unitech

UNITECH- CONCOURSE

SECTOR 71, GURUGRAM

TENDER DOCUMENT

Volume-1

Name of Work:- Construction of Multi-storeyed Building
Tender for Electrical Sub Station Works at Concourse, Unitech Limited, Sector 71, Gurgaon

TENDER DOCUMENT

FOR

Construction of Multi-storeyed Building Tender for Electrical Sub Station Works at Concourse, Unitech Limited, Sector 71, Gurgaon

Master Index

Master Index

Master Index

Master Index

SECTION-1

Notice Inviting Tender

Name of the holding company

8/13th Floor, Tower B**,** Signature Tower, South City-1**,** Gurugram, 122001, Haryana

Date: 05-05-2023

Notice Inviting Tender (NIT)

1. M/s Unitech Limited (hereinafter referred to as the Employer), invites tenders from experienced and eligible agencies for Construction of Multi-storeyed Building Tender for Electrical Sub Station Works at Concourse, Unitech Limited, Sector 71, Gurgaon as per Schedule as under:

Sr. No.	Subject	Description
(i)	Tender Document No.	UL/KY/GRG/Concourse/2023/126
(ii)	Bidding Process	**Two envelope bidding System** (i) To be uploaded/ filled as per the instructions given in **e-Tendering Procedure** at **Annexure - III**.
(iii)	Name of the Work	Construction of Multi-storeyed Building Tender for Electrical Sub Station Works at Concourse, Unitech Limited, Sector 71, Gurgaon
(iv)	Brief Scope of Work	Electrical Sub Station Works at Concourse, Unitech Limited, Sector 71, Gurgaon
(v)	Estimated Cost	Rs. 5.86 Crores
(vi)	Period of Completion	18 Months
(vii)	Earnest Money Deposit (1% of the Estimated Cost of the Tender)	Rs. 2.50 Lacs (In Words) Two point Five Lacs **Bank Details of the Employer for Preparation of bank Guarantee only** Name of Beneficiary:- Unitech Limited Bank:- ICICI Bank Limited Current A/c No 245105001682 IFSC Code:- ICICI0002451 CIF ID:- 587747798
(viii)	Non-refundable cost of Tender document	Rs. 10,000/- + GST@ 18% through e- payment gateway
(ix)	Non-refundable e-Tender processing fee	Rs. 5,000/- + GST@ 18% through e- payment gateway
(x)	Site Visit with PMC/ Employer	On 10-05-2023 at 11:00 Hrs (IST)
(xi)	Site Visit – Contact	Bidder may contact Mr. D.R.Gupta Contact No. 9810511243 for conducting site visit.

Sr. No.	Subject	Description
(xii)	Last date of receipt of Bidder's Queries in consolidated form	12-05-2023 on Email id :- Ky@unitechgroup.com
(xiii)	Pre-Tender Meeting (Time & Venue)	17-05-2023 at by 11.00 Hrs (IST)
(xiv)	Last date & time of submission of Online Tender	Up to 08-06-2023 by 16.00 Hrs (IST)
(xv)	Date & Time of Opening of Technical Bids	On 09-06-2023 at 11:00 Hrs (IST)
(xvi)	Intimation of technically qualified bids.	To be notified Later
(xvii)	Date & time of opening of Financial Bids of technically qualified bidders.	To be notified Later
(xviii)	Validity of offer	180 days from the date of opening of Technical Bid.

1.2 The tender document can be downloaded from the website www.unitechgroup.com

1.3 Corrigendum,if any, would appear only on the website and not to be published in any Newspaper.

2.0 Eligibility Criteria:

The interested bidders should meet the following qualifying criteria:

2.1 Work Experience:

(i) Experience of having successfully completed similar works during the last 07 (seven) years ending previous day of last date of submission of tenders.

(a) Three similar works each costing not less than 40% of the estimated cost put to tender, OR

(b) Two similar works each costing not less than 60% of the estimated cost put to tender, OR

(c) One similar work costing not less than 80% of the estimated cost put to tender.

AND

"Similar works" shall mean " Electrical substation and ancillary works for Commercial/ Institutional/ Multi-storeyed residential buildings***".***

Notes: -

(i) The past experience in similar nature of work should be supported by certificates i.e. copies of Letter of Award & Completion Certificate issued by the respective Employer's organizations. In case, the work experience is of Private sector, the said certificates shall be supported with copies of Corresponding TDS Certificates. Value of work will be computed from the amount reflected in the TDS Certificates in conjunction with the completion certificate.

(ii) The value of executed works shall be brought to the current level by enhancing the actual value of work done at a simple rate of 7% per annum, calculated from the date of completion to the date of submission of tenders including extension(s) given, if any.

(iii) The values of completed work shall be exclusive of Service Tax/GST. Bidder shall produce documentary evidence against the Taxes & Duties applicable against the concerned job(s). In case the value of job submitted by the bidder does not have clarity with regard to inclusion/ exclusion of Service tax/GST, the amount appearing in the Completion Certificate, the bidder shall provide statutory auditors certificates clearly stating the service tax/GST in the computation to arrive at the completed work value in conjunction with the completion certificate. In case where such certification is not provided or the completion certificate does not have clarity, the value of completed work shall be considered inclusive of applicable GST @18% tax and shall be evaluated accordingly.

(iv) **Joint venture/ consortium of firms/ companies shall not be allowed, and the bidder should meet the above criteria himself.**

(v) **Certificates of Subsidiary/ Group Companies:**

(a) Any company/ firm while submitting the bid can use the work experience of its subsidiary company to the extent of its ownership in the subsidiary company.

(b) In case, the companies/ firms, which intend to get qualified on the basis of experience of the parent company/Group Company, the same shall not be considered. However, for the purpose of clarification, the parent company by itself only can submit the bid.

(c) In case, the companies/ firms, which intend to get qualified on the basis of experience of their own works/in-house works, the same shall not be considered.

(d) In case of a Company/ firm, formed after merger and/ or acquisition of other companies/ firms, past experience and other antecedents of the merged/ acquired companies/ firms will be

considered for qualification of such Company/ firm provided such Company/ firm continues to own the requisite assets and resources of the merged/ acquired companies/ firms relevant to the claimed experience.

(vi) **Foreign Certificate:**

(a) In case the work experience is for the work executed outside India, the bidders must submit the completion/ experience certificate issued by the owner duly signed & stamped and a self-attested undertaking towards the correctness of the completion/ experience certificates. The contractor shall also get the completion/ experience certificates attested by the Indian Embassy/ Consulate/ High Commission in the respective country.

(b) In the event of submission of completion/ experience certificate by the Bidder in a language other than English, the English translation of the same shall be duly authenticated by Chamber of Commerce of the respective country and attested by the Indian Embassy/ Consulate/ High Commission of the respective country.

(c) For the purpose of evaluation of bidders, the conversion rate of such currency into INR shall be arrived at by the daily representative exchange rate published by the IMF as of 7 (Seven) days prior to last date of Submission of bid including extension(s) given, if any.

2.2 Financial Strength:

(i) The Average annual financial turnover for last 3 years shall be at least 50% of the estimated cost put to tender. The requisite Turn-over shall beduly certified by a Chartered Accountant/ Statutory auditor with his Seal/ signatures and registration number. In case of Companies/ Firms less than 3 years old, the Average annual financial turnover shall be worked out as relevant to the available period only.

(ii) Net Worth of the company/ firm as on the last day of preceding Financial Year should be positive.

Net worth means paid-up share capital, Share Application Money pending allotment* and reserves # less accumulated losses and deferred expenditure to the extent not written off. Net worth has been calculated using the following formula.

 # Reserves to be considered for the purpose of Net worth shall be all reserves created out of the profits and securities premium account but shall not include reserves created out of revaluation of assets, write back of depreciation and amalgamation.

***** *Share Application Money pending allotment will be considered only in respect of*

share to be allotted.

Paid up share capital	
Add: Share Application Money pending allotment	
Add: Reserves (As defined Above)	
Less: accumulated losses	
Less: Deferred Revenue Expenditure to the extent not written off	
Net Worth	

Notes:-

(a) Self-certified copy of Bank Solvency Certificate issued from Nationalized or any Schedule Bank should be at least 40% of Estimated Cost of the Project put to tender. The certificate should have been issued within 6 months from the last date of the submission of the tender including extension(s) given if any.

Bank Solvency Certificate is not required if estimated cost put to tender is less than or equal to INR 25 Crore.

(b) The bidders are required to upload and submit one page of summarized Balance Sheet (Audited) and also one page of summarized Profit & Loss Account (Audited) for the last three years.

3.0 The intending bidder must read the terms and conditions of this document carefully including the checklist at **Annexure-IV**.He should submit his tender only if he considers himself eligible and he is in possession of all the documents required. Information and Instructions/addendums for bidders posted on Website(s) shall form part of the Tender Document.

4.0 The Tender Document, as uploaded, can be viewed and downloaded free of cost by the intending tenderer. However, the tender can be submitted only after payment of (a)Non-refundable cost of tender document (b) Non-refundable Tender Processing Fee and (c) EMD through e-payment gateway & all other documents shall be as per Notice Inviting e-tender.

5.0 Set of Contract/ Tender Documents:

The following documents will constitute set of tender documents:

(i) Notice Inviting e-Tender

(ii) Summary of price

(iii) Instructions to Tenderers & General Conditions of Contract

(iv) Technical Specifications

(v) Bill of Quantities

(vi) List of approved makes of materials

(vii) Tender Drawings

(viii) GENERAL DETAILS Annexure-I

(ix) Acceptance of Tender Conditions

(x) Integrity Pact at Annexure-II (To be signed and stamped by the contractorsand scanned copy to be uploaded with the bid)

(xi) Addendum/ Corrigendum, if any, - Duly signed by the authorized person

(xii) Special Conditions of Contract

(xiii) Pre Tender clarifications, if any

6.0 The bidders are required to quote strictly as per terms and conditions, specifications, standards given in the tender documents and is not allowed to stipulateany deviations/ conditions.

The bidders are advised to submit complete details with their bids as Technical Bid Evaluation will be done on the basis of documents uploaded on the website by the bidders with the bids. The procedure for e-Tendering, including the maximum allowable file size for the upload, is described at **Annexure-III** and must be complied by the tenderer for successful bid submission. The information should be submitted in the prescribed Performa and only in PDF format as per the sequence defined in the checklist at **Annexure IV**. All pages of all submittals are to be duly signed/attested by the authorised signatory of the bidder along with the company seal.

Bids with Incomplete / Ambiguous information will be rejected.

The Bank Guarantee for EMD submitted by the bidders shall be strictly in the format prescribed in the General Conditions of Contract GCC. In case, EMD is not found verbatim in the prescribed format, the bid will be liable for rejection.

7.0 The bidders are advised in their own interest to submit their bid documents well in advance from last date/ time of submission of bids so as to avoid problems which the bidders may face in submission at the last moment/during rush hours for the purpose of uploading the bids.

8.0 On the opening date, the tenderer can login and see the tender opening process.

9.0 Notwithstanding anything stated above, the Employer reserves the right to assess the capabilities and capacity of the tenderer to perform the contract in the overall interest of work. In case, bidder's capabilities and capacities are not found satisfactory, the Employer reserves the right to reject the tender and the bidder will have no objection to it.

10.0 Certificate of Financial Turn Over:

The submission at Clause 2.2 part (ii) (b) above of the audited balance sheet and P&L account, the bidder shall upload the certificate duly attested by the Chartered Accountant/statutory auditor mentioning the Financial Turnover of last 3 years, however, the entire voluminous balance sheets or P&L accounts are not to be uploaded. Only one page of summarized balance sheet (Audited) and one page of summarized Profit & Loss Account (Audited) copy for last 03 years shall be uploaded and the same shall also be submitted in hard copy.

11.0 The bidder must ensure to quote separate rates of percentage for Schedule-A and Schedule-B items. The Rate shall be quoted up to two decimals places. The rate of percentage (above, at par or below) quoted by the bidder for Schedule-A items will be applicable to all items covered under Schedule-A and the rate of percentage (above, at par or below) quoted by the bidder for Schedule-B items will be applicable to all items covered under Schedule-B. The evaluation of Lowest (L1) bid shall be done based on the SUM of the value quoted by the bidder towards combined Schedule-A and Schedule-B items.

a. In case bidder has quoted percentage increase or decrease and the total amount in the summary of prices, but there is discrepancy in total amount, quoted and the amount arrived at after calculating the percentage increase/ decrease quoted by the bidder over Estimated Cost, then the total amount shall be corrected based on the estimated cost and the quoted percentage.

b. In case bidder has quoted the percentage and the total amount in summary of prices, but increase or decrease (“+” or “-“) has not been indicated by the bidder against the % figure, then the amount quoted by bidder shall be considered and the percentage increase/ decrease shall be calculated based on the total amount quoted by the bidder and Estimate Cost.

c. In case bidder has quoted the percentage in the summary of prices, but the total amount has not been quoted and increase or decrease (“+” or “-“) has not been indicated against the % figure, then the `+’ shall be considered for the % figure.

d. In case the bidder left the % and amount Blank, % increase/ decrease shall be considered as NIL.

12.0 The tenderer(s) if required, may submit queries, if any, through E-mail Ky@unitechgroup.com and in writing to the Employer to seek clarifications within 10 days from the date of uploading of Tender on website but latest by 12-05-2023 so as to reach the office. The Employer will respond to only those

queries which are essentially required for submission of bids. The Employer may not respond to the queries which are not considered fit, viz. replies of which can be implied/ found in the NIT/ Tender documents or which are not relevant or in contravention to NIT/ Tender Documents and the queries received after due date. Technical Bids are to be opened on the scheduled dates. **Requests for Extension of Bid submission will not be entertained.**

The Pre-Bid meeting shall be attended by the intending bidders only and not by vendors/ manufacturers. The intending bidders should depute their authorized person with authorization letter in original to attend the pre-bid meeting.

13.0 Integrity Pact

Integrity Pact at **Annexure-II** duly signed and stamped by the tenderer, shall be submitted. Any tenderer submitting the bid without the integrity Pact shall be liable for rejection.

14.0 The Bidder shall submit an affidavit disclosing therein that no criminal case against him/ company, in relation to his normal course of business, is pending at any level including any inquiry by the Central Bureau of Investigation (CBI)/ Enforcement Directorate (ED).

15.0 List of Documents to be scanned, uploaded and also to be submitted in hard copy within the period of tender submission:

(i) If EMD submit as BG, upload scanned copy of Bank Guarantee

(ii) GENERAL DETAILS as per Annexure-I.

(iii) Unconditional Letter of Acceptance of Tender Conditions (in original) on the Letter Head of the Applicant/ Bidder.

(iv) Integrity pact as per Annexure -II.

(v) Details of Work Experience Certificates –FORM A.

(vi) Details of Similar Works – FORM B.

(vii) Financial Details - FORM C.

(viii) TDS details for Private Sector Projects – FORM D.

(ix) Self-certified copy of Bank Solvency Certificate - FORM E.

(x) Documents regarding Net Worth of the Company/ Firm.

(xi) General Information – Form F.

(xii) Work Experience Certificates consisting of details as mentioned in Form G.

(xiii) Affidavit duly notarized by Notary Public on Non-Judicial Stamp Paper of Rs. 100/- for correctness of Documents /Information – Form H.

(xiv) Power of Attorney in the name of the person authorized for signing/

submitting the tender.

(xv) E-payment Transaction details towards cost of e-tender processing fee.

(xvi) Valid GST registration/ EPF registration/ PAN No.

(xvii) All pages of the entire Corrigendum (if any) duly signed by the authorized person.

(xviii) Registration Details of the bidder in the GST Act – Form I.

(xix) Checklist compliance as per Annexure IV.

Notes:

(i) All the uploaded documents should be in readable, printable and legible form, failing which the bids are liable for rejection. The document submitted in hard copy should be indexed and duly page numbered in the sequence as per the checklist at Annexure IV.

(ii) In case of foreign bidders participating individually, the bidder is exempted from submission of GST/ EPF/ ESIC registration/ PAN etc. including all other statutory registrations/ permissions/ approvals for executing work in India during bid submission. However, foreign bidders have to submit undertaking on a pre-approved format stating that they will be complying with such mandatory requirements within 60 days of issue of Letter of award. Such format, for the purposes of approval, should reach the Employer on or before the date of the Pre-bid meeting.

(iii) The Contract agreement shall be signed with successful Bidder only after meeting out all above requirements. No payment during the execution of work shall be released till the compliance to above requirements. In case of non-fulfilment of any such requirement by the successful bidder within the stipulated time period, the EMD shall be forfeited, and the bidder will be put under holiday list of the Employer and its parent company M/s Unitech Ltd.

(iv) The foreign bidder can provide the credit limit documents in lieu of Solvency Certificate.

16.0 No Clarification will be sought in case of non-submission of Cost of tender document, EMD of requisite amount, Letter of Waiver as per Section 4 (Forms and formats) and Affidavit as per Form H of Section 2 of the bidding document. In such cases the bid shall be rejected out rightly without seeking any further clarification/document.

17.0 The Employer reserves the right to reject any or all tenders or cancel/withdraw the invitation for bid without assigning any reasons whatsoever thereof. The Employer does not bind itself to accept lowest tender and reserves the right to negotiate post the financial bid opening if it may so deem fit.

18.0 For all scheduled BOQ items as per Schedule A, the nomenclature/rates/unit of applicable DSR items shall be applicable. In case, any ambiguity is observed in scheduled BOQ items, nomenclature, unit and rate of relevant DSR item will hold good.

19.0 Canvassing in connection in the overall tender award process is strictly prohibited, and such canvassed tenders submitted by the bidder will be liable to be rejected and his earnest money shall be forfeited.

20.0 In case of any query, please contact D.R. Gupta, Ph. No 9810511243 during Office hours on all working days.

(……..)

Annexure - I

General Details

<table>
<tr><th>Sl. No.</th><th>Description</th><th>Cl. No. of NIT/ ITT/ GCC</th><th>Values/ Description to be Applicable for Relevant Clause(s)</th></tr>
<tr><td>1</td><td>Name of Work</td><td></td><td>Construction of Multi-storeyed Building Tender for Electrical Sub Station Works at Concourse, Unitech Limited, Sector 71, Gurgaon</td></tr>
<tr><td>2</td><td>Employer</td><td></td><td>M/s Unitech Limited</td></tr>
<tr><td>3</td><td>Type of Tender</td><td></td><td>Item rate</td></tr>
<tr><td>4</td><td>Earnest Money Deposit</td><td>NIT</td><td>Rs 2.5 Lacs (Rupees Two Point Five Lacs only)</td></tr>
<tr><td>5</td><td>Estimated Cost</td><td>NIT</td><td>Rs 5.86 Lacs (Rupees Five point Eighty Six Crs only)</td></tr>
<tr><td>6</td><td>Time allowed for Completion of Work</td><td>NIT</td><td>24 Months</td></tr>
<tr><td>7</td><td>Mobilization Advance</td><td>GCC / 4.0</td><td>Up to 5% of contract value</td></tr>
<tr><td>8</td><td>Rate of interest on Mobilization Advance</td><td>GCC /4.0</td><td>Mobilization Advance shall bear an Interest
@ 9% per annum</td></tr>
<tr><td>9</td><td>Validity of Tender</td><td>ITT /7.0</td><td>180 days</td></tr>
<tr><td>10</td><td>Performance Guarantee</td><td>GCC / 2.0</td><td>3% (Three Per cent Only) of contract value to be submitted within 15 days of issue of Letter of Award</td></tr>
<tr><td>11</td><td>Security Deposit/ Retention Money</td><td>GCC / 3.0</td><td>5% (Five Per cent Only) of the gross value of each running/ final bill.</td></tr>
<tr><td>12</td><td>Start date of Contract</td><td>GCC/1.0</td><td>The date of start of contract shall be reckoned from 15th day from the date of issue of letter of Award.</td></tr>
<tr><td>13</td><td>Deviation limit beyond which clause of GCC shall apply for all works except foundations.</td><td>GCC/ 6.0</td><td><table><tr><td>Building Work</td><td>Repair of Buildings</td><td>Road Work</td></tr><tr><td>30%</td><td>50%</td><td>50%</td></tr></table></td></tr>
<tr><td>14</td><td>Deviation limit beyond which clause of GCC shall apply for foundation work.</td><td>GCC/ 6.0</td><td><table><tr><td>Building Work</td><td>Repair of Buildings</td><td>Road Work</td></tr><tr><td>100%</td><td>NA</td><td>NA</td></tr></table></td></tr>
</table>

Sl. No.	Description	Cl. No. of NIT/ ITT/ GCC	Values/ Description to be Applicable for Relevant Clause(s)
15	Escalation	GCC / 7.0	For operation of Clause 7.0, the basic rate of materials as on last date of receipt of tender will be as under - (a) Cement – …….. (b) Reinforcement steel/ TMT bars – ……. (c) Structural steel - …….
16	Defect Liability Period	GCC/ 42.0	05 (Five) years from the date of Issuance of Completion Certificate for the works by the Employer.

SECTION - 2

Instructions to Tenderers

Instructions to Tenderers (ITT)

1. Online percentage rate open tenders are invited from eligible agencies for Construction of Multi-storeyed Building Tender for Electrical Sub Station Works at Concourse, Sector 71, Gurgaon by M/s Unitech Limited

2. The work is estimated to cost Rs 5.86 Crores

3. The tender document, as uploaded, can be seen on website www.unitechgroup.com and can be downloaded free of cost.

4. Earnest Money Depositvust

(i) Earnest Money Deposit (EMD) i.e. Rs 2.5 Lacs to be paid online on the e-Tendering portal or as a Bank Guarantee (BG) .

(ii) The EMD shall be valid for a minimum period of 180 (One Hundred Eighty) days from the last date of submission of Tender. The Bank Guarantee (BG) against EMD shall be scanned and uploaded to the e-Tendering website at the time of tender submission. The original BG shall be maintained with the bidder and deposited in the office of Employer as and when demanded. The EMD shall be payable to the Employer without any condition(s), recourse or reservations.

(iii) Wherever the EMD is not paid in the online mode, scanned copy of BG should be uploaded on the portal, Original copy of BG shall be submitted to the Employer as and when demanded by them, failing which the Employer have the right to reject the Bid.

(iv) The Employer will verify all EMD submitted as a BG with the issuing bank. Incase the BG is not confirmed by the bank the bid will be marked as unresponsive and will be rejected.

(v) The EMD of unsuccessful bidders will be returned within 15 days after the award of work to the successful bidder or within 180 days from the date of opening of the financial bid, whichever is earlier.

(vi) The EMD of the successful bidder will be discharged after the contractor has furnished the performance guarantee.

(vii) No interest shall be paid by the Employer on the EMD.

(viii) The EMD shall be forfeited in the following events:

(a) If the bidder withdraws the bid after bid opening during the period of validity;

(b) Any unilateral revision in the offer made by the tenderer during the validity of the offer.

(c) Upon non-acceptance of LOI/ LOA by bidder, if and when issued by the Employer.

(d) In the case of a successful bidder, if the bidder fails to sign the contract

Agreement within 15 days from the date of issue of LOA or furnish the required Performance Guarantee or fail to mobilise within 30 days of the LOA/LOI.

(e) If any bidder furnishes any incorrect or false statement/ information/ document.

(f) If bidder commits any breach of the Integrity Pact.

5. Interested bidder, who intends to participate in the tender, has to make following payments online

(a) Cost of Tender Document (Non-refundable) – Rs.10,000.00 + GST@ 18%

(b) Cost of e-Tender Processing Fee (Non- refundable) – Rs. 5,000.00 + GST @ 18%

(c) EMD amount as specified in previous section. To be paid online or as BG. In case of BG the scanned copy of BG shall be uploaded on the portal failing which the bid will be rejected.

6. Online technical tender documents only of those tenderers shall be opened, whose Earnest Money Deposit, Cost of Tender Document and e-Tender Processing Fee and other documents submitted are found in order. The Financial Bids of only those tenderers will be opened whose technical bid documents are complete in all respect and meet the qualification criteria.

7. Validity of Tender

The tender for the works shall remain open for acceptance by the bidder for a period of 180 days from the date of opening of financial bid. If any tenderer withdraws his tender before the said period or issue of letter of acceptance, whichever is earlier, or makes any modifications in the terms and conditions of the tender which are not acceptable to the Employer, then the Employer shall, without prejudice to any other right or remedy, be at a liberty to forfeit the Earnest Money Deposit of the bidder. Further, the tenderers shall be put under holiday list of the Employer and its parent company M/s Unitech Ltd.

8. The tender submitted shall become invalid if:

(a) The tenderer is found ineligible on technical evaluation.

(b) The tenderer does not upload all the documents as stipulated in the tender document.

9. Acceptance of Tender

The Employer reserves the right to reject any or all the tenders in part or full without assigning any reason whatsoever.

10. The bid shall be submitted strictly in accordance with the conditions of Contract and instructions to tenderer. Tenders with any additional

condition(s)/ modifications shall be rejected. Tenders, in which any of the prescribed conditions are not fulfilled or found incomplete in any respect, are liable to be rejected.

11. On acceptance of tender, the name of the authorised representative(s)of the contractor, who would be responsible for taking instructions from the Engineer-in-Charge, shall be intimated by the contractor within 15 days of issue date of Letter of Award by the Employer.

12. The tenderer is not permitted to bid for the works if his family member or a close relative is posted in the project office or concerned Zonal Office of the Employer or its parent company Unitech Limited, unless otherwise permitted. The contractor shall also intimate the names of persons who are working with him in any capacity or are subsequently employed by him and who are close relatives to any of the officers of the Employer or its parent company Unitech Limited through the entire duration/ time period of the project. Any breach of this condition by the tenderer would render him liable to the withdrawal of the work awarded to him and forfeiture of Earnest Money Deposit and Security Deposit. This may also debar the contractor from tendering for other/ future works of the Employer or its parent company Unitech Ltd. For the purpose of operation of this clause, a close relative shall mean wife, husband, parents, grandparents, children, grandchildren, brothers, sisters, uncles, aunts, cousins and their corresponding in-laws.

13. The time for completion of the work as contained in contract shall be as per "GENERAL DETAILS - **Annexure-I**".

14. Canvassing, whether directly or indirectly, with Employers/ PMC/ TPIA is strictly prohibited, and the tenders submitted by the bidders, who resort to canvassing, will be liable for rejection.

15. The tender award, execution and completion of work shall be governed by tender documents consisting of (but not limited to) Letter of Award/ Letter of Work Order, Bill of Quantities, General Conditions of Contract, Special Conditions of Contract, Specifications, Drawings. The tenderers shall be deemed to have gone through the various conditions including sub-soil water conditions, topography of the land, drainage and accessibility etc. or any other condition which, in his opinion, will affect his price/ rates before quoting their rates for the work. No claim whatsoever against the foregoing shall be entertained at any stage after the award of works.

16. The drawings issued with the tender documents are indicative. Works shall be carried out as per "Good For Construction/ GFC drawings issued by Engineer-in-Charge to the Contractor" and the "Shop Drawings prepared by the Contractor and approved by Engineer-in-Charge".

17. Addenda/ Corrigenda

Addenda/Corrigenda to the tender documents may be issued at least three days prior to last date of submission of the tender to clarify or effect modification in specification(s) and/or contract terms included in various sections of the tender document. The tenderer shall suitably take into consideration such Addenda/Corrigenda while submitting his tender. The tenderer shall return such Addenda/ Corrigenda duly signed and stamped as confirmation of its receipt & acceptance and submit along with the tender document as per **Annexure - IV**. All addenda/ Corrigenda shall be signed and stamped on each page by the tenderer and shall become part of the tender and contract documents.

18. Site Visit and Collecting Local Information

Before tendering, the tenderers are advised to visit the site of work, the present status of the project/ work, its surroundings to assess and satisfy themselves about the local conditions such as the status of the project, working and other constraints at site, approach roads to the site, availability of water & electrical power supply, application of taxes/ duties/ levies/ Toll/ Octroi as applicable & any other relevant information required by them to execute the complete scope of work. It becomes even more important in the case of brown-field projects where part works have already been executed that the tenderer obtain all necessary information as to the risks, weather conditions, contingencies & other circumstances, which may influence or affect its tender prices. Tenderer shall be deemed to have considered the above site and local conditions whether he has inspected the site or not and to have satisfied himself in all respect before quoting his rates so as not to raise any claims or extra charges whatsoever in this regard during the entire duration of the project execution, upon completion or during the defect liability period. No claims or extra charges whatsoever shall be entertained/ payable by the Employer on a later date after award of work.

19. Access by Road

(i) Contractor, if necessary, shall build temporary access roads to the site of construction for the works at his own cost to make the site accessible. The Contractor shall maintain the same in motorable condition at all the times at his own cost. The contractor shall be required to permit the use of any access roads so constructed by him for vehicles of the Employer or any other agencies/ contractors who may be engaged on the project site without any charges whatsoever.

(ii) Non-availability of access roads or approach to site, for the use of the contractor shall in no case condone any delay in the execution of work nor be the cause for any claim for Penalty.

20. Handing Over & Clearing of Site

(i) The Contractor should note that the area for construction may be made available in phases as per availability and in conjunction with pace of actual progress of work at site. The work may require to be carried out in constrained conditions. The work is to be carried out in such a way that the traffic, people movement, if any, is kept operative and nothing extra shall be payable to the contractor due to this phasing/ sequencing of the work. The contractor is required to arrange the resources to complete the entire project within total stipulated completion time of the contract. Traffic diversion, if required, is to be done and maintained as per requirement of local traffic police, by the contractor at his own cost and the contractor shall not be entitled for any extra payment, whatsoever, in this regard.

(ii) Efforts will be made by the Engineer-in-Charge/ Employer to handover the site to the Contractor free of encumbrances. However, in case of any delay in handing over of the site to the Contractor, the Employer shall only consider suitable extension of time for the execution of the work. It should be clearly understood that the Employer shall not consider any revision in contract price or any other Compensation whatsoever viz. towards any idling of Contractor's labour, equipment etc.

(iii) Old/ Temporary structures on the site of work, if required, shall be demolished by the contractor properly at his own cost unless and otherwise mentioned elsewhere in the Schedule A & B of the financial bid or as mentioned in SCC. The useful material obtained from demolition of structures & services shall be the property of the Employer and these materials shall be stacked as directed and at the place specified by the Engineer-in-Charge.

(iv) Necessary arrangement including site maintenance is to be made by the contractor for temporary diversion of flow of existing drain, road etc. The existing drain, road would be demolished, wherever required, with the progress of work under the scope of work. The existing Road and Drain, which are not in the alignment of the said project but are affected and/or need to be demolished during execution for smooth progress of theproject, shall be re-constructed/re-habilitated to its original status and condition by the contractor at his own cost. The cost to be incurred by contractor in this regard shall be deemed tobe included in the quoted rates and contractor shall not be entitled for any extra payment on this account whatsoever.

(v) The information about the public utilities (whether over ground or underground) like electrical/ telephone/ water supply lines, OFC Cables, open drain etc. is the responsibility of contractor to ascertain through the site investigation whether the utilities will affect the works.

(vi) The contractor shall be responsible for obtaining necessary approvals from

the respective statutory authorities for shifting/ re-alignment of existing public utilities. The Employer shall only assist the contractor in obtaining the approvals from the concerned statutory authorities.

(vii) Any services affected by the works must be temporarily supported by the bidder/ contractor who shall also take all reasonable measures required to protect the services and property of various government/ private bodies during the progress of works. The cost towards the same is deemed to be a part of the contract bid, and no extra payment shall be made to the contractor for the same.

21. Scope of Work

(i) The scope of work covered in this tender shall be as per the Bill of Quantities, specifications, drawings, instructions, orders issued tothe contractor from time to time during the execution of work. The drawings for this work, which may be referred for tendering, provide general information about the work to be performed under the scope of this contract. These may not be the final drawings and may not indicate the full range of the work under the scope of this contract. The work will be executed according to the drawings to be released as “GOOD FOR CONSTRUCTION” from time to time by the Engineer-in-charge and according to any additions/ modifications/ alterations/ deletions made from time to time, as required by any other drawings that would be issued to the contractor progressively during execution of work.It shall be the responsibility of the contractor to incorporate the changes that may be in this scope of work, envisaged at the timeof tendering and as actually required to be executed.

(ii) The quantities of various items as entered in the “BILL OF QUANTITIES” are approximate and may vary depending upon the actual requirement of the work. The contractor shall be bound to carry out and complete the stipulated work irrespective of the variation in individual items specified in the bill of quantities. The variation of quantities will be governed as per Section 3, clause No. 6.0 of the contract.

22. Approval of Temporary / Enabling Works

The setting and nature of all offices, huts, access road to the work and all other temporary works as may be required for proper execution of the works shall be subject to the approval of the Engineer- in-Charge. All the equipment, labour, material including cement, reinforcement and the structural steel required for the enabling/ temporary works associated with the entire Contract shall have to be arranged by the Contractor only and at his own costs and is deemed to be considered in the bid price. Nothing extra shall be paid to the Contractor on this account.

23. Clarifications after Tender Submission

Tenderer’s attention is drawn to the fact that during the period the tenders

are under consideration, the tenderers are advised to refrain from contacting the Employer and/or his employees/ representatives on matters related to the tender under considerationand that, if necessary, Employer/ PMC will obtain clarifications in writing or as may be necessary. The tender evaluation and processing shall be done by the PMC concerned and vetted by the EIL. The recommendations of the PMC& EIL will be put up to the Tender Award Committee constituted by the Employer.

24. Order of Precedence of Documents

In case of any difference, contradiction, discrepancy, regarding the conditions of contract, specifications, drawings, Bill of quantities etc. forming part of the contract, the following shall prevail in order of precedence:

(i) Contract Agreement

(ii) Letter of Award

(iii) Bill of Quantities

(iv) GFC Drawings

(v) Technical Specifications

(vi) Special Conditions of Contract

(vii) Instructions to Tenderers

(viii) General Conditions of Contract

(ix) Others

Annexure - II

Integrity Pact

To be executed Between

The Employer and its representatives such as the PMC/TPIA hereinafter referred to as **"The Principal"** (which expression, unless repugnant to the context thereof, shall mean and include its legal representatives, heirs and assigns)

AND

…….. hereinafter referred to as **"The Bidder/ Contractor"** (which expression, unless repugnant to the context thereof, shall mean and include itslegal representatives, heirs and assigns)

Preamble

1. Unitech Limited, along with its project owning subsidiaries, being the Employer, is in the process of inviting proposals & bids and award of contracts for procurement, works, goods and services, for completion of its various residential and commercial projects in fulfilment of its given mandate.

2. The Employer places a very high value to the overall integrity, probity and honesty, promoting economic use of resources, and ensure fairness/transparency in its relations with its Bidder(s) and/ or Contractor(s). In order to ensure that highest level of integrity, transparency and trustworthiness is maintained throughout the execution and completion of all its projects, the Employer proposes to adopt and follow an 'Integrity Pact' with the prospective bidders/ contractors. The Integrity Pact is applicable to all the stakeholders i.e. the Contractors and their personnel, the Project Management Consulting agencies and staff, the Engineers India Limited (EIL) and their staff in its role as the Third Party Monitoring Agency, and above all, the Employer and its staff. It seeks the commitment of all persons engaged on these projects on whosoever's behalf to perform without compromising on any aspect, or resorting to any unethical or corrupt practices in any aspect/ stage of the contract, or exercise any unwarranted influence or be influenced on any aspect of the contract or transaction. Only those bidders/ contractors, who commit themselves to this Integrity Pact, would be considered eligible to participate in the bidding process.

3. In order to achieve these goals, the Employer, the EIL and the Project Management Consultants (appointed by the Employer) will monitor the tender process and execution of the contract for compliance with the principles mentioned above.

Section -1: **Commitments of the Employer**

Unitech Group, along with its staff, commit itself to take all measures necessary to prevent any form of corruption and to observe the following principles:-

(i) No employee of the Employer or the PMC or the Third Party Inspection & Monitoring Agency (appointed by the Employer) personally or through any other persons/ family members, will take a promise or demand or accept for self or third person, any material or other benefit or consideration, which the person is not legally entitled to in connection with the tender, or the execution of a contract.

(ii) The Employer or its agents (i.e. the PMCs and the TPIA) will treat all Bidder (s) with equity, fairness and transparency during the tender process. It will, in particular, before and during the tender process, provide to all Bidder (s) the same information and will not provide to any Bidder(s) confidential/ additional information through which the Bidder(s) could obtain an unfair advantage in relation to the process or the contract execution.

Section -2: **Commitments of Bidders (s)/ Contractor(s)**

The Bidder(s)/Contractor(s) shall also commit himself/herself/ themselves to take all measures necessary to prevent all forms of corruption. The Bidder commits himself/herself to observe the following principles during his/her participation in the tender process and thereafter during the contract execution.

(i) The Bidder(s)/ Contractor(s) shall not, directly or through any other persons or firm, offer, promise or give to any Employee of the Employer or its agents (PMCs and TPIA) involved in the tender process or the execution of the contract or to any third person any material or other benefit which he/she is not legally entitled to, in order to obtain in exchange any advantage during the tender process or during the execution of the contract.

(ii) The Bidder(s)/ Contractor(s) shall not enter into any undisclosed agreement or understanding, whether formal or informal, whether collusive or otherwise, with other Bidders. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process in any manner.

(iii) The Bidder(s)/ Contractor(s) shall not commit any offence surrounding the observance of integrity under any law. The Bidder(s)/ Contractors will not indulge in any improper use of any information or document provided by the Employer or its agents in the course of a business relationship, for purposes of competition or personal gain, or pass on to others such information or documents regarding plans, technical proposals and business details, including information contained or transmitted electronically.

(iv) In case of sub-contracting, Bidder (s)/ Contractor(s) shall also like-wise ensure the adoption and signing of the Integrity Pact by the respective sub-contractors.

(v) The Bidder(s)/ Contractor(s) shall, when presenting their/ its bid, faithfully disclose any and all payments he/she/it has made or committed or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract.

Section-3: Equal treatment of the Bidders/Contractors/Subcontractors.

(i) The bidders(s)/ contractor(s) undertake(s) to obtain a commitment in conformity with this integrity pact from all the sub-contractors.

(ii) The Employer shall enter into agreements with identical conditions with all bidders and contractors.

(iii) Employer will disqualify the bidders, who do not sign this Integrity Pact or violate its provisions, from the tender process.

Section-4: Disqualification from tender process and exclusion from future contracts.

If the Bidder(s)/ Contractor(s), before award or during the project execution, has committed a transgression through a violation of Section-2 above or in any other form such as to put his reliability or credibility in question, the Employer is entitled to disqualify the Bidder(s)/ Contractor(s) from the tender process and restrict the Bidder (s)/ Contractor(s) from participating in future tenders of the Employer for a period of two years.

Section-5: Compensation for Damages

If the Employer has disqualified the Bidder(s) from the tender process prior to the award of the contract in terms of Section 4, the Employer shall be entitled to demand and recover the amount equivalent to Earnest Money Deposit towards compensation for damages.

Section – 6: Integrity Pact Duration

(i) This Integrity pact comes into effect as soon as it is signed by both parties. It shall expire for the Contractor(s) 12 months after the Completion of the work, and 03 months for other unsuccessful Bidder(s) after the contract has been awarded.

(ii) If any complaint is made/ lodged by either Party to the Employer during the periods mentioned in (i) above, the management would be at liberty to take such action as may be deemed appropriate.

Section – 7: Miscellaneous

(i) If the Bidder(s)/ Contractor(s) is/are a partnership firm or a consortium or a joint venture, the Integrity Pact shall be signed by all members of the partnership firm or the consortium or the Joint Venture, as the case may be.

(ii) Any dispute or difference arising between the parties with regard to the terms of this Integrity Pact/Agreement, any action taken by the Employer in accordance with this Integrity Pact/ Agreement or interpretation thereof shall not be subject to arbitration.

(iii) This agreement shall be governed by the Indian laws for the time being in force. The Courts in Delhi, having the ordinary original civil jurisdiction will have the authority to deal with matters arising from this Pact/ Agreement.

(For and on behalf of the Principal)	(For and on behalf of Bidders/Contractors)
(Official Seal)	(Official Seal)
Witness-1	Witness -2
<Name>	<Name>
<Address>	<Address>

Place: _____

Date: _____

Annexure - III

Procedure for e-Tendering

Bidders intending to participate in the tenders of Unitech Group have to register first on the e-Tendering portal of Unitech Limited. For this purpose, the authorized representative of the bidder must possess a Class 3 DSC (Digital Signature Certificate). Registration and participation of the bid has to be done at etenders.unitechgroup.com.

1. Registration / Empanelment

Registration includes issuance of a unique User ID to each Bidder by the system. The request for the same is made online. The Bidder fills in the basic identification information during the registration process. The approval of registration will be automatic via email verification. Registration and approval are mandatory to be able to operate as a Bidder on the e-tendering processes.

2. File Size

The documents required to be submitted are given in Annexure-III of Section-2. Five (5) Buckets of different documents have been made in such a manner that each document size is within 25 MB, which is the maximum limit for uploading the said document. This arrangement must be strictly adhered to overcome any problems qua e-filing of documents.

3. Bidder Information Update

Bidder information can be updated as and when required by Bidders online by going on to " Edit Profile". The changes may be subject to Employer approval depending on configuration.

4. Update of Digital Signature Certificate (DSC)

The Digital Signature Certificate (DSC) is required to be registered by each bidder on the System. Since DSCs are valid for a limited period, the digital certificates need to be updated (re-registered) online from time to time. Bidders can participate in a bid only by using their DSC.

5. Public View of Tenders

5.1 View of tender notices/ Notice Inviting Tenders

The bidders can view the detailed N.I.T and the time schedule (Key Dates) for all the tenders floated through the tendering portal on the homepage at https://etenders.unitechgroup.com. The tender documents can be downloaded from the portal.

5.2 View of in-process tenders

The list of live tenders is available to bidders at the home page of the eTendering portal. However, details of the participants who have downloaded

the tender or from whom the bids are received are not made available in order to maintain the confidentiality of identities of bidders and transparency of the procurement process until the process of tender opening has been initiated. The list shows the status of each tender and allows viewing of the tender notices of these tenders.

5.3 View of completed tenders

Bidders will be able to view their completed tenders online on the portal.

5.4 View of opened bids

(i) The participating bidder will be able to view only his opened technical bid.

(ii) The participating bidder, whose technical bid is qualified, will be able to view all the financial bids on the date of opening of financial bids.

5.5 Key Dates

The bidders are strictly advised to follow dates and times as indicated in the tender document. The data and time shall be binding to all bidders. All online activities are time tracked and the system enforces time locks to ensure that no activity or transaction can take place outside the start and end dates and the time of stage as defined in the tender document.

6. Bid Preparation

Bid preparation must be done online. In order to operate on the electronic tender management system, a user's machine is required to be set up. A help file on system setup/Pre-requisite can be downloaded from home page of the website - https://etenders.unitechgroup.com

6.1 Filling up the bid forms

Bid forms are in tabular format. Each bid will be submitted on two envelope formats. Bidder has to fill all forms related with these envelopes. Bid form data can be saved only after encryption with the public key of the Bidder's digital certificate. Data can be edited only after decrypting it with the private key of the Bidder's digital certificate. Unencrypted data cannot be saved in the System.

6.2 Adding attachments

(i) The attachments, if required, may need to be submitted. Some of these may be mandatory and some not. This is clearly indicated on the form for attachment upload. Extra attachments i.e. the ones not asked for in the tender document can also be uploaded at the choice of the Bidder. Employer has the option to disallow uncalled for attachments.

(ii) The Bidder has an additional feature of 'Briefcase' where he can keep his commonly used documents. While attaching the same to the tender,

he can select document either from the briefcase or he can directly upload the same.

(iii) **Scan copy of Documents to be submitted/uploaded for Prequalification or Technical bid under online PQQ/ Technical Envelope:** The required documents (refer to Tender document) shall be prepared and scanned in different file formats (in PDF /JPEG/MS WORD format such that file size is not exceed more than 25 MB) and uploaded during the on-line submission of PQQ or Technical Envelope.

(iv) **FINANCIAL or Price Bid PROPOSAL shall be submitted mandatorily online under Commercial Envelope .**

(v) **Technical and Financial bid to be submitted on portal and not to be submitted manually**

6.3 Validating bid data

Basic validation rules such as item set rules and mandatory field validations are done during validation. Bidder can choose to go back and rework the bid at this stage, if required.

6.4 Bid signing

(i) Each electronic bid is digitally signed. The server also obtains a digitally signed time stamp for each envelope that can be verified at any later date. Bidders can generate and print proof of Bid submission with time stamping.

(ii) The System does not allow the process to be carried out before or after the designated time in tender schedule. Bidder can rework on its bid till the last date of bidding. A bidder seeking to withdraw its bid should initiate the “re-submit” button.

6.5 EMD and Tender Document fees

Bids submitted with EMD and tender fees will only for considered for evaluation. The system will not permit submission of Bid without payment of complete fees.

7 Bid Opening

Unitech representative will undertake the bid opening. Bidder will be able to see the status of bid opened. Technical bids will be opened in the first instance. Upon completion of the technical evaluation, the bids will be marked as “qualified” or “not-qualified”. Financial bids of only such bidders, who qualify in the technical bid evaluation, will be opened.

8. Assistance to the Bidders (Help Desk):

E-mail: Support.tenders@unitechgroup.com

Contact No: **8010208825, 9356477055 & 9028672454 (Nextenders (India) Pvt. Ltd.) Queries related with e-Tendering only**

Support Timings: Monday to Friday- 09.00 A.M. to 08.00 P.M.

Saturday- 10.00 A.M. to 04.30 P.M.

Important Note:-

All queries would require to be registered at our official email- support.tenders@unitechgroup.com for on-time support. (Only those queries which are sent through email along with appropriate screenshots or error description will be considered as registered with the Help-desk). Contact our helpdesk on or before prior to 4 hours of the scheduled closing date & time of respective Tender event.

Bidders participating in online tenders shall check the validity of his/her Digital Signature Certificate before participating in the online Tenders at the portal https://etenders.unitechgroup.com. For help manual please refer to the 'Home Page' of the eTendering portal https://etenders.unitechgroup.com, and click on the available link 'How to...?' to download the file.

Annexure - IV

Check-list - documents to be submitted along with the bid

(All documents mentioned in the Check-list are to be uploaded as a part of the Technical Bid)

Sr. No.	Description	Reference from Tender	Bucket (Size not exceeding 20MB for each bucket)	Submission Compliance (Yes / No)
Pre-Qualification Documents				
1	If EMD submit as BG, upload scanned copy of Bank Guarantee	As per Form No. VI (Section 4)	Bucket-1	
2	General Details	Annexure-I		
3	Unconditional Letter of Acceptance of Tender Conditions (in original) on the Letter Head of the Applicant/ Bidder.	Section-4		
4	Integrity pact	Annexure-II		
5	Details of Work Experience Certificates	Form-A		
6	Details of Similar Works	Form-B		
7	Financial Details	Form-C		
8	TDS details for Private Sector Projects	Form-D		
9	Documents regarding Net Worth of the Company/ Firm.	2.2(II) & 14(XI) of NIT		
10	Self-certified copy of Bank Solvency Certificate	Form-E		
11	Audited summarised Balance Sheet (Last 3 years)	2.2 (ii) Note B of NIT		
12	Audited summarised Profit & Loss Account (Last 3 years)	2.2 (ii) Note B & Para 10 of NIT		
13	General Information	Form-F		
14	Work Experience Certificates	Form-G		
15	Affidavit duly notarized by Notary Public on Non-Judicial Stamp Paper of Rs. 100/- for correctness of Documents /Information	Form-H	Bucket-2	
16	Power of Attorney in the name of the person authorized for signing/ submitting the tender	14(XV) of NIT		
17	E-payment Transaction details towards cost of e-tender processing fee.	6.5 of Annexure-3/ 14(ii) & (xvi) of NIT		

Sr. No.	Description	Reference from Tender	Bucket (Size not exceeding 20MB for each bucket)	Submission Compliance (Yes / No)
18	Registration Details of the bidder in the GST Act	Form-I		
19	Valid GST registration/ EPF registration/ PAN No.	14 (xvii) of NIT & Note -2 of NIT		
20	All pages of the entire Corrigendum/ Addenda (if any) duly signed and stamped by the authorized representative of the tenderer	14(xviii) of NIT	Bucket-3	
	Technical Submissions as Part of Bid			
21	Project Execution Plan	18 of GCC	Bucket-4	
22	Overall Project Schedule (Resource loaded-Level 3) along with Critical Path	18 of GCC		
23	Progress 'S' Curves	17.2(IV) of GCC		
24	Manpower and Machinery Deployment	33 of GCC		
25	Details of Software's to be used for planning, material control etc.	17.2(iv)		
26	Any other relevant documents the tenderer wishes to submit to support the bid.	-		
27	**Forms and Formats**			
I	Declaration By the Bidder Regarding Bidding Document	As per Form No. I (Section 4)	Bucket-5	
II	Letter of Waiver	As per Form No. II (Section 4)		
III	Undertaking For Non-Engagement of Child Labour	As per Form No. III (Section 4)		
Iv	Affidavit disclosing therein that no criminal case against him/ company, in relation to his normal course of business, is pending at any level including any inquiry by the Central Bureau of Investigation (CBI)/ Enforcement Directorate (ED)			

Signatures of the Bidders

(Name of the Signatory _____)

Place:

Date:

Form - A
Tender for _____

Mandatory Information Documents

Details of Work Experience Certificates

Sr. No.		1	2	3	4
1.	Name of Work and its Location				
2.	Name of Employer				
3.	Date & Reference No. of Completion Certificate				
4.	Date of Start				
5.	Date of Planned Completion				
6.	Date of Actual Completion				
7.	Awarded cost of Work (Exc. Tax)				
8.	Cost of Work on Completion (Exc. Tax)				
9.	Value of Tax (as considered in the Completion Certificate)				
10.	Reference and page No. of documentary proof of the detail missing in the Completion Certificate				

1. Certified that the Completion Certificates of above works are enclosed with the Tender Documents;
2. Details mentioned in the above Form are as per Completion Certificates and have not been presumed.

Note: If any detail is not mentioned in the Completion Certificate, documentary proof of details like drawings, LoA, BoQ, Completion Certificate/ Occupation Certificate, copy of final bill, etc. is to be submitted and uploaded on e-Tender Website along with the Completion Certificate.

Signature of the Bidder with Seal.

Form - B
Tender for _____

Mandatory Information Documents

Details of Similar Works

Sr. No.		1	2	3	4
1.	Name of Work for which Experience Certificate has been submitted				
2.	Name of Employer				
3.	Date & Reference No. of Completion Certificate				
4.	Type of Work				
5.	No. of Basements				
6.	No. of Storeys				
7.	Height of Building (From GF level to Terrace Floor level)				
8.	Reference and page No. of documentary proof of the detail missing in the Completion Certificate				
9.	Any Other				

Deleted

If any detail is not mentioned in the Work Completion Certificate, documentary proof of detail is to be submitted and uploaded on e-Tender Website along with the Completion Certificate.

Signature of the Bidder with Seal.

Form – C
Tender for _____

Mandatory Financial Documents

Sr. No.	Description	1st Year (Rs. in Lakh)	2nd Year (Rs. in Lakh)	3rd Year (Rs. in Lakh)
		(A)	(B)	(C)
(i)	Profit/ Loss			
(ii)	Gross Annual Turnover of previous 3 financial years ending as on the last date of the preceding Financial Year			
(iii)	Average Annual Turnover for previous 3 Financial Years (Rs. in Lakh) = (A+B+C)/3			
(iv)	Net Worth (Paid-up Capital + Reserves) on the last date of the previous Financial Year			
(v)	Bank Solvency amount as mentioned in the bank Solvency Certificate			

Note: This Form-C is to be submitted in Original

1. Summarised page of Audited Profit & Loss Account of previous 03 Financial Years duly certified by the Chartered Accountant/ Statutory Auditor, has been submitted.
2. Summarised page of Audited Balance Sheet of last Financial Year (ending on the last day of the preceding Financial Year) duly certified by the Chartered Accountant/ Statutory Auditor, has been submitted.

Signature of Chartered Accountant/ Statutory Auditor with Membership Number and Seal	Signature of the Bidder along with the Seal

Form – D

TDS details of Private Sector Projects

Sr. No.	Subject	1	2	3
(i)	Name of Work			
(ii)	Name of Employer			
(iii)	Project Cost (Rs. in Cr.)			
(iv)	No. and date of Completion Certificate			
(v)	Cost of the Work on Completion (Rs. in Cr.)			
(vi)	Payments received as per TDS (Rs. in Cr.)			
(vii)	TDS corresponding to the Payments			
(viii)	Year-wise TDS as per Form 26AS/ Form 16-A relating to the Work			

Notes:

1. Value of work done will be considered commensurate with the value of TDS Certificates.
2. In case of multiple contracts undertaken from a Employer, details of TDS/ Form 26AS for each work mentioned above need to be segregated and given separately.
3. This Form needs to be supported with Form -26AS taken in HTML format on Form – 16A

Signature of Chartered Accountant/ Statutory Auditor with Membership Number and Seal	Signature of the Bidder along with the Seal

Form – E

Dispatch number of bank/ Date

Solvency certificate on Letter-head of the Bank

1. This is to state that to the best of our knowledge and information that M/s _____ having/ registered office address …….. ……..…….. is a customer of the bank and has beenmaintaining his accounts with our branch since _____. As per records available with the bank, M/s…….. can be treated as solvent up to a limit of Rs……(Rupees in words).

2. It is clarified that the above information is furnished and this certificate is being issued at the specific request of the customer.

Name, designation, Signature with seal

Form – F

General Information

1.	Name of Applicant/ Company	
2.	Address for correspondence	
3.	Official e-mail for communication	
4.	Contact Person: Telephone Nos. Fax Nos. Mobile	
5.	Type of Organization: (a) An individual (b) A proprietary firm (c) A firm in partnership (Attach copy of Partnership) (d) A Limited Company (e) (Attach copy of Article of Association) (f) Any other (mention the type)	
6.	Place and Year of Incorporation	
7.	Name(s) of Directors/ Partners in the organization	
8.	Name(s) and Designation of the persons, who is authorized to deal with Employer (Attach copy of power of Attorney)	
9.	Bank Details: Name of Bank, Address of Bank Branch, Account No., RTGS, IFS Code	

Signature of the Bidder with Seal

Form – G

Work Experience Certificate

Name of Employer with Address, Email & Phone Number

Dispatch No. _____ Date: _____

Name of Contractor _____

Sr. No.	Subject	Description			
1.	Name of work / project & Location				
2.	Name and Address of the Employers				
3.	Agreement Amount				
4.	Cost of work on completion				
5.	Date of start				
6.	Stipulated date of completion				
7.	Actual date of completion				
8.	Amount of Penalty levied for delayed completion (if any).				
9.	Type of Work:				
10.	No. of Basements in any Building of this work				
11.	Maximum Height of any Building of this work (From Ground Floor Level to Terrace Floor Level)				
12.	Maximum No. of storeys of any Building of this work				
13.	Performance report	Outstanding	Very Good	Good	Poor
(a)	Quality of work				
(b)	Resourcefulness				
(c)	Financial soundness				
(d)	Technical proficiency				
(e)	General behaviour				

Deleted

Name & Designation Signature with

Seal of issuing Authority **Date:** _____

Form - H

AFFIDAVIT

(To be submitted by bidder on non-judicial stamp paper of Rs.100/ (Rupees Hundred only) duly attested by Notary Public)

Affidavit of Mr. _____ S/o.....R/o .....

I, …….. the deponent above named do hereby solemnly affirm and declare as under:

1. That I am the Proprietor/Authorized signatory of M/s ……. having its Head Office/ Regd. Office at ……

2. That the information/ documents/ Experience certificates submitted by M/s……. along with the tender for ……. *(Name of work*) …… to …… *(Hereinafter referred to as the Employer)* are genuine and true and nothing has been concealed.

3. I shall have no objection in case the Employer verifies them from issuing authority (ies). I shall also have no objection in providing the original document(s) in case the Employer demands so for verification.

4. I hereby confirm that in case, any document, information &/or certificate submitted by me found to be incorrect/ false/ fabricated, the Employer at its discretion may disqualify / reject / terminate the bid/contract and forfeit the EMD/ All dues.

5. I shall have no objection in case the Employer verifies any or all Bank Guarantee(s) underany of the clause(s) of Contract including those issued towards EMD and Performance Guarantee from the Zonal/ Branch office of issuing Bank and I/We shall have no right or claim on my submitted EMD before the Employer receives said verification.

6. That the Bank Guarantee issued against the EMD issued by (name and address of the Bank) is genuine and if found at any stage to be incorrect / false / fabricated, M/s The Employer shall reject my bid, cancel pre-qualification, and debar me from participatingin any future tender.

7. I hereby confirm that our firm /company is not blacklisted/ barred /banned from tendering by M/s The Employer If this information is found incorrect, the Employer at its discretion may disqualify / reject / terminate the bid/contract.

8. The person who has signed the tender documents is our authorized representative. The Company is responsible for all of his acts and omissions in the tender.

I, ..., the Proprietor / Authorized signatory of ..... do hereby confirm that the contents of the above Affidavit are true to my knowledge, and nothing has been concealed there from.……and that no part of it is false.

DEPONENT

Verified at .....this.....day of .....

ATTESTED BY (NOTARY PUBLIC)

Form - I

GST Registration Details of Contractor/ Vendor	
Name	
Address (As per registration with GST)	
City	
Postal Code	
Region/ State (Complete State Name)	
Permanent Account Number	
GSTIN ID/ Provisional ID No.: (Copy of Acknowledgement required)	
Type of Business (As per registration with GST)	
Service Accounting Code/HSN Code:	
Contact Person	
Phone Number and Mobile Number	
Email ID	
Compliance Rating (if updated by GSTN)	

Signature of Bidder with Seal

SECTION-3

General Conditions of Contract

1. Definitions

In the contract, the following expressions shall, unless the context otherwise requires, have the meanings hereby respectively assigned to them:

(a) **Approval** means approval of the Engineer in Charge/Employer, as the case may be, in writing including subsequent written confirmation of previous verbal approval, if any.

(b) **Authorized Representative of Employer** means the person designated by the Employer/ TPIA and/ or the PMC and shall include their authorized nominee(s) or agent(s).

(c) **Bill of Quantities** or **Schedule of Quantities** means the priced complete bill of quantities or schedule of quantities forming part of the complete bill of tender/ tender document.

(d) **Contract** means the documents forming the tender and acceptance thereof and the formal agreement executed between the Unitech Group Company and the Contractor, together with the documents referred to therein including these conditions, specifications, designs, drawings and instructions issued from time to time by the Engineer-in-Charge and all these documents taken together, shall be deemed to form one contract and shall be complementary to one another.

(e) **Contractor** means the individual, firm**,** or company, whether incorporated or not, undertaking the works and shall include the legally authorized personnel and representative of such individual or the persons composing such firm or company, or the successors of such firm or company and the permitted assignees of such individual, firm or company.

(f) **Contract Value** means the sum for which the tender is accepted as per the letter of Award.

(g) **Drawings** mean the drawings referred to in the contract document including modifications, if any, and such other drawings as may from time to time be furnished and/ or approved by Engineer-in-charge/PMC.

(h) **Date of Commencement of Work:** The date of commencement of contract shall be reckoned from the 15th day after the date of issue of Letter of Award.

(i) **Employer** means Unitech Limited, the holding Company or any of its subsidiaries/ JV/ affiliate, with its corporate office at 8/13th Floor, Tower-B, Signature Towers, South City-1, Gurugram-122007, Haryana.

(j) **Engineer-in-Charge** shall mean the Authorized representative of the Employer.

(k) **Excepted Risks** are risks due to riots (other than those among Contractor's employees), war (whether declared or not), invasion, act of foreign enemies, hostilities, civil war, rebellion revolution, insurgency, military or usurped power, any acts of Government, damages from aircraft, acts of God, such as earthquake, lightening and unprecedented floods, pandemic and other causes over which the Contractor has no control and accepted as such by the Employer or causes solely due to use or occupation by Government/ Employer of the part of the works in respect of which a certificate of completion has been issued or a cause solely due to Employer's faulty design of works.

(l) **Language:** All documents and correspondence in respect of this contractshall be in English Language.

(m) **Letter of Award (LoA)** shall mean Employer's notification letter conveying its acceptance of the tender along with the conditions stated therein.

(n) **Market Rate** shall be the rate as decided by the Engineer-in-Charge on the basis of the prevailing cost of materials and labour at the site of work where the work is to be executed plus 15% (Fifteen per cent) to cover all overheads and profits of the Contractor.

(o) **Month** means English Calendar month, 'Day' means a Calendar Day of 24 Hrs each.

(p) **PMC** means the Project Management Consultancy agency appointed by the Employer for the works, its Authorized Representatives, Agents, Successors, Beneficiaries, and Legal Heirs.

(q) **Site** means the land and other places on, under, in or through which the works are to be executed or carried out and any other lands or places provided by the Employer or used for the purpose of the contract.

(r) **Tender or Bid** means the tender submitted by the bidder for acceptance by the Employer.

(s) **TPIA** means Third Party Inspection & Monitoring Agency i.e. M/s Engineers India Limited,. appointed by the Employer for Inspection, Monitoring, Audit & Quality Control of the works.

(t) **Writing** means any manuscript type-written or printed statement under or over signature and/or seal of the concerned, as the case may be.

(u) **Work or Works** shall, unless there be something in the subject or either context repugnant to such construction, be construed and taken to mean the works by or by virtue of the contract contracted to be

executed whether temporary or permanent, and whether original, altered, substituted or additional.

