length, width & weight) of each container/box/drum/carton, Item SAP Code, PO No & date. One copy of the packing list shall be enclosed in each package delivered.

7.01 Price basis for supply of materials

a) Bidder to quote their prices on Landed Cost Basis and separate price for each items. FIRM prices for supply to BYPL Delhi/New Delhi stores inclusive of packing, forwarding, loading at manufacturer's premises, payment of GST, Freight, Custom Duty, any other local charges. Octroi is presently not applicable in Delhi and however if applicable shall be reimbursed at actual**.**

b) The above supply prices shall also include unloading at BYPL Delhi/New Delhi stores/site.

8.0 Terms of payment and billing – SUPPLY

A. 65% prorata of supply value item wise shall be payable against R/A bills for supply of equipments and materials within 45 days against receipt & acceptance of material at site and submission of following documents duly certified by BYPL Project-in-charge, complete in all respects:

a) Signed copy of accepted Purchase Order (for first payment)
b) LR / RR / BL as applicable
c) Challan as applicable
d) Two (02) copies of Supplier's detailed Recipient Invoice showing Commodity description, quantity, unit price, total price and basis of delivery, and being 100% of the value of the consignment claimed.
e) Two (02) copies of Supplier's transporter invoice duly receipted by BYPL Stores & Original certificate issued by BYPL confirming receipt of the subject material at Stores/Site and acceptance of the same as per the provisions of the contract.
f) Two (02) copies Packing List / Detailed Packing List
g) Approved Test certificates / Quality certificates, if applicable
h) Certificate of Origin, if applicable
i) Material Dispatch Clearance Certificate (MDCC)
j) Insurance Policy / Certificate, if applicable
k) Warranty / Guarantee Certificate, if applicable
l) Check list for bill submission.
m) Performance Bank Guarantee equivalent to 10% of Supply value of the Contract valid upto Defect Liability period for 36 months from the date of handing over of the scheme plus 3 months Claim period.

B. 20% prorata on account of supply value of the actual executed value after installation/erection of material duly certified by BYPL Project-in- charge.

C. Balance 15% on account of supply value of the actual executed value shall be paid in 30 days after completion of successful acceptance testing, commissioning and handing over of complete systems duly certified by BYPL Engineer-in-Charge specified in the tender and on submission of performance Bank Guarantee of 10% amount, in our format valid up to a defect liability period for 36 months from the date of handing over of the scheme including submission of Electrical Inspector Clearance Certificate, Compliance of final punch point, No Demand

Certificate, Letter of Indemnity by the supplier (The format of No Demand Certificate and Letter of Indemnity are attached as Annexure) and after reconciliation & adjustments of payments, if any towards quantities of materials issued from purchaser's stock and consumed by the contractor for expeditious completion of the job.

8.02 Purchaser has the right to recover tax loss, interest and penalty suffered due to any non-compliance of tax laws by the Vendor. In the event, Purchaser is not able to avail any tax credit due to any short coming on the part of the Vendor (which otherwise should have been available to Purchaser in the normal course), then the Vendor at his own cost and effort will get the short coming rectified. If for any reason the same is not possible, then the Vendor will make 'good' the loss suffered by Purchaser due to the tax credit it lost . In such event, any amount paid to the Vendors shall be first attributable to the tax (GST) charged in the invoice and the balance shall be considered towards the 'value' of supply of goods/ services.

8.03 Purchaser shall deduct "Tax Deducted at Source" wherever applicable and at the rate prescribed under the GST Laws or any other Indian law and remit the same to the Government. Necessary TDS certificates as per law shall be issued by the purchase to the vendor.

8.04 Any liability arising out of dispute on the tax rate, classification under HSN, calculation and payment of tax to the Government will be to the Vendor's account.

8.05 Where the supply of Goods are liable to GST under reverse charge mechanism, then the supplier should clearly mention the category under which it has been registered and also that "the liability of payment of GST is on the Recipient of Supply".

9.0 Price Validity

9.01 All bids submitted shall remain valid, firm and subject to unconditional acceptance by BYPL Delhi for 150 days from the due date of submission. For awarded suppliers/contractors, the prices shall remain valid and firm till contract completion.

10.0 Performance Guarantee

10.01 Bank guarantee shall be drawn in favour of BSES Yamuna Power Ltd as applicable. The performance Bank guarantee shall be in the format as specified by BYPL.

11.0 Forfeiture

11.01 Each Performance Bond established under Clause 10.0 shall contain a statement that it shall be automatically and unconditionally forfeited without recourse and payable against the presentation by BYPL of this Performance Bond, to the relevant bank referred to above, together with a simple statement that supplier has failed to comply with any term or condition set forth in the Contract.

11.02 Each Performance BG established under will be automatically and unconditionally forfeited without recourse if BYPL in its sole discretion determines that supplier has failed to comply with any term or condition set forth in the contract.

12.0 Release

12.01 All Performance Bonds will be released without interest within seven (7) days from the last date up to which the Performance Bond has to be kept valid (as defined in Clause10.0) except for the case set forth in Clause 21.0.

13.0 Warranty/Defects Liability Period

13.01 The bidder to Guarantee the materials / items supplied against any defect of failure, which arise due to faulty materials, workmanship or design for the entire defects liability period. The Defect liability period for the complete system shall be 36 months from the date of handing over of entire Installation.
For Cable: The Defect liability period shall be 60 months from the date of commissioning or 66 months from the date of delivery whichever is earlier.
If during the defects liability period any materials/items are found to be defective, these shall be replaced or rectified by the bidder at his own cost within 30 days from the date of receipt of intimation.

14.0 Return, Replacement or Substitution.

14.01 BYPL shall give Supplier notice of any defective Commodity promptly after becoming aware thereof. BYPL may in its discretion elect to return defective Commodities to Supplier for replacement, free of charge to BYPL, or may reject such Commodities and purchase the same or similar Commodities from any third party. In the latter case BYPL shall furnish proof to Supplier of the cost of such substitute purchase. In either case, all costs of any replacement, substitution, shipping, labour and other related expenses incurred in connection with the return and replacement or for the substitute purchase of a Commodity hereunder should be for the account of Supplier. BYPL may set off such costs against any amounts payable by BYPL to Supplier. Supplier shall reimburse BYPL for the amount, if any, by which the price of a substitute Commodity exceeds the price for such Commodity as quoted in the Bid.

15.0 Effective Date of Commencement of Contract:

15.01 The date of the issuance of the Letter of Acceptance/Purchase Order shall be treated as the effective date of the commencement of Contract.

16.0 Time – The Essence of Contract

16.01 The time and the date of completion of the "Supply" as stipulated in the Letter of Acceptance / Purchase order issued to the Supplier shall be deemed to be the essence of the "Contract". The Supply has to be completed not later than the aforesaid Schedule and date of completion of supply.

17.0 The Laws and Jurisdiction of Contract:

17.01 The laws applicable to this Contract shall be the Laws in force in India.

17.02 All disputes arising in connection with the present Contract shall be settled amicably by mutual consultation failing which shall be finally settled as per the rules of Arbitration and Conciliation Act, 1996 at the discretion of Purchaser. The venue of arbitration shall be at Delhi in India.

18.0 Events of Default

18.01 Events of Default. Each of the following events or occurrences shall constitute an event of default ("Event of Default") under the Contract:

(a) Supplier fails or refuses to pay any amounts due under the Contract;

(b) Supplier fails or refuses to deliver Commodities conforming to this RFQ/specifications, or fails to deliver Commodities within the period specified in P.O. or any extension thereof

(c) Supplier becomes insolvent or unable to pay its debts when due, or commits any act of bankruptcy, such as filing any petition in any bankruptcy, winding-up or reorganization proceeding, or acknowledges in writing its insolvency or inability to pay its debts; or the Supplier's creditors file any petition relating to bankruptcy of Supplier;

(d) Supplier otherwise fails or refuses to perform or observe any term or condition of the Contract and such failure is not remediable or, if remediable, continues for a period of 30 days after receipt by the Supplier of notice of such failure from BYPL.

19.0 Consequences of Default.

(a) If an Event of Default shall occur and be continuing, BYPL may forthwith terminate the Contract by written notice.

(b) In the event of an Event of Default, BYPL may, without prejudice to any other right granted to it by law, or the Contract, take any or all of the following actions;

(i) present for payment to the relevant bank the Performance Bond;

(ii) Purchase the same or similar Commodities from any third party; and/or

(iii) Recover any losses and/or additional expenses BYPL may incur as a result of Supplier's default.

20.0 Liquidated Damages

20.01 If supply of items / equipments is delayed beyond the supply schedule as stipulated in purchase order then the Supplier shall be liable to pay to the Purchaser as penalty for delay, a sum of 1% (one percent) of the basic (ex-works) price of the contract for every week delay or part thereof delay until the actual date of completion.

20.02 The total amount for delay under the contract will be subject to a maximum of (10%) of the basic (ex-works) price.

20.03 The Purchaser may, without prejudice to any method of recovery, deduct the amount for such damages from any amount due or which may become due to the Supplier or from the Performance Bond or file a claim against the supplier.

21.0 Statutory variation in Taxes and Duties

21.1 The total order value shall be adjusted on account of any variations in Statutory Levies imposed by Competent Authorities by way of fresh notification(s) within the stipulated delivery period only. However, in case of reduction in taxes, duties and levies, the benefits of the same shall be passed on to BUYER.

21.2 No other Taxes, Duties & Levies other than those specified above will be payable by BUYER except in case of new Levies, Taxes & Duties imposed by the Competent Authorities by way of fresh notification(s) subsequent to the issue of PURCHASE ORDER but within the stipulated delivery period.

21.3 Notwithstanding what is stated above, changes in Taxes, Duties & Levies shall apply only to that portion of PURCHASE ORDER not executed on the date of notification by Competent Authority. Further, changes in Taxes, Duties & Levies after due date of Delivery shall not affect PURCHASE ORDER Terms and Value.

21.4 PURCHASE ORDER value shall not be subject to any variation on account of variation in Exchange rate(s).

21.5 Taxes & Duties on raw materials & bought out components are included in Order Value and are not subject to any escalation or variation for any reason whatsoever.

21.6 Taxes & Duties on raw materials & bought out components procured indigenously are included in Order Value and are not subject to any escalation or variation for any reason whatsoever.

21.7 THE CENTRAL GOODS AND SERVICES TAX ACT, 2017 (Anti Profiteering rules 2017)
As per GOI Notifications Section 164 read with Section 171 of the central goods and services tax act 2017, Central Govt makes "Anti Profiteering rules 2017 ". We have anti-profiteering Clause 171 applied as per Govt Notification which provides that it is mandatory to pass on all the benefits due to reduction in rate of tax or from input tax credit to the consumer by way of commensurate reduction in prices.

22.0 Force Majeure

22.01 General

An "Event of Force Majeure" shall mean any event or circumstance not within the reasonable control directly or indirectly, of the Party affected, but only if and to the extent that:

(i) Such event or circumstance materially and adversely affects the ability of the affected Party to perform its obligations under this Contract, and the affected Party has taken all reasonable precautions, due care and reasonable alternative measures in order to prevent or avoid the effect of such event on the affected party's ability to perform its obligations under this Contract and to mitigate the consequences thereof.

(ii) For the avoidance of doubt, if such event or circumstance would not have materially and adversely affected the performance of the affected party had such affected party followed good industry practice, such event or circumstance shall not constitute force majeure.

(iii) Such event is not the direct or indirect result of the failure of such Party to perform any of its obligations under this Contract.

(iv) Such Party has given the other Party prompt notice describing such events, the effect thereof and the actions being taken in order to comply with above clause.

22.02 Specific Events of Force Majeure subject to the provisions of above clause, Events of Force Majeure shall include only the following to the extent that they or their consequences satisfy the above requirements :

(i) The following events and circumstances:

a) Effect of any natural element or other acts of God, including but not limited to storm, flood, earthquake, lightning, cyclone, landslides or other natural disasters.

b) Explosions or fires

(ii) War declared by the Government of India, provided that the ports at Mumbai are declared as a war zone.

(iii) Dangers of navigation, perils of the sea.

22.03 Notice of Events of Force Majeure If a force majeure event prevents a party from performing any obligations under the Contract in part or in full, that party shall:

i) Immediately notify the other party in writing of the force majeure events within 7(seven) working days of the occurrence of the force majeure event

ii) Be entitled to suspend performance of the obligation under the Contract which is affected by force majeure event for the duration of the force majeure event.

iii) Use all reasonable efforts to resume full performance of the obligation as soon as practicable

iv) Keep the other party informed of all such efforts to resume full performance of the obligation on a regular basis.

v) Provide prompt notice of the resumption of full performance or obligation to the other party.

22.04 Mitigation of Events of Force Majeure Each Party shall:

(i) Make all reasonable efforts to prevent and reduce to a minimum and mitigate the effect of any delay occasioned by an Event of Force Majeure including recourse to alternate methods of satisfying its obligations under the Contract;

(ii) Use its best efforts to ensure resumption of normal performance after the termination of any Event of Force Majeure and shall perform its obligations to the maximum extent practicable as agreed between the Parties; and

(iii) Keep the other Party informed at regular intervals of the circumstances concerning the event of Force Majeure, with best estimates as to its likely continuation and what measures or contingency planning it is taking to mitigate and or terminate the Event of Force Majeure.

22.05 Burden of Proof In the event that the Parties are unable in good faith to agree that a Force Majeure event has occurred to an affected party, the parties shall resolve their dispute in accordance with the provisions of this Agreement. The burden of proof as to whether or not a force majeure event has occurred shall be upon the party claiming that the force majeure event has occurred and that it is the affected party.

22.06 Termination for Certain Events of Force Majeure. If any obligation of any Party under the Contract is or is reasonably expected to be delayed or prevented by a Force Majeure event for a continuous period of more than 3 months, the Parties shall promptly discuss in good faith how to proceed with a view to reaching a solution on mutually agreed basis. If a solution on mutually agreed basis cannot be arrived at within a period of 30 days after the expiry of the period of three months, the Contract shall be terminated after the said period of 30 days and neither Party shall be liable to the other for any consequences arising on account of such termination.

22.07 The Purchaser may terminate the contract after giving 15 (Fifteen) days notice if any of following occurs:

a) Contractor fails to complete execution of works within the approved schedule of works, terms and conditions.
b) In case the contractor commits any Act of Insolvency, or adjudged insolvent.
c) Has abandoned the contract.
d) Has failed to commence work or has suspended the progress of works.
e) Has failed to proceed the works with due diligence and failed to make such due progress.

22.08 Limitation of Force Majeure event. The Supplier shall not be relieved of any obligation under the Contract solely because cost of performance is increased, whether as a consequence of adverse economic consequences or otherwise.

22.09 Extension of Contract Period due to Force Majeure event The Contract period may be extended by mutual agreement of Parties by way of an adjustment on account of any period during which an obligation of either Party is suspended due to a Force Majeure event.

22.10 Effect of Events of Force Majeure. Except as otherwise provided herein or may further be agreed between the Parties, either Party shall be excused from performance and neither Party shall be construed to be in default in respect of any obligations hereunder, for so long as failure to perform such obligations shall be due to and event of Force Majeure."

23.0 Transfer and Sub-Letting

23.01 The Supplier shall not sublet, transfer, assign or otherwise part with the Contract or any part thereof, either directly or indirectly, without prior written permission of the Purchaser.

24.0 Recoveries

24.01 When ever under this contract any money is recoverable from and payable by the bidder, the purchaser shall be entitled to recover such sum by appropriating in part or in whole by detecting any sum due to which any time thereafter may become due from the supplier in this or any other contract. Should the sum be not sufficient to cover the full amount recoverable the bidder shall pay to the purchaser on demand the remaining balance.

25.0 Waiver

25.01 Failure to enforce any condition herein contained shall not operate as a waiver of the condition itself or any subsequent breach thereof.

26.0 Indemnification

26.01 Notwithstanding contrary to anything contained in this RFQ, Supplier shall at his costs and risks make good any loss or damage to the property of the Purchaser and/or the other Supplier engaged by the Purchaser and/or the employees of the Purchaser and/or employees of the other Supplier engaged by the Purchaser whatsoever arising out of the negligence of the Supplier while performing the obligations under this contract.

27.01 DOCUMENTATION

The Bidder shall procure all equipment from BYPL approved sources as per attached specifications. The Bidder's shall submit 5 copies of Material/Type Test Certificates, O&M Manuals, and Approved & As-built drawings, related to various equipment. The Bidder's shall ensure for the strict compliance to the specifications and Field Quality Procedures issued by BYPL Engineer in-charge.

27.0 Limitation of Liability

Except as provided otherwise in the Contract and except for willful misconduct or gross negligence, neither Party shall be liable to the other Party for loss of use of any Works, loss of profit, loss of any contract or any other indirect or consequential loss or damage which may be suffered by the other Party in connection with the Contract. The total liability of the Contractor to the Purchaser under the Contract shall not exceed the Contract Value. Except that this Clause shall not limit the liability of the Contractor:

(a) Under any other provisions of the Contract which expressly impose a greater liability,

(b) In cases of fraud, willful misconduct or illegal or unlawful acts, or

(c) In cases of acts or omissions of the Contractor which are contrary to the most elementary rules of diligence which a conscientious Contractor would have followed in similar circumstances.

28.0 Liability of Contractors

28.01 Subject to the due discharge of its obligations under the Contract and except in case of gross negligence or willful misconduct on the part of the Contractor or on the part of any person acting on behalf of the Contractor, with respect to any loss or damage caused by the Contractor to the Purchaser's property or the Site, the Contractor shall not be liable to the Purchaser for the following:

(a) For any indirect or consequential loss or damage; and

(b) For any direct loss or damage that exceeds:

(i) The total payments made and expected to be made to the Contractor under the Contract including reimbursements, if any; or

(ii) The insurance claim proceeds which the Contractor may be entitled to receive from any insurance purchased by the Contractor to cover such a liability, whichever is higher.

28.02 This limitation of liability shall not affect the Contractor's liability, if any, for damage to any third party, caused by the Contractor or any Person or firm acting on behalf of the Contractor in executing the Works.

28.03 Notwithstanding anything contained in the Contract, the Contractor shall not be liable for any gross negligence or willful misconduct on the part of the Purchaser or any of its affiliates, any vendor, or any party, other than Contractor and/or, its directors, officers, agents or representatives or its affiliates, or Subcontractor, or the vendor or any third party engaged by it.

28.04 Notwithstanding anything contained in the Contract, including but not limited to approval by the Purchaser of any drawings, documents, vendor list, supply of information or data or the participation of the Purchaser in any meeting and/or discussion or otherwise, shall not absolve the Contractor from any of its liabilities or responsibilities arising in relation to or under the Contract.

29.0 Intellectual Property Rights and Royalties

29.01 The Contractor shall indemnify the Purchaser and the Purchaser's Representative from and against all claims and proceedings on account of infringement (or alleged infringement) of any patent rights, registered designs, copyright, design, trademark, trade name, know-how or other intellectual property rights (hereinafter collectively referred to as "**Intellectual Property Rights**") in respect of the Works, Contractor's Equipment, machines, Works method, Plant, Materials, or anything whatsoever required for the execution of the Works and from and against all claims, demands, proceedings, damages, costs, charges and expenses whatsoever in respect thereof or in relation thereto. In the event of infringement of any Intellectual Property Rights of any third party as a result of the execution of the Works (or any part thereof) by the Contractor, the Contractor shall rectify, modify or replace, at its own cost, the Works, Plant or Materials or anything whatsoever required for the Works so that infringement ceases to exist or, in the alternative, the Contractor shall procure necessary rights/ licenses from the affected third party so that there is no infringement of Intellectual Property Rights.

29.02 The Contractor shall be promptly notified of any claim made against the Purchaser. The Contractor shall, at its cost, conduct negotiations for the settlement of such claim, and any litigation or arbitration that may arise from it. The Purchaser or the Purchaser's Representative shall not make any admission which might be prejudicial to the Contractor, unless the Contractor has failed to take over the conduct of the negotiations, litigation or arbitration within a reasonable time after having been so requested. In the event of Contractor failing to act at the Purchaser's Representative's notice, the Purchaser shall be at full liberty to deduct any such amount of pending claim from any amount due to the Contractor under the Contract or any other contract and the balance portion of claim shall be treated as debt due from the Contractor.

29.03 All Intellectual Property Rights in respect of any Plant, Materials, Drawings and Designs, plans, documents, specifications, data, materials, know how, charts, information, etc., provided to the Contractor by the Purchaser pursuant to this Contract for the execution of the Works, belongs to and shall continue to belong to the Purchaser and the Contractor shall not have any rights in the same other than the limited right for its use for the purpose of execution of the Works.

29.04 Intellectual Property Rights in respect of any Plant, Materials, Drawings and Designs, plans, calculations, drawings, documents, know-how and information relating to the Works which are proprietary to the Contractor and/ or its third party licensors ("**Contractor's IPR**") shall continue to vest with the Contractor and/ or its third party licensors and the Contractor shall grant and/ or procure from its third party licensors, at its own cost, a worldwide, perpetual, royalty free, non-exclusive license (along with the right to sub-license) to use and reproduce such Contractor's IPR for the use, operation, maintenance and repair of the Works.

29.05 If any patent, trademark, trade name, registered design or software is developed by the Contractor or its Subcontractor specifically for the execution of the Works, then all Intellectual Property Rights in respect of such design, trademark, trade name or software shall be the absolute property of the Purchaser and shall not be utilized or retained by the Contractor (or its Subcontractors) for any purpose other than with the prior written consent of the Purchaser.

29.06 If the Contractor uses proprietary software (whether customized or off the shelf) for the purpose of storing or utilizing records in relation to the Works, the Contractor shall obtain at its own expense, the grant of a worldwide, royalty-free, perpetual licence or sublicence (including the right to sublicense) to use such software, in favour of the Purchaser provided that the use of such software under the licence or the sublicense may be restricted to use any such software only for the design, construction, reconstruction, manufacture,

installation, completion, reinstatement, extension, repair and operation of the Works or any part thereof.

29.07 If any software is used by the Contractor for the execution of the Works over which the Contractor or a third party holds pre-existing title or other rights, the Contractor shall obtain for the Purchaser, a worldwide, royalty free, perpetual license for the right to use and apply that software (together with any modifications, improvements and developments thereof).

30.01 Commissioning Spares

30.01 Commissioning Spares shall be deemed to be included in the quoted prices.

31.0 Tax Indemnity Clause:

31.01 Vendor (along with its affiliates in India or overseas including any agent/ third party contractor or any other person appointed by such affiliates for the purpose of this agreement) agrees that it will be solely responsible for performing all compliances and making payments of all taxes (direct tax or indirect tax including but not limited to income-tax, transfer pricing, value added tax, SGST, CGST, IGST, UTGST, GST Compensation Cess custom duty, excise duty, Research and Development Cess, etc.), cesses, interest, penalties or any other tax/ duty/ amount/ charge/ liability arising either out of laws/ regulations applicable in India and overseas or because of a demand/ recovery initiated by any revenue authority under laws/ regulations applicable in India or overseas.

31.02 In case any tax liability (including but not limited to income-tax, transfer pricing, value added tax, SGST, CGST, IGST, UTGST, GST Compensation Cess custom duty, excise duty, Research and Development Cess, etc.), cesses, interest, penalties or any other tax/ duty/ amount/ charge/ liability becomes payable by Purchaser due to failure of the Vendor, or any of its affiliates in India or overseas including any agent/ third party contractor or any other person appointed by such affiliates for the purpose of this agreement, to comply with the relevant laws/ regulations applicable in India or overseas, Vendor undertakes to indemnify Purchaser for an amount equal to amount payable by Purchaser.

31.03 Further, Vendor undertakes to keep Purchaser indemnified at all times against and from all other actions, proceedings, claims, loss, damage, costs and expenses which may be brought against Purchaser or suffered or incurred by Purchaser and which shall have arisen either directly or indirectly out of or in connection with failure of The Vendor, or any of its affiliates in India or overseas including any agent/ third party contractor or any other person appointed by such affiliates for the purpose of this agreement, to comply with relevant obligations/ compliance under any law/ regulations applicable in India and overseas.

31.04 The parties agree to follow the following process in case any communication of demand, arising out non-compliance by Vendor (along with its affiliates in India or overseas including any agent/ third party contractor or any other person appointed by such affiliates for the purpose of this agreement), is received by Purchaser :

31.4.1 On Purchaser receiving any communication from a competent authority demanding tax liability (including but not limited to income-tax, transfer pricing, value added tax, SGST, CGST, IGST, UTGST, GST Compensation Cess custom duty, excise duty, Research and Development Cess, etc.), cesses, interest, penalties or any other tax/ duty/ amount/ charge/ liability, Purchaser shall, within 5 common working days from the date of receipt of such communication (save where the period to respond to the relevant authority is less than five days, in which case, as soon as reasonably possible) inform Vendor in writing of such communication.

31.4.2 Pursuant to receiving communication from Purchaser, Vendor shall suggest to accept the communication and pay the demand amount to the competent authority. In

such an event, Vendor shall reimburse such amount paid to Purchaser within 5 working days from the date of payment by Purchaser to the competent authority.

31.4.3 If Vendor advises in writing and Purchaser agrees to dispute the demand, then Purchaser shall dispute the matter with competent authority as per due process prescribed under the regulations and Purchaser shall not pay the Tax Demand. In such scenario, cost of litigation including but not limited to Counsel cost, filing fees, other related charges, should be reimbursed by Vendor to Purchaser. Additionally, If any coercive steps of recovery are initiated by the department, then Purchaser would pay such amount (including by way of adjustment of refunds due to it) and the same would be reimbursed by Vendor within 5 working days from date of such recovery from Purchaser. Purchaser will take all necessary steps to avoid such recovery measures.

31.4.4 On determination of the demand through an Order issued by a Tribunal or any other similar Authority, by whatever name called, under any law applicable in India or overseas, if the demand or any part thereof becomes payable and is paid by Purchaser, then Vendor undertakes to reimburse such amount to Purchaser within 10 days from the date of payment. Alternatively, if on determination of the demand through an Order, no amount is payable by Purchaser then any refund arising to Purchaser due to such an Order shall be passed on to Vendor within 10 days from the date of receipt of refund.

32.0 TRANSIT INSURANCE:

32.1 Transit Insurance shall be arranged by the Bidder.

32.2 DAMAGE / LOSS OF CARGO IN TRANSIT: Vendor shall be solely responsible for coordinating with the concerned insurance company for procuring insurance for material and/or Goods, processing claim lodgment and settlement. Notwithstanding the insurance cover, in case of loss / damage to material and/or Goods, in any manner and for any cause whatsoever, Vendor shall cause the damaged cargo to be replaced and delivered to the Purchaser with new material and/or Goods within 30 days of such loss / damage. The Vendor shall be solely responsible for all expenses in relation to the replacement and delivery in such circumstances.

33.0 Acceptance:

33.01 Vendor confirms to have gone through the Policy of BYPL on legal and ethical code required to be followed by vendors encapsulated in the "Vendor Code of Conduct" displayed on the official website of BYPL (www.bsesdelhi.com) also, which shall be treated as a part of the contract/PO/WO.

Vendor undertakes that he shall adhere to the Vendor code of Conduct and also agrees that any violation of the Vendor Code of Conduct shall be treated as breach of the contract/PO/WO.

In event of any such breach, irrespective of whether it causes any loss/damage, Purchaser (BYPL) shall have the right to recover loss/damage from Vendor.

The Contractor/Vendor herby indemnifies and agrees to keep indemnified the Purchaser (BYPL) against any claim/litigation arising out of any violation of Vendor Code of Conduct by the Contractor/Vendor or its officers, agents & representatives etc.

33.02 Acceptance of the CONTRACT implies and includes acceptance of all terms and conditions enumerated in the CONTRACT in the technical specification and drawings made available to Contractor consisting of general conditions, detailed scope of work, detailed technical specification, detailed equipment drawing and complete scope of work.

33.03 Contractor and Company contractual obligation are strictly limited to the terms set out in the CONTRACT. No amendments to the concluded CONTRACT shall be binding unless agreed to in writing for such amendment by both the parties

SECTION IV

PRICE FORMAT – SUPPLY (A) (Items shown are indicative, Kindly refer BOQ, attached as Annexure)

DESCRIPTION OF GOODS	HSN CODE (8 Digit Mandatory)	QTY	UoM	UNIT BASIC PRICE (₹)	UNIT FREIGHT (₹)	TOTAL TAXABLE UNIT BASIC PRICE (₹)	UNIT GST & CESS AS APPLICABLE		UNIT LANDED COST (₹)	TOTAL LANDED COST (₹)
							CGST & SGST/ IGST/ CESS/ etc			
							%	AMT		
Items as per BOQ i.e. shall be utilized to furnish price break-up.										
GRAND TOTAL LANDED COST										
In words ……										

NOTE:

1) Bidder shall include & indicate any others taxes under the applicable law(s) for supply and services to be performed in the purchaser's country.
2) The bidder shall, at its own, handle all imported equipment's and handle all formalities for custom clearances, port charges, etc if any.
3) All Tools & Tackles, Consumables and Commissioning Spares required to complete the work shall be included in the quoted rates.
4) In case any additional equipment is required, the same should be included in the scope with no additional payment and the offer should be complete and comprehensive.
5) Specify amount of taxes, duties and levies as per GST Rules, payable on the transactions between contractor and employer as applicable for destination site/state on all terms of supply including brought-out finished items(to be identified in the contract),which shall be dispatched directly from the Sub vendor's works to the Employer's site (sale-in-transit), only.

SECTION V

SUMMARY COMMERCIAL TERMS AND CONDITIONS – SUPPLY

Sl No	Item Description	AS PER BYPL	BIDDER'S CONFIRMATION
1	Validity	150 days from the due date of submission	
2	Price basis	a) Firm, FOR Delhi store basis. Prices shall be inclusive of all taxes & duties, freight upto Delhi stores. b) Unloading at site stores - in vendor's scope c) Transit insurance in Bidders scope	
3	Payment terms	As per Clause 8.0 of Part I, Page 18	
4	Completion time	150 days from date of LOI/PO	
5	Defect Liability period	36 months from the date of Handing over of entire Installation. For Cable: The Defect liability period shall be 60 months from the date of commissioning or 66 months from the date of delivery whichever is earlier.	
6	Liquidated damages	1% per week of delay of the basic (ex-works) price of undelivered units or part thereof subject to maximum of 10% of total basic (ex-works) price of undelivered units	
7	Contract Performance Bank Guarantee	10% (Ten percent) of the Contract Price valid upto completion period/handing over	
8	Performance Bank Guarantee	10% (Ten percent) of the Contract Price valid upto 36 months from the date of Handing over of entire Installation plus 3 months towards claim period	

Bidder should furnish the below details for future communication:-

General Information
Full Name of the Company:
Postal Address:
GSTIN:

For Technical Clarification(s)
Name:
Designation:
E-Mail:
Mobile No.:
Telephone No.:

For Commercial Clarification(s) / Reverse Auction
Name:
Designation:
E-Mail:
Mobile No.:
Telephone No.:

SECTION VI

BID FORM

To

Head of Department
Contracts & Material Deptt.
BSES Yamuna Power Ltd
Shaktikiran Building, Karkardooma,
Delhi 110032

Sir,

1 We understand that BYPL is desirous of procuring…….. for it's licensed distribution network area in Delhi

2 Having examined the Bidding Documents for the above named works, we the undersigned, offer to deliver the goods in full conformity with the Terms and Conditions and technical specifications for the sum of..... (figures.....) or such other sums as may be determined in accordance with the terms and conditions of the contract .The above Amounts are in accordance with the Price Schedules attached herewith and are made part of this bid.

3 If our Bid is accepted, we under take to deliver the entire goods as) as per delivery schedule mentioned in Section IV from the date of award of purchase order/letter of intent.

4 If our Bid is accepted, we will furnish a performance bank guarantee for an amount of 10% (Ten)percent of the total contract value for due performance of the Contract in accordance with the Terms and Conditions.

5 We agree to abide by this Bid for a period of 150 days from the due date of bid submission and it shall remain binding upon us and may be accepted at any time before the expiration of that period.

6 We declare that we have studied the provision of Indian Laws for supply of equipments/materials and the prices have been quoted accordingly.

7 Unless and until Letter of Intent is issued, this Bid, together with your written acceptance there of, shall constitute a binding contract between us.

8 We understand that you are not bound to accept the lowest, or any bid you may receive.

9 There is provision for Resolution of Disputes under this Contract, in accordance with the Laws and Jurisdiction of Contract.

Dated this..... day of..... 2019

Signature..... In the capacity of ……

.....duly authorized to sign for and on behalf of

(IN BLOCK CAPITALS) .....

SECTION VII

ACCEPTANCE FORM FOR PARTICIPATION IN REVERSE AUCTION EVENT

(To be signed and stamped by the bidder)

BSES Yamuna Power Ltd (hereinafter referred to as **"BYPL"**) intends to use the reverse auction through SAP-SRM tool as an integral part of the entire tendering process. All the bidders who are found as techno commercial qualified based on the tender requirements shall be eligible to participate in the reverse auction event.

The following terms and conditions are deemed as accepted by the bidder on participation in the bid event:

1. BYPL shall provide the user id and password to the authorized representative of the bidder. (Authorization letter in lieu of the same be submitted along with the signed and stamped acceptance form)
2. BYPL will make every effort to make the bid process transparent. However, the award decision by BYPL would be final and binding on the bidder.
3. The bidder agrees to non-disclosure of trade information regarding the purchase, identity of BYPL, bid process, bid technology, bid documentation, bid details, and etc.
4. The bidder is advised to understand the auto bid process to safeguard themselves against any possibility of non-participation in the auction event.
5. In case of bidding through internet medium, bidders are further advised to ensure availability of the entire infrastructure as required at their end to participate in the auction event. Inability to bid due to telephone line glitch, internet response issues, software or hardware hangs; power failure or any other reason shall not be the responsibility of BYPL.
6. In case of intranet medium, BYPL shall provide the infrastructure to bidders, further, BYPL has sole discretion to extend or restart the auction event in case of any glitches in infrastructure observed which has restricted the bidders to submit the bids to ensure fair & transparent competitive bidding. In case of an auction event is restarted, the best bid as already available in the system shall become the start price for the new auction.
7. In case the bidder fails to participate in the auction event due any reason whatsoever, it shall be presumed that the bidder has no further discounts to offer and the initial bid as submitted by the bidder as a part of the tender shall be considered as the bidder's final no regret offer. Any offline price bids received from a bidder in lieu of non-participation in the auction event shall be out rightly rejected by BYPL.
8. The bidder shall be prepared with competitive price quotes on the day of the reverse auction event.
9. The prices as quoted by the bidder during the auction event shall be inclusive of all the applicable taxes, duties and levies and shall be FOR Landed Cost basis at BYPL site.
10. The prices submitted by a bidder during the auction event shall be binding on the bidder.
11. No requests for time extension of the auction event shall be considered by BYPL.
12. The original price bids of the bidders shall be reduced on pro-rata basis against each line item based on the final all inclusive prices offered during conclusion of the auction event for arriving at contract amount.

Signature & seal of the Bidder

SECTION VIII

FORMAT FOR EMD BANK GUARANTEE

(To be issued in a Non Judicial Stamp Paper of Rs.50/-purchased in the name of the bank)

Whereas [*name of the Bidder*] (herein after called the "Bidder") has submitted its bid dated[*date of submission of bid*] for the supply of [*name and/or description of the goods*] (here after called the "Bid").

KNOW ALL PEOPLE by these presents that WE [name of bank] at [*Branch Name and address*],having our registered office at[*address of the registered office of the bank*](herein after called the "Bank"),are bound unto BSES Yamuna Power Ltd., with it's Corporate Office at Shaktikiran Building, Karkardooma, Delhi -110032, (herein after called —the "Purchaser")in the sum of Rs…… (Rupees…… only) for which payment well and truly to be made to the said Purchaser, the Bank binds itself, its successors, and assigns by these presents.

Sealed with the Common Seal of the said Bank this_____ day of_____ 20____.

TH E CONDITIONS of this obligation are:

1 If the Bidder withdraws its Bid during the period of bid validity specified by the Bidder on the Bid Form ; or

2. If the Bidder, having been notified of the acceptance of its Bid by the Purchaser during the period of bid validity:

(a) fails or refuses to execute the Contract Form ,if required; or

(b) fails or refuses to furnish the performance security, In accordance with the Instructions to Bidders/ Terms and Conditions;

We undertake to pay to the Purchaser up to the above amount upon receipt of its first written demand, without the Purchaser having to substantiate its demand, provided that is its demand the purchaser will note that amount claimed by it is due to it, owing to the occurrence of one or both of the two condition(s), specifying the occurred condition or condition(s).

This guarantee will remain in force up to and including One Fifty (150) days after the due date of submission bid, and any demand in respect thereof should reach the Bank not later than the above date.

(Stamp & signature of the bank)

Signature of the witness

LITIGATION HISTORY

Year	Name of client	Details of contract & date	Cause of Litigation/arbitration and dispute	Disputed amount

CURRENT CONTRACT COMMITMENTS/ WORK IN PROGRESS

Year	Name of client	Details of contract & date	Value of outstanding work	Estimated completion date

FINANCIAL DATA

(Duly Certified by Chartered Accountant)

	Actual in previous 5 financial years				
	FY 17-18	FY 16-17	FY 15-16	FY 14-15	FY 13-14
Total assets					
Current assets					
Total Liability					
Current Liability					
Profit before taxes					
Profit after taxes					

CHECK LIST

Sr No	Description	Compliance
1	INDEX	YES/NO
2	COVERING LETTER	YES/NO
3	BID FORM (UNPRICED) DULY SIGNED	YES/NO
4	BILL OF MATERIAL (UNPRICED)	YES/NO
5	DOCUMENTS IN SUPPORT OF QUALIFICATION CRITERIA	YES/NO
6	TECHNICAL BID	YES/NO
7	ACCEPTANCE TO COMMERCIAL TERMS AND CONDITIONS	YES/NO
8	FINANCIAL BID (IN SEALED ENVELOPE)	YES/NO
9	EMD IN PRESCRIBED FORMAT	YES/NO
10	DEMAND DRAFT OF RS 1180/- DRAWN IN FAVOUR OF BSES YAMUNA POWER LTD	YES/NO
11	POWER OF ATTORNEY/AUTHORISATION LETTER FOR SIGNING THE BID	YES/NO
12	FINANCIAL DATA IN TABULAR FORMAT	YES/NO
13	LIST OF CURRENT COMMITMENTS/WORK IN PROGRESS	YES/NO
14	BANK SOLVENCY CERTIFICATE	YES/NO
15	NO LITIGATION CERTIFICATE	YES/NO

SECTION IX

GENERAL TERMS & CONDITIONS - LAYING, TESTING, & COMISSIONING

1. DEFINITIONS and INTERPRETATION

The following terms shall have the following meanings:

1.1 "Company/Employer": means BSES Yamuna Power Ltd, a company incorporated under the Companies Act 1956 and having its office at BSES Yamuna Power Limited having its office at Shaktikiran Building, Karkardooma, Delhi -110032, which expression shall include its authorized representatives, agents, successors and assigns.

1.2 "Contractor": shall mean the successful Tenderer / vendor to whom the contract has been awarded

1.3 "Rate": The unit rates for the work to be carried out at site shall be as per finalized unit rates through tender. The finalized rates shall be firm for the entire duration of work to be carried out by the Contractor under the work order and are not subject to escalation for any reason whatsoever.

1.4. CONTRACT SPECIFICATION: The terms "CONTRACT Specification" shall mean the Technical specification of the work as agreed by you and description of work as detailed in Annexure-I enclosed herewith and all such particulars mentioned directly/referred to or implied as such in the contract.

1.5 SITE: The terms "Site" shall mean the working location in BYPL area. Under this tender, working location shall be as mentioned elsewhere.

1.6 ENGINEER IN CHARGE: "Engineer In-charge" means the Company's authorized representative for the purpose of carrying out the work.

1.7 PRIORITY OF CONTRACT DOCUMENTS:
The several documents forming the Contract are to be taken as mutually explanatory of one another, but in case of ambiguities or discrepancies, the same shall be explained and adjusted by the Employer, who shall thereupon issue to the Contractor, instructions thereon. In such event, unless otherwise provided in the Contract, the priority of the documents forming the Contract shall be as follows:

1.1. SAP Work Order duly acknowledged by Contractor
1.2. Price Schedule
1.3. Special Condition of Contract
1.4. Technical specification and Tender Drawing
1.5. Erection Conditions of Contract
1.6. General Conditions to the Contract

2. EXAMINATION OF SITE AND LOCAL CONDITIONS:

The contractor is deemed to have visited the site of the work and ascertained therefore all site conditions and information pertaining to his work. The company shall not accept any claim whatsoever arising out of the difficult site/terrain/local conditions, if any.

