



## **Jharkhand Urban Infrastructure Development Company Ltd.**

(A Government of Jharkhand Undertaking under Urban Development & Housing Department)

### **COMPLETE BIDDING DOCUMENT**

Name of Work      Construction of road from Airport to Birsa Chowk via  
-                      Hinoo Chowk (Road No-1) under Ranchi District,  
                            Jharkhand.

**General Manager (W&P)**

**Jharkhand Urban Infrastructure Development Company Ltd.**

**(A Government of Jharkhand Undertaking under UD&HD)**



## **Jharkhand Urban Infrastructure Development Company Ltd.**

(A Government of Jharkhand Undertaking under Urban Development & Housing Department)

### **STANDARD BIDDING DOCUMENT**

#### **PROCUREMENT OF**

#### **CIVIL WORKS**

Name of Work    Construction of road from Airport to Birsa Chowk via  
-                      Hinoos Chowk (Road No-1) under Ranchi District,  
                            Jharkhand.

### **COMPLETE BIDDING DOCUMENT**

**JHARKHAND URBAN INFRASTRUCTURE DEVELOPMENT COMPANY LIMITED**

3<sup>RD</sup> FLOOR, PRAGATI SADAN, KUTCHERY ROAD,  
RANCHI 834 001, JHARKHAND.

PH: +91 651 2243203, E-MAIL: [juidcolimited@gmail.com](mailto:juidcolimited@gmail.com)

CIN: U45200JH2013SGC001752

**e-Procurement Notice****Tender Notice**

**NIT No.: JUIDCO/NIT/AR\_BC/RN1/2017/89**

**Date: - 16.06.2017**

1.	Name of the Work	Construction of road from Airport to Birsa Chowk via Hinoo Chowk (Road No-1) under Ranchi District, Jharkhand.
2.	Mode of Bid Submission	e-tendering ( <a href="http://jharkhandtenders.gov.in">http://jharkhandtenders.gov.in</a> )
3.	Estimated Cost (Rs.)	Rs. 47, 25, 38, 511/- (Rupees Forty Seven Crore Twenty Five Lakh Thirty Eight Thousand Five Hundred Eleven Only)
4.	Tender Fee and Bid Security	Tender document fee: - INR 25,000/- (Twenty-Five Thousand Only) Non-Refundable. Bid Security: INR 47,26,000/- (Rupees forty seven lakhs twenty six thousand Only)
5.	Date / Time of Publication of Tender on Website	20.06.2017, 16.00 Hrs
6.	Last date of submission of Pre bid queries	27.06.2017, 17:00 Hrs
7.	Date of Pre bid meeting	28.06.2017, 11:00 Hrs
8.	Last Date / Time of Bid Submission	10.07.2017, 17:00 Hrs
9.	Last Date / Time of Submission of Tender Fee & EMD	11.07.2017, 17:00 Hrs
10.	Date of Bid Opening	11.07.2017, 17:30 Hrs
11.	Bid Submission Address	Jharkhand Urban Infrastructure Development Company Limited, 3 <sup>rd</sup> Floor, Pragati Sadan, Kutcheri Road, Ranchi – 834001.
12.	Helpline No. of e-Procurement Cell	+91 9431103781, + 91 9470360204, + 91 7781011400, +91 8102233340

**Note: Only e-Tenders will be accepted.**

Further details can be seen on website <http://jharkhandtenders.gov.in>

Sd/-  
General Manager (W&P)  
JUIDCO Ltd., Ranchi

# **INVITATION FOR BID**

## **(IFB)**

# Jharkhand Urban Infrastructure Development Company Limited

## INVITATION FOR BIDS (IFB)

### NATIONAL COMPETITIVE BIDDING

**e-Tender Reference No.– JUIDCO/NIT/AR\_BC/RNI/2017/89**

**Date:- 16.06.2017**

The undersigned, on behalf of the JUIDCO invites item rate bids for the work mentioned in table below through e-Procurement from eligible and approved Contractors, registered in appropriate class with Urban Development & Housing Department, Government of Jharkhand. Those Contractors who are not registered with Urban Development & Housing Department, Government of Jharkhand are also permitted to take part in tender process. In such case the Contractor should be registered in any State Government/ Central Government/ Public Sector Unit/undertaking in appropriate class in Road Construction. However such Contractors in the event of award of work will perforce have to get registered with Urban Development & Housing Department, Government of Jharkhand within a period of Two (2) Months from date of Award of Contract. The bid shall be submitted online in the Website <http://jharkhandtenders.gov.in>. The bidder(s) should have necessary portal enrolment with their own Digital Signature Certificate:

Sl. No.	Name of the Work	Approximate Value of work (Rs.)	Bid Security * (Rs.)	Cost of Document (Rs.)	Period of Completion
1	2	3	4	5	6
1	Construction of road from Airport to Birsa Chowk via Hinoo Chowk (Road No-1) under Ranchi District, Jharkhand.	47.25 Crores	47.26 Lakhs	25,000/- (Rupees Twenty Five Thousand Only)	24 Months

2. Period of availability of tenders online/ date & time of bidding online / last date of seeking clarification / date of opening of tender papers are as given below.

Sl no	Procurement officer	Place of opening	Availability of tender online (date & time)		Date & time of opening of technical bid
			From	To	
1	2	3	4	5	7
1	General Manager (W&P), JUIDCO Ltd., Ranchi	E-Procurement cell, JUIDCO Ltd., 3rd Floor, Pragati Sadan (RRDA Building), Kutcheri Chowk, Ranchi, 834001, Jharkhand	<b>20.06.2017 16:00 Hrs</b>	<b>10.07.2017 17:00 Hrs</b>	<b>11.07.2017 17:30 Hrs</b>

- Cost of bidding document for a non-refundable fee as indicated shall be in the form of demand draft of any scheduled Bank payable at **Ranchi in favor of “Managing Director, JUIDCO Ltd Ranchi”**.
- Bids must be accompanied by scanned copy of security amount specified for the work in the table, payable at **Ranchi** and drawn in favor of **“Managing Director, JUIDCO Ltd Ranchi”** Bid security will have to be in anyone of the forms as specified in the bidding document and shall have to be valid for 45 days beyond the validity of the bid.

5. Cost of bidding document and security money shall be deposited in the office of **Managing Director, JUIDCO Ltd** (JUIDCO Ltd, 3<sup>rd</sup> Floor, Pragati Sadan (RRDA Building), Kutchery Chowk, Ranchi, 834001, Jharkhand); on all working days till **11.07.2017, 17:00 Hrs**; either by registered post / speed post or by hand. Only those applications will be entertained whose cost of Bidding documents and security money is received on or before **11.07.2017, 17:00 Hrs** at JUIDCO Ltd Ranchi. **JUIDCO Ltd. Ranchi** will not be held responsible for postal delay, if any, in the delivery of the document or non-receipt of the same.
6. Bids shall be submitted online on the website **<http://jharkhandtenders.gov.in>**
7. A pre-bid meeting will be held on **28.06.2017 at 11:00 Hrs** at the office of **Managing Director, JUIDCO Ltd**. JUIDCO Ltd, 3<sup>rd</sup> Floor, Pragati Sadan (RRDA Building), Kutchery Chowk, Ranchi, 834001, Jharkhand. To clarify the issues and to answer queries on any matter that may be raised at that stage as stated in 'Instructions to Bidders' of the bidding document. All such queries must be submitted on mail to us at **[juidcolimited@gmail.com](mailto:juidcolimited@gmail.com)** at least two working days prior to pre bid conference.
8. Scanned copies of sales Tax Registration certificate, PAN card, & Letter of Registration as contractor, shall be uploaded by the tenderer or otherwise bid may be rejected.
9. The work is to be completed in time, otherwise penalty for non –completion of work in time shall be imposed as stated in the Bid Document. Provision of Bonus for early completion of work is also incorporated in the bid document.
10. Bidders must provide the contact details of their Banker's for any verification/references by the procurement officer, if contacted by the JUIDCO Ltd. Ranchi.
11. The contractor is supposed to return the empty bitumen drum and empty cement bag to the nearest godown. In case of failure to return the used contained in good condition, panel rate @ Rs. 180/- per Bitumen Drum & Rs. 3.50/ per empty bag will be recovered from the contractor's bill.

**General Manager (W&P)**  
**Jharkhand Urban Infrastructure Development Company Limited**  
**Ranchi**

**SECTION 1**  
**INSTRUCTIONS TO BIDDERS**  
**(ITB)**

## Section 1: Instructions to Bidders

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## **A. GENERAL**

### **1. Scope of Bid**

- 1.1 The Employer (named in appendix in appendix to ITB) invites bids for the construction of works (as defined in these documents and referred to as “the works”) detailed in the table, given in IFB. The bidder may submit bids for any or all of the works detailed in the table given in IFB.
- 1.2 The successful bidder will be expected to complete the works by the intended completion date specified in the Contract data.
- 1.3 Throughout these bidding documents, the terms ‘bid’ and ‘tender’ and their derivatives (bidder/tenderer, bid/tender, bidding/tendering etc.) are synonymous.

### **2. Source of Funds**

The expenditure on this project will be met from the budget of Govt. of Jharkhand.

### **3. Eligible Bidders**

- 3.1 This invitation for Bids is open to all bidders.
- 3.2 All bidders shall provide in section 2. Forms of Bid and Qualification Information, a statement that the Bidder is neither associated, nor has been associated, directly or indirectly, with the Consultant or any other entity that has prepared the design, specifications and other documents for the Project or being proposed as Project Manager for the Contract. A firm that has been engaged by the Employer to provide consulting services for the preparation or supervision of the works, and any of its affiliates, shall not be eligible to bid.

### **4. Qualification of the Bidder**

- 4.1 All bidders shall provide in Section 2, Forms of Bid and Qualification Information a preliminary description of the proposed work method and schedule including drawings and charts, as necessary. The proposed methodology should include programme of construction backed with equipment planning and deployment duly supported with board calculations and quality assurance procedures proposed to be adopted justifying their capability of execution and completion of work as per technical specification, within stipulated period of completion.
- 4.2\* In the event that Pre-qualification of potential bidders has been undertaken, only bids from pre-qualified bidders will be considered for award of Contract. These qualified bidders should submit with their bids any information updating their original pre-qualification applications or alternatively, confirm in their bids that the originally submitted pre-qualification confirmation remains essentially correct as of date of bid submission. The update or confirmation should be

provided in Section 2. A copy of the original pre-qualification application and the letter of prequalification should also be furnished. Within the updated information, the bidder must continue to be qualified in accordance with the criteria laid down in the pre-qualification document. All bidders shall also furnish the following information in Section 2.

*\* Delete, if post – qualification is to be carried out.*

- (i) Evidence of access to or credit facilities (minimum 10% or estimated cost) certified by the bankers.
- (ii) Undertaking that bidder would be able to invest a minimum of cost upto 25% of the contract value of work, during implementation of contract.
- (iii) Proposals, if any, for sub-contracting of elements of work, costing more than 10% of the bid amount.
- (iv) Power of Attorney.

4.3\* If the Employer has not undertaken pre-qualification of potential bidders, all bidders shall include the following information and documents with their bids in Section 2.

- (a) Copies of original documents defining the construction or legal status, place of registration, and principal place of business, written power of attorney of the signatory of the Bid to commit the Bidder.
- (b) Total monetary value of construction work performed for each of the last five years.
- (c) Qualification in works of a similar nature and size for each of the last five years, and details of works underway of contractually committed: and clients who may be contacted for further information on these contracts.
- (d) Major items of construction equipment proposal to carry out the Contract.
- (e) Qualifications and experience of key site management and technical personal proposed for contract.
- (f) Reports on the financial standing of the Bidder, such as profit and loss statements and auditor's reports for the past five years.
- (g) Evidence of access to line (s) of credit availability of other financial resources facilities (10% of contract value), certified by the Bankers (not more than 3 months old).
- (h) Undertaking that the bidder will be able to invest a minimum cash upto 25% of contract value of work, during implementation of work.

- (i) Authority to seek references from the Bidder's bankers.
- (j) Information regarding any litigation, current or during the last five years, in which the Bidder is involved, the parties concerned and disputed amount.

*\* Delete, if pre-qualification is to be carried out.*

- (k) proposal for sub-contracting component of the works amounting to more than 10 percent of the Bid Price (for each, the qualifications and experience of the identified sub-contractor in the relevant filed should be annexed): and
- (l) the proposed methodology and programme of construction, backed with equipment planning and deployment, duly supported with broad calculation and quality control procedures proposed to be adopted, justifying their capability of execution and completion of the work as per technical specifications within stipulated period of completion as per milestones (for all contracts over Rs. 2.5 Crore)

4.4 Bids from Joint ventures are not acceptable.\*

**Or**

Bids from pre-qualified firms or pre-qualified joint ventures only will be acceptable.\*\*

4.4.1 Joint Ventures partners would be limited to three (including the lead partner)

4.4.2 One of the partners, who is responsible for performing a key in contract (lead partner of the JV) management or is executing a major component of the proposed contract, shall be nominated as being in charge during Bidding periods and in the event of successful Bid, during contract execution. The partner in charge shall be authorized to incur liabilities and receive instructions for and on behalf of the partner (s) of the Joint Venture. This authorization shall be evidenced by submitting a power of attorney signed by legally authorized signatories of all partners.

4.4.3 All the partners of Joint Ventures shall be, jointly and severally liable, during the Bidding process and for the execution of the contract in accordance with the contract terms, and a statement of this affect shall be included in the authorization. The Bid shall be signed so as to legally bind all the partners, jointly and severally.

Bid security and performance guarantee, as required will be furnished by the lead partner and Joint Ventures partner(s) out of their accounts in proportion to their participation in Joint Ventures.

4.4.4 Qualifying criteria for Joint Ventures

Joint Ventures must comply with the following requirements: -

(a) the Joint Ventures must satisfy collectively the criteria for this purpose the following data of each number of the Joint Ventures may be added together to meet the collective qualifying criteria.

- (i) Annual Turnover {Cl. 4.5 (A) (a) of ITB }
- (ii) Particular Construction Experience. {Cl. 4.5 (A) (b) of ITB }
- (iii) Personal Capabilities. (Annexure II)
- (iv) Equipment Capabilities. (Annexure I)
- (v) Financial Capabilities. {Cl. 4.3 (g) & Cl. 4.3 (h) of ITB }

*\* To be deleted for projects costing Rs. 20 Crores or more*

*\*\* To be deleted for projects costing less than Rs. 50 Crores.*

(b) The lead partner shall meet the following qualifying criteria in proportion to the partnership in JV but not less than 50%.

- (i) Annual Turnover. {Cl. 4.5 (A) (a) of ITB }
- (ii) Particular Capabilities Experience. {Cl. 4.5 (A) (b) of ITB }
- (iii) Financial Capabilities. {Cl. 4.3 (g) & 4.3 (h) of ITB }

(c) Other partner shall meet the following qualifying criteria in proportion to the partnership in JV but not less than 25%.

- (i) Annual Turnover. {Cl. 4.5 (A) (a) of ITB }
- (ii) Particular Construction Experience. {Cl. 4.5 (A) (b) of ITB }
- (iii) Financial Capabilities. {Cl. 4.3 (g) & 4.3 (h) of ITB }

4.4.5 A copy of the Joint Venture Agreement (JVA) entered into between the partner shall be submitted with the application. Alternatively, a letter of Intent to execute a JVA application together with a copy of the proposed agreement. The JVA shall include among other things a Joint Venture's objectives and proposed management structure, the contribution of each partner to the Joint Venture operation, the commitment of the partner to Joint Venture in the event of the default or withdrawal of any partner an arrangement for providing the required indemnities:

- (i) Stepping into the shoes of the existing partner(s) of JV with all liabilities of the existing partners from the beginning of the contract.
- (ii) With the prior approval of the employer.
- (iii) Notwithstanding demarcation or allotment of work between two JV partner(s), JV shall be liable for non-performance of the whole contract irrespective of their demarcation or shared of work.

In case of successful Bid being accepted by employer the payments under the contract will only be made to the JV not to the individual partner(s).

4.4.6 Joint Venture Agreement shall contain a Clause to the effect that, there shall be a separate JV Bank Account (distinct from the Bank Account of the individual Partners) to which the individual partner shall contribute their share/or working capital.

**4.5 A To qualify for award of the contract, each bidder in its name should have in the last five years as referred to in Appendix.**

- (a) achieved a minimum annual financial turnover (in all classes of civil engineering construction works only) amount indicated in Appendix in any one year (usually not less than one and a half times the estimated cost of the project);
- (b) satisfactorily completed (not less than 90% of contract value) as a prime contractor (or as a nominated subcontractor, where the subcontract involved execution of all main items of work described in the bid document, provided further that all other qualification criteria are satisfied) at least one similar work of value not less than amount indicated in Appendix to ITB (usually not less than 50% of estimated value of contract of last five years);
- (c) Executed in any one year, the minimum quantities of the following items of work as indicated in Appendix of ITB.
  - i) **Earthwork - \_\_\_\_\_ Cu.m**
  - ii) **GSB - \_\_\_\_\_ Cu.m**
  - iii) **WBM/WMM - \_\_\_\_\_ Cu.m**
  - iv) **Bituminous Work (BM/DBM/BC) - \_\_\_\_\_ Cu.m**
  - v) **RCC/PSC/PQC Concrete – \_\_\_\_\_ Cu.m.**
  - vi) **HYSD Steel - \_\_\_\_\_ MT.**  
(Usually 50% of the estimated quantity)
- (d) \*The Contractor or his identified sub-contractor should possess required valid electrical license for executing the building electrification works and should have executed similar electrical works for a minimum amount as indicated in Appendix in any one year.
- (e) \*The contractor or his identified sub-contractor should possess required valid license for executing the water supply/sanitary engineering works and should have executed similar water supply/ sanitary engineering works for a minimum amount as indicated in Appendix in any one year.

**4.5 B. Each bidder should further demonstrate**

- (a) Availability (either owned or leased or by procurement against mobilization advances) of the following key and critical equipment for this work.

NOTE: (To be indicated for bids valued over Rs. 2.5 Crore) Based on the studies, carried out by the Engineer the minimum suggested Major equipment to attain the completion of works in accordance with the prescribed construction schedule are shown in the Annexure-I.

*\* Delete, if not applicable.*

The bidders should, however, undertake their own studies and furnish with their bid, a detailed construction planning and methodology supported with layout and necessary drawings and calculations (detailed) as stated in Clause 4.3 (C) above to allow the employer to review their proposals. The numbers, types and capacities of each plant/equipment shall be shown in the proposals along with the cycle time for each operation for the given production capacity to match the requirements.

- (b) availability for this work of personnel with adequate experience as required as per Annexure-II.
- (c) Liquid assets and/or availability of credit facilities of no less than amount indicated in Appendix to ITB (credit lines/letter of credit/certificates from Banks for meeting the funds requirements etc. usually the equivalent of the estimated cash flow for 3 months in peak construction period).

**C. To qualify for a package of contracts made up of this and other contracts for which bids are invited in the IFB**, the bidder must demonstrate having experience and resources sufficient to meet the aggregate of the qualifying criteria for the individual contracts.

4.6 Sub-contractors experience and resources shall not be taken into account in determining the bidder's compliance with the qualifying criteria except to the extent stated in 4.5 (A) above.

4.7 Bidders who meet the minimum qualification criteria will be qualified only if their available bid capacity is more than the total bid value. The available bid capacity will be calculated as under.

**Assessed Available Bid Capacity = (A\*N\*2-B)**

Where

A = Maximum value of civil engineering works executed in any one year during the last five years (updated to the level of the year indicated in Appendix to ITB) taking into account the completed as well as works in progress.

N = Number of years prescribed for completion of the works for which bid are invited.

B = Value (updated to the price level of the year indicated in Appendix to ITB) of existing commitments and on-going works to be completed during the next 2 Years (period of completion of the works for which bids are invited)

*Note:* The statements showing the value of existing commitments and on-going works as well as the stipulate period of completion remaining for each of the works listed should be countersigned by the engineer in charge, not below the rank of an Executive Engineer or equivalent.

4.8 Even though the bidders meet the above qualifying criteria, they are subject to be disqualified if they have:

- made misleading or false representations in the forms, statements and attachments in proof of the qualification requirements; and/or
- record of poor performance such as abandoning the works, not properly completing the contract, inordinate delays in completion, litigation history, or financial failures etc.; and/or
- participated in the previous bidding for the same work and had quoted unreasonably high bid prices and could not furnish rational justification to the employer.

## **5. One Bid per Bidder**

5.1 Each bidder shall submit only one bid for one package. A bidder who submits or participates in more than one Bid (other than as a subcontractor or in cases of alternatives that have been permitted or requested) will cause all the proposals with the Bidder's participation to be disqualified.

## **6. Cost of Bidding**

6.1 The bidder shall bear all costs associated with the preparation and submission of his Bid, and the Employer will in no case be responsible and liable for those costs.

## **7. Site Visit**

7.1 The Bidder, at the Bidder's own responsibility and risk is encouraged to visit and examine the site of works and its surroundings and obtain all information that may be necessary for preparing the Bid and entering into a contract for construction of the works. The costs of visiting the site shall be at the Bidder's own expense.

## **B. BIDDING DOCUMENTS**

### **8. Content of Bidding Documents**

8.1 The set of bidding documents comprises the documents listed below and addenda issued in accordance with Clause 10:

Section	Particulars	Volume No.
	Invitation for Bids	I
1	Instruction for Bidders	
2	Qualification Information, and other forms	
3	Conditions of Contract	
4	Contract Data	
5	Technical Specifications	II
6	Form of Bid	III
7	Bill of Quantities	
8	Securities and other forms	
9	Drawings	IV
10	Documents to be furnished by bidder	V

8.2 One copy of each of the Volumes I, II, III and IV will be issued to the bidder. Documents to be furnished by the bidder in compliance to section 2 will be prepared by him and furnished as Volume V in two parts (refer clause 12).

8.3 The bidder is expected to examine carefully all instructions conditions of contract, contract data forms, terms, technical specification, Bill of Quantities, forms, Annexes and drawings in the Bid Document. Failure to comply with the requirements of Bid Documents shall be at the bidder's own risk, Pursuant to clause 26 hereof, bids which are not substantially responsive to the requirements of the Bid Documents shall be rejected.

### **9. Classification of Bidding Documents**

9.1 A prospective bidder requiring any clarification of the bidding documents may notify the Employer in writing or by cable (hereinafter "Cable" includes telex and facsimile) at the Employer's address indicated in the invitation to bid. The Employer will respond to any request for clarification which he received earlier than 15 days prior to the deadline for submission of bids. Copies of the Employer's response will be forwarded to all purchasers of the bidding documents, including a description of the enquiry but without identifying its source.



## **9.2 Pre-bid meeting**

- 9.2.1 The bidder or his official representative is invited to attend a pre-bid meeting which will take place at the address, venue, time and date as indicated in Appendix to ITB.
- 9.2.2 The purpose of the meeting will be to clarify issues and to answer questions on any matter that may be raised at that stage.
- 9.2.3 The bidder is required to submit any questions in writing or by cable to reach the employer not later than one week before the meeting.
- 9.2.4 Minutes of the meeting including the text of the questions raised (without identifying the source of enquiry) and the responses given will be transmitted without delay to all purchasers of the bidding documents. Any modification of the bidding documents listed in sub-clause 8.1 which may become necessary as a result of the pre-bid meeting shall be made by the employer exclusively through the issue of an Addendum pursuant to clause 10 and not through the minutes of the pre-bid meeting.
- 9.2.5 Non-attendance at the pre-bid meeting will not be a clause for disqualification of bidder.

## **10. Amendment of Bidding Documents**

- 10.1 Before the deadline for submission of bids, the employer may modify the bidding documents by issuing addenda.
- 10.2 Any addendum thus issued shall be part of the bidding documents and shall be communicated in writing or by cable to all the purchasers of the bidding documents. Prospective bidders shall acknowledge receipt of each addendum in writing or by cable to the employer. The employer will assume no responsibility for postal delays.
- 10.3 To give prospective bidders reasonable time in which to take an addendum into account in preparing their bids, the employer may, at his discretion, extend as necessary the deadline for submission of bids, in accordance with Sub-Clause 20.2 below.

## **C. PREPARATION OF BIDS**

### **11. Language of the Bid**

- 11.1 All documents relating to the bid shall be in the English language.

### **12. Documents Comprising the Bid**

The bid to be submitted by:

- 12.1 The bidder as volume V of the bid document (refer Clause 8.1) shall be in two separate parts.

**Part I, shall be named “Technical Bid” and shall comprise.**

- (i) Bid security in the form specified in section 8.
- (ii) Qualification information and supporting documents as specified in section 2.
- (iii) Certificates, undertaking affidavits as specified in section 2.

- (iv) Any other information pursuant to Clause 4.2 of these instructions.
- (v) Undertaking that the bid shall remain valid for the period specified in Clause 15.1.

**Part II shall be named “Financial Bid” and shall comprise.**

- (i) Form of Bid as specified in section 6.
  - (ii) Priced Bill of Quantities for items specified in section 7, each part will be separately sealed and marked in accordance with the sealing and Marking Instructions in Clause 19.
- 12.2 The bidder shall prepare two copies of the bid, marking them ‘Original’ and ‘Copy’ respectively.
- 12.3 Following documents, which are not submitted with the bid, will be deemed to be part of the bid.

Section	Particulars	Volume No.
	Invitation of Bids (IFB)	Volume I
1	Instruction to Bidders	
3	Conditions of Contract	
4	Contract Data	
5	Specifications	Volume II
8	Drawings	Volume IV

**13 Bid Prices**

- 13.1 The contract shall be for the whole works as described in Sub-Clause 1.1. based on the priced Bill of Quantities submitted by the Bidder.
- 13.2 The bidder shall fill in rates and prices and line item total (both in figures and words) for all items of the Works described in the Bill of Quantities along with total bid price (both in figures and words) Items for which no rate or price is entered by the bidder will not be paid for by the Employer when executed and shall be deemed covered by the other rates and prices in the Bill of Quantities. Corrections, if any, shall be made by crossing out, initialing, dating and rewriting.
- 13.3 All duties, taxes, and other levels payable by the contractor under the contract, or for any other cause shall be included in the rates, prices and total Bid Price submitted by the Bidder.
- 13.4 The rates and prices quoted by the bidder are subject to adjustment during the performance of the Contract in accordance with the provisions of Clause 47 of the Conditions of Contract (For contracts more than 12 months period.)

**14. Currencies of Bid and Payment**

- 14.1 The unit rates and the prices shall be quoted by the bidder entirely in Indian rupees. All payment shall be made in Indian Rupees.

## **15. Bid Validity**

- 15.1 Bids shall remain valid for a period not less than 120 days after the deadline date for bid submission specified in Clause 20. A bid valid for a shorter period shall be rejected by the employer as non-responsive. In case of discrepancy in bid validity period between that given in the undertaking pursuant to clause 12.1 (v) and the Form of Bid submitted by the bidder, the latter shall be deemed to stand corrected in accordance with the former and the bidder has to provide for any additional security that is required.
- 15.2 In exceptional circumstances, prior to expiry of the original time limit, the Employer may request that the bidders may extend the period of validity for a specified additional period. The request and the bidders' responses shall be made in writing or by cable. A bidder may refuse the request without forfeiting his bid security. A bidder agreeing to the request will not be required or permitted to modify his bid, but will be required to extend the validity of his bid security for a period of the extension, and in compliance with Clause 16 in all respects.

## **15.3 Deleted**

- 15.4 Bid evaluation will be based on the bid prices without taking into consideration the above correction.

## **16. Bid Security**

- 16.1 The Bidder shall furnish, as part of his Bid, a Bid security in the amount as shown in column 4 of the table of IFB for this particular work. This bid security shall be in favor of Employer as named in Appendix to ITB and may be in one of the following forms:
- (a) Receipt in Challan of cash deposit in the Govt. treasury in India.
  - (b) Deposit-at-call receipt from any scheduled Indian bank from any of the branches of SBI/Nationalized/Scheduled Bank situated within the State of Jharkhand approved by the Reserve bank of India.
  - (c) Indian Post Office/National Savings Certificates duly endorsed by the competent postal authority in India.
  - (d) Bank Guarantee from any scheduled Indian Bank from any of the branches of SBI/Nationalized/scheduled Bank situated within the state of Jharkhand in the format given in Section 8.
  - (e) Fixed deposit receipt, a certified cheque or an irrevocable letter of credit, issued by any scheduled Indian Bank approved by the Reserve Bank of India.

- 16.2** Bank guarantees (and other instruments having fixed validity) issued as surety for the bid shall be valid for 45 days beyond the validity of the bid.
- 16.3** Any bid not accompanied by an acceptable Bid Security and not secured as indicated in Sub-Clauses 16 and 16.2 above shall be rejected by the employer as non-responsive.
- 16.4** The Bid security of unsuccessful bidders will be returned within 28 days of the end validity period specified in sub-Clause 15.1.
- 16.5** The Bid security of the successful bidder will be discharged when the bidder has signed the Agreement and furnished the required Performance Security.
- 16.6** The Bid security may be forfeited.
- (a) If the Bidder withdraws the Bid after Bid opening during the period of Bid validity;
  - (b) If the Bidder does not accept the correction of the Bid Price, pursuant to Clause 27; or
  - (c) In the case of a successful Bidder, if the Bidder fails within the specified time limit to
    - (i) Sign the Agreement; or
    - (ii) Furnish the required Performance Security.

**17. Alternative proposals by Bidders**

- 17.1** Bidders shall submit offers that fully comply with the requirements of the bidding documents, including the conditions of contract (including mobilization advance or time for completion), basic technical design as indicated in the drawing and specifications. Conditional offer or alternative offers will not be considered further in the process of tender evaluation.

**18. Format and signing of Bid**

- 18.1** The bidder shall prepare one original and one copy of the documents comprising the bid as described in Clause 12 of these Instructions to Bidders, bound, with the volume containing the “Technical Bid” and “Financial bid” in separate parts and clearly marked “**ORIGINAL**” and “**COPY**” as appropriate. In the event of discrepancy between them, the original shall prevail.
- 18.2** The original and copy of the Bid shall be typed or written in indelible ink and shall be signed by a person or persons duly authorized to sign on behalf of the Bidder, pursuant to sub-Clauses 4.3. All pages of the bid where entries or amendments have been made shall be initialed by the person or persons signing the bid.
- 18.3** The Bid shall contain no alterations or additions, except those to comply with instructions issued by the Employer or as necessary to correct errors made by the bidder, in which case such corrections shall be initialed by the persons signing the bid.

**D. SUBMISSION OF BIDS**

## **19. Sealing and Marking of Bids**

19.1 The Bidder shall seal the original and copy of the Bid in separate envelopes. Duly making the envelopes as “**ORIGINAL**” and “**COPY**”. These two envelopes (called as inner envelopes) shall then be put inside on outer envelope. Each set of the inner envelope marked “**ORIGINAL**” and “**COPY**” shall contain within it two separate sealed envelopes marked “**Technical Bid**” and “**Financial Bid**” with additional markings as follows:

- Original or Copy, as the case may be

- Technical Bid to be opened on \_\_\_\_\_ at **17:30 Hrs**(date of Technical Bid opening) in the presence of Evaluation committee.

- Financial Bid not to be opened except with the approval of Evaluation Committee. The contents of Technical and financial Bids will be as specified in clause 12.1

19.2 The inner, outer, and separate envelopes containing technical and financial Bids shall

- (a) be addressed to the Employer at the address given in Appendix to ITB

- (b) bear the identification as indicated in Appendix to ITB

19.3 In addition to the identification required in sub-Clauses 19.1 and 19.2, each of the envelopes shall indicate the name and address of the bidder to enable the bid to be returned unopened in case it is declared late. Pursuant to Clause 21, or the Evaluation Committee declares the bid as non-responsive pursuant to Clause 23.

19.4 If the outer envelope is not sealed and marked as above, the Employer will assume no responsibility for the misplacement or premature opening of the bid.

## **20. Deadline for Submission of the Bids**

20.1 Complete Bids (including Technical and Financial) must be received by the Employer at the address specified above not later than the date indicated in appendix. In the event of the specified date for the submission bids declared a holiday for the employer, the bids will be received up to the appointed time on the next working day.

20.2 The Employer may extend the deadline for submission of bids by issuing an amendment in accordance with Clause 10, in which case all rights and obligations of the employer and the bidders previously subject to the original deadline will then be subject to the new deadline.

## **21. Late Bids.**

21.1 Any Bid received by the Employer after the deadline prescribed in Clause 20 will be returned to the bidder.

## **22. Modification and Withdrawal of Bids**

- 22.1 Bidders may modify or withdraw their bids by giving notice in writing before the deadline prescribed in clause 20 or pursuant to Clause 23.
- 22.2 Each Bidder's modification or withdrawal notice shall be prepared, sealed, marked, and delivered in accordance with clause 18 & 19, with the outer and inner envelopes additionally marked "**MODIFICATION**" or "**WITHDRAWAL**", as appropriate.
- 22.3 No bid may be modified after the deadline for submission of Bids except in pursuance of clause 23.
- 22.4 Withdrawal or modification of a Bid between the deadline for submission of bids and the expiration of the original period of bid validity specified in clause 15.1 above or as extended pursuant to clause 15.2 may result in the forfeiture of the Bid security pursuant to Clause 16.