Notes:

(i) Headings in the clauses/conditions of tender documents are for convenience only and shall not be used for interpretation of the clause/condition.

(ii) Words imparting the singular meaning only also include the plurals and vice versa where the context requires. Words imparting persons or parties shall include firms and corporations and organizations having legal capacities.

2.0 Performance Guarantee

(i) Within 15 (Fifteen) days from the date of issue of Letter of Award (LoA), the Contractor shall submit an irrevocable Performance Guarantee (as per Form No. VII, Section 4) of 3% (Three per cent) of the tendered amount in addition to other deposits mentioned elsewhere in the contract for his proper performance of the contract agreement (notwithstanding and/or without prejudice to any other provisions in the contract). The Performance Guarantee shall be initially valid up to the stipulated date of completion of work plus 60 days. In case the time for completion of works gets extended, the Contractor shall get the validity of Performance Guarantee extended up to such extent to cover such extended time for completion of work + 60 days. The performance guarantee shall be returned to the Contractor/ discharged, without any interest thereon, after issue of the Completion Certificate for the work by the Engineer-in-Charge.

(ii) The Employer reserves the right to ask for Additional Performance Guarantee where the quoted rates are found to be lower by 15% as compared with the rates indicated in the NIT.

(iii) The Engineer-in-Charge shall make a claim under the performance guarantee except for amounts to which the Engineer-in-Charge is entitled under the contract (not withstanding and/or without prejudice to any other provisions in the contract agreement) in the event of:

(a) Failure by the Contractor to extend the validity of the Performance Guarantee as described herein above, in which case the Engineer-in-Charge may claim the full amount of the Performance Guarantee.

(b) Failure by the Contractor to pay any amount due, either as agreed by the Contractor or determined under any of the Clauses/ Conditions of the agreement, within 30 days of the service of notice to this effect by the Engineer-in-Charge.

(c) In the event of the contract being determined or rescinded under provisions of any of the Clauses/ Conditions of the agreement, the

performance guarantee shall stand forfeited in full and shall be absolutely at the disposal of Engineer-in-Charge.

3.0 Security Deposit/ Retention Money

3.1 At the time of making payment to Contractor towards each running and final bill for the work done under the contract, the Contractor shall permit the Engineer-in-Charge to deduct a sum at the rate of 5% (five per cent) of the gross amount of bill till the sum deducted will amount to security deposit of 5% (five per cent) of the tendered value of the work. Such deductions will be made and held by the Engineer-in-Charge by way of Security Deposit unless the Contractor has deposited the amount of Security at the rate mentioned above in cash or in the form of a Bank Guarantee. At any event, if the Bank Guarantee is to be revoked by Engineer-in-Charge, and the Bank is unable to make payment against the said bank guarantee, the loss caused thereby shall fall on the Contractor and the Contractor shall forthwith, on demand, furnish additional security to the Engineer-in-Charge to make good the deficit.

3.2 All Compensation or other sums of money payable by the Contractor under the terms of this contract may be deducted from, or paid by adjustment of a sufficient part of his security deposit or from the interest arising there from, or from any sums which may be due to or may become due to the Contractor by Engineer-in-Charge on any account whatsoever. In the event of his Security Deposit being reduced by reason of any such deductions or adjustment as aforesaid, the Contractor shall within 10 days make good in cash or fixed deposit receipt tendered by the State Bank of India or by any Scheduled Bank or Government Securities (if deposited for more than 12 months) endorsed in favour of the Employer, any sum or sums which may have been deducted from, or raised by adjustment of his security deposit or any part thereof.

3.3 Release of Security Deposit

5% Security Money will be released as per following –

(a) 25% of the Retention Money/ Security Deposit will be released after 01 year from the date of issue of Completion Certificate subject to the condition that any defects observed during this period are duly rectified/ repaired by the Contractor at his cost to the satisfaction of the Engineer-in-Charge;

(b) Another 50% of the Retention Money/ Security Deposit will be released after completion of two years from the date of issue of Completion Certificate subject to the condition that any defects observed during this period are duly rectified/ repaired by the Contractor at his cost to the satisfaction of the Engineer-in-Charge;

(c) The balance 25% of the Retention Money/ Security Deposit will be released after the Defect Liability Period of 5 years from the date of

issue of Completion Certificate subject to the condition that any defects observed during this period are duly rectified/ repaired by the Contractor at his cost to the satisfaction of the Engineer-in-Charge;

(d) If any defect arises within defect liability period, it is the contractor's sole responsibility to rectify the same at his cost once communicated by the Engineer-in-Charge in writing as per Clause 42 & 82 below. In case the contractor fails to rectify the same, then such defect(s) will be got rectified/ repaired by the Employer through any other agency at contractor's risk and cost. The cost will be deducted from the security deposit retained towards such defect liability period.

(e) The Contractor may, if he so wishes, get his Security Deposit/ Retention Money released from the Employer and replace the same with Bank Guarantees, valid for a period of one year +60 days (25% of the Retention Money), 50% after two years +60 days and the balance 25% after five years +60 days respectively.

4.0 Mobilization Advance

4.1 Mobilization advance up to 5% of the contract value, bearing a simple interest rate of 9% per annum, shall be paid to the Contractor, if requested by him on submission of irrevocable Bank Guarantee (as per Form VIII of Section 4) of an amount equivalent to 110% of the respective instalment of mobilization advance, valid for the entire contract period from a Scheduled Bank in the enclosed Performa.

4.2 The mobilization advance, if requested, shall be paid in three instalments as follows:

(i) First Instalment of Twenty per cent (20%) of the total mobilization advance shall be paid after:

(a) Initial mobilisation at the project site;

(b) Submission of bank guarantee in approved Performa (annexed under Forms and Formats).

This instalment shall be paid if the request is made by the Contractor within 30 days from date of issue of LOA/LOI.

(ii) Second instalment of Forty per cent (40%) of total mobilization advance shall be paid after the Contractor has constructed Site Office, storage shed, fabrication yard, site laboratory, etc. and has physically mobilized plant and machinery, scaffolding & shuttering materials etc. at site and is ready to start the work to the entire satisfaction of Engineer-in-Charge and commenced the work at site.

The above instalment will be released subject to the actions at sub-para (ii) above are performed by the Contractor within 60 days of signing the contract and/or 90 days from the date of issue of LOA/LOI, whichever is earlier.

(iii) The Balance Forty per cent (40%) of mobilization advance shall be paid to the Contractor on submission of Utilization Certificate (For this contract only) of 60% of the mobilization advance for the already paid to him.

4.3 The mobilization advance, including the accrued interest, shall be recovered from each running account bill of the Contractor in such a manner that the total Mobilization Advance is recovered when 85% of the contract value gets paid to the contractor.

4.4 The Contractor can submit a single bank guarantee for the entire mobilisation amount or submit the bank guarantees in parts against the mobilization advances in the proposed numbers of recovery instalments equivalent to the amount of each instalment as per Clause 4.1 and 4.2 above. The bank guarantee submitted by Contractor against mobilization advance shall initially be valid for the entire contract period and shall be kept renewed from time to time to cover the balance amount arrived by deducting the amount already recovered along with the accrued interest till such time.

5.0 Secured Advance

(i) Interest-free secured advance will be payable to the Contractor up to a maximum of 60% (sixty per cent) in respect of purchase of material required for incorporation in the permanent works and brought to site on production of the Tax Invoice against which the Secured Advance is being sought subject to approval by the Engineer-in-charge. This secured advance will be tenable only for non-perishable material/s brought to site after due verification by the Engineer-in-Charge for quality, quantity requirements on site and value as described above. The advance will be paid only on submission of Indemnity Bond in the prescribed Performa (As per Form XII, Section 4).

(ii) The Contractor shall construct suitable Go-down/ warehouse at the site of work for safe storage of the materials against any possible damages due to sun, rain, dampness, fire, theft etc. at his own cost. He shall also employ necessary watch & ward establishment for the purpose at his risk and costs. No claims extra charges on account of safe keeping, pilferage or loss for any reason whatsoever will be tenable or entertained by the Employer.

(iii) Such secured advance shall not be payable on other items of perishable nature, fragile and combustible. No secured advance shall be paid on high-risk materials such as glass, sand, petrol, diesel etc.

5.1 Recovery of Secured Advance

When materials on account of which an advance has been paid under clause 5.0, are incorporated in the work, the amount of such advance shall be recovered from the next payment to be made to the Contractor under any

of the clauses of this contract.

If there is any inordinate and inexcusable delay on the part of contractor in incorporation of the goods and materials for which the Secured Advance is provided in the permanent work, the Engineer in Charge may levy interest @ 12% on the value of unutilized goods and materials from the date on which such goods and materials were scheduled to be incorporated in the work as per the work completion schedule till the date on which goods and materials are incorporated in the work.

6.0 Deviations/ Variations Extent and Pricing

The Engineer-in-Charge shall have the power to (i) make alteration in, omissions from, additions to, or substitutions for the original specifications, drawings, designs and instructions that may appear to him to be necessary or advisable during the progress of the work, and (ii) omit a part of the works in case of non-availability of a portion of the site or for any other reasons and the Contractor shall be bound to carry out the works in accordance with any instructions given to him in writing by the Engineer-in-Charge and such alterations, omissions, additions or substitutions shall form part of the contract as if originally provided therein and any altered, additional or substituted work which is instructed, the contractor shall be bound to carry out the works on the same conditions in all respects including the price on which he agreed to do the main work except as hereafter provided in Clause 6.1 and 6.2 below.

The time for completion of the works shall, in the event of any deviations resulting in additional cost over the tendered value sum being ordered, be suitably extended, if requested by the Contractor. Such extension in time on account of additional work shall be proportionate to the value of additional work.

6.1 Deviations, Extra Items & Pricing

(i) In the case of extra item(s) (items that are completely new and are in addition to the items contained in the contract), the Contractor may within 15 days of receipt of order or occurrence of the item(s) submit the rates as per the relevant DSR/DAR supported by proper analysis which shall include detailed CPWD specifications for the work. The Engineer-in-Charge shall, within prescribed time limit of 90 days of the date from the receipt of the claims supported by analysis, determine the rates based on the contractor submission, and the Contractor shall be paid in accordance with the rates so determined. In case the Contractor fails to claim such scheduled item rate claim within the prescribed time of 15 days, the rate approved later by the Engineer- in-Charge shall be binding on the Contractor.

(ii) In the case of extra item(s) (items that are completely new, not a part of the DSR and are in addition to the items contained in the contract), the Contractor

may within 15 days of receipt of order or occurrence of the item(s) submit the rates as per the relevant market rate claim rates, supported by proper analysis based on relevant available costs in the DAR which shall include invoices, vouchers etc. and manufacturer's specifications for the work. The Engineer-in-Charge shall, within prescribed time limit of 90 days of the date from the receipt of the claims supported by analysis, determine the rates on the basis of the market rates after giving consideration to the analysis of the rates submitted by the Contractor, and the Contractor shall be paid in accordance with the rates so determined. In case the Contractor fails to claim such market rate claim within the prescribed time of 15 days, the rate approved later by the Engineer- in-Charge shall be binding on the Contractor.

(iii) In the case of substituted items (items that are taken up with partial substitution or in lieu of items of work in the contract), the rate for the agreement item (to be substituted) and substituted item shall also be determined based on the substituted item being a scheduled item of Schedule A or Schedule B in the manner as mentioned in the following para:

(a) For Schedule B item, If the market rate for the substituted item so determined is more than the market rate of the agreement item (to be substituted), the rate payable to the Contractor for the substituted item shall be the rate for the agreement item (to be substituted) so increased to the extent of the difference between the market rates of substituted item and the agreement item (to be substituted)

(b) For Schedule B item, If the market rate for the substituted item so determined is less than the market rate of the agreement item (to be substituted), the rate payable to the Contractor for the substituted item shall be the rate for the agreement item (to be substituted) so decreased to the extent of the difference between the market rates of substituted item and the agreement item (to be substituted).

(c) For Schedule A item, if the scheduled/DSR/DAR rate for the substituted item so determined is less than the rate of the agreement item (to be substituted), the rate payable to the Contractor for the substituted item shall be the rate for the agreement item (to be substituted) so decreased to the extent of the difference between the DAR/DSR rates (as prevalent on the day of receiving the bid) of substituted item and the agreement item (to be substituted).

(d) For Schedule A item, if the scheduled/DSR/DAR rate for the substituted item so determined is more than the rate of the agreement item (to be substituted), the rate payable to the Contractor for the substituted item shall be the rate for the agreement item (to be substituted) so increased to the extent of the difference between the DAR/DSR rates (as prevalent on the day of receiving the bid) of substituted item and the agreement item (to be substituted).

The Engineer-in-Charge shall, within prescribed time limit of 90 days from the date of the receipt of the claims **for the substituted item mentioned at Clause 6.1 (iii) (a), (b), (c) & (d) above,** supported by analysis, determine the rates based on the contractor submission, and the Contractor shall be paid in accordance with the rates so determined. In case the Contractor fails to claim such rates for the substituted item within the prescribed time of 15 days, the rate approved later by the Engineer- in-Charge shall be binding on the Contractor.

(iv) Market rates, in case not available in the DAR/DSR, are to be determined as per various sub-clauses under clause 6.0 and shall be based on prevailing rates of materials excluding GST unless mentioned otherwise, relevant authority rate for labour, market rates of T&P etc. plus 15% towards Contractor's overheads and profits.

6.2 Deviation, Deviated Quantities & Pricing

(i) In the case of contract items, substituted items, contract-cum-substituted items, which exceed the limits laid down in General details (Annexure-I) are scheduled rates (Schedule A) or have been derived from Scheduled rates based on DSR/DAR, the Contractor may within fifteen days of receipt of order or occurrence of the excess, claim revision of the rates, supported by proper analysis for the work in excess of the above-mentioned limits, provided that if the rates so claimed are in excess of the rates specified in the latest DSR along with its associated latest cost index adjustments (if any) as published by CPWD for the DSR, till the date of receipt of the claim, by the contractor, post adjusting the (below/above/at par percentage quoted by the contractor in his financial bid for Schedule A rates). The Engineer-in-Charge shall within prescribed time limit of 90 days from the date of receipt of the claims supported by analysis, after considering the analysis of the rates submitted by the Contractor, determine the rates on the basis of the DSR/DAR/Cost Index and the Contractor price bid shall be paid in accordance with the rates so determined. In case the Contractor fails to claim such market rate claim within the prescribed time of 15 days, the rate approved later by the Engineer- in-Charge shall be binding on the Contractor.

(ii) In the case of contract items, substituted items, contract-cum-substituted items, which exceed the limits laid down in General details (Annexure-I) are NOT scheduled rates (Schedule A) or have not been derived from Scheduled rates based on DSR/DAR, the Contractor may within fifteen days of receipt of order or occurrence of the excess, claim revision of the rates, supported by proper analysis for the work in excess of the above-mentioned limits, provided that if the rates so claimed are in excess of the rates specified in the schedule of quantities. The Engineer-in-Charge shall within prescribed time limit of 90 days from the date of receipt of the claims supported by analysis, after giving consideration to the analysis of the rates submitted by

the Contractor, determine the rates on the basis of the market rates (as per invoice, vouchers from the manufacturers or suppliers submitted by the agency and duly verified by Engineer-in-Charge or his representative) and the Contractor shall be paid in accordance with the rates so determined. In case the Contractor fails to claim such market rate claim within the prescribed time of 15 days, the rate approved later by the Engineer- in-Charge shall be binding on the Contractor for the cases where market rate for the deviated quantity comes out to be less than SOR rate.

(iii) For the purpose of operation/ Accounting of quantities in deviation, the following works shall be treated as works relating to foundation unless & otherwise defined in the contract -

(a) For Buildings: All works up to 1.2 meter above ground level or up to floor 1 level, whichever is lower.

(b) For abutments, piers and well staining: All works up to 1.2 meter above the bed level.

(c) For retaining walls, wing walls, compound walls, chimneys, overhead reservoirs/ tanks and other elevated structures - All works up to 1.2 meter above the ground level.

(d) For reservoirs/ tanks (other than overhead reservoirs/tanks) - All works up to 1.2 meter above the ground level.

(e) For basement - All works up to 1.2 meter above ground level or up to floor 1 level, whichever is lower.

(f) For Roads, all items of excavation and filling including treatment of sub-base.

(iv) Any operation incidental to or necessary for proper execution of the item included in the Schedule of Quantities or in the schedule of rates mentioned above, whether or not, specifically indicated in the description of the item and the relevant specifications, shall be deemed to be included in the rates quoted by the tenderer or the rate given in the said schedule of rates, as the case may be. Nothing extra shall be admissible for such operations and such claims will be rejected as submissions for deviations, deviated quantities and pricing and not be treated tenable under this clause.

7.0 Escalation (Cement, Reinforcement & Structural Steel only)

7.1 Payment due to variation in prices of materials after receipt of tender:

(i) If after submission of the tender, the price of materials increases/ decreases beyond the base price(s) for the work as mentioned in the contract, then the amount of the contract shall be accordingly varied.

Provided that any such variations shall be effected for the stipulated period of Contract including the justified extended period under the provisions of

Clause 17 of the Contract without any action under Clause 8. .

(ii) However, for work done during the justified extended period, it will be limited to the indices prevailing at the time of updated stipulated date of completion considering the effect of extra work (extra time to be calculated on pro-rata basis only as cost of extra work x stipulated period/tendered cost). If updated stipulated date of completion as calculated on pro- rata basis does not cover a full calendar month, then indices will be considered or restricted to the previous month.

(iii) The increase/ decrease in prices of cement, steel reinforcement and structural steel shall be determined by the Price indices issued by the Director General, CPWD. Base price for cement, steel reinforcement and structural steel shall be as issued under the authority of Director General CPWD applicable for the NCR i.e. Delhi including Noida, Gurgaon, Faridabad & Ghaziabad and for other places as issued under the authority of Zonal Chief Engineer, CPWD.

(iv) The amount of the contract shall accordingly be varied for all such materials and will be worked out as per the formula given below for individual material:

Adjustment for component of individual material -

$V = P \times Q \times (CI - CI_o)/ CI_o$

where,

V = Variation in material cost i.e. increase or decrease in the amount of rupees to be paid or recovered.

P = Base Price of material as mentioned in the contract

Q = Quantity of material brought at site for bona-fide use in the works since previous bill excluding any such quantity consumed in the deviated quantity of items beyond deviation limit and extra /substituted item, paid/to be paid at rates derived on the basis of market rate under clause 6.2.

CI_o = Price index for cement, steel reinforcement bars, structural steel as issued by DG, CPWD and corresponding to the time of base price of respective material.

CI = Price index for cement, steel reinforcement bars, structural steel as issued under the authority of DG, CPWD for period under consideration.

Notes:

(i) In respect of the justified extended period under the provisions of clause 17 of the contract, without any action under clause 8, the index prevailing at the time of updated stipulated date of completion considering the effect of extra work (extra time to be calculated on pro-

rata basis only as cost of extra work x stipulated period/ tendered cost) shall be considered.

(ii) If updated stipulated date of completion, as calculated on pro- rata basis, does not cover full calendar month then the indices will be considered or restricted to the previous month.

(iii) If during progress of work or at the time of completion of work, it is noticed that any material brought at site is in excess of requirement, then the amount of escalation, if paid earlier on such excess quantity of material, shall be recovered on the basis of cost indices as applied at the time of payment of escalation or as prevailing at the time of effecting recovery, whichever is higher.

(iv) Cement, wherever mentioned in this clause, also includes Cement component used in RMC brought at site from the outside approved RMC plants, if any.

(v) The date-wise record of ready-mix concrete shall be kept in a register and the cement consumption for the same shall be calculated accordingly.

(vi) If built-up steel items are brought at site from workshop, then the variation shall be paid for the structural steel up to the period when the built-up item/ finished product is brought at site or as applicable on the date of purchase of such material based on the invoice, whichever is lower.

8.0 Compensation for Delay

(i) If the Contractor fails (a) to maintain the required progress in terms of clause 17, or (b) to complete the work and clear the site on or before the stipulated date of completion of contract or justified extended date of completion as well as any extension granted under any other clause, he shall, without prejudice to any other right or remedy available under the law to the Employer on account of such breach, pay as Penalty the amount calculated at the rates stipulated in sub para (ii) below.

(ii) Compensation for delay of work - With maximum rate @ 0.5% (zero point five per cent) per week of delay to be computed on per day basis.

Provided always that the total amount of Penalty for delay to be levied under this condition shall not exceed 10 % (ten per cent) of accepted tendered value.

(iii) In case, penalty for delay has not been decided/ not communicated to the contractor by the Engineer-in-Charge during the progress of work, it shall not be treated as a deemed waiver of right to levy penalty by Engineer-in-Charge if the work remains incomplete on the actual date of completion or the final justified extended date of completion.

9.0 Action in case work is not done as per Specifications

(i) All works under or in the course of execution or executed in pursuance of the contract, shall at all times be open and accessible to inspection and supervision of the Engineer-in-charge, his authorized subordinates, and all the superior officers, officer of the Third Party Inspection and Monitoring Agency (TPIA) of the Employer or any organization engaged by the Employer for Monitoring and Quality Assurance, during the usual working hours and at all other times for which reasonable notice of the visit of such officers will be communicated to the Contractor in writing by the Engineer-in-charge/ Employer/ PMC. Orders given to the Contractor's authorised representative shall be considered to have the same force as if they had been given to the Contractor himself.

(ii) If it shall appear to the Engineer-in-charge or the PMC and/or his authorized subordinates or to the officer of the TPIA or his subordinate officers that –

(a) Any work has been executed with unsound, imperfect, or unskilful workmanship; or

(b) With materials or articles provided by him for the execution of work are unsound or of a quality inferior to that contracted; or

(c) Otherwise not in accordance with the contract;

the Contractor shall, on demand in writing, which shall be made within twelve months of the completion of the work from the Engineer-in-Charge specifying the work, materials or articles complained of notwithstanding that the same may have been passed, certified and paid for, forthwith rectify, or remove and reconstruct the work so specified in whole or in part, as the case may require or as the case may be, remove the materials or articles so specified and provide other approved proper and suitable materials or articles at his own risk, charge and cost including the cost of suitable barricading around the work front as directed by the engineer in charge.

(iii) In such case, the Engineer-in-Charge may not accept the item of work at the rates applicable under the contract but may accept such items at reduced rates as the Engineer-in-Charge may consider reasonable during the preparation of on-account bills or final bill if the item is so acceptable without detriment to the safety and utility of the item and the structure or he may reject the work outright without any payment and/or get it and other connected and incidental items rectified, or removed and re-executed at the risk and cost of the Contractor. Decision of the Engineer-in-Charge will be conveyed in writing in respect of the same and will be final and binding on the Contractor.

10.0 Action in case of Bad Work

(i) If it shall appear to the Employer/ Engineer-in-Charge or his authorized

representative or to any other inspecting agency, that any work has been executed with unsound, imperfect, or unskilful workmanship or with materials of any inferior description, or that any materials or articles provided by him for the execution are unsound or of a quality inferior to that contracted for or of the works are otherwise not in accordance with the contract, the Contractor shall on demand in writing, which shall be made within twelve months of the completion of the work, from the Engineer-in-Charge specifying the work, materials or articles complained of notwithstanding that the same may have been passed, Certified and paid for, forthwith rectify or remove and reconstruct the work so specified in whole or in part as the case may require or as the case may be, remove the materials or articles so specified and provide other proper and suitable materials or articles at his own proper charge and cost.

(ii) In the event of the Contractor failing to do so within a period to be specified by the Engineer-in-Charge in his demand aforesaid, while the Contractor failure to do so shall continue, the Engineer-in-Charge may rectify or remove and re-execute the work or remove and replace with others, the material or articles complained of, as the case may be, at the risk and cost of the Contractor in all respects.

11.0 Non-Waiver:

Failure of Engineer-in-Charge to insist upon strict performance of any of the terms & conditions hereof, or failure or delay to exercise any rights or remedies provided herein or by law or failure to properly notify the Contractor in the event of breach or the acceptance of or payment for any services hereunder or approval of interim reports, shall not release the Contractor of any of the warranties or obligations of this order and shall not be deemed a waiver of any right of Engineer-in-Charge/ Employer/ PMC/ TPIA to insist upon strict performance hereof or of any of its rights or remedies as to any such services regardless when received or accepted, nor shall any purported oral modification or rescission of this Order by Engineer-in-Charge operate as a waiver of the terms hereof.

12.0 Cancellation/ Determination of Contract in Full or Part

12.1 Subject to other provisions contained in this clause, the Engineer-in-Charge may, without prejudice to his any other rights or remedy against the Contractor in respect of any delay, or not following safety norms, inferior workmanship, any claims for damages and/ or any other provisions of this contract or otherwise, and whether the date of completion has or has not elapsed, by notice in writing, absolutely determine the contract in any of the following cases:

(i) If the Contractor having been given a notice in writing by the Engineer-in-Charge to rectify, reconstruct or replace any defective

work or that the work is being performed in an inefficient or otherwise improper or in a manner of unacceptable and poor workmanship, does not comply with the requirement of such notice for a period of 15 days thereafter; or

(ii) If the Contractor has, without reasonable cause, suspended the progress ofthe work or has failed to proceed with the work with due diligence so that in the opinion of the Engineer-in-Charge (which shall be final and binding) he will be unable to secure completion of the work by the scheduled date for completion and continues to do so after a notice in writing of 15 days from the Engineer-in-Charge; or

(iii) If the Contractor fails to complete the work within the stipulated date or items of work/ achieve the milestones with individual dates of completion, if any stipulated, on or before the stipulated date; and does not complete them within the period specified in a notice given in writing by the Engineer-in-Charge: or

(iv) If the Contractor persistently neglects to carry out his obligations under the contract and/ or commits default in complying with any of the terms and conditions of the contract and does not remedy it or take effective steps to remedy it within 15 days after a notice in writing is given to him in that behalf by the Engineer-in-Charge; or

(v) If the Contractor shall offer or give or agree to give to any person in Employer's/ PMC/ TPIA service or to any other person on his behalf, any gift or consideration or make a promise of any kind as an inducement or reward for doing or forbearing to do or for having done or forborne to do any action in relation to the obtaining or execution of this or any other contract for the Employer/ PMC/ TPIA; or

(vi) If the Contractor being an individual, or if a firm, any partner thereof shall at any time be adjudged insolvent or have a receiving order or order for administration of his estate made against him or shall take any proceedings for liquidation or composition (other than a voluntary liquidation for the purpose of amalgamation or reconstruction) under any Insolvency law for the time being in force or make any conveyance or assignment of his effects or composition or arrangement for the benefit of his creditors or purport to do so, or if any application be made under any Insolvency law for the time being in force for the sequestration of his estate or if a trust deed be executed by him for benefit of his creditors;

(vii) If the Contractor, being a company, shall pass a resolution or the Court shall make an order that the company shall be wound up or if a receiver or a manager on behalf of a creditor shall be appointed or if

circumstances shall arise which entitle the Court or the creditor to appoint a receiver or a manager or which entitle the Court to make a winding up order;

(viii) If the Contractor assigns (excluding part(s) of work assigned to other agency(s) by the Contractor as per terms of contract), transfers, sublets (engagement of labour on a piece-work basis or of labour with materials not to be incorporated in the work, shall not be deemed to be subletting) or otherwise parts with or attempts to assign, transfer, sublet or otherwise parts with the entire works or any portion thereof without the prior written approval of the Engineer -in-Charge with reference to the General Conditions of Contract.

12.2 When the contractor has made himself liable for action under any of the cases aforesaid, the Engineer-in-Charge, without prejudice to any other right or remedy which shall have accrued or shall accrue hereafter to the Employer/ PMC, by a notice in writing to cancel the contract as a whole or only such items of work in default from the contract, shall have the powers to:

(i) Determine or rescind the contract as aforesaid in full or in part (of which termination or rescission notice in writing to the Contractor under the hand of the Engineer-in-Charge shall be conclusive evidence) and get the same executed at the risk & cost of the Contractor. Upon such determination or rescission, Security Deposit already recovered, Security deposit payable and Performance Guarantee under the contract shall be liable to be forfeited and shall be absolutely at the disposal of Engineer-in-Charge and unused materials, construction plants, implements, temporary buildings, etc. shall be taken over by Engineer-in-Charge and shall be absolutely at the disposal of the Engineer-in-Charge.

(ii) After giving notice to the contractor to measure up the work of the contractor and to take such whole, or the balance or part thereof as shall be un-executed or delayed with reference to the General Conditions of Contract clause no. 24.0 and/ or relevant clause of Special Conditions of Contract, out of his hands and to give it to another contractor to complete.

Notes:

(i) The Contractor, whose contract is determined as above, shall not be allowed to participate in the tendering process for the balance work including any new items needed to complete the work.

(ii) In the event of the Engineer-in-Charge taking recourse to the above, the Contractor shall have no claim to Penalty for any loss sustained by him by reasons of his having purchased or procured any materials or

entered into any engagements or made any advances on account of or with a view to the execution of the work or the performance of the contract; and

(iii) In case action is taken under any of the provisions aforesaid, the Contractor shall not be entitled to recover or be paid any sum for any work thereof or performed under this contract unless and until the Engineer-in-Charge has certified in writing the performance of such work and the value payable in respect thereof and he shall only be entitled to be paid the value so certified.

12.3 Any sums in excess of the amounts due to Employer and unsold materials, constructional plant etc. shall be returned to the Contractor, provided always that if the cost or anticipated cost of completion of the works or part of the works by Employer/ PMC/ TPIA is less than the amount which the Contractor would have been paid if he had completed the works or part of the works, such benefit shall not accrue to the Contractor.

12.4 In the event of anyone or more of the above courses being adopted by the Engineer-in-Charge, the Contractor shall have no claim towards Penalty for any loss sustained by him by reasons of his having purchased or procured any materials or entered into any engagements or made any advances on such account or with a view to the execution of the work or the performance of the contract. In case action is taken under any of the aforesaid provisions, the Contractor shall not be entitled to recover or be paid any sum for any work thereof or actually performed under this contract unless and until the Engineer-in-Charge has certified in writing the performance of such work and the value payable in respect thereof and he shall only be entitled to be paid the value so certified.

12.5 In case, the work cannot be started due to reasons not within the control of the Contractor within 1/8th of the stipulated time or two months for completion of work, whichever is lower, either party may close the contract by giving notice to the other party stating the reasons. In such an eventuality, the Performance Guarantee of the Contractor shall be refunded within following time limits:

(i)	If the Tendered value of work is up to Rs. 1.00 Crore	15 days
(ii)	If the Tendered value of work is more than Rs. 1 Crore and up to Rs. 10 Crore	21 days
(iii)	If the Tendered value of work exceeds Rs. 10 Crore	30 days

Neither party shall claim any compensation for such eventuality. This clause is not applicable for any breach of the contract by either party.

13.0 Contractor liable to pay Compensation even if action not taken under clause 12.0

In a case where any of the powers conferred upon the Engineer-in-Charge shall have become exercisable under the relevant clause of the Contract, and the same are not exercised, the non-exercise thereof shall not constitute an ipso facto waiver of any of the conditions hereof. Such powers shall be exercisable in the event of any future case of default by the Contractor and the liability of the Contractor for Penalty shall remain unaffected. In the event of the Engineer-in-Charge putting in force all or any of the powers vested in him under any clause, he may, if he so decides, after giving a notice in writing to the Contractor, take possession of (or at the sole discretion of the Engineer-in-Charge, which shall be final and binding on the Contractor), use ason hire (the amount of the hire money being also in the final determination of the Engineer-in-Charge) all or any tools, plant, materials and stores, in or upon the works, or the site thereof belonging to the contractor, or procured by the contractor and intended to the used for the execution of the work/ or any part thereof, paying or allowing for the same in account at the contract rates, or in the case of these not being applicable, at current market rates to be certified by the Engineer-in-Charge, whose certificate thereof shall be final and binding on the contractor and/or direct the contractor, clerk of the works, foreman or other authorized agent to remove such tools, plant, materials, or stores from the premises (within a time to be specified in such notice) in the event of the contractor failing to comply with any such requisition, the Engineer-in-Charge may remove them at the contractor's expense or sell them by auction or private sale on account of the contractor and his risk in all respects and the certificate of the Engineer-in-Charge as to the expenses of any such removal and the amount of the proceeds and expenses of any suchsale shall be final and conclusive against the contractor.

14.0 Carrying out part work at the risk & cost of the Contractor

14.1 If the Contractor:

(i) At any time makes default during currency of work or does not execute any part of the work with due diligence and continues to do so even after receiving a notice in writing of 15 days in this respect from the Engineer-in-charge: or

(ii) Commits default in complying with any of the terms and conditions of the contract and does not remedy it or takes effective steps to remedy it within 15 days even after a notice in writing is given in that behalf by the Engineer-in-Charge; or

(iii) Fails to complete the work(s) or items of work with individual dates of completion, on or before the date(s) so determined, and does

not complete them within the period specified in the notice given in writing in that behalf by the Engineer-in-Charge;

The Engineer-in-Charge, without invoking action under clause 12.0 of the contract may, without prejudice to any other right or remedy against the Contractor, which have either accrued or accrue thereafter to Employer/PMC, by a notice in writing to take the part work/ part incomplete work of any item(s) out of his hands and shall have the powers to:

(a) Take possession of the site and any materials, constructional plant, implements, stores, etc. thereon; and/or

(b) Carry out the part work/ part incomplete work of any item(s) by any means at the risk and cost of the Contractor.

The Engineer-in-Charge shall determine the amount recoverable from the Contractor, if any, for completion of the part work/ part of any incomplete work and execute the same at the risk and cost of the Contractor. The liability of the Contractor on account of loss or damage suffered by the Employer because of action under this clause shall not exceed 10% of the tendered value of the work.

In determining the amount, credit shall be given to the Contractor for the value of work done in all respects in the same manner and at the same rate as if it had been carried out by the Contractor under the terms of his contract, the value of Contractor's materials taken over and incorporated in the work and use of plant and machinery belonging to the Contractor. The certificate of the Engineer-in-Charge as to the value of work done shall be final and binding on the Contractor provided that action under this clause shall be taken only after giving notice in writing to the Contractor. Provided also that if the expenses incurred by the Employer are less than the amount payable to the Contractor at his agreement rates, the difference shall not be payable to the Contractor.

14.2 Any excess expenditure incurred or to be incurred by the Employer in completing the part work/ part incomplete work of any item(s) or the excess loss of damages suffered or may be suffered by the Employer as aforesaid after allowing such credit, shall without prejudice to any other right or remedy available to the Employer in law or as per agreement, be recovered from any money due to the Contractor on any account, and if such money is insufficient, the Contractor shall be called upon in writing and shall be liable to pay the same within 30 days.

If the Contractor fails to pay the required sum within the aforesaid period of 30 days, the Engineer-in-Charge shall have the right to sell any or all of the Contractors' unused materials, constructional plant, implements, temporary building at site etc. and adjust the proceeds of sale thereof towards the dues recoverable from the Contractor under the contract and if thereafter there

remains any balance outstanding, it shall be recovered from the Contractor in accordance with the provisions of the contract.

In the event of above course being taken by the Engineer-in-Charge, the Contractor shall have no claim to compensation for any loss suffered by him by reason of his having purchased or procured any materials or entered into any engagements or made any advance on any account or with a view to the execution of the work or the performance of the contract.

15.0 Suspension of Works

(i) The Contractor shall, on receipt of the order in writing of the Engineer-in-charge (whose decision shall be final and binding on the Contractor), suspend the progress of the works or any part thereof for such time and in such manner as the Engineer-in-charge may consider necessary for any of the following reasons:

(a) On account of any default on part of the Contractor, or

(b) For proper execution of the works or part thereof for reason other than the default of the Contractor, or

(c) For safety of the works or part thereof.

(ii) The Contractor shall, during such suspension, properly protect and secure the works to the extent necessary and carry out the instructions given in that behalf by the Engineer-in-charge.

(iii) If the suspension is ordered for reasons (b) and (c) in sub-Para (i) above.

(a) The Contractor shall be entitled to an extension of time equal to the period of every such suspension PLUS 25%, for completion period. No adjustment in contract price will be allowed for reasons of such suspension.

(b) In the event of the Contractor treating the suspension as an abandonment of the Contract by Employer, he shall have no claim to payment of any Penalty on account of any profit, loss of profit or advantage, which he may have derived from the execution of the work in full.

16.0 Termination of Contract on Death of the Contractor

Without prejudice to any of the rights or remedies under this contract, if the Contractor dies, the Engineer-in-Charge shall have the option of terminating the contract without any Penalty to the Contractor.

17.0 Time & Extension for Delay

17.1 The time allowed for execution of the Works as specified or the extended time in accordance with the conditions as per this clause shall be the essence of the Contract. The execution of the work shall commence from the 15th day of

issue of LoA or from the date of handing over of the site, notified by the Engineer-in-Charge, whichever is later. If the Contractor commits default in commencing the execution of the work as aforesaid, the performance guarantee shall be forfeited by the Engineer-in-Charge and shall be absolutely at the disposal of the Engineer-in-Charge without prejudice to any other right or remedy available in law.

17.2 As soon as possible but within 10 days of award of work:

(i) The Contractor shall submit a Time and Progress Chart for each milestone as per the format required by the engineer-in-charge. The Engineer-in-Charge may, if required, within 30 (Thirty) days thereafter modify, and communicate the approved program to the Contractor, failing which the program submitted by the Contractor shall be deemed to be approved by the Engineer-in-Charge. The work programme shall include all details of drawings and decisions required to complete the contract with specific dates by which these details are required by the Contractor without causing any delay in execution of the work. The Chart shall be prepared in direct relation to the time stated in the Contract documents for completion of items of the works. It shall indicate the forecast of the dates of commencement and completion of various activities of the work and may be amended as necessary by agreement between the Engineer-in-Charge and the Contractor within the overall limitations of time imposed in the Contract documents.

(ii) In case of non-submission of construction programme by the Contractor, the program approved by the Engineer-in-Charge shall be deemed to be final.

(iii) The approval by the Engineer-in-Charge of such programme shall not relieve the Contractor of any of the obligations under the contract.

(iv) The Contractor shall submit the Time and Progress Chart using the mutually agreed software or in other format decided by Engineer-in-Charge for the work done during the previous month to the engineer in charge on or before the 7th day of each month with S curves of the proposed planning vs actual execution progress.

17.3 If the work(s) be delayed by -

(i) force majeure; or

(ii) abnormally bad weather; or

(iii) serious loss or damage by fire; or

(iv) civil commotion, local commotion of workmen, strike or lockout, affecting any of the trades employed on the work; or

(v) delay on the part of other Contractors or tradesmen engaged by Engineer-in-Charge in executing work not forming part of the Contract; or

(vi) any other cause like above which, in the reasoned opinion of the Engineer-in-Charge is beyond the Contractor's control;

then upon the happening of any such event causing delay, the Contractor shall immediately give notice thereof in writing to the Engineer-in-Charge but shall nevertheless constantly use his best endeavours to prevent or make good the delay and shall do all that may be reasonably required to the satisfaction of the Engineer-in-Charge to proceed with the works.

The Contractor shall have no claim of damages for extension of time granted or rescheduling of milestone/s for events listed in above sub clauses and he shall update the progress schedule reports submitted at above Clause for all such delays once they are approved by the engineer in charge based on the contractor submittals as defined in Clause below.

17.4 In case the work is hindered by the Employer for any reason/event, for which the Employer is responsible, the Engineer-in-Charge shall, if justified, give a fair and reasonable extension of time and reschedule the milestones for completion of work. Such extension of time or rescheduling of milestone/s shall be without prejudice to any other right or remedy of the parties in contract or in law. Provided further that for concurrent delays under this clause and sub clause 17.3 to the extent the delay is covered under sub clause 17.3, the Contractor shall be entitled to only extension of time and no damages and/or claims on this account.

17.5 Request for rescheduling of Milestones or extension of time, to be eligible for consideration, shall be made by the Contractor in writing within ten days of the happening of the event causing delay. The Contractor shall indicate in such a request the period by which rescheduling of milestone/s or extension of time is required.

17.6 In case the work is delayed by the Contractor for any reasons, in the opinion of the Engineer-in-Charge, beyond the events mentioned in clause 17.3 or clause 17.4 and beyond the justified extended date, without prejudice to the right to take action, the Engineer-in-Charge may grant extension of time required for completion of work without rescheduling of the milestones. The Contractor shall be liable for levy of Penalty for delay for such extension of time.

18.0 Time Schedule & Progress

18.0 Time allowed for carrying out all the works as entered in the tender shall be as mentioned in the “GENERAL DETAILS (Annexure-I)” which shall be reckoned from the 15th day from the date on which the letter of Award or the date of handing over of site whichever is later, is issued to the Contractor. Time shall be the essence of the contract and contractor shall ensure the completion of the entire work within the stipulated time of completion.

18.1 The contractor shall also furnish within 15th days of date of issue of letter of

Award a CPM network/ PERT chart/ Bar Chart for completion of work within stipulated time. This will be duly got approved from the Engineer-in-Charge. This approved Network/ PERT Chart shall form a part of the agreement. Achievement of milestones as well as total completion has to be within the time period allowed.

18.2 Contractor shall mobilize and employ sufficient resources for completion of all the works as indicated in the agreed BAR CHART/PERT Network. No additional payment will be made to the contractor for any multiple shift work or other incentive methods contemplated by him in his work schedule even though the time schedule is approved by the Engineer-in-Charge.

18.3 During the currency of the work the contractor is expected to adhere to the time schedule on milestone and total completion and this adherence will be a part of Contractor's performance under the contract. During the execution of the work contractor is expected to participate in the review and updating of the Network/BAR CHART undertaken by the Engineer-in-Charge. These reviews may be undertaken at the discretion of Engineer-in-charge either as a periodical appraisal measure or when the quantum of work order on the contractor is substantially changed through deviation orders or amendments. The review shall be held at site or any of the offices of Employer/PMC at the sole discretion of Engineer-in-Charge. The contractor will adhere to the revised schedule thereafter. The approval to the revised schedule resulting in a completion date beyond the stipulated date of completion shall not automatically amount to a grant of extension of time to the contractor.

18.4 Contractor shall submit (as directed by Engineer-in-Charge) progress reports on a computer-based program (program and software to be approved by Engineer-in-Charge) highlighting status of various activities and physical completion of work. The contractor shall send completion report with as built drawings to the office of Engineer-in-Charge, in writing within a period of 30 days of completion of work.

18.5 At least 10 Nos dated photographs of the project taken on last day of every month indicating progress of work (in soft copies) shall be attached along with the physical progress reports to be submitted to Engineer-in-charge

18.6 The defined timelines for documents to be submitted post-award, though mentioned at various other places, are summarised as under:

Sr. No.	**Document Title**	**From issue of Letter of Award (On or before)**
1	Time & Progress Chart for each mile-stone	10 days
2	Date of Commencement of Work	15th day
3	Details of Contractor's Authorised Representative	15 days

	taking instructions from Engineer-in-charge	
4	Updated Overall Project Schedule	15 days
5	CPM network/ PERT chart/ Bar Chart for completion of work within stipulated time	15 days
6	Submission of Irrevocable Performance Bank Guarantee (5% of tendered amount)	15 days
7	Quality Assurance Programme/ Plan	30 days
8	Detailed contract coordination procedure	30 days
9	Site organizational chart and individual personnel resume, including details of experience of the Project-in-Charge and other staff proposed to be deployed by him	30 days
10	Insurance Policies	30 days

Notes: Document Review and Submission Cycle

(i) Post submission of the document by the Contractor, the Engineer-in-charge/ PMC-TPIA will review and provide comments/approval within fourteen (14) days of the receipt of respective documents.

(ii) The contractor shall re-submit the documents (incorporating comments) within Five (5) days of receipt of the comments, for review/approval.

(iii) The Engineer-in-charge/PMC-TPIA will be reviewing the same and providing comment s/approval within seven (7) days of the receipt of revised/updated document. The defined cycle will be followed till all the project requirements are complied with by the contractor and document is approved.

19.0 Taxes and Duties

19.1 The contract price is inclusive of all taxes, duties, cesses, fees, charges, interest/ late fees, incidental expenses, and statutory levies payable under any law (as applicable on the date of submission of bid) by the Contractor in connection with execution of the contract) but excluding the GST as applicable. The contract price shall be adjusted for any increase/ decrease in the rate of GST on works contract as notified by Government of India, from time to time.

19.2 Notwithstanding anything contained in clause 19.1, the Contractor shall ensure payment of applicable taxes on the supplies made under the contract. The Contractor shall take registration under the applicable enactment levying tax on supply of goods or services under the contract and issue invoices having all the particulars prescribed under the applicable provisions of law, including description of goods/services, rate and amount of tax paid or payable on the supplies made under the contract, so that the Employer can avail credit of such tax, wherever applicable. The Contractor shall comply with

all applicable provisions of Goods and Service Tax (GST) levied by Union Government and State Governments/ Union Territories (CGST, UTGST, SGST and IGST). The Contractor shall get himself registered and discharge his obligations for payment of taxes, filing of returns on time etc. under the appropriate provisions of law in respect of all the taxes, duties, levies, cess, etc. The Employer would have the right to seek necessary evidence that the Contractor is registered under the law and duly discharging its obligations under the tax laws, enabling the Employer to avail input tax credit, wherever admissible.

Whenever any GST, interest, penalty, late fees etc. is payable by the Employer on reversal of Input Tax Credit (ITC) or through cash payment under GST Act or rules due to default on Contractor's part, such as, non-filing/ late filing of GST returns, non-payment/ late payment of GST liabilities, delay in issue of invoices or non-appearance of GST invoice on the GST portal within the prescribed period, then in such an eventuality, the amount of GST, interest, penalty, late fees, if any, liable to be paid by the Employer under the said contract shall be borne by the Contractor and shall be recoverable from him.

19.3 In case the Contractor does not deposit the tax payable on execution of the contract, or has not provided the tax invoice to the Employer showing the amount of tax, or has not uploaded the document in computerized tax network as per prevailing law, leading to non-availability of inputs credit of the tax to Employer, the amount equivalent to such tax shall be retained or withheld from the subsequent RA Bill or payment to be made to the contractor on any account by the Employer till such time that the contractor ensures availability of input credit of the tax to the Employer.

19.4 The Contractor will be under obligation for charging correct rate of tax as prescribed under the respective tax laws from time to time during the entire duration of the contract. Further, the contractor shall avail and pass on benefits of all exemptions/concessions available under the tax laws to the Employer.

19.5 The Contractor will ensure its registration with the respective tax authorities and submit self-attested copy of such registration certificates to the Employer within 30 days of the award of LOA. The Contractor will be responsible for procurement of material on its own registration (GSTIN) and also to issue/ arrange its own Road Permit/ E-way Bill, if applicable, and comply with the statutory laws of the concerned state.

19.6 Any error of interpretation of applicability of taxes/ duties by the Contractor shall be to the Contractor's account. The classification of Goods & Services as per GST Act and charging of correct rate of tax as prescribed under the respective tax laws should be correctly done by the Contractor to ensure that input credit benefit is not lost to the Employer on account of any error on the

part of the Contractor or its sub-contractor/vendor. The contractor must ensure that Employer is not subjected to any additional liability towards payment of applicable taxes & duties as a result of wrong classification, valuation, assessment/ interpretation of applicable taxes & duties by the Contractor and the contractor will reimburse all losses on this account to the Employer (if any).

19.7 GST shall be applicable on all advance payments as per GST Act, Rules and relevant notifications thereunder.

19.8 Stamp duty and registration charges, if any, under Income Tax/ GST Act, payable towards the execution of any and all contract documents/agreements, shall be borne by the Contractor.

19.9 Tax deduction at source (TDS), if any, under Income Tax/ GST Act, shall be made by the Employer as per law applicable from time to time, from the amount payable to the Contractor.

19.10 Statutory variations on IGST/ CGST/ SGST/ UTGST (included in quoted prices) in case of imported materials from outside India in Contractor's name (i.e. for Indian Bidders) shall be to the Contractor's account.

19.11 New Taxes & Duties

All new taxes, duties, cess, levies notified or imposed after the due date of submission of last/ final price bid before the contractual date of completion of work (including extended contractual completion period for the reasons attributable to the Employer or due to Force Majeure condition), shall be to the Employer's account. These shall be reimbursed against documentary evidence. In case of reduction/elimination of taxes, the necessary credit shall be given to the Employer. However, in case of delays attributable to the Contractor, any new or additional taxes and duties imposed after the Scheduled Completion Date, as above, shall be to the Contractor's account.

19.12 Any Other Taxes Duties and Levies

(i) Except as hereinabove specified, the Contractor shall be liable for and shall pay all fees, cesses, taxes, duties and levies assessable against the Contractor in respect of or pursuance to the Contract. If any legal/ departmental proceedings are initiated against the Contractor for short levy or non-levy of taxes, he shall be fully responsible to defend the same at his own.

(ii) In addition, the Contractor shall be responsible for payment of all duties, levies, and taxes assessable against the Contractor or Contractor's employees or Sub-Contractor's whether corporate or personal as applicable in respect of property.

(iii) The Contractor shall accept sole liability for the payment of any and all taxes, duties, cesses and levies, as are payable to any government, local or

statutory authority in any country other than India as are now in force or as are hereinafter imposed, increased or modified and as are payable by the Contractor, his agents, Sub-Contractors and Suppliers and its/their respective employees for or in relation to the performance of this Contract. The Contractor shall be deemed to have been fully informed with respect to all such liabilities and shall deemed to have considered and included the same in his bid. The quoted Price shall not be varied in any manner on this account.

20.0 Tax Deduction at Source

20.1 Income Tax Deduction (TDS)

Income tax deductions shall be made from all payments made to the Contractor including advances, in respect of the work/ project undertaken by the Contractor, in accordance with the provisions of the Income Tax Act and Rules made thereunder prevailing and in force from time to time.

20.2 TDS under GST

TDS under GST, if applicable, shall be deducted from Contractor's bill at applicable rate and a certificate as per rules for tax so deducted shall be provided to the Contractor.

The Contractor shall be solely responsible and liable to deduct TDS, if applicable, from the sub-Contractors/ sub-vendors and remit the same to the Government within the due date, as per applicable laws.

20.3 Income Tax & Corporate Tax

(i) The Contractor shall be solely responsible and liable to pay all Direct Taxes including income tax, profession tax and wealth tax on any payments arising out of the Contract, whether payable in India or in any other jurisdiction.

(ii) The Contractor shall be responsible for ensuring compliance with all provisions of the Direct Tax laws of India including, but not limited to, the filing of appropriate Returns and shall promptly provide all information required by the Employer for discharging any of its responsibilities under such laws in relation to or arising out of the Contract.

(iii) The Contractor shall indemnify the Employer against any and all liabilities or claims arising out of this contract for such taxes including interest and penalty which any tax authority may assess or levy on the Employer or its representatives.

(iv) Tax shall be deducted at source by the Employer from all sums due to an Indian tax resident Contractor in accordance with the provisions of Indian Income Tax Act/ Rules as in force at the relevant point of time.

(v) Corporate Tax Liability pertaining to contractor's work, if any, shall be to the Contractor's account.

20.4 Employer shall issue a Tax Deduction Certificate to the Contractor evidencing the Tax deducted or withheld and deposited by the Employer on payments made to the Contractor to enable the Contractor to claim the credit of the Tax deducted by the Employer.

20.5 Construction Workers' Cess / Labour Cess

(i) The Contractor shall comply with the Building and Other Construction Workers' Welfare Cess Act, 1996, the Building and Other Construction Workers' (Regulation of Employment and Condition of Service) Central Rules, 1998 and the Building and Other Construction Workers' Welfare Cess Rules, 1998.

(ii) Prices quoted by the bidder shall be deemed to be inclusive of construction workers cess/ labour cess.

(iii) Cess as per the prevailing rate, shall be deducted at source from the bills of the Contractor and remitted to the "Secretary, Building and Other Construction Workers Welfare Board" of the concerned State by the Employer as per regulations. The Contractor shall be responsible to submit final assessment return of the cess amount to the assessing officer after adjusting the cess deducted at source.

21.0 Royalty and other costs on Materials

The cost of procurement of materials required for construction, including the Royalty, Cess, Toll, Octroi, if applicable for procurement/ supply of materials such as bajri, stone, kankar, sand, ordinary earth and other materials etc. shall be deemed to be included in the quoted rates and nothing additional would be payable on this account.

22.0 Insurance of Works etc.

22.1 Contractor is required to take 'Contractor's All Risk Policy' or 'Erection All Risk Policy', as the case may be, before start of work from an approved insurance company in the joint name with first name of Employer and bear all costs towards the same for the full period of execution of works for the full amount of contract against all loss of damage from whatever cause arising other than excepted risks for which he is responsible under the terms of the contract and in such manner that the Employer and his authorized representatives and the Contractor are covered during the period of construction of works for loss or damage in respect of:

(i) The work and the temporary works to the full value of such works.

(ii) The materials, constructional plant, centring, shuttering and scaffolding materials and other things brought to the site for their full value.

The Contractor is required to submit the original policy document and the receipt for payment of the current premium to the Employer.

22.2 Insurance under Workmen Compensation Act

(i) Contractor is required to take insurance cover under the Workman Compensation Act, 1923 amended from time to time from an approved insurance company and pay premium charges thereof.

(ii) The Contractor is required to submit the original policy document and the receipt for payment of the current premium to Employer.

22.3 Third Party Insurance

(i) Contractor is required to take third party insurance cover for an amount of 5% (five per cent) of contract value from an approved insurance company for insurance against any damage, injury or loss which may occur to any person or property including that of Employer, arising out of the execution of works or temporary works.

(ii) The Contractor is required to submit the original policy document and the receipt for payment of the current premium to Employer.

(iii) Engineer-in-charge to ensure that Insurance policies are submitted by the Contractor within 30 days from the date of issue of LOA. In case of failure of the Contractor to obtain Contractors All Risk Policy, insurance under Workman Compensation Act and third-party insurance as described above, Employer reserves the right of forfeiture of the Performance Bank Guarantee.

(iv) If the Contractor could not effect a comprehensive insurance cover against risks which he may be required to effect under the terms of the contract, then he shall give his attention and even in case to get the best insurance cover available of effecting a wider insurance cover than the one which the subsidiary of the General Insurance Company could offer, such an insurance is ought to be done after the Employer's approval, by or through the subsidiary of the General Insurance Company.

22.4 The Contractor shall at all times indemnify the Employer against all claims, damages or compensation under the provision of Payment of Wages Act 1936, Minimum Wages Act 1948, Employer's Liability Act 1938, the Workmen's Compensation Act 1947, Industrial Disputes Act 1947 and Maternity Benefit Act 1961 or any modifications thereof or any other law in force or as a consequence of any accident or injury to any workman or other persons in or about the works, whether in the employment of the Contractor or not, against all costs, charges and expenses of any suit, action or proceedings arising out of such incident or injury and against all sum or sums which may, with the consent of the Contractor, be paid to compromise or

compound any such claim. Without limiting his obligations and liabilities as above provided, the Contractor shall insure against all claims, damages or compensation payable under the Workmen's Compensation Act 1923 or any modification thereof or any other law relating thereto.

23.0 Payments

23.1 All running payments shall be regarded as payments by way of advance against the final payment only and not as payments for work actually done and completed and/or accepted by Engineer-in-Charge and shall not preclude the recovery for bad, unsound and imperfect or unskilled work to be removed and reconstructed or re-erected. The final bill shall be submitted by the Contractor within three months of the completion of work otherwise Engineer-in-Charge's certificate of the total measurement shall be binding on the Contractor.

(i) Intermittent progress Photographs, as and when required, shall also be provided by the Contractor at his own cost as per the direction of Engineer-in-Charge. No payment of running account bill shall be released unless it is accompanied by photographs, Monthly Progress Report and tax invoices as stated above.

(ii) It may be noted that GST shall be recoverable as extra on all applicable recoveries e.g. Workmen recovery, compensation etc. made from the bills of Contractor.

(iii) The Running Bills will be submitted by the Contractor (in 4 copies), complete in all respects, on a monthly basis. The Engineer-in-Charge shall process and verify the same within 15 days of submission of the bill, complete in all respects, who shall then forward the same with his certification to the Employer. The Employer will make every effort to process the payment thereof within 15 days of receipt of the certified bill from the Engineer-in-Charge.

(iv) All payments shall be released by way of e-transfer through RTGS in India directly to their Bank account by the Employer.

(v) No Running Account Bill shall be paid for the work till the labour licenses, registration with EPFO, ESIC and BOCW Welfare Board, whatever applicable, is submitted by the Contractor to the Engineer-in-Charge/Employer.

23.2 Payment of Final Bill

(i) The final bill shall be submitted by the Contractor in the same manner as specified in the interim bills/ running bills within three months of physical completion of the work or within one month of the date of the final certificate of completion furnished by the Engineer-in-Charge, whichever is earlier.

(ii) No further claims shall be made by the Contractor after submission of the final bill and these shall be deemed to have been waived and extinguished. Payments of those items of the bill in respect of which there is no dispute for quantities and rates, as approved by Engineer-in-Charge, will, as far as possible be made within 3 months of submission of final bill. As regards the disputed items, the payment to the extent of amount considered reasonable/ acceptable to the Engineer-in-Charge shall be made along with the payment of undisputed items. However, the payment in respect of the remaining claim shall be resolved and paid as per the provisions in Clause.83

23.3 Opening of Designated Bank Account for the Project

(i) The Contractor shall maintain a separate bank account with a Scheduled Bank for the purpose of receiving all payments under the Contract and for utilization of payments received from the Employer for disbursement to sub-Contractors, sub-vendors, PRW's, suppliers etc. for this contract. The Contractor shall maintain separate Books of Account for all payments under this contract and the Engineer-in-Charge shall have access to it at all times.

24.0 Measurements of Works

(i) Engineer-in-charge shall, except as otherwise provided, ascertain and determine by measurement, the value of work done in accordance with the contract. Except where any general or detailed description of the work expressly shows to the contrary, measurement shall be taken in accordance with the procedure set forth in the CPWD Specifications. In the case of items, which are not covered by specifications, mode of measurement as specified in the Technical Specifications of the contract, and if for any item no such technical specification is available, then a relevant standard method of measurement issued by the Bureau of Indian Standard shall be followed.

(ii) Provided further that, in case of Cancellation/ Determination of Contract in Full or in Part in accordance with clause 12.0 (and its sub-clauses), following methodology shall be adopted in respect of measurements in addition to what has been mentioned in foregoing:

(a) All measurements and levels shall be taken jointly by the Engineer-in- Charge or his authorized representative and by the Contractor or his authorized representative from time to time during the progress of the work and such measurements shall be signed and dated by the Engineer-in-Charge and the Contractor or their representatives as token of their acceptance. If the Contractor objects to any of the measurements recorded, a note shall be made to that effect with reason and signed by Engineer-in-Charge & the Contractor.

(b) If for any reason, the Contractor or his authorized representative is not

available and the work of recording measurements is suspended by the Engineer-in-Charge or his representative, the Engineer-in-Charge shall not entertain any claim from Contractor for any loss or damages on this account. If the Contractor or his authorized representative does not remain present at the time of such measurements after the Contractor or his authorized representative has been given a notice in writing three (3) days in advance or fails to countersign or to record objection within a week from the date of the measurement, then such measurements recorded in his absence by the Engineer-in-Charge or his representative shall be deemed to be accepted by the Contractor.

(c) The Contractor shall, without any extra charge, provide all assistance with every appliance, equipment, scaffolding, labour and any other things necessary for recording the measurements.

25.0 Computerised Measurement Books

(i) Engineer-in-Charge shall, except as otherwise provided, ascertain and determine by measurement the value of work done in accordance with the contract. All measurements of all items having financial value shall be entered by the Contractor and compiled in the shape of the Computerized Measurement Book as per the format provided by Engineer-in-Charge so that a complete record is obtained of all the items of works performed under the contract. All such measurements and levels recorded by the Contractor or his authorized representative from time to time, during the progress of the work, shall be got checked by the Contractor from the Engineer-in-Charge or his authorized representative as per interval or program fixed in consultation with Engineer-in-Charge or his authorized representative.

(ii) After the necessary corrections made by the Engineer-in-Charge, the measurement sheets shall be returned to the Contractor for incorporating the corrections, and for resubmission to the Engineer-in-charge for the dated signatures by the Engineer-in-Charge and the Contractor or their representatives in token of their acceptance.

(iii) Whenever a Running Account bill is due for payment, the Contractor would initially submit draft computerized measurement sheets and these measurements would be got checked/ test- checked from the Engineer-in-Charge and/or his authorized representative. The Contractor will, thereafter, incorporate such changes as may be done during these checks/ test checks in his draft computerized measurements, and submit it to Engineer-In-Charge in both Soft and Hard copies.

(iv) All the required documents viz. measurement sheets, summary of quality test reports, ESIC/EPF challans, Tax invoice, theoretical v/s actual consumption of material (as required by Engineer-in-Charge) etc. shall also

be submitted along with the RA bill in both soft and hard copies.

(v) The Contractor shall give not less than seven days' notice to the Engineer-in-Charge or his authorized representative before covering up or otherwise placing beyond the reach of checking and/or test checking the measurement of any work. The Contractor shall not cover up and place beyond reach of measurement any work without consent of the Engineer-in-Charge or his authorized representative in writing in order to ensure the proper checking and measurement thereof. The Engineer-in-Charge or his authorized representative shall within the aforesaid period of seven days inspect the work, and if any work is found to be covered up or placed beyond the reach of checking and/or test checking measurements without such notice having been given or the Engineer-in- Charge's consent being obtained in writing, the same shall be uncovered at the Contractor's expense, or in default thereof no payment or allowance shall be made for such work or the materials with which the same was executed.