3. LANGUAGE AND MEASUREMENT:

The CONTRACT issued to the contractor by the company and all correspondence and documents relating to the CONTRACT placed on the Contractor shall be written in English language.

Metric System shall be followed for all dimension, units etc.

4. SCOPE OF WORK:

The scope of work shall be Digging, Laying, Testing and commissioning, etc. Schedule of work shall be as mentioned in the Bill of quantity attached herewith.

Free Issue Material as required for the completion of work under the scope of the Contract shall be issued free of cost by the Employer / Owner from its stores. Transportation from store to the work area shall be in scope of the Contractor.

The Contractor shall requisition the free issue materials in the prescribed format(s) to the Employer and Employer shall arrange to issue the same on Free of Cost basis.

The Contractor shall take proper care of the materials supplied to the Contractor and protect the same from weathering and any other damages. Any material rendered unserviceable or damaged while in Contractor's custody shall be replaced by the Contractor at his cost as determined by the Engineer.

The Contractor shall have to furnish an Indemnity Bond (Annexure attached) for the materials supplied free of cost by the Employer / Owner. Further, he shall be responsible for the safe custody of materials till the materials are utilized, fabricated, erected and accounted for in all respect in the Project.

After completion of L/T/C work as per the SOW, contractor has to obtain the Electrical Inspectorate's Clearance from the Electrical Inspector of Delhi Govt. However the Electrical Inspectors clearance fees shall be paid by the company.

Engineer In-Charge shall arrange any permission like Road cutting clearance etc. from the Delhi Civic authorities like MCD,DDA, PWD and DJB. However, the contractor shall make follow up with local authorities and other connected persons that may be required to carry out the job under this work order.

All the labour, cranes, tool and tackles, and technical supervision etc. are including in your scope of work. Adequate number of engineers, supervisors and labours shall be posted at site and the list of the same along with certificate of Qualification of technical staff should be submitted by the Contractor to the Engineer In Charge for checking the adequacy immediately (with in seven days) after award of contract.

The Contractor shall also make his own arrangement for the accommodation/conveyance requirements for its staff at site. Company will provided at site the adequate open space for contractor's site store for storing the materials, tools, tackles etc. The entire Contractor's storage will be within the site premises. All the incoming and outgoing materials, equipment, tools, tackles and any other items related to said work shall be entered into the register kept for this purpose and shall be in the custody of Contractor, however company does not hold any responsibility for any loss or damage of Contractor's material etc.

All loading/unloading, of materials at work-site shall be your responsibility. Involvement of Crane/Hydra/Tractor/Trailer for this type of work shall be in your scope. Adequate weather

protection shall be provided by the contractor to keep the materials safe from sun & rain by providing covered storage space as well as using tarpaulins.

The Contractor will make his own arrangement for electricity and water requirement from Local sources for construction requirements.

The Contractor will be required to make his own arrangement for distribution of water/power on the site by erecting temporary lines. All such work shall be carried out according to local regulation. The temporary lines will be removed forthwith after the completion of work. If there is hindrance caused to the other work done to the alignment of these lines, the contractor will re-route and remove the temporary lines at his own cost

Under no circumstances the delay in work shall be attributed to non-availability or inadequate power and / water supply.

5. SITE MOBILIZATION:

5.1 Contractor shall commence the work as per the plan.
5.2 Contractor shall submit deployment plan for the T&P and Man power required for the project. If the Contractor is not able to deploy the required T&P, manpower & construction materials, Employer, at its sole discretion, may opt to arrange the same on behalf of Contractor and an amount of cost plus 20% shall be deducted from any amount due or becoming due to the Contractor.
5.3 Quality Assurance Plan: Contractor to submit QAP / FQP for the complete scope within 02 weeks of issue of order for Employers / Owners Approval. Works to be executed as per approved QAP.
5.5 Schedule of work to be performed shall be as per implementation schedule (to be finalized during kick-off meeting).
The Network so finalised shall also be used for the purpose of contract execution, monitoring progress of work, payments and operation of all other terms and conditions of the Contract strictly.
The Schedules shall be reviewed periodically with the Employer / Owner to ensure that the completion dates for different milestones will be met and to institute all corrective steps such as mobilising additional resources in terms of labour, materials, equipment, tools and plant, night work etc. at no extra cost to the Employer / Owner to achieve any accelerated progress at any time to the extent required to adhere to the completion dates. The Employer / Owner reserves the right to revise the work schedule at his discretion in order to ensure completion date and to suit the project requirements and such alterations shall not entitle the Contractor to any extra payment.

6. RATES:

The rates finalized for this order shall be firm for the entire duration of work carried out by the Contractor under the order and are not subject to any variation and escalation for any reason whatsoever.

Rate for all the extra items shall be mutually negotiated and fixed on the basis of cost of materials, consumables, labour and T&P expenses plus overhead expenses and profit upto maximum 10%.

The cost of insurance during loading/unloading of materials/ equipments during its storage and handling/erection at site for installation is included in the contractor's scope and value is included in the unit rates finalized.

7. TAXES AND DUTIES:

Prices are inclusive of all taxes and duties including labour cess and GST as applicable. However, IT as per applicable rate will be deducted from your bills as Tax Deduction at Source (TDS).
The total order value shall remain **FIRM** and shall only be adjusted on account of any variations in Statutory Taxes, duties and Levies imposed by Competent Authorities by way of fresh notification(s) within the stipulated delivery period.

8. BILL SUBMISSION PROCEDURE:

All bills shall be submitted to the Engineer In charge / Package Engineer for certification. Bills shall be complete in all respect including ESI / HR compliance, Quality compliance, HSE compliance, Store compliance, Finance compliance etc. An established procedure is followed at site. Incomplete bills / invoices will not be considered for processing payments.

9. POWER TO WITHHOLD PAYMENT BY EMPLOYER:

9.1 Employer shall have power to withhold payment of RA Bill in full or in parts for the reason of non compliance of major contract terms and conditions such as quality of work, progress of work etc as per the discretion of Engineer In Charge.
9.2 Such withholding of payment neither relieve the contractor to execute the work with due diligence and speed, nor entitle contractor to claim any interest, loss of anticipated profit, etc there on.
9.3 All the compliances to be done by the Contractor before next RA bill and hold amount to be released. In case contractor is not able to do the compliance before next RA bill such hold amount shall be released as and when such compliances are fulfilled to the satisfaction of Employer.
9.4 If the work is not performed in strict accordance with the contract ,or if the work of any other contract between the contractor herein and the Employer is not performed in strict accordance with its terms ,or if the Employer has a claim against the contractor herein for any other reason whatsoever ,or if any claim ,just or unjust (including claims for wrongful death and for injuries to person property), which arises out of the performance of work is made against the Employer, the Employer shall have the right to withhold out of any payment, final or otherwise, such sums as the Employer may deem ample to protect it against delays or loss or to assure the payment of such claims.
9.5 Deduction of Defective Work as Alternative to Requiring Corrections: If the Employer deems it inexpedient to require the Contractor to Correct Work damaged or not done in accordance with the Contract, an equitable deduction from the Contract Price shall be made by agreement between the Contractor and Employer. In the event of failure of said parties to reach an agreement, the amount to be so deducted shall be settled in accordance with the procedure hereinafter provided for the settlement of disputes. Until such settlement, the Employer may withhold such sum as it deems just and reasonable from monies, if any, due the Contractor.

10. TERMS OF PAYMENT

Payment shall be made to you as under:

i) 85% pro-rata payment of total installation value of the actual executed value shall be made progressively on submission of your running invoices on Monthly basis duly certified by our Engineer In charge & shall be paid within 30 days on receipt of such bills at our office.

ii) Balance 15% on account of total installation value of the actual executed value payable shall be paid in 30 days after completion of successful acceptance testing, commissioning and handing over of complete systems duly certified by BYPL Engineer-in-Charge specified in the tender and on submission of performance Bank Guarantee of 10% amount, in our format valid up to a defect liability period for 36 months from the date of handing over of the scheme including submission of Electrical Inspector Clearance Certificate, Compliance of final punch point, No Demand Certificate,

Letter of Indemnity by the supplier (The format of No Demand Certificate and Letter of Indemnity are attached as Annexure) and after reconciliation & adjustments of payments, if any towards quantities of materials issued from purchaser's stock and consumed by the contractor for expeditious completion of the job.

Balance 15% on account of total installation value of the actual executed value payable shall be paid in 30 days after completion of successful acceptance testing, commissioning and handing over of complete systems duly certified by BYPL Engineer-in-Charge specified in the tender and on submission of performance Bank Guarantee of 10% amount, in our format valid up to a defect liability period for 36 months from the date of handing over of the scheme including submission of Electrical Inspector Clearance Certificate, Compliance of final punch point and after reconciliation & adjustments of payments, if any towards quantities of materials issued from purchaser's stock and consumed by the contractor for expeditious completion of the job.

All the Bank guarantees shall be submitted as per Company's format (Appendix) and from any scheduled Bank approved by Company.

11. DEFECT LIABILITY PERIOD:

Work executed shall be guaranteed against any defect or failure which may arise due to faulty materials, design or workmanship for a period of 36 months from the date of handing over of entire installation.

If during the Defect Liability Period any materials/ items are found to be defective, these shall be replaced or rectified by the bidder at his own cost within 30 days from the date of receipt of intimation.

12. COMPLETION PERIOD:

You are required to mobilize your manpower and Tools & Tackles and furnish a list of equipments to be used for erection and commence the execution activity as per instructions of Engineer In-charge. The entire erection work should be completed within 150 days from the date of issue of LOI. The detailed schedule and milestone completion dates would be as per the contract schedules given from time to time by Engineer In-charge at site. You shall submit a weekly progress report to Engineer In charge.

13. CLEANLINESS:

All debris shall be removed and disposed of at assigned areas on daily basis. Surplus excavated earth shall be disposed of in an approved manner. In short, you shall be fully responsible for keeping the work site clean at all times. In case of non- compliance, company shall get the same done at Contractor's risk and costs.

14. COMMISSIONING & ACCEPTANCE TEST:

After completion of the work, the Contractor shall conduct trial run/ operation in the presence of Engineer In charge. During such trial run the system shall be operated under the supervision of the Contractor. If any rectification/modification required during this period the Contractor shall do all necessary measures.
On satisfactory completion of above, the system shall be deemed to have energized and placed in commercial operation. The Engineer In Charge will issue an acceptance certificate.

15. WORK COMPLETION CERTIFICATION, HANDING OVER:

The work carried out by the Contractor under this order has to be certified by Engineer In-charge for satisfactory completion of work allotted to the contractor with respect to specifications / Field Quality Procedures as per applicable standards. In case of modification/correction to be carried

out, contractor shall carry out the said modifications/correction without additional cost. The Contractor shall remain in close contact with Engineer In-Charge at site to report the general findings of the fieldwork during the initial as well as later stage of the work at site.

16. RECONCILIATION:

Reconciliation of free issue material, BOQ items shall be done on monthly basis and same shall form part of the running bills. The contractor shall maintain an accurate and exhaustive record detailing out the list of all items received by him for the purpose of erection and keep such record open for the inspection of the company. All measurement of works shall be done in The Joint Measurement Book, jointly signed by Engineer In Charge / Package Owner and contractor's representative. Copy of measurement sheet shall form part of both running bill and final bill.

The contractor shall be solely responsible for any shortage or damage of materials issued to them handling of and / or in storage and erection at site and cost of the same will be recovered from the contractor as certified by Engineer In-Charge.

17. PUNCH LIST AND OUTSTANDING WORK:

17.1 The Contractor shall, in conjunction with the Employer / Owner, prepare and update on a continuing basis during the period between completion of structure and final completion, punch lists (based on the preliminary punch list) of outstanding items requiring completion or rectification.
17.2 The Contractor shall rectify or complete to the standards specified in the Contract and in accordance with the schedule stated in the punch list any outstanding items of work or plant noted as requiring rectification or as incomplete. In the event that the Contractor fails to commence and / or diligently proceed with the execution of any such outstanding items of work in accordance with such schedule, the Employer / owner may arrange for the outstanding work to be done and reasonable cost thereof shall be certified by the Employer / Owner and deducted from the contract price or paid by the Contractor to the Employer / Owner.
17.3 The parties may in any event agree that any outstanding items of work shall be carried out by the Employer / Owner or shall otherwise be deleted from the punch list referred to above, subject to the agreement of any appropriate sum to be paid or allowed by the Contractor to the Employer / Owner in respect of such outstanding item.
17.4 Rectification / Correction and Replacement of faulty / defective / damaged work
The Employer may reject defective or unsatisfactory work or materials. The Contractor shall proceed immediately with the correction of rejected, defective, or unsatisfactory workmanship or materials and shall have all objectionable materials and defective work removed from the site (or any place used for storing materials for use on the work) and replaced.

18. REMEDY FOR CONTRACTOR'S DEFAULT:

In case the quality of works performed by the Contractor is found to be not meeting the requirements of the contract, then the Employer / Owner shall have the right to demolish such work and get it re-executed at the risk and cost of the contractor. In case the contractor is not able to perform as per the time schedule and other requirements of the contract, then, the Employer / Owner, upon giving a notice of 7 (seven) days to the contractor, can get the works rectified/completed by some other agency, at the risk and cost of the contractor.

19. DEMOBILIZATION:

19.1 Prior to Handing over, the contractor shall remove all the belonging from the site.
19.2 Debris, Rubbish etc. so as to take all practical measures to prevent damage to the site or any other property on or near the site or work area. As soon as reasonably practicable, but in any event prior to handing over, the contractor shall remove or dispose of in accordance with applicable laws all such rubbish, debris, etc. and all contractor's Equipment, supplies, materials and wastes brought or produced by the contractor on the site or the work area.

19.3 Labour and Hutments: Labour and work men engaged by the contractor for the works along with their hutments, sheds and dwellings, notwithstanding the foregoing, the contractor shall be responsible for the removal of all its temporary structures built at site.

20. CONTRACT CLOSURE:

As per Annexure - Contract closure document

21. CODES AND STANDARD:

All required codes and standard detailed in the specifications are to be adhered to. The plant equipment material and works shall be completely furnished in all the respects in accordance with the technical specification as per the acceptable codes & standards.

22. PENALTY AND LIQUIDATED DAMAGES:

22.1 Penalty: A penalty of 2.5% of bill amount shall be levied in each case of non-compliance of safety practices and site cleanliness.

22.2 Liquidated Damages: In the event of any delay in completion of the work beyond the stipulated time given by in order due to reasons solely attributable to the Contractor, the Contractor shall pay to the Company liquidated damages.

If the Contractor failed perform the services within the time period specified in the order, the Company shall, without prejudice to its other remedies under the contract, deduct liquidated damages a sum equivalent to 1 % of the work value (basic) for each week or part there of delay until the actual date of completion up to a maximum deduction of 10% of order value (basic). Once the maximum is reached to Company may consider termination of contract without any liabilities to Company.

22.3 The Liquidated Damages shall not in any way relieve the Contractor from any of its obligations to complete the Work or from any other obligations and liabilities of the Contractor under the Contract.

22.4 Notwithstanding the above, in the event the Contractor fails to complete the package as per the schedule; and delays the Employer 'Handing Over' of the plant / Structure / unit(s) up to a period for which the Liquidated Damages for time delay becomes more than 5% of the Contract Price, then the Employer at his sole discretion, shall be entitled to treat the failure as an act of default by the Contractor and same shall entitle the Employer to terminate the Contract and get the work done by some other agency, at the Risk & Cost of Contractor.

22.5 Employer shall issue notice to Contractor in writing before recommending any risk & cost to contractor. The Contractor shall immediately provide an action plan to make good of any balance Work/deficient Work within seven (07) days of receiving such notice. Any non response by the Contractor to the Risk and Cost proposal of the Employer or failure to provide an action plan shall be deemed as acceptance of the Risk and Cost proposal by the Contractor.
20.6 The Liquidated Damages for delay will be recovered at the sole discretion of the Employer from the Contract Price or from other securities/ BG's available with the Employer or jointly.
20.7 Time is essence of the Contract. After issuance of the Work order, the Contractual network / L2 network will be finalized and approved by the Employer.

Engineer In charge should specifically mention the amount of LD levied on the bill of contractor.

23. MITIGATION OF CONSEQUENCES OF DELAY:

In all cases where such an event for delay has occurred, the Contractor shall advise the Employer / Owner of -

21.1 "The extent of the actual and contemplated delay and its anticipated effect upon the date of "Handing-Over".
21.2 "The Contractor's plans to take steps to overcome or minimize the actual or anticipated delay and
21.3 The Contractor's plans to adopt any methods suggested by the Employer / Owner to overcome or minimize the delay, and shall use all reasonable endeavors to take such steps and/or adopt such methods.

24. SAFETY CODE:

The Contractor shall ensure adequate safety precautions at site as required under the law of the land and shall be entirely responsible for the complete safety of their workman as well as other workers at site and premises. The contractor shall not deploy any worker below the age of 18 years.

The contractor shall observe the safety requirements as laid down in the contract and in case of sub-contract (only after written approval of company), it shall be the responsibility of main contractor that all safety requirements are followed by the employees and staff of the sub-contractor.

The contractor employing two hundred employees or more, including contract workers, shall have a safety co-ordinator in order to ensure the implementation of safety requirements of the contract and a contractor with lesser number of employees, including contract workers, shall nominate one of his employees to act as safety co-ordinator who shall liaise with the safety officer on matters relating to safety and his name shall be displayed on the notice board at a prominent place at the work site.

The contractor shall be responsible for non-compliance of the safety measures, implications, injuries, fatalities and compensation arising out of such situations or incidents.

In case of any accident, the contractor shall immediately submit a statement of the same to the owner and the safety officer, containing the details of the accident, any injury or casualities, extent of properly damage and remedial action taken to prevent recurrence and in addition, the contractor shall submit a monthly statement of the accidents to the owner at the end of each month.

25. STATUTORY OBLIGATIONS:

The Contractor shall take all steps as may be necessary to comply with various Acts, Rules, including but not limited to The Child Labour (Prohibition & Regulation) Act, 1986, The Contract Labour (Regulation & Abolition) Act, 1970. The Employees Pension scheme , The Employees Provident Funds and miscellaneous provisions Act, 1952 ,The Employees state Insurance Act,1948,The Equal Remuneration Act, The Industrial Dispute Act,1947, The Maternity Benefit Act , 1961, The Minimum Wages Act, 1948, The payment of Bonus Act ,1965, The Payment of Gratuity Act,1972, The Payment of wages Act, 1936, The Shops & Establishment Act, The Workmen's Compensation Act , 1923, Building and Other Construction Workers (Employment and Regulations) Act 1996, Building and Other Construction Workers (Cess) Act 1996, The Employers Liability Act,1938, Indian Electricity Act, 2003 and Indian Electricity Rules, VAT and Service tax etc., and all other applicable laws as amended and rules framed there under including any statutory approval required from the Central/State Govt. Ministry of Labour. Broadly, the compliance shall be as detailed below, but not limited to:

a) An Electrical license.
b) PF Code No. and all employees to have PF A/c No. under PF every Act, 1952.
c) All employees to have a temporary or permanent ESI Card as per ESI Act.
d) ESI Registration No.
e) Sales Tax registration number, if applicable.

f) PAN No.
g) Work Contract Tax Registration Number/ VAT Registration.
h) Labour License under Contract Labour Act (R & A) Act 1970.
i) Delhi Building and other Construction Worker (Regulation of Employment and Conditions of Services) Rules, 2002(B.O.C.W.)

(Bidder responsible for execution of the job should obtain a copy of Labour License before start of the work by the contractor.)

The Contractor must follow:

a) Third party Insurance Policy before start of work.
b) To follow Minimum Wages Act prevailing in the state.
c) The Salary/wages to all deployed manpower is to be distributed through ECS only into the bank accounts of all individuals and not later than 7th of succeeding month. In case of unavoidable circumstances the payment may be made through crossed cheques in the name of the individual and information of all such cases need to be submitted to HR(CMC).
d) To maintain Wage- cum - Attendance Register.
e) To maintain First Aid Box at Site.
f) Latest P.F. and E.S.I. challans pertaining to the period in which work was undertaken along with a certificate mentioning that P.F. and E.S.I. applicable to all the employees has been deducted and deposited with the Authorities within the time limits specified under the respective Acts.
g) Workman Compensation Policy. {If applicable}.
h) Labour license before start of work. {If applicable}.

Before commencing the work it would be mandatory for the Contractor to furnish the Company the permanent PF code no and ESI of the employees.

26. WORKMAN COMPENSATION:

The Contactor shall take insurance policy under the Workman Compensation Act to cover such workers who are not covered under ESI and PF by the Contractor however engaged to undertake the jobs covered under this order and a copy of this insurance policy will be given to Company for reference and records. This insurance policy shall be kept valid at all times. In case there are no worker involve other than those who are covered under ESI and PF by the Contractor, the Contractor shall certify for the same.

The contractor shall keep the company indemnified at all times, against all claims of compensation under the provision of Workmen Compensation Act 1923 and as amended from time to time or any compensation payable under any other law for the time being workman engaged by the contractor/sub-contractor/sub-agent in carrying out the job involved under this work order and against costs and expenses, if any, incurred by the company in connection therewith and without prejudice to make any recovery.

The company shall be entitled to deduct from any money due to or to become due to the Contractor, moneys paid or payable by way of compensation as aforesaid or cost or expenses in connection with any claims thereto and the Contractor shall abide by the decision of the Company as to the sum payable by the Contractor under the provisions of this clause.

27. STAFF AND WORKMAN:

(I) It shall be responsibility of contractor:

(a) To obtain Contract Labour License from the concerned authorities and maintain proper liaison with them. Necessary Forms for obtaining Labour License would be issued by the

company. However you will bear all expenses for obtaining Labour license and registration in PF Department for your scope of work. You will deposit PF of your staff/laborer each month and all related documents should be furnished to us.

(b) To obtain workman insurance cover against deployment of workers etc.

(II) To maintain, proper records relating to workmen employed, in the form of various Registers, namely.

(a) Register of workmen.
(b) Register of muster roll.
(c) Register of overtime.
(d) Register of wages.
(e) Any other register as per latest amendment Labour Act.

(III) To disburse monthly wages to your workers/ supervisors in time and in the presence of Company representatives or as directed by the Labour authorities.

(IV) To maintain proper liaison with the Project authorities, local police and all other government and local bodies.

(V) To pay your workmen at least not less than the minimum prescribed wages as per state/Central Labour laws as may be, applicable. The contractor shall, be responsible for compliance of all the provisions of minimum Wages Act, PF, ESIC Act workmen Compensation Act and Contract Labour Regulation & Abolition Act the rules made there under. In case of non-Compliance of the statutory requirements. The company would take necessary action at the risk and cost of the Contractor.

(VI) To employ required number of skilled/semi-skilled and unskilled workmen as per site requirement to complete the entire project as per schedule. To provide safety shoes, safety helmets, safety belts, gloves etc. to your worker/staff as per requirement during erection work.

(VII) To employ necessary engineering and supervisory staff for completion of the Project in time. While day-to-day management of the site and supervision of the works shall be the responsibility of your Engineer - In charge, he will report to the our Engineer in charge to assist him to discharge the overall responsibility of the execution of the project.

28. INSURANCE:

Before commencing the execution of the work the Contractor shall take at his own cost Transit Insurance policy, Third party insurance and suitable insurance policy for his own men and material. Please note that these insurance policies shall be taken in consultation with the Employer, where Employer is to be named as Co-insured and a copy of the insurance policy shall have to be furnished to Employer within 30 days of the date of order. For all the insurance policies (whether taken by the Employer or Contractor), the Contractor shall be responsible for settlement of claims with the underwriters without any liability on the Employer / Employer and will arrange replacements / rectification expeditiously without waiting for settlement of insurance claim, at contractor's own cost and this shall arrange the comprehensive Insurance policy for workmen's compensation, General liability Insurance, Automobile insurance, Third party insurance for damage of any movable and immovable properties and lives. This shall not entitle the Contractor for any extension of time.

Third Party Risk and Public Liability Insurance –
The Contractor, at his own cost, shall take necessary insurance to indemnify third party risk arising out of the work to be done by him. The contractor shall also take out the following Public Liability and Property Damage Liability Insurance Cover for the entire period of contract as given below.
A Public Liability and Property Damage Liability Insurance Covering All Operations the contract

Limits for bodily injury or death up to and including Rs. 10,00,000/- for one person and Rs. 20,00,000/- for each accident.

Limits for property damage up to and including Rs. 500000/- for each accident.

B Automobile Liability Insurance
On all self –propelled vehicles used in connection with this contract, whether owned, non-owned or hired by the contractor, limits of insurance shall be as follows:

For Public Liability up to and including Rs. Rs. 10,00,000/- for one person and Rs. 20,00,000/- for each accident.

For property damage up to and including Rs. 2,00,000/- for each accident.

Insurance for contractor's personnel
The contractor shall effect and maintain insurance against liability for claims, damages, losses and expenses (including legal fees and expenses) arising from injury, sickness, disease or death of any person employed by the contractor or any other of the Contractor's personnel.

COMPENSATION FOR CONTRACTOR'S PERSONNEL

In the event of any untoward incident/ accident, the Contractor shall ensure prompt medical assistance such as treatment, sickness benefit, etc. is provided to the victim(s) as per the Employees' Compensation Act, 1923 or Employees' State Insurance Act, 1948, as applicable. Also, the contractor will be required to take adequate measures for compensating the victim(s) or his/her/their kin as follows:

I. For Death or Permanent / Total Disablement

The contractor shall take an insurance coverage of at least Rs. 10 lakhs for each engaged employee, to cover any incidence of Death or Permanent / Total Disablement (Permanent/Total Disability shall be considered as defined under Employees' Compensation Act, 1923). In the event of any such unfortunate incident, the contractor would ensure that adequate compensation is paid immediately to the family of the victim(s) from his own resources. This compensation shall be covered under the insurance policy subscribed by the contractor mentioned earlier and the arrangement should be such that it would get reimbursed to the contractor by the insurance agency subsequently.

II. For Permanent Partial Disablement and Temporary Total Disablement

The compensation in this case will be as per provisions of the Employees' Compensation Act, 1923 or Employees' State Insurance Act, 1948, as applicable.
Accordingly, the contractor shall obtain a suitable Insurance Policy on award of Contract and submit documentary evidence of the policy to the HR CMC Cell before commencement of work. The contractor shall ensure that the Insurance policy is active at all times and all employees are covered in all respects till the conclusion of contract period or till working with BYPL. The contractor shall submit a copy of the policy after periodic renewals to the HR CMC Cell.

However, on occurrence of such unfortunate incident, if it is found that the victim(s) is/are not covered under any insurance policy, the contractor shall be liable to pay the entire sum of Rs. 10 lakhs from his own resources.

Further, in case of an accident resulting in Death or Permanent / Total Disablement while on duty, the appointed Contractor Nodal Officer will ensure that the contractor complies with all statutory

provisions and benefits i.e. PF, Compensation, Gratuity etc., and that all these are made available to the employees' nominee(s) as per the stipulated timelines.

29. SECURITY/WATCH & WARD:

Adequate number of trained Security Guards shall be deployed both at the storage yard and stores as well as places of work to prevent theft and pilferage of material and accessories and various other materials. All security rules and safety rules enforced at site by company shall be strictly observed.

30. ENVIRONMENTAL, HEALTH & SAFETY PLAN:

Contractor will make ensure that the Environment, Health & Safety (EHS) requirements are clearly understood and faithfully implemented at all levels at site as per instruction of Company. Contractors must comply with these requirements:

a) Comply with all of the elements of the EHS Plan and any regulations applicable to the work.
b) Comply with the procedures provided in the interests of Environment, Health and Safety.
c) Ensure that all of their employees designated to work are properly trained and competent.
d) Ensure that all plant and equipment they bring on to site has been inspected and serviced in accordance with legal requirement and manufacturer's or suppliers' instructions.
e) Make arrangements to ensure that all employees designated to work on or visit the site present themselves for site induction prior to commencement of work.
f) Provide details of any hazardous substances to be brought onsite.
g) Ensure that a responsible person accompanies any of their visitors to site.

All contractor's staff are accountable for the following:

1. Use the correct tools and equipment for the job and use safety equipment and protective clothing supplied, e.g. helmets, goggles, ear protection, etc. as instructed.
2. Keep tools in good condition.
3. Report to the Supervisor any unsafe or unhealthy condition or any defects in plant or equipment.
4. Develop a concern for safety for themselves and for others.
5. Prohibit horseplay.
6. Not to operate any item of plant unless they have been specifically trained and are authorized to do so.

31. TEST CERTIFICATE & QUALITY ASSURANCE:

The Contractor shall procure all equipment from genuine sources as approved by the Company and as per Company specifications. The Contractor shall submit all the test certificates and joint inspection reports related to major equipment wherever applicable. The contractor shall ensure for the strict compliance to the specifications and Field Quality Procedures issued by company / Engineer in-charge.

32. SUB-CONTRACTING / SUBLETTING:

CONTRACTOR shall not assign or transfer the whole or any part of this Work Order or any other benefits accruing there from nor shall it subcontract / sublet the whole or any part of the Works without the prior written consent of COMPANY.

In the event the contractor assigns this work order, contractor's assignees shall be bound by the terms and conditions of this work order and shall , if deemed necessary by COMPANY at the time of such assignment, undertake in writing to be so bound by this Work Order.

Notwithstanding the subletting / subcontracting of any portion of the works, contractor shall remain wholly responsible for the carrying out, completion and satisfactory execution of Works in all respects in accordance with this Work Order, specification, approved drawings and data sheets.

33. INDEMNITY:

Contractor shall indemnify and save harmless COMPANY against and from any and all liabilities, claims, damages, losses or expenses arising due to or resulting from:

a) Any breach non-observance or non-performance by contractor or its employees or agents of any of the provisions of this Work Order.
b) Any act or omission of contractor or its employees or agents.
c) Any negligence or breach of duty on the part of contractor, its employees or agents including any wrongful use by it or them of any property or goods belonging to or by COMPANY.

Contractor shall at all times indemnify COMPANY against all liabilities to other persons, including he employees or agents of COMPANY or contractor for bodily injury, damage to property or other loss which may arise out of or in consequence of the execution or completion of Works and against all costs charges and expenses that may be occasioned to COMPANY by the claims of such person.

34. EVENTS OF DEFAULTS:

COMPANY may, without prejudice to any of its other rights or remedies under the Work Order or in law, terminate the whole or any part of this Work Order by giving written notice to the Contractor, if in the opinion of COMPANY, contractor has neglected to proceed with the works with due diligence or commits a breach of any of the provisions of this work order including but not limited to any of the following cases.

a) Failing to complete execution of work within the terms specified in this work order.
b) Failing to complete works in accordance with the approved schedule of works.
c) Failing to meet requirements of specifications, drawings, and designs as approved by COMPANY.
d) Failing to comply with any reasonable instructions or orders issued by COMPANY in connection with the works.
e) Failing to comply with any of the terms or conditions of this work order.

In the event COMPANY terminates this work order, in whole or in part, on the occurrence of any event of default, COMPANY reserves the right to engage any other subcontractor or agency to complete the work or any part thereof, and in addition to any other right COMPANY may have under this work order or in law including without limitation the right to penalize for delay under clause 15.0 of this work order, the contractor shall be liable to COMPANY for any additional costs that may be incurred by COMPANY for the execution of the Work.

35. RISK & COST:

If the Contractor fails to execute the work as per specification / as per the direction of Engineer's In-charge within the scheduled period and even after the extended period, the contract shall got cancel and company reserves the right to get the work executed from any other source at the Risk & Cost of the Contractor. The Extra Expenditure so incurred shall be debited to the Contractor.

36. ARBITRATION:

To the best of their ability, the parties hereto shall endeavor to resolve amicably between themselves all disputes arising in connection with this LOA. If the same remain unresolved within thirty (30) days of the matter being raised by either party, either party may refer the dispute for settlement by arbitration. The arbitration to be undertaken by two arbitrators, one each to be appointed by either party. The arbitrators appointed by both the parties shall mutually nominate a person to act as presiding arbitrator before entering upon the reference in the event of a difference between the two arbitrators and the award of the said presiding arbitrator in such a contingency shall be conducted in accordance with this provisions of the Indian Arbitration & Conciliation Act, 1996 and the venue of such arbitration shall be in the city of New Delhi only.

37. FORCE MAJEURE:

37.1 General:

An "Event of Force Majeure" shall mean any event or circumstance not within the reasonable control, of the Party affected, but only if and to the extent that:

(i) Such event or circumstance, despite the exercise of reasonable diligence, could not have been prevented, avoided or reasonably foreseen by such Party;

(ii) Such event or circumstance materially and adversely affects the ability of the affected Party to perform its obligations under this Contract, and the affected Party has taken all reasonable precautions, due care and reasonable alternative measures in order to prevent or avoid the effect of such event on the affected parties ability to perform its obligations under this Contract and to mitigate the consequences thereof. For the avoidance of doubt, if such event or circumstance would not have materially and adversely affected the performance of the affected party had such affected party followed good industry practice, such event or circumstance shall not constitute force majeure.

(iii) Such event is not the direct or indirect result of the failure of such Party to perform any of its obligations under this Contract; and

(iv) Such Party has given the other Party prompt notice describing such events, the effect thereof and the actions being taken in order to comply with above clause

37.2 Specific Events of Force Majeure:

Subject to the provisions of above clause, Events of Force Majeure shall include only the following to the extent that they or their consequences satisfy the above requirements: The following events and circumstances:

(i) Effect of any natural element or other acts of God, including but not limited to storm, flood, earthquake, lightning, cyclone, landslides or other natural disasters, and

(ii) Explosions or fires

(iii) Declaration of the Site as war zone

Any order, regulation, directive, requirement from any Governmental, legislative, executive or judicial authority.

37.3 Notice of Events of Force Majeure:

If a force majeure event prevents a party from performing any obligations under the Contract in part or in full, that party shall:

(i) Immediately notify the other party in writing of the force majeure events within 2 working days of the occurrence of the force majeure event

(ii) Be entitled to suspend performance of the obligation under the Contract which is affected by force majeure event for the duration of the force majeure event

(iii) Use all reasonable efforts to resume full performance of the obligation as soon as practicable

(iv) Keep the other party informed of all such efforts to resume full performance of the obligation on a regular basis.

(v) Provide prompt notice of the resumption of full performance or obligation to the other party.

37.4 Mitigation of events of force majeure:

The Contractor shall:

(i) Make all reasonable efforts to prevent and reduce to a minimum and mitigate the effect of any delay occasioned by an Event of Force Majeure, including applying other ways in which to perform the Contract;

(ii) Use its best efforts to ensure resumption of normal performance after the termination of any Event of Force Majeure and shall perform its obligations to the maximum extent practicable as agreed between the Parties; and

(iii) Keep the Company informed at regular intervals of the circumstances concerning the event of Force Majeure, with best estimates as to its likely continuation and what measures or contingency planning it is taking to mitigate and or terminate the Event of Force Majeure.

37.5 Burden of proof:
In the event that the Parties are unable in good faith to agree that a Force Majeure event has occurred to an affected party, the parties shall resolve their dispute in accordance with the provisions of this Contract. The burden of proof as to whether or not a force majeure event has occurred shall be upon the party claiming that the force majeure event has occurred and that it is the affected party.

37.6 Terminations for certain events of force majeure:

If any obligation of any Party under the Contract is or is reasonably expected to be delayed or prevented by a Force Majeure event for a continuous period of more than 1 (one) month during the Term of the Contract the Contract shall be terminated at the discretion of the Company and neither Party shall be liable to the other for any consequences arising on account of such termination.

38. <u>SECRECY CLAUSE</u>:

The technical information, drawing and other related documents forming part of work order and the information obtained during the course of investigation under this work order shall be the Company's executive property and shall not be used for any other purpose except for the execution of the work order. The technical information drawing, records and other document shall not be copied, transferred, or divulged and/ or disclosed to third party in full/part, not misused in any form whatsoever except to the extent for the execution of this work order.
This technical information, drawing and other related documents shall be returned to the Company with all approved copies and duplicates including drawing/plans as are prepared by the

Bidder during the executions of this work order, if any, immediately after they have been used for agreed purpose.
In the event of any breach of this provision, the Bidder shall indemnify the Company against any loss, cost or damage or claim by any party in respect of such breach.

39. TERMINATION:

During the course of the execution, if at any time BSES observe and form an opinion that the work under the order is not being performed in accordance with the terms of this Agreement, BSES reserves its right to cancel this Agreement giving 15 days notice mentioning the reason for the termination of the agreement and BSES will recover all damages including losses occurred due to loss of time from Contractor.

40. QUALITY:

Contractor shall ensure that strict quality is maintained and execution of works under this Work Order and Works are executed in conformity with the Specification.

All tools, tackles, instruments and other equipments used in the execution of the Works shall be duly calibrated as required and Contractor shall maintain proper records of such tools, tackles, instruments and / or equipment.

41. PROGRESS REPORT INCLUDING PHOTOGRAPH:

41.1 During the various stages of erection and commissioning of the critical equipments in the pursuance of the Contract, the Contractor shall at its own cost submit periodic progress reports as may be reasonably required by the Employer (Format Attached as per Annexure-) with such materials as charts, networks, photographs, test certificates, etc. Such progress reports shall be in the form and size as may be required by the Employer and shall be submitted in adequate number of copies to be notified by the Employer
41.2 The quantitative progress report of the works by reference to the project schedule in sufficient detail should permit the Employer to assess performance, plan witness dates and evaluate forecasts, including reports on key Sub-contracts (as applicable). Within 10 days of the submission of each such report and at such other times as the Employer may reasonably request, the Contractor and the Employer shall meet to discuss progress. Contractor has to submit daily manpower, T&P, & work done report. Weekly MIS is required to be submitted by Contractor, at the end of each weekday (On Every Monday). Each monthly progress report shall be submitted not later than the 3rd day of the month following that in respect of which it is made, but may report on actual progress only up to the 25th day of the month and anticipated progress thereafter. Monthly progress reports shall include the following section
41.2.1 Executive summary
41.2.2 Description of the work and services performed and erection / commissioning activities completed during the preceding month
41.2.3 Necessary photographs of erection and commissioning activities which shall be taken when and where indicated by the Employer. Photographs shall be approximately 100 x 125 mm in size including a margin of 5 mm side for fixing. Adequate numbers of photographs shall be submitted indicating various stages of erection / commissioning. Each photograph shall contain the date, the name of the Contractor and the title of the view taken
41.2.4 Updated project schedule showing progress to the end of the month (as percentages completed of the Contractor's activities broken down into significant elements of the works), and the current schedule of activities and the targets for the next month including catch up plan, if required.
41.2.5 Identification of areas with foreseeable problems which in the opinion of the Contractor may affect the project schedule
41.2.6 Such other information and supporting documentation as the Employer may require satisfying himself about the timely erection and commissioning of equipment as per Contract.