## **E. BID OPENING AND EVALUATION**

### **23. Bid Opening**

- 23.1 The Employer will open all the Bids received (except those received late), including modifications made pursuant to Clause 22, in the presence of the Bidders or their representatives who choose to attend at time, date and the place specified in appendix in the manner specified in clause 20 and 23.3 In the event of the specified date of Bid opening being declared a holiday for the Employer, the Bids will be opened at the appointed time and location on the next working day.
- 23.2 Envelopes marked "WITHDRAWAL" shall be opened and read out first Bids for which are acceptable notice of withdrawal has been submitted pursuant to clause 22 shall not be opened.
- 23.3 The envelope containing "Technical bid" shall be opened. The amount, form and validity of the bid security furnished with each bid will be announced. If the bid security furnished does not conform to the amount and validity period as specified in the Invitation for Bid (ref. Column 4 and paragraph 3) and has not been furnished in the form specified in Clause 16, the remaining technical bid and sealed financial bid will be returned to the bidder.
- 23.4. (i) Subject to confirmation of the bid security by the issuing bank, the bids accompanied with valid security will be taken up for evaluation with respect to the Qualification Information and other information furnished in Part I the Bid Pursuant to clause 12.1.
- (ii) After receipt of confirmation of the bid security, the bidder will be asked in writing (usually within 10 days of opening of the technical Bid) to clarify or modify his technical bid, if necessary, with respect to any rectifiable defects.
- (iii) The bidders will respond in not more than 7 days of issue of the clarification letter, which will also indicate the date, time and venue of opening of the Financial Bid (usually on the 21<sup>st</sup> day of opening of the technical bid)

- (iv) Immediately (usually within 3 or 4 days), on receipt of these clarifications the evaluation Committee will finalize the list of responsive bidders whose financial bids are eligible for consideration.
- 23.5 If, as a consequence of the modifications carried out by the bidder in response to sub-clause 23.4 the bidders desire to modify their financial bid, they will submit the modification in separate sealed envelope so as to reach the employer's address (refer sub-clause 19.2) before the opening of the financial bid as intimated in the clarification letter (refer sub-clause 23.4). The envelope shall have clear making "MODIFICATION TO FINANCIAL BID, not to be opened except with the approval of the evaluation committee".
- 23.6 At the time of opening of "Financial Bid" the names of the bidders were found responsive in accordance with Clause 23.4(iv) will be announced. The bids of only these bidders will be opened. The remaining bids will be returned to the bidders unopened. The responsive Bidders names, the bid prices, the total amount of each bid, any discounts, Bid Modifications and withdrawals, and such other details as the Employer may consider appropriate, will be announced by the employer at the opening. Any Bid price or discount which is not read out and recorded will not be taken into account in Bid Evaluation.
- 23.7 In case bids are invited in more than one package, the order for opening of the "Financial Bid" shall be that in which they appear in the "Invitation for Bid".
- 23.8 The Employer shall prepare minutes of the Bid opening, including the information disclosed to those present in accordance with sub-clause 23.6.
- 24. Process to be Confidential**
- 24.1 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 until the award to the successful Bidder has been announced. Any effort by a Bidder to influence the Employer's processing of Bids or award decisions may result in the rejection of his Bid.
- 25. Clarification of Financial Bids**
- 25.1 To assist in the examination, evaluation, and comparison of Bids, the Employer may, at his discretion, ask any Bidder for clarification if his Bid, including breakdowns of unit rates. The request for clarification and the response shall be in writing or by cable, but no change in the price of substance of the Bid shall be sought, offered, or permitted except as required to confirm

the correction of arithmetic errors discovered by the Employer in the evaluation of the Bids in accordance with Clause 27.

- 25.2 Subject to sub-clause 25.1, no Bidder shall contact the employer on the any matter relating to his bid from the time of the bid opening to the time the contract is awarded. If the bidder wishes to bring additional information to the notice of the employer, it should do so in writing.
- 25.3 Any effort by the Bidder to influence the employer in the Employer's bid evaluation, bid comparison or contract award decisions may result in the rejection of the Bidders' bid.

## **26. Examination of Bids and Determination of Responsiveness**

- 26.1 During the detailed evaluation of "Technical Bids", the Employer will determine whether each Bid (a) meets the eligibility criteria defined in Clause 3 and 4; (b) has been properly signed; (c) is accompanied by the required securities and; (d) is substantially responsive to the requirements of the Bidding documents. During the detailed evaluation of the "Financial Bid", the responsiveness of the bids will be further determined with respect to the remaining bid conditions, i.e., priced bill of quantities, technical specifications, and drawings.
- 26.2 A substantially responsive "Financial Bid" is one which conforms to all the terms, conditions, and specifications of the Bidding documents, without material deviation or reservation. A material deviation or reservation is one (a) which affects in any substantial way the scope, quality, or performance of the Works; (b) which limits in any substantial way, inconsistent with the Bidding documents, the Employer's rights or the Bidder's obligations under the Contract; or (c) whose rectification would affect unfairly the competitive position of other Bidders presenting substantially responsive Bids.
- 26.3 If a "Financial Bid" is not substantially responsive, it will be rejected by the Employer, and may not subsequently be made responsive by correction or withdrawal of the non-conforming deviation or reservation.

## **27. Correction of Errors**

- 27.1 "Financial Bids" determined to be substantially responsive will be checked by the employer for any arithmetical errors. Errors will be corrected by the employer as follows:
- (a) Where there is a discrepancy between the rates in figures and in word, the rate in words will govern; and
- (b) Where there is a discrepancy between the unit rate and the line item total resulting from multiplying the unit rate by the quantity, the unit rate as quoted will govern.



27.2 The amount stated in the “financial Bid” will be corrected by the employer in accordance with the above procedure and the bid amount adjusted with the concurrence of the Bidder in the following manner:

- (a) If the Bid price increases as a result of these corrections, the amount as stated in the bid will be the ‘bid price’ and the increase will be treated as rebate;
- (b) If the bid price decrease as a result of the corrections, the decreased amount will be treated as the ‘bid price’. Such adjusted bid price shall be considered as binding upon the Bidder. The Bidder does not accept the corrected amount the Bid will be rejected, and the Bid securing may be forfeited in accordance with Sub-clause 16.6(b).

**28. Deleted**

**29. Evaluation and Comparison of Financial Bids**

29.1 The employer will evaluate and compare only the Bids determined to be substantially responsive in accordance with Sub-Clause 26.2.

29.2 In evaluating the Bids, the Employer will determine for each Bid the evaluated Bid Price by adjusting the Bid Price as follows:

- (a) Making any corrections for errors pursuant to clause 27; or
- (b) Making an appropriate adjustments for any other acceptable variations, deviations; and
- (c) Making appropriate adjustments to reflects discounts or other price modifications offered in accordance with Sub-Clause 23.6.

29.3 The Employer reserves the right to accept or reject any variation or deviation. Variations and deviations and other factors, which are in excess of the requirements of the bidding documents or otherwise result in unsolicited benefits for the Employer shall not be taken into account in Bid evaluation.

29.4 The estimated effect of the price adjustment conditions under Clause 47 of the Conditions of Contract, during the period of implementation of the Contract, will not be taken into account in Bid evaluation.

29.5 If the Bid on the successful Bidder is seriously unbalanced in relation to the engineer’s estimate of the cost of work to be performed under the contract, the employer may require the bidder to produce detailed price analyses for any or all items of all items of the Bill of Quantities. To demonstrate the internal consistency of those prices with the construction methods and schedule proposed. After evaluation of the price analyses, the employer may require that the amount of the performance security set forth in clause 34 be increased at the expense of the successful Bidder to a level

sufficient to protect the Employer against financial loss in event of default of the successful Bidder under the Contract.

- 29.6 A bid which contains several items in the Bill of Quantities which are unrealistically priced low and which cannot be substantiated satisfactorily by the bidder, may be rejected as non-responsive.

**30. Deleted**

**F. AWARD OF CONTRACT**

**31. Award of Criteria**

- 31.1 Subject to clause 32, the Employer will award the Contract to the Bidder whose Bid has been determined.
- (i) to be substantially responsive to the bidding documents and who has offered the lowest evaluated bid Price; and
  - (ii) to be within the available bid capacity adjusted to account for his bid price which is evaluated the lowest in any of the packages opened earlier than the one under consideration. In no case, the contract shall be awarded to any bidder whose available bid capacity is less than the evaluated bid price, even if the said bidder is the lowest evaluated bid. The contract will in such cases be awarded to the next lowest bidder on his evaluated bid price.

**32. Employer's Right to Accept any Bid and to reject any or all Bids**

- 32.1 Notwithstanding Clause 31, the Employer reserves the right to accept or reject any Bid to cancel the bidding process and reject all bids, at any time prior to the 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 Employer's action.

**33. Notification of Award and Signing of Agreement**

- 33.1 The Bidder whose bid has been accepted will be notified of the award by the employer prior to expiration of the Bid validity period by cable, telex or facsimile confirmed by registered letter. This letter (hereinafter and in the Conditions of contract called the "Letter of Acceptance") will state the sum that the Employer will pay the contractor in consideration of the execution, completion, and maintenance of the Works by the contractor as prescribed by the contract (hereinafter and in the contract called the "Contract Price").
- 33.2 The notification of award will constitute the formation of the Contract, subject only to the furnishing of a performance security in accordance with the provisions of Clause 34.

- 33.3 The Agreement will incorporate all agreements between the Employer and the successful Bidder. It will be signed by the Employer and sent to the successful Bidder, within 28 days following the notification of award along with the Letter of Acceptance. Within 21 days of receipt, the successful Bidder will sign the Agreement and deliver it to the Employer.
- 33.4 Upon the furnishing by the successful Bidder of the Performance Security, the Employer will promptly notify the other Bidders that their Bids have been unsuccessful.

#### **34. Performance Security**

- 34.1 Within 21 days of receipt of the Letter of Acceptance, the successful Bidder shall deliver to the employer a Performance security in any of the forms given below for an amount equivalent to 2% of the contract price plus additional security for unbalanced Bids in accordance with clause 29.5 of ITB and Clause 52 of Conditions of contract:
- A bank guarantee from any of the branches of SBI/Nationalised/Scheduled Bank situated within the state of Jharkhand in the form given in Section 8; or Certified Cheque/Bank Draft as indicated in appendix.
- 34.2 If the performance security is provided by the successful Bidder in the form of a Bank Guarantee, it shall be issued from any of the branches of SBI/Nationalised/scheduled Bank situated within the state of Jharkhand.
- 34.3 Failure of successful bidder to comply with the requirements of sub clause 34.1 shall constitute grounds for cancellation of the award and forfeiture of the bid security.

#### **35. Advance Payment and Security**

- 35.1 The Employer will provide an advance Payment on the contract Price as stipulated in the Conditions of Contract, subject to maximum amount, as stated in the Contract Data.

#### **36. Deleted**

#### **37. Corrupt or Fraudulent Practices**

- 37.1 The Employer 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 and will declare the firm ineligible, either indefinitely or for a stated period of time, to be awarded a contract with National Highways authority of India/State PWD and any other agencies, if at any time determines that the firm has engaged in corrupt or fraudulent practices in competing for the contractor, or in execution.

- 37.2 Furthermore, Bidders shall be aware of the provision stated in Sub-Clause 23.2 and Sub-Clause 59.2 of the Clause 59.2 of the conditions of Contract.

Clause Reference with respect to  
Section-I

1. Name of the Employer: **Chairman –cum-Managing Director, JUIDCO Ltd.** {Cl. 1.1}
2. The last five years  
  
**2012 - 2013**  
**2013 - 2014**  
**2014 - 2015**  
**2015 - 2016**  
**2016 – 2017**
3. The annual financial turn over amount **Rs. 70.88 Crores (Rupees Seventy Crores and Eighty Eight Lakhs Only)** {Cl. 4.5A (a)}
4. Value of work is Rs. **23.63 Crores (Rupees Twenty Three Crores and Sixty Three Lakhs Only).**  
**[50% of Estimated Value of Contract]** [Cl. 4.5A (b)]
5. Quantities of work are:
 

i)	<b>Earthwork</b>	<b>:22435 Cu.m</b>
ii)	<b>GSB</b>	<b>: 2397 Cu.m</b>
iii)	<b>WBM/WMM</b>	<b>: 1955 Cu.m</b>
iv)	<b>Bituminous Work (BM/DBM/BC)</b>	<b>: 1658 Cu.m</b>
v)	<b>RCC/PSC/PQC Concrete</b>	<b>: 6878 Cu.m.</b>
vi)	<b>HYSD Steel</b>	<b>: 463 MT.</b>
6. The cost of Power distribution and Illumination work is Rs. **6.69 Cr/-** (Rupees Six crores and Sixty Nine Lakhs Only) {Cl.4.5A (d)}
7. The cost of water supply/sanitary works – **N.A** {Cl.4.5A (e)}
8. Liquid assets and/or availability of credit facilities is Rs. **9.45 Crores (Rupees Nine Crore and Forty Five Lakhs Only).** {Cl.4.5B (c)}
9. Price level of the financial year 2017 - 2018 {Cl. 4.7}
10. The pre-bid meeting will take place at 3<sup>rd</sup> Floor, Pragati Sadan, Kutchery Road, Ranchi - 834001 on **28.06.2017,11:00 Hrs** {Cl. 9.2.1}
11. The technical bids will be opened at 3<sup>rd</sup> Floor, Pragati Sadan, Kutchery Road, Ranchi - 834001 on **11.07.2017, 17:30 Hrs** {Cl. 23.1}
12. Address of the Employer **CMD, JUIDCO Ltd, 3rd Floor, Pragati Sadan (RRDA Building), Kutchery Chowk, Ranchi, 834001, Jharkhand.**

13. Identification: Bid for Construction of Airport to Birsa Chowk via Hinoos Chowk (Road No-1) under Ranchi District, Jharkhand.

{Cl. 19.2 (b)}

No: **JUIDCO/NIT/AR\_BC/RNI/2017/89**

Do not open before – **11.07.2017 at 17.30 Hrs**

14. The bid should be submitted latest by **11.07.2017, 17:00 Hrs**

{Cl. 20.1 (a)}

15. The bid will be opened in the office of the **General Manager (W&P), e-Procurement Cell, JUIDCO Ltd., Jharkhand, Ranchi** on **11.07.2017 at 17:30 Hrs**

{Cl. 23.1}

16. The submitted bank draft should be in favor of **Managing Director, JUIDCO Ltd.** Payable at **Ranchi**

{Cl. 34.1}

17. Deleted

18. Escalation factors (for the cost of works executed and financial figures to a common base value for works completed)

Years before	Multiply factor
One	1.10
Two	1.21
Three	1.33
Four	1.46
Five	1.61

**ANNEXURE-I****List of Key Plant & Equipment to be deployed on Contract work**

**(Ownership/ Lease/ Hire the Age Certificate of the construction Equipment certifying that the age of the equipment's is not more than 5 Years)**

{Reference Cl. 4.5 (B) (a)}

Sl.	Type of Equipment	Maximum age as on 01.06.2017 (Years)	Contract package size		
			Upto Rs. 30 Crores	Rs. 31-50 Crores	Rs. 51 Crores & above
1	Motor Grader	5	2	3	5
2	Dozer	5	1	1	2
3	Front and Loader	5	1	2	3
4	Smooth Wheeled Roller	5	2	2	3
5	Vibratory Roller	5	1	1	2
6	Hot mix Plant with Electronic Controls (Minimum 80-100 TPH Capacity)	5	1	1	2
7	Paver Finisher with Electronic Sensor	5	1	1	2
8	Water Tanker	5	2	3	4
9	Bitumen Sprayer	5-7	1	1	2
10	Tandem Roller	5	1	2	2
11	Concrete Mixes with integral weigh batching facility	5	1	1	1
12	Concrete Batching and Mixing Plant (Minimum Capacity – 15m <sup>3</sup> / hour)	5	-	-	1
	<b>Total</b>		<b>14</b>	<b>18</b>	<b>29</b>

**ANNEXURE-II****List of Key Personal to be deployed on Contract work**

{Reference Cl. 4.5 (B) (b)}

Sl.	Type of Equipment	Maximum age as on 01.06.2017 (Years)	Contract package size		
			Upto Rs. 30 Crores	Rs. 31-50 Crores	Rs. 51 Crores & above
1	Project Manager	B.E. Civil + 15 Years Exp. (5 years as Manager)	1 No.	1No.	1 No.
2	Site Engineer	B.E. Civil + 10 Years Exp. (5 years in Road Construction)	1 No.	2 No.	4 No.
3	Plan Engineer	B.E. Mech. + 10 Years Exp. Or Dip. Mech. + 15 years Exp.	1 No.	1 No.	2 No.
4	Quantity Surveyor	B.E. Civil + 7 Years Exp. Or Dip. Civil + 10 years Exp.	1 No.	1 No.	2 No.
5	Soil & Material Engineer	B.E. Civil + 10 Years Exp.	1 No.	1 No.	2 No.
6	Survey Engineer	B.E. Civil + 5 Years Exp. Or Dip. Civil + 8 years Exp.	1 No.	1 No.	2 No.
<b>Total</b>			<b>6</b>	<b>7</b>	<b>13</b>



**ADDENDUM**  
**to**  
**Instructions to Bidders**

Detailed instructions & documents to be furnished for online bidding

1. Guidelines for online submission of bids can be downloaded from the website <http://jharkhandtenders.gov.in>
2. Interested bidders can download the bid from the website <http://jharkhandtenders.gov.in>
3. Bidders in order to participate in the bidding process have to get 'Digital Signature Certificate (DSC)' as per Information Technology Act-2000 to participate in online bidding. This certificate will be required for digitally signing the bid. Bidders can get the above mentioned digital signature certificate from any approved vendors (CCA). Bidders, who already possess valid Digital Certificates, need not procure new Digital Certificate.
4. Bidders have to submit their bids online in electronic format with digital Signature.  
Bids without digital signature will not be accepted. No proposal will be accepted in physical form.
5. Bids will be opened online as per time schedule mentioned in the Invitation for Bids (IFB).
6. Bidders should be ready with the scanned copies of cost of documents & bid security as specified in the tender document. Before submission of bids online, bidders must ensure that scanned copies of all the necessary documents have been attached with bid.
7. Bidders have to produce original Demand Draft towards tender fee & bid security as mentioned in the Invitation for Bids (IFB) to the Chairman, e- Procurement Cell during the period & time as mentioned in the I.F.B. failing which bid will not be accepted. The details of cost of documents, bid security specified in the tender documents should be the same as submitted online (scanned copies), otherwise bid will summarily be rejected.
8. Uploaded documents of successful bidder will be verified with the original before signing the agreement.  
The successful bidder has to provide the originals to the concerned authority.
9. JUIDCO Ltd. will not be responsible for delay in online submission of bids due to any reason, what so ever. No Claim shall be entertained on account of disruption of internet services being used by the bidder. Bidders are advised to upload their bids well in advance to avoid last minute technical snags.
10. All required information for bid must be filled and submitted online.
11. Other details can be seen in the bidding documents.

12. Only online withdrawal or modification of bids, if any, in pursuance of relevant clauses of the SBD is acceptable.

B. Details of documents to be furnished for online bidding

1. Scanned copies of the following documents to be up-loaded in .pdf format on the website <http://jharkhandtenders.gov.in> in technical bid folder.

- i. D.D. towards Cost of document.
- ii. Bid security in the form specified in Section-8 of SBD.
- iii. Qualification information and supporting documents as specified in Section-2 of SBD.
- iv. Certificates, undertakings, affidavits as specified in Section-2.
- v. Any other information pursuant to Clause-4.2 of ITB.
- vi. Undertakings that the bid shall remain valid for the period specified in Clause-15.1 of ITB.

2. Scanned copies of the following documents to be up-loaded on the website <http://jharkhandtenders.gov.in> in financial bid folder.

i. Form of bid has specified in Section-6 in pdf format.

3. Duly filled in & digitally signed BOQ in financial bid folder.

4. Uploaded documents of successful bidder will be verified with the original before signing the agreement. The successful bidder has to provide the originals to the concerned authority on receipt of such a letter, which will be sent through registered post or speed post or delivered by hand.

5. SBD is not to be uploaded by the Bidder. The Bidder has to give affidavit stating agree/disagree on the conditions in the SBD. The bidder who disagrees on the conditions of SBD cannot participate in the tender.

6. Each uploading shall be digitally signed by the bidders.

7. Corrigendum / Addendum/Corrections, if any, will be published only in the website <http://jharkhandtenders.gov.in>

Sd/-  
General Manager (W&P)  
Jharkhand Urban Infrastructure Development Company Ltd.  
Ranchi

**अनुलग्नक 2**

<b>Section1-ITB: Clause No.</b>	<b>As mentioned in Part – I : Complete Bidding Document of Standard Bidding Document –Procurement of Civil Works.</b>	<b>Text to be substituted as under</b>
Clause – 8.2	One copy of each of the Volumes I, II, III and IV will be issued to the Bidder. Documents to be furnished by the Bidder in compliance to Section2 will be prepared by him and furnished as Volume – V in two parts ( refer clause 12))	Each of the volumes I, II, III and IV will be available online on website <a href="http://jharkhandtender.gov.in">http://jharkhandtender.gov.in</a> for bidder(s). Documents to be submitted by the bidder(s) in compliance to section 2 will be prepared by him and submitted on line as per instructions given in addendum to ITB.
Clause – 12.1	The bid to be submitted by the bidder as volume V of the bid document ( refer clause 8.1) shall be in two separate parts.	The bid shall be submitted by the bidders online as per instructions contained in addendum to ITB.
Clause – 12.2	The bidder shall prepare two copies of the bid, marking them ‘original’ and ‘Copy’ respectively.	The bid shall be submitted by the bidders online as per instructions contained in addendum to ITB.
Clause – 13.2	The bidder shall fill in rates and prices and line item total (both in figures and words) for all items of the Works described in the Bill of Quantities along with total bid price (both in figures and words). Items for which no rate or price is entered by the bidder will not be paid for by the Employer when executed and shall be deemed covered by the other rates and prices in the Bill of Quantities. Corrections, if any, shall be made by crossing out, initialing, dating and rewriting.	The bidder shall fill in rates in figures only as the rate in words will be generated automatically in the BOQ template. Items for which no rate or price is entered by the bidder will not be paid for by the Employer when executed and shall be deemed covered by the other rates and prices in the Bill of Quantities.
Clause – 18.1	The bidder shall prepare one original and one copy of the documents comprising the bid as described in Clause 12 of these Instructions to Bidders, bound, with the volume containing the “Technical Bid” and “Financial bid” in separate parts and clearly marked “ORIGINAL” and “COPY” as appropriate. In the event of discrepancy between them, the original shall prevail.	The bidder shall submit the bids as per addendum to instruction to bidder.
Clause – 18.2	The original and copy of the Bid shall be typed or written in indelible ink and shall be signed by a person or persons duly authorizes to sign on behalf of the Bidder, pursuant to Sub-Clauses 4.3. All pages of the bid where entries or amendments have been made shall be initialed by the person or persons signing the bid.	The bidder shall submit the bids as per addendum to instruction to bidder. Bids submitted online have to be digitally signed by the bidder.

Clause – 18.3	The Bid shall contain no alterations or additions, except those to comply with instructions issued by the Employer, or as necessary to correct errors made by the bidder, in which case such corrections shall be initiated by the persons signing the bid.	Bidders shall follow the Method of submission of bid as mentioned in addendum to ITB.
Clause – 19.1	The Bidder shall seal the original and copy of the Bid in separate envelopes, duly marking the envelopes as “ORIGINAL” and “COPY”. These two envelopes (called as inner envelopes) shall then be put inside one outer envelope. Each set of the inner envelope marked “ORIGINAL” and “COPY” shall contain within it two separate sealed envelopes marked “Technical Bid” and “Financial Bid” with additional markings as follows :	Bidders shall follow the Method of submission of bid as mentioned in addendum to ITB.
Clause – 19.2	The inner, outer, and separate envelopes containing Technical and Financial Bids shall (a) Be addressed to the Employer at the address given in Appendix (b) Bear the identification as indicated in Appendix.	Bidders shall follow the Method of submission of bid as mentioned in addendum to ITB.
Clause – 19.3	In addition to the identification required in sub-clauses 19.1 and 19.2, each of the envelopes shall indicate the name and address of the bidder to enable the bid to be returned unopened in case it is declared late, pursuant to clause 21, or the Evaluation Committee declares the bid as non-responsive pursuant to clause 23.	Bidders shall follow the Method of submission of bid as mentioned in addendum to ITB.
Clause – 19.4	If the outer envelope is not sealed and marked as above, the Employer will assume no responsibility for the misplacement or premature opening of the bid.	Bidders shall follow the Method of submission of bid as mentioned in addendum to ITB.
Clause – 20.1	Complete Bids (including Technical and Financial) must be received by the employer at the address specified above not later than the date indicated in appendix. In the event of the specified date for the submission of bids declared a holiday for the Employer, the bids will be received up to the appointed time on the next working day.	Bidders shall follow the Method of submission of bid as mentioned in addendum to ITB.

Clause – 22.2	Each Bidder’s modification or withdrawal notice shall be prepared, sealed, marked, and delivered in accordance with clause 18 & 19, with the outer and inner envelopes additionally marked “MODIFICATION” or “WITHDRAWAL”, as appropriate.	Bidders shall follow the Method of submission of bid as mentioned in addendum to ITB.
---------------	--	---

Clause-23.1	The Employer will open all the Bids received (except those received late), including modification made pursuant to Clause 22, in the presence of the Bidders or their representatives who choose to attend at time, date and the places specified in Appendix in the manner specified in Clause 20 and 23.3. In the event of the specified date of Bid opening being declared a holiday for the Employer, the Bids will be opened at the appointed time and location on the next working day.	The Employer will open all the Bids submitted online including modification made pursuant to Clause 22, in the presence of the Bidders or their representatives who choose to attend at time, date and the place specified in Appendix in the manner specified in Clause 20 and 23.3. In the event of the specified date of Bid opening being declared a holiday for the employer, the Bids will be opened at the appointed time and location on the next working day. A notice for the same shall be posted on the website.
Clause-23.2	Envelopes marked “WITHDRAWAL” shall be Opened and read out first. Bids for which an acceptable notice of withdrawal has been submitted pursuant to clause 22 shall not be opened.	Withdrawn bids shall be opened and read out first. Bids for which an acceptable notice of withdrawal has been submitted pursuant to clause 22 shall not be opened.
Clause-23.3	The envelope containing “Technical bid” shall be opened. The amount, form and validity of the bid security furnished with each bid will be announced. If the bid security furnished does not conform to the amount and validity period as specified in the Invitation for Bid (ref. Column 4 and paragraph 3), and has not been furnished in the form specified in Clause 16, the remaining technical bid and the sealed financial bid will be returned to the bidder.	“Technical bid” shall be opened first. The amount, form and validity of the bid security furnished with each bid will be announced. If the bid security furnished does not conform to the amount and validity period as specified in the Invitation for Bid Column 4 and paragraph 3), and has not been furnished in the form specified in Clause 16, the said bid shall not be opened/ processed further.

Clause-23.4(ii)	After receipt of confirmation of the bid security, the bidder will be asked in writing (usually within 10 days of opening of the Technical Bid) to clarify or modify his technical bid, if necessary, with respect to any rectifiable defects.	After receipt of confirmation of the bid security, the bidder will be asked in writing/e-mail (usually within 10 days of opening of the Technical Bid) to clarify or modify his technical bid, if necessary, with respect to any rectifiable defects.
Clause-23.4(iii)	The bidders will respond in not more than 7 days of issue of the clarification letter, which will also indicate the date, time and venue of opening of the Financial Bid (usually on the 21st day of opening of the Technical bid)	The bidders will respond by e-mail in not more than 7 days of issue of the clarification letter, which will also indicate the date, time and venue of opening of the Financial Bid (usually on the 21st day of opening of the Technical bid)
Clause-23.5	If, as a consequence of the modifications carried out by the bidder in response to sub-clause 23.4, the bidders desire to modify their financial bid, they will submit the modification in separate sealed envelope so as to reach the Employer's address (refer sub-clause 19.2) before the opening of the financial bid as intimated in the clarification letter (refer sub-clause 23.4). The envelope shall have clear marking "MODIFICATION TO FINANCIAL BID, Not to be opened except with the approval of the Evaluation Committee"	If, as a consequence of the modifications carried out by the bidder in response to sub-clause 23.4, the bidders desire to modify their financial bid, they will submit the modification online before the opening of the financial bid as intimated in the clarification letter (refer sub-clause 23.4).
Clause-23.6	At the time of opening of "Financial Bid", the names of the bidders were found responsive in accordance with Clause 23.4(iv) will be announced. The bids of only these bidders will be opened. The remaining bids will be returned to the bidders unopened. The responsive Bidders' names, the bid prices, the total amount of each bid, any discounts, Bid Modifications and withdrawals, and such other details as the Employer may consider appropriate, will be announced by the Employer at the opening. Any Bid price or discount, which is not read out and recorded will not be taken into account in Bid Evaluation.	At the time of opening of "Financial Bid", the names of the bidders found responsive in accordance with Clause 23.4(iv) will be announced. The bids of only these bidders will be opened. The remaining bids will remain unopened. The responsive Bidders' names, the bid prices, the total amount of each bid, any discounts, Bid Modifications and withdrawals, and such other details as the employer may consider appropriate, will be announced by the Employer at the opening. Any Bid price or discount, which is not read out and recorded will not be taken into account in Bid Evaluation.

## **SECTION 2**

### **QUALIFICATION INFORMATION**



## QUALIFICATION INFORMATION

The information to be filled in by the bidder in the following pages will be used for purpose of post qualification as provided for in Clause 4 of the Instruction to Bidders. This information will not be incorporated in the Contract.

### 1. For Individual Bidders

#### 1.1 Construction or legal status of Bidder

**[Attach copy]**

Place of registration:

---

Principal place of business:

---

Power of attorney of signatory of Bid

**[Attach]**

#### 1.2 Total value of Civil Engineering construction

Work performed in the last five years**	2012 - 2013
(in Rs. Million)	2013 - 2014
	2014 - 2015
	2015 – 2016
	2016- 2017

1.3.1 Work performed as prime contractor, work performed in the past as a nominated sub-contractor will also be considered provided the sub-contract involved execution of all main items of work described in the bid document provided further that all other qualification criteria are satisfied (in the same name) on works of a similar nature over the last five years.\*\*

Project Name	Name of the Employer*	Description of Work	Contract No.	Value of Contract (Rs. Crore)	Date of issue of work order	Stipulated Period of completion	Actual date of completion*	Remarks Explaining reason for delay & work Completed

\* Attach certificate(s) from the Engineer(s)-in-Charge

\*\* Immediately preceding the financial year in which bids are received.

β Attach certificate from Chartered Accountant.

1.3.2. Quantities of work executed as prime contractor, work performed in the past as a nominated sub-contractor, will also be considered provided the sub-contract involved executed of all main items of work described in the bid document, provided further that all other qualification criteria are satisfied (in the same name and style) in the last five years.\*\*

Year	Name of the work	Name of the Employer	Quantity of work performed (cum) @ Remarks						Remarks* (indicate contract Ref)
			Cement Concrete (including RCC & PCC)	Masonry	Earth Works	WBM	WM M	Bituminous work	
2012 - 2013									
2013 - 2014									
2014 - 2015									
2015 - 2016									
2016 - 2017									

1.4 Information on Bid capacity (works for which bids have been submitted and works which are yet to be completed) as on the date of this bid.

(A) Existing commitments and on-going works:

Description of works	Place & State	Contract No.	Name & Address of Employer	Value of Contract (Rs. Cr)	Stipulated Period of Completion	Value of Works* remaining to be completed (Rs. Cr.)	Anticipated date of completion
1	2	3	4	5	6	7	8

\* Attach certification(s) from the Engineer(s)-in-charge

@ The item of work for which data is requested should tally with that specified in ITB clause 4.5 A (c)

\*\* Immediately preceding the financial year in which bids are received.

# Delete, if prequalification has been carried out.

**(B) Works for which bids already submitted:**

Description of work	Place & State	Name & Address of Employer	Estimated value of works (Rs Cr.)	Stipulated period of completion	Date when decision is expected	Remarks If any
1	2	3	4	5	6	7

1.5 Availability of key items of Contractor's equipment essential for carrying out the works [ref. Clause 4.5 (B) (a). The Bidder should list all the information requested below. Refer also to sub Clause 4.3 (d) of the instructions to Bidders.

Item of Equipment	Requirement		Availability Proposals			Remarks (from whom to be purchased)
	No.	Capacity	Owned/Leased to be procured	Nos./Capacity	Age/Condition	

1.6 Qualifications and experience of key personal required for administration and execution of the contract [Ref. Clause 4.5 (B) (b)]. Attach biographical data. Refer also to sub Clause 4.3 (e) of instructions to Bidders and Sub Clause 9.1 of the Conditions of Contract.

Position	Name	Qualification	Year of Experience (General)	Years of experience in the Proposed position
Project Manager				
Etc.				

1.7 Proposed sub-contracts and firms involved. [Refer ITB Clause 4.3 (k)]

Sanctions of the works	Value of Sub-contract	Sub-contractor (Name & Address)	Experience in similar work

Attach copies of certificates on possession of valid license for executing water supply/sanitary work/building electrification works [Reference Clause 4.5 (d) & Clause 4.5 (e)]

\*1.8 Financial reports for the last five years: balance sheets, profit and loss statements, auditors' reports (in case of companies/corporation) etc. List them below and attach copies.

\*1.9 Evidence of access to financial resources to meet the qualification requirements:

Cash in hand, lines of credit, etc. List them below and attach copies of support documents.

\*1.10 Name, address and telephone, telex. and fax numbers of the Bidders' bankers who may provide references if contracted by the Employer.