(vi) It is also a term of this contract that checking and/or test checking the measurements of any item(s) of work in the Measurement Book and/or its payment in the interim, on account of final bill shall not be considered as conclusive evidence as to the sufficiency of any work or material to which it relates nor shall it relieve the Contractor from liabilities from any over measurement or defects noticed till the final completion of the work and certification thereof.

26.0 Withholding & Lien In Respect of Sums Due From Contractor

(i) Whenever any claim or claims for payment of a sum of money arises out of or under the contract or against the Contractor, Employer shall be entitled to withhold and also have a lien to retain such sum or sums in whole or in part from the Security Deposit by the Contractor and for the purpose aforesaid, Employer shall be entitled to withhold the security deposit, if any, furnished as the case may be and also have a lien over the same pending finalization or adjudication of any such claim. In the event of the security being insufficient to cover the claimed amount or amounts or if no security has been taken from the Contractor, Employer shall be entitled to withhold and have a lien to retain to the extent of such claimed amount or amounts referred to above, from any sum or sums found payable or which may at any time thereafter become payable to the Contractor under the same contract or any other contract pending finalization of adjudication of any such claim.

(ii) It is an agreed term of the contract that the sum of money or moneys so withheld or retained under the lien referred to above by the Engineer-in-Charge or Employer will be kept withheld or retained till the claim arising out of or under the contract is determined by the competent authority and that the Contractor will have no claim for interest or damages whatsoever on any account in respect of such withholding or retention under the lien referred to

above and duly notified as such to the Contractor. For the purpose of this clause, where the Contractor is a partnership firm or a limited company, the Engineer-in-Charge or the Employer shall be entitled to withhold and also have a lien to retain towards such claimed amount or amounts in whole or in part from any sum found payable to any partner/ limited company, be whether in his individual capacity or otherwise, as the case may be. Employer shall have the right to cause an audit and technical examination of the works and the final bills of the Contractor including all supporting vouchers, abstract etc. to be made after payment of the final bill and if as a result of such audit and technical examination any sum is found to have been overpaid in respect of any work done by the Contractor under the contract or any work claimed to have been done by him under the contract and found not to have been executed, the Contractor shall be liable to refund the amount of over-payment and it shall be lawful for Employer to recover the same from him in any other manner legally permissible. If it is found that the Contractor was paid less than what was due to him under the contract in respect of any work executed by him under it, the amount of such under payment shall be duly paid by Employer to the Contractor, without any interest thereon whatsoever.

Lien In Respect of Claims in Other Contracts

Any sum of money due and payable to the Contractor (including the security deposit returnable to him) under the contract may be withheld or retained by way of lien by the Engineer-in-Charge or by Employer against any claim of Engineer-in-Charge or Employer in respect of payment of a sum of money arising out of or under any other contract made by the Contractor with the Engineer-in-Charge or the Employer. It is an agreed term of the contract that the sum of money so withheld or retained under this clause by the Engineer-in-Charge or the Employer will be kept withheld or retained till his claim arising out of the same contract or any other contract is either mutually settled or determined by the Competent Authority, as the case may be, and that the Contractor shall have no claim for interest or damages whatsoever on this account or on any other ground in respect of any sum of money withheld or retained under this clause and duly notified as such to the Contractor.

27.0 Work to be executed in accordance with Specifications, Drawings and Orders etc.

(i) All items of work in the bill of quantities/ schedule of quantities shall be carried out as per the CPWD specifications, drawings and instructions of the Engineer-in-Charge and the rates shall include procurement and supply of required materials including proper storage, consumables, skilled & unskilled labour, supervision and tools, plant & machinery complete as called for in the detailed specifications and conditions of the contract. Latest updated CPWD specifications shall be followed for execution of work.

(ii) The Contractor shall execute the whole of the work in the most substantial and workman like manner for materials and otherwise in all other aspects in strict accordance with the specifications. The Contractor shall also conform exactly, fully and faithfully to the design, drawings and instructions in writing in respect of the work assigned by the Engineer-in-Charge.

(iii) The Contractor shall comply with the provisions of the contract and execute the works with due care and diligence and maintain the works and provide all labour and materials, tools and plants, including for measurements and supervision, of all works, structural plans and other things of temporary or permanent nature required for such execution and maintenance in so far as the necessity for providing these, is specified or is reasonably inferred from the contract. The Contractor shall take full responsibility for adequacy, suitability, and safety of all the works and methods of construction.

28.0 Materials to be provided by the Contractor

(i) The Contractor shall, at his own expense, provide all materials required for the works. The Contractor at his own expense and without delay provide to the Engineer-in-Charge samples of materials to be used on the work and shall get the same approved in advance. In some cases, the contractor would be instructed by the engineer in charge to create mood boards with a set of samples being available at the same place and time to justify the design aspects for getting Employer's approvals. All such materials to be provided by the Contractor shall be in conformity with the specifications laid down or referred to in the contract. The Contractor shall, if requested by the Engineer-in-Charge, furnish proof to the satisfaction of the Engineer-in-Charge regarding the material being conforming to the specifications. The Contractor shall submit the samples of materials to be tested or analysed and bear all charges and cost of testing unless specifically provided for otherwise elsewhere in the contract or specifications.

(ii) The Engineer-in-Charge or his authorized representative/ Employer/ PMC/ TPIA shall at all times have access to the works and to all workshops and places where work is being prepared or from where materials, manufactured articles, equipment's or machinery are being obtained for the works and the Contractor shall offer every assistance in obtaining the right to visit and ensure physical visit to such works as directed by engineer-in-charge. The cost for travelling and accommodation to these works of the engineer in charge or his authorized representatives will be borne by the Employer/ PMC/ TPIA apart from those specifically written in the Special conditions of

contract. However, the costs towards the contractor or his representatives towards the costs of such visits will be borne by the contractor. The Engineer-in-Charge shall have full powers to instruct the contractor for acceptance, rejection, improvement or substitution prior to delivery on site of any such material that he might have undertaken to inspect the materials at the works.

(iii) The Engineer-in-Charge shall have full powers to instruct the contractor for removal of all materials from the site/premises, which in his opinion are not in accordance with the specifications. In case of default, the Engineer-in-Charge shall be at liberty to employ at the expense of the Contractor, other persons to remove the same without being answerable or accountable for any loss or damage that may happen or arise to such materials. The Engineer-in-Charge shall also have full power to require other proper materials to be substituted thereof and in case of default, the Engineer-in-Charge may cause the same to be supplied by others at the risk and cost of the contractor. All such costs for removal and substitution shall be borne by the Contractor.

(iv) The Contractor shall ensure that the materials are brought to the site in original sealed containers (except where the packing, bearing manufacturer's markings and brands, and quantity required is a fraction of the smallest packing). Materials not complying with this requirement shall be rejected. The empty containers of such materials shall not be destroyed/disposed-off without the permission of Engineer-in-Charge or his authorized representative.

(v) The Contractor shall produce receipt vouchers showing quantity of materials to satisfy the Engineer-in-Charge that the materials comply with the contract stipulations. These vouchers shall be endorsed, dated and signed by the Contractor. A certified copy of each such voucher signed both by the Engineer-in-Charge and the Contractor shall be kept on record.

29.0 Materials, Samples and Testing

(i) The materials/products used on the works shall be one of the approved makes/ brands out of the list of approved manufacturers/ brands/ makes given in the tender document. The Contractor shall submit samples/specimens out of approved makes to the Engineer-in-Charge for prior approval.

(ii) In case single brand/ make are mentioned, other equivalent makes/ brands may be considered by the Engineer-in-Charge on the request of the Contractor. In case of variance in CPWD/IS/BIS specifications from approved products/makes specification, the specification of

approvedproduct/ make shall prevail for which nothing shall be paid extra to the Contractor. In case no make or brand of any materials, articles, fittings and accessories etc. is specified, the same shall comply with the relevant Indian Standard Specifications and shall bear the ISI/BIS mark and meet the contractual specifications. The Engineer-in-charge shall have the discretion to the check quality of materials and equipment to be incorporated in the work, at source of supply or site of work and even after incorporation in the work. The Contractor shall provide the necessary facilities and assistance for this purpose.

(iii) The above provisions shall not absolve the Contractor from the quality of final product and in getting the material and workmanship quality checked and approved from the Engineer-in-Charge/Employer.

(iv) The Contractor shall well in advance, produce samples of all materials, articles, fittings, accessories etc. that he proposes to use and get them approved in writing by the Engineer-in-Charge. The materials, articles etc. as approved shall be labelled as such and shall be signed by Engineer-in-Charge and the Contractor's representative.

(v) The approved samples shall be kept in the custody of the Engineer-in-Charge till completion of the work. Thereafter the samples, except those destroyed during testing, shall be returned to the Contractor. No payment will be made to the Contractor for the samples or samples destroyed in testing.

(vi) The Contractor shall set up and maintain at his cost, a field-testing laboratory for all day-to-day tests at his own cost to the satisfaction of the Engineer-in-Charge. This field-testing laboratory shall be provided with equipment and facilities to carry out all mandatory field tests as per CPWD specifications. The Field-testing laboratory shall be constructed and installed with appropriate facilities. Temperature and humidity controls shall be available, wherever necessary, during the testing of sample(s). All equipment shall be provided by the Contractor so as to be compatible with the specified testing requirements.

(vii) The Contractor shall maintain all the equipment in good working condition for the duration of the contract. The Contractor shall provide/ deploy approved qualified personnel to run the laboratory for the duration of the Contract. The number of staff and equipment available must be sufficient to keep pace with the sampling and testing programme as required by the Engineer-in-charge. The Contractor shall fully service the site laboratory and shall supply everything necessary for its proper functioning, including all transport needed to move equipment and samples to and from sampling points on the site, etc. All measuring devices/equipment shall be calibrated, and

Contractor shall keep the records of valid calibration certificates of devices/ equipment at the field laboratory for inspection by Engineer-in-Charge at all times. All field tests shall be carried out in the presence of Engineer-in-Charge or his representative.

(viii) All costs towards samples, materials, collection, transport, manpower, testing etc. shall be borne by the Contractor and are deemed to be included in the rates quoted by him in the bill of quantities.

(ix) In the case of certain materials pertaining to mechanical, electrical, and plumbing (MEP) works, the Contractor shall be responsible for getting the items tested from Employer/ PMC approved laboratories at his own cost as per the tests written in the Special conditions of contract (SCC) or as deemed fit by engineer in charge, when it is not found feasible to establish a testing facility at site in respect of such items.

30.0 Makes of Materials

The materials required to be supplied by the Contractor under this contract shall be procured from the list of approved manufacturers/ brands/ makes enclosed in the contract document. Where the makes of materials are not indicated in the Bidding document, Contractor shall furnish the details of makes/ brands and shall obtain prior approval of Engineer-in-Charge before placing order.

31.0 Materials Procured with the Assistance of Engineer-in-Charge

If any material for the execution of this contract is procured with the assistance of Engineer-in-Charge by issue from its stores, the Contractor shall use the said materials solely for the purpose of contract and shall not dispose them without the permission of Engineer-in-Charge. Rates of material available at site are mentioned in Annexure VI of SCC. However, if no rate is mentioned for any material, the rate shall be worked out as per DSR rate with "plus" or "minus" percentage quoted by the bidder for such item in that tender. If the rate is not available in DSR, then the same shall be as per the market rate of new material (Non-Schedule Items) at the time of execution of the work. The Contractor shall deploy security personnel for safe-keeping and safeguarding of all such materials procured at site and handed over to the contractor by the Engineer-in-Charge. The contractor will satisfy himself with the quantity, specifications and quality of the material being procured with the assistance of the Engineer in charge so as to ensure that the works are done in accordance with the contractual stipulations. The contractor is not allowed to raise any claim/deviation/relaxation on the use of any/all such material post the handover of the material by the Engineer-in-Charge. The contractor though can submit his objections in writing for the consideration of the engineer in charge prior to accepting the handover of

any/all such material.

32.0 Contractor to Supply Tools & Plants

The Contractor shall provide at his own cost all materials, machinery, tools & plants as required for execution of the work. In addition to this, appliances, implements, other plants, ladders, cordage, tackle, scaffolding and temporary works required for the proper execution of the work, whether original, altered or substituted and whether included in the specifications or other documents forming part of the contract or referred to in these conditions or not, or which may be necessary for the purpose of completion of the work. The Contractor shall also supply without any charge the requisite number of persons with the means and materials, necessary for the purpose of setting out works, and counting, weighing and assisting in the measurement or examination at any time and from time to time of the work or materials. In the event of his failure to do so, the same may be provided by the Engineer-in-Charge at the expense of the Contractor and the expenses thereon shall be recovered from any money due to the Contractor under this contract or otherwise and/ or from his security deposit.

33.0 Mobilization of Men, Materials and Machinery

(i) All expenses towards mobilization at site and de-mobilization including bringing in equipment, work force, materials, dismantling the equipment, clearing the site etc. shall be deemed to be included in prices quoted and no separate payment on account of such expenses shall be entertained.

(ii) It shall be solely the Contractor's responsibility to provide, operate and maintain all necessary construction equipment, scaffoldings and safety, gadget, lifting tackles, tools and appliances to perform the work in a workman-like and efficient manner and complete all jobs as per the specifications and within the scheduled time of completion of work. Contractor shall also be responsible for obtaining temporary electric and water connections for all purposes. The Contractor shall also make standby arrangements for un-interrupted supply of water & electricity.

(iii) The procurement and supply in sequence and at the appropriate time of all materials and consumables shall be solely the Contractor's responsibility and his rates for execution of work shall be inclusive of supply of all these items.

(iv) It is mandatory for the Contractor to provide safety equipment and gadgets to all his workers, supervisory and technical staff engaged in the execution of the work while working. The minimum requirement (but not limited to) shall be gumboots, safety helmets, Rubber hand- gloves, face- masks, safety- nets, safety-belts, goggles, hand

sanitizers etc. as per work requirements. The Contractor shall keep a few spare sets of such gadgets for use by the Employer or the Engineer-in-Charge and /or his representative or any other inspecting teams. No staff/ worker shall be allowed to enter the site without these equipment/ gadgets.

(v) The cost of the above equipment/ gadgets is deemed to be included in the rates quoted by the Contractor and the Contractor shall not be entitled for any extra payment in this regard. The Contractor shall abide by the regulations pertaining to Health, Safety and Environment as per the HSE policy attached elsewhere as a part of this contract.

(vi) All designs, drawings, bill of quantities etc., except Bar Bending Schedule, Shop & Fabrication drawings, for all works shall be supplied to the Contractor for his scope of work by the Engineer-in-charge in a phased manner, as the works progresses. However, it shall be the duty and responsibility of the Contractor to bring to the notice of the Engineer-in-charge as to any variation, discrepancy or any other changes required and to obtain revised drawings and designs and/ or approval of the Engineer-in-Charge in writing for the same.

(vii) One copy of contract documents, including drawings furnished to the Contractor, shall be kept at the site and the same shall at all reasonable times be available for inspection of Engineer-in-charge and his authorised representatives.

(viii) All materials, construction plants and equipment etc. (including scrap of brought in material) once brought by the Contractor within the project area will not be allowed to be removed from the premises without the written permission of the Engineer-in-charge. Similarly, all enabling works built by the Contractor for the main construction undertaken by him, shall not be dismantled, and removed without written permission of the Engineer-in-charge.

(ix) The Contractor shall need to furnish list of equipment/ machinery/ plants available with the Contractor along with the details/ capacities and manufacturing year of each equipment/ machinery/ plant.

(x) Contractor shall prepare the Bar Bending Schedule, shop and fabrication drawings at no extra cost to Employer, if required for any of the items of work as directed by the engineer in charge. Five copies of these drawings and documents will be submitted to the Engineer-in-charge/Employer for approval, at least 30 days prior to execution of the works related to these documents and drawings.

(xi) All Contractor’s plant, machinery and equipment shall be kept in perfect working condition during currency of the contract.

34.0 Health, Safety and Environment (HSE) Management

(i) The Contractor, during entire duration of the Contract, shall adhere to HSE requirement as enclosed in the Bidding Document as Annexure-VIII to SCC.

(ii) The contractor shall also barricade the site with minimum 3 mtr high sheets or as per the requirement of Green Tribunal/ State Pollution Control Board/ Environment Department or any directions by the local administration during the entire duration of the contract wherever required. Nothing extra shall be paid on this account.

(iii) Safety Regulations

The Contractor shall abide by all safety regulations and ensure that safety equipment for specific jobs, as stipulated in the factory act/ safety handbook, is issued to workers during execution of work, failing which all the works at site shall be suspended.

(iv) Security

The Contractor shall make proper security arrangements at his own cost for the materials at site & the works till handing over of the works to the Employer/ Engineer-in-Charge.

35.0 Quality Assurance Programme

(i) To ensure that the services under the scope of this contract are in accordance with the specifications, the Contractor shall adopt Quality Assurance Programme to control such activities at the necessary points. The Contractor shall prepare and submit to Engineer in charge, such Quality Assurance Programme within 30 days from date of issue Letter of Award for approval. Engineer-in-charge shall also carry out quality audit and quality surveillance of systems and procedures of Contractor's quality control activities. A Quality Assurance Programme of Contractor shall generally cover the following:

(a) His organization structure for the management and implementation of theproposed Quality Assurance Program;

(b) Documentation control system;

(c) The procedure for materials and source inspection;

(d) System for site controls including process controls;

(e) Control of non-conforming items and systems for corrective actions;

(f) Inspection and test procedure for site activities;

(g) System for indication and appraisal of inspection status;

(h) System for maintenance of records;

(i) System for handling, storage, and delivery; and

(j) A quality plan detailing out quality practices and procedures, relevant acceptance levels for all types of work under the scope of this contract.

(ii) The Contractor shall maintain all the quality reports. Checklists & Registers as per CPWD norms in this regard shall be submitted to the Engineer-in-Charge for approval and the same shall be adopted. If any item is not covered by the Check-list/ Register, the Format for the same may be developed and submitted to the Engineer-in-Charge for approval and the same shall be adopted. These filled-in reports shall be duly signed by representatives of the Contractor and the Engineer-in-charge. All the costs associated with Printing of Formats and testing of materials required as per technical specifications or as per instructions of Engineer-in-Charge shall be included in the Contractor's quoted rates in the Schedule/ Bill of quantities. Nothing extra shall be paid to the Contractor on this account.

36.0 Contract Coordination Procedures, Coordination Meetings and Progress Reporting

The Contractor shall prepare and finalize a detailed contract coordination procedure within 30 days from the date of issue of Letter of Award in consultation with the Engineer-in-charge for the purpose of execution of the Contract. The Contractor shall have to attend all the meetings at any place in India at his own cost with the representatives of the Employer, the PMC, the TPIA and their representatives during the currency of the Contract, as and when required and fully co-operate with such personnel and agencies involved during these discussions. The Contractor would be advised to deal with the Employer/ PMC only through the Engineer-in-Charge and any dealing/correspondence, if required, at any time with the Employers/ PMC/ TPIA shall be done through Engineer-in-Charge only.

37.0 Protection of Existing Facilities

(i) Contractor shall obtain full details of all existing and planned underground services from concerned agencies and shall always follow these closely during the performance of work. Contractor shall be responsible for location and protection of all underground lines, structures, power cables, OFC cables etc. at his own cost.

(ii) Despite all precautions, should any damage to any structure/ utility etc. occur, the Contractor shall immediately inform the Engineer-in-Charge and the Contractor shall forthwith carry out repair at his expense under the direction and to the satisfaction of Engineer-in-Charge. If the same is not attended by the Contractor within the said time period, it will be got done at the risk and cost of the contractor through other agencies.

(iii) Contractor shall take all precautions to ensure that no damage is caused to the existing pipelines, cables etc. during services.

38.0 Completion Plans and Completion Certificate

(i) Within ten days of completion of the work, the Contractor shall give notice of such completion to the Engineer-in-Charge. On the receipt of such notice, the Engineer-in-Charge shall within thirty days inspect the work and if there is no defect in the work, he shall furnish the Contractor with a final certificate of completion.

(ii) In case of any shortcomings/ defects, a provisional certificate of physical completion indicating the defects (a) to be rectified by the Contractor, and/or (b) for which payment will be made at reduced rates, shall be issued.

(iii) However, no final certificate of completion shall be issued, nor shall the work be considered to be complete until the Contractor shall have removed from the premises on which the work is executed, all scaffolding, surplus materials, rubbish and all huts and sanitary arrangements required for his/their work, people on the site in connection with the execution of the works and cleaned off the dirt from all wood work, doors, windows, walls, floor or other parts of the building, in, upon, or about which the work is to be executed or of which he may have had possession for the purpose of the execution. Similarly, no completion Certificate shall be issued until the work shall have been measured by the Engineer-in-Charge.

(iv) If the Contractor shall fail to comply with the requirements of this clause as regards removal of scaffolding, surplus materials and rubbish and all huts and sanitary arrangements as aforesaid and cleaning off dirt on or before the date fixed for the completion of work, the Engineer-in-Charge may remove such scaffolding, surplus materials and rubbish etc. at the expense of the Contractor and dispose of the same as he deems fit and clean off such dirt as aforesaid, and the Contractor shall have no claim in respect of scaffolding or surplus materials as aforesaid except for any sum actually realized by the sale thereof less actual cost incurred on removal of materials/ debris / malba etc.

(v) The Contractor shall be responsible for handing over of the completed works including signing of inventories by the Engineer-in-charge on a pre-approved format.

(vi) The Contractor shall, during the course of execution, prepare and keep updated a complete set of ‘As Built’ drawings to show each and every change from the contract drawings, changes recorded shall be counter-signed by the Engineer-in-Charge and the Contractor.

No payment of final bill shall be released to the Contractor until final work completion certificate is obtained from Employer.

39.0 Completion Documents

The following documents shall be submitted in soft copy and hard-binders by the Contractor in 05 (Five) sets as a part of completion documents:

(i) Test Certificates, Warranty/ Guarantee certificates and copies of Purchase Orders (Required for Warranty/ Guarantee).

(ii) All other documents as specified in the respective specifications.

(iii) Complete set of "As-built" drawings showing therein corrections and modifications (if any) made during the course of execution of the Works, signed by the Engineer-in-Charge;

(iv) Declaration by the Contractor that it has duly cleared any and all of the dues payable by it to its labourer, employees, piece-rate workers (PRWs), and other personnel, sub-Contractors, suppliers, vendors, GST, income Tax, entry tax, excise, customs duty, provident fund, employees state insurance (ESI) and royalties, or other amounts payable under any Applicable Law (if any) and Certificate towards 'No claim' other than the claim in the Final bill.

40.0 Prohibition of Unauthorised Construction & Occupation

(i) No unauthorized buildings, construction of structures should be put up by the Contractor anywhere on the project site, neither any building built by him shall be occupied in un-authorized manner by him or his staff.

(ii) It shall be the responsibility of the Contractor to see that the building under construction is not occupied by anybody in un-authorized manner during construction and is handed over to the Engineer-in-Charge with vacant possession of complete building. If such building, though completed, is occupied unauthorisedly/ illegally, then the Engineer-in-Charge shall have the option to refuse to accept the said building/ buildings in that position. Any delay in acceptance on this account will be treated as delay in completion and, levy of Penalty may be imposed in line with Clause 8.0 of GCC for such delay.

41.0 Foreclosure of Contract

(i) If at any time after acceptance of the tender or during the progress of work, the purpose or object for which the work is being done changes due to any unforeseen and compelling reasons and as a result of which the work has to be abandoned or reduced in scope, the Engineer-in-Charge shall give notice in writing to that effect to the Contractor stating the decision as well as the cause for such decision and the Contractor shall act accordingly in the matter. The Contractor

shall have no claim of any compensation or otherwise, whatsoever, on account of any profit, loss of profit or advantage which he might have derived from the execution of the works in full but which he did not derive in consequence of the foreclosure of the whole or part of the works.

(ii) The Contractor shall be paid for the works executed at site at contract rates at the time of foreclosure.

(iii) The Contractor shall, if required by the Engineer-in-Charge, furnish to him, books of account, wage books, time sheets and other relevant documents and evidence as may be necessary to enable him to certify the reasonable amount payable under this condition.

(iv) In the event of action being taken under Clause 14.0 to reduce the scope of work, the Contractor may furnish fresh Performance Guarantee on the same conditions, in the same manner and at the same rate for the balance tendered amount and initially valid up to the extended date of completion or stipulated date of completion if no extension has been granted plus minimum 60 days beyond that. Wherever such a fresh Performance Guarantee is furnished by the Contractor, the Engineer-in-Charge/Employer may return the previous Performance Guarantee.

42. Defects Liability Period

(i) The Contractor shall be responsible for rectification of defects in the works for a period 5 (Five) years from the date of issue of Completion Certificate by the Engineer-in-Charge. Any defects, except normal wear & tear, discovered and brought to the notice of the Contractor forthwith shall be attended to and rectified by him at his own cost and expense. In case the Contractor fails to carry out these rectifications, the same may, without prejudice to any otherright or remedy available, be got rectified by Engineer-in-Charge at the risk and cost of the Contractor.

Provided that the Contractor shall not be liable for any such structural/ architectural defect as may be induced by the allottee(s), by means of carrying out structural or architectural changes from the original specification designs.

(ii) A part of the security deposit will be retained towards defect liability as per Clause 3.0 of the GCC above. The final amount towards defect liability would be released after 5 years from the actual date of completion or the final justified extended date of completion.

43. Sub-Letting / Sub-Contracting

No subletting of whole work or part shall be allowed. However, the Contractor may engage the sub-Contractor for specialized works as mentioned below:

(i) The Contractor, after obtaining approval from the Engineer-in-Charge, shall engage specialized agencies in respect of the following works at site, in case the Contractor does not have such in-house expertise:

- (a) Anti-termite treatment.
- (b) Water proofing works.
- (c) Fire Fighting works
- (d) Electrical / LV Works
- (e) HVAC Works
- (f) BMS works
- (g) Horticulture works
- (h) Tree Transplantation Works, if any
- (i) Painting work.
- (j) Any other work as directed by Engineer-in-Charge

(ii) If the Contractor is required to engage a Sub-Contractor for any part of work, then such Sub-Contractors shall have prior proven experience of similar work and shall require specific approval by the Engineer-in-charge.

(iii) The Contractor will submit to the Engineer-in-Charge for approval, the details of Sub-Contractors as per the format enclosed as Form XIV at Section 4 for approval. Contractor shall ensure that very competent and resourceful agencies with proven track record and performance should be proposed for the work to be sub-contracted.

(iv) However, whatever arrangements are made by the Contractor for sub-letting any part of the work/ getting any part of the work executed through a sub-contractor, getting the works executed from such sub-contractors or payments to such sub-contractors shall always remain the responsibility of the Contractor and the Employer shall not in any manner deal with such sub-contractors.

(v) Notwithstanding any consent to sub-contract given by the Engineer-in-Charge, if in his opinion it is considered necessary, the Engineer-in-Charge shall have full authority to order the removal of any sub-Contractor from the site.

44. Execution of Electrical Works

The Contractor shall engage an approved electrical agency for execution of electrical works, holding valid electrical Contractor licence. In case the Contractor himself executes electrical works, then he shall arrange valid electrical Contractor licence before start of electrical works at site.

45. Force Majeure

(i) Any delay in or failure to perform on the part of either party, shall not constitute default so as to give rise to any claim for damages, to the extent such delay or failure to perform is caused by an act of God, due to Pandemic, or by fire, explosion, flood or other natural catastrophe, governmental legislation, orders or regulation etc. The time for performance of the respective obligations by the parties shall be deemed to be extended for a period equal to the duration of the force majeure event. Both parties shall make their best efforts to minimize the delay caused by the force majeure event. If the failure/ delay of the Employer in handing over the entire site and/ or in releasing the funds continues even on the expiry of the stipulated date of completion, Engineer-in-charge, may, at the request of the Contractor, foreclose the contract without any liability to either party. In the event of such foreclosure, the Contractor shall not be entitled to any compensation whatsoever. If prior to such foreclosure, the Contractor has brought any material at site and which remain unused, the Engineer-in-Charge shall always have the option of taking over of all such materials at their purchase price or at the local current /DSR rates, whichever is lower.

(ii) The Contractor shall have no claim of damages for extension of time granted or rescheduling of milestone/s for events listed in this clause.

46. No Compensation

The Contractor shall have no claim, whatsoever, for compensation or idling charges against the Employer or his authorized representative on any ground or for any reason, whatsoever.

47. Directions for Works

(i) All works under the contract shall be executed under the direction and subject to approval in all respects of the Engineer-in-Charge.

(ii) The Engineer-in-Charge and his authorized representative shall communicate or confirm their instructions to the Contractor in respect of execution of work during their site inspection in a ‘Works Site Order Book’ maintained at the site office of Engineer-in-Charge. The Contractor or his authorized representative shall confirm receipt of such instructions by signing against the relevant orders in of the Site Order Book. A soft copy of this “works site order book” shall be mailed

to the contractor and Employer/PMC/TPIA monthly.

48. Work in Monsoon Season and Rains

The execution of the work may entail working in the monsoon season also. The Contractor must maintain labour force as may be required for the work and plan and execute the construction and erection according to the prescribed schedule. No special/ extra rate will be considered for such work during the monsoon season. The stipulated period for completion of project includes the monsoon period, holidays & festivals and the contractor shall make provisions of the same in the contract scheduling submitted to the engineer in charge/Employer. Further;

(i) During monsoon season and other periods, it shall be the responsibility of the Contractor to keep the construction work site free from any water accumulation at his own cost by making suitable arrangements/ deploying de-watering pumps.

(ii) Contractor must take due cognizance of the presence of monsoon/ rainy season/ days in his scheduled completion period and accordingly, take all necessary measures to protect, reorganize and maintain progress on the work without any interruptions.

(iii) No extension of time due to interruption/suspension of work, waterlogging, reduced/ slowing down of progress, non-availability of manpower etc., whatsoever may be the reason, shall be tenable on account of monsoons/ rains and further no claim for stand-by of manpower and equipment, other resources etc. shall be paid for subject to provisions under Clause 17 of the General conditions of contract.

(iv) Contractor shall procure and stock sufficient quantities of materials viz. coarse and fine aggregates, bricks etc. adequate for the planned volume of the work during the monsoons, well in advance of the onset of same so that progress of work is not affected on this account.

(v) All electrical installations, equipment shall be placed on plinths above ground under proper rain sheds to avoid any inundation, short circuit and hazards of electrocution.

(vi) Price shall be inclusive of all costs and expenses including supply of materials required for monsoon protection like tarpaulins, shed, structural, GI sheet etc. for the above provisions and no separate payment shall be made on this account.

49. Work on Sundays, Holidays and During Night

For carrying out work on Sundays and Holidays or during night, the Contractor shall make necessary arrangements to carry out the works at no extra cost to the Employer, under intimation to the Engineer-in-Charge.

50. Water and Electricity

The Contractor shall make his own arrangements for Water, fit for construction, use & Electrical Power for construction including all necessary materials and equipment's for its distribution and utilisation for construction activities and other purposes at his own cost. The Contractor shall also make standby arrangements for water & electricity to ensure un-interrupted supply of water and electricity for smooth progress of works as per relevant clauses in the special conditions of contract (SCC).

51. Land for Labour Huts/ Site Office and Storage Accommodation

(i) The Contractor may construct temporary office, storage, accommodation, and labour huts within the site premises wherever possible, with prior approval of the Engineer-in-Charge. In case, where surplus land is not available within the site and/or not permitted by the Employer, the Contractor shall arrange the land for temporary office, storage, accommodation and labour huts at his own cost and shall be responsible for taking the clearance of local authorities, if required, for setting up/construction of labour camp and the same is deemed to be included in the rates quoted by the Contractor for the works. The Contractor shall check the availability of land before tendering and no claim whatsoever shall be entertained in this regard.

(ii) The Contractor shall ensure that the labour huts are kept clean and in hygienic conditions. The land for the above purposes shall be so placed that it does not hinder the progress of work or access to the worksite. Vacant possession of the land used for the purpose shall be given back by the Contractor to Employer/ authority after completion of the work.

(iii) The security deposit of the Contractor shall be released only after the Contractor demolishes all temporary structures and clears the site to the satisfaction of Engineer-in-Charge. In the event the Contractor has to shift his labour camps at any time during execution of the work on the instructions of local authorities or as per the requirement of the work progress or as may be required by the Engineer-in-Charge, he shall comply with such instructions at his risk and cost and no claim whatsoever shall be entertained on this account.

52. Watch & Ward and Lighting of Work Place

(i) The Contractor shall at his own cost take all precautions to ensure safety of life and property by providing necessary barriers, obstructions, lights, watchmen etc. during the progress of work as directed by Engineer-in-Charge.

(ii) The Contractor shall provide uninterrupted lighting of the work-place

and surrounding areas during the night hours with a minimum lux level of 10-15 lux. No additional payment shall be made on this account and the cost in this regard is deemed to be included in the quoted rates.

53. Installation of Sign Boards

The Contractor shall fix/ install Construction/safety sign boards of suitable sizes and in adequate numbers as per the instructions of Engineer-in-Charge before/during the execution of work. No additional payment shall be made to the Contractor on this account.

54. Cement and Cement Godown

(i) Cement shall be procured by Contractor in line with the technical specifications and requirement of the contract.

(ii) The cement shall be procured directly from the reputed manufacturers/ stockists as per list of approved makes. Relevant vouchers and test certificates will be produced as and when required by the Engineer-in-charge. It shall be stored by the Contractor in suitable covered and lockable stores, well protected from climate and atmospheric effects. The cement go-down shall be constructed by the Contractor as per the CPWD specifications at his own cost. Cement bags shall be used on “first -in -first -out” basis. Cement stored beyond 90 days will not be used in structural works. However, this cement can be used in other works after getting the cement tested and found suitable as per relevant IS codes at Contractor’s cost and accepted by Engineer-in-charge, before use in works.

55. Steel & Steel Stockyard

Steel conforming to contract specifications/ BIS specifications (latest edition) shall be procured by the Contractor directly from reputed manufacturers/ producers as per list of approved makes. Relevant vouchers & test certificates will be produced by the Contractor. Reinforcement steel, structural steel shall be stored and stacked in such manner so as to facilitate easy identification, removal etc. The Contractor shall take proper care to prevent direct contact between the steel and the ground/water for which he shall provide necessary arrangement at his own cost including ensuring proper drainage of area to prevent water logging as per directions of the Engineer-in-Charge. Steel shall also be protected by applying a coat of neat cement slurry or any other protective treatment over the TMT bars in order to save it from any rusting, for which no extra payment shall be made. Test certificates for each consignment of steel shall be furnished and tests will be got carried out from the authorized NABL accredited laboratory, as per the directions of the Engineer-in-Charge, before incorporating the materials in the work.

56. Schedule of Quantities/ Bill of Quantities

The quantities shown against the various items of work are approximate quantities, which may vary as per the actual requirement of work. Any variation in quantities, if occurs during the execution of the works, will be dealt as per the provisions of the contract.

57. Water - proof Treatment

57.1 The water-proof treatment shall be of type and specifications as given in the schedule of quantities.

57.2 The water-proofing of basement, roofs, water retaining areas shall be and remain fully effective for a period of not less than 10 (Ten) years to be reckoned from the date of issue of Completion Certificate, prescribed in the contract. If any defect or any evidence of re-infestation, dampness, leakage in any part of buildings or structure is found in the said treatment at any time during the said guarantee period and the Contractor is notified of the same, the Contractor shall be liable to rectify the defect or give re-treatment. The Contractor shall commence the work or such rectification or re-treatment within seven days from the date of issue of such letter to him. If the Contractor fails to commence such work within the stipulated period, the Employer may get the same done by deploying another agency at the Contractor's risk & cost.

57.3 Water- proofing shall be got done through approved/ specialized agencies only with prior approval of Engineer-in-Charge.

57.4 During the execution of work, if any damage occurs to the treatment already done, either due to rain or any other circumstances, the same shall be rectified and made good to the entire satisfaction of Engineer-in-Charge by the Contractor at his cost and risk.

57.5 The Contractor shall make his own arrangement for all equipment required for the execution of the job. The Contractor shall execute a Guarantee Bond in the prescribed form as appended for guaranteeing the water-proofing treatment.

58. Indian Standards

Wherever any reference is made to any BIS in any particular specifications, drawings or bill of quantities, it means the Indian Standards editions with up-to-date amendments issued till the last date of receipt of tender documents.

59. Centring & Shuttering

Plywood/steel/Aluminium plates or any material fit for the use as mentioned elsewhere in the tender document or as approved by Engineer-in-Charge shall be used for formwork. The shuttering plates shall be cleaned and oiled before every repetition and shall be used only after obtaining approval of the

Engineer-in-charge. The number of repetitions allowed for plywood/ steel shuttering/ aluminium shall be at the discretion of Engineer-in-Charge depending upon the condition of shuttering surface after each use and the decision of Engineer-in- Charge in this regard shall be final and binding on the Contractor. No claim, whatsoever, on this account shall be admissible.

60. Records of Consumption of Cement, Steel & Other Materials

(i) For the purpose of keeping a record of cement and steel received at site and consumed in works, the Contractor shall maintain a register in the format approved by the Engineer-in-Charge, showing columns like quantity received and used in work and balance in hand etc. This register shall be signed daily by the Contractor's representative and the representative of the Engineer-in-Charge.

(ii) The register of cement, steel & other materials (if required) shall be kept at site in the safe custody of Engineer-in-charge during progress of the work. This provision will not, however, absolve the Contractor from the quality of the final product.

61. Borrow Areas

The Contractor shall make his own arrangements for borrow pits and borrow disposal areas including their approaches and space for movement of man, machinery, other equipment as required for carrying out the works. The Contractor shall be responsible for taking all safety measures, getting approval, making payment of royalties, charges etc. and nothing extra shall be paid to the Contractor on this account and unit rates quoted by the Contractor for various items of bill of quantities shall deemed to include the same.

62. Care of Works

From the commencement to the completion of works and handing over, the Contractor shall take full responsibility for care of all the works and in case of any damage/ loss to the works or to any part thereof or to any temporary works due to lack of precautions or due to negligence on the part of Contractor, the same shall be made good by the Contractor at no extra cost to Employer.

63. Coordination with Other Agencies

(i) Work shall be carried out in such a manner that the work of other agencies operating at the site is not hampered due to any action of the Contractor. Proper coordination with other agencies will be Contractor's responsibility. In case of any dispute, the decision of Engineer-in-charge shall be final and binding on the Contractor.

(ii) If and when required for the coordination of works with other agencies involved at site, the Contractor shall within the scope of work, re-route

and/or prepare approaches and working areas as may be necessary.

64. Setting Out of the Works

The Contractor shall be responsible for the true and proper setting out of the works and for the correctness of the position, levels, dimensions and alignment of all parts of the works. If any error appears or arises in the position, levels, dimensions or alignment of any part of the works at any time during the progress of works, the Contractor shall rectify such error to the satisfaction of Engineer-in-charge at his own expenses. The checking of any setting out or of any line or level by the Engineer-in-charge shall not in any way relieve the Contractor of his responsibility for the correctness thereof.

65. Site Clearance

(i) The Contractor shall ensure that the working site is kept clean and free of obstructions for easy access to job site and also from safety point of view. Before handing over the completed work to the Engineer-in-charge, the Contractor shall remove all temporary structures like the site offices, cement go-down, stores, labour hutments, scaffolding, rubbish, debris, left-over materials, tools and plants, equipment etc. and clean the site to the entire satisfaction of the Engineer-in-charge. If this is not done, the same may be got done by the Engineer-in-charge at the risk and cost of Contractor.

(ii) The Contractor shall clean all floors, remove cement/ lime/ paint drops and deposits, clean joinery, glass panes etc., touching all painter's works and carry out all other necessary items of works to make the premises clean and tidy before handing over the completed works, and the rates quoted by the Contractor shall be deemed to have included for the same.

(iii) If the work involves dismantling of any existing structure in whole or part, any RCC foundation and/ or paved area, care shall be taken to limit the dismantling up to the exact point and/ or lines as directed by the Engineer-in-Charge and any damage caused to the existing structure beyond the said line or point shall be repaired and restored to the original condition at the cost and risk of Contractor to the satisfaction of the Engineer-in-Charge, whose decision shall be final and binding upon the Contractor.

(iv) The Contractor shall not dispose of the ordinary earth excavated from within the boundary limits to any place outside such limits as the same may be required as per the discretion of the engineer in charge.

(v) Disposal of Debris/ Surplus Earth (including contaminated earth) shall be done by the Contractor at the designated disposal area(s) within the boundary limits as directed by engineer in charge. In case the Employer is not in a position to provide disposal area within the

boundary limits due to space constraints, the Contractor has to dispose the same outside the boundary limits as per the provisions of the contract. While disposing the Debris/ Surplus Earth (including contaminated Earth) outside the boundary limit, the Contractor has to ensure that the same are disposed off safely and fulfilling the local statutory regulations including but not limited to the guidelines/ stipulations of State Pollution Control Board.

66. General Guidelines during and before Erection

(i) The Contractor shall be responsible for organizing the lifting of the equipment in the proper sequence for orderly progress of the work and to ensure that access routes for erecting the other equipment are kept open. The installation of machines at different floor levels/ terrace and at basement shall be carried out by the Contractor with due care so as to guard against any damage to the existing finishes of the building and shall augment if required, necessary machineries/ lifting crane for installation purpose within the quoted prices.

(ii) Orientation of all foundations, elevations, lengths and disposition of anchor bolts and diameter of holes in the supports and saddles shall be checked by the Contractor well in advance of the installation. Rectifications, including chipping of foundations, shall be carried out only where necessary in consultation with the Engineer-in-Charge. If a structural member needs to be dismantled to facilitate the equipment erection, this shall be done by the Contractor after ensuring proper stability of the main structure in consultation with the Engineer-in-Charge. All such dismantled members shall be put back in position to the satisfaction of Engineer-in-Charge after the completion of the equipment erection.

(iii) During the performance of the work the Contractor shall at his own cost keep structures, materials and equipment adequately braced by guys, struts or other approved means which shall be supplied and installed by the Contractor as required till the installation work is satisfactorily completed. Such guys, shoring, bracing, strutting, planking supports etc. shall not interfere with the work of other agencies and shall not damage or cause distortion to other works executed by the Contractor or other agencies.

(iv) The Contractor shall duly comply with manufacturer(s) recommendations and detailed specifications for the installation of the various equipment and machines. Various tolerances required as marked on the drawings and/or in accordance with the specifications and/or instructions of the Engineer-in-charge shall be maintained. Verticality shall be verified with the Total-station and shall be maintained.

67. Security and Security Arrangements

(i) The Contractor shall provide adequate number of watch and ward personnel on round the clock basis with limited/restricted access to the site through gates manned by the Security personnel. The responsibility for safe custody of materials, works in progress, office of Employer/ Engineer-in-charge, building and all services etc. lies with the Contractor till handing over of the works to the Employer.

(ii) The Contractor shall ensure adequate illumination of the worksite(s) on a continuous basis to ensure safe working and to avoid pilferage/theft of materials lying at the work site. The rates quoted shall be deemed to be inclusive of this scope and the Contractor is not entitled for any additional payment in this regard. This is to be implemented from start of work till handing over of the works to the Employer.

(iii) The project site during execution shall be properly barricaded with Pre-coated sheets/ GI/ MS sheets of at least 3.0 meters and, as directed by the engineer in charge, with proper supports/ foundations in order to isolate the site from surroundings to avoid any disturbance and to avoid the entry of unauthorized personnel. Expenditure towards this activity is considered to be included in the quoted rates.

(iv) The Contractor shall make adequate security arrangement for protection of the work site and to prevent unauthorized entry to protect their materials and equipment in its own interest at no extra cost to the Employer.

(v) If at any place/site, entry is restricted by the Employer, the Contractor shall then arrange to obtain through the Engineer-in-Charge, well in advance, all necessary entry permits/ gate passes for his staff and labourer and entry and exit of his men and materials shall be subject to vigorous checking by the security staff. The Contractor shall not be eligible for any claim or extension of time whatsoever on this account.

(vi) The Contractor shall, at their own cost, construct their centralized store for safe keeping of the materials/equipment and for proper accounting of the material/ equipment being used in this project.

68. Works to remain Open to Inspection

(i) All works executed or under the course of execution in pursuance of this contract shall at all times be open to inspection of the Engineer-in-charge.

(ii) The work during its progress or after its completion may be inspected

by the third party appointed by the Employer. The compliance of observations/ improvements suggested by the inspecting officers shall be obligatory on the part of the Contractor at his cost.

69. Set-Off of Contractor's Liabilities

The Engineer-in-charge shall have the right to deduct or set off the expenses incurred or likely to be incurred by it in rectifying the defects and/or any claim under this agreement against the Contractor from any or against any amount payable to the Contractor under this agreement including security deposit, defect liability and proceeds of performance guarantee.

70. Possession Prior to Completion

The Engineer-in-charge shall have the right to take temporary possession of any completed or use partially completed work or part of the work. Such possession or use shall not be deemed to be any acceptance of any work not completed in accordance with the contract agreement. If such prior possession or use by Engineer-in-charge delays the progress of work, an equitable adjustment in the time of completion will be made and the contract agreement shall be deemed to be modified accordingly. The decision of Engineer-in-charge in such case shall be final binding and conclusive on the Contractor.

71. Employment of Personnel

(i) The Contractor shall employ his representatives and workmen after verifying their antecedents and loyalty. He shall ensure that no personnel of doubtful antecedents is associated with the works in any manner.

(ii) In case the Engineer-in-charge observes misconduct, negligence or incompetence etc. on the part of any representative, agent and workmen or employees etc. of the Contractor, the Engineer-in-charge shall be competent to instruct the Contractor to remove such engineer/ staff/ worker from the site without giving any reason to the Contractor and ask to provide suitable replacements. The decision of the Engineer-in-charge shall be final and binding on the Contractor. The Contractor shall not be allowed any compensation on this account.

72. Technical Staff for Work

(i) The Contractor shall employ adequate number of technical staff at his cost during the execution of this work depending upon the requirement of work. For this purpose, the numbers to be deployed, their qualification and experience, as decided by Engineer-in-charge, shall be final and binding on Contractor. The Contractor shall not be entitled for any extra payment in this regard.

(ii) The technical staff should be available at site to take instructions from

the Engineer-in-Charge.

(iii) The Contractor shall submit a site organizational chart and Resume, including details of experience of the Project-in-Charge and other staff proposed to be deployed by him. The technical team shall be deputed by the Contractor on the Project after getting approval from the Engineer-in-Charge.

(iv) In case the Contractor fails to employ the staff as aforesaid, he shall be liable to pay a reasonable amount as defined in Special conditions of contract for each month of default in the case of each person. The decision of the Engineer-in-charge as to number of Technical Staff to be adequate for the project and the period for which the desired strength of technical staff was not employed by the Contractor and as to the reasonableness of the amount to be deducted on this account shall be final and binding on the Contractor.

73. Valuable Articles Found at Site

All gold, silver and other minerals of any description and all precious stones, coins, treasure, relics, antiques and all other similar things which shall be found in, under or upon the site shall be the property of the Employer.

74. Labour Laws - to be Complied with by the Contractor

(i) The Contractor shall obtain a valid license under the Contract Labour (Regulation & Abolition) Act, 1970 and the Contract Labour Act (Regulation & Abolition) Central Rules 1971, as amended from time to time, and continue to have a valid license until the completion of the work including the defect liability period.

(ii) The Contractor shall also comply with the provisions of the building and other Construction Workers (Regulation of Employment & Conditions of Service) Act, 1996 and the Building and other Construction Workers Welfare Cess Act, 1996 and its amendments, if any.

(iii) The Contractor shall also comply with the provisions of the Inter-State Migrant Workmen (Regulation of Employment and Conditions of Service) Act, 1979.

(iv) The Contractor shall not engage any labour below the age of 18 years under any circumstances. The provisions under Child Labour (Prohibition and Regulation) Amendment Act, 2016 shall be strictly adhered to. In case of any non- compliance with the requirements of Labour laws, the Contractor shall be liable for all consequences or any penalty imposed in this regard.

74.1 Payment of Wages:

(i) The Contractor shall pay to the labour employed by him either directly

or through sub-Contractors, wages not less than fair wages as defined in the Contractor's Labour Regulations or as per the provisions of the Contract Labour (Regulation and Abolition) Act, 1970 and the Contract Labour (Regulation and Abolition) Central Rules, 1971, wherever applicable.

(ii) The Contractor shall, notwithstanding the provisions of any contract to the contrary, cause to be paid fair wages to labour indirectly engaged on the work, including any labour engaged by his sub-Contractors in connection with the said work, as if the labour had been employed by him.

(iii) The Contractor shall transfer/ credit the wages/ salary of all labourer/ workers preferably in their bank accounts. He shall be responsible for opening of bank accounts of all labourers/workers employed by the Contractor at the work site in this regard.

(iv) In respect of all labour, directly or indirectly employed in the works for performance of the Contractor's part of this contract, the Contractor shall comply with Labour Regulations in regard to payment of wages, wage period, maintenance of wage books or wage slips, publication of scale of wages and other terms of employment, inspection and submission of periodical returns and all other matters of the like nature or as per the provisions of the Contract Labour (Regulation and Abolition) Act, 1970, and the Contract Labour (Regulation and Abolition) Central Rules, 1971, wherever applicable..

(v) Under the provision of labour rules, the Contractor is bound to allow one-day rest for 6 days' continuous work and pay wages at the same rate as for duty to the labour directly or indirectly employed in the works. In the event of default, the Engineer-in-Charge shall have the right to deduct the sum or sums not paid on account of wages for weekly holidays to any labourer/ worker and pay the same to the persons entitled thereto from any money due to the Contractor.

(vi) The Contractor shall comply with the provisions of the Payment of Wages Act, 1936, Minimum Wages Act, 1948, Employees Liability Act, 1938, Workmen's Compensation Act, 1923, Industrial Disputes Act, 1947, Maternity Benefits Act, 1961, and the Contractor's Labour (Regulation and Abolition) Act 1970, or the modifications thereof or any other laws relating thereto and the rules made there under from time to time.

(vii) The Contractor shall indemnify and keep the Employer indemnified against payments to be made under and for the observance of the laws aforesaid and the Labour Regulations without prejudice to his right to claim indemnity from his sub-Contractors.

(viii) The laws aforesaid shall be deemed to be a part of this contract and any breach thereof shall be deemed to be a breach of this contract.

74.2 Labour Safety Provisions

(i) The Contractor shall be fully responsible to observe the labour safety provisions. The Contractor shall at his own cost take all precautions to ensure safety of life and property by providing necessary barriers, lights, watchmen etc. during the progress of work.

(ii) In case of all labour, directly or indirectly employed in work for the performance on the Contractor's part of this contract, the Contractor shall comply with all rules framed by Government from time to time for the protection of health and sanitary arrangements for workers.

74.3 Observance of Labour Laws

(i) The Contractor shall be fully responsible for observance of all labour laws, including the local laws and other laws, applicable in this matter and shall indemnify and keep the Employer indemnified against any adverse effect or non-observance of any such laws. The Contractor shall be liable to make payment to all its employees, workers and sub-Contractors and make compliance with labour laws. If the Employer or his authorized representative is held liable as "Principal Employer" to pay contributions etc. under legislation of Government or Court decision in respect of the employees of the Contractor, then the Contractor would be liable to reimburse the amount of such payments, contribution etc. to the Employer and/ or the same shall be deducted from the payments, security deposit etc. of the Contractor.

(ii) The Contractor shall submit proof of having a valid EPF registration certificate. He shall within 7 days of the close of every month, submit a statement to the Employer showing the recoveries of contributions in respect of each employee employed by or through him and shall furnish to Employer such information as the Employer is required to furnish under the provisions of para 36B of the EPF Scheme 1952 to the EPF authorities and other information required by the EPFO authorities from time to time. He shall also submit a copy of challan every month in token of proof of having deposited the subscription and contribution of workers engaged on the project, if demanded by the Engineer-in-Charge.

(iii) The Contractor shall also ensure the compliance of EPF Act, 1952 by the sub-Contractors, if any, engaged by the Contractor for the above said work.

(iv) The Contractor shall indemnify and keep the Employer harmless from and against all actions, suits, proceedings, losses, costs, damages, charges, claims and demands of every nature and description brought

or recovered against the Employer by reasons of any act or omission of the Contractor, his agents or employees in connection with complying the provisions of the Employees Provident Fund & Miscellaneous Provisions Act, 1952 as amended from time to time. All sums payable by way of compensation/ damages/ interest on the outstanding amounts payable by the Contractor shall be considered as reasonable and be payable by the Contractor to the Employer immediately and if the Contractor does not pay the amount immediately the same will be deducted from the security deposit or earnest money or any other amount available with the Employer or any money payable to the Contractor by the Employer.

74.4 Minimum Wages Act

The Contractor shall comply with all provisions of the Minimum Wages Act, 1948, Contract Labour Act (Regulation & Abolition) 1970, and rules framed thereunder and other labour laws/ local laws affecting the contract labour that may be brought into force from time to time.

74.5 Labour Records

(i) The Contractor shall submit a true statement of the following data by the 4th & 19th of every month to the Engineer-in-Charge, showing in respect of the second half of the preceding month and the first half of the current month respectively:

(a)	The number of the labourer employed by him (category-wise)	
(b)	Their working hours	
(c)	The wages paid to them	
(d)	The accidents that occurred during the said fortnight showing the circumstances under which they happened and the extent of damage and injury caused.	
(e)	The number of female workers who have been allowed Maternity Benefitsand the amount paid to them.	
(f)	Any other information required by Engineer-in-Charge	

(ii) In the event of the Contractor(s) committing a default or breach of any of the provisions of the Labour Regulations and Model Rules for the protection of health and sanitary arrangements for the workers as amended from time to time or furnishing any information or submitting or filing any statement under the provisions of the above Regulations and Rules which is materially incorrect, the compensation imposed, if any, by the concerned Department will be recoverable from his dues.

(iii) Should it appear to the Engineer-in-Charge that the Contractor is not properly observing and complying with the provisions of the Contractor's Labour Regulations and Model Rules and the provisions

of the Contract Labour (Regulation and Abolition) Act 1970, and the Contract Labour (R&A) Central Rules 1971, for the protection of health and sanitary arrangements for workers employed by the Contractor(s) (hereinafter referred as “the said Rules”) the Engineer-in-Charge shall be competent to give a notice in writing to the Contractor requiring that the said Rules be complied with the amenities prescribed therein and shall be provided to the workers within a reasonable time to be specified in the notice.

(iv) If the Contractor(s) fails to comply with the notice and observe the said rules within the period specified to provide the amenities to the workers as aforesaid, the Engineer-in-Charge shall have the power to provide the amenities hereinbefore mentioned at the cost of the Contractor(s). The Contractor(s) shall erect, make and maintain at his/their own expense and in accordance with the approved standards all necessary huts and sanitary arrangements required for his/their work-people on the site in connection with the execution of the works, and if the same shall not have been erected or constructed, according to approved standards, the Engineer-in-Charge shall have the power to give notice in writing to the Contractor(s) requiring that the said huts and sanitary arrangements be remodelled and/or reconstructed according to approved standards. If the Contractor(s) fail to remodel or reconstruct such huts and sanitary arrangements according to approved standards within the period specified in the notice, the Engineer-in-Charge shall have the power to remodel or reconstruct such huts and sanitary arrangements according to approved standards at the cost of the Contractor(s).

(v) The Contractor shall provide his labourers with a sufficient number of huts (hereinafter referred to as the camp) at his own cost of the following specifications on a suitable plot of land:

(a) The minimum height of each hut at the eave’s level shall be 2.10 m. (7 ft.) and the floor area to be provided will be at the rate of 2.70 sqm (30 Sqft.) for each member of the worker’s family staying with the labourer.

(b) The Contractor shall in addition construct suitable cooking places having a minimum area of 1.80m x 1.50m (6’x5') adjacent to the hut for each family.

(c) The Contractor shall also construct temporary latrines and urinals, and bathing & washing places for the use of labour/ workers, which shall be at the rate one such facility for each 25 users (men and women to be counted separately), and separate latrines and urinals to be provided for women. These facilities shall be suitably screened.

(vi) All the huts shall have walls of sun-dried or burnt-bricks laid in mud mortar or other suitable local materials as may be approved by the Engineer-in-Charge. In case of sun-dried bricks, the walls should be plastered with mud gobri on both sides. The floor may be kutcha but plastered with mud gobri and shall be at least 15 cm (6") above the surrounding ground. The roofs shall be laid with thatch, or any other materials as may be approved by the Engineer-in-Charge and the Contractor shall ensure that throughout the period of their occupation, the roofs remain water-tight.

(vii) The Contractor(s) shall provide each hut with proper ventilation.

(viii) All doors, windows, and ventilators shall be provided with suitable leaves for security purposes.

(ix) There shall be kept an open space of at least 7.2 m. between the rows of huts, which may be reduced to 6 m. according to the availability of site with the approval of the Engineer-in-Charge. Back-to-back construction will be allowed.

(x) Water Supply - The Contractor(s) shall provide adequate supply of water for the use of labourer. The provisions shall not be less than two gallons of pure and wholesome water per head per day for drinking purposes and three gallons of clean water per head per day for bathing and washing purposes. Where piped water supply is available, supply shall be at stand posts and where the supply is from wells or river, tanks which may be of metal or masonry, shall be provided. The Contractor(s) shall also at his/ their own cost make arrangements for laying pipelines for water supply to his/ their labour camp from the existing mains wherever available, and shall pay all fees and charges thereof.

(xi) Disposal of Excreta- The Contractor shall make necessary arrangements for the disposal of excreta from the latrines by trenching or incineration which shall be according to the requirements laid down by the Local Health Authorities. If trenching or incineration is not allowed, the Contractor shall make arrangements for the removal of the excreta through the Municipal Committee/authority and inform it about the number of labourers employed so that arrangements may be made by such Committee/authority for the removal of the excreta. All charges on this account shall be borne by the Contractor and paid directly by him to the Municipality/authority. The Contractor shall provide one sweeper for every eight seats in case of dry system.

(xii) Drainage - The Contractor shall provide efficient arrangements to drain away sullage water so as to keep the camp neat and tidy.

(xiii) The Contractor shall make necessary arrangements for keeping the

camp area sufficiently lighted to avoid accidents to the workers.

(xiv) Sanitation - The Contractor shall make arrangements for conservancy and sanitation in the labour camps according to the Public Health and Medical Authorities.

75. Recovery of Compensation Paid to Workmen

In every case in which by virtue of the provisions of the Workmen's Compensation Act, 1923, Employer is obliged to pay Compensation to a workman employed by the Contractor, in execution of the works, Engineer-in-Charge/Employer will recover from the Contractor, the amount of the Compensation so paid from any sum due to the Contractor whether under this contract or otherwise.

76. Ensuring Payment and Amenities to Workers if Contractor Fails

In every case in which by virtue of the provisions of the Contract Labour (Regulation and Abolition) Act, 1970, and of the Contract Labour (Regulation & Abolition) Central Rules 1971, Employer is obliged to pay any amount of wages to workman employed by the Contractor in execution of the works, or to incur any expenditure in providing welfare and health amenities required to be provided under the above said Act or under the Labour Regulations, or under the Rules framed by Government from time to time for the protection of health and sanitary arrangements for workers employed by Contractors, Employer will recover from the Contractor, the amount of wages so paid or the amount of expenditure so incurred from any sum due by Employer to the Contractor whether under this contract or otherwise.

77. Change in Firm's Constitution to be Intimated

Where the Contractor is a partnership firm, the prior approval in writing of the Engineer-in-Charge shall be obtained before any change is made in the constitution of the firm. Where the Contractor is an individual or a Hindu Undivided Family business concern such approval as aforesaid shall likewise be obtained before the Contractor enters into any partnership under agreement where the partnership firm would have the right to carry out the works hereby undertaken by the Contractor.

78. Indemnity Against Patent Rights

The Contractor shall fully indemnify the Employer and his authorized representatives from and against all claims and proceedings for or on account of any infringement of any patent rights, design, trademark or name or other protected rights in respect of any construction plant, machine, work or material used for in connection with the works or temporary works.

79. Law Covering the Contract

This contract shall be governed by the Indian laws for the time being in force.

80. Laws, Bye-Laws Relating to the Work

The Contractor shall strictly adhere by the provisions of law for the time being in force relating to works or any regulations and bylaws made by any local authority or any water & lighting agencies or any undertakings within the limits of the jurisdiction of which the work is proposed to be executed. The Contractor shall be bound to give to the authorities concerned such notices and take all approvals as may be provided in the law, regulations or bylaws as aforesaid, and to pay all fees and taxes payable to such authorities in respect thereof.

81. Jurisdiction

The agreement shall be executed at Gurugram on non-judicial stamp paper purchased in Gurugram and the courts at Gurugram alone will have jurisdiction to deal with matters arising there from, to the exclusion of all other courts.

82. Contractor Liable for Damages, Defects During Defect Liability Period

If the Contractor or his working people or servants shall break, deface, injure, or destroy any part of the building in which they may be working, or any building, road, road kerb, fence, enclosure, water pipe, cables, drains, electric or telephone post or wires, trees, grass or grassland, or cultivated ground contiguous to the premises on which the work or any part is being executed, or if any damage shall happen to the work while in progress, from any cause whatever or if any defect, shrinkage or other faults appear in the work, he shall, upon receipt of a notice in writing from Engineer-in-Charge on that behalf, make the same good at his own expense or in default, the Engineer-in-Charge shall cause the same to be made good by other workmen and deduct the expense from any sums that may be due or at any time thereafter may become due to the Contractor, or from his security deposit or the proceeds of sale thereof or of a sufficient portion thereof.