41.2.7 The Employer shall advise the Contractor about the number of copies of progress reports and, where relevant, photographs to be submitted each month together with the names and addresses of persons to whom they are to be sent. Employer will also advise the Contractor regarding the format of the Monthly Progress report as per Annexure – VII.
41.2.8 The Contractor shall submit to the Engineer-in-Charge on a daily basis details of Contractor's and subcontractors' personnel (classified by trade), equipment and construction materials on Site; progress of Work under the Contract; and safety issues.
41.3 Monthly/Fortnightly Progress Report - Format
41.3.1 Project Overview
41.3.2 Executive Summary
i. Performance Highlights during the period
ii. Issues needing Attention
41.3.3 Schedule Analysis
i. Progress Curves: Attach – Engineering progress curve, procurement progress curve, Erection & commissioning curve and overall progress curve Schedule Analysis
ii. Brief write up on major gains and shortfall in each schedule.
iii. One page summary schedule indicating target and forecast delivery dates of major equipment.
iv. Overview of critical inputs to be provided by Contractor to Employer and vice versa.
41.3.4 Critical areas/ issues needing attention
Bring out any critical issue that needs attention/action of project team including Contractor, Employer & its Consultants. Suggest action required from concerned on the critical issues and impact of the decision on project schedule & cost (if any). Bring out specifically the previous agreed date for issue of deliverable/delivery of equipment or a decision on the issue.
41.3.5 Recovery Plan:
Bring out the areas that are delayed by over 2 weeks from the schedule or current requirement. Provide action taken for recovery of schedule and meet the delivery dates.
41.3.6 Engineering Progress
i. Major highlights during the month.
ii. Goals for next month
iii. Updated project schedule – 12 weeks rolling plan. Target Vs Actual/ Forecast
iv. Detailed schedule analysis
v. Critical areas and action taken recovery plan.
vi. List of inputs required from Contractor to Employer and vice versa – Plan Vs Actual.
vii. Plan for next month
41.3.7 Procurement Schedule
i. Major highlights during the month
ii. Updated detailed manufacturing and delivery schedule. 12 weeks rolling plan. Target Vs Actual/ Forecast
iii. Detailed delivery report – Indicate list of all material supplied and plan for next 3 months as annexure.
iv. Critical areas, Impact of delays, action taken and recovery plan
v. List of purchase orders placed, with vendor name, order no., and date
vi. Transport & logistics Plan
vii. QA & Inspection plan
viii. Plan for next month
41.3.8 Erection & Commissioning Schedule
i. Major highlights during the month
ii. Updated detailed erection schedule. 12 weeks rolling plan. Target Vs Actual/ Forecast
iii. Resource mobilization plan Vs Actual, Constraints
iv. Critical areas, Constraints, Impact of delays, action taken and recovery plan
v. QA & Inspection plan
vi. Plan for next month
41.3.9 Financial Summary
Invoice raised, Payments received
41.3.10 Fortnightly Progress Report

The fortnightly progress report shall consist of executive summary, critical areas and updated project schedule.
Vendor shall submit the progress report latest by 3rd day of every month.
41.4 Meetings At Site
i. Meetings shall be convened weekly or at other intervals as deemed necessary by the Engineer-in-Charge during the period of Work under the Contract and such meetings shall be held on Site during the period of Site work. The meetings shall be attended by the Senior Representatives of both Employer and the Contractor.
ii. The meetings shall ascertain Work progress, safety issues, any problems related to manpower, equipment or Site conditions, and provide early notice of any potential claims for Contract variations. Meetings shall be minutes by the Employer Representative / Engineer-in-Charge. Copies of the minutes shall be supplied to attendees and a standard list of addressees and the Employer.

42. REVIEW MEETING:

The contractor has to attend weekly review meeting at site level and bi-monthly review meeting at corporate level. MIS and Resources planning shall be prepared and monitored showing progress and quantity completion along with S-curve.

43. ACCEPTANCE:

Acceptance of this work order implies and includes acceptance of all terms and conditions enumerated in this work order in the technical specification and drawings made available to you consisting of general conditions, detailed scope of work, detailed technical specification & detailed equipment, drawing. Complete scope of work and the Bidder's and Company's contractual obligation are strictly limited to the terms set out in the work order. No amendments to the concluded work order shall be binding unless agreed to in writing for such amendment by both the parties.
However, during the course of the execution of the work order, if at any time the Company's representative observe and form an opinion that the work under the work order is not being performed in accordance with the terms of this work order, the company reserves its right to cancel this work order forthwith without assigning any reason and the Company will recover all damages including losses occurred due to loss of time from the Bidder.
We request you to please sign the duplicate copy of this work order as a token of your acceptance and return to us.

SECTION X

PRICE FORMAT – (SERVICES) (Items shown are indicative, Kindly refer BOQ, attached as Annexure)

DESCRIPTION OF SERVICES	SAC CODE	QTY	UoM	UNIT RATE (₹)	UNIT GST & CESS AS APPLICABLE (CGST & SGST/UTGST or IGST)		UNIT LANDED COST (₹)	TOTAL LANDED COST (₹)
					%	AMT		
Items as per BOQ i.e. shall be utilized to furnish price break-up.								
GRAND TOTAL LANDED COST								
In words ……								

NOTE:

1) Bidder shall include & indicate any others taxes under the applicable law(s) for supply and services to be performed in the purchaser's country.
2) In case any additional equipment is required, the same should be included in the scope with no additional payment and the offer should be complete and comprehensive.

SECTION XIII

GRAND SUMMARY OF THE QUOTED PRICE

DESCRIPTION	Total price for supply F.O.R site incl all duties, taxes	Total for Erection, Testing & Comm incl all Taxes	Grand Total (₹)
SURVEY, DESIGN, ENGINEERING, MANUFACTURE, SHOP TESTING, INSPECTION, PACKING, DISPATCH, LOADING, UNLOADING AND STORAGE AT SITE, TRANSIT/STORAGE AND CONSTRUCTION INSURANCE, ASSEMBLY, ERECTION, STRUCTURAL, COMPLETE PRE-COMMISSIONING CHECKS, TESTING & COMMISSIONING AT SITE, OBTAINING STATUTORY CLEARANCE & CERTIFICATION FROM STATE ELECTRICAL INSPECTOR, AND HANDING OVER TO THE OWNER AFTER SATISFACTORY COMMISSIONING OF 33KV CABLE WITH REQUIRED ACCESSORIES AS PER THE SCOPE OF WORK			

We declare that the following are our quoted prices in INR for the entire project.

Date: Bidders Name:

Place: Bidders Address:

Signature: ……

Printed Name: ……..

Designation: ……..

Common Seal: ……..

SECTION XIV

VENDOR CODE OF CONDUCT

Purchaser is committed to conducting its business in an ethical, legal and socially responsible manner. To encourage compliance with all legal requirements and ethical business practices, Purchaser has established this Vendor Code of Conduct (the "Code") for Purchaser's Vendors. For the purposes of this document, "Vendor" means any company, corporation or other entity that sells, or seeks to sell goods or services, to Purchaser, including the Vendor's employees, agents and other representatives.

Fundamental to adopting the Code is the understanding that a business, in all of its activities, must operate in full compliance with the laws, rules and regulations of the countries in which it operates. This Code encourages Vendors to go beyond legal compliance, drawing upon internationally recognized standards, in order to advance social and environmental responsibility.

I. Labour and Human Rights

Vendors must uphold the human rights of workers, and treat them with dignity and respect as understood by the international community.

. Fair Treatment - Vendors must be committed to a workplace free of harassment. Vendors shall not threaten workers with or subject them to harsh or inhumane treatment, including sexual harassment, sexual abuse, corporal punishment, mental coercion, physical coercion, verbal abuse or unreasonable restrictions on entering or exiting company provided facilities.

. Antidiscrimination - Vendors shall not discriminate against any worker based on race, colour, age,gender,sexual orientation, ethnicity, disability, religion, political affiliation, union membership, national origin, or marital status in hiring and employment practices such as applications for employment, promotions, rewards, access to training, job assignments, wages, benefits, discipline, and termination. Vendors shall not require a pregnancy test or discriminate against pregnant workers except where required by applicable laws or regulations or prudent for workplace safety. In addition, Vendors shall not require workers or potential workers to undergo medical tests that could be used in a discriminatory way except where required by applicable law or regulation or prudent for workplace safety.

. Freely Chosen Employment - Forced, bonded or indentured labour or involuntary prison labour is not to be used. All work will be voluntary, and workers should be free to leave upon reasonable notice. Workers shall not be required to hand over government-issued identification, passports or work permits as a condition of employment.

. Prevention of Under Age Labor - Child labor is strictly prohibited. Vendors shall not employ children. The minimum age for employment or work shall be 15 years of age, the minimum age for employment in that country, or the age for completing compulsory education in that country, whichever is higher. This Code does not prohibit participation in legitimate workplace apprenticeship programs that are consistent with Article 6 of ILO Minimum Age Convention No. 138 or light work consistent with Article 7 of ILO Minimum Age Convention No. 138.

.Juvenile Labor - Vendors may employ juveniles who are older than the applicable legal minimum age for employment but are younger than 18 years of age, provided they do not perform work likely to jeopardize their health, safety, or morals, consistent with ILO Minimum Age Convention No. 138.

. Minimum Wages - Compensation paid to workers shall comply with all applicable wage laws, including those relating to minimum wages, overtime hours and legally mandated benefits. Any Disciplinary wage deductions are to conform to local law. The basis on which workers are being paid is to be clearly conveyed to them in a timely manner.

. Working Hours - Studies of good manufacturing practices clearly link worker strain to reduced productivity, increased turnover and increased injury and illness. Work weeks are not to exceed

maximum set by local law. Further, a work week should not be more than 60 hours per week, including overtime, except in emergency or unusual situations. Workers should be allowed at least one day off per seven-day week.

. Freedom of Association - Open communication and direct engagement between workers and management are the most effective ways to resolve workplace and compensation issues. Vendors are to respect the rights of workers to associate freely and to communicate openly with management regarding working conditions without fear of reprisal, intimidation or harassment. Workers' rights to join labour unions seek representation and or join worker's councils in accordance with local laws should be acknowledged.

II. Health and Safety

Vendors must recognize that in addition to minimizing the incidence of work-related injury and illness, a safe and healthy work environment enhances the quality of products and services, consistency of production and worker retention and morale. Vendors must also recognize that ongoing worker input and education is essential to identifying and solving health and safety issues in the workplace.

The health and safety standards are:

. Occupational Injury and Illness - Procedures and systems are to be in place to prevent, manage, track and report occupational injury and illness, including provisions to: a) encourage worker reporting; b) classify and record injury and illness cases; c) provide necessary medical treatment; d) investigate cases and implement corrective actions to eliminate their causes; and e) facilitate return of workers to work.

. Emergency Preparedness - Emergency situations and events are to be identified and assessed, and their impact minimized by implementing emergency plans and response procedures, including: emergency reporting, employee notification and evacuation procedures, worker training and drills, appropriate fire detection and suppression equipment, adequate exit facilities and recovery plans.

. Occupational Safety - Worker exposure to potential safety hazards (e.g., electrical and other energy sources, fire, vehicles, and fall hazards) are to be controlled through proper design engineering and administrative controls, preventative maintenance and safe work procedures (including lockout/ragout), and ongoing safety training. Where hazards cannot be adequately controlled by these means, workers are to be provided with appropriate, well-maintained, personal protective equipment. Workers shall not be disciplined for raising safety concerns.

. Machine Safeguarding - Production and other machinery is to be evaluated for safety hazards. Physical guards, interlocks and barriers are to be provided and properly maintained where machinery presents an injury hazard to workers.

.Industrial Hygiene - Worker exposure to chemical, biological and physical agents is to be identified, evaluated, and controlled. Engineering or administrative controls must be used to control overexposures. When hazards cannot be adequately controlled by such means, worker health is to be protected by appropriate personal protective equipment programs.

.Sanitation, Food, and Housing - Workers are to be provided with ready access to clean toilet, facilities potable water and sanitary food preparation, storage, and eating facilities. Worker dormitories provided by the Participant or a labour agent are to be maintained clean and safe, and provided by the Participant or a labour egress, hot water for bathing and showering, and adequate heat and ventilation and reasonable personal space along with reasonable entry and exit privileges.

. Physically Demanding Work - Worker exposure to the hazards of physically demanding tasks, including manual material handling and heavy or repetitive lifting, prolonged standing and highly repetitive or forceful assembly tasks is to be identified, evaluated and controlled.

III. Environmental

Vendors should recognize that environmental responsibility is integral to producing world class products In manufacturing operations, adverse effects on the environment and natural resources are to be minimized while safeguarding the health and safety of the public.

The environmental standards are:

. Product Content Restrictions - Vendors are to adhere to applicable laws and regulations regarding prohibition or restriction of specific substances including labeling laws and regulations for recycling and disposal. In addition, Vendors are to adhere to all environmental requirements specified by Purchaser.
. Chemical and Hazardous Materials -Chemical and other materials posing a hazard if released to the environment are to be identified and managed to ensure their safe handling, movement storage, recycling or reuse and disposal.
. Air Emissions - Air emissions of volatile organic chemicals, aerosols, corrosives, particulates, ozone depleting chemicals and combustion by-products generated from operations are to be characterized, monitored, controlled and treated as required prior to discharge.
. Pollution Prevention and Resource Reduction -Waste of all types, including water and energy, are to reduced or eliminated at the source or by practices such as modifying production, maintenance and facility processes, materials substitution, conservation, recycling and re-using materials.
. Wastewater and Solid Waste - Wastewater and solid waste generated from operations industrial processes and sanitation facilities are to be monitored, controlled and treated as required prior to discharge or disposal.
. Environmental Permits and Reporting - All required environmental permits (e.g. discharge monitoring) and registrations are to be obtained, maintained and kept current and their operational and reporting requirements are to be followed.

IV. Ethics

Vendors must be committed to the highest standards of ethical conduct when dealing with workers, Vendors, and customers.
. Corruption, Extortion, or Embezzlement - Corruption, extortion, and embezzlement, in any form, are strictly prohibited. Vendors shall not engage in corruption, extortion or embezzlement in any form and violations of this prohibition may result in immediate termination as an Vendor and in legal action.
. Disclosure of Information - Vendors must disclose information regarding its business activities, structure financial situation, and performance in accordance with applicable laws and regulations and prevailing industry practices.
. No Improper Advantage - Vendors shall not offer or accept bribes or other means of obtaining undue or improper advantage.
. Fair Business, Advertising, and Competition - Vendors must uphold fair business standards in advertising, sales, and competition.
. Business Integrity - The highest standards of integrity are to be expected in all business interactions. Participants shall prohibit any and all forms of corruption, extortion and embezzlement. Monitoring and enforcement procedures shall be implemented to ensure conformance.
. Community Engagement - Vendors are encouraged to engage the community to help foster social and economic development and to contribute to the sustainability of the communities in which they operate.
. Protection of Intellectual Property - Vendors must respect intellectual property rights; safeguard customer information; and transfer of technology and know-how must be done in a manner that protects intellectual property rights.

V. Management System

Vendors shall adopt or establish a management system whose scope is related to the content of this Code. The management system shall be designed to ensure (a) compliance with applicable laws, regulations and customer requirements related to the Vendors' operations and products; (b) conformance with this Code; and (c) identification and mitigation of operational risks related to this Code. It should also facilitate continual improvement.

The management system should contain the following elements:

. Company Commitment - Corporate social and environmental responsibility statements affirming Vendor's commitment to compliance and continual improvement.

. Management Accountability and Responsibility - Clearly identified company representative[s]responsible for ensuring implementation and periodic review of the status of the management systems.

. Legal and Customer Requirements - Identification, monitoring and understanding of applicable laws, regulations and customer requirements.

. Risk Assessment and Risk Management - Process to identify the environmental, health and safety and labour practice risks associated with Vendor's operations. Determination of the relative significance for each risk and implementation of appropriate procedural and physical controls to ensure regulatory compliance to control the identified risks.

.Performance Objectives with Implementation Plan and Measures - Areas to be included in a risk assessment for health and safety are warehouse and storage facilities, plant/facilities support equipment, laboratories and test areas, sanitation facilities (bathrooms), kitchen/cafeteria and worker housing /dormitories. Written standards, performance objectives, and targets an implementation plans including a periodic assessment of Vendor's performance against those objectives.

. Training - Programs for training managers and workers to implement Vendor's policies, procedures and improvement objectives.

. Communication - Process for communicating clear and accurate information about Vendor's performance, practices and expectations to workers, Vendors and customers.

. Worker Feedback and Participation - Ongoing processes to assess employees' understanding of and obtain feedback on practices and conditions covered by this Code and to foster continuous improvement.

. Audits and Assessments - Periodic self-evaluations to ensure conformity to legal and regulatory requirements, the content of the Code and customer contractual requirements related to social and environmental responsibility.

. Corrective Action Process - Process for timely correction of deficiencies identified by internal or external assessments, inspections, investigations and reviews.

. Documentation and Records - Creation of documents and records to ensure regulatory compliance and conformity to company requirements along with appropriate confidentiality to protect privacy.

The Code is modeled on and contains language from the Recognized standards such as International Labour Organization Standards (ILO), Universal Declaration of Human Rights (UDHR), United Nations Convention against Corruption, and the Ethical Trading Initiative (ETI) were used as references in preparing this Code and may be useful sources of additional information

APPENDIX

Annexure-Contract closure document:

After completion of works, as per scope and specification of contract, process for contract closure will be initiated.

Following are major activities to be carried out for contract closure.

i. Completion of Works and issuance of Work Certificate by Employer.
ii. Closure Of Punch Points.
iii. Finalization of Measurements with certification from Engineer In Charge / Engineering.
iv. Joint Final Material reconciliation of Free Issue material (FIM) between contractor and Employer
v. Joint finalization of delay analysis & LD value if applicable between contractor and Employer.
vi. No Demand Certificate from Contractor
vii. Indemnity Bond from Contractor
viii. Contract Payment Register with accounts duly reconciled between Contractor and Employer.

Annexure – Weekly / Monthly Progress Report: Format

Agenda	**Project Progress review of**		Meeting No	
			Date	
Time Start :		Time End:	Issue Date	
Attendees:				
	BYPL Team	**Contractor**		

S.No	**Points Discussed**	**Description**		**Action By Contractor**	**Action By Reliance**	**Remark/ Status**
A	Construction					
1						
2						
3						
B	Payment					
1						
2						
3						
C	Hinderence / Issues if any like front, drawing etc					
1						
2						
3						
D	Amendment					
1						
2						
3						
E	Delay if any (& attributable to)					
F	Other points, if any					

----------XXXXX----------

Annexure – FORMAT OF ADVANCE BANK GUARANTEE

(To be executed on a Non-Judicial Stamp Paper of appropriate value)

This Guarantee made at _____ this [___] day of [_____] 20XX

1. WHEREAS *M/s.* _____*(Pl specify the name of the Company)_,,* a Company within the meaning of the Companies Act, 1956 having its Registered Office at _____ hereinafter referred to as the " Purchaser", (which expression shall unless repugnant to the context or meaning thereof include its successors, administrators, executors and assigns).

2. AND WHEREAS the Purchaser has entered into a contract for _____(Please specify the nature of contract here) vide Contract No. _____dated _____(hereinafter referred to as the "Contract") with M/s._____, (hereinafter referred to as "the Supplier", which expression shall unless repugnant to the context or meaning thereof be deemed to mean and include its successors and assigns) for providing of the Goods and/or services on the terms and conditions as more particularly detailed therein.

3. AND WHEREAS in conformity with the provisions of clause _____ *of Special conditions of Contract/GTC*, the Supplier has agreed to furnish a Bank Guarantee for an amount equivalent to the Advance Payment of Rs……. extended by the Purchaser to the Supplier for the faithful execution of the Contract.

4. AND WHEREAS the Supplier has agreed to provide the Purchaser and the Purchaser has agreed to accept the Advance Bank Guarantee for ____ percent (____%) of the total Contract Value from **[**_____**]** *(pl. specify the name of Bank)* having its head/registered office at **[**_____**]** through its branch in _____*(pl. specify the name of Branch through which B.G is issued)* hereinafter referred to as "the Bank", (which expression shall unless it be repugnant to the context or meaning thereof be deemed to include its successors and permitted assigns).

5. NOW THEREFORE, in consideration inter alia of the Purchaser granting the Suppliers the Contract, the Bank hereby unconditionally and irrevocably guarantees and undertakes, on a written demand, to immediately pay to the Purchaser any amount so demanded (by way of one or more claims) not exceeding in the aggregate [Rs.]……)*in words)* without any demur, reservation, contest or protest and/or without reference to the Supplier and without the Purchaser needing to provide or show to the Bank ,grounds or reasons or give any justification for such demand for the sum/s demanded.

6. The decision of the Purchaser as to whether the Supplier has fulfilled its obligation or not towards set-off of Advance Payment extended by the Purchaser to the Supplier shall be final and binding on the Bank and the Supplier. The Bank acknowledges that any such demand by the Purchaser of the amounts payable by the Bank to the Purchaser shall be final, binding and conclusive evidence in respect of the amounts payable by the Supplier to the Purchaser. Any such demand made by the Purchaser on the Bank shall be conclusive and binding, notwithstanding any difference between the Purchaser and the Supplier or any dispute raised, invoked, threatened or pending before any court, tribunal, arbitrator or any other authority.

7. The Bank also agrees that the Purchaser at its option shall be entitled to enforce this Guarantee against the Bank as a principal debtor without proceeding against the Supplier notwithstanding any other security or other guarantee that the Purchaser may have in relation to the Supplier's liabilities.

8. The Bank hereby waives the necessity for the Purchaser first demanding the aforesaid amounts or any part thereof from the Supplier before making payment to the Purchaser and further also waives any right the Bank may have of first requiring the Purchaser to use its legal

remedies against the Supplier, before presenting any written demand to the Bank for payment under this Guarantee.

9. The Bank's obligations under this Guarantee shall not be reduced by reason of any partial performance of the Contract. The Bank's obligations shall not be reduced by any failure by the Purchaser to timely pay or perform any of its obligations under the Contract.

10. The Bank further unconditionally and unequivocally agrees with the Purchaser that the Purchaser shall be at liberty, without the Bank's consent and without affecting in any manner its rights and the Bank's obligation under this Guarantee, from time to time, to:
i. vary and/or modify any of the terms and conditions of the Contract;
ii. forebear or enforce any of the rights exercisable by the Purchaser against the Supplier under the terms and conditions of the Contract; or and the Bank shall not be relieved from its liability by reason of any such act or omission on the part of the Purchaser or any indulgence shown by the Purchaser to the Supplier or any other reason whatsoever which under the law relating to sureties would, but for this provision, have the effect of relieving the Bank of its obligations under this Guarantee.

11. This Guarantee shall not be discharged by any change in the constitution or composition of the Supplier, and this Guarantee shall not be affected or discharged by the liquidation, winding-up, bankruptcy, reorganisation, dissolution or insolvency of the Supplier or any of them or any other circumstances whatsoever.

12. This Guarantee shall be in addition to and not in substitution or in derogation of any other security held by the Purchaser to secure the obligations of the Supplier under the Contract.

13. NOTWITHSTANDING anything herein above contained, the liability of the BANK under this Guarantee shall be restricted to _____*(insert an amount equal to ___ percent (__%) of the Contract Value)* and this Guarantee shall be valid and enforceable and expire on _____*(pl. specify date)* or unless a suit or action to enforce a claim under this Guarantee is filed against the Bank on or before the date of expiry.

14. On termination of this Guarantee, all rights under the said Guarantee shall be forfeited and the Bank shall be relieved and discharged from all liabilities hereunder.
15. The Bank undertakes not to revoke this Guarantee during its validity except with the prior written consent of the Purchaser and agrees that any change in the constitution of the Bank or the Supplier shall not discharge our liability hereunder.

16. Purchaser may assign this Guarantee to any Person or body whether natural, incorporated or otherwise under intimation to the Bank. The Bank shall be discharged of its obligations hereunder by performance in accordance with the terms hereof to such assignee without verifying the validity / legality / enforceability of the assignment.

17. This Guarantee shall be governed by the laws of India. Any suit, action, or other proceeding arising out of, connected with, or related to this Guarantee or the subject matter hereof shall be subject to the exclusive jurisdiction of the courts of _____ *(pl. specify the city)* , India.

Dated this ……. day of …….. …20XX at ……..

(Signature)
.....
(Name)
.....
(Designation with Bank Stamp)
Attorney as per
Power of Attorney No.....
Date.....

Annexure – FORMAT OF PERFORMANCE BANK GUARANTEE

(To be executed on a Non-Judicial Stamp Paper of appropriate value)

This Guarantee made at _____ this [___] day of [_____] 20XX

1. WHEREAS *M/s.* _____*(Pl specify the name of the Company)_,* a Company within the meaning of the Companies Act, 1956 having its Registered Office at _____ hereinafter referred to as the " Purchaser ", (which expression shall unless repugnant to the context or meaning thereof include its successors, administrators, executors and assigns).

2. AND WHEREAS the Purchaser has entered into a *contract for* _____*(Please specify the nature of contract here) vide Contract No.* _____*dated* _____(hereinafter referred to as the "Contract") with *M/s.*_____*,* (hereinafter referred to as "the Supplier", which expression shall unless repugnant to the context or meaning thereof be deemed to mean and include their successors and assigns) for providing Goods and/or services on the terms and conditions as more particularly detailed therein.

3. AND WHEREAS as per clause ____ *of Special conditions of Contract/GTC*, the Supplier is obliged to provide to the Purchaser an unconditional bank guarantee for an amount equivalent to _____ percent (__%) of the total Contract Value for the timely completion and faithful and successful execution of the Contract from **[**_____**]** *pl. specify the name of Bank)* having its head/registered office at **[**_____**]** through its branch in _____*(pl. specify the name of Branch through which B.G is issued)* hereinafter referred to as "the Bank", (which expression shall unless it be repugnant to the context or meaning thereof be deemed to include its successors and permitted assigns).

4. NOW THEREFORE, in consideration inter alia of the Purchaser granting the Suppliers the Contract, the Bank hereby unconditionally and irrevocably guarantees and undertakes, on a written demand, to immediately pay to the Purchaser any amount so demanded (by way of one or more claims) not exceeding in the aggregate [Rs.]……(*in words)* without any demur, reservation, contest or protest and/or without reference to the Supplier and without the Purchaser needing to provide or show to the Bank ,grounds or reasons or give any justification for such demand for the sum/s demanded.

5. The decision of the Purchaser to invoke this Guarantee and as to whether the Supplier has not performed its obligations under the Contract shall be binding on the Bank. The Bank acknowledges that any such demand by the Purchaser of the amounts payable by the Bank to the Purchaser shall be final, binding and conclusive evidence in respect of the amounts payable by the Supplier to the Purchaser. Any such demand made by the Purchaser on the Bank shall be conclusive and binding, notwithstanding any difference between the Purchaser and the Supplier or any dispute raised, invoked, threatened or pending before any court, tribunal, arbitrator or any other authority.

6. The Bank also agrees that the Purchaser at its option shall be entitled to enforce this Guarantee against the Bank as a principal debtor without proceeding against the Supplier notwithstanding any other security or other guarantee that the Purchaser may have in relation to the Supplier's liabilities.

7. The Bank hereby waives the necessity for the Purchaser first demanding the aforesaid amounts or any part thereof from the Supplier before making payment to the Purchaser and further also waives any right the Bank may have of first requiring the Purchaser to use its legal remedies against the Supplier, before presenting any written demand to the Bank for payment under this Guarantee.

8. The Bank's obligations under this Guarantee shall not be reduced by reason of any partial performance of the Contract. The Bank's obligations shall not be reduced by any failure by the Purchaser to timely pay or perform any of its obligations under the Contract.

9. The Bank further unconditionally and unequivocally agrees with the Purchaser that the Purchaser shall be at liberty, without the Bank's consent and without affecting in any manner its rights and the Bank's obligation under this Guarantee, from time to time, to:
(i) vary and/or modify any of the terms and conditions of the Contract;
(ii) Forebear or enforce any of the rights exercisable by the Purchaser against the Supplier under the terms and conditions of the Contract; or
(iii) Extend and/or postpone the time for performance of the obligations of the Supplier under the Contract;
and the Bank shall not be relieved from its liability by reason of any such act or omission on the part of the Purchaser or any indulgence shown by the Purchaser to the Supplier or any other reason whatsoever which under the law relating to sureties would, but for this provision, have the effect of relieving the Bank of its obligations under this Guarantee.

10. This Guarantee shall be a continuing bank guarantee and shall not be discharged by any change in the constitution or composition of the Supplier, and this Guarantee shall not be affected or discharged by the liquidation, winding-up, bankruptcy, reorganisation, dissolution or insolvency of the Supplier or any of them or any other circumstances whatsoever.

11. This Guarantee shall be in addition to and not in substitution or in derogation of any other security held by the Purchaser to secure the performance of the obligations of the Supplier under the Contract.

12. NOTWITHSTANDING anything herein above contained, the liability of the BANK under this Guarantee shall be restricted to _____*(insert an amount equal to ___ percent (__%) of the Contract Value)* and this Guarantee shall be valid and enforceable and expire on _____*(pl. specify date)* or unless a suit or action to enforce a claim under this Guarantee is filed against the Bank on or before the date of expiry.

13. On termination of this Guarantee, all rights under the said Guarantee shall be forfeited and the Bank shall be relieved and discharged from all liabilities hereunder.

14. The Bank undertakes not to revoke this Guarantee during its validity except with the prior written consent of the Purchaser and agrees that any change in the constitution of the Bank or the Supplier shall not discharge its liability hereunder.

15. Purchaser may assign this Guarantee to any Person or body whether natural, incorporated or otherwise under intimation to the Bank. The Bank shall be discharged of its obligations hereunder by performance in accordance with the terms hereof to such assignee without verifying the validity / legality / enforceability of the assignment.

16. This Guarantee shall be governed by the laws of India. Any suit, action, or other proceeding arising out of, connected with, or related to this Guarantee or the subject matter hereof shall be subject to the exclusive jurisdiction of the courts of _____ *(pl. specify the city)* , India.

Dated this ……. day of …….. …20XX at ……

(Signature).....

(Name) .....
(Designation with Bank Stamp)
Attorney as per
Power of Attorney No.....
Date.....

Beneficiary's bank detail with IFSC Code:

1. Name of the Bank:	Axis Bank Limited
2. Branch Name & Full Address:	C-58, Basement & Ground Floor, Preet Vihar, Main Vikas Marg, New Delhi 110092
3. Branch Code:	055
4. Bank Account No:	911020005246567
5. IFSC Code:	UTIB0000055

Annexure – FORMAT OF WARRANTY/GUARANTEE CERTIFICATE-SUPPLY

BSES YAMUNA POWER LIMITED, Shaktikiran Building, Karkardooma, Delhi -110032.

Ref. Purchase Order No. :

Dear Sir,

We hereby confirm that the.....dispatched to BSES YAMUNA POWER LTD vide invoice no..... DT.....is exactly of the same nature and description as per above mentioned Purchase Order.

We further confirm that we will replace/repair our.....free of cost If found any manufacturing defect during.....months from the date of dispatch of material or.....months from the data of commissioning whichever is earlier.

Vendors Name & Signature

Annexure – WARRANTY / DEFECT LIABILITY PERIOD –SERVICE

Performance requirements of the works completed is as per detailed specifications and standards specified and to be adhered to strictly. In-case of deficiency, the same is to be rectified / redone to meet the specifications by the contractor within stipulated schedule or any extension thereof. The Contractor shall be liable to rectify all defects except those arising out of normal wear and tear, in the works done by the Contractor under this contract, or from any act or omission of the contractors for a period of 36 months will depend on individual contract period package to package from the date of Handing over the works to the Employer / Owner.

Annexure – NO DEMAND CERTIFICATE FORMAT

NO DEMAND CERTIFICATE BY CONTRACTOR
(To be issued on letterhead of Contractor)

To ,

BSES YAMUNA POWER LIMITED,
Shaktikiran Building, Karkardooma,
Delhi -110032.

Name of the Project:
Contract No.:
Date of Contract:
Name of the Contractor:

We, M/s _____(Contractor) do hereby acknowledge and confirm that we have claimed Rs. _____ (Rs. _____)
towards full and final settlement of our claims from BSES Yamuna Power Limited, in respect of the aforesaid WO/PO/Contract No.: #######. Dated. ####. including all amendments, if any, to the said Contract, to our entire satisfaction and we further confirm that we have no claim whatsoever pending with BSES Yamuna Power Limited under or in respect of the said Contract.

Notwithstanding any protest, note or objection recorded or raised by us in any correspondence, documents, measurement books and / or final bills etc.

(a) we confirm that BSES Yamuna Power Limited stands fully discharged of all its obligations,

(b) we shall make no claim of any nature on BSES Yamuna Power Limited or any of its affiliates or personnel, and

(c) we waive all our rights to lodge any claim or protest in future, in respect of the said Contract.

We have paid in full all applicable duties, levies, taxes and statutory and other amounts payable by us in connection with the above-mentioned Contract and amounts payable to or in relation to third parties engaged by us including our contractors, suppliers, employees and labour. No payment in this regard is pending or unpaid and we have no (and shall have no) claim against BSES Yamuna Power Limited in this regard.

No refund has been received/ is envisaged to be received or reasonably believed to be receivable on account of taxes, duties or any other payment made by us in respect of the Contract. In case any refund corresponding to any amount paid or reimbursed by BSES Yamuna Power Limited is received in the future, the same will be passed on to BSES Yamuna Power Limited promptly and without any demand from them in this regard.

We are issuing this "NO DEMAND CERTIFICATE" in favor of BSES Yamuna Power Limited with full knowledge of its contents and with our free consent without any influence, misrepresentation, coercion etc.

Date:
Place:

Signature:
Name:
Designation:
(Company Seal)

Annexure – FORMAT FOR LETTER OF INDEMNITY

Format for Letter of Indemnity
(Notes: Preferably shall be obtained on Stamp paper of appropriate value as applicable at the place of execution, if not, then at least on the letterhead of the Contractor)

Place:_____
Date: _____
To,

BSES Yamuna Power Limited, Shaktikiran Building, Karkardooma, Delhi -110032.

Dear Sirs,

WO/PO/Contract No. _____Dated _/__/___

For _____

Settlement of Dues
In consideration of your awarding the subject Work Order/Purchase Order/Contract to us and in further consideration of your having agreed to pay our final bill towards settlement of the dues in respect of the subject Work Order/Purchase Order/Contract, inter alia, on our assurances and representations that :
(a) We have paid in full all amounts payable by us including but not limited to duties, levies, taxes, cess, octroi, royalties, statutory payments, amounts payable to or in relation to third parties engaged by us including our contractors, suppliers, employees and labour, and
(b) we have fully complied with all requirements under applicable laws in connection with the subject Purchase Order/Work Order/Contract,
We_____,
unconditionally and irrevocably agree and undertake, to pay and/or settle entirely at our own cost and indemnify, defend and hold harmless you, your affiliates and your/your affiliates' personnel, directors and representatives, (hereinafter collectively referred to as "Indemnified Parties") from and against any and all liabilities, judgments, damages, losses, claims, costs and expenses, claimed, suffered or incurred or, likely to be claimed, suffered or incurred at any time by or against the Indemnified Parties or any of them as a result of, or arising out of, or in any way related to any failure or delay in payment of any of the amounts or compliances by us as aforesaid for any reason whatsoever.
Any notice(s) or communication(s) by you shall be sufficient proof that the Indemnified Parties have suffered or incurred loss, damages, liabilities etc. as aforesaid and we shall upon receipt of such notice(s) or communication(s) immediately, without any delay or demur or contest, make payment to you of the entire amount demanded under the said notice(s) or communication(s).
This letter of indemnity shall be in addition to and not in derogation of any other indemnity/ guarantee and/or security which we may have executed in your favor or your rights and entitlements under the contract.
This letter shall be governed by and construed and interpreted to accordance with the laws of India, and shall be subject to the exclusive jurisdiction of the courts of law at Mumbai.

Yours faithfully,

For M/s_____

Authorized Signatory

SCOPE OF WORK

FOR

SUPPLY, INSTALLATION, TESTING AND COMMISSIONING (SITC)

OF

33 KV 3x400 sq mm XLPE CABLE

FROM

BYPL SHASTRI PARK GRID TO GANGARAM HOSPITAL

AND

BYPL SHANKAR ROAD GRID TO GANGARAM HOSPITAL

Department	Prepared by	Reviewed by	Approved by
CES			
P&E	—		

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1. SCOPE

1.1. Scope covers supply, laying, testing and commissioning of 33 KV 3Cx400 sq mm XLPE underground cable circuits from

a. BYPL Shankar Road Grid to Gangaram Hospital – Circuit Length 800 meter

b. BYPL Shastri Park Grid to Gangaram Hospital – Circuit length 1600 meter

1.2. Each circuit will have 2 no's cable runs. Therefore total 4 no's cable runs will be laid.

2. SCOPE OF SUPPLY

S No	Material Description	UoM	Quantity
1	Cable ARM XLPE 33 kV 3Cx400 sq mm AL	Meter	4800
2	Cable End Termination kit Indoor Suitable for 33 kV 3Cx400 sq mm cable (Make- Raychem/3M)	No's	8
3	Cable straight through joint kit Suitable for 33 kV 3Cx400 sq mm cable(Make- Raychem/3M)	No's	22
4	Precast RCC (1:2:4) cable cover 600x300x50 mm	No's	6800
5	HDPE PIPE 200 MM Dia PN4 PE 80	Meter	1680
6	HDPE Pipe Collar 200 mm	No's	280
7	Weather and acid resistant PVC warning tape of 150mm width 300 micron thick Yellow colour with desired Red/Black lettering	Meter	2040
8	Route indicating stone at every 50 meter circuit length and Joint indicating stones at every cable joint location	No's	70

S No	Material Description	UoM	Quantity
9	Galvanized Channel, Angle, Beam and other Structural steel with hardware for all structures including cable support Structure, drain crossing structure etc	MT	1
10	Fine Sand	Cubic meter	274
11	End Cap for Cable 33 KV AL 3X400 Sqmm XLPE	No's	48
12	Optical Fiber cable 24F (2 Runs with each circuit)	Meter	4800
13	Duct for Optical Fibre Cable (40mm)	Meter	4800
14	Collar for optical fiber cable duct	No's	48
15	Optical Fiber cable splice enclosure for jointing of optical fiber cable	No's	6
16	Fibre optic cable end termination distribution box	No's	8
17	Cable armour- earth link box without SVL	No's	8
18	HDPE cleat with hardware's suitable for 33 kV 3Cx400 sq mm cable	No's	8
19	Support insulators for mounting of cable on support structure	No's	8
20	Danger Plates	No's	4
21	Circuit Name Plate	No's	4
22	Anti Climbing device	No's	2
23	Cable Identification Road Stud	No's	1
24	50X6 Sq mm GI Earthing strip	MT	1
25	Aluminum Cable Identification tag with nylon	No's	160

S No	Material Description	UoM	Quantity
	string		
26	Safety barricading PVC tape	Lot	1
27	Safety barricading cone	Lot	1
28	RFID based electronic buried type cable route marker for cable joints and turns having facility to feed the joint/turn related information	Lot	1
29	Receiver unit for electronic cable route marker cum cable route tracer suitable with offline as well as online cable route tracing functionality	No's	1
30	Coarse sand for PCC & RCC	Cubic meter	1
31	Burnt clay Brick - First class	No's	1
32	Cement Bags 50 kg	No's	1
33	Reinforcement steel bars	MT	1
34	Construction Aggregate	Cubic meter	1
35	Optical Fiber Cable Loop chamber for every 300 meter of cable run	No's	16
Note: All quantities mentioned above are estimated quantities. Actual quantities may vary as per site requirement.			