1.11 Information litigation history in which the Bidder is involved.

Other Party(ies)	Employer	Cause of Dispute	Amount involved	Remarks showing Present status

1.12 Statement of compliance under the requirements of Sub Clause 3.2 of the instructions to Bidders (Name of Consultant engaged project preparations is\*\*-----  
-----  
-----

1.13 Proposed work method and schedule. The Bidder should attach descriptions, drawings and charts as necessary to comply with the requirements of the Bidding documents. (Refer ITB Clause 4.1 % 4.3 (1))

1.14 Programme

1.15 Quality Assurance Programme

2. **Deleted**

3. **Additional Requirements.**

3.1 Bidders should provide any additional information required to fulfill the requirements of Clause 4 of the Instructions to the Bidders, if applicable.

(i) Affidavit

(ii) Undertaking

\*\*\* (iii) Update of original pre-qualification application

\*\*\* (iv) Copy of original pre-qualification application

\*\*\* (v) Copy of pre-qualification letter

---

\* Delete, if pre-qualification has been carried out

\*\* Fill the Name of Consultant.

\*\*\* Delete, if pre-qualification has not been carried out.

**SAMPLE FORMAT FOR EVIDENCE OF ACCESS TO OR AVAILABILITY OF CREDIT  
FACILITIES**

**AVAILABILITY OF CREDIT FACILITIES**

(Clause 4.2 (i) OF ITB)

**BANK CERTIFICATE**

This is to certify that M/s-----is a reputed  
Company with a good financial standing

If the contract for the work, namely -----is  
awarded to the above firm, we shall be able to provide overdraft/credit facilities to the extent Rs.-----  
-----to meet their working capital requirements for executing above contract during  
the contact period.

-----

(Signature)

Name of Bank

Senior Bank Manager

Address of the Bank

### **AFFIDAVIT**

1. I, the undersigned. Do hereby certify that all the statements made in the required attachments are true and correct.
2. The undersigned also hereby certifies that neither our firm M/s-----  
-----have abandoned any work of Road Construction Department, Jharkhand or any contract awarded to us for such work have been rescinded, during five years prior to the date of this bid.
3. The undersigned hereby authorize(s) and request(s) any bank, firm or corporations to furnish pertinent information deemed necessary and requested by the Department to verify this statement or regarding my (our) competence and general reputation
4. The undersigned understand and agrees that further qualifying information may be requested, and agrees to furnish any such information at the request of the Department/project implementing agency.

-----  
(Signed by an authorized Officer of the Firm)

-----  
Title of officer

-----  
Name of Firm

-----  
DATE

## UNDERTAKING

I, the undersigned do hereby undertake that our firm M/s-----  
-----would invest a minimum cash up to  
25% of the value of work, during implementation of the Contract.

-----  
(Signed by an authorized Officer of the  
Firm)

-----  
Title of officer

-----  
Name of Firm

-----  
DATE



### **SECTION-3**

## **CONDITIONS OF CONTRACT**

**Conditions of Contract****Table of Contents**

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## **CONDITIONS OF CONTRACT**

### **A. GENERAL**

#### **1. Definitions**

- 1.1.1** Items which defined in the contract data are not also defined in the Conditions of Contract but keep their defined meanings. Capital initials are used to identify defined terms.

**Bill of Quantities** means the priced and completed Bill of Quantities forming part of the Bid.

**The Completion Date** is the date of completion of the Work as certified by the Engineer in accordance with Sub clause 55.1

The **Contract** is the contract between the Employer and the Contractor to execute, complete and maintain the works, it consists of the documents listed in Clause 2.3 below

The **Contract Data** defines the documents and other information which comprise the Contract.

The **Contractor** is a person of corporate body whose Bid to carry out the Works has been accepted by the Employer.

The **Contractor's Bid** is the completed Bidding document submitted by the Contractor to the Employer and includes Technical and Financial bids.

The **Contractor's Price** is the price state in the letter of Acceptance and thereafter as adjusted in accordance with the provisions of the Contract.

**Days** are calendar days: **Months** are calendar months.

**A Defects Liability Period** is the period named in the Contract Data and calculated from the Completion Date.

**The Employer is Chairman-cum-Managing Director, JUIDCO Ltd. who will employ the** contractor to carry out the Works.

**The Employer's representative** will be the General Manager (W&P), JUIDCO Ltd. concerned to the notified by the Employer.

The Employer's representative will on behalf of Employer.

**The Engineer** is the person named in the Contract data for any other competent person appointed and notified to the contractor to act in replacement to the Engineer who is responsible for supervising the Contractor, administering the Contract, certifying payments due to the Contractor issuing and valuing Variations to the Contract, awarding extensions of time.\*

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\* For the Road Projects Costing more than Rs. 10 Crores and for the Bridge Projects costing more than Rs. 5 Crores, "Supervision Consultant" would act as Engineer "For the project advised by the Chief Engineer (Communication) or Engineer –in–Chief. For the Road Projects costing between Rs. 2.5 Crores to Rs. 10 Crores and Bridges Projects costing between Rs. 2.5 Crores to Rs. 5 Crores

and other projects where Supervisions consultant will not acts as “Engineer” the Employer’s Representative acts as “Engineer.”

**Equipment** is the Contractors machinery and vehicles brought temporarily to the Site to construct the Works.

**The Initial Contract price** is the Contract listed in the Employer’s Letter of Acceptance.

**The Intended Completion Date** is the date on which it is intended that the contractor shall complete the works. The Intended Completion Date is specified in the Contract Data The Intended Completion date may be revised only by the Engineer by issuing an extension of time.

**Materials** are all supplies including consumables, used by the contractor for incorporation in the works.

**Plant** is any integral part of the Works which is to have a mechanical, electrical. Electronic or chemical or biological function.

**The Site** is the area defined as such in the Contract Data.

**Site Investigation Reports** are those which included in the Bidding documents and are factual interpretative reports about the surface and sub-surface conditions at the site.

**Specification** means the Specification of the Works included in the Contract and any modification or addition made or approved by the Engineer.

**The Start Date** is given in the Contract Data. It is the dater when the Contractor shall commence execution of the works. It does not necessarily coincide with any of the Site Possession Dates.

**A Subcontractor** is a person or corporate body who has a contract with the Contractor to carry out a part of the work in the Contract which includes work on the Site.

**Temporary Works** are works designed, consulted, installed, and removed by the contractor which are needed for construction or installation of the Works.

**A Variation** is an instruction given by the Engineer, which varies the works.

**The works** are what the contract requires the Contractor to construct, install, and turn over to the Employer, as defamed in the Contract Data.

## 2. **Interpretation**

- 2.1 In interpreting these Conditions of Contract, singular also means plural, male also means female or neuter and the other way around. Headings have no significance. Words have their normal meaning under the language of the Contract unless specifically defined. The engineer will have proved instructions clarifying queries about the Conditions of Contract. If sectional completion is specified in the Contract Data, references in the Conditions of Contract to the works. The completion Date and the

Intended Completion Date apply to any section of the Works (other than references to the Completion date and intended Completion date for the whole of the works.)

**The documents forming the contract shall be interpreted in the following order of priority:**

- (i) Agreement
- (ii) Letter of Acceptance, notice to proceed with the works
- (iii) Contractor's bid
- (iv) Contract Data
- (v) Conditions of Contract including Special conditions of Contract
- (vi) Specifications.
- (vii) Drawings
- (viii) Bill of Quantities and
- (ix) Any other document listed in the Contract data as forming part of the Contract

### **3. Language and Law**

- 3.1 The language and law contract and the law governing the contract are stated in the contract Data.

### **4. Engineer's Decisions**

- 4.1 Where otherwise specifically stated. The Engineer will decide contractual matters between the Employers and the contractor in the role representing the Employer.

### **5. Delegation**

- 5.1 The Engineer may delegate any of his duties and responsibilities to other people after notifying the contractor and may cancel any delegation after notifying the Contractor

### **6. Communications**

- 6.1 Communications between parties which are referred to in the conditions are effective only in writing. A notice shall be effective only when it is delivered (in terms of Indian Contract act.)

### **7. Sub- Contracting**

- 7.1 The Contractor may sub-contract any portion of work, up to a limit specified in Contract Data with the approval of the Engineer but may not assign the Contract without the approval of the Employer in writing sub-contractor does not alter the Contractor's Obligations. Maximum no. of Sub-Contractor will be two and they will have to meet all qualifying criteria in the ratio of work allowed

### **8. Other Contractors**

- 8.1 The Contractor shall cooperate and share the site with other contractors, public authorities, utilities and the employer between the dates given in the Schedule of other Contractors. The contractors shall as referred to in the Contract Data, also provide facilities and services for them as described in the

Schedule the Employer may modify schedule of other contractors and shall notify the contractor of any such modification.

## **9. Personnel**

- 9.1 The Contractor shall employ the key personnel named in the Schedule of Key Personnel as referred to in the Contract Data to carry out the functions stated in the Schedule or other personnel approved by the Engineer. The Engineer will approve any proposed replacement of key personnel only if their qualification, abilities, and relevant experience are substantially equal to or better than those of the personnel listed in the schedule.
- 9.2 If the Engineer asks the Contractor to remove a person who is a member of the Contractor's staff of his work force stating the reasons the Contractor shall ensure that the person leaves the Site within seven days and has no further connection with the work in the Contract.

## **10. Employer's and Contractor's Risks**

- 10.1 The Employer carries the risks which this contract states are Employer's risks, and the contractor carries the risks which this Contract states are Contractor's risks.

## **11. Employer's Risks**

- 11.1 The employer is responsible for the excepted risks which are (a) in so far as they directly affect the execution of the works in India, the risks of war, hostilities. Invasion, act of foreign enemies, rebellion, revolution, insurrection or military or usurped power, civil war, riot commotion or disorder (unless restricted to the Contractor's employees), and contamination from any nuclear fuel or nuclear waste or radioactive toxic explosive; or (b) a cause due solely to the design of the Works, other than the Contractor's design.

## **12. Contractor's Risks**

- 12.1 All risks of loss or damage to physical property and of personal injury and death which arise during and in consequence of the performance of the Contract other than the excepted risks are the responsibility of the contractor.

## **13. Insurance**

- 13.1 The Contractor shall provide in the joint names of the Employer and the contractor, insurance cover from the Start Date to the end of the Defects Liability Period, in the amounts and deductibles stated in the Contract data for the following events which are due to the contractor's risks:

- (a) Loss of the or damage to the works, Plants and Materials;

- (b) Loss of the or damage to Equipment;
- (c) Loss of or damage of property (except the Works, Plant, Materials and Equipment) in connection with the contract; and
- (d) Personal injury or death.

13.2 Policies and certificates for insurance shall be delivered by the contractor to the Engineer for the engineer's approval before the Start Date. All such insurance shall provide for compensation to be payable in the types and proportions of currencies required to rectify the loss or damage incurred.

13.3 If the contractor does not provide any of the policies and certificates required, the employer may affect the insurance which the contractor should have provided and recover the premiums the employer has paid from payments otherwise due to the contractor or if no payment is due, the payment of the premiums shall be a debt due.

13.4 Alterations to the terms of an insurance shall not be made without the approval of the Engineer.

13.5 Both parties shall comply with any conditions of the insurance policies.

#### **14. Site Investigation Reports**

14.1 The contractor, in preparing the Bid, shall rely on any site investigation reports referred to in the Contract data, supplemented by any information available to the Bidder.

#### **15. Queries about the contract Data**

15.1 The Engineer will clarify queries on the contract Data.

#### **16. Contractor to construct the Works**

16.1 The Contractor shall construct and install the Works in accordance with the Specification and Drawings.

#### **17. The works to be completed by the Intended Completion date**

17.1 The Contractor may commence execution of the Works on the Start Date and shall carry out the works in accordance with the programme submitted by the contractor, as updated with the approval of the Engineer, and complete them by the intended Completion Data.

#### **18. Approval by the Engineer**

18.1 The Contractor shall submit Specifications and Drawings, showing the proposed Temporary works to the Engineer, who is to approve them if they comply with the Specifications and Drawings.

- 18.2 The Contractor shall be responsible for design of Temporary Works.
- 18.3 The Engineer's approval shall not alter the contractor's responsibility for design of the temporary Works.
- 18.4 The Contractor shall obtain approval of third parties to the design of the Temporary Works where required.
- 18.5 All drawings prepared by the contractor for the execution of the temporary or permanent Works, are subject to prior approval by the Engineer before their use.

## **19. Safety**

- 19.1 The Contractor shall be responsible for the safety of all activities on the Site.

## **20. Discoveries**

- 20.1 Anything of historical or other interest or of significant value unexpectedly discovered on the site is the property of the Employer. The Contractor is to notify the Engineer of such discoveries and carry out the engineer's instructions for dealing with them.

## **21. Possession of the Site**

- 21.1 The Employer shall give possession of all parts of the site to the contractor.

## **22. Access to the Site**

- 22.1 The contractor shall allow the engineer and any person authorized by the Engineer access to the Site, to any place whether work in the connection with the contract is being carried out or is intended to be carried out or is intended to be carried out and to any place where materials or plant are being manufactured/fabricated/assembled for the works.

## **23. Instructions**

- 23.1 The Contractor shall carry out all instructions of the Engineer pertaining to works which comply with the applicable law where the site is located.
- 23.2 The constructor shall permit the Employer to inspect the Contractor's accounts and records relating to the performance of the Contractor and to have them audited by auditors appointed by the employer, if so required by the Employer.

## **24. Deleted**

## **25. Deleted**

## **26. Deleted**



## **B. TIME CONTROL**

### **27. Programme**

- 27.1 Within the time stated in the Contract Data the contractor shall submit to the Engineer for approval a Programme showing the general methods, arrangements, order, and timing for all the activities in the Works along with monthly cash flow forecast.
- 27.2 An update of the Programme shall be a programme showing the actual progress achieved on each activity and the effect of the progress achieved on the timing of the remaining work including any changes to the sequence of the activities.
- 27.3 The Contractor shall submit to the engineer, for approval, an updated Programme at intervals no longer than the period stated in the contract data. If the Contractor does not submit an updated Programme within this period, the Engineer may withhold the amount stated in the contract Data from the next payment certificate and continue to withhold this amount until the next payment after the date on which the overdue Programme has been submitted.
- 27.4 The Engineer's approval of the Programme shall not alter the contractor's obligations. The contractor may revise the Programme and submit it to the Engineer again at any time. A revised Programme is to show the effect of Variations and compensation Events.

### **28. Extension of the Intended Completion Date**

- 28.1 The Engineer shall extend the Intended Completion Date if a variation is issued which makes it impossible for completion to be achieved by the Intended Completion Date without the Contractor taking steps to accelerate the remaining work and which would cause the contractor to incur additional cost.
- 28.2 The engineer shall decide whether and by how much to extend the Intended completion date within 35 days of the contractor asking the engineer for a decision upon the effect of a Variation and submitting full supporting information. If the contractor has failed to give early warning of a delay or has failed to cooperate in dealing with a delay, the delay by this failure shall not be considered in assessing the new Intended Completion Date.
- 28.3 The Engineer shall within 14 days of receiving full justification from the contractor for extension of Intended Completion Date refer to the Employer his decision. The Employer shall in not more than 21 days communicate to the Engineer the acceptance or otherwise of the Engineer's decision.

### **29. Deleted**

### **30. Delays Ordered by the Engineer**

- 30.1 The Engineer may instruct the Contractor to delay the start or progress of any activity within the works.

### **31. Management Meetings**

- 31.1 Either the engineer or the Contractor may require the other to attend a management meeting. The business of a management meeting shall be to review the plans for remaining work and to deal with matters raised in accordance with the early warning procedure.
- 31.2 The Engineer shall record the business of management meetings and is to provide copies of his record to those attending the meeting and to the Employer. The responsibility of the parties for actions to be taken is to be decided by the Engineer either at the management meeting or after the management meeting and stated in writing to all who attended the meeting.

### **32. Early Warning**

- 32.1 The Contractor is to warn the Engineer at the earliest opportunity of specific likely future events or circumstances that may adversely affect the quality of the work, increase the Contract Price or delay the execution of works. The Engineer may require the contractor to provide an estimate of the expected effect of the future event or circumstance on the Contract Price and completion Date. The estimate is to be provided by the contractor as soon as reasonably possible.
- 32.2 The contractor shall cooperate with the Engineer in making and considering proposals for how the effect of such an event or circumstance can be avoided or reduced by anyone involved in the work and in carrying out any resulting instruction of the engineer.

## **C. QUALITY CONTROL**

### **33. Identifying Defects**

- 33.1 The engineer shall check the contractor's work and notify the contractor of any defects that are found. Such checking shall not affect the Contractor's responsibilities. The engineer may instruct the Contractor to search for a Defect and to uncover and test any work that the engineer considers may have a Defect.

### **34. Tests**

- 34.1 If the Engineer instructs the Constructor to carry out a test not specified in the Specification to check whether any work has a Defect and the test shows that it does, the Contractor shall pay for the test and any samples.

### **35. Correction of Defects**

- 35.1 The Engineer shall give notice to the contractor of any Defects before the end of the Defects Liability Period, which begins at completion and is defined in the contract Data. The defects Liability Period shall be extended for as long as defects remain to be corrected.
- 35.2 Every time notice of a defect is given, the Contractor shall correct the notified Defect within the length of time specified by the engineer's notice.

### **36. Uncorrected Defects**

- 36.1 If the contractor has not corrected a Defect within the time specified in the Engineer's notice. The Engineer will assess the cost of having the Defect corrected, and the Contractor will pay this amount.

## **D. COST CONTROL**

### **37. Bill of Quantities**

- 37.1 The Bill of quantities shall contain items for the construction, installation, testing, and commissioning work to be done by the contractor.
- 37.2 The Bill of quantities is used to calculate the Contract Price. The contractor is paid for the quantity of the work done at the rate in the Bill of Quantities for each item.

### **38. Changes in the Quantities**

- 38.1 If the final quantity of the work done differs from the quantity in the Bill of Quantities for the particular item by more than 25 percent provided the change exceeds 1% of initial contract Price, the engineer shall adjust the rate to allow for the change, duly considering.
- (a) Justification for rate adjustment as furnished by the contractor,
  - (b) Economics resulting from increase in quantities by way of reduced plant, equipment, and overhead costs,
- 38.2 The engineer shall not adjust rates from changes in quantities if thereby the Initial Contract Price is exceeded by more than 15 percent, except with the Prior approval of the Employer.
- 38.3 If requested by the engineer, the contractor shall provide the Engineer with a detailed cost breakdown of any rate in the Bill of quantities.

### **39. Variations**

39. All Variations shall be included in updated Programmes produced by the contractor.

#### **40. Payments for Variations**

- 40.1 The contractor shall provide the Engineer with a quotation (with breakdown of unit rates) for carrying out the Variation when requested to do so by the Engineer. The engineer shall assess the quotation, which shall be given within seven days of the request or within any longer period stated by the engineer and before the Variation is ordered.
- 40.2 If the work in the Variation corresponds with an item description in the Bill of Quantities and if, in the opinion of the engineer, the quantity of work above the limit stated in sub clause 38.1 or the timing of its execution do not cause the cost per unit of quantity to change, the rate in the Bill of Quantities shall be used to calculate the value of Variation. If the cost per unit of quantity changes, or if the nature of timing of the work in the Variation does not correspond with items in the Bill of Quantities, the quotation by the contractor shall be in the form of new rates for the relevant items of work.
- 40.3 If the Contractor's quotation is unreasonable, the Engineer may order the Variation and make a change to the Contract Price which shall be based on Engineer's own forecast of the effects of the variation on the contractor's costs.
- 40.4 The contractor shall not be entitled to additional payment for costs which could have been avoided by giving early warning.

#### **41. Cash flow forecasts**

- 41.1 When the Programme is updated, the contractor is to provide the engineer with an updated cash flow forecast.

#### **42. Payment Certificates**

- 42.1 The Contractor shall submit to the engineer monthly statements of the estimated value of the work completed less the cumulative amount certified previously.
- 42.2 The engineer shall check the Contractor's monthly statement within 14 days and certify the amount to be paid to the Contractor.
- 42.3 the value of work executed shall be determined by the Engineer.
- 42.4 The value of work executed shall comprise the value of the quantities of the items in the Bill of Quantities completed.
- 42.5 The value of work executed shall include the valuation of Variations.

- 42.6 The Engineer may exclude any item certified in a previous certificate or reduce the proportion of any item previously certified in any certificate in the light of later information.

### **43. Payments**

- 43.1 Payments shall be adjusted for deductions for advance payments, retention, other recoveries in terms of contract and taxes at source, as applicable under the law. The employer shall pay the contractor the amounts certified by the Engineer within 28 days of the date of each certificate. If the employer makes a late payment, the contractor shall be paid interest on the late payment in the next payment. Interest shall be calculated from the date for which the payment should have been made upto the date when the late payment is made at 12% per annum.
- 43.2 Items of the Works for which no rate or price has been entered in will not be paid for by the employer and shall be deemed covered by other rates and prices in the Contract.

### **44. Deleted**

### **45. Tax**

- 45.1 The rates quoted by the contractor shall be deemed to be inclusive of the sales and other taxes that the Contractor will have to pay for the performance of this contract. The contractor will perform such duties in regard to the deduction of such taxes at source as per applicable law.

### **46. Currencies**

- 46.1 All payments shall be made in Indian Rupees.

### **47. Price Adjustment**

- 47.1 Contract Price shall be adjusted for increase or decrease in rates and price of materials in accordance with the following principles and procedures and as per formula given in the contract data:
- (a) The price adjustment shall apply for the work done from the start date given in the contract data upto end of the initial intended completion date or extensions granted by the Engineer and shall not apply to the work carried out beyond the stipulated time for reasons attributable to the contractor.
  - (b) The price adjustment shall be determined during each month from the formula given in the contract data.
  - (c) Following expressions and meanings are assigned to the work done during each month:

R= Total value of work done during the month. It will exclude value for works executed under variations for which price adjustment will be worked separately based on the terms mutually agreed.

- 47.2 To the extent that full compensation for any rise or fall in costs to the contractor is not covered by the provisions of this or other clauses in the contract, the unit rates and prices included in the contract shall be deemed to include amounts to cover the contingency of such other rise or fall in costs.

#### **48. Retention**

- 48.1 The employer shall retain from each payment due to the contractor the proportion stated in the contract Data until completion of the whole of the Works.
- 48.2 On completion of the whole of the Works half the total amount retained is repaid to the contractor and half when the Defects Liability Period has passed and the Engineer has certified that all Defects notified by the engineer to the contractor before the end of this period have been corrected.
- 48.3 On completion of the whole work, the contractor may substitute retention money with an “on demand” Bank Guarantee

#### **49. Liquidated Damages**

- 49.1 The contractor shall pay liquidated damages to the Employer at the rate per day stated in the Contract data for each day that the Completion Date is later than the Intended Completion Date (for the whole of the works or the milestones as stated in the contract data). The total amount of liquidated damages shall not exceed the amount defined in the Contract Data. The Employer may deduct liquidated damages from payments due to the Contractor. Payment of liquidated damages does not affect the contractor’s liabilities.
- 49.2 if the Intended Completion date is extended after liquidated damages have been paid, the Engineer shall correct any over payment of liquidated damages by the Contractor by adjusting the next payment certificate. The Contractor shall be paid interest on the over payment calculated from the date of payment to the date of repayment at the rates specified in Sub Clause 43.1.
- 49.3 If the Contractor fails to comply with the time for completion as stipulated in the tender, then the contractor shall pay to the employer the relevant sum stated in the Contract Data as Liquidated damages for such default and not as penalty for everyday or part of day which shall elapse between relevant time for completion and the date stated in the taking over certificate of the whole of the works on the relevant section, subject to the limit stated in the contract data. The employer may, without prejudice to any other method of recovery deduct the amount of such damages from any monies due

or to become due to the contractor. The payment or deduction of such damages shall not relieve the contractor from his obligation to complete the works on from any other of his obligations and liabilities under the contract.

- 49.4 If, before the Time for Completion of the whole of the Works or, if applicable, any Section, a Taking – Over Certificate has been issued for any part of the Works or of a Section, the liquidated damages for delay in completion of the remainders of the Works or of that Section shall, for any period of delay after the date stated in such Taking – Over Certificate, and in the absence of alternative provisions in the Contract, be reduced in the proportion which the value of the part so certified bears to the value of the whole of the Works or section, as applicable. The provisions of this Sub-Clause shall only apply to the rate of liquidated damages and shall not affect the limit thereof.

## **50. Bonus**

- 50.1 If the contractor achieves completion of the whole of the works prior to the Intended Completion date prescribed in Contract Data the Employer shall pay to the contractor sum stated in Contract Data as bonus for every completed month which shall elapse between the date of completion of all items of works as stipulated in the contract including variations ordered by the Engineer and the time prescribed in clause 17.

For the purpose of calculating bonus payments, the time given in the Bid for completion of the whole of the works is fixed and unless otherwise agreed, no adjustment of the time by reason of granting an extension of time pursuant to Clause 28 or any other clause of these conditions will be allowed. Any period falling short of a complete month shall be ignored for the purpose of computing the period relevant for the payment of bonus.

## **51. Advance Payment**

- 51.1 The Employer shall make advance payment to the Contractor of the amounts stated in the Contract Data by the date stated in the Contract Data, against provision by the Contractor of an Unconditional Bank Guarantee in a form and by a bank acceptable to the employer amounts and currencies equal to the advance payment. The guarantee shall remain effective until the advance payment has been repaid, but the amount of guarantee shall progressively reduce by the amounts repaid by the Contractor. Interest will not be charged on the advance payment.
- 51.2 The Contractor is to use the advance payment only to pay for Equipment, Plant and Mobilization expenses required specifically for execution of the works. The contractor shall demonstrate that advance payment has been used in this way by supplying copies of invoices or other documents.

51.3 The advance payment shall be repaid by deducting proportionate amounts from payments otherwise due to the Contractor, following the schedule of completed percentages of the Works on a payment basis. No account shall be taken of the advance payment or repayment in assessing valuations of work done, Variations, price adjustments or liquidated damages.

51.4 Deleted.

## **52. Securities**

52.1 The Performance Security (including additional security for unbalanced bids) shall be provided to the Employer no later than the date specified in the Letter of Acceptance and shall be issued in an amount and from and by a bank or surety acceptable to the Employer. And denominated in Indian Rupees. The Performance Security shall be valid until a date 28 days from the date of expiry of Defects Liability Period and the additional security for unbalanced bids shall be valid until a date 28 days from the date of issue of the certificate of completion.

## **53. Deleted**

## **54. Cost of Repairs**

54.1 Loss or damage to the Works or Materials to be incorporated in the Works between the Start Date and the end of the defects correction periods shall be remedied by the contractor at the Contractor's cost if the loss or damage arises from the Contractor's acts or omissions.

# **E. FINISHING THE CONTRACT**

## **55. Completion**

55.1 The Contractor shall request the Engineer to issue a Certificate of Completion of the Works and the Engineer will do so upon deciding that the Work is completed.

## **56. Taking Over**

56.1 The employer shall take over the Site and the Works within seven days of the Engineer issuing a certificate of Completion.

## **57. Final Account**

57.1 The Contractor shall supply to the engineer a detailed account of the total amount that the Contractor considers payable under the contract before the end of the Defects Liability Period. The engineer shall issue a Defect Liability Certificate and certify any final payment that is due to the Contractor within 56 days of receiving the contractor's account if it is correct and complete. If it is not, the Engineer shall issue within 56 days a schedule that states the scope of the corrections or additions that are



necessary. If the Final Account is still unsatisfactory after it has been resubmitted, the Engineer shall decide on the amount payable to the Contractor and issue a payment certificate, within 56 days or receiving the Contractor's revised account.

## **58. Operating and Maintenance Manuals**

- 58.1 If "as built" Drawings and/or operating and maintenance manuals are required, the Contractor shall supply them by dates stated in the Contract Data.
- 58.2 If the Contractor does not supply the Drawing and/or manuals by the dates stated in the Contract Data, or they do not receive the Engineer's approval, the Engineer shall withhold the amount stated in the Contract Data from payments due to the Contractor.

## **59. Termination**

- 59.1 The Employer or the Contractor may terminate the Contract if the other party causes a fundamental breach of the Contract.
- 59.2 Fundamental breaches of contract include, but shall not be limited to the following:
- (a) The Contractor stops work for 28 days when no stoppage of work is shown on the current Programme and the stoppage has not been authorized by the Engineer;
  - (b) The engineer instructs the contractor to delay the progress of the Works and the instruction is not withdrawn within 28 days;
  - (c) The Employer or the contractor is made bankrupt or goes into liquidation other than for a reconstruction or amalgamation;
  - (d) A payment certified by the engineer is not paid by the Employer to the contractor within 56 days of the date of the Engineer's certificate;
  - (e) The Engineer gives Notice that failure to correct a particular Defect is a fundamental breach of contract and the Contractor fails to correct it within a reasonable period of time determined by the Engineer.
  - (f) The Contractor does not maintain a security which is required;
  - (g) The Contractor has delayed the completion of works by the number of days for which the maximum amount of liquidated damages can be paid as defined in the Contract data; and
  - (h) If the Contractor, in the judgment of the Employer has engaged in corrupt or fraudulent practices in competing for or in executing the contract.

For the purpose of this paragraph: "corrupt practice" means the offering, giving receiving or soliciting of anything of value to influence the action of a public official in the procurement process or in contract

execution. “Fraudulent practice” means misrepresentation of facts in order to influence a procurement process or the execution a contract to the detriment of the Borrower, 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 Borrower of the benefits of free and open competition.”

- 59.3 When either party to the contract gives notice of a breach of contract to the Engineer for a cause other than those listed under sub Clause 59.2. above, the Engineer shall decide whether the breach is fundamental or not.
- 59.4 Notwithstanding the above, the Employer may terminate the contract for convenience.
- 59.5 If the Contract is terminated the contractor shall stop work immediately, make the safe and secure and leave the Site as soon as reasonably possible.

## **60. Payment upon termination**

- 60.1 If the Contract is terminated because of a fundamental breach of Contract by contractor, the Engineer shall issue a certificate for the value of the work done advance payments received up to the date of the issue of the certificate, less other recoveries due in terms of the contract, less taxes due to be deducted at source as per applicable law and less the percentage to apply to the work not completed as indicated in the Contract Data. Additional Liquidated Damages shall not apply. If the total amount due to the Employer exceeds any payment due to the contractor shall be a debt payable to the Employer.
- 60.2 If the Contract is terminated at the Employer’s convenience or because of a fundamental Breach of Contract by the Employer, the Engineer shall issue a certificate for the value of the work done, the cost of balance by the contractor and available at site, the reasonable cost of removal of Equipment, a repatriation of the contractor’s personnel employed solely on the Works, and the contractor’s cost of protecting and securing the Works and less advance payments received due in terms of the contract and less taxes due to be deducted at source as per applicable law.

## **61. Property**

- 61.1 All materials on the Site, Plant, equipment, Temporary Works and works are deemed to be the property of the Employer, if the Contract is terminated because of a Contractor’s default.

## **62. Release from Performance**

- 62.1 If the Contract is frustrated by the outbreak of war or by any other event entirely outside the control of either the employer or the Contractor the engineer shall certify that the Contract has been frustrated. The Contractor shall make the Site safe and stop work as quickly as possible after receiving this

certificate and shall be paid for all work carried out before receiving it and for any work carried out afterwards to which commitment was made.

## **F. SPECIAL CONDITIONS OF CONTRACT**

## **1. LABOUR**

The Contractor shall, unless otherwise provided in the Contract, make his own arrangements for the engagement of all staff and labour, local or other, and for their payment, housing, feeding and transport.

The Contractor shall, if required by the Engineers, deliver to the Engineer a return in detail, in such form and at such intervals as the Engineer may prescribe, showing the staff and the numbers of the several classes of labour from time to time employed by the Contractor on the Site and such other information as the Engineer may require.

## **2. COMPLIANCE WITH LABOUR REGULATIONS**

During continuance of the contract, the Contractor and his sub-contractors shall abide at all times by all existing labour enactments and rules made there under, regulations, notifications and bye laws of the State or Central Government or local authority and any other labour law (including rules), regulations, bye laws that may be passed or notification that may be issued under any labour some of the major laws that are applicable to construction industry are given below. The Contractor shall keep the Employer indemnified in case any action is taken against the Employer by the competent authority on account of contravention of any of the provisions of any Act or rules made there under, regulations or notifications including amendments. If the Employer is caused to pay or reimburse, such amounts as may be necessary to cause or observe, or for non-observance of the provisions stipulated in the notifications/ byelaws/ Acts/Rules/ regulations including amendments, if due to the Contractor including his amount of performance security. The Employer/Engineer shall also have right to recover from the Contractor any sum required or estimated to be required for making good the loss or damage suffered by the Employer.

The employees of the Contractor and the sub-Contractor in no case shall be treated as the employees of the Employer at any point of time.