83. Resolution and Settlement of Disputes & Arbitration

Except where otherwise provided in the contract, all questions and disputes relating to the meaning of the specifications, design, drawings and instructions here-in before mentioned and as to the quality of workmanship or materials used on the work or as to any other question, claim, right, matter or thing whatsoever in any way arising out of or relating to the contract, designs, drawings, specifications, estimates, instructions, orders or these conditions or otherwise concerning the works or the execution or failure to execute the same, whether arising during the progress of the work or after the cancellation, termination, completion or abandonment thereof shall be dealt with as mentioned hereinafter:

(i) If the Contractor considers any work demanded of him to be outside the requirements of the contract, or disputes any drawings, record or decision

given in writing by the Engineer-in-Charge or if the Engineer-in-Charge considers any act or decision of the Contractor on any matter in connection with or arising out of the contract or carrying out of the work, to be unacceptable and is disputed, such party shall promptly within 15 days of the arising of the disputes, request as under.

(a) Dispute to be put up before the Employer for resolution.

(b) If the resolution fails, the matter be put up before the Conciliation Committee to be appointed by the Employer.

(c) If the conciliation also fails, the Contractor may request for the appointment of arbitrator under intimation to the other party.

(d) On receipt of such request, the Employer may appoint a sole arbitrator for adjudication of the dispute(s).

(ii) It is a term of this contract that the party invoking arbitration shall give a list of disputes with amounts claimed, if any, in respect of each such dispute along with the notice for appointment of arbitrator.

(iii) The parties shall share the Arbitration fees equally. In case there is no finalization of place of arbitration, the Arbitral Tribunal shall determine the place of arbitration. The venue of the arbitration shall be such place as may be fixed by the Arbitral Tribunal in consultation with both the parties. Failing any such agreement, the Arbitral Tribunal shall decide the venue.

84. Action where no Specifications are prescribed

In the case of any class of work for which there is no such specifications, such work shall be carried out in accordance with the latest CPWD, Bureau of Indian Standards Specifications. In case there are no such specifications mentioned in the CPWD/ Bureau of Indian Standards, the work shall be carried out as per DHBVN/HVPN/ manufacturers' specifications, if not available then as per State/ District Specifications. In case there are no such specifications as required above, the work shall be carried out in all respects in accordance with the instructions and requirements of the Engineer-in-Charge.

SECTION - 4

Forms and Formats

Format-I

Declaration by the bidder regarding bidding document

1. I/ We_____ (Name of the Bidder) hereby represent that we have gone through and understood the Bidding Documents (including but not limited to) the Commercial & Technical Requirements/ Specifications and that our Bid has been prepared accordingly in compliancewith the requirements stipulated in the said documents.

2. I/ We are submitting the **Table of Contents of Bidding Documents and amendments, if any**, as part of our Bid duly signed and stamped on each page in token of our acceptance. We arenot submitting the total Bidding Document as part of our Bid but undertake that said Bidding Document shall be deemed to form part of our Bid and in the event of award of work to us, all parts shall be considered for constitution of the Contract Agreement. Further, I/ We shall signand stamp each page of these documents as a token of Acceptance and as a part of the Contract in the event of award of Contract to us.

Signed for and on behalf of **<bidder's name>**
<Name of the Signatory>
Authorised Representative of the Bidder

Place: _____

Date: _____

Format-II

Letter of Waiver (on Letter-head of the Bidder)

1. I/ We _____<Bidder's Name> _____ hereby agree to fully comply with, abide by and accept without variation, deviation or reservation, all technical, commercial and other conditions whatsoever of the Bidding Document including Addenda (if any).

2. I/ We further hereby waive, withdraw and abandon any and all deviations, variations, objections or reservations whatsoever thereto here to-before set out, given or indicated in our offer, clarifications, correspondence, communications, or otherwise, with a view that the price bid submitted shall be treated to conform in all respects with the terms and conditions of the said Bidding Documents including all Addenda.

3. I/ We further hereby confirm that the prices quoted in the price bid are as per the provisions of the Bidding Document and there is no deviation in the price bid.

Signed for and on behalf of **<bidder's name>**
<Name of the Signatory>
Authorised Representative of the Bidder

Place: _____

Date: _____

Format-III

Undertaking for Non-engagement of Child Labour

I/ We hereby declare that:

(i) We are committed to elimination of child labour in all its forms.

(ii) Neither we nor any of our nominated sub-contractor(s) are engaging Child Labour in any of our work(s) in terms of the provisions of The Child Labour (Prohibition and Regulation) Act, 1986 and other applicable laws.

(iii) We, as well as our nominated sub-contractor(s), undertake to fully comply with provisions of The Child Labour (Prohibition and Regulation) Act, 1986 and otherapplicable labour laws in case the work is awarded to us.

(iv) It is understood that if I/We, either before award or during execution of Contract, commit a transgression through a violation of (ii) and (iii) above or in any other form, such as to put my/our reliability or credibility in question, the Employer is entitled to disqualify us from the Tender process or terminate the Contract, if already executed or exclude me/us from future contract award processes. The imposition and duration of the exclusion will be determined by the severity of transgression as determined by the Employer. Such exclusion may be for a period of 1 year to 3 years as per the procedure prescribed in the guidelines for holiday listing of the Employer.

(v) I/ We accept and undertake to respect and uphold the Employer's absolute right to resort to and impose such exclusion.

Signed for and on behalf of **<bidder's name>**
<Name of the Signatory>
Authorised Representative of the Bidder

Place: _____

Date: _____

Format - IV

Form for submission of Pre-bid queries by the bidders

Bidder's Queries Form						
Sr. No.	Reference Of Bidding Document				Bidder's Queries	Reply
	Part/ Section	Page Number	Clause Number	Subject		
1	2	3	4	5	6	7

**(Name & Signature of the Bidder
or his authorised representative)**

Place:
Dated:

Format-V

Application for Extension of Time

(To be submitted by the Contractor)

<table>
<tr><td>1.</td><td>Name of the Contractor</td><td></td></tr>
<tr><td>2.</td><td>Name of the work as given in the Agreement</td><td></td></tr>
<tr><td>3.</td><td>Agreement No.</td><td></td></tr>
<tr><td>4.</td><td>Estimated amount put to tender</td><td></td></tr>
<tr><td>5.</td><td>Date of commencement of work as per agreement</td><td></td></tr>
<tr><td>6.</td><td>Period allowed for completion of work as per agreement</td><td></td></tr>
<tr><td>7.</td><td>Date of completion stipulated as per agreement</td><td></td></tr>
<tr><td>8.</td><td>Period for which extension of time has been given previously:
Extension Granted earlier:
<table>
<tr><td>a)</td><td>First extension vide Engineer-in-charge letter No… ……date</td><td>Months</td><td>Days</td></tr>
<tr><td>b)</td><td>2nd extension vide Engineer-in-charge letter No……. date</td><td>Months</td><td>Days</td></tr>
</table></td><td></td></tr>
<tr><td>9.</td><td>Reasons for which extension have been previously given (copies of the previousapplication should be attached)</td><td></td></tr>
<tr><td>10.</td><td>Period for which extension is applied for:</td><td></td></tr>
<tr><td>11.</td><td>Hindrances on account of which extension is applied for with dates on which hindrances occurred, and the period for which these are likely to last -
a) Serial No.
b) Nature of hindrance
c) Date of Occurrence
d) Period for which it is likely to last
e) Period for which extension required for this particular hindrance.
f) Over lapping period, if any, with reference to item
g) Net extension applied for
h) Remarks, if any</td><td></td></tr>
<tr><td>12.</td><td>Total period for which extension is now applied for</td><td>Month/ days</td></tr>
</table>

	on account of hindrancesmentioned above	
13.	Extension of time required for extra work.	
14.	Details of extra work and on the amount involved: a) Total value of extra work b) Proportionate period of extension of time based on estimated amountput to tender on account of extra work.	
15.	Total extension of time required for 11 & 12	

Submitted in the office of the Engineer-in-Charge.

Signed for and on behalf of **<bidder's name>**
<Name of the Signatory>
Authorised Representative of the Bidder

Place: _____

Date: _____

Format - VI

Performa of Bank Guarantee in lieu of EMD

(Judicial Stamp paper of appropriate value as per stamp Act of respective state)

Employer/PMC,

1. In consideration of the Employer/PMC, having its Registered Office at _____(hereinafter called "Employer/ PMC" which expression shall, unless repugnant to the subject or context, include its successors and assigns) having issued Notice Inviting Tender No. _____ and M/s. _____ having its Registered Office at _____ (hereinafter called the "Tenderer") is to participate in the said tender for _____.

2. Whereas the Employer/PMC, as a special case, has agreed to accept an irrevocable and unconditional Tender Bond Guarantee for an amount of Rs. _____, valid up to _____ from the tenderer in lieu of Cash Deposit of Rs. _____ required to be made by the tenderer, as a condition precedent for participation in the said tender.

3. We the (hereinafter called the "BANK") having its Registered Office at _____ and branch office at _____, do hereby unconditionally and irrevocably undertake to pay to the Employer/PMC immediately on demand in writing, without any demur/ protest, any amount but not exceeding Rs. _____ and any such demand made by the Employer/PMC shall be conclusive and binding on us irrespective of any dispute or differences that may be raised by the tenderer. Any change in the constitution of the tenderer or the Bank shall not discharge our liability under this Guarantee.

4. We, the _____ Bank, lastly undertake not to revoke this guarantee during its currency without the prior consent of the Employer/PMC in writing and this guarantee shall remain valid up to _____ upon expiry of which, we shall be relieved of our liability under this guarantee thereafter.

For and on behalf of the Bank

Place:

Dated:

Witness.

1.

2.

Format-VII

Performa of Bank Guarantee (Performance)
(Judicial Stamp paper of appropriate value as per stamp Act of respective state)

Employer/PMC,

1. Whereas the Employer/ PMC, having its Registered Office at _____ (hereinafter called "Employer/PMC", which expression shall include its successors and assigns) having awarded a work order/contract / supply order No. dated (hereinafter called the contract) to M/s _____ (hereinafter called the contractor/ supplier) at a total price of Rs. _____ subject to the terms and conditions contained in the contract.

2. Whereas, the terms and conditions of the contract require the contractor to furnish a bank guarantee for Rs. _____(Rupees _____) being _____ % of the total value of the contract for proper execution and due fulfilment of the terms and conditions contained in the contract.

3. We, the Bank, (hereinafter called the "Bank") do hereby unconditionally and irrevocably undertake to pay to the Employer/PMC immediately on demand in writing and without protest/or demur all moneys payable by the contractor/ supplier to the Employer/PMC in connection with the execution/ supply of and performance of the works/ equipment, inclusive of any loss, damages, charges, expenses and costs caused to or suffered by or which would be caused to or suffered by Employer/PMC by reason of any breach by the contractor/ supplier of any of the terms and conditions contained in the contract as specified in the notice of demand made by Employer/PMC to the bank. Any such demand made by Employer/PMC on the bank shall be conclusive evidence of the amount due and payable.

4. This guarantee shall be a continuing guarantee and irrevocable for all claims of the Employer/PMC as specified above and shall be valid during the period specified for the performance of the contract.

5. We, the said bank, further agree with the Employer/PMC that the Employer/PMC shall have the fullest liberty, without our consent and without affecting in any manner our obligations and liabilities hereunder, to vary any of the terms and conditions of the said contract or to extend time for performance of the contract by the contractor from time to time or to postpone for any time or from time to time any of the powers exercisable by Employer/PMC against the contractor/supplier under the contract and forbear or enforce any of the terms and conditions relating to the said contract and we shall not be relieved from our liability by reason of any such variations or extension being granted to the contractor or for any forbearance, act or omission on the part of Employer/PMC or any indulgence by Employer/PMC to the contractor or by any such matter or thing, whatsoever, which under the law relating to the sureties would, but for this provision, have effect of so relieving us.

6. This guarantee/undertaking shall be in addition to any other guarantee or security whatsoever Employer/PMC may now or at any time have in relation to the performance of the works/ equipment and the Employer shall have full re-course to or enforce this security in performance to any other security or guarantee which the Employer/PMC may have or obtained and there shall be no forbearance on the part of the Contractor in enforcing or requiring enforcement of any other security which shall have the effect of releasing the Bank from its full liability. It shall not be necessary for Employer/PMC to proceed against the said contractor/supplier before proceeding against the Bank.

7. This guarantee/ undertaking shall not be determined or affected by the liquidationor winding up, dissolution or change of constitution or insolvency of the supplier/ contractor, but shall in all respects and for all purposes be binding and operative until payment of all moneys payable to Employer/PMC are paid by the Bank in terms thereof.

8. The Bank hereby waives all rights at any time inconsistent with the terms of this Guarantee and the obligations of the bank in terms hereof shall not be otherwise effected or suspended by reasons of any dispute or disputes having been raised by the supplier/ contractor (whether or not pending before any Arbitrator, Tribunal or Court) or any denial of liability by the supplier/ contractor stopping or preventing or purporting to stop or prevent any payment by the Bank to Employer/PMC in terms hereof.

9. We, the said Bank, lastly undertake not to revoke this guarantee during its currency except with the previous consent of Employer/PMC in writing, upon expiry of which we shall be relieved from all liabilities under this guarantee thereafter.

10. Signed this _____ day of _____ at _____.

For and on behalf of the Bank

(Signature, name and Designation of the Signatory

along with the Bank Seal)

WITNESS.

1.

2.

Format - VIII

Performa of Bank Guarantee
(For mobilization advance)

(Judicial Stamp paper of appropriate value as per stamp Act of the respective state)

Employer/PMC,

1. In consideration of the Employer/PMC, having its Registered Office at _____ (hereinafter called "Employer/PMC", which expression shall unless repugnant to the subject or context include its successor and assigns) having agreed under the terms and conditions of Contract No. _____ dated _____made between _____ and the Employer/PMC in connection with _____ (hereinafter called "the said contract") to make at the request of the Contractor a Mobilization Advance of Rs. _____ for utilizing it for the purpose of the Contract on his furnishing a guarantee acceptable to Employer/PMC, we the _____ Bank Ltd. (hereinafter referred to the "the said Bank") and having our registered office at _____ do hereby guarantee the due recovery by Employer/PMC of the said advance as provided according to the terms and conditions of the Contract.

2. We, the said Bank, do hereby undertake to pay the amount due and payable under this Guarantee without any demur, merely on a demand from the Employer/PMC stating that the amount claimed is due to the Employer/PMC under the said Agreement. Any such demand made on the _____ shall be conclusive as regards the amount due and payable by the _____ under this guarantee and _____ agree that the liability of the _____to pay the amount so demanded to the Employer/PMC, shall be absolute and unconditional notwithstanding any dispute or disputes raised by the Contractor and notwithstanding any legal proceeding(s) pending in any Court or Tribunal relating thereto. However, our liability under this Guarantee shall be restricted to an amount not exceeding Rs. _____, which shall be valid up to _____.

3. We, _____ Bank further agree that Employer/PMC shall be the sole judge of and as to whether the amount claimed has fallen due to the Employer/PMC under the said agreement or whether the said Contractor has not utilized the said advance or any part thereof for the purpose of the Contract and the extent of loss or damage caused to or suffered by Employer/PMC on account of the said advance together with interest not being recovered in full and the decision of Employer/PMC that the amount has fallen due from contractor or the said Contractor has not utilized the said advance or any part thereto for the purpose of the contract and as to the amount or amounts of loss or damage caused to or suffered by Employer/PMC shall be final and binding on us.

4. We, the said Bank, further agree that the Guarantee herein contained shall remain in full force and effect till the said advance has been fully recovered and its claims satisfied or discharged and till the Employer/PMC certify that the said advance has been fully recovered from the said contractor and, accordingly, discharges this Guarantee subject, however, that Employer/PMC shall have no claims under this Guarantee after the said advance has been fully recovered, unless a notice of the claims under this Guarantee has been served on the bank before the expiry of the said Bank Guarantee in which case the same shall be enforceable against the Bank.

5. The Employer/PMC shall have the fullest liberty without affecting in any way the liability of the Bank under this Guarantee or indemnity from time to time to vary any of the terms and conditions of the said Contract or the advance or to extend time of performance by the said Contractor or to postpone for any time and from time to time of the powers exercisable by it against the said Contractor and either to enforce or forbear from enforcing any of terms and conditions governing the said Contract or the advance or securities available to the Employer/PMC and the said Bank shall not be released from its liability under these presents by any exercise by Employer/PMC of the liberty with reference to the matters aforesaid or by reasons of time being given to the said Contractor or any other forbearance, act or omission on the part of Employer/PMC or any indulgence by Employer/PMC to the said Contractor or of any other matter or thing whatsoever which under sureties the law relating to would but for this provision have the effect of so releasing the bank from its such liability.

6. It shall not be necessary for Employer/PMC to proceed against the Contractor before proceeding against the Bank and the Guarantee herein contained shall be enforceable against the Bank notwithstanding any security which Employer/PMC may have obtained or obtain from the Contractor or shall at the time when proceedings are taken against the Bank hereunder be outstanding or unrealized.

7. We, the said Bank, lastly undertake not to revoke this Guarantee during its currency except with the previous consent of Employer/PMC in writing and agree that any change in the constitution of the said Contractor or the said Bank shall not discharge our liability hereunder.

8. Signed this ____ day of _____ at _____.

For and on behalf of the Bank

(Signature, name and Designation of the Signatory
along with the Bank Seal)

WITNESS.

1._____ 2_____

Format – IX

Performa for Bank Guarantee
(In lieu of Security Deposit)
(Judicial Stamp paper of appropriate value as per Stamp Act of respective state)

Employer/PMC,

A. In consideration of the Employer/PMC, having its Registered Office at _____ (hereinafter called) "Employer/PMC"), which expression shall include its successors and assigns, having awarded to M/s _____ (hereinafter called "the Supplier/ Contractor"), which expression shall wherever the subject or context so permits includes its successors and assigns, a Contract in terms inter-alia of Employer/PMC's letter No. _____ dated _____ and the Contract/ Purchase Conditions of the Employer/ PMC with the condition of the Contractor/ Supplier furnishing a Bank Guarantee to secure the performance of Contractor's/ Supplier's obligations and /or discharge of the contractor's/ supplier's liability under and/or in connection with the said supply/ contract up to a sum of Rs. _____ (Rupees _____ only).

B. We, _____, ((hereinafter called "the Bank"), which expression shall include its successors and assigns, hereby undertake and guarantee payment to Employer/ PMC forthwith on the same day on demand in writing and without any protest or demur of any and all moneys payable by the supplier/contractor to the Employer/PMC under, in respect or in connection with the said contract inclusive of all the losses, damages, costs, charges and expenses and other moneys payable in respect of the above as specified in any notice of demand made by Employer/PMC to the Bank with reference to this guarantee up to and aggregate limit of Rs. _____ (Rupees _____only) and the Bank hereby agree with Employer/PMC that:

1. This Guarantee shall be a continuing guarantee and shall remain valid and irrevocable for all claims of the Employer/PMC and liabilities of Supplier/ Contractor arising up to and until midnight of _____ ;

2. This Guarantee shall be in addition to any other Guarantee or Security whatsoever that Employer/PMC now or at any time have in relation to the Supplier's/ Contractor's obligations/ liabilities under and/or in connection with the said supply/contract, and the Employer/PMC shall have full authority to take recourse or to enforce this Security in preference to any other Guarantee or Security which the Employer/PMC may have or obtain and no forbearance on the part of Employer/PMC in enforcing or requiring enforcement of any other Security shall have the effect of releasing the Bank from its liability

hereunder;

3. The Employer/PMC shall be at liberty without reference to the Bank and without affecting the full liability of the Bank hereunder to take any other security in respect of the Supplier's/Contractor's obligations and/ or liabilities under or in connection with the said supply/contract or to grant time and / or indulgence to the supplier/ contractor or to increase or otherwise vary the prices or the total contract value or to release or to forbear from enforcement of all or any of the conditions under the said supply/ contract and/or the remedies of the Employer/PMC under any other security/securities now or hereafter held by Employer/PMC and no such dealings, increase(s) or other indulgence(s) or arrangement(s) with the supplier/ contractor or releasing or forbearance whatsoever shall have the effect of releasing the Bank from its full liability to Employer/PMC hereunder or prejudicing rights of Employer/ PMC against the Bank;

4. This Guarantee shall not be determined or affected by the liquidation or winding up, dissolution or change of constitution or insolvency of the supplier/ contractor but shall in all respects and for all purposes be binding and operative until payment of all moneys payable to the Employer/PMC in terms thereof;

5. The Bank hereby waives all rights at any time inconsistent with the terms of this Guarantee and the obligations of the Bank in terms hereof shall not be otherwise affected or suspended by reason of any dispute or disputes having been raised by the supplier/ contractor (whether or not pending before any Arbitrator, Tribunal or Court) or any denial or liability by the supplier/ contractor stopping/ preventing or purporting to stop or prevent any payment by the Bank to Employer/PMC in terms thereof;

6. The amount stated in any notice of demand addressed by Employer/PMC to the Guarantor as liable to be paid to the Employer/PMC by the supplier/contractor or as suffered or incurred by Employer/PMC on account of any losses or damages, costs, charges and/or expenses shall as between the Bank and Employer/PMC be conclusive of the amount so liable to be paid to the Employer/PMC or suffered or incurred by Employer/PMC as the case may be and payable by the Guarantor to the Employer/PMC in terms hereof subject to a maximum of Rs _____ (Rupees _____ only);

7. Unless demand or claim under this Guarantee is made on the Guarantor in writing within three months from the date of expiry of the Guarantee i.e. up to the Guarantor shall be discharged from all liabilities under this Guarantee there under;

8. Notwithstanding anything contained hereinbefore, our liability under this guarantee is restricted to Rs. _____ (Rupees _____ only). This guarantee will expire on _____. Any claim under this Guarantee must be received by us within three months from the date of expiry.

9. Signed this _____ day of _____ at _____.

For and on behalf of the Bank

(Signature, name and Designation of the Signatory
along with the Bank Seal)

WITNESS.
1.

2.

Format - X

Form for Guarantee Bond for anti-termite Treatment

THIS AGREEMENT is made this _____ day of _____ at _____ between:

M/s _____ (hereinafter called the guarantor) of the one part;

and

M/s Employer/ PMC, hereinafter called the Employer/PMC of the other part, which expression shall include its successors or assigns, more particularly the Resident Welfare Association (RWA) of the said complex.

This agreement witnesses as under:

1. Whereas this agreement is supplementary to the contract hereinafter called the Main Contract dated _____ between the guarantor of the one part and the Employer/PMC of the other part whereby the contractor, inter-alia, is understood to render the buildings and structures in the said contract recited, completed, termite proof.
2. And whereas the guarantor agreed to furnish a guarantee to the effect that the said structure will remain termite proof for TEN YEARS to be so reckoned from the date of issue of Completion Certificate of the Contract by the Employer/ PMC;
3. During this period of guarantee, the guarantor shall make good all defects and for that matter shall replace at his risk and cost such wooden member(s) as may be damaged by termite and in case of any other defect being found, he shall render the building termite- proof at his cost to the satisfaction of the Engineer-in-charge and shall commence the works of such rectification within seven days from date of issuing notice from the Engineer-in-Charge, and later the manager concerned from the concerned RWA, calling upon him to rectify the defects falling which the work shall be got done by Employer/PMC/ Employer by some other contractor at the guarantor's cost and risk and in the latter case the decision of the Engineer-in-chargeas to the cost recoverable from the guarantor shall be final and binding.
4. That if the Guarantor fails to execute the Anti-Termite treatment or commits breaches hereunder, then the Guarantor will indemnify Employer/PMC against all losses damages, costs, expenses or otherwise which may be incurred by him by reasons of any default on the part of the guarantor in performance and observance of this supplemental Agreement. As to the amount of loss and or damage and/or cost incurred by Employer/PMC, decision of the Engineer-in-charge will be final and binding on the parties.

5. In witness where of these presents have been executed by the Guarantor _____ and by_____for and on behalf of Employer/PMC on the day of month and year first above written.

For and on Behalf of the Guarantor	**For and on behalf of the Employer/ PMC**
<Signature>	<Signature>
<Name and Address of the Authorised Signatory>	<Name and Address of the Authorised Signatory>
Witnesses	
1.	1.

Format - XI

Draft for Guarantee to be executed by the Contractor for removal of defects after completion in respect of Water-proofing works

This agreement made on this _____ day of _____, Two thousand Twenty Two between _____ (hereinafter called Guarantor of the one Part) and the Employer/ PMC (hereinafter called the Execution Agency of the other Part).

A. WHEREAS this agreement is supplementary to a contract (hereinafter called the Contract) dated _____ made between the GUARANTOR of the ONE Part and the Employer/ PMC of the Other Part, whereby the Contractor, inter-alia, undertook to render the buildings and structures in the said contract recited completely water and leak proof.

B. AND WHEREAS the Guarantor agreed to give a guarantee to the effect that the said structures will remain water and leak proof for a period of Ten years from the date of issue of Completion Certificate by the Employer.

NOW, THE GUARANTOR hereby guarantees that the water-proofing treatment given by himwill render the structures completely leak-proof and the minimum life of such water-proofing treatment shall be Ten years to be reckoned from the date of issue of Completion Certificate of the building/ project by the Employer/PMC as prescribed in the contract.

Provided that the Guarantor will not be responsible for leakage caused by earthquake or structural defects or misuse of roof or alteration and for such purpose.

(a) Misuse of roof shall mean any operation, which will damage water-proofing treatment, like chopping of fire wood and things of the same nature which might cause damage to the roof.

(b) Alternation shall mean construction of an additional storey or a part of the roof or construction adjoining to existing roof whereby proofing treatment is removed in parts.

(c) The decision of the Engineer-in-Charge with regard to cause of leakage shall be final.

That this Agreement, inter alia, provides for the following:

1. During this period of guarantee, the Guarantor shall make good all defects, in case of any defect being found, and render the building completely water-proof to the satisfaction of the Engineer-in-Charge at his cost. The Guarantor shall commence the work for such rectification within seven days from the date of issue of notice by the Engineer-in-Charge calling upon him to rectify the defects, failing which the work shall be got done by the Employer/ PMC from some other Contractor at the guarantor's cost and risk. The decision of

Engineer- in-Charge as to the cost, payable by the Guarantor, shall be final and binding.

2. That if the Guarantor fails to execute the waterproofing or commits any breach thereunder, then the Guarantor will indemnify the principal and his successors against all laws, damage, cost, expense or otherwise which may be incurred by him by reason of any default on the part of the GUARANTOR in performance and observance of this supplementary agreement. As to the amount of loss and/or damage and/or cost incurred by the Employer/PMC, the decision of the Engineer-in-Charge will be final and binding on the parties.

3. IN WITNESS WHEREOF these presents have been executed by the Obligator _____ and by _____ and for and on behalf of the Employer/PMC on the day, month and year first above written.

For and on Behalf of the Guarantor	**For and on behalf of the Employer/ PMC**
<Signature>	<Signature>
<Name and Address of the Authorised Signatory>	<Name and Address of the Authorised Signatory>
Witnesses	**Witnesses**
1.	1.
2.	2.

Format-XII

Performa for Indenture for Secured Advance or Credit

THIS INDENTURE made this _____day of _____

Between

The Contractor, which expression shall where the Context as admits or implies be deemed to include his executor/ administrators and assigns of the one part;

And

The Employer/PMC, having its Registered Office at _____ (represented trough the Engineer-in-Charge), which expression shall where the context so admits or implies be deemed to include its successors and assign of the other part;

Whereas by an agreement dated (hereinafter called the said agreement), the Contractor has agreed to construct _____ ;

And whereas the Contractor has applied to the Engineer-in-Charge that he may be or be given credit for materials brought by him to the site of the work subject to the said agreement for use in construction of the work.

NOW. THIS INDENTURE Witnessed that in pursuance of the said agreement and in consideration of the sum of Rs. _____ (Rupees _____ only) paid to the contractor by the Engineer-in-Charge, the receipt whereof the Contractor hereby acknowledges and of such advance or credit (if any) as may be made to him as aforesaid, the Contractor hereby covenants and agrees with the Engineer-in-Charge and declares as follows:

1. That all sums given as advance or credit by the Engineer-in-Charge to the Contractor as aforesaid shall be employed by the Constructor in or toward the execution of the said works and for no other purpose whatsoever.
2. That the material for which the advance or credit is given are offered to and accepted by the Engineer-in-Charge as security and are absolutely the Contractor's own property and free from encumbrances of any kind. The Contractor will not make any application for or receive further advance or credit on the security or material which are not absolutely his own property and free from encumbrances of any kind and the Contractor shall indemnify the Engineer-in-Charge against any claims to any material in respect of which advance or credit has been made to him as aforesaid.
3. That the said material and all other material on the security of which any further advance or advances or credit may be given as aforesaid (hereinafter called the said materials) shall be used by the Contractor solely in the execution of the said works in accordance with the directions of the Engineer-in-Charge and in terms of said agreement.

4. That the Contractor shall make all necessary and adequate arrangements for the proper safe custody and protection at his own cost against all risks qua thesaid material and, that until used in the construction as aforesaid, the material shall remain at the site of the said works in the Contractor's custody and on his responsibility and shall at all times be open to inspection by the Engineer-in-Charge. In theevent of the materials or any part thereof being stolen, destroyed or damagedor getting deteriorated, the Contractor will replace the same with other materials of like quality or repair and make good the same as required by the Engineer-in-Charge.

5. That said material shall not on any account be removed from the site of work expect with the written permission of the Engineer-in-Charge.

6. That the advance shall be repayable in full when or before the Contractor receives payment from the Engineer-in-Charge of the price payable to him for the said work under the terms and provisions of the said agreement. Provided that if any intermediate payments are made to the Contractor on account of work done then on the occasion of each payment, the Engineer-in-Charge will be at liberty to make a recovery from the Contractor's bill from such payments by deducting therefrom the value of the said materials than actually used in the construction and in respect of which recovery has not been made previously. The value of this purpose being determined in respect of each description of materials at the rates at which the amounts of the advance as made under these presents was calculated.

7. That if the Contractor shall at any time make any default in the performance of observance in respect of any of the terms and provisions of the said agreement or of that provisions the total amount of the advance or advances that may still be owing to the Engineer-in-Charge, shall immediately on the happening of such default be repayable by the Contractor to the Engineer-in-Charge together with interest thereon at 12% p.a. from the date of respective dated to such advance or advances to the date of payment and with all costs. Damages and expenses incurred by the Engineer-in-Charge in or for recovery hereof or the Contractor hereby covenants and agrees with The Engineer to repay and pay the same respective to him accordingly.

8. That the Contractor hereby charges all the said materials with the repayment to The Engineer of all sums advances or credit as aforesaid and all costs. Charges, damages and expenses payable under these presents PROVIDED ALWAYS it is hereby agreed and declared that notwithstanding anything in the said agreement and without prejudice to the powers contained therein if and wherever the covenant for payment and repayment herein before contained shall be become enforceable and the money owing shall not be paid in accordance therewith. The Engineer may at any time thereafter adopt all or any of the following courses he may deem best:

(i) Seize the utilize the said material or any part thereof in the completion of the said works in accordance with the provision in that behalf contained in the said agreement debating the Contractor with the actual cost of effecting such completion and the amount due in respect of advance or credit under these presents and crediting the Contractor with value of work done as if he has carried it out in accordance with the said agreement and the rates thereby provided if the balance is against the Contractor is to pay the same to the engineer on demand.

(ii) Remove and sell by public action the seized materials or any part thereof and out of the money arising from the sale repay the engineer under these presents and pay over the surplus (if any) to the Contractor.

(iii) Deduct all or any part of the moneys owing from any sums due to the contractor under said agreement.

9. Expect in the event of such default on the part of contractor as aforesaid, interest or the said advance shall not be payable.

10. That in the event of conflict between the provisions of these presents and the said agreements, the provision of these presents shall prevail and in the event of any dispute or difference arising over the construction or effect of these presents, the settlement of which has not been hereinbefore expressly provided for the same shall so far as is lawful be subject to jurisdiction of Delhi courts only.

IN WITNESS whereof the said the engineer and the contractor hereunto set their respective hands and seals the day year first above written.

Signed Sealed and delivered by Contractor

Note:-As described in the GCC clause 5 regarding secured advance, the interest on secured advance will be charged as mentioned in form no 12, Section-4, Sr No 7. for the delay in incorporation of material by the contractor (For which secured advance is paid to the contractor) in work.

Format - XIII

Undertaking by the Contractor regarding Compliance with the provisions of Contract Labour (Regulation & Abolition) Act & Rules, EPF and ESI Obligations

(To be submitted along with each RA/Final Bill)

I, S/o Sh. _____, authorised representative of M/s _____ <the Contractor> _____ do hereby declare and undertake as under:

(i) That in the capacity of independent Contractor for M/s _____ <Employer/PMC> _____ at _____, I and the sub-contractor engaged by me for the above said work, if any, have complied with the provisions of Contract Labour (Regulation & Abolition) Act, 1970 by holding a valid license under the Act andRules thereto. I have paid the wages **for the month of** _____.

(ii) These wages are not less than the minimum rates applicable to all the employees and no other dues are payable to any employee.

(iii) That I and the sub-contractor engaged by me for the above said work, if any, have covered all the eligible employees under the Employees Provident Funds and Miscellaneous Provisions Act, 1952 and the Employees State Insurance Act, 1948 and deposited the Contributions for the months up to _____ and, as such, no amount towards EPF/ESI contributions, whatsoever is payable, is pending.

(iv) I further declare and undertake that in case any liability pertaining to my employees or towards employees of the sub-contractor engaged by me for the above said work, if any, arises in future, I shall be fully responsible for all consequences. In case any liability is discharged by Employer/PMC due to my/ my sub-contractor's lapse, I undertake to reimburse the same or the Employer/PMC is authorised to deduct the same from my dues at this Project or at any other Project.

Authorised Signatory

(Name & Seal of Company)

Date:-_____

Witness

1. –

2. –

Format - XIV
Approval of Sub-Contractor

1.	Name of Main Contractor	
2.	Name of Work, Location	
3.	Name of Proposed Sub- Contractor	
4.	Scope of Work Proposed to be Sub-contracted (Brief)	
5.	Estimated Value of the Proposed Work to be Sub-Contracted (INR)	
6.	Qualifying Criteria for Sub-Contractor	
6.1	Similar Work Experience	
(i)	1 (One) Contract of 50% or 2 (Two) Contracts of 30% Each of Estimated Value of Proposed Work to be Sub-Contracted	
(ii)	Annual Turnover (Not Less Than 100% of Estimated Value of the Proposed Work to be Sub-Contracted)	
(iii)	Positive Net Worth as per latest Annual Balance Sheet/ Profit & Loss Account	
7	Experience and Financial Details of Proposed Sub-Contractor	
(i)	Contract Value of Similar Work Executed (as Evidenced by Work Order & Completion Certificate) during the Last 7 Years	
(ii)	Maximum Annual Turnover During Last 3 (Three) Years (as Evidenced by Balance Sheet)	
(iii)	Net Worth as per latest Annual Balance Sheet/ Profit & Loss Account	
8	Criteria for Qualification of Sub-Contractor	
(i)	Sl. No. 7(i) > 6(i)	YES / NO
(ii)	Sl. No. 7(ii) > 6(ii)	YES / NO
(iii)	Sl. No. 7(iii)>0	YES / NO

9.	Based On Above Mentioned Information, We M/S_____ (Name Of Main Contractor) Propose M/S_____ (Name Of Proposed Sub-Contractor) As Our Sub-Contractor For The Above Mentioned Works. We Understand That Notwithstanding Above Approval, We Shall Remain Fully Responsible For The Performance Of The Said Sub-Contractor And Any Failure Of The Sub-Contractor Shall Not Absolve/Relieve Us Of Our Responsibility To Complete The Works As Per The Terms And Condition Of The Contract.

Note: Contractor to fill all the details in the above performa. Further Contractor shall also fill-in the details at Sl.No.5 above based on the estimated value of the proposed work to be subcontracted.

(STAMP & SIGNATURE OF CONTRACTOR)

SECTION - 5

Special Conditions of Contract

1. General

The documents forming the Contract are to be taken as mutually explanatory of one another. If there is an ambiguity or discrepancy in the documents, the Employer shall issue necessary clarifications or instructions to the Contractor, and the order of precedence of the documents shall be as follows:

I. Contract Agreement

II. Letter of Award

III. Bill of Quantities

IV. GFC Drawings

V. Technical Specifications

VI. Special Conditions of Contract

VII. Instructions to Tenderers

VIII. General Conditions of Contract

IX. Other

2. Scope of Work

The scope of work covered in this contract will be as described in **Annexure - I to SCC.**

3. Scope of Supply

The scope of supply covered in this contract will be as described in **Annexure –II to SCC**.

4. Time Schedule

4.1. The work shall be executed strictly as per the Time Schedule mentioned in **Annexure - III to SCC**. The period of completion given includes the time required for mobilization & demobilization as well as testing, commissioning, rectifications, if any, re-testing, and completion in all respects as per the directions of the Engineer-in-Charge.

5. Statutory Approvals

5.1. Obtaining statutory approvals (for both temporary and permanent works) during construction and upon completion, as required, and as defined in Contractor's Scope of Work in **Annexure-I to SCC**, shall be the responsibility of the Contractor. Contractor shall arrange the inspection of the works by the authorities and necessary co-ordination and liaison work in this respect.

The statutory approvals/ permissions (but not limited to the following) are required to be arranged by the contractor for the execution of works. In case the permissions/ approvals are arranged by the contractor in the name of employer, the fees paid for obtaining such statutory approvals shall be

reimbursed as per actuals by the employer on production of documentary evidence .

(a) Permission for excavation
(b) Labour registration
(c) Temporary water, sewer and electricity connections.
(d) NOC from electrical inspectorate.
(e) NOC from Labour department.
(f) Any other approvals from the statutory authorities that the Contractor may need to obtain in connection with his scope of work.

5.2 However, in addition to the above, the contractor shall render all possible support for submission and approval of various other statutory approvals required to be taken by the PMC/ Employer, including the following:

(a) Application for obtaining the Occupation Certificate and to support checking by the authorities that the Building has been constructed in conformity with the sanctioned building plans;

(b) Obtaining the Fire NOC;

(c) Obtaining Permanent Water, Sewer and Electricity connections from the authorities;

(d) Any other approval arising from the execution of works that may be required.

6. Site Organization and Construction Equipment

6.1. Site Organisation:

(i) The contractor stands liable and responsible to provide adequately qualified, skilled, semi-skilled, and unskilled personnel on the work. The contractor shall deploy the minimum key Construction Personnel as specified in **Annexure-IV to SCC** and augment the same from time to time as decided by the Engineer-in-Charge depending upon the site requirements & the exigencies of work so as to complete all works within the contracted time schedule and the same shall be done without any additional cost to the Employer. In case the contractor fails to deploy the minimum required key personal, the recovery shall be effected as per details in **Annexure –IV.**

6.2. Construction Equipment

To complete the work as per specifications and within the time schedule, the Contractor shall progressively deploy **Equipment & Machinery** as specified in **Annexure-V to SCC** as and when required and augment the same as decided and directed by the Engineer-in-Charge depending on the exigencies of the work so as to complete all works within the contracted time schedule and without any additional cost to the Employer. The Employer shall not supply any equipment, except those mentioned in Clause 8 below.

7. Materials to be supplied by the Employer

In continuation to Clause 31 of the GCC, the issue of materials lying at Site and listed in **Annexure-VI to SCC** shall be supplied by the Employer to the contractor against Payment as per rates depicted in **Annexure-VI** which includes GST. The contractor shall be responsible for the transportation, up-keep and watch and ward of the material after issue.

8. Tools and Equipment Lying at Site.

(i) The Employer shall not supply any Tools and Equipment lying at site as 'free issue' material.

(ii) However, for the purpose of faster mobilization and timely project execution, if opted by the contractor, the tools and equipment already lying at site under Employer's Possession, will be offered to the Contractor for work execution at the rates as mentioned in **Annexure-VII of SCC.** The amount based on the mentioned Rates will be recovered by the Employer from the RA/ final bills of the contractor on a pro rata basis.

(iii) It may be noted that the repair, operation and maintenance of the equipment so made available would be the responsibility of the contractor.

(iv) The quality of work shall be as per bid document irrespective of the Employer's offered equipment supply. The responsibility of the quality of work that has been executed using the corresponding equipment solely lies with the Contractor, without any time and cost implications to the Employer.

(v) On completion of the work, the contractor shall handover the possession of tools and equipment to the Engineer-in-Charge in working condition. In case of any damage to the tools and equipment, contractor shall repair the same before handing over to the Employer/ his representative.

9. Health Safety and Environment (HSE) Management

In continuation with Clause 34 of the GCC, the HSE management at site shall be carried out in strict compliance to **Annexure - VIII to SCC**.

10. Office Accommodation to be arranged by the Contractor for the Engineer-in-Charge/ PMC/ TPIA/ Employer

(i) The Contractor to establish/ provide an Office at site, furnished with basic furniture, for the PMC/ TPIA/ Employer's personnel to the satisfaction of Engineer-in-charge. Minimum capacity of the number of persons and area shall be as per site requirements**.**

(ii) The contractor shall maintain the aforesaid facilities for various site activities operational during the currency of the contract and till the contractual completion date including extensions (if any). Operation and maintenance cost on the above facilities shall be completely borne by the contractor.

11. Maintenance of the Works

(i) The maintenance cost of the works executed shall be borne by the Employer after the offer of possession to the homebuyers or 6 months from the date of issue of the Completion Certificate, whichever is later.

(ii) Contractor shall prepare and submit all Operation & Maintenance manuals as per “Good Engineering Practices” after completion of work, which shall be got approved from the Engineer- in-charge.

12. Additional Special conditions of contract (Annexure-IX)

Additional special project specific conditions are given in the **Annexure-IX.**

Annexure - I
(Special Conditions of Contract)

Scope of Work

1. The scope of work includes balance works, works as per BOQ and ancillary works to complete the system and make it functional.
2. The quantities of various items as entered in the “BILL OF QUANTITIES” are approximate and may vary depending upon the actual requirement of the work. The contractor shall be bound to carry out and complete the stipulated work irrespective of the variation in individual items specified in the bill of quantities. The variation of quantities will be governed as per Section 3, clause No. 6.0 of the contract
3. The approximate balance works are as under for main components of work:

	Name	Concourse Project
	Structure works	As per BOQ
	Internal finishing works & flooring	As per BOQ
	External finishing works	As per BOQ
	Electrical works	As per BOQ
	Plumbing & sanitary works	As per BOQ
	Common infrastructure	As per BOQ
	External works And Other contingent work	As per BOQ

4. These quantities given above are approximate only. These may vary at site during execution of work for completing the work making it functional.

Annexure - II
(Special Condition of Contract)

Scope of Supply

1. GENERAL

Work under this contract is intended to cover the External Electrical and Substation Works at **VISTA, GURGAON, HARYANA** and shall be executed as stipulated in this tender document and as required at site whether specifically shown or not. The contractor shall carry out and complete the work under this contract in every respect in conformity with the contract documents and as per directions of and to the satisfaction of the Architects/ Owners.

2. INTENT OF SPECIFICATION

Technical specifications forming a part of this contract are intended to cover work referred above. It is not the intent to specify completely herein all aspects of design, constructional features of equipment and details of the work to be carried out, but nevertheless the intent of the specification is to ensure that the equipment and work shall conform in all respects to the relevant Discom's technical specification, Bureau of Indian Standard Specifications, Codes of Practice, Indian Electricity Act, Indian Electricity Rules and other Statutory Regulations as may be applicable and to high standards of engineering, design and workmanship. The equipment and work shall perform in continuous operation in a manner acceptable to the owners who will interpret the meaning of the specifications and drawings and shall have the right to reject or accept any equipment or work which in their assessment is not complete to meet the requirements of this specification and/or applicable Codes and Standards.

3. SCOPE OF CONTRACT

Work covered in this contract shall include design, manufacture, supply, transportation, delivery, installation, testing and commissioning of Electrical and Substation works and shall include but not limited to the following.

- Supply and erection of Substation equipment's such as Main LT Panel, Capacitor panel, Basement panels, main ventilation panels, service panel, Distribution board etc.
- 3x2500KVA 33/0.433 KV INDOOR type DRY TYPE AN distribution Transformer.
- 1 No. Single Panel 33 KV HT ICOG VCB Switchboard
- 1 No. FOUR Panel 33 KV HT VCB Switchboard.
- 33KV Metring cubicle.
- 33KV Isolator with earth switch with all other ancillary items as required with 4 pole Structure.
- Supply, Laying, termination of LT/HT cable (including & upto 400Sq.mm).
- LT Bus duct with supporting structure.
- 415 V ACDB, 24 Volts DCDB with battery bank & Battery charger.
- HT & LT cabling & End Termination.
- All other Civil works required for carrying out electrical works under this contract including making good and painting of such civil works.

- Submission of technical particulars along with the tender and shop drawings after award of contract.
- Obtaining Electrical Inspector's approval before commissioning of the electrical systems.
- Liaisoning and obtaining necessary approvals and power connection from relevant authorities.
- All other works/items which is necessary to complete the entire system function as required.

5. All material, equipment, consumables etc. required for successful completion of the works are to be supplied by the contractor.

6. All materials, equipment, labour & consumables required for successful completion of work as per the description of items in the Schedule of Rates shall be supplied by the Contractor and the cost of such supply shall be deemed to be included in the quoted rates without any additional liability on the Employer except for the material (if any) specifically covered under Employer’s Scope of Supply.

7. The Equipment tools and tackles to facilitate construction and after final commissioning, Performance Guarantee, Test run shall be in Contractor’s scope. The Contractor may arrange the same through purchase/ hire/ lease basis and such equipment, tools, tackles shall remain the property of the Contractor and it shall be removed from site after its requirement is over. No additional payment shall be made for mobilization and/or demobilization of such equipment, tools & tackles etc.

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Annexure- III
(Special Condition Of Contract)

Time Schedule

Name of Work: Construction of Multi-storeyed Building Tender for Electrical Sub Station Works at Concourse, Unitech Limited, Sector 71, Gurgaon

Sr. No.	Description	Time of Completion
1	Construction of Multi-storeyed Building Tender for Electrical Sub Station Works at Concourse, Unitech Limited, Sector 71, Gurgaon	18 Months

Notes:

1. Time of Completion shall be as defined in the NIT.
2. The Time indicated is for completing all the works in all respects as per specifications, codes, drawings and instructions of Engineer-in-Charge.

Annexure- IV
(Special Conditions of Contract)

Qualifications & Experience of Key Construction Personnel

1. Minimum Qualification, Experience & Numbers of Key Personnel to be deployed along with rate of recovery in case minimum staff not deployed:

Sr. No.	Category	Qualification & Experience	Nos.	Rate at which recovery shall be made per month form the contractor in the event of not fulfilling provision of clause 36
1.	Discipline Engineers	Degree in Electrical Engineering Discipline with minimum 5 years' experience in Construction of Electrical Installation **OR** Diploma in Engineering with minimum 15 Years' relevant experience.	1	Rs 75000/- Rs Seventy five thousand Only
2.	QA/QC Engineer	Degree in Engineering with minimum 10 years' relevant experience **OR** Diploma in Engineering with minimum 15 Years' relevant experience.	To ensure the compliance of clause 33.0 Page 79	Rs 75000/- Rs Seventy five thousand Only
3.	Safety Manager	A recognized degree/ diploma or equivalent in any branch of engineering or technology. Also, had practical experience of working in a construction project site in supervisory capacity for a period of not less than 10-15 years. Possesses	1	Rs. 60000/- Rs Sixty thousand Only

Sr. No.	Category	Qualification & Experience	Nos.	Rate at which recovery shall be made per month form the contractor in the event of not fulfilling provision of clause 36
		a degree or diploma in construction / industrial safety recognized by the Central / State Government.		
4.	Safety Officer	A recognized degree/ diploma or equivalent in any branch of engineering or technology. Also, had practical experience of working in a construction project site in supervisory capacity for a period of not less than 5-10 years. Possesses a degree or diploma in construction / industrial safety recognized by the Central / State Government.	2	Rs 50000/- Rs Fifty thousand Only

2. Notes-

(i) The detail of manpower required to be deployed by the contractor during Construction for Completion of the work within schedule time is Indicative only. This should be corresponding to the scale and size of the Contract. The Contractor is required to augment the above list with additional numbers/categories of personnel as required and/or as directed by Engineer-in-Charge to carry out the works in working hours including night shifts and complete the work within the completion schedule.

(ii) The Key Personnel identified above shall be well qualified & having adequate relevant experience as specified in document above. The other manpower shall also be qualified and experienced with their assigned work. The contractor shall submit the Detailed Manpower Deployment schedule along with the Bid.

(iii) CVs of key persons proposed to be deployed shall be submitted to Engineer–in-Charge prior to their mobilization at site.

(iv) Note:- The mentioned in Annexure-IV of ITT at item no 22 with reference to Clause 72 of GCC. The provision of CVs would be required only in case of the successful bidder who would be obliged to submit the same immediately after the allotment of work.

Annexure - V
(Special Conditions of Contract)

Indicative List of Equipment & Machinery to be deployed by the Contractor

Sr. No.	Equipment	Minimum Capacity	Indicative Nos.
	Concrete pump		
1	Concrete Vibrator (Electrical / Pneumatic)	-	As required
2	DG Set	40 kVa	As required
3	Water Pumps	nos.	As required
4	Bar Cutting Machine	nos.	As required
5	Bar Bending Machine	nos.	As required
6	Hydra Machine	Nos	1
7	Welding Machine	Nos	2
8	Stone Cutting Machine	Nos.	2
9	Stone polishing Machine	Nos.	2
10	HILTI Breaker	Nos.	2
11	Steel Scaffolding pipes , clamps and related accessories	-	As Required

The Equipment/ Machinery required to be mobilized by the contractor during Construction to Complete the work within schedule time is Indicative only. Contractor is required to augment the above list with additional numbers/categories as required and/or as directed by Engineer-In-Charge to carry out the works within the completion schedule.

Annexure - VI
(Special Conditions of Contract)

Material lying at site to be supplied by the Employer

NIL

Annexure - VII
(Special Conditions of Contract)

List of Plant & Equipment in possession of Employer, lying at Site along with rates to be recovered from the Contractor.

Sr. No.	Description of Machinery /equipment	Unit	Rate per day to be charged including GST
1			
2	**--------Nil-------**		
3			
4			

Note:- It is not compulsory to use plant & material laying at site. Only, if the contractor is willing to use the same at mutually agreed rates, he is free to use the same.

Annexure - VIII
(Special Conditions of Contract)

Health, Safety & Environment Management Plan

HEALTH, SAFETY & ENVIRONMENT MANAGEMENT PLAN

1. Scope

This specification establishes the Health, Safety and Environment (HSE) management requirement to be complied by Contractors/Vendors including their sub-contractors/sub vendors during construction.

This specification is not intended to replace the necessary professional judgment needed to design & implement an effective HSE system for construction activities and the contractor is expected to fulfil HSE requirements in this specification as a minimum. It is expected that contractor shall implement best HSE practices beyond whatever are mentioned in this specification.

Requirements stipulated in this specification shall supplement the requirements of HSE Management given in relevant Act(s)/ Legislations, General Conditions of Contract (GCC), Special Conditions of Contract (SCC) and Technical Specifications. Where different documents stipulate different requirements, the most stringent shall apply.

2. References

The document should be read in conjunction with following:

- General Conditions of Contract (GCC)
- Special Conditions of Contract (SCC)
- Building and other construction workers Act,
- Indian Factories Act
- Technical specifications
- Relevant State & National Statutory requirements.
- Operating Manuals Recommendation of Manufacturer of various construction Machineries

3. Requirements of Health, Safety & Environmental (HSE) Management System to be complied by contractors

3.1 Management Responsibility

3.1.1 HSE Policy & Objectives

The Contractor should have a documented and duly approved HSE policy & objectives to demonstrate commitment of their organization to ensure health, safety and environmental aspects in their line of operations.

3.1.2 Management System

The HSE management system of the Contractor shall cover the HSE requirements & commitments to fulfil them, including but not limited to what have been specified under clauses 1.0 and 2.0 above. The Contractor shall obtain the approval of its site specific HSE Plan from Engineer in charge prior to commencement of any site works. Corporate as well as Site management of the Contractor shall ensure compliance of their HSE Plan at work sites in its

entirety in true spirit.

3.1.3 Indemnification

Contractor shall indemnify & hold harmless, Employer & their representatives, free from any and all liabilities arising out of non-fulfilment of HSE requirements or its consequences.

3.1.4 Deployment & Qualifications of Safety Personnel

The Contractor shall designate / deploy various categories of HSE personnel at site as indicated below in sufficient number. The Safety supervisors, Safety stewards/Observer etc. would facilitate the HSE tasks at grass root level for construction sites and shall assist Safety Officer/Engineers. Contractor shall appoint safety personnel as given below;

3.1.4.1 Safety Observer/Steward: Contractor shall depute one Safety Observer/Steward.

3.1.4.2 Safety Supervisor: In addition to above, contractor shall depute one Safety Supervisor for every 250 workers and additionally thereon.

3.1.4.3 Safety Engineer: In addition to above (i &ii), one safety engineer/ officer for every 1000 workers and additionally thereon.

a) Safety Steward/Observer

As a minimum, he shall possess class XII pass certificate and should have minimum two year of practical experience in construction work environment and should have adequate knowledge of the local language spoken by majority of the workers at the construction site.

b) Safety Supervisor

As a minimum, he shall possess a recognized graduation Degree or a Diploma in Engg. with minimum Two years of practical experience in construction work environment and should possess requisite skills to deal with construction safety related day-to-day issues.

c) Safety Officer / Safety Engineer

Safety Officer/Engineer should possess following qualification & experience:

(i) Recognized degree in any branch of Engg. or Tech. or Architecture with practical experience of working in a building or other construction work in supervisory capacity for a period of not less than two years, **or** possessing recognized diploma in any branch of Engg. or Tech with practical experience of working in a building or other construction work in supervisory capacity for a period of not less than five years.

(ii) Recognized degree or one year diploma in Industrial safety (from any reputed Indian Institutes).

(iii) Preferably have adequate knowledge of the language spoken by majority of the workers at the construction site.

Alternately

(i) Person possessing Graduation Degree in Science with Physics & Chemistry and degree or one year diploma in Industrial Safety (from any reputed Indian institutes) with practical experience of working in a building, plant or other construction works (as Safety Officer) for a period of not less than five years, may be considered as Safety Officer.

The Contractor shall verify & authenticate credentials of such safety personnel and furnish Bio-Data/Resume/Curriculum Vitae of the safety personnel as above for approval of Engineer in charge.

Imposition/ Realization of penalty shall not absolve the Contractor from his/her responsibility of deploying competent safety officer at site.

Adequate planning and deployment of safety personnel shall be ensured by the Contractor, so that field activities do not get affected because of non-deployment of competent & qualified safety personnel in appropriate numbers.

3.1.5 Implementation, Inspection/Monitoring

a) The Contractor shall be fully responsible for planning, reporting, implementing and monitoring all HSE requirements and compliance of all laws & statutory requirements.

b) The Contractor shall also ensure that the HSE requirements are clearly understood & implemented conscientiously by their site personnel at all levels at site.

c) The Contractor shall ensure physical presence of their field engineers / supervisors, during the continuation of their contract works / site activities including all material transportation activities. Physical absence of experienced field engineers / supervisors of Contractor at critical work spot during the course of work may invite halting / stoppage of work.

d) The Contractor shall regularly review inspection report internally and implement all practical steps / actions for improving the status continuously.

e) Contractor skilled workmen like riggers, scaffold erectors, welders, crane operators etc. should have sufficient past experience and skill on the relevant job.

f) The Contractor shall ensure important safety checks right from beginning of works at every work site locations. and to this effect format No. HSE-

10 “Daily Safety Check List” shall be prepared by field engineer & duly checked by safety personnel for conformance.

g) The Contractor shall carry out inspection to identify various unsafe conditions of work sites/machinery/equipments as well as unsafe acts on the part of workmen/supervisor/engineer while carrying out different project related works.

h) Adequate records for all inspections shall be maintained by the Contractor and the same shall be furnished to Engineer in charge, whenever sought.

i) As a general practice lifting tools/tackles, machinery, accessories etc. shall be inspected, tested and examined by competent person (approved by concerned State authorities) before being used at site and also at periodical interval (e.g. during replacement, extension, modification, elongation/reduction of machine/parts, etc.) as per relevant statutes. Hydra, cranes, lifting machinery, mobile equipments/ machinery/ vehicles, etc. shall be inspected regularly by only competent / experienced personnel at site and requisite records for such inspections shall be maintained by contractor. Contractor shall also maintain records of maintenance of all other site machinery (e.g. generators, rectifiers, compressors, cutters, etc.) &portable tools/equipments being used at project related works (e.g. drills, abrasive wheels, punches, chisels, spanners, etc.).

j) Site facilities /temporary. installations, e.g. batching plant, cement go down, DG-room, temporary electrical panels/distribution boards, fabrication yards, etc. and site welfare facilities, like labour colonies, canteen/pantry, rest-shelters, motor cycle/bicycle-shed, First-aid centers, urinals/toilets, etc. should be periodically inspected by Contractor.

3.1.6 Awareness and Motivation

a) The Contractor shall promote and develop awareness on Health, Safety and Environmental protection among all personnel working for the Contractor.

b) The contractor shall display safety statistics board at all prominent location .Also shall provide dedicated notice board for displaying of safety alerts or any other safety related notices for awareness site workforces.

c) Regular awareness programs and fabrication shop/work site meetings at least on monthly basis shall be arranged on HSE activities to cover hazards/risks involved in various operations during construction.

d) Contractor to motivate & encourage the workmen & supervisory staff by issuing/ awarding them with tokens/ gifts/ mementos/ monetary incentives/ certificates etc. The motivational program shall be organized on regular basis.

3.1.7 Fire Prevention & First-Aid

a) The Contractor shall arrange suitable First-aid measures such as First Aid Box

(Refer Appendix-B for details), stand-by Emergency Vehicle .Additionally separate ambulance. At least one fire extinguisher shall be placed at each location of DG Set, Hot works, electrical booth etc.

b) The Contractor shall arrange installation of fire protection measures such as adequate number of steel buckets with sand & water and adequate number of appropriate portable fire extinguishers (Refer Appendix-C for details) to the satisfaction of Engineer in Charge..

c) The Contractor shall arrange EMERGENCY MOCK DRILL like fire, bomb threat, gas leakage, earth quake, etc. at each site at least once in three months, involving site workmen and site supervisory personnel & engineers.

d) The contractor shall require to tie-up with the hospitals located in the neighbourhood for attending medical emergency.

3.1.8 Documentation

The Contractor shall evolve a comprehensive, planned and documented system covering the following as a minimum for implementation and monitoring of the HSE requirements and the same shall be submitted for approval by Engineer in Charge & EIL.

- HSE Organogram
- Site specific HSE Plan
- Safety Procedures, forms and Checklist. Indicative list of HSE procedures is attached as Appendix :H
- Inspections and Test Plan

3.1.9 Audit

The Contractor shall submit an Audit Plan to Engineer in charge indicating the type of audits covering following as minimum:

a) Internal HSE audits regularly on six monthly basis by engaging internal qualified auditors However, minimum two internal HSE audit will have to be conducted irrespective of time period of the contract.

All HSE shortfalls/ non-conformances on HSE matters brought out during review/audit, shall be resolved forthwith (generally within a week) by Contractor& compliance report shall be submitted to Engineer in charge.

In addition to above audits by contractor, the contractor's work shall be subjected to HSE audit by Engineer in charge at any point of time during the pendency of contract. The Contractor shall take all actions required to comply with the findings of the Audit Report and issue regular Compliance Reports for the same to Engineer in charge till all the findings of the Audit Report are fully complied. Failure to carry-out HSE Audits& its compliance by Contractor, shall invite penalization.

3.1.10 Meetings

i. The Contractor shall ensure participation of his top most executive at site (viz. Resident Construction Manager / Resident Engineer/ Project Manager / Site-in-Charge) in Safety Committee/HSE Committee meetings arranged by Engineer in charge usually on monthly basis or as and when called for. In case Contractor's top most executive at site is not in a position to attend such meeting, he shall inform Engineer in charge in writing before the commencement of such meeting indicating reasons of his absence and nominate his representative – failure to do so may invite very stringent penalization against the specific Contractor, as deemed fitas per Contract. The obligation of compliance of any observations during the meeting shall be always time bound. The Contractor shall always assist Engineer in charge to achieve the targets set by them on HSE management during the project implementation.

ii. In addition, the Contractor shall also arrange internal HSE meetings chaired by his top most executive at site on fortnightly basis and maintain records. Such internal HSE meetings shall essentially be attended by field engineers / supervisors including safety personnel of the Contractor and its associates. Records of such internal HSE meetings shall be maintained by the Contractor for review by Engineer in charge or for any HSE Audits.

iii. Agenda of internal HSE meeting should broadly cover: -

a) Confirmation of record notes /minutes of previous meeting
b) Discussion on outstanding subjects of previous points / subjects, if any
c) Incidents / Accidents (of all types) at project site, if any
d) Current topics related to site activities / subjects of discussion
e) House keeping
f) Information / views / deliberations of members / site sub-contractors
g) Report from Owner / Client
h) Status of Safety awareness, Induction programs & Training programs. The time frame for such HSE meeting shall be religiously maintained by one and all.