3. SCOPE OF WORK

S No	Description	Unit	Qty
1	Surveying of cable Route, Detailed Site Plan & Profile using Ground penetration Radar System, Excavation of trial pits as per field requirement, preparation of route drawing with	Meter	2400

S No	Description	Unit	Qty
	location of joint chambers position and finalizing the cable route in consultation with BSES Representative		
2	Digging of cable trench as per specification and drawings. Rate is inclusive of digging and backfilling for Ordinary Bituminous/C.C.Road (including dewatering if any)	Cubic meter	578
3	Digging of cable trench as per specification and drawings. Rate is inclusive of digging and backfilling for Dense Carpeted bituminous Road (including dewatering if any)	Cubic meter	482
4	Digging of cable trench as per specification and drawings. Rate is inclusive of digging and backfilling for Footpath/tile/Rajasthani Stone/Brick work (including dewatering if any)	Cubic meter	482
5	Digging of cable trench as per specification and drawings. Rate is inclusive of digging and backfilling for Hard Rocky Soil (including dewatering if any)	Cubic meter	96
6	Laying of XLPE cables in the excavated trench as per BYPL Standards (Regarding Depth, Layer formation, etc). Cable rollers to be used during Laying.	Meter	3120
7	Laying of XLPE cable in HDPE Pipe in Excavated Trench	Meter	960

S No	Description	Unit	Qty
8	Laying of cable in trenchless ducts with 200 mm dia HDPE pipe using HDD machine including laying of 200 mm dia HDPE pipe PN4 PE 80 Class	Meter	720
9	Continuous steel Barricade for all Excavated areas, till the work is completed.	Meter	2040
10	Fixing of Aluminum Cable identification tags with Nylon string at every 30 Mtrs cable length	No's	160
11	Installation of straight through joints for 33 kv 3Cx400 sq mm cables by jointing kit OEM authorized jointer.	No's	22
12	Installation of End Termination for 33kv 3Cx400 sq mm cables by jointing kit OEM authorized jointer	No's	8
13	Digging of joint pit suitable for 33 cable joint box and covering the joint box with sand and providing protection for Ordinary bituminous road/C.C. Road	No's	7
14	Digging of joint pit suitable for 33 cable joint box and covering the joint box with sand and providing protection for Dense carpeted bituminous road.	No's	7
15	Digging of joint pit suitable for 33 cable joint box and covering the joint box with sand and providing protection for Footpath/ tile/ Rajasthani Stone / Brick Works	No's	7

S No	Description	Unit	Qty
16	Digging of joint pit suitable for 33 cable joint box and covering the joint box with sand and providing protection for Hard Rocky Soil.	No's	1
17	Spreading of sand forming cushion and cover around the cable	Cubic meter	274
18	Disposal of debris/surplus malba including Loading / Unloading	Cubic meter	301
19	Digging of test pits of required size(not less than 1/2 Meter Wide at site for identification of cable route)	No's	4
20	Watch and ward of complete circuit till project handover	Lot	1
21	Installation of Precast RCC Cable cover	No's	6800
22	Installation of Route and Joint indicating stone marked with "BYPL 33 KV Cable Helpline No-011-399 99 808"	No's	70
23	Laying of PVC warning tape	Meter	2040
24	Fabrication and installation of galvanized Channel, Angle, Beam and other Structural steel for all structures including cable support Structure, drain crossing structure etc	MT	1
25	Laying of optical fiber cable in 40 mm duct including blowing and pulling	Meter	4800
26	Installation of OFC cable splice enclosure	No's	6
27	Testing of optical fiber cable after installation	Lot	1
28	Partial discharge test on complete cable length at site	Lot	1

S No	Description	Unit	Qty
29	VLF High voltage test on complete cable lengths as per relevant IEC/IEEE	Lot	1
30	Installation of Fiber optic cable distribution box for termination of fiber optic cable	No's	8
31	Installation of cable armour- earth link box without SVL including cable earthing/armour connection with grid earthing	No's	8
32	Installation, mounting and fixing of 33 kV 3Cx400 sq mm cable with termination on mounting structure/tower and fixing it with suitable HDPE cleats	No's	8
33	Installation of support insulators on cable mounting structure with misc. hardware's.	No's	8
34	Fixing of danger plate on poles including fabrication of clamps etc	No's	4
35	Fixing of circuit Name plate including fabrication of clamps etc	No's	4
36	Fixing of anti climbing device on cables mounting structures including fabrication of clamps etc	No's	2
37	Installation of Cable identification road stud	No's	1
38	Transportation of empty 33 kV cable drums from site to BSES store	No's	24
39	Laying of GI earth connecting strip of 50x6 sq mm size including required welding, painting on joints etc	MT	1

S No	Description	Unit	Qty
40	Submission of actual laid drawing of cable circuits including GPS coordinates of all joint in cables circuits	Lot	1
41	Cable Phasing work, Cable Phase Sequence (R,Y,B) Marking, Cable 1&2 Marking, and final connection as per Phase Sequence.	Lot	1
42	Masonry Brick work	Cubic meter	1
43	Providing and laying in position cement concrete 1:1.5:3 (1 cement :1.5 coarse sand : 3 graded stone aggregate) excluding the cost of centering, shuttering, finishing and enforcement	Cubic meter	1
44	Providing and laying in position cement concrete 1:2:4 (1 cement :2 coarse sand : 4 graded stone aggregate) excluding the cost of centering, shuttering, finishing and enforcement	Cubic meter	1
45	Providing and laying in position cement concrete 1:4:8 (1 cement :4 coarse sand : 8 graded stone aggregate) excluding the cost of centering, shuttering, finishing and enforcement	Cubic meter	1
46	Centering, shuttering including shuttering propping etc and removal of shuttering	Lot	1

S No	Description	Unit	Qty
47	Fabrication of reinforcement for RCC work including straightening, cutting, bending, placing in position and binding all complete thermo mechanically treated bars.	Lot	1
48	Installation of Brick as Cable Separator	No's	1
49	Installation of Optical Fiber cable loop chamber	No's	16
50	ETC of RFID Marker	Lot	1

Note: All the Testing's shall be witnessed by BYPL. All Site Test Reports shall be submitted, before charging of the Cables.

4. DOCUMENT SUBMISSION MATRIX

Drawing submission shall be as per the matrix given below. All documents/ drawing shall be provided on A3/A4 sheet in box file with separators for each section. PDF shall also be provided of all documents via USB i.e. USB must be the part of Bid. Language of the documents shall be English only. Deficient/ improper document/ drawing submission shall be liable for rejection

S No	Detail of Document	Bid	Approval	Pre Dispatch	Pre closure
1	Cable GTP in accordance with BSES specification	Yes	Yes	Yes	
2	Cross sectional drawing of offered cable	Yes	Yes		
3	GTP & component drawing of cable straight through joint	Yes	Yes	Yes	

S No	Detail of Document	Bid	Approval	Pre Dispatch	Pre closure
4	GTP & component drawing of cable End termination kit	Yes	Yes	Yes	
5	CPRI/ERDA type test report of offered cable design	Yes	Yes		
6	CPRI/ERDA type test report of offered straight through Joint kit along with offered make cable	Yes	Yes		
7	CPRI/ERDA type test report of offered end termination kit along with offered make cable	Yes	Yes		
8	Cable Route Layout drawing	Yes	Yes		
9	Installation drawings including cable trench drawing, joint pit, HDPE Pipe, Name Plate, Warning Tape, Route Marker, Joint Marker, RCC cover, Danger plate, anti climbing device and other miscellaneous items		Yes		
10	VLF and Partial discharge test results for every circuit duly stamped and signed by BSES representative				Yes
11	Deviation Sheet	Yes	Yes		
12	Actual as laid drawing of complete circuit with GPS coordinates of each joint location				Yes
13	Factory Test Reports to be submitted,			Yes	

S No	Detail of Document	Bid	Approval	Pre Dispatch	Pre closure
	for the Material supplied (Cables, Cable Jointing Kits, Fiber Optic, etc)				

5. SCOPE DEMARCATION

S No	Head	BYPL Scope	Vendor Scope	Remarks
1	Road Cutting Permission and Road Restoration	✓	×	NA
2	Permissions from various external and internal agencies regarding cable laying and commissioning (Traffic Police, GAIL, IGL etc)	×	✓	Statutory fees will be borne by BYPL
3	Supply, Erection, Testing and commissioning of equipments related to schemes	×	✓	As per specifications & Standards
4	Drawing Submissions	×	✓	NA
5	Engineering Approvals	✓	×	NA
6	Testing Equipments	×	✓	NA
7	Lighting Arrangement	×	✓	NA
8	Construction Power and Construction Water	×	✓	NA
9	Safety of Manpower (Labour, Engineers, Supervisors etc) and Security of Material, till Handing-over to O&M.	×	✓	NA

S No	Head	BYPL Scope	Vendor Scope	Remarks
10	Various Tools and Tackles related to Job	×	✓	NA
11	Transportation of Material and any other tender related work	×	✓	NA
12	Cleanliness around work premises	×	✓	NA
13	Security and Safety of material until handing over to O&M.	×	✓	NA
14	Various Machines, Material, Special Tools & tackles, e.g. Crane, Hydra, JCB, Hammer Cutting Machine etc to complete the Job	×	✓	NA
15	Maintenance of Equipments Until Handover	×	✓	NA
16	Loading and Unloading of material	×	✓	NA
17	Electrical Inspector Clearance	×	✓	Statutory fees will be borne by BYPL
18	Continuous Steel Barricading with Mobile no of Vendor's Engineer Incharge	×	✓	Steel barricade should have small scheme description along with vendor and BYPL name on it

S No	Head	BYPL Scope	Vendor Scope	Remarks
19	Permit to work request to BYPL authority	×	✓	Permit Should be applied to Engineer Incharge prior to work through proper procedure
20	Permit to work issuance from BYPL authority	✓	×	NA
21	Temporary office and Material Store near work premises	×	✓	NA
22	Storage of Material	×	✓	BYPL store will not be used for any kind of material storage and issuance
23	Dismantled material loading, Unloading and transportation to BYPL store	×	✓	Store location will be within BYPL premises
24	Preparation, updation and submission of PERT chart, detailed work Progress Report with Photographs, fortnightly to track activities	×	✓	NA
25	Submission of final drawing showing layout of cable in Google map along with of cable joint locations	×	✓	Approval will be done by BYPL Representative

S No	Head	BYPL Scope	Vendor Scope	Remarks
26	Removal and renaming of existing switchboards' painting as per their route	×	✓	Painting colour and material should be in line with the existing ones for aesthetic look
27	Any other supply item or scope of work missing in given sheet to complete all these schemes/ Work	×	✓	NA
28	Any damage to Public Utilities/Properties, Like Gas Pipeline, Water Pipeline, Sewage Pipeline, Telephone/ Fibre optic cables, Power Cables of any other Circuits, Traffic Signal or camera cables, etc Shall be rectified/ replaced.	×	✓	Any Damages to be rectified on priority, in minimum possible Time.

RELIANCE

Specification

for

H. T. CABLES

(11 & 33 kV : 1-Core / 3-Core)

Specification No:
SP- EWHP- 01- R4

Prepared by		Checked by		Reviewed by		Approved by		Rev.	Date
Name	Sign	Name	Sign	Name	Sign	Name	Sign	3	01.09.07
AP/DRS		DSP		PVC		AM		4	**09.03.12**

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List of R-Infra approved Sub-Vendors

Annexure D : **[R4]** 29
Service Conditions

Annexure E: 30
(Attachments)

a) General Arrangement Drawing for Pulling-eye Assembly

b) General Arrangement Drawing for End-sealing Cap

Annexure F: **[R4]** 33
(Attachment)
R-Infra format (typical) for
Quality Assurance Plan (QAP) for H. T. Cables

Annexure G: **[R4]** 42
Testing and manufacturing process requirements w. r. t. TR- XLPE insulation

Revision Record

Note:

Revisions made in R4 are marked by symbol [**R4]** at the respective text or drawing throughout the Specification.

[R4]

Rev. No.	Revision Date	Item/ clause no:	Page No.	Nature of Change	Approved by
R4	09.03.12	Cl. 1.0.0 ,	5	IS 0462 (Part1)/1983 - added	AM
R4	09.03.12	Cl. 1.0.0 ,	5	IEC 332 - added	AM
R4	09.03.12	Cl. 2.0.0 , GTP 5.0	5	Cable Code - added	AM
R4	09.03.12	Cl. 2.0.0 , GTP 5.0 (Annexure-B)	5	For 33 kV 3-core Cables only armour strips (not armour wires).	AM
R4	09.03.12	Cl. 2.0.0	5	1c x 630 sq. mm. Cables - added.	AM
R4	09.03.12	Cl. 2.1.1	7	Copper conductor - deleted.	AM
R4	09.03.12	Cl. 2.1.1	7	Conductor Al grade H4 - deleted	AM
R4	09.03.12	Cl. 2.1.1, GTP 8.0	7	"Longitudinal Water Blocking Arrangement" within conductor - added	AM
R4	09.03.12	Cl. 2.1.3, GTP-10.0	7	Eccentricity check with regard to Insulation - added	AM
R4	09.03.12	Cl. 2.1.4, GTP-11A.0	8	Ovality check on core (over outer semi-con) - added	AM
R4	09.03.12	Cl. 2.1.4A , GTP 28.0	8	For 11 kV Cables also : "Dry-cure process only" (no moisture cure)	AM
R4	09.03.12	Cl. 2.1.6 , GTP 11C	9	Colour strips to carry manufacturer's name also.	AM
R4	09.03.12	Cl. 2.1.6	9	Copper tape arrangement - added	AM
R4	09.03.12	Cl. 2.1.7	9	Properties of PP filler - added	AM
R4	09.03.12	Cl. 2.1.10	9	Zero negative tolerance for diameter of armour wire - added	AM
R4	09.03.12	Cl. 2.1.12	10	Anti-rodent properties for outer sheath - added	AM
R4	09.03.12	Cl. 2.1.12	10	Ovality check over completed cable - added.	AM
R4	09.03.12	Cl. 2.1.12, GTP 15.0	10	FRLS properties for outer sheath, when required - added	AM
R4	09.03.12	Cl. 2.1.12	10-11	Details of Embossing - revised	AM
R4	09.03.12	Cl. 4.0.0	12	R- Infra QAP detail added	AM
R4	09.03.12	Cl. 4.0.0	12	Strippability Test added in Routine Test and Acceptance Test.	AM
R4	09.03.12	Cl. 4.0.0	12	Minimum lot size of Cables for	AM

				raising Inspection Call - added	
R4	09.03.12	Cl. 4.0.0	13	Water Penetration Test (WPT) - added	AM
R4	09.03.12	Cl. 4.0.0	13	Make & Grade of critical items used during manufacture to be stated in TC - added	AM
R4	09.03.12	Cl. 5.0.0, GTP 18A.0	14	Cross-sectional drawing - added (required details mentioned)	AM
R4	09.03.12	Cl. 7.0.0 , GTP 18.0	15-16	a) Required Packing details mentioned. b) Drum Identification markings - revised c) M. S. Spindle required for drums - added f) Cable drum handling added	AM
R4	09.03.12	Annexure - A	18	a) Document Submission - revised b) Delivery Schedule - added	AM
R4	09.03.12	Annexure-B (GTP)	20	One consolidated GTP format is prepared, instead of earlier separate GTPs for different types of cables.	AM
R4	09.03.12	Annexure-B (GTP)	20	GTP generally revised as per revised clauses.	AM
R4	09.03.12	Annexure-B GTP 8H.0	21	Longitudinal Water blocking arrangement added	AM
R4	09.03.12	Annexure-B GTP 9.0	21	Conductor Screen thickness revised to 0.5 min.	AM
R4	09.03.12	Annexure-B (GTP) – 11B.0	22	Approval for Pre-slitted w. s. tapes from sub-vendors necessary. - added	AM
R4	09.03.12	Annexure-B GTP – 11D.0	22	Thickness of Copper Tape increased from 0.06 to 0.1 mm	AM
R4	09.03.12	Annexure-B (GTP) - 13.0	23	Inner Sheath – min thickness for 11 kV, 1cx1000 sq.mm. increased from 0.6 to 0.7 mm	AM
R4	09.03.12	Annexure-B (GTP) – 17A.0	24	Overall order tolerance - added	AM
R4	09.03.12	Annexure-C , Cl. 2.1.3 , GTP-31.0	27	R-Infra Approved Sub-Vendors List - added	AM
R4	09.03.12	Annexure-D	29	Service Conditions – added.	AM
R4	09.03.12	Annexure-E	31-32	For Pulling-eye Assembly and Sealing-end Cap, new drawings added.	AM
R4	09.03.12	i) Annexure-F (QAP) ii) Cl. 4.0.0 iii) GTP-30.0	34 to 41	QAP format - added.	AM
R4	09.03.12	Cl. 2.1.3 GTP 10.0-G	8 21	Introduction of “water-tree retardant” property for XLPE insulation	AM
R4	09.03.12	Annexure-G	42	Introduction of “water-tree retardant” property for XLPE insulation	AM

General Specification

1.0.0 Codes & Standards

The cables shall be designed, manufactured and tested in accordance with the following National Standards and IEC Standards.

National Standards

IS 7098 Part-2	Cross linked polyethylene (XLPE) insulated PVC sheathed cables for working voltages from 3.3 kV up to and including 33 kV.
IS 5831 : 1984	PVC insulation & sheath of electric cables.
IS 10810 : 1984	Methods of test for cables.
IS 8130 : 1984	Conductors for insulated electric cables and flexible cords.
IS 3975 : 1999	Mild steel wires, formed wires and tapes for armouring of cables.
IS 0462 (Part 1) / 1983	Fictitious Calculation Method for determination of dimensions of protective covering of cables

International Standards

IEC 60183	Guide to the selection of high voltage cables
IEC 60228	Conductors of insulated cables. Guide to the dimensional limits of circular conductors.
IEC 60332 - 3	Tests on electric cables under fire conditions. Part 3: Tests on bunched wires or cables.
IEC 60502 - 2	Power cables for rated voltages from 6 kV (Um = 7.2 kV) up to 30 kV (Um = 36 kV)
IEC 60811 Pts 1 through 5	Common test methods for insulating and sheathing materials of electric cables.
IEC 885 Pts 1 through 3	Electric test methods for electric cables.
IEC 28	International Standard of Resistance for Copper
IEC 332	Test on Electric Cables under fire conditions

2.0.0 Cable Construction Features

This Specification generally covers following types / sizes of XLPE H. T. Cables used in R-Infra network in Mumbai Discom area, mostly under-ground (buried, with

chances of flooding by water) or for laying on racks, in ducts, trenches, conduits, and so on.

Note: (Ref.: Table stating Cable sizes given below.)

Cable Code: **[R4]**

As per IS, cable designations comprise of following codes / options, as applicable for this Specification:

(N.A. - Not applicable for Specification)

-	(with Copper conductor)	(N.A.) **[R4]**
A	Aluminium conductor	

2X	XLPE insulation	

W	Steel round Wire armour	(N.A.)
W W	Double steel round Wire armour	(N.A.)
Wa	Non-magnetic round Wire armour	
F	Steel formed wire (strip) armour	
FF	Double steel formed wire (strip) armour	(N.A.)
Fa	Non-magnetic formed wire (strip) armour	(N.A.)
-	(“un-armoured” or without armour)	(N.A.)

Y	PVC outer sheath	

Sr. No.	Description	Conductor Material	Cable Code **[R4]**
1.	11 kV, 3c x 150 sq. mm.	Al	A 2X F Y
2.	11 kV, 3c x 300 sq. mm.	Al	A 2X F Y
3.	33 kV, 3c x 400 sq. mm.	Al	A 2X F Y
4.	33 kV, 1c x 630 sq. mm. **[R4]**	Al	A 2X Wa Y
5.	11 kV, 1c x 1000 sq. mm.	Al	A 2X Wa Y
6.	33 kV, 1c x 1000 sq. mm	Al	A 2X Wa Y

Description of each item mentioned in the Specification (the text, BOQ, GTP or any site specific requirement) shall be followed, along with IS: 7098 – Part 2.

2.1.1	**Conductor**	a) Electrolytic Grade Stranded Aluminium Conductor **[R4]** b) Grade: H2 as per IS: 8130 / 1984 (For Al) **[R4]** c) Stranded, compacted and circular in shape d) Class 2 e) "Longitudinal Water-Blocking Arrangement" (or water-tight construction or water barrier protection) shall be provided within the Conductor. **[R4]** i) As per manufacturer's procedures, 100 % water-tight conductor shall be achieved. iii) Make & Type of materials to be used (i.e. Water-swellable tapes / yarn / powder, etc.) shall also be stated in the List of Sub-Vendors for pre-order approval. f) All detailed constructional features shall be shown in the cross-sectional drawing.
2.1.2	**Conductor Screen**	Extruded semi-conducting material. (Also refer Cl. 2.1.3.) (Tapes are not acceptable)
2.1.3	**Insulation**	a) Extruded XLPE (Cross-Linked Poly-Ethylene) Insulation, with water-tree retardant (WTR) property**[R4]** b) The required compound used shall be from R-Infra-approved sub-vendors and not from any other (refer Annexure – C). **[R4]** c) Uniform thickness of insulation shall be within the permissible values as per IEC Standards;

		eccentricity check shall be carried out to ensure this. **[R4]** d) Insulation Color : natural
2.1.4	**Insulation Screen**	a) Freely-strippable semi-conducting screen, which should not require application of heat for its removal. (Refer Cl. 2.1.3.) b) Text "Do not Heat - Freely Strippable" to be printed on insulation screen (at every 600 mm interval). c) Round shape over the outer semi-con shall be within the permissible limits as per IEC standards; Ovality check shall be carried out to ensure this. **[R4]** d) Compound used shall be suitable for the operating temperature of the Cable and shall be compatible with the insulation used. **[R4]**
2.1.4A	**XLPE Process**	
2.1.4A-1	11 KV	Dry Cure process only. **[R4]**
2.1.4A-2	33 KV	Dry Cure process only.
2.1.4A-3	Extrusion **[R4]**	It is desirable that Conductor Screen, Insulation and Insulation Screen shall be extruded simultaneously, in a Single One-Time Process (i.e. as a triple-head extrusion) to ensure homogeneity of layers over the conductor, and absence of voids. However, Tandem Extrusion (1+2) is also acceptable
2.1.4A-4	Make of Compounds for Insulation and Semi-conducting	Any deviation from Approved Makes mentioned in Annexure-C shall not be acceptable, unless the deviation has been specifically approved by R-Infra, prior to sourcing the compounds and taking up manufacturing of cable.
2.1.5	**Water-Swellable Tape**	a) Semi-Conducting Water-Sellable Tape shall be provided, under the copper tape, on each core.

		b) Nominal thickness : 0.3 mm c) Weight: 118 gm / sq. m apprx. d) Swell height: ≥ 12 mm in 1 min. e) Compatible to strippable / non-strippable semi-con, over which it is applied.
2.1.6	**Core Identification**	a) For 3-core cables, cores shall be identified by coloured strips (Red, Yellow, Blue), applied helically / longitudinally below the copper tape. The coloured strips shall carry the name of manufacturer permanently printed at close intervals; this is to provide additional identification of manufacturer of the cable. **[R4]**
2.1.6A	**Copper Tape**	Copper Tape shall be applied helically over the layer formed after application of insulation screen, water-swellable tape and identification strip. **[R4]**
2.1.7	**Filler**	a) All interstices, including center interstices shall be filled by PP filler. b) PP Filler shall be non-hygroscopic, not having any effect on other compounds used, stable at cable temperatures, etc. **[R4]** c) PVC filler is not acceptable. d) Filler is not applicable for single-core cables.
2.1.8	**Binder Tape**	As per manufacturer's standard
2.1.9	**Inner Sheath**	Extruded Inner Sheath of Black PVC type ST-2 (IS 5831)
2.1.10	**Armour**	a) For 3-core Cables : Galvanised Steel flat strip armour b) For 1-core Cables : Non-magnetic round wire armour

		(hard-drawn aluminium wire) c) Minimum area of coverage of armouring shall be 90 % (min.). At any time, the gap between any two adjacent armour strips / wires shall not be more than the width of strip / diameter of wire. d) Zero negative tolerance is for : • Thickness of armour strip • Diameter of armour wire **[R4]**
2.1.11	**Binder Tape**	Rubberised cotton tape
2.1.12	**Outer Sheath**	a) Extruded outer sheath of PVC (ST-2 as per IS 5831) with termite-repellant and anti-rodent properties. **[R4]** (Outer Sheath shall be FRLS-type, if chosen by purchaser.) **[R4]**
		b) Shape of the cable over the outer sheath shall be circular, when manufactured / completed. Regular Ovality check shall be carried out at factory, to detect any abnormality. Manufacturing quality shall be such that cable will retain its circular shape, even after it is laid at site. **[R4]**
		c) The Outer Sheath shall be embossed with following minimum text : **[R4]** 1. The voltage designation 2. Type of construction / cable code (e.g. A2XFY) 3. Manufacturer's Name and Trade-mark 4. Number of cores and nominal cross-sectional area of conductor 5. Progressive (sequential) length of cable at every metre, starting from zero for every drum. Colour filled in for the progressive marking,

		shall be with proper contrast in colouring. 6. Name of buyer / purchaser, R-Infra (Reliance Infrastructure Ltd.) 7. Month & Year of manufacturing 8. IS reference, i.e. IS : 7098 9. Batch No. / Lot No. (For traceability purpose, in case of any, in case of any manufacturing defect or otherwise arising in the cable in future.) 10. Purchase Order Number & date 11. Word ' FRLSH ', in case the cable is of FRLSH type. **[R4]**
2.1.13	**Pulling-eye Assembly** and **Sealing-end Cap** (for Cables)	a) A cable pulling-eye assembly Drg. No. MISC/E/4-1131/1698 (see Annexure-E) shall be provided at the loose end (outer end) of the cable on each drum. Sealing material shall be filled in inside the spaces / gaps between the pulling-eye assembly and cable outer sheath. Further, a heat-shrinkable sleeve shall be provided over the pulling-eye assembly and outer sheath of cable. b) Other end (inner end) of the cable shall be sealed as per MISC/E/4-1131/1699 (see Annexure-E.) One PVC cap with Polyurethane compound shall be provided as primary sealing and heat-shrink end-cap shall form a secondary sealing over the PVC cap.
3.0.0	(This number not used.)	
4.0.0	**Testing & Inspection**	Tests shall be carried out in accordance with IS 7098 (Part-2).
	a) Type Tests	1. Cables must be of type tested quality. Type Test Reports shall be submitted for the type, size and

		rating of cable offered in the bid. 2. If the manufacturer's laboratory is accredited by govt. /authorized body, then it shall be acceptable for type testing. 3. Type test on one cable drum of each type/rating, from the first lot, shall be conducted at Govt.-approved / Internationally accredited labs.
	b) R-Infra QAP (Typical) **[R4]**	In general, all tests mentioned in the R-Infra QAP (Characteristics – Typical) mentioned in Annexure-F shall be included in the Routine Tests, Type Tests and Acceptance Tests stated above.
	c) Routine Tests	1. Measurement of Electrical Resistance 2. HV Test with power frequency AC voltage 3. PD test 4. "Strippability Test" at both the ends of cable for each drum, to check the freely-strippable property of the Insulation Screen (outer semi-con). **[R4]** Test results from the above tests must appear in the documents forwarded by the vendor for Inspection call / waival.
	d) Inspection	1. The Buyer reserves the right to witness all tests specified on completed cables. 2. The Buyer reserves the right to inspect cables at Sellers works at any time prior to dispatch, to verify compliance with the specifications. 3. In-process (stage inspection) and final inspection call intimation shall be given sufficiently in advance to the purchaser. 4. Minimum lot size of Cables to be offered for inspection shall be mutually agreed between Purchaser and Vendor, before placing the order. Vendor shall raise inspection call only after a minimum lot size is ready and with due factory routine tests already carried out. **[R4]**
	e) Acceptance Tests	Acceptance Tests shall be conducted as per Cl. 18.2

		of IS 7098 (Part-2) and the approved Quality Assurance Plan (QAP) for each lot of cables. Following tests shall also be carried out during the Acceptance Tests : a) "Wafer Boil Test" for checking integrity of semi-conducting layers. b) "Void-and-contamination Test" for the Insulation c) "Strippability Test" at both the ends of cable for each drum, to check freely-strippable property of the Insulation Screen (outer semi-con). **[R4]** d) "Water Penetration Test (WPT)", as per applicable IEC standards, to check adequacy of water-blocking arrangement provided inside the conductor. **[R4]** Number of times WPT is to be carried out, during Acceptance Test, shall be mutually agreed and generally determined as follows : a) For the order Qty. < 50 kms : One no. WPT b) For the order Qty. < 50 kms : Two times WPT **[R4]**
	f) Test Certificates (TC)	Three sets of complete Test Certificates (Routine tests and Acceptance tests) shall be submitted along with the delivery of cables. Soft copy of the TCs shall be separately e-mailed to the Purchaser. **[R4]** **Note :** **[R4]** Make/grades of critical materials (such as, for conductor screen, insulation, insulation screen, etc.), actually used during manufacturing of cables for order-on-hand, shall be clearly stated in the TCs forwarded by the Manufacturer, enabling references in future.
5.0.0	**Drawing, Data and Manuals**	a) Refer Annexure-A regarding Document Submission.

		b) Cross-Sectional Drawing shall show every feature of construction, including the thickness / diameter over every layer. This drawing shall also state the text to be embossed over the outer sheath - i.e. type/size, etc. of the cable, drum no./lot no., sequential marking over every meter, printing text on outer semi-con ("Do Not Heat-Freely Strippable"), font sizes to be used, additional text, if any, etc. Also, drum details, markings to be made on both sides of the drum, and so on. **[R4]**
5.0.1	Documents to be submitted along with bid	The vendor shall submit : a) Cross-sectional drawing **[R4]** b) GTP (all data to appear) c) Type Test certificates d) Dimensional drawing for pulling eye e) Fault Level Calculation for armour and copper tape screen f) Complete Cable Catalogue and Manual g) Armour Coverage Calculation
5.0.2	Documents after award of contract	Within 15 days, the seller has to submit four sets of above-mentioned drawings, along with one soft copy for buyer's approval.
5.0.3	Final As-Built Drawings	One soft copy of all documents, including type & routine test certificates.
6.0.0	**Drum length & tolerance**	Cable length per drum
6.0.1	a) 11 KV, Three core b) 33 KV, Three core c) 11 KV, Single core d) 33 KV, Single core	a) 300 mtr +/- 5 % b) 200 mtr +/- 5 % c) 500 mtr +/- 5 % d) 500 mtr +/- 5 %
6.0.2	Overall tolerance	+/- 2 % for the total cable length for the entire order.

6.0.3	Short length of cables	Manufacturer shall take prior approval from Purchaser for any supply of short length cables. For 33 KV, 3-core/1-core cables, minimum acceptable short length cable can be 150 meter and 250 meter respectively. Similarly, for 11 KV cables, minimum acceptable short length cables can be 250 meter. In any case, manufacturer shall not put two cable pieces of different short lengths in same cable drum.
7.0.0	**Packing, Shipping, Handling & Storage**	
	a) Packing	**[R4]** 1. Both the ends of the cables shall be properly sealed to prevent any deterioration of the cable, due to ingress of water, etc. 2. Cable inner end (starting end) shall project, outside the completely wound cable, by sufficient length enabling verify cable details, including the initial length marking. 3. Similarly, outer end of the cable shall be saddled / secured to the drum properly to prevent any external damage to the end at any time. 4. Before putting on wooden planks, protective covers (thick plastic sheets, etc.) shall be secured over the wound cable, to avoid any abrasion by wooden planks, over the outer sheath of the cable. 5. After providing the protective covers, the cable drums shall be finally closed by wooden planks (with saddles), without leaving any gaps between the planks; i.e. 100 % covering shall be

		ensured.
	b) Drum Identification Markings:	Direct marking (i.e. text painting through stencils, etc.) shall be done on the drums, instead of attaching labels, which may be misplaced/lost over a period of time. **[R4]** 1. Drum identification number 2. Cable voltage grade 3. Cable code (e.g. A2XFY, etc.) 4. Number of cores and cross sectional area 5. Cable quantity, i.e. cable length (metre) 6. Purchase order number & date 7. SAP item code 8. Total weight of cable and drum (kg) 9. Manufacturer's Name 10. Buyer's name 11. Month & Year of Manufacturing 12. Direction of rotation of drum 13. Cable length final end-markings (i.e., reading at the inner end and reading at the outer end, just before packing, shall be marked on the drum.)
	c) Shipping information	The seller shall give complete shipping information concerning the weight, size of each package
	d) Transit damage	The seller shall be responsible for any transit damage due to improper packing.
	e) Type of Drum	Steel / wooden drums, as per relevant IS / IEC. (Wooden drums shall be with M.S. spindle plate with nut-bolts)
	f) Cable Drum handling	The drums shall be with M.S. spindle plate (with nut-bolts) of adequate size to suit the spindle rods, normally required for handling the drums, according to expected weight of the cable drums. **[R4]**
8.0.0	**Quality Assurance Plan (QAP)**	
8.0.1	Vendor's QAP	Manufacturer shall submit QAP in line with R-Infra

		QAP format (Annexure-F) for purchaser's approval. **[R4]**
8.0.2	Inspection Points	To be mutually identified and agreed upon in QAP.
9.0.0	**Progress Reporting**	
9.0.1	Outline Document	To be submitted for purchaser's approval for outline of programmes for production, stage-inspection, testing, final inspection, packing, dispatch and documentation.
9.0.2	Detailed Progress Report	To be submitted to Purchaser once a month containing : i) Progress on material procurement ii) Progress on fabrication (as applicable) iii) Progress on assembly (as applicable) iv) Progress on internal stage-inspection v) Reason for any delay in total programme vi) Details of test failures, if any, during manufacturing stages. vii) Progress on final box-up Constraints / Forward Path
10.0.0	**Deviation**	a) Deviations from this specification are only acceptable, where the Seller has listed in his quotation the requirements he cannot, or does not, wish to comply with, and the Buyer has accepted, in writing, the deviations before the order is placed. b) In the absence of any list of deviation, it will be assumed by the Buyer that the Seller complies fully with this specification.

Annexure – A

Scope, Documentation and Delivery schedule

1. Scope

A.	Scope	Design, manufacture, testing at manufacturer's works before dispatch, packing, delivery, unloading, stacking at stores/site of H.T. Power cables, as per Purchaser's BOQ (Bill of Quantity).
B.	Delivery Schedule	To be filled up on a case-to-case basis.

a) **Document Submission**

Submission of drawings, calculations, catalogues, manuals, test reports shall be as follows. (Also refer clause 5.0.0 – Drawings, Data and Manuals.)

Legend:

GTP : Guaranteed Technical Particulars
TTR : Type Test Report
RTR : Routine Test Report

[R4]

	Documents Along with offer	After award of contract - for Approval	Final documents (after Approval)
GTP	3 copies	** 1 soft copy	** 1 soft copy + CD
Drawings	3 copies	** 1 soft copy	** 1 soft copy + CD
Calculations	3 copies	** 1 soft copy	** 1 soft copy + CD
Catalogues & Manual	1 copy each		** 1 soft copy + CD
Test Report	1 copy each of TTR and sample RTR		** 1 soft copy + CD

** Soft copy and CD shall contain documents duly approved, signed and scanned.

3. Delivery Schedule [R4]

a)	Delivery period Start Date	:	from date of LOI / LOA
b)	Delivery period End Date	:	as agreed with supplier
c)	Material dispatch Clearance	:	after inspection by purchaser

Annexure - B

GUARANTEED TECHNICAL PARTICULARS
(GTP) [R4]

Note: [R4]

1) For every type / size of cable, every data shall be mentioned.
2) Seller may submit separate GTP for every type / size of cable, as suitable.
3) GTP requirements are generally as per IS : 7098 (Part-II).
4) GTP shall be read in line with purchaser's Project Site Specific Requirement.

Sr. No.	Description	Buyer's requirement	Unit	Seller's Data
1.0	Purchase Req. No.	-		
2.0	Guarantee Period (Min.)	60 Months (from date of commissioning) / 66 Months (from date of receipt at purchaser's store) whichever is earlier		
3.0	Applicable IS / IEC Standard followed by vendor	IS 7098 Part-2 / IEC 60502-2		
4.0	Make	-		
5.0	**Type** (as required by purchaser)	**[R4]**		
	a) 11 kV, 3c x 150 sq. mm.	A2XFY		
	b) 11 kV, 3c x 300 sq. mm.	A2XFY		
	c) 33 kV, 3c x 400 sq. mm.	A2XFY		
	d) 33 kV, 1c x 630 sq. mm.	A2XWaY		
	e) 11 kV, 1c x 1000 sq. mm.	A2XWaY		
	f) 33 kV, 1c x 1000 sq. mm.	A2XWaY		
6.0	**Voltage Grade**			
	a) 11 kV, 3c or 1c	6.35 / 11	kV	
	b) 33 kV, 3c or 1c	19 / 33	kV	
7.0	Maximum Conductor temperature			
A	Continuous	90	deg. C	
B	Short time	250	deg. C	
8.0	**Conductor**			
A	Material and Grade	As per Cl. 2.1.1		
B	Size	As shown under 5.0 above		

C	Wires in each conductor	As per Table 2 of IS 8130	Nos.	
D	Conductor Shape	As per Cl. 2.1.1 ~~c~~		
E	Dia. of wires in each conductor before compaction	Manufacturer Standard	mm	
F	Diameter over conductor		mm	
G	Maximum Conductor resistance at 20 ° C			
	a) 11 kV, 3c x 150 sq. mm.	0.2060	ohm/km	
	b) 11 kV, 3c x 300 sq. mm.	0.1000	ohm/km	
	c) 33 kV, 3c x 400 sq. mm.	0.0778	ohm/km	
	d) 33 kV, 1c x 630 sq. mm.	0.0469	ohm/km	
	e) 11 kV, 1c x 1000 sq. mm.	0.0291	ohm/km	
	f) 33 kV, 1c x 1000 sq. mm.	0.0291	ohm/km	
H	Longitudinal Water Blocking Arrangement within conductor **[R4]**	Is it provided and shown in the cross-sectional drawing? (Yes / No)		
I	Short circuit current-carrying capacity of conductor		kA for 1 sec.	
9.0	**Conductor Screen** (inner semi-con)			
A	Material & type	As per Cl. 2.1.2		
B	Thickness (min) **[R4]**	0.50	mm	
C	Diameter over conductor screen		mm	
D	Make and grade of semi-conducting compound			
10.0	**Insulation**			
A	Insulation Material	As per Cl. 2.1.3		
B	Nominal thickness			
	a) 11 kV, 3c or 1c	3.6	mm	
	b) 33 kV, 3c or 1c	8.8	mm	
C	Minimum thickness			
	a) 11 kV, 3c or 1c	3.14	mm	
	b) 33 kV, 3c or 1c	7.82	mm	
D	Diameter over Insulation (Approx.)		mm	
E	Make and grade of Insulation compound			
F	Eccentricity **[R4]**	As per IEC standards	%	
G	Water-tree retardant property	Required **[R4]**		
11A.	**Insulation Screen** (outer semi-con)			

a.	i) Thickness of freely strippable Semi conducting screen	0.50	mm	
	ii) Make and grade of semi-conducting compound			
	iii) Printing	As per Cl. No. 2.1.4 (Yes / No)		
	iv) Ovality of the core **[R4]**	As per IEC Standards	%	
b.	Diameter over Insulation Screen (apprx.)		mm	
11B.	**Water-Swellable Tape** (if required by Purchaser)			
	a) Thickness b) Weight c) Swell height d) Compatible to strippable / non-strippable semi-con, over which it is applied. e) Make & Grade f) Pre-slitted packed tapes from sub-vendors approved by R-Infra **[R4]**	a) 0.3 mm b) 118 gm / sq. m c) ≥ 12 mm in 1 min. d) Yes / No e) Pl. state f) Yes / No		
11C.	**Cable Core identification** a) By coloured strips over cores applied helically / longitudinally b) Manufacturer's name shall be permanently printed on the strips, at close intervals. **[R4]**			
11D.	**Copper Tape**			
	i) Dimensions	a) Thickness : 0.1 +/- 5 % b) Width : 50 mm C) Overlap: 20% **[R4]**	Mm	
	ii) Fault current-carrying capacity of copper tape	Manufacturer's Standard (Calculation sheet shall be attached)	… kA for … sec.	
11E.	Diameter over laid up core (apprx.)		mm	

12.0	**Filler** (Material and type)	As per Cl. 2.1.7 (Specify no. & size of filler at center & core interstices)		
	a) 11 kV, 3c x 150 sq. mm.			
	b) 11 kV, 3c x 300 sq. mm.			
	c) 33 kV, 3c x 400 sq. mm.			
	d) 11 kV or 33 kV, 1core	Not applicable		
12A.0	**Binder Tape**	over laid-up cores		
13.0	**Inner Sheath**			
A	Material and type	As per Cl. 2.1.9		
B	Minimum thickness			
	a) 11 kV, 3c x 150 sq. mm.	0.6	mm	
	b) 11 kV, 3c x 300 sq. mm.	0.7	mm	
	c) 33 kV, 3c x 400 sq. mm.	0.7	mm	
	d) 33 kV, 1c x 630 sq. mm.	0.6	mm	
	e) 11 kV, 1c x 1000 sq. mm.	0.7 **[R4]**	mm	
	f) 33 kV, 1c x 1000 sq. mm.	0.7	mm	
C	Approx. dia. over inner sheath		mm	
14.0	**Armour**	As per Manufacturer's Standard and as per purchaser's site-specific requirements		
A	Material			
	a) 11 kV, 3c	G. I. Strip	No.	
	b) 33 kV, 3c	G. I. Strip **[R4]**	No.	
	c) 11 kV or 33 kV, 1c	non-magnetic wire armour (Aluminium wire)	No.	
B	Armour – Wires a) Diameter of wire b) Number of wires (min.)	As per Table 4 of IS 7098 Part-2 (zero negative tolerance for diameter)	mm. no.	