## **SALIENT FEATURES OF SOME MAJOR LABOUR LAWS APPLICABLE TO ESTABLISHMENTS ENGAGED IN BUILDING AND OTHER CONSTRUCTION WORK**

- a) Workmen Compensation Act 1923:- The Act provides for compensation in case of injury by accident arising out of and during the course of employment.
- b) Payment of Gratuity Act 1972 :- Gratuity is payable to an employee under the Act on satisfaction of certain conditions on separation if an employee has completed 5 years' service or more on death, the rate of 15 days wages for every completed year of service. The Act is applicable to all establishments employing 10 or more employees.
- c) Employee P.F. and Miscellaneous Provision Act 1952:- The Act provides for monthly contributions by the employer plus workers @ 10% or 8.33%. The benefits payable under the Act are:
  - (i) Pension or family pension on retirement or death, as the case may be.
  - (ii) Deposit linked insurance on the death in harness of the worker (iii) (iii) Payment of P.F. accumulation on retirement/death etc.
- d) Maternity Benefit Act 1951:- The Act provides for leave and some other benefits to women employees in case of confinement or miscarriage etc.:
- e) Contract Labor (Regulations & Abolition) Act 1970:- The Act provides for certain welfare measures to be provided by the Contractor to contract labour and case the Contractor fails to provide, the same are required to be provided, by take Principal Employer by Law. The Principal Employer is required to take Certificate of Registration and the Contractor is required to take License from the designated Officer. The Act is applicable to the establishments or Contractor of Employer, if they employ 20 or more contract labour.
- f) Minimum Wages Act 1948:- The Employer is supposed to pay not less than the Minimum Wages fixed by appropriate Government as per Construction of Buildings, Roads Runways scheduled employments.
- g) Payment of Wages Act 1936:- It lays down as to by what date the wages are to be paid, when it will be paid and what deductions can be made from the wages of the workers.
- h) Equal Remuneration Act 1979:- The provides for payment of equal wages for work of equal nature to Male and Female workers and for not making discrimination against Female employees in the matters of transfers, training and promotions etc.
- i) Payment of Bonus Act 1965:- The Act is applicable to all establishment employing 20 or more employees, The Act provides for payments of annual bonus subject to a minimum of 8.33% of wages and maximum of 20% of wages to employees drawing Rs. 3500/- per month or less. The bonus to be paid to employees getting Rs. 2500/- per month or above up to Rs. 3500/- per month shall be worked out by taking wages as Rs. 2500/- per month only. The Act does not apply to certain establishments. The set-up establishments are exempted for five years in certain circumstances the State Governments have reduced the employment size from 20 to 10 for purpose of applicability of this Act.

- j) Industrial Disputes Act 1947:- The Act lays down the machinery and proceed resolution of Industrial disputes, in what situations a strike or lock-out becomes and what are the requirements for laying off or retrenching the employees on down the establishment,
- k) Industrial Employment (Standing orders) Act 1946: - It is applicable establishments employing 100 or more workmen (employment size reduced the States and Central Government to 50) The Act provides for laying down governing the Conditions of employment by the Employer on matters provided in and get the same certified by the designated Authority.
- l) Trade Unions Act 1926:- The Act lays down the procedure for registration of unions of workmen and employers The Trade Unions registered under the Act has given certain immunities from civil and criminal liabilities.
- m) Child Labour (Prohibition & Regulation) Act 1986: - The Act prohibits employers of children below 14 years of age in certain occupations and processes and regulation of employment of children in all other occupations and Employment of Child Labour is prohibited in Building and Construction Industry.
- n) Inter-State Migrant workmen's (Regulation of Employment & Conditions) act 1979:-The act is applicable to an establishment which employees 5 or state migrant workmen through an intermediary (who has required workman state for employment in the establishment situated in another state). The migrant workman in an establishment to which this act becomes applicable required to be provided a certain facility such as housing medical expenses from home up to the establishment back etc.
- o) The Building and other construction workers (Regulation of employer and Conditions of Service) Act 1996 and the Cass Act of 1996: - All the establishment who carry on any building or other construction work and employs 10 workers are covered under this Act. All such establishments are required to paper the rate not exceeding 2% of the post of construction as may be modification government. The employer of the establishment is required to provide safety at the building or construction work and for the welfare measures such as first and facilities, Ambulance, Housing accommodation for workers near place etc. The employer to whom the act applies has to obtain a registration from the registry officer appointed by the government.
- p) Factories Act 1948: - The Act lays down the procedure for approval of setting of a factory, health and safety provisions welfare provisions, annual, earned leave and rendering information regarding accidents to designated authorities. It is applicable to premises employee with add of power or 20 or more persons without the aid of power turning process.

## **SECTION 4**

### **CONTRACT DATA**

## CONTRACT DATA

**Clause Reference  
with respect to  
section 3.**

Items marked “N/A” do not apply in this contracts

1. The Employer is Name: **Chairman-cum-Managing Director, JUIDCO Ltd.** (Cl. 1.1.)  
 Address: **3<sup>rd</sup> Floor, Pragati Sadan, Kutchery Road, Ranchi - 834001**  
 Name of Employer’s Representative: **General Manager (W&P), JUIDCO Ltd.**
2. The Engineer is  
 Name of Authorized Representative: **Project Manager, I/C, Construction of road from Airport to Birsa Chowk, Road No. 1, JUIDCO Ltd.**
3. Deleted
4. The Defects Liability period is 365 days from the date of completion, (Cl.1.1& 35)
5. The Start Date shall be the same day for the date of issue of the Notice to Proceed with the work. (Cl. 1.1)
6. The Intended Completion Date for the whole of the Works is **24 Months** after start of work with the following milestones: (Cl.1.1.17&28)  
 Milestone dates: (Cl.2.2&49.1)  

Physical works to be completed.	Period from the start date
Milestone 1 – 25% (of whole work)	6 Months
Milestone 2 – 50% (of whole work)	12 Months
Milestone 3 – 75% (of whole work)	18 Months
Milestone 4 – 100% - FULL	24 Months
7. The Site is located between Airport to Birsa Chowk via Hinoo Chowk (Cl.1.1)
8. The name and identification number of the Contract is: Name of Work - **Construction of Road from** Airport to Birsa Chowk via Hinoo Chowk.  
 Identification No. **JUIDCO/NIT/AR\_BC/RNI/2017/89** (Cl.1.1)
9. The works consist of **Construction of Road from** Airport to Birsa Chowk via Hinoo Chowk (Cl.1.1)



**Clause Reference with  
respect to section 3**

**(A) Road Works**

Site clearance; setting-out and layout; widening of existing carriageway and strengthening including camber corrections; construction of new road/parallel service road; bituminous pavements remodeling/construction of junctions, intersections, bus bays, lay byes, supplying and placing of drainage channels, flumes, guard posts and guard other related items; construction/extension of cross drainage works, bridges, approaches and other related stones; road markings, road signs and kilometer/hectometer stones; protective works for roads/ bridges; all aspects of quality assurance of various components of the works, rectification of the defects in the completed works during the Defects Liability Period; submission of “As-built” drawings, and any other related document and other item of work as may be required to be carried out for completing the works in accordance with the drawings and provisions of the contract to ensure safety.

**(C) Other Items**

Any other items as required to fulfill all contractual obligations as per the Bid documents.	(Cl.1.1)
10. The following documents also form part of the Contract:	(Cl.2.3(9))
11. The law which applies to the Contract is the law of Union of India	(Cl.3.1)
12. The language of the Contract documents is English	(Cl.3.1)
13. Limit of subcontracting 50% of the Initial Contract Price	(Cl.7.1)
14. The Schedule of Other Contractors	(Cl.8)
15. The Schedule of Key personnel As per Annex—II to Section-I	(Cl.9)
16. The minimum insurance cover for physical property, injury and death is	(Cl.13)
Rs. 5 lakhs per occurrence with number of occurrences limited to four, after each occurrence, contractor will pay additional premium necessary to make insurance valid four occurrences always.	
17. Site investigation report.	(Cl.14)
18. The Site Possession Dates shall be_____	(Cl.21)
19. Deleted	
20. Deleted	
21. The period for submission of the programmer for approval of Engineer	(Cl.27.1)
Shall be 21 days from the issue of latter of Acceptance.	
22. The period between program expires shall be <b>15</b> days.	(Cl.27.3)
23. The amount to be withheld for let submission on updated	(Cl.27.3)
Programme shall be Rs. 20.00 lakhs (Rupees Twenty Lakhs Only)	
24. Deleted	

25. The currency of the Contract is Indian Rupees. (Cl.46)

26. The formula (e) for adjustment of prices are; (Cl.47)

R= Value of work as defined in Clause 47.1 of Conditions of Contract

**Adjustment for cement component**

- (i) Price adjustment for increase or decrease in the cost of cement procured by the contractor shall be paid in accordance with the following formula:

$$V_c = 0.85 \times P_c / 100 \times R \times (C_i - C_o) / C_o$$

$V_c$  = Increase or decrease in the cost of work during the month under consideration due to changes in rates for cement.

$C_o$  = The all India wholesale price index for cement on 28 days preceding the date of opening of Bids as published by the Ministry of Industrial Development, government of India, New Delhi.

$C_i$  = The all India average wholesale price index for cement for the month under consideration as published by Ministry of Industrial Development. Government of India, New Delhi

$P_c$  = Percentage of cement component of the work

**Adjustment for steel component**

- (ii) Price adjustment for increase or decrease in the cost of steel procured by the Contractor shall be paid in accordance with the following formula:

$$V_s = 0.85 \times P_s / 100 \times R \times (S_i - S_o) / S_o$$

$V_s$  = Increase or decrease in the cost of work during the month under consideration due to changes in the rates for steel

$S_o$  = The all India wholesale price index for steel (Bars and Rods) on 28 days preceding the date of opening of Bids as published by the Ministry of Industrial Development Government of India, New Delhi,

$S_i$  = The all India average wholesale price index for steel (Bars and Rods) for the month under consideration as published by ministry of Industrial Development, New Delhi

$P_s$  = Percentage of steel component of the work

Note: For the application of this clause, index of Bars and Rods has been chosen to represent steel group.

with respect to section 3

### **Adjustment of bitumen component**

(iii) Price adjustment for increase or decrease in the cost of bitumen shall be paid in accordance with the following formula:

$$V_h = 0.85 \times P_h / 100 \times R \times (B_i - B_o) / B_o$$

$V_h$  = Increase or decrease in the cost of work during the month under consideration due to changes in rates for bitumen.

$B_o$  = The official retail price of bitumen at the IOC depot at nearest center on the day 28 days prior to date of opening of Bids.

$B_i$  = The official retail price of bitumen of IOC depot at nearest center for the 15 days of the month under consideration.

$P_b$  = Percentage of bitumen component of the work

### **Adjustment of other Materials Component**

(iv) Price adjustment for increase or decrease in cost of local materials other than cement; bitumen and POL procured by the contractor shall be paid in accordance with the following formula:

$$V_M = 0.85 \times P_M / 100 \times R \times (M_i - M_o) / M_o$$

$V_M$  = Increase or decrease in the cost of work during the month under consideration due to changes in rates for local materials other than cement, steel, bitumen and POL.

$M_o$  = The all India wholesale price index (all commodities) on 28 days preceding the date of opening of Bids as published by the Ministry of Industrial Development, government of India, New Delhi

$M_i$  = The all India wholesale price index (all commodities) for the month under consideration as published by ministry of Industrial Development, government of India New Delhi

$P_M$  = Percentage of local material component (other than cement, steel, bitumen and POL) of the work,

Clause Reference

with respect  
to section 3

The following percentages will govern the price adjustment for the entire contract

- |     |  |   |            |
|-----|--|---|------------|
| 1.  | Cement- $P_c$  | 5%  |            |
| 2.  | Steel- $P_s$   | 5%  |            |
| 3.  | Bitumen- $P_b$   | 10%   |            |
| 4.  | Other materials- $P_m$   | 45%   |            |
|     |  |   |            |
|     | Total  | 65%   |            |
| 27. | The proportion of payments retained (retention money) shall be 9% from each bill subject to a maximum of 8% of final contract price. |   | (Cl.48)    |
| 28. | Amount of liquidated damages for delay in completion of works  | FOR Whole of work<br>(1/2000)" of the Initial Contract price.<br>Rounded off to the nearest Thousand, per Day.<br>For-----sectional completion<br>(wherever specified in item 6 of contract Data) (1/200)" of initial contract price rounded off to the nearest Thousand per day. | (Cl.49)    |
| 29. | Maximum limit of liquidated damages for delay in completion of work  | 10 percent of the Initial Contract price<br>Rounded off to the nearest thousand   | (Cl.49)    |
| 30. | Amount of Bonus for early completion Of whole of the works   | 1 percent of the Initial Contract price (part of a Month to be excluded) rounded off to the nearest Thousand, per month   | (Cl.50)    |
| 31. | Maximum limit of bonus for early Completion or work  | 6 percent of the contract price rounded off to the Nearest thousand   | (Cl.50)    |
| 32. | The amounts of the advance payment are:  |   | (Cl.51&52) |

**Clause Reference  
with respect  
to section 3**

Nature of Advance	Amount (Rs.)	Conditions to be fulfilled
i. Mobilization 10% of the Contract Price		On submission of unconditional Bank Guarantee (to be drawn before the end of 20% of Contract Period). The contractor may furnish four bank Guarantees of 2.5% each, valid for full period.
ii. Equipment 90% for new and 50% of depreciated value for old equipment. Total amount will be subject to a maximum of 5 % of the Contract price.		After equipment is brought to site (Provided the Engineer is satisfied that the equipment is required for performance of the contract) and on submission of unconditional Bank Guarantee for amount of advance.
33. Repayment of advance payment for mobilization and equipment:		(Cl.51.3) The advance loan shall be repaid with percentage deductions from the interim payments certified by the Engineer under the Contract. Deductions shall commence in the next interim payment Certificate following that in which the total of all such payments to the Contractor has reached not less than 20 percent of the contract price of 6 (six) months from the date of payment of first installment of advance whichever period concludes earlier, and shall be made at the rate of 20 percent of the amounts of all Interim payment certificates until such time as the loan has been repaid, always provided that the loan shall be completely repaid prior to the expiry of the original time for completion pursuant to Clauses 17 and 28.
34. Deleted.		
35. The Securities shall be for the following minimum amounts equivalent as a percentage of the Contract price.		
		Performance Security for 2 percent of contract price plus Rs. ----- (to be decided after evaluation of the bid) as additional security in terms of ITB Clause 29.5
The standard form of performance Security acceptable to the Employer shall be an unconditional Bank Guarantee of the type as presented in section 8 of the Bidding Documents.		
36. The Schedule of Operating and Maintenance Manuals-----	N/A	(Cl.58)
37. The date by which as built drawing (in scale as directed) in 2 sets are required is within 28 days of Issue of certificate of completion of whole or section of the work, as the case may be.		(Cl.58)

38. The amount to be withheld for failing to supply as built drawing by the date required is Rs 30.00 Lakhs (Rupees Thirty Lakhs Only) (Cl.58)
39. The following events shall also be fundamental breach of contract “The Contractor has contravened Sub-clause 7.1 and Clause 9 of GCC” (Cl.59.2)
40. The percentage to apply to the value of the work not completed representing the Employer’s Additional cost for completing the works shall be 20 percent. (Cl.60)

**SECTION-5**  
**TECHNICAL SPECIFICATION**

## **SECTION 5 – TECHNICAL SPECIFICATION**

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## **1. PREAMBLE**

### **1.1.1 General**

The Technical specification covering the materials and the workmanship aspects as well as method of measurements and payments are included in this section. These specifications cover the items of civil and non-civil works coming under scope of this document. All work shall be carried out in conformity with the same. These specifications are not intended to cover the minute details. The works shall be executed in accordance with good practices followed for achieving high standards of workmanship, thus ensuring safety and durability of the construction. All codes and standard referred to in these specifications shall be the latest thereof, unless otherwise stated.

### **1.1.2 Inclusive Documents**

The provisions of special conditions of contract, those specified elsewhere in the Bid documents, as well as execution drawings and notes or other specifications issued in writing by the Engineer shall form part of the technical specification of this project.

The attention of the Contractor is drawn to those clauses of codes, which require supporting specification either by the Engineer or by "Mutual agreement between the supplier and purchaser". In such cases, it is the responsibility of the Bidder/ contractor to seek clarification on any uncertainty and obtain prior approval of the Engineer before taking up the supply/construction. In absence of such prior clarification, the Engineer's choice/design will be final and binding on the contractor without involving separately any additional payment.

### **1.1.3 Defective Works**

All defective works are liable to be demolished and to be rebuilt and defective materials replaced by the Contractor at his own cost without involving any time extension.

## **1.2 SITE INFORMATION**

1.2.1 The information given hereunder and provided elsewhere in these documents is given in good faith by JUIDCO Ltd. but the Contractor shall satisfy himself regarding all aspects of site conditions and no claim will be entertained on the plea that the information supplied by JUIDCO Ltd is erroneous or insufficient.

1.2.2 The works involves construction of flyovers, approach road, service road, drains, rain water harvesting, pier protection, electrical, illumination works and telecommunication work, confirmatory boring and other miscellaneous works at two locations in the Ranchi city as specified elsewhere in the tender document.

### **1.2.3 General Climatic Conditions**

- The temperature in this region ranges between 5.3°C and 42.1°C
- The heaviest rainfall in 24 Hrs is 231.1mm and average annual rainfall 1431.6mm
- The works are located in seismic zone II as defined in IRC-6.

## **2. GENERAL REQUIREMENTS**

The technical Specification in accordance with which the entire work described hereinafter shall be constructed and completed by the Contractor and comprise of the following:

## **PART I – GENERAL TECHNICAL SPECIFICATION**

The General Technical Specification shall be the “Specification for Road and bridge work” (Fifth Revision - April 2013) issued by the Ministry of Road Transport and Highways, Government of India and published by the Indian Roads Congress (IRC), Jamnagar House, New Delhi-110001 with a cross reference to relevant Bureau of Indian Standards (BIS) for materials or other aspects not covered by the IRC.

1.0 This part shall comprise the Specification for Road & Bridge Works” (Fifth Revision), issued by the Ministry of, Road transport and highways, Govt of India & published by the Indian Road Congress, Jamnagar House, New Delhi- 110001, all as deemed to be bound into this document.

### **1.1 General condition regarding use of equipment in works :**

In addition to the general conditions already mentioned in Volume –I, the following requirement regarding the use of equipments in works shall be satisfied:-

- (a) The contractor shall be required to give a trial run of the equipment(s) to meet the requirements of specification tolerance criteria and completion of work as per programme before commencement of work;
- (b) All equipment’s provided shall be of proven efficiency and shall be operated and maintained at all times in a manner as specified by the manufactures or industry practice. Regular report on proper and adequate maintenance shall be submitted to the Engineer in the format and at intervals as approved by the Engineer.
- (c) No equipment of personnel will be removed from site without the permission of the engineer.

1.2 Where the term crushed stone is referred to in the Specification for Road & Bridge Works of the MoRT&H (Clause 1007) for use as aggregate in construction, it would mean that the aggregates would be obtained through the use of crusher/granulator and vibratory screens of suitable capacity and of required grading.

### **2.0 Quality Control on Works & Materials**

Quality control on material and execution remains the primary responsibility of the contractor. The contractor will submit a detailed quality assurance plan for the material input and finished output and workmanship for employers/engineers clearance/approval.

Nevertheless the Engineer will inspect the work from time to time during and after construction and get the quality of the work tested (by himself, by his Testing & Quality Control Units and/or by any other agency deemed fit by him) generally as per the requirements of the Handbook of Quality Control for Construction of Roads & Runways (IRC Special Publication No 11 & Section-900/1000 of MoRT&H Specification).

### **3.0 Surveying & Measuring Equipment’s**

Equipment’s for surveying and measurement of the work shall be procured by the Contractor for his use. The same shall also be made available to the Engineer at site for any work connected with the Contract without any Charge.

## **2.2 PART II- SUPPLEMENTARY TECHNICAL SPECIFICATIONS**

The Supplementary Technical Specification shall comprise of various Amendments/Modifications/Additions to the “SPECIFICATION FOR ROADS AND BRIDGE WORKS” referred to in Part I above and also Additional Specifications for particular item if works not already covered in Part I.

- 2.2.1 A particular Clause or a part thereof in “SPECIFICATION FOR ROAD AND BRIDGE WORKS (FIFTH REVISION – APRIL 2013)”referred to in Part -I above, where Amended/Modified/Added upon and incorporation in Part-II referred to above, such Amendment/Modification/Addition supersedes the relevant Clause or part of the Clause.
- 2.2.2 When an Amended/Modified /Added Clause supersedes a Clause or part thereof in the said specifications, then any reference to the superseded Clause shall be deemed to refer to the Amended/modified /Added Clause or part thereof.
- 2.2.3 In so far as Amended /Modified/Added Clause may come in conflict or be inconsistent with any of the provisions of the said Specifications under reference, the Amended/modified/Added clause shall always prevail.
- 2.2.4 The Additional Specifications shall comprise specifications for particular item of works not already covered in Part-I.
- 2.2.5 In the absence of any definite provisions on any particular issue in the aforesaid specifications, reference may be made to the latest codes and specifications of IRC, BIS, BS, ASTM, AASHTO and CAN/CSA in that order. Where even these are silent, the construction and completion of the works shall conform to sound engineering practice as approval by the Engineer.

**AMENDMENTS/MODIFICATIONS/ADDITIONS to the existing CLAUSES of SPECIFICATIONS  
FOR ROAD & BRIDGE WORKS, MoRTH, FIFTH Edition:**

SECTION 100	<b>General</b>
Clause 103	<b>Materials and test Standards:</b> Add the following at the end of the clause: “The latest edition of these standards till 30(thirty) days before the final date of submission of the Bid shall be adopted.”
Clause 106	<p><b>Construction Equipment</b></p> <p>Add the following below sub para (k)</p> <p>I) All measuring device and gauges shall be in good working condition. Measuring devices that can affect product quality shall be calibrated prior to use and at prescribed intervals against certified equipment. Calibration procedures shall be established, maintained and documented and corrective actions taken when results are unsatisfactory. Accuracy and fitness if measuring devices shall be ensured by proper maintenance.</p> <p>J) In addition to the listed plant &amp; equipment, any other plants &amp; requirement necessary for construction activities shall be provided by the contractor as directed by the Engineer.</p>
Clause 107	<b>Contract Drawings</b>
Clause 107.3	<p>Add the following after the end of the para :</p> <p>“After careful study of the drawings issued by the Engineer, the contractor shall prepare ,where necessary ,all supplementary and working drawing with necessary field/construction information and the methodology for construction and procedure etc. and shall submit the same to the Engineer for approval prior to construction progressively according to the work programme accepted by the Engineer. Engineer shall be given not less than 21 days for review of these supplementary/working drawings and as directed, the contractor shall modify the drawing incorporating the comments and requirements of the Engineer.</p>
Clause 108	<b>Site Information</b>
Clause 108.2	<p>Add the following after the end of the para :</p> <p>“Before quoting for the job, the bidder should visit the site. The bidder shall identify Quarries. Borrow areas and other sources of materials required for the work. He shall satisfy himself that the required materials are available in adequate quantities and complying with the requirements of specifications. No claims shall be entertained on account of non-availability and inadequacy of materials, and increase in leads on that pretext”.</p>
Clause 109	<b>Setting Out</b>

Clause 109.8	<p>Add the following after the end the para:</p> <p>“Surveying Equipments and Personnel</p> <p>The Contractor shall provide the necessary surveying equipments, accessories, surveyors and labours required for setting out and related measurements including making available these to the Engineer and his representative at different stages of the work. The surveying equipment shall be of high standard of manufacture in good working condition with adequate numbers.</p> <p>The Contractor shall maintain the surveying equipment in good condition during the full duration of works and replace the one which get worn out or otherwise become unworkable. The surveying equipment and related resources shall be provided under the general obligations of the Contractor requiring no separate payment.</p> ”
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Clause 110	Public utilities
Clause 110.3	<p>Add the following after the end of the para :</p> <p>Any utility likely to be affected by the Contractor's work shall be brought to the notice of the Engineer/ Employer and such work shall be undertaken only after getting written clearance from the Engineer.</p>
Clause 111.2	<p><b>Borrow pits for Embankment Construction</b></p> <p>Delete the word "Normally" in the second line of the para</p>
Clause 111.3	<p><b>Quarry Operations</b></p> <p>Add the following after the end of the para:</p> <p>Contractor shall ensure scheduling the movement of transport carrying material to and from site during non-peak hours. The trucks carrying dusty material shall be covered with tarpaulin and provided with adequate free board to prevent spillage. End boards shall be provided in loaders to prevent spillage. Stockpiling of material shall be properly planned so as to ensure that no traffic jam takes place.</p>
Clause 111.4.1	<p><b>Precautions against Dust</b></p> <p>The contractor shall take all reasonable steps to minimize dust nuisance during the construction of the works. All existing highway and roads used by vehicles of the contractor or any of his sub-contractor or supplier of materials or plant, and similarly any new roads which are part of the works and which are being used by traffic, shall be kept clean and clear of all dust/mud or other extraneous materials dropped by the said vehicle or their tyres. Similarly, the Contractor shall immediately and clear all dust or mud or other extraneous materials from the works spreading on these highways clearance shall be effected by manual sweeping and removal of debris, or, if so directed by the Engineer, by mechanical sweeping and clearing equipment, and all dust, mud and other debris shall be removed entirely from the road surface. Additionally, the road surface shall be hosted or watered using suitable equipment to avoid dust pollution. Special care shall be taken to combat dust problem originating from use to Flash/Pond ash. If at all any crops in the side field adjacent to the work are damaged, the Contractor has to compensate to the field owners at his cost and no claim what so ever will be entertained.</p>
Clause 111.8.5	<p>Any structural damage caused to the existing road/structures by his construction equipment shall be made good without any extra cost.</p>
Clause 112	Arrangement for <b>Traffic During Construction</b>
Clause 112.1	<p>General</p> <p>Add the following at the end of clause 112.1:</p> <p>"Two weeks before undertaking work which would involve any obstruction whatsoever to traffic, the contractor shall submit, for the Engineer's approval, a Traffic Control Plan.</p> <p>Special consideration shall be given in the preparation of the Traffic Control Plan for the safety of pedestrian and works and delineation of the roadway at night.</p> <p>Temporary diversion will be constructed only with the approval of the Engineer.</p>

Clause 112.2	<p>1<sup>st</sup> Para shall be read as under</p> <p>For widening and strengthening of the existing part width of the carriageway is proposed to be used for passage of traffic, carriageway or paved shoulder shall be ensured for traffic movement with the following requirement:</p> <ol style="list-style-type: none"> <li>1. At Least one 7.0m lane to remain open to traffic at all time;</li> <li>2. The surface used for the through traffic shall at all time free of potholes and other defects.</li> </ol>
Clause 112.4	<p>Add at the end of the clause as 6<sup>th</sup> para the following</p> <p>The Contractor shall be fully responsible for the adequate safety of all site operations and methods of construction. The Contractor shall submit to the Engineer detailed proposed covering safety measures proposal to be adopted at site.</p> <p>Persistent breaches of the safety provisions by the Contractor and his employee shall constitute a sufficient cause for action. The contractor shall also observe the following additional safety provisions :</p> <ul style="list-style-type: none"> <li>• All workmen shall use safety helmets at work site, which should be provided by the contractor.</li> <li>• All workmen shall wear reflective jackets, while working at site and in the traffic movement zone, which should be provided by the Contractor.</li> <li>• Adequate precautions shall be taken to prevent danger from electric cables, while digging operation is underway.</li> <li>• Workers employed on bituminous work, stone crushers, concrete batching plants etc. shall be provided with protective goggles and suitable footwear.</li> <li>• Those engaged in welding work shall be providing with welder protective shields.</li> <li>• All scaffolds, ladders and safety devices shall be maintained in safe and sound conditions.</li> <li>• All display boards shall be of retro-reflective material and of sizes as per IRC Specifications or as mentioned in the drawings or as approved by the Engineer.</li> <li>• Flag men should be deployed throughout the period if construction with flas to regulate traffic as per the directions if the Engineer.</li> <li>• During launching of girders, additional safety precaution are to be taken.</li> </ul>
112.6	<p>Clause 112.6 shall read as :</p> <p>“All arrangements as contained in this section 112 for safety of road users, safety of all site operations during construction including provision of temporary diversions/temporary cross drainage structures/treated shoulders their maintenance, dismantling and clearing debris shall be considered as incidental to the works and shall not be paid separately.</p>
Clause 114	Scope of Rates for Different items of Works
Clause 114.2	<p>Add the following as item (xix) of the sub clause 114.2: Monthly progress report in a format acceptable to the Engineer shall be submitted. The report shall state the progress which has been achieved compared with the planned progress. Illustrate delays proportion to the progress planned, analyze the consequences and state planned corrective measures. Intermediate progress report may also be required. Soft copy for Monthly Progress report shall also be provided. Adequate photography evidence shall be provided for the activities undertaken, achieved and shall be form a part this progress report.</p> <p>The first issue form the detailed construction programme including the detailed description of he system and the procedures shall be submitted to the Engineer for acceptance not later than 28 days after the date of receipt of the letter of acceptance. Monthly progress report shall be submitted before 10<sup>th</sup> day of every month.</p>
115.3	<p>Replace 115.3 c) with the following :</p> <p>Sequence of construction, details of temporary or enabling works like, diversions, framework including specialized formwork for superstructure, details of borrow areas, method of construction of embankment and subgrade, pavements, piles, concerting procedures, details of proprietary processes</p>

	<p>and product (e.g details of restressing system, bearings, expansion joints etc.), procedure for girder launching and details of equipment to be deployed. Wherever necessary, technical literature, design calculation and drawing shall be included in the methods statement.</p> <p>115.3 a), b) d) e) &amp; last para remains unchanged.</p>
115.4	<p>Replace 115.3 d) with the following:</p> <p>Name of manufacturer and name of product/process/system complete details of the manufacturer of the product/processes/system shall be furnished. Details of project where similar product/process/system has been successfully used shall be furnished. Authenticated copies of license/collaboration agreement shall be furnished.</p> <p>Replace 115.4b) with the following :</p> <p>General feature of the product/product process/system detailed write up with method statement shall be furnished for each product/process/system. This shall include complete working drawing &amp; installation drawings, technical specification covering fabrication, materials, system of corrosion protection etc.</p> <p>Replace 115.3 d) with the following :</p> <p>“Acceptance test and criteria Shall submit a quality assurance system document. Details of acceptance test and criteria of acceptance shall be furnished in this document 115.4 c) e), f) &amp; g) remains unchanged.</p>
Clause 120.2	<p>Add the following at the end of note of Table 100-2.</p> <p>The type &amp; quantity of various field &amp; laboratory equipment shall be assessed by the contractor and are to be provided in the site laboratory. The list shall be submitted for approval of engineer before setting up of laboratory.</p>
Clause 202.5	<p><b>Disposal of Materials</b></p> <p>Delete this Sub-clause and replace with :</p> <p>“Materials determined by the Engineer as having salvage value shall be placed in neat stacks of like materials within the Right of Way as directed by the Engineer with all lifts and leads.</p> <p>All materials obtained from dismantling operations, which, in the opinion of the Engineer cannot be used or auctioned, shall be removed from the site by the contractor and disposed off with all leads and lifts.</p>
SECTION 300	EARTHWORK, EROSION CONTROL AND DRAINAGE
Clause 305.2.2.2	<p><b>Borrow materials</b></p> <p>Add the following at the start of Para 1 of his clause :</p> <p>“No borrow area shall be made available by the Employer for this work”</p>
Clause 406.2.1.1	<p>Add at the end of first paragraph:</p> <p>The fraction of materials passing through 4.75mm sieve shall be crusher run screening only. The river sand or quarry sand shall not be permitted either as such or mixed with crusher-run-screening in the Wet Mix Macadam.</p>
Clause 504.2.2	Delete the word “Crushed Gravel” in the first sentence of the para.