3.1.11 Intoxicating drinks & drugs and smoking

a) The Contractor shall ensure that his staff members & workers (permanent as well casual) shall not be in a state of intoxication during working hours and shall abide by any law relating to consumption & possession of intoxicating drinks or drugs in force.

b) The Contractor shall not allow any workman to commence any work at any locations of project activity who is/are influenced / effected with the intake of alcohol, drugs or any other intoxicating items being consumed prior to start of work or working day.

c) Awareness about local laws on this issue shall form part of the Induction Training and compulsory work-site discipline.

d) The Contractor shall ensure that all personnel working for him comply with “No-Smoking” requirements of the Owner as notified from time to time. Cigarettes, lighters, auto ignition tools or appliances as well as intoxicating drugs, dry tobacco powder, etc. shall not be allowed inside the project / plant complex.

e) Smoking shall be permitted only inside smoking booths, if any, exclusively designated & authorized by the Engineer in charge.

3.1.12 Penalty

The Contractor shall adhere consistently to all provisions of HSE requirements. In case of non- compliances and also for repeated failure in implementation of any of the HSE provisions, Engineer in charge may impose stoppage of work without any cost & time implication to the Owner and/or impose a suitable penalty.

The amount of penalty to be levied against defaulted Contractor shall be up to a cumulative limit of 2.0% (Two percent) of the contract value.

This penalty shall be in addition to all other penalties specified elsewhere in the contract. The decision of imposing stop-work-instruction and imposition of penalty shall rest with Engineer in charge. The same shall be binding on the Contractor. Imposition of penalty does not make the Contractor eligible to continue the work in unsafe manner.

The amount of penalty applicable for the Contractor on different types of HSE violations is specified below:

Sl. No.	Violation of HSE Norms	Penalty Amount
1.	For not using personal protective equipment like Helmet, Safety Shoes, and other safety gadgets as applicable as per nature of work.	Rs.500/- per day/Item / Person
2.	Execution of work without deployment of requisite field engineer / supervisor at work spot	Rs.5,000/- per violation per day
3.	Unsafe electrical practices (not installing ELCB, using poor joints of cables, using naked wire without top plug into socket, laying wire/cables on the roads, electrical jobs by incompetent person, etc.)	Rs.5,000/- per item per day
4.	Working at height without full body harness, using non-standard/ rejected scaffolding and not arranging fall protection arrangement as required, like handrails, life-lines, Safety Nets etc.	Rs.10,000/- per case per day
5.	No fencing/barricading of excavated areas / trenches.	Rs.5,000/- per occasion
6.	Absence of Contractor's RCM/SIC or his nominated representative (prior approval must be taken for each meeting for nomination) from site HSE meetings whenever called by Engineer in Charge & failure to nominate his immediate deputy for such HSE meetings.	Rs.10,000/- per meeting
7.	Poor House Keeping	Rs.5,000 /- per occasion per subject
8.	Failure to report & follow-up accident (including Near Miss) reporting system within specific timeframe.	Rs.20,000/- per occasion
9.	Failure to deploy adequately qualified and competent Safety Officer	Rs.10,000/- Per day
10.	Any violation not covered above	To be decided by Engineer in charge

Note: Penalty amount deducted from the contractor shall be utilized by Engineer in charge for the promotion of the safety during the currency of the project.

The Contractor shall make his field engineers/supervisors fully aware of the fact that they keep track with the site workmen for their behavior and compliance of various HSE requirements. Safety lapses / defects of project construction site shall be attributable to the concerned job supervisor / engineer of the Contractor, (who remains directly responsible for safely executing field works). For repeated HSE violations, concerned job supervisor / engineer shall be reprimanded or appropriate action, as deemed fit, shall be initiated (with information to Engineer in charge) by the concerned Contractor.

Contractor shall initiate verbal warning shall be given to the worker/employee during his first HSE violation. A written warning shall be issued on second violation and specific training shall be arranged / provided by the Contractor to enhance HSE awareness/skill including feedback on the mistakes/ flaws. Any further violation of HSE stipulations by the erring individuals shall call for his forthright debar from the specific construction site. A record of warnings for each worker/employee shall be maintained by the Contractor, like by punching their cards / Gate passes or by displaying their names at the Project entry gate. Warnings, penalizations, appreciations etc. shall be discussed in HSE Committee meetings by site Head of the Contractor.

3.1.13 Accident/ Incident investigation

All accidents/incidents shall be informed to Engineer in charge at least telephonically by Contractor immediately and in writing within 24 hours on Format No. HSE-2 as applicable, by Contractor. Thereafter, a Supplementary Accident/Incident investigation Report on Format No.

HSE-3 shall be submitted to Engineer in Charge within 72 hours. Near Miss incident(s), Dangerous accidents/incident shall also be reported on Format No. HSE-4 within24 hours. The accident/ incident shall be investigated by a team of Contractor's senior Site personnel (involving Site-in- Charge or at least by his deputy) for establishing root-cause and recommending corrective & preventive actions. Findings shall be documented and suitable actions taken to avoid recurrences shall be communicated to Engineer in charge. Engineer in charge shall have the liberty to independently investigate such occurrences and the Contractor shall extend all necessary help and cooperation in this regard. Engineer in charge shall have the right to share the content of this report with the outside world.

3.2 House Keeping

The Contractor shall ensure that a high degree of housekeeping is maintained and shall ensure inter-alia; the followings:

a) All surplus earth and debris are removed/disposed-off from the working areas to designated location(s).

b) Unused/surplus cables, steel items and steel scrap lying scattered at different places within the working areas are removed to identify

location(s).

c) All wooden scrap, empty wooden cable drums and other combustible packing materials, shall be removed from work place to identified location(s).

d) Roads shall be kept clear and materials like pipes, steel, sand, boulders, concrete, chips and bricks etc. shall not be allowed on the roads to obstruct free movement of men & machineries.

e) Fabricated steel structural, pipes & piping materials shall be stacked properly.

f) Water logging on roads shall not be allowed.

g) No parking of trucks/trolleys, cranes and trailers etc. shall be allowed on roads, which may obstruct the traffic movement.

h) Utmost care shall be taken to ensure over all cleanliness and proper upkeep of the working areas.

i) Protective measures to be ensured with projected rebar by suitable means.

j) Trucks carrying sand, earth and pulverized materials etc. shall be covered while moving within the plant area/ or these materials shall be transported with top surface wet.

k) The contractor shall ensure that the atmosphere in plant area and on roads is free from particulate matter like dust, sand, etc. by keeping the top surface wet for ease in breathing.

l) At least two exits for any unit area shall be assured at all times – same arrangement is preferable for digging pits/ trench excavation/ elevated work platforms/ confined spaces etc.

m) Welding cables and the power cable must be segregated and properly stored and used. The same shall be laid away from the area of movement and shall be free from obstruction.

n) Schedule for upkeep /cleaning of site to be firmed up and implemented on regular basis.

The Contractor shall carry-out regular checks (minimum one per fortnight) as per format No. HSE-11 for maintaining high standard of housekeeping and maintain records for the same. The Contractor shall provide supervisor for housekeeping exclusively for management of day-to-day housekeeping activities.

3.3 HSE Measures

3.3.1 Construction Hazards

The Contractor shall ensure identification of all Occupational Health, Safety & Environmental hazards in the type of work he is going to undertake and enlist mitigation measures specially towards following activities;

a) Working at height (+2.0 Mts height)
b) Work in confined space,
c) Deep excavations & trench cutting (depth > 2.0 mts.)
d) Operation & Maintenance of Batching Plant.
e) Shuttering / concreting (in single or multiple pour) for columns, parapets & roofs.
f) Erection & maintenance of Tower Crane.
g) Erection of structural steel members / roof-trusses / pipes at height more than 2.0 Mts. with or without crane.
h) All lifts using 100T Crane plus mechanical pulling.
i) Any lift exceeding 80% capacity of the lifting equipments (hydra, crane etc.).
j) Laying of pipes (isolated or fabricated) in deep narrow trenches – manually or mechanically.
k) Maintenance of crane / extension or reduction of crane-boom on roads or in yards.
l) Erection of any item at >2.0 Mts. height using 100T crane or of higher capacity
m) Work in Live Electrical installations / circuits
n) Demolishing/ dismantling activities
o) Welding/ gas cutting jobs at height (+2.0 Mts.)
p) Lifting/placing roof-girders at height (+2.0 Mts.)
q) Working in “Charged/Live” elect. Panels
r) Erection/dismantling of scaffolding

The necessary HSE measures devises shall be put in place, prior to start of an activity & also shall be maintained during the course of works, by the Contractor.

3.3.2 Accessibility

a) The Contractor shall provide safe means of access(in sufficient numbers) & efficient exit to any working place including provisions of suitable and sufficient scaffolding at various stages during all operations of the work for the safety of his workmen and Engineer in Charge or his representative.

b) The Contractor shall implement use of all measures including use of “life line”, “fall- arresters”, “retractable fall arresters”, “safety nets” etc. during the course of using all safe accesses & exits, so that in no case any individual remains at risk of slip & fall during their travel.

c) A ladder or step- ladder must have a level and firm footing, in case of use of fixed ladders, sufficient foot hold and hand hold to be provided.

d) The access to operating plant / project complex shall be strictly regulated. Any person or vehicle entering such complex shall undergo identification check, as per the procedures in force / requirement of Engineer in charge.

e) Accessibility to 'confined space' shall be governed by specific system / regulation, as established at project site.

3.3.3 Personal Protective Equipment (PPEs)

a) The Contractor workmen shall be permitted entry inside the project premises only with proper PPEs.

b) The Contractor shall ensure that all their staff, workers and visitors including their sub- contractor(s) have been issued (records to be kept) & wear appropriate PPEs like nape strap type safety helmets preferably with head &sweat band with ¾" cotton chin strap, High ankle safety shoes with steel toe cap and antiskid sole, full body harness, protective goggles, gloves, ear muffs, respiratory protective devices, etc. All these gadgets shall conform to applicable IS Specifications. The Contractor shall implement a regular regime of inspecting physical conditions of the PPEs being issued / used by the workmen of their own & also its sub-agencies and the damaged / unserviceable PPEs shall be replaced forthwith.

c) Engineer in charge may issue a comprehensive color scheme for helmets to be used by various agencies. The Contractor shall follow the scheme issued by the Engineer in charge and shall choose colour other than blue (for Owner and their representatives). All HSE personnel shall preferably wear dark green band on their helmet or green color safety helmet so that workmen can approach them for guidance during emergencies. HSE personnel shall preferably wear such dresses with fluorescent stripes, which are noticeable during night, when light falls on them.

d) Florescent jackets with respective company logo to be worn by the contractor workmen with different color coding for categories like supervisor and workmen.

e) An indicative list of HSE standards/codes is given under **Appendix-A**.

f) Contractor shall ensure procurement & usage of following safety equipments/ accessories (conforming to applicable IS mark) by their staff, workmen & visitors including their subcontractors all through the span of project construction.

i. PPEs (Helmet with company name/logo, Safety Goggles, Coverall, Ear-muff, Face Shield, Hand Gloves, High Ankle Safety Shoes, Gum Boot etc.)
ii. Barricading tape / warning signs
iii. Rechargeable Safety torch (flame-proof)
iv. Safety nets (with tie-chords)
v. Fall arresters
vi. Portable ladders (varying lengths)
vii. Life-lines (steel wire-rope, dia. not less than 8.0 mm)
viii. Full body double lanyard Safety harness with Rebar/ladder hook or scaffolding hook.
ix. Retractable fall arresters (various length)
x. Portable fire extinguishers of adequate capacity
xi. Portable Multi Gas detector

3.3.4 Working at height

a) The Contractor shall issue permit for working (PFW) at height after verifying and certifying the checkpoints as specified in the attached permit (Format No. HSE-6). He shall also undertake to ensure compliance to the conditions of the permit during the currency of the permit including adherence of personal protective equipments. Contractor's Safety Officer shall verify compliance status of the items of permit document after implementation of action is completed by Contractor's execution / field engineers at work site.

b) Such PFW shall be initially issued for one single shift or expected duration of normal work and extended further for balance duration, if required.

c) Contractors are expected to maintain a register for issuance of permit and extensions thereof including preserving the used permits for verification during audits etc.

d) The Contractor shall ensure that Full body harnesses with double lanyards conforming IS Specifications is used by all personnel while working at height. The life lines should have enough tensile strength to take the load of the worker in case of a fall. The harness should be capable of keeping the workman vertical in case of a fall, enabling him to rescue himself.

e) The Contractor shall ensure that a proper Safety Net System is used wherever the hazard of fall from height is present. The safety net, preferably a knotted one with mesh ropes conforming to relevant IS specifications shall have a border rope & tie cord of minimum 12mm dia. The Safety Net shall be located not more than 6.0 meters below the working surface extending on either side upto sufficient margin to arrest

fall of persons working at different heights.

f) In case of accidental fall of person on such Safety Net, the bottom most portion of Safety Net should not touch any structure, object or ground.

g) Beam Clamps may be used for construction of localized temporary working platforms sheds for welding booths etc. at height in all types of steel structure due to faster installation and requirement of less scaffolding materials.

h) Hanging Platform, manufactured by Standard HSE equipment vendors must be encouraged for painting of Buildings etc.

i) All the tools used at height (like spanner, screw driver etc.) shall be provided with securing arrangement like back-pack/waist pouch to prevent accidental slippage from worker hand.

j) The Contractor shall install temporary lightening arrester in tall structures during construction to save human life and to avoid damage to equipments & machineries. During the possibility of a thunderstorm, all the work at height where a person can be exposed to lightning shall be stopped.

3.3.5 Scaffoldings& Barricading

a) Suitable steel scaffoldings only shall be provided to workmen for all works that cannot be safely done from the ground or from solid construction except such short period work that can be safely done using ladders or man-basket. When a ladder is used, an extra workman shall always be engaged for holding the ladder. The ladder shall be inspected before use for cracked or split stiles, missing, broken, loose or damaged rungs & splinters. The ladder shall be of adequate length to enable it to extend to at least 1.0m above the landing place or working point. Metallic ladders shall be only used as access.

b) The Contractor shall ensure that the scaffolds used during construction activities shall be strong enough to take the designed load. Only metallic scaffold boards shall be allowed to use. Steel tubes shall be free from cracks, splits, Surface flaws & other defects. All couplers & fittings shall be properly oiled and maintained.

c) All scaffolds shall be inspected by a safety officer. He shall paste a GREEN tag on each scaffold found safe and a RED tag on each scaffold found unsafe. Scaffolds with GREEN tag only shall be permitted to be used and Scaffolds with RED ones shall immediately be made inaccessible.

d) The Contractor shall ensure positive barricading (indicative as well as protective) of the excavated, radiography, heavy lift, high pressure hydrostatic & pneumatic testing and other such areas. Sufficient warning

signs shall be displayed along the barricading areas.

e) Scaffolding shall be constructed using foot seals or base plates only. Base plates shall be used below each standard on surface .Sole plate of timber shall be used beneath the base plate to achieve greater load distribution.

3.3.6 Electrical installations

a) All electrical installations/ connections shall be carried out as per the provisions of latest Indian codes/standard.

b) All temporary electrical installations / facilities shall be regularly checked by the licensed/competent electricians of the Contractor.

The Contractor shall meet the following requirements:

a. Ensure that electrical systems and equipment including tools & tackles used during construction phase are properly selected, installed, used and maintained as per provisions of the latest revision of the Indian Electrical/ applicable international regulations.

b. Shall deploy qualified & licensed electricians.

c. All switchboards / welding machines shall be kept in well-ventilated & covered shed/ with rain shed protection. The shed shall be elevated from the existing ground level to avoid water logging inside the shed. Installation of electrical switch board must be done taking care of the prevention of shock and safety of machine.

d. No flammable materials shall be used for constructing the shed. Also flammable materials shall not be stored in and around electrical equipment / switchboard. Adequate clearances and operational space shall be provided around the equipment.

e. Fire extinguishers and insulating mats shall be provided in all power distribution centers.

f. Temporary electrical equipment shall not be employed in hazardous area without obtaining safety permit.

g. Proper housekeeping shall be done around the electrical installations.

h. All temporary installations shall be tested before energizing, to ensure proper earthing, bonding, suitability of protection system, adequacy of feeders/cables etc.

i. All welders shall use hand gloves irrespective of holder voltage.

j. Multilingual (Hindi, English and local language) caution boards, shock treatment charts and instruction plate containing location of isolation point for incoming supply, name & telephone No. of contact person in emergency shall be provided in substations and near all distribution

boards / local panels.

k. ELCB tester /test meter shall be used for testing the ELCBs operation. ELCBs testing shall be carried out by using ELCB tester on monthly basis but in specific cases like heavy rain as decided by owner/EIC. Record of the testing shall be maintained.

l. Regular inspection of all installations at least once in a month.

The following features shall also be ensured for all electrical installations during construction phase by the contractor:

a). Each installation shall have a main switch with a protective device, installed in an enclosure adjacent to the metering point. The operating height of the main switch shall not exceed 1.5 M. The main switch shall be connected to the point of supply by means of armoured cable.

b). The outgoing feeders shall be double or triple pole switches with fuses / MCBs. Loads in a three phase circuit shall be balanced as far as possible and load on neutral should not exceed 20% of load in the phase.

c). The installation shall be adequately protected against overload, short circuit and earth leakage by the use of suitable protective devices. Fuses wherever used shall be HRC type. Use of rewirable fuses shall be strictly prohibited. ELCB/RCCB (Residual Current Circuit Breaker) must be fitted with all Electrical installation. The earth leakage device shall have an operating current not exceeding 30 mA.

d). All connections to the hand tools / welding receptacles shall be taken through proper switches, sockets and plugs.

e). All single phase sockets shall be minimum 3 pin type only. All unused sockets shall be provided with socket caps.

f). Only 3 core (P+N+E) overall sheathed flexible cables with minimum conductor size of 1.5 mm2 copper shall be used for all single phase hand tools.

g). Only metallic distribution boxes with double earthing shall be used at site. No wooden boxes shall be used.

h). All power cables shall be terminated with compression type cable glands. Tinned copper lugs shall be used for multi-strand wires / cables.

i). Cables shall be free from any insulation damage.

j). Minimum depth of cable trench shall be 750 mm for MV & control cables and 900 mm for HV cables. These cables shall be laid over a sand layer and covered with sand, brick & soil for ensuring mechanical protection. Cables shall not be laid in waterlogged area as far as practicable. Cable route markers shall be provided at every 25 M of buried trench route.

When laid above ground, cables shall be properly cleated or supported on rigid poles of at least 2.1 M high. Minimum head clearance of 6 meters shall be provided at road crossings.

k). Underground road crossings for cables shall be avoided to the extent feasible. In any case no underground power cable shall be allowed to cross the roads without pipe sleeve.

l). All cable joints shall be done with proper jointing kit. No taped/temporary joints shall be used.

m). An independent earthing facility should preferably be established within the temporary installation premises. All appliances and equipment shall be adequately earthed. In case of armored cables, the armour shall be bonded to the earthing system. IS: 3043 Code for earthing practices shall be followed at project site.

n). All cables (green colour) and wire rope used for earth connections shall be terminated through tinned copper lugs.

o). In case of local earthing, earth electrodes shall be buried near the supply point and earth continuity wire shall be connected to local earth plate for further distribution to various appliances. All insulated wires for earth connection shall have insulation of green colour.

p). Separate core shall be provided for neutral. Earth / Structures shall not be used as a neutral in any case.

q). ON/OFF position of all switches shall be clearly designated / painted for easy isolation in emergency.

3.3.7 Ergonomics and tools & tackles

a) The Contractor shall assign to his workmen, tasks commensurate with their qualification, experience and state of health.

b) All lifting tools, tackles, equipment, trailers, trucks/dumpers, accessories including cranes shall be tested periodically by competent authority for their condition and load carrying capacity. Valid test & fitness certificates from the applicable authority shall be submitted to Engineer in charge for their review/acceptance before the lifting tools, tackles, equipment, trailers, trucks/dumpers, accessories and cranes are used. Third party inspection certificate is mandatory for all lifting tools & tackles before put into use.

c) Load testing of Cranes by competent person must be made mandatory after each modification/alteration of crane configuration/change in boom length. All heavy equipments including cranes must be maintained in good condition & record of such maintenance shall be maintained.

d) The contractor shall not be allowed to use defective equipment or tools

not adhering to safety norms.

i. Tower Crane, Crane, Hydra mobile Crane (F-15 or equivalent), Hydraulic Rig & Boom

   Lift shall be inspected on fortnightly basis as per Format No. HSE-20, HSE-21, HSE- 22, HSE-23 & HSE-24.

ii. The Contractor shall deploy experienced operator & may arrange training program for operators of hydra mobile crane, crane, excavator, mobile machinery, Tower Crane, etc. at site by utilizing services from renowned manufacturers.

iii. Hydra mobile crane (F-15 or equivalent) having steering control mechanism shall be permitted at construction site only for the purpose of loading/unloading. However, continuous rigger availability during marching of hydraulic crane at site shall be ensured by contractor.

3.3.8 Occupational Health

a) The contractor shall identify all operations that can adversely affect the health of its workers and issue & implement mitigation measures.

b) The Contractor shall arrange Medical Camps at regular intervals at work sites and labor colonies to assess health condition of workers.

c) The Contractor shall ensure vaccination of all the workers including their families if residing at site, during the course of entire project span.

3.3.9 Hazardous substances

a) Hazardous, inflammable and/or toxic materials such as solvent coating, thinners, anti- termite solutions, water proofing materials shall be stored in appropriate containers preferably with lids having spillage catchment trays and shall be stored in a good ventilated area. These containers shall be labeled with the name of the materials highlighting the hazards associated with its use and necessary precautions to be taken.

b) The work place shall be checked prior to start of activities to identify the location, type and condition of any asbestos materials which could be disturbed during the work. In case asbestos material is detected, usage of appropriate PPEs by all personnel shall be ensured.

3.3.10 Slips, trips & falls

a) The contractor shall establish a regular cleaning and basic housekeeping programme that covers all aspects of the workplace to help minimize the risk of slips, trips & falls. The contractor shall take positive measures like keeping the work area tidy, storing waste in suitable containers & harmful items separately, keeping passages, stairways, entrances & exits especially emergency ones clear, cleaning

up spillages immediately and replacing damaged carpet/ floor tiles, mats & rugs at once to avoid slips, trips & falls.

3.3.11 Demolition/ Dismantling

a) The contractor shall adhere to safe demolishing/ dismantling practices at all stages of work to guard against unsafe working practices.

b) Before carrying out any demolition/dismantling work, the contractor shall take prior approval of Engineer in charge and generate the Format No.HSE-9.

3.3.12 Road Safety

a) The Contractor shall ensure adequately planned road transport safety management system.

b) The vehicles shall be fitted with reverse warning alarms & flashing lights / fog-lights and usage of seat belts shall be ensured.

c) The Contractor shall also ensure a separate pedestrian route for safety of the workers and comply with all traffic rules & regulations, including maintaining speed limit of 20 KMPH or indicated by owner for all types of vehicles / mobile machinery. The maximum allowable speed shall be adhered to.

d) In case of an alert or emergency, the Contractor must arrange clearance of all the routes, roads, access.

e) Dumpers, Tippers, etc. shall not be allowed to carry workers within the site and also to & from the labour colony to & from project sites.

f) The Contractor shall not deploy any such mobile machinery / Equipments, which do not have competent operator and / or experienced banks-man/signal-man. Such machinery/equipments shall have effective limit-switches, reverse-alarm, front & rear-end lights etc. and shall be maintained in good working order.

g) The Contractor shall not carry-out maintenance of vehicles / mobile machinery occupying space on project / plant roads and shall always arrange close supervision for such works.

h) Contractor's shall arrange /install visible road signs, diversion boards, caution boards, etc. on project roads for safe movement of men and machinery.

3.3.13 Welfare measures

Contractor shall, at the minimum, ensure the following facilities at work sites:

a) A crèche at site where 10 or more female workers are having children below the age of 6 years.

b) Adequately ventilated / illuminated rooms at labour camps & its hygienic

up-keeping.

c) Reasonable canteen facilities at site and in labour camps at appropriate location depending upon site conditions. Contractor shall make use of “industrial” variety of LPG cylinder & satisfactory illumination at the canteens. Necessary arrangement for efficient disposal of wastes from canteens & urinals /toilets shall also be made and regular review shall be made to maintain the ambience satisfactorily hygienic &shall also comply with all applicable statutory requirements.

d) Adequately lighted & ventilated Rest rooms at site (separate for male workers and female workers).

e) Provision for suitable mobile toilets to be made available by Contractor for remote/scattered job locations.

f) Urinals, Toilets, drinking water, washing facilities, adequate lighting at site and labour camps.

g) The contractor at periodic interval shall arrange to prevent mosquito breeding by fumigation/spraying of insecticides at workplace/ fabrication yard.

3.3.14 Environment Protection

Contractor shall ensure proper storage and utilization methodology of materials that are detrimental to the environment. Where required, Contractor shall ensure that only the environment friendly materials are selected and emphasize on recycling of waste materials, such as metals, plastics, glass, paper, oil & solvents. The waste that cannot be minimized, reused or recovered shall be stored and disposed of safely. In no way, toxic spills shall be allowed to percolate into the ground. The contractor shall not use the empty areas for dumping the wastes.

The contractor shall strive to conserve energy and water wherever feasible.

The contractor shall ensure dust free environment at workplace by sprinkling water on the ground at frequent intervals. The air quality parameters for poisonous gases, toxic releases, harmful radiations, etc. shall be checked by the contractor on daily basis and whenever need arises.The contractor shall not be allowed to discharge chemicals, oil, silt, sewage, sullage and other waste materials directly into the controlled waters like surface drains, streams, rivers, ponds. A discharge plan shall be submitted to Engineer in charge for approval.

3.3.15 Rules & Regulations

All persons deployed at site shall be knowledgeable of and comply with the environmental laws, rules & regulations relating to the hazardous materials, substances and wastes. Contractor shall not dump, release or otherwise

discharge or disposes off any such materials without the express authorization of Engineer in charge. An indicative list of Statutory Acts & Rules relating to HSE is given under Appendix-D.

3.3.16 Weather Protection

Contractor shall take appropriate measures to protect workers from severe storms, rain, solar radiations, poisonous gases, dust, etc. by ensuring proper usage of PPEs like Sun glasses, Sun screen lotions, respirators, dust masks, etc. and rearranging/ planning he construction activities to suit the weather conditions. Effective arrangement (without creating inconvenience to project facilities & permanent installations) for protecting workmen from hailstorm, drizzle in the form of temporary shelter shall be made at site.

3.3.17 Communication

All persons deployed at the work site shall have access to effective means of communication so that any untoward incident can be reported immediately and assistance sought by them.

All health & safety information shall be communicated in a simple & clear language easily understood by the local workforce.

For information to all, typical subjects that should be communicated are: - Inside the company (Top to down)

a. Quality Policy

b. HSE Policy contents

c. Environment Policy

d. HSE Objectives

e. Safety Cardinal Rules

f. HSE Target – reached or missed

g. Praises & Warnings to personnel for HSE Management

h. Safety Walk Through Reports and safety defects / shortfalls (by management)

i. HSE Audit results

j. Revised Statutory Health & Safety provisions, if any

k. H & S publicity

l. Suggestions

Inside the Company (Bottom to up)

a. Complaints

b. Compliances on safety defects / shortfalls

c. Suggestions

d. Proposals for changes & improvements

e. HSE Reports (including near-miss reports)

3.3.18 Confined Space Entry

The contractor shall generate a work permit (Format No. HSE -7) before entering a confined space. People, who are permitted to enter into confined space, must be medically examined. All necessary precautions mentioned therein shall be adhered to. An attendant shall be positioned outside a confined space for extending help during an emergency. Effective communication shall be maintained between personnel in confined space and outside by combination of visual/voice or portable radio. Compressed gas cylinders shall not be taken into confine space.

Entry Register for confined space to be maintained with the name and time of entry/exit.

3.3.19 Excavation

The Contractor shall obtain permission from competent authorities prior to excavation wherever required.

The Contractor shall locate the position of buried utilities (water line, cable route, etc.) by referring to project in consultation with Engineer in charge. The Contractor shall start digging manually to locate the exact position of buried utilities & thereafter use mechanical means.

The Contractor shall keep soil heaps at least 1.5 M away from edge or a distance equal to depth of pit (whichever is more)

All excavated pits greater than 10 Sq.M plan area and depth more than 1.5M shall have at least two access routes for ingress and egress. Also, additional access routes shall be provided such that distance between any two access routes shall not be more than 20M.

The Contractor shall maintain sufficient “angle of repose” during excavation – shall also provide slope or suitable bench as decided by Engineer in Charge.

The Contractor shall arrange “battering” or “benching” wherever required for preventing collapse of edge of excavations.

The Contractor shall identify & arrange de-watering pump or well-point system to prevent earth collapse due to heavy rain / influx of underground water.

The Contractor shall arrange protective fencing/ hard barricading with warning signal around excavated pits, trenches, etc. along with minimum 2 (two) entries, exits / escape ladders.

The Contractor must avoid “underpinning” / under-cutting to prevent collapse of chunk of earth during excavation

The Contractor shall use “stoppers” to prevent over-run of vehicle wheels at the edge of excavated pits / trenches.

The Contractor shall arrange strengthening of “shoring” & “strutting” proactively to avoid collapse of earth / edges due to vehicular movement in close proximity of excavated areas / pits/ trenches, etc.

3.4 Tool Box Talks (TBT)

Contractor shall conduct daily TBT with workers prior to start of work and shall maintain proper record of the meeting. A record shall be maintained in a format suggested by Engineer in charge.

The Contractor shall conduct TBT before start of every morning or evening shift or night shift activities, for alerting the workers on specific hazards and their appropriate dos & don’ts. The Contractor shall provide sufficient rests to the site workmen and their foremen to avert fatigue & thereby endangering their lives during the course of site works.

3.5 Training & Induction Programme

a) Initial induction of workers into Construction oriented activities and appraising them about the methodology of works and how to carry-out safely and the same should not be inter mixed with Tool Box Talks or HSE Training. In this regard careful action should be made & maintained for imparting HSE induction to every individual, irrespective of his task/designation/level of employment, whereas, HSE Training should be imparted to specific person/group of people who are to carry-out that specific task more than once – for example, Riggers must be trained for working at heights, welders must be trained for work in confined space, fitters/carpenters, mesons must be trained for work at heights, etc.

b) Contractor shall conduct Safety induction programme on HSE for all his workers and maintain records. The Gate Pass shall be issued only to those workers who successfully qualify the Safety induction programme.

c) The Contractor shall brief the visitors about the HSE precautions which are required to be taken before their proceeding to site and make necessary arrangements to issue appropriate PPEs like Aprons, hard hats, ear-plugs, goggles & safety shoes etc., to his visitors. The Contractor shall always maintain relevant acknowledgement from visitor on providing him brief information on HSE actions.

d) Contractor shall ensure that all his personnel possess appropriate training to carry out the assigned job safely. The training should be imparted in a language understood by them and should specifically be trained about

- Potential hazards to which they may be exposed at their workplace

- Measures available for prevention and elimination of these hazards The topics during training shall cover, at the minimum:
- Why safety should be considered during work - explanation
- Education about hazards and precautions required
- Employees' duties & responsibilities
- Emergency and evacuation plan
- HSE requirements during project activities
- Fire fighting and First-Aid
- Use of PPEs
- Occupational health issues – dos & don'ts
- Local laws on intoxicating drinks, drugs, smoking in force
- Common environmental subjects – lighting, ventilation, vibration, smoke/fumes etc.

e) Records of the training shall be kept and submitted to Engineer in charge.

DETAILS OF HSE MANAGEMENT SYSTEM BY CONTRACTOR

On Award of Contract

The Contractor shall submit a comprehensive Health, Safety and Environmental Plan or programme for approval by Engineer in charge prior to start of work. The Contractor shall participate in the pre-start meeting with Engineer in charge to finalize HSE Plans which shall including the following:

- HSE policy & Objectives
- Job procedure to be followed by the Contractor for construction activities including handling of equipments, scaffolding, electric installations, etc. describing the risks involved, actions to be taken and methodology for monitoring each activity. Indicative list of procedures is enclosed as Annexure-H
- Engineer in Charge' review/audit requirement.
- Organization structure along with responsibility and authority, on HSE activities.
- Administrative & disciplinary steps involving implementation of HSE requirements
- Emergency evacuation plan/ procedures for site and labour camps
- Procedures for reporting & investigation of accidents and near misses.
- HSE Inspection
- HSE Training programme at project site
- HSE Awareness programme at project site
- Reference to Rules, Regulations and statutory requirements.
- HSE documentation viz reporting, analysis & record keeping.

A. IS CODES ON HSE

APPENDIX-A
(Sheet 1 of 2)

SP: 53	Safety code for the use, Care and protection of hand operated tools.
IS: 838	Code of practice for safety & health requirements in electric and gas welding and cutting operations
IS: 1179	Eye & Face precautions during welding, equipment etc
IS: 1860	Safety requirements for use, care and protection of abrasive grinding wheels.
IS: 1989	(Pt -II) Leather safety boots and shoes
IS: 2925	Industrial Safety Helmets
IS: 3016	Code of practice for fire safety precautions in welding & cutting operation.
IS: 3043	Code of practice for earthing
IS: 3764	Code of safety for excavation work
IS: 3786	Methods for computation of frequency and severity rates for industrial injuries and classification of industrial accidents
IS: 3696	Safety Code of scaffolds and ladders
IS: 4083	Recommendations on stacking and storage of construction materials and components at site
IS: 4770	Rubber gloves for electrical purposes
IS: 5121	Safety code for piling and other deep foundations
IS: 5216	Recommendations on Safety procedures and practices in electrical works
IS: 5557	Industrial and Safety rubber lined boots
IS: 5983	Eye protectors
IS: 6519	Selection, care and repair of Safety footwear
IS: 6994	(Pt-I) Industrial Safety Gloves (Leather & Cotton Gloves)
IS: 7293	Safety Code for working with construction Machinery
IS: 8519	Guide for selection of industrial safety equipment for body protection
IS: 9167	Ear protectors
IS: 11006	Flash back arrestor (Flame arrestor)
IS: 11016	General and safety requirements for machine tools and their operation
IS: 11057	Specification for Industrial safety nets

IS: 11226	Leather safety footwear having direct moulded rubber sole
IS: 11972	Code of practice for safety precaution to be taken when entering a sewerage system
IS: 13367	Code of practice-safe use of cranes
IS: 13416	Recommendations for preventive measures against hazards at working place

B. INTERNATIONAL STANDARDS ON HSE

APPENDIX-A
(Sheet 2 of 2)

Safety Glasses	ANSI Z 87.1, ANSI ZZ 87.1, AS 1337, BS 2092, BS 1542, BS 679, DIN 4646/ 58311
Safety Shoes	ANSI Z 41.1, AS 2210, EN 345
Hand Gloves	BS 1651
Ear Muffs	BS 6344, ANSI S 31.9
Hard Hat	ANSI Z 89.1/89.2, AS 1808, BS 5240, DIN 4840
Goggles	ANSI Z 87.1
Face Shield	ANSI Z 89.1
Breathing Apparatus	BS 4667, NIOSH
Welding & Cutting	ANSI Z49.1
Safe handling of compressed	P-1 (Compressed Gas Association Gases in cylinders 1235 Jefferson Davis Highway, Arlington VA 22202 - USA)
Full body harness	EN-361
Lanyard	EN-354
Karabiner	EN-362 and EN-12275

APPENDIX-B

	DETAILS OF FIRST AID BOX	
SL. NO.	**DESCRIPTION**	**QUANTITY**
1.	Small size Roller Bandages, 1 Inch Wide (Finger Dressing small)	6 Pcs.
2.	Medium size Roller Bandages, 2 Inches Wide (Hand & Foot Dressing)	6 Pcs.
3.	Large size Roller Bandages, 4 Inches Wide(Body Dressing Large)	6 Pcs.
4.	Large size Burn Dressing(Burn Dressing Large)	4 Pkts.
5.	Cotton Wool(20 gms packing)	4 Pkts.
6.	Antiseptic Solution Dettol (100 ml.) or Savlon	1 Bottle
7.	Mercurochrome Solution (100 ml.) 2% in water	1 Bottle
8.	Ammonia Solution (20 ml.)	1 Bottle
9.	A Pair of Scissors	1 Piece
10.	Adhesive Plaster (1.25 cm X 5 m)	1 Spool
11.	Eye pads in Separate Sealed Pkt.	4 pcs.
12.	Tourniqut	1 No.
13.	Safety Pins	1 Dozen
14.	Tinc. Iodine/ Betadine (100 ml.)	1 Bottle
15.	Polythene Wash cup for washing eyes	1 No.
16.	Potassium Permanganate (20 gms.)	1 Pkt.
17.	Tinc. Benzoine (100 ml.)	1 Bottle
18.	Triangular Bandages	2 Nos.
19.	Band Aid Dressing	5 Pcs.
20.	Iodex/ Moov (25 gms.)	1 Bottle
21.	Tongue Depressor	1 No.
22.	Boric Acid Powder (20 gms.)	2 Pkt.
23.	Sodium Bicarbonate (20 gms.)	1 Pkt.
24.	Dressing Powder (Nebasulf) (10 gms.)	1 Bottle
25.	Medicinal Glass	1 No.
26.	Duster	1 No.

	DETAILS OF FIRST AID BOX	
SL. NO.	**DESCRIPTION**	**QUANTITY**
27.	Booklet (English& Local Language)	1 No. each
28.	Soap	1 No.
29.	Toothache Solution	1 No.
30.	Vicks (22 gms.)	1 Bottle
31.	Forceps	1 No.
32.	Snake –Bite Lancet	1No.
33.	Note Book	1 No.
34.	Splints	4 Nos.
35.	Lock	1 Piece
36.	Life Saving/Emergency/Over-the counter Drugs	As decided at site

Box size: Suitable size first aid box to be used for first aid items

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Note : The medicines prescribed above are only indicative. Equivalent medicines can also be used. A prescription, in this regard, shall be required from a qualified Physician.

APPENDIX-C

TYPE OF FIRES VIS-À-VIS FIRE EXTINGUISHERS

Fire Extinguisher → / Fire ↓	Water	Foam	CO_2	Dry Powder	Multi purpose (ABC)
Originated from paper, clothes, wood	✓	✓	can control minor surface fires	can control minor surface fires	✓
Inflammable liquids like alcohol, diesel, petrol, edible oils, bitumen	x	✓	✓	✓	✓
Originated from gases like LPG, CNG, H_2	x	X	✓	✓	✓
Electrical fires	x	X	✓	✓	✓

LEGEND : ✓ : CAN BE USED

x : NOT TO BE USED

Note: Fire extinguishing equipment must be checked at least once a year and after every use by an authorized person. The equipment must have an inspection label on which the next inspection date is given. Type of extinguisher shall clearly be marked on it.

APPENDIX-D

List of Statutory Acts & Rules Relating to HSE

- The Indian Explosives Act and Rules
- The Motor Vehicle Act and Central Motor Vehicle Rules
- The Factories Act and concerned Factory Rules
- The Petroleum Act and Petroleum Rules
- The Workmen Compensation Act
- The Gas Cylinder Rules and the Static & Mobile Pressure Vessels Rules
- The Indian Electricity Act and Rules
- The Indian Boiler Act and Regulations
- The Water (Prevention & Control & Pollution) Act
- The Water (Prevention & Control of Pollution) Cess Act
- The Mines & Minerals (Regulation & Development) Act
- The Air (Prevention & Control of Pollution) Act
- The Atomic Energy Act
- The Radiation Protection Rules
- The Indian Fisheries Act
- The Indian Forest Act
- The Wild Life (Protection) Act
- The Environment (Protection) Act and Rules
- The Hazardous Wastes (Management & Handling) Rules
- The Manufacturing, Storage & import of Hazardous Chemicals Rules
- The Public Liability Act
- The Building and Other Construction Workers (Regulation of Employment and Condition of Service) Act
- Other statutory acts Like EPF, ESIS, and Minimum Wages Act.

APPENDIX-E

LIST OF PROCEDURES (MINIMUM) TO BE FORMING PART OF HSE PLAN:-

A. HSE Management Procedures:

- HSE Objectives & Performance
- HSE Training and Competence (including Induction)
- HSE Motivation &Award Scheme
- HSE Audits
- HSE Emergency Management
- HSE Incidents Reporting and Management
- First Aid & Management
- Roles, Responsibility, accountabilities and Authorities

B. Job procedures/Safe Operating procedures

- Setting Up Site & Signages
- Working at Height
- Confined Space Entry
- Permit to Work Housekeeping
- Transportation of materials including Manual Handling
- Earthmoving Operations & excavation
- Scaffolding
- Fire Prevention/Protection
- Hazardous Substance handling & Storage
- Personal Protective Equipment

FORMAT NO.:HSE-2 REV 0

ACCIDENT / INCIDENT REPORT

(To be submitted by Contractor after every Incident / Accident within 24 hours to Engineer in Charge)

Report No.:_____ **Date**:_____

Project site:_____**Name of work:** _____

Contractor's name:_____ Contractor's Job Engineer (name) ___

Non-disabling injury (Non-LTA)	Hospitalized but resumed duty before end of 48 hrs
Disabling injury (other LTA)	Hospitalized & failed to resume duty within next 48 hrs
Fatal (LTA):	Death / Expiry
First Aid case (non LTA)	Resume duty after first aid

Name of the injured:_____

Father's name of victim: _____

Sub Contractor's Name: _____

Gate Pass No.: ..... Age:____Yrs.

Victim's medical fitness exam. (Pre-empl.) date: - _____

Date & time of Accident / Incident: _____

Names of Witnesses: (1_____(2)_____(3)_____

Profession of victim:

Bar bender		Carpenter		Meson	
Fitter		Helper		Gas cutter	
Grinder		Welder		Electrician	
Driver		Rigger		M/c. operator	
Engineer		Manager		Other/specify	

Qualification

No formal education		Non-Matriculate		Matriculate	
Graduate		Post- grad		Other/specify	

Job Experience

NIL		Less than 2 yrs		2-5 yrs	
5-10 yrs		11-15 yrs		15 years and above	

Location where the incident happened: _____

Activity / Works that were continuing during incident / accident: -

Excavation		Demolition		Concrete carrying	
Concrete pouring		Transportation of materials (manually)		Transportation of materials (mechanically)	
Work on or adjacent to water		Work at height (+2.0 mts)		Scaffold preparation	
Scaffold dismantling		Piling works		Welding	
Grinding		Gas-cutting		Pipe fit-ups & fabrication	
Structural fabrications		Machine works		Hydro-testing works	
Electrical works		Erection activities		Other/specify	

What exactly the victim was doing just before the incident / accident?

……

……

Nature of injury:

Bruise or Contusion		Abrasion (superficial wound)		Sprains or strains	
Cut or Laceration		Puncture or Open wound		Burn	
Inhalation of toxic or Poisonous fumes or gases		Absorption		Amputation	
Fracture		Other/specify			

Parts of body involved in incident / accident

Head		Face		Eyes	
Throat		Arm (above wrist)		Hand (including wrist)	
Fingers		Truck (Abdomen / Back / Chest / Shoulder)		Throat	
Leg (above ankle)		Foot (incl. ankle)		Toes	
Multiple				Other/specify	

Accident type:

Struck against		Struck by		Fall from Elevation	
Fall on same level		caught in		caught under	
caught in between		Rubbed or abraded		Contact with (Electricity)	
Contact with (Temp./ extremes)		Contact with chemicals or oils		Vehicle accident	
Other/specify					

Medical Aid provided:- (indicate specific aids / treatment etc.)-

……

……

Actionstaken to prevent recurrence of similar incident / accident:

……

……

……

……

……

……

Intimation to local authorities (Dist. Collector / Local Police Station / ESI authority): Yes / No / NA. If yes, to whom

……

Safety Officer

(Signature and Name)

Site Head / Resident Construction Manager

(Signature and Name)

Stamp of Contractor

FORMAT NO. : HSE-3 REV 0

SUPPLEMENTARY INCIDENT / ACCIDENT INVESTIGATION REPORT
TICK THE APPROPRIATE ONE AS APPLICABLE (furnish within 72 hours)

Supplementary to Incident / Accident Report No:_____(Copy enclosed)

Report No.:_____ **Date**:_____

Project site:_____Name of work: _____

Contractor's name:_____Contractor's Job Engineer (name) _____

Non-disabling injury (Non- LTA)	Hospitalized but resumed duty before end of 48 hrs.
Disabling injury (other LTA)	Hospitalized & failed to resume duty within next 48 hrs.
Fatal (LTA):	Death / Expiry
First Aid case (non LTA)	Resume duty after first aid

Name of the injured:_____

Father's name of victim: _____

Sub Contractor's Name: _____

Gate Pass No.: .....Age:____Yrs.

Victim's medical fitness exam. (Pre-empl.) date: - _____

Date & time of Accident / Incident: _____

Names of Witnesses: (1_____(2)_____(3)_____

Profession of victim:

Bar bender		Carpenter		Meson	
Fitter		Helper		Gas cutter	
Grinder		Welder		Electrician	
Driver		Rigger		M/c. operator	
Engineer		Manager		Other/specify	

Qualification

No formal education		Non-Matriculate		Matriculate	
Graduate		Post- grad		Other/specify	

Job Experience

NIL		Less than 2 yrs.		2-5 yrs.	
5-10 yrs.		11-15 yrs.		15 years and above	

Location where the incident happened: _____

Activity / Works that were continuing during incident / accident: -

Excavation		Demolition		Concrete carrying	
Concrete pouring		Transportation of materials (manually)		Transportation of materials (mechanically)	
Work on or adjacent to water		Work at height (+2.0 mts)		Scaffold preparation	
Scaffold dismantling		Piling works		Welding	
Grinding		Gas-cutting		Pipe fit-ups & fabrication	
Structural fabrications		Machine works		Hydro-testing works	
Electrical works		Erection activities		Other/specify	

What exactly the victim was doing just before the incident / accident?

……

……

Particular of tools & tackles being used and condition of the same after incident/accident:

……

……

Description of Incident/Accident (How the incident was caused):

……

……

Nature of injury:

Bruise or Contusion		Abrasion (superficial wound)		Sprains or strains	
Cut or Laceration		Puncture or Open wound		Burn	
Inhalation of toxic or Poisonous fumes or gases		Absorption		Amputation	
Fracture		Other/specify			

Parts of body involved in incident / accident

Head		Face		Eyes	
Throat		Arm (above wrist)		Hand (including wrist)	
Fingers		Truck (Abdomen / Back / Chest / Shoulder)		Throat	
Leg (above ankle)		Foot (incl. ankle)		Toes	
Multiple				Other/specify	

Accident type

Struck against		Struck by		Fall from Elevation	
Fall on same level		caught in		caught under	
caught in between		Rubbed or abraded		Contact with (Electricity)	
Contact with (Temp./ extremes)		Contact with chemicals or oils		Vehicle accident	
Other/specify					

Name & Designation of person who provided First-Aid to the victim: _____

Name & Telephone number of Hospital where the victim was treated _____

Mode of transport used for transporting victim – Ambulance / Private car / Tempo/ Truck / Others How much time taken to shift the injured person to Hospital

In case of FATAL incident, indicateclearlythe BOCW Registration No. ____of the victim/ Company……..Comments of Medical Practitioner, who treated/attended the victim/injured (attached / described here).

What actions are taken for investigation of the incident, please indicate clearly – (Video film / Photography / Measurements taken etc)

Immediate cause (Please tick the right applicable) –

Hazardous methods or procedures inadequately uarded		Poor housekeeping		Inadequate or improper PPE	
Environmental hazards (excess noise/ space constraint/ inadequate Ventilation		improper illumination/ Moving on oval surface		Working on dangerous equipment	

Failure to secure		Horse-play		Failure to use PPE	
Inattention to surroundings		Improper use of hands & body-parts		By-passing safety devices	
Unsafe mixing or placement of tools & tackles		Bypassing standard procedures		Failure in communication	
Operating without authority		Improper use of equipment or tools & tackles		drug or alcoholic influence	
excessive haste		Others(specify)			

Basic cause

Over confidence		Impulsiveness		over-exertion	
Faulty judgement or poor understanding		Failing to keep attention constantly		Nervousness & Fear	
Fatigue		Defective vision		Ill health or sickness	
Slow reaction		Others (specify)			

Root cause

Inadequate Engg		Improper Design		Inadequate Planning & organization	
Inadequate knowledge		Inadequate skill		Inadequate training	
Inadequate supervision		Improper work procedure		Inadequate compliance with standard	
Substandard performance		Inadequate maintenance		Improper inspection	
Others (specify)					

Loss of man days and impact on site works, (if any) –

Remarks from Contractor's Safety Officer/ Engineer –

Was the victim performing relevant tasks for which he was engaged /employed? Yes / No
Was the Supervisor present on work-site during the incident? Yes /No
Have the causes of incident rightly identified? Yes / No
Cause of Accident was_____

Remedial measures recommended by **Safety Officer of Contractor** for avoiding similar incident in future**:** ……

……

……

Intimation to local authorities (Dist. Collector / Local Police Station / ESI authority): Yes / No / NA. If yes, to whom …….

Safety Officer Site Head / Resident Construction Manager

(Signature and Name) (Signature and Name)

Stamp of Contractor

FORMAT NO. : HSE-4 REV0

NEAR MISS INCIDENT/ DANGEROUS OCCURRENCE SUGGESTED PROFORMA
(to be submitted within 24 hours)

- Near Miss **: Human injury escaped & no damage to property, equipment or interruption to work.**
- **Dangerous Occurrence**: Damage to property, equipment or interruption of work, but not resulting in personal injury/ illness, e.g. Fire incident, collapse of structure, crane failure, etc.

Report No.: _____

Name of Site:_____ Date: _____

Name of work:_____ Contractor: _____

Incident reported by :

Date & Time of Incident :

Location :

_____

Brief description of incident

_____

Probable cause of incident

_____

Suggested corrective action

_____

Steps taken to avoid recurrence Yes ☐ No ☐

Safety Officer Site Head / Resident Construction Manager

(Signature and Name) (Signature and Name)

Stamp of Contractor

FORMAT NO. : HSE-5 REV:-0
MONTHLY HEALTH, SAFETY & ENVIRONMENTAL (HSE) REPORT

(To be submitted by each Contractor)

Actual work start Date: _____ Project:_____ Name of the Contractor: _____

Name of Work : _____For the Month of: _____Report No: _____

Status as on : _____Job No : _____

(Contractor in consultation with Engineer in Charge shall generate here ports through web based package only.

Sr No	ITEM		UPTO PREVIOUS MONTH	THIS MONTH	CUMULATIVE
1	Average number of Staff & Workmen (average daily headcount, not man days)				
2	Total Man-hours worked				
3	Number of Induction programmes conducted				
4	Number of HSE meetings organized at site				
5	Number of HSE awareness programmes conducted at site				
6	Number of Tool Box Talks conducted				
7	Number of Lost Time Accidents (LTA)	Fatal			
		Other LTA			
8	Number of Loss Time Injuries (LTI)	Fatalities			
		Other LTI			
9	Number of Non-Loss Time Accidents				
10	Number of First Aid Cases				
11	Number of Near Miss Incidents				
12	No. of unsafe acts/ practices detected				
13	No. of disciplinary actions taken against staff/ workmen				
14	Man-days lost due to accidents				
15	LTA Free man-hours i.e. LTA free man-hours counted from the Last LTA (enter date:)				
16	Frequency Rate (No. of LTA per 2 lacs man-hours worked)				

Sr No	ITEM	UPTO PREVIOUS MONTH		THIS MONTH		CUMULATIVE
17	Severity Rate (No. of man days lost per 2 lacs man-hours worked)					
18	Loss Time Injury Frequency (No. of LTI per 2 lacs man-hours worked)					
19	No. of activities for which HIRAC completed					
20	No. of incentives/ awards given					
21	No. of occasions on which penalty imposed by Engineer in Charge					
22	No. of Audits conducted					
23	No. of pending NCs in above Audits					
24	Compensation cases raised with Insurance					
25	Compensation cases resolved and paid to workmen					
26	No of Vehicular Accident cases					
27	No of fire/Explosion cases					
28	Whether workmen compensation policy taken		Yes		No	
29	Whether workmen compensation policy is valid		Yes		No	
30	Whether workmen registered under ESI Act, as applicable		Yes		No	
31	Whether HIRAC Register prepared and updated		Yes		No	
32	Whether Environment Aspect Impact Register prepared and updated		Yes		No	
33	Whether Legal Register prepared and updated		Yes		No	
	Remarks, if any					

Date:_____

Prepared by Safety Officer

Approved by Site Head /
Resident Construction Manager

(Signature and Name)

(Signature and Name)

FORMAT NO.: HSE-6 REV 0

PERMIT FOR WORKING AT HEIGHTS (ABOVE 2.0 METER)

Permit No. …….. Name of Main Contractor ……Name of work executing agency / sub agency / vendor: ……..……Date ……Exact Location of work ……

Nature of work ……..Duration of work (from) …… (to)

Number of workers covered within this permit ……

(*List enclosed with name & gate pass numbers*.)

Sl. No.	**Items / Subjects**	**Status of compliance (Yes / No)**	
1	Work areas / Equipments inspected		
2	Work area cordoned off		
3	Adequate lighting is provided		
4	Precautions against public traffic taken		
5	Concerned persons in & around have been alerted & cautioned		
6	Hazards / risks involved in routine / non-routine task assessed and control measures have been implemented at specific task		
7	ELCB provided for electrical connection & found working		
8	Ladder safely attached / fixed		
9	Scaffoldings are checked and TAGs are found used correctly		
10	Working platforms are provided and are found sound /safe for use		
11	Safe access & egress arrangements (e.g. ladders, fall arresters, life-lines etc.) are satisfactorily incorporated		
12	a. Openings on platform / floors are effectively cordoned / covered		
	b. Safety Nets are provided wherever required		
13	Use of following safety gadgets by people working at area under this permit, is checked and found satisfactory - Safety helmet Safety harness (full body) with double lanyard Safety Shoes Safety gloves Safety goggles		
14	Housekeeping of work area found satisfactorily tidy / clean &		

Sl. No.	Items / Subjects	Status of compliance (Yes / No)	
	clear		
15	Adequate measures have been taken for works being continued at the ground level, when simultaneous works are permitted overhead at that very location.		
16	Materials are not thrown from heights on to ground		
17	Medical examination of workers are made & found satisfactory		
18	Responsible job engineer / supervisor found physically present at work spot for overall administration of work as well as safety of people.		

Above items have been checked & compliance has been found in place. Hence work is permitted to start / continue at the above-mentioned location. Work shall not start till identified lapses are rectified.

Additional Precautions, if any ……

……..

Work Permit issued by
Contractor Engineer/RCM

Verification By
Contractor Safety Officer

AT THE END OF THE DAY/WORK:

All works at height are completed & workmen have returned safely from work location at (time)…….. (date) …….

(Sig. Contractor Engineer**)**

FORMAT NO.: HSE-7 REV 0

CONFINED SPACE ENTRY PERMIT

Project site _____ Name of the work _____
Name of Contractor _____ Exact location of work _____
Sr. No. _____ Date_____ Nature of work _____

Safety Requirements POSITIVE ISOLATION OF THE VESSEL IS MANDATORY		
(A) Has the equipment been ?		
Y NR ☐ ☐ Isolated from power/steam/air ☐ ☐ isolated from liquid or gases ☐ ☐ depressurized &/or drained ☐ ☐ blanked/ blinded/ disconnected	Y NR ☐ ☐ water flushed &/or steamed ☐ ☐ Man ways open & ventilated ☐ ☐ cont. inert gas flow arranged ☐ ☐ adequately cooled	Y NR ☐ ☐ radiation sources removed ☐ ☐ proper lighting provided
(**B) Expected Residual Hazards**		
☐ ☐ lack of O_2 ☐ ☐ corrosive chemicals ☐ ☐ heat/ steam / frost	☐ ☐ combustible gas/ liquid ☐ ☐ pyrophoric iron / scales ☐ ☐ high humidity	☐ ☐ H_2S / toxic gases ☐ ☐ electricity / static ☐ ☐ ionizing radiation
(C) Protection Measures		
☐ ☐ gloves ☐ ☐ protective clothing ☐ ☐ grounded air duct/blower /AC ☐ ☐ Fire fighting arrangements	☐ ☐ ear plug / muff ☐ ☐ dust / gas / air line mask attendant with SCBA/air mask ☐ ☐ safety harness & lifeline	☐ ☐ goggles / face shield personal gas alarm rescue equipment/team communication equipment

Authorization / Renewal (It is safe to enter the confined space)

	No. of persons allowed	Name of persons allowed	Signature		Time		Signature
			Contractor's Supervisor	Contractor's Safety Officer	From	To	Workman

Permit Closure :

(A) Entry ☐ was closed ☐ stopped ☐ will continue on ...

(B) ☐ Site left in a safe condition ☐ Housekeeping done

(C) ☐ Multilock ☐ removed ☐ key transferred

☐ Ensured all men have come out ☐ Man-ways barricaded

Remarks, if any:

FORMAT NO.: HSE-9 REV 0

DEMOLISHING/DISMANTLING WORK PERMIT

Project : Sr. No. :

Name of the work : Date :

Name of contractor : Job No. :

Name of sub-contractor : No. of workers to be engaged:

(*List enclosed with name & gate pass numbers*.)

Line No./ Equipment No./ Structure to be dismantled :

Location details of dismantling/ demolition with sketch : (clearly indicate the area)

S. No.

The following items have been checked &compliance shall be ensured during currency of the permit:

Item description	**Done**	**Not Applicable**
Services like power, gas supply, water, etc. disconnected.	☐	☐
Dismantling/ Demolishing method reviewed & approved Usage of appropriate PPEs ensured.	☐	☐
Precautions taken for neighboring structures First-Aid arrangements made	☐	☐
Fire fighting arrangements ensured	☐	☐

Precautions taken for blasting

(Contractor's Supervisor) (Contractor's Safety Officer)

Permission is granted.

(Permit issuing authority-Client)

Name : Date :

Completion report:

Dismantling/ Demolishing is completed on_____Date at_____Hrs.

Materials/ debris transported to identified location ☐ Tagging completed (as applicable) ☐

Services like power, gas supply, water, etc. ☐

restored (Permit issuing authority-Client)

CONTRACTOR’s NAME

FORMAT NO. : HSE-10 REV 0

HOUSEKEEPING ASSESSMENT& COMPLIANCE

(Sheet 1 of 2)

Project : Sr. No. :
Name of the work : Date :
Name of contractor : Job No. :
Name of contractor : Fortnightly

Sl.No	Subjects of Review	Satisfactory/ Yes	Non-satisfactory/ No	Remarks	Action
1.	Cleanliness at the Main entry / access of site				
2.	Ground condition / floor areas free from water- logging / oil spillage				
3.	Ground & elevated floors free from rubbish / wastes / accumulated debris / scraps.				
4.	Manholes / openings are covered / fenced				
5.	Trenches are barricaded / walkways are in place				
6.	Drains are cleaned / not choked / not occupied by dumped materials				
7.	Sufficient CAUTION boards / instructions displayed				
8.	Construction machinery are maintained & parked in orderly manner.				
9.	Movement of site people are not obstructed because of dumping / storing of construction materials				
10.	Access / egress to Electrical Distribution Boards / Panels clear from wires / cables / earth-strips etc.				

Sl.No	Subjects of Review	Satisfactory/ Yes	Non-satisfactory/ No	Remarks	Action
11.	Electrical panel rooms / sheds / MCC / Control rooms / Substations etc. are clean & tidy and not used for storing dress / clothes, tiffin-box or bicycles.				
12.	Passage behind Elec. panels are free for access				
13.	Fire extinguishers / fire-buckets are accessible without any difficulty.				
14.	Stair-steps, platforms & landings are clear & tidy				
15.	Sheds / rooms & work areas have got sufficient illumination as well as ventilation				
16.	Cables / Wires / welding leads are routed / hanged appropriately & are not creating unsafe condition.				
17.	Stacking / storing of insulation materials or their packing.				
18.	Removal or cleanliness of left-over sand, concrete, brick-bats, insulation-materials, excess earth, wastes etc.				
19.	Storing / stacking of sand, metal chips, re-bars, steel pipes, valves, fittings etc.				
20.	One escape route at ground & minimum two escape routes at elevation available,				
21.	Captions / Posters / Slogans on various safety instructions are displayed legibly in local language				
22.	Cable trenches are water-free or regular arrangement for taking out accumulated water exists.				

Sl.No	Subjects of Review	Satisfactory/ Yes	Non-satisfactory/ No	Remarks	Action
23.	Windows of rooms / offices are regularly cleaned				
24.	Facilities for cycle sheds, drinking water, washing, rest-rooms etc. are maintained in tidy manner.				
25.	Toilet, Urinals, Canteen / kitchen / pantry etc. are maintained & free from obnoxious smell.				
26.	Construction tools / tackles are stored systematically - the items are tagged / tested / certified by competent third party.				
27.	Sufficient numbers of Dust-bins / Waste-bins found at site and are regularly emptied.				