C	Armour – GI strips a) Width of strip & Thickness of strip b) Number of strips (min.)	4 x 0.8 (zero negative tolerance for thickness)	mm no.	
D	Approx. Equivalent Area		sq. mm.	
E	Area covered by armour	Min. 90 % Calculation shall be attached.	%	
F	Dia. over armour - apprx.		Mm	
G	Fault current carrying capacity of armour	Calculation sheet shall be attached.	… kA for … sec.	
15.0	**Outer Sheath**			
A	Material and type	As per Cl. 2.2.12		
B	Thickness (min.)	** As per Table-5 of IS 7098 Part-2		
	a) 11 kV, 3c x 150 sq. mm.	**	mm	
	b) 11 kV, 3c x 300 sq. mm.	**	mm	
	c) 33 kV, 3c x 400 sq. mm.	**	mm	
	d) 33 kV, 1c x 630 sq. mm.	**	mm	
	e) 11 kV, 1c x 1000 sq. mm.	**	mm	
	f) 33 kV, 1c x 1000 sq. mm.	**	mm	
C	Color	Blue		
D	Embossing (details as per Cl. 2.1.12)	Yes / No		
E	FRLS Properties **[R4]**	As per customer's requirement		
16.0	Approx. overall diameter		mm	
17.0	Standard drum length with tolerance			
	a) 11 kV, 3c x 150 / 300 sq. mm.	300 +/- 5%	meters	
	b) 33 kV, 3c x 400 sq. mm.	200 +/- 5%	meters	
	c) 33 kV, 1c x 630 sq. mm.	500 +/- 5%	meters	
	d) 11 kV or 33 kV, 1c x 1000 sq. mm.	500 +/- 5%	meters	
17A	Overall order tolerance **[R4]**	+ / - 2 % for the total cable length for the entire order.		
18.0	**Cable Drum**			
a.	Type of drum	Steel / Wooden		

		(Specify the relevant IS / IEC followed for drum design)		
b.	Markings on the drum (as per Cl. 7.0.0) **[R4]**	On both faces		
18A.0	**Cross-Sectional Drawing** (ref. Cl. 5.0.0) **[R4]**	Is drawing submitted, showing every feature of constructions? (Yes / No)		
19.0	**a. Pulling-eye Assembly** (provided at one running end) Refer drawing in Annexure-E **[R4]**	Is manufacturer's / Sub-vendor's drawing submitted? (Yes / No)		
	b. Sealing-end Cap (provided at the other end) Refer drawing in Annexure-E **[R4]**	Is manufacturer's / Sub-Vendor's drawing submitted? (Yes / No)		
20.0	**Weights**			
	a) Net weight of cable (apprx.)		kg / km	
	b) Weight of empty drum		Kg	
	c) Weight of Cable with drum		kg	
21.0	Continuous current rating for standard I. S. condition laid Direct			
	a) In ground 30° C		Amp	
	b) In duct 30° C		Amp	
	c) In air 40° C		Amp	
22.0	(not used)			
23.0	Electrical Parameters at Maximum Operating temperature:			
A	AC Resistance		ohm / km	
B	Reactance at 50 c/s		ohm / km	
C	Impedance		ohm / km	
D	Zero sequence impedance		ohm / km	
E	Positive sequence impedance		ohm / km	
F	Negative sequence impedance		ohm / km	
G	Capacitance		micro-farad / km	

24.0	Recommended minimum bending radius	--- x O. D.	mm	
25.0	De-rating factor for following Ambient Temperatures :	Ground / Air		
	a) At 30° C			
	b) At 35° C			
	c) At 40° C			
	d) At 45° C			
	e) At 50° C			
26.0	Group factor for following numbers of cables laid :	Touching Trefoil		
	a) 3 Nos.			
	b) 4 Nos.			
	c) 5 Nos.			
	d) 6 Nos.			
27.0	Recommended pressure for laying cable using power winch	30 N / mm2	N / sq. mm.	
28.0	Process of Cross-linking of Polyethylene			
	a) 11 kV, 3c or 1c	Dry Cure process only **[R4]**		
	b) 33 kV, 3c or 1c	Dry Cure process only		
29.0	**Type test** (TTR - Type Test Report)	Is copy of latest valid TTR for respective sizes enclosed? (Yes / No)		
30.0	**Quality Assurance Plan** (QAP) **[R4]**	Is QAP Format (Annexure-F), duly filled in and enclosed? (Yes / No)		
31.0	**List of Sub-Vendors** for construction items (Annexure-C) **[R4]**	Is this list enclosed for R-Infra approval? (Yes / No)		

Annexure - C

List of Sub-Vendors

for critical items

[R4]

Vendor to state sub-vendors' names for other items, wherever approved names are not mentioned, for purchaser's approval during pre-order / post-order stages.

Ser. No.	Description of Material	R-Infra Approved @	Sub-Vendors
1.	XLPE Compound	@	Dow Chemicals , U.S.A.
		@	Borealis , Sweden
		@	Hanwha , Seoul , South Korea
2.	Semi-Conducting Compound	@	Dow Chemicals , U.S.A.
		@	Borealis , Sweden
		@	Hanwha , Seoul , South Korea
3.	Conductor Water-Blocking tapes / yarn / powder	@	Lantor
		@	Geca
		@	Freudenberg
		@	Scapa
4.	Water-Swellable Tapes (Pre-slitted)	@	Lantor
		@	Geca
		@	Freudenberg
		@	Scapa
		@	Miracle
		@	Tekstilna (Slovenia)
5.	E.C. Grade Aluminium Rod	@	Bharat Aluminium Co. Ltd. (BALCO)
		@	Hindustan Aluminium Co. Ltd. (HINDALCO)
		@	National Aluminium Co. Ltd. (NALCO)

6.	Aluminium Alloy		
7.	E.C. Grade Copper Rod		
8.	H.T.G.S. Wire		
9.	PVC Compound		
10.	PVC Resin		
11.	Galvanised Steel Wires / Strips		
12.	Copper Tape (for screening)		
13.	P. P. Fillers		

Annexure - D

Service Conditions [R4]

(Atmospheric / Soil conditions at Site)

A.	**Mumbai**	
a)	Average grade atmospheric condition	Heavily polluted, salt-laden, dusty, humid with possibility of condensation
b)	Average grade soil condition	Water-logged
c)	Maximum altitude above sea level	1000 M
d)	Ambient Air temperature	i) Highest : 45 deg C ii) Average : 35 deg C iii) Minimum : 15 deg C
e)	Relative Humidity	100 % Max
f)	Thermal Resistivity of Soil	150 deg. C . cm / W max.
g)	Seismic Zone	3
h)	Rainfall	3000 mm concentrated in four months

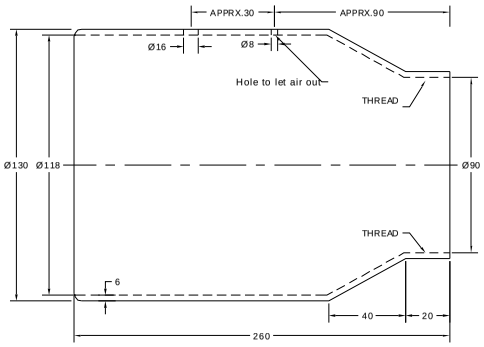
B.	**Delhi**	
a)	Average grade atmospheric condition	Heavily polluted, dry
b)	Average grade soil condition	
c)	Maximum altitude above sea level	1000 M
d)	Air temperature Ambient	i) Highest : 50 deg C ii) Average : 40 deg C iii) Minimum : 0 deg C
e)	Relative Humidity	100 % max
f)	Thermal Resistivity of Soil	150 deg. C . cm / W max.
g)	Seismic Zone	4
h)	Rainfall	750 mm concentrated in four months

Annexure E

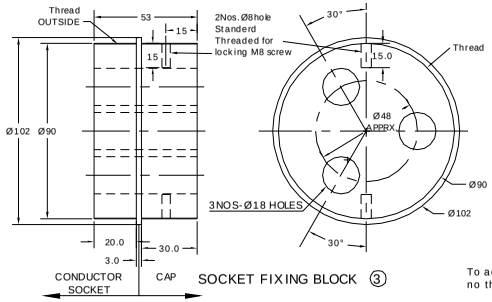
1. **General Arrangement Drawing for Cable Pulling Eye [R4]**

2. **General Arrangement Drawing for End-sealing Cap [R4]**

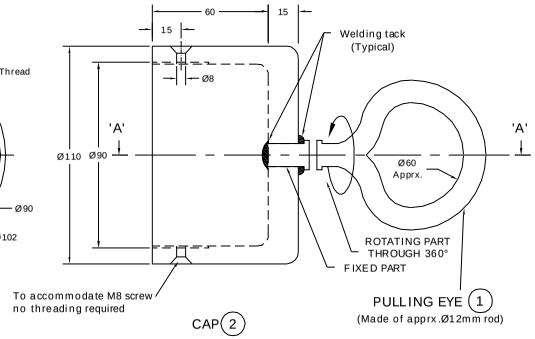
Both the above drawings are given on next pages.



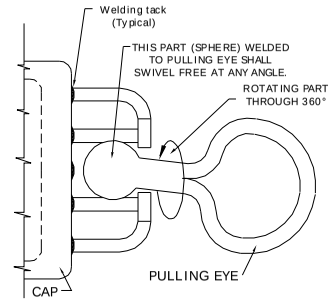
PULLING BLOCK HOUSING (4)



SOCKET FIXING BLOCK (3)

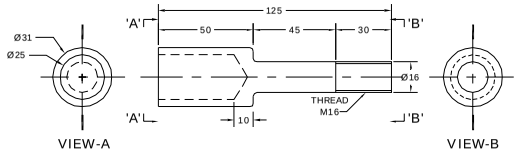


CAP (2)

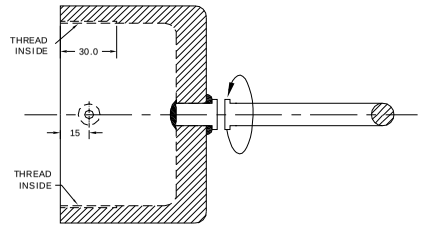


OPTIONAL ARRANGEMENT

(10) LOCKING SCREW
(Suitably long to fix CAP (2) with socket fixing block (3)

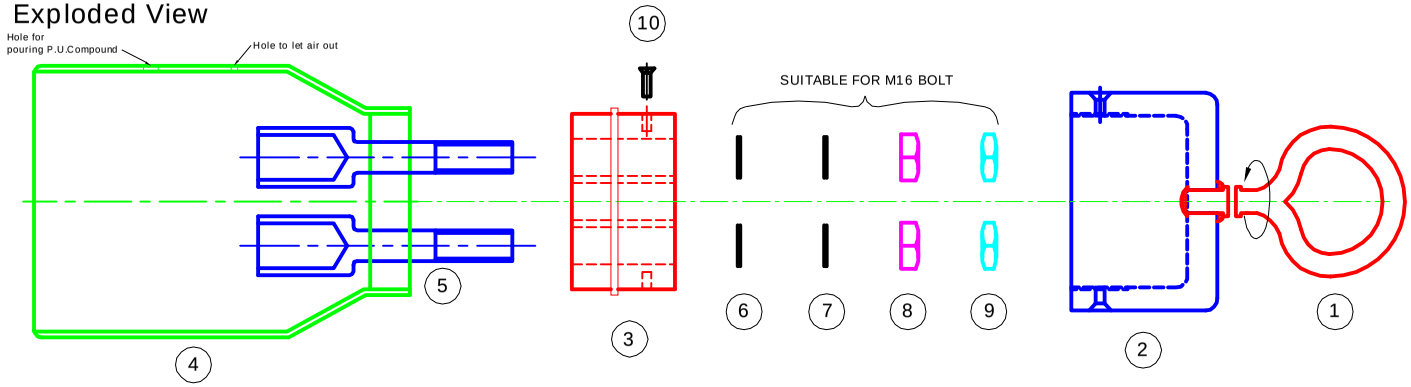


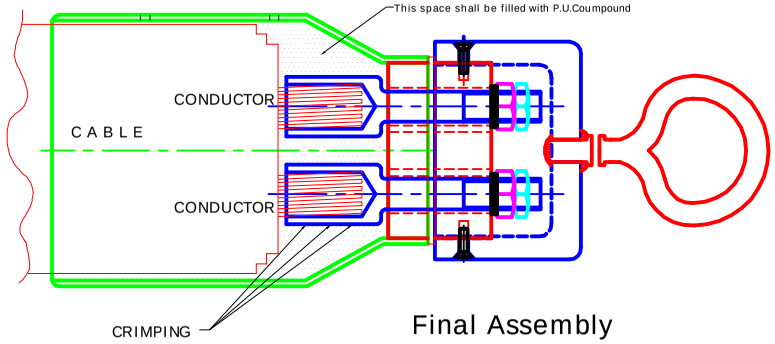
CONDUCTOR SOCKET (5)
(for crimping on conductor)



SECTIONAL VIEW

Exploded View





Final Assembly

EXAMPLE:
1) For cable size 33kV, 3/C X 400sq mm Al XLPE.
2) Diameter over conductor : 23.8mm apprx.
   Overall diameter : 108±3mm apprx.
   Pulling force applicable on the cable : 30 N/sq mm
   Pulling eye shall withstand total force of : 36000N+Safety margin

NOTE:
1) All Dimensions are in mm, unless otherwise stated.
2) This drawing is typical / indicative.Separate dimensioned drawing for cable pulling eye assembly, suitable for required size & rating of cables, shall be submitted for approval,prior to manufacturing.
3) After fixing cable pulling eye, P.U.(Poly-Urethane) Compound shall be poured to occupy inner spaces to avoid ingress of Water / Moisture.
4) After P.U.Compound oozes/flows out from the cable side,the same edge shall be sealed with suitable sleeve/Tape.

NO.	DISCRIPTION	QTY.	MATERIAL
10	LOCKING SCREW	2	M.S.Zinc-Plated
9	LOCK NUT	3	M.S.Zinc-Plated
8	NUT	3	M.S.Zinc-Plated
7	SPRING. WASHER	3	M.S.Zinc-Plated
6	PLAIN WASHER	3	M.S.Zinc-Plated
5	CONDUCTOR SOCKET	3	AL.
4	PULLING BLOCK HOUSING	1	M.S.Zinc-Plated
3	SOCKET FIXING BLOCK	1	M.S.Zinc-Plated
2	CAP	1	M.S.Zinc-Plated
1	PULLING EYE	1	M.S.Zinc-Plated

RELIANCE

DRAWING No. MISC/E/4-1133/1699

SCALE :NOT TO SCALE | DATE: 09-05-2011

CABLE PULLING EYE ASSEMBLY (TYPICAL)

DRAWN BY: BJR | CHECKED BY: AP/DS/PS | APPROVED BY:

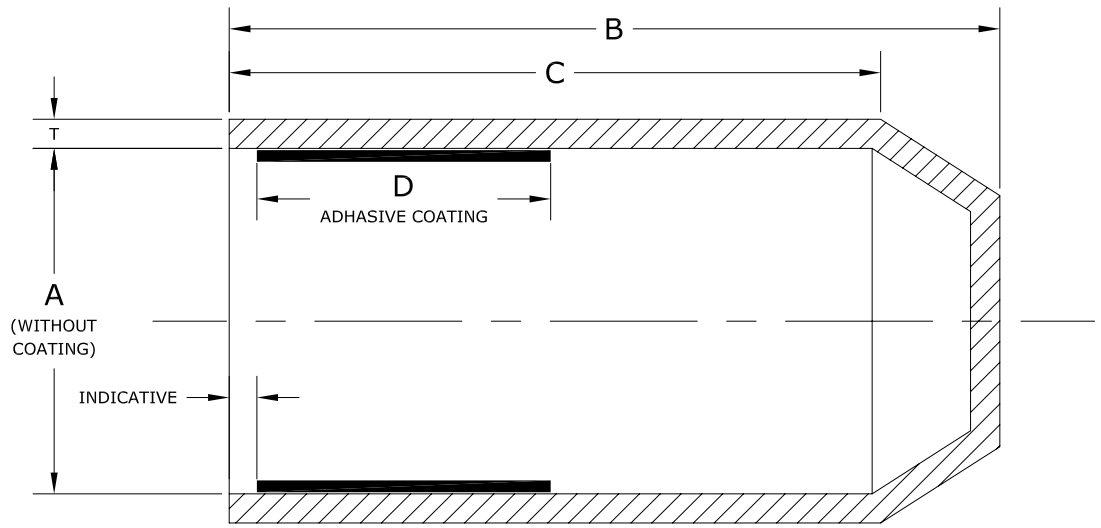
REVISIONS

Addl V.P.

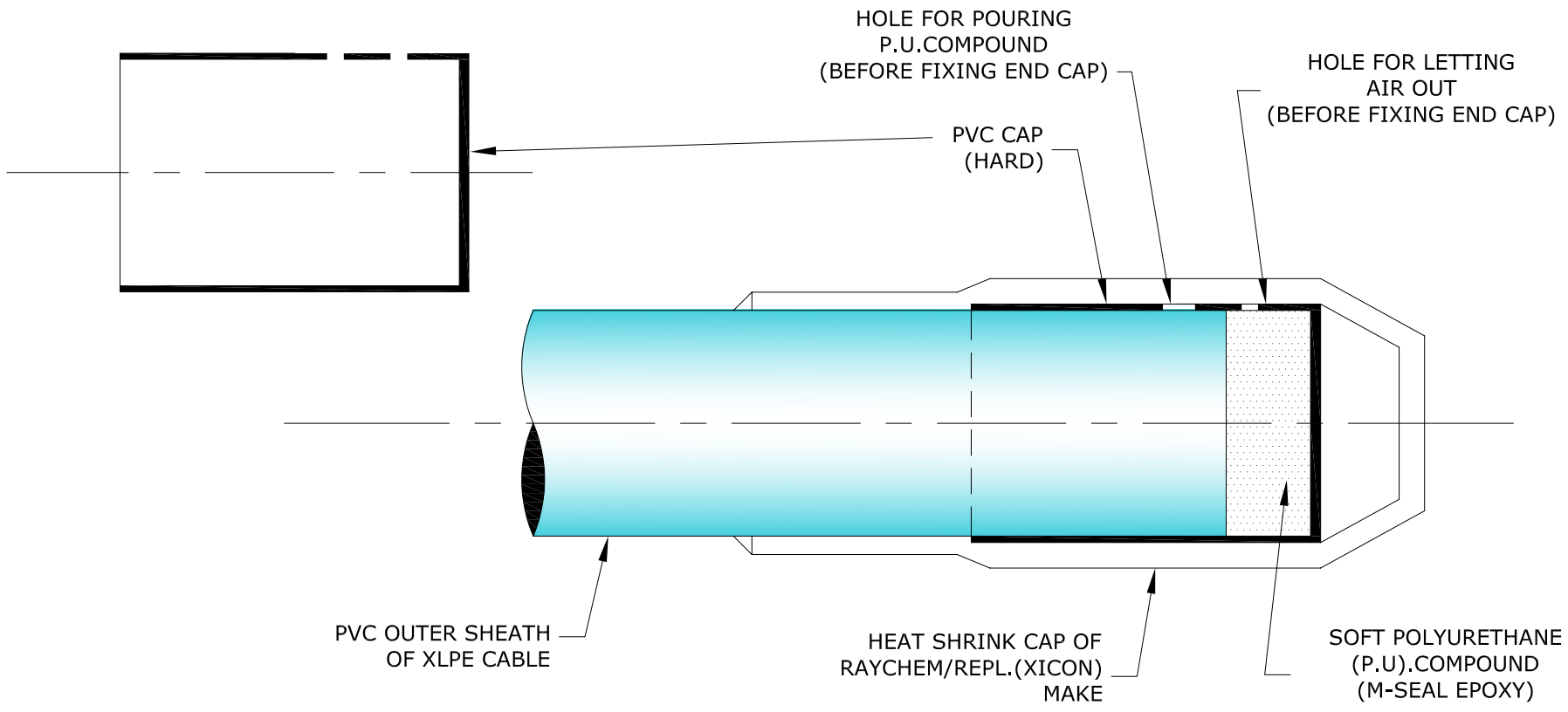
DIMENSIONS

SIZE	A EXP.(Min.)	A REC.(Max)	B EXP.(Min.)	C EXP.(Min.)	D EXP.(Min.)	LC %	T (WALL REC. ± 20 %)
EC 120/150	75	34	120	105	50	± 10	4.2
EC 240/300	100	62	130	110	70	± 10	3.5
EC 400	145	75	155	120	70	± 10	4.6

EXP - Expanded (as supplied), REC - Recovered freely, LC - Longitudinal Change,T - Wall Thickness, EC - End Cap



END CAP
(AS SUPPLIED)
SECTIONAL VIEW



END CAP
(AFTER HEAT SHRINKING OVER THE CABLE END)

MATERIAL SPECIFICATIONS

	Characteristics	Test Class	Value	Test Method
A	**Physical Properties**			
1	Specific Gravity	Type	1.05 ± 0.2	ASTM D -1505
2	Water Absorption	Type	1 % (max)	ASTM D-570 / ISO 62
3	Tensile Strength	Routine	10 N /sqmm (min)	ASTM D-412 / ISO 37
4	Ultimate Elongation	Routine	300% (min)	ASTM D-412 / ISO 37
5	Hardness	Type	45 shore D ± 3	ASTM D -2240
6	**Thermal Test**			
B	Thermal Ageing (120°C for 500 hrs)			
1	Tensile Strength	Type	8 N/sqmm (min)	ASTM D-412 / ISO 37
2	Ultimate Elongation	Type	200% (min)	ASTM D-412 / ISO 37
C	**Electrical Properties**			
1	Volume Resistivity	Type	10^{12} ohm-cm. (min)	ASTM D-257 / IEC 93
2	Dielectrical Strength	Type	10 kV/mm. (min)	ASTM D-149 / IEC 243
3	Dielectric Constant	Type	5 (max)	ASTM D-150 / IEC 250

Note : 1) All dimension in mm
2) Colour Black
3) Size as mentioned in the table shall be stencilled on respective item

RELIANCE

DRAWING No. MISC/E/4-1131/1698

SCALE :NOT TO SCALE | DATE: 09-05-2011

END SEALING CAP
(FOR XLPE CABLE)

DRAWN BY: BJR | CHECKED BY: AP/DS/PS | APPROVED BY:

REVISIONS

Addl V.P.

Annexure- F

QAP Format
(Quality Assurance Plan)
For H. T. Cables (Typical)
(Page 1 to 10)
[R4]

Typical Characteristics are mentioned in the above QAP format, which is appearing on the next pages.

Vendor shall submit the QAP, duly filled in, in accordance with IS / IEC standards and manufacturer's standards/procedures, for Purchaser's approval, during pre-order / post-order stages.

QUALITY ASSURANCE PLAN (QAP)
FOR H. T. CABLES
(Typical Format)

09.03.2012

Legend : SV : Sub-Vendor of Cable Manufacturer, MFR : Cable Manufacturer, R-Infra : Reliance Infra-Structure Ltd., PS : Purchase Specification of Cable Vendor, R-Infra Spec. - R-Infra Specification
P - Perform , V - Verify , W - Witness

Sr. No.	COMPONENT			CHARACTERISTICS & OPERATIONS	UNIT	CLASS	Measuring Equipment / Technique	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT / TEST	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY			Remarks
													SV	MFR	R-Infra	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
A.	**RAW MATERIALS**															
1	**Aluminium / Copper Rod**	a)		Tensile strength	kg								P	P/V	V/W	
		b)		Resistivity at 20 Deg C	ohm-mm2/km								P	P/V	V/W	
		c)		Diameter	mm								P	P/V	V/W	
		d)		Chemical composition									P	V	V	
		e)		Surface finish	--								P	P	V/W	
		f)		Purity of Aluminium / Copper					One sample per PO				P	P	V/W	
2	**PVC Compound**	a)		Tensile Strength	N/sq.mm.								P	P/V	V	
		b)		Elongation at break	%								P	P/V	V	
		c)		Thermal stability	min.								P	P/V	V	
		d)		Additional test (for FRLS Sheathing compound only)												
			i)	Oxygen Index test									P	P/V	V	
			ii)	Temperature Index test									P	P/V	V	
			iii)	Smoke generation test									P	P/V	V	
			iv)	Acid gas generation test									P	P/V	V	
3	**XLPE Compound**	a)		Packing									P	V	V	
		b)		Tensile Strength	N/sq.mm.								P	P/V	V	
		c)		Elongation at break	%								P	P/V	V	
		d)		Hot set test	%								P	P/V	V	
		e)		Volume Resistivity	ohm-cm								P	P/V	V	
		f)		Cure Curve (Max. Torque)	lb-in								-	P	V	
		g)		Density	g/cc								P	P/V	V	
4	**Semi-conducting Compound**	a)		Packing									P	V	V	
		b)		Volume Resistivity									P	P/V	V	
		c)		Tensile Strength	N/sq.mm.								P	P/V	V	
		d)		Elongation at break	%								P	P/V	V	
		e)		Cure Curve (Max. Torque)	lb-in								-	P	V	
		f)		Density	g/cc								P	P/V	V	
		g)		Firmly bonded over conductor									P	P/V	V	
		h)		Easly strippable over XLPE insulation									P	P/V	V	
5	**Copper Tape**	a)		Thickness & width	mm x mm								P	P/V	V	
		b)		Tensile Strength	N/sq.mm.								P	P/V	V	
		c)		Elongation at break	%								P	P/V	V	
		d)		Resistivity	ohm-mm2/km								P	P/V	V	

RELIANCE

QUALITY ASSURANCE PLAN (QAP)
FOR H. T. CABLES
(Typical Format)

09.03.2012

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P - Perform , V - Verify , W - Witness

Sr. No.	COMPONENT			CHARACTERISTICS & OPERATIONS	UNIT	CLASS	Measuring Equipment / Technique	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT / TEST	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY			Remarks
													SV	MFR	R-Infra	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
6	**Armour wires/strips (Galvanised Steel)**	a)		Dimensions	mm x mm								P	P/V	V	
		b)		Surface condition/finish	--								P	P/V	V	
		c)		Tensile Strength	N/sq.mm.								P	P/V	V	
		d)		Elongation at break	%								P	P/V	V	
		e)		Torsion test for round wire									P	P/V	V	
		f)		Wrapping test									P	P/V	V	
		g)		Mass of zinc coating	g/sq.m.								P	P/V	V	
		h)		Uniformity of zinc coating	dips								P	P/V	V	
		i)		Adhesion test									P	P/V	V	
		j)		Resistivity test	ohm-mm2/km								P	P/V	V	
7	**Water Swellable Tape (Non-Woven)**	a)		Dimensions	mm x mm								P	P/V	V	
		b)		Swelling height	mm								P	P/V	V	
		c)		Resistivity									P	P/V	V	
		d)		Mass	g/sq.m.								P	P/V	V	
8	**Steel / Wooden Drum**	a)		Dimension	mm						As per IS	-	P	P	V	
		b)		Finish & workman ship	--							-	P	P	V	
9	**Cable Pulling Eye**	a)		Dimensions & Material	mm						R-Infra approved drawing	-	P	P	V	
		b)		Finish & workman ship	--							-	P	P	V	
		c)		Tension test on pulling eye	N/sq.mm.					R-Infra approved drawing		-	P	P	V	
10	**Binder Tape**			Dimensions & material	mm							-	P	P	V	
11	**Poly-propylene Net Filler**			Size								-	P	P	V	
12	**Heat-shrinkable End Cap**	a)		Bore diameter	mm						R-Infra approved drawing	-	-	P	V	
		b)		Length of end cap	mm						R-Infra approved drawing	-	-	P	V	
		c)		hot melt adhesive												
B.	**IN-PROCESS INSPECTION**															
1	**Wire Drawing**	a)		Diameter	mm								-	P	V/W	
		b)		Surface finish	--								-	P	V/W	
		c)		Tensile test (for Al)	N/sq.mm.					IS: 8130/84	IS: 8130/84		-	P	V/W	
		d)		Elongation test (for Cu)						IS: 8130/84	IS: 8130/84		-	P	V/W	
		e)		Wrapping test (for Al)						IS: 8130/84	IS: 8130/84		-	P	V/W	
		f)		D.C. Resistance at 20 deg C	ohm-cm									P	V/W	
2	**Stranding**	a)		No. of wires/strands	no.								-	P	V	
		b)		Lay length & Lay direction	mm								-	P	V	
		c)		Dia of conductor	mm								-	P	V	
		d)		Surface finish	--								-	P	V	
		e)		Mass of conductor	kg							IS 8130/84	-	P	V	

QUALITY ASSURANCE PLAN (QAP)
FOR H. T. CABLES
(Typical Format)

09.03.2012

Legend : SV : Sub-Vendor of Cable Manufacturer, MFR : Cable Manufacturer, R-Infra : Reliance Infra-Structure Ltd., PS : Purchase Specification of Cable Vendor, R-Infra Spec. - R-Infra Specification
P - Perform , V - Verify , W - Witness

Sr. No.	COMPONENT			CHARACTERISTICS & OPERATIONS	UNIT	CLASS	Measuring Equipment / Technique	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT / TEST	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY			Remarks
													SV	MFR	R-Infra	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
3	**Core Extrusion (CCV)**	a)		Compound Make/Grade	--							-	-	P	V	
	Conductor Screen	b)		i) Thickness of Conductor Screen ii) Thickness of Insulation iii) Thickness of Insulation Screen	mm					IS 7098 (Part 2) / 85	IS 7098 (Part 2) / 85		-	P	V	
	+	c)		Surface finish	--								-	P	V	
	Insulation (XLPE with water-tree retardant property)	d)		Printing on outer semi-conducting layer						"DO NOT HEAT, FREELY STRIPPABLE"			-	P	V	
		e)		Tensile Strength						IS 7098(Part 2)/85	IS 7098(Part 2)/85		-	P	V	
		f)		Elongation at break						IS 7098(Part 2)/85	IS 7098(Part 2)/85		-	P	V	
	+	g)		Hot set test	%					IS 7098(Part 2)/85	IS 7098(Part 2)/85		-	P	V	
	Insulation Screen	h)		Eccentricity of insulation	%								-	P	V	
		i)		Core diameter and Ovality check on core	mm								-	P	V	
		j)		Void & contamination test for insulation (Silicon Oil test)	no.								-	P	V/W	
		k)		Condition of Triple Extrude									-	P	V/W	
		l)		CCV tube pressure (N2) and temperature	bars & deg. C								-	P	V/W	
		m)		Temperature of Extruder (65 mm, 80 mm, 150 mm)	deg C								-	P	V/W	
		n)		Haul off / Line Speed	m/min								-	P	V/W	
		o)		Dimensions and Condition of dies & nipple	mm								-	P	V/W	
		p)		Freely strippable insulation screen (Strippability Test)						IS:7098/3, 93 Cl. No. 20	IS:7098/3, 93 Cl. No. 20		-	P	V/W	
		q)		Water boil test for extruded semi-conducting layers						BIS draft Specn	BIS draft Specn		-	P	V/W	
		r)		Longitudinal Water-Blocking Test						IEC 60502-2	IEC 60502-2		-	P	V/W	
4	**Water Swellable Semi-conducting**	a)		Dimensions (thickness x width)	mm x mm								-	P	V	
		b)		Tape Application (Overlap)	%								-	P	V	
		c)		Lay direction	--											
5	**Copper Tape - taping**	a)		Diameter under copper tape	mm								-	P	V	
		b)		Dimensions (thickness x wid	mm x mm								-	P	V	
		c)		Number of tapes									-	P	V	
		d)		Tape application (Overlap)	%								-	P	V	
		e)		Diameter over copper tape	mm								-	P	V	
6	**Laying up**	a)		Identification of cores	--								-	P	V	
		b)		Direction of lay & core sequence	Measuring tape					IS 7098(Part 2)/85	IS 7098(Part 2)/85		-	P	V	
		c)		Lay length	Scale								-	P	V	
		d)		Shape of laid up assembly	--								-	P	V	
		e)		P. P. Filler size	mm								-	P	V	
		f)		Diameter over Lay-up	mm								-	P	V	

RELIANCE

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													SV	MFR	R-Infra	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
7	**Inner Sheath**	a)		Material & type	--								-	P	V	
		b)		Thickness	mm					IS 7098(Part 2) / 85	IS 7098(Part 2) / 85		-	P	V	
		c)		Surface finish	--								-	P	V	
		d)		Colour of inner sheath									-	P	V	
		e)		Diameter over Inner Sheath	mm								-	P	V	
8	**Armouring**	a)		Dimension of wires/strips	mm								-	P	V	
		b)		No. of wires/strip	no.								-	P	V	
		c)		Armour coverage	%					IS 7098(Part 2)/85	IS 7098(Part 2)/85		-	P	V	
		d)		Direction of lay						IS 7098(Part 2)/85	IS 7098(Part 2)/85		-	P	V	
		e)		Lay length/Gear setting	mm								-	P	V	
		f)		Surface finish	--								-	P	V	
		g)		Diameter over Armour	mm								-	P	V	
		h)		Rubberised cotton tape over armour												
9	**Outer Sheath**	a)		Material & type								-	-	P	V	
		b)		Anti termite additives									-	P	V	
		c)		Thickness	mm								-	P	V	
		d)		Overall diameter of the Cable	mm								-	P	V	
		e)		Surface finish & colour of sheath	--								-	P	V	
		f)		Cable length verification									-	P	V	
		g)		Embossing / Printing / Sequential Marking						As per R-Infra's approved GTP/Cross-sectional drawing			-	P	V	
10	**Cable Winding over the drum**	a)		Cable appearance	--								-	P	V	
		b)		Ovality check over completed cable									-	P	V	
		c)		Drum appearance, including fixing of M. S. Spindle Plates	--								-	P	V	
		d)		Winding	--								-	P	V	
		e)		Packing	--								-	P	V	
		f)		Embossing / Printing	--								-	P	V	
		g)		Surface finish	--								-	P	V	
C.	**TESTING & INSPECTION**															
1.	**Type Tests**			**Type Tests at Vendor's works**												
		a)		**Tests on conductor**					One sample							
			i)	Annealing test for copper						IS 8130/84	IS 8130/84		-	P	V	
			ii)	Tensile test for aluminium	N/mm2					IS 8130/84	IS 8130/84		-	P	V	
			iii)	Wrapping test for aluminium						IS 8130/84	IS 8130/84		-	P	V	
			iv)	Conductor resistance test	ohm/km					IS 8130/84	IS 8130/84		-	P	V/W	

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													SV	MFR	R-Infra	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
		b)		**Tests on armouring wires/strips**					One sample							
			i)	Dimensions of wire/strip	mm					IS 3975, IS 10810 Pt. 36			-	P	V/W	
			ii)	Tensile strength & Elongation at break	N/mm2					IS 3975	IS 3975		-	P	V/W	
			iii)	Torsion test for round wire						IS 3975	IS 3975		-	P	V/W	
			iv)	Winding test for strip (Wrapping Test for Al wires/formed wires only)						IS 3975	IS 3975		-	P	V/W	
			v)	Uniformity of zinc coating (for GS)	dips					IS 3975	IS 3975		-	P	V/W	
			vi)	Mass of zinc coating (for GS)	g/mm2					IS 3975	IS 3975		-	P	V/W	
			vii)	Adhesion Test						IS	IS		-	P	V/W	
			viii)	Resistivity of wire/strip	ohm-cm					IS 3975	IS 3975		-	P	V/W	
		c)		Test for thickness of insulation & sheath	mm				One sample	IS 7098(Part 2)/85			-	P	V/W	
		d)		**Physical tests on insulation**					One sample							
			i)	Tensile strength & Elongation test (before and after ageing)	N/mm2, %					IS 7098(Part 2)/85	IS 7098(Part 2)/85		-	P	V/W	
			ii)	Ageing in air oven						IS 7098(Part 2)/85	IS 7098(Part 2)/85		-	P	V/W	
			iii)	Hot set test	%					IS 7098(Part 2)/85	IS 7098(Part 2)/85		-	P	V/W	
			iv)	Shrinkage test						IS 7098(Part 2)/85	IS 7098(Part 2)/85		-	P	V/W	
			v)	Water absorption test (gravimetric)						IS 7098(Part 2)/85	IS 7098(Part 2)/85		-	P	V/W	
			vi)	Eccentricity test									-	P	V/W	
		e)		**Physical tests on outer sheath**					One sample							
			i)	Tensile strength & Elongation test at break (before and after ageing)						IS 5831/84	IS 5831/84		-	P	V/W	
			ii)	Ageing in air oven						IS 5831/84	IS 5831/84		-	P	V/W	
			iii)	Shrinkage test	%					IS 5831/84	IS 5831/84		-	P	V/W	
			iv)	Hot deformation test						IS 5831/84	IS 5831/84		-	P	V/W	
			v)	Loss of mass test in air oven						IS 5831/84	IS 5831/84		-	P	V/W	
			vi)	Heat shock test						IS 5831/84	IS 5831/84		-	P	V/W	
			vii)	Thermal stability test	deg C, time					IS 5831/84	IS 5831/84		-	P	V/W	
			viii)	Cold Bend Test						IS 5831/84	IS 5831/84		-	P	V/W	
			ix)	Cold Impact Test						IS 5831/84	IS 5831/84		-	P	V/W	

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													SV	MFR	R-Infra	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
		f)		**Electrical Tests**					One sample							
			i)	Partial discharge test	pC					IS 7098(Part 2)/85	IS 7098(Part 2)/85		-	P	V/W	
			ii)	Bending test						IS 7098(Part 2)/85	IS 7098(Part 2)/85		-	P	V/W	
			iii)	Partial discharge test	pC					IS 7098(Part 2)/85	IS 7098(Part 2)/85		-	P	V/W	
			iv)	Dielectric power factor test (as a function of voltage)						IS 7098(Part 2)/85	IS 7098(Part 2)/85		-	P	V/W	
			v)	Dielectric power factor test (as a function of temperature)						IS 7098(Part 2)/85	IS 7098(Part 2)/85		-	P	V/W	
			vi)	Heating cycle test	deg C, hrs., nos.					IS 7098(Part 2)/85	IS 7098(Part 2)/85		-	P	V/W	
			vii)	Dielectric power factor as a function of voltage						IS 7098(Part 2)/85	IS 7098(Part 2)/85		-	P	V/W	
			viii)	Partial discharge test	pC					IS 7098(Part 2)/85	IS 7098(Part 2)/85		-	P	V/W	
			ix)	Impulse withstand test						IS 7098(Part 2)/85	IS 7098(Part 2)/85		-	P	V/W	
			x)	High voltage test	kV, min.					IS 7098(Part 2)/85	IS 7098(Part 2)/85		-	P	V/W	
		g)		Insulation Resistance test (Volume Resistivity test)	ohm-cm				One sample	IS 7098(Part 2)/85	IS 7098(Part 2)/85		-	P	V/W	
		h)		Flammability Test					One sample	IS 7098(Part 2)/85	IS 7098(Part 2)/85		-	P	V/W	
		i)		Water Penetration Test (WPT) on core (Longitudinal Water-Blocking test)					One sample	IEC 60502-2	IEC 60502-2		-	P	V/W	
		j)		Freely strippable insulation screen (Strippability Test)									-	P	V/W	
		k)		Ovality check on core									-	P	V/W	
		l)		Ovality check on completed Cable									-	P	V/W	
		m)		Check on fixing of M.S. Spindle Plates									-	P	V/W	
		o)		Additional tests on FRLS-type cables only												
			1)	Tests on FRLS outer sheath					One sample							
				i) Oxygen Index test									-	P	V	
				ii) Temperature Index test									-	P	V	
				iii) Acid gas generation test									-	P	V	
				iv) Smoke density test									-	P	V	
			2)	Flammability test on a piece of completely ready FRLS cable					One sample	IS 7098 (Part 2)/85 / IEC 332 (Part 3- Category B)	IS 7098 (Part 2)/85		-	P	V/W	

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													SV	MFR	R-Infra	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
2.	**Routin Tests**	a)		High Voltage	kV, min.				100 %	IS 7098(Part 2)/85	IS 7098(Part 2)/85		-	P	V	
		b)		Conductor Resistance	ohm/km				100 %	IS 8130/84	IS 8130/84		-	P	V	
		c)		Partial Discharge	pC				100 %	IS 7098(Part 2)/85	IS 7098(Part 2)/85		-	P	V	
		d)		Freely strippable insulation screen (Strippability Test)									-	P	V	
3.	**Acceptance Tests**	a)		Annealing test for copper					Appendix A to IS 7098(Part 2)/85	IS 8130/84	IS 8130/84		-	P	V	
		b)		Tensile test for aluminium						IS 8130/84	IS 8130/84		-	P	V	
		c)		Wrapping test for aluminium						IS 8130/84	IS 8130/84		-	P	V	
		d)		Conductor resistance test	ohm/km					IS 8130/84	IS 8130/84		-	P	W	
		e)		Test for thickness of insulation & sheath						IS 7098(Part 2)/85	IS 7098(Part 2)/85		-	P	W	
		f)		Eccentricity test on insulation												
		g)		Hot set test for insulation	%					IS 7098(Part 2)/85	IS 7098(Part 2)/85		-	P	W	
		h)		Tensile strength & Elongation at break of insulation & outer sheath	N/mm2, %				Appendix A to IS 7098(Part 2)/85	IS 7098 (Part 2) / 85 & IS 5831/84 (Type ST2)			-	P	W	
		i)		Partial discharge test	pC					IS 7098(Part 2)/85	IS 7098(Part 2)/85		-	P	W	
		j)		High voltage test	kV, min.					IS 7098(Part 2)/85	IS 7098(Part 2)/85		-	P	W	
		k)		Insulation resistance (Volume resistivity) test	ohm-cm					IS 7098(Part 2)/85	IS 7098(Part 2)/85		-	P	W	
		l)		Tests for dimension and number of armour wires/strips	mm					IS 3975, IS 10810 Pt. 36			-	P	W	
		m)	i)	Test for anti-termite property of outer sheath									-	P	W	
			ii)	Test for anti-rodent property of outer sheath									-	P	W	
		n)		Winding of cable on drum To check : i) cable appearance ii) drum appearance iii) cable winding iv) packing v) embossing / printing vi) length verification vii) mass of cable viii) ovality check on completed cable x) Fixing of M. S. Plates					One drum from offered lot				-	P	W	

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													SV	MFR	R-Infra	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
		o)		Water Boil test to check the integrity of semiconducting layer									-	P	W	
		p)		Void and Contamination test for insulation									-	P	W	
		q)		Swell Height of water-swellable tape					Appendix A to IS 7098(Part 2)/85				-	P	W	
		r)		Lay Ratio of armour									-	P	W	
		s)		Mass of Zinc coating for armour						IS 3975, IS 10810 Pt. 36 &			-	P	W	
		t)		Uniformity of Zinc coating						IS 3975, IS 10810 Pt. 36			-	P	W	
		u)		Printing over semicon									-	P	W	
		v)		Water Penetration Test (WPT) on core (i.e. Longitudinal Water-Blocking Test)						IEC 60502-2	IEC 60502-2		-	P	W	
		w)		Freely strippable insulation screen (Strippability Test)									-	P	W	
		x)		Ovality check on core									-	P	W	
		y)		Additional tests for FRLS cables												
			1)	Tests on FRLS sheath												
				i) Oxygen Index test									-	P	W	
				ii) Temperature Index test									-	P	W	
				iii) Acid gas generation test									-	P	W	
				iv) Smoke density test									-	P	W	
			2)	Flammability test on finished cable									-	P	W	
D.	**PACKING & MARKINGS**															
1	**Packing & Marking**	a)		Cable end sealing					100 %	IS 7098(Part 2)/85	IS 7098(Part 2)/85		-	P	V/W	
		b)		Pulling eye at leading end					100 %				-	P	V/W	
		c)		Stencilling / Marking on drum					100 %	IS 7098(Part 2):85	IS 7098(Part 2):85		-	P	V	

Note :

1. Checks specified above for Raw Material, In-Process and Final Inspection shall be as relevant to the specific cable construction.
2. Number of samples shall be selected as per Factory Standard/Agreement wherever 'sample' is indicated for extent of check.
3. Plant standards shall be followed in case Technical Data Sheet does not include requirements for characteristics to be checked.
4. R-Infra's may witness Raw materials and In process Inspections, in addition to Type/Routine/Acceptance tests, at any time/stage of manufacturing.
5. R-Infra's Inspector shall randomly select a cable drum for type testing at vendor's premises / CPRI / ERDA among the lot offered for inspection.
6. For each of the offered lot for inspection, R-Infra may randomly select one cable drum for testing of end cap "Destructive testing" to verify adhesion of sealing cap to cable outer sheath. Similarly, pulling eye shall be tested with 30N/mm2 pressure.