Clause 505.2.2	<b>Coarse aggregates</b>
507.2.2	Delete the word “Crushed Gravel” in the first sentence of the first para.
Clause 903.4.3	<p>Add the following at the end of para:</p> <p>Bituminous works, shall be tested immediately after laying/finishing for :</p> <ul style="list-style-type: none"> <li>a) Thickness (compacted) measured by extracting cores and shall be dealt in accordance with MORT&amp;H Specifications section 900.</li> <li>b) Density (compaction) test as performed on the extracted cores.</li> <li>c) Workmanship test by measuring roughness of the finished layer by duly calibrated Towed Fifth Wheel Bump integrator.</li> </ul> <p>Note: Contractor shall arrange the core extraction machine at his cost and shall take cores of the executed bituminous works jointly with Engineer without any extra cost.</p>
SECTION 1000	<b>MATERIALS FOR STRUCTURES</b>
Clause 1006	<p>Cement</p> <p>Cements of 43 and 53 grade Ordinary Portland cement conforming IS 8112 and 12269 respectively shall be used for this work</p>
Clause 1007	<p><b>Coarse Aggregates</b></p> <p>Delete the word “Crushed Gravel, Natural gravel” in the first sentence of the first para.</p>
Clause 1008	Delete the word “Gravel” in the first sentence of the first para.
Clause 1113	<p><b>PILE TESTS</b></p> <p><b>Add the following :</b></p> <p><b>General</b></p> <p>The initial and routine pile load tests proposed for flyovers shall all be as per specifications and included as part of the bye work for the pilling. Nothing additional will be payable for conducting routine and initial pile load test including installation of piles for initial load tests.</p> <p>1113.1 to 1113.4 remains unchanged.</p>
Clause 1115.2	<p><b>Bored Cast-in-Situ piles</b></p> <p>Add to the clause 1115.2.8 at last para: Other recommendations for tremie concreting are :</p> <ul style="list-style-type: none"> <li>(i) The sides of the bore-hole have to be stable throughout.</li> <li>(ii) The tremie shall be water-tight throughout its length and have a hopper attached at its head by a water-tight connection.</li> <li>(iii) The tremie pipe shall be large enough in relation to the size of aggregates. For 20mm aggregate, the tremie pipe shall be of diameter not less than 150mm and for larger size aggregate tremie pipe of larger diameter is required.</li> <li>(iv) The tremie pipe shall be lowered to the bottom of the borehole allowing water or drilling mud to rise inside it before pouring concrete.</li> <li>(v) The tremie pipe shall always be kept full of concrete and shall penetrate well into the concrete in the bore-hole with adequate margin of safety against accidental withdrawal if the pipe is surged to discharge the concrete.</li> </ul> <p>For very long or large diameter piles, use of retarding plasticiser in concrete is desirable.</p>
SECTION 1500	<b>FORMWORK</b>

Clause 1503	<b>Design of Formwork</b>
Clause 1503.2	<p>The following shall be added to this clause :</p> <p>“For distribution of load and load transfer to the ground through staging, an appropriately designed base plate must be provided which shall rest on firm sub-stratum. The loading from the form work shall be distributed to the soil or the permanent works below (e.g. pile cap) in such a manner that any total or differential settlement are within acceptable limits.”</p>
Clause 1505	<p>Substitute the following Clause in place of the existing clause :</p> <p><b>Formed &amp; Unformed Surface Finishes</b></p> <p>The surface finishes for formed and unformed surfaces are classified and defined as below Surface irregularities permitted for the various classes of finishes are termed either ‘abrupt’ or ‘gradual’. Fins or offsets caused by displaced or misplaced form sheeting, lining or form sections, by loose knots in form lumber or by otherwise defective form lumber are considered abrupt irregularities. All other cases are described as gradual irregularities. Gradual irregularities will be measured with a template consisting of a straight edge for plain surfaces or its equivalent for curved surfaces. The length of template for testing gradual irregularities on formed surfaces shall be 1.5m in length, the permissible gradual irregularities being measured over this length of the template.</p> <p>Finish F1, F2, and F3 shall describe formed surfaces.</p> <p>Finish U1, U2 and U3 shall describe unformed surfaces.</p> <p><b>Class F1 Finish</b></p> <p>The class F1 finish shall apply to all formed surfaces for which class F2 or F3 is not specified. It shall generally be formed by steel frame mounted with steel sheet. It shall be so constructed that there shall be no loss of material from the concrete during placement and compaction. After hardening, the concrete shall be in the required positions and shall have the shape and dimensions called for in the drawing. Any abrupt irregularities shall not exceed 10mm. All fins and drifts in excess of the above limits shall be made good by chipping and grinding if required by the Engineer. Small blemishes caused by entrapped air or water may be expected but the surface shall be free from voids, honeycombing or other large blemishes. Class F1 finish shall be generally specified for all surfaces buried in ground or not visible during service or for all surfaces that are to receive further rendering treatment such as plastering etc. Unless otherwise specified in the item of Bill of Quantity the surface finish shall be understood to be class F1.</p> <p><b>Class F2 Finish</b></p> <p>Class F2 finish shall be obtained by use of properly designed forms with steel sheet lining. The abrupt irregularities shall not exceed 5mm and gradual irregularities shall be less than 8mm. Small blemishes caused by entrapped air or water may be permitted but the surface shall be free from honeycombing, voids and large blemishes. Surface irregularities in excess of those stipulated shall be removed by chipping or rubbing with abrasive stone.</p> <p><b>Class F3 Finish</b></p> <p>Class F3 Finish shall be formed by specially designed close jointed rigid forms having lining or high quality form plywood. The surface irregularities shall be limited to nil for abrupt irregularities and 3 mm for gradual irregularities, Class F3 finish may be obtained from class F2 finish by carefully removing all abrupt irregularities including fins and projections by rubbing/grinding. If steel are used they shall have steel sheet backing faced with plywood.</p>

	<p>In addition finish F3 shall include filling air holes with mortar and treatment of the entire surface with sack rubbed finish. It shall also include clean-up of loose and adhering debris. For a sack rubbed finish, the surface shall be prepared within two days after removal of the forms. The surface shall be wetted two days after removal of the forms. The surface shall be wetted and allowed to dry slightly before mortar is applied by sack rubbing. The mortar used shall consist of one part cement to one and one half parts by volume of fine (I.S.No. 16 mesh) sand. Only sufficient mixing water to give the mortar a workable consistency shall be used. The mortar a workable consistency shall be used. The mortar shall then be rubbed over the surface with a fine burlap or linen cloth so as to fill all the surface voids. The mortar in the voids shall be allowed to stiffen and solidify after which the whole surface shall be wiped clean with clean burlap such that all air holes etc. are filled and the entire surface presents a uniform appearance without air holes, irregularities etc.</p> <p><b>Class U1 finish</b></p> <p>This is the screeded finish used on surfaces over which other finishes such as wearing coats etc are to be placed. It is also the first step in the formation of U2 and U3 finishes. The finishing operation consists of levelling and screeding the concrete to produce an even and uniform surface so that the gradual irregularities are not greater than 5 mm. Surplus concrete should be removed immediately after consolidation by striking it off with a sawing motion of a straight edge or template across a wooden or metal strip that has been set as guide. Unless the drawings specify a horizontal surface or show the slope required, the tops of narrow surfaces, such as stair treads, walls, curbs and parapets shall be sloped approximately 10 mm per 300 mm width. Surfaces to be covered with concrete topping, terrazzo, and similar surfaces shall be smooth screeded and levelled to produce even surfaces, irregularities not exceeding 5mm.</p> <p><b>Class U2 Finish</b></p> <p>This is a floated finish used on all outdoor unformed surfaces not prominently exposed to view such as tops of piers etc. The floating may be done by hand or power driven equipment. It should not however be started until some stiffening has taken place in the surface concrete and the moisture film or 'shine' has disappeared. The floating should work the concrete no more than is necessary to produce a surface that is free from screed marks. All joints and edges should be finished with edging tools. It shall include the repair of gradual irregularities exceeding 5mm. All abrupt irregularities shall also be repaired unless a roughened texture is specified.</p> <p><b>Class U3 Finish</b></p> <p>This is a trowelled finish used on all surfaces exposed to view at close quarters such as tops of parapets and kerbs etc. Steel trowelling should not be started until after the moisture film and shine have completely disappeared from the floated surface and the concrete has hardened enough to prevent an excess of fine material and water from being worked to the surface. Excessive trowelling especially if started too soon, tends to produce crazing and lack of durability. Too long a delay will result in a surface too hard for proper finishing. Steel trowelling should be performed with a firm pressure that will flatten and smooth the sandy surface free of blemishes, ripples and trowel marks. It shall include the repair of all abrupt irregularities and the repair of gradual irregularities exceeding 5mm. It shall also include finishing the joints and the edges of concrete with edging tools.</p>
Clause 1508	<p><b>Removal of Formwork</b></p> <p>Add the following as para 5 Clause 1508 :</p> <p>For prestressed units, the side forms shall be released as early as possible and the soffit forms shall permit without giving restraint to the deformation of the member, when prestress is applied. Form supports and forms for cast in situ members shall not be removed until sufficient prestress has been applied to carry the dead load and any formwork supported by the member and anticipated construction loads.</p>

Clause 1513	<p>Rate</p> <p>Add the following at the end of the first para:</p> <p>“The unit rate shall also include all costs for preparation of erection scheme, designs of false work and formwork and their approval.”</p>
Clause 1606	Bar Splices
Clause 1606.1	<p>Add the following as paragraph 2 of clause 1606.1:</p> <p>The location of joints in continuous reinforcing bars, not shown in drawings shall be submitted to the Engineer for acceptance. If nothing contrary has been specified, the number of bars to be joined in any cross-section shall not exceed one-third of the total.</p>
Clause 1606.2.2	<p>Add the following at the end of the paragraph :</p> <p>In pre - restressed concrete members, when welding of un - tensioned reinforcement is permitted by the Engineer, It shall be carried out before insertion of the pre - stressing tendons. No welding, will be permitted after insertion of the pre - stressing tendons.</p>
SECTION 1700	STRUCTURAL CONCRETE
Clause 1708	<p>Transporting, placing and Compaction of Concrete</p> <p>Add the following paragraph at the end of the clause :</p> <p><b>For placing concrete with pumps:</b> Pipe lines from the pump to the placing area should be laid out with a minimum of bends. For large concrete placements standby pumps shall be available. Suitable valves (air release valves, shutoff valves etc.) shall be provided as per the site needs. The pumping of concrete shall be preceded by a priming mix to lubricate the pump and pipeline. A rich mix of creamy consistency shall be required for lubricating the pipelines. Continuous pumping shall be done to the extent possible. After concrete has been placed, the lines and all related equipment shall be cleaned immediately. A plug sponge ball shall be inserted in the end near the pump and shall be forced through the line by either water or air pressure. Pipes for pumping should not be made from materials which can ham concrete, aluminium alloy pipelines shall not be used.</p>
SECTION 2000	BEARINGS
Clause 2001	<p>Description</p> <p>Add the following as paragraph 2 of his clause :</p> <p>Within 90 days of award of work, the Contractor shall submit detailed specifications, designs and drawings from MoRT&amp;H accredited manufacturer including installation and maintenance manual, for the approval of the Engineer. Designs shall also include review and modifications of designs and drawings of bearing pedestals and other elements required for installation. For Pot bearing a movement indicator comprising of steel scale and pointer to be provided in sliding and free bearing to ascertain movement during its life time. The installation of bearings shall be carried out only under the supervision of the manufacturer of the bearings. The contractor shall provide a warranty for 20 years <b>(calculated from the date of installation of bearing)</b> from the manufacturers and the bearings shall be repaired or replaced free of cost by the contractor/manufacturer, if any defects are observed during this period. The employer’s decision regarding replacement/repairs during this period. The employer’s decision regarding replacement/repairs shall be final and binding. The Contractor shall provide the bearings only from the manufacturers approved and enlisted by the Ministry of Road Transport and Highways. Basic load data for bearings shall be provided by the client.</p>
SECTION 2100	OPEN FOUNDATIONS

Clause 2101	Add the following after para 1 :  Rock Anchors consisting of 25 mm dia MS installed in 50 mm dia holes 1000 mm long by using compressor & installing the same in the holes by using lockset compound as per drawing & instructions of engineer including all bye works. (The founding rock strata to be cleared by the Engineer)
Clause 2402.1	This clause shall be read as  “Contractor shall carryout confirmatory boring and testing to test the suitability of the underlying strata for the foundations of proposed flyover as per specifications and instructions of Engineer and submit the report to the engineer for approval. Confirmatory boring shall be carried out at all piers and abutments locations. Also 2 bores shall be taken in the approaches on either side along the centre line of alignment at a distance of 50m and 120m behind the abutment positions.”
Section 3100	<b><u>Reinforced Soil</u></b>  The Contractor shall design the R.E wall and submit the design and drawings for approval of the Engineer and vetting by IIT/ BIT Mesra/ NIT.

### **PART-III SPECIFICATIONS FOR ELECTRICAL, ILLUMINATION & TELECOMMUNIATION WORK:**

1. All equipments shall be suitable for voltage/freq. variation and other data as given in Electrical System Design parameters.
2. **STANDARDS AND REGULATIONS:**
  - The Design, Manufacture, Performance, testing and Installation including safety earthing covered under this specification shall in general comply with the latest issues of:
  - Applicable Standards & codes of practices published by BIS
  - Central Board of Irrigation & Power
  - Indian Electricity Act
  - Central Electricity Authority
  - Indian Electricity Rules.
  - The make of the equipments shall be limited to preferred makes indicated under “List of preferred makes”.
  - Makes of other equipment & accessories are subject to prior approval by the Engineer.
    - Makes of other equipment and components shall be of same make. Equipment of same type and rating shall be interchangeable.
    - The Engineer has the option of selecting the manufacturer of Electrical equipment, instruments and controls and any other specialized items in the interest of standardization. The successful Bidder shall supply equipment of the particular make.
3. **SAFETY:**
  - All units with respect to their location, layout, general arrangement and design of equipment, structure design etc. shall be safe to the personnel and conform to the relevant safety rules and regulations/ statutory requirement issued by Jharkhand Government and the Central Government but not limited to the following:
    - Indian Electricity Rules
    - Indian Electricity Act
    - Indian Explosives Manual
    - Fire Protection Manual issued by Tariff Advisory Committee (India)
4. **COMPLIANCE WITH RULES, REGULATION AND OBTAINING STATUTORY APPROVAL:**
  - All equipment/materials shall be installed in accordance with the requirement of relevant tendered Indian electricity Rules and Acts. It is the responsibility of the Bidder to see that the electrical installation supplied

and erected by him shall be to the entire satisfaction of Chief Electrical Inspector, Central Electricity Authority or other statutory body having Jurisdiction in the area and also to the Employer/ consultant.

- The responsibility for obtaining the Electricity Inspectors' approval for the installation to be carried out and commissioning shall be done by contractor. Also the contractor should prepare and submit all necessary drawing, calculations, test certificate and relevant details to the Electrical inspector and obtain prior approval for commencing the work and for the complete installation work done.

## **5. INSTRUCTION MANUALS:**

- Instruction manual shall give step by step procedure for ;
  - Erection, Testing and commissioning
  - Operation & Maintenance
  - Repair
- Maintained instruction shall include tests for checking of proper functioning.
- Instruction manual shall also contain :
  - Manufacturer's catalogues with ordering specification for all items.
  - List if consumable with specification brand names and annual consumption figures.
  - Drawing relevant for erection, operation, maintenance and repair of the equipment.
  - Procedure for ordering spares

## **6. SPARES:**

### **i. Commissioning Spares:**

- The bidder shall include in his offer, sufficient quantity of commissioning spares required for commissioning of all equipment and for their efficient operation until their provisional acceptance after demonstration of satisfactory performance. All commissioning spares shall be supplied free of cost.
- A separate item wise list of commissioning spares indicating quantity of each item offered shall be furnished along with the Bid. These items of commissioning spares shall be dispatched along with the main equipment.
- However, any additional spares required for successful commissioning shall be supplied free of cost .

### **ii. Two years' Operation & Maintenance Spares:**

- The list of two years recommended Operation & Maintenance spares shall be proposed by the Bidder & enclosed with the bid.
- The quotation shall include item wise list of all spares indicating their unit rates and quantities.

## **7. CONSUMABLES AND FIRST FILL:**

- The initial requirement of all consumables for start-up of commissioning and performance test shall be provided along with the equipment.

## **8. TESTS AND INSPECTION:**

- Routine tests shall be carried out on all equipment at manufacturer's work as per appropriate IS regulations. The contractor shall also carry out type tests on certain items. The contractor shall arrange all necessary facilities, free of cost for inspection and testing of the equipment by the Employer. No equipment shall be dispatched to site without a provisional certificate of acceptance issued by the Employer. Inspection and tests do not relieve the contractor of his contractual obligation regarding performance of the equipment at site/ in actual use.

**9. INSTALATION OF EQUIPMENTS & COMMISSIONING:**

- The contractor shall be fully responsible for the satisfactory Erection, Testing, Commissioning, start-up and performance test of equipment, notwithstanding that he may be assisted by the client representatives.
- The installation of all electrical equipment shall be carried out by an electrical contractor having a valid license issued by the Jharkhand State Government for carrying out installation work of the voltage classes involved under the direct supervision by persons holding valid certificates of competency for the same voltage classes. The contractor shall furnish with his Bid, the particulars of the license held by him and the electrical contractor he proposes to engage for carrying out the installation work against the specification.

**10. DRAWINGS/DOCUMENTS TO BE SUBMITTED BY THE BIDDER:**

**i. Drawings/Data to be submitted along with Bid**

1. List of deviations, if any, from Technological Specification.
2. List of commissioning spares and consumables including the main offer.
3. Equipment-wise list of 2 years' operation spares recommended by the Bidder, (unpriced).
4. Work schedule with bar chart indicating all activities.
5. List of performance tests proposed by the Bidder to demonstrate the guaranteed parameters.
6. Type test certificate for major equipment issued by independent testing parameters.
7. Instruction for storage of the equipment at site.
8. Construction/ storage of the equipment at site.
9. Quality Assurance Plan (QAP) for each electrical equipment & telecom equipment.
10. Scope of work with general description of the system and equipment offered specifying the important features.
11. Bill of Quantities (un-priced) in specified format.
12. Detailed scope of work. Separately for electrical, civil.

**ii . Data/Drawing to be submitted by supplier after placement of order**

**a. General**

- Name of coordinators with address telephone/FAX numbers for all sub-contractors, pertaining to electrical job.
- List of equipment/tools and manpower proposed to be arranged for survey, installation erection site handling & dismantling of the equipment.
- Name of site in-charge with office/organization and date of opening of site office.
- Quality Control manuals.
- Detailed list of drawing and documents.
- Monthly progress report furnishing status of planning manufacture transportation, erection testing and commissioning.

**b. Approval Category drawing/ documents:**

**i. Calculations:**

- Earthing calculations
- Design calculation for steel structures used for mounting of electrical Equipment.

**ii. Other:**

- Layout of entire installation (Power Distribution illumination Telecommunication) area wise

- Control and schematics drawings for control/protection for each equipment.
- Lightning protection drawing showing coverage of all equipment structure building etc.
- Equipment drawings
- Prototype Installation template (each type)

**c. Information Category drawings/documents**

- Categories for each type of equipment
- Installation and commissioning manual for each equipment relay etc.
- Operation and Maintenance Manual indicating trouble shooting procedure for all Equipment.
- Type test certificate for all major Equipment.
- Detail of test result for tests conducted at works for all Equipment.
- Details of test results, for test conduct at site for all Equipment.
- Spare part list number and ordering procedure for all recommended spares.
- Fixing details of all the panels/ Equipment. Supporting structures etc.
- Static and dynamic loading of each equipment.
- Floor cut-out and wall opening details for cables and light conduits etc.
- Details and location of various inserts base plates, bolts, etc. required to be provided for support of cable structure elect panel etc.
- As built drawing incorporating site change along with reproducible.

**11. SYSTEM DESIGN PARAMETER**

**i. Climatic Condition:**

Maximum ambient temperature	:	<b>50 Deg C</b>
Minimum ambient temperature	:	<b>3 Deg C</b>
Maximum Relative Humidity	:	100%
Altitude	:	Not Exceeding 1000m
Maximum Wind Velocity	:	<b>39m/sec as per IS 875 Part3</b>
Seismic Level (Horizontal Acceleration)	:	<b>0.3 g</b>
Intensity of Solar Radiation	:	<b>1KW/M<sup>2</sup></b>

**ii. System Particulars**

Highest System Voltage	:	12 kV for 11kV system
		36 kV for 33kV system
Voltage variation	:	+6% and -9% for up to 33kV
		+6% and -6% for 11kV & LV
System Frequency	:	50Hz
Frequency Variation	:	+3% and -3%
DC Supply Voltage	:	30 V DC
DC Supply Voltage Variation	:	+10% and -15%
No. of Phases	:	3
Short Circuit Level	:	500 MVA for 11kV
		1500 MVA for 33kV
		50 KA for 1 second at 415V
System earthing	:	Solidly earthed



## 12. PERFORMANCE REQUIREMENT AND GUARANTEE:

- The bidder shall study the specification and satisfy himself thoroughly regarding the workability of the equipment and system offered and also take full responsibility for the guaranteed operation and performance of the same as well as for their smooth, safe and reliable working.
- All equipment shall be guaranteed for workmanship, materials, design and satisfactory performance to the parameter in accordance with this specification. The guarantee for performance shall cover individual items as well as system as a whole.
- The contractor shall conduct performance/acceptance tests on each of the major items of equipment supplied to demonstrate that the equipment and system supplied are capable of achieving the performance parameters specified and contracted for. The performance test shall be carried over a period of twenty one consecutive days of continuous operation for twenty four hours each day. The test will comprise keeping energized all system and equipment at full load or whatever load available at that time. All system shall perform without any fault and temperature rise shall be within the specified limits for all equipment (to be demonstrated). In case of any fault detected within this period, the Bidder shall rectify or replace the defective equipment/device free of cost. After the fault rectification, the test shall be undertaken afresh and shall be continued successfully for the specified duration.
- Should the tests specified show that the equipment has failed to achieve the guaranteed parameters the supplier shall carry out necessary modification or part replacement to achieve the guarantee parameters.
- Bidder shall give guarantee for design manufacture workmanship and performance of individual equipment as well as complete system installation during the defect liability period. During this period, elimination of defects in design manufacture material quality workmanship erection shall be done by the successful Bidder, free of cost and to the full satisfaction of client representative. Cost of dismantling, transportation, re-erection if any, during elimination of defects/replacement of defective items shall be borne by the successful Bidder.
- The successful Bidder shall stand guarantee against obsolescence of equipment under their scope of supply for a minimum period of ten years and that discontinuity of production of any item offered as part of the system shall not affect the maintainability of the system.

## 13. EQUIPMENT SPECIFICATION

### 13.1. AERIAL BUNCHED (AB) CABLE (11KV & 1.1kv GRADE)

- This specification covers Design, Manufacture, Shop Testing, Supply and Delivery of XLPE insulated. Three and Single Core 11KV Aerial Bunched Cable (ABC) having Aluminium Conductor twisted around an XLPE Insulated all Aluminium Alloy (AAA) messenger wire suitable for installation of these self-supporting overhead Power Cables in Overhead system of the Urban Electrification Schemes.
- The size of the 11 KV Aerial Bunched Cable is 3X1 Core x mm<sup>2</sup> (Phase) + 120mm<sup>2</sup> (Messenger) and 1.1 KV Aerial Bunched Cable is 3x1 Core x120 mm<sup>2</sup> (Phase) + 40mm<sup>2</sup> (Neutral)+ 120mm<sup>2</sup> (Messenger).
- The AB cable shall meet the technical parameter given below in the table.

11kV Aerial Bunched Cable		
1.	Composition of the Cable	The composite cable shall comprise three single-core cables twisted around a bare aluminium alloy messenger wire, which will carry the weight of the cable
2.	Rated Voltage (for 11 KV AB Cable)	The rated voltage of the cables shall be 6.35KV/11KV and the maximum operation voltage shall be 12KV
3.	Applicable Standards	Unless otherwise stipulated in the Specification, the following Standard shall be applicable :

		i) IS:7098 (Part II) -1985- Cross linked Polyethylene Insulated PVC Sheathed Cables ii) IS: 8130-1984- Conductors for insulated Cables. iii) IS:398(Part-iv)-1979-Aluminium Alloy Conductors
4.	Details of Single core cable	The cable conductors shall be of circular stranded and compacted aluminium of nominal cross sectional areas 120 mm <sup>2</sup> Aluminium shall be of flexibility class 2 as per IS: 8130 .
5.	Conductor Screen	The conductor screen shall be of extruded semi conducting cross linked polyethylene composed of thickness not less than 0.5mm. It shall be black in color.
6.	Insulation	The insulation shall be of extruded cross linked polyethylene insulated of nominal insulation thickness 3.6mm and natural color and its properties shall confirm to IS: 7098.
7.	Insulation Screen (Non- Metallic)	The insulation screen shall comprise of extruded semi conducting composed and/or semi conducting tape. Thickness of the screen shall be not less than 0.6mm
8.	Outer Sheath	The outer sheath shall be black polyethylene. The nominal thickness of sheath shall be 1.8mm and it shall confirm to the technical requirements of ST-3 of IEC-502.
9.	Messenger	Stranded and compacted all Aluminium Alloy (AAA) conductors shall conform to IS: 398 (pt-IV)/79 to serve the purpose of neutral in the network and also to carry the weight of the entire Aerial Bunches Cable under suspension on overhead lines. There shall not be joints in any wire of the stranded messenger conductor except those made in the base rod or wire before final drawing.
10.	Messenger Insulation	Extruded weather resistant black cross polyethylene rated voltage of insulation :1.1 KV
11.	Other Features	There shall be no joints in any wire of the standard messenger conductor except those made in the base rod or wires before finally drawing.

**LT Aerial Bunched Cable (1.1KV grade)**

1.1 KV Aluminium conductor as per IS 398 (Part 4) -1978, Flexibility of conductor – class 2 as per IS 8130 – 1984. The insulation shall be black weather resistant polyethylene insulated, polyethylene compound suitable for continuous operation at 700C. The messenger (Natural conductor shall be either stranded circular or conductor, except those made in base rod or wires before final drawing, Compacted circular type of minimum 7 strands. There shall be no joints in any wire of messenger construction for 3-phase Aerial Bunched Cable – minimum 3 cores + 1 messenger +Neutral Conductor. Construction for 1-Ph Aerial Bunches Cable – 1 Core + 1 Messenger / Neutral conductor. The Aluminium cables are twisted over central bare Aluminium messenger wire. The aerial bunched cable should confirmed to IS 14255-1995.

Type test certificate for each size & type of cable shall be furnished for approval. The purchaser has the right to have tests carried out at his own cost by an independent agency whenever there is a dispute regarding the quality of supply.

## **Packing and Marking**

### **Packing**

Cables shall be supplied in wooden drums conforming to IS: 10418. The standard length of the bunched cable in each drum shall be 1 Km ( $\pm$ ) 10%

### **Marking**

The cable drum shall carry the information as per the requirements of IS: 7098 (Part-II).

Suitable identification marks shall be given on the outer sheath to clearly distinguish three phases of the bunched cable.

## **13.2 Outdoor 200 KVA & 50 KVA Compact Substation (11KV/415V)**

### **13.2.1 General**

The Compact Secondary Substations of Non-walkable type shall be factory assembled units consisting of the following major equipments.

- 11KV 630A Isolator,
- 11kV VCB Circuit Breaker,
- 630A Isolator with Earth Switch,
- 11/0.433 kV Transformer
- LT Distribution Board
- Capacitor Bank (Capacitor bank shall be installed in a separate Module, however it will be the integral part of CSS enclosure).
- Protection CT- 40/1A, 2.5VA 5P10
- Battery & battery charger.
- Energy metering at all outgoing feeder.

### **13.2.2 Constructional Features**

- a. Non walkable type, sheet steel clad, compartmentalized, floor mounted, free standing design outdoor type with canopy. Door arrangement on all sides with glass window for viewing indication lamps and meters as applicable.
- b. Minimum sheet steel thickness: 2 mm CRCA, gland plate 3 mm
- c. Doors shall be provided with lock and key arrangement
- d. Degree of protection shall be IP54, unless otherwise specified.
- e. Assembled on base channel of structural steel or minimum height 75mm. painted black.
- f. Zinc bichromated and passivated hardware shall be provided.
- g. Panel door switch shall be provided for illumination inside the panel with sufficient CFL lamps.
- h. For each CSS, 2 nos. Bulk Head fittings with min 25W CFL lamps for peripheral lighting. Suitable mounting arrangements on the CSS enclosure shall be done for the same. Independent rotary switch shall be provided for light fittings for controlling light fittings. (Illumination of CSS is not included in Schedule of quantities)
- i. A DC Power pack with AC input & DC output shall be provided. It will be suitable for 2 close & open operations within half an hour of failure of input AC supply.
- j.

### 13.2.3 11 kV VCB Circuit Breaker and Isolators

The circuit breaker, isolator & isolator with earth switch and associated bus bars shall be inside the hermetically SF6 gas sealed for life time HV cubicle of CSS, complete with current transformers, IDMT over current and earth fault microprocessor based numerical relay, master trip relay, ammeter with selector switches to read line currents. The cubicle shall be suitable for XLPE AB Cable termination on incoming (3 X 1C X 120) and outgoing side and shall be equipped with DC power pack. The cubicle / compartments shall be suitable for outdoor installation complete with rain water protection. Mechanical indication for ON/ OFF / spring charged shall be provided. The breaker operation shall be with stored energy spring charging mechanism with closing and shunt tripping coils suitable for 48 V DC.

The CSS shall be rated for 12 kV. The Isolator switches have 3 positions ON/OFF/Earth. VCB shall motorized & Isolator shall be manual operated. SF6 gas filling arrangement and manometers for gas pressure low indication / tripping of VCB shall be provided. Suitable surge arrestors shall be provided for vacuum circuit breaker feeders to Dry type transformers.

The CSS shall be type tested for short time rating & degree of protection, as per the relevant standard. Breaker & Isolator shall comply the specification given below.

i) Type	VCB & Isolators (Isolator & Isolator with earth switch) housed in SF6 GIS Enclosure module (RMU)
ii) Rated voltage	11 kV, 3 Phase, 50 Hz, AC
iii) Rated current :	
a) Continuous	630 A
b) Short time	25 kA for 1 Sec.
c) RMS breaking capacity	20 kA
d) Making capacity	50 kA peak
iv) Design Ambient Temperature	
a) Max	50 Deg. C
b) Average	45 Deg. C
v) One minute power frequency withstand voltage	28
vi) Impulse withstand voltage (1.2 x 50 Micro second	75 kV Peak
vii) Fixed / Draw out	Fixed
viii) Interlocks	As per specification and as required
ix) Control Voltage of CSS	48 VDC
x) Operation Mechanism	VCB – Motorized Isolator – Manual
xi) Accessories to be provided on Breaker Panel	
a) Closing and shunt trip coils suitable for 48 V DC connected to the supply of DC power pack suitable for 2 Nos. close & trip operation.	
b) CTs as per requirement	
c) Manual charging arrangement for keeping the springs charged.	
d) Auxiliary contact block.	
xii) Accessories to be provided on Relay Compartment	
a) Microprocessor based IDMT O/C and E/F protection relay.	
b) DC Power pack	

- c) Master trip relay
- d) Ammeter 0 – 40 A
- e) Selector switch for Ammeter
- f) ON/OFF Tripped on fault lamps
- g) Backup Earth fault protection relay

**Protective relays shall be electromechanical / static type and self-powered.**

#### 13.2.4 DRY TYPE TRANSFORMER

##### Standards

Transformers shall comply with the following Indian Standards.

- IS 11171 (1985) - Dry Type Transformers
- IEC: 60726 - Dry Type Transformers

##### 13.2.4.1 Mechanical Design

- 01 Transformer enclosure shall be welded/ bolted sheet steel construction, free standing, with suitable size of louvers backed with wire mesh. Base shall be suitably reinforced to prevent any distortion during lifting. Base channels shall be provided with flat wheels with pulling eyes and lifting hooks to facilitate handling.
- 02 All fasteners and bolts etc. shall be galvanized or zinc passivated. All surfaces to be painted shall be thoroughly cleaned, made free from rust and given a primary coat or rust resisting paint followed by two finishing coats of approved shade. Paint shall be suitable to withstand specific climatic conditions.

##### 13.2.4.2 Electrical; Design

- i. The transformer shall be cast resin dry type transformer, AN cooled suitable for indoor installation (inside the CSS enclosure)
- ii. Generally as per IS 11171.
- iii. 3 phase, core type, cast resin.
- iv. Rated output, voltage ratio, vector group shall be as specified in technical particulars for design.
- v. Rated frequency 50Hz,  $\pm 5\%$ .
- vi. Transformers shall be capable of delivering rated current at an applied voltage up to 150% of rated voltage without exceeding the temperature limits.
- vii. Overload capacity of the transformer shall be as per IS 6600 – 1972 unless otherwise specified.
- viii. Shall be operable at its capacity at any voltage within  $\pm 10\%$  of rated voltage of the particular tap.
- ix. Permissible maximum temperature at rated output and principal tap at the ambient temperature of 50°C

Windings (by resistance method)	120°C
Core and other parts adjacent to winding	Within safe limits of core and adjacent materials.

- x. Transformers shall be designed to withstand the thermal and dynamic stresses due to short circuits at its terminals or symmetrical/asymmetrical fault on any winding. Short circuits withstand capacity for the bolted fault at the terminals shall not be less than 2 second duration with respect to fault level specified.

- xi. The maximum temperature at the end of the short circuit duration shall not be more than 250°C with the temperature prior to short circuit corresponding to maximum permissible overload.
- xii. Transformer shall be designed for maximum no-load and load losses within the economic limit.
- xiii. Designed for suppression of harmonics, especially 3<sup>rd</sup> and 5<sup>th</sup>.

#### **13.2.4.3 MAGNETIC CIRCUIT**

- i) Low loss CRGO silicon steel shall be used.
- ii) Laminations shall be annealed in a non-oxidizing atmosphere to relieve stresses and restore the original magnetic properties of CRGO sheets after the cutting and punching operations.
- iii) Insulation to withstand annealing temperature as high as 850 Deg. C and shall reduce eddy current to minimum.
- iv) Ducts to be provided to ensure adequate cooling.
- v) Core, framework and clamps arranged and tightened to securely hold laminations in order to prevent any setting or displacement in case of heavy shocks during transport, handling or short circuits.
- vi) Flux density under specified over voltage or frequency conditions shall be within the maximum permissible for the laminations. However it shall not exceed 1.5 tesla at rated voltage & frequency.
- vii) Transformers shall be designed to withstand 110% over fluxing corresponding to rated voltage.
- viii) Magnetizing current shall be maximum 1% of the rated current.

#### **13.2.4.4 WINDINGS**

- i) Material shall be electrolytic grade copper.
- ii) Shall be subjected to shrinkage treatment.
- iii) Completed core and winding to be vacuum dried in full vacuum, impregnated immediately, then dried before casting in resin.
- iv) Shall be braced to withstand shocks due to rough handling and forces due to short circuit, switching or other transients.
- v) Permanent current carrying joint in winding and leads shall be brazed.
- vi) Coils shall be supported using dried and high-pressure compressed wedge type insulation spacers.
- vii) Leads to the terminal board and bushings shall be rigidly supported.
- viii) Current density shall be 2.5A/mm<sup>2</sup> maximum.

#### **13.2.4.5 INSULATION**

- i) Inter-turn and inter-coil insulation shall be designed such that di-electric stress is uniformly distributed throughout the windings under all operating conditions.
- ii) The winding shall be provided with class F insulation However, temperature rise in winding and core shall be limited to class B insulation.
- iv) The inter-turn and inter coil insulation shall be class C insulation.

#### **13.2.4.6 OFF CIRCUIT TAP SWITCH**

- i) Bolted link type within enclosure, with easy accessibility.
- ii) Designed for sustained over current of at least 155% of the rated current of the winding.
- iii) Capable of repeated operation and withstanding short circuit forces.
- iv) Tap position configuration diagram shall be provided.
- v) Inspection/ operation /or repair shall not require removal of transformer core from its enclosure.