Additional remarks, if any -
……
……

Inspected by
Contractor Engineer

Verification By
Contractor Safety Officer

FORMAT NO. : HSE-13 REV 0

INSPECTION FOR SCAFFOLDING

Project : Sr. No. :
Name of the work : Date :
Name of contractor : Job No. :

(Sheet 1 of 2)

Sr **No**	**Description**	**Yes**	**No**	**N.A.**	**Actions taken**
1	Whether work permit is obtained to take up work at height above 1.5 Mts?				
2	Whether atmospheric condition is “stormy” or “raining” and works at heights have been permitted?				
3	Whether steel pipes scaffoldings are used for units /off-site areas?				
4	Whether scaffolding has been erected on rigid/firm/leveled surfaces / ground? Whether “foot-seals” or “base-plates” are used beneath the up-rights (vertical steel pipes)				
5	Whether scaffold construction is as per IS specification with toe-board and hand-rails (top-rail as well as mid-rail)?				
6	Whether distance between two successive up-rights are less than 2.5 Mts (height of scaffold & load carrying capacity governs the distance between two uprights)				
7	Whether all uprights are extended at least 900 mm above the top most working platform (to enable fitting of handrails)?				
8	Whether vertical distance of two successive ledgers is satisfactory? (*varying between 1.3 Mts. To 2.1 Mts)*				
9	Whether the peripheral areas of working at height are cordoned-off? (for avoiding accident to people arising out of dropped / deflected materials)				
10	Whether platform is provided? Is it safely approachable?				
11	Whether end of scaffold platform / board are extended beyond transoms? (125mm to 150 mm)				

Sr **No**	**Description**	**Yes**	**No**	**N.A.**	**Actions taken**
12	Whether CE / IS approved quality and worthy conditioned full-body safety harness (with double lanyard & karabiners) are used while working at heights?				
13	Whether life-line of safety harness is anchored to an independent secured support capable of withstanding load of a falling person?				
14	Whether the area around the scaffold is cordoned off to prohibit the entry of unauthorized person / vehicle?				
15	Whether clamps used are of good condition, of adequate strength and free from defects?				
16	Whether ladder is placed at secured and leveled surface?				
17	Whether water-pass and oil-spills are avoided around the scaffold structure?				
18	Whether ladder is extended 1.5mts. above the landing point at height?				
19	Whether more than one access/egress provided to the scaffold?				
20	Whether ladder used are of adequate length and overlapping of short ladders avoided?				
21	Whether metallic ladders are placed much away from near-by electrical transmission line?				
22	Whether rungs of ladder are inspected and found in good order?				
23	Whether fall-arresters provided on both the access/egress routes?				
24	Whether diagonal (cross) bracings are provided at regular interval on the scaffold?				
25	Whether working platform on the scaffold has been made free from “jolt” or “gap”?				
26	Whether tools or materials are removed after completion of the day’s job at heights?				
27	Whether a valid Permit for Work (PFW) is obtained before taking up work over asbestos or fragile roof?				
28	Whether sufficient precaution is taken while working on fragile roof?				
29	Whether provision is made to arrange duck ladder, crawling board for working on fragile roof?				
30	Whether scaffold has been inspected by qualified civil engineers prior to their use?				

Sr **No**	**Description**	**Yes**	**No**	**N.A.**	**Actions taken**
31	Whether the scaffolding has been designed for the load to be borne by the same?				
32	Whether the erection and dismantling of the scaffolding is being done by trained persons and under adequate supervision?				
33	Whether safety net with proper working arrangement and life-line has been provided?				
34	Whether TAGS (Green for acceptable and Red for incomplete/unsafe scaffolds) are used on scaffolds?				

Inspected by
Contractor Engineer

Verification By
Contractor Safety Officer

FORMAT NO. : HSE-14 REV 0

(sheet 1 of 2)

PERMIT FOR ERECTION / MODIFICATION & DISMANTLING OF SCAFFOLDING

Project : Sr. No. :

Name of the work : Date :

Name of contractor : Job No. :

Nature of activities : Duration: From……To…….

SL. No.	SUBJECTS / ITEMS	DONE	NOT DONE	REMARKS
1	Specific task of Erection / Modification / Dismantling of scaffolds, identified & TAGGED accordingly (before as well as after carrying-out jobs).			
2	People engaged in doing the job are identified & are certified by Job Engineer of Main Contractor as experienced / trained.			
3	Concerned persons are alerted by the Job Engineer of Main Contractor in connection with possible hazards & what the workmen MUST do / MUST not do.			
4	Verification by Job Engineer of Main Contractor made for confirming that all persons permitted to carry-out the jobs are making use of Helmet, Safety Shoes, Goggles, Gloves & Double lanyard safety harness and other relevant PPEs.			
5	Area of work is effectively cordoned-off / barricaded / illuminated.			
6	For taking-up / lowering down Scaffolding members / clamps / couplings etc. appropriate ropes / pulleys/ chains etc. have been arranged for use (not to throw any item) & the same have been verified as “fit for purpose”.			
7	Items / members of scaffold, being lowered are removed from the area & stacked correctly.			
8	Ropes, chains, pulley blocks etc. being used for lifting or lowering scaffold items, are inspected by the Job Engineer & their certifications as well as physical conditions have been found O.K, before signing this PERMIT.			

SL. No.	SUBJECTS / ITEMS	DONE	NOT DONE	REMARKS
9	Safety Net / Life-line / Fall Arresters etc. are arranged in position and Job Engineer has found working conditions favourable for activities to start.			
10	Scaffold erection or dismantling tasks are being supervised by Experienced Engineer / Competent person.			
11	Only competent & experienced people have been selected / engaged in Scaffolding erection, modification or dismantling tasks.			
12	Adequate & effective actions for traffic and movement of people around the cordoned-off area taken to avoid inadvertent incident			
13	Working platforms are protected with handrails & toe-boards.			
14	Access & Exit (for reach & escape) are safe for use by people.			
15	Tools, tackles to be used for above jobs are verified by job Engineers of Main contractor as genuinely good and tied-up at height (to prevent their fall).			
16	Site important Telephone Nos. are made known to everyone			
17	SOP (Safe Operating Procedure) for the specific task is made & followed too.			
18	Emergency vehicle has been arranged at work locations.			

- This permit for work shall be available at specific work location all the time.
- After completion of work, permit shall be returned to safety cell of main contractor, without fail.
- This Permit shall be issued maximum upto (Monday to Sunday).
- Additional Precautions, if any

  ……
- **ACCORD OF PERMISSION** (to be ticked) - **YES** ( ) **/ NO** ( )

Inspected by
Contractor Engineer

Verification By
Contractor Safety Officer]

FORMAT NO. : HSE-14 REV 0
(sheet 2 of 2)

Everyday Site working conditions & performance of workmen shall be assessed / checked by Contractor Site Engr. and Safety Officer shall verify the same.

	Name / Sign.	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Site Engr.								
Safety Off.								

FORMAT NO. : HSE-17 REV 1

PERMIT FOR EXCAVATION (depth 2m and above**)**

Project : Sr. No. :

Name of the work : Date :

Name of contractor : Job No. :

Job Description : Location:

Size of excavation :

(Sheet 1of 2)

SL. NO.	Description of Item	COMPLIANCE STATUS			Remarks
		Yes	No	Not applicable	
1)	Suitable and sufficient risk assessments and method statements has been carried to ensure that the work shall be undertaken in accordance with specification and standard.				
2)	Are plans/details of underground services available and the same has been reviewed?				
3)	Has survey done to locate the services/obstacles etc.				
4)	Has the live services (electrical, water line, air line,telephone line, etc.) has been disabled for carrying out the job.				
5)	Is adequate barriers/fences to protect the excavation are in place?				
6)	Is Adequate warning signs are in place?				
7)	Is Assessment of ground conditions done and remedial action (if any) taken?				
8)	Safe access / egress (e.g. ramp / steps / ladders etc.) provided for site workmen & supervisors.				
9)	Is the excavation work being undertaken in proximity of structure, etc.? If Yes, its effect is considered?				
10)	Availability of competent person for supervising the excavation work?				
11)	Adequate safe arrangement to prevent collapse of edges (e.g. shoring / strutting / benching / sloping etc.) made at site.				

SL. NO.	Description of Item	COMPLIANCE STATUS			Remarks
		Yes	No	Not applicable	
12)	Hard barricades (at least 1.0M away from edge & for excavation near site access roads) with warning signs/caution boards are provided				
13)	Accumulation / passage-ways of water at periphery of excavation / trench stopped/ restricted.				
14)	Is the equipment being used for excavation has been checked for adequacy and is in good working condition having all the safety features?				
15)	Age & fitness of workmen ensured by medical test before engagement in job ?				
16)	Arrangement of Monitoring of possible oxygen deficiency or obnoxious gases done & action taken?				

PERMIT GRANTED - Yes / No
(*List enclosed with name & gate pass numbers*.)

Name & Signature of Site Engr. of Contractor (Initiator)

Name & Signature of Area – In charge/RCM Contractor (Issuing authority) Verification by Contractor Safety Officer

NOTES: -

1. Slopes or benches for excavation beyond 2.0M depth shall be designed & approved by Contractor's site head.
2. Excavated earth to be kept at least 1.5M away from edges
3. Safety helmets, Safety shoes or gum-boots, gloves, goggles, Face shield, Safety Harness shall be essential PPEs.
4. Permit shall be made in **duplicate** and original shall be available at site of work.
5. Permit shall be issued for maximum **one week** only (Monday to Sunday)
6. After completion of works, permit shall be closed & preserved for record purpose

GRANT OF PERMIT AND EXTENSIONS

Sl. No.	Validity period From _____ To _____	Working Time From _____ To _____	Initiator (site Engr. of Main Contractor)	Issuing authority (Area In charge/ RCM of Main Contractor)	Review by Engineer in Charge/EIL (Remarks with date
1.					
2.					
3.					
4.					
5.					
6.					
7.					

Additional safety instructions if any: -

1.

2.

3.

FORMAT NO.: **HSE-20 REV 0**

Inspection of Tower Crane

Name of Contractor: **Project:**

Name of Work: **Job No:**

Vehicle Identification/Registration No: **Date:**

Sr. No.	Description	Observation	Remarks & Suggestions
1	Serial number plate & SWL marking		
2	Valid TPI Certificate		
3	Valid Insurance		
4	Safe access and egress are provided to the crane operator.		
5	Front glass of Operator cabin		
6	Operator crane cabin is provided with a locking mechanism so as to prevent unauthorised entry.		
7	A safety bar is fitted across the operator's cabin window where there is likelihood of the operator falling through it.		
8	Manufacturer Operating Manual and Maintenance Manual are made available.		
9	An updated Operation and Maintenance log book is available in the operator cabin.		
10	All mounting bolts are in good condition.		
11	Load chart provided		
12	SLI available		
13	Crane hooks have got smooth surface and no dent		
14	Hook-latch / Dog-clamp in hook is effective		
15	Over hoist limit switch		
16	Double body earthing of Tower Crane		
17	Jib angle indicator is provided (For Luffing Jib Tower Crane).		
18	Emergency stop button, which will terminate the operation of the crane engine, is installed in the operator cabin and correctly identified.		
19	Effective braking mechanisms for Hoisting, Derricking, Slewing, Trolley Travelling maintained:		
20	Trolley Travelling limiter to prevent over-travelling of trolley is functional.		
21	Limit switches to prevent over-derricking and over-		

Sr. No.	Description	Observation	Remarks & Suggestions
	lowering of jib (For Luffing Jib Tower Crane) is functional.		
22	Slewing limiter to restrict slewing of crane is functional.		
23	Over load Limiter to prevent overloading of crane is functional.		
24	Load Moment Limiter to prevent over-turning moment is functional.		
25	Anti-collision devices are tested to stop the tower crane's operation such that the crane-to-crane interference must be maintained at not less than 3 m.		
26	Condition of boom		
27	Counter weight placement and pins		
28	Winches, pulleys and wire ropes are in good working condition.		
29	Colour coding		
30	Leakage in hydraulic cylinder		
31	Fire Extinguisher		
32	Tower crane is adequately grounded or protected against lightning.		
33	Wind anemometer is installed and is in good working condition.		
34	Aviation lamp is functional (Reqd. for 30mt and above)		
35	Pre Medical Check-up& Periodic Medical check-up (every 6 months) including vision test for Operator		
36	Safety Induction for Operator		
37	Others		

Signature & Name of Operator:

Signature and name of Job Engineer

Signature & Name of Contractor's Safety Officer

FORMAT NO. : HSE-21 REV 0

Crane Inspection Checklist

Name of Contractor: **Project:**

Name of Work: **Job No:**

Vehicle Identification/Registration No: **Date:**

Sr. No.	Description	Observation	Remarks & Suggestions
1	Crane hooks have got smooth surface and no dent		
2	Hook-latch / Dog-clamp in hook is effective		
3	Over hoist limit switch		
4	Over Load Indicator		
5	Over Boom limit switch		
6	Boom angle indicator		
7	Colour coding		
8	Condition of boom		
9	Condition of wire rope		
10	Rope drum / sheaves are in good working condition		
11	Swing break & lock		
12	Swing Alarm		
13	Over hoist break & lock		
14	Boom break & lock (For Telescopic Boom)		
15	Leakage in hydraulic cylinder		
16	Condition of Outrigger (For Tyre Mounted Crane)		
17	Outrigger fully extended Marking (For Tyre Mounted Crane)		
18	Condition of Tyre (For Tyre Mounted Crane)		
19	Wheel chokes are present and are used whenever required (For Tyre mounted)		
20	Battery & lamps		
21	Moving & rotating parts guarded		
22	Load chart provided		
23	Reverse horn (For Tyre Mounted Crane)		
24	Body Condition of crane		

Sr. No.	Description	Observation	Remarks & Suggestions
25	Front glass of Operator cabin		
26	Both side Mirror		
27	Number Plate (For Tyre Mounted Crane)		
28	Fire Extinguisher		
29	Horn		
30	Windshield and wipers		
31	Working of light & Indicator		
32	SLI		
33	Spark Arrestor(For Running Refinery/ Petrochemical/Chemical Plant)		
34	Foot-steps and hand-holds are in good working condition for exit /enter in to cabin		
35	TPI Certificate		
36	RC Document (For Tyre Mounted Crane)		
37	Fitness Certificate of Vehicle by authority		
38	Insurance		
39	PUC		
40	HMV License for Operator		
41	Pre Medical Check-up& Periodic Medical check- up (every 6 months) including vision test for Operator		
42	Safety Induction for Operator		
43	Others		

Signature & Name of Operator:

Signature & Name of Contractor's Concern Engineer

Signature & Name of Contractor's Safety Officer

FORMAT NO. : HSE-22 REV 0

Hydra Crane Inspection Checklist

Name of Contractor: **Project:**

Name of Work: **Job No:**

Vehicle Identification/Registration No: **Date:**

Sr. No.	Description	Observation	Remarks & Suggestions
1	Identification number of Hydra crane boldly scribed in front and rear end of machine		
2	Hydra Operator has got adequate document in support of his competency (i.e. HMV driving license, knowledge & training)		
3	Marking of SWL on hook position is clearly visible		
4	Test & examination of Hydra crane by statutory / competent authority is carried out & document is valid		
5	Colour Coding		
6	RC Document		
7	Fitness Certificate of Vehicle by authority		
8	Valid Insurance		
9	Valid PUC		
10	Pre Medical Check-up& Periodic Medical check-up (every 6 months) including vision test for Operator		
11	Safety Induction for Operator		
12	Crane hooks have got smooth surface and no dent		
13	Hook-latch / Dog-clamp in hook is effective		
14	Over hoist limit switch		
15	Over Load Indicator		
16	SLI		
17	Condition of boom		
18	Condition of wire rope		
19	Rope drum / sheaves are in good working condition		
20	Leakage in hydraulic cylinder		

Sr. No.	Description	Observation	Remarks & Suggestions
21	Tyre condition		
22	Battery		
23	Moving & rotating parts guarded		
24	Break		
25	Parking Break		
26	Front horn		
27	Reverse horn		
28	Hydra cabin body and frame of machine is in good order		
29	Both side Mirror		
30	Fire Extinguisher		
31	Front glass pane of the Hydra operator's cabin is clean & clear (i.e. not cracked / damaged / broken)		
32	Windshield and wipers condition		
33	Working of front & back lights, turn Indicators, parking lights & fog lamps		
34	Spark Arrestor (For Running Refinery/ Petrochemical/ Chemical Plant)		
35	Wheel chokes are present and are used whenever required		
36	Foot-steps and hand-holds are in good working condition for exit /enter in to cabin		
37	Others		

Signature & Name of Operator:

Signature & Name of Contractor's Concern Engineer

Signature & Name of Contractor's Safety Officer

FORMAT NO. : HSE-23 REV 0

Hydraulic Rig Inspection Checklist

Name of Contractor: **Project:**

Name of Work: **Job No:**

Vehicle Identification/Registration No: **Date:**

Sr. No.	Description	Observation	Remarks & Suggestions
1	Control panel is clean & all buttons/switches are clearly visible (no paint over spray, etc.)		
2	All switch & mechanical guards are in good condition and properly installed		
3	All Safety Indicator lights work		
4	Drive controls function properly & accurately labelled (up, down, right, left, forward, back)		
5	Motion alarms are functional		
6	Safety decals are in place and readable		
7	Any defects such as cracked welds, fuel leaks, hydraulic leaks, damaged control cables or wire harness, etc.		
8	Braking devices are operating properly		
9	Winches, pulleys and wire ropes are in good working condition.		
10	Function of interlocks and limit switch		
11	The manufacturer's operations manual (in all languages of the operators)		
12	Oil level, Hydraulic Oil Level, Fuel Level, Coolant Level		
13	Battery Charge		
14	Outriggers in place or functioning. Associated alarms working		
15	Moving & rotating parts guarded		
16	Load chart provided		
17	Fire Extinguisher		
18	Spark Arrestor, if operated by using fuel (For Running Refinery/ Petrochemical/		

Sr. No.	Description	Observation	Remarks & Suggestions
	Chemical Plant)		
19	Serial number plate		
20	SLI		
21	TPI Certificate		
22	Colour Coding		
23	Insurance		
24	Pre Medical Check-up & Periodic Medical check-up (every 6 months) including vision test for Operator		
25	Safety Induction for Operator		
26	Others		

Signature & Name of Operator:

Signature & Name of Contractor's Concern Engineer

Signature & Name of Contractor's Safety Officer

FORMAT NO.: HSE-24 REV 0

Boom Lift Inspection Checklist

Name of Contractor: **Project:**

Name of Work: **Job No:**

Vehicle Identification/Registration No: **Date:**

Sr. No.	Description	Observation	Remarks & Suggestions
1	Operating and emergency controls are in proper working condition, EMO button or Emergency Stop Device		
2	Functional upper drive control interlock (i.e. foot pedal, spring lock, or two hand controls)		
3	Emergency Lowering function operates properly		
4	Lower operating controls successfully override the upper controls		
5	Both upper and lower controls are adequately protected from inadvertent operation.		
6	Control panel is clean & all buttons/switches are clearly visible (no paint over spray, etc.)		
7	All switch & mechanical guards are in good condition and properly installed		
8	All Safety Indicator lights work		
9	Drive controls function properly & accurately labelled (up, down, right, left, forward, back)		
10	Motion alarms are functional		
11	Safety decals are in place and readable		
12	Guardrails and anchor points are in place, and in good condition		
13	Work platform & extension slides are clean, dry, & clear of debris		
14	Work platform extension slides in and out freely with safety locking pins in place to lock setting on models with extension platforms.		
15	Any defects such as cracked welds, fuel		

Sr. No.	Description	Observation	Remarks & Suggestions
	leaks, hydraulic leaks, damaged control cables or wire harness, etc.		
16	Braking devices are operating properly		
17	The manufacturer's operations manual is stored on AWP (in all languages of the operators)		
18	Oil level, Hydraulic Oil Level, Fuel Level, Coolant Level		
19	Battery Charge		
20	Outriggers in place or functioning. Associated alarms working		
21	Tyres and wheels are in good condition, with adequate air pressure if pneumatic		
22	Wheel chokes are present and are used whenever required		
23	Moving & rotating parts guarded		
24	Load chart provided		
25	Fire Extinguisher		
26	Spark Arrestor, if operated by using fuel (For Running Refinery/ Petrochemical/ Chemical Plant)		
27	Serial number plate with Load capacity		
28	TPI Certificate		
29	Colour Coding		
30	Insurance		
31	Pre Medical Check-up& Periodic Medical check-up (every 6 months) including vision test for Operator		
32	Safety Induction for Operator		
33	Others		

Signature & Name of Operator:

Signature & Name of Contractor's Concern Engineer

Signature & Name of Contractor's Safety Officer

Annexure- IX
(Special Conditions of Contract)

Additional Special Conditions of Contract

(i) The guidelines of NGT, Environment department and local administration

(ii) The bank solvency certificate as mentioned in para 2.2 Notes A of NIT is required if the total value of works awarded to a contractor a multiple tenders/contracts goes beyond Rs 25.00 Crs. However the bank solvency certificate is not required if the Estimated cost of the work put to tenders is equal to or less than 25 Cr.

(iii) The Net Worth as mentioned in para 2.2(ii) of NIT ;- The network capacity of would be considered if he is awarded multiple contracts.

(iv) The payment terms of MEP related works will be as under:-

A. For items involving Erection only:-

(a) 90% on Erection of material at site & acceptance by Engineer -in -Charge.

(b) 10% on testing, commissioning of the material and acceptance thereof by the Engineer- in - Charge.

B. **For items involving Supply & Erection:**

(a) 60% on supply of material at site & acceptance by Engineer in Charge.

(b) 30% on Erection of material at site and acceptance by Engineer in Charge.

(c) 10% on testing, commissioning of the material and acceptance thereof by the Engineer in Charge.

Note: Clause 3.0 of GCC will be applicable on above payment terms.

(v) Sufficient funds are available with Unitech for execution of works. If for any unforeseen reasons, there is shortage of fund for payment to contractors, in lieu of the work done, Unitech may exercise the option of offering the unsold inventory of the project at the current rate, discounted by 10% on that particular day, subject to the acceptance of the contractor.

SECTION 6

TECHNICAL SPECIFICATIONS:

(FIRE FIGHTING WORKS)

1.0 SCOPE OF WORK:

1.1 The scope of work as mentioned in BOQ covers supply, erection, painting, testing, commissioning, and handing over of complete Fire Protection System envisaged for all the buildings covered under the current phase of the project in line with stipulations of National Building Code – 2016.

Work under this sub-head consists of furnishing all Labour, Material, equipment and accessories necessary and required to completely install the Fire Fighting equipment etc., specified hereinafter and given in the Schedule of Quantities.

1.2 Without restricting to the generality of the foregoing, the work of Fire Fighting System shall include the followings:

a.) Providing M.S. black steel pressure pipe line main including Valves, Fire Hydrants, Excavation for Pipes, Laying of pipes, Painting of pipe and Making Connection to supply system.

b) Black Steel Pipe, Mains Laterals, Branches, Valves Hangers and Appurtenances.

c) Hose Reels, Rubberized fabric lined hose pipes, Hose cabinets & Landing Valves.

d) Portable Fire Extinguishers.

e) Hydrants (Internal, External & related accessories).

f) Sprinkler System as per Requirements of the basement.

g) Fire Fighting Pumps, Suction Delivery Lines, Electrical Panels & all other related accessories (as per requirements).

h) All civil and structural works, electrics, control & instrumentation, site & shop painting for fire fighting system.

2.0 APPLICABLE / REFERENCE CODES

1.	IS: 1239	(Part 1 & 2) - M.S. Pipe Heavy duty
2.	IS: 14846	Sluice valves (PN 1.6)
3.	IS: 6392-1971 -	Steel Pipe Flanges
4.	IS:554 -	Pipe threads where pressure tight joints are Required
5.	IS:909 -	U/G fire hydrants, sluice valve type
6.	IS:5312 (P-1) -	NRV
7.	IS:778 -	Gunmetal fullway valves with wheel tested to 20kg/cm^{2}class II

8.	Butterfly valves -	They shall be of specified quality conforming to IS:13095 or BS:5155
9.	IS:5290 -	Internal hydrant shall comprise “Single Headed Single Outlet GM Landing Valve” conforming to Type “A”.
10.	IS:12585 -	Hose tubing (Thermoplastic)
11.	IS:884 -	Hose tubing, Globe valve, Stop cock & Nozzle
12.	IS:636 -	Hose pipes rubber lined woven jacketed (RRL) & 63mm dia, conforming to type “A”
13.	IS:903 -	The couplings shall be of instantaneous [Branch pipe, nozzle, spring lock type Coupling etc]
14.	IS:15683 -	Portable fire extinguishers
15.	Pendant Sprinkler -	UL Listed, Temperature Rating 68oC (155 oF).
16.	Upright Sprinkler -	UL Listed, Temperature Rating 68oC (155 oF).
17.	Sidewall Sprinkler -	UL Listed, Temperature Rating 68oC (155 oF)

3.0 APPROVAL BY LOCAL FIRE SERVICE

It shall be the responsibility of the contractor to get the approval in stages from the Local fire Service as required. This shall be without any liability to the Engineer-in charge.

On successful completion of work, the contractor shall prepare as built drawings which have been so approved by the Fire Service incorporating all changes that might have been effected during execution of the work.

The contractor shall also bring to the notice of the Engineer-in-charge any deviations from Local Fire Service/Building Bye Laws Norms and requirements in the systems that he shall install as well as architectural features that will affect approval from the Fire Service. No extra charges shall be paid on account of interaction with the Fire Service.

4.0 COORDINATION

The Contractor shall be required to coordinate his activities with all other services such as Air Conditioning, Electrical and Civil (Interiors) etc.

5.0 CIVIL WORKS

All civil works are included in Contractor’s scope of work unless otherwise specified. Civil works like excavation for pipe laying underground with pedestal supports or chasing in the wall/ceiling or making hole in the RCC floor/ceiling or in brick wall for piping, grouting etc. including making good after completion, small size pedestals or any other minor civil works required in connection with the installation of the system are included in the scope of work of this contract and it shall be deemed to be included in the contractor’s scope of work.

Only the foundation for pumps in pump room shall be casted by civil contractor as per scope of work covered under separate package as per

requirement given the contractor.

The Contractor shall however furnish all details and relevant data required for design and detailed engineering of all civil works included in this design.

6.0 PIPING

6.1 Scope

The scope of this section comprises the Supply, Laying, Erection, Testing and Commissioning of pipes required for this project.

All piping laid shall be black steel unless otherwise stated. Pipes shall be given one primary coat of red oxide paint before being installed. Pipes and jointing shall be as follows:

Pipe Size	**Material**	**Jointing Method**
Upto 50mm	MS tube heavy class as per IS-1239	threaded Fitting
65mm to Above	MS tube heavy class as per IS-1239	Welding Joints

Pipe threads and flanges shall be as per IS.

6.1.1 All Fittings shall be new and from approved /reputed manufacturers, Fittings shall be of malleable castings of pressure ratings suitable for the piping system.

6.1.2 Flanges shall be new and from standard manufacturer as per I.S.6392-1971, Table 17 with appropriate number of G.I. Washers, Nuts and Bolts, half threaded of GKW make or equivalent with 3 mm insertion neoprene gasket complete.

6.1.3 All equipment and valve connections shall be through flanges (Welded or screwed for galvanized steel)

6.1.4 All welded piping is subject to the approval of the Engineer in charge. Sufficient number of flanges and unions shall be provided.

6.2 PIPING INSTALLATION

6.2.1 The Tender drawings to have Cross reference and indicate schematically the size and location of pipes. Pipes runs and sizes may, however, be changed to meet the site conditions. The Contractor on the award of the work shall prepare detailed working drawings showing the cross section, longitudinal section, detail of fittings, locations of isolating drain and air valves etc. They must keep in view the specific openings in buildings and other structures

through which the pipes are designed to pass.

6.2.2 Piping shall be properly supported on or suspended from stands, clamps, hangers etc., as specified and as required. The tenderer shall adequately design all the brackets, saddles, clamps, hangers etc. and be responsible for their structural integrity. Shop Drawings of all proposed supports to be submitted for approved before execution of work.

6.2.3 Pipe supports shall be of steel, adjustable for height and primer coated with rust preventive paint and finish coated black. Where pipe and clamp are of dissimilar material, a gasket shall be provided in between. Spacing of pipe supports on main headers shall not exceed 3.0 meters in any case, and additional supports shall be provided on all bends, tees, and valves etc. as per requirements. For the Sprinkler branching, the pipe supports shall be installed as per I.S. 15105.

Pipe hangers shall be fixed on walls and ceiling by means of metallic rawl plugs.

6.2.4 Vertical risers shall be parallel to walls and column lines and shall be straight and plumb. Risers passing from floor to floor shall be supported at each floor by clamps or collars attached to pipe and with a 12mm thick rubber pad or any other approved resilient material. Where pipes pass through the terrace floor, suitable curbing shall be provided to prevent water leakage. Risers shall also have a suitable concrete pipe support at the lowest point.

6.2.5 Pipe sleeves of 50mm larger diameter shall be provided wherever pipes pass through wall and the annular space filled with lead wool and finished with retaining rings.

6.2.6 Piping work shall be carried out with minimum disturbance to the other works being done at the site. A program of work shall be chalked out in consultation with the Engineer-in-charge.

6.2.7 Piping layout shall take due care for expansion and contraction in pipes.

6.2.8 All pipes using DI fittings shall be accurately cut to the required sizes and threaded in accordance with IS: 554 and burrs removed before laying. Open ends of the piping shall be locked as the pipe is installed to avoid entrance of foreign matter. Wherever reducers are to be made in horizontal runs, eccentric reducers shall be used if the piping is to drain freely, in other locations, concentric reducers may be used.

6.2.9 Contractor shall provide suitable cement concrete, anchor blocks of adequate dimensions as per spacing mentioned above & at all bends, tee connection and other places required and necessary for overcoming pressure thrusts in pipes wherever pipes are installed on-ground/underground. Anchor blocks shall be of cement concrete 1:2:4 mix (1 cement: 2 coarse sand: 4 stone aggregate 20 mm nominal size).

6.3 PIPE PROTECTION

6.3.1 All pipes above ground and in exposed locations shall be painted with one coat of Red Oxide Primer immediately after bringing the pipes to site and shall be painted with one coat of red oxide primer after erection and proper hydraulic testing, and two or more coats of Synthetic Enamel Paint of approved shade on finishing.

All black steel pipes under floors or below ground shall be provided with protection against corrosion after proper hydraulic testing by application of 100mm wide and 4mm thick layer of anti-corrosive protection tape over the pipe, with overlap of 25mm minimum as per manufacturers specifications.

6.3.2 Where pipes are buried under ground, after treated, the same shall be back filled with the excavated soil. The top of the pipes shall not be less than 100cms below the ground level. Where this is not possible, the permission of Engineer-In –charge shall be obtained for burying the pipes at lesser depth. Underground pipe shall be laid at least 2M away from the face of the building preferably along the roads and foots paths.

6.3.3 Vibration Elimination:

Piping installation shall be carried out with vibration elimination fittings wherever required.

6.4 TESTING

6.4.1 All piping shall be tested to hydrostatic test pressure of minimum 14 kg/cm^2 or 1.5 times the design pressure whichever is higher for a period of not less than 24 hours. All leaks and defects in joints revealed during the testing shall be rectified to the satisfaction of the Engineer-in-charge.

6.4.2 Piping required subsequent to the above pressure test shall be re-tested in the same manner.

6.4.3 System may be tested in sections and such sections shall be securely capped.

6.4.4 The Engineer-in-charge shall be notified well in advance by the contractor of his intention to test a section of piping and all testing shall be witnessed by the Engineer in-charge or his authorized representative.

6.4.5 The Contractor shall make sure that proper noiseless circulation of fluid is achieved through the system concerned. If proper circulation is not achieved due to air bound connections, the contractor shall rectify the defective connections. The Contractor shall bear all the expenses for carrying out the above rectification including the tarring - up and re - finishing of floors, walls etc. as required.

6.4.6 Complete Flushing out Test of Sprinklers installation shall be carried out to clean the sprinkler pipes for foreign materials before fixing the sprinkler heads to avoid obstruction in the sprinklers

6.4.7 The Contractor shall provide all materials, tools, equipment, instruments,

services and labour required to perform the test, and shall ensure that the plant room and other areas are cleaned up and spill over water is removed.

6.5 PAINTING

6.5.1 After the piping has been installed, tested and run for at least ten days. The piping shall be given two finish coats, 3 mils each of approved color.

6.5.2 The direction of flow of fluid in the pipes shall be visibly marked in white arrows or as directed by the Engineer-in-charge.

7.0 VALVES & ACCESSORIES

7.1 Sluice / Gate Valves

Sluice Valves above 65 mm shall be of Cast Iron body and Gunmetal seat. They shall conform to type PN 1.6 of IS: 780. Sluice valves up to 65mm shall be of Gunmetal Full way Valve with wheel tested to 20 Kg./cm2 class-II as per I.S: 778. Valve wheels shall be of right hand type and have an arrow head engraved or cast thereon showing the direction for turning open and closing.

7.2 Butterfly Valves

7.2.1. The Butterfly Valve shall be suitable for waterworks. The Valves conforming to IS : 13095 shall be provided. All valves shall be suitable to withstand the pressure in the system and rating shall be PN 1.6. All valves shall be right handed (i.e. handle or key shall be rotated clock wise to close the valve).

7.2.2 The direction of opening and closing shall be marked and an open / shut indicator fitted.

7.2.3 The material of valves shall be as under:-

Body - Cast iron

Disc - S.G Iron /Stainless Steel

Shaft - Stainless Steel

7.2.4 The Valve shall be fitted between two flanges on either side of pipe flanges. The Valve edge rubber shall be projected outside such that they are wedged within the pipe flanges to prevent leakages.

7.3 Non-Return Valve

Non-return valves shall be of Cast Iron body and Stainless Steel seat. They shall conform to API-594 and have companion flanges. They shall be Dual Plate Type suitable for both horizontal and vertical installation. An arrow mark in the direction of flow shall be marked on the body of the valve.

7.4 Air Release Valve

Air valves shall be provided at all high points in the piping system for venting valves shall be of the double float type, with G.M. body, vulcanite balls, rubber sealing, etc. Air valves shall be of the sizes specified and shall be associated

with an equal size forged ball valve.

7.5 Ball Valve

7.5.1 The Ball Valve shall be made from forged brass and tested to 25 Kg/ cm² pressure. The valve shall be internally threaded to receive pipe connections.

7.5.2 The Ball shall be made from brass and machined to perfect round shape and subsequently chrome plated. The seat of the valve body bonnet gasket and gland packing shall be of Teflon.

7.5.3 The handle shall be of chrome plated steel with PVC jacket. The handle shall also indicate the direction of 'open' and 'closed' situations. The gap between the ball and the teflon packing shall be sealed to prevent water seeping upto 16 Kg / cm² pressure.

7.5.4 The handle shall also be provided with a lug to keep the movement of the ball valve within 90 degree.

7.6 Suction Strainer

Strainers shall be preferably of the approved type with fabricated steel bodies designed to the test pressure of 16 Kg/ cm². Strainers shall be fabricated by minimum 1.2 mm thick stainless steel sheet with 3 mm dia. perforation holes. Strainers shall be provided with flanges or threaded sockets as required. They shall be designed so as to enable blowing out accumulated dirt and facilitate removal and replacement of screen without disconnection of the main pipe.

7.7 Pressure Gauges

Pressure gauges shall be of 150mm dia. dial and of appropriate range and be complete with shut off gauge valve etc. duly calibrated before installation. Care shall be taken to protect pressure gauges during pressure testing.

7.8 Flexible Connection for Pumps

All suction and delivery lines shall be provided with double flanged reinforced neoprene flexible pipe connectors. Connectors should be suitable for a working pressure of each pump. Length of the connector shall be as per manufacturer's details.

8.0 INTERNAL HYDRANTS

8.1 The Single headed Internal Hydrant outlet shall be as per IS: 5290 (Type-A), and as specified in the bill of quantities.

8.1.1 A cap with chain is provided on the head of the outlet. The hydrant will have an instantaneous pattern female coupling for connecting to Hose Pipe.

8.1.2 The Landing Valve shall be fitted to a Tee connection on the wet riser at the landing.

8.1.3 The Hydrant shall be constructed from gun metal and finished to a smooth

polish on screwed ends. The Hydrant shall have screwed inlet of 80mm dia. flanged type with 4 nos. holes. The Hydrant shall have a PVC plug with chain fixed to the main body of the Hydrant. The Hydrant shall be tested to minimum 20 kg / cm² test pressure. The Hydrant shall not leak at any screwed joint.

9.0 FIRST-AID HOSE REEL EQUIPMENT

9.1 First aid hose reel equipment shall comprise reel, drum which can swing up to 170 degrees, with hose, guide fixing wall bracket, hose tubing, globe valve, stopcock and nozzle. This shall conform to IS: 884 - 1969. The hose tubing shall confirm to IS: 444- 1980 or IS: 12585 (Thermoplastic). The drum shall be fabricated from GI sheet of minimum 18 gauge thickness or as specified in the bill of quantities.

9.1.1 The hose tubing shall be 20 mm dia and 36 m long, or as specified in the bill of quantities. The G.M nozzle 5mm and shutoff valve shall be of 25 mm size to shut off the water supply to the Hose Reel, or as specified in the bill of quantities.

9.1.2 The fixing bracket shall be of swinging type. Operating instructions shall be engraved on the assembly. This heavy duty mild steel and cast iron brackets shall be conforming to IS: 884 - 1969. The first-aid hose reel shall be connected directly to the M.S. pipe riser through a 25mm dia pipe.

9.1.3 A MS bracket shall be fixed on the wall to which the first aid hose reel shall be bolted. The bracket shall be of 40x40x5mm thick MS angle to form a square of 400x400 mm approx. This shall be fixed on the wall. After approval of sample by Engineer-in charge further units shall be fabricated in factory and all joints shall be finished with grinder and shall be spray painted after single coat of primer.

10.0 HOSE PIPES, BRANCH PIPES AND NOZZLES

10.1 HOSE PIPES

10.1.1 Two numbers Hose Pipes for Single headed External and Internal hydrants shall be rubber lined woven jacketed (RRL) and 63mm in dia. 15m long, (non percolating Reinforced rubber lined) conforming to IS:636 (Type A), or as specified in the bill of quantities. The hose shall be sufficiently flexible and capable of being rolled.

10.1.2 Each run of hose shall be complete with necessary Male & Female Gun Metal coupling at the ends to match with the landing valve or with another run of hose pipe or with branch pipe. The couplings shall be of instantaneous spring lock type. This shall be conforming to IS: 903.

10.2 BRANCH PIPES

10.2.1 Standard short sized Branch pipe shall be constructed from alloy of Gunmetal material, 63 mm dia and be complete with male instantaneous spring lock type coupling for connection to the hose pipe. The branch pipe shall be externally threaded to receive the nozzle conforming to IS: 903. The branch pipe shall to be tested to 20 kg/ cm2pressure.

10.3 NOZZLES

10.3.1 The nozzle shall be of Gunmetal, 20 mm internal diameter. The screw threads at the inlet connection shall match with the threading on the branch pipe. The inlet end shall have a hexagonal head to facilitate screwing of the nozzle on to the branch pipe with nozzle spanner.

10.3.2 End Couplings, Branch pipe, and Nozzles shall conform to IS:903 - 1985.

11.0 ORIFICE PLATE

11.1 The pressure in a Fire Fighting system varies from point to point. The pressure will be maximum in the pump house and minimum at the farthest hydrant at TOP level. To reduce pressure to operating pressure at every internal /external hydrant, orifice plates are provided before connection of landing valve between the flanges of landing valve and pipe flange.

12.0 FIRE BRIGADE INLET CONNECTIONS

12.1 Fire Brigade Inlet connection shall be provided near the pump house and to the external fire ring system as specified and as described in the BOQ, for the following purposes:

(a) Fire Brigade suction draw out connection for fire static tank with provision of foot valve.

(b) Fire brigade inlet connection to fire static tank.

(c) Fire brigade inlet connection to the external ring main. Each connection shall be in accordance with similar dia of Sluice valve and Non return valve.

12.2 The locations of these fire brigade connections shall be suitably decided with the approval of Engineer-in-charge and with a view that these are easily accessible to the fire brigade, without any possible hindrance.

13.0 VALVE CHAMBERS

Contractor shall provide suitable Brick Masonry Chamber in cement mortar 1:4 (1 cement: 4 coarse sand) on cement concrete foundations 150 mm thick in 1:5:10 mix (1 cement: 5 fine sand: 10 graded stone aggregate 40 mm nominal size) 12 mm thick plaster inside and outside finished with a floating coat of neat cement inside with cast iron surface box approved by fire brigade including excavation, back filling complete. .

14. WATER TYPE EXTINGUISHER (GAS PRESSURE TYPE)

14.1 The Extinguisher medium shall be primarily water stored under normal

pressure, the discharge being affected by release of Carbon Dioxide Gas from a 120 gms cylinder.

14.2 The capacity of Extinguisher, when filled up to the indicated level, shall be 9 liters.

14.3 The skin thickness of the cylinder shall be fabricated from Mild Steel sheet, welded as required, with dish and dome, being of same thickness, and of size not exceeding the diameter of body. The diameter of body to be not less than 150 mm and not exceeding 200 mm. The neck shall be externally threaded up to minimum depth of 16 mm, and leaded tin bronze.

14.4 The cap shall be of leaded tin bronze, and screwed on the body upto a minimum of 1.6 cm depth, with parallel screw thread to match the neck ring. The siphon tube to be of brass or G.I and the strainer of brass. The cartridge holder, knob, discharge fittings and plunger to be of Brass/Leaded tin bronze, and plunger of stainless steel, spring of stainless steel. It shall have a snifter valve to act as breather. The cap shall have handle fixed to it. The discharge hose shall be braided nylon, of 10 mm dia and 600 mm long, with a nozzle of brass fitted at end.

14.5 The extinguisher shall be treated for anti-corrosion internally and externally, and externally painted with Fire Red paint. The paint shall be stove enameled / powder coated. The cartridge shall be as per IS, and have 60 gm. Net carbon dioxide gas for expelling. The extinguisher, body and cap shall be treated to an internal hydraulic pressure of 25 kg/cm^2. It shall have external marking with letter A, of 2.5 cm height, in block letters within a triangle of 5 cm each side. The extinguisher shall be upright in operation, with the body placed on ground, and discharge tube with nozzle held in one hand to give a throw of not less than 6 meter, and continue so for at least 60 sec. The extinguisher body shall be clearly marked with ISI stamp (IS 15683).

14.3 **Carbon Dioxide Extinguisher**

14.3.1 The Carbon Dioxide Extinguisher shall be as per IS: 15683.

14.3.2 The Body shall be constructed of seamless tube conforming to IS: 7285, and having a convex dome and flat base. Its dia shall be maximum 140 mm, and the overlay height shall not exceed 720 mm.

14.3.3 The discharge mechanism shall be through a control valve conforming to IS: 3224. The internal siphon tube shall be of copper or aluminum conforming to relevant specifications.

14.3.4 Hose pipe shall be high pressure braided Rubber hose with a minimum burst pressure of 140 kg/cm^2, and shall be approximately 1.0 meters in length having internal dia of 10 mm. The discharge horn shall be of high quality unbreakable plastic with gradually expanding shape, to convert liquid carbon dioxide into gas form. The handgrip of Discharge horn shall be insulated with Rubber of appropriate thickness.

14.3.5 The gas shall be conforming to IS: 307 and shall be stored at about 85 kg/cm². The expansion ratio between stored liquid carbon dioxide to expanded gas shall be 1:9 times and total discharge time shall be minimum 10 sec. and Maximum 25 sec.

14.3.6 The extinguisher shall fulfill the following test pressures:

a. Cylinder: 236 kg/cm²

b. Control Valve: 125 kg/cm²

c. Burst pressure of Hose: 140 kg/cm² minimum.

14.3.7 It shall be an upright type. The cylinder, including the control valve and high pressure Discharge Hose must comply with relevant Statutory Regulations, and be approved by chief Controller of Explosives, Nagpur and also bear IS marking.

14.3.8 The Extinguisher including components shall be ISI Mark.

15. Any other item not mentioned above shall be executed as per the relevant CPWD specifications.

i. Part VI Fire Detection and Alarm System – 2018

ii. Part V Wet Riser & Sprinkler Systems – 2020.

iii. Part VIII Gas Based Fire Extinguishing System 2013

(ELECTRICAL WORKS)

1. GENERAL

The electrical Installation work shall be carried out in accordance with Indian Standard Code of Practice. It shall also be in conformity with the current Indian Electricity rules and regulations and requirements of the Local Electricity Supply Authority and Fire Insurance regulations so far as these become applicable to the installation. Electrical work in general shall be carried out as per following CPWD Specifications.

i) General Specifications for Electrical Works.(Part I)Internal Work - 2013.
ii) General Specifications for Electrical Works Part IV Sub Station 2013.
iii) General Specifications for Electrical Works Part VIII Gas Based Fire Extinguishing System - 2013.

Wherever these specifications calls for a higher standard of material and or workmanship than those required by any of the above mentions regulations and specification then the specification here under shall take.

2. LED LIGHT FIXTURES (INDOOR TYPE)

2.1. Scope of Work

Scope of work under this section as per BOQ shall include supply inspection/testing at suppliers/manufacturer's premises at site, receiving at site, safe storage, transportation from point of storage to point of erection, erection and commissioning of light fittings, fixtures and accessories for back of the house area including all necessary supports, brackets, down rods and painting etc. as required Light fixture can only be supplied after getting approval from Engineer-in Charge.

2.2. Technical and functional specifications

i) To supply, installation, testing & commissioning LED fixtures of up to 40 watt for Indoor application.

ii) IT should be made out of high quality materials and complying with industrial standard practices to ensure high reliability and ling lift.

iii) Efficacy of the fixture must be minimum 100 lumen/Watt.

iv) The light colour shall be cool day white.

v) Service Life of the fixture should be minimum 50,000 burning hours and shall be capable of continuous operation.

vi) The LED used should be of reputed make.

vii) The CRI of the fixture should be minimum 80 for indoor applications and 70 for outdoor applications.

viii) The CCT of the fixture should be minimum 5000 K-6500 K.

ix) The THD should be less than 10%.

x) To reduce the glare of the fitting diffuser shall be used.

xi) The fixtures shall be capable to operate having supply voltage range 120 to 270 volte AC with 47 to 53 Hz frequency.

xii) The electronic driver shall be constant current SMPS based LED driver.

xiii) The light fixture shall be capable to operate at operating temperature -10 to 50^0 C.

xiv) The housing of the indoor fixtures should be extruded aluminium/standard alloy housing,

xv) The IP category should be IP20 or higher for indoor applications and IP65 or higher for outdoor applications,

xvi) The Surge Protection to be provided conforming to relevant IS standards/IEC 61643- II Class-2 & EN 61643-II Type-2,

xvii) The manufacturers name/logo should be engraved/embossed on the housing/ body or Name/Logo on aluminium plate labels or Name/logo printed on housing/ body,

xviii) The warranty period on complete LED luminaire/fixtures including electronic driver, all accessories should be 1 year from the actual date of completion of work.

xix) The Power factor should be 0.95 or higher,

xx) The total power consumption of the fitting should not be more than 110% of rated capacity of LED light.

xxi) The driver should comply with CISPR 15 for limits and methods of measurement of Radio Disturbances Characteristics.

xxii) The LED fixtures shall be provided with arrangement (prefabricated holes in fixture/ mounting arrangement) so that they can be mounted in wall/ceiling without any hassle.

xxiii) The fixture shall carry a permanent identification as under

- Sr.No.
- Name/Year of manufacturing
- Rated wattage (input & output)
- Voltage input
- Batch no. for identification

xxiv) Each fitting shall have a terminal block suitable for loop-out connection by 1100 V PVC insulated copper conductor wires upto 4 sq.mm. the internal wiring should be completed by the manufacturer by means of standard copper wire and terminated on the terminal block.

xxv) All hardware's used in the fitting shall be suitably plated or anodized and passivated.

xxvi) Earthing : Each lighting fitting shall be provided with an earthing terminal. All metal or metal enclosed parts of the housing shall be bonded and connected to the earthing terminal so as to ensure satisfactory earthing continuity throughout the fixture.

xxvii) Luminaires and driver both shall be BIS certified individually.

3. Lighting Fixtures & Accessories

The light fixtures and fittings shall be assembled and installed in position completeand ready for service, in accordance with details, drawings, instructions and to the satisfaction of the Engineer-in-Charge

3.1 Standards :

The lighting and their associated accessories such as reflectors, housings, drivers etc., shall comply with the latest applicable standards, more specifically the following:

The Luminaire should be compliant to the following standards	
IEC 60529 -	Classification of degree of protections provided by enclosures
16103(Part 1):	2012 Led Modules for General Lighting- Safety Requirements
16103(Part 2):	2012 LED MODULES FOR GENERAL LIGHTING PART 2 PERFORMANCE REQUIREMENTS

IS 16107 (Part 1):	2012 LUMINAIRES PERFORMANCE PART 1 GENERAL REQUIREMENTS
IS 16107 (Part 2):	2012 LUMINAIRES PERFORMANCE PART 2
PARTICULAR REQUIREMENTS Section 1 LED Luminaire	
IS 16104 :	2012 d.c. or a.c. Supplied Electronic Control Gear for LED Modules - Performance Requirements
IS 16105	2012 Method of Measurement of Lumen Maintenance of Solid - State Light LED Sources
IS 16106	2012 - Method of Electrical and Photometric Measurements of Solid- State Lighting (Led) Products
IES LM-79-08	Electrical and Photometric Measurements for Solid StateLighting Products
IES LM-80-08	Measuring Lumen Maintenance of LED Light Sources IEC 60598-1 - General requirement and tests
IEC 60068-2-38	Specification for Permitted Humidity Test Immunity to interference EN 61547
EN 60598	(General Requirements & Tests)
EN 61547	Transient voltages, Voltage dips and fluctuations
EN 61000-3-3	Flicker
EN 55015	(RFI < 30 MHz)
EN 55022	(RFI > 30 MHz)
Safety	
	EN 60928 / IEC 928 / IS 13021 (Part I) Performance
	EN 60929 / IEC 929 / IS 13021 (Part II) Vibrations & Bump tests IEC 68-2-6 FC / IEC 9001
Quality Standard	
ISO 9001	Environmental Standard
ISO 14001	DC Operation
EN 60924	Emergency Lighting Operation VDE 0108

3.2 CERTIFICATIONS

The equipment offered should also have certifications issued by NABL or NABL approved Lab or Lab approved by DSIR, Ministry of Science & technology, Govt. of India and valid as on the due date of the tender, for critical technical specifications and compliance to standards. The minimum certifications required are:

- Type test certificates.
- Acceptance test certificates
- Lumen Depreciation Curve of LEDs used as per L70.
- Test report as per LM79 by vendor.
- LM 80 report for the LEDs used from manufacturer.
- IP certification report.

3.3 Document for submission

- The bidder shall furnish GA dimensional drawings with all views of Luminary pertaining to the model offered along with the technical bid.
- Type test certificates as mentioned above under Test Certificates.
- Technical Catalogue of product.
- Operating/fixing manuals / technical leaflets giving all the details of Installation, operation and maintenance.
- Certificates supporting periodic depreciation value.

3.4 Electronic driver

- Input voltage Range within 120Vrms to 270Vrms. Operating input voltage 240Vrms. No load power consumption ≤ 500mW.
- Output voltage ripple should be within 3%.
- Power factor 0.95
- Full Load Efficiency ≥ 90%
- THD ≤8 %.
- Load regulation ±5%

3.5 Installation

Fixtures shall be installed at mounting heights as detailed on the Drawings or as instructed on site by the Engineer.

Pendent fixtures within the same room or area, shall be installed plumb and at a uniform height from the finished floor. Adjustment of height shall be made during installation. Flush mounted recessed fixtures, shall be installed so as to completely eliminate leakage of light within the fixture and between the fixture and adjacent finish.

Fixtures mounted outlet boxes shall be rigidly secured to a fixture stud in the outlet box. Hickeys or extension pieces shall be installed where required to facilitate proper installation.

Fixtures located on the exterior of the building shall be installed with non-ferrous metal screws finished to match the fixtures.

All light fittings shall be supported with appropriate fixing accessories such as clips, supporting brackets, suspension sets, nuts, washers, screws etc. for their proper installation on different types of ceiling panels. Suspension sets shall be of adjustable type suitable to carry the weight of the lighting fittings unless otherwise stated or indicated on drawings.

3.6 Testing of installations:

After all lighting fixtures are installed and are connected their respective switches, test all fixtures to ensure operation on their correct switch in the presence of the representative of Engineer-in charge. All un-operating fixtures or ones connected to the wrong or inconveniently located switch shall be correctly connected as directed by the Engineer-in charge.

LT Cable

1. MEDIUM AND LOW PRESSURE:

Cables should be aluminium armoured earthed XLPE type with fire retardant compound Aluminium conductor FRLS overall sheathed 1100 volts grade conforming to the quality as specified in the schedule of work. All cables, accessories and other materials should conform to IS: 7098 amended up to date Specifications. No joint allowed in any of the cabling work.

2. TERMINATION JOINTS

Terminal joints shall be carried out inside the cable end boxes fixed on the equipment. Lugs shall be fitted by the means of bolts and nuts with the terminal studs. On the glands, armour of the cable shall be fixed by means of clamps which shall be grounded.

2.1 INSTALLATION OF CABLES

Cables in the LT Rooms of the Sub-Station/Towers shall be laid in trenches. All cables shall be bent in radius not less than 15 times the diameter of cables or as prescribed by the manufacturer whichever is higher. Cable laying shall be carried out as per CPWD specifications/ IS 1255 & as per Clause no. 3.5 of this specification.

2.2 L.T. CABLES

2.2.1 GENERAL

L.T. Cables shall be supplied, inspected, laid tested and commissioned in accordance with drawings, specifications, relevant Indian Standards specifications. Clearly written on the drums only after getting written approval of Engineer-in-Charge after having the inspection at factory. The recommendations of the cable manufacturer with regard to jointing and sealing shall be strictly followed.

2.2.2 CONSTRUCTION

L.T. Cables shall be XLPE insulated and PVC sheathed aluminium conductor armoured cables conforming to IS: 7098 (Part I) respectively. Cables shall be of 1100 volt and with ISI certification mark. Conductor of power cables shall be made of electrical purity aluminium conforming to IS: 8130-1984.

2.2.3 INSTALLATION OF CABLES

Cables shall be laid directly in ground, pipes, HDPE pipe, masonry ducts, on cable tray, surface of wall/ceiling etc. as indicated on drawings or schedule of quantities as per the direction of Engineer-in-Charge. Cable laying shall be carried out as per CPWD specifications.

2.3 INSPECTION

All LT Cables shall be inspected at factory for dispatch clearance & at site and checked for any damage during transit.

2.4 JOINTS IN CABLES

The Contractor shall take care to see that the cables received at site are apportioned to various locations in such a manner as to ensure maximum utilization and avoiding of cable joints. This apportioning shall be got approved from Engineer-in-Charge before the cables are cut to lengths.

2.5 CABLE LAYING

2.5.1 SCOPE

The scope of this section comprises specifications for laying of LT Cable in Ground, Surface and Cable Trays and in hume Pipe/Duct/trench as per CPWD guidelines.

2.5.2 Laying direct in ground

2.5.2.1 General

This method shall be adopted where the cable route is through open ground and where no frequent excavations are likely to be encountered and where re-excavation is easily possible without affecting other services.

Laying Cables in Ground (If required)

Cables shall be laid by skilled experienced workmen using adequate rollers to minimize stretching of the cables. The cable drums shall be placed on jacks before unwinding the cable. With great care it shall be unrolled on over wooden rollers placed in trenches at intervals not exceeding 2 meters. Cables shall be laid at depth of 1.2/0.75 meters below ground level for LT cables. A cushion of sand total of 250mm shall be provided both above and below the cable, joint boxes and other accessories. Cable shall not be laid in the same trench or alongside a water main. The cable shall be laid in excavated trench over 80mm layer of sand cushion. The relative position of the cables, laid in the same trench shall preserved. At all changes in direction in horizontal and vertical planes, the cables shall be bent smooth with a radius of bent not less than 12 times the diameter of cables. Minimum 3 meter long loop shall be provided at both end of cable. Distinguishing marks may be made on the cable ends for identifications of phases. Insulation, tapes of appropriate voltage and in red, yellow and blue colours shall be wrapped just below the sockets for phase identifications.

2.5.3 Laying in open ducts

Open ducts with suitable removable covers (RCC slabs or cheered plates) are generally provided in sub-stations, switch rooms, between the buildings etc., for taking the cables. The cable ducts should be of suitable dimensions

for the number of cables involved. Laying of cables with different voltage ratings in the same duct shall be avoided. Where it is inescapable to take HV & MV cables in same trench, they shall be laid with a barrier between them or alternatively, one of the two (HV/MV) cables may be taken through pipe(s). Splices or joints of any type shall not be permitted inside the ducts. The cables shall be laid directly in the duct such that unnecessary crossing of cables is avoided. Cables shall be fixed with clamps on the walls of the duct or taken in hooks/brackets/troughs in ducts. The size and material of saddles/clamps shall be as given under laying on surface.

Laying on surface

This method may be adopted in places like switch rooms, rising distribution) mains in buildings etc. This may also be necessitated in the works of additions and/or alterations to the existing installation, where other methods of laying may not be feasible.

Cables may be laid in surface by any of the following methods as specified:-

Directly clamped by saddles / clamps or tie belt.

Supported on cradles.

Laid on troughs/trays duly clamped.

The saddles and clamps used for fixing the cables on surface shall be 1 mm thick with fixing interval of 45 cm for cable of overall diameter up to 26 mm and 3mm thick 25mm wide with fixing interval of 60 cm for cable of overall diameter up to 45 mm. For cable of overall diameters above 45 mm the clamps shall be minimum of 3 mm thick 40 mm wide and fixing interval 60 cm. Additional clamping shall be provided at 30 cm from the center of bend on both sides. Saddles shall be secured with screws to suitable approved plugs. Clamps shall be secured with nuts on to the bolts, grouted in the supporting structure in an approved manner. In the case of single core cables, the clamps shall be of non-magnetic material. Suitable non corrosive packing shall be used for clamping unarmoured cables to prevent damage to the cable sheath. Cables shall be fixed neatly without undue sag or kinks. All MS components used in fixing the cables shall be either galvanized or given a coat of red oxide primer and finished with 2 coats of approved paint.

2.5.4 Laying on cable tray

This method may be adopted in places like indoor substations, switch rooms, electrical shaft etc., are where long horizontal runs of cables are required within the building and where it is not convenient to carry the cable in open ducts. The cable trays with their auxiliaries shall be perforated sheet type having sheet thickness 1.6/2 mm with perforation not more than 17.5%. The width of cable tray shall be chosen, so as to accommodate all the cables in one/two tier plus 30 to 50% additional width for future expansion. This additional width shall be minimum 100 mm. The overall width of one cable

tray shall be limited to 600 mm. All cable trays should be hot dipped Galvanized Iron type having Galvanization not less than 50 microns. The cable tray shall be bonded to the earth terminal of the Switchgear panel.

Factory fabricated bends, reducers, tee/cross junctions, etc., shall be provided as per good engineering practice. The radius of bends, junctions etc., shall not be less than the minimum permissible radius of bending of the largest size of cable to be carried by the cable tray.

The cable tray shall be measured on unit length basis, along the center line of the cable tray, including bends, reducers, tees, cross joints.

However, installation of cable trays including MS/GI steel structure/suspender etc. shall be in the scope of contractor and part of the cable tray works.

2.5.5 Laying in covered duct

Covered duct shall be provided between substation and switch rooms (where feasible) at Terminal Building for taking the cables. Suitable angle iron supports will be provided in this duct by Employer. The contractor shall fix the cables by using suitable clamps. The size and material of saddles/clamps shall be as given under laying on surface. Employer may opt for fixing cable trays on angle iron supports and taking / laying cables in trays.

2.5.6 Cables Hangers or Racks

The Contractor shall provide and install all iron hangers racks or racks with die cast cleats with all fixings, rag bolts or girder clamps or other specialist fixing as required. Where hangers or racks are to be fixed to wall sides, ceiling and other concrete structures, the Contractor shall be responsible for cutting away, fixing and grouting in rag bolts and making good. The hangers or racks shall be designed to leave at least 25 mm clearance between the cables and the face to which it is fixed.

Multiple hangers shall have two or more fixing holes. All cables shall be saddled at not more than 150mm centres. These shall be designed to keep provision of some spare capacity for future development.

Cable Tags & Cable Route Markers (If Required)

2.5.6.1 Cables Tags

Cable tags shall be made out of 2mm thick aluminum sheets/PVC, each tag 1-1/2 inch in dia with one hole of 2.5mm dia, 6mm below the periphery. Cable designations are to be punched with letter/number punches and the tags are to be tied inside the panels beyond the glanding as well as below the glands at cable entries. Trays tags are to be tied at all bends.

2.5.6.2 Testing of Cables

Prior to installation burying of cables, following tests shall be carried out. Insulation test between phases, phase & neutral, phase & earth for each

length of cable.

a. Before laying.

b. After laying.

c. After jointing.

On completion of cable laying work, the following tests shall be conducted in the presence of the Engineer in Charge.

a. Insulation Resistance Test (Sectional and overall).

b. Continuity Resistance Test.

c. Earth Test.

All tests shall be carried out in accordance with relevant Indian Standard code of practice and Indian Electricity Rules. The Contractor shall provide necessary

3. Any other item not mentioned above shall be executed as per the relevant CPWD specifications.

TECHNICAL SPECIFICATIONS

MEDIUM VOLTAGE DISTRIBUTION BOARDS

1 GENERAL

This section covers specification of DBs.

2. STANDARDS AND CODES

The following Indian Standard Specifications and Codes of Practice will apply to the equipment and the work covered by the scope of this contract. In addition the relevant clauses of the Indian Electricity Act 1910 and Indian Electricity Rules 1956 as amended upto date shall also apply. Wherever appropriate Indian Standards are not available, relevant British and/or IEC Standards shall be applicable.

BIS certified equipment shall be used as a part of the Contract in line with Government regulations. Necessary test certificates in support of the certification shall be submitted prior to supply of the equipment.

It is to be noted that updated and current Standards shall be applicable irrespective of those listed below.