Annexure- G

Testing and manufacturing process requirements w. r. t. TR- XLPE insulation

All cables made with TR-XLPE Insulation should be tested and/or certified to meet the following performance parameters as per ANSI /ICEA S-94-649 after one year AWTT.

Property	Units	Requirements Values
Min. Avg. Electrical Breakdown Strength(qual. test)	Kv/mm	≥ 25
Impulse Strength	Kv/mm	≥ 83
Water Tree Length	mm	0.25
Max. Bowtie Tree Density	(Number per 16.4 cu. cm)	Maximum 15 (0.12-0.25 mm range)

Manufacturing processes to produce high-quality cables with the following characteristics:

- Cure consistency with hot set/creep less than 100%
- No voids larger than 75 microns per 16.4 cubic cm
- No ambers larger than 250 microns per 16.4 cubic cm
- No contaminants larger than 125 microns and less than 5 between 50-125 microns per cubic 16.4 cubic cm tested.
- Neutral indent on cable is less than 375 microns
- Cable insulation concentricity greater than 90% tested
- No protrusions greater than 75 microns at the conductor shield and 125 microns at the insulation shield

Technical Specification
For Heat Shrinkable And Cold Shrinkable Straight Through Jointing Kit
(11 KV, 33 KV, 66 KV XLPE Insulated Cables)

Specification no – SP-HCSTJ-03-R1

Prepared by		Reviewed by		Approved by		Rev	Date
Name	Sign	Name	Sign	Name	Sign		
PG		GS		AA		R0	02/06/2017

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Record of Revision

Item/Clause No.	Change in Specification	Approved By	Rev

1.0.0 Scope of work

A. Heat Shrinkable / Cold shrinkable Straight through Joint Kits (hereinafter briefly referred to as “STJ Kits”), suitable for 11 kV, 33 & 66kV XLPE cables, shall be designed, manufactured, tested, packed and delivered by the Vendor, as per Purchaser’s requirements.

B. During post-installation period, if a joint fails at site, the vendor shall depute a technical team to site for a root-cause analysis of the failure of the joint, in the presence of BSES officials. An Analysis Report shall then be submitted for BSES’s review and approval. If this report concludes the cause of failure as due to a design/manufacturing defect in a component, then vendor shall replace all such components in the entire stock available with BSES.

2.0.0 Codes & standards

2.1.0 National Standards:

S No.	Standard Number	Title
2.1.1	IS- 13573: 2011	Joints & Terminations of Polymeric Cables for working voltages from 6.6 kV up to and including 33 kV Performance Requirements and Type Tests
2.1.2	IS- 7098: Part 2:1985	Cross-linked Polyethylene (XLPE) Insulated PVC sheathed cables: Part 2 - For working voltages from 3.3 kV up to and including 33 kV
	IS- 7098: Part 3:1993	Cross-linked polyethylene insulated thermoplastic sheathed Cables specification: Part 3 - For working voltages from 66 kV up to and including 220 KV
2.1.3	IS- 10810: 1984	Methods of test for cables

2.1.1 International Standards:

S No.	Standard Number	Title
2.2.1	EA TS - 09-13	Electricity Association - Technical Specification – 09 - 13 Material component for use in Electric Power Cable Termination & Joints for System voltage above 1kV up to 36 kV
2.2.2	IEC - 60183	Guide to the selection of high voltage cables
2.2.3	IEC - 885 Part 1 to 3	Electric test methods for electric cables
2.2.4	IEC - 60502 - 4	Power Cable Accessories for XLPE Cables above 3kV & up to 30 kV Test methods
2.2.5	IEC - 60840	Power cable with extruded insulation and their accessories for rated voltage above 30 kV (Um=36 KV) up to 150 KV (Um=170 KV) - test methods and requirements.

3.0.0 Cable Construction

Normal sizes of XLPE cables used in BSES system and the construction features of these cables are indicated below:

11kV, 3-core x 150 sq mm AL
11kV, 3-core x 300 sq mm AL
11kV, 1-core x 1000 sq mm AL
33kV, 3-core x 300 / 400 sq mm AL
66kV, 1-core x 630 sq mm AL
66KV, 1 core x 1000 sq mm AL

3.1.0	Conductor	a) Electrolytic Grade Stranded Aluminium Conductor b) Grade: H2 / H4 as per IS: 8130 / 1984 (For Al) c) Stranded, compacted and circular in shape d) Class 2 e) Longitudinal "Water-Blocking Arrangement" (or water-tight construction or water barrier protection)
3.1.1	Conductor Screen	Extruded Semi Conducting material
3.1.2	Insulation	Extruded XLPE Insulation.
3.1.3	Insulation Screen	Freely strippable Semi Conducting (without application of heat) for 66KV firmly bonded.
3.1.4	Water Swell able Tape	Semi-conducting Water Swell able Tape under the copper tape on each core.
3.1.5	Copper Tape	Copper Tape applied helically over the layer formed by application of insulation screen, water swell able tape and identification strip
3.1.6	Filler	All interstices, including center interstices filled by PP filler.
3.1.7	Over all three cores	Binder tape
3.1.8	Inner Sheath	Extruded Inner Sheath of Black PVC type ST-2.
3.1.9	Armour	a) For 3-core Cables : Galvanized Steel flat strip armour b) For 1-core Cables : Non-Magnetic, Hard drawn Aluminium wire (flat/round) c) Corrugated aluminium or lead sheathed for 66KV Cable
3.1.10	Binder Tape	Rubberized cotton tape
3.1.11	Outer Sheath	Extruded outer sheath of PVC (ST-2) for 11 KV and 33 KV and HDPE ST 7 for 66KV with termite- repellant and anti-rodent properties.

4.0.0 Straight-Through Joints (STJ)

General Technical Requirements for Straight-Through Joints (STJ) for XLPE cables are as follows:

Scope: Design, manufacture, testing and supply of Straight-Through Joint Kits for 11 KV, 33 KV & 66KV Power Cables.

Functional requirements for Heat Shrinkable / Cold Shrinkable STJ joints are given below:

4.1.0 Heat Shrinkable / Cold Shrinkable STJ joints		
4.1.1	Cable preparation	Cable preparation shall be as per installation instruction sheet. Manufacturer shall be provide Installation instruction sheet in every kit
Connector		
4.1.2	Conductor Screen	For 11kV a) Conductors to be jointed by crimping connectors b) Annular CSA (cross-sectional area) of the ferrule shall not be less than CSA of the conductor of the cable. Length of the ferrule shall be sufficient to allow adequate number of crimps, to limit temperature rise at the joint. (Vendor to furnish dimensional drawing for ferrule, indicating crimp marks.) c) For aluminium cable, the crimped ferrule shall be of aluminium d) Refer annexure F for GA drawing of crimping ferrule For 33kV and 66KV a) Shear bolt type mechanical connector b) Approved make: • Tyco Electronics (BSM-185/400-U) • Pfisterer (332617010) • Or equivalent make (Manufacturer shall take prior approval from CES) d) Maintain smooth surface over connector after cut the shear head bolt e) Vendor to furnish drawing for the mechanical connector
4.1.3	Void filling and stress relief over crimped connector and cut point of the insulation screen.	By means of High permittivity mastic tapes / Lubricant.
4.1.4	Metal screen continuity	By means of Tinned copper wire mesh, wrap individual core from cu screen with 50 % overlap and continue on other side cu screen. Bind the copper wire mesh on copper screen with copper binding wire
Armour / Earthing Continuity		

4.1.5	Armour bond	a) By means of a combination of steel (G.I.) support ring (for 3 - core Cable) or Aluminium support ring (for 1 - core Cable) and two nos. of stainless steel hose clips. b) GI Support Ring shall be 'zinc-sprayed Split Type
4.1.6	Armour continuity	By means of two nos. Of tinned copper braided conductor of 25 sq. mm. for 11 kV 35 sq. mm. for 33kV and 50 sq mm for 66KV.
Accessories		
4.1.7	Suppression of electrical discharges over XLPE insulation	Cleaning solvent /equivalent, for manual application.
4.1.8	Installation Instruction	Shall be provided in English and Hindi and shall be inside every kit.
4.1.9	Sheet paper Tap	Paper tape, required for measurements during jointing, shall be provided inside every kit.
4.1.10	Identification Tag (for traceability)	a) An aluminum pouch with paper tag & sealing arrangement at one end shall be provided. b) This tag is required to be tied over the cable at one side of the joint. c) The paper tag shall give following information 1) Vendor kit designation 2) Division 3) Breakdown ID/Shutdown ID/Scheme No. 4) Cable section 5) Type of joint 6) Size of Joint 7) Make of joint 8) Voltage class 9) Serial no. of kit 10) Vendor lot & batch no 11) Month & year of manufacturing 12) Date of installation 13) Name of jointer 14) Name of vendor supervisor 15) Name of BSES supervisor 16) Remarks
4.1.11	Printing on each Heat/cold shrinkable or Moulded component	Month and year of manufacturing, batch no. /lot no., size, make, type etc.

4.2.0 Only for Heat Shrinkable STJ joints		
4.2.1	Stress Control System	a) The earthed insulation screen of an XLPE cable is terminated at a suitable distance (minimum 75 mm) from the connector (Ferrule). b) The stress control tube is in electrical contact with insulation screen. c) Impedance of the tube shall be constant up to an operating temperature and shall be within the range 1 x 10^8 ohm-cm to 8x10^8 ohm-cm. d) The physical and electrical properties shall conform to EA TS 09-13.
4.2.1	Insulation build-up	a) Maximum three layers of insulation tubes shall be used. Total thickness of the insulation being provided in the joint shall not be less than 1.2 times the insulation of the cable being jointed. b) Outer-most tube shall be screened insulating tube (dual wall tube). This tube shall be manufactured by extrusion process. c) Physical and Electrical properties shall conform to EA TS 09-13.
4.2.2	Sealing end of tube	By means of Core end sealing sleeve with red mastic coating.\ Bidder must ensure to provide a solution to prevent water/moisture ingress in the joint.
4.2.3	Mechanical Protection	a) For 3-core cable: By means of a rollable steel mat (with required protective coating against corrosion) (Refer Annex F) b) For 1-core cable: i) Copper wire mesh ii) Adhesive coated medium wall tube iii) One more layer of copper wire mesh iv) Medium wall tube
4.2.4	Corrosion Protection	By means of semi-rigid tubes, internally coated with water blocking sealant. Thick wall Insulating tube

4.3.0 Only for Cold Shrinkable ST joints Scope: The term cold shrink applies to materials, which are capable of shrinking without raising the material above the ambient temperature of its immediate surroundings. The material of the rubber insulator used in the Cold Shrink assembly shall be silicone which is factory expanded and placed on a removable core. The removing of the core causes the cold shrink assembly to shrink. The cold shrink assembly shall maintain a compressive force on the cable continuously throughout the life of the product. This pressure will ensure a complete moisture seal.		
4.3.1	Stress Control System	By means of one piece body (splice assembly) providing stress control, insulation and screen continuity.

4.3.2	Mechanical Protection	By application of mastic coated vinyl tape and armor cast structural material. The taped armor cast layer may also be sprayed with water to hasten the curing.

4.4.0	Technical Particulars	Vendor shall submit Guaranteed Technical Particulars (GTP) as per Annexure A.
4.5.0 Testing & Inspection		
4.5.1	Type Tests	a) Straight-Through Joint shall be of type-tested quality. b) In addition to this, vendor will be required to conduct type-testing on heat/cold -shrinkable and moulded components, stress grading mastic, etc., in line with EA TS 09-13 standard, at third party test laboratory once in 6 months on randomly selected sample of each voltage rating without any commercial implication.
4.5.2	Routine & acceptance Tests	I) All the routine and acceptance tests shall be carried out as per EA TS 09-13 guidelines, refer Annexure C. II) H.V. Test shall be carried out on a randomly selected and installed Straight-Through Joint, in the presence of Purchaser's representative, at manufacturer's works. III) The joint shall withstand a test of 4Uo voltage for 4 hours.
4.5.6	Inspection	I) Purchaser reserves the right to inspect /witness all tests on the STJ Kits at Seller's works at any time, prior to dispatch, to verify compliance with the specification. II) In-process and / or final inspection call intimation shall be given in advance to purchaser.
4.5.7	Test Certificates	i) Three sets of complete Test Certificates (Routine & Acceptance tests) shall be submitted along with the delivery of STJ Kits. ii) Bought-out Items: Vendor shall submit Test Certificates, lot/batch number-wise, from their sub- suppliers / principal. TC's should clearly indicate the measured technical parameters, in accordance with sub-supplier's specification. (Also refer Annexure - C)
4.6.0	Documents	"Documents" refer to Documents, Data, Manuals, etc. (Scanned copy of signed documents also shall be part of entire soft file (e-file).

4.7.0	Along with the Bid	Vendor shall submit signed 3 sets (plus 1 set of soft copy) of following documents a) GTP (duly filled-in) (as per Annexure — A) b) Cross-sectional drawings for components Assembly. c) Type Test Certificates d) Complete Catalogue and Installation Instructions. e) Any other document.
4.8.0	After Award Contract	Vendor shall submit signed 2 sets (plus 1 set of soft copy) of above-mentioned documents within 15 days, for Purchaser's approval.
4.8.0	"As-Built" documents	Final signed "As-built" documents for the equipment in 3 sets (hard copy), 1 no. soft copy and 1 no. CD. These documents shall include signed Routine & Acceptance Test Certificates also.
4.9.0	Packing, Marking, Shipping, Handling and Storage	a). Every component / kit / box shall be properly sealed/ packed for protection against damage. Stress grading mastic shall be packed in air-tight / air-sealed packing. b). Every kit box shall be wrapped in polythene covers. c. Separate packing (sub-kits) shall be provided, for components (given below) used in crotch area and connector area. These sub-kits, labeled as "CROTCH KIT" and "CONNECTOR KIT', shall be placed inside every kit box. i) Crotch Kit Components --Conductive cable break-out -- Yellow moulded wedge -- Break-out end sealing tube -- Break-out finger sealing tube -- Stress grading mastic ii) Connector Kit : Components -- Ferrule (connector) -- Void Filling mastic (yellow)

4.9.1	Identification Label	Markings / Labels shall be on both sides of every packed box. 1) Identification number/type designation (as per manufacturer's standard) 2) Voltage grade, size, description of the Kit (including the voltage grade, size, type of the cables, for which it is to be used) 3) Batch no., lot no., etc. 4) Quantity 5) a) Purchase Order no. & date b) Purchaser's name BSES Yamuna Power Ltd c) BSES's SAP code number 6) Weights (kg) of each Cable Termination Kit and of each box containing kits. 7) Manufacturer's name 8) Month & Year of Manufacturing 9) Date of packing, shelf life (if applicable)
4.9.2	Transit damage	The seller shall be responsible for any transit damage due to improper packing.

5.0.0 Quality Assurance Plan (QAP)

5.1.0	Vendor's Quality Assurance Plan (QAP)	To be submitted for Purchaser's approval.
5.2.0	Sampling Method	Sampling Method for quality checks shall be as per manufacturer's standard practice / ESI guidelines and Purchaser's prior approval shall be taken for the same.
5.3.0	Inspection Hold-Points	To be mutually identified, agreed and approved in Quality Plan.

6.0.0 Deviations

6.1.0	Deviations	a) Deviations from this specification can be acceptable, only where the Seller has listed in his quotation the requirements he cannot, or does not, wish to comply with and which deviations the Buyer has agreed to in writing, before any order is placed. b) In the absence of any list of deviations from the Seller, it will be assumed by the Buyer that the Seller complies with the Specification fully.

7.0.0 Delivery

7.1.0	Delivery	Dispatch of Material: Vendor shall dispatch the material, only after the Routine Tests /Final Acceptance Tests (FAT) of the material witnessed/waived by the Purchaser, and after receiving written Material Dispatch Clearance Certificate (MDCC) from the Purchaser.

Annexure - A: Guaranteed Technical Particulars (GTP)

The Vendor is deemed to have examined all parts of the Specification documents and to have been fully informed, as to the nature of work and the conditions related to its performance.

S No.	Description	Purchase requirement	Vendor's data
1	Manufacturer's name		
2	Purchase Order no. & date		
3	Guarantee Period (minimum)	60 Months (from date of commissioning) / 66 Months (from date of receipt at Purchaser's store),whichever is earlier	
4	Applicable IS / IEC Standard followed by Vendor (incl. type test standard)		
5	Voltage Grade (kV)		
5.1	Lightning Impulse Voltage Withstand Test		
5.2	4Uo AC voltage withstand test for 4 hours	Test report submitted	
6	Continuous operating temperature	90 deg. C	
7	Functional Requirements		
7.1	Method of Stress Control and Discharge Suppression		
7.2	Method of Insulation build-up and screening		
7.3	Method of earth bond a) Size and no. of braids b) Size of armour support c) No. of hose clips		
7.4	Method of mechanical protection a) for 3-core Cable b) for 1-core Cable		
7.5	Method of protection against corrosion (type & coating thickness of protective layer on steel mat)		
7.6	Method of conductor continuity a) For crimping connector b) For mechanical connector		

8	Description of items in the Kit, which are imported /sourced From Principal /Sub-suppliers		
9	Names of items in the Kit and their respective shelf life (months l years)		
10	Kit Content Table (KCT) enclosed? (Refer Annexure — B)	Yes / No	
11	Drawing for connector (ferrule) enclosed	Yes / No (If yes, mention the document reference)	
12	Is Annexure - D (Technical Deviation Sheet) duly filled-in?		
13	Packing (Qty) i) Packing of every Kit h) Group Packing	1 no -- No. of Kits per Box -- No. of Boxes	
14	Installation Procedure enclosed?	Yes / No (If yes, mention the document reference)	
15	Quality Assurance Programme (QAP for raw materials, in-process inspection, factory testing) is enclosed?	Yes / No	
16	Whether all heat-shrinkable and moulded components of the kit meet the requirements of and have been tested in accordance with EA TS -09-1 3.(for heat-shrinkable joints)	Yes / No (If yes, details of test report no. /Date /name of test laboratory to be mentioned.)	
17	Type Test Reports (TTR) (Relevant test report no. & date, With type, size, other details of each type of Kit.) a) Prepared Joint: CPRI TTR as per BIS / IEC enclosed? b) Loose Components: CPRI TTR as per EA TS 09-13 enclosed?	Yes/No Yes/No	
18	Printing details on each of the Heat- shrinkable and Moulded components	(Mention the text, presently printed on each of the component)	

Annexure - B: Kit Content Table (KCT)

Vendor shall submit KCT as a consolidated table, consisting of all data, such as:

A. Heading

1. Voltage grade, size, description of the Kit
(Including the voltage grade, size, type of the cables, for which it is to be used)
2. Type designation (as per manufacturer's standard)

B. Details / Parameters (For each component/item of the KCT)

1. Lot no. /Batch no., etc.
2. Item number (manufacturer's standard)
3. Description
   a) Material, type, make and grade
   b) Dimensions cross sectional area
   c) Colour,
   d) Other description, if any
4. Function of the item
5. Quantity
6. Make/Name/Location of manufacturer/sub-vendor
   a) Minimum supplied (or in expanded form) diameter
   b) Maximum freely recovered diameter
7. a) Minimum supplied (or in expanded form) thickness
   b) Maximum freely recovered thickness

C. Notes on the KCT

Markings, printings and other details for individual/group of components is to be mentioned on KCT. For example:
a) Printing of item code, size, batch no., etc.
b) Printing on components
c) Other embossing or engraving, it any.

(Note: Vendor may attach an Annexure, for any additional information, if required.)

Annexure - C: Routine and Acceptance Test

A. Visual Examination

Condition of selected items / components, as per sampling method, shall be recorded. Some of the normal check-points can be as follows:

1. Every component shall be verified in quantity and description as per KCT.
2. All items shall be free from any defects, pin holes, cracks, etc.
3. Metallic components to be free from sharp edges.

B. Measurements of Dimensions

(Required / observed dimension — length, diameter, etc.)

1. Supplied dimensions
2. Recovered dimensions

C. Destructive Testing

On various heat-shrinkable / moulded components of ready Kits (items 3 and 4 are applicable only for heat-shrinkable components)

1. Tensile Strength
2. Wall Thickness Ratio
3. Heat Shock
4. Longitudinal Change, after full recovery
5. Ultimate Elongation
6. Low Temperature Flexibility
7. Dielectric Strength
8. Volume Resistivity

Routine Test Reports (RTR) (Typical)

Each RTR shall clearly indicate P.O. no. & date and also BSES's SAP code no. RTR shall record the serial numbers of the kits selected, as per vendor's sampling method. Following details, besides vendor's/manufacturers standard check-points, shall appear in every RTR.

Annexure - D: Deviation Sheet

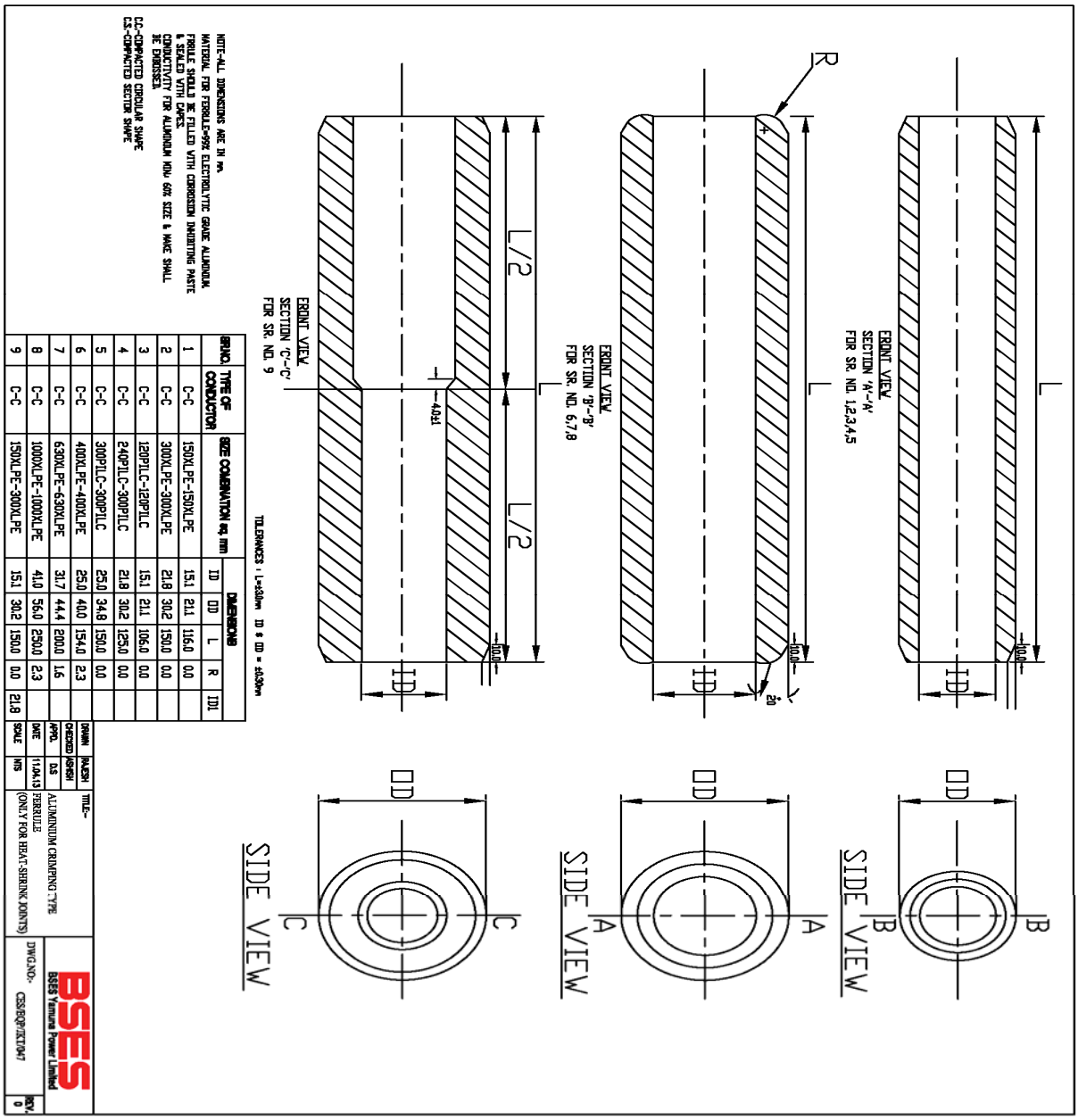
Sr No.	Clause No.	Deviation

Annexure - E: Service Conditions

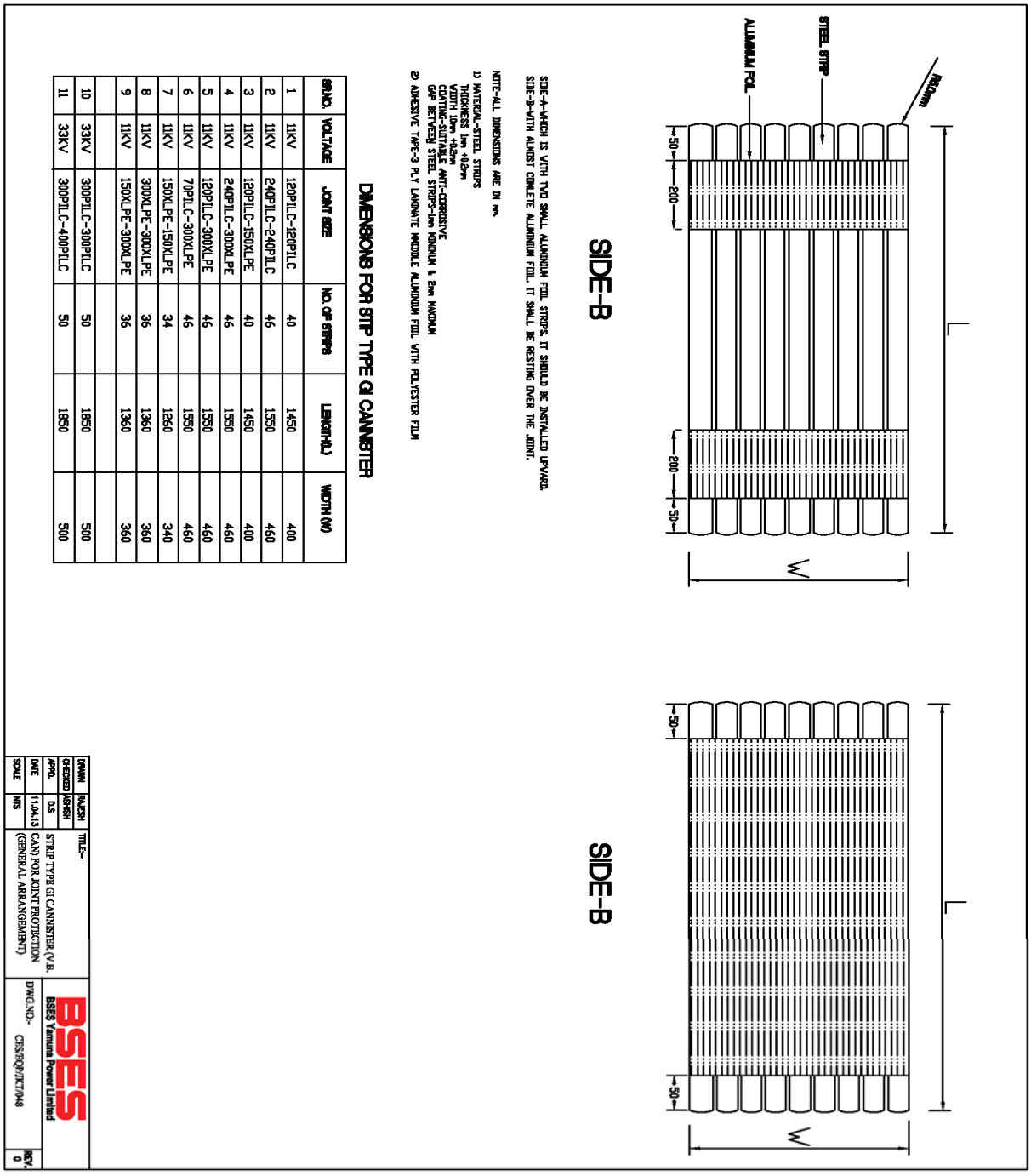
(Atmospheric conditions in Delhi)

a)	Average grade Soil Condition	
b)	Maximum altitude above sea level	1000 M
c)	Ambient Air temperature	Highest 50 Deg C, Average 40 Deg C
d)	Minimum ambient air temperature	0 Deg C
e)	Relative Humidity	100 % Max
f)	Thermal Resistivity of Soil	150 Deg C cm/W
g)	Seismic Zone	4
h)	Rainfall	750 mm concentrated in four months

Annexure - E: Aluminium crimping-type Ferrule for compacted circular conductor only for Heat Shrink joints



Annexure – F: Strip type GI canister (V.B. Can) for joint protection only for Heat Shrink Joint



SIDE-A-WHICH IS WITH TWO SMALL ALUMINIUM FOIL STRIPS. IT SHOULD BE INSTALLED UPWARD.
SIDE-B-WITH ALMOST COMPLETE ALUMINIUM FOIL. IT SHALL BE RESTING OVER THE JOINT.

NOTE-ALL DIMENSIONS ARE IN mm.

1) MATERIAL-STEEL STRIPS
THICKNESS 1mm ±0.2mm
WIDTH 10mm ±0.2mm
COATING-SUITABLE ANTI-CORROSIVE
GAP BETWEEN STEEL STRIPS-1mm MINIMUM & 2mm MAXIMUM

2) ADHESIVE TAPE-3 PLY LAMINATE WHOOLE ALUMINIUM FOIL WITH POLYESTER FILM

DIMENSIONS FOR STIP TYPE GI CANNISTER

SR.NO.	VOLTAGE	JOINT SIZE	NO. OF STRIPS	LENGTH(L)	WIDTH (W)
1	11KV	120PILC-120PILC	40	1450	400
2	11KV	240PILC-240PILC	46	1550	460
3	11KV	120PILC-150XLPE	40	1450	400
4	11KV	240PILC-300XLPE	46	1550	460
5	11KV	120PILC-300XLPE	46	1550	460
6	11KV	70PILC-300XLPE	46	1550	460
7	11KV	150XLPE-150XLPE	34	1260	340
8	11KV	300XLPE-300XLPE	36	1360	360
9	11KV	150XLPE-300XLPE	36	1360	360
10	33KV	300PILC-300PILC	50	1850	500
11	33KV	300PILC-400PILC	50	1850	500

DRAWN	RAJESH	TITLE:-	BSES Yamuna Power Limited
CHECKED	ASHISH	STRIP TYPE GI CANNISTER (V.B. CAN) FOR JOINT PROTECTION (GENERAL ARRANGEMENT)	
APPD.	DJS		
DATE	11.04.13	DWG.NO:- CES/RQP/JKT/044	REV. 0
SCALE	NTS		

Technical Specification
For Heat Shrinkable and GIS Cable Termination Kit (For 11 KV, 33 KV & 66 KV Cables)

Specification no – SP-HSGTK-04-R1

Prepared by		Reviewed by		Approved by		Rev	Date
Name	Sign	Name	Sign	Name	Sign		
AV		GS		AA		R0	02/06/2017

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Record of Revision

Item/Clause No.	Change in Specification	Approved By	Rev

1.0.0 Scope of work

Heat Shrinkable & GIS Termination Kits, suitable for 11 kV & 33 kV, 66KV XLPE / PILC cables, shall be designed, manufactured, tested, packed and delivered by the Vendor, as per Purchaser's requirements.

2.0.0 Codes & standards

2.1.0 National Standards:

SL	Standard Number	Title
2.1.1	IS - 13573: 2011	Joints & Terminations of Polymeric Cables for working voltages from 6.6 kV up to and including 33 kV Performance Requirements and Type Tests
2.1.2	IS – 7098 Part 2 : 1985	Cross-linked Polyethylene (XLPE) Insulated PVC sheathed cables : Part 2 : For working voltages from 3.3 kV upto and including 33 kV
2.1.3	IS - 692: 1994	Paper insulated lead-sheathed cables (PILC) for rated voltages up to and including 33 kV specification
2.1.3	IS - 10810: 1984	Methods of test for cables

2.1.1 International Standards:

S No.	Standard Number	Title
2.2.1	EA TS - 09 - 13	Electricity Association - Technical Specification -09-13 Material component for use in Electric Power Cable Termination & Joints for System voltage above 1000 V up to 36 kV
2.2.2	IEEE - 48	Standards Test Procedures and requirements for high voltage alternating current cable termination
2.2.3	IEC - 60183	Guide to the selection of high voltage cables
2.2.4	IEC - 885 Part 1-3	Electric test methods for electric cables
2.2.5	IEC - 60840	Power cable with extruded insulation and their accessories for rated voltage above 30 kV (Um=36 KV) up to 150 KV (Um=170 KV) - test methods and requirements.

3.0.0 Cable Construction

Normal sizes of XLPE cables used in BSES system and the construction features of these cables are indicated below:

XLPE type Cables: 3-core x 150, 300 & 400 sq. mm. Al
1-core x 630 or 1000 sq. mm. Al

PILC type Cables: 3-core 240 or 300 sq. mm. Al

3.1.0	Conductor	For XLPE : a) Electrolytic Grade stranded Aluminium b) Grade: H2/ H4 as per IS: 8130/84 (For Al) c) Shape: Compacted Circular d) Class 2 For PILC : a) 11 kV : sector-shaped b) 33kV: oval-shaped
3.2.0	Conductor Screen	For XLPE : Extruded Semi Conducting material For PILC : 11 kV : no conductor screen 33 kV : carbon paper
3.3.0	Insulation	For XLPE: Extruded XLPE Insulation For PILC: Layers of impregnated papers
3.4.0	Insulation Screen	For XLPE : a) Freely strippable Semi Conducting (without application of heat) for 66KV firmly bonded b) Copper Tape For PILC : a) 11 kV : absent (Belted) b) 33kV: metallised paper tape
3.5.0	Water Swellable Tape	For XLPE: Semi-conducting Water Swellable Tape shall be provided under the copper tape on each core. For PILC : not applicable
3.6.0	Filler	For XLPE: All interstices, including centre interstices filled by PP filler. For PILC : a) 11 kV : Crushed paper filler b) 33kV: Jute twine
3.7.0	Over all three cores	XLPE : Binder tape PILCA : 11 kV : belt paper 33kV: Copper Woven Fabric tape
3.8.0	Inner Sheath	For XLPE: Extruded Inner Sheath of Black PVC type ST-2. For PILC : Lead alloy sheath
3.9.0	Bedding Tape	For XLPE: not applicable For PILC: two layers of paper, followed by compounded (bituminized) cotton tape.
3.10.0	Copper Woven Fabric Tape (CWF tape)	For XLPE : not applicable For PILC : a) 11 kV : absent (Belted cable) b) 33 kV : applicable for screened cable

3.11.0	Armour	For XLPE : a) Galvanised steel flat strip armour (For 3 core cables) b) Hard drawn Aluminium Wire (For 1 core cables) c) Aluminium or lead sheathed for 66KV cable For PILC : a) 11 kV double steel tape armour
3.12.0	Binder Tape	For XLPE: Rubberised cotton tape
3.13.0	Outer Sheath	For XLPE: Extruded outer sheath of PVC (ST-2) for 11 KV/ 33 KV and HDPE for 66KV Cable with termite- repellent. For PILC : compounded (bituminised) Jute/PVC

4.0.0 Cable Termination Kits

General Technical Requirements for Cable Termination Kits are as follows:

<table>
<tr><td>4.1.0</td><td>Scope</td><td>Design, manufacture, testing and supply of Cable Termination Kits for H. T. Power Cables.</td></tr>
<tr><td>4.2.0</td><td>Functional Requirements</td><td></td></tr>
<tr><td>4.2.1.</td><td>Conductor Connection</td><td>
<table>
<tr><th>Voltage Grade</th><th>Cable Size</th><th>Application</th><th>Material of Lug</th><th>Connection Method</th></tr>
<tr><td rowspan="4">11 KV</td><td rowspan="2">3Cx 150 & 3Cx 300 sq mm</td><td>Indoor</td><td>Bi-Metal</td><td>Mechanical connector</td></tr>
<tr><td>Outdoor</td><td>Aluminium</td><td>Mechanical connector</td></tr>
<tr><td rowspan="2">1Cx1000 sq mm</td><td>Indoor</td><td>Aluminium</td><td>Crimping</td></tr>
<tr><td>Outdoor</td><td>Aluminium</td><td>Crimping</td></tr>
<tr><td rowspan="2">33 KV</td><td rowspan="2">3Cx400 sq mm</td><td>Indoor</td><td>Bi-Metal</td><td>Mechanical connector</td></tr>
<tr><td>Outdoor</td><td>Aluminium</td><td>Mechanical connector</td></tr>
<tr><td rowspan="2">66 KV</td><td rowspan="2">1Cx630 & 1Cx1000 sq mm</td><td>Indoor</td><td>Aluminium</td><td>Crimping</td></tr>
<tr><td>Outdoor</td><td>Aluminium</td><td>Crimping</td></tr>
</table>
a) For 240 sq. mm. PILC cable and 300 sq. mm. XLPE cable, the lug suitable for 300 sq. mm. XLPE cable shall be used.
b) For GIS cable termination kits: Conductor connection assembly shall be done by standard method of split, silver-plated copper cone and pressure-fit contact assembly or as per manufacturer's standard.
</td></tr>
</table>

4.2.2	Stress Control System	a) The earthed insulation screen of an XLPE cable is terminated at a suitable distance from the conductor. b) The tube is in electrical contact with insulation screen. c) Impedance of the tube shall be constant upto an operating temperature and shall be within the range $1x10^{08}$ ohm-cm to $8x10^{08}$ ohm-cm. d) Minimum length of stress control tube for 11 kV and 33 kV shall be 130 mm and 260 mm respectively. e) The physical and electrical properties shall conform to ESI 09: 13. f) For GIS cable termination kits Stress control shall be done by means of a polymeric stress cone. External profile of the cone shall match inner profile of GIS epoxy bushing. Vendor shall specify the material (EPDM / Silicone) of the cone.
4.2.3	Insulation Protection	a) XLPE insulation shall be protected by means of an outer tube, resistant to tracking and weathering. b) One end of the tube shall be coated internally with red sealant mastic for a length of 50 mm. c) Physical and Electrical properties shall conform to ESI 09: 13.
4.2.3.1	Outer Anti-tracking Tube	Outer length of the tube shall be controlled by providing creepage Extension Shed having the same material composition as the tube. These lengths are given in the table below:

Cable System		Minimum Length of tube (mm)		Creepage Extension Shed (No.) (min)	
Voltage	Cores	Indoor	Outdoor	Indoor	Outdoor
11 kV	3 - core	650	650	Nil	2
	1 - core	340	340	Nil	2
33 kV	3 - core	800	1200	2	5
	1 - core	600	600	2	5

4.2.3.3	Oil Barrier Tube (applicable for PILC cable termination)	a) Transparent tube is used for restoring the insulation provided by belt paper, which is terminated at the crotch. b) 33 kV PILC Termination: The oil barrier tube provides an oil-resistant layer to contain impregnating compound within, thus preventing anti-tracking tube coming in contact with the impregnating compound.