- vi) Shall not occupy any intermediate position between clearly marked tap positions.

#### **13.2.4.7 TERMINATIONS**

Windings shall be brought out and terminated on external /cable boxes as specified in the technical particulars.

- i) Cable termination
  - a) Air insulated cable end box suitable for the type and number of cables specified.
  - b) Compression type brass cable glands with tinned copper lugs of non-soldering crimped type.
  - c) Bolted type gland [plated (non-magnetic material wherever specified).
  - d) Sealing kits with associated accessories like stress relieving, insulating type, bifurcating boot, HT insulating tape etc.

#### **13.2.4.8 6.2.4.8 Bushings**

- i) Conforming to IS 3347 part-1, 2 & 3 – 1979, Part 3&4 – 1988 and IS : 2099-1986 for HT and IS 7421 for LT system.
- ii) Minimum rated current of line end bushings shall be 1.5 times rated current of the corresponding windings.
- iii) Clamps and fittings made of steel or malleable iron shall be hot dip galvanized.
- iv) Bushing rated 400 amps and above shall have non-magnetic clamps and fittings only.
- v) Bushing shall be solid porcelain type / EPOXY Type.
- vi) Clearances shall be as per CBIP Guidance.

#### **13.2.4.9 Winding Temperature Indicator**

- i) Digital temperature scanner for local winding temperature indicator (WTI) for each winding shall be provided with a manual reset maximum temperature recording feature. The WTI shall be microprocessor based with digital display and necessary signal contacts. There shall be two potential free contacts for alarm and trip signals. The setting for closing/opening of each contact shall be independence adjustable. Contact rating at DC11, 220/110 V DC shall be minimum 5 amps.
- ii) RTD shall be provided in all windings and shall be connected to digital temperature scanner.

#### **13.2.4.10 Marshalling Box**

- i) All transformer shall be provided with a indicators, level indicators CT secondaries, fault contacts for annunciation, etc shall be wired to a Marshalling Box.
- ii) Degree of protection of enclosure shall be IP52.

#### **13.2.4.11 Rating Plate**

Each transformer shall be provided with a rating plate giving the details as per IS: 2026 (Part-I). The marking shall be indelible and the rating plate shall be located on the front side. Exact value of transformer % impedance, as determined by tests shall be engraved on it and also on the final submission of name plate drawing.

#### **13.2.4.12 Noise**

Noise level shall be low and shall be within limit depending on the rating of the transformer as per IEEE-141.

**13.2.4.13 Earthing**

- i) All metal parts of the transformer with the exception of individual core lamination core bolts and clamping plates shall be maintained of fixed by earthing.
- ii) Two nos. of tinned copper earthing terminals shall be provided.

**13.2.4.14 List of Fittings and Accessories**

- i) Identification plate
- ii) Rating and diagram plates
- iii) Off-circuit tap switch (as specified) and Tap connection plate
- iv) Digital winding temperature indicators operated by RTD elements
- (v) HV, LV and neutral bushings.
- vi) Bushing CTs (As specified)
- vii) Lifting lugs and jacking pads
- viii) Earthing terminals and lugs
- ix) Marshalling box.
- x) Danger plate indicating “Entry prohibited under energized condition”

**13.2.5 L.T. Distribution Board/ Module with capacitor Bank**

415V, 4 wire self-supporting LT distribution board comprising incoming Module Case circuit breaker, LT busbar chamber and outgoing CSS MCCBs & MCBs shall be suitable for mounting, in the CSS enclosure.

The MCB outgoings shall be housed in separate module & fed from one MCCB. The incoming MCCB shall be fixed manual type with Thermal based magnetic release for overload, short circuit & earth fault protection. LT busbar chamber shall be of fabricated sheet steel construction with 2 mm thick sheet steel and angles. Removable busbar covers at front and back shall have water/ dust excluding gaskets.

Outgoing feeders shall be fixed Manual type MCCBs. Thermal Based release for overload, short circuit & earth fault shall be provided. All outgoing MCCBs shall be with Earth Fault modules.

Type	Indoor mounted inside the CSS enclosure
Rating	Incomer-80 A MCCB, 3 Phase 4 wire Outgoing- 32A MCCB, 3 phase 4 wire 5 number – For 50 KVACSS  Incomer-300A MCCB, 3 Phase 4 wire Outgoing- 160 A MCCB, 3 Phase 4 Wire 3 number – For 200 KVACSS
System earthing	solidly earthed
3 Ph. Fault level	50 kA for 1 Sec
Type of mounting	Floor mounting
Installation	Indoor
Material of bus bars	Aluminium type E91E
<b>A) Incomer</b>	
Type	TPN, ACB
Provision of shunt trip coil suitable for 415 VAC	Shall be provided
Thermal release setting range	To be decided during engineering
Short circuit release setting range	To be decided during engineering



Termination facilities	
a) Incoming from transformer	Cable
b) Outgoing	AB Cable
<b>Meters</b>	
a) Flush mounted ammeter	Class 1.0 suitable for 1000/5ACT
b) Flush mounted voltmeter	Class 1.0 suitable for 415 V with scale 0-500V
c) Ammeter selector switch	To read line currents
d) Voltage selector switch	To read phase and line voltages
e) Multi-function meter	To read A, V, W, PF, Energy.
<b>B) Outgoing</b>	As per rating given above

#### Capacitor Bank (APFC Panel)

APFC Panel to be considered for 200 KVA Substation only

Power factor compensation equipment comprising of 75 KVAR capacitor bank, consisting of six sub-banks of 05KVAR+2 X 10KVAR+ 25 KVA Rx2 each connected in delta formation which shall be switched through load MCCB along with contractors actuated by an automatic power factor correction relay to achieve 0.95 p.f. Employer's end.

#### ITB

#### L.T. Distribution Board / Module

In addition, other auxiliary equipment shall also be provided as per requirement. All these equipment are interconnected suitably to make a complete set of logic circuitry as desired by the user.

The Compact Secondary Sub-station shall have Outdoor type having construction of Galvanized Steel having 2 mm thickness of load bearing member & 1.5 mm thickness for non-load bearing member with 4 mm base plate. The enclosure shall have IP 54 degree of protection for HT & LT switchgear compartment & IP 23 degree of protection for Transformer compartment.

The enclosure shall be divided into three compartments for the medium voltage switchgear, low voltage switchgear and dry type distribution transformer. The enclosure exterior shall be powder coated (Colour light grey and DA grey). Each compartment shall be provided with door & pad locking arrangement. The compartment illumination lamp with door operated switch shall be provided for each compartment.

Suitable arrangement for ventilation of the CSS shall be provided.

**The Substations shall conform to IS – 14786 and IEC-61330 (new no. IEC-62271-202)**

13.2.6 LIGHTNING ARRESTORS/Surge Suppressor in between VCB Transformer (inside the CSS)

#### 13.2.6.1 General

**Standard Lightning Arrestors shall strictly confirm to IS-3070 part-3 (1993) and IEC-99/4 with latest amendment.**

- Station class, 10 kA, Heavy duty, non-linear resistance, metal oxide type gapless lightning arrestor of 5kA for 11 kV systems.
- Indoor type suitable for installation in CSS
- Shall be designed to provide maximum protection against lightning and switching surges.

## 13.2.6.2

**Technical particulars**

a)	Nominal system voltage	:		11 kV
b)	Highest system voltage (rms)	:		12 kV
c)	Rated arrestor voltage (rms)	:		10 kV
d)	Continuous operating voltage (rms)	:		8 kV
e)	Frequency	:		50 Hz
f)	Power frequency with stand test voltage	:		28 kV
g)	Impulse voltage	:		75 kV peak
h)	System neutral connection	:		Solidly Earthed
i)	Nominal discharge current for 8/20 micro Sec.	:		5 KA peak
j)	Long duration discharge class as per IEC 99-4	:		3/2
k)	Maximum residual voltage at nominal discharge current of 8/20 micro sec. wave Kv peak	:		35 Kvp
l)	Maximum steep current impulse (1/20 micro sec.) residual voltage at nominal discharge current (kVp)	:		40 Kvp
m)	Arrester Housing			
a)	One minute power frequency withstand voltage Kv (rms)	:		28
b)	Lightning impulse withstand voltage (KVP)	:		75
c)	Prospective sym m. fault current for pressure relief test Ka (rms)	:		40
d)	Disconnecting device	:	Disconnecting devices IS: 3070 (Part-II) shall be connected in series with ground lead.	
e)	Minimum creeping distance of porcelain housing (mm)	:		300

## 13.2.7

**Maximum guaranteed No Load/ Load losses for Dry type Transformer inside the CSS**

The no load and load losses be limited to:

These losses are maximum allowable without any plus tolerance. However, the manufacturer can offer losses lesser than specified.

Loss capitalization factor may be taken as follows:

$$\text{Capitalized cost of transformer} = IC + (\text{No load loss factor} * W_i) + (\text{Load loss factor} * W_c)$$

Where,

No load loss factor -Rs 2, 17,515/Kw (as per CEA recommendations)

Load loss factor - Rs 28,772/kW (as per CEA recommendations)

- IC - Price quoted by the Bidder in Rs.
- Wi - Difference in no load loss in KW.
- Wc - Difference in Cu loss in KW

#### **Penalty for Excessive Losses:**

During testing, if it is found that the actual measured losses are more than the values quoted by the bidder, penalty shall be recovered from the bidder at double the loss capitalization rate arrived at clause 5.3. For fraction of a Kw, proportionate penalty will be covered.

Purchaser reserves the right to reject any transformer during the test at supplier's works, if the temperature rise exceeds the guaranteed values.

### **13.2.8**

#### **L.T. CURRENT TRANSFORMER**

A set of 4 nos. of Resin cast current transformers (CT) of accuracy class 1.0 for low tension energy metering shall be supplied with each meter.

#### **General Technical Requirement**

Rated Voltage	230 Volts (Phase to Neutral), 440V (ph-ph)
Rated Current (I basic)	5 Amps balanced & unbalanced load
Rated Frequency	50Hz
Accuracy class	1.0
Temperature:	The standard reference temperature for performance shall be 27 degree C.
Supply system variation	Voltage Vref + 20% to – 30% Frequency 50 Hz $\pm$ 5%
Highest system variation	660V
Current Transformer Ratio	As specified above

#### **\* Construction**

##### **\* CORE MATERIAL**

- \* Material: Low loss, CRGO M4 or better grade (core losses should not exceed 0.8 Watts/Kg. At 1.5 tesla)

##### **\* COPPER WIRE**

Material: Enameled wire as per IS 4800 Part IX/  
Test certification: To be submitted.

##### **\* INSULATION**

- Coil shall be insulated with electrical grade polyester tape.
- Outer insulation shall be with vacuum mixed, homogenous Resin casting
- Minimum 2 mm thickness of resin above the coil of the CT to shall be ensured

##### **\* Secondary Terminal**

A three core (2 mm) PVC insulated flexible multi strand copper wire lead shall come out directly from the CT as secondary terminal. Two wires shall be used for CT incoming and outgoing & one wire for PT. Power color coding/identification shall be used to identify the CT & PT leads. Secondary lead must be secured during casting against loosening while connection.

\* **Mounting Clamp**

- a) M.S. (1.6 mm thick) uniformly hot dip galvanized
- b) It must shall be properly tightened to secure CT against vibration
- c) It must suitable insulation distance from primary.

\* **Rating Plate**

Self-adhesive, laminated, printed label must be having following details.

- a) Ratio, Burden & Accuracy class
- b) Applicable Standard
- c) Insulation Level.
- d) Short Circuit Rating
- e) Continuous thermal current
- f) Caution against open secondary
- g) Batch No.
- h) Manufacturer's name
- i) Manufacturing month and year

### **13.2.9 LT CAPACITOR**

#### **13.2.9.1 Electrical Design**

- \* Generally as per IS: 2834 (1986) & IS: 13340 (1993)
- \* Rated Voltage and frequency: 440V, 3 phase, 50 Hz
- \* Connection : Delta
- \* Type :Self-healing type LT fixed shunt capacitor
- \* Location : Indoor (to be located on LT side of distribution transformer)
- \* The permissible overloads shall not exceed any one of the following limits confirming to IS: 2834 (1986) & clause – 6 of IS: 13340 (1993)
  - i. Voltage: Capacitor shall be suitable for prolonged operation at r.m.s. voltage between terminals not exceeding 1.10 times the rated voltage.
  - ii. Current: Capacitor shall be suitable for continuous operation at r.m.s line current of 1.30 times the current that occurs at rated voltage & frequency excluding transients.
- Rating Plate  
As per IS 2834 (1986) & IS 13340 (1993) with latest amendments.

#### **13.2.9.2 Construction**

- \* Delta connected to from a 3 phase bank.
- \* Individual unit to be clamped & housed in sheet metal enclosure made up of 2 mm CRCA sheet with proper ventilation.
- \* Front hinged door for easy maintenance.
- \* Only 3 terminals brought out.
- \* Cable entry through gland plate.

#### **13.2.9.3 Protection**

- Each individual capacitor within the capacitor unit shall be protected with an individual timed copper fuse.

#### **13.2.9.4 Safety Requirement**

- Provided with directly connected discharge device a per IS 13340

- Discharge device suitable to reduce the residual voltage to 50 V or less within one minute after disconnection from supply voltage.

### **13.2.10 CURRENT TRANSFORMER**

#### **13.2.10.1 Type**

- Indoor type suitable for installation in CSS
- Oil Cooled type / Polycrystalline Type

#### **13.2.10.2 Technical Particulars**

- |   |   |   |
|---|---|---|
| a) Standard   | : | IS 2705 (1992)                                |
| b) Nominal system voltage                               | : | 11 Kv   |
| c) Highest system voltage                               | : | 12 Kv   |
| d) Rated frequency                                      | : | 50 Hz   |
| e) System neutral earthing                              | : | Solidly earthed                               |
| f) Short time thermal current                           | : | 25Ka/ 20Ka                                    |
| Rating for 1 sec. duration                              |   | (rms)   |
| g) Class of insulation                                  | : | B   |
| h) Insulation level                                     |   |   |
| - Peak impulse  | : | 75 Kv   |
| Withstand voltage                                       |   |   |
| - Rated one minute                                      | : | 28 Kv   |
| Power frequency wet                                     |   |   |
| And dry withstand voltage                               |   |   |
| i) Terminal   | : | Suitable for ACSR conductors / Aluminium pipe |
| j) Marshalling Box                                      | : | IP55 enclosure                                |
| k) For rating, ratio, class of Accuracy, VA Burden etc. | : | refer Bill of Quantities.                     |

### **13.2.11 POTENTIAL TRANSFORMER**

#### **13.2.11.1 Type**

- Indoor type suitable for installation in CSS Chamber
- Oil Cooled Type
- Single phase, Independently mounted design
- Suitable for operation on 11Kv, 3 phase, 50 Hz Ac systems.

#### **13.2.11.2 Technical Particulars**

- |                           |   |                                |
|---------------------------|---|--------------------------------|
| a) Standard               | : | IEC publication 186 / IS: 3156 |
| b) Nominal system voltage | : | 11 Kv                          |
| c) Highest system voltage | : | 12 Kv                          |
| d) Rated frequency        | : | 50 Hz                          |

- e) System neutral earthing : Solidly earthed.
- f) Number of secondary : Two
- g) Voltage ratio :  

$$\frac{11\text{kV}}{\sqrt{3}} / \frac{110\text{V}}{\sqrt{3}} / \frac{110\text{V}}{\sqrt{3}}$$
- h) Class of insulation : B  
 Insulation level :  
 - One minute power : 5 Kv  
 Frequency withstand Voltage
- i) Temperature rise : As per IS: 3156, Part -I/1992
- j) Limits of voltage error & phase displacements : As per IS: 3156, Part-1/1992

### 13.2.11.3

#### **Winding connection**

- \* Any three single-phase units shall be suitable for three-phase connection in star /star formation on three-phase system
- \* The positive, negative and zero sequence impedances shall all be equal.
- \* Secondary winding to be used for metering.

### 13.2.11.4

#### **Limits of Temperature Rise**

- \* Limits of temperature rise specified in technical particulars shall correspond to 1.2 times the rated primary voltage applied continuously at rated frequency and at rated burden connected to both the secondary windings simultaneously.
- \* Temperature rise when 1.5 times the rated primary voltage is applied for 30 seconds after achieving stable thermal conditions followed by application of 1.2 times the rated voltage continuously shall not exceed by more than 10°C from the values specified above.

### 13.2.11.5

#### **TERMINAL ARRANGMENT**

- \* Bi-metallic (Cu/A) terminal connectors shall be suitable for ACSR conductors/ Aluminium pipes of the required size on HV side.
- \* Suitable earth terminal connector to be supplied for connections to earth.
- \* Secondary terminals to be housed in weather and dust proof cabinet with provision for terminating PVC insulated, armored and PVC sheathed control cables.

### 13.2.12

#### **Earthing of CSS**

An earthing conductor shall be provided to be connected to each component of the prefabricated substation. The current density in the earthing conductor, if of copper, shall not exceed 200 A/mm<sup>2</sup> for a rated duration of short circuit of 1 s and 125 A/mm<sup>2</sup> for a rated short

circuit duration of 3 sec. However, its cross-section of area shall be not less than 30 mm<sup>2</sup>. It shall be terminated by an adequate terminal intended for connection to the earth system of the installation.

The continuity of the earth system shall be ensured, taking into account the thermal and mechanical stresses caused by the current it may have to carry. The maximum value of earth fault currents depends upon the type of system neutral earthing employed and as per use.

Components to be connected to the earthing circuit shall include:

- \* the enclosure of prefabricated substation if it is metallic.
- \* the enclosure, if metallic, of the high-voltage switchgear and control gear from the terminal provided for that purpose.
- \* the metal screens and the high-voltage cable earth conductors.
- \* the transformer tank of metal frame of dry type transformer.
- \* the frame and/or enclosure, if metallic, of the low-voltage switchgear and control gear.
- \* The earthing connection of automatic controls and remote control devices.

### **13.2.13 Nameplate**

Each prefabricated substation shall be provided with a durable and clearly legible nameplate which shall contain at least the following information.

- Manufacturer's name or trademark.
- Type designation.
- Serial number.
- Number of this standard.
- Year of manufacture.

### **13.2.14 Protection of the prefabricated substation against mechanical stresses**

The enclosure of a prefabricated substation shall have sufficient mechanical strength and shall withstand the following loads and impacts.

- a) Roof load:
  - \* minimum 2500N/m<sup>2</sup> (erection loads or other loads)
- b) Wind load on the enclosure.
  - \* Wind load according to IEC 60694.
- c) External mechanical impacts on covers, doors and ventilation openings.
  - \* External mechanical impacts with impact energy of 20J.

Accidental mechanical impacts above this value (e.g. traffic collisions) are not covered by this standard and shall be prevented, if necessary by other means provided external to and around the prefabricated substation.

### **13.2.15 Installation**

The CSS comprising of 11 KV Circuit breaker cubicle with isolators, transformers and LT switchboard module shall be installed on RCC foundation above ground level. The height of foundation for CSS shall be 500 mm (minimum) from the ground level.

Installation, Testing, Commissioning & completeness in totality of the Compact Secondary Substation shall be carried out in presence of manufacturer's authorized representative.

### 13.2.16 Other accessories as required for CSS

Accessories required for the external connection of HT & LT Cable like termination kits, lugs, glands etc. & extending of earth bar to earth pit is also included in Bidder scope. Battery & Battery charger as required for CSS is also included in bidder scope.

### 13.3 Feeder Pillar in between CSS

Serial No.	Parameter	Requirements
1.	Rating	Single Incomer 160A MCCB, Fixed manual type with Thermomagnetic release for overcurrent & Short Circuit Double outgoing 160A MCCB, fixed manual type with thermomagnetic release for overcurrent & short circuit
2.	Cable Entry	Bottom
3.	Degree of Protection for Enclosure	IP-55 (Outdoor type) with canopy
4.	Fabrication	Box : 2.0 mm CRCA sheet Mounting Plate : 2.0 mm CRCA sheet Gland Plate : 3.0 mm CRCA sheet
5.	Type of Cable Gland Plate	Undrilled Removable Type
6.	Painting	Pre-treatment : 10 tank Process Powder Type : Epoxy based Powder shade : 631 as per IS : 5
7.	Gasket	Polyurethane on door
8.	Control wiring	Shall be done by 1100 Volt grade 2.5 square mm black multi stranded PVC insulated Cu Conductor
9.	Bus Bar	High Conductivity Aluminium (Grade – E91E) For Phase : 30 × 10 mm For Neutral : 30 × 6 mm Bus bar shall be provided with 1100 V heat Shrinkable PVC Sleeve.
10.	Bus bar clearance	Phase to Phase : 25.4 mm Phase to Neutral & Earth : 19 mm
11.	Bus bar insulator	SMC/DMC
12.	Name Plate	Anodized Aluminium with white letter engraved on black Background
13.	Shrouding	All live part shall be provided with suitable FRP Shrouding.
14.	Mounting	Structure



**13.4 4****15 V power Distribution Board**

Serial No.	Parameter	Requirements
1.	Rating	Single incomer 160A MCCB, Fixed manual type with Thermomagnetic release for Overcurrent & Short Circuit Five Outgoing 32A MCCB, Fixed manual type with Thermomagnetic release for Overcurrent & ShortCircuit
2.	Cable Entry	Bottom
3.	Degree of Protection for Enclosure`	IP-55 (Outdoor type) with canopy
4.	Fabrication	Box : 2.0 mm CRCA sheet Mounting Plate : 2.0 mm CRCA sheet Gland Plate : 3.0 mm CRCA sheet
5.	Type of cable Gland Plate	Undrilled Removable Type
6.	Painting	Pre-treatment : 10 Tank Process Powder Type : Epoxy based Powder Shade : 631 as per IS : 5
7.	Gasket	Polyurethane on door
8.	Control wiring	Shall be done by 1100 Volt grade 2.5 square mm Black multi stranded PVC insulated Cu Conductor
9.	Bus Bar	High Conductivity Aluminium (Grade-E91E) For Phase : 30 × 10 mm For Neutral : 30 × 6 mm Bus bar shall be provided with 1100 V heat
10.	Bus Bar insulator	Phase to Phase : 25.4 mm Phase to Neutral &Earth : 19 mm
11.	Name Plate	SMC/DMC
12.	Name Plate	Anodized Aluminium with white letter engraved on Black background
13.	Shrouding	All live part shall be provided with suitable FRP shrouding
14.	Mounting	Structure

**13.5****Three phase to Single Phase (415 V/230V) Power Distribution Board**

Serial No.	Parameter	Requirements
1.	Rating	Single incomer 32 A MCCB, Fixed manual type with Thermomagnetic release for Overcurrent & Short Circuit Five Outgoing 16A MCCB, with Overcurrent & Short Circuit protection

2.	Cable Entry	Bottom
3.	Degree of Protection for Enclosure	IP-55 (Outdoor type) with canopy
4.	Fabrication	Box : 2.0 mm CRCA sheet Mounting Plate : 2.0 mm CRCA sheet Gland Plate : 3.0 mm CRCA sheet
5.	Type of cable Gland Plate	Undrilled Removable Type
6.	Painting	Pre-treatment : 10 Tank Process Powder Type : Epoxy based Powder Shade : 631 as per IS : 5
7.	Gasket	Polyurethane on door
8.	Control wiring	Shall be done by 1100 Volt grade 2.5 square mm Black multi stranded PVC insulated Cu Conductor
9.	Bus Bar	High Conductivity Aluminium (Grade-E91E) For Phase : 30 × 10 mm For Neutral : 30 × 6 mm Bus bar shall be provided with 1100 V heat Shrinkable PVC Sleeve.
10.	Bus Bar insulator	Phase to Phase : 25.4 mm Phase to Neutral & Earth : 19 mm
11.	Name Plate	SMC/DMC
12.	Name Plate	Anodized Aluminium with white letter engraved on Black background
13.	Shrouding	All live part shall be provided with suitable FRP shrouding
14.	Mounting	Structure

### 13.6 INSULATED PIERCING CONNECTOR

The connectors should be totally insulated with no loose parts. The connectors should be totally weather and moisture proof so that no water or moisture can enter through the pierced holes on the cable insulation.

The maximum voltage withstand capacity should be 6Kv. The connector should work at 30 cm under water bath for 30 mins and voltage applied of 6 Kv for one minute without any flashover / failure and moisture ingress in it. It should withstand operating temperature up to 60°C. The metallic part should be corrosion resistant.

13.7

### **11KV termination Kit**

11KV termination Kit shall have following features

- a. Suitable for termination of Cable Size- $3 \times 3c \times 120$  sq. mm, Al, XLPE terminated in compact Secondary Substation (11/0.415KV) of 100,200 KVA rating.
- b. The termination kit shall be of heat shrinkable type only.
- c. Electrical stress control to be provided at the cable insulation shield terminus.
- d. An external leakage insulation to be provided between the cable conductors and ground.
- e. Adequate protection to be provided at the end of the cables against the entrance of the moisture and, provision to maintain the constant pressure in the cable termination.

13.8

### **EARTHING AND LIGHTING PROTECTION USING BENTONITE POWDER**

- \* Shall include complete grounding of electrical & telecommunication equipment including earthing of transformer neutrals, earthing of all steel structures, earthing of bodies of all equipment.
- \* Electrical equipment shall be earthed in accordance with latest IE rules, IS-3043 (revised) and IEEE-80-1986.
- \* All earthing connections shall be sufficient to carry the fault current of 25 KA for 1 sec.
- \* Soldered joints shall be used. All joints shall be made pressure type fitting or welded. The earth resistance of yard shall not be more than 1.0 ohm.
- \* Touch and step potential shall be maintained in a safe value by grounding mat in accordance with IEEE-80 for a fault current of 25 kA for 1 sec.
- \* Grounding stations shall be exposed and not buried. These shall be protected from traffic movement.
- \* Fencing around the yard shall be earthed separately.
- \* Earth electrodes shall have facilities for measurements of resistance and watering during dry season.
- \* Earth-mat shall be extended 100cm beyond fencing.
- \* All structures and buildings shall be provided with lighting earthing as per IS-2309.
- \* Complete earthing of transformer neutrals, lighting earthing of all steel structures, earthing of bodies of all equipment.

#### **Note:**

1. Successful Bidder shall measure soil resistivity, before submitting calculation for earthing system.
2. Earthing system shall be designed to limit the earth resistance below 1 ohm.
3. The minimum size of the earthing conductors will be follows:
  - 65×8 mm GI flat sub-station earthing ring.
  - 50×6 mm GI flat main earthing ring inside buildings, switch boards etc.

13.9

**ILLUMINATION SYSTEM**

13.9.1

**Specification of Pole:**

<b>Sl No.</b>	<b>Parameter</b>	<b>Specification</b>
1.	Shape	Octagonal Hot Sip galvanized (single section)
2.	Height	12 meter with double arm at the median of the flyover with 33 meter spacing. 7 meter with single arm on the road below the flyover at 20 meter spacing
3.	Arm Length & shape of the bracket	Decorative type (Length & Shape to be decided during engineering)
4.	Material of Pole	S355JO grade as per BSEN 10025 or equivalent
5.	Material of Base Plate	Fe-410 as per IS:2062 or Equivalent
6.	Galvanization	70 micron as per BSEN IS01461 or Equivalent
7.	Wind speed	Maximum wind as specified in IS 875. The top loading area & maximum weight of the fixture are considered while calculating the maximum deflection of the pole & to meet the requirements of BS 5649 Part VI 1982.
8.	Pole Shaft	The pole shaft have octagonal cross section & are continuously tapered with single longitudinal welding. There are no circumferential welding. The welding of pole shaft is done by submerged arc welding process. There are provided with rigid flange plate of suitable thickness with provision for fixing 4 foundation bolts. The base plate is fitted welded to the pole shaft from inside and outside. The welding is done by MMAW process.
9.	Door opening	The octagonal poles shall have a door of approximate 500mm length at the elevation of 500mm from the base plate. The door is vandal resistance and weather proof to ensure safety of internal connection. The door is flush with the exterior surface & has suitable locking arrangement. There is also suitable arrangement for earthing. The poles are adequately strengthened at the location of the door. Door shall be of hinged type.
10.	Welding	Welding is carried out confirming to approve procedure duly qualified by third party inspection agency. The welder are qualified for welding octagonal shafts.
11.	Fixing Type	The octagonal poles are bolted on precast foundation with a set of four foundation bolts for greater rigidity.
12.	Top Mountings	Galvanized mounting bracket are supplied along with the octagonal poles for installation of luminaries

13.	Manufacturing	The pole manufacturing & galvanizing unit are ISO 9001:2000 & ISO 14001 certified to ensure consistent quality.
14.	Plate thickness	3 mm (minimum)
15.	Top Dia	70-75 mm
16.	Bottom Dia	130-150 mm
17.	Thickness of base plate	16 mm (minimum)
18.	Bottom plate dimension	225 × 225 × 16 mm (minimum)
19.	Foundation Bolt Size (Number × dia × Length)	4 × M20 × 600

## 13.9.2

**Specification of Luminaries:**

Sl. No.	Parameter	Specification
1.	Type	Fit within bracket of octagonal pole
2.	Input Voltage & power	120-280v A.C
3.	IP rating	IP-66
4.	Power factor	≥ 0.95
5.	CRI	≥ 70
6.	CCT	5700 ± 300° Kelvin
7.	Housing	Powder coated pressure die cast aluminium
8.	THD	≤ 10%
9.	Protection	Surge, Short circuit, over temperature & Voltage
10.	Luminous	≥ 100 Lumen/watt
11.	LED Module	The LED modules should be standardized and similar in construction. The modules should be interchangeable and should be arranged in such a manner that failure of single LED does not affect performance of balance LEDs in the modules. LED light fittings should consist of inbuilt protection circuit to protect the driver circuit and LED modules from heating short circuit surges etc.
		The supplier shall enclose the proof of procurement of LEDs from OEMs approved for supply at the time of inspection of the unit against each purchase order. The LEDs be sourced from International reputed OEMs and should meet the IESNA standards. Relevant test certificates and compliance matrix be submitted to the Inspection Authority.

12.	Life of light fitting	50000 Hrs
13.	Wattage of the LED	To be decided by manufacturer based on category of the road. Dimension of the road, inter pole distance & specification given in this Bid document.
14.	Optics	IESNA Type II Optics using globally branded lenses. Super white tempered glass cover for extra protection.
15.	Earthing	To be provided as per manufacturer recommendation
16.	Driver Circuit	Access to the driver is from the top & when the top cover is open the power supply is cutoff.

### 13.9.3 Luminaries below the flyover

1. Outdoor Flexible Strip LED (14.4watt per meter, Standard Color. Golden, Yellow, IP-65) = 4500 meter.
2. Lamp posts/Pathway luminaries (Standard Color: Black, IP-65, 18watt LED) = 25 Nos.
3. Short bollards 360mm high (Colour: Graphite Grey/Black, IP-65, CCT: 6000-6200K, TOP: Round, 8W LED) = 150 Nos.
4. Landscape luminaries (Standard Color : Black, IP-65 LED Module) = 20 Nos

### 13.9.4 Sub Lighting Distribution Board for Luminaries at Clause 6.9.3

1.0	Type	- Metal clad - Shall be suitable for 415/240V, 3 phase and neutral.
2.0	Construction	- Totally enclosed - Dust & vermin proof. - Welded back and sides.
3.0	Enclosure class	IP 55 (with canopy)
4.0	Type of execution	Single front
5.0	Mounting	Structure mounting
6.0	Installation	Outdoor (with canopy)
<b>B. Constructional Features :-</b>		
1.0	Sheet steel CRCA	
	Thickness	2 mm
2.0	Cable entry	- Incomer :- Bottom cable entry - Outgoing :- Bottom cable entry
3.0	Design	- One Incomer and outgoings - All the components shall be accessible from front. - Access to the operating handle of the incoming isolating switch shall be from the front of the cubicle without opening the front door.