Miniature Air Circuit Breakers for AC circuits IS 8828 : 1978

Degrees of Protection provided by enclosures for low voltage switchgear IS 2147 : 1962

Code of Practice for installation and maintenance of switchgear not exceeding 1000 volts IS 10118 : 1982

General requirements for switchgear and controlgear for voltages not exceeding 1000 volts IS 4237 : 1982

3. MINIATURE CIRCUIT BREAKERS

- The MCB's shall be of the completely moulded design suitable for operation at 240/415 Volts 50 Hz system.
- The MCB's shall have a rupturing capacity of 10 KA at 0.5 p.f.
- The MCB's shall have inverse time delayed thermal overload and instantaneous magnetic short circuit protection. The MCB time current characteristic shall coordinate with PVC cable characteristic.
- Type test certificates from independent authorities shall be submitted with the tender.

4. FINAL DISTRIBUTION BOARDS

- Final distribution boards shall be flush mounting, totally enclosed, dust and vermin proof and shall comprise of miniature circuit breakers, earth leakage circuit breakers, neutral link etc as detailed in the schedule of quantities.
- The distribution equipment forming a part of the Distribution Boards shall comply to the relevant Standards and Codes of the Bureau of Indian Standards and as per detailed specifications included in this tender document.

- The board shall be fabricated from 16 gauge CRCA sheet steel and shall have a hinged lockable spring loaded cover. All cutouts and covers shall be provided with synthetic rubber gaskets. The entire construction shall give a IP 42 degree of protection.
- Detachable Inner Door
- The bus-bar shall be of electrical grade copper having a maximum current density of 1.6 ampere per square mm and PVC insulated throughout the length. The minimum spacing between phases shall be 25 mm and between phase and earth 19 mm. Busbars shall be insulated.
- Separate neutral link for each phase shall be provided.
- All the internal connections shall be with either solid copper PVC insulated or copper conductor PVC insulated wires of adequate rating.
- All the internal connections shall be concealed by providing a hinged protective panel to avoid accidental contact with live points.
- All outgoing equipment shall be connected direct to the bus bar on the live side. The equipment shall be mounted on a frame work for easy removal and maintenance.
- The sheet steel work shall undergo a rigorous rust proofing process, two coats of filler oxide primer and final powder coated paint finish.
- All the circuits shall have an independent neutral insulated wire, one per circuit, and shall be numbered and marked as required by the Project Manager. Danger Plates shall be provided on the front door
- A sample of the completed board is to be got approved by the Project Manager before commencement of supply and erection.
- Before commissioning, the distribution boards shall be megger tested for insulation and earth continuity.

5 SHEET STEEL TREATMENT AND PAINTING

- Sheet Steel materials used in the construction of these units should have undergone a rigorous rust proofing process comprising of alkaline degreasing, descaling in dilute sulphuric acid and a recognised phosphating process. The steel work shall then receive two costs of oxide filler primer before final painting. Castings shall be scrupulously cleaned and fettled before receiving a similar oxide primer coat.
- All sheet steel shall after metal treatment be given powder coated finish painted with two coats of shade 692 to IS 5 on the outside and white on the inside. Each coat of paint shall be properly stoved and the paint thickness shall not be less than 50 microns.

6. NAME PLATES AND LABELS

- Suitable engraved white on black name plates and identification labels of metal for all Switch Boards and Circuits shall be provided. These shall indicate the feeder number and feeder designation.

TECHNICAL SPECIFICATIONS

MEDIUM VOLTAGE SWITCHGEAR

1. GENERAL

This section covers specification of Medium Voltage Switchboards incorporating items of switchgear like Circuit Breakers, SFUs, metering and protection

2 STANDARDS AND CODES

The following Indian Standard Specifications and Codes of Practice will apply to the equipment and the work covered by the scope of this contract. In addition the relevant clauses of the Indian Electricity Act 1910 and Indian Electricity Rules 1956 as amended upto date shall also apply. Wherever appropriate Indian Standards are not available, relevant British and/or IEC Standards shall be applicable.

BIS certified equipment shall be used as a part of the Contract in line with Government regulations. Necessary test certificates in support of the certification shall be submitted prior to supply of the equipment.

It is to be noted that updated and current Standards shall be applicable irrespective of those listed below.

Low Voltage switchgear & control gear	IS 13947 : 1993
Part I : General rules	
Part II : Circuit Breakers	
Part III : Switches, disconnections, switch disconnections and fuse combination units	
Part IV : Contactors &Motor starters	
Part V : Control circuit devices and switching elements Marking of Switchgear busbars	IS 11203 : 1985
Degree of Protection of Enclosures for low voltage switchgear.	IS 2147 : 1962
Electrical relays for power system protection	IS 3231 : 1986
Code of Practice for selection, installation and Maintenance of switchgear & control gear	IS 10118 : 1982
Low voltage switchgear & control gear assemblies	IS 8623 : 1993

3. SWITCHGEAR

3.1 Medium Voltage Air Circuit Breakers

3.1.1 Technical Parameters

- The circuit breaker shall be of the air break type, robust and compact design suitable for indoor mounting and shall comply with the requirement of IS: 13947 : 1993. Rupturing capacity shall be 31 MVA at 415 Volts or as per schedule of quantities.

3.1.2 Constructional Features

- The Circuit Breaker shall be flush front, metal clad, horizontal draw-out pattern, three/four pole as required and fully interlocked. Each Circuit Breaker shall be housed in a separate compartment enclosed on all sides.
- The Circuit Breaker cradle shall be designed and constructed to permit smooth withdrawal and insertion. The movement shall be free of jerks, easy to operate and positive.
- All current carrying parts in the breaker shall be silver plated and suitable arcing contacts shall be provided to protect the main contacts which shall be separate from the main contacts and easily replaceable. In addition, Arc chutes shall be provided for each pole, and these shall be suitable for being lifted out for the inspection of the main and the arcing contacts.
- Self aligning cluster type isolating contacts shall be provided for the Circuit Breaker, with automatically operated shutters to screen live cluster contacts when the Breaker is withdrawn from the cubicle. Sliding connections including those for the auxiliary contacts and control wiring shall also be of the self aligning type. The fixed portion of the sliding connections shall have easy access for maintenance purposes.
- The cubicle for housing the Breaker shall be free standing dead front pattern, fabricated from the best quality sheet steel.

3.1.3 Operating Mechanism

- The Circuit Breaker shall be trip free with independent manual spring operated or motor wound spring operated mechanism as specified and with mechanical ON/OFF indication. The operating mechanism shall be such that the circuit breaker is at all times free to open immediately the trip coil is energised.
- The operating handle and mechanical trip push button shall be at the front of and integral with the Circuit Breaker.
- The Circuit Breaker shall have the following four distinct and separate positions which shall be indicated on the face of the panel.

  "Service" -- Both main and secondary isolating contacts closed

  "Test" -- Main isolating contacts open and secondary isolating contacts

closed

"Isolated" -- Both main and secondary isolating contacts open

"Maintenance" -- Circuit Breaker fully outside the panel ready for maintenance

- The tests shall be carried out with a breaking performance during operation (Ics) and admissible short time withstand (Icw) equal to the ultimate breaking capacity (Icu). i.e. Icu = Ics = Icw for 1 Sec.
- All Air circuit breakers can be reverse fed without reduction in performance

3.1.4 Circuit Breaker Interlocking

- Sequence type strain free interlocks shall be provided to ensure the following:
- It shall not be possible for the Breaker to be withdrawn from the cubicle when in the "ON" position. To achieve this, suitable mechanism shall be provided to lock the Breaker in the tripped position before the Breaker is isolated.
- It shall not be possible for the Breaker to be switched "ON" until it is either in the fully inserted position or, for testing purposes, it is in the fully isolated position.
- It shall not be possible for the Circuit Breaker to be plugged in unless it is in the OFF position.
- A safety latch shall be provided to ensure that the movement of the Breaker, as it is withdrawn, is checked before it is completely out of the cubicle, thus preventing its accidental fall due its weight.
- Mechanical and electrical antipumping devices shall be incorporated in the ACB's as required.

3.1.5 Circuit Breaker Auxiliary Contacts

The Circuit Breaker shall have minimum 6 NO/NC auxiliary contacts rated at 16 amps 415 volts 50 Hz. These contacts shall be approachable from the front. They shall close before the main contacts when the Circuit Breaker is plugged in and vice versa when the Circuit Breaker is Drawn Out of the cubicle.

3. 1.6 Protective Devices

- The Circuit Breaker shall have protective devices as specified in the Schedule of Quantities. These will in general be:
- C.T. operated thermal overload releases with magnetic instantaneous short circuit release. The overload releases shall be such that each phase can be individually set depending on the phase unbalanced currents. The releases shall have inverse time current characteristics and the magnetic release shall be time delayed with a minimum setting of 25 ms varying upto 300 ms for discrimination without effecting the breaking current capacity of the ACB.
- Over voltage relay.

- Under/no voltage trip coil or Relay as required.
- Over current and earth fault IDMT relays with shunt/series trip coil operation as specified.
- The Circuit Breakers shall be suitable to accommodate one or more types of protection as specified.

3. 1.7 Instrument Transformers

The Circuit Breaker shall have the required Current Transformers as specified for metering and protection mounted outside the Circuit Breaker compartment but within the free standing cubicle. The transformers shall comply to the relevant Indian Standards and the Class of Accuracy required for metering and protection. Separate sets of Current transformers shall be provided.

3. 1.8 Metering

The metering required to be provided for each Circuit Breaker shall be as per the Schedule of Quantities. Such metering shall not be provided on the front panel of the Circuit Breaker compartment. A separate compartment shall be provided for the metering and Protective relays as required.

Square pattern flush mounting meters complying with the requirements of the relevant Indian Standards shall only be used.

Selector switches of the three way and OFF pattern complying to the relevant Indian Standards shall be used.

3. 1.9 Indicating Lamps

Neon type indicating lamps shall be provided for indication of phases and Breaker position as required in the Schedule of Quantities.

3.1.10 Control Wiring

All wiring for relays and meters shall be of copper conductor PVC insulated and shall be colour coded and labelled with appropriate plastic ferrules for identification. The minimum size of control wires to be used shall be 1.5 sq mm.

All control circuits shall be provided with protective MCB. Instrument testing plugs shall be provided for testing the meters.

3. 1.11Earthing

The frame of the Circuit Breaker shall be positively earthed when the Circuit Breaker is racked into the cubicle.

3. 1.12Type Test Certificates

The Contractor shall submit type test certificates from a recognised test house for the Circuit Breakers offered.

3.2. Moulded Case Circuit Breakers

Moulded case circuit breakers (MCCB) or fuse free breakers, incorporated in switchboards wherever required, shall conform to IS 13947 : 1993 in all respects. MCCBs shall be suitable either for single phase 240 Volts or 3 Phase 415 Volts AC 50 HZ supply.

MCCB cover and case shall be made of high strength heat resisting and flame

retardant thermosetting insulating material. Operating handle shall be quick make/break, trip - free type. Operating handle shall have suitable ON, OFF and TRIPPED indicators. Three phase MCCBs shall have a common handle for simultaneous operation and tripping of all the three phases. Suitable arc extinguishing device shall be provided for each contact. Tripping unit shall be of thermal/magnetic type provided on each pole and connected by a common tripe bar such that tripping of any one pole causes three poles to open simultaneously. Thermal/magnetic tripping device shall have IDMT characteristics for sustained over loads and short circuits.

Contact trips shall be made of suitable arc resistant sintered alloy. Terminals shall be of liberal design with adequate clearances.

MCCBs shall be provided with following accessories, if specified in drawings/schedule of quantities

- Under voltage trip
- Shunt trip
- Alarm switch
- Auxiliary switch

MCCBs shall be provided with following interlocking devices for interlocking the door a switch board.

- Handle interlock to prevent unnecessary manipulations of the breaker.
- Door interlock to prevent door being opened when the breaker is in ON position
- Deinter locking device to open the door even if the breaker is in ON position.

MCCBs shall have rupturing capacity as specified in drawings/schedule of quantities.

MCCBs shall be designed to prevent access to live parts when the cover is removed, means main current path of the circuit breaker should be isolated from auxiliary section i.e MCCB shall offer class– II front face.

3.3. Metering, Instrumentation And Protection.

Ratings, type and quantity of meters, instruments and protective devices shall be as per drawings and schedule of quantities.

Current Transformers

CTs shall confirm to IS 2705 (part -I, II and III) in all respects. All CTs used for medium voltage application shall be rated for 1 kV. CTs shall have rated primary current, rated burden and class of accuracy as specified in schedule of quantities/drawings. Rated secondary current shall be 5A unless otherwise stated. Minimum acceptable class for measurement shall be class 0.5 to 1 and for protection class 10. CTs shall be capable of withstanding magnetic and thermal stresses due to short circuit faults of 31 MVA on medium voltage. Terminals of CTs shall be paired permanently for easy identification of poles. CTs shall be provided with earthing terminals for earthing chassis, frame work and fixed part of metal casing (if any). Each CT shall be provided with rating plate indicating :

- Name and make
- Serial number
- Transformation ratio
- Rated burden
- Rated voltage
- Accuracy class

CTs shall be mounded such that they are easily accessible for inspection, maintenance and replacement. Wiring for CT shall be with copper conductor PVC insulated wires with proper termination works and wiring shall be bunched with cable straps and fixed to the panel structure in a neat manner.

Potential Transformer

PTs shall confirm to IS 3156 (Part-I,II and III) in all respects.

Measuring Instruments

Direct reading electrical instruments shall conform to IS 1248 or in all respects. Accuracy of direct reading shall be 1.0 of voltmeter and 1.5 for ammeters. Other instruments shall have accuracy of 1.5. Meters shall be suitable for continuous operation between -10o C and +500C. Meters shall be flush mounting and shall be enclosed in dust tight housing. The housing shall be of steel or phenolic mould . Design and manufacture of meters shall ensure prevention of fogging of instrument glass. Pointer shall be black in colour and shall have Zero position adjustment device operable from out side. Direction of deflection shall be from left to right. Selector switches shall be provided for ammeters and volt meters used in three phase system.

Ammeters

Ammeters shall be of moving iron type. Moving part assembly shall be with jewel bearings. Jewel bearings shall be mounted on a spring to prevent damage to pivot due to vibrations and shocks. Ammeters shall be manufacture and calibrated as per IS 1248.

Ammeters shall normally be suitable for 5 A secondary of current transformers.

Ammeters shall be capable of carrying substantial over loads during fault conditions.

Voltmeters

Voltmeters shall be moving iron type range of 3 phase 415 volt voltmeters shall be 0-500. Volt meters shall be provided with protection MCB.

Watt meter

Wattmeter shall be of 3 phase electro dynamic type and shall be provided with a maximum demand indicator if required.

Power factor meters

3 phase power factor meters shall be of electro dynamic type with current and potential coils suitable for operation with current and potential transformers provided in the panel. Scale shall be calibrated for 50% lag - 100% - 50%

readings. Phase angle accuracy shall be +40.

Energy and reactive power meters

Trivector meters shall be two element, integrating type, KWH, KVA, KVA hour reactive meters. Meters shall confirm to IEC 170 in all respects. Energy meters, KVA, and KVARH meters shall be provided with integrating registers. The registers shall be able to record energy conception of 500 hours corresponding to maximum current at rated voltage and unity power factor. Meters shall be suitable for operation with current and potential transformers available in the panel.

Relays

Protection relays shall be provided with flag type indicators to indicate cause of tripping. Flag indicators shall remain in position till they are reset by hand reset. Relays shall be designed to make or break the normal circuit current with which they are associated. Relay contacts shall be of silver or platinum alloy and shall be designed to withstand repeated operation without damage. Relays shall be of draw out type to facilitate testing and maintenance. Draw out case shall be dust tight. Relays shall be capable of disconnecting faulty section of network without causing interruption to remaining sections. Analysis of setting shall be made considering relay errors, pickup and overshoot errors and shall be submitted to Project Manager for approval.

Over current relays

Over current relays shall be induction type with inverse definite minimum time lag characteristics. Relays shall be provided with adjustable current and time settings. Setting for current shall be 50 to 200 % insteps of 25%. The IDMT relay shall have time lag (delay) of 0 to 3 seconds. The time setting multiplier shall be adjustable from 0.1 to unity. Over current relays shall be fitted with suitable tripping device with trip coil being suitable for operation on 5 Amps.

Earth fault relay

Same as over current relay excepting the current setting shall be 10% to 40% in steps of 10%.

Under voltage relay

Under voltage relays shall be of induction type and shall have inverse limit operation characteristics with pickup voltage range of 50 to 90% of the rated voltage.

3.4. Power Factor Correction Capacitors

Power factor correction capacitors shall conform to IS 2834 in all respects. Approval of insurance association of India shall be obtain if called for. Capacitors shall be suitable for 3 phase 415 volts 50 HZ supply and shall be available in single and three phase units of 5, 10, 15, 25, 25, 50 kVAR sizes as specified. Capacitor shall be usable for indoor use, permissible overloads being as below.

- Voltage overloads shall be 10% for continuous operation and 15% for six hours in a 24 hours cycle.
- Current overloads shall be 15 % for continuous operations and 50% for six hours in a 24 hours cycle.

- Over load of 30% continuously and 45% for six hours in a 24 hours cycle.

Capacitors shall be hermetically sealed in sturdy corrosion proof sheet steel containers and impregnated with non inflammable synthetic liquid. Every element of each capacitor unit shall be provided with its own built in protection. Capacitors shall have suitable discharge device to reduce the residual voltage from crest value of the rated voltage to 50 volts or less within one minute after capacitor is disconnected from the source of supply. The loss factor of capacitor shall not exceed 0.005 for capacitors with synthetic impregnates The capacitors shall withstand power frequency test voltage of 2500 volts AC for one minute. Insulation resistance between capacitors terminals and containers when a test voltage of 500 volts DC is applied shall not be less than 50 meg.ohms.

4. MEDIUM VOLTAGE SWITCH BOARDS

4.1 General

- All medium voltage switchboards shall be suitable for operation at three phase/three phase 4 wire, 415 volt, 50 Hz, neutral grounded at transformer system with a short circuit level withstand of 31 MVA at 415 volts or as per schedule of quantities.
- The Switch Boards shall comply with the latest edition with upto date amendments of relevant Indian Standards and Indian Electricity Rules and Regulations.

4.2 Switch Board Configuration

- The Switch Board shall be configured with Air Circuit Breakers, MCCB's, and other equipment as called for in the Schedule of Quantities.
- The MCCB's shall be arranged in multi-tier formation whereas the Air Circuit Breakers shall be arranged in Single or Double tier formation only to facilitate operation and maintenance.
- The Switch Boards shall be of adequate size with a provision of 10% spare space to accommodate possible future additional switch gear.

4.3 Equipment Specifications

All equipment used to configure the Switch Board shall comply to the relevant Standards and Codes of the Bureau of Indian Standards and to the detailed technical Specifications as included in this tender document.

4.4 Constructional Features

- The Switch Boards shall be metal enclosed, sheet steel cubicle pattern, extensible, dead front, floor mounting type and suitable for indoor mounting.
- The Switch Boards shall be totally enclosed, completely dust and vermin proof. Synthetic rubber gaskets between all adjacent units and beneath all covers shall be provided to render the joints dust and vermin proof to provide a degree of protection of IP 42/IP 54 as specified. All doors and covers shall also be fully gasketed with synthetic rubber and shall be lockable.
- The Switch Board shall be fabricated with CRCA Sheet Steel of thickness not less than 1.6 mm and shall be folded and braced as necessary to provide a rigid support for all components. The doors and covers shall be constructed from CRCA sheet steel of thickness not less than 1.6 mm. Joints of any kind in sheet metal shall be seam welded and all welding slag ground off and welding pits wiped smooth with plumber metal.
- All panels and covers shall be properly fitted and square with the frame. The holes in the panel shall be correctly positioned.
- Fixing screws shall enter holes tapped into an adequate thickness of metal or provided with hank nuts. Self threading screws shall not be used in the construction of the Switch Boards.

4.5 Switchboard Dimensional Limitations

- A base channel 100 x 50 x 6 mm thick shall be provided at the bottom.
- A minimum of 200 mm blank space between the floor of switch board and bottom most unit shall be provided.
- The overall height of the Switch Board shall be limited to 2300 mm
- The height of the operating handle, push buttons etc shall be restricted between 300 mm and 2000 mm from finished floor level.

4.6 Switch Board Compartmentalisation

The Switch Board shall be divided into distinct separate compartments comprising

- A completely enclosed ventilated dust and vermin proof bus bar compartment for the horizontal and vertical busbars.
- Each circuit breaker, and MCCB shall be housed in separate compartments enclosed on all sides.
- Sheet steel hinged lockable doors for each separate compartment shall be provided and duly interlocked with the breaker in "on" and "off" position.
- For all Circuit Breakers separate and adequate compartments shall be provided for accommodating instruments, indicating lamps, control contactors and control MCB etc. These shall be accessible for testing and maintenance without any danger of accidental contact with live parts of the circuit breaker, busbars and connections.
- A horizontal wire way with screwed cover shall be provided at the top to take interconnecting control wiring between vertical sections.
- Separate cable compartments running the height of the Switch Board in the case of front access Boards shall be provided for incoming and outgoing cables.
- Cable compartments shall be of adequate size for easy termination of all incoming and outgoing cables entering from bottom or top.
- Adequate and proper support shall be provided in cable compartments to support cables.

4.7 Switch Board Bus Bars

- The Bus Bar and interconnections shall be of electrolytic Copper/Aluminium and of rectangular cross sections suitable for full load current for phase bus bars and half rated current for neutral bus bar. The maximum current density for copper shall be 1.6 amps per sq. mm. and for Aluminium shall be 1 amp per Sq. mm. and suitable to withstand the stresses of a 31 MVA fault level or at 415 volts for 1 second or as per schedule of quantities.
- The bus bars and interconnections shall be insulated with insulation tape/ fiber glass.
- The bus bars shall be extensible on either side of the Switch Board.

- The bus bars shall be supported on non-breakable, non-hygroscopic insulated supports at regular intervals, to withstand the forces arising from a fault level of 31 MVA at 415 volts for 1 second.
- All bus bars shall be colour coded.
- All bus bar connections in Switch Boards shall be bolted with brass bolts and nuts. Additional cross section of bus bars shall be provided wherever holes are drilled in the bus bars.
- All TRIP/CLOSE/INDICATION circuit shall be compatable on 24V DC. Accordingly all relay & CTs etc shall be 24 V DC.

4.8 Switch Board Interconnections

- All connections between the bus bars/Breakers/cable terminations shall be through solid tinned copper strips of adequate size to carry full rated current and PVC/fibre glass insulated.
- For unit ratings upto 100 amps PVC insulated copper conductor wires of adequate size to carry full load current shall be used. The terminations of all such interconnections shall be crimped and aluminium lugs shall be used.

4.9 Drawout Features

Air Circuit Breakers shall be provided in fully draw out cubicles. These cubicles shall be such that draw out is possible without disconnection of the wires and cables. The power and control circuits shall have self aligning and self isolating contacts. The fixed and moving contacts shall be easily accessible for operation and maintenance. Mechanical interlocks shall be provided on the draw out cubicles to ensure safety and compliance to relevant Standards. The MCCB's shall be provided in fixed type cubicles.

4.10 Instrument Accommodation

- Instruments and indicating lamps shall not be mounted on the Circuit Breaker Compartment door for which a separate and adequate compartment shall be provided and the instrumentation shall be accessible for testing and maintenance without danger of accidental contact with live parts of the Switch Board.
- For MCCB's instruments and indicating lamps can be provided on the compartment doors.
- The current transformers for metering and for protection shall be mounted on the solid copper/aluminium busbars with proper supports.

4.11 Wiring

All wiring for relays and meters shall be with PVC insulated copper conductor wires. The wiring shall be coded and labelled with approved ferrules for identification. The minimum size of copper conductor control wires shall be 1.5 sq. mm.

4.12 Cable Terminations

- Knockout holes of appropriate size and number shall be provided in the Switch Board in conformity with the location of incoming and outgoing conduits/cables.
- The cable terminations of the Circuit Breakers shall be brought out to terminal cable sockets suitably located at the rear of the panel.
- The cable terminations for the MCCB's shall be brought out to the rear in the case of rear access switchboards or in the cable compartment in the case of front access Switch Boards.
- The Switch Boards shall be complete with tinned brass cable sockets, tinned brass compression glands, gland plates, supporting clamps and brackets etc for termination of 1100 volt grade aluminium conductor PVC/PVCA cables.

4. 13 Space Heaters

The Switch Board shall have in each panel thermostatically controlled space heaters with a controlling 15 amp 230 volt switch socket outlet to eliminate condensation.

4. 14 Ventilation Fans

The Switch Board shall be provided with panel mounting type ventilation fans in each panel with switchgear rated for 2500 amp and above. The fan shall be interlocked with switchgear operation.

4.15 Earthing

A main earth bar of G.I./copper as required shall be provided throughout the full length of the Switch Board with a provision to make connections to the sub-station earths on both sides.

4.16 Sheet Steel Treatment And Painting

- Sheet Steel materials used in the construction of these units should have undergone a rigorous rust proofing process comprising of alkaline degreasing, descaling in dilute sulphuric acid and a recognised phosphating process. The steel work shall then receive two costs of oxide filler primer before final painting. Castings shall be scrupulously cleaned and fettled before receiving a similar oxide primer coat.
- All sheet steel shall after metal treatment be spray or powder painted with two coats of shade 692 to IS 5 on the outside and white on the inside. Each coat of paint shall be properly stoved and the paint thickness shall not be less than 50 microns.

4.17 Name Plates And Labels

Suitable engraved white on black name plates and identification labels of metal for all Switch Boards and Circuits shall be provided. These shall indicate the feeder number and feeder designation.

5.0 CONTROL, OPERATION AND LOAD MANAGEMENT THROUGH PLC PANEL

5.1 Programmable Logic Controller (PLC)

Operation of DG sets shall be monitored and controlled by a Programmable Logic Controller (PLC) which shall actuate and control Auto Mains Failure, Auto Changeover / Interlocking and Auto Load Management functions along with fault annunciation, alternator control and protection. The PLC Panel shall be provided with a **total manual over-ride**. The panel shall be complete with all Auxiliary Relays, Timers, Contactors, Programmable Logic Controller, control wiring with 1.5 sq mm PVC insulated 1100 V grade copper conductor wires, interconnections etc. as required as per schedule of quantities and schematic wiring diagram. The PLC Panel shall ensure providing suitable software interlocks, in addition to hard wired interlocks, to achieve the following sequence of operation.

PLC shall be of state-of-art technology, microprocessor based, fully programmable, modular in Construction with DIN Rail mounting facility. It should be able to perform functions like boolean logic, bracked operation, result assignment, setting/resetting (latching/unlatching), counter and timer functions, load transfer, comparison and jump operation, block calls, special function, logical word gating & arithmetic operations.

PLC or Controller shall have Microprocessor (CPU) with EPROM/EEPROM which will be non-voltile memory & shall be modular & plug in type. In addition the CPU contains:

- As internal power supply (24V / 9V DC)
- Also internal power supply for input / output Modules.
- An internal programme memory (RAM) with battery back up to save the contents of the RAM in the event of power failure. RAM memory size should be 4K bytes & above.
- A programmer port
- Built in “COPY” function to save and transfer use programme without a programmer. The programme transfer would be from memory sub mosdule to internal RAM of CPU.
- Application program modules like Analog Input/Outpur Modules. Digital Input/Output modules for programme algorithams specified. The modules should be Moduler plug-in type with in-built LEDs for status indication of each Input/Outpur. The output modules should be adequate ratings for driving various loads like cranking, fuel Solenoid, ACB closing & trip Coils etc either directly or through interposing relays.
- Execution time of the CPU should be in the range of 2ms to 7ms for 1K binary statements.

The PLC shall have high degree of accuracy for Analog Inputs/Outputs. The PLC shall be suitable for operation in ambient weather conditions of 0 to 50^{o}C & 15 to 95% humidity.

The offer for the system shall be complete in all respect, clearly specifying the bill of materials, make of various components selected number of Analog & Digital Inputs/Outputs considered in the offer alongwith complete technical details of the PLC selected like RAM/EPROM/EEPROM Memory size, execution time, I/O capacity, no of programmable timers/counters, internal flags etc.

5.1.1 Auto Synchronization.

The Auto Synchronization of the DG Sets shall be the part of DG Set manufacturer. The controller of DG set PCC 3100 Cummins/ equivalent shall be provided by DG set supplier which shall synch DG Set and PLC shall monitor and provide command to breaker ON/ OFF. The DG set shall take command to start/ stop from ATS /or through PLC to start DG Set in case of failure of supply/ restoration of supply depending upon total **sum up load on transformer.**

5.1.2 Auto Mode and Auto Load Management

a) System Operation

- While the normal mains supply is healthy, the DG set shall be at rest and the load shall be supplied by the mains. During this period all the bus couplers shall be in OPEN position.
- The PLC system shall monitor supply voltage on each phase. When the mains supply fails completely or falls below set value (variable between 80% to 95% of the nominal value) on any phase, the monitor module shall initiate start up of diesel engine. To avoid initiation due to momentary dips or system disturbance, a time delay adjustable between 0.5 to 5 seconds (adjustable) shall be incorporated in the start up initiation.
- The Mains supply circuit breaker shall open before the alternator circuit breaker closes. Before giving close command to alternator breaker, all the bus couplers shall be given close command. At this point of time all the load shall be on one DG. System provided in the PLC Panel shall check and ensure that all the engine auxiliaries like lub oil pump, CT fan, cooling water pump are running and healthy. In case of any fault in engine auxiliaries, the system shall automatically stop the DG set and an audio visual alarm shall be given. Suitable inputs for overload and single phase preventor for alternator and for each of the engine auxiliaries shall also be considered as inputs for this function.
- PLC system shall continuously monitor total load on the DG set. In case the load on any of the DG sets is less than 60% of the rated value, the PLC shall assess the load on the adjacent DG set. In case the summation of the loads is within 90% of the rating of one of the DG sets, one DG set shall shut down and load shall be transferred to the

second DG set. In case the total load on the system is not more than 90% of the full load rating of a single DG set, the PLC controller shall shut down two DG sets and transfer the total load to any one of the three DG sets. In case a DG set is shut down due to non availability of adequate load and should the load increase, the PLC shall automatically start the DG set and shall isolate the buses/loads on the Main LT panel bus.

- The Automatic Load Management system shall be designed to provide optimum utilisation of the DG sets so that operation of the DG sets is need based with higher load factor on each set. The system would therefore transfer loads from one bus to the other on the Main LT panel with automatic control of the interlocks and operation of the incoming and Bus Section ACB's on the Main L.T. panel as per logic sequence required. The PLC shall ensure that that the ACB's are closed and opened and DG sets are started and stopped according to the predetermined logic and interlocking scheme to provide a fail safe system.
- When the voltage in the mains get restored, its quality shall be monitored for about one minute and if proven satisfactory, the main supply breaker shall close automatically for retransfer of the load from Diesel engine to the main supply at LT Panel. However prior to this operation DG and bus coupler breakers shall open to ensure that all the bus couplers all the bus couplers are in open position before the mains breaker closed.
- The Automatic Logic Management system shall also consider that in the eventuality of failure of any component of the PLC adequate safeguards shall be provided in that the system shall revert to the manual mode with visual and audible alarms. These safeguards and the system shall be detailed in the offer.
- The Logic Panel shall automatically arrange for sequential starting of DG sets to be based on number of operating hours of each DG set so that to ensure that all DG sets are operated as equally as possible.
- In case of overload on the DG system, the logic panel shall given an audio visual alarm to enable the operators to switch off loads as required and if this is not taken care of in predetermined time, the Logic Panel shall put the DG in shut down mode with alarm.
- The DG set shall stop after idle running of one minute after restoration of main supply.
- The DG sets reverts to standby conditions and is ready to start should the mains supply fail again.
- Sequence of operation for Autostart & load management
- One failure of grid supply all grid breaker shall be switched off and all bus coupler breaker shall be switched on automatically.
- On failure of grid supply, DG-1 shall start automatically and PCC shall close its breaker and shall start feeding the load.
- On DG-1 attaining its full rated capacity, DG-2 shall start automatically.

- It shall be possible to alter sequence of DG set starting through manual selectors or through Man Machine Interface.
- Active Power shall be made equal on both the machines automatically with the help of active load balancing system through governor control.
- Load management system shall have necessary output contacts for tripping various loads by field wiring and also trip the breaker of different DG set and give alarm for shutting off DG in accordance with predefined parameters to avoid under loading/ over loading/ cascading effect of tripping and unnecessary fuel wastage.
- On restoration of grid supply, DG breakers and Bus coupler breakers shall be switched off in sequence with time delays to cover dips and grids supply breakers shall be switched ON. DG sets shall continue to run for one minutes after DG breaker has been switched OFF.
- It shall be possible to alter crucial settings/time delays thru. Man Machine Interface
- PLC, annunciation system, protection system and metering system shall have compatibility for future interface with PC for graphics displays/report generation.
- System shall have total manual override.
- Tenderers may note that the PLC controls and sequence of operation are indicative of requirements and the PLC shall, not withstanding the above, be complete in all respects to achieve the control, monitoring and operation of DG sets indicated above.

5.1.3 Manual Mode

- Under manual mode it shall be possible for the operator to start up the generator set by pressing the (START) push button.
- Alternator, mains and bus coupler circuit breakers 'CLOSE' and 'TRIP' operations as per logic sequence required shall be manual by pressing the appropriate push button on the panel. Closure shall be feasible only after alternator has built up full voltage. If the load is already on 'MAINS' pressure on 'CLOSE' button shall be ineffective.
- When running under manual mode, if the mains supply has failed, the load shall automatically get transferred to the alternator immediately overriding the stipulation of pressure on 'CLOSE' button.
- Engine shut down, other than due to faults shall be manual by pressing a 'STOP' button.

5.1.4 Test Mode

- When under 'TEST' mode pressure of 'TEST' button shall complete the start up sequence simulation and start the engine. The simulation will be that of mains failure.

- Engine shall build up voltage but the set shall not close alternator circuit breaker when the load is on the mains. Monitoring performance for voltage/frequency etc. should be feasible without supply to load.
- If during TEST run the power supply has failed, the load shall automatically get transferred to alternator.
- Bringing the mode selector to auto position shall shut down the sets.

5.1.5 The necessary software shall be loaded in PC with graphics /Alarms / Layout of DG status of cooling tower / pumps / with voltage / Frequency/ kWH / kVA details of all DG sets and Transformer through RS 485 port of energy meters provided in panels.

6. OUTDOOR TYPE DISTRIBUTION FEEDER PILLARS

The feeder pillar shall be of the floor mounting type, totally enclosed, and weather proof, conforming to ISI IP 54. The feeder pillar shall be suitable for 440 volts 3 phase 4 wires, 50 cycles AC supply.

The cubicle should be fabricated out of heavy gauge sheet steel of thickness not less than 2 mm thick with suitable side frame and stiffeners. Hinged doors of not less than 1.6 mm thick should be provided at the front and rear of the cubicle to provide access for installation, operation, tests and inspection. The rear door is provided to facilitate cable termination and the front door for inspection of breaker, to switch 'ON' and 'OFF' the switch as and when required. All doors should be fitted with dust excluding neoprene gaskets. The doors should also be fitted with suitable locking arrangement with lock to prevent unauthorized opening. The cubicle should be designed for mounting over cement concrete plinths by the roadside, and should be of substantial construction capable of withstanding the vibrations normally experienced due to vehicular traffic. The top of the feeder pillar is of slanting construction in all directions to prevent any collection of water due to rain. A gland plate is provided at the bottom of the feeder pillar (removable) for mounting the cable glands. The feeder pillar shall be fitted on an angle iron pedestal at the bottom covered with sheet metal from all the four sides which facilitates cable bending etc specially with aluminium cables. Two lifting hooks shall be provided at the top. A door switch shall be provided in the feeder pillar so as to switch 'ON' and 'OFF' the lamp fixed in the brass batten holder below the top sheet of the pillar.

The sheet steel materials used in the construction of the cubicle should have undergone a rigorous rust proofing process comprising alkaline degreasing, descaling in dilute sulphuric acid solution and recognised phosphating process. After metal treatment, the interior of the cubicle should be painted with two coats of air-drying red lead primer followed by two coats of air drying anti-condensation paint. The exterior of the cubicle should be painted with two coats of staving red oxide primer followed by one coats of epoxy finishing paint. One final spray of epoxy paint shall be applied at the time of handing

over the installation.

All the nuts, bolts shall be cadmium plated with spring washers. A minimum spacing from cable connection to the bottom of gland plate shall be 300mm.

The bus bars should be of electrical grade copper. They should be air insulated with adequate clearances between conductors and between conductors and earth. These should be colour coded to enable immediate identification of the phases and neutral. The current density for bus bars shall not be more than 1.0 amps per square mm. All bus bar joints and tapings should be of the clamped type as far as possible thereby avoiding drilling of holes on bus bars. The bus bars should be carried on supports made out of a suitable non-inflammable and non-hygroscopic material such as Hylam, Permali or Formics. Suitable insulating phase barriers should be provided to prevent accidental short-circuits during operation.

The neutral bus bar shall be rated at 100 % of the phase bus bars. The design should allow for neutral cable sockets to be fitted directly to the bus bars. A GI earth bar of size 40x5mm together with two cable eyes shall be provided for connections to earth pits. All the cables shall be terminated at ELEMEX terminal block and therefrom wiring shall be done with PVC insulated aluminium conductor cable to breaker units. The wiring shall be neatly bunched and shall be secured to wiring cradles.

A circuit cardholder to be made inside the front door and the card duly engraved / painted on aluminium / hylam sheet, Identification ferrules shall be used for incoming and out going cables.

7. TESTING AT WORKS

Copies of type test carried out at ACB/MCCB manufacturers works and routine tests carried out at the switchboard fabricators shop shall be furnished along with the delivery of the switchboards. Project Manager reserves the right to get the switchboard inspected by their representative at fabricators works prior to dispatch to site to witness the routine tests as per clause 7.7 of SCC

8. INSTALLATION

The foundations prepared as per the manufacturers drawings shall be leveled, checked for accuracy and the Switch Board installed. All bus bar connections shall be checked with a feeler gauge after installation. The able end boxes shall be sealed to prevent entry of moisture. The main earth bar shall be connected to the sub-station earths.

A 15 mm thick rubber matting of approved make on a 100 mm high timber platform shall be provided in front of and along the full length of the Switch Board. The width of the matting shall be 1000 mm. The rubber mat shall withstand 15 KV for 1 minute and leakage current shall not exceed 160 mA/sq. metre.

After installation the Switch Board shall be tested as required prior to commissioning.

9. TESTING AT SITE

Pre-commissioning tests as required and as per manufacturers recommendations shall be carried out on each switch boards at site before energizing the switchboards including but not restricted to the following.

- Physical checking of the switchboards including checking alignment of panels, interconnection of Bus bars, tightness of bolts/connections and evidence of damage/cracks in any components.
- Physical checking and inspections of Inter panel wiring
- Checking free movement of ACBs/MCCBs/SFUs
- Checking of operation of breakers
- Insulation tests of bus bar supports and control wiring etc. with 1.1 kV megger.
- Primary & secondary injection tests of relays and CTs.
- Checking of Interlocking function.

TECHNICAL SPECIFICATIONS
33 kV Vacumn Circuit Breaker panel board (Indoor type)

1. GENERAL

The technical specifications covers for 33 kV Switchboards suitable for 33 kV, 3 phase, 50 Hz, earthed system with a fault level of 1500 MVA at 33 kV. The equipment shall be suitable for continuous operation in the stipulated ambient conditions.

The equipment shall be of type tested design at CPRI /Independent test house for short circuit, temperature rise and dielectric tests of the ratings required as per BOQ.

2. STANDARDS AND CODES

Updated and current Indian Standard Specifications and Codes of Practice will apply to the equipment and the work covered by the scope of this contract. In addition the relevant clauses of the Indian Electricity Act 1910, Indian Electricity Rules 1956, National Building Code 1994, National Electric Code 1985, Code of Practice for Fire Safety of Building (general): General Principal and Fire Grading – IS 1641 - 1988 as amended upto date shall also apply. Wherever appropriate Indian Standards are not available, relevant British and/or IEC Standards shall be applicable.

33000 volt Circuit Breaker	IS 13118; 1991
Metal Enclosed Switchgear and Control gear for voltages above1000 Volts	IS 3427 : 1969
Electrical Relays for Power System Protection	IS 3231 : 1986
Numeric Relay	IEC 60255
Voltage Transformers	IS 3156: 1978
Current Transformers	IS 2705 : 1981
Danger Notice Plate	IS 2551 : 1982
AC isolators and earthing switches	IEC 129
AC metal enclosed Switchgear	IEC 298
HT AC contactors	IEC 470 IEC 60298, IS 3427
Bus bar	IEC 60694, IS 12729 IS 5082

3. 33000 VOLT CIRCUIT BREAKERS

- Circuit breakers shall be triple pole single throw Vacuum Circuit Breaker (VCB).
- Vacuum circuit breakers shall be provided with suitable surge protection devices to restrict rate of rise of restricting voltage.
- Circuit breakers of identical rating shall be completely interchangeable.
- Circuit breakers shall be provided with protective relays, meters, indicating instruments with associated current and potential transformers as per schedule of quantities and schematic drawing.

- Circuit breakers shall be provided with motor wound spring charged trip free mechanism with anti pumping feature and shunt trip. In addition, facility for manual charging of spring shall also be available. One open-close-open operation of the breaker shall be possible after loss of supply to the motor.
- Each breaker shall be provided with:
  - Shrouded manual emergency trip push button,
  - Manually ON push button
  - ON/OFF indication,
  - Operation counter
  - Spring charged/discharged indicator.
  - Tripping supply failure alarm
- The following minimum indication lamps shall be provided in the front of the cubicle. Lamps shall be clustered LED type and trip circuit supervision scheme shall be of continuous supervision type.
  - Breaker Open/ Closed/Tripped.
  - Spring charged trip circuit healthy
  - Control supply healthy. .
  - Tripping Supply Healthy
- After meeting all necessary internal control and indication requirements, 2 nos NO and 2 nos NC spare auxiliary contacts of the breaker shall be made available wired upto terminal block.
- Circuit breakers shall be housed in flush front, metal clad, truck mounted, drawout type truck and shall be fully interlocked. The truck that carries the Circuit Breaker shall be of rigid fabricated construction. Each Circuit Breaker shall be housed in a separate compartment enclosed on all sides. Each withdrawable truck shall have its own Circuit Breaker. The drawout mechanism shall be so designed and constructed as to permit smooth withdrawal and insertion. The movement shall be free of jerks, easy to operate and positive.
- All current carrying parts in the Circuit Breaker shall be silver plated.
- Circuit breaker operating mechanism shall provide 2 distinct and separate positions of the circuit breakers on the cradle along with their indication
  - Service
  - Test

4. 33 KV SWITCH BOARD

- 33 kV Switchboard shall be suitable for operation at 33000 volt 3 phase 50 Hz supply system with a short circuit withstand of 1500 MVA at 33000 volts and a corresponding short time rating for 1 second unless otherwise stated.
- Switchboard shall be totally enclosed, single busbar, draw out type, metal clad, cubicle pattern, floor mounting, extensible on both sides and suitable for indoor use. The Switchboard assembly shall form a continuous dead front line up of free standing vertical cubicals. Each

cubical shall have lockable hinged door and removable bolted back cover. Each cubical shall be provided with lifting arrangement.

- Switchboard shall be totally enclosed and completely dust and vermin proof with IP 4X protection. Neoprene gaskets between all adjacent units and beneath all covers shall be provided to render the joints dust and vermin proof. All doors and covers shall also be fully gasketed.
- Sheet steel barriers shall be provided between
  - Instrument Panel and Potential Transformer
  - Instrument Panel and Current Transformers
  - Busbar chamber and Circuit Breaker compartments.
- The switchboard bus bars shall be made of high strength, high conductivity copper with maximum temperature rise limited to thermal limits of connected equipment, viz cables etc. The bus bars shall be insulated with Raychem or equivalent sleeves. All bus bar joints shall be provided with FRP shrouds. Bus bar chamber shall be provided with inter panel barriers with epoxy cast seal off bushings
- Switchboards shall be suitable for cable entry from top or bottom as specified. Power and control cabling shall be completely segregated. Suitable space for termination/maintenance shall be provided in the cable compartment. Suitable working space between gland plate and power cable box shall be provided for and also for mounting core balance CTs if required.
- A ground bus rated for same short circuit level as the system shall be provided along the full length of the switchgear. Ground bus shall be of copper (1 x 40 x 10 mm) and bolted studs should be provided at each end of the switchboard to permit connection of flat/cable. All instrument transformer neutrals shall be connected to the ground bus through removable links. All removable/hinged doors and covers shall be grounded by flexible stranded connectors.
- The power flow direction should be clearly maked on the panel back cover to identify incomers and outgoings.

5. TECHNICAL PARAMETERS

The Circuit Breaker and associated switchboards shall generally confirm to the following particular.

5.1 Circuit Breaker

	Nominal system voltage	33 kV
	Rated voltage	36 kV
	System frequency	50 Hz +/- 3%
	No. of poles	Three
	Max. spring charging time of motor	10 sec. for vaccum type
	Max. power consumption of trip & close coils	200 Watt
	Trip & Closing coil operating voltage	24VDC

	Spring Charging Motor (Universal Motor)	240 V AC
	No. of Spare auxiliary contacts	8NO + 8 NC
	One minute power frequency withstand voltage (kV rms)	75 kV
	Impulse voltage withstand with 1.2/50 micro second wave shape kv peak (standard)	170 kVp
	Short time thermal rating for 1 sec max.	26.3 kA
	Short time peak withstand current	26.3 kA
	Main bus bar current rating	1250 A
	Rated interrupting time	1 secs
	Operating duty	O-0.3 sec-CO-15 secs-Co
	Test and service facility	To be provided with indication & min 4 NO + NC contacts
	Current Transformer	Ratio as per SLD, burden & class 0.2S,10VA for metering & 5P20 10VA for protection
	Potential Transformer (Draw out Type)	Ratio 33√3/110/√3-110/√3, Accuracy class & Burden- 3P & 50VA, 3P & 50VA ,0.2 & 30VA

5.2 33 kV Switchboards

•	Paint	Powder Coating
	Sheet steel CRCA thickness front door CB/LT chamber, Structural members, Bottom sheet partition cover between panels, rear / side cover	2.0 mm
	Top cover, shutter	1 mm
	Partition for LT chamber, barrier sheet between CB, bus bar and cable chamber	2 mm
	Degree of protection	IP 4X
•	Space heater	One no. each in cable and CB chamber, 230 volt, 50 Hz, 70 watt, controlled by thermostat with variable setting
•	Earth bus bar	Minimum Bare Copper bus bar (1 x 40 x 10 mm) inside cable chamber or as required.
•	Bus bars & feeder connections	Electrolytic copper with silver coated contacts as per IS 1897 , Rectangular shaped having max. current density 1.6A/sqmm
•	Clearance (P-P & P-E)	Sufficient to withstand fault level specified for 1 min and impulse voltage in line with IEC 60298, IEC 60694, IS 3427, IS 12729
•	Temperature rise for rated continuous current	
	Reference ambient temperature	40 deg C
	Max rise of temperature at an ambient temperature as per IS3427 and IEC 694	90 deg C
•	Bus support insulator	
	Ref standard	IEC 6 for testing IEC 273 for overall dimensions
	Type of material	Epoxy cast resin
	Voltage class	36 kV
	1 min power frequency withstand voltage	75 kV rms value
	Minimum creepage distance	475 mm
	Type of mounting of insulator	Rigid

•	Protection	As per Schedule of Quantities
•	Size of cable box required	Suitable for 33 kV grade, 3 core XLPE aluminium armoured cable up 400sqmm
•	Safety device	• Earthing switch cannot be switched on when truck is inside panel • Inbuilt interlocks for prevention of withdrawing / insertion of closed CB • Truck cannot be inserted with earthing switch is on • Low voltge plug and socket cannot be disconnected in on position except in test / isolated position • All switching operations including CB rack in & out to be performed with front door closed • Earthed metallic shutters • Independent pressure relief vents for all HT compartment
•	Indication	• Breaker ON • Breaker OFF • Breaker Tripped • Breaker in test position • Breaker in service position • Tripping voltage low
•	Cubicle illumination lamp	CFL
•	Plug & socket	240 Volt Ac

6. INTERNAL WIRING

All spare contacts of breaker, relays switches etc shall be wired upto terminal blocks. Wiring shall be done with flexible, 1100 volts grade PVC LSZH insulated cables minimum size 4 mm^2 for all potential circuits and 4 mm^2 for CT circuits having an insulation value of 2 kV 50 Hz for 1 minute. Each wire shall be identified at both ends with permanently marked ferrules. All wire termination's shall be made with crimped connectors having insulating sleeves. Not more than 2 wires shall be connected to any terminal. Spare terminals equal to at least 20% of active terminals shall be provided in each terminal block. Terminals will also need to be segregated circuit wise and voltage wise. All other auxiliary wiring shall be done with 2.5 sqmm copper wire.

7. TEST AT MANUFACTURERS WORKS

Copies of type tests and of routine tests carried out at manufacturer's works shall be furnished along with the delivery of the switchboards. Engineer-in-Charge reserves the right to get the switchboard inspected by their

representative at manufacturer's works prior to dispatch to site to witness the routine tests, for which purpose the manufacturer / supplier shall provide the necessary facilities and also give due notice.

8. TESTS AT SITE

Pre-commissioning tests as per manufacturers recommendations shall be carried out on the switchboard a site after installation including but not restricted to the following.

- Physical checking of the switchboard including checking for damage or cracks in components, bolt tightness, gasketting etc.
- Mechanical endurance test by frequent breaker operation.
- Checking of vacuum bottles to ensure leak tightness
- Insulation testing of Bus bar supports by 5 kV megger
- Insulation testing of Bus bar and Circuit breaker by 5 kV megger
- Insulation testing of Control wiring by 1 kV megger.
- Testing of relays and CTs with secondary injection kit.
- Checking of breaker operation.
- Checking of earth continuity.
- Primary Injection test
- Secondary Injection test.

TECHNICAL SPECIFICATIONS BUSDUCT – SANDWICH TYPE

A. GENERAL

1. Work Included

- Metal (Preferably non — magnetic) enclosed Bus duct (Sandwich Type)
- Accessories

2. Related Work and Obligations

- The general requirements apply to work specified in this section.
- Examine all the other sections of the specification for requirements, which may affect work of this section.
- Co-ordinate works with all other trades affecting, or affected by activities of this section. Cooperate with such other trades to assure the steady progress of all operations under the contract.

3. General Requirements

- This specification covers requirements for supply, erection, testing and commissioning of metal enclosed Bus duct (Sandwich Type)

4. Codes And Standards

The Bus Duct Riser (Sandwich Type) shall comply with all applicable Indian Standards, Indian Electricity Act and Indian Electricity rules

Wrought Aluminum and aluminum alloys for electrical purposes	IS 5082
Specification for factory built assemblies of Switchgear and Control gear for voltages up to and including 1000 V AC and 1200 VDC	IS 8623
Colours for ready-mixed paints and enamels	IS 5
Degree of protection provided by enclosure for low voltage switch gear and control gear	IS 2147
Danger notice plates	IS 2551
Code of practice for installation and maintenance of switch gear / Busduct	IS 3072

5. Quality Assurance

- The Contractor shall ensured that all materials furnish and installed by him under the contract shall meet the requirements of relevant Indian standards.
- Manufacturers regularly engaged in manufacture of Bus duct (Sandwich Type), whose products have been in satisfactory use in similar service for not less than 5 years.

6. Guarantee

- Manufacturer shall provide guarantee for work under this section. However, such guarantee shall be in addition to and not in lieu of all other liabilities which manufacturer and Contractor may have by other

provisions of the contract document.

7. Delivery, Handling and Storage

- Bus duct (Sandwich Type) shall be carefully transported to site to avoid damage during transit. While on site the same shall be stored in a proper manner to prevent damage from moisture / rusting / mechanical damage.
- Bus duct (Sandwich Type) and accessories shall be inspected for the followings:
  - Damage
  - Compliance with specifications
  - Quality
- Bus duct (Sandwich Type) shall be protected form weather, fire or mechanical damage during storage.

B. PRODUCTS

1. Metal Enclosed Busduct (Sandwich Type)

- Bus duct (Sandwich Type) shall be aluminum / copper conductor suitable for 3 P+N+2E, 415 Volt AC, 50 cycles distribution system in accordance with material and ratings as defined in enclosed BOQ.
- The copper Bus Bars shall have conductivity in excess of 98% IACS. And aluminum Bus bars shall have conductivity in excess of 55% IACS.
- All copper or Aluminum Bus bars shall be electroplated with Tin on all contact surface
- Busduct (Sandwich Type) shall have a rated insulation voltage of 1000 V & rated frequency of 50 Hz. Bus Bar Riser shall have rated operating voltage of 1000 V.
- Busduct (Sandwich Type) shall be suitable for short time withstand current of 50 kA
- Busduct enclosure shall be made from Extruded Aluminun/ GI/MS powder coated housing.
- Busduct (Sandwich type) shall be suitable for degree of protection lP-54/IP-42 and confirm to lEC -439 part-I and Part-II.
- The design shall be compact type with low impedance. All Bus Bars shall be constructed in sandwich type which means no air gap shall exist between bus bars except at joints to obtain low impedance and better heat dissipation and low voltage drops.
- Busduct shall be provided with spring Hangers with minimum one set on each floor. Standard accessories like end feed units, bends / elbows, tee junctions, expansion joints, tap-off boxes shall be provided as called for in BOQ. Busduct shall be available in standard lengths.
- Construction shall be adopted to make it tamper proof The degree of protection shall be minimum lP-54 / IP-42 for inside and lP-67 for Out door applications.
- Tap off outlets shall be provided every 500mm to accommodate

flexibility for any changes that may be required. The Tap of units shall be provided with mechanical interlocking so as to prevent taking of the Plug in box without switching of the Power switch.

- At tap-off points, proper shrouding with Padlocking facility shall be provided to avoid accidental contacts with live parts. While inserting and removal of plug-in boxes, earth contact shall first make and be last to break. It shall be possible to position the plug in boxes on the Busduct without using tools.
- The joint shall be with single bolt with double headed shear off design. High tensile steel bolts with Belleville spring washers shall be provided to have equal pressure across the complete joint.
- Each joint shall have flexibility to allow +/- 10 mm linear adjustment and +/- 5 degree angular adjustment.
- The end point of Rising main shall be provided with end cover easily removable for future extension.
- Neutral bus shall be of section not less than half or equal to the phase cross-section as specified in BOQ
- All the insulating materials that are used shall have high mechanical strength against impact and heat shocks. It should be able to withstand glitches and spikes electrical system and shall be halogen free
- Insulation :- Individual bus bars shall be covered with B-Class rated 130 deg C mylar insulation / epoxy insulation material. The temperature rise at any point in the busbar trunking shall not exceed 55 deg C rise above ambient temperature when operated at rated load current.
- Accessories :- All accessories like bends, tee, Junctions expansion joints, reducers, fire proof s\ barriers shall be deemed to be included in the quoted rates unless specified separately.)
- Thermal Indicators to be provided at different intervals through out the length of Bus ways toy" continual visual inspection of rise in temperature.

C. INSTALLATION

1. Erection

1.1 Busducts / Rising Mains

- All steel structures require for Busduct / Rising Main supports shall be MS (painted). Termination of bus bars at transformer and PCC / Main Panel shall be done through flexible copper links.
- Proper sealing arrangement shall be provided with Fire Retardant Mortor at the wall / cut out where Busduct enter the Panel / switch gear room.
- Proper alignment and co-ordination regarding phase sequence etc. between the Busduct / Rising Mains, Transformer, PCC / Main Panel termination etc. shall be the Contractor's responsibility.
- Various sections of the Busduct shall be joined by special insulated

clamps, which can be tightened by single screw turning. Bus bars shall not be drilled anywhere. Inspection covers shall be provided where clamps can be approached to check tightness when required System shall be maintenance free.

- If work is suspended during installation due to any reason. The ends of connecting sections shall be protected against water and dust by keeping the riser covered with polythene or similar material.

2. Examination Of Work

- Prior to installation of Busduct (Sandwich Type), the Contractor shall carefully examine the drawings indicating the layout. All installation shall be carried out as per manufactures instruction manual.
- The Contractor shall give due notice to the Consultant / Engineer-in-charge whenever any such work is ready for examination and the Consultant / Engineer-in-charge shall without unreasonable delay, unless he considers it unnecessary and advises the Contractor accordingly, attend for the purpose of examining and measuring such work.
- No work shall be covered or otherwise put out of view without the approval of the Consultant / Engineer-in-charge.
- The insulation resistance shall be checked before and after installation.

D MEASUREMENT

- Busduct shall be measured by length. Cost of any steel structure, angles, GI rods and dash fasteners etc. required for fixing / suspension shall be included in the erection rate and nothing extra shall be paid for the same.

TECHNICAL SPECIFICATION AIR INSULATED BUS DUCT

1 INTRODUCTION

Bus ducts shall be provided to connect transformer MV side/DG sets to Main LT Panels/Main Emergency Panel. Bus ducts shall be supplied in convenient lengths and shall be capable of easy assembly at site. Bus ducts shall incorporate flexible bellows on DG set side, phase changeover, bends, risers, jumpers and connections etc. as required.

2 STANDARDS

Bus ducts shall conform to IS 8623 Part 2 - 1993. Rating of bus ducts shall be as specified in drawings and schedule of quantities. Design data in support of temperature rise being within permissible limits and adequacy of supports to withstand mechanical stresses, during normal and short circuit conditions, shall be furnished along with the tender.

3 SYSTEM PARAMETERS

Bus ducts shall be suitable for following system parameters .

Bus bars	:	1 A/Sq mm
Nominal voltage	:	415 Volts
Number of conductors	:	3 Phase 4 wire
Maximum system voltage	:	500 Volts
Power frequency withstand	:	2500 Volts
Temperature rise	:	35^0 C above 45^0 C ambient (bus temperature 80^0 C)
Short circuit strength	:	As per IS 8623 Part I and II

4 CONSTRUCTION

Bus ducts shall be enclosed type with bus bars being sleeved with PVC sleeve. Bus ducts and enclosure testing shall withstand thermal and mechanical stresses due to system short circuit without deformation. Bus bars shall be of electrical wrought aluminium of cross section calculated to allow temperature rise as specified above taking all de-rating factors into consideration. Maximum bus bar temperature shall not exceed 120^OC during system short circuits for more than 3 seconds and less than 5 seconds. Bus bars shall be held as close as possible to minimize reactance. Insulation shall be capable for withstanding 130^0C without deterioration. Design shall allow for expansion of adjacent bus bars and enclosure. Design shall permit a misalignment of 12 mm at transformer end.

5 ENCLOSURE

Bus ducts enclosure shall be of totally enclosed dust and vermin proof construction and shall be fabricated from 2 mm thick CRCA sheets suitably rust proofed with alkaline degreasing, descaling and phosphating. The covers thickness shall not be less than 1.6 mm. Enclosure shall be given two coats of primer and then stove enameled with finishing coats of enamel paint to give a paint film of minimum 50 Microns/galvanized. Enclosure shall have facility for suspension at a regular intervals. Electrical bonding between adjacent sections of enclosure shall be ensured with proper external or internal connections. Double run of earth bus of specified size shall be provided throughout the run of bus ducts and connected to the system earth grid. Enclosure shall be provided with removable cover plates at top and bottom.

6 ACCESSORIES

Bus ducts shall be provided with right angle bends as required. Construction of bends shall be similar to straight length. Joints between bends and straight pieces shall be spliced and properly bolted, a slicing chamber being provided for the purposes. Adapter boxes shall be provided at end connections to transformers, panels etc. Flexible connections with copper flexible tapes of required size and number shall be provided at transformer & DG, LT panel end.

TECHNICAL SPECIFICATIONS CABLE TRAYS

1. Cable trays, of sizes as per schedule of quantities and drawings shall be of perforated doubled bend channel/ladder design unless otherwise stated. Cable trays shall be fabricated from minimum 2 mm thick sheet steel and shall be complete with tees, elbows, risers, and all necessary hardware. Cable trays shall comply with the following:

2. Trays shall have suitable strength and rigidity to provide proper support for all contained cables. Trays shall not have sharp edges, burrs or projections injurious to cable insulation. Trays shall include fittings for changes in direction and elevation. Cable trays and accessories shall be power coated or approved equivalent. Cable trays shall not have sharp edges, burrs or projection that may damage the insulation jackets of the wiring. Cable trays shall have side rails or equivalent structural members.