4.2.4	Environmental Sealing System	a) Red Sealant Mastic Tape: This tape, used for sealing at ends, shall be synthetic rubber-based and resistant to tracking and weathering. Sufficient quantity of this tape shall be provided. b) Lug-sealing Sleeve: It shall have the same material composition as outer anti-tracking tube. The sleeve shall be fully coated internally with red sealant mastic tape. Length of the sleeve shall be so as to cover half length of the lug barrel and an equal length of track-resistant tube. c) Conductive Break-out: It shall be provided over the crotch for 3-core cables. The break-out base shall overlap PVC outer sheath by a 50 mm. minimum. d) For GIS termination kits : Environmental sealing of cores below the switchgear shall be by means of a trifurcation kit, consisting of heat shrinkable conductive break-out and heat-shrinkable conductive tube of total length of 6 metres supplied in one roll.
4.2.5	Earth Bond System	a) Earth Bond Assembly shall comprise of copper braided conductors as earthing conductors, GI armour support ring (split type) and two stainless steel hose clips. b) For GIS termination kit The earthing arrangement for 3-core cables shall be the same as stated under 'a' above. c) Two nos. copper braided conductors shall be of size: 25 sq. mm. for 11 kV cables, 35 sq. mm. for 33 kV cables and 50 sq mm for 66KV. d) Length of the copper braided conductor shall be 750 mm. e) Each copper braided conductor shall be supplied with copper lug, crimped at one end. Size of lug : 70 sq. mm. for 11 kV and 120 sq. mm. for 33 kV.
4.2.6	Suppression of electrical discharges	Following materials are required for use during cable termination : a) Silicone-based compound Required for filling-in minute services/ surface cracks over XLPE insulation. b) Polymeric mastic Required for application over semiconducting screen, for, eliminating any air-entrapment at any cut point on the surface. It should have sufficient elongation and electrical properties compatible with stress control tube.
4.2.7	Installation. Instruction Sheet	It shall be in English and Hindi language and shall be provided inside every kit.
4.2.8	Identification Tag (for traceability)	a) An aluminum pouch with paper tag & sealing arrangement at one end shall be provided. b) This tag is required to be tied over the cable at one side of the joint. c) The paper tag shall give following information 1) Vendor kit designation 2) Division 3) Breakdown ID/Shutdown ID/Scheme No. 4) Cable section 5) Type of joint 6) Size of Joint 7) Make of joint

		8) Voltage class 9) Serial no. of kit 10) Vendor lot & batch no 11) Month & year of manufacturing 12) Date of installation 13) Name of jointer 14) Name of vendor supervisor 15) Name of BSES supervisor 16) Remarks
4.2.9	Paper Measuring Tap	Required for use during cable preparation / terminations.
4.3.0	Technical Particulars	Vendor shall submit Guaranteed Technical Particulars (GTP) as per Annexure A.
4.4.0	Type Tests	Termination Kit shall be of type-tested quality.
4.5.0	Testing & Inspection	
	a) Tests	All the routine and acceptance tests shall be carried out as per ESI guidelines. (Also refer Annexure -C)
	b) Inspection	1) Buyer reserves the right to witness all tests specified on individual H. S. components, Moulded components or completed Cable Termination Kit. 2)Buyer reserves the right to inspect Cable Termination Kit at the Seller's works at any time, prior to dispatch, to verify compliance with the specification. 3) In-process and final inspection call intimation shall be given in advance to purchaser.
	c) Test Certificates	Three sets of complete Test Certificates (Routine & Acceptance tests) shall be submitted along with the delivery of Cable Termination Kits.
	d) Type Test	a) End termination kit shall be of type-tested quality. b) In addition to this, vendor will be required to conduct type-testing on heat shrinkable and moulded components, stress grading mastic, etc., in line with EA TS 09-13 standard, at third party test laboratory once in every six months on randomly selected sample of each voltage rating without any commercial implication.
4.6.0	Documents	"Documents" refer to Documents, Data, Manuals, etc. (Scanned copy of signed documents also shall be part of entire soft file (e-file) or CD.)
4.6.1	Along with the Bid	Vendor shall submit signed 3 sets (plus 1 set of soft copy) of following documents: a) GTP (duly filled-in) (as per Annexure - A). b) Cross-sectional drawings for components Assembly c) Type Test Certificates d) Complete Catalogue and Instructions. e) Any other document.
4.6.2	After Award of Contract	Vendor shall submit signed 2 sets (plus 1 set of soft copy) of above mentioned documents within 15 days, for Purchaser's approval.

4.6.3	"As-Built" documents	Final signed "As-built" documents for the equipment in 3 sets (hard copy), 1 no. soft copy. These documents shall include signed Routine & Acceptance Test Certificates also.
4.7.0	Packing, Marking, Shipping, Handling and Storage	Every component/kit/box shall be properly sealed/ packed for protection against damage.
a)	Identification Label	Markings / Labels shall be on both sides of every packed box. 1) Identification number/type designation (as per manufacturer's standard) 2) Voltage grade, size, description of the Kit (including the voltage grade, size, type of the cables, for which it is to be used) 3) Batch no., lot no., etc. 4) Quantity 5) a) Purchase Order no. & date b) Purchaser's name BSES Yamuna Power Ltd c) BSES's SAP code number 6) Weights (kg) of each Cable Termination Kit and of each box containing kits. 7) Manufacturer's name 8) Month & Year of Manufacturing 9) Date of packing, shelf life (if applicable)
b)	Transit damage	The seller shall be responsible for any transit damage due to improper packing.

5.0.0 Quality Assurance (QA)

5.1.0	Vendor's Quality Plan (QP)	To be submitted for Purchaser's approval.
5.2.0	Sampling Method	Sampling Method for quality checks shall be as per manufacturer's standard practice / ESI guidelines and Purchaser's prior approval shall be taken for the same.
5.3.0	Inspection Hold-Points	To be mutually identified, agreed and approved in Quality Plan.

6.0.0 Deviations

6.1.0.	Deviations	A) Deviations from this specification can· be acceptable, only where the Seller has listed in his quotation the requirements he cannot, or does not, wish to comply with and which deviations the Buyer has agreed to in writing, before any order is placed. B) In the absence of any list of deviations from the Seller, it will be assumed by the Buyer that the Seller complies with the Specification fully.

7.0.0 Delivery

7.1.0.	Delivery	Despatch of Material: Vendor shall despatch the material, only after the Routine Tests/Final Acceptance Tests (FAT) of the material witnessed/waived by the Purchaser, and after receiving written Material Despatch Clearance (MDC) from the Purchaser.

Annexure – A: Guaranteed Technical Particulars (GTP)

The Seller is deemed to have examined all parts of the Specification documents and to have been fully informed, as to the nature of work and the conditions related to its performance.

S No.	Description	Purchase requirement	Vendor's data
1	Manufacturer's name		
2	Purchase Order no. & date		
3	Guarantee Period (minimum)	60 Months (from date of commissioning) / 66 Months (from date of receipt at Purchaser's store), whichever is earlier	
4	Applicable IS / IEC Standard followed by Vendor (incl. type test standard)		
5	Voltage Grade (kV)		
5.1	Lightning Impulse Voltage Withstand Test		
5.2	4Uo AC voltage withstand test for 4 hours	Test report submitted	
6	Continuous operating temperature	90 deg. C	
7	Functional Requirements		
7.1	Method of Stress Control and Discharge Suppression		
7.2	Method of Insulation build-up and screening		
7.3	Method of earth bond a) Size and no. of braids b) Size of armour support c) No. of hose clips		
7.4	Method of mechanical protection a) for 3-core Cable b) for 1-core Cable		
7.5	Method of protection against corrosion (type & coating thickness of protective layer on		

	steel mat)		
7.6	Method of conductor continuity a) For crimping connector b) For mechanical connector		
8	Description of items in the Kit, which are imported /sourced From Principal /Sub-suppliers		
9	Names of items in the Kit and their respective shelf life (months l years)		
10	Kit Content Table (KCT) enclosed? (Refer Annexure — B)	Yes / No	
11	Drawing for connector (ferrule) enclosed	Yes / No (If yes, mention the document reference)	
12	Is Annexure - D (Technical Deviation Sheet) duly filled-in?		
13	Packing (Qty) i) Packing of every Kit h) Group Packing	1 no -- No. of Kits per Box -- No. of Boxes	
14	Installation Procedure enclosed?	Yes / No (If yes, mention the document reference)	
15	Quality Assurance Plan (QAP for raw materials, in-process inspection, factory testing) is enclosed?	Yes / No	
16	Whether all heat-shrinkable and moulded components of the kit meet the requirements of and have been tested in accordance with EA TS -09-1 3.(for heat-shrinkable joints)	Yes / No (If yes, details of test report no. /Date /name of test laboratory to be mentioned.)	

17	Type Test Reports (TTR) (Relevant test report no. & date, With type, size, other details of each type of Kit.) a) Prepared Joint: CPRI TTR as per BIS / IEC enclosed? b) Loose Components: CPRI TTR as per EA TS 09-13 enclosed?	 Yes/No Yes/No	
18	Printing details on each of the Heat- shrinkable and Moulded components	(Mention the text, presently printed on each of the component)	

Annexure – B: Kit Content Table (KCT)

Vendor shall submit KCT as a consolidated table, consisting of all data, such as:

A. Heading

1. Voltage grade, size, description of the Kit
(Including the voltage grade, size, type of the cables, for which it is to be used)

2. Type designation (as per manufacturer's standard)

B. Details / Parameters

(For each component/item of the KCT)
1. Lot no. /Batch no., etc.
2. Item number (manufacturer's standard)
3. Description
a) Material, type, make and grade
b) Dimensions cross sectional area
c) Colour,
d) Other description, if any
4. Function of the item
5. Quantity
6. Make/Name/Location of manufacturer/sub-vendor
7. a) Minimum supplied (or in expanded form) diameter
   b) Maximum freely recovered diameter
8. a) Minimum supplied (or in expanded form) thickness
   b) Maximum freely recovered thickness

C. Notes on the KCT

Markings, printings, other details for individual/group of components are to be mentioned on KCT. For example:
a) Printing of item code, size, batch no., etc.
b) Printing on components
c) Other embossing or engraving, it any.

(Note: Vendor may attach an Annexure, for any additional information, if required.)

Annexure – C: Routine and Acceptance Test

A. Visual Examination
Condition of selected items / components, as per sampling method, shall be recorded. Some of the normal check-points can be as follows:
1. Every component shall be verified in quantity and description as per KCT.
2. All items shall be free from any defects, pin holes, cracks, etc.
3. Metallic components to be free from sharp edges.

B. Measurements of Dimensions
(Required / observed dimension — length, diameter, etc.)
1. Supplied dimensions
2. Recovered dimensions

C. Destructive Testing
On various heat-shrinkable / moulded components of ready Kits
(Items 3 and 4 are applicable only for heat-shrinkable components)
1. Tensile Strength
2. Wall Thickness Ratio
3. Heat Shock
4. Longitudinal Change, after full recovery
5. Ultimate Elongation
6. Low Temperature Flexibility
7. Dielectric Strength
8. Volume Resistivity

D. Routine Test Reports (RTR)
(Typical)

Each RTR shall clearly indicate P.O. no. & date and also BSES's SAP code no. RTR shall record the serial numbers of the kits selected, as per vendor's sampling method. Following details, besides vendor's/manufacturers standard check-points, shall appear in every RTR.

Annexure – D: Technical Deviation Sheet

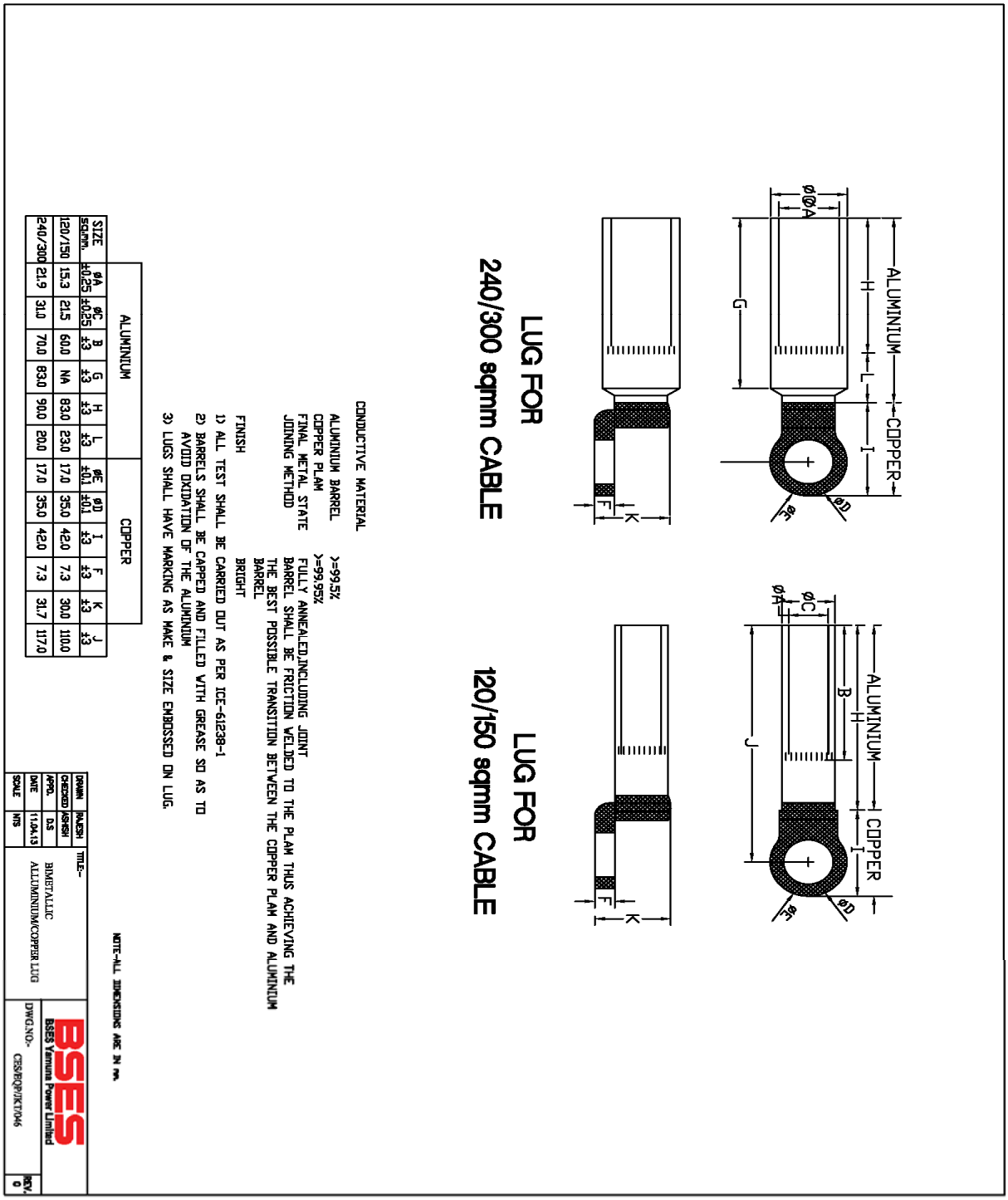
Sr No.	Clause No.	Deviation

Annexure – E: Service Conditions

(Atmospheric conditions at Site)

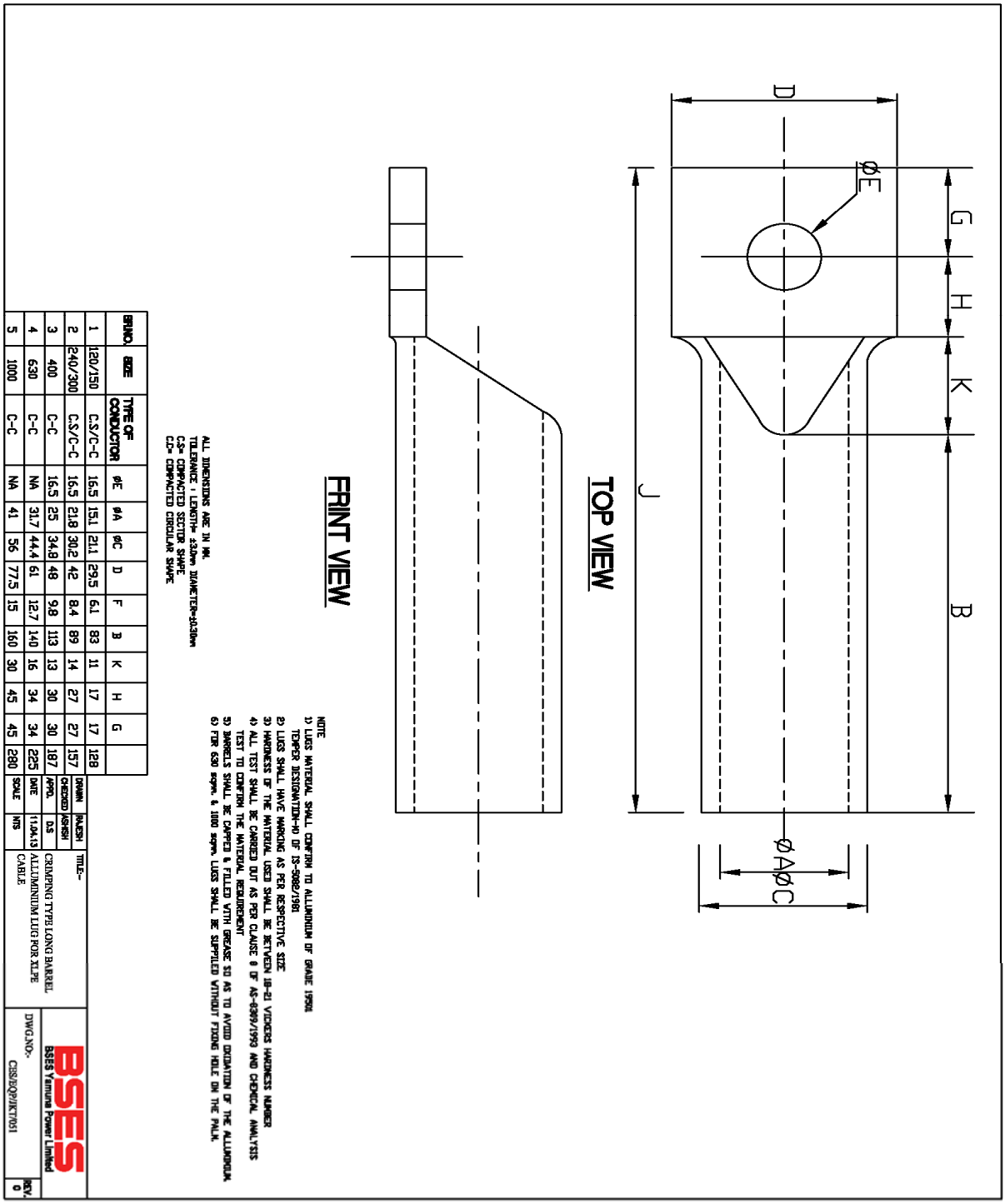
1	Delhi	
a)	Average grade Atmospheric Condition:	Heavily Polluted, Dry
b)	Maximum altitude above sea level	1000 M
c)	Ambient Air temperature	Highest 50 deg C, Average 40 deg C
d)	Minimum ambient air temperature	0 deg C
e)	Relative Humidity	90 % Max
f)	Thermal Resistivity of Soil	150 Deg. C cmm
g)	Seismic Zone	4
h)	Rainfall	750 mm concentrated in four months

Annexure – F: Bimetallic Aluminium / Copper Lug



SIZE SQMM.	ALUMINIUM							COPPER				
	øA ±0.25	øC ±0.25	B ±3	G ±3	H ±3	L ±3	øE ±0.1	øD ±0.1	I ±3	F ±3	K ±3	J ±3
120/150	15.3	21.5	60.0	NA	83.0	23.0	17.0	35.0	42.0	7.3	30.0	110.0
240/300	21.9	31.0	70.0	83.0	90.0	20.0	17.0	35.0	42.0	7.3	31.7	117.0

Annexure – G: Aluminum Lug For XLPE Cable



NOTE
1) LUGS MATERIAL SHALL CONFIRM TO ALUMINIUM OF GRADE 19201 TEMPER DESIGNATION-H0 OF IS-5082/1981
2) LUGS SHALL HAVE MARKING AS PER RESPECTIVE SIZE
3) HARDNESS OF THE MATERIAL USED SHALL BE BETWEEN 18-21 VICKERS HARDNESS NUMBER
4) ALL TEST SHALL BE CARRIED OUT AS PER CLAUSE 8 OF AS-6309/1993 AND CHEMICAL ANALYSIS TEST TO CONFIRM THE MATERIAL REQUIREMENT
5) BARRELS SHALL BE CAPPED & FILLED WITH GREASE SO AS TO AVOID OXIDATION OF THE ALUMINIUM.
6) FOR 630 sqmm & 1000 sqmm, LUGS SHALL BE SUPPLIED WITHOUT FIXING HOLE ON THE PALM.

ALL DIMENSIONS ARE IN MM.
TOLERANCE : LENGTH= ±3.0mm DIAMETER=±0.30mm
C.S= COMPACTED SECTOR SHAPE
C.C= COMPACTED CIRCULAR SHAPE

SR.NO.	SIZE	TYPE OF CONDUCTOR	ØE	ØA	ØC	D	F	B	K	H	G
1	120/150	C.S/C-C	16.5	15.1	21.1	29.5	6.1	83	11	17	17	128
2	240/300	C.S/C-C	16.5	21.8	30.2	42	8.4	89	14	27	27	157
3	400	C-C	16.5	25	34.8	48	9.8	113	13	30	30	187
4	630	C-C	NA	31.7	44.4	61	12.7	140	16	34	34	225
5	1000	C-C	NA	41	56	77.5	15	160	30	45	45	280

DRAWN	RAJESH	TITLE:-	BSES Yamuna Power Limited
CHECKED	ASHISH	CRIMPING TYPE LONG BARREL ALLUMINIUM LUG FOR XLPE CABLE	
APPD.	DJS		
DATE	11.04.13		
SCALE	NTS	DWG.NO:- CBS/SQP/ELT/051	REV. 0

Technical Specification of Fibre optical cable & Joint with 24 strands for Line Differential Relay and suitable Permanently Lubricated HDPE Pipe

Specification No. – SP-FO24-96-R0

Prepared by		Reviewed by		Approved by		Rev	Date
Name	Sign	Name	Sign	Name	Sign		
AV		GS		AA		R0	11.05.2017

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Record of Revision

Clause No.	Change in Specification	Approved by	Rev

1.0. SCOPE

This specification covers manufacturing and supply of Fibre optical cable with 24 strands, its joint and suitable PLB HDPE Pipe.

2.0. SERVICE CONDITIONS

Optical Fibre cable to be supplied against this specification shall be suitable for satisfactory operation under the following conditions-

2.1	Average grade atmosphere	Heavily polluted, Dry
2.2	Maximum altitude above sea level	1000M
2.3	Relative Humidity	100%
2.4	Ambient air temperature	Highest 50 Deg C Average 40 Deg C Minimum 0 Deg C
2.5	Operating temperature	0 Deg C - 50 Deg C
2.6	Rainfall	750mm concentrated in four months

3.0. CONSTRUCTIONAL FEATURES OF OPTICAL FIBRE CABLE

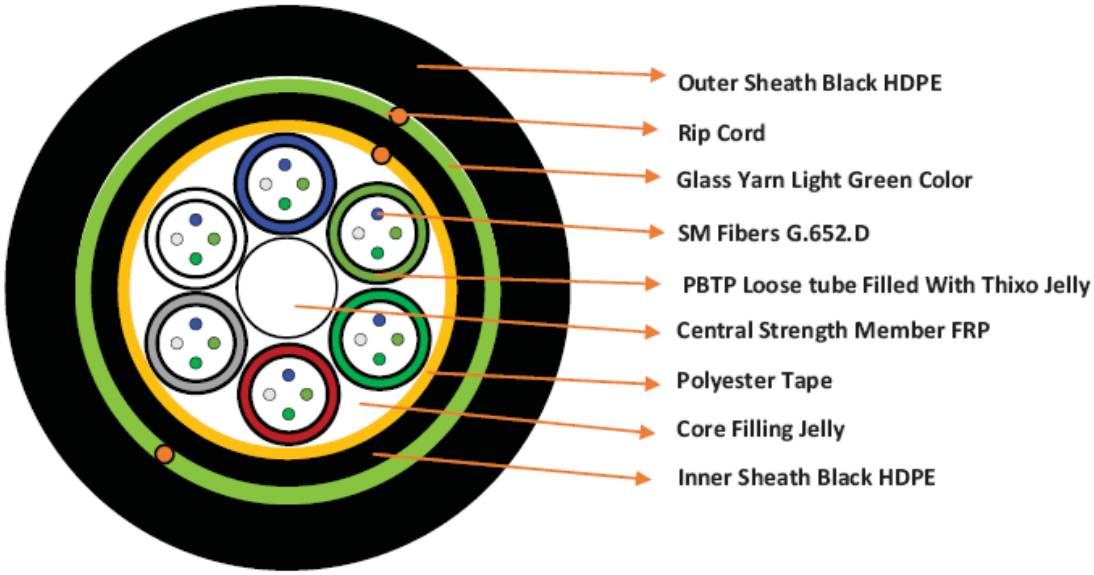
S No	Parameter	Units	Guaranteed Value
3.1	No. of fibers in the cable		24
3.2	Type of fibers		Single mode,G652D
3.3	Cable diameter - Nominal - Tolerance	 mm mm	
3.4	Cable weight	Kg/ km	
3.5	Max Tensile Strength	KN	3500
3.6	Max pulling tension - During installation - During Service	 KN KN	 6000 3500
3.7	Minimum bending radius - During installation - During service	 mm mm	
3.8	Maximum continuous length	Km	2000+/-10%

3.9	Temperature range Operation Installation Shipping & Storage	°C	-20deg to +70deg
3.10	Crush strength	KN/M2	2000N/100X100mm
3.11	Impact resistance		25Nm
3.12	Torsion resistance		180deg
3.13	Outer jacket thickness - Nominal - Tolerance	 mm mm	 1.6mm +/-0.2
3.14	Outer jacket material		HDPE Black
3.15	Description of outer jacket coatings/ additives		Anti Termite & Anti Rodent
3.16	Inner jacket material		HDPE Black
3.17	Inner jacket thickness		1.2mm
3.18	Description of Inner jacket coatings/ additives		Anti Termite
3.19	Cable core binding arrangement - Lay length - Lay Direction	 mm S/Z	
3.20	Central strength members - Material - Diameter - Shape	 mm	 FRP 2.0mm Round
3.21	Peripheral strength member		Glass Yarns
3.22	Central Fibre optic unit:	Y/N	N
3.23	Loose tube dia & material		1.9mm +/- 0.1 with PBTP
3.24	Loose tube lay direction		
3.25	No of fibers per tube		4

3.26	Total no. of tubes and number of empty tubes		6 no. Loose Tube, Dummy=Nil
3.27	Identification / numbering of individual tubes		Blue, Orange, Green, Brown, Slate, White
3.28	Filling compound within tube		Thixotropic Tube Filling Jelly
3.29	Filling compound in cable core interstices		Thixotropic Flooding Jelly
3.30	Rip cord (s) provided ?	Y/N	Y
3.31	Cable design life	Years	Min 25Years
3.32	Describe cable termite proofing measures		Anti Termite additives
3.33	Describe cable anti-rodent measures		Equally distributed Glass Yarns over Inner Sheath

Cable Cross Section Drawing of 24F SM Multitube Double Sheath Direct Buried Cable

DO NOT SCALE



4.0. CONSTRUCTIONAL FEATURES OF JOINT FOR OPTICAL FIBER CABLE

Construction of the optical fibre cable joint Box shall be as following:

4.1 Main Box:

The main box shall be sturdy & durable having a base and dome shaped body. The domed shaped body shall cover the entire junction while the base shall enable the entries of the optical fibre cable. The base and dome shall be made of Thermoplastic /High density polypropylene material. The Joint Box should be suitable for opening and reentry frequently without impairing its properties. The body may have ribs as strength member if required.

4.2 Cable organizer (Strength member and cable termination)

Cable organizer shall be suitable to secure extra length of fiber tubes with safe bending radius. It should not cause any strain or tension on the fiber. It shall be possible to fix the strength member(s) and the optical fiber cable firmly so that the cable arrangement will not shift or move laterally inside the Joint box. The Internal structure shall be metallic (made of stainless steel) to support and hold the cables and strength members etc. The metallic parts for making connections shall be made of Brass or Nickle Chromium plated steel and the total assembly shall be corrosion proof.

4.3 Fibre organiser/ Fibre Splice trays

Fibre organiser shall be non-metallic made of ABS material having following characteristic.

i.	Specific Gravity	1.01-1.21 gm/cc	ASTM-D-792
ii.	Tensile Strength	0.002 kg/sqmm – 0.005 kg/sqmm	ASTM-D-638
iii.	Elongation	<50%	ASTM-D-638
iv.	Water absorption	0.3-0.4	ASTM-D-57-59
v.	Rock well hardness	R81-R111	ASTM-D785A

Test certificates in conformity to the above parameters of the ABS Material shall be furnished. Fiber organizer cassettes shall be provided on which the fibre splice and service loops of fibres may be placed by making fibre coils. Slots on the splice tray for fixing splice protection sleeve shall be in such a way that they will not cause any stress or strain on sleeve or fibre and shall not shift, loose or move inside the tray or come into conflict with the fibre coils once fixed. It shall be possible to fix a minimum of 4 secondary tubes at the entry port of each tray. No PVC or any other type of adhesive tape is permitted to hold fibres and loose tube inside the tray. All fibres of a tube shall be spliced in a single tray for better tube identity and fibre looping. The fibre organiser shall be fixed inside the Joint box in such a way that this shall not loosen once fixed or to shift or move in any way.

4.4 Holding Arrangements

The box shall provide the following:

i. Holding arrangement and framework for properly securing cable organizers with splice trays.

ii. Securing arrangement for holding fibres.

iii. Holding device to hold strength member of fibre optic cable securely.

iv. Any other extra component required for providing strength and reliability to the Joint Box.

4.4 Compatibility

All the component and parts used shall be compatible with the optical fibre cable, fibre splices and cable components. Their use for long should not result in increase in transmission loss or deterioration in other properties.

4.5 Marking on body of the Joint box

Following information by marking indelibly on Joint box shall be provided:

i. Manufacturer's name & date

ii. Type of Joint box

iii. Number of Splice organizer cassettes

iv. Number of splices per cassette

v. Batch number and serial number.

vi. Name of Purchaser i.e. BSES Yamuna Power Ltd

vii. Purchase order number & Date

5.0. CONSTRUCTIONAL FEATURES OF HDPE PIPE FOR OPTICAL FIBRE CABLE

S No	Parameter	Units	Guaranteed Value
PLB HDPE Pipe Parameters			
5.1	Manufacturer's Name		
5.2	Pipe diameter - Nominal - Tolerance	 mm %	 40 +1% & -0%
5.3	Wall Thickness - Nominal - Tolerance	 mm %	 3.5 +1% & -0%
5.4	Standard Length - Nominal - Tolerance	 meter &	 500 +/- 5%
5.5	Weight	Kg/meter	
5.6	Pipe construction type		Two concentric layers
5.7	Thickness of permanent lubricant	mm	3.85 mm
5.8	Construction material of outer layer		HDPE
5.8	Construction material of inner layer		HDPE with silicon
5.9	Base HDPE Resin - Density at 27 deg C - Melt flow rate at 190 deg C & 5 kg load	 Kg/m^3 g/10 minutes	 940 to 958 0.2 to 1.1
5.10	Service life span	years	>25
5.11	Maximum outside diameter of fibre optic cable that can be installed by blowing technique		16 mm
5.12	Suitable for underground cable installation by- - Blowing - Pulling		 Yes Yes

5.13	Tensile Strength	N/mm^2	Min. 20
5.14	Elongation at break	%	Min 350
5.15	Internal coefficient of friction		>0.06
5.16	Description of coatings/ additives		Anti Termite & Anti Rodent
PLB HDPE Pipe Accessories			
5.17	Coupler Type		Push Fit
2.18	Coupler Material		PP
5.19	Coupler strength		15 Kgf/cm^2
5.20	End cap material		PP

TECHNICAL SPECIFICATION

FOR

LAYING OF

11 KV, 33KV AND 66 KV CABLE

Prepared by	Reviewed by	Approved by	Rev	02
			Date	18th March 2019
AV	GS	AA	Page	1 of 42

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1. REFERENCE STANDARDS

i) IS 1255: Code of practice for installation and maintenance of power cable up to and including 33kV rating.

ii) IS 1554: PVC Insulated Electrical Cables upto 11KV

iii) IS 2274: Code of Practice for electrical wiring installation – system voltage exceeding 650V

iv) IS 7098 Part II: Cross linked Polyethylene Insulated PVC sheathed cables for working voltages from 3.3KV up to and including 33KV

v) IS 7098 Part III: Cross linked Polyethylene Insulated PVC sheathed cables for working voltages from 66KV up to and including 220KV

vi) IS 5820: Specification of precast concrete Cable cover.

vii) Indian Electricity Rules 1956.

2. CABLE LAYING

2.1. SELECTION OF THE ROUTE

The cable route selection shall be done by the concerned supervising engineer by first conducting route survey and selecting a route along with contractor keeping followings in mind-

i) The side of road, which presents the least obstacles and the fewest roadways crossings.

ii) The future consumers and existing cables in the route may influence the cable route.

iii) Railway, road crossings, MCD and other government agencies may also influence in selection of cable route.

iv) Plans for future building projects should be considered.

The route shall be as far as possible away from parallel running gas, water pipes and telephone/telecommunication cables.

2.2. CLEARANCES

The desired minimum clearances are as follows –

i) Power cable to power cable – A minimum clearance equal to diameter shall be maintained. Trench drawings shall be referred for guidance.

ii) Power Cable to control cables – 0.2 M

iii) Power cable to communication cable – 0.3M

iv) Power cable to gas/water main – 0.3 M

2.3. DEPTH OF CABLE LAYING

The desired minimum depth of laying from ground surface to the top of cable shall be

i)	650 / 1100V grade XLPE Cable	-	75 cm
ii)	Low voltage and Control Cable	-	75 cm
iii)	6.35 / 11KV grade XLPE Cable	-	90 cm
iv)	19 / 33KV grade XLPE Cable	-	1.05 M
v)	38 / 66KV grade XLPE Cable	-	1.20 M
vi)	Cables at Road crossing	-	1.0 M (min)
vii)	Cables at railways level crossings (measured from bottom of sleepers to the top of Pipe)	-	1.0 M (min)

Whenever there is any obstacle at the laying depth, the cable should be lowered/ raised to cross the obstacle. However variation in the depth is to be approved by BSES. The Contractor shall provide the same in deviation report.

2.4. WIDTH OF CABLE TRENCHES

The width and depth of Cable Trenches shall depend upon number of circuits and Voltage Grade. Drawings of this specification are shown in the document itself.

2.5. BENDING RADIUS OF CABLES

While pulling of the Cable from the drum or during laying following minimum bending radius shall be maintained so that the cable, in particular the insulation does not get damaged.

i) Single Core Cables (PVC & XLPE)

a) Up to 11KV grade – 15 X D

b) Above 11KV grade - 20 X D

ii) Multi Core Cables (PVC & XLPE)

a) Up to 1.1KV grade - 12 X D

b) Above 1.1KV grade – 15 X D

Where 'D' is overall diameter of the cable

2.6. MAXIMUM PERMISSIBLE TENSILE STRENGTH FOR CABLES

i) For cables pulled with Stocking

a) PVC and XLPE SWA Armoured cables P = 30 X D

b) PVC and XLPE AWA Armoured cables P = 20 X D

Where P= pulling force in Kgm, D= Diameter of Cable in mm

ii) For Cables pulled by Cable eyes

a) Aluminium conductor – 30 N/mm2 = 3 Kg/sq. mm

b) Copper conductors - 50N/mm2 = 5 Kg/sq. mm

Permissible force is calculated by multiplying the above values by cross sectional area (CSA) of conductor of each core and then number of cores.

2.7. METHODS OF LAYING

i) Cables shall be laid in direct in ground, in trenches excavated therein and shall be protected with covers as given in the drawing. Cables shall also be drawn into pipes of ducts or laid in the formed trenches or troughs or on racks or supported in trays or cleats as required by the site exigencies. Where the cables are laid in the formed trenches, the installation shall include removal and replacement of the trench covers and the provision of temporary protective covers on the trenches where they cross the access ways.

ii) HDPE (200 mm) pipes shall be used where cable cross roads and railways tracks. Spare ducts for future extensions should be provided. Spare duct should be sealed off. Buried ducts or ducting blocks shall project into footpath or up to the edge of road, where there is no footpath, to permit smooth entry of cable without un-due bending. The diameter of the cable conduit or pipe or duct should be at least 1.5 times the outer diameter of the cable. Angular alignment of the duct across road crossings shall be predetermined to maintain safe bending radius when direction of cable trench changes before or after the road.

iii) The contractor shall lay cable by horizontal direct drilling (HDD) in main roads and highway with heavy traffic, passage to public

property where excavation is not possible. Contractor shall take approval for laying of cable by means of HDD wherever required from the supervising engineer. The cable laid by HDD shall be minimized so that it doesn't exceed by 12% of total route length. This is to avoid De-rating of Cables.

iv) Unless approved by BSES, the contractor shall lay the cables, direct in ground, in single layer. The cables shall be laid with the pre-determined and approved cable route.

v) Spacing shall be maintained uniformly between the cables all along the length including the bends, as approved by BSES. To maintain the spacing, suitable non-metallic formers shall be placed uniformly with spacing not exceeding 5 meters. Every bend shall have at least one spacer.

vi) 75 mm of the sand bed shall be placed at the bottom of cable trench.

vii) After the cables have been laid the trench shall be filled with the sand and shall be well rammed to a level not less than 75 mm above the top of the cables all throughout the route.

viii) To protect the cables against external mechanical damage, which may be caused by other agencies, the cable shall be protected by suitable cover.(for dimensions of RCC cable cover refer cable laying drawing)

The type of the covers shall be as under

a) 1.1KV Cables – Single layer of brick thickness not less than 75 mm (3 inch)

b) 11KV Cables – sand stone of thickness not less than 75mm (3 inch).

c) 33KV Cables shall be protected by reinforced concrete cover of width 300 mm as per attached drawing with thickness not less than 50mm.

d) 66KV Cables shall be protected by reinforced concrete cover as per attached drawing with thickness not less than 50mm.