		<ul style="list-style-type: none"> <li>- Operating knobs of outgoing MCBs shall be accessible only after opening the front door of the cubicle.</li> <li>- Protective insulated cover plate (3 mm thick Bakelite sheet) shall be provided inside the cubicle to shroud all the live parts.</li> </ul>
4.0	Gland plate	Undrilled detachable gland plates (3 mm thick) shall be provided at the top and bottom with suitable gaskets for cable entry.
5.0	Miscellaneous	<ul style="list-style-type: none"> <li>- Neoprene rubber gasket shall be provided for all the doors, removable covers &amp; between adjacent covers.</li> <li>- Suitable locking devices.</li> <li>- Door shall have concealed hinges.</li> </ul>
6.0	Labelling	<p>Clear legible identification labels (anodized aluminium with white letters engraved on black background) with letter sizes of :-</p> <ul style="list-style-type: none"> <li>- 5 mm for components and module name plates.</li> <li>- Danger board on front and rear sides in English, Hindi and local language.</li> </ul>
7.0	Earthing	Two separate earthing terminals will be provided.
8.0	Paint shade	Shade No. 631 as per IS-5: 1992

**C. Bus bars**

1.0	Arrangement	Three phase & Neutral
2.0	Material	High conductivity electrolytic aluminium alloy confirming to grade E91E as per IS-5082-1981
3.0	Phase Bus bar Rating	<ul style="list-style-type: none"> <li>- Shall be able to carry continuously the connected load (considering all derating factors) plus a 25% margin.</li> <li>- Max. current density shall be</li> <li>- 1.0 A/sq.mm for Aluminium</li> <li>- 1.5 A/sq.mm for copper</li> </ul>
4.0	Neutral Bus bar Rating	50% of phase bus bar rating
5.0	Short circuit rating	50 KA for 1 sec.
6.0	Bus bar configuration	Red-yellow-blue, black for neutral.
7.0	Bus bar insulation	<p>Heat shrinkable PVC</p> <ul style="list-style-type: none"> <li>- R,Y,B coloured sleeves for phases</li> <li>- Black for neutral</li> </ul>

8.0	Bus bar supporting insulators	<ul style="list-style-type: none"> <li>- Non-hygroscopic</li> <li>- Flame retarded</li> <li>- Flame retarded</li> <li>- Track resistant</li> <li>- High strength</li> <li>- Sheet moulded compound or equivalent polyester fibre glass moulded type</li> </ul>
9.0	Air clearance for bare busbar	Phase to phase :- 25.4 mm (minimum) Phase to earth :- 19.0 mm (minimum)
<b>F. Feeder arrangement</b>		
<b>Incomers</b>		
1.0	Isolating Equipment	3 pole ELCB ELCB shall be of AC 23 duty category conforming to IS: 13947-1993 having fully shrouded contacts.
2.0	Quantity	One
3.0	Indication Lamps	LED type indicating lamps for :- -Power ON R/Y/B
<b>Outgoing feeder arrangements</b>		
1.0	Circuit breaker	DP MCB (15 number) & looping of one 3 phase 4 wire connection to next SLDB directly from the bus bar
<b>G. Panel wiring</b>		
1.0	Power/ current transformer circuit	1. 1Kv grade single core, black colour PVC insulated, stranded copper conductor of minimum size 2.5 sq.mm.
2.0	Ferrules	<ul style="list-style-type: none"> <li>- Numbered plastic/ceramic ferrules.</li> <li>- Self-locking type.</li> </ul>
3.0	Terminals	<ul style="list-style-type: none"> <li>- Power &amp; control terminals shall be segregated by insulating material like hylam/Bakelite sheet.</li> <li>- Terminals shall be ELMEX type suitable for connecting two cores of 2.5 sq.mm wires.</li> <li>- Minimum 20 % spare terminals will be provided.</li> <li>- The minimum rating of control terminal shall be 10 Amps.</li> </ul>
5.0	Cable glands	Double compression cable glands for receiving cables.



**13.9.5****Lighting Junction box**

A weather proof sheet steel junction box will be provided at the bottom of the pole and contain fuse, neutral link, bolted type terminals, grounding stud etc. The bolted type terminals will be suitable for receiving 4 x 25 mm<sup>2</sup> AYFY cables with loop-in-loop out arrangement GL conduits will be embedded in the muff for incoming and outgoing cable. Lighting junction box shall be IP-55.

**13.9.6****1.1 kv Power cable for illumination system**

Sl. No.	Parameter	Description
1.0	Voltage Grade	1.1 Kv GRADE
2.0	Duty type	Heavy duty
3.0	No. of cores	- 3.5/ 4 core cables shall be used for motor feeders. - For other consumers or for power supply to other panel 4 core (upto conductor size of 50 sq.mm) OR 3.5 core (for conductor size beyond 50 sq.mm) cable shall be used.
4.0	Reference standard	IS : 8130 – 1984 IS : 5831 – 1984 IS : 3975 – 1988 IS : 1554, part – 1, 1988 IS : 3961 (Part-II) – 1967 IS : 7098 Part-I & II IEC – 60502
5.0	Conductor type	- Plain aluminium conductor. - All power cables of size 10 sq.mm and above shall have standard sector shaped (sm) or compact circular stranded (rm/V) or circular as applicable. - The conductors will be H2 or H4 grade. - The solid conductor will be shall be class - 1 and the stranded conductor will be class – 2. - The conductors shall be solid for conductor of nominal area upto and including 6 sq. mm. and stranded beyond 6 sq. mm. Conductors of nominal area less than 25 sq. mm. shall be circular or shaped. Cables with reduced neutral conductor shall have sizes as per Table 1 of IS 1554 (Part-1) -1988.
6.0	Insulation type	- XLPE insulation - The insulation compound shall be conforming to IS: 7098 (Part I) – 1988.

7.0	Inner sheath	- For armoured/unarmoured cables a tough inner sheath of heat resisting PVC compound (wrapped / extruded as per size), Type ST2 as per IS 5831. - Black in colour.
8.0	Armour	- Galvanised steel wire armour shall be used for 3C×10 sq. mm/4C×6 sq.mm cable. - Galvanised flat steel wires (strips) armour shall be used for bigger size cables. - Single core armoured cables are provided with non-magnetic armour consisting of hard drawn flat or round aluminium flat or round aluminium wires.
9.0	Outer sheath	- For armoured / unarmoured cables a tough outer sheath of heat resisting PVC compound (Type ST2 as per IS 5831). - Black in colour.
10.0	Miscellaneous	- Minimum cross – sectional area of the power cable shall be 6 sq. mm in case of aluminium conductor and 2.5 sq.mm in case of copper conductor. - Power cables shall be selected from core sizes of 6, 10, 16, 25, 50, 70, 120, 240 & 300 sq. mm (Aluminium conductor).
11.0	Temp. rise	Shall be limited to 90 deg.C.
12.0	Core identification	- cable identification will be provided by embossing on the outer sheath the following: <ul style="list-style-type: none"> <li>• Manufacturer's name &amp; trade mark</li> <li>• Voltage grade</li> <li>• Year of manufacture</li> <li>• Type of insulation</li> </ul> - R, Y, B for phases. - Black for neutral (fourth core)

### 13.10 **Telecommunication System**

#### 13.10.1 **Technical Specification – Telephone cable network**

Armoured telephone cable jelly filled underground of size 200/400/800x2x0.63mm polythene insulated fully filled water resistant jelly polythene sheathed galvanized steel tape armoured and polythene jacketed cable with annealed high conductivity copper conforming of specification: TEC-CR /CUG-01/ 03, AUG 2003 or latest

#### 13.10.2 **Cable distribution boxes (DBs)**

##### **Telephone Cable Distribution pillar Box Size: 300/500/900 pr**

Box should be made of 14 swg mild steel sheet painted with antirust grey paint with proper ventilation racks bus bars and jumper wire guiding brackets of galvanised mild steel with tapped hole on racks with screws for fixing cable terminal boxes of various size and will have lockable double / single doors on front and on back sides. This is to be without CT boxes.

##### **Telephone Cable termination Box 100 pr**

For terminating telephone cable in the cable distribution cabinet CT box should be galvanised mild steel/brass sheet of suitable thickness and have two inlet, for cable and should such that these can be sealed by plumbing cable lead sheath front side of the box to provide with requisite numbers of brass terminal blocks each with 100 pair of brass screw terminals. These terminals to be extended to the back of the box and end as a soldering tags for connecting cable conductor the back side of the box to be cover by separate metal cover of same material as box. This should have suitable brackets to fix it in cable distribution cabinet. Insulation of these terminal should not be less than 100meg-ohms.

**Telephone Pillar box, 2MM, TYPE: Outdoor 1000 pr**

Weather proof, distribution cabinet of 1000 pair capacity made of mild steel sheet painted with one coat of primer and two coats of antirust grey paint with proper ventilation. The cabinet will have rack and jumper wire screw for fixing 100 pairs stainless back mount frame with 10nos, 100 pairs stainless steel back mount frame with 100nos 2/2, 10 pairs, krone disconnection modules.

Contractor has to provide 100 pair stainless steel back mount frame and 100nos 2/2, 10 pairs, krone disconnection module for termination of cables at pillar boxes.

**Telephone DP Box 100 par**

100 pair the box should be wall mounting type with hinged cover and locking arrangement, made of galvanised mild steel sheet with power coated of thickness: 2mm, for telephone cable with all screw nuts and bolts made of brass and gaskets between front door and body and between terminal plate and body with solid moulded back, conforming to its specification with 6 no. cable entry holes: two no. Dia 3/4 inch and two no. 1/2 inch for back termination and 2no hole of dia: 3/4 inch for front termination at the bottom of the box with water tight plugs. Centre-to-centre distance (horizontal and vertical) between any two adjacent bolts for cable termination should be at least 20 mm. Hole for front termination should be at two sides of the front plate. Dia of bolts should be 4mm and should be fitted tightly on the terminal plate. The terminal plate should be phenolic moulded (backlight) of at least 4mm thickness and conform to IS 2046 with latest amendment. Insulation value between studs of each pair should be at least 100mm tested by 500 volt insulation tester. Terminal plate fixing screw with the chassis should be at least 20mm inside from the edge.

**13.10.3**

**Optical Fibre Cable:**

Cable, fibre, armoured, single mode, 12 core jelly-filled with multiple loose tubes, outdoor, direct burial type, having following specifications:

Fibre:- size	:	9/125 microns (fibre dia./cladding dia.)
No. of fibres	:	12
Dia. Of coated fibres	:	12
Loose tube: - material	:	P.B.T.P.,
OD	:	1.9 mm (nominal),
Colour:	:	Required
Gel:	:	Thixotropic
Inner sheath: - material	:	H.D.P.E
Thickness	:	1.5mm (nominal)
Armouring	:	E.C.C.S. Tape
Jacketing	:	H.D.P.E
Nominal thickness	:	1.80 mm,
Overall diameter	:	14.7 ± 0.5 mm (nominal)
Strength members:- type (central):	:	F.R.P. Rod,
Size	:	2mm
Type(peripheral):	:	G.F.R.
Bending radius :-	:	Less than or equal to 20 times overall dia
Applicable standards:- The cable will conform to the standards/ technical specifications of:	:	(I) ITU-T Recommendations G-652D. (II) International electro-technical commission standards- IEC 60304, IEC 60794-1-2, IEC 11-5-1, IEC 60811-5-1, ETC

#### 3.10.4 RCC Route marker

SHAPE: Inverted,

SIZE: 800 MM (H) X 150 MM (L) X 100 MM (W).

Dimension of base: 300 MM (L) X100 MM (H).

Overall height: 900 MM.

The words # TELE CABLE# to be inscribed on the marker.

#### 13.10.5 GI PIPE (80mm /50mm OD)

GI pipes should be hot dip galvanized electric resistance welded (ERW), screw type, Medium gauge threaded at both end with socket and as per IS 1239 latest revision IS of reputed make suitable for laying under Roads / Rail crossings /load bearing surfaces.  
Make: Tata, Jindal,

### **13.10.6 OTDR**

**Compact OTDR should have the following minimum features**

- a) Distance range: 1310nm – 20km (min)
  - b) Dynamic Range: 22.5/38 Db
  - c) Emitter Type: Laser
  - d) Wavelength: 1310+30nm
  - e) Fibre under test: 9/125nm
  - f) Operating temperature: 0-45 deg C
  - g) Battery pack life should be min 8 hours
  - h) Port connector should be cleanable ferrule, UPC polish with removable SC adaptor
- Essential Accessories:
- I) FC Universal Adapter
  - j) AC Power card
  - k) DC battery card (Built-in)
  - I) Charger adapted
  - m) Emulation software
  - n) Carrying case
  - p) Operational Manual, etc.

### **13.10.7 FIBRE CABLE PIGTAIL, 1.5 LONG WITH FACTORY-CRIMPED SCCONNECTOR AT ONE END**

Tolerable losses:

The losses in various Fibre Optic Components will be limited to values as per following details:

Single Mode Fibre: At 1310 nm – 0.35 to 0.4 dB/KM

Optical Connectors: 0.1 – 0.75 dB

Fusion splices: 0.1dB will conform to TIA/EIA/ITU specification

### **13.10.8 Cable laying Specification**

**Laying & Termination instruction of FO cable & telephone cable:**

- a) Excavation & back filling of cable trench:

Trenches are to be cut in all type of soil available at the site. The depth (1 mtr.) and width (300 mm) of the trenches should be specified. All efforts are to be given to maintain the depth of trench

at equal level. The executing authority holds the right to no payment or against proportional to depth, if it is not possible to achieve the depth due to difficult underground condition or pre-existing cable/water pipes/sewerage lines etc. The depth should be level at the bottom. After digging, all trenches should be shown to the EA before proceeding for further jobs. The trench will be backfilled completely with full quantity of the excavated earth after completion of cable laying and the surface of the trench should be finished as good as surroundings. When the cable has to be laid under roads, it has to be taken through G.I pipes. The pipe should be closed at both ends with jute cotton soaked with bituminous compound to arrest ingress of moisture. Arrangement of pumping out logged water from the trench and pits, if required during execution of work will be the responsibility of the contractor. Breaking of PCC/RCC surface coming in the way of the trench and repair of the same will be at the scope of the contractor.

Arrangement of pumping out Logged water from tranches and pits, if required, during execution of work will be the responsibility of the contractor. Also any obstruction like steel pipes, ropes, pieces of rail, section, bolder, stones etc. coming in way of trench are to be removed by contractor at his own cost.

b) Road/ Rail crossing:

The Road is to be cut one half at a time. The crust of the road top surface is to be preserved separately. The boulders etc should be stacked on one side of the road and the soft earth from down below should be stacked on the other side. Before laying of GI pipe a bed of riddled sand of 100 mm thickness will be put on the laid pipe. On top of the second layer of sand, earth should be filled up to a depth of 450 mm from top. The rest will be filled up with boulder/debris coming out during cutting and on top of everything, the crust of the road surface is to be put. Ramming after water spraying should be done at every stage to give the road proper strength. The finish of the top surface will be more or less like the old one. Almost the same procedure will be followed in case of Rail Crossing, where instead of crust of top surface, ballast will be put on the top surface.

c) Laying of Underground Cables (Telephone Cable & OFC):

Underground cable will be laid in GI pipe. Medium duty GI Pipe as per specification should be used for all Road/Rail crossing. In each cable run, some extra length to be kept at suitable points to enable one or two straight through joints in future. When a number of cables are laid together, the extra cable length will be adjusted to stagger the straight through joints. Aluminium cable tags bearing the cable No. should be fixed on each cable separately at 50 mtr intervals & at both ends of each joints & at every turning or diversion of each cable route. RCC cable route markers are to be erected at 100 mtrs intervals & at every turning or diversion of each cable route.

d) Fixing of DBs & Pillar Boxes: two MS steel strip of length 16 to 24 inches or as per requirement, width 1.5 inches & thickness 0.5 mm should be made U-shaped & should be embedded inside the wall at required distance as per the direction of EA. The strip should be jammed with sand & cement. Four holes are to be made on strip as per measurement of the fixing holes of the DBs & DBs are to be fixed on MS steel strip using nuts & bolts. The whole job will be done under the supervision & direction of EA. The DBs will be supplied by the department free of cost. Cable termination at the box is included in the cost. Pillar box to be fixed on the floor or a basement with proper grouting &

#### **13.10.9 Cable jointing:**

##### **a) Telephone Cable:**

The open ends of both the cables should be stripped to remove armour, sheathe etc. and clean the cores properly with kerosene for removing jelly & then dry them keeping in open air. Each and every pair should be clearly identified on both ends & isolated to avoid ambiguity. Straight through jointing will be done amongst matching pair the cables by twisting. At the end, the joint will be covered using Heat Shrinkable cable jointing Kits. Jointing kits will be supplied by the Department at free of cost. The contractor will have to bring all the tools & tackles required for jointing & no extra cost will be given for that. All the jointing are to be done by experienced jointer and to the satisfaction of the EA.

#### **13.10.10 Termination of Cables:**

##### **a) Telephone Cable**

After laying, the cables will be terminated in CT boxes or DP Box as per direction of EA. Before termination, the open end of the cable should be stripped to remove armor sheathe etc. & clean the cores properly with kerosene for removing jelly & then dry it keeping in open air. Then the termination will be done as per standard procedure and direction of EA. The contractor will have to bring all the tools & tackle required for termination & no extra cost will be given for that.

##### **b) Optical Fibre Cable:**

The fibre slack will be neatly coiled within the fibre termination panel. No slack loops will be allowed external to the fibre panels. Each cable will be individually attached to the respective termination panel by mechanical means. Each cable will be stripped upon entering the termination panel and individual fibre routed in the terminal panel. Each cable will be clearly labelled at the entrance to the termination point. Cables labelled within the bundle are not acceptable. Dust caps will be provided on the connectors and couplings. Termination and distribution of fiber optic cable will be carried out by fusion splicing with pigtail.

### **13.10.11 Installation and Commissioning**

The contractor is fully responsible for the satisfactory erection, testing, commissioning, of the cable network.

The installation of all equipment will be carried out only by a contractor holding a valid license issued by the State Government for carrying out installation work of telecommunication systems in the steel plant complex. The contractor will furnish to the purchaser, the names and particulars of the certificate of competence of the supervisors and workmen to be engaged for carrying out the installation work against this specification.

All erection work will be carried out in accordance with the requirement specified in this contract document, the standard recommended practice and best workmanship. All electrical work will also comply with standard norms and practices adopted by the purchaser and state /Central Government authorities.

For complete erection, testing and commissioning, contractor will bring all installation aids / material, consumables, tools, test equipment and qualified and experience personnel, in order to complete the job successfully. A list of the same will be furnished to the purchaser for review.

The contractor will make his own arrangement at his own cost for the transport of his own staff and labour to and from the site of works.

Appropriate storage of the materials to be arranged by the contractor at the site. The contractor's responsibility also includes safety and security of the equipment at site.

On completion of erection and installation of all equipment, and before start up, each item of the system will be jointly inspected by the purchaser and the contractor for correctness and completeness of the installation and acceptability to start up leading to commissioning tests.

The list of commissioning tests to be performed will be mutually agreed upon and included in the contractor's quality assurance plan.

The commissioning spares for all items/ equipment is included along with the commissioning services. The consumables required during the commissioning of the system is included as part of the commissioning spares.

Requisite factory and site test reports will be supplied by the contractor.

The contractor's scope for testing and commissioning also includes:

- Preparation for commissioning including time and personnel planning.
- Provision of all necessary measuring instrument / test equipment and qualified personnel.
- Preparation of final commissioning report
- Conducting preliminary acceptance test and final acceptance tests and attending rectification of all points raised during all above tests.
- Demonstration of satisfactory working of the offered systems and cable networks.
- Dissolution of commissioning site and handing over of balance materials at purchaser's store.



**13.11 COLOUR CODE:**

Following colour codes shall be followed for electrical & telecom equipment:

<b>Sl. No.</b>	<b>Equipment</b>	<b>Colour</b>	<b>Paint shade no. as per IS: 5-1991</b>	<b>Equivalent RAL Code</b>
1.	Outdoor structures, nuts, bolts etc.	Galvanised	-	-
2.	CSS and Outdoor Equipment	Dark admiralty Gray	632	7012
3.	HT Switchgear panels	Light Gary	631	7042
4.	LT Switchboard Charger etc.	Light admiralty Gray	697	6010
5.	Panels, DBS etc.	Light admiralty Gray	697	7001
6.	Junction Boxes	Dark admiralty Gray	631	7042
7.	Earthing	Black	-	-
8.	Other equipment	As per drawing Approval	-	-

Painting of all equipment shall be as per relevant IS, manufacturer's practice to ensure long, without causing rust, peeling off. Any touch-up painting as required at site including of paints etc. shall be done by Bidder at no extra cost.

**14.0 ERECTION SPECIFICATION****14.1 General**

- All electrical installation shall confirm to the Indian Electricity Act, IE Rules and Regulation in force, in the state, by electrical inspectorate.
- All work under this contract including the installation of the equipments shall be inspected and approved by the relevant authorities like Electrical Inspectorate etc.
- The circuit breaker, current transformers, lightning arresters, power transformers etc., shall be examined on receipt for damages. The contractor shall assemble, install and connect the equipments wherever necessary as per manufacturer's recommendations. The assembly of the unit including their operating mechanism, site adjustments shall also be carried out as per guiding instructions from the manufacturer. The equipment shall be placed and levelled carefully on their

respective structures. All the preparatory works such as civil foundations, any concrete channels etc., shall be completed prior to this.

- The operating mechanism and control circuit of the equipment shall be tested for proper opening, closing and position indication. The opening and closing tests shall be made from control points as in service operation.
- Earthing of supporting structures and metal parts of operating mechanism operating cabinets, operating handles at ground potential shall be ensured. Where moving parts are involved, flexible copper conductors shall be used.
- Before charging the equipments, contractor shall submit the completion report for each equipment indicating rectifications/modifications carried out during erection, site test certificates with observations, rectifications carried out. Contractor shall also indicate the correctness of operational and safety interlocks. Site test certificates shall also indicate the corresponding values obtained in the factory test.
- The conductor/jumpers shall be correctly and effectively connected to the terminals of equipment. The faces shall be cleaned with fine cloth and lightly coated with petroleum jelly before use. However, if contacts are silver plated, they shall not be cleaned with emery paper. The connection shall be flexible to withstand stresses during switching operation.
- The control cabling shall be effectively crimped to the cable lugs which shall be bolted tight after ensuring that the contact faces are clean. Small wiring that is necessary between units in accordance with the diagram of connection shall be made complete.
- In outdoor switchyard, the structure required for 33/11 kV renovated equipments shall match with the existing system.

## **14.2 Construction of Overhead lines**

### **14.2.1 Survey and Markings**

- The preliminary survey of the line shall be done and plotted on the map and submitted to Engineer of the work.
- During preliminary survey, crossing / proximity to buildings and to all categories of power lines as well as telecom lines shall be clearly indicated in the route map.
- The detailed survey shall be undertaken only after the route alignment submitted.
- The pit marking shall be undertaken only after the route alignment submitted.
- The pit marking shall then be done at the locations. Any likely discrepancy in respect of ground / building clearance shall be sorted out first, then the work shall be started.
- In case of erection to be carried out across existing power line, telegraph, telephone lines and public roads. Bidder shall co-ordinate with concerned agencies/Client's officials for clearances.
- All necessary care shall be taken by the Bidder to avoid damage to crops and properties, while executing the work.

#### 14.2.2 Excavating pits for erection of poles

- After the pit locations are located and peg marked on the ground, the pole pit of size  $600 \times 900 \times 2250$  mm be dug. The base padding of 200 mm thick with 1:3:6 cement concrete shall be done before erection of pole. The earthing coil shall also be grounded 800 mm below ground level by digging a separate pit and filling the pit with soil. The pole in the pole pit shall be erected in truly vertical position and the pit is filled with 1:3:6 cement concrete mixture for size  $450 \times 600 \times 2050$  mm and muffing be provided on pole up-to  $400 \times 400 \times 400$  mm above ground level for rail poles.
- Painting of joists poles with on two coats of red oxide and two coats of aluminium paints on portion above ground level shall be applied.
- For the portion joists poles buried under ground, additional two coats of Bitumen paints shall be applied.
- Pole shall be earthed as per BOQ with GI pipe electrode of 50 mm at 60 cm height above ground level by putting 18 mm hole in rail pole and bolting with 16 mm size nuts and bolts. All materials are included in Bidder's scope, as part of erection work.

#### 14.2.3 Fixing cross arm, top clamps, channels etc. on the poles

- The fitting such as V cross arm, top clamps, channel etc. shall be fixed on poles as per state standard practice. The fabrication of above fittings shall also be done as per state practice. The general specification of steel sections are given below :
  - i) V cross arm shall be made of MS channel of size  $75 \times 40 \times 6$  mm.
  - ii) Top clamp shall be made of MS channel of size  $75 \times 40 \times 6$  mm.
  - iii) Double Cross arm shall be made out of the MS channel of size  $100 \times 50 \times 6$  mm.
  - iv) Other special fittings if required may be got fabricated as per the REC standard. The clamps for holdings the fittings shall be fabricated out of MS flat  $65 \times 8$  mm size.
- All nuts and bolts used shall be of MS with combination of plain and spring washer and machine made.
- All material should be hot dipped galvanized.

#### 14.2.4 Fixing on insulators and Connected Hardware

- Insulator shall be handled carefully in all stages of loading and individually checked for cracks, damages, loss of glaze etc. before assembling and erection at site.
- The pit  $0.4 \times 0.6 \times 1.6$  meter shall be excavated and anchor plate with stay rod shall be suitably aligned in such a manner that the stay wire when bonded with anchor rod and stay clamp at pole, the same shall make an angle of  $30^\circ$  to  $45^\circ$  from the pole. Cement concrete mix of 1:3:6 shall be poured in the pit, rammed adequately and cured properly.
- The conductor shall be laid out in such a way that there is no damage to conductor. Rules of conductor shall be handled carefully so that no damage to conductor stands occur.

#### 14.2.5 Stringing of Conductor

- Conductor shall be laid out from rotating wheel supported on jacks for easy unwinding of the conductor. Snatch blocks shall be used for stringing the conductor and shall have grooves of a shape and size to allow easy flow of conductor and ensure damage free operation, clamp shall be used to grip the conductor at the time of stringing.

#### 14.2.6 Sagging of conductor

- All conductors sagging shall be in accordance with the sag and tension tables as per relevant Indian Standards. After the conductors have been pulled to the required sag, intermediate spans shall be checked to determine the correct sag. The conductor shall be installed on insulators secured to it by means of 6 SWG Aluminium binding wire. The jumpers at the tension locations shall also be bound by 6 SWG Aluminium binding wire with PG clamp. Before fixing the conductor on insulator and strain hardware, Aluminium tape shall be wrapped on the conductor.

#### 14.2.7 Anti climbing Devices

- Barbed wire weighing 35 kg per pole shall be wrapped at a height of 3000 mm above ground level stretching in 900 mm length. Both ends of barbed wire shall be clamped suitably to avoid coming down from its location. It is under scope of work.

#### 14.2.8 Danger Board

- Danger board for 11 kV, 0.415 kV voltage and danger mark conforming to IS : 2551-1963 shall be fixed on each location.

#### 14.2.9 Installation of CSS: As per guide of OEM

#### 14.2.10 Installation of Grounding/earthing

- Entire system shall be earthed in accordance with the provisions of the relevant IEC recommendations/IS code of practice IS: 3043-1987 and Indian Electricity Rules, so that the values of the step and touch potentials in case of faults, are kept within safe permissible limits.
- The principal requirements of the grounding are :
  - a) Low resistance and adequate current carrying capacity.
  - b) Uniform and near uniform ground potential on all structural metal work on all metal enclosures and/or supports of equipment and apparatus.
- The resistance of earthing network shall be less than 1 ohm for the network of outdoor yard under all conditions. The earthing network shall be as per actual site conditions.
- The contractor's scope of installation will also include all the civil work associated with complete earthing network.

- All earth connection shall ensure a permanent low resistance contact. Earth connections required to be removed for the purpose of testing of equipment/earthing network shall have bolted connection and joints fastened. All earthing connections shall be visible for inspection.
- Switchyard fencing and all equipment located at switchyard shall have 2 separate distinct earth connections.
- Lightning arresters and transformer neutrals shall be connected to two independent earth electrodes as per IS: 3043.
- Air termination rods of lightning protection system shall be connected to earthing network as per IS : 3043.
- The grounding connection to the lightning arresters, air termination points of lightning protection system shall be as short as possible. Sharp turns in these conductors shall be avoided.
- It has to be ensured that main earth bus in the installation as well as earth buses in individual sections/areas shall form complete ring and they shall be interconnected.
- ◆ Duplicate earthing (two separate and distinct connections with earth) shall be employed for all equipment.
- ◆ Wherever burying of earth conductors are specified they shall be buried as per approved drawings.
- ◆ Wherever earth conductor crosses the road, it shall be taken through GI pipes.
- ◆ At all terminations of earth conductors on equipments. Sufficient length shall be left for easy movement of the equipment from its position for alignment purposes.
- ◆ Wherever not detailed, the route of the conductor and location of the earth pit shall be arranged, so as to avoid obstructions, crossing etc, according to convenience at site and shall be got approved by the owner's representative in-charge of the work.

#### **14.2.11 Installation of Earth pits**

- ◆ The arrangement of earth electrode/pit shall be as shown in IS: 3043. Termination arrangement of interconnecting earth strips is included in the scope of earth pit. Interconnecting on the earth flats shall be joined by welding to the termination arrangement on the electrode. Electrode will be 50 mm dia GI pipe of 3 m length, medium class in a single piece.
- ◆ The distance between two pits shall not be less than 6 meters.
- ◆ All accessories required for the earth pits such as electrodes, charcoal, salt, clamps, clips, bolts/nuts, washers, GI pipes, funnel cast iron cover and also the masonry works of the pits including supply on necessary materials, bricks, cement and excavation of earth for providing earth pit shall be part of rate quoted for earth pit.
- ◆ The electrodes shall be well packed with earth, charcoal and salt mix up to the level of connections.
- ◆ Masonry work of the earth pit shall be carried out only after well ramming of riddled soil and complete setting of loose soil. As such electrodes shall be fixed in the ground before commencing of any other work of the installation and masonry work shall be taken only at the end after completion of all other works in the installation.
- ◆ Separate earth pits to be provided for LA, transformer neutral and body ear thing.

#### 14.2.12 **Joints/Terminations of Earth Strips**

- All joints of bare galvanized earth strips shall be welded so as to form rigid earth ring. All such welded joints shall be given necessary coating of cold galvanized paint as per relevant standards and a coat of suitable bitumen compound to prevent corrosion. Welded joints shall form part of laying of earth conductors and they shall not be considered as terminations for payment purposes. No extra costs shall be applicable for joints of all the earth conductors,
- In case the joints are made by using suitable connectors the entire joint shall be fully sealed by suitable compound so that no metallic part is exposed.
- The contractor shall make his own arrangements for the necessary crimping tools, soldering equipments, drilling machines and other tools and tackles, which are necessary for completing the installation.

#### 14.2.13 **Erection and Commissioning, tools and tackles**

- The contractor shall provide all tools/tackles, jigs and fixtures, winches, alignment tools, welding sets, testing kits, testing meters/instruments, breaker handling devices, all consumable items and construction equipment as required in installing the work, complete in all respects and shall include but not be limited to bolts, nuts, rivets, welding rods, shims wedges, packing sheets, packing compounds, oil, flushing oil, protective greases and oils, all materials required for proper installation and protection of individual equipment in storages, and during erection, testing and commissioning.
- This shall also cover proper alignment, tack welding tagging, laying marking of and connection of cables, fabrication, supply and installation of all support structures for installation of various electrical equipment's and cables.
- Supply and installation of first aid boxes, shock treatment charts, rubber mats, keyboard.
  - The rubber mats shall be provided in front of all control panels/switchgears to comply with Indian Electricity Act.
  - Erection, testing and commissioning of various equipment shall be done strictly as per manufacturer's instructions.
  - All plant and equipment the painting of which has been damaged during transportation/erection or by corrosion shall be given two coats of paint after removal of scales, rust, oil etc.
  - All iron framework erected shall be provided with one under coat of primer and one topcoat of finish paint.
  - Cable shall be always laid in conduit up to 2 meter of height in case of vertical run to avoid mechanical damage.
  - Cable shall be laid in separate racks according to voltage levels and between tow cables horizontal clearance equal to diameter of cables shall be provided in the hooks.
  - Maximum cross section areas of cable passing through conduit shall not exceed 60% of cross section of conduit.
  - Approved type of danger boards, boards, inscribing EARTHED; DO NOT close; MENAT WORK etc., shall be provided in sufficient numbers.
  - Special care shall be taken to make the enclosed equipment protected against entry of rats, lizard, and creeping reptiles which may create electrical short circuits.

## **14.2.14 Stages of completion of works**

- The stages of completion of various works shall be as follows:

### **14.2.14.1 Completion of erection**

- Equipment shall be considered to be completely erected when the following activities have been completed:
  - Moving of all equipment to the respective foundations.
  - Aligning the equipment
  - Fixing of anchor bolts or tack welding as required
  - Drying of equipment as required and testing of oil for dielectric strength.
  - Assembling of all accessories such as relays, CTs, PTs, meters, instruments etc, as described in job specification.
  - Filtration and filling of oil as required.
  - Cable laying termination with continuity checking.
  - Applying of finish coat of paint.
  - Completion of earthing system.
  - Removing of unwanted materials and covering of all openings including cable openings, conduits etc.
- In other words, erection shall be considered to be complete where the equipment is ready for testing with all other associated equipment's required for commissioning. In this matter the opinion of Employer/Consultant shall be final.

### **14.2.14.2 Completion of testing**

- Testing of equipment shall be considered as complete after the following operational tests.
- Testing/commissioning of all panels and equipment's as specified.
  - Checking of all circuits/schemes for correct connections and continuity.
  - Reworking as required during testing and retesting.
  - Charging of the equipment's

## **14.2.15 Cable Installation**

### **14.15.1 Mode of Cable Installation**

- Over head for AB cable
- Laid in Buried GI pipe while road crossing Illumination cable in buried GI pipe.
- Telecom cable in Buried GI pipe.
- Straight through joints shall not be permitted in cables.

### **14.15.2 Markers**

- Approved cable markers of reinforced concrete shall be provided and fixed to mark each and every deviation of all buried cable routes. A marker shall also be placed every 50 meters along straight portions of each route.
- A concrete cable marker shall also be provided and fixed to mark the position of every buried joint.

#### **14.15.3 Supporting steel work for outdoor switch yard equipment**

- All supporting steel work shall be free from dirt, rust of scale and shall be galvanized.

#### **14.15.4 Cable in pipe**

- Cable pipe, kick guards shall be provided to protect the cables, where the cables rise through holes at ground level.
- Not more than one cable shall be drawn into one pipe unless agreed otherwise.
- After the cable has been drawn, in the pipe shall be sealed by an approved means.

#### **14.15.5 Cable Terminations**

- The cable shall be terminated in accordance with the relevant diagrams.
- The cable cores from the sealing box or gland, to the terminals of the apparatus shall be neatly dressed & arranged, and shall be of sufficient length to prevent the development of tension or local pressure on the insulation. They shall be suitably supported wherever required.

#### **14.15.6 Identification and Marking**

- End of each core of every control cable shall be fitted with tight ferrules of approved make and white non-inflammable plastic insulation material, having the marking engraved in black to correspond with the relevant diagram. Where the ends of one conductor have different markings, each end shall also have white ferrules engraved in red with the remote marking.
- Distinguishing labels of non-corrodible material marked in accordance with the cable numbers of the cabling diagram shall be permanently attached to each end of every cable.
- The phase or polarity of each power cable core at the cable ends shall be identified as follows:
  - AC system: Phase-Red, Yellow and Blue painted discs
  - Neutral-Black painted disc.

#### **14.15.7 Connection to terminals**

- Power cable connections shall be made with cable lugs of approved type and materials, taking into account the bimetallic actions
- All control circuit connections shall be made with the bare conductor with the use of washers, crimped lugs etc.
- The ends of all stranded conductors shall be connected to terminal study by taking one complete turnaround the stud between the flat washers.
- Connections to an easy wiring terminal shall be made with a straight end conductor.
- The cable cores from sealing box or gland to the terminals of the apparatus shall be neatly dressed and arranged and shall be of sufficient length to prevent the development of tension of local pressure on the insulation. This shall be suitably supported wherever required.

#### **14.15.8 Protection of Cables**

- All cables shall be installed such that the risk of subsequent damage is minimized. Steel guards shall be provided where necessary.



#### **14.15.9 Sealing**

- All cables passing from one electrical premises to other i.e. basement to cable trench, basement to cable trench, basement to cable tunnel, pare ducts etc, to be sealed properly to prevent seepage of water.

#### **14.16 Guidelines for clearance in Electrical Premises**

##### **14.16.1** All the substation building size shall be decided as per the following guidelines:

- All equipment/panels shall have minimum 1250 mm back clearance all around them.
- The front-to-front clearance of switchboards/ panels shall be minimum 2500 mm.
- Clearance between two panels installed in a row shall be minimum 1000mm.
- Clearance between wall and end of the panels shall be minimum 1000 mm.

##### **14.16.2 Cable Channels**

- The cable channels shall have removable covers for the full width.
- Minimum working passage of 500 mm shall be provided between cable racks or between cable rack and wall.
- Shall have suitable drainage facility to avoid accumulation of seepage water.

##### **14.16.3 Safety partitions and entries**

- All the cable openings on the equipment floor shall be sealed.

#### **15.0 INSPECTION AND TESTING**

##### **15.1 Inspection**

##### **15.1.1 General**

Inspection & testing of equipment covered under the Technical Specification shall be carried out by the employer representative at the manufacturer's works Premises prior to dispatch to ensure that their quality & workmanship are in conformity with the contract specifications and approved drawings.

##### **15.1.2 Inspection & Testing Stages and finalization of Quality Assurance plan (QAP)**

Within 4 weeks of the award of contract the contractor shall furnish the Quality Assurance plan for electrical equipment.

Inspection & testing of plan & equipment shall be undertaken by the Employer after finalization & approval of QAP.

##### **15.1.3 Responsibility for inspection**

Any inspection by the Employer representative does not relieve the responsibility of quality assurance and quality control functions, as expected of the contractor to be performed by him for supply of plant & equipment as part of the contractual obligations.

#### **15.1.4 Extent of Inspection**

Routine test as per QAP.

Type test shall be carried out on each type of equipment for which the Bidder fails to produce type Test Certificates carried out on similar type of equipment confirming design specification as per TS/GTP and approved drawing.

Successful Bidder has to submit type Test report of CPRI of following material/equipment i.e. LA, CT,PT,LT Capacitor, Isolator, VCB, Transformers, Control & Relay panel conforming to design specification as per TS along with GTP and drawings for approval. **Only type tested material/ ISI marked materials equipment conforming to TS, approved GTP and drawing shall be accepted.**

#### **15.1.5 Tests, Test certificates and Documents**

For each of the items being manufactured following test certificates and Documents (as applicable for each of the equipment) in requisite copies shall be prepared and submitted to the Inspection Engineer for scrutiny & records.

Routine/type / calibration/acceptance/special test certificates for electrical items

Certificates from competent authority for the items coming under statutory regulations.

Should the result of tests not come within the margin specified, the tests shall if required be repeated at Contractor's cost without any liability to the Employer.

#### **15.1.6 Methods of giving inspection calls**

Inspection calls shall be given by the contractor with ten days' notice period. All calls shall accompany two sets of relevant test certificates and inspection report of the Contractor/ sub-contractor after satisfactory completion of internal.

Inspection and tests by them as per approved QAP inspection calls without enclosing relevant tests certificates & internal inspection report shall not be entertained.

#### **15.2 Testing**

Test of all equipment shall be conducted as per latest BIS.

The site tests and acceptance tests to be performed by contractor are detailed below.

The contractor shall be responsible for satisfactory working of complete integrated system and guaranteed performance.

##### **15.2.1 Site Tests and Checks**

All the equipment shall be tested at site to know their condition and to prove suitability for required performance.

Following tests shall be conducted after installation. All tools, accessories and required instruments shall have to be arranged by the Bidder.

Any other test, which is considered necessary by the manufacturer of the equipment, has to be conducted at site.

The tests to be carried out on the equipment at pre-commissioning stage shall include but not limited to the following.

#### **15.2.2 Vacuum circuit Breaker**

1. IR test on each pole by Meggar (Between poles and lower poles to ground)
2. IR tests on control circuits.
3. Functional check of breaker operation on minimum and maximum
4. Checking of interlocks with isolators & earthing switches.
5. Measurement of contact resistance.
6. Checking of operation and tripping of protection release.
7. Checking tightness of termination connectors and earthing connections.
8. Checking of insulators for cracks etc.
9. Check for closing and opening time and simultaneous closing of all poles through oscillography.
10. Tripping of circuit breaker at reduced or over voltage i.e. at 60% & 110%.

#### **15.2.3 Isolator/Disconnecting switches**

1. R test by HV Meggar on main poles.
2. IR test on control circuits.
3. Measurement of contact resistance for all three phases.
4. Functional checking for manual operation.
5. Checking of interlocking with earth switch.
6. Checking of earth switch operation.
7. Checking tightness of earthing connections.
8. Checking of insulators for cracks.

#### **15.2.4 Lightning Arrestor**

1. Continuity check (for metal oxide type only)
2. Check for connection to ground.
3. Check insulators for cracks.
4. HT and IR test of each element.
5. Check reading of leakage current.

15.2.5

**Current Transformer**

1. IR test on each winding to earth and between windings.
2. Checking of winding ratios by primary injections set.
3. Polarity check on each winding.
4. Continuity check for all windings.
5. Check for connections to correct taps.
6. Checking of oil level.
7. Checking of continuity and IR values for cables from CT to Marsh Box.
8. Checking tightness of earthing connections.
9. Checking of insulator of cracks.
10. Check output after loading of the main circuit.

15.2.6

**Potential Transformer**

1. IR test on winding to earth and between windings.
2. Polarity check on each winding.
3. Continuity check for all windings.
4. Turns ratio test.
5. Check for connections to correct taps.
6. Checking of oil level.
7. Checking tightness of earthing connections.
8. Checking of insulator for cracks.

15.2.7

**Distribution Transformer (DTR)**

1. IR test on each winding to ground and between windings.
2. Turns ratio test on each tap.
3. Polarity and vector group test.
4. Measurement of winding group test.
5. Checking of earthing with respect to transformer tank (flexible from top cover to tank), other parts, and neutrals.
6. Check insulators for cracks.
7. Checking for oil leakage and arresting of leakages (if observed)
8. Filtrations of oil by using line filter, vacuum pump and heater set.
9. BDV test on oil samples from top and bottom.
10. Measurement of magnetizing current and no load loss.

11. Measurement of PI Value.
12. Checking of silica-gel breather.
13. Checking of other points given in manufacturer's commissioning manual.

#### 15.2.8

##### **Power Transformer**

1. IR test on each winding to ground and between windings.
2. Turns ratio test on each tap.
3. Polarity and vector group test.
4. Measurement of winding group test.
5. IR, wiring and operational tests on all control devices in control cabinet oil level indicator, winding and oil temp. Indicators etc.
6. Checking of earthing w.r.t. transformer tank (flexible from top cover to tank) other part, neutrals.
7. Testing of buchholz relay for alarm and trip conditions.
8. Setting of oil/winding temperature indicators, level gauge and checking of alarm/trip circuits.
9. Check insulators for cracks.
10. Checking for oil leakage and arresting of leakages (if observed)
11. Checking for open position of all the valves (except drain and filter valves.
12. Filtrations of oil samples from top and bottom.
13. BDV test on oil samples from tap and bottom.
14. Measurement of magnetizing current and no loads loss.
15. Measurement of PI Value.
16. Checking of silica-gel breather.
17. Checking of other points given in manufacturer's commissioning manual.

#### 15.2.9

##### **LT Capacitor**

1. IR test
2. Checking of tightness of earthing & cable connection.

#### 15.2.10

##### **Insulators**

1. Checking tightness of connections.
2. Check for minor damage/cracks after cleaning.
3. Verification of number of disks as per drawings.
4. Check heating at termination point during shut down.

**15.2.11 ACSR Conductor**

1. Check for continuity
2. Check for tightness of connections for all the termination points.
3. Check for phase sequence marking and for their correctness.
4. Physical verification

**15.2.12 Control & Relay panels**

1. IR Value test by Meggar
2. Checking of control cable connection.
3. Operational test of all components mounted on control & relay panel.
4. Testing and calibration of indicating meters.
5. Testing of all relays including auxiliary relays for their pick up, drop out values, operation at all taps etc with the help of relay testing kits.
6. Setting of relays as per approved setting table and checking its operation for one below and one upper setting in the scheme.
7. Measurement of current and voltage in relay operating coils by secondary injection in CT and PT circuit.
8. Measurement of current and voltage in relay and meter circuits during loading of the primary circuit/system.
9. Testing of all schemes for their functions as per approved drawings.
10. Check operation of relays at minimum/maximum control voltage as per the specification.
11. Integrated testing of protective relays for operation of master trip relay and tripping of breakers from operation of master trip relay.
12. Check earthing connection of panels, fixing of panels and opening from side and bottom.
13. Testing of TVM meters.
14. Checking and adjustment in TVM meters as per the manufacturer's instructions.

**15.2.13 Battery**

1. Check polarity of connections between battery and charger.
2. Visual inspection test for level and leakages.
3. Checking of layout as per approved drawing.

4. checking of IR Value from positives to earth and negative to earth.
5. checking of voltage per cell and total voltage between positive to negative and earth to positive/negative and also tap cell voltage (as applicable)
6. Checking of tightness of connectors on each cell.

#### 15.2.14 **Battery Charger**

1. IR test
2. HV test
3. Checking charging mode of batteries, constant current and constant voltage mode.
4. Checking of tightness of earthing connections.
5. Check functional operation of charger, auto / manual change over from boost to boost and boost to float.
6. Checking and setting of all relays.
7. Check polarity of cables connected to battery.

#### 15.2.15 **AC Distribution Board/DC Distribution Board**

1. IR test before and after HV test.
2. HV test by HV Meggar (2.5kV)
3. Checking of tightness of earth connection.

#### 15.2.16 **Cables**

1. Checking of continuity/phasing and IR values for all the cables before and after HV test.
2. HV test and measurement of leakage current after termination of cable kits (for HT cables)
3. Checking of continuity for Armor and fourth core (if applicable)

#### 15.2.17 **Earthing**

1. Check tightness of all earth connections.
2. Check earthing of all metallic equipment, bus bar supporting structures, yard Fencing steel structures of yard, rails, gates, building column (if steel) all elect. Equipments, water pipe lines etc., as per the drawing/specification.
3. Measurement of earth resistance for each electrode.
4. Measurement of total earth resistance.

#### 15.2.18 **Lightning Protection**

1. Check continuity of all the earth strips/shield wire.
2. Check tightness of all connections.
3. Measure earth resistance of each electrode and combined system.

15.2.19 **Miscellaneous**

1. Checking of continuity of the system.
2. Checking of phase sequence from overhead line to consumer end.
3. Checking safe accessibility of all operating points.
4. Check availability of control/aux. supply.

15.2.20 **HV Aerial Bunch cable**

**Tests**

15.2.20.1 The tests shall be carried out on the single-core cables in accordance with IS: 7098 (Part – II). The list of the acceptance test and routine test is indicated below:

15.2.20.2 **Acceptance Test**

- a) Tensile test
- b) Wrapping test
- c) Conductor resistance test
- d) Test for thickness of insulation and sheath
- e) Hot set test for insulation
- f) Tensile strength and elongation at break test for insulation and sheath
- g) Partial discharge test
- h) High Voltage test
- i) Insulation resistance (volume resistivity) test

15.2.20.3 **Routine Tests**

- a) Conductor resistance test
- b) Partial Discharge test
- c) High voltage test

15.2.20.4 The following tests shall be carried out on the bare messenger wire in accordance with IS : 14255-1995.

**Acceptance Tests**

- a) Breaking Load Test (on finished wire)
- b) Elongation Test

15.2.21 **LV Aerial Bunched Cable**

- a) Test for phase conductor



1. Tensile test (IS: 8130)
  2. Wrapping test (IS: 8130)
  3. Resistance test (IS: 8130)
- b) Test on messenger conductor IS: 14255
1. Breaking load
  2. Elongation test.
  3. Resistance test
- c) Physical test for PE insulation. IS: 14255
1. Tensile strength and elongation at break.
  2. Melt flow index
  3. Carbon black
    - i) Content
    - ii) Dispersion
  4. Vicat softening point
  5. Environmental stress cracking.
- d) Test for thickness insulation IS: 14255
- e) Insulation resistance (Volume resistivity) test IS: 14255
- f) High voltage test IS: 14255

15.2.22 **Distribution box.**

1. UV resistance test
2. Flammability test.
3. Degree of protection.
4. Withstand voltage test

15.2.23 **Piercing Connector**

1. Corrosion Qualification Test
2. Electrical Ageing Test
3. Dielectric Investigation Test in Water
4. Mechanical Test

**SECTION-6**

**FORM OF BID**

## FORM OF BID

Description of the Works:

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-----  
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BID

To :

Address:

1. We offer to execute the works described above and remedy any defects therein conformity with the conditions of Contract, specification drawings, Bill of Quantities Addenda for the sum (S) of  
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-----  
-----
2. We undertake, if our Bid is accepted, to commence the Works as soon as is reasonably possible after the receipt of the Engineer's notice to commence, and to cost plate the whole of the works comprised in the Contract within the time stated in document.
3. We agree to abide by this bid for the period of\*-----days from the date fixed for receiving the same, and it shall remain binding upon us and may be accepted at any time before the expiration of that period
4. Unless and until a formal Agreement is prepared and executed this Bid tighter with your written acceptance thereof shall constitute a binding contract between us.
5. We understand that you are not bound to accept the lowest or any tender you receive.

Dated this-----day of-----20-----

Signature-----in the capacity of-----

Duly authorized to sign bids for and on behalf of-----

(in block capitals or typed)

Address:

-----  
-----

Witness:

-----

Address:

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Occupation:

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**SECTION-7**  
**BILL OF QUANTITIES**

## **BILL OF QUANTITIES**

### **Preamble**

1. The Bill of Quantities shall be read in conjunction with the Instructions to Bidders Conditions of Contract. Technical Specification and Drawings.
2. The quantities given in the Bill of Quantities are estimated and provisional, and are given to provide a common basis for bidding. The basis of payment will be the actual Quantities of work ordered and carried out, as measured by the Contractor and verified by the Engineer and valued at the rates and prices tendered in the prices Bill of Quantities, where applicable, and otherwise at such rates and prices as the Engineer may fix within the terms of the Contract.
3. The rates and prices tendered in the priced bill of Quantities shall, except in so far as it is otherwise provided under the Contract, include all constructional plant, labour, supervision, materials, erection, maintenance, insurance, profit taxes and duties, together with all general risks, liabilities and obligations set out or implied in the contract.
4. The rates and prices shall be quoted entirely in Indian Currency.
5. A rate or price shall be entered against each item in the Bill of Quantities whether Quantities are stated or not. The cost of Items against which the Contractor has failed to enter a rate or price shall be deemed to be covered by other rates and prices entered in the Bill of Quantities.
6. The whole cost or complying with the provisions of the Contract shall be included in the items provided in the priced Bill of Quantities and where no Items are provided the cost shall be deemed to be distributed among the rates and prices entered for the related Items of Work.
7. General directions and descriptions of work and materials are not necessarily repeated or summarized in the Bill of Quantities. References to the relevant sections of the contract documentation shall be made before entering rates or prices against each item in the Bill of Quantities.
8. The method of measurement of completed work for payment shall be accordance with the specification for Road and Bridge Works published by the Ministry of Surface Transport (edition).
9. Errors will be corrected by the Employer for any arithmetic errors pursuant to Clause 29 of the Instructions of Bidders.
10. Rock is defined as all materials which, in the opinion of the Engineer, require blasting or the use of metal wedges and sledgehammers, or the use of compressed air drilling for its removal, and which cannot be extracted by ripping with a tractor of at least 150 kw. With a single rear mounted heavy duty ripper.

### BILL OF QUANTITIES

Sl. No	Description of Item (with brief specification and reference to book of specification	Quantity	Unit	Rate	In Words	Amount
				In Figures		In Figures

ATTACHED  
SEPARATELY IN  
BOQ SECTION

Note:

1. Item for which no rate or price has been entered in will not be paid for by the Employer when executed and shall be deemed covered by the other rates and prices in the bill of quantities (Refer: ITB Clause 13.2 and GCC Clause 43.3)
2. Unit rates and prices shall be quoted by the bidder in Indian rupee (ITB Clause 14.1)
3. Where there is a discrepancy between the rate in figures and words, the rates in words will govern. (ITB Clause 27.1 (a))
4. Where there is a discrepancy between the unit rate and the line item total resulting from multiplying the unit rate by quantity. The unit rate quoted shall govern (ITB Clause 27.1 (b))

## **SECTION-8**

### **SECURITIES AND OTHER FORMS**

### **BID SECURITY (BANK GUARANTEE)**

WHEREAS----- (Name of Bidder) (hereinafter called “the Bidder”) has submitted his Bid dated (date) for the construction of ----- (name of contract hereinafter called “the Bid”)

KNOW ALL PEOPLE BY these presents that we-----

(name of Bank of----- (name of country) having our

Registered office at----- (hereinafter called “the

(Bank”) are bound unto----- (name of Employer’s

Representative) hereinafter

Called “the Employer’s Representative”) in the sum of -----\*for which payment

Well and truly to be made to the said Employer’s Representative the Bank itself, his successors and assigns by these presents.

SEALED with the Common Seal of the said Bank this-----day of-----20

THE CONDITIONS of this obligation are:

1. If after Bid opening the Bidder withdraws his bid during the period of Bid validity specified in the Form of Bid.

OR

2. If the Bidder having been notified to the acceptance of his bid by the Employer during the period of Bid Validity:
  - (a) Fails or refuses to execute the Form of Agreement in accordance with the Instructions to Bidders, if required; or
  - (b) Fails or refuses to furnish the performance security, in accordance with the Instructions to Bidders, if required or
  - (c) Does not accept the correction of the Bid price pursuant to Clause 27.

We undertake to pay to the Employer up to the above amount upon receipt of his first-written demand, without the Employer having to substantiate his demand, provided that in his demand the Employer will note that the amount claimed by him is due to his owing to the occurrence of one of any of the three conditions, specifying the occurred condition or conditions.

This Guarantee will remain in force up to and including the date-----\*\*days after deadline for submission of Bids as such deadline i. stated in the Instructions to Bidders or as it may be extended by the Employer, notice of which extension(s) to the Bank is hereby waived. Any demand in respect of this guarantee should reach the Bank not later than the above date.

DATE-----  
-----

SIGNATURE-----



WTINESS-----

SEAL-----

-----

-----

(Signature, name and address)

- \* The Bidder should insert the amount of the guarantee in words and figures denominated in Indian Rupees. This figure should be the same as shown in Clause 16.1.0 the Instructions to Bidders.
- \*\* 45 days after the end of the validity period of the Bid. Date should be inserted by the Employer before the Bidding documents are issued.

## PERFORMANCE BANK GUARANTEE

To

----- (Name of Employer's  
Representative)

----- (Address of Employer's  
Representative)

-----  
WHEREAS ----- (Name and Address of  
Contractor)

(hereafter called "the Contractor") has undertaken, in pursuance of Contract No.-----  
--

dated----- to execute ----- (Name of Contract  
and brief)

Description of Works) (hereinafter called the Contract").

AND WHEREAS it has been stipulated by you in the said Contract that the Contract shall furnish you with the Bank guarantee by a recognized bank for the sum specified the security for compliance with his obligation in accordance with the Contract.

AND WHEREAS we have agreed to give the Contractor such a Bank Guarantee

NOW THEREFORE we hereby affirm that we are the Guarantor and responsible you on behalf of the Contractor up to a total of----- (amount guarantee)  
\*----- (in words). Such sum being payable in the types proportions of currencies in which the Contract price is payable, and we undertake to pay upon your first written demand and without cavil or argument, any sum or sums without limits of ----- (amount of guarantee) as aforesaid without needing to prove or to show grounds or reasons for your demand for the sum specified the

We hereby waive the necessity of your demanding the said debt from the contract before presenting us with the demand.

WE further agree that no change or addition to or other modification of the terms contract or of the works to be performed there under or of any of the contract documents which may be made between you and the contractor shall in any way release us from any laid under this guarantee. And we hereby waive notice of any such change, addition or modification,

This guarantee shall be valid until 28 days from the date of expiry of the Defect utility period.

-----  
Signature and Seal of the Guarantor-----

-----  
Name of Bank-----

Address-----

-----

-----

-----

Date-----

-----

---

\* An amount shall be inserted by the Guarantor, representing the percentage the Contract price specified in the Contract including additional security for unbalanced Bids, if denominated in Indian Rupees.

## BANK GUARANTEE FOR ADVANCE PAYMENT

To

----- (Name of Employer's  
Representative)

----- (Address of Employer's  
Representative)

Gentlemen:

In accordance with the provisions of the Conditions of Contract, sub-clause 51.1 ("Advance payment") of the above mentioned contract, (name and address of Contractor) (herein at called "the contractor") shall deposit with (name of Employer's Representative) a bank guarantee to guarantee his proper and faithful performance under the said Clause the Contract in an amount of----- (amount of Guarantee----- (in words.)

We. The----- (bank of financial institution) as instructed by contractor agree unconditionally and irrevocably to guarantee as primary obligator and not surety merely, the payment to----- (name of Employer's Representative) on his demand without whatsoever right of obligation on our part and without his first claim to contractor, in the amount not exceeding ----- (amount of guarantee----- (in words)

We further agree that no change or addition to or other modification of the terms of contractor or works to be performed there under or on any of the contract documents which may be made between----- (name of Employer's Representative and the Contractor, shall in any way release us from any liability under this guarantee and we hereby waive notice of any such change, addition or modification.

This guarantee shall remain valid and in full effect from the date of the advance payment under the contract until----- (name of Employer's Representative receives full repayment of the same amount from the contractor,

Yours truly,

Signature and Seal-----

Name of Bank/Financial Institution-----

Address-----

Date-----

---

\*An amount shall be inserted by the Bank or Financial Institution representing the amount of the Advance payment and denominated in Indian Rupees.

**Letter of Acceptance**

(Letter head paper of the Employer's Representative)

----- (Date)

To

----- (Name and address of the Contractor)

-----

-----

Dear Sirs,

This is to notify you that your Bid dated-----for execution of the-----

----- (name of the Contract and identification number, as given in the Instructions to Bidders) for the Contract price of Rs. -----(-----)(amount in words and figures) as corrected and modification in accordance with the Instructions to Bidders is her accepted by our agency.

You are hereby requested to furnish performance security, in the form detailed in para of ITB for an amount equivalent to Rs. -----within 21 days of the receipt of this letter of acceptance valid up to 28 days from the dater of expiry of dated Liability period i.e. up to-----  
-----and sign the contract (ailing which action as stated in para.34.3 of ITB will be taken.

Yours faithfully,

Authorized Signature

Name and title of Signatory  
(Employer's Representative)

- 
1. Delete "corrected and" or "and modified" if only of these actions applies. Date as corrected and modified in accordance with the Instructions to Bidders. If correctly or modifications have not been affected.

**Issue of Notice to proceed with the work**

(Letter head of the Employer's Representative)

To

----- (Date)

----- (Name and address of the Contractor)

-----

-----

Dear Sirs,

Pursuant to your furnishing the requisite security as stipulated in ITB Clause 34.1 and signing of the Contract for the construction of-----

-----

-----at a  
Bid Price of Rs. -----

You are hereby instructed to proceed with the execution of the said works in accordance with the contract documents.

Yours faithfully,

(Signature, name and title of Employer's Representative)

### **Agreement Form**

#### Agreement

This agreement made the-----day of-----between-----  
----- (name and address of Employer) (hereinafter called “the Employer and-----  
-----  
---

(name and address of contractor) hereinafter called “the Contractor” of the other part

Whereas the Employer’s is desirous that Contractor execute

---

(name and identification number of Contract) (Hereinafter called “the Works”) and the Employer has accepted the Bid by the Contractor for the execution and completion of such works and the remedying of any defects therein at a cost of Rs. -----

**NOW THIS AGREEMENT WITNESSETH** as follows:

1. In this Agreement words and expression shall have the same meanings as are respectively assigned to them in the conditions of contract hereinafter referred to and they shall be deemed to form and be read and construed as part of this Agreement.
2. In consideration of the payments to be made by the Employer to the Contractor as hereinafter mentioned, the Contractor hereby covenants with the Employers, to execute and complete the works and remedy any defects therein in conformity in all aspects with the provisions of the contracts.
3. The Employer hereby covenants to pay the Contractor in considerations of the execution and completion of the Works and the remedying the defects wherein Contract price or such other sum as may become payable under the provisions of the contract at the limes and in the manner prescribed by the Contract.
4. The following documents shall be deemed to form and be ready and construed as part of this Agreement viz.
  - (i) Letter of Acceptance
  - (ii) Notice to proceed with the works,
  - (iii) Contractor’s Bid
  - (iv) Condition of Contract General and Special
  - (v) Contract Data
  - (vi) Additional condition
  - (vii) Drawings
  - (viii) Bill of Quantities and
  - (ix) Any other documents listed in the Contract Data as forming part of the Contract

In witnessed whereof of parties there to have caused this Agreement to be executed the day and year first before written.

The Common Seal of-----was

Hereunto affixed in the presence of-----

Signed, Sealed and Delivered by the said-----

-----

Binding Signature of Employer Representative-----

Binding Signature of Contractor-----



**UNDERTAKING**

1. The undersigned do hereby undertake that our firm M/s -----  
-----agree to abide by this bid for a period-----days for  
the date fixed for receiving the same and it shall be binding on us any may be accepted at any time  
before the expiration of that period.

-----

(Signed by an Authorized Officer of the Firm)

-----

Title of Officer

-----

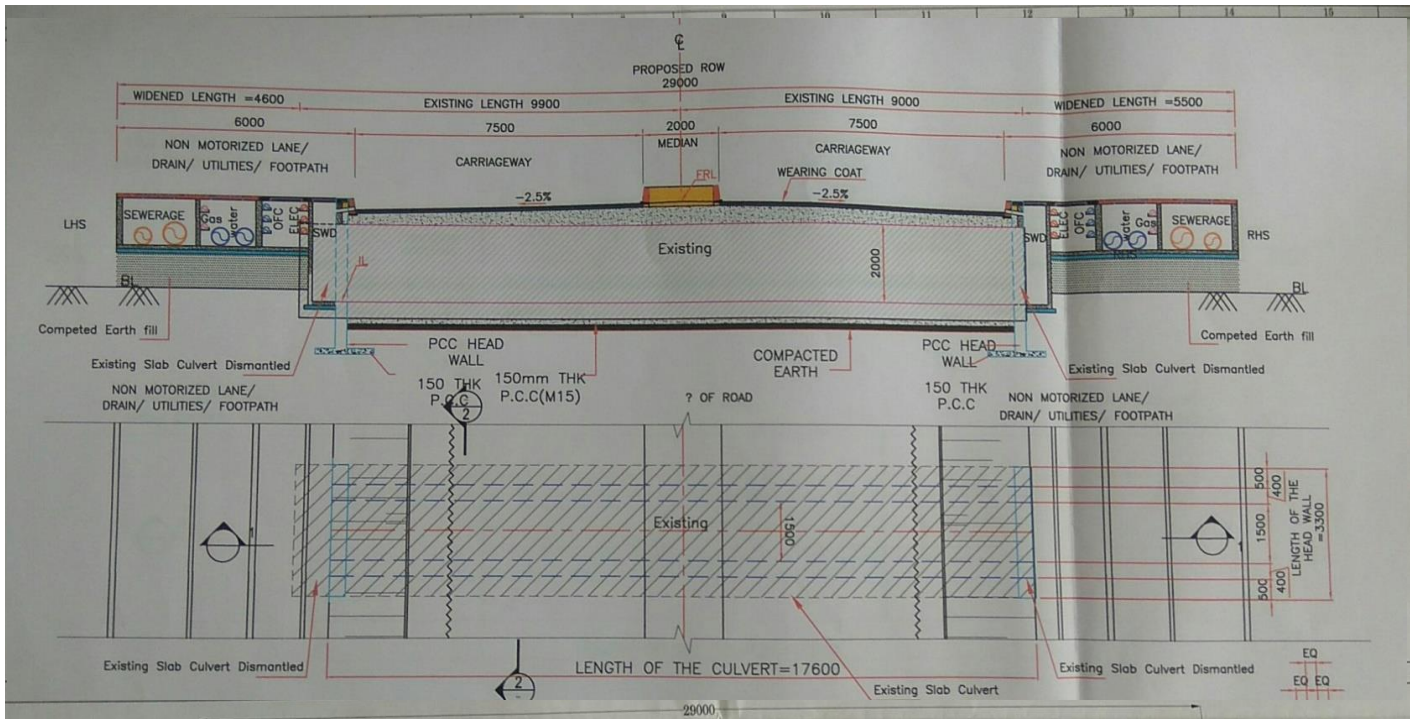
Name of Firm

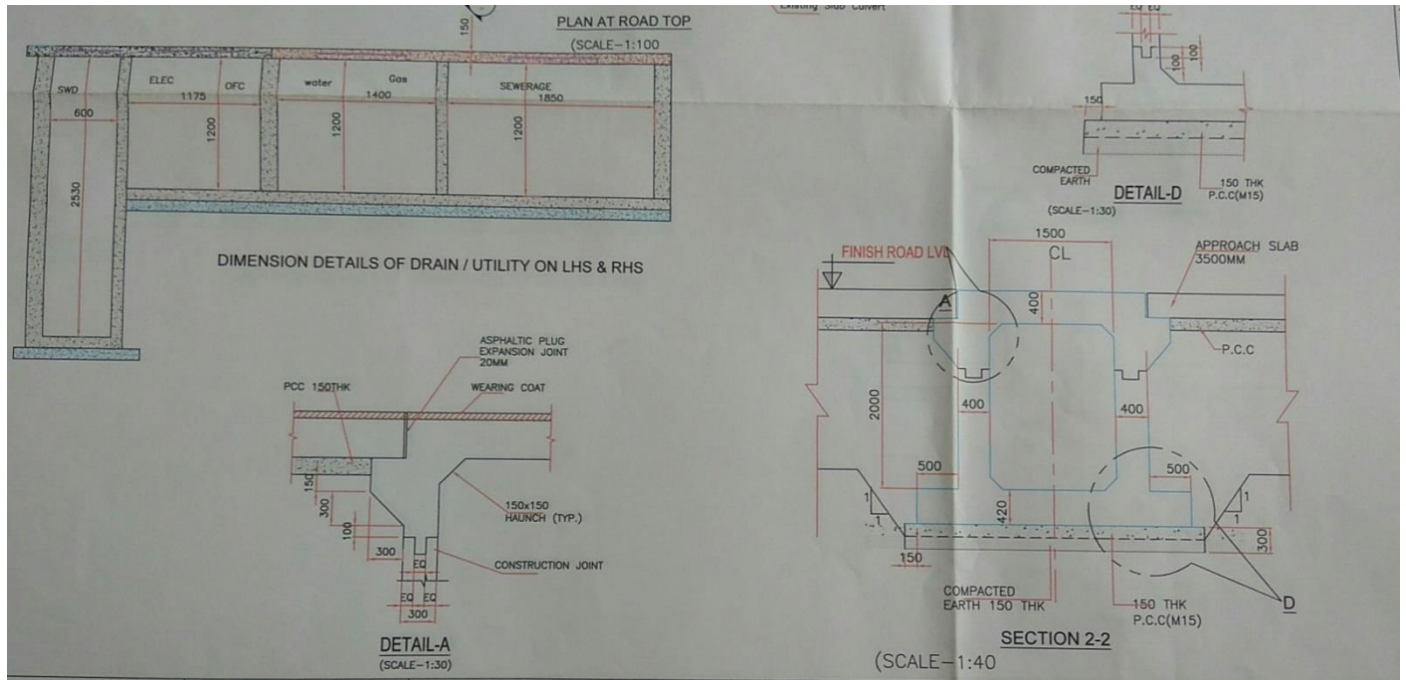
-----

DATE

## **SECTION-9**

### **DRAWINGS**





## **SECTION-10**

### **DOCUMENT TO BE FURNISHED BY BIDDER**