3. Unless otherwise specifically noted on the relevant layout drawing, all cable tray mounting works to be carried out ensuring the following :

4. Cable tray mounting arrangement type to be as marked on layout drawing. Assembly of tray mounting structure shall be supplied fabricated, erected & painted by the electrical contractor. Tray mounting structures shall be welded to plate inserts or to structural beams as approved by the Owners/Architects. Wherever embedded plates & structural beams are not available for welding the tray mounting structure electrical contractor to supply the MS plates & fix them to floor slab by four anchor fasteners of minimum 16 mm dia having minimum holding power of 5000 Kg at no extra cost. Maximum loading on a horizontal support arm to be 120 Kg. metre of cable run. Width of the horizontal arms of the tray supporting structures to be same as the tray widths specified in tray layout drawings, plus length required, for welding to the vertical supports. The length of vertical supporting members for horizontal tray runs shall be to suit the number of tray tiers shown in tray layout drawings. Spacing between horizontal supports arms of vertical tray runs to be 300 mm. Cable trays will be welded to their mounting supports. Minimum clearance between the top most tray tier and structural member to be 300 mm. Cables in vertical race ways to be clamped by saddle type clamps to the horizontal slotted angels. Clamps to be fabricated from 3 mm thick aluminium strip at site by the electrical contractor to suit cable groups. The structural steel (standard quality) shall be according to latest revision of IS : 226 & 808. Welding shall be as per latest revisions of IS : 816. All structural steel to be painted with one shop coat of red oxide and oil primer followed by a finishing coat of aluminium alkyd paint where any cuts or holes are made on finished steel work these shall be sealed against oxidation by red oxide followed by the same finishing paint. Steel sheet covers wherever indicated to be similarly painted. Trays shall be erected properly to present a neat and clean appearance. Trays shall be installed as a complete system. Trays shall be

supported adequately by means of painted MS structural members secured to the structure by dash fasteners or by grouting. The entire cable tray system shall be rigid. Each run of cable tray shall be completed before laying of cables. Cable trays shall be erected so as to be exposed and accessible.

TECHNICAL SPECIFICATIONS

For DRY TYPE (VPI) DISTRIBUTION TRANSFORMER 2500 kVA (INDOOR/UNDERGROUND) 33/0.433 kV

1.0 SCOPE

The specification covers design manufacture, testing, packing and delivery of 3 phase 50 Hz, Dry Type (VPI) distribution transformer of ratings 2500 kVA, 33/0.433 kV (Indoor/Underground) AN conforming to IS: 2026 1981 Part (I TO V), IS: 11171 1985 and IEC 76.

The equipment offered shall be complete with all necessary parts for effective and trouble-free operation in the distribution system. Such parts will be deemed to be within the scope of the supply irrespective of whether they are specifically indicated in the commercial order or not.

It is not the intent to specify herein complete details of design and construction. The equipment offered shall conform to all relevant standards and be of high quality, sturdy, and robust and of good workmanship and complete design in all respects. The equipment shall be capable to perform continuous and satisfactory operations in the actual service conditions at site and shall have sufficiently long life in service as per statutory requirements.

The Tenderer/supplier shall bind himself to abide by these considerations to the entire satisfaction of the purchaser and will be required to adjust such details at no extra cost to the purchaser over and above the tendered rates and prices.

Tolerances on all the dimensions shall be in accordance with provisions made in the relevant Indian standards and in these specifications. Otherwise the same will be governed by good engineering practice in conformity with required quality of the product.

2.0 SYSTEM PARTICULARS:

The transformers shall be suitable for indoor installation with following system particulars and should be suitable for service under fluctuations in supply voltage as permissible under Indian Electricity Act & Rules there under.

2.1	Nominal System Voltage	33 kV
2.2	Corresponding Highest system Voltage	36 kV
2.3	Neutral Earthing	Solidly earthed
2.4	Frequency	50Hz with ±3 % Tolerance

3.0 SERVICE CONDITIONS

Equipment to be supplied against the specification shall be suitably design to work satisfactorily under following tropical conditions:-

	Location	**At various locations in the state of Haryana**
i)	Maximum ambient temperature (0C)	50
ii)	Minimum ambient air temperature (0C)	-5
iii)	Maximum average daily ambient temperature	40
iv)	Maximum yearly weighed average ambient temperature (0C)	32
vi)	Maximum altitude above mean sea level (m)	1000
vii)	Minimum Relative Humidity(%)	26
xii)	Seismic Zone	4

The climatic conditions are prone to wide variations in ambient conditions and hence the equipment shall be suitably designed to work satisfactorily under these conditions.

4.0 APPLICABLE STANDARDS:

i. The design, manufacture and performance of the equipment shall comply with all currently applicable statutes, regulations and safety codes.

ii. Nothing in this specification shall be construed to relieve the tenderer of his responsibilities.

The Distribution Transformers shall conform to IS: 2026 as amended up to date or other International Standards for equal or better performance.

Unless otherwise specified, the equipment offered shall conform to the latest applicable Indian, IEC, British or U.S.A. Standards and in particular, to the following:-

b.	IS:11171	Dry Type Transformers
c.	IS : 12063	Degree of protection provided by enclosures
d.	IEC 60076	Power Transformers Dry Type Transformers
e.	IS: 3347	Dimension for porcelain transformer bushing for use in normally and lightly polluted atmospheres

f.	IS:5	Colours for ready mixed paints and enamels
g.	IEEE C57.12.01-1988	Dry type transformer

In case of conflict arising out due to variations between the applicable standard and the standards specified herein the provisions of this specification should prevail. The equipment shall also conform to the provisions of Indian Electricity rules and other statutory regulations currently in force in the country.

5.0 SPECIFIC TECHNICAL REQUIREMENT:

5.1 Standard kVA Ratings:

5.1.1. The standard ratings of transformers shall be 2500kVA

5.2 Nominal voltage ratings

i. Primary voltage - 33 kV

ii. Secondary voltage - 0.433 kV

5.3 The windings of the transformers shall be connected to Delta () on the primary side and star (Y) on the secondary side. The neutral of the LT winding shall be brought out to a separate terminal. The vector group shall be Dyn - 11.

5.4 Percentage Impedance: 6.25% for rating of 2500 kVA at 75deg C (subject to IS tolerance)

5.5 Temperature Rise;

i. Average winding temperature rise over an ambient temperature of 50 deg. C shall not exceed 65 deg. C by resistance method. i.e. Max temperature of winding shall not exceed 115° C.

ii Core, metallic parts and adjacent material shall in no case reach a value that may damage these material or reduce their life expectancies.

6.0 TRANSFORMER DETAILED SPECIFICATIONS

6.1 TRANSFORMER OPERATION

The transformer shall be suitable for operation on 33 kV, 3 phase 50 cycle earthed system, connected Delta on H.V. side and star on the L.V. side with neutral brought out for independent earthing (Vector Group DY II). The transformer shall be suitable for continuous operation at the rated capacity under Site conditions.

6.2 TRANSFORMER MATERIAL

The material used in the manufacture of the transformer shall be of the best quality of their respective kind available as per standard specifications.

6.3 CORE MATERIAL

The core shall be of high grade cold rolled grain oriented (C.R.G.O) annealed

steel lamination, having low loss and good grain properties, coated with insulation on both sides, bolted together to the frames firmly to prevent vibration or noise. All core clamping bolts shall be effectively insulated. The complete design of core must ensure permanency of the core losses with continuous working of the transformers. The entire core assembly shall be covered with heat retardant resin based varnish for corrosion protection before the coils are mounted.

i. Core insulation --C-Class grade insulation paper of thickness 20 mils (0.5 mm) shall be used and make should be clearly stated in the offer along with test certificates.

ii. The successful bidder shall be required to submit the manufacturer's test report showing the Watt Loss per kg and the thickness of the core plate, to ascertain the quality of Core materials.

iii. The purchaser reserves the right to get tested at any Government recognized laboratory.

iv. The transformer core shall not be saturated for any value of V/f ratio to the extent of 112 .5% of the rated value of V/f ratio (i.e. 33000 I 50) (due to combined effect of voltage and frequency) upto 12.5% without injurious heating at full load conditions and will not get saturated. The bidder shall furnish necessary design data in support of this situation.

6.4 FLUX DENSITY

Flux density should not be more than 1.55 Tesla at the rated voltage and frequency. The value of the flux density allowed in the design shall be clearly stated in the offer along with graph.

The No load current shall not exceed 1.5% of the full load current. The no load current shall not exceed 3 % of the full load current in L. V. Winding when the applied voltage is 112.5%.

6.5 CLAMPS & WINDINGS

a. M.S channel 150 x 75 mm as per manufacturer standard on top and bottom.

b. 2 x 20 mm. High tensile bolts in parallel at each end will be used.

c. The top yoke channels to be reinforced by adequate size of M.S flat with thickness not less than 6 mm, at equidistance if holes cutting is done for LT lead so as to avoid bending of channel.

d. MS channels are to be painted by heat resistant paint.

The high voltage and low voltage windings shall be of Electrolytic copper conductors completely impregnated and cast under vacuum into moulds.

LV side winding shall be in even layers so that Neutral formation shall be in top.

6.6 INSULATION CLASS

The insulation material used shall be minimum insulation class 'F' & above.

6.7 CURRENT DENSITY:

Current density for HV and LV winding should not be more than 1.4 A/sq.mm. (However, ± 5 % tolerance for LV winding is permissible) for copper conductor.

6.8 LOSSES:

The losses at rated voltage for various ratings of transformers of 33 kV class shall be as shown below subject to tolerance as per relevant IS and shall be calculated at 75 deg.C as per limits specified in IS 2026.

Voltage Ratio In volts	KVA Rating	Max losses at No loading in watts	Max losses at 100% loading In In watts
33000/433	2500	6500	19500

The values given in G. T. P. for flux density, no load current at rated voltage, no load current at 112 . 5% of rated voltage and no load loss at rated voltage shall be individually met.

6.9 CLEARANCES :

a. The minimum electrical clearance between the winding and body of the enclosure (between inside surface of the enclosure and outside edge of the winding) should be 200 mm. in case of 33 kV class transformers.

b. End insulation to earth

33 kV -200 mm.

c Minimum Clearance.

External Clearance of HV	PH to PH	350 MM
	PH to E	320 MM
LV Bushing	PH to PH	75 MM
LV Terminal	PH to E	50 mm

6.10 TRANSFORMER TAPPINGS

The transformer shall be provided with an off load externally hand operated switch as per Schedule of Quantities +5% to -15% in step of 2.5% on HV side so as to give a constant voltage at L.V. side.

6.11 TRANSFORMER CHARACTERISTICS

The no load voltage ratio of the transformer shall be 33000/433 volts and the percentage impedance shall not exceed 5%. / As per ISI

6.12 ENCLOSURE

The T/F enclosure shall be of robust construction and shall be built of electrically welded MS sheet with adequate provision for ventilation. The degree of protection of enclosure shall be IP 43 protection as per IS 13947 amended upto date and thickness of enclosure shall be minimum 2.5mm M.S. sheets provided with powder coating finish after rigorous cleaning and surface treatment.

The shape of enclosure shall be rectangular. The enclosure design shall be such that the core and winding can be lifted freely. The enclosure plates shall be of such strength that the complete transformer may be lifted bodily by means of the lifting lugs provided. The top cover shall have no cut at point of Lifting lug.

6.13 COOLING

The transformer shall be design for normal cooling (AN).

6.14 TRANSFORMER TERMINATIONS

The transformer shall have cable boxes with suitable glands and cable sockets for receiving 33,000 volt grade XLPE cables on the H.V. side as required.

On the L.T. side the transformer shall have a suitable terminal arrangement with extended busbars to receive 415 volt Bus Duct with aluminium busbars as specified.

6.15 TAPPING

Off circuits tap links on 33 kV side. The range of off circuits tap links on HV side shall be +5% to -15% in steps of 2.5%

6.16 TEMPERATURE RISE PARAMETERS

Thermistor sensors shall be embedded in the low voltage winding for warning and tripping, for temperature control. The temperature detectors shall be suitable for 24 volts D.C. The temperature rise when continuously operated of windings by resistance method shall not exceed 90^{O} C over 50 deg C ambient.

6.17 TRANSFORMER FITTINGS

The transformer shall be manufactured in accordance with the requirements as specified in the Standards stated above and shall be fitted with :

1. Diagram and Rating plate
2. Lifting Lugs.
3. Two earthing terminals on either side of the tank.
4. Four bidirectional rollers on the under carriage for movement.
5. Winding Temperature Indicator with alarm contacts for alarm and trip circuits.

6. Externally operated tapping switch with locking arrangement.
7. Terminal marking plate.
8. Jacking Lugs.
9. H.V. cable box for 3 core XLPE cable as required.
10. L.V. cable box suitable for bus duct as required
11. LV Neutral Shing
12. 1 no PT-100 sensor in each LV windings wired up to the winding temp. scanner. The instrument shall have two sets of adjustable contracts for alarm and trip. Instrument shall have scanner to read and show temperature of all three phases sequentially..

6.18 TRANSFORMER TESTING

Prior to acceptance and despatch of the transformer, the Client reserves the right to witness the routine tests at manufacturers works.

The transformer shall be subjected to the following tests as per IS 2026-1962 at the manufacturers Works. The test certificates shall be submitted to the Clients for approval prior to despatch.

ROUTINE TEST

a) Measurement of Winding Resistance
b) Ratio polarity and phase relationship
c) No load and load losses
d) Impedance voltage
e) No load and load current
f) Insulation resistance
g) Induced over voltage withstand
h) Separate source voltage withstand

TYPE TESTS

Type test certificate of CPRI of similar rating of transformer to be submitted along with approval of drawings.

a) Temperature Rise
b) Impulse voltage withstand.

6.19 WARRANTY PERIOD

The supplier shall be responsible to replace, free of cost, with no transportation or insurance cost to the Purchaser, up to destination, the whole or any part of the material which in normal and proper use proves the defective in quality or workmanship, subject to the condition that the defect is noticed

within 72 months from the date of commissioning and shall be for entire duration of the warranty period. The replacement shall be effected by the supplier within a reasonable time, but not, in any case, exceeding 45 days. The supplier shall, also, arrange to remove the defective within a reasonable period, but not exceeding 45 days from the date of issue of notice in respect thereof, failing which, the purchaser reserve the right to dispose of defective material in any manner considered fit by him

6.20 INSTALLATION

The transformer shall be installed as per the manufacturers instruction manual and shall conform to the requirements of IS 1886-1967.

The transformer foundations shall be cast as required. If any lifting is required, the same shall be done by all the lifting lugs to avoid any imbalance.

The transformer wheels shall be locked by suitable locking arrangement to avoid accidental movement after testing and commissioning.

The transformer cable end boxes shall be sealed to prevent entry of moisture.

The transformer neutral and body earthing shall be as per the requirements of IS 3043-1966 and the Local Inspecting Authorities

6.21 COMMISSIONING TESTS

The following tests shall be carried out prior to commissioning at site by third party

a) Insulation resistance of the winding between phases and phase and earth on the H.T. side.

b) Winding resistance of all the windings on all tap positions.

c) Voltage ratio test shall be carried out by applying low voltage on H.T. side and measuring the voltage between phases and phase and neutral on the L.T. side for every tap setting.

d) If necessary the transformer shall be heated by applying low voltage on the H.T. side and shorting the L.T. side. This shall be done for a period of 48 hours or till all the moisture has been removed from the transformer.

e) On commissioning of the transformer the following readings shall be taken

- L.T. side voltages at all tap settings
- Temperature rise under no load conditions

6.22 DOCUMENTS

All drawings shall conform to International Standards organization (ISO) 'A' series of drawings sheet/ Indian Standards Specification IS-656. All drawings shall be in ink and suitable for microfilming. All dimensions and data shall be in SI Units

6.23 LIST OF DRAWING AND DICUMENTS

The tenderer shall furnish TWO sets of following drawings along With his offer:-

a) General outline and assembly drawings of the equipment.

b) Graphs showing the performance of equipment in regard to magnetization characteristics.

c) Sectional views showing:

   a. General constructional features.

      i) The materials used.

      ii) The Insulation, the winding arrangements, method of connection of the primary / secondary winding to the primary / secondary terminals etc.

      iii) Cable box /Porcelain used and its dimensions along with the mechanical and electrical characteristics.

d) Arrangement of terminals and details of connection studs provided.

e) Name Plate.

f) Schematic drawing.

g) Type test reports in case the equipment has already been Type tested.

h) Test reports, literature, pamphlets of the bought out items and raw material.

SCHEDULE OF GUARANTEED TECHNICAL AND OTHER PARTICULARS FOR 2500 KVA 33/0.415 KV, DRY TYPE, INDOOR/UNDERGROUND TYPE DISTRIBUTION TRANSFORMERS

SI.No	Particulars				
1.	Name and address of the manufacturer		:		
2.	Country of origin		:		
3.	a) Applicable standard		:		
	b) Service		:		
4.	Maximum continuous rating (in KVA)		:		
5.	No load voltage ratio at Principal (Nominal) tap (in KV/KV)		:		
6.	Rated frequency (in Hz)		:		
7.	Number of phases		:		
8.	Type of Cooling		:		
9.	Connections		:		
	(i) H.V. Winding		:		
	(ii) L.V. Winding		:		
10.	Vector Symbol		:		
11.	Tapings		:		
	(a) Range		:		
	(b) Number of steps		:		
	(c) Variation of voltage in each step (in KV)		:		
	(d) No load voltage ratio in each tap (in KV/KV)		:		
	Tap Number	Voltage ratio in KV/KV		Tap Number	Voltage ratio in KV/KV
	1.			4.	
	2.			5.	
	3.			6.	

12.	i) Temperature rise under normal operating condition above ambient temperature.		
	(a) Windings (in Degree C)		
	(b) Maximum hot spot temperature of Copper windings (in Degree C)		
13.	Magnetizing current referred to H.V. at rated frequency		
	(a) at 90% rated voltage : (in Amps)		
	(b) at 100% rated voltage : (in Amps)		
	(c) at 110% rated voltage (in Amps)		
14.	Power factor of magnetizing current at 100% rated voltage & frequency		
15.	No load current at rated voltage and rated frequency (in Arms)		
16.	No load loss in KW at rated frequency and voltage		
	(a) at Lowest tap		
	(b) at principal tap		
	(c) at highest tap		
17.	Load loss in KW at 75 Deg. C. at Rated output and frequency		
18.	Percentage Regulation at full load at 75 Deg.C		
	(a) at unity power factor		
	(b) at 0.8 power factor lagging		
19.	Efficiencies at 75 Deg.C (in percentage)		

	a) at full load (i) at unity power factor (ii) at 0.8 power factor lagging		
	(b) at ¾ full load (i) at unity power factor (ii) at 0.8 power factor lagging		
	(c) at 1/2 full load (i) at unity power factor (ii) at 0.8 power factor lagging		
20.	Impedance voltage on rated KVA base at rated current and frequency for the Principal tapping 75c. (in percentage)		
21.	a) Reactance voltage at rated current and frequency for the principal tapping at 75"c.(in percentage) b) Resistance voltage at rated current and frequency for the principal tapping at 75 deg. C		
22.	Resistance at H.V. base at 75'c		
	(a) at Lowest tap		
	(b) at principal tap		
	(c) at highest tap		
23.	Reactance at H.V. base at 75c.		
	(a) at Lowest tap		
	(b) at principal tap		
	(c) at highest tap		
24.	Withstand time without injury for three phase dead short circuit at terminal (in seconds)		
25.	Short time current rating for short		
	a) H.V. winding (in K. Amps)		

	b) L.V. winding (in K Amps)		
	c) Duration (in seconds)		
26.	Permissible overloading with time		
27.	Core:		
	i) Type		
	ii) Flux density of core and yoke at principal tap		
	a) at rated voltage at 50 Hz (in lines/sq.cm		
	b) at 112.50% rated voltage at 50 Hz (in lines/sq.cm.)		
	iii) Thickness of Stamping (in mm)		
	iv) Type of insulation between core laminations		
	v) Core bolt withstand Insulation (in KV rms for 1 min)		
	vi) Approximate area of Cross Section of Core and yoke (in sq.mm.)		
	vii) Material of Core clamping plate		
	viii) Thickness of Core clamping plate (in mm)		
	ix) Insulation of Core clamping plate		
	x) Describe location/Method of Core grounding		
28.	Terminal Arrangement		
	i) High Voltage		
	ii) Low Voltage		

29.	Positive Sequence Impedance between HV & L.V. winding on rated MVA base at rated Current and frequency at 75 Deg.C. winding temperature				
	i) AT principal tapping (in percent)				
	ii) At lowest tapping (in percent)				
	iii) At highest tapping (in percent)				
30.	Zero Sequence Impedance at reference temperature of 75C at principal tap (in percent)				
31.	Details of windings				
	i) Type of Winding				
	(a) High Voltage				
	(b) Low Voltage				
32.	Winding conductor				
i)	Material of the winding conductor				
	(a) High Voltage				
	(b) Low Voltage				
ii)	Conductor Area				
	(a) High Voltage (in sq.cm)				
	(b) Low Voltage (in sq.cm)				
iii)	Current density of windings at rated KVA	At principal tapping 1		At lowest tapping 2	At highest tapping 3
a)	High voltage (Amp. Per sq.cm)				
b)	) b) Low voltage (Amp. per sq.mm)				

iv)	Insulating material used for				
	(a) High voltage winding				
	(b) Low voltage winding				
v)	Insulting material used between				
	(a) High voltage and low voltage winding				
	(b) Low voltage winding and core				
vi)	Whether adjustable coil clamp are proOvided for H.V. & L.V. winding (if yes, details may be given) :				
vii)	Type of Axial Coil Supports				
	(a) H.V. winding				
	(a) L.V. winding				
viii)	Type of Radial Coil Supports				
	(a) H.V. winding				
	(b) L.V. winding				
33.	Insulation withstand Test voltages		H.V	L.V	
	i) Lightning Impulse withstand test voltage 9Skv Peak)				
	(ii) Power frequency withstand test voltage (in KV rms for 1 min)				
	(iii) Induced over voltage withstand test voltage (in KV rms)				
34.	Current in the winding at rated kVA		At principal tapping	At lowest tapping	At highest tapping
	(i) Low voltage (in Amps)				
	(ii) High voltage (in Amps)				
38.	Details of Tap changer				

	i) Number of steps			
	ii) Number of Plus taps			
	iii) Number of minus taps			
	iv) Position of taps on HV			
	v) Type of tap changing arrangement			
39.	Bushing :		High voltage	
i)	Make			
ii)	Type			
iii)	Applicable standard			
iv)	Insulation withstand test Voltage			
a)	Lightning Impulse withstand test voltage (1.2 x 50 micro seconds in KV peak)			
b)	Power frequency withstand test voltage (in KV rms for 1 min)			
	1)Dry			
	2)Wet			
v)	Creepage distance			
	a) Total (in mm)			
	b) Total (in mm)			
vi)	Minimum height of the bushing			
40.	Minimum clearance (in mm)		In Air	
			Between Phases	Phase to Ground
i)	H.V.			
ii)	L.V.			
41.	Particulars of Enclosures & Fitment			
i)	CRCA Steel Thickness			
ii)	No of Louvers provided in side			

	enclosures		
iii)	Covering of Louvers -- Fine Steel Mesh		
iv)	Proper ventilation is provided		
v)	Structure of Enclosure along with Dimension		
a)	Whether the Hinged Door are lockable		
b)	The IP of Enclosure		
vi)	No of Cowl type inspection Cover provided		
vii)	No of Drain Plug Provided		
viii)	No of Lifting Hooks provided in the main tank		
ix)	No of Lifting Lug		
X)	No of Earthing terminal Provided		
i)	Skid Chanel with Round Corner provided		
ii)	No of Explosion Vent provided		
iii)	The area of Each Vent		
iv)	Thickness of LT cable End Box Metal Sheet		
v)	Thickness of LV Door leaf Sheet Metal		
vi)	Thickness of HT cable End Box Metal Sheet		
Vii)	Thickness of HV Door leaf Sheet Metal		
42.	Weight of Transformer, Enclosure and fitting with accessories		
i)	Untanking weight		

ii)	Total weight with Core, Winding Fittings.		
iii)	Detail of Thermometer embedded in windinq		
iv)	Current rating of each contact of Temp meter		
43.	Approximate overall Dimensions in mm		
	a) Length		
	b) Breadth		
	c) Height		
	d) Minimum height of bottom most portion of bushing from bottom of base channel		
44.	Minimum clearance height for lifting Enclosures (in mm)		
45.	Whether agreeable to carry out Type Tests, in line with specification at your Cost?		
46.	Category		
47.	Whether all particulars against sl.No. 1 to 46 furnished?		

TECHNICAL SPECIFICATIONS

EARTHING

1. GENERAL

All the non-current carrying metal parts of electrical installation shall be earthed properly. All metal conduits, trunking, cable sheaths, switchgear, distribution MCB boards, light fittings and all other parts made of metal shall be bonded together and connected by means of specified earthing conductors to an efficient earthing system. All earthing shall be in conformity with Indian Electricity Rules.

The Earthing System shall in totally comprise the following:-

a) Earth Resistivity Test

b) Earth Electrodes

c) Earthing Leads

d) Earth Conductors

All three phase equipment shall have two separate and distinct body earths and single phase equipment shall have a single body earth.

2. STANDARDS

All equipments, components, materials and entire work shall be carried out in conformity with applicable and relevant Bureau of Indian Standards and Codes of Practice, as amended upto date and as below. In addition, relevant clauses of the Indian Electricity Act 1910 and Indian Electricity Rules 1956 as amended upto date shall also apply. Wherever appropriate Indian Standards are not available, relevant British and /or IEC Standards shall be applicable.

Equipments certified by Bureau of Indian Standards shall be used in this contract in line with government regulations. Test certificates in support of this certification shall be submitted, as required.

It is to be noted that updated and current standards shall be applicable irrespective of dates mentioned along with ISS's in the tender documents.

3. EARTHING MATERIAL

Materials of which the protective system is composed shall be resistant to corrosion or be adequately protected against corrosion. The material shall be as specified in the schedule of quantities and shall comply to the following requirements:

- Copper - When solid or stranded copper wire is used it shall be of the grade ordinarily required for commercial electrical work generally designated as being of 98% conductivity when annealed, conforming to Indian standard specifications.

- Galvanised Steel - Galvanised steel used shall be thoroughly protected against corrosion by hot dipped Zinc coating. The material coating shall withstand the test specified in IS 2309:1969.
- The strips to be used shall be in maximum lengths available as manufactured normally avoiding unnecessary joints.

4 EARTH ELECTRODES

Plate Earth Electrode

The plate electrodes shall be of copper/ GI as called for in the schedule of quantities. The minimum dimensions of the electrodes shall be 600 mm x 600 mm. Thickness of copper electrodes shall not be less than 3 mm and of GI electrodes not less than 6 mm.

The electrode shall be buried in ground with its face vertical and top not less than 4 meters below ground level.

Earth Electrode Pit

Method Of Installing Watering Arrangement

In the case of plate earth electrode, a watering pipe of 20 mm dia of medium class G.I. Pipe shall be provided and attached to the electrode. A funnel with mesh shall be provided at the top of this pipe for watering the earth. The watering funnel attachment shall be housed in masonry enclosure of not less than 300 x 300 x 300 mm. A cast iron/M.S. frame with cover having locking arrangement shall be suitably embedded in the masonry enclosure. A suitable test link shall be provided in the earth chamber.

Location Of Earth Electrode

The following guidelines shall be followed for locating the earth electrodes

An earth electrode shall not be situated less than 3 metres from any building.

The excavations for electrode shall not affect the column footings or foundations of the buildings. In such cases electrode may be further away from the building.

The location of the earth electrode shall be such where the soil has reasonable chance of remaining moist, as far as possible.

Entrances, pavements and road ways shall not be used for locating the earth electrode.

Number Of Earth Electrodes

In all cases the relevant provision of rule 33, 61 & 67 of the Indian Electricity Rules 1956 as amended shall be complied with.

Metallic covers or supports of all medium or H.T. apparatus or conductors shall, in all cases be connected to not less than two separate and distinct earth electrodes.

5. EARTHING LEADS

The strip earthing leads shall be connected to the Earth Electrode at one end and to the metallic body of the main equipment at the other end. The earthing lead shall connect to the earthing network in the installation.

Earthing Lead Sizes

Strip earthing leads shall be of copper/GI and as per specifications.

Earthing Lead Installation

The length of buried strip earthing lead shall be not less than 15 metres and shall be buried in trench not less than 0.5 m deep.

If conditions necessitates use of more than one earthing lead they shall be laid as widely distributed as possible preferably in a single straight trench or in a number of trenches radiating from one point.

Method Of Connecting Earthing Lead To Earth Electrode

In the case of plate earth electrode the earthing lead shall be securely bolted to the plate with two bolts, nuts, checknuts and washers as required by IS 3043 : 1987.

All materials used for connecting the earth lead with electrode shall be GI in case of GI Pipe and GI plate earth electrodes or tinned brass in case of Copper plate electrode.

Protection Of Earthing Lead

The earthing lead from electrode onwards shall be suitably protected from mechanical injury and corrosion by a 15 mm dia GI pipe in case of wire and 100/40 mm dia medium class GI Pipe

The portion of the G.I. pipe within ground shall be buried at least 30 cm deep (to be increased to 60 cm in case of road crossing or pavements). The portion within the building shall be recessed in walls and floors to adequate depth.

6. EARTHING CONDUCTORS

Earthing conductors shall form the earthing network throughout the installation for earthing of all non- carrying metal parts.

Connection Of Earthing Conductors

- Main earthing conductors shall be taken from the earth connections at the main switch boards to all other switchboards in the network.
- Sub-mains earthing conductors shall run from the main switch board to the sub distribution boards and to the final distribution boards.
- Loop earthing conductors shall run from the distribution boards and shall be connected to any point on the main/sub-main earthing

conductor, or its distribution board or to an earth leakage circuit breaker.

- Metal conduits, cable sheathing and armouring shall be earthed at the ends adjacent to switch boards at which they originate, or otherwise at the commencement of the run by an earthing conductor in effective electrical contact with cable sheathing, Switches, accessories, lighting fitting etc shall be effectively connected to the Loop Earthing Conductors. These though rigidly secured in effective electrical contact with a run of metallic conduit shall not be considered earthed, even though the run of metallic conduit is earthed.

Earthing Conductor Installation

The earthing conductors inside the building wherever exposed shall be properly protected from mechanical injury by running the same in GI pipe of adequate size.

Joints shall be revetted and brazed in approved manner.

Sweated lugs of adequate capacity and size shall be used for termination. Lugs shall be bolted to the equipment body to be earthed after the metal body is cleaned of paint and other oily substances and properly tinned.

Sizing Of Earthing Conductors

All fixtures, outlet boxes and junction boxes shall be earthed with Bare copper wires as specified.

All 3 phase switches and distribution boards upto 60 amps rating shall be earthed with 2 Nos. distinct and independent 4 mm dia copper/6 mm dia GI wires. All 3 phase switches and distribution boards upto 100 amps rating shall be earthed with 2 Nos. distinct and independent 6 mm dia copper/8 mm dia GI wires. All switches, bus bar, ducts and distribution boards of rating 200 amps and above shall be earthed with a minimum of 2 Nos. separate and independent 25 mm x 3 mm copper/25mm x 6 mm GI tape.

7. PROHIBITED CONNECTIONS

Neutral conductor, sprinkler pipes, or pipes conveying gas, water, or inflammable liquid, structural steel work, metallic enclosures, metallic conduits and lighting protection system conductors shall not be used as a means of earthing an installation or even as a link in an earthing system.

8. RESISTANCE TO EARTH

No earth electrode shall have a greater ohmic resistance than 3 ohms as measured by an approved earth testing apparatus. In rocky soil the resistance may be upto 5 ohms. The electrical resistance measured between earth connection at the main switchboard and any other point on the completed installation shall be low enough to permit the passage of current necessary to operate circuit breakers, and shall not exceed 1 ohm.

TECHNICAL SPECIFICATIONS

LIGHTNING PROTECTION SYSTEM

1.1 STANDARDS

The following Indian Standard Specifications and Codes of Practice will apply to the equipment and the work covered by the scope of the Contract. In addition the relevant clauses of the Indian Electricity Act 1910 and Indian Electricity Rules 1956 as amended upto date shall apply. Wherever appropriate Indian Standards are not available relevant British and/or IEC Standards shall be applicable.

BIS certified equipment shall be used as a part of the Contract in line with Government regulations. Necessary test certificates in support of the certification shall be submitted prior to supply of the equipment.

It is to be noted that updated and current Standards shall be applicable irrespective of those listed below.

Code of Practice for the Protection of buildings and Allied Structures against Lightning IS 2309 : 1989

Code of Practice for Earthing IS 3043 : 1987

1.2 GENERAL

The Lightning Protective System shall comprise of Air Terminations, Down Conductors, Earth Terminations etc as required. The System shall preferably use the same conducting material throughout and will comply to the detailed specifications detailed hereinafter.

The entire lightning system should be mechanically strong to withstand the mechanical forces produced in case of a lightning stroke.

1.3 MATERIALS

The materials of which the protective system is composed shall be resistant to corrosion or be adequately protected against corrosion. The material shall be as specified in the Schedule of Quantities and shall comply to the following requirements:

a) Copper - When solid or stranded copper wire is used it shall be of the grade ordinarily required for commercial electrical work generally designated as being of 98% conductivity when annealed, conforming to Indian Standard Specifications.

b) Galvanised Steel - Galvanised steel used shall be thoroughly protected against corrosion by hot dipped Zinc coating. The material coating shall withstand the test specified in IS 2309:1968.

c) The strips to be used shall be in maximum lengths available as manufactured normally avoiding unnecessary joints.

1.4 AIR TERMINATIONS

1.4.1 Vertical Air Terminations

Vertical air terminations shall comprise of finials made of 25 mm dia GI tube with single or multiple prongs at the top. Vertical terminations where provided shall project 30 cms above the project salient point or net work on which it is fixed.

1.4.2 Horizontal Air Terminations

Horizontal air terminations should be so interconnected that no part of the roof is more than 9 m away from the nearest horizontal conductor. For a flat roof horizontal air termination along the outer perimeter of the roof is to be used. For a roof of larger area a net work of parallel horizontal conductors shall be installed. Horizontal air terminations should be coursed along contours such as ridges, parapets and edges of the flat roofs and where necessary over flat surfaces in such a way as to join each air termination to the rest and should themselves form a closed network. All metallic finials, chimneys, duct, vent pipes, railings, gutters, and the like on or above the main surface of the roof of the structure should be bonded to and form part of the air termination network.

1.5 DOWN CONDUCTORS

The Down Conductors shall be of material as specified in the Schedule of Quantities. These shall be distributed around the outside walls of the structure and shall preferable be run along the corners and other projections. Lift shafts shall not be used for fixing the Down Conductors.

The routing of the Down Conductors shall be such that it is accessible for inspection, testing and maintenance.

1.6 TESTING JOINTS AND BENDS

The lightning protective system should have as few joints in it as possible.

Wherever joints in the down conductor above ground level are necessary they shall be mechanically and electrically effective. In the down conductor below ground level there shall be no joints. The joints may be clamped, screwed, bolted, rivetted, sweated braced or welded. Bolted joints should be used on test points or on bonds to existing metal. Each down conductor should be provided with a testing joint in a position convenient for testing but inaccessible for interference.

1.7 FASTENERS

Conductors shall be securely attached to the building by fasteners which shall be substantial in construction, not subject to breakage. These shall be of galvanised steel or other suitable materials with suitable precautions to avoid corrosion. The method and nature of the fixing should be simple, solid and

permanent. The lightning conductors shall be secured at not more than 1.20 m apart for horizontal run and 1.00 m for vertical run.

1.8 EARTH TERMINATION

Each down conductor shall have an independent earth termination and all earth terminations should be interconnected.

1.9 EARTH ELECTRODES

Earth electrodes shall be constructed and installed as laid down in the IS 3043.

1.9.1 Plate Earth Electrode

The plate electrodes shall be of Copper or G.I. as called for in the Bill of Quantities. The minimum dimensions of the electrode shall be G.I. 600 mm x 600 mm x 6 m thick and for Copper 600 mm x 600 mm x 3 mm. The electrode shall be buried in ground with its face vertical and top not less than 4 m below ground level.

1.9.2 Earth Electrode Pit

In the case of plate earth electrode, a watering pipe of 20 mm dia of medium class G.I. Pipe shall be provided and attached to the electrode. A funnel with mesh shall be provided at the top of this pipe for watering the earth. The watering funnel attachment shall be housed in masonry enclosure of not less than 300 x 300 x 300 mm. A pre-cast RCC cover shall be suitably embedded in the masonry enclosure.

1.9.3 Location of Earth Electrode

The following guidelines shall be followed for locating the earth electrodes

- An earth electrode shall not be situated less than 2 metres from any building.
- The excavations for electrode shall not affect the column footings or foundations of the buildings. In such cases electrode may be further away from the building.
- The location of the earth electrode shall be such where the soil has reasonable chance of remaining moist, as far as possible.
- Entrances, pavements and road ways shall not be used for locating the earth electrode.

1.10 EARTH RESISTANCE

The whole of the lightning protective system should have a combined esistance to earth not exceeding 1 ohms before any bonding has been effected to metal or on a surface or to surface below ground.

ROUTINE AND COMPLETION TESTS

1 INSTALLATION COMPLETION TESTS

At the completion of the work, the entire installation shall be subject to the following tests:

1. Wiring continuity test
2. Insulation resistance test
3. Earth continuity test
4. Earth resistivity test

Besides the above, any other test specified by the local authority shall also be carried out. All tested and calibrated instruments for testing, labour, materials and incidentals necessary to conduct the above tests shall be provided by the contractor at his own cost.

2 WIRING CONTINUITY TEST

All wiring systems shall be tested for continuity of circuits, short circuits, and earthing after wiring is completed and before installation is energised.

3 INSULATION RESISTANCE TEST

The insulation resistance shall be measured between earth and the whole system conductors, or any section thereof with all fuses in place and all switches closed and except in concentric wiring all lamps in position of both poles of the installation otherwise electrically connected together, a direct current pressure of not less than twice the working pressure provided that it does not exceed 1100 volts for medium voltage circuits. Where the supply is derived from AC three phase system, the neutral pole of which is connected to earth, either direct or through added resistance, pressure shall be deemed to be that which is maintained between the phase conductor and the neutral. The insulation resistance measured as above shall not be less than 50 megohms divided by the number of points provided on the circuit the whole installation shall not have an insulation resistance lower than one megohm.

The insulation resistance shall also be measured between all conductors connected to one phase conductor of the supply and shall be carried out after removing all metallic connections between he two poles of the installation and in those circumstances the insulation shall not be less than that specified above.

The insulation resistance between the frame work of housing of power appliances and all live parts of each appliance shall not be less than that specified in the relevant Standard specification or where there is no such specification, shall not be less than half a megohm or when PVC insulated cables are used for wiring 11.5 megohms divided by the number of outlets. Where a whole installation is being tested a lower value than that given by

the above formula subject to a minimum of 1 Megohms is acceptable.

4 TESTING OF EARTH CONTINUITY PATH

The earth continuity conductor including metal conduits and metallic envelopes of cable in all cases shall be tested for electric continuity and the electrical resistance of the same alongwith the earthing lead but excluding any added resistance of earth leakage circuit breaker measured from the connection with the earth electrode to any point in the earth continuity conductor in the completed installation shall not exceed one ohm.

5 TESTING OF POLARITY OF NON-LINKED SINGLE POLE SWITCHES

In a two wire installation a test shall be made to verify that all non-linked single pole switches have been connected to the same conductor throughout, and such conductor shall be labeled or marked for connection to an outer or phase conductor or to the non-earthed conductor of the supply. In the three of four wire installation, a test shall be made to verify that every non-linked single pole switch is fitted to one of the outer or phase conductor of the supply. The entire electrical installation shall be subject to the final acceptance of the Architect as well as the local authorities.

6 EARTH RESISTIVITY TEST

Earth resistivity test shall be carried out in accordance with IS Code of Practice for earthing IS 3043.

7 PERFORMANCE

Should the above tests not comply with the limits and requirements as above the contractor shall rectify the faults until the required results are obtained. The contractor shall be responsible for providing the necessary instruments and subsidiary earths for carrying out the tests. The above tests are to be carried out by the contractor without any extra charge.

8 TESTS AND TEST REPORTS

The Contractor shall furnish test reports and preliminary drawings for the equipment to the Architect/owners for approval before commencing supply of the equipment. The Contractor should intimate with the tender the equipment intended to be supplied with its technical particulars. Any test certificates etc., required by the local Inspectors or any other Authorities would be supplied by the Contractor without any extra charge.

Section-7

Bill of Quantities
Attached at Annexure-A

Section-8

DRAWINGS
Attached in Volume-2

Concourse Sub Station		
Electrical Drawings		
SR NO.	**DRAWING NO.**	**DRAWING TITLE**
1	RKGCES/UVTC/EL-01	EXTERNAL ELECTRIFICATION SCHEME FOR TENDER
2	RKGCES/UVTC/EL-02	SUBSTATION LAYOUT FOR SUBMISSION
3	UL/TC/EL-03	415V ACDB

Section-9

Approved Makes List & Material Specifications

MAKE LIST- ELECTRICAL WORKS		
Sr. No..	Material Name	Middle Income Group (MIG)
1	**2**	3
1	LED Tube/Lamp/Bulb	
i		Philips
ii		Havells
iii		Crompton
iv		Toshiba
v		Osram
vi		GE
vii		Wipro
2	LED Internal Light Fixture	
i		Philips
ii		Havells
iii		Crompton
iv		Toshiba
v		Osram
vi		Wipro
vii		Bajaj
viii		Decon
		GE
3	LED Street Light Fittings	
i		Philips
ii		Havells
iii		Wipro
iv		Crompton
v		Bajaj
4	LED Flood Light	
i		Philips
ii		Havells
iii		Wipro
iv		Crompton
5	LED Pathway Light	
i		Philips
ii		Havells
iii		Wipro
iv		Crompton
v		HPL
6	LED Gate Light	
i		Philips
ii		Havells

MAKE LIST- ELECTRICAL WORKS		
Sr. No..	Material Name	Middle Income Group (MIG)
iii		Wipro
iv		Crompton
v		HPL
7	LED Underwater Light	
i		Philips
ii		Havells
iii		Wipro
iv		Crompton
v		HPL
8	Ceiling Fans	
i		Crompton
ii		Orient
iii		Havells
iv		Khaitan
v		Usha
vi		Bajaj
9	Exhaust Fans	
i		Crompton
ii		Orient
iii		Havells
iv		Khaitan
v		Usha
vi		Bajaj
10	Modular Switch, Socket & Sheet	
i		Schneider Opal
ii		Wipro Stylus +
iii		Legrand Myrius
iv		MK Wrap round plus
v		Anchor Vision
11	Modular TV,Telephone & Data Socket	
i		Schneider Opal
ii		Wipro Stylus +
iii		Legrand Myrius
iv		MK Wrap round plus
v		Anchor Vision
12	Industrial Sockets	
i		Schneider
ii		Hensel
iii		Legrand
iv		Neptune

MAKE LIST- ELECTRICAL WORKS		
Sr. No..	Material Name	Middle Income Group (MIG)
v		HPL
vi		Havells
13	DB, MCB, RCCB, RCBO,ELCB	
i		Schneider
ii		Siemens
iii		ABB
iv		L&T
v		Wipro
vi		Hager
vii		Legrand
viii		Havells
14	MPCB	
i		ABB
ii		L&T
iii		Schneider
iv		Siemens
15	HRC Switch Fuse Units	
i		Schneider
ii		Siemens
iii		ABB
iv		L&T
v		Wipro
vi		Hager
vii		Legrand
viii		Havells
16	Lamp Holder	
i		Havells
ii		Bajaj
iii		wipro
iv		Anchor
v		HPL
17	Video door phone	
i		Zicom
ii		Legrand
iii		Panasonic
iv		Hikvision
v		Honeywell
18	Copper Wires : 1100V/660V Grade FRLS	
i		Finolex
ii		Polycab
iii		KEI

MAKE LIST- ELECTRICAL WORKS		
Sr. No..	Material Name	Middle Income Group (MIG)
iv		Havells
v		RR cable
vi		Skytone
19	RG6, RG11 Coaxial T V & Telephone Cable	
i		Finolex
ii		Polycab
iii		Delton
iv		KEI
v		Rallison
vi		Lapp
vii		Belldon
viii		D Link
20	CAT 6 Cable	
i		Finolex
ii		Dlink
iii		Polycab
iv		Legrend
v		Belden
vi		AMP
vii		Systimax
viii		Avaya
21	CAT 6 I/O Socket	
i		Dlink
ii		Lucent
iii		Molex
iv		Legrend
v		Belden
vi		AMP
vii		Systimax
xi		Avaya
22	PVC Conduits & Accessories	
i		Polycab
ii		AKG
iii		BEC
iv		Precision
v		Finolex
		Sudhakar
23	MS Black enameled /galvanised ERW conduit	

MAKE LIST- ELECTRICAL WORKS		
Sr. No..	Material Name	Middle Income Group (MIG)
i		BEC
ii		Steel Craft
ii		AKG
24	MS PIPES and GI PIPES	
i		JINDAL
ii		TATA
iii		SURYA
iv		SAIL
25	XLPE Cables & Accessories	
i		Polycab
ii		Havells
iii		Finolex
iv		KEI
v		Cables corporation of India
vi		RPG Cables Ltd.
vii		Universal cables ltd.
viii		Gemscab Industries Ltd
ix		Gloster cables
		Ravin cables pvt ltd
26	Control cable/ Fire survival, Communication Cables	
i		Polycab
ii		Havells
iii		Finolex
iv		KEI
v		Laap
vi		Delton
vii		Fusion Polymer
		Rallison
27	Cables Glands & Lugs	
i		Dowell
ii		Comet
iii		Centurion
iv		Bentec
v		Jainson
		Baliga lighting eqpts ltd
		FCG Power IND Pvt Ltd
28	Bimetalic Cable Lug	
i		Comet
ii		Cosmos

MAKE LIST- ELECTRICAL WORKS		
Sr. No..	Material Name	Middle Income Group (MIG)
iii		Dowells
iv		Jainsons
29	PVC Glands	
i		Comet
ii		Dowells
iii		Gripwel
v		Jainsons
		HMI
30	Aluminum Raceways	
i		Jindal
ii		Bemtec
iii		Indiana
iv		HILTI
v		Gripple
vi		Legrand
vii		Slotco
viii		MEM
31	MS/GI Cable Tray & Raceways	
i		Indiana
ii		Ricco
iii		Pilco
iv		Hi Reach
		Slotco
32	Load break switch	
i		Legrand
ii		L&T
iii		HPL
iv		Panasonic
v		Siemens
vi		Havells
vii		ABB
33	Changeover Switch	
i		Siemens
ii		Schneider
iii		Socomec
iv		L&T
v		ABB
vi		Havells
vii		HPL
34	ATS	
i		Siemens
ii		Schneider

MAKE LIST- ELECTRICAL WORKS		
Sr. No..	Material Name	Middle Income Group (MIG)
iii		Socomec
iv		L&T
		ABB
35	ACCL	
i		Pork device
ii		Havells
iii		Salzer
iv		L & T
v		Electron
36	Electrical Measuring Meters	
i		L&T
ii		HPL
iii		Siemens
iv		Socomec
v		Neptune
vi		Conzerv
vii		Schneider
viii		Secure
37	Capacitors	
i		L&T
ii		Epcos
iii		Neptune
iv		Schneider
v		Siemens
38	Lightning Arrestor	
i		Altec
ii		Duval Messien
iii		ABB
iv		Erico
v		Crompton
vi		Jmv Lps Pvt.Ltd
vii		Indelac
viii		Obo Betterman
39	Main LT PANEL and AFC Panel	
i		Tricolite
ii		Adlec System
iii		Advance Panel & Switchgear Pvt. Ltd. New Delhi
iv		Jakson
v		Ambit Switch gears- Noida

MAKE LIST- ELECTRICAL WORKS		
Sr. No..	Material Name	Middle Income Group (MIG)
vi		Sudhir Power
vii		Indian Electrical
		L&T
40	L.T. Feeder Pillar	
i		Tricolite
ii		Adlec System
iii		Advance Panel & Switchgear Pvt. Ltd. New Delhi
iv		Jakson
v		Ambit Switch gears- Noida
vi		Sudhir Power
vii		Indian Electrical
		L&T
41	AIR Insulated / Sandwich Bus Duct & Rising Main	
i		C&S
ii		L & T
iii		Schneider
iv		Zucchini Legrand
v		Adlec System
vi		Tricolite
vii		Jakson
viii		Advance Panel & Switchgear Pvt. Ltd. New Delhi
ix		Zeta
42	Metering Cubicle	
i		Tricolite
ii		Adlec System
iii		Advance Panel & Switchgear Pvt. Ltd. New Delhi
iv		Jakson
v		Ambit Switch gears- Noida
vi		Sudhir Power
vii		Indian Electrical
43	HT Panel Indoor/Out door VCB/RMU	
i		Siemens
ii		Schneider
iii		L & T
iv		Cromption
v		ABB
44	11KV isolator & D.O. fuse.	
i		Topaz

MAKE LIST- ELECTRICAL WORKS		
Sr. No..	Material Name	Middle Income Group (MIG)
ii		Siemens
iii		ABB
iv		L&T
v		Schneider
vi		GE
45	D G Set- Engine	
i		Kirloskar
ii		Cummins
iii		Cromptons
iv		Perkins
v		Caterpillar
46	D G Set- Alternator	
i		Stamford
ii		Kirloskar
iii		Leroy Somer
iv		Caterpillar
v		Trident
vi		Toyo Donkey power
47	Elevator/ Escalator	
i		Schnidler
ii		Mitsubishi
iii		Otis
iv		Kone
v		Toshiba
vi		Johnson
48	Water Pumps	
i		KIRLOSKAR
ii		CROMPTON
iii		GRUNDFOS
iv		WILO
v		EBARA
		Lubi
49	Solar Water Heating Systems	
i		COMFONOMICS
ii		TATA SOLAR
iii		SURYA
iv		BHEL
v		Solarhart
vi		Photon
vii		BIPSUN
viii		RACOLD
ix		Solimpeks

MAKE LIST- ELECTRICAL WORKS		
Sr. No..	Material Name	Middle Income Group (MIG)
x		KK Tech Eco Product Pvt. Ltd.
xi		Ecoguard
xii		Composite Nirman Materail Pvt. Ltd.
50	Air Source Heat Pump	
i		Aquarian Systems
ii		Phillips
iii		Murphy
iv		SYSKA
v		ENSYS
vi		A.O. Smith
vii		STIEBEL ELTON
51	Insulating Mats- LT & HT Rating	
i		Jyoti
ii		Padmini
iii		Premier Polyfilm
iv		Tata Rubber Corporation
v		Suntex
52	Fire Sealent and Fire Retardent Paint	
i		3M India
ii		Hilti
iii		OBO Betterman
iv		Starvac Flammadar
v		M Seal
53	Surge protection device	
i		JMV
ii		DHEN
iii		OBO
iv		MERSEN
54	Solar PV Cleaning System	
i		OORJA
ii		SOLBRIGHT
iii		ECOPPIA
55	Solar Inverter/Power conditioning unit	
i		Solis
ii		Delta
iii		Tata Power
iv		Havells
v		Luminous
vi		BHEL
vii		Moaserbear
56	SPV Modules-Mono Perc	

MAKE LIST- ELECTRICAL WORKS		
Sr. No..	Material Name	Middle Income Group (MIG)
i		Reneways
ii		Adani
iii		Tata Power
iv		Jakson
v		BHEL
vi		Moaserbear
57	SPV Modules Bifacial	
i		Reneways
ii		Adani
iii		Tata Power
iv		Jakson
v		BHEL
vi		Moaserbear
58	FUEL CELL SYSTEM	
i		BLOOM ENERGY
ii		FC TECNRGY
59	EXIT SIGNAGES	
i		Legrand
ii		ABB
iii		Philips
iv		MK
v		D-Lite
vi		Cease Fire
vii		Cooper
ix		Bajaj
60	HDPE - Pipe	
i		Duraline
ii		Rex Poly Extrusion
iii		Tirupati Plasomatics
61	Lighting Poles	
i		Bajaj
ii		Bombay Tubes & poles
iii		Surya
iv		Philips
v		Wipro
vi		Keselec
vii		BPP pole
62	Anchor Fastner	
i		Fischer
ii		Hilti
iii		Power fastener
63	Occupancy Sensors	

MAKE LIST- ELECTRICAL WORKS		
Sr. No..	Material Name	Middle Income Group (MIG)
i		Honywell
ii		Schneider
iii		Johnson
iv		Siemens
v		Wipro
vi		Philips
64	Lighting Control Equipment/ Dimmers	
i		Lutron
ii		Crystron
iii		Schneider
iv		Wipro
v		Legrand
vi		Panasonic
65	Aviation Obstruction Light LED Type	
i		Bajaj
ii		Philips
iii		Wipro
iv		Havells
v		Instapower Ltd
66	Terminal Blocks	
i		Connectwell
ii		Elmax
iii		Wago
67	POP UP Boxes	
i		Legrand
ii		MK
iii		ABB
69	Push Button & Indicating Lamp	
i		L&T
ii		Schneider
iii		Kaycee
iv		ABB
v		Siemens
70	66kV and 33 KV OUTDOOR SWITCHYARD PACKAGE	
i		ABB
ii		CG Power and Industrial Solutions LTD
iii		L&T
iv		SIEMENS
v		SREX POWER INDIA PVT. LTD.
vi		STERLING & WILSON INDIA

MAKE LIST- ELECTRICAL WORKS		
Sr. No..	Material Name	Middle Income Group (MIG)
71	66kV and 33 KV GIS (Indoor)	
i		ABB INDIA
ii		SCHNEIDER ELECTRIC INDIA
iii		SIEMENS
72	CATHODIC PROTECTION SYSTEM	
i		BSS TECH CP INDIA PVT. LTD.
ii		CATHODIC CONTROL COMPANY
iii		CONSULTECH CATHODIC PROTECTION ENGRS & INDIA
iv		CORROSION CONTROL SERVICES PVT. LTD.
73	ELECTRICAL CONTROL SYSTEMS (MICRO-GRID / SCADA)	
i		HONEYWELL
ii		DEIF INDIA PVT LTD
iii		ROCKWELL AUTOMATION
iv		SCHNEIDER ELECTRIC INDIA PVT LTD
v		SIEMENS
74	NEUTRAL GROUNDING RESISTORS-H.V.	
i		IRESCO ELECTRICALS PVT. LTD. INDIA
ii		NATIONAL SWITCHGEARS
iii		RESITECH ELECTRICALS PVT LTD
iv		RSI SWITCHGEAR PVT LTD
v		S.R. NARKHEDE ENGINEERING PVT LTD
75	Protection Relays	
i		ABB
ii		Alstom
iii		Easun Reyrolle
iv		L&T
v		Schneider
vi		Areva
76	AUX. / Bimetalic Relays	
i		ABB
ii		Schneider
iii		Easun Reyrolle

MAKE LIST- ELECTRICAL WORKS		
Sr. No..	Material Name	Middle Income Group (MIG)
iv		L&T
v		Siemens
77	Flame Proof Panel Light LED & Accessories	
i		Baliga Lighting Eqpts Ltd.
ii		FCG Power Industries
iii		Flame proof Eqpts Pvt.Ltd
78	Instrument Transformers CT & PT - MV	
i		Gilbert & maxwell
ii		Kappa
iii		L&T
iv		AE
v		Matrix precise
79	Instrument Transformers CT & PT -HV	
i		Kappa
ii		Pragati
iii		Schneider
iv		Siemens
v		ABB
80	Fuses	
i		Cooper
ii		L&T
iii		Siemens
iv		ABB
v		Schneider
		GE
81	Cable Termination & jointing kit(Heat Shrinkable)	
i		3M India
ii		Raychem
iii		Yamuna gases & Chemicals
iv		M Seal
82	Contactors	
i		ABB
ii		C & S
iii		L & T
iv		Schneider
v		Siemens
		GE
83	Selector Switches	

MAKE LIST- ELECTRICAL WORKS		
Sr. No..	Material Name	Middle Income Group (MIG)
i		Kaycee
ii		L & T
iii		Siemens
iv		Salzer
v		Neptune
84	Air Circuit Breaker- ACB	
i		Siemens - 3WL
ii		Schneider- Masterpact
iii		L & T- U power
iv		ABB -E max
		GE
		C&S Electric limited
85	MCCB	
i		L&T D sine
ii		Schneider compact
iii		Siemens VL
iv		ABB Tmax
86	High Mast Lighting System	
i		Bajaj
ii		CG Power
iii		Philips
87	U.P.S. System	
i		APC
ii		Emerson
iii		Delta
iv		Numeric
v		Eaton
vi		Toshiba
88	Batteries	
i		Exide
ii		Amaron
iii		Amar Raja
iv		Panasonic
v		Amco
vi		HBL
		Hitachi
89	Battery Charger	
i		Max
ii		Mohamai
iii		Amar Raja
iv		HBL
v		Chloride Power System

MAKE LIST- ELECTRICAL WORKS		
Sr. No..	Material Name	Middle Income Group (MIG)
90	Switch Board Fixed for Pakage equipments	
i		Adlec
iii		Advance Panel
iv		Tricolite
v		Jackson
vi		Neptune
		SPC Electrotech
91	Gang Operated air breaker Switch unit 11KV	
i		Pactil
ii		Isotech
iii		Mitsubishi
92	11 KV pallet type lighting accessories	
i		BHEL
ii		WSI
iii		PACTIL
93	11 KV Insulator	
i		BHEL
ii		WSI
iii		PACTIL
94	11 KV Elastomeric Rubber Floor Mat	
i		Suntax
ii		Tycoon
iii		Polymax
95	Time Switches	
i		L&T
ii		Schneider
iii		Siemens
iv		Legrand
96	Chemical Earthing	
i		Altec
ii		Erico
97	Butterfly Valves	
i		Audco
ii		Advance
iii		Sant
98	Balanceing Valve	

MAKE LIST- ELECTRICAL WORKS		
Sr. No..	Material Name	Middle Income Group (MIG)
i		Advance
99	Ball Valve/Gate Valve	
i		Audco
ii		Advance
100	Check valve(NRV)	
i		Audco
ii		Advance
101	Flexible Coupling with SS guard	
i		Resistoflex
ii		Kanwal
102	Strainer for water line	
i		Sant
ii		Venus
iii		Emarald
103	Pressure Guage	
i		Fiebig
ii		H.Guru
104	Temperature Gauge	
i		Fiebig
ii		H.Guru
105	Insulation	
i		UP Twiga
ii		Lloyd
iii		Rock Wool
106	Rotary Gear Pump	
i		Rotodel
ii		Delta
107	Bulk oil Tank	
i		Indo Asiatic
ii		Rapid Cool
iii		Raunaq Enterprises
108	Flame proof motor	
i		Crompton
ii		KEC
109	Red Oxide Primer Paint	
i		Shalimar
ii		Asian
110	Rust Preventing Polymeric tape	
i		Pypekote
111	Flow meter (Diesel)	
i		Kent
ii		AquaMetro

MAKE LIST- ELECTRICAL WORKS		
Sr. No..	Material Name	Middle Income Group (MIG)
112	Bucket/ Y -Strainer	
i		Emarald
ii		Stainwell
iii		Aquo Metro
113	Adaptor	
i		kayess
114	Stainless Steel Bellow	
i		Kanwal
ii		Alfa flexi
115	Flame Proof Level switch	
i		
ii		Minilec
iii		Veksler
116	Fire Extinguisher	
i		Minimax
ii		Newage
iii		Superex
117	MS Conduit Accessories	
i		Sharma
ii		Rama
iii		Noble
118	Hume Pipe	
i		Pragati
ii		Daya Spun
iii		Jain Spun
119	RCC Frame & Cover	
i		KK Manhole
120	Pumps	
i		Grundfos
ii		KSB
iii		Wilo
iv		Mather Platt
v		Xylem
vi		Kirloskar
vii		Armstrong
viii		Crompton
ix		
		Lubi
121	Electrical Motors	
i		Siemens
ii		ABB

MAKE LIST- ELECTRICAL WORKS		
Sr. No..	Material Name	Middle Income Group (MIG)
iii		KSB
iv		Crompton
v		Mather & Platt
vi		Grundfos
vii		Kirloskar
viii		Lubi
ix		Marathon
122	CI Y Strainer	
i		Sant
ii		Kartar
iii		Zoloto
iv		Emerald
v		AIP
vi		DRP
vii		DS Engg.
123	Smoke Detector	
i		Siemens
ii		Securiton
iii		Honeywell
iv		BOSCH
v		TYCO
vi		Johnson Control
vii		Copper
viii		
ix		
		Daksh
124	Heat Detector	
i		Siemens
ii		Securiton
iii		Honeywell
iv		BOSCH
v		TYCO
vi		Johnson Control
vii		
viii		
ix		
		Daksh
125	MCP	
i		BOSCH
ii		Honeywell
iii		Siemens

MAKE LIST- ELECTRICAL WORKS		
Sr. No..	Material Name	Middle Income Group (MIG)
iv		TYCO
v		Johnson Control
vi		Notifier
vii		Daksh
viii		Copper
126	Sound / Strobe	
i		BOSCH
ii		Honeywell
iii		Siemens
iv		TYCO
v		Johnson Control
vi		Copper
vii		Daksh
127	Response Indicator	
i		BOSCH
ii		APOLLO
iii		Honeywell
iv		Siemens
v		TYCO
vi		Johnson Control
vii		Daksh
128	Controller with Amplifier for Fire Alarm	
i		BOSCH
ii		TYCO
iii		Honeywell
iv		Henriche
v		Siemens
vi		Johnson Control
vii		
viii		
129	Goose nech Microphone	
i		BOSCH
ii		Honeywell
iii		Henriche
130	Speaker	
i		BOSCH
ii		Honeywell
iii		Henriche
iv		Siemens
v		TYCO
vi		Johnson Control
131	Wooden Rack	

MAKE LIST- ELECTRICAL WORKS		
Sr. No..	Material Name	Middle Income Group (MIG)
i		BOSCH
ii		Honeywell
iii		Henriche
132	Fire Extinguishers	
i		Ceasefire
ii		Firex
iii		Safex
iv		New Age
v		Minimax
vi		Kalpex
vii		Kanex

Note:- In addition to the above the approved brands already used in the existing works will also be considered by Engineer in Charge for approval.