The RCC cable cover shall be embossed as “BYPL 66/33/11 KV CABLE” whichever is applicable.

ix) Back fill to be filled up to 75mm and the warning tape shall be installed continuously. The tape shall be yellow in colour with Black / Red lettering of minimum 20mm height. The approved warning message shall be written in English and Hindi/ local language. The minimum thickness and width of the tape should be 300 microns and 150 mm respectively.

x) The trench shall be filled-up by soft soil (300mm) and Excavated soil as indicated in drawings.

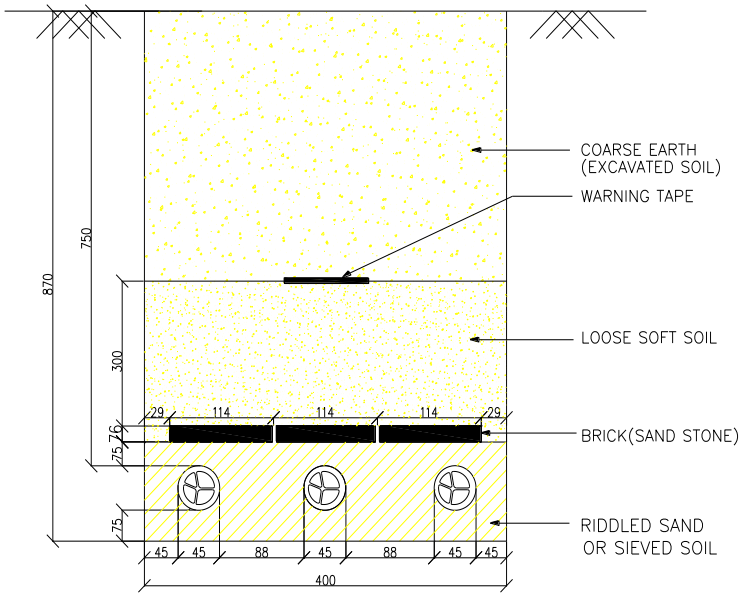

Figure 1.1 – 1.1kV, 150sqmm Buried Cable

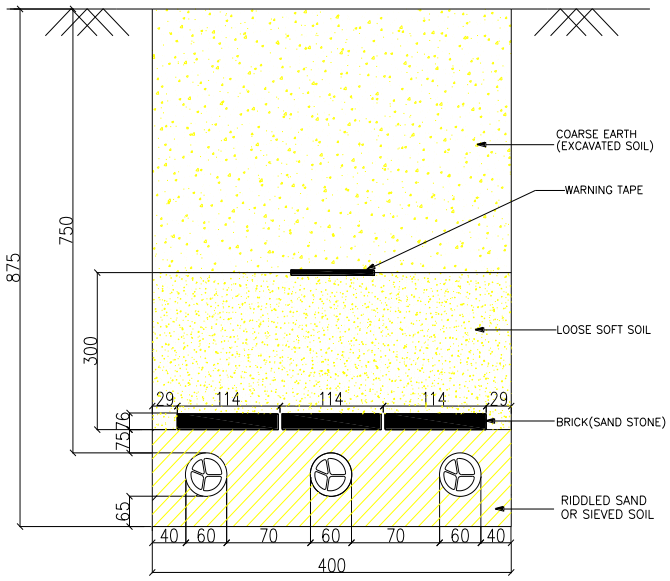

Figure 1.2 – 1.1kV, 300sqmm Buried Cable

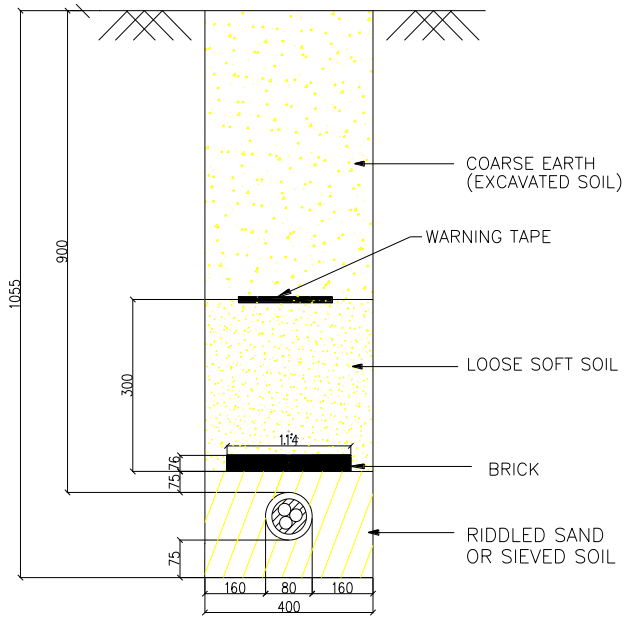

Figure 1.3 – 11kV Buried Cable for Single Circuit

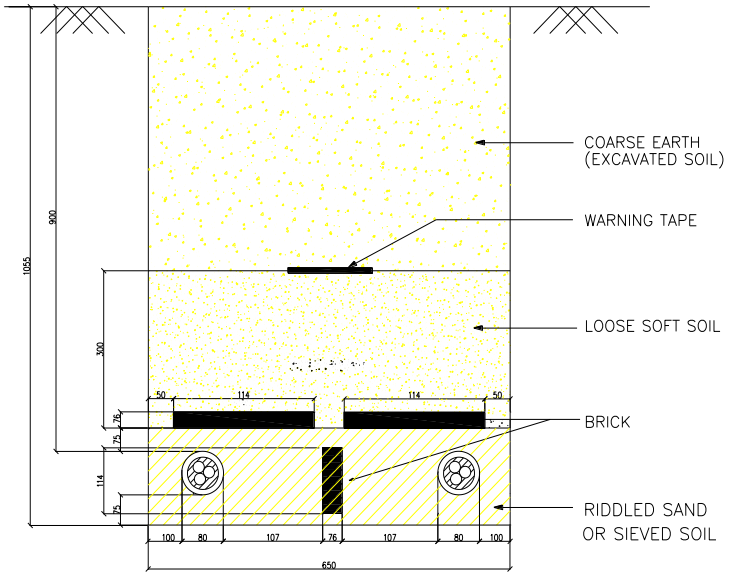

Figure 1.4 – 11kV Buried Cable for Double Circuit

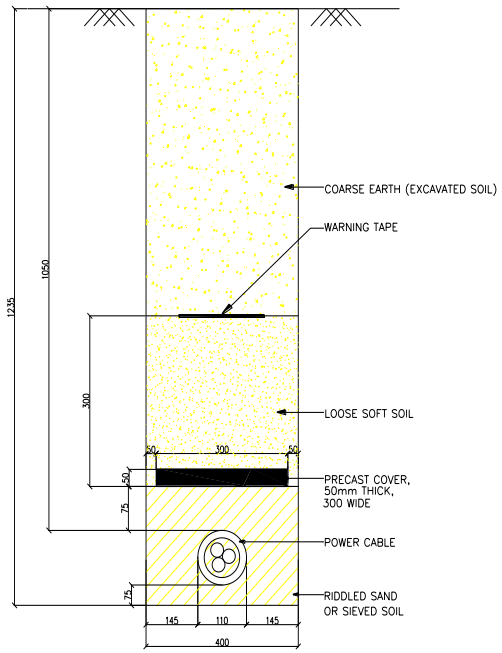

Figure 1.5 – 33kV Buried Cable for Single Circuit

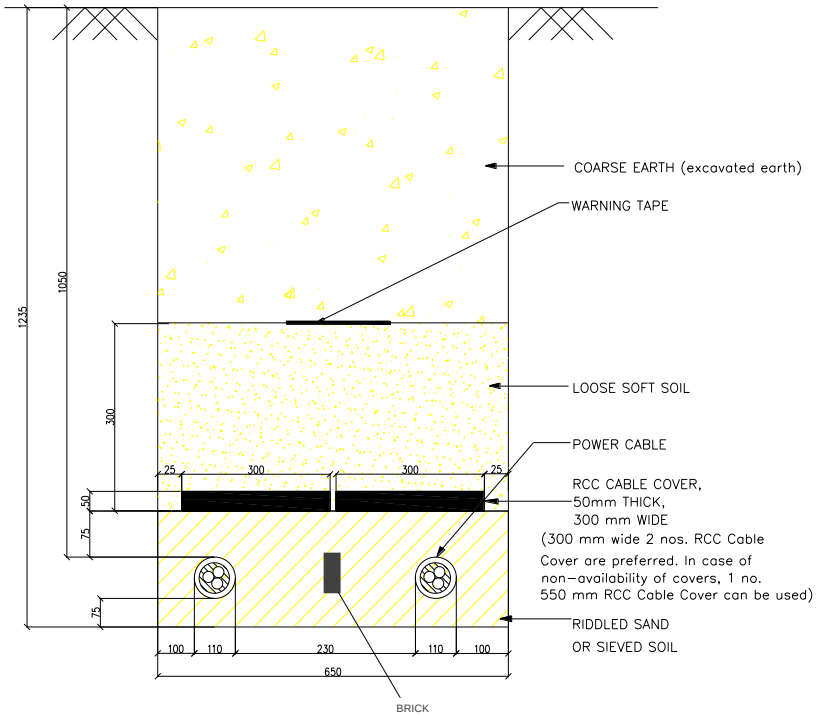

Figure 1.6 – 33kV Buried Cable for Double Circuit

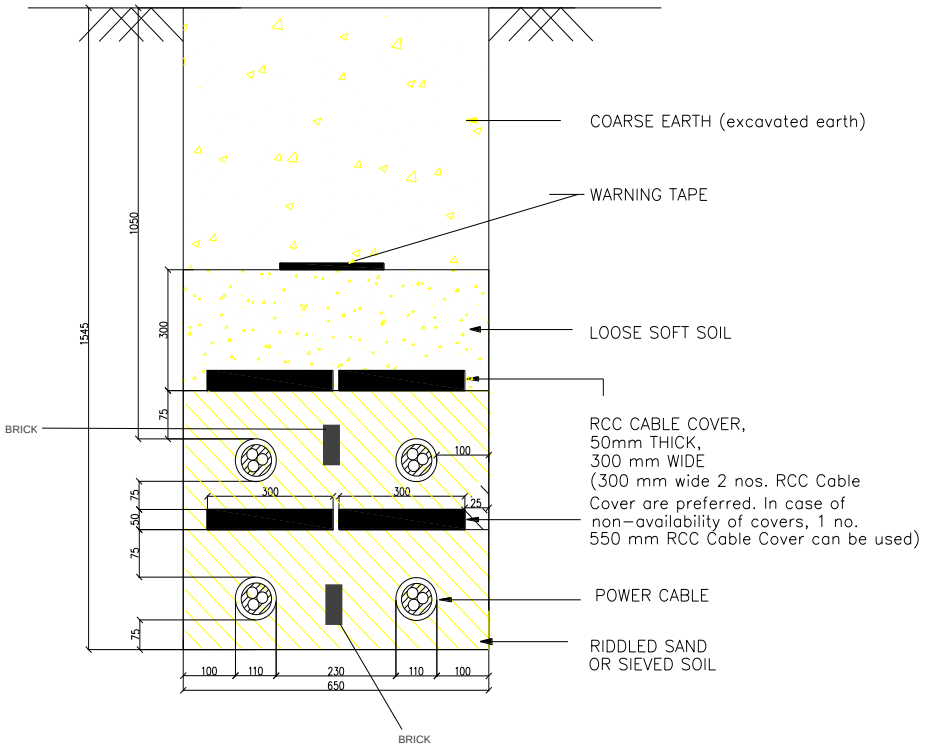

Figure 1.7 – 33kV Buried Cable Option-1 for Four Circuits

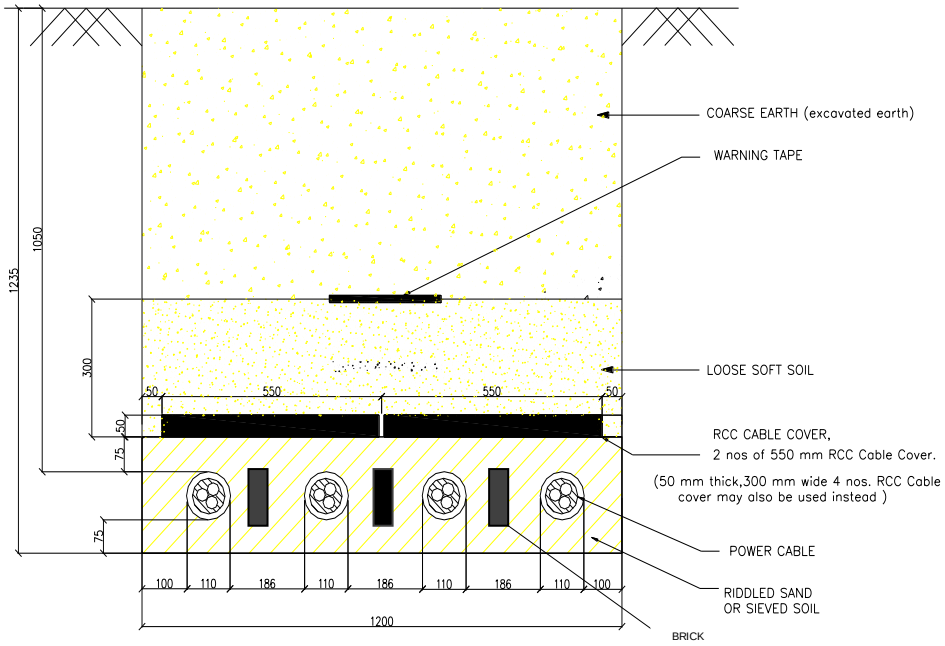

Figure 1.8 – 33kV Buried Cable Option-2 for Four Circuits

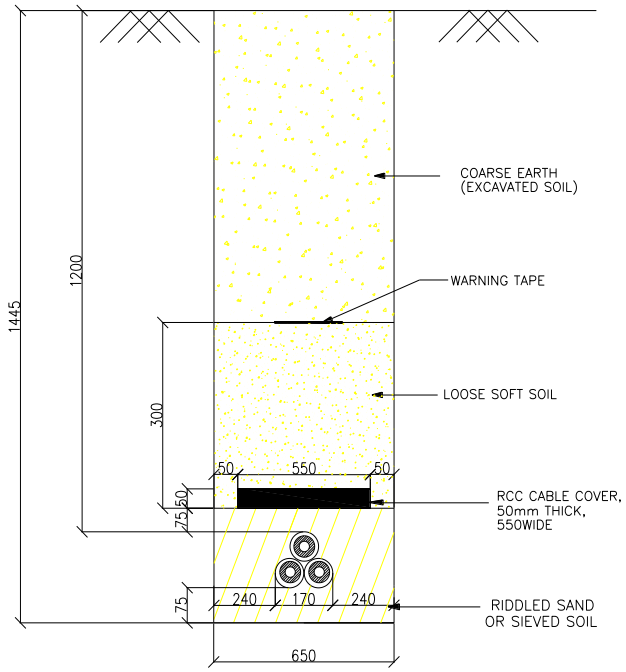

Figure 1.9 – 66kV Buried Cable for Single Circuit

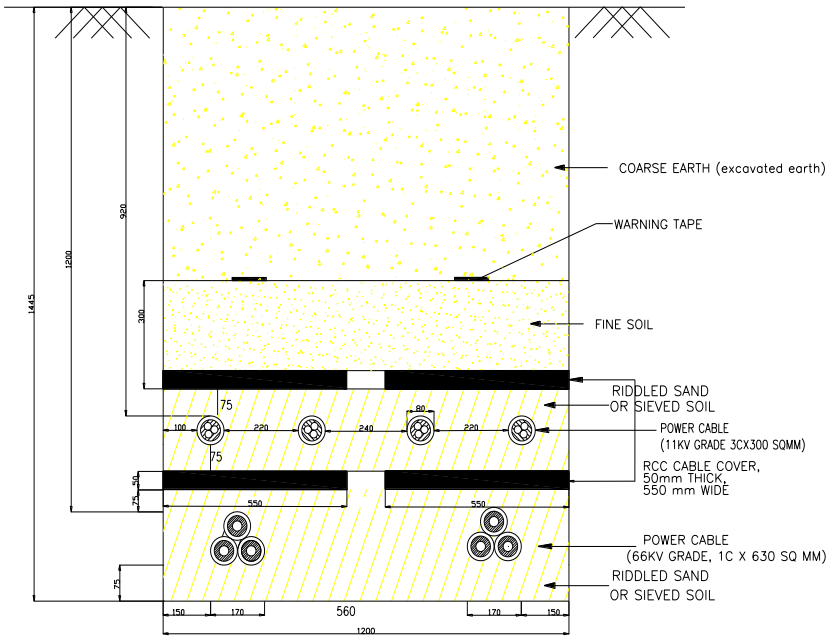

Figure 1.10 – 66kV Double Circuit and 11kV Circuits

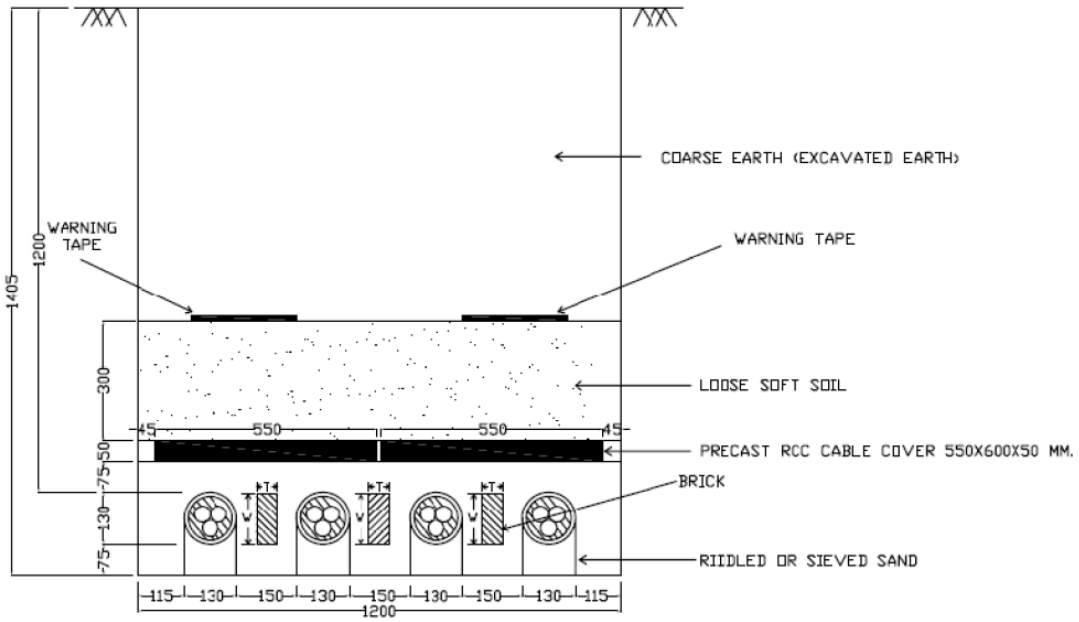

Figure 1.11 – 66kV 3Cx300 sq mm Four No's Cable Runs

2.8 CABLE OVER BRIDGES

On Bridges the cables are generally supported on HDPE cleats and clamped on steel supports at regular intervals. Approval from appropriate authorities (PWD/railways) as applicable shall be taken by contractor.

2.9 LAYING OF SINGLE CORE CABLES

a) The single core cables shall be laid in trefoil formation. Single core cables can be laid individually in 200mm HDPE pipe in case of HDD only.

b) For single core cables laid in trefoil formation, plastic cable ties shall be used at interval of 1.0 (one) meter throughout the cable length to maintain the trefoil arrangement.

c) To prevent magnetic losses (eddy current and hysteresis losses), the base plate of the panels or the terminal box of the equipments, shall have aluminum plate. Incase the entry into the building is through GI pipe; a “slit” in the GI pipe shall be necessary. Alternatively GI pipes may altogether be avoided and non-metallic pipes such as PVC or HDPE pipe shall be used. Concrete pipes having steel reinforcement (RCC pipe) are not to be used.

2.10 EARTHING OF SINGLE CORE CABLES

i) Single point bonded earthing shall be employed to prevent flow of induced circulating current in the armour and screen and consequential de-rating of cables for feeder less than 2.0 KM.

ii) For feeder length more than 2 KM, cross bonding shall be provided.

2.11 GENERAL GUIDELINES FOR LAYING CABLES

i) Laying of the cables and handling of the same shall be undertaken, at all times, by adequate staff suitably trained and supplied with all the necessary plant, equipment and tools.

ii) The contractor shall be responsible for all the route survey, establishment of the position of the joints as per the site requirement and the drum lengths of cables to be laid. While carrying out the route survey the contractor shall take into account the obstacles on the route whether above or below ground. The cable shall be planned to be laid in an orderly formation, free from unnecessary bends and crossings

iii) The contractor shall submit a drawing for the complete scheme showing the entire route, road crossings, location of joints and also the arrangement of cables to be laid. In case due to site exigencies, cables have to cross over within the trench, the same shall be shown in the drawing. For each and every job, this drawing shall be approved by BSES, prior to commencement of work.

iv) Contractor shall arrange for all the material and manpower required for jointing and end termination. The Contractor shall provide pit, carry out excavation for creation of working space required for jointing by the jointer. The contractor shall carry out all civil works, structural work, clamping and earthing, so that the cables and accessories perform satisfactorily during the entire lifetime.

v) The entry and exit of the cables into the building shall be through RCC or GI pipe except for single core cables, which shall be properly sealed and shall be duly supported as per the method and technique approved by BSES, so that the outer sheath of the cable does not get damaged at the entry and exit points. The sealing should be of adequate length so that it minimizes the risk of spreading of fire or ingress of water.

2.12 HANDLING AND STORAGE OF CABLE DRUMS

i) The cable drums shall be transported upright, so that the weight is distributed on both the flanges. Under no circumstances the cable drum may be laid on its side. During transportation the drums must be properly secured. The cable drums should never be dropped from Lorry or a trailer, so as to prevent damage to the cable drum and also to the cable. Ramp may be used for unloading. The drums may be rolled over short distance, provided the correct direction of rolling as provided on the drum is observed. Alternatively, a mobile crane should be used for lifting and lowering the drum. A chain-pulley arrangement may also be used to lift the drums and deposit the same on ground if required.

ii) In case the drums are to be stored prior to cable laying, they should be arranged in such a way to leave some space between them for air circulation. It is desirable that the drums stand on battens placed directly under the flanges. Overhead covering is not essential except in heavy rainfall areas or during monsoon. Cable should however be protected from direct rays of sun by leaving the battens on or by providing some form of sunshade. In no case the drums shall be stored in a flat position with flanges horizontal.

iii) For transportation of the cable drums from storage site to work site, the drum should be mounted on a trailer or an open lorry and unloaded by mobile cranes.

2.13 PROCEDURE OF LAYING

i) The ground over which the drum is positioned at site should be properly consolidated and jacks placed on both sizes of the drum to make the pay-off arrangement stable. Suitable arrangement be made to stop the drum rotation, during cable laying preferably by square wooden poles kept temporarily pivoted over cable roller under the flanges which when required can be applied on the flange as a brake by personnel manning the drum.

ii) The cable should always be paid off from the top of the drum. The drum must be positioned in such a way that the arrow on the drum points opposite to the direction of rotation marked on the drum.

iii) It must be ensured that the cable is not dragged over sharp object or on the road surface, so as to avoid damage to the outer sheath of the cable.

iv) The pulling method to be used shall be approved by BSES. Cable supplier's recommended maximum pulling tension shall not be exceeded.

v) Rollers shall be placed at intervals and the cable shall be pulled over the rollers. The rollers shall be kept lubricated so that they rotate freely, minimize friction to the cable in motion. Rollers shall be positioned at the bends to minimize sidewall friction. The contractor shall ensure that PVC/HDPE sheath of cable is free from damage due to abrasion.

vi) The cable should not be pulled out from the drum by lifting of the coil while the drum is lying flat on the flange. This leads to twisting of the armour and cores resulting in permanent damage to the cable.

vii) To avoid ingress of moisture, it must be observed that the end capping of the cables is not damaged. Cut pieces of the cables must be capped immediately, before laying of the same is taken-up.

2.14 EXCAVATION OF THE TRENCHES

i) The excavation of the trenches shall be commenced, with proper approvals from various authorities well in time.

ii) Before opening of the section of the trench, the contractor shall satisfy himself that the line of the trench is clear of underground obstructions, by taking out trial pits on the line of the trench.

iii) The exact location of each trench shall be approved on site by BSES. The trenches shall be kept as straight as possible and each trench shall be excavated to approved formation and dimensions. If necessary, the trenches shall be adequate shored by wooden planks and bracing to avoid trench cave-ins which would cause injury to the persons and also damage the cables laid.

iv) The bottom of each trench shall be firm and of smooth contour. The contractor shall take reasonable precautions to prevent damage to the highway or ground surface from a slip or breaking away of the sides of the trench.

v) The trench excavation and filling in shall be so executed that all walls, roads, sewers, drains, pipes, cables, structures, places and things shall be reasonably secured against risk of subsidence or injury and shall be carried out to the satisfaction of the authorities concerned. Should, however, a damage to an existing or other services be made, the Contractor will arrange and pay for any necessary repair, to make good the damages.

vi) Where trenches pass from a footway to a roadway or at other positions where a change of level is necessary, the bottom of the trench shall rise or fall gradually. The rate of rise or fall shall be approved by BSES.

vii) Contractor shall ensure that during excavation and until restoration has been completed, for reasonable access of persons and vehicles to property or places adjacent to the route.

viii) When the excavation of the trenches has been accurately executed, the contractor shall inform BSES for approval. Laying of cables or building of structure shall not be started until the contractor has been advised by BSES to proceed with the work.

2.15 EXCAVATED MATERIAL

i) The materials excavated from each trench shall be placed so as to prevent nuisance or damage to adjacent ditches, drains fences, gateways and other property or things. Excavated material shall be stacked so as to avoid undue interference with traffic.

ii) Where, owing to traffic or for reasons of safety or other considerations, this is not permissible, the excavated material shall be removed from the site and returned for refilling the trench on completion of laying; surplus material shall be disposed off by the contractor at his own cost.

2.16 PIPES AND DUCTS

i) Care shall be taken to make the bend of the pipes or duct lines as easy as practicable and in no case of radius less than 3 meters. Where approved, split pipes may be used on bends, the pipes being fitted round the cable after laying.

ii) All road crossings shall be ducted. This applies to present and future roads as indicated on the route plans. The pipes and the ducts shall be laid in an approved manner and shall be surrounded by 150 mm of PCC (1:2:4)

iii) Ducts under the road shall be provided by the contractor, by non-disruptive method, if road cutting is not permitted by the concerned authorities Cable laying shall be done by Horizontal Direct drilling method (HDD).

iv) The cables shall be suitably protected at entry and exit from the pipes, so that the outer sheath does not come in contact with the edges of the pipes / ducts. The pipes and ducts shall have slope so that the seepage water can drain through the small opening provided on the lower side of the pipe sealing.

v) The pipes and ducts shall be secured to the base at both ends and at regular interval, throughout the length, so that at no point the ducts or pipes get suspended over the threaded cable, and damage the same, thus defeating the very purpose of providing the pipe / duct.

vi) At all road crossings at least one spare duct / pipe shall be provided for future use. The pipe shall be thoroughly cleaned of obstructions. A draw wire or rope shall be left in each pipe to facilitate the drawing in of the cables. The duct end shall be sealed temporarily to prevent the entry of foreign matter. End caps and permanent markers shall be placed flush with footpath / roadways at both the ends. The pipes

and ducts shall be cleaned again immediately before the cables are drawn in.

vii) The internal diameter of the pipe / duct should be such that the cables occupy only 40% of the area of the pipe / duct to avoid de-rating.

3. JOINTING OF CABLES

3.1 TYPES OF ACCESSORIES

i) Straight Through / Transition Joints - These Joints are used for connecting two cables in the run.

ii) Termination or sealing end – This is generally used to connect a cable to switchgear terminals, H.T. pillars, transformer boxes and OH lines etc. GIS End termination should be used wherever required.

3.2 REQUIREMENTS OF CABLE JOINTS

i) Resistance of the jointed conductor should be equal to or less than resistance of the conductor of the same length.

ii) Connector & lug should have a mechanical strength should be comparable to that of the conductor.

iii) Thickness of built up insulation should be equal to or more than thickness of insulation of cable.

iv) The Joint should provide proper mechanical protection to the insulated cores against damage by impact.

v) The joints should ensure the continuity of metallic sheath or armour.

vi) Proper stress control shall be provided to eliminate occurrences of high electrical stresses at screen cut points and over crimped connector.

vii) The Joints shall be provided with an outermost layer resistant to corrosion by chemical effect

For joints of screened cables, following additional features must be considered

i) Electric stress relief at termination of screen

ii) Ionization and corona discharge

Besides the above requirement, cable joints should be simple and compact. It should require minimum time for jointing. It should be mechanically strong to

withstand dynamic stresses due to short circuit current and impacts. The joints should further be resistant to corrosion and other chemical effects.

3.3 PREPARATION BEFORE JOINTING

A proper joint position should be selected for jointing. The joint pit should be of sufficient dimensions as to allow jointers to work. Sides of the pit should be well covered with tarpaulin sheets to prevent loose earth from falling. When jointing cables in water logged ground or under monsoon conditions, sump hole should be excavated at one end of the joint pit in such a position so that the accumulating water can be pumped out or baled out without causing interference to the jointing operation. The jointing as far as possible is to be carried out inside a tent. Before proceeding for jointing, on the existing cable, it is very essential to identify the cable to be jointed. For jointing of high tension cables, the cable should be made dead and earthed before commencement of the jointing. This should be confirmed by spiking method.

Cleanliness is the most important factor in all jointing work. All tools should be clean and dry at the time of the jointing process. Cleanliness while handling the insulation is very important. Any contamination of the insulation by dust or moisture is detrimental to the joint. In case of paper cables, the cable seals should be examined for any damage or puncture. The paper insulation should then be tested for the presence of moisture. This is done by dipping the insulation paper in hot G-38 compound (110 Deg - 120 deg.C). Care should be taken not to touch the paper with hand. Paper should be held with a plier which

should be slightly warm. If moisture is present in the sample, it will be detected easily by a bubbling or crackling sound. In case of faulty cable, if on test moisture is detected, then further test would have to be carried out to arrest moisture. The cables to be jointed should then be meggered to check the condition of the insulation and a further check of further continuity of cables and tracing out cables to be jointed is necessary. Number on cores represents the phases. But these should never be taken for granted. Crossing of the core should be avoided in a joint.

3.4 PROCESS OF JOINTING

The process of jointing mainly consist of

i) Connecting conductors together

ii) Replacing the machine applied insulation

iii) Providing earth continuity

iv) Providing mechanical protection

Conductor joints should satisfy the following basic requirements.

i) Ensure conductivity of the conductor by proper crimping.

ii) Leave a reasonably smooth finish and profile on the conductor joint so as to avoid under stress concentration.

4. BACK FILLING TRENCHES AND TEMPORARY REINSTATEMENT

i) Filling in of trenches shall not be commenced until BSES has inspected and approved the cables and accessories at site. The inspection should be done on daily basis so that the trenches do not remain open unnecessarily, to avoid inconvenience to public.

ii) Where cables routes are in public highways, footpaths, gardens etc., the method of reinstatement will be subject to approval by MCD. All costs incurred will be at the contractor's expenses.

iii) The contractor shall be responsible for proper permanent reinstatement of the upper levels, which shall be carried out to the satisfaction of BSES and the MCD authorities concerned.

iv) Before finally leaving site, permanent reinstatement shall be executed by the contractor to the approval of MCD and the property owners and all costs incurred shall be to the contractor's account.

5. PERMANENT REINSTATEMENT OF PUBLIC ROAD, FOOT PATH ETC

i) In public roads and footways the surfaces and foundations shall be temporarily reinstated by the contractor. After settlement, temporary reinstatement material shall be removed as necessary and the permanent reinstatement shall be carried out to the approval of the appropriate highway authority / MCD. Stone and pre-cast concrete paving kerbs and channels shall also be finally reinstated by the contractor.

ii) Temporary reinstatement shall be maintained by the contractor until commencement of final reinstatement to ensure that the surface is always safe for the passage of pedestrians and vehicular traffic**.**

6. IDENTIFICATION

All cables shall be identified below the gland at each end, at joint position and at approved positions by means of bands engraved or punched with cable no. feeder name, size of cable, number of cores, phase colour etc. The bands shall be secured fastened in a permanent manner, and shall be made of material able to resist corrosion, dampness and mechanical damage.

7. CABLE ROUTE MARKERS

All cables routes shall have markers at suitable location with a gap not exceeding 30 meters. The route markers shall be approved design. Additional markers shall be provided at joint locations with approved markings.

8. CABLE SUPPORTS / CLAMPS

i) The contractor shall supply and install all the supports, racks, trays, cleats, saddles, clips and other parts required to carry and secure the cables, without risk so that there is no undue mechanical load or stress due to weight of the cable at each end. Cleats, saddles and clips shall be of the design as approved by BSES. No cable shall be laid on the trench floor. They shall be run in a neat and orderly manner and the crossing of cables within the trench shall be avoided as far as possible. Where cable runs unavoidably cross, a suitable supporting arrangement shall be provided to maintain an adequate gap between the cables.

ii) Every cable shall be supported at a point not more than 500 mm from its termination.

9. INSTALLATION OF CABLES IN TUNNELS / BASEMENT / BELOW THE PANELS

i) The design of cable support for cables installed in air in cable tunnels, basements etc. shall consist of vertical steel members spaced at approved interval and secured to the walls, floors and ceilings as necessary by means of bolts either cemented in position or expanded into cored holes. Each vertical support shall have bolted to it a number of steel brackets spaced at the intervals and designed to support and retain trays constructed of galvanized sheet steel of adequate section to carry the weight of the cables, plus space for an additional quantity of future cables at least 25% by weight and dimensions in excess of the cables installed under the contract and an additional load of 100 kg at the extremity without distortion. The trays shall be designed with raised edges to retain the cables and shall incorporate an interlocking feature so as to prevent movement between supports.

ii) The design and construction of all cable cleating and supporting arrangements shall suit the cable system design. The spacing of cable supports shall be approved by BSES.

iii) Cable run on trays shall be neatly dressed and where not provided with cleats shall be secured by heavy gauge, type approved metal reinforced, clips or saddles. Not more than six cables shall be embraced by one clip.

iv) Mild steel of appropriate sections, duly painted in an approved manner, shall be used for fabrication of cable supports. The steel shall be free from blisters, scales, laminations or other defects. Before final painting, the steel sections shall be provided with double coat of red primer.

10. CABLE PROTECTION AT OVERHEAD TOWERS OR POLES

Where the cables terminate on overhead line poles or towers located outside substation compounds the contractor shall provide suitable cable supporting galvanized steel work attached to the pole or tower and comprising backboard, runners, sheet, steel cover of not less than 3.0mm thickness, stays, cable cleats, anti climbing guard and all incidental items to provide secure protection for the cables. Isolators and Lightning arrestor. The erection and steel structure required shall also be in scope of the contractor.

11. SUN SHADES

All cables shall be protected from direct solar radiation by ventilated sun shields as approved by BSES.

12. ROUTE PLAN

i) Contractor should get updated the GIS map of BSES of route along with joints and other obstructions.

ii) During the progress of the contract works the contractor shall record on a set of route plans and cross section drawings of an approved

form, these details so that the same can be transferred on the GPS maps. Such particulars will allow an accurate reference to be made in the case of any fault or projected modification. These records shall show, amongst other data, both indoors and outdoors the exact position of every joint, cable end termination and also the particulars of the depth of the trench, the arrangement of the cables, with cable numbers and the position of all obstructions revealed during the course of excavations. These completed records shall be submitted to BSES within 15 days of completion of any particular route/feeder.

13. SITE FACILITIES TO BE MAINTAINED BY THE CONTRACTOR

i) The contractor shall arrange for all the tools and tackles required for cable laying, jointing testing and commissioning as per this specification.

ii) The contractor shall arrange illumination and Power supply so that the work can be carried out round the clock.

iii) The contractor shall maintain functional dewatering pumping facility with suitable power supply so as to protect the cables and the joints from ingress of water due to rain or otherwise

iv) The contractor shall make arrangement to provide suitable scaffolding arrangement to carry out the termination work

v) The contractor shall carry out proper barricading of the dug cable route and the joint bays and shall take all necessary precautions to avoid any public hazard.

14. TESTING

Following tests are to be carried out during and after completion of Cable Laying:

i) Testing of cable before jointing –Cable shall be tested for Insulation Resistance prior to laying by opening the end and resealing end properly.

ii) Testing on complete Cable Installation –

a. Insulation resistance of each core shall be measured against all the other cores and the metal screen connected to earth.

b. The resistance of the conductor shall be measured.

c. High voltage – Very Low frequency (VLF) kit shall be used for high voltage testing of complete cables length. Testing voltage and duration shall be as per IEEE 400.2 standards.

d. Partial discharge test shall be carried on complete cable length.

e. Charging of Cable at No-Load at Nominal working voltage for 24 Hours.

f. After laying and before termination of cable a sheath test shall be conducted for 66KV Single core Cable as under:-

At both ends the cable shall be raised from ground. From the end graphite coat over the outer PVC jacket shall be removed with a piece of glass for a length of 300mm. A spiked steel rod with an eye for attaching a wire shall be driven into the ground and connected to a nearby water or hydrant pipe. Insulation resistance of PVC

jacket shall be measured between the aluminum wire armour and the spike with a 500/1000V insulation tester. Measured resistance shall not be less than 2.5 mega ohm / KM. Thereafter 10KV DC shall be applied for one minute in the same way. After the test the armour shall be kept earthed to the steel spike for 15 minutes for discharging residual charge.

g. Any other testing required to complete the job shall be performed as per IEC standards.

15. BARRICADING AND SAFETY REQUIREMENT

a. Dimensions of barricading- Height- 2 mtr, Length- 1.5 mtr.
b. There shall not be any gap in between two barricades.
c. LED Bacon light shall be placed at 1st and every 4th barricade
d. Name, painting, color, cleanliness etc. shall be done on regular basis.
e. Vendor to ensure that traffic management shall not be excuse of work execution. The contactor shall not undertake loading and unloading at carriageways obstructing the free flow of vehicular traffic.
f. Full height fence, barriers, barricades etc. shall be erected around the site in order to prevent the working area from the risk of accidents due to speedy vehicular movement. In same way barricades shall protect the road users from the danger due to construction equipment and temporary structures.
g. The structure dimensions of the barricades , material and composition, its color scheme, BSES logo and details shall be in

accordance with specification and drawing laid down in the tender documents.

h. All the barricades shall be erected as per the design requirements of employer, numbered painted and shall be maintained in good condition. Barricading In-charge shall maintain barricade register at site.

i. All barricades shall be easily seen in the dark/night time by the road users so that no vehicle hits the barricades. Night vision shall be ensured by affixing retro reflective strips of required size and shape at appropriate angle at bottom and middle portion of the barricades at a minimum gap of 1000 mm. In addition minimum one red light /red blinker and red beacon light shall be placed at the top of each barricade.

j. No dust deposit is permitted at the front side of barricades.

k. Cable drum shall be returnable and vendor shall take it back (by buy back process or as per PO agreement) from site at their own risk and cost.

l. Once cable lying of a drum is completed, within two days, empty drum shall be removed from site.

m. Trained traffic marshal with all PPE and traffic control light (Red and Green) shall be placed at site for 24x7 hours.

n. During execution of job, any damage to other agency's properties shall be counted in vendor account and necessary action shall be taken by vendor to immediate recover, repair etc.

o. Excess earth shall be removed from site after back filling. Site to be cleared to avoid flowing of dust. Barricades to be removed from site within 24 hrs after completion of job.

p. During non working hrs vendor to ensure presence of supervisor for controlling any event from locals.

q. PPEs

   a. Helmets
   b. Mask
   c. Jacket
   d. Safety Shoes
   e. First Aid Box etc.

   Above mentioned PPEs shall be available at site 24x7. Zero tolerance on absence of PPEs to the working personnel. No excuse shall be acceptable in this regards.

r. EPR/Scanning shall be done by vendor of whole the route and same shall be submitted to BYPL. This work shall be done by vendor before execution of job.

s. Lifting of cable drums with hydraulic machine, pulling of cable from top end of drum with pulling machine (hydraulic winch) is mandatory.

t. Violation on barricading guideline and safety norms, a fine of Rs.5000 /day shall be imposed. BYPL inspector/engineer in-charge shall be empowered to impose the above penalty.

u. Artwork & Text to be printed on barricading sheet shall be approved by BYPL prior to start